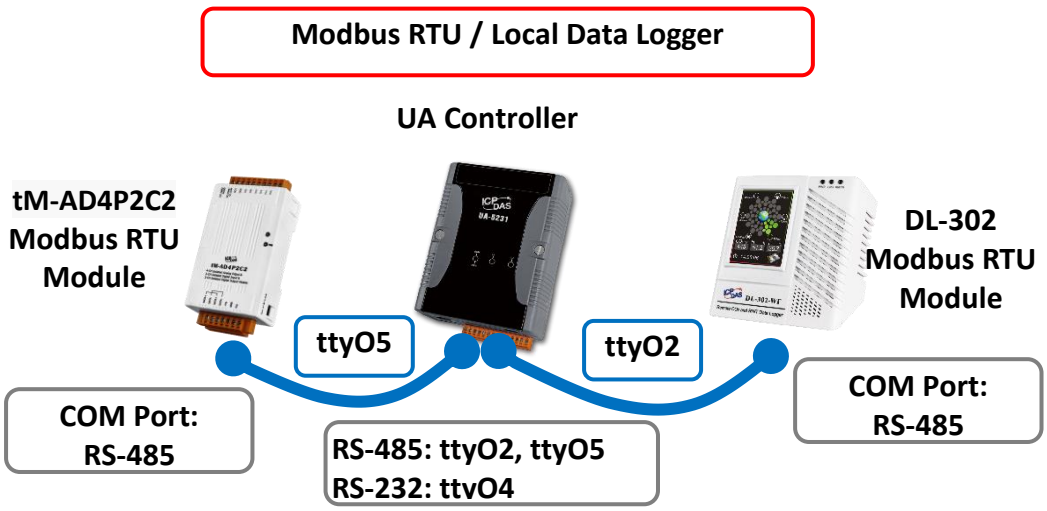
FAQ-DBL-01: UA Web UI Function Wizard – Data Log - How to set up Data Log function: Modbus RTU / Local Data Logger ? (Multi-module example: Use tM-AD4P2C2 + DL-302)

UA series supports Data Logger function. Its Local Data Logger can save I/O data log to **local CSV file**, and record I/O status at the scheduled time. Furthermore, users can set the time interval of which CSV file to generate and divide on the local side. Its Remote Database can import I/O data collection directly into the remote SQL database, e.g. MS SQL, MySQL, Maria …, for the Big Data analysis.

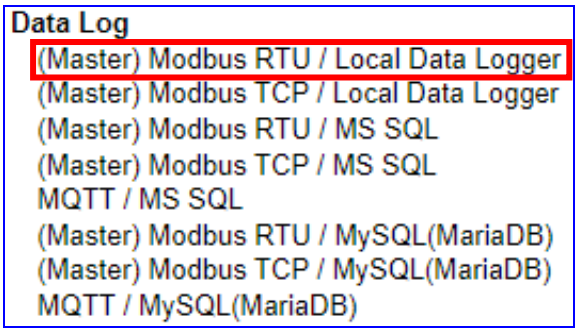
Function Local Data Logger supports to save I/O data log to **Local CSV file in the SD card** of the UA, and can record I/O status at the scheduled time. The Modbus / Local Data Logger settings include Modbus RTU and TCP. Here will introduce Modbus RTU and multi-module as the setting example.

- **Modbus RTU / Local Data Logger**



Note: The hardware/network connection methods please see the UA Manual Chapter 2.

When UA series controller connects the Modbus RTU multiple modules, e.g. **tM-AD4P2C2 (port: ttyO5) and DL-302 (port: ttyO2)**, as the picture. And save the data logger record into the CSV file of microSD card in the UA, user can choose the item [**Modbus RTU / Local Data Logger**] of the "**Data Log**" in the Function Wizard.



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[Step Box]:

The Step Box of the [**Modbus RTU / Local Data Logger**] has the steps as the picture. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the “Step Box” step-by-step and then can complete the project quickly and rightly.



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Step 1. Controller COM Port Setting

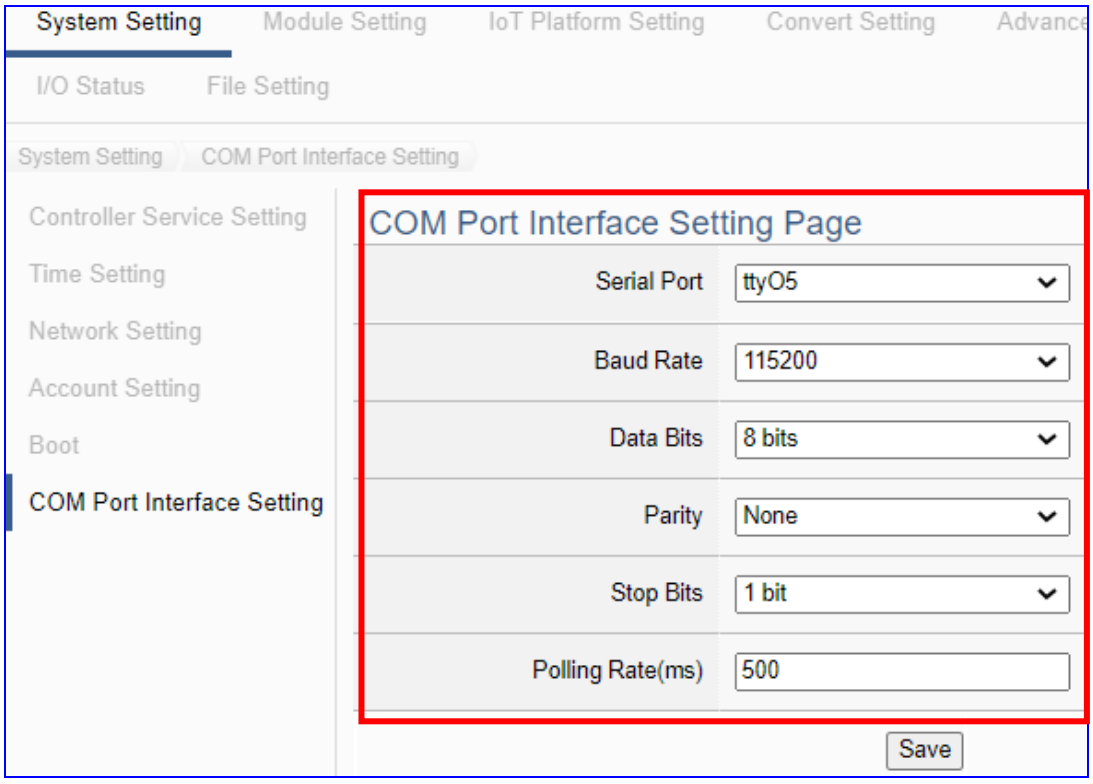


This page allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication. The user can find the default communication values of our I/O modules from the module CD, manual or I/O Module website.

In this example: the communication data of module **tM-AD4P2C2** can be found in the product website https://www.icpdas.com/en/product/tM-AD4P2C2

COM Ports	
Ports	1 x RS-485
Baud Rate	1200 ~ 115200 bps
Data Format	(N, 8, 1), (N, 8, 2), (O, 8, 1), (E, 8, 1)
Protocol	DCON, Modbus/RTU, Modbus/ASCII

Setting as below. **Note: This example uses ttyO5 port to link tM-AD4P2C2 module.**
After settings, click "Save".



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In this example: the communication data of module **DL-302** can be found in the product user manual. https://www.icpdas.com/en/product/DL-302 (as the following)

Address: Sets the address for a module.

Default: 1
Range: 0 ~ 255

Protocol: Sets the communication protocol.

