Maple Systems

USER MANUAL

cMT Series

MODELS

- **CTRL01**

1010-1118 Rev. 0.0

Table of Contents

Chapter1. Overview 1

1.1. Specification 1

1.2. Dimensions 2

1.3. Pin Assignment 3

1.4. Restoring factory default 3

1.5. LED indicator 3

1.6. Battery 4

1.7. Power connection 5

1.8. Power Consumption 5

Chapter2. cMT-CTRL01 System Setting 6

2.1. Search for cMT-CTRL01's IP address 6

2.2. Set in internet browser 6

2.3. System Setting 7

2.3.1. Network 8

2.3.2. Date/Time 8

2.3.3. HMI Name 9

2.3.4. History 9

2.3.5. Email 10

2.3.6. Project Management 10

2.3.7. System Password 11

2.3.8. Enhanced Security 11

2.3.9. EasyAccess 2.0 (Optional) 12

2.3.10. OPC UA 12

2.3.11. Communication 12

Chapter3. Updating Web Package and OS 15

3.1 Updating Web Package 15

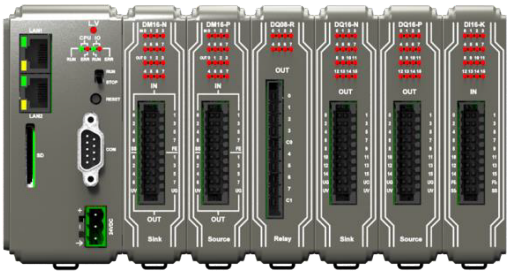
3.2 Updating OS 15

3.3 Updating iR Firmware 17
Chapter4. How to create a cMT-CTRL01 project 19
4.1. Create a new project 19
4.2. Download project to cMT-CTRL01 20
4.3. Monitoring OPC UA Client 22
4.4. On-line/Off-line Simulation 22
Chapter5. Functions supported by cMT-CTRL01 24
Chapter6. OPC UA Web Management Interface 25
6.1. Introduction 25
6.2. Startup / Shut Down 26
6.3. Server Settings 26
6.4. Edit Node 28
6.5. Certificates 29
6.6. Discovery 30
6.7. Advanced 31
Chapter7. Installing Weintek CODESYS and RemoteIO Package 32
Chapter8. Connecting cMT-CTRL01 CODESYS 34
8.1. Connecting Through Network 34
8.2. Creating CODESYS Project 34
Chapter9. Creating EasyBuilder Project 38
9.1. Creating Tags 38
9.2. Exporting Tags 38
9.3. Configuring EasyBuilder 39
9.3.1. Connecting Built-in CODESYS 39
9.3.2. Connecting cMT-CTRL01 CODESYS to other HMI 40
Chapter10. Connecting cMT-CTRL01 CODESYS to iR Series Modules 41
Chapter11. Connecting cMT-CTRL01 to iR-ETN 44
11.1. Connecting cMT-CTRL01 to iR-ETN using Modbus TCP/IP 44
11.2. Connecting CODESYS and Modbus TCP/IP Gateway 47

11.2.1. C
ODESYS Settings 47
11.2.2. ....G
Chapter12. ateway Settings....48
Chapter13. Connecting cMT-CTRL01 via EtherCAT 49
Removing Weintek Built-in CODESYS....52
Chapter14. Frequently Asked Questions 54
14.1. Questions Related to CODESYS....54
14.2. Questions Related to Downloading cMT CODESYS File 55

Chapter1. Overview

1.1. Specification



CODESYS PLC with IIoT Gateway

Features

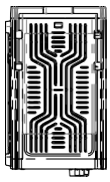
- CODESYS PLC compliant with IEC61131-3
- Fan-less Cooling System
- Built- in 4GB Flash Memory and RTC
- SD Card Slot Supports SD/SDHC Cards
- Rich combination of iR Series Modules

Gateway

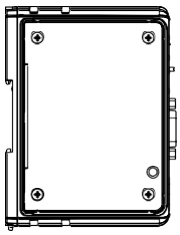
- COM2 / COM3 RS-485 2W Supports MPI 187.5K
- Supports OPC UA Server/Client and MQTT
- Modbus TCP/IP Gateway

Memory	Flash	4 GB
	RAM	512 MB
	Data, Memory, Code	3 MB
	Retain area	16 KB (every minute) (Kept after reboots)
	Persistent area	16 KB (every minute) (Kept after downloads)
	File system	8MB
Processor		Dual-Core 32 bits RISC 1GHz
I/O Port	SD Card Slot	SD/SDHC
	Ethernet	Ethernet 1: 10/100/1000 Base-T x 1 Ethernet 2: 10/100 Base-T x 1
	COM Port	COM1 RS-232 2W, COM2 RS-485 2W/4W, COM3 RS-485 2W (Only applicable to Gateway communication)
	Local bus	iBus
	CAN Bus	N/A
CODESYS	Protocol	Modbus TCP/IP Master, EtherCAT Master, EtherNet/IP Scanner, Canopen Manager
	Max. Number of iR Module	16
RTC		Built-in
Power	Input Power	24±20%VDC
	Power Isolation	Built-in
	Power Dissipation	Nominal 310mA@24VDC
	Current for Internal Bus	Max 2A@5VDC
	Current Consumption	550mA@5VDC
	Voltage Resistance	500VAC (1 min.)
	Isolation Resistance	Exceed 50MΩ @ 500VDC
	Vibration Endurance	10 to 25Hz (X, Y, Z direction 2G 30 minutes)
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions WxHxD	50 x 109 x 81 mm
	Weight	Approx. 0.24 kg
	Mount	35 mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	-10° ~ 50°C (14° ~122°F)
	Relative Humidity	10% ~ 90% (non-condensing)
Certificate	CE	CE marked
	UL	cULus Listed
Software		EasyBuilder Pro V6.03.02 or later versions CODESYS V3.5 SP10 Patch 3 or later

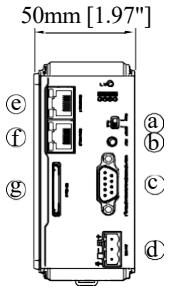
1.2. Dimensions



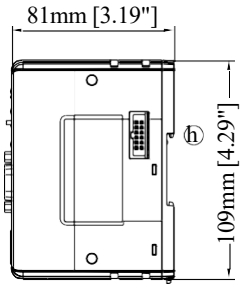
Top View



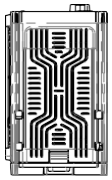
Side View



Front View



Side View



Bottom View

a	RUN/STOP switch	***e***	Ethernet 1
b	Reset Button	***f***	Ethernet 2
c	COM1: RS-232, COM2: RS-485 2W/4W, COM3: RS-485 2W	***g***	SD Card Slot
d	Power Connector	***h***	Expansion Connector

1.3. Pin Assignment

COM1 [RS232], COM2 [RS-485 2W/4W], COM3 [RS-485 2W], 9 Pin, Male, D-sub

PIN#	COM1 [RS-232]	COM2 [RS-485]		COM3 [RS-485] 2W
		2W	4W	
1				Data+
2	RxD			
3	TxD			
4				Data-
5		GND		
6		Data+	Rx+	
7		Data-	Rx-	
8			Tx+	
9			Tx-	

1.4. Restoring factory default

Press and hold on the Reset button on the unit for more than a certain period of time when the RUN/Stop toggle switch (CODESYS switch) is in STOP state:

Period of time button is pressed	ERR LED	Action
0~3 seconds		No action.
3~10 seconds	Blinking	Reboot PLC and Gateway
Over 10 seconds	Lights UP	Reset to default. The projects stored in the unit will be cleared and Ethernet 1, Ethernet 2 are reset to default.

Default settings of cMT-CTRL01:

Ethernet 1: DHCP, CODESYS

Ethernet 2: DHCP, Gateway

Note: The projects and data stored in the unit will all be cleared after restoring factory default, please download the projects again.

1.5. LED indicator

LED indicators show the status of cMT-CTRL01.

L.V LED

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

CPU LED

Green(RUN)	Red(ERR)	Description
OFF	OFF	CODESYS STOP
ON	OFF	CODESYS RUN
Blinking	OFF	EBPro or CODESYS scans and the LED of the found unit winks.
OFF	ON	CODESYS ERROR
Blinking	Blinking	BOOT

IO LED

Green(RUN)	Red(ERR)	Description
OFF	OFF	Power off or no power
Fast Blinking	OFF	CODESYS stops
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	Exceeds power limitation or too many modules connected.

Ethernet

Ethernet 1: Assigned for CODESYS by default; and the default IP is DHCP.

If a DHCP server is not available, the IP address will be set to 0.0.0.0.

Ethernet 2: Assigned for Gateway; and the default IP is DHCP.

If a DHCP server is not available, the IP address will be automatically set to 169.254.0.1.

Color	Status
Orange	Ethernet connection status
Green	Ethernet communication status

1.6. Battery

cMT-CTRL01 requires a CR1220 3V lithium battery to keep the RTC running.

Battery Specification: UL Certification Battery, Type CR1220, Rated 3V, Max. Abnormal Charging Current 10mA, Working Temperature: max. 70°C

Battery replacement shall be performed by qualified personnel (Engineer) only and care must be taken when handling lithium batteries.

1.7. Power connection

Power: The unit can be powered by DC power only, the voltage range is compatible with most controller DC systems. The power conditioning circuitry inside the unit is accomplished by a switching power supply. The peak starting current can be as high as 500mA.

cMT-CTRL01 voltage range: 24±20% VDC

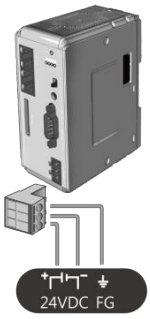
Power Connector Specifications:

Wire AWG: 24~12

Wiring Conductor Minimum Temperature: 75°C

Screw Torque: 4.5 lbf-in (max.)

Copper conduct only



Note: Connect positive DC line to the '+' terminal and the DC ground to the '-' terminal.

1.8. Power Consumption

Type	Device	Consumption(5V)	Power Supply(5V)
CPU	cMT-CTRL01	550mA/2.75w	2A/10w
Digital I/O	iR-DM16-P	130mA/0.65 W	--
	iR-DM16-N	130mA/0.65 W	--
	iR-DQ08-R	220mA/1.1 W	--
	iR-DQ16-N	205mA/1.02 W	--
	iR-DQ16-P	196mA/0.984 W	--
	iR-DI16-K	83mA/0.418 W	--
Analog I/O	iR-AQ04-VI	65mA/0.325 W	--
	iR-AI04-VI	70mA/0.35 W	--
	iR-AM06-VI	70mA/0.35 W	--
	iR-AI04-TR	65mA/0.325 W	--
Motion	iR-PU01-P	108mA/0.54 W	--

Note:

cMT-CTRL01 is the only power supply for the modules in this system. Please consider power requirements when connecting multiple modules. The following is an example.

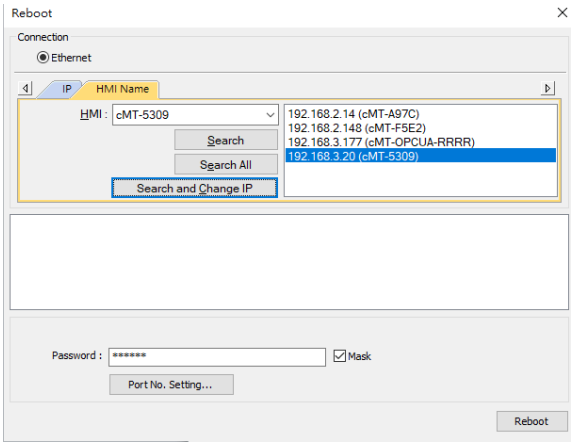
Device	Name	Consumption	Power Supply
CPU	cMT-CTRL01	550mA/2.75w	2A/10w
Module	iR-DM16-P *11	130mA*11=1.43A	X
System	Power consumption : $550\text{mA} + 1.43\text{A} = 1.98\text{ A}$ Power supply: $2\text{A} > 1.98\text{A}$		

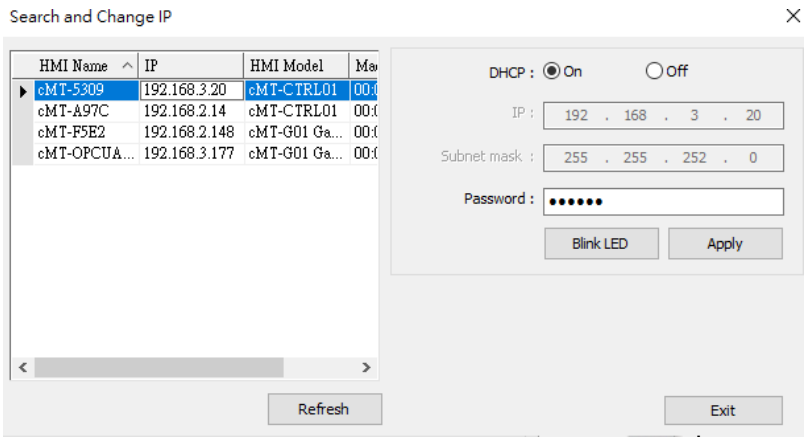
Chapter2. cMT-CTRL01 System Setting

Connect cMT-CTRL01's Ethernet 2 via Ethernet cable and then configure system settings by the following ways.

2.1. Search for cMT-CTRL01's IP address

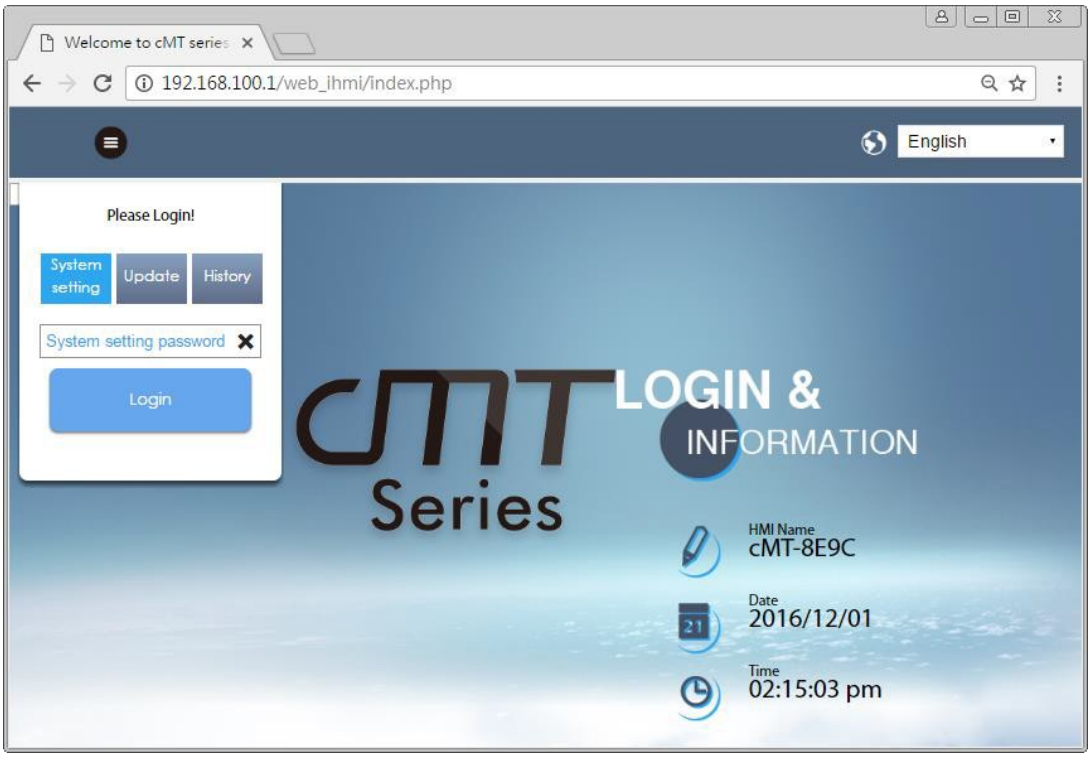
Launch Utility Manager. On the top-left menu select IIoT Gateway Series, and then select a function from Reboot, Download, or Upload. cMT-CTRL01 can be found in the IP/HMI Name group box by using the model's IP address, even if the PC or laptop is not on the same network. The Utility Manager can find and change cMT-CTRL01's IP address. The following settings can be carried out after obtaining the IP address.



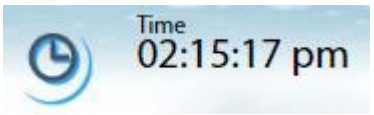


2.2. Set in internet browser

Open internet browser (Edge, Chrome, Firefox, Safari), and enter cMT-CTRL01's IP address (e.g. 192.168.100.1) to configure cMT-CTRL01.



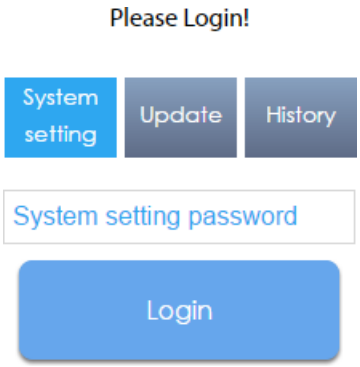
cMT-CTRL01 system information is shown in the Login page, and the language used can be changed in this page.

Icon	Description
	Displays HMI name.
	Displays system date.
	Displays system time.

Please note that by default, Ethernet 2 is assigned for Gateway (DHCP).

2.3. System Setting

The following part introduces cMT-CTRL01 system settings.



Three levels of privileges can be found:

[System Setting]: Controls all the settings

[Update]: Controls limited items.

[History]: Downloads history data (Recipes and Event Logs).

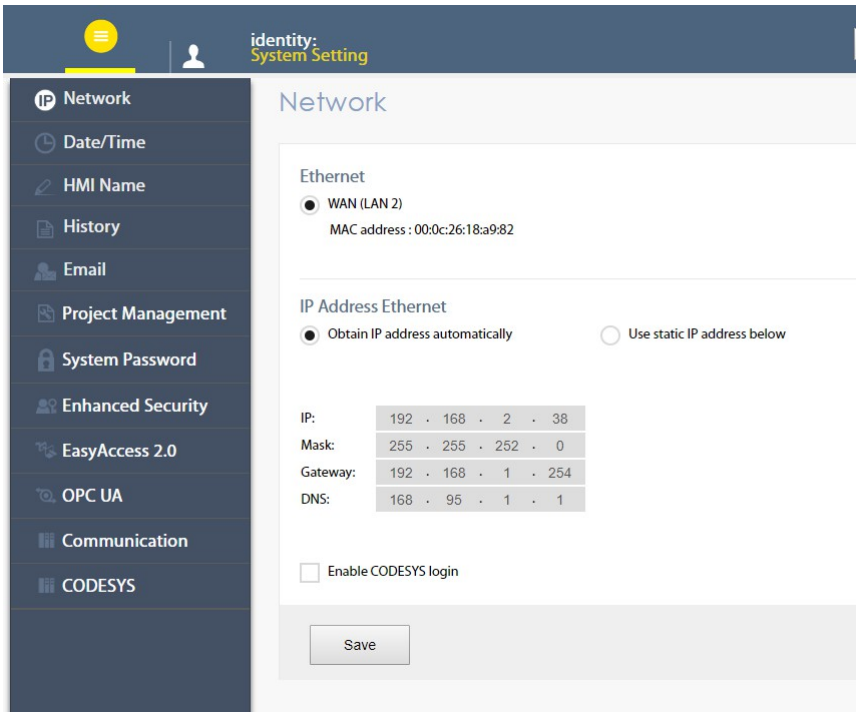
2.3.1. Network

Configure Ethernet ports: IP, Mask, Gateway, and DNS.

cMT-CTRL01 is equipped with dual Ethernet ports that can be freely assigned as one of the following:

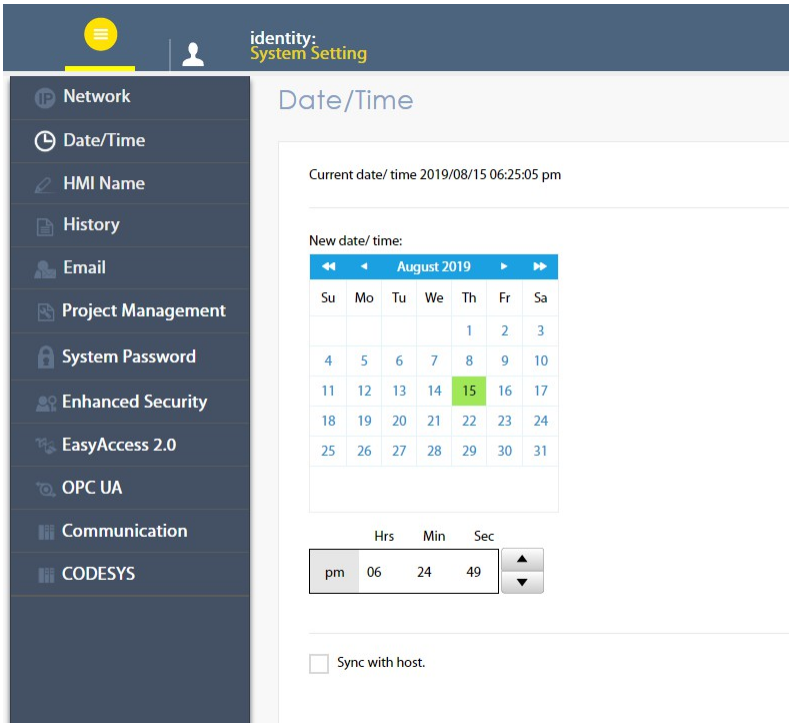
1. One Ethernet port for CODESYS (Ethernet 1, DHCP) and the other one for IIoT Gateway (Ethernet 2 DHCP).
2. Both Ethernet ports for IIoT Gateway

Select [Enable CODESYS login] to log in using Ethernet 2's IP address in CODESYS.



2.3.2. Date/Time

Set RTC date and time. Select [Sync. with host] and then click [Save] to synchronize cMT-CTRL01 time with the computer time.



2.3.3. HMI Name

Enter a name to identify the unit.

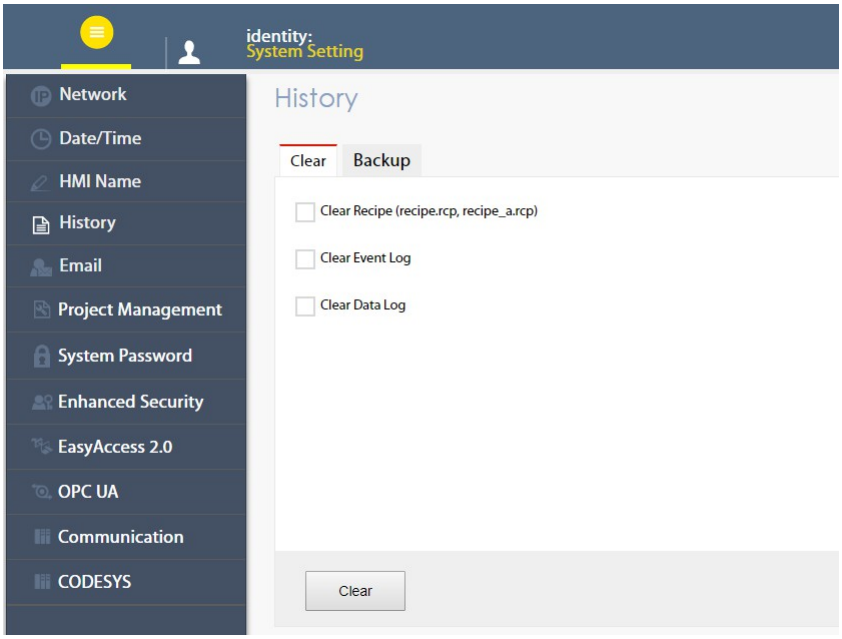
[Identification light]: The LED indicator of the unit will flash three times when this button is clicked, helping user to find the unit.

2.3.4. History

This tab offers settings related to historical data.

[Clear]: Clears history data.

[Backup]: Downloads history data in the unit to this computer.



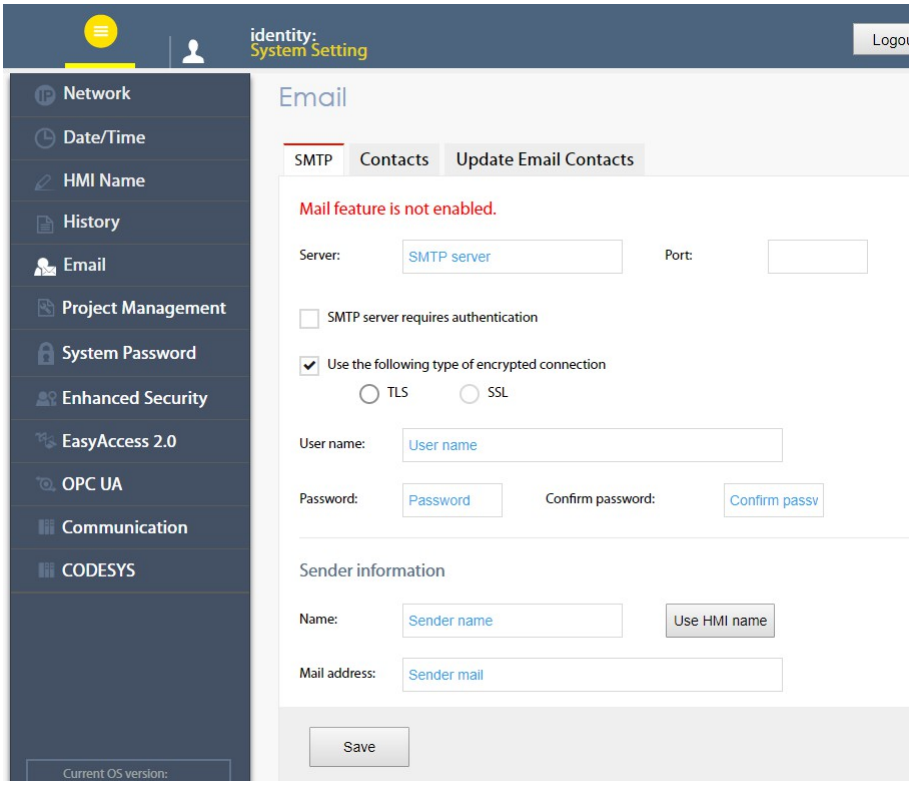
2.3.5. Email

This tab offers settings related to email.

[SMTP]: Configure email server and relevant settings.

[Contacts]: Set email contacts in this tab.

[Update Email Contacts]: Import the email contacts built using Administrator Tools.



2.3.6. Project Management

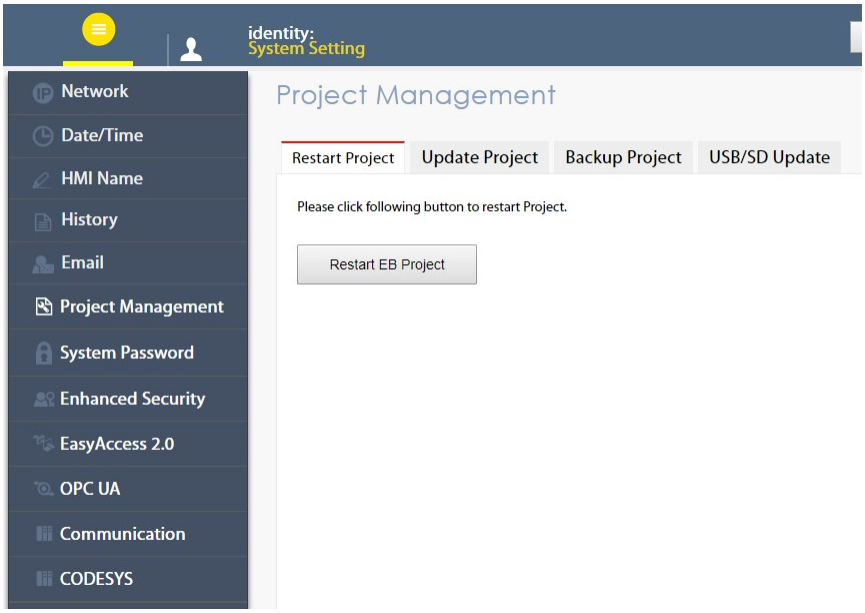
This tab offers settings related to project management.

[Restart Project]: Restart cMT-CTRL01 project.

[Update Project]: Upload the project's *.cxob file to cMT-CTRL01.

[Backup Project]: Backup the project file to this computer.

[USB/SD Update]: Use the project file stored in the external device to update the project file on cMT-CTRL01.



2.3.7. System Password

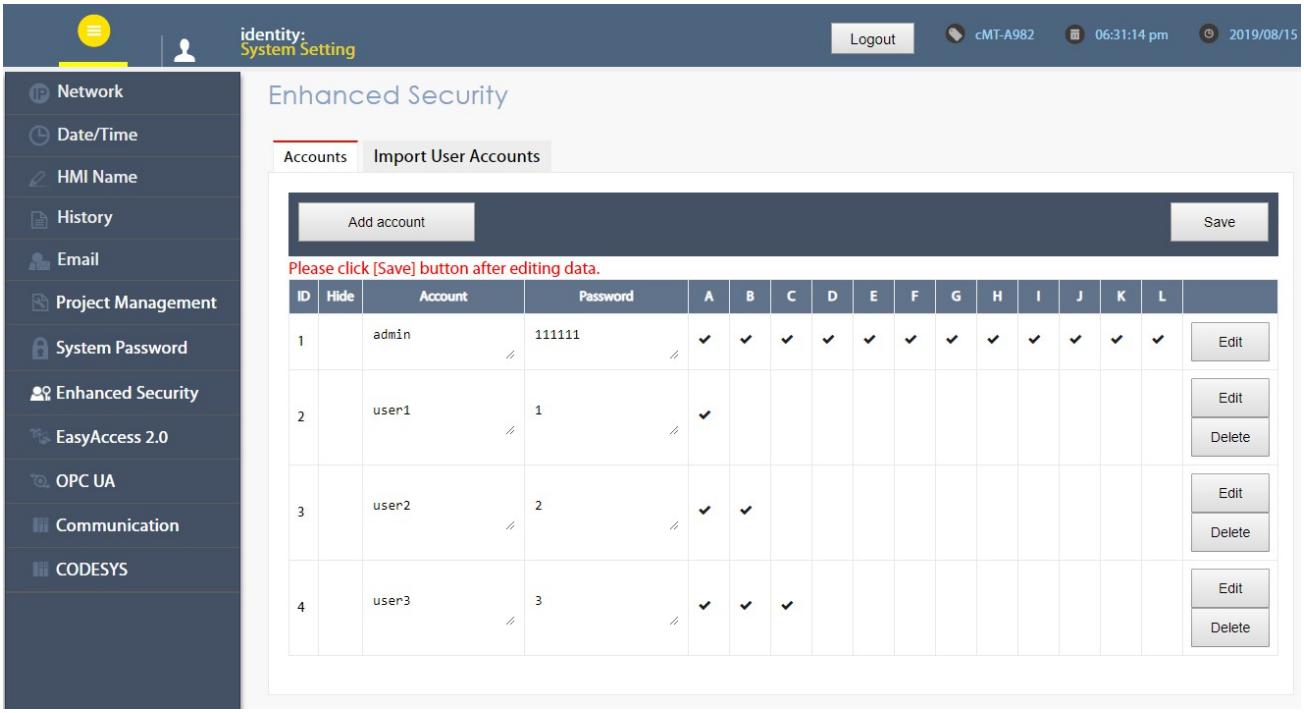
Set login password and the password for transferring project file.

2.3.8. Enhanced Security

The account settings in this tab determine the accounts that can log in OPC UA.

[Accounts]: Add user or change user password and operable classes.

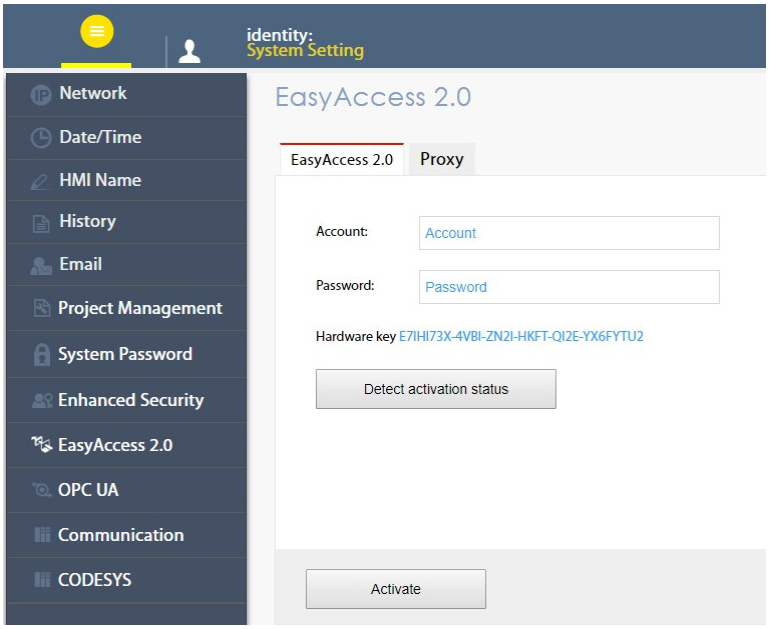
[Import User Account]: Import the user accounts built in Administrator Tools.



2.3.9. EasyAccess 2.0 (Optional)

This tab shows Hardware Key, EasyAccess 2.0 activate status, and proxy settings.

For more information on EasyAccess 2.0, please see EasyAccess 2.0 User Manual.

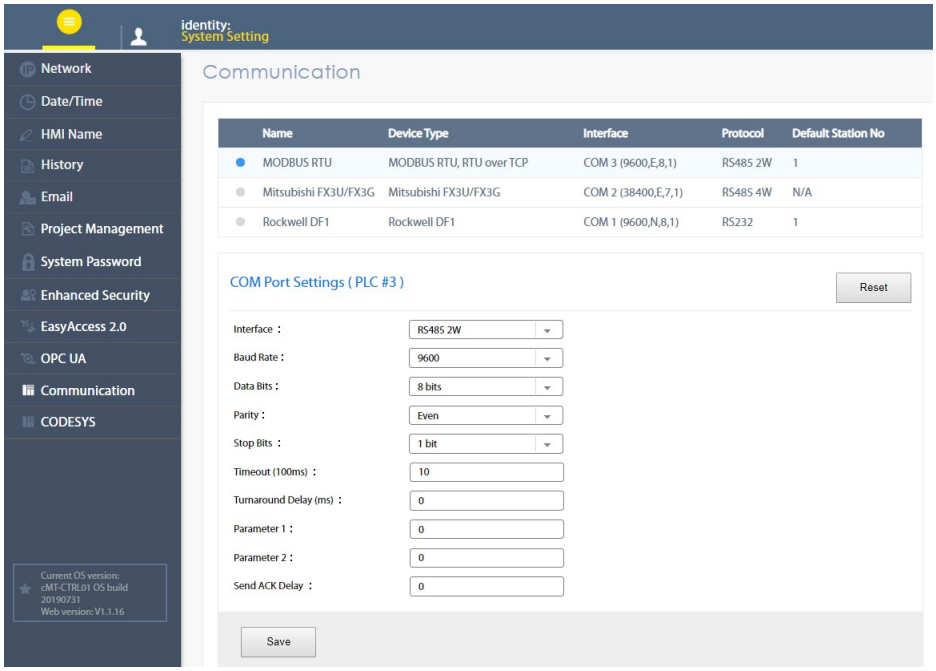


2.3.10. OPC UA

Configure OPC UA settings. Please see “Chapter 6 OPC UA Web Management Interface” in this manual for details.

2.3.11. Communication

This tab displays the communication parameters of the device connected to cMT-CTRL01, and the parameters can be changed in this tab.


identity:
System Setting
Network
Date/Time
HMI Name
History
Email
Project Management
System Password
Enhanced Security
EasyAccess 2.0
OPC UA
Communication
CODESYS
Current OS version:
cMT-CTRL01 OS build
20190731
Web version: V1.1.16
Communication
Name
Device Type
Interface
Protocol
Default Station No
MODBUS RTU
MODBUS RTU, RTU over TCP
COM 3 (9600,E,8,1)
RS485 2W
1
Mitsubishi FX3U/FX3G
Mitsubishi FX3U/FX3G
COM 2 (38400,E,7,1)
RS485 4W
N/A
Rockwell DF1
Rockwell DF1
COM 1 (9600,N,8,1)
RS232
1
COM Port Settings (PLC #3)
Reset
Interface :
RS485 2W
Baud Rate :
9600
Data Bits :
8 bits
Parity :
Even
Stop Bits :
1 bit
Timeout (100ms) :
10
Turnaround Delay (ms) :
0
Parameter 1 :
0
Parameter 2 :
0
Send ACK Delay :
0
Save

Parameters that can be viewed and modified for a device connected via COM port.

Interface
Baud rate
Data Bits
Parity
Stop Bits
Timeout
Parameter 1
Parameter 2
Send ACK Delay

Parameters that can be viewed and modified for a device connected via Ethernet.

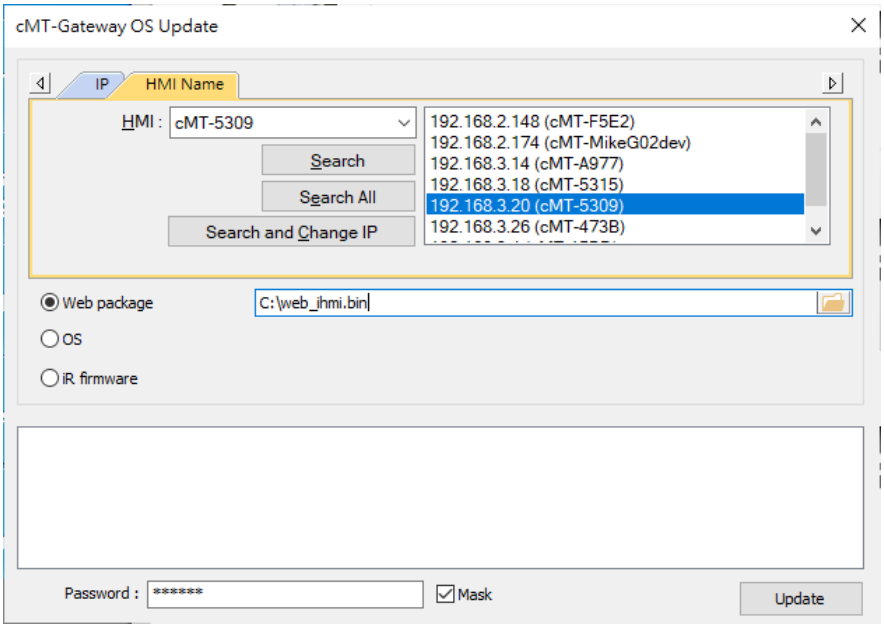
IP Address
Port
Timeout
Turnaround Delay
Parameter 1
Parameter 2
Send ACK Delay

Chapter3. Updating Web Package and OS

cMT-CTRL01 Web Package and OS can be updated through Ethernet. Launch Utility Manager, select [Gateway Series] » [Maintenance] » [cMT-Gateway OS Update].

3.1 Updating Web Package

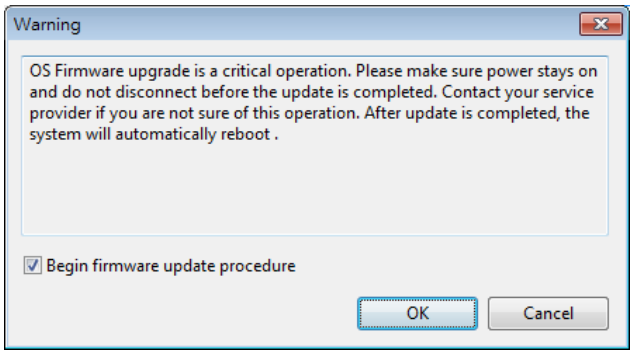
1. Select an HMI to update OS.
2. Select [Web package] and browse for the source file.
3. Click [Update].



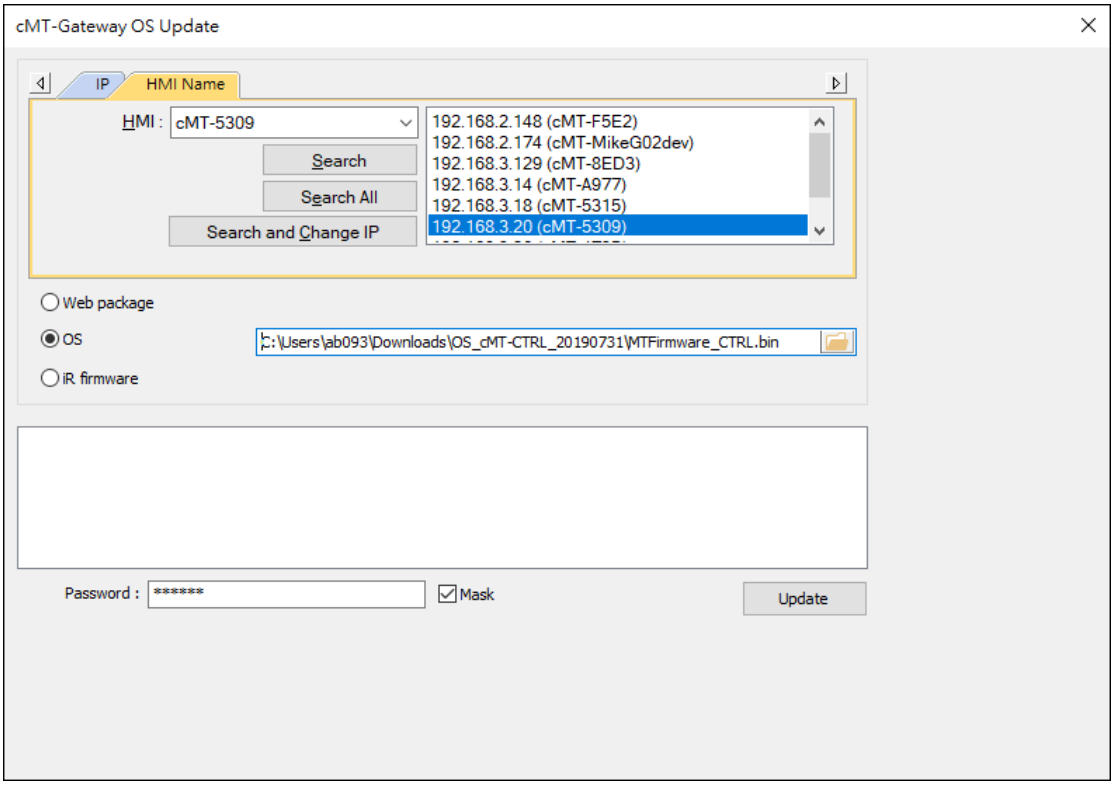
3.2 Updating OS

1. Select a cMT-CTRL01 to update OS.

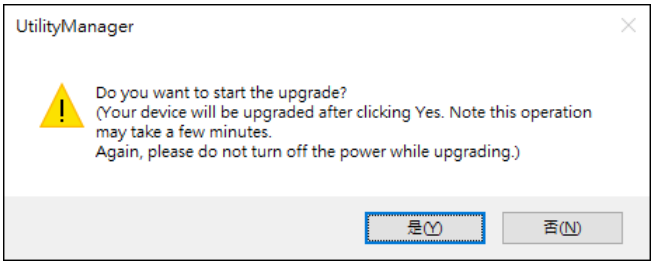
2. Select [OS], a Warning message shows, please read this message carefully before you click [OK].



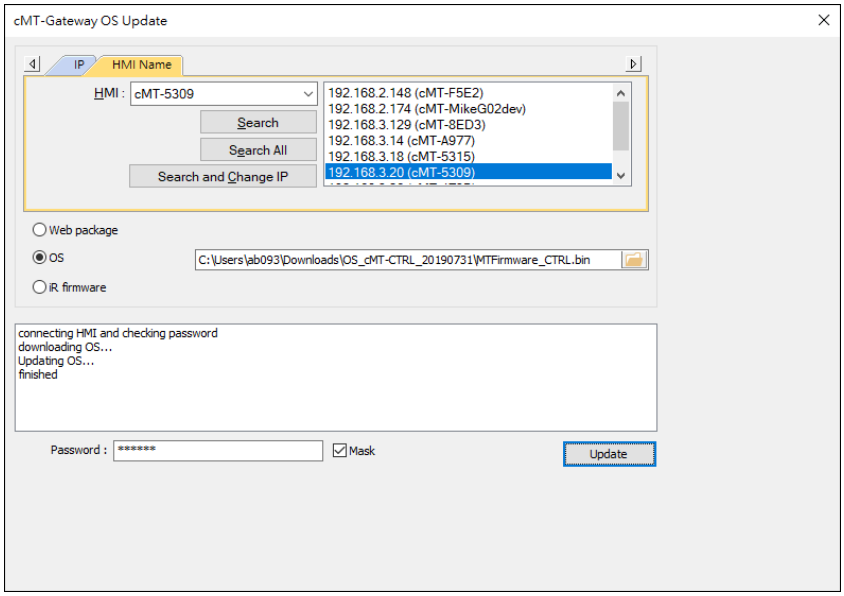
3. If you click [OK], the cMT-Gateway OS Update window opens again, browse for the source file, and then click [Update].



4. The message window below opens, please do not turn off the power while upgrading.



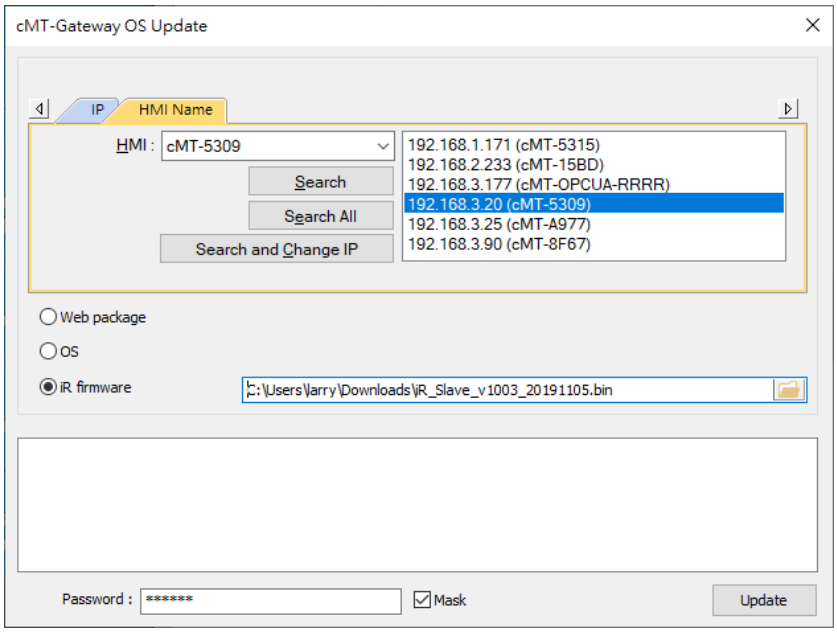
5. When finished, cMT-Gateway OS Update window shows “finished”.