- ModbusRTU (default)
- DCON
- DCONChkSum: uses DCON protocol and enables checksum validation feature

Baud Rate

Default: 9600
Support Baud Rate: 1200/ 2400/ 4800/ 9600/ 19200/ 38400/ 57600/ 115200 (unit: bps)

Parity

Default: N,8,1
Support format: N81, N82, E81, O81

Response Delay (ms): Sets the delay time between receiving the command and sending the data.

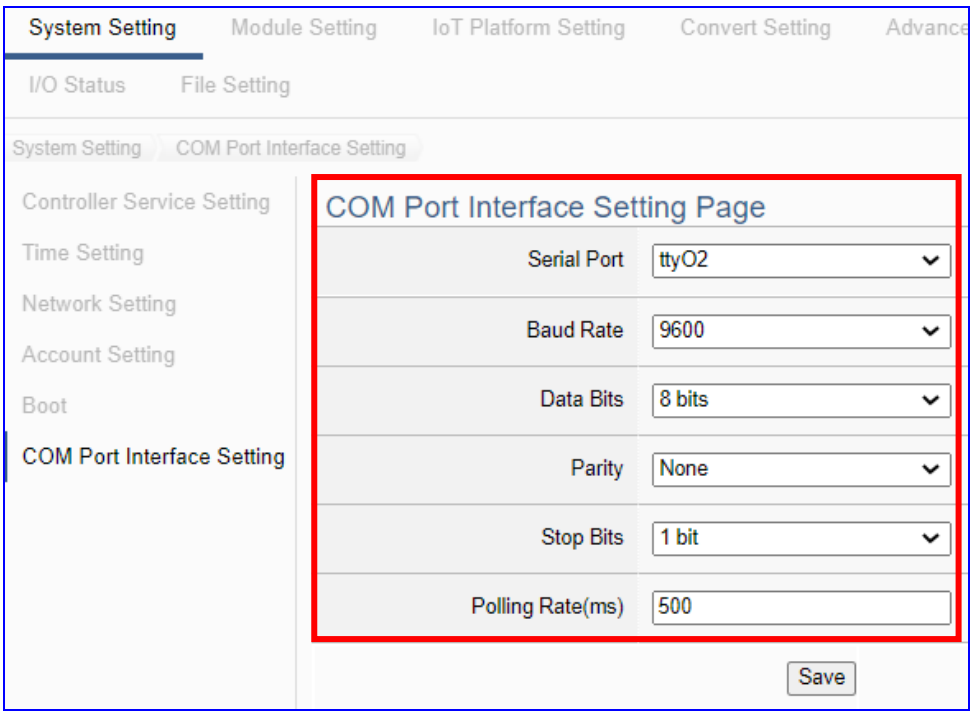
Default: 0 ms
Range: 0 ~ 30 (unit: ms)

Save: Saves the modification and returns to the Settings menu.
All the changes take effect immediately after saving changes.

Skip: Returns to the Settings menu without saving any changes.

Setting as below. **Note: This example uses ttyO2 port to link DL-302 module.**
After settings, click “Save”.

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The descriptions for the setting parameters:

COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click [Save] button could save the settings of this page.

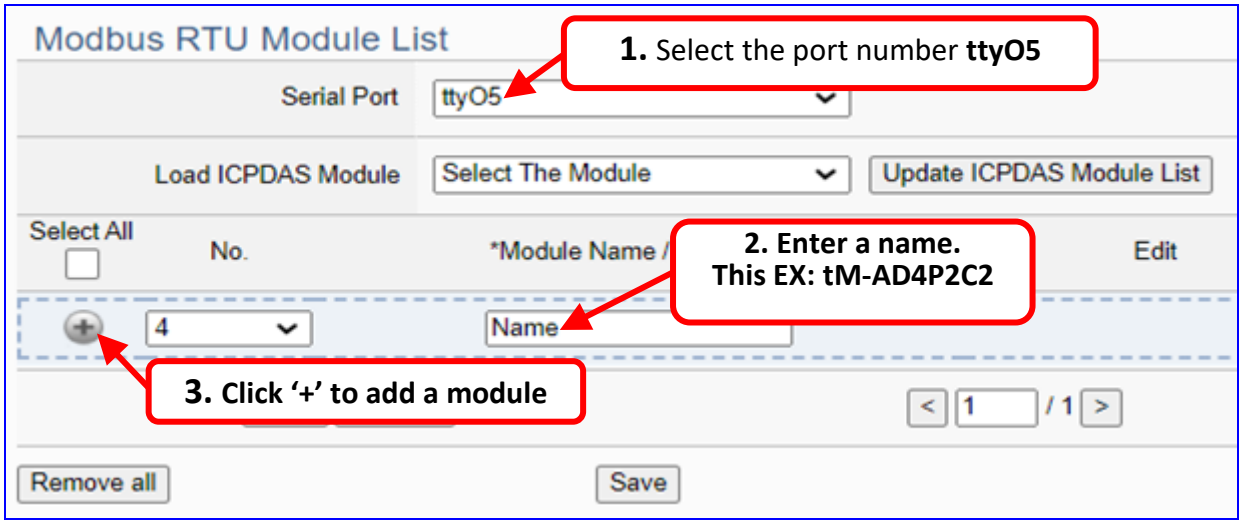
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Step 2. Module Setting

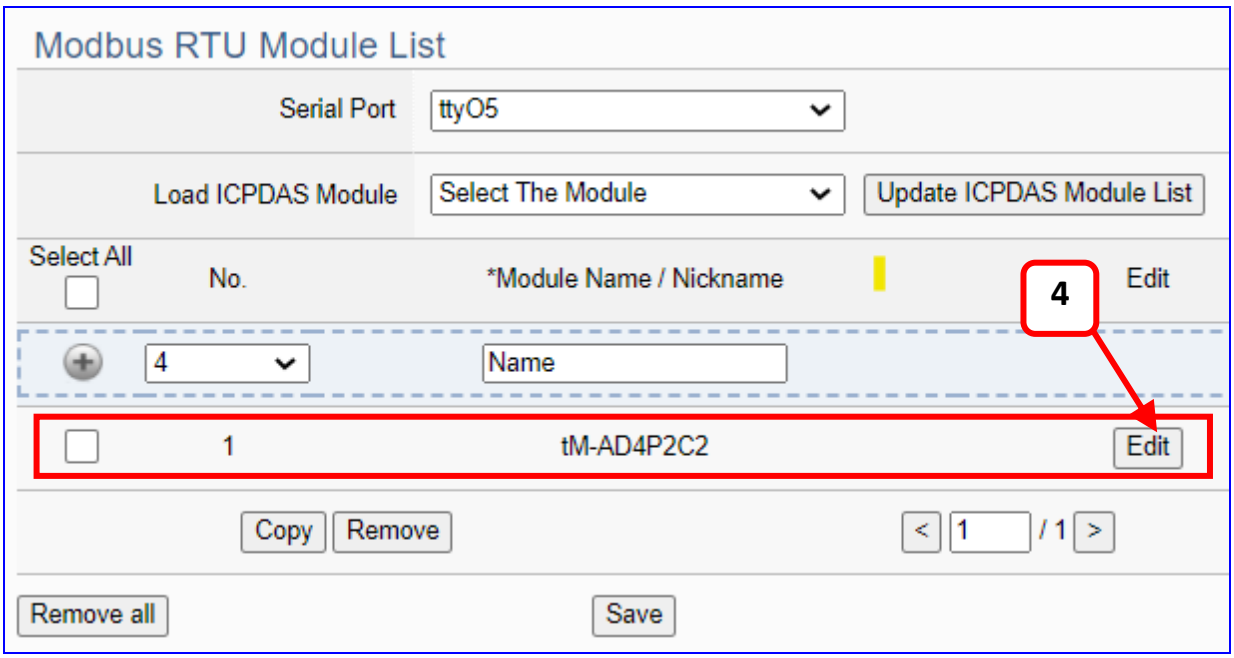


It auto-enter the first step, **Step 2 [Module Setting]** of the UI setting.
This page is for setting the communication values with the connected modules. First check the port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