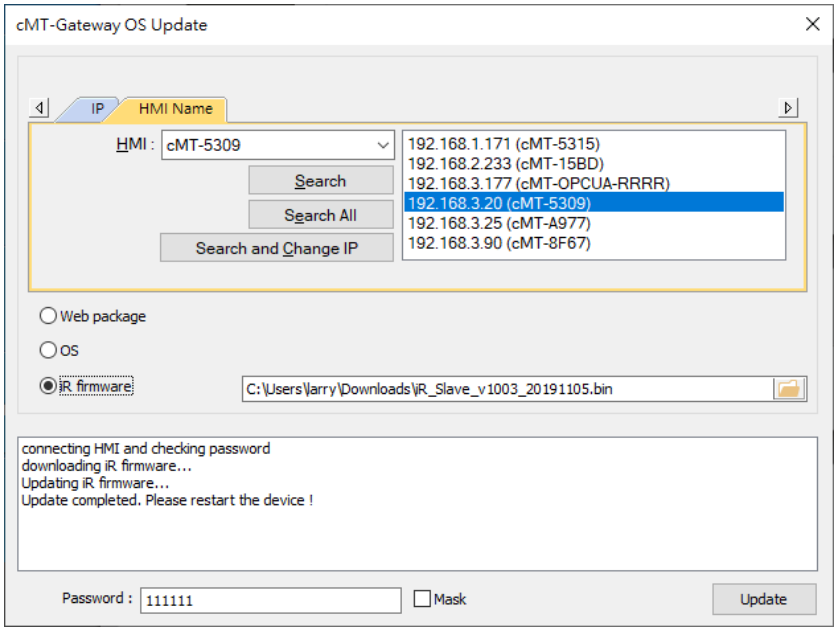
3.3 Updating iR Firmware

When updating iR firmware for cMT-CTRL01, please press and hold the Reset button and power up the unit again.

1. Select a cMT-CTRL01.

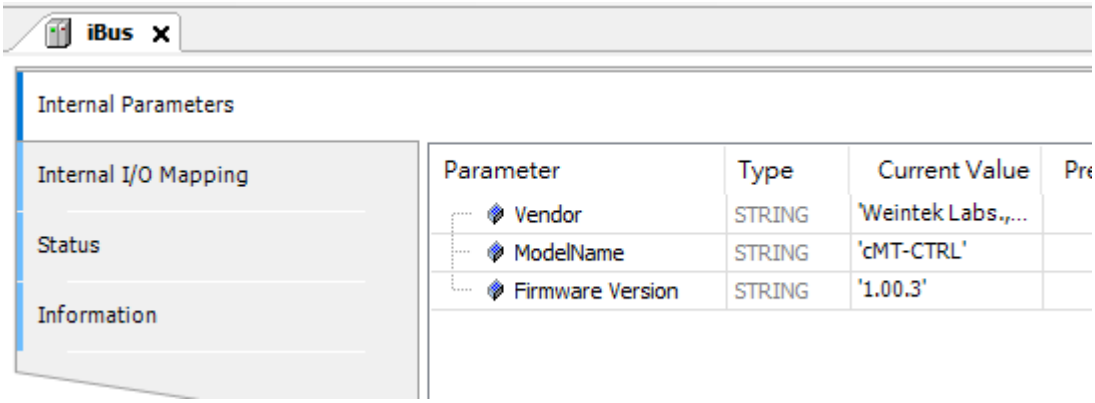


2. Select the bin file and then click [Update].



After update, power up the unit again.

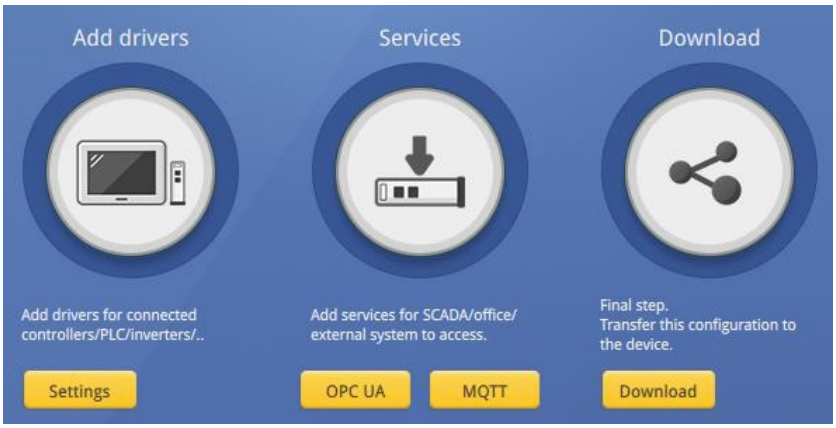
In CODESYS log in cMT-CTRL01, and the iR firmware version can be found in the iBus tab.



Chapter4. How to create a cMT-CTRL01 project

This chapter explains how to create a project when cMT-CTRL01 is used as an OPC UA Server. The basic steps are:

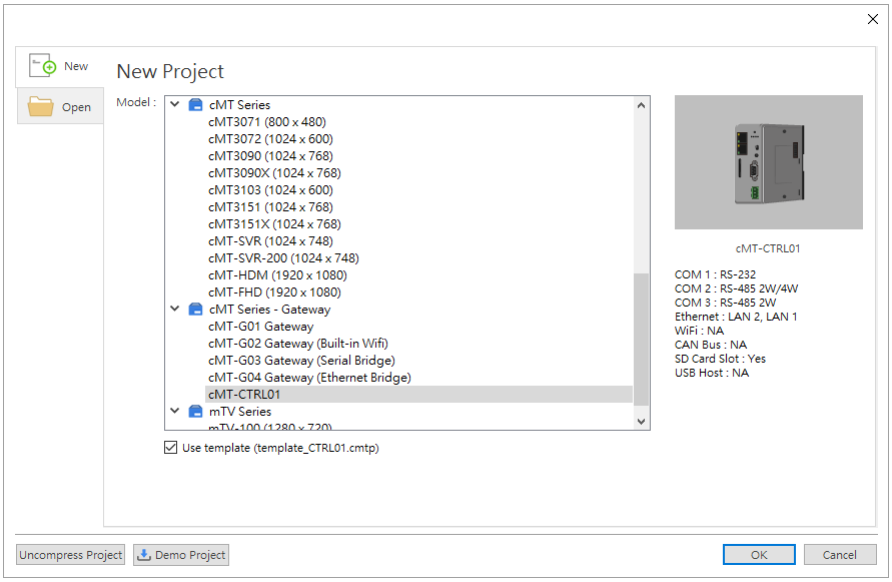
1. Add a driver into Device List in EasyBuilder Pro.
2. Enable OPC UA Server and designate communication address.
3. Download the project to HMI.



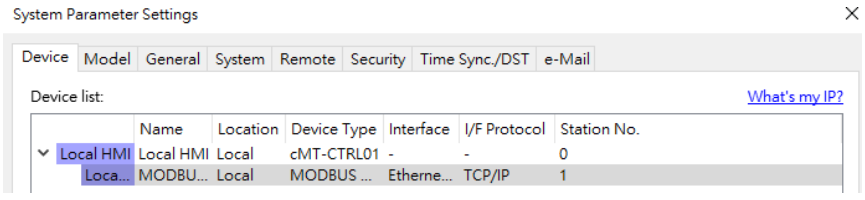
The following explains how to set up OPC UA Server in the project.

4.1. Create a new project

Step 1. Launch EasyBuilder Pro and select a cMT-CTRL01.

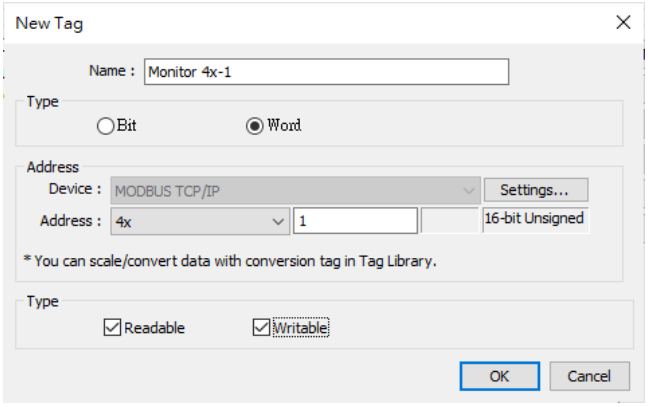


Step 2. Add a device into the list and configure communication parameters.

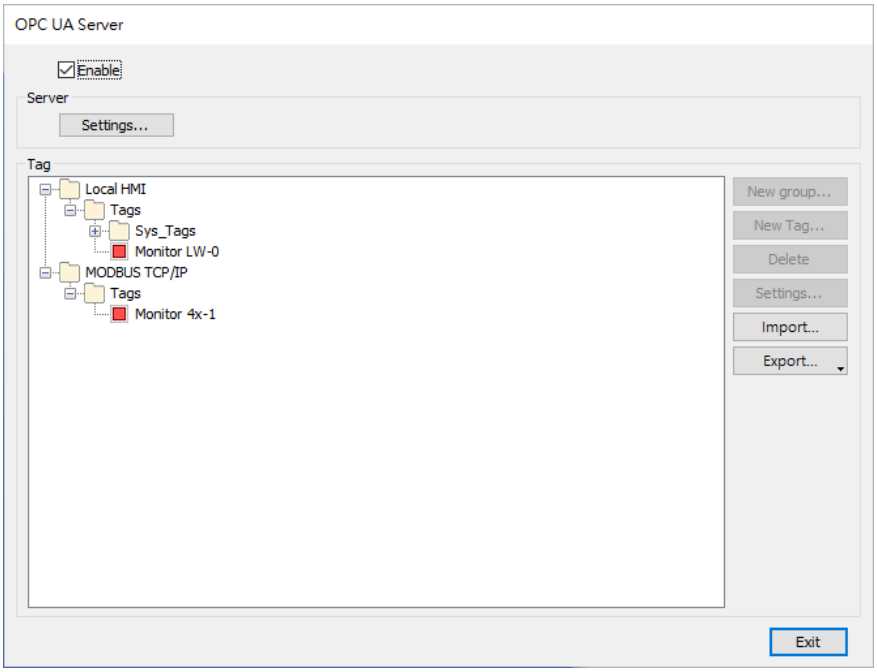


Step 3. Click [IIoT/Energy] » [OPC UA Server], and select [Enable] check box to enable OPC UA Server.

Step 4. Click [Tags] of the device and then click [New Tag] to add tags monitored using OPC UA. When finished, click [OK] to leave.



Step 5. Find the created tags in OPC UA Server window. When a large number of tags are used, the tags can be exported as a csv/excel file to be edited and then imported again.

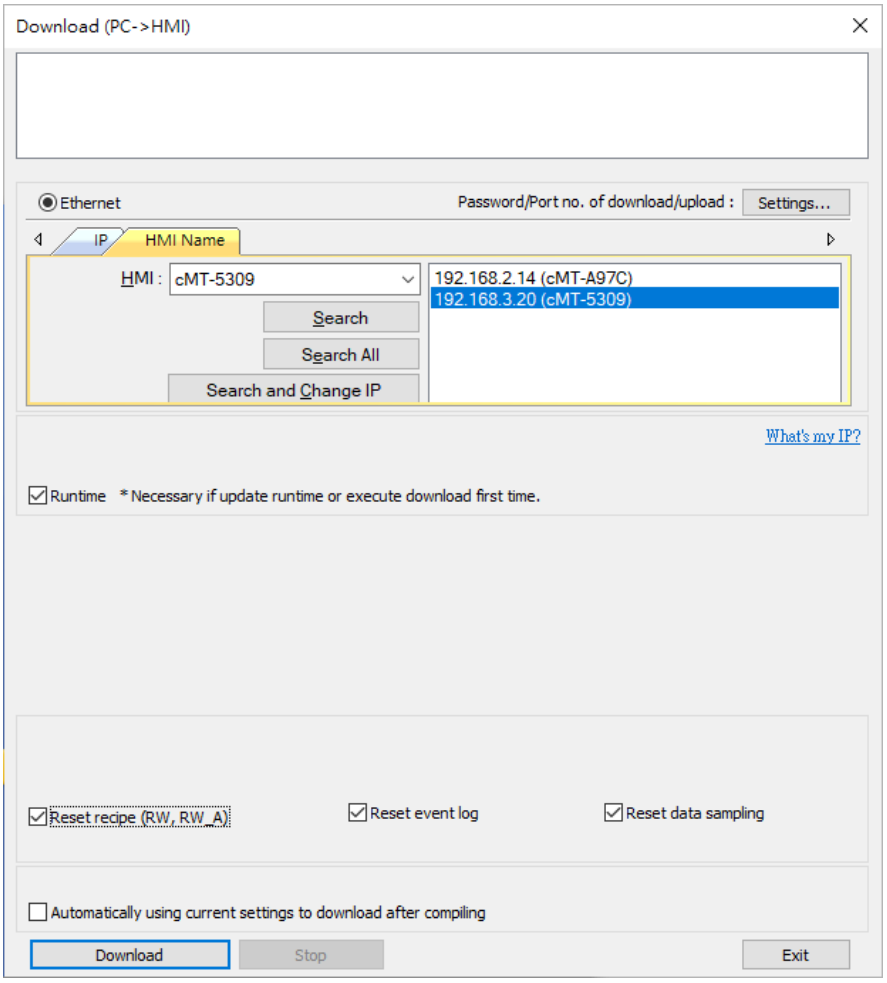


4.2. Download project to cMT-CTRL01

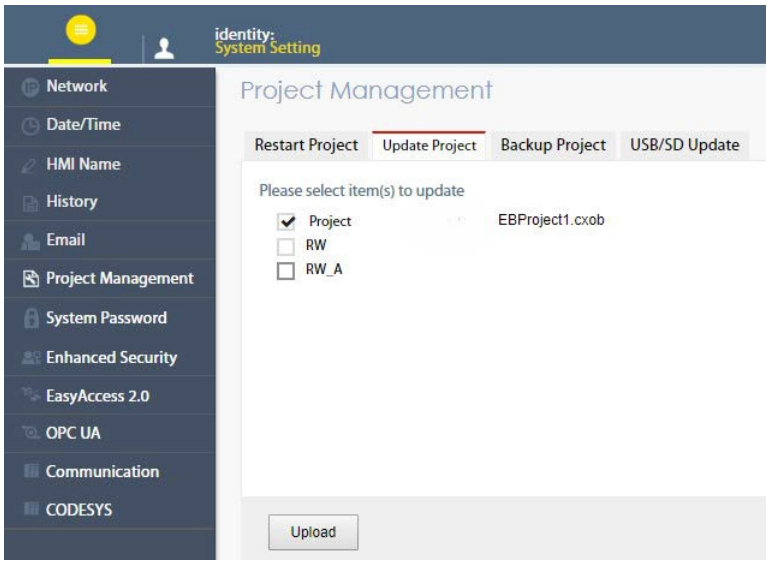
The format of the project file run on cMT-CTRL01 is *.cxob. In EasyBuilder Pro, click [Project] »

[Compile] to compile the project into *.cxob format. When finish compiling, you can download the project to cMT-CTRL01 by two ways.

Way 1: Download using EasyBuilder Pro. Click [Project] » [Download(PC->HMI)], and set HMI IP address. The project can be downloaded via Ethernet.

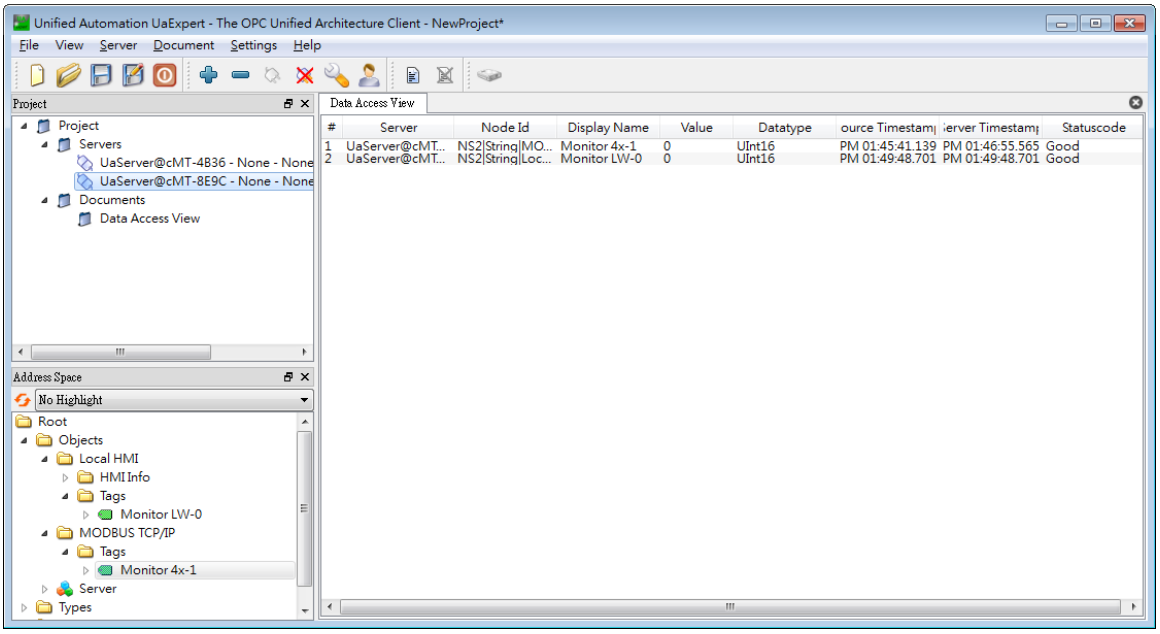


Way 2: Download using website. Open internet browser (Edge, Chrome, Firefox), enter cMT-CTRL01's IP address (e.g. 192.168.100.1), click System Setting, enter password, and then configure cMT-CTRL01 settings. Go to [Project Management] page and open [Upload Project] tab to download the project file from the computer to cMT-CTRL01.



4.3. Monitoring OPC UA Client

After downloading the project file, use OPC UA Client software to connect with cMT-CTRL01 to monitor PLC data.



Note: The above is a screenshot of UaExpert. For more information on OPC UA Client software settings, please see OPC UA server manual.

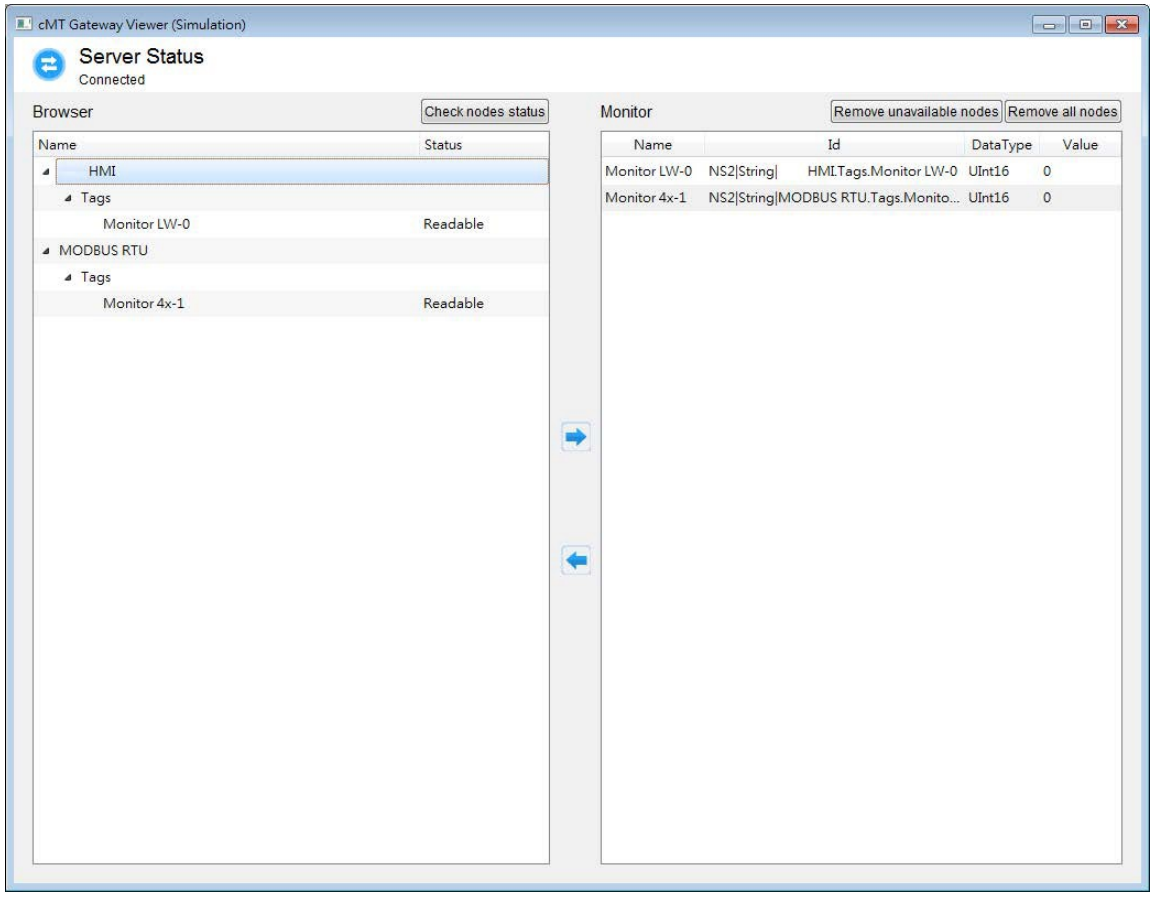
4.4. On-line/Off-line Simulation

Running On-line or Off-line simulation in EasyBuilder Pro helps you examine OPC UA Tag settings. In On-line simulation, cMT Gateway Viewer can read from / write to PLC. Please note that On-line simulation is limited to 10 minutes.

Step 1. In EasyBuilder Pro click [Project] » [On-line Simulation] / [Off-line Simulation] to open cMT Gateway Viewer window.

Step 2. Add the tags to be previewed into the Monitor list on the right side.

Step 3. In On-line Simulation, data in PLC tags will also change.



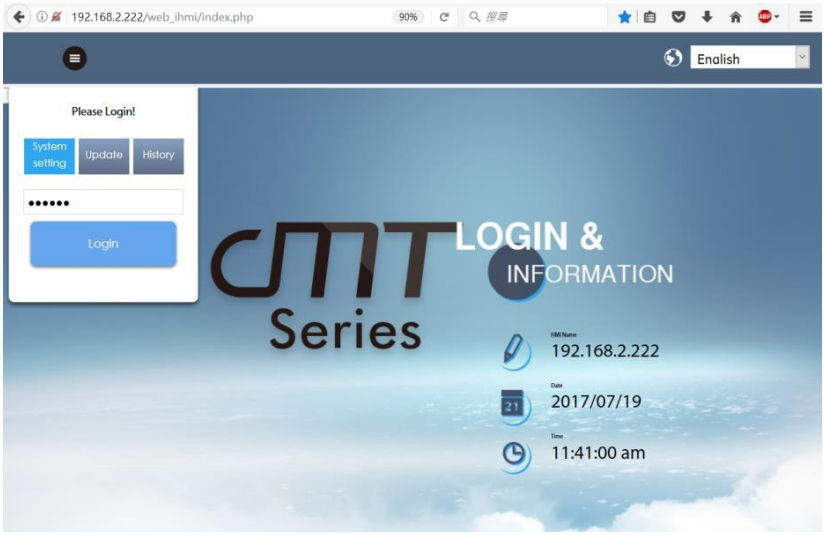
Chapter5. Functions supported by cMT-CTRL01

- OPC UA Server
- EasyAccess 2.0 (Optional)
  https://maplesystems.com/download/14833/?tmstv=1738609404
- Modbus TCP/IP Gateway
- OPC UA Client
- MQTT Server / MQTT Subscriber / MQTT Publisher
- Administrator Tools
- Time synchronization (NTP)
- Macro
- Project protection
- iE/XE/eMT/mTV communication protocol
- Pass-through
- Data Transfer (Global) object
- Off-line / On-line Simulation
- Recipes (RW, RW_A)
- Data Sampling (please note that data visualization is not supported, including Trend Display, History Data Display, and so on.)
- Event Log (please note that data visualization is not supported, including Alarm Bar, Alarm Display, and so on.)
- Database Server
- E-Mail
- Scheduler
- Web interface for managing OPC UA and communication parameters

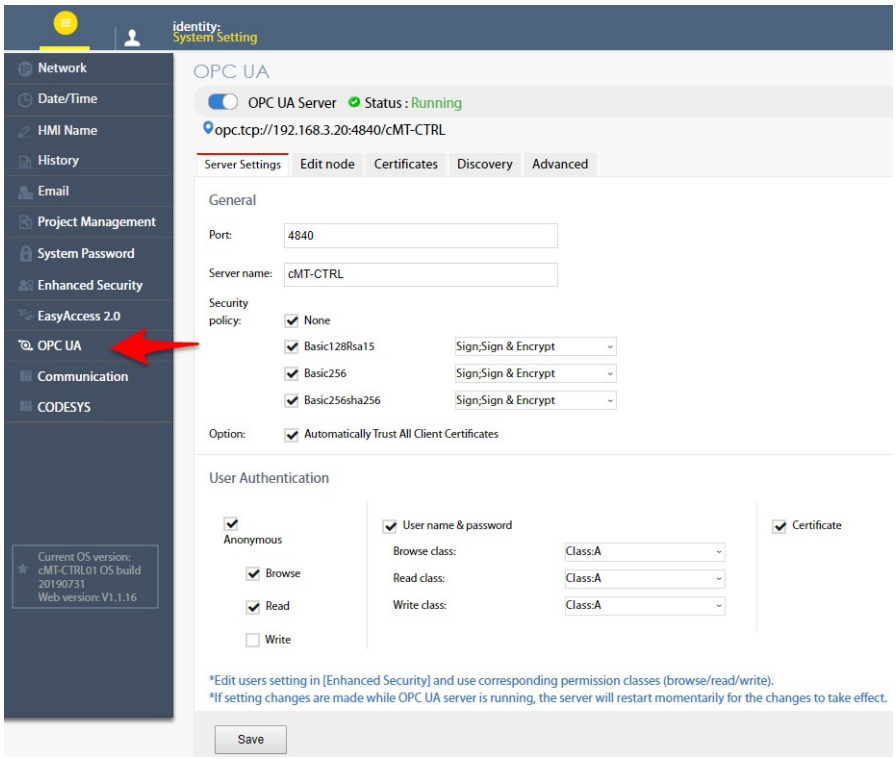
Chapter6. OPC UA Web Management Interface

6.1. Introduction

cMT-CTRL01 provides a web-based tool for convenient access to OPC UA configurations.



Open cMT-CTRL01's webpage by entering its IP address into the address bar of a web browser. At the entry page, log in with System setting's password. Factory default of the password is 111111. (Suggested resolution: 1024×768 or higher)



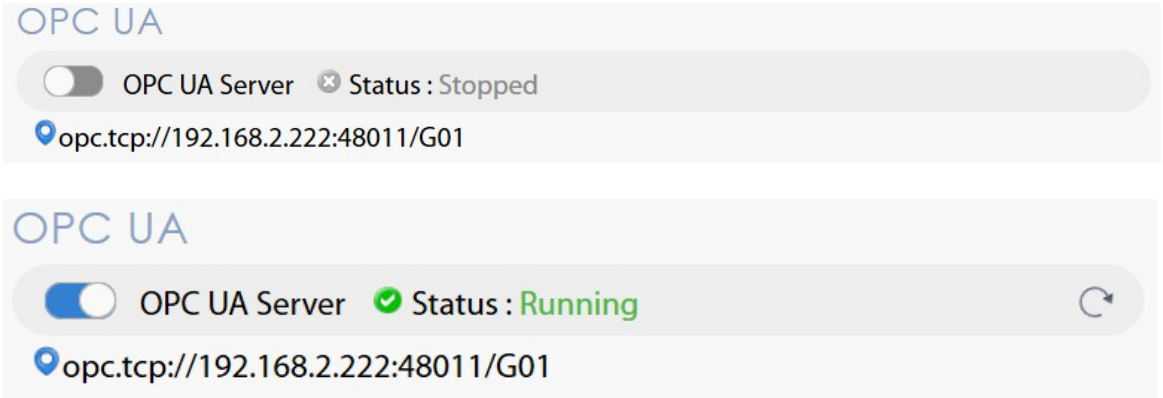
Navigate to the OPC UA configuration page from the context menu on the left.

The OPC UA configuration page consists of a Startup/Shutdown control with status bar and tabbed windows including: Server settings, Edit node, Certificates, Discovery, and Advanced.

Usage of each window tab:

Tab	Description
Server settings	Configure server settings such as port, name, security, user authentication……etc.
Edit node	Manage tags used by OPC UA server.
Certificates	Manage certificates used by OPC UA server.
Discovery	Manage list of discovery server.
Advanced	Advanced options and features.

6.2. Startup / Shut Down



Use the toggle button to start up or shut down the OPC UA server. If there is active client connection, when shutting down, the server will wait for a few seconds before closing off completely.

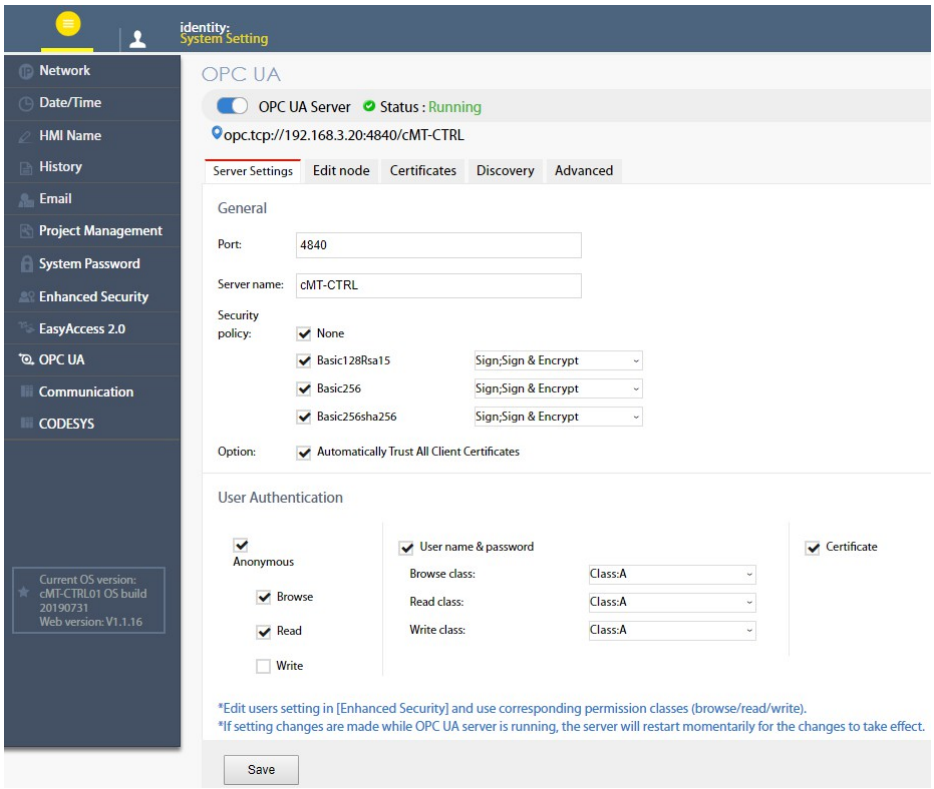
In addition, both the toggle button and a line of text also indicate the status of the server. The status is refreshed approximately every 10 seconds. An icon on the right indicates that the status is being refreshed.

Endpoint URL is also displayed for user's reference.

*Whenever a page refresh is desired, use the menu on the left. Avoid using the browser's refresh button to reload a tab as you may be asked to enter the password to log in again.

6.3. Server Settings

The Server settings page shows the general configurations of the OPC UA server.



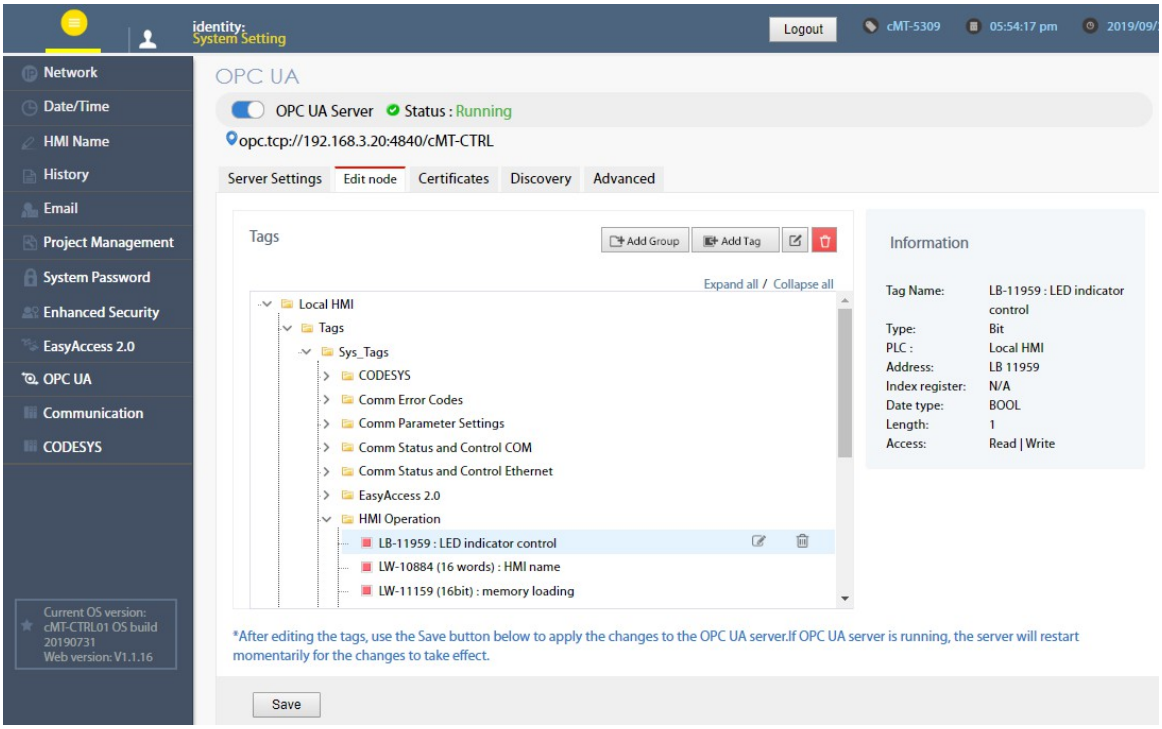
General	Function
Port	Access port of the OPC UA server
Server name	Server name of the OPC UA server
Security policy	Supported security policies. At least one must be selected. Supported Policy: None, Basic128Rsa15, Basic256, Basic256sha256 Mode: Sign, Sign & Encrypt
Option	Automatically Trust all client certificates: by enabling this option, the OPC UA server will trust the certificate from any client connection.

OPC UA server must be configured with at least one user authentication mode as listed in the following table.

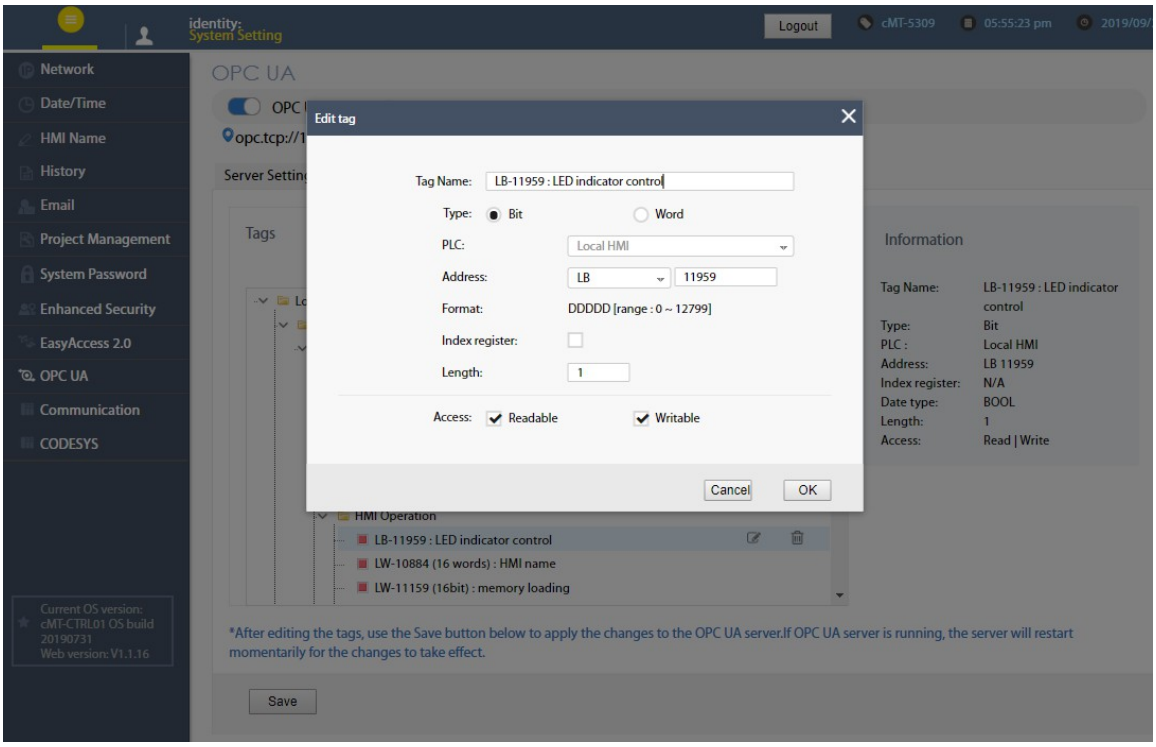
Authentication	Descriptions
Anonymous	Allow anonymous client connection. At least one of Browse, Read, or Write modes must be selected.
User name & Password	Allow user authentication with username and password. Each access mode, browse, read, and write can be assigned to a user class. User classes are configured in the Enhanced Security mode on the web interface or in EasyBuilder Pro.
Certificate	User authentication with X.509 certificate

After completing settings, click the Save button to save the changes. OPC UA server will shut down momentarily and then restart for the changes to take effect.

6.4. Edit Node



In this page, the user can view and manage the tags currently available in the OPC UA server. New nodes and groups can be added, while existing nodes and groups can be edited or deleted. For ease of navigation, detailed information of the currently selected node/group is displayed on the right. After completing settings, it is necessary to click the Save button to save the changes. OPC UA server will shut down momentarily and then restart for the changes to take effect. Changes will be lost if one exits this page without saving.



Note that all modifications can only be made for existing drivers. It is not possible to change or add other drivers that are not already available. It is also not possible to edit the nodes used by tag PLCs*.

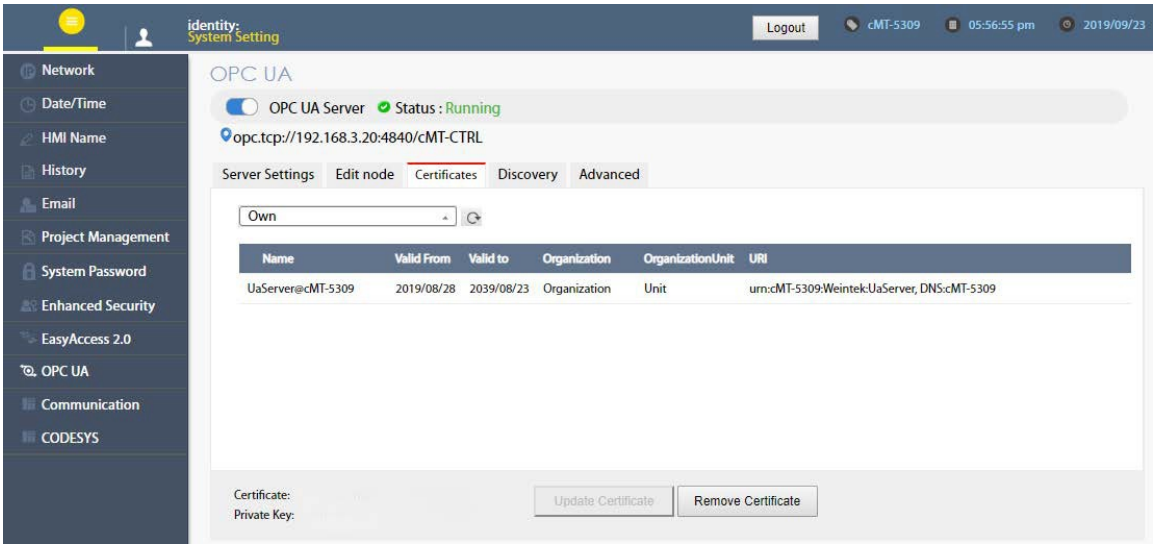
*Tag PLCs are characterized by their use of name tags as device memory address as opposed to using device name with indices. Examples of tag PLCs include: BACnet, Rockwell Free Tag Names, Siemens S7-1200/1500 Symbolic Addressing,etc.

6.5. Certificates

In this page, the user can manage certificates, and revocation lists of the OPC UA server. Use the dropdown menu to access each page.

If “Automatically Trust All Client Certificates” (in the Server settings tab) option is not enabled, OPC UA server will reject all client connections and place their certificates in the untrusted list. User may manually “trust” them in this page. Use the reload button to repopulate the list of certificates if necessary.

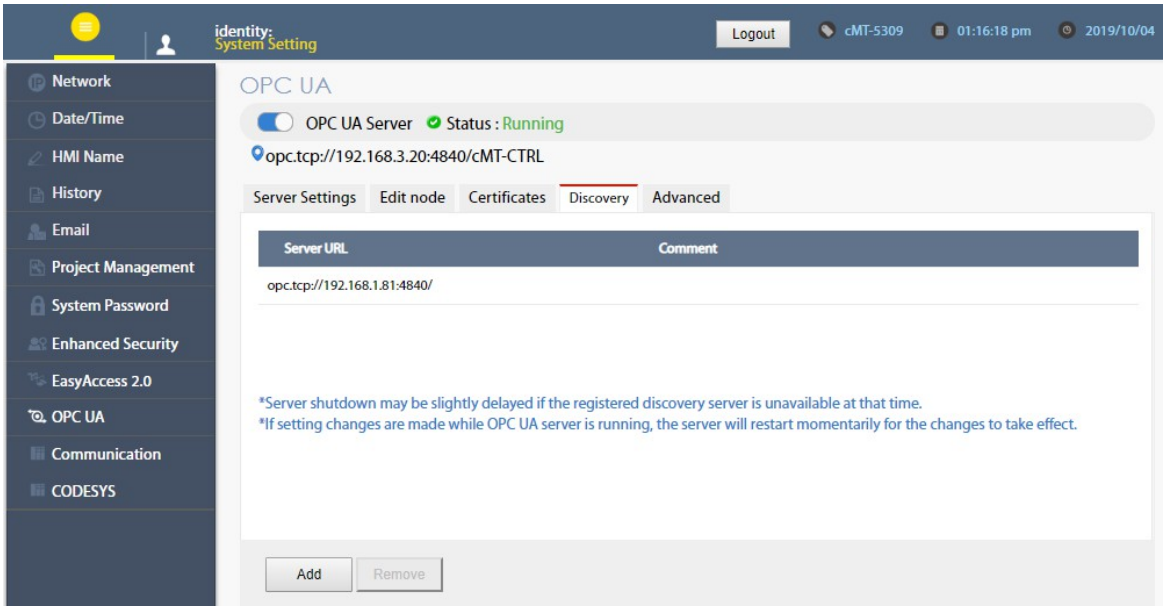
Similarly, currently trusted certificates can be manually rejected on the same page.



Page	Description
Trusted Clients	Lists of trusted/rejected client certificates on the server. Supported operation: Trust/Reject, Remove, Import, Export.
Trusted Users	Lists of trusted/rejected user certificates on the server. Supported operation: Trust/Reject, Remove, Import, Export.
Own	Server's own certificate. Supported operation: Update, Remove. When updating own certificate, matching certificate and Private Key must be uploaded together; otherwise, update will fail. A self-signed, 20-year validity certificate will be generated automatically if own certificate is absent when server starts up.
Trusted Client Issuers	List of trusted client issuer certificates. Supported operation: Import, Remove, Export.
Trusted User Issues	List of trusted client issuer certificates. Supported operation: Import, Remove, Export.
Certificate Revocation List	Certificate revocation lists for client, user, client issuer, and user issuer. Supported operation: Import, Remove, Export

6.6. Discovery

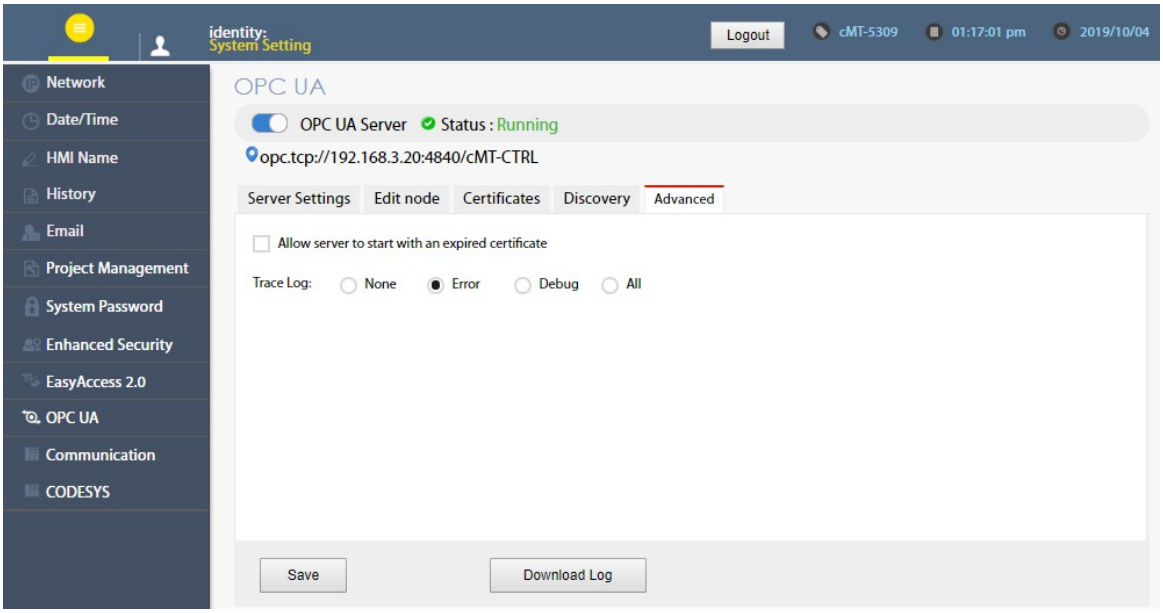
OPC UA server can register itself with Local Discovery Servers. In this page, the user can maintain the list of discovery servers that OPC UA server will register with during startup. Should the discovery server be unavailable during server shutdown, the shutdown process will be slightly delayed.



After completing settings, click the Save button to save the changes. OPC UA server will shut down momentarily and then restart for the changes to take effect.

6.7. Advanced

Additional settings can be configured in the Advanced tab. The user can set the trace logging level and specific startup behavior of the OPC UA server. Furthermore, the trace log can be downloaded.



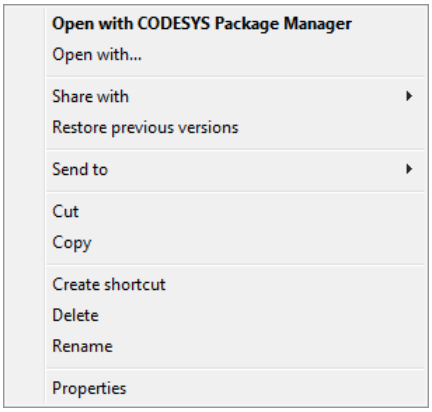
After completing settings, click the Save button to save the changes. OPC UA server will shut down momentarily and then restart for the changes to take effect.