This example to set up tM-AD4P2C2 : (Port: ttyO5)

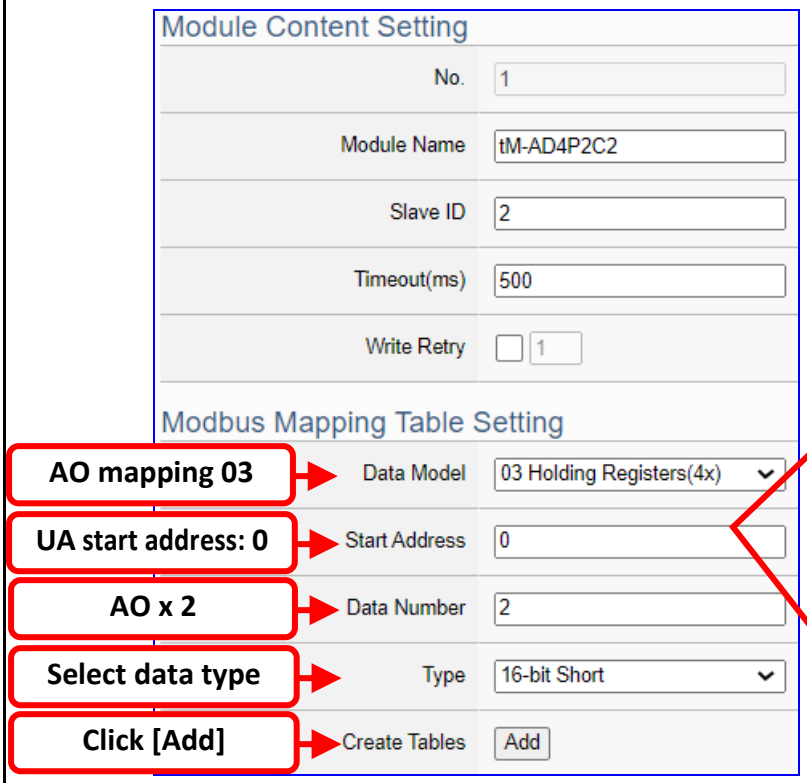


The module (Ex: **tM-AD4P2C2**) is as below, and then click [Edit] button to enter the "Module Content Setting" page.



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[**Module Content Setting**] page can set the module and its Modbus mapping table.



> Modbus Mapping Table Setting:
Set module in the order of Data Model, Start Address and Data Number, then click "Add".

p.s. If select from ICP DAS module list, system will auto setup the Modbus Mapping Table; if not, user can check the Modbus address or I/O number from the module manual or website.

[This Example] tM-AD4P2C2:
Set up **AO x 2**
Data Model: 03 Holding Registers(4x)
Start Address: **0**,
Data Number: **2**,
Type: **16-bit Short**,
click [**Add**], as the left picture.

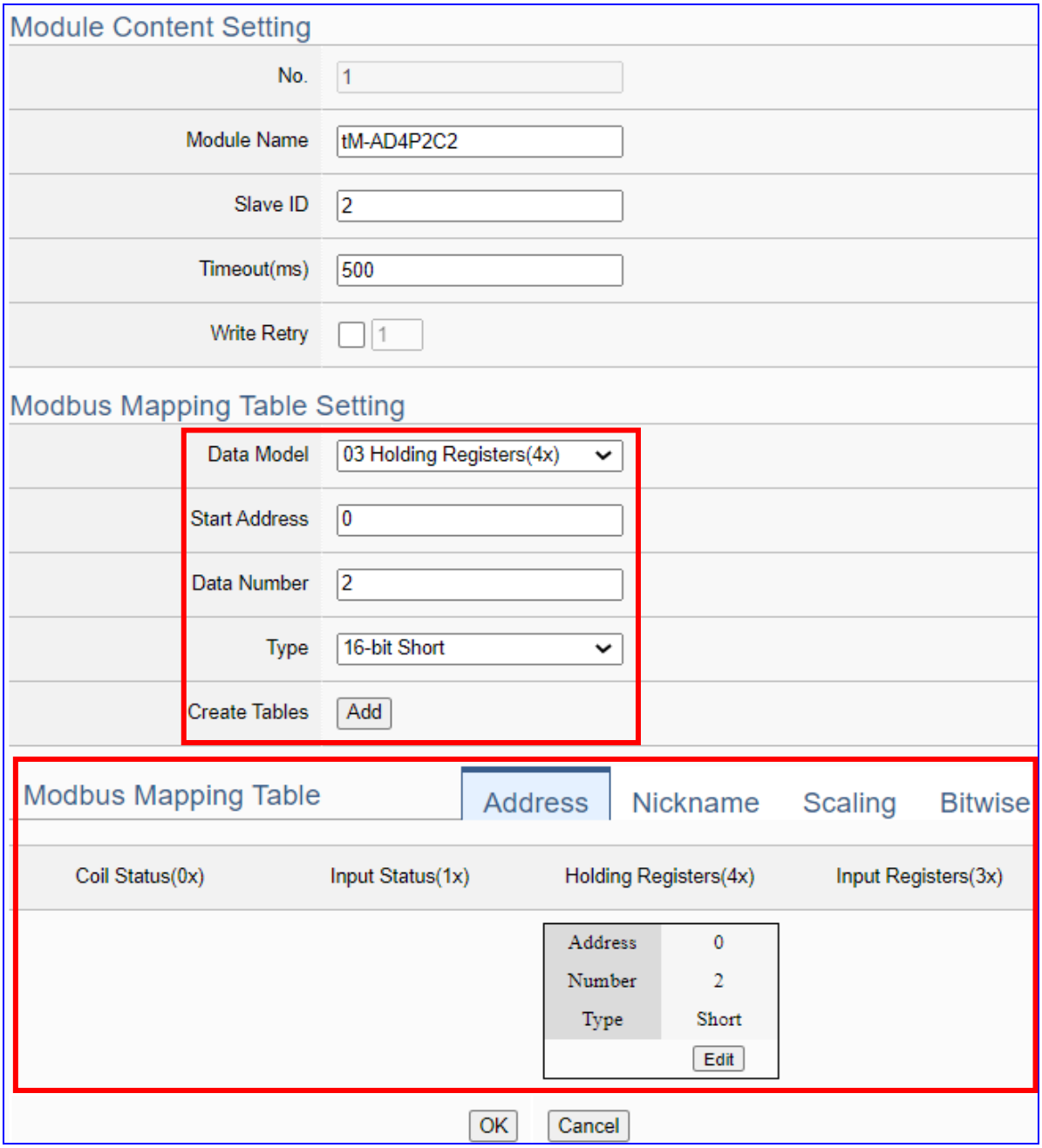
Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Write Retry	Check: If there is no response after the set time, it will retry to write again, max. 3 times.
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI) 01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

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[**Module Mapping Table**] page can set up the Modbus mapping table.

If select from the ICP DAS module list, system will auto-setup the module and its Modbus Mapping Table. **If not, user needs to check the module data and set up the module.** Such as this example, we check the module manual and set up the **tM-AD4P2C2** with 2 AO. The **Address** of the Modbus Mapping Table is as following.