Chapter7. Installing CODESYS and RemoteIO Package

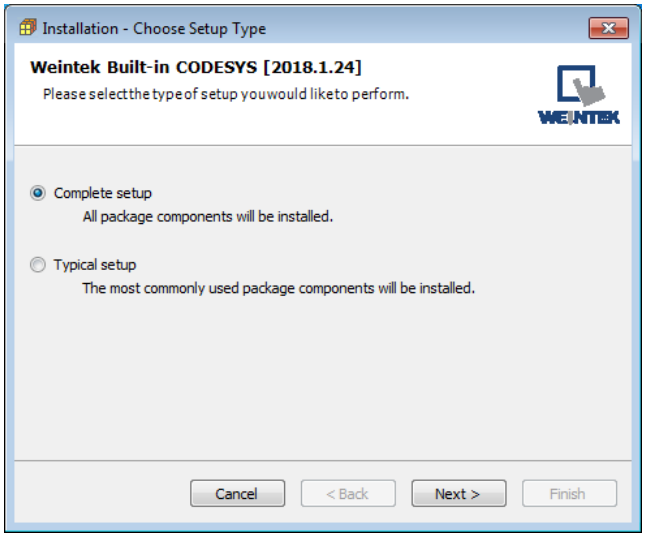
Installing CODESYS and Remote IO Package allows users to easily create a cMT+CODESYS project in CODESYS software. Please find the Package file we prepared and follow these steps for quick installation.

1. Firstly, get a copy of CODESYS and RemoteIO Package file.

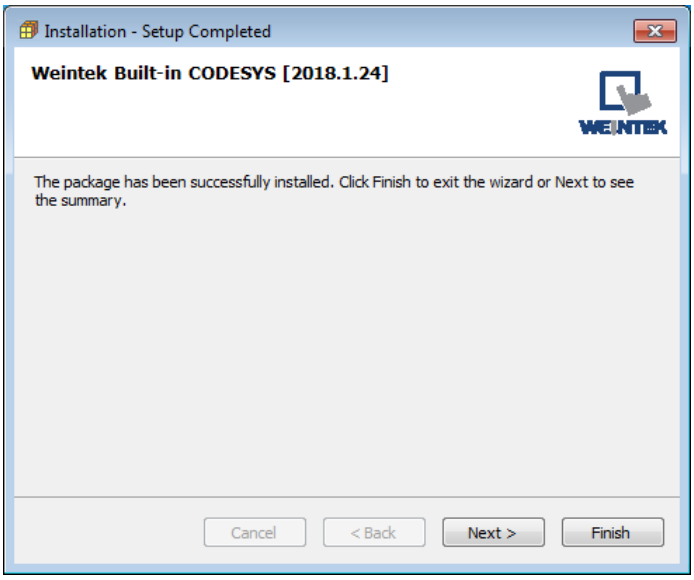
2. On your PC, right-click the mouse button and select [Open with CODESYS Package Manager].



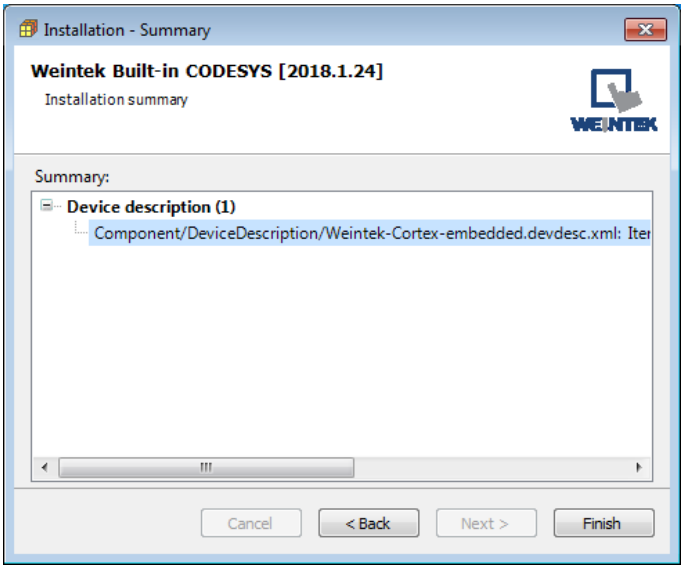
3. Select Complete Setup or Typical Setup (you may select any of these setup types since the components used by Weintek Built-in CODESYS exist in both types.)



4. Click [Next] when seeing the following message.



5. The installed component will be shown in the installation summary.



Chapter8. Connecting cMT-CTRL01 CODESYS

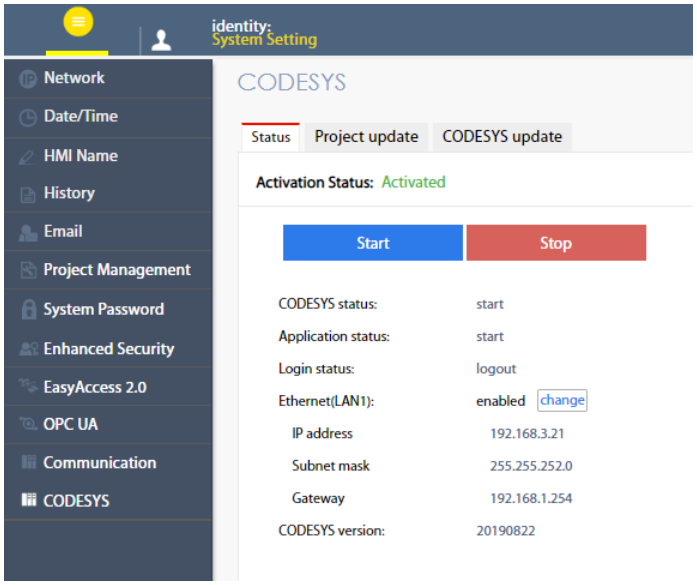
8.1. Connecting Through Network

The PC can directly connect with CODESYS via Ethernet 1 when:

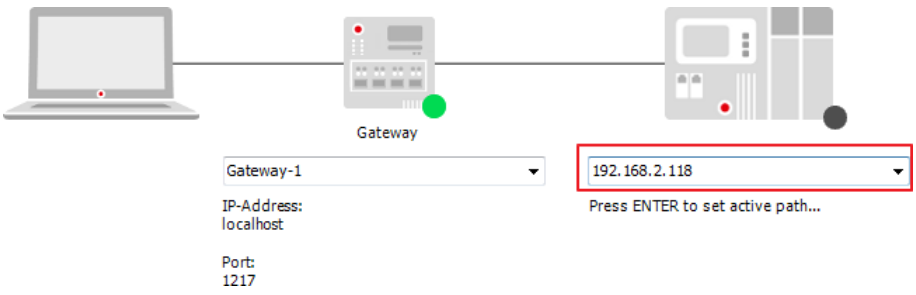
- The PC and cMT-CTRL01's Ethernet 1 & 2 are all connected to the same router.
- The PC is directly connected to cMT-CTRL01's Ethernet 1 using an Ethernet cable.

When the PC is connected to cMT-CTRL01's Ethernet 2, please follow the setting steps below.

1. Find cMT-CTRL01's IP address in the way explained in Chapter 2.1.
2. Open internet browser (IE, Chrome, Firefox, Safari), enter cMT-CTRL01 Gateway IP address (e.g. 192.168.100.1), and then configure cMT-CTRL01 settings.
3. Open CODESYS page to see the IP address. By default, DHCP is used for cMT-CTRL01 CODESYS IP.

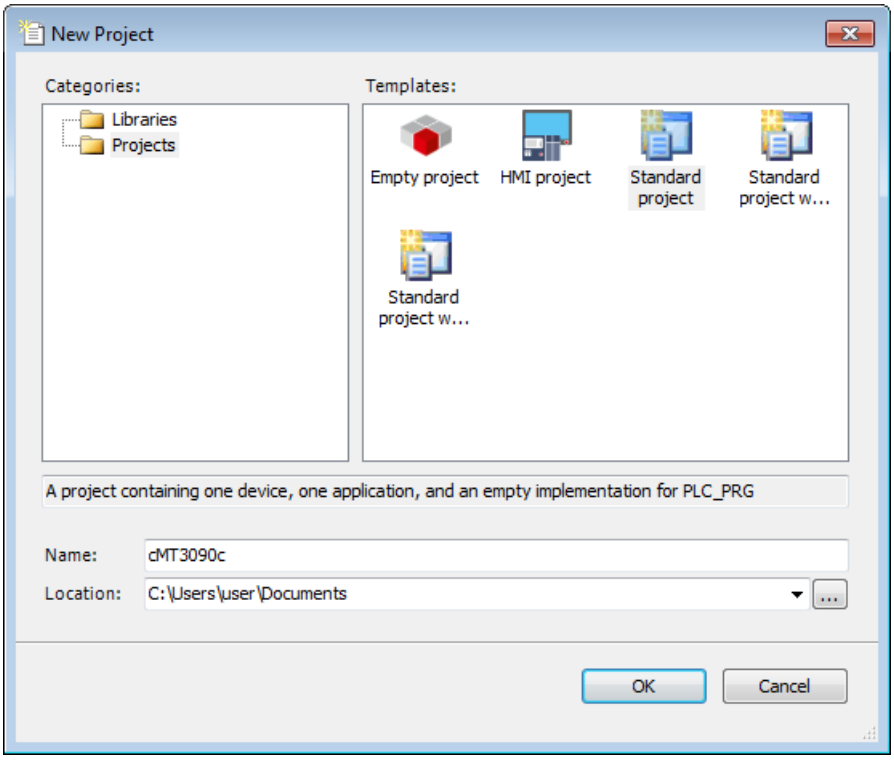


4. When Ethernet 1 is assigned for Gateway, please see Chapter 2.3.1 Network and select [Enable CODESYS login]. With this option selected, Ethernet 2's IP address can be entered in CODESYS for login.

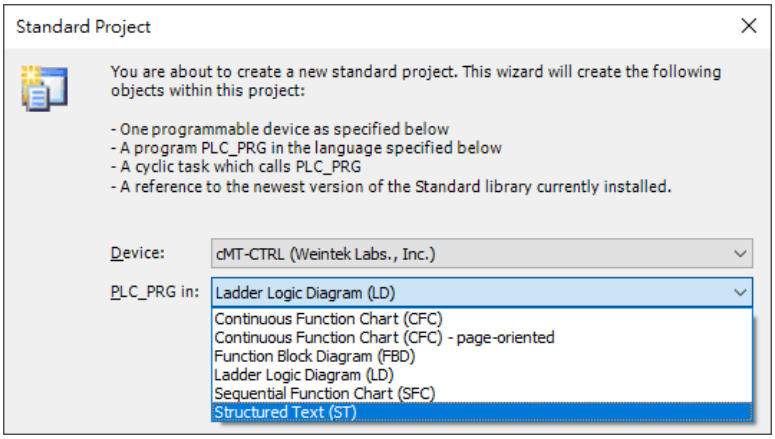


8.2. Creating CODESYS Project

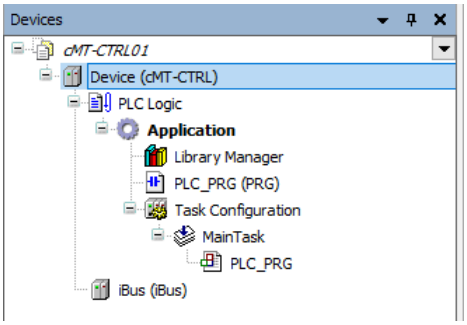
1. Launch CODESYS V3.5 and click [File] » [New Project], and then select [Standard project]. Enter the project name in Name filed, browse for the location, and then click [OK] to leave.

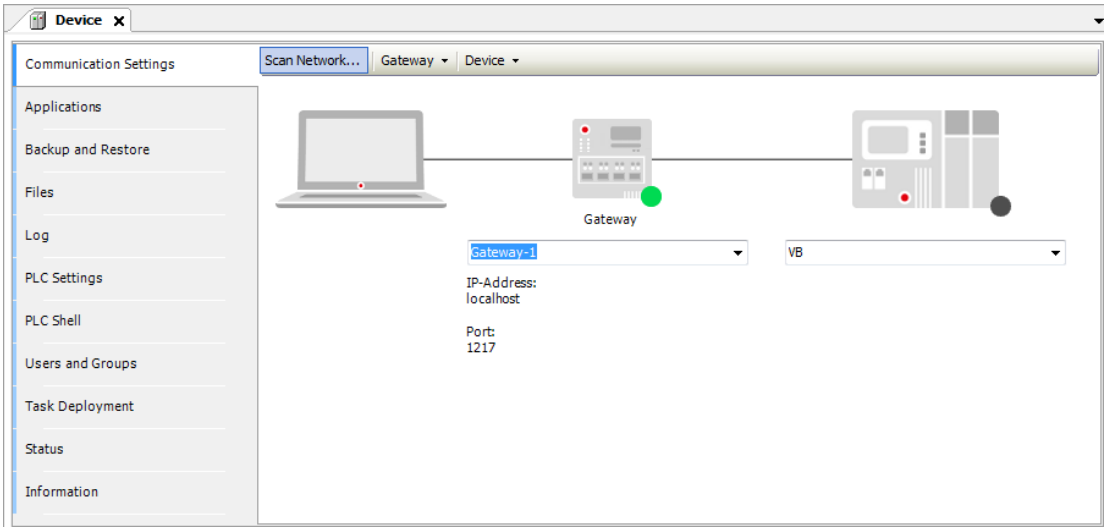


2. Select cMT-CTRL. CODESYS software provides 6 languages that can be selected in [PLC_PRG in:] drop-down list as shown below. Structure Text (ST) is used as an example in this manual.

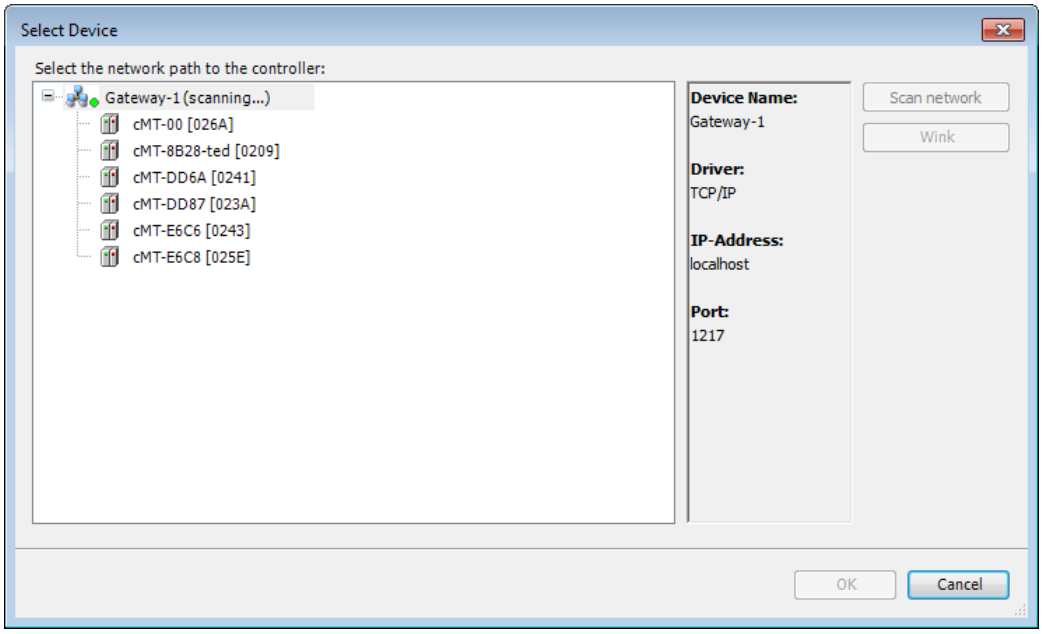


3. Double-click on Device (cMT-CTRL) to open the settings window.

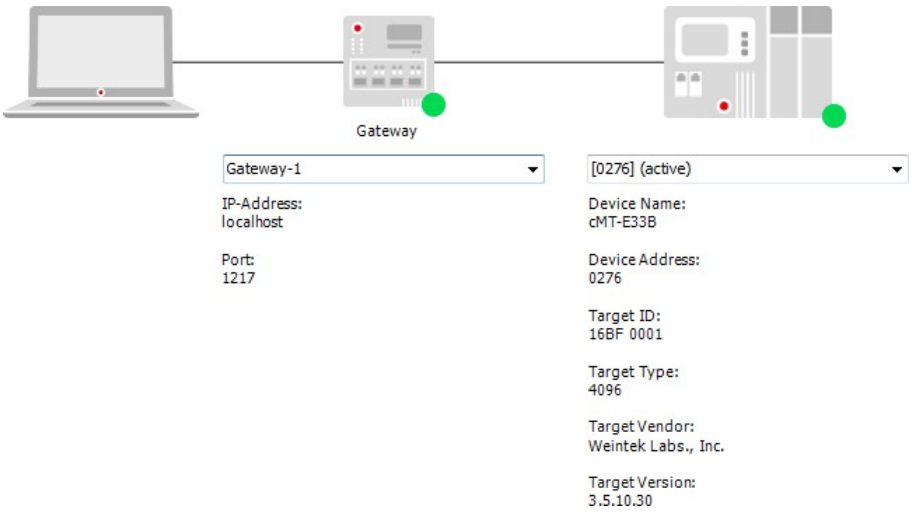




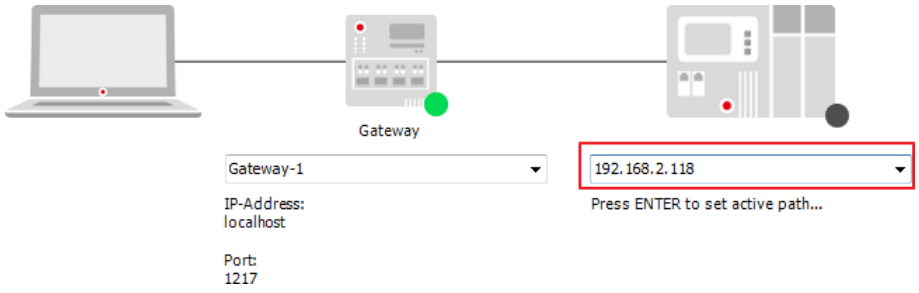
4. Open Scan Network tab, CODESYS software, will start searching for the CODESYS devices on the same network. Select the desired device and then click [OK] to leave. The last two IP address parts (between dots) are converted into HEX digits and shown in this window. For example, if the IP address of the CODESYS device is 192.168.2.118, please select *HMI Name[0276]*. After clicking Wink button, CPU RUN LED flashes three times.



5. The project will connect the selected device.



IP address of the device can be entered in the field shown below.

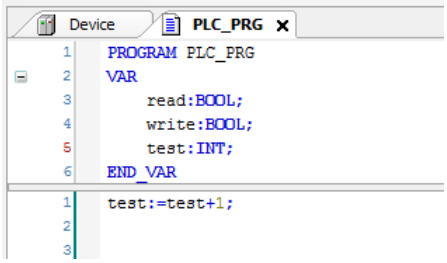


Chapter9. Creating EasyBuilder Project

*Please use EasyBuilder Pro v6.03.02 or later versions.

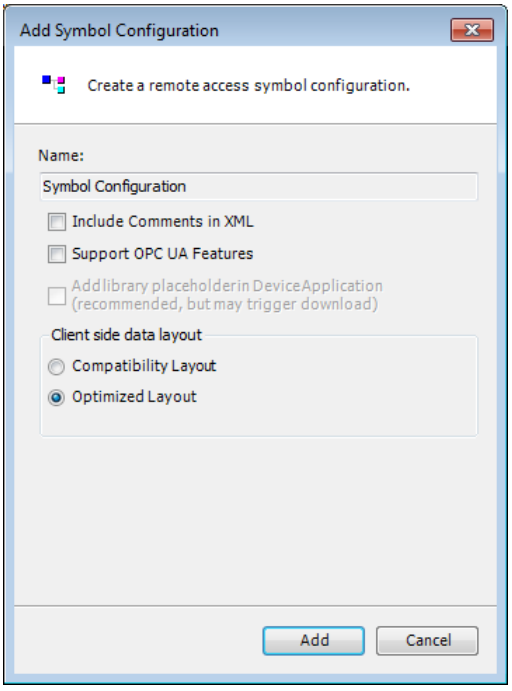
9.1. Creating Tags

1. Create several tags in PLC_PRG tab and make tag “test” accumulate automatically.

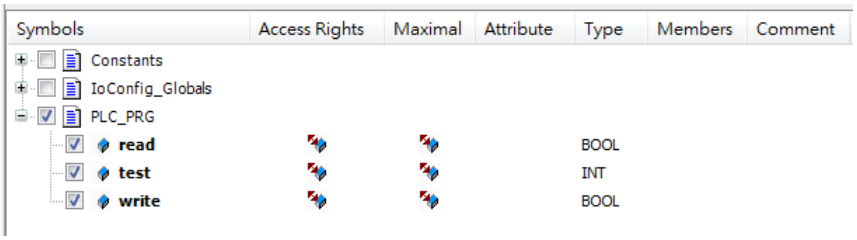


9.2. Exporting Tags

1. Right-click on Application in Devices tree and then select [Add Object] » [Symbol Configuration], use defaults.



2. Find PLC_PRG, select the variables to be exported, and then click [Build].



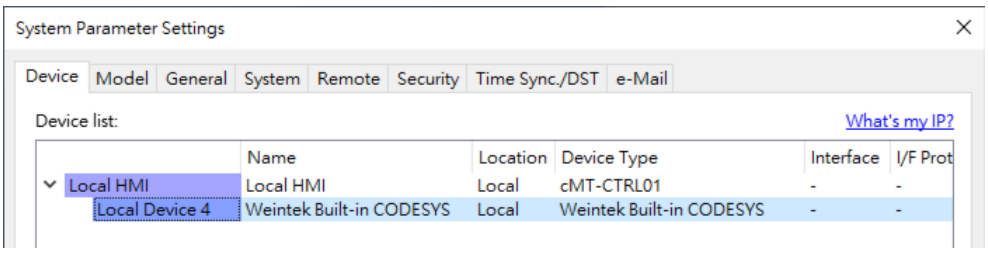
3. Select [Build] » [General code], the *.xml file can be found in the directory of the project.

9.3. Configuring EasyBuilder

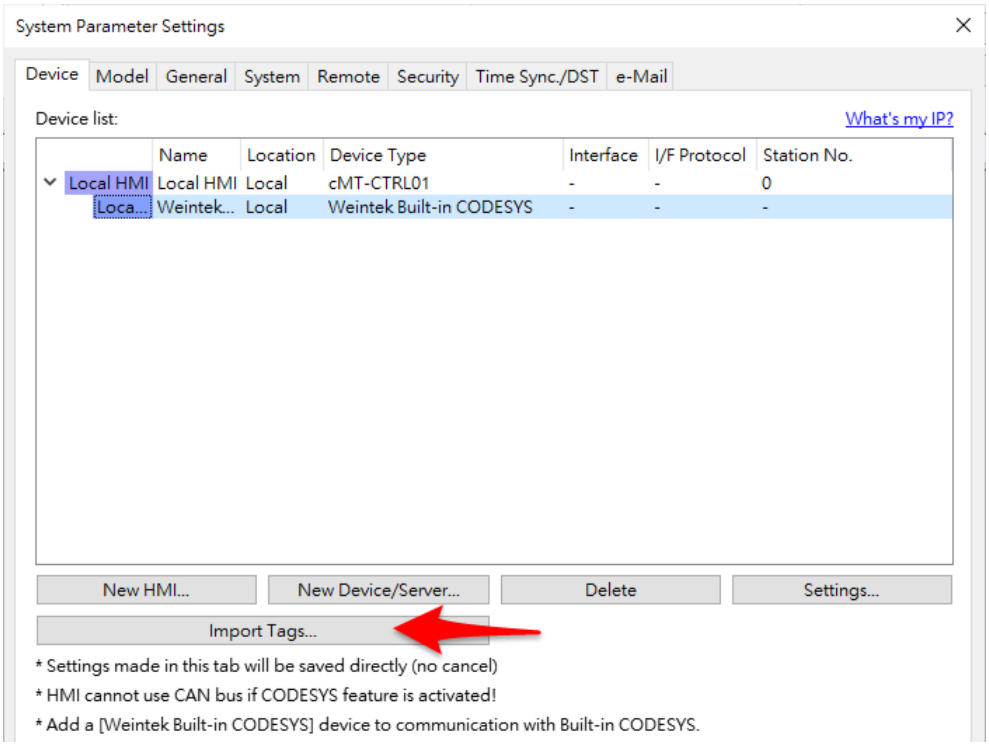
Use Weintek Built-in CODESYS driver for cMT-CTRL01 Gateway or use CODESYS V3 (Ethernet) driver for other HMI models to connect with CODESYS on cMT-CTRL01.