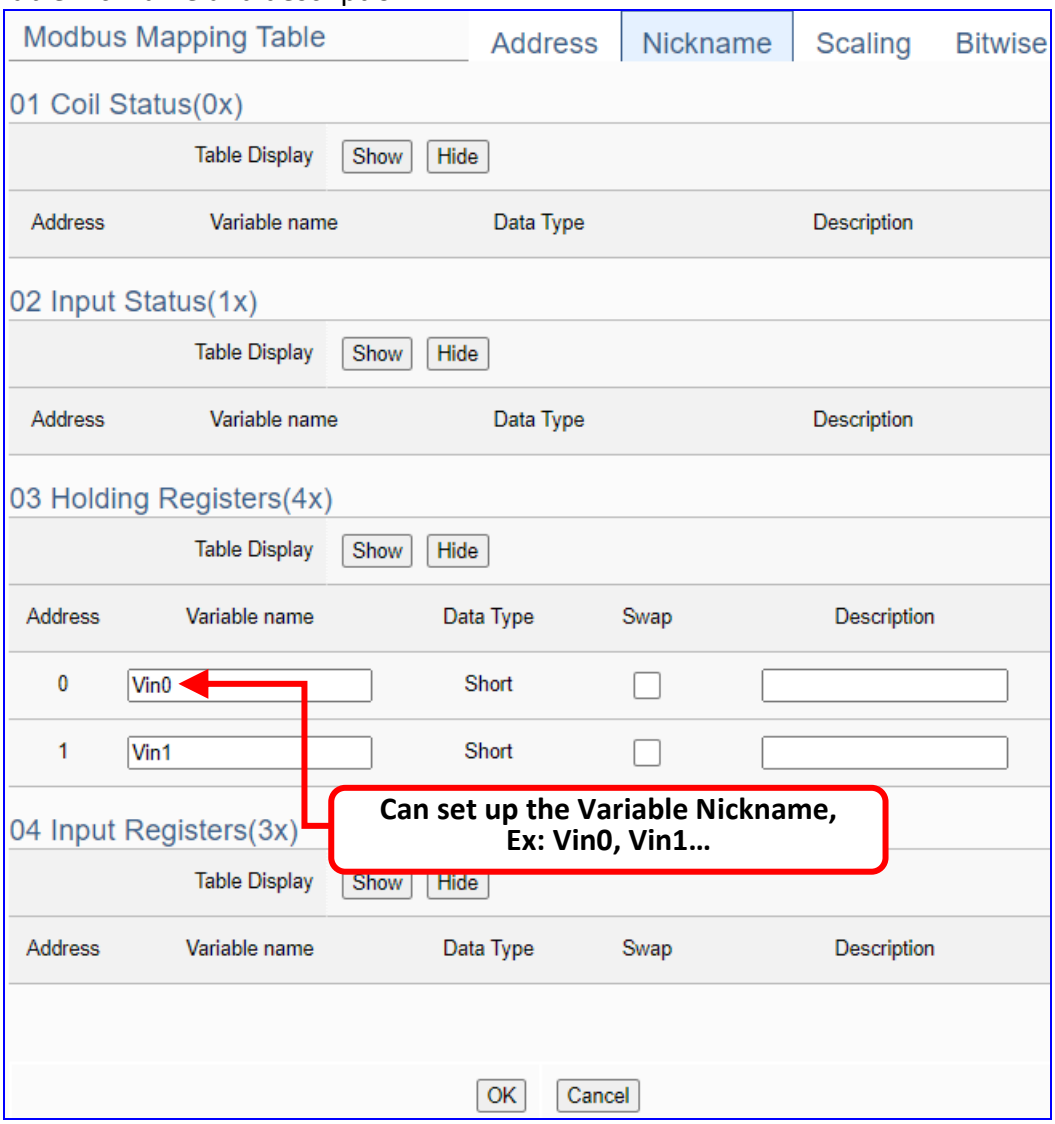
Address:
Display and edit the Modbus Mapping Table.



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Nickname:

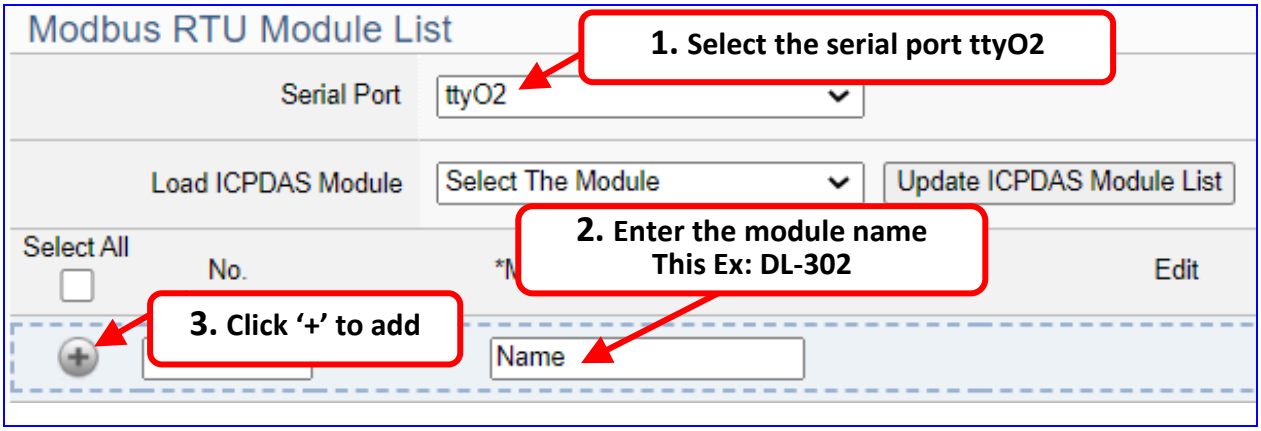
Setting the variable nickname and description.



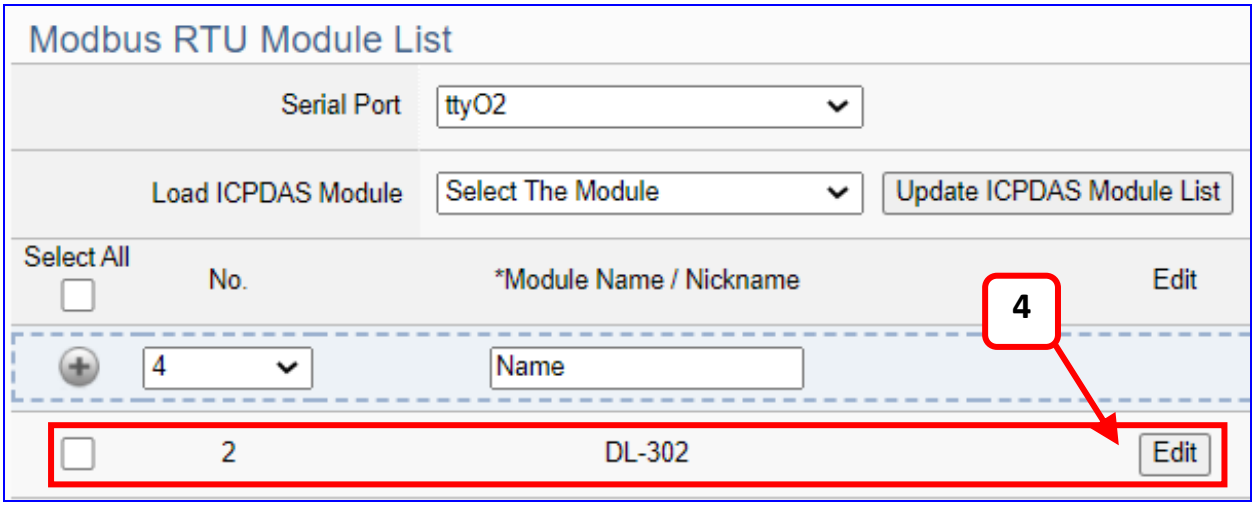
Modbus Mapping Table – Nickname	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

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This example: use the same way to set up DL-302 (Serial Port: ttyO2)



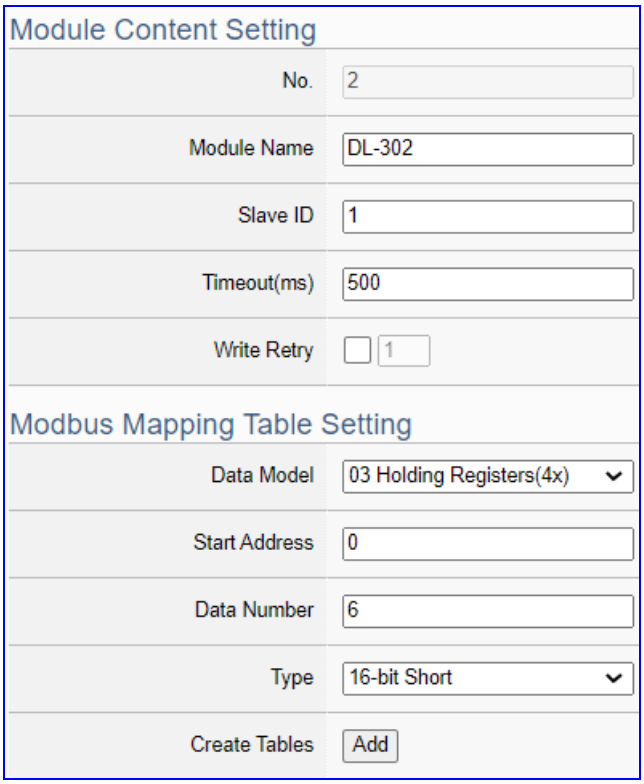
Add a module (as the picture, this example: **DL-302**), and then click the [Edit] of the module to enter the screen of "Module Content Setting".



If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

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[**Module Content Setting**] page can set up the module and the Modbus mapping table



This Example: DL-302
Set up AO Short x 6

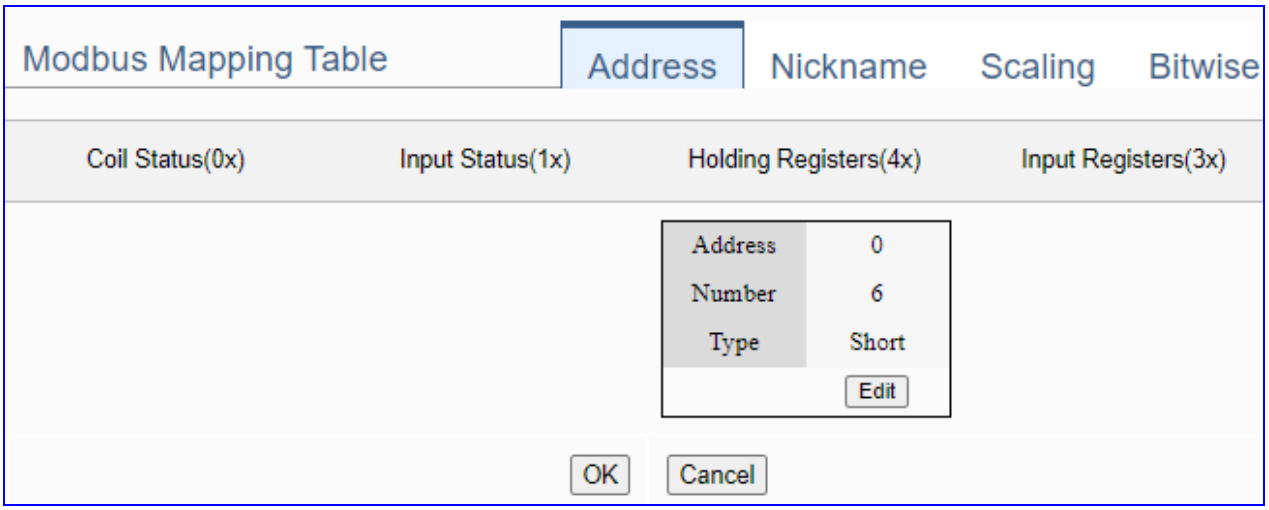
[Modbus Mapping Table Setting]
Data Models: 03 Holding Registers(4x)
Start Address: 0
Data Number : 6
Type: 16-bit Short
→ Click [Add]

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Write Retry	Check: If there is no response after the set time, it will retry to write again, max. 3 times.
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI) 01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

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The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

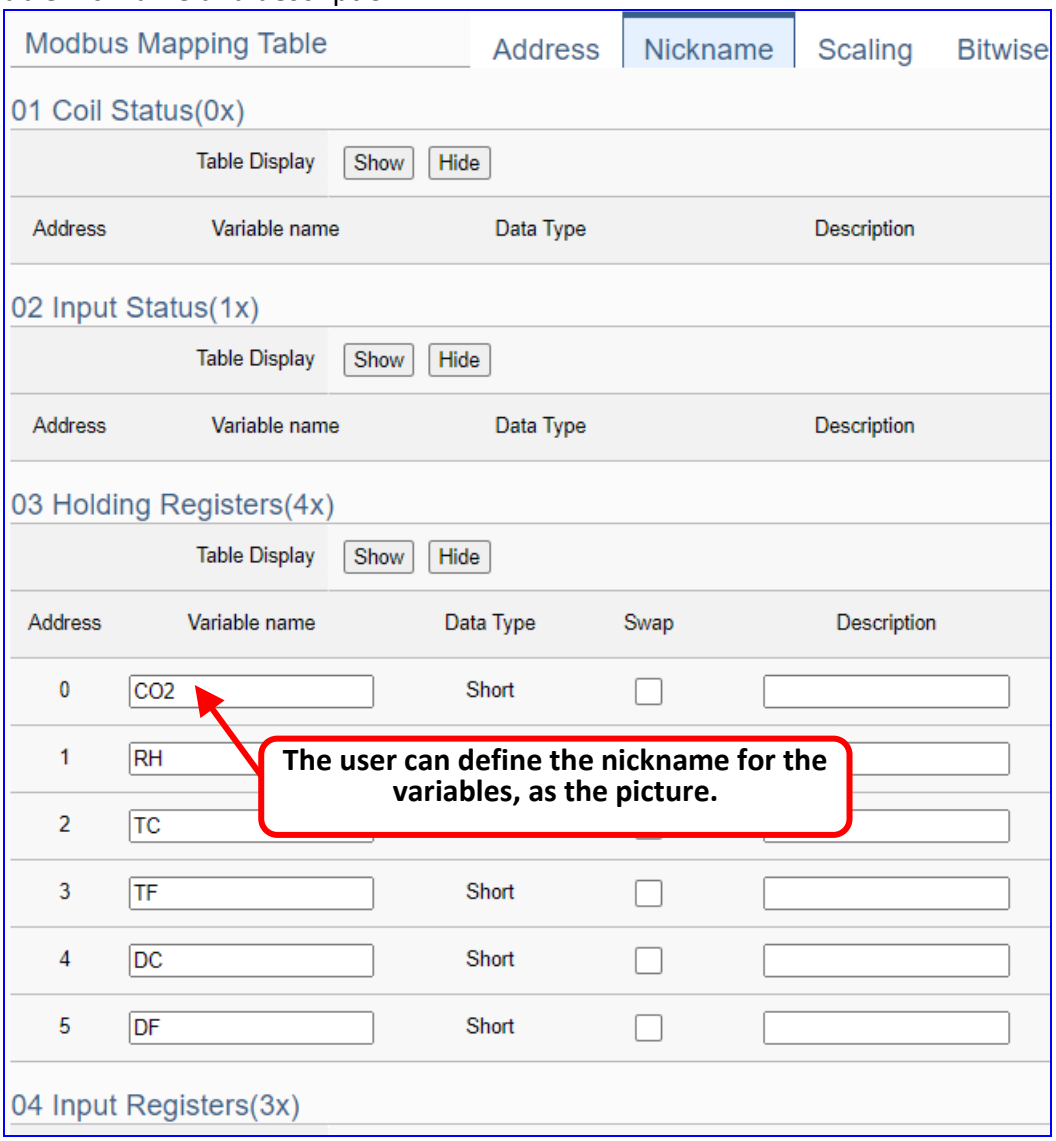
Address:
Display and edit the Modbus Mapping Table.