9.3.1. Connecting Built-in CODESYS

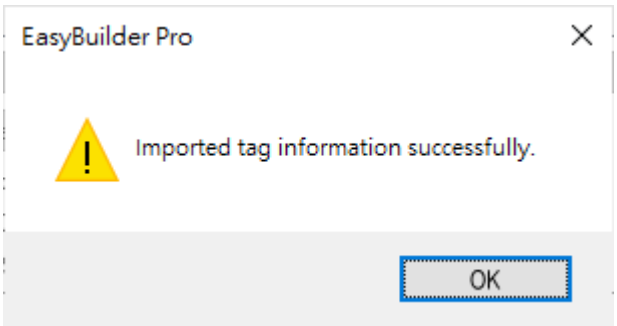
1. Create a project and select Weintek Built-in CODESYS in the device list.



2. Click [Import Tag] to import the *.xml file built in preceding steps.



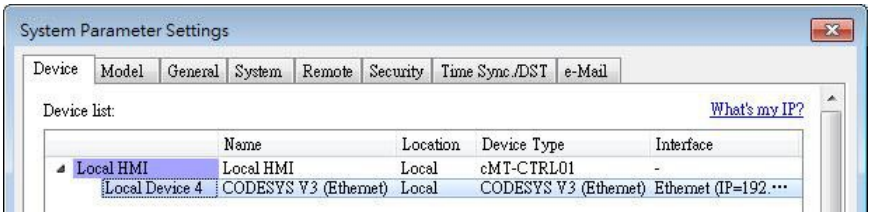
3. The CODESYS tags can now be found in Tag Manager.



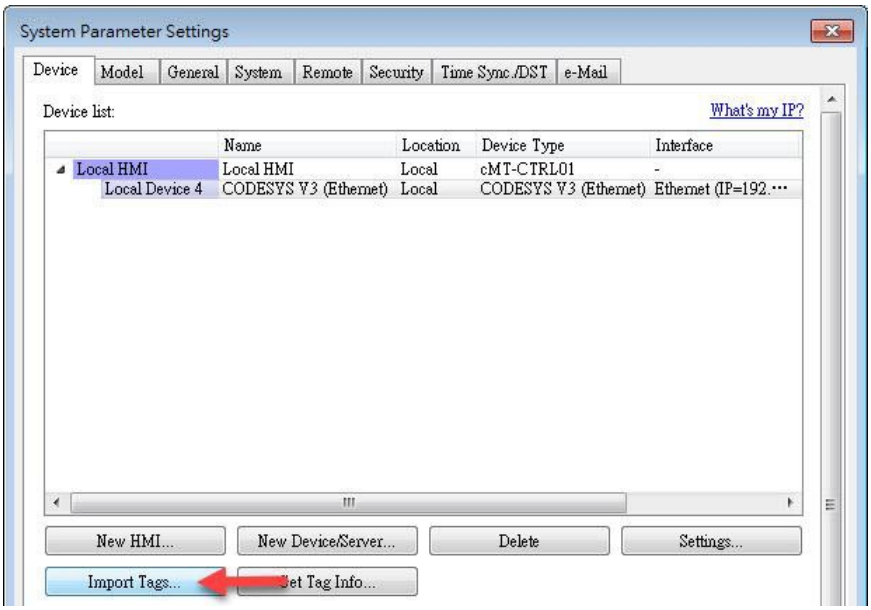
4. For cMT-CTRL01 Gateway, create OPA UA TAG, or use MQTT publisher.
For other HMI models, create a Numeric object and use “Application.PLC_PRG.test” for address. After downloading the project to HMI, “test” tag data can be found.

9.3.2. Connecting cMT-CTRL01 CODESYS to other HMI

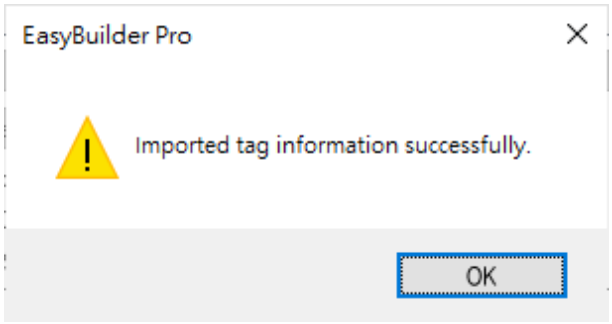
1. Create a project and select CODESYS V3 (Ethernet) driver in the device list.



2. Click [Import Tag] and select the *.xml generated in the preceding steps.



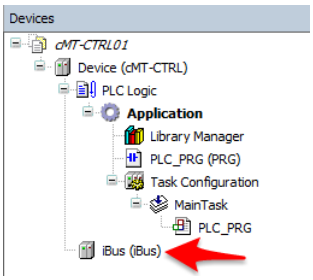
3. CODESYS Tag can be found after importing.



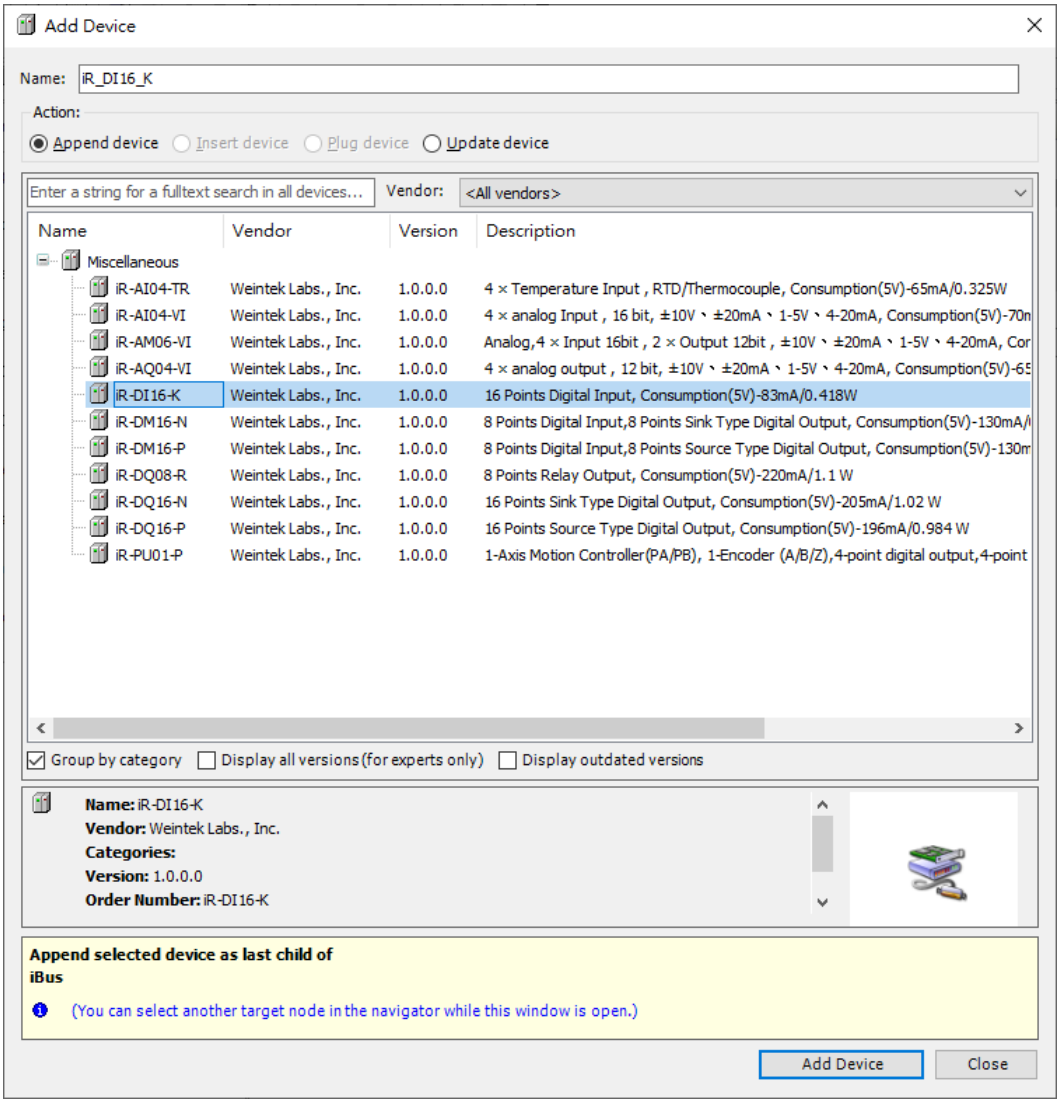
Chapter10. Connecting cMT-CTRL01 CODESYS to iR Series Modules

cMT-CTRL01 and iR Series modules do not support hot swapping by design. Please connect iR Series modules to cMT-CTRL01 before powering up cMT-CTRL01.

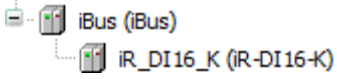
1. Right-click on [iBus (iBus)] and then select [Add Device].



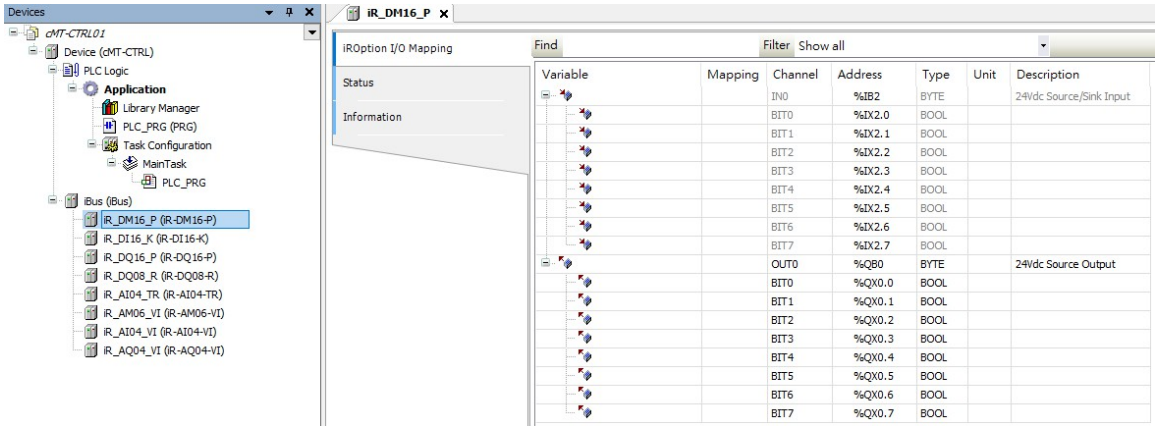
2. Select an iR module and then click [Add Device].



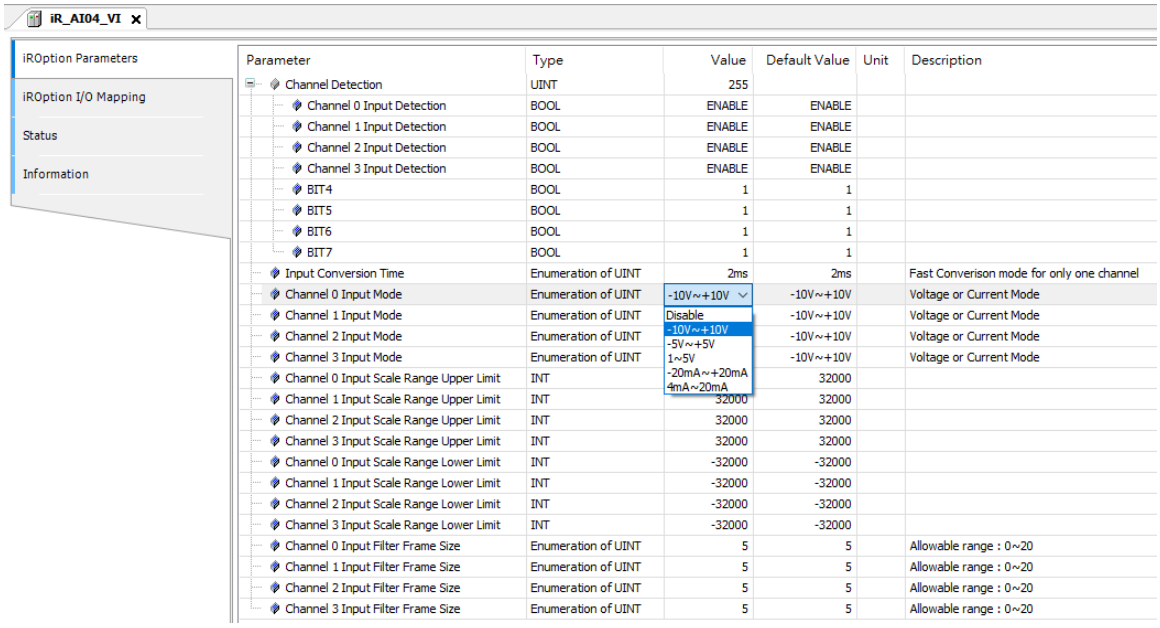
3. The added device can be found under iBus. You may add more modules with this window left opened.



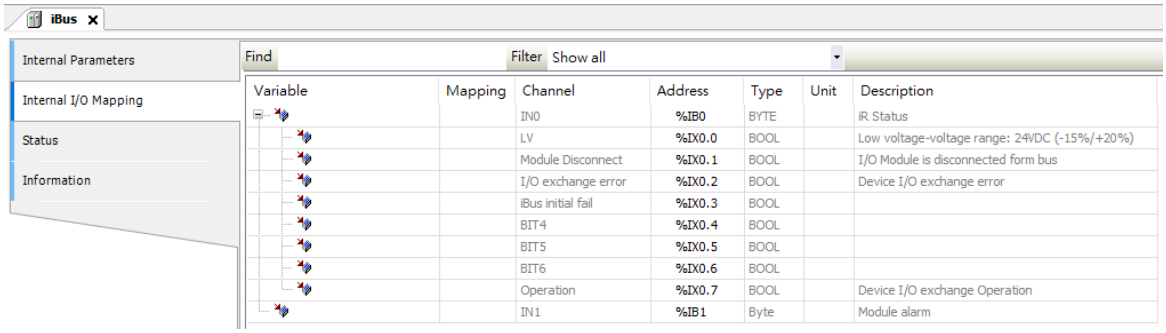
4. Double click on a module name to open iROption I/O Mapping.



Analog modules, other modules, and their settings.



iBus has two addresses in BYTE type that show low voltage and I/O error.

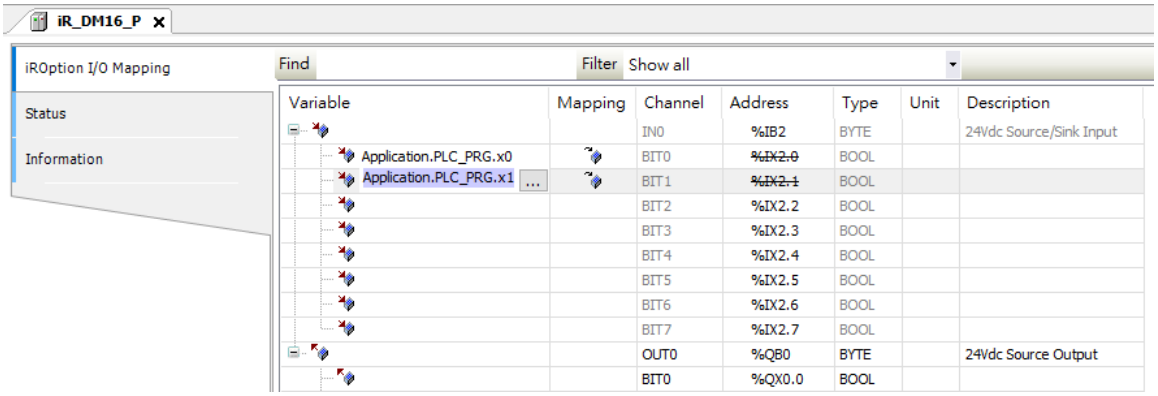


5. Open PLC_PRG in Devices tree and configure variables as shown below.

```
1  PROGRAM PLC_PRG
2  VAR
3      x0 : BOOL;
4      x1 : BOOL;
5
6  END_VAR
```

6. In Devices tree double click on an iR module name to open object settings window. In

iROption I/O Mapping tab, select a variable for the object.

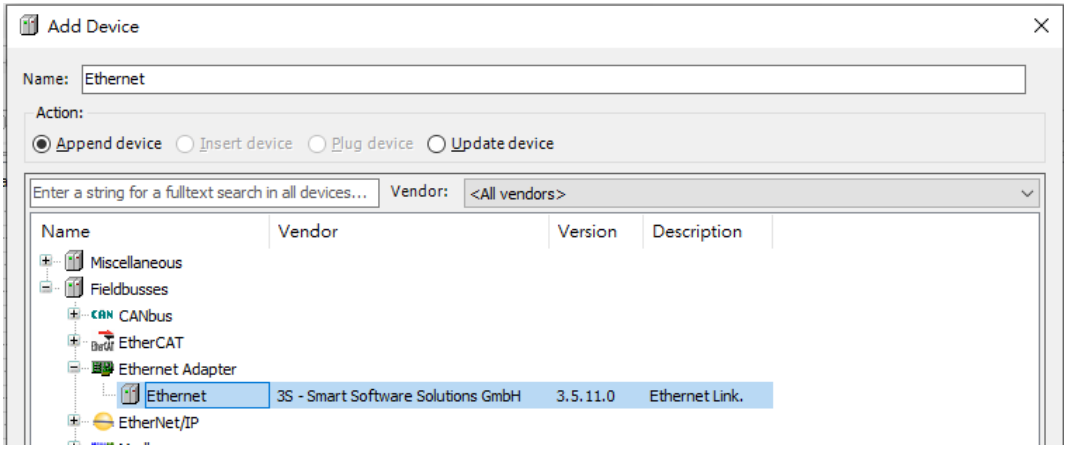


7. When finished, click [Online] » [Login] to download the project to CODESYS.

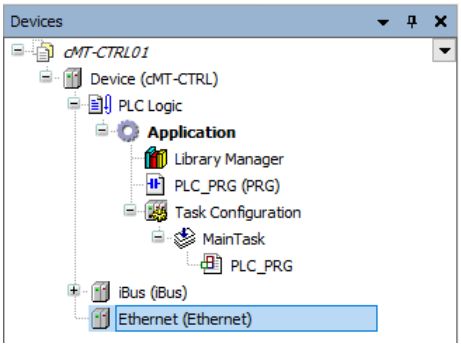
Chapter11. Connecting cMT-CTRL01 to iR-ETN

11.1. Connecting cMT-CTRL01 to iR-ETN using Modbus TCP/IP

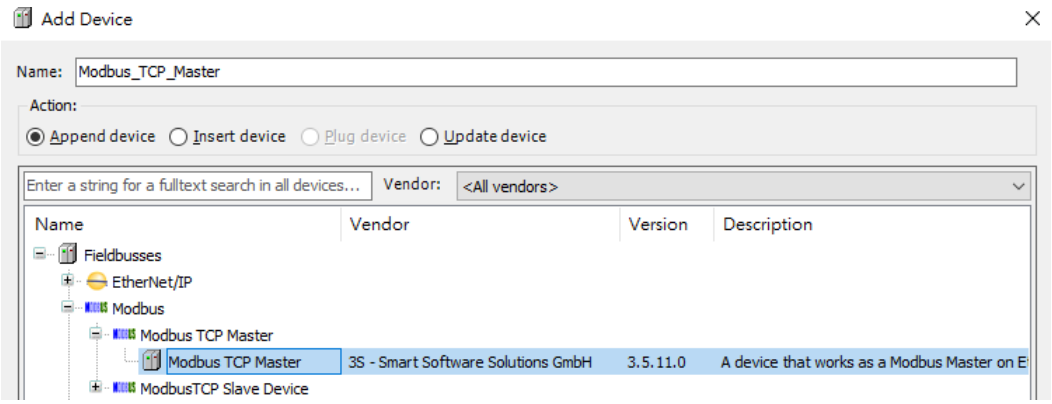
1. Right-click on Device (cMT-CTRL01) and then select [Add Device].
2. Select [Ethernet Adapter] » [Ethernet] and then click [Add Device].



3. Ethernet (Ethernet) can be found in Devices tree.

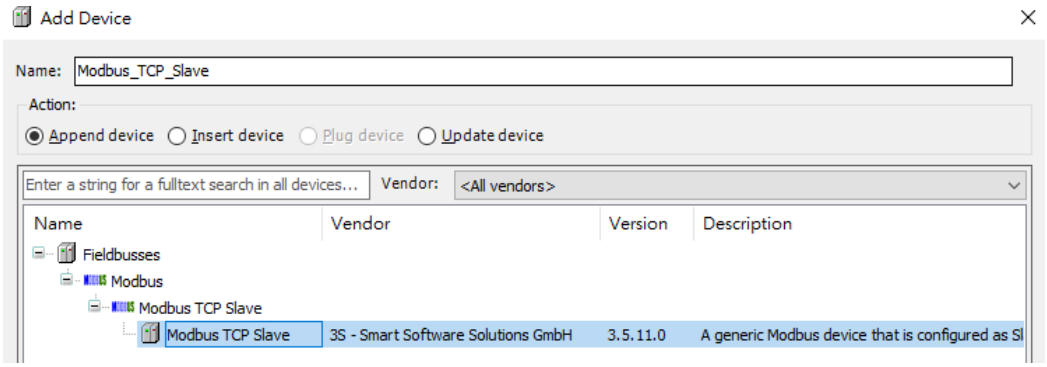


4. Double-click on Ethernet with the current window opened in Devices tree or right-click on Ethernet and then select [Add Device].
5. Click [Fieldbusses] » [Modbus] » [Modbus TCP Master] » [Modbus TCP Master], and then select [Add Device]. If you have the PLCopenXML exported from EasyRemoteIO, click [Project] » [Import PLCopenXML…] to import the file to complete the settings.

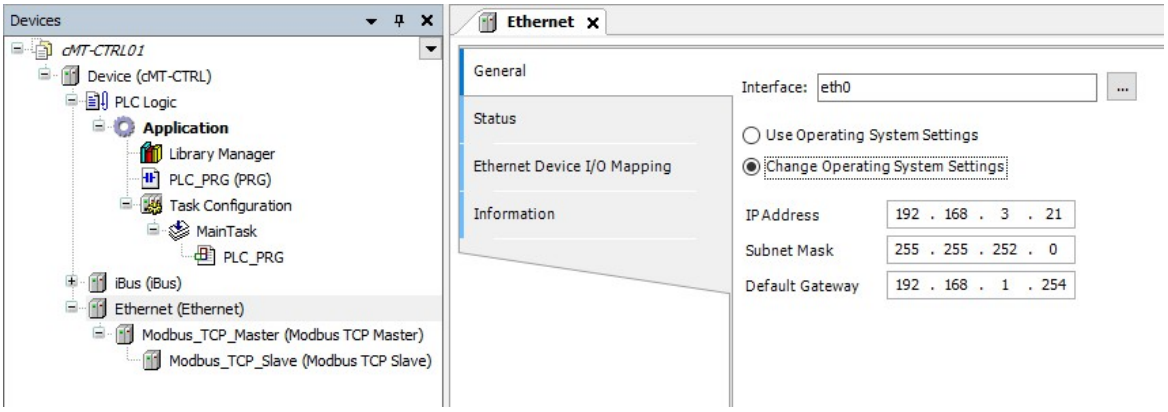


6. Double-click on Modbus TCP Master with the current window open in Devices tree or right-click on Modbus TCP Master and then click [Add Device].

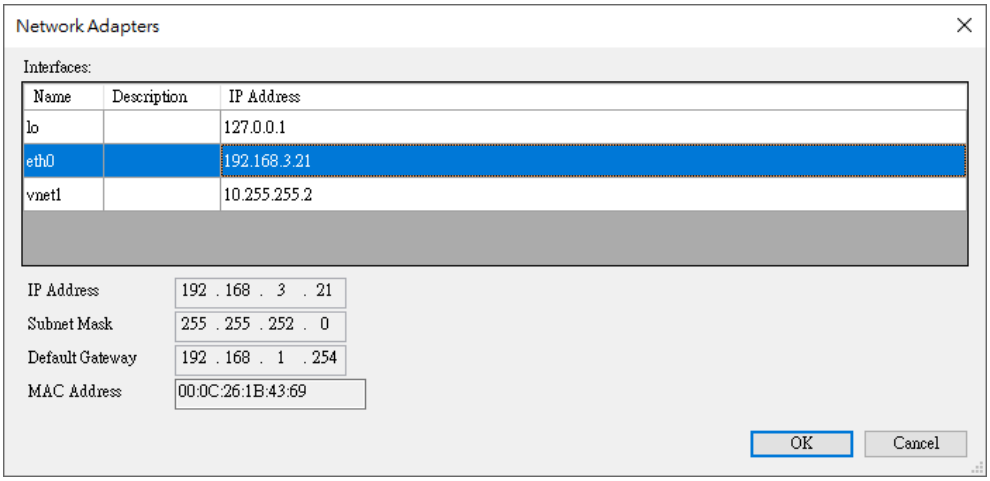
7. Click [Fieldbusses] » [Modbus] » [Modbus TCP Slave] » [Modbus TCP Slave], and then select [Add Device].



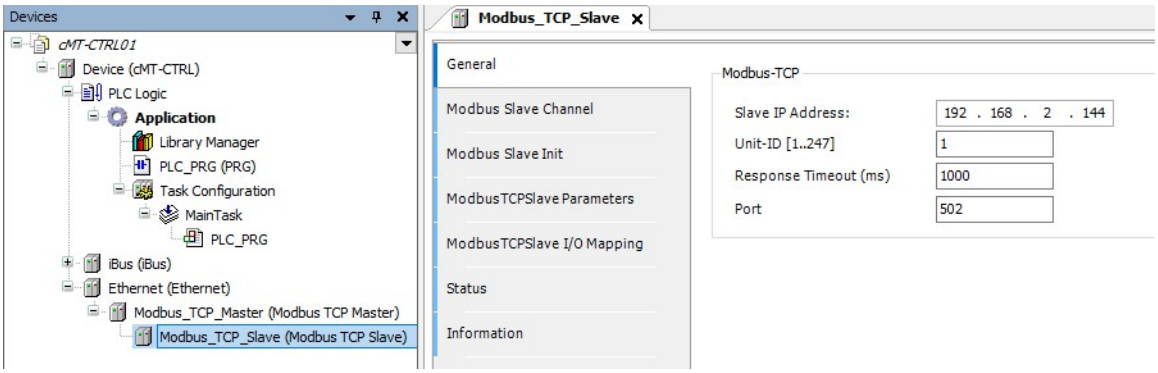
8. Double click on Ethernet in the Devices tree, enter CODESYS's IP address in General tab, and then select [Change Operating System Settings]. When [Use operating System Settings] is selected, settings on cMT-CTRL01 will be used without being changed.



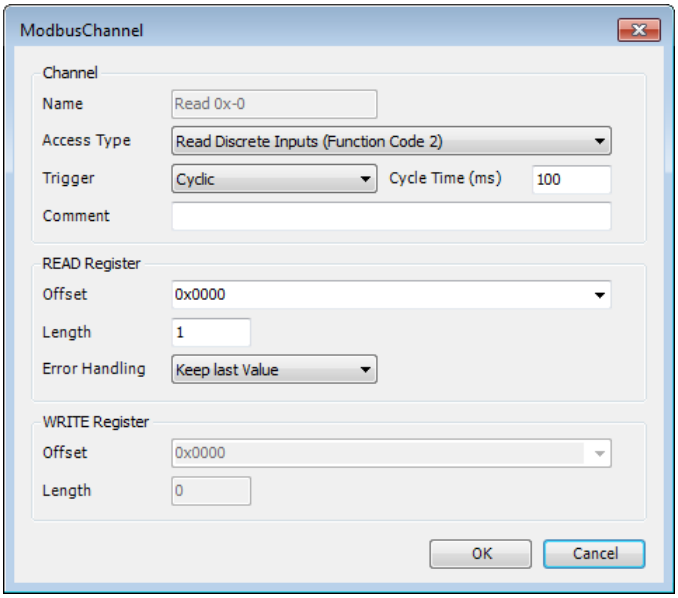
9. When CODESYS is already connected, go to General tab and click the […] button near Interface field and select eth0.