Modbus Mapping Table – Address	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.

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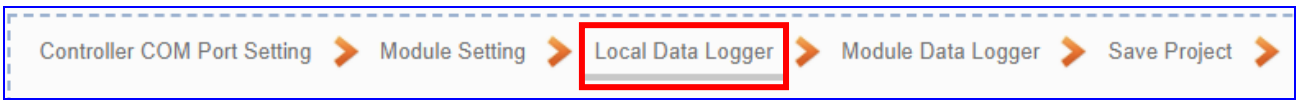
Nickname:
Setting the variable nickname and description.



Modbus Mapping Table – Nickname	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

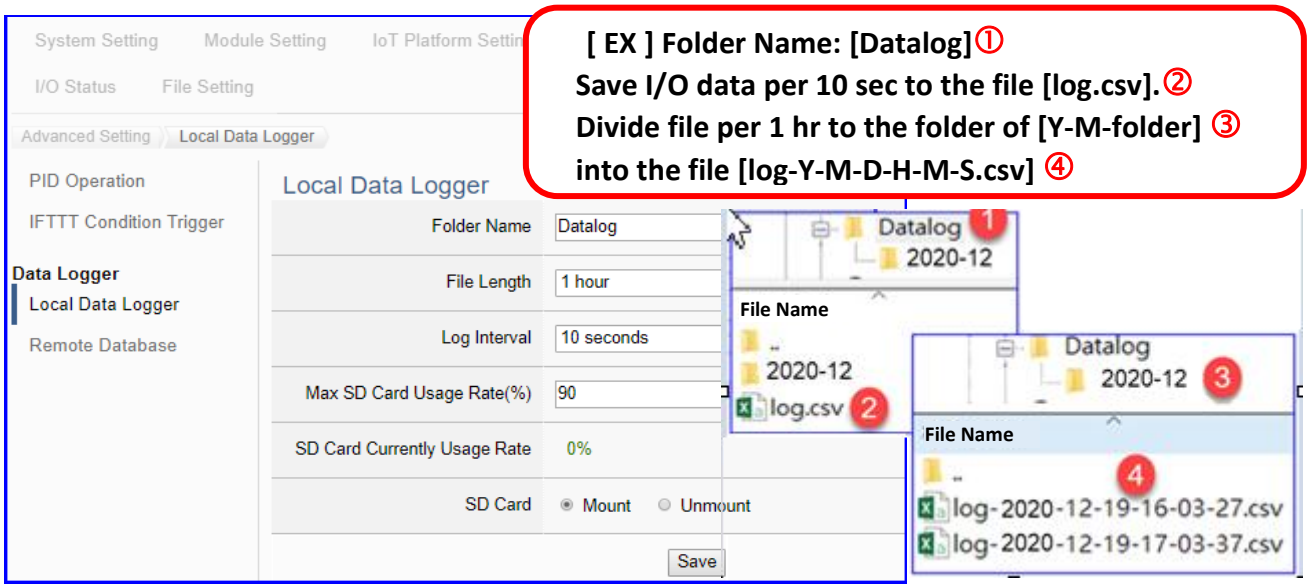
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Step 3. Local Data Logger



Click the next step, and enter the **Step 3 [Local Data Logger]** of the UI setting. This page is for setting the saving microSD card, e.g. the folder name, file length, log interval, card usage rate, and mount/unmount.
We select the “Modbus RTU / Local Data Logger” conversion at the beginning, so this step will auto enter the [**Data Logger > Local Data Logger**] page of Advanced Setting.

Before setting the parameters, user can refer to the "Example of the Log file and fields for the local data log file" that after the step 6.



Advanced Setting > Data Logger > Local Data Logger	
Folder Name	The folder name in microSD card of UA, user definable. The I/O data will save into the file “log.csv” under this folder.
File Length	Unit: hour. User can select per 1, 2, 3, … 8, 12, or 24 hours to divide the log.csv into the file “log-Y-M-D-H-M-S.csv” under the folder “Y-M”. (e.g. 2020-12)
Log Interval	The interval to save I/O data per seconds, minutes or hours.
Max SD Card Usage Rate (%)	Set up the maximum usage rate (Unit: %) of UA microSD card. If the data current rate meet the max rate, the oldest data will be removed first.
SD Card Currently Usage Rate	Display the current usage rate of UA microSD card (show %).
SD Card	Mount: Click to mount microSD card and begin to record data. Unmount: Click to unmount microSD card and stop record data.
Save	Click to save the settings of this item.

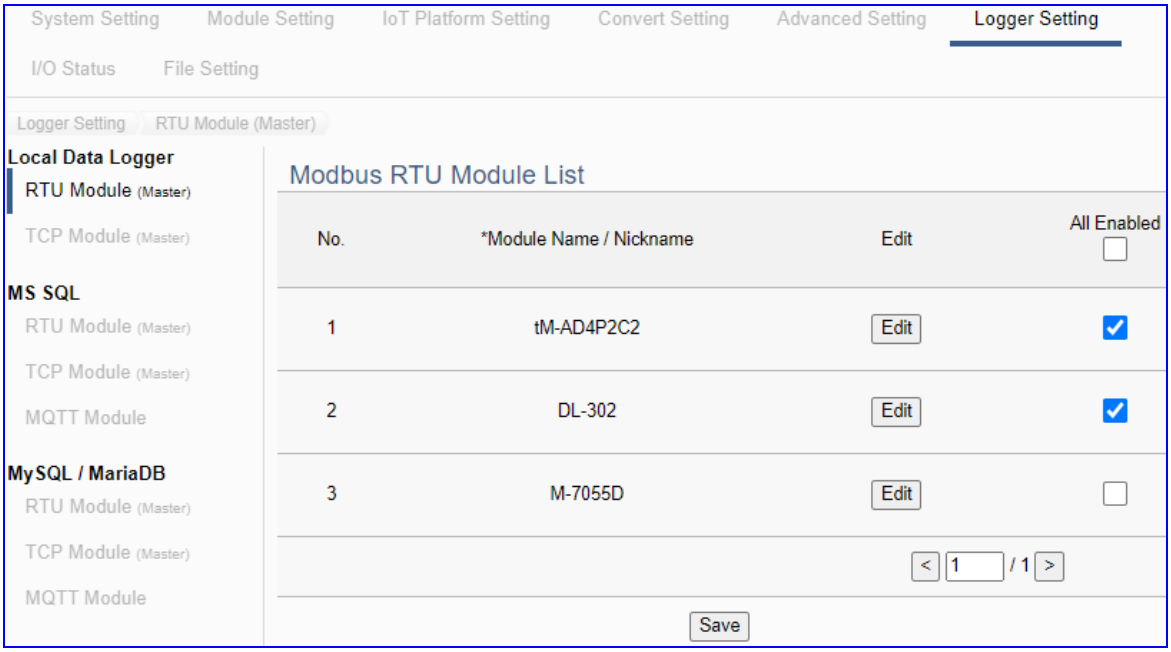
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Step 4. Module Data logger



Click the next step, and enter the **Step 4 [Module Data logger]** UI setting. This step is for enabling the Modbus TCP module for Local Data Logger.
We select the “Modbus RTU / Local data logger” of Data Log at the beginning, so this step will auto enter the [**Local Data Logger > RTU Module (Master)**] page of Logger Setting. The “Step Box” will prevent the user from selecting the wrong platform.

Check the box of the module user wants to do the data logger, **e.g. tM-AD4P2C2 and DL-302**

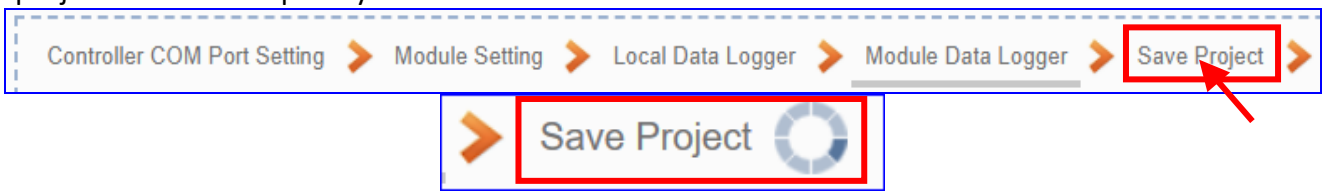


Logger Setting > Local Data Logger > TCP Module – Modbus TCP Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled ☑ / ☐	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module.
Edit	If user wants to enable some I/O channels for data logger, click [Edit] of that module to enter the “Content Setting”. It is normal to set all channels as enabled, and the function will not affect the unconnected channels.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

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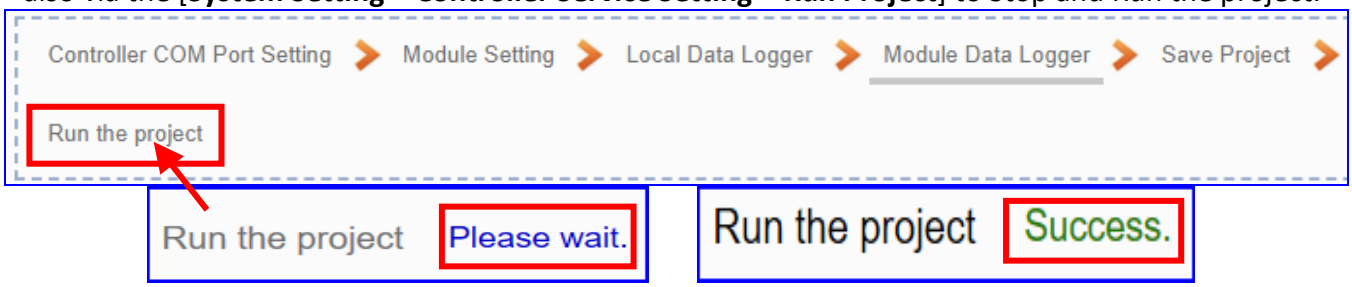
- **Step 5. Save Project**

The setting of this example is finished now. Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



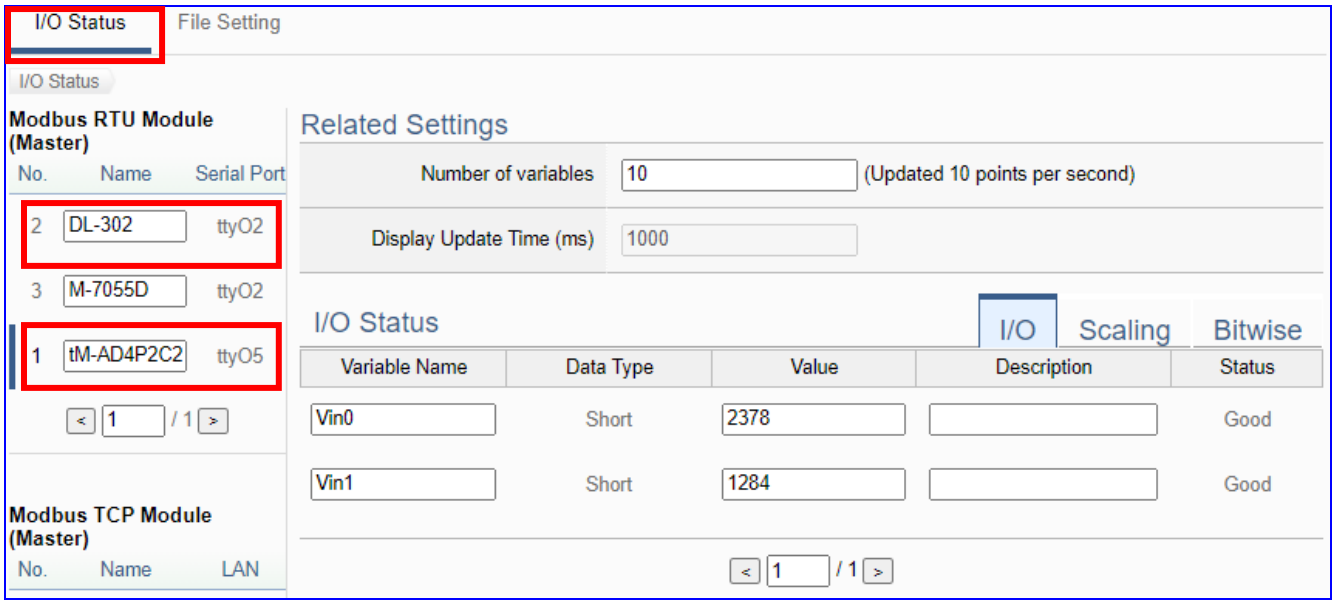
- **Step 6. Run the Project**

The project, after saving, needs to be executed. Click the next step **[Run the Project]**. This step can also via the [**System Setting** > **Controller Service Setting** > **Run Project**] to Stop and Run the project.



When the words "**Please wait**" disappears, the new words "**Success**" appears, that means the UA controller is running new project successfully. Then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