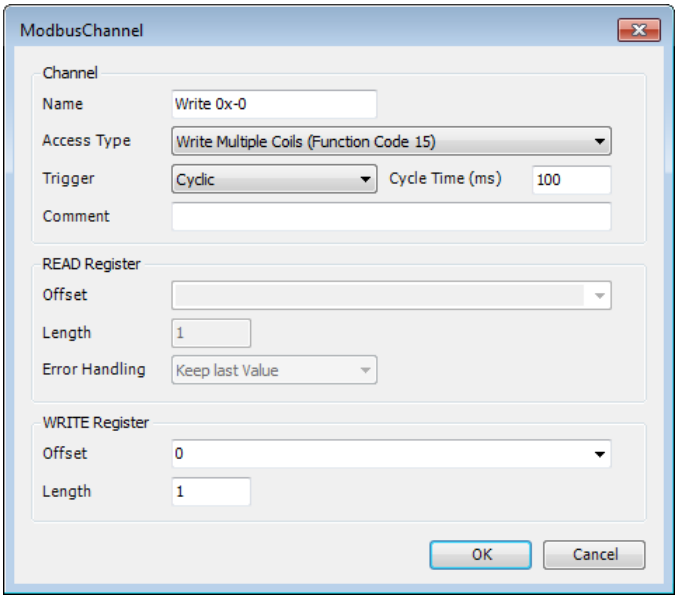


10. Select Modbus_TCP_Slave in the Devices tree and then go to General tab to set up IR-ETN's IP address and Unit ID.



11. Open [Modbus Slave Channel] tab and create Modbus Variable.





12. Open PLC_PRG in Devices tree, create tag and set Bool as data type. Write a command as shown below.

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

write:=1;
```

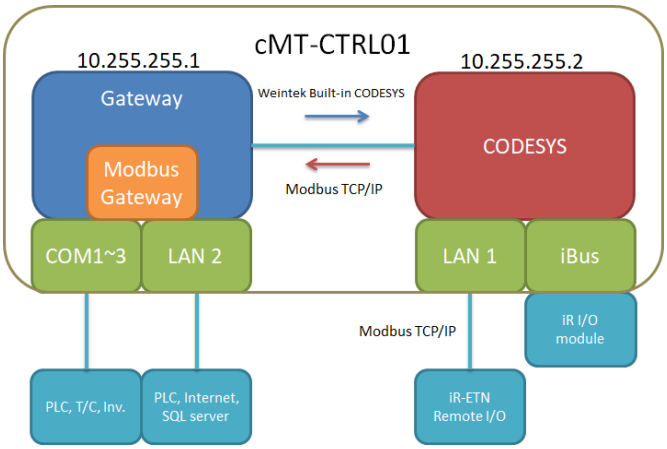
13. Open Modbus_TCP_Slave in Devices tree and then go to [Modbus_TCPSlave I/O Mapping] tab to set up iR-ETN's IP address and Unit ID.

Variable	Mapping	Channel	Address	Type	Unit	Description
		Read 0x-0	%IB0	ARRAY [0..0] OF BYTE		Read Discrete Inputs
		Read 0x-0[0]	%IB0	BYTE		Read Discrete Inputs
Application.PLC_PRG.read		Bit0	~~%IX0.0~~	BOOL		0x0000
		Write 0x-0	%QB0	ARRAY [0..0] OF BYTE		Write Multiple Coils
		Write 0x-0[0]	%QB0	BYTE		Write Multiple Coils
Application.PLC_PRG.write		Bit0	~~%QX0.0~~	BOOL		0x0000

14. When finished, click [Online] » [Login] to download the project to CODESYS.

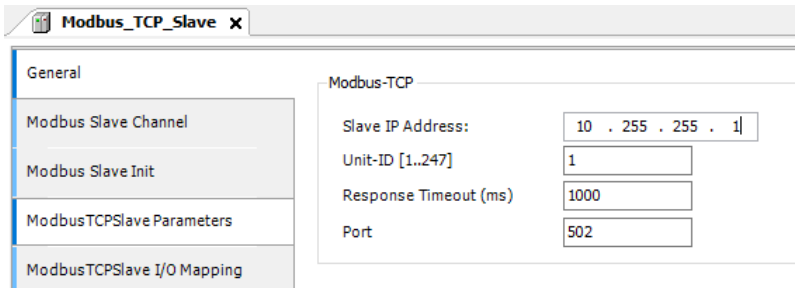
11.2. Connecting CODESYS and Modbus TCP/IP Gateway

cMT-CTRL01 supports Modbus TCP/IP Gateway which allows CODESYS to access Modbus TCP/IP Gateway using Modbus TCP Slave, in order to control the devices connected to Modbus TCP/IP Gateway.

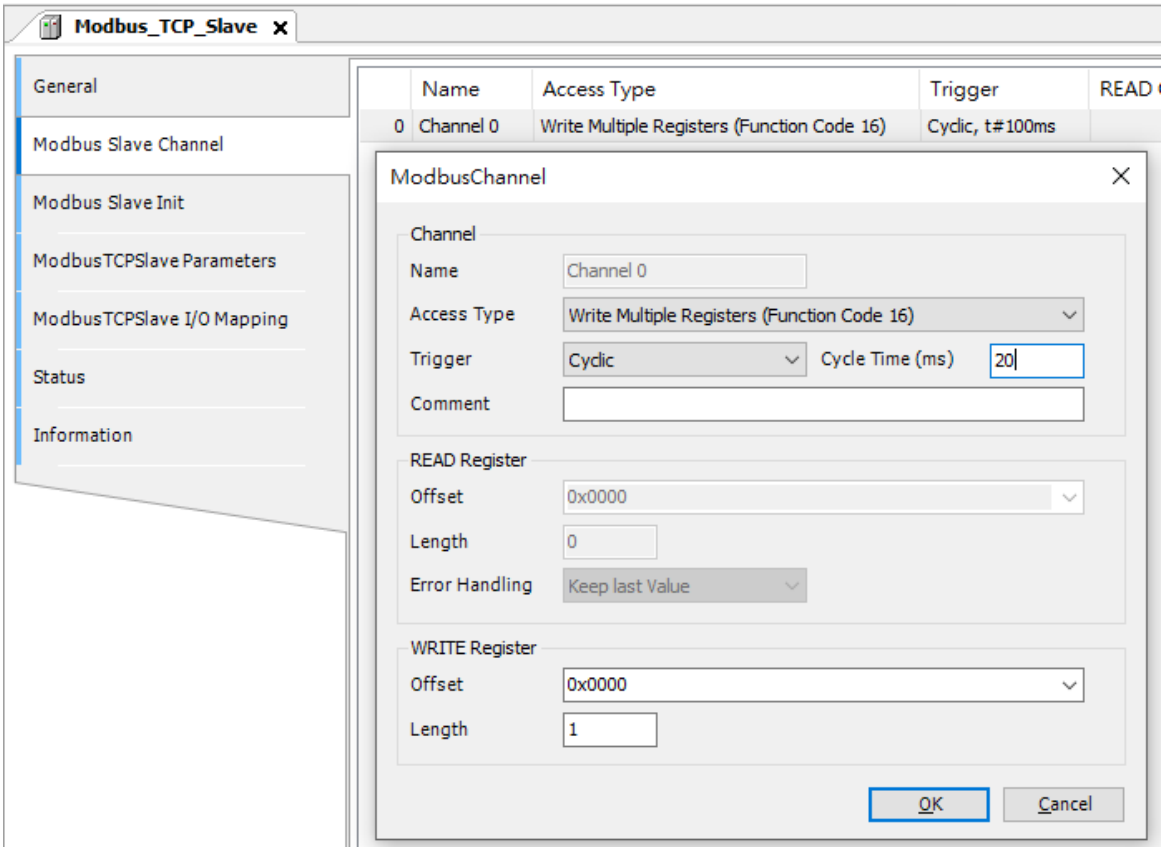


11.2.1. CODESYS Settings

On cMT-CTRL01, Gateway and CODESYS respectively use different IP addresses; therefore, by adding Modbus_TCP_Slave for CODESYS and set IP address to 10.255.255.1, CODESYS is able to connect to Modbus Gateway.



To immediately display CODESYS data on HMI, values can be written to HMI's LW registers for objects to read. When setting Modbus Slave Channel, Cycle Time can be configured to adjust the frequency at which data is written to the registers.

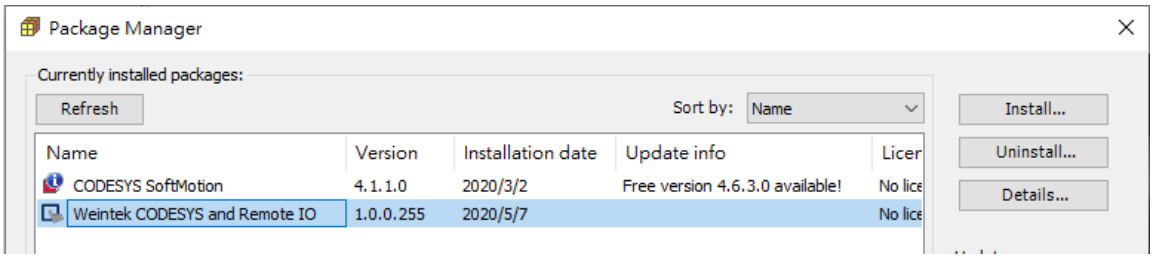


11.2.2. Gateway Settings

For more information on Modbus Gateway, please see EasyBuilder Pro User Manual

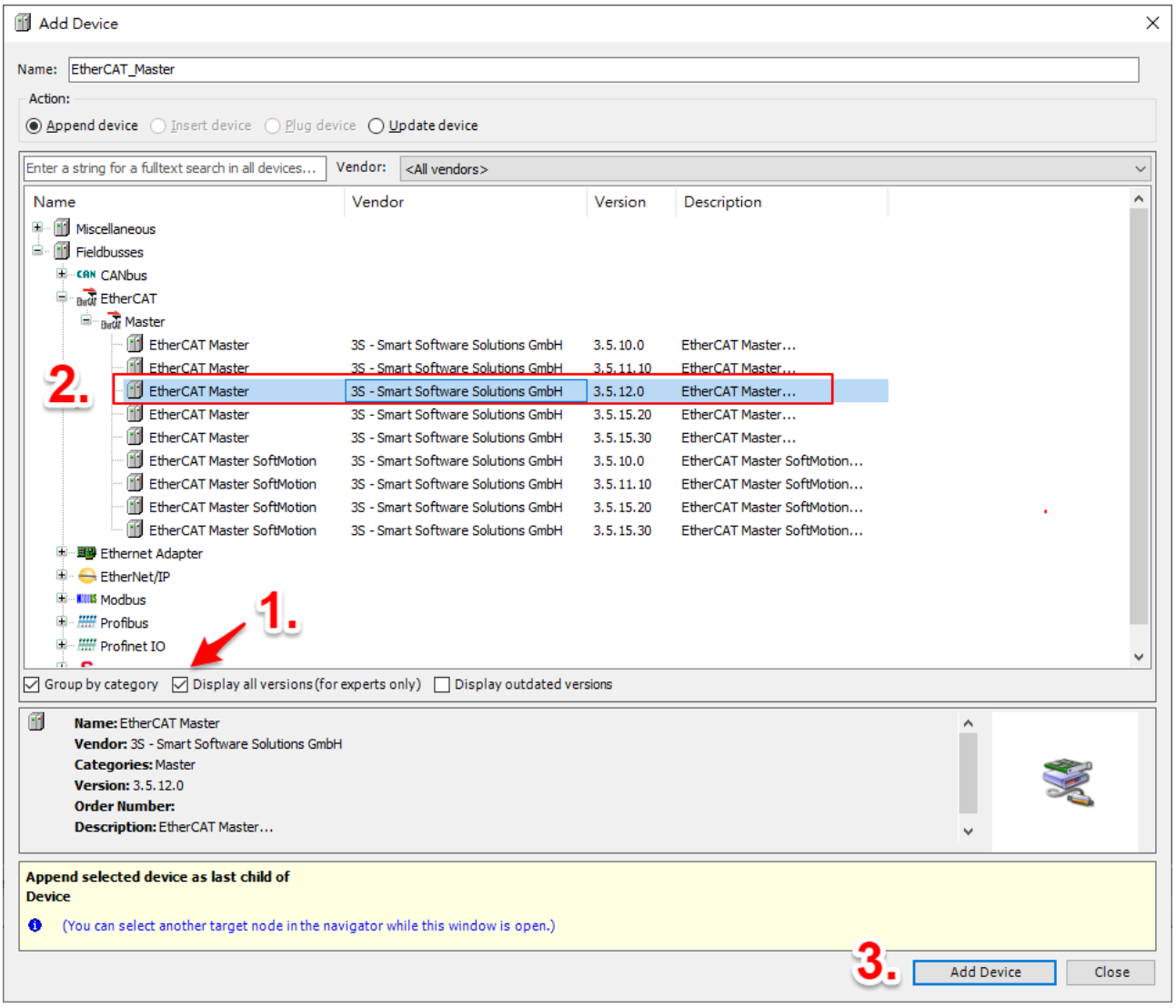
Chapter12. Connecting cMT-CTRL01 via EtherCAT

From CODESYS Firmware 20200401, cMT-CTRL01 supports EtherCAT connection. Please see Chapter 14.2 Questions relating to Downloading cMT CODESYS File, and Chapter 7 Installing Weintek CODESYS and RemoteIO Package in this manual for more information.

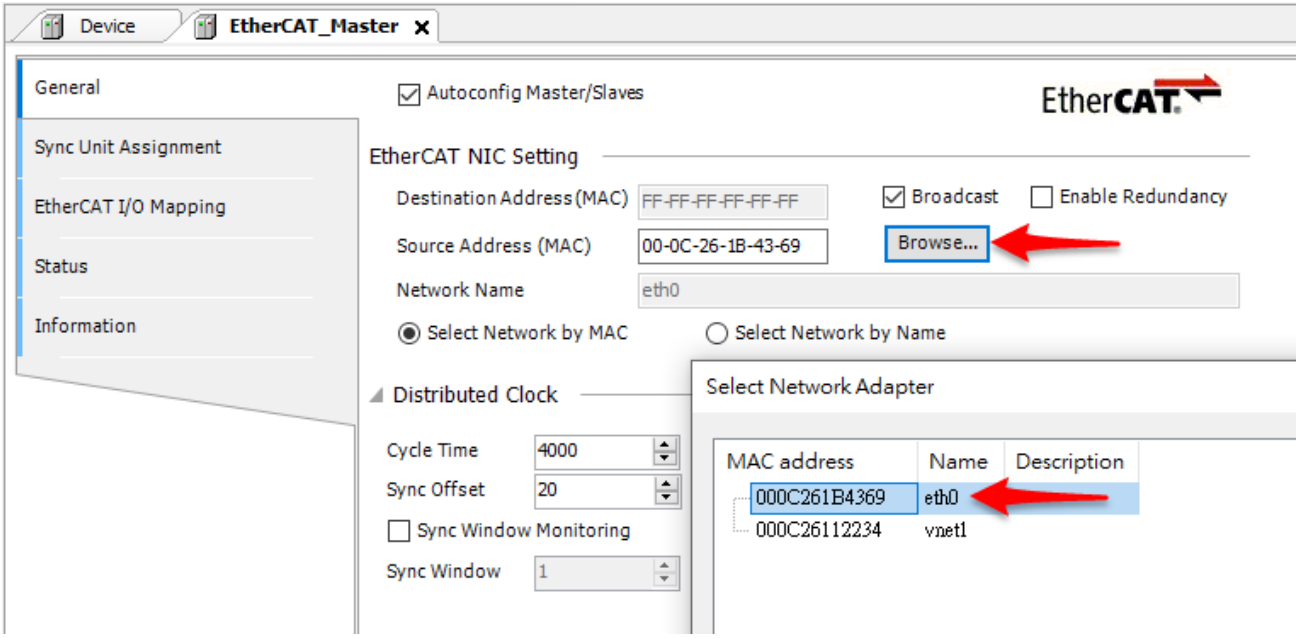


This chapter explains how to connect cMT-CTRL01's LAN1 to iR-ECAT and iR module.

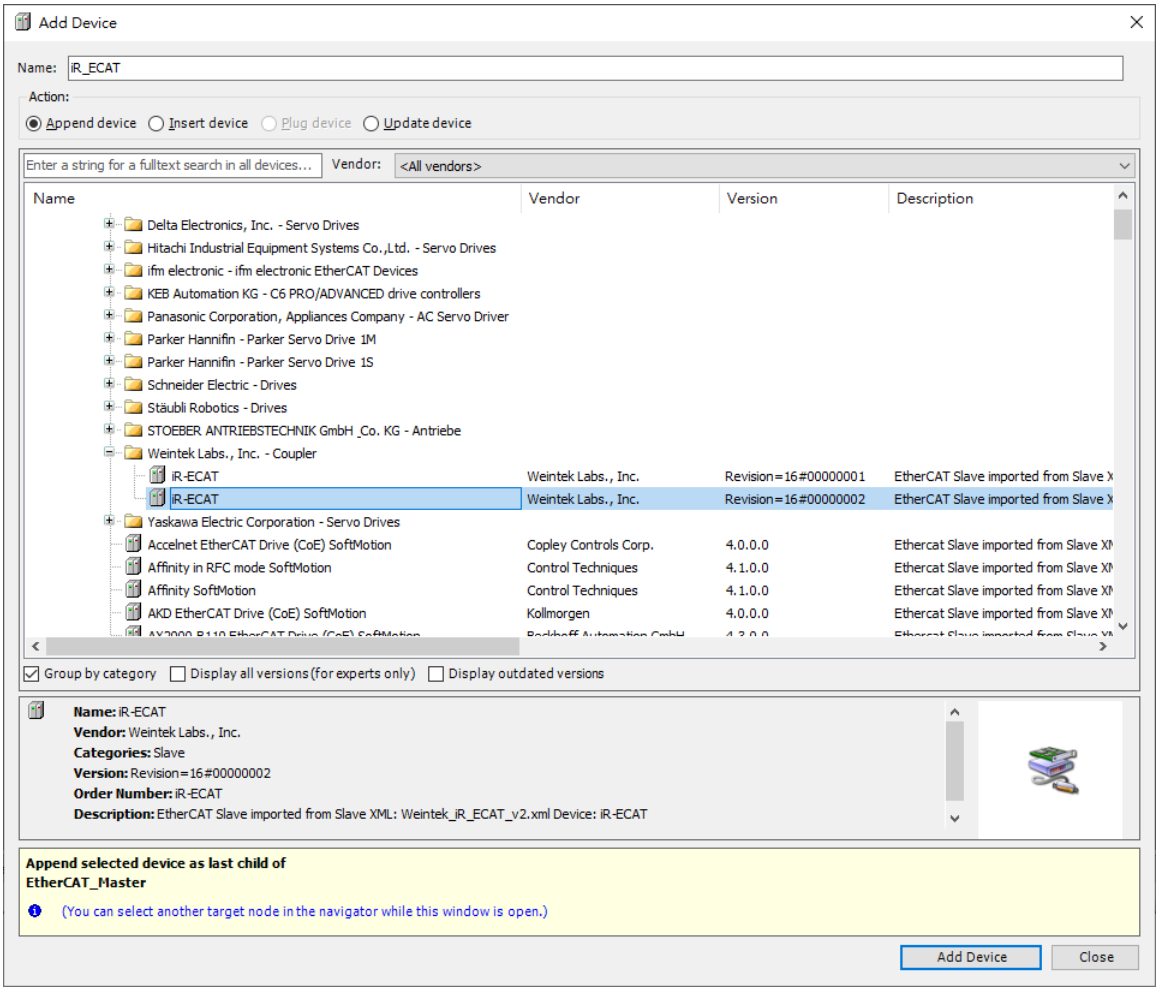
Open the CODESYS project file of cMT-CTRL01 and add a device. The recommended device is EtehrCAT Master V3.5.12.0. This device can be found when [Display all versions (for expert only)] is selected.



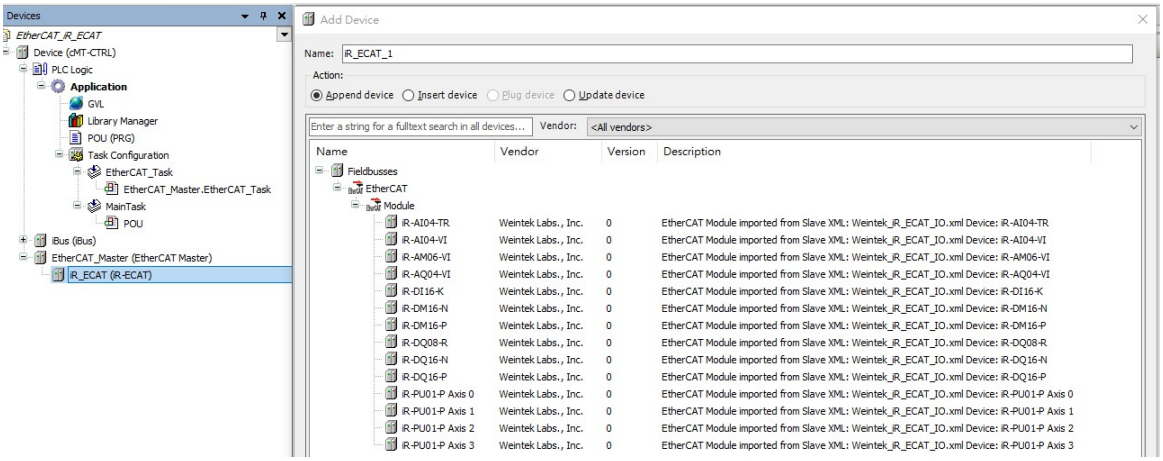
After adding the device, select cMT-CTRL01. Double click on EtherCAT Master, click [Browse…], and select network adapter eth0.



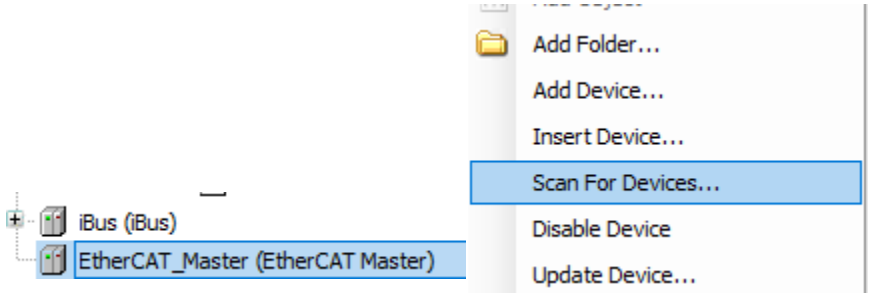
To set the device manually, add iR-ECAT first. iR-ECAT may have multiple versions, please select a suitable version.



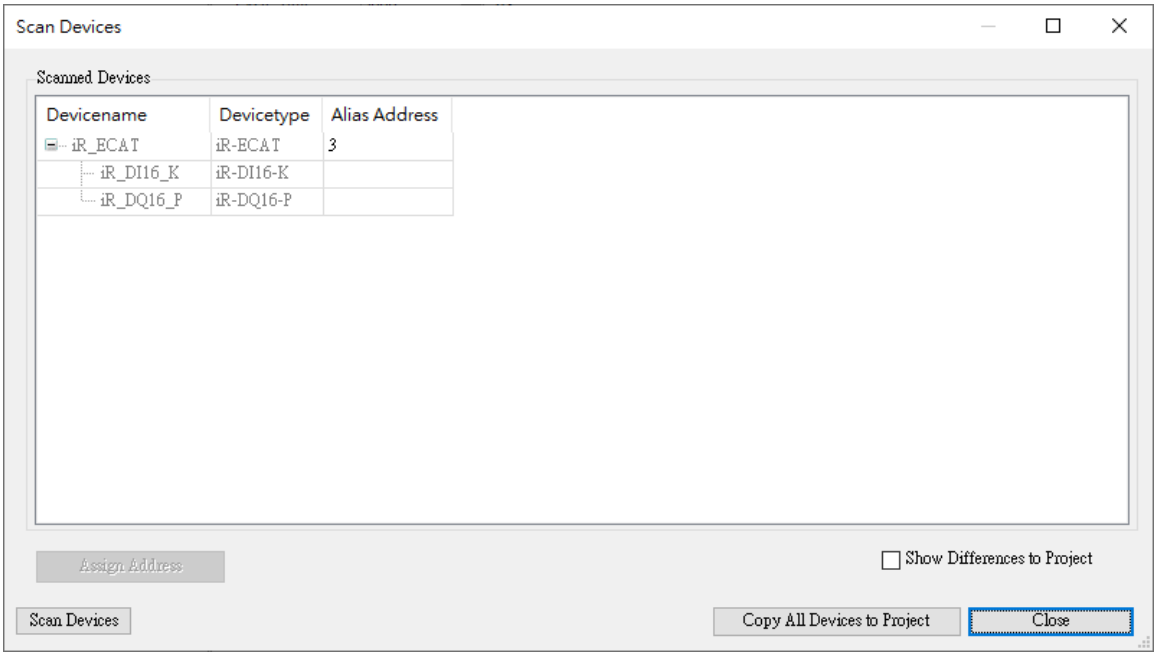
Add iR I/O module.



CODESYS can scan EtherCAT devices on the network. Set the device and select cMT-CTRL01. Right-click on EtherCAT Master and then select [Scan For Devices…].

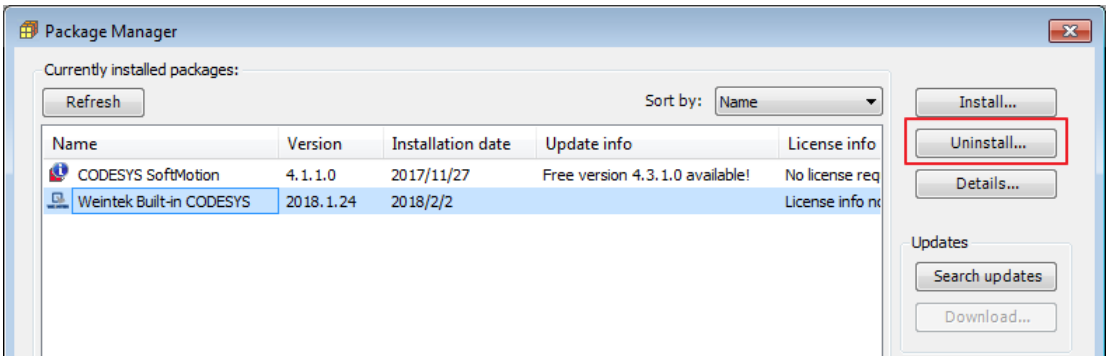


Information on iR-ECAT and iR I/O modules is displayed in the Scan Devices window. Click [Copy All Devices to Project] to finish setting up the device.

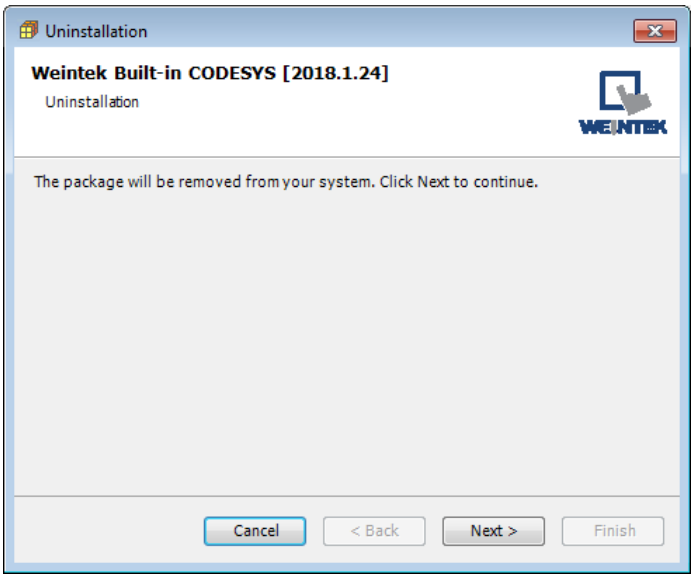


Chapter13. Removing Weintek Built-in CODESYS

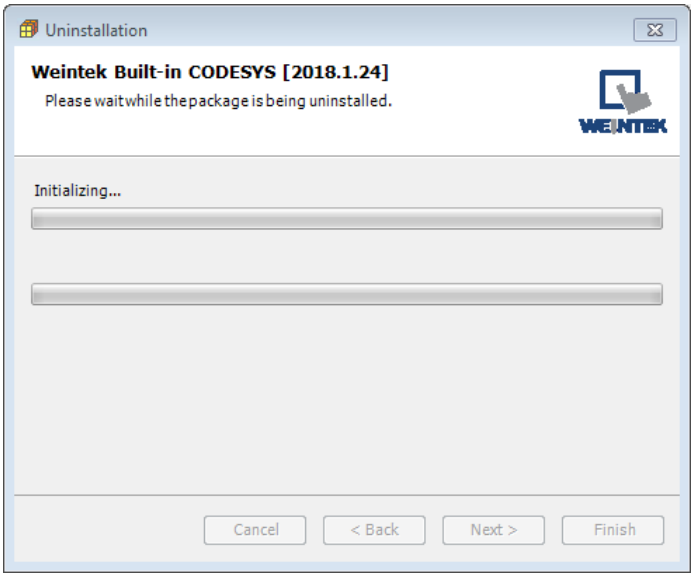
1. Click [Tools] » [Packages Manager].
2. Find Weintek Built-in CODESYS and then click [Uninstall].



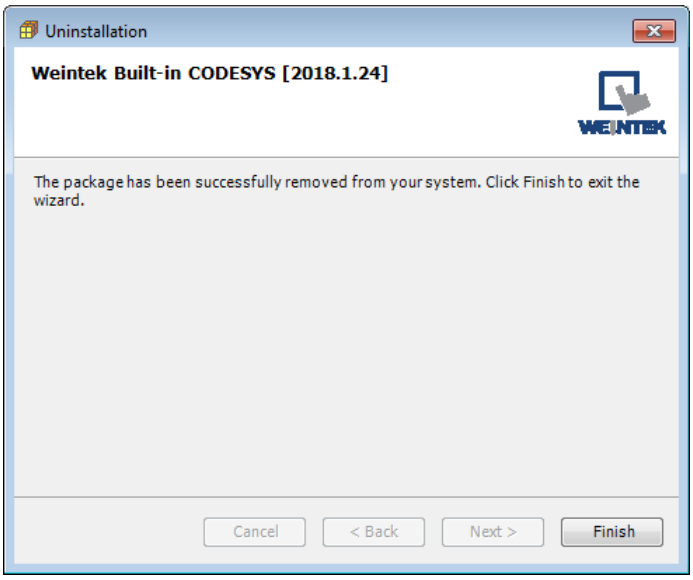
3. Click [Next] when seeing the window below.



4. Removing the program.



5. Click [Finish].

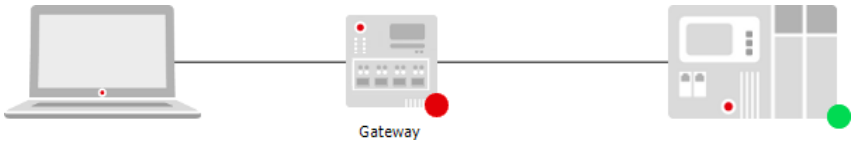

Uninstallation
Weintek Built-in CODESYS [2018.1.24]
The package has been successfully removed from your system. Click Finish to exit the wizard.
Cancel
< Back
Next >
Finish

Chapter14. Frequently Asked Questions

14.1. Questions Related to CODESYS

Q1. When the indicator of CODESYS Gateway lights up in red, how can I connect to the device?

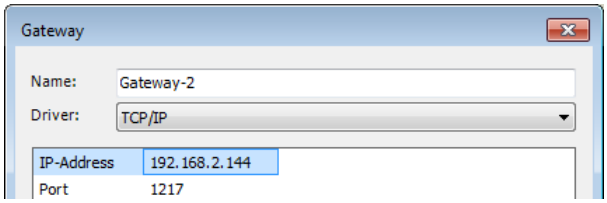
A: When CODESYS Gateway is not properly started or installed, its indicator will light up in red.



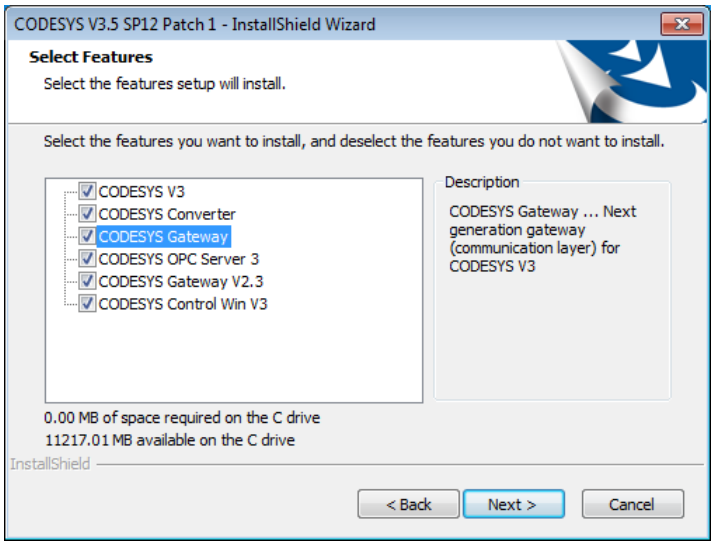
Please try the following 3 methods to solve this situation.

1. Click the icon of "CODESYS Gateway SysTray" in system settings and then click [Start Gateway].

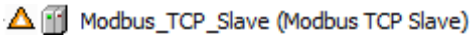
2. Add new gateway and enter HMI IP.



3. Re-install CODESYS Gateway.



Q2. Why a triangle icon shows near Modbus_TCP_Slave device when I log in HMI in CODESYS software?



A: This means that HMI cannot connect Modbus TCP/IP device via CODESYS. Please check the

IP settings and make sure the cable is properly connected.

Q3. Which CODESYS Development System version is suitable for cMT+CODESYS? Is there any other version to use?

A: **Use the same version as cMT+CODESYS runtime**

The built-in CODESYS Runtime of cMT+CODESYS is 3.5.10.30; therefore, using CODESYS Development 3.5.10.30 is recommended.

Use a later version on PC

Versions later than CODESYS Development 3.5.10.30, including 64bit versions are also compatible. The CODESYS Library offered by Weintek can work properly when using these versions.

The current latest version of CODESYS Development is 3.5.15.20 (Date: 19/11/2019)

Please note that Missing Libraries issue may occur when using a new version CODESYS Development System to open an earlier version CODESYS project.

The following two solutions can be used to address this issue:

1. Click “Download Missing Libraries” in Library Manger.
2. Use cMT+CODESYS Package (PC) 1.0.0.229 or later (1.0.0.229 is not included), select and install library version 3.5.10.30.

Upgrade from CODESYS V2.3 to CODESYS V3.5

CODESYS offers a tool for users to use CODESYS Development 2.3 project in CODESYS V3.5 Development. Reference link:

https://store.codesys.com/codesys-v23-converter.html

Use compatible version for EasyRemoteIO to work with CODESYS

By default, the PLCopen XML file exported from EasyRemoteIO can work in CODESYS Development System V3.5.10.0. The following two ways are options for using other versions.

1. Set the version in EasyRemoteIO before exporting PLCopen XML. (supported by EasyRemoteIO V1.3.1.0 or later)
2. Open PLCopen XML file in Windows® Notepad software, change the <Version> to the current version of CODESYS Development and save to a new file. Let’s take CODESYS Development version 3.5.12.0 as an example:
   In Notepad, change from `<Version>3.5.10.0</Version>`
   to `<Version>3.5.12.0</Version>`.

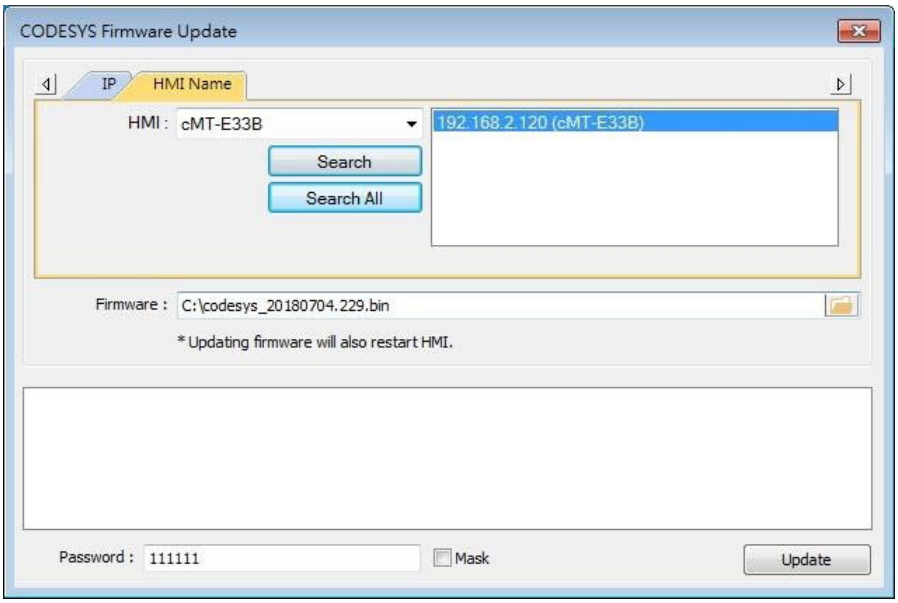
14.2. Questions Related to Downloading cMT CODESYS File

Q1. How to update CODESYS firmware?

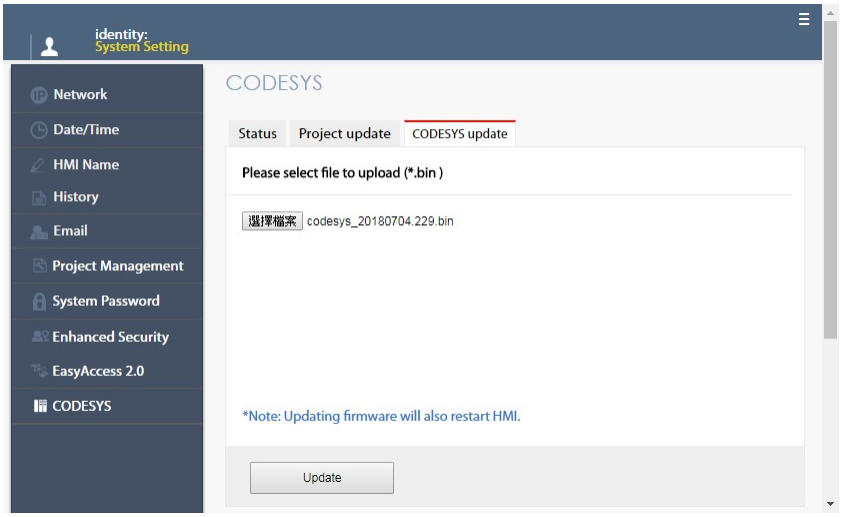
A:

There are 2 ways to update CODESYS firmware.

1. Launch Utility Manager and select Gateway Series » Maintenance » CODESYS Firmware Update. Browse for the firmware file and click [Update].



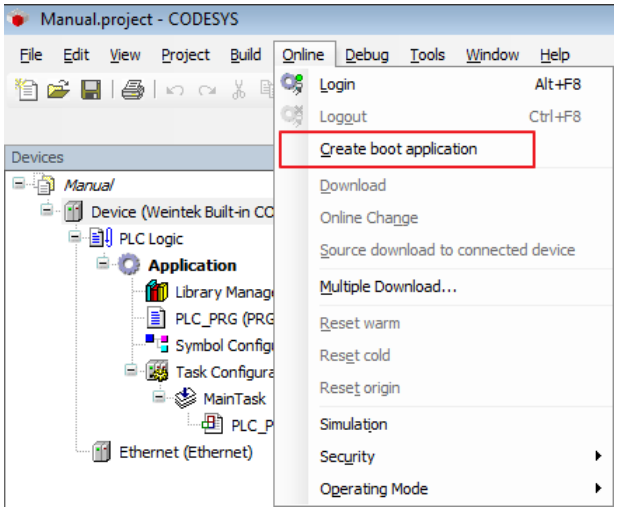
2. Enter cMT HMI's IP address in the website browser and find [CODESYS] » [CODESYS update] tab. Select the file and click [Update].



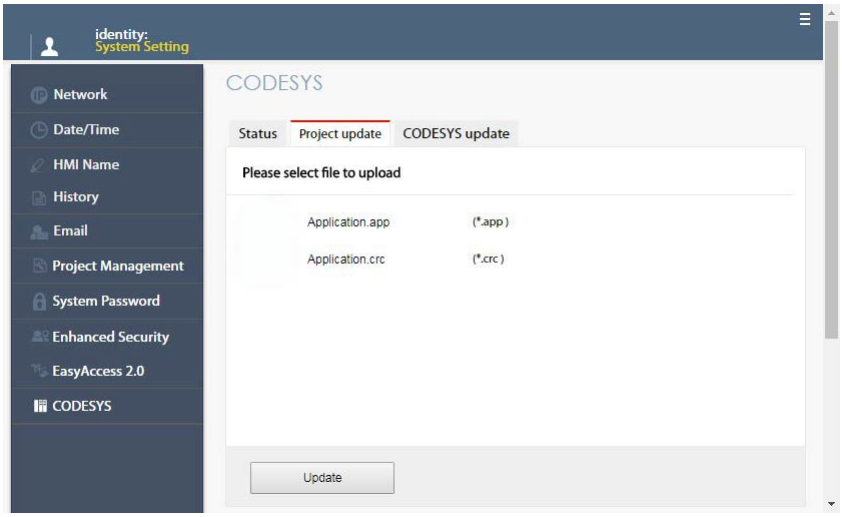
Q2. How to download CODESYS project using website?

A:

1. In CODESYS software select [Online] » [Create boot application]. An *.app file and a *.crc file will be generated.



2. Enter cMT HMI's IP address in the website browser and find [CODESYS] » [Project update] tab. Select the files generated in the previous step and click [Update].



MAPLE SYSTEMS INC.

808 134th St SW #120
Everett, WA 98204

Phone +1 425-745-3229
Web: www.maplesystems.com

1010-1118 Rev. 0.0