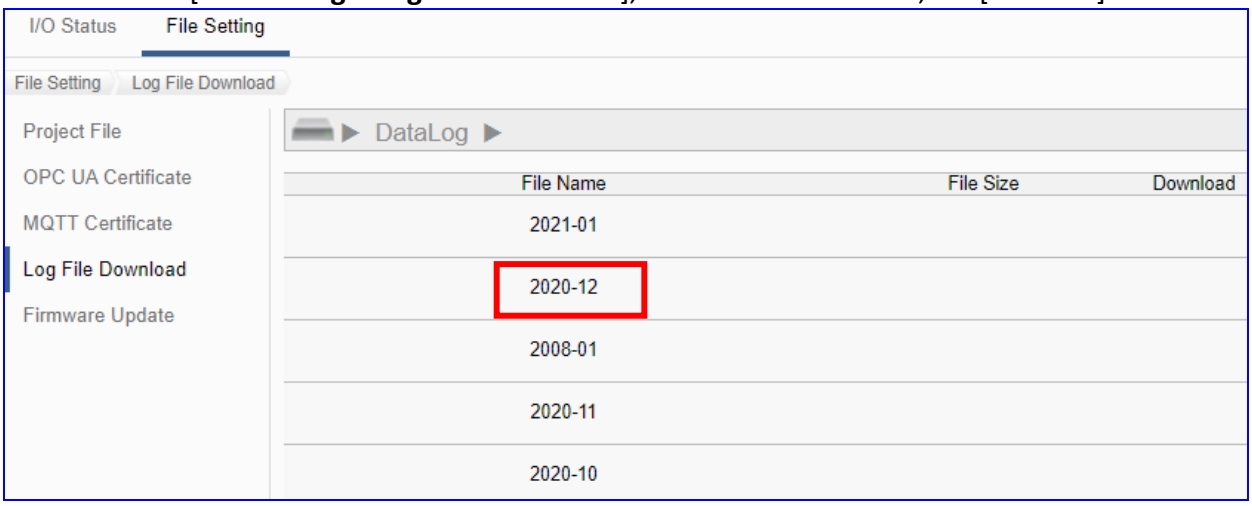
The new project now completes the setting, uploading and running in the UA controller and can process the Data Logger function. Users can see the I/O status from the menu [**I/O Status**]. For more about the Web UI settings, please refer to CH4 and CH5.



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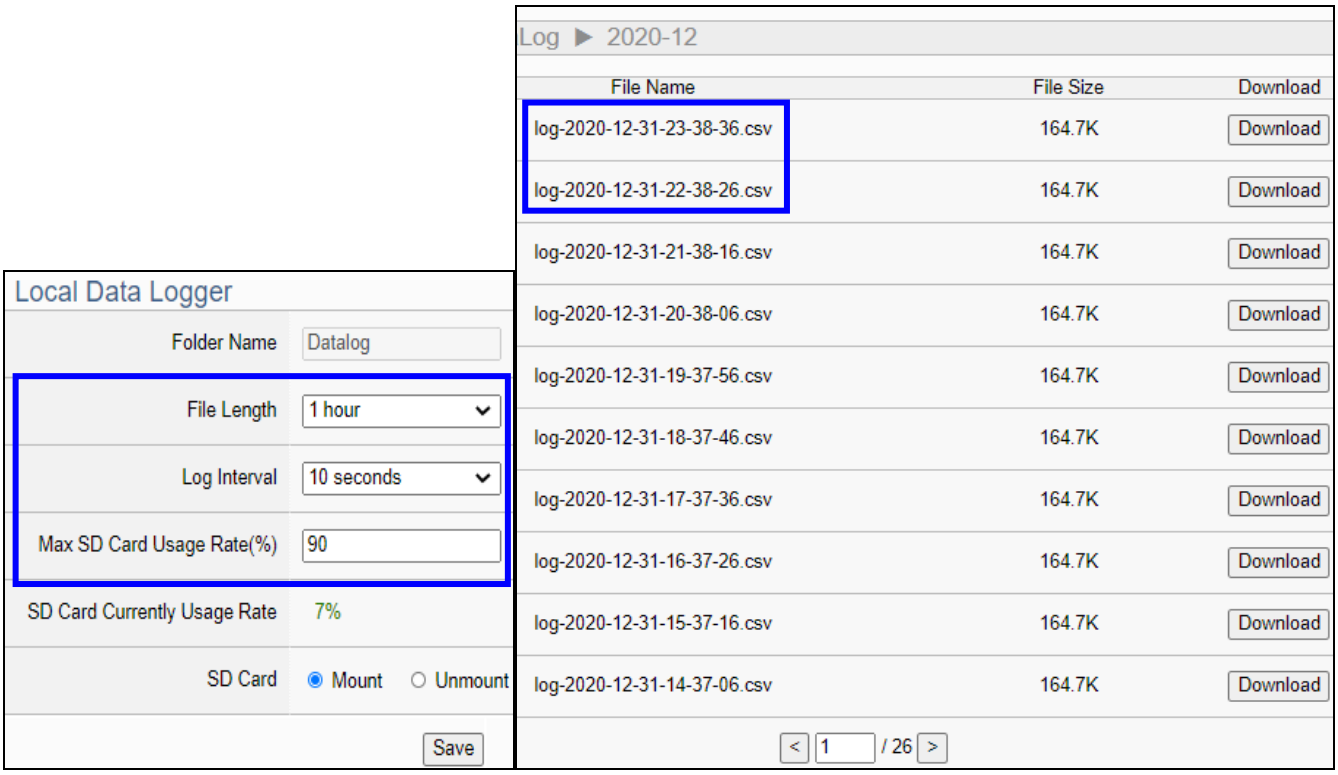
- **Get the Log File of the Local Data Logger:**

1. Enter the menu [**File Setting > Log File Download**], click the folder name, ex: [2020-12].



2. Download the Log file you need. The relationship of file name and the time is as below:
   The log file is divided according to the "**File Length**" set by the user and stored in the file under the **"year-month" folder**. The file name/example is as follows:
   "**log-20xx(year)-xx(month)-xx(day)-xx(hour)-xx(minute)- xx(seconds).csv**"

[Example]: Set **"File Length"** as **1 hr.**, "**Log interval**" as **10 Sec.,** and data recording will be performed every 10 seconds, and the file generation time is **every 1 hour + 10 seconds**. When the system time comes to these specific times, the file will automatically end and save the file to the storage. The system will generate a new file to continue recording the log data of the next 1 hour + 10 seconds, and so on. When all files are saved to over the setting of **"Max SD Card Usage Rate(%)", the oldest file will be overwritten**.



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- **Example of the CVS file and fields for the local data log file:**

✧ The Log record will be stored to the microSD card in the UA PAC, and the default name is the **folder** "**Datalog**" which can be customized by the user.
✧ I/O data records will be stored in the **file** "**log.csv"** under this folder.
✧ The log data file is divided every 1, 2, 3… 8, 12 or 24 hours according to user settings, and saved to the **file** "**log-YYYY-MM-DD-HH-MM-SS.csv**" under the **folder** "**YYYY-MM**".
✧ Each tag data and status are recorded in each separate row, **the row is added down for each interval**, and the tag data is recorded in time sequence.

The example file is shown as the following.

	A	B	C	D
1	# Log file created/rotated Wednesday	9 Dec 20 04:46:29 GMT		
2	Timestamp	Name	Value	Status
3	2020-12-09-12-46-29-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
4	2020-12-09-12-46-29-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1133	Good
5	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.CO2	699	Good
6	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.RH	7089	Good
7	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.TC	2225	Good
8	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.TF	7205	Good
9	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.DC	1671	Good
10	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.DF	6207	Good
11	2020-12-09-12-46-39-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
12	2020-12-09-12-46-39-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1152	Good
13	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.CO2	699	Good
14	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.RH	7089	Good
15	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.TC	2225	Good
16	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.TF	7205	Good
17	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.DC	1671	Good
18	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.DF	6207	Good
19	2020-12-09-12-46-49-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
20	2020-12-09-12-46-49-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1172	Good
21	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.CO2	699	Good
22	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.RH	7085	Good
23	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.TC	2225	Good
24	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.TF	7205	Good
25	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.DC	1670	Good
26	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.DF	6206	Good
27	2020-12-09-12-46-59-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
28	2020-12-09-12-46-59-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1193	Good
29	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.CO2	698	Good
30	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.RH	7089	Good
31	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.TC	2223	Good
32	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.TF	7201	Good
33	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.DC	1668	Good
34	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.DF	6202	Good
35	2020-12-09-12-47-09-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
36	2020-12-09-12-47-09-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1213	Good

log-2020-12-09-12-46-29

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