● How to connect UA product with tGW product for Modbus TCP? (Take tGW-715 as an example)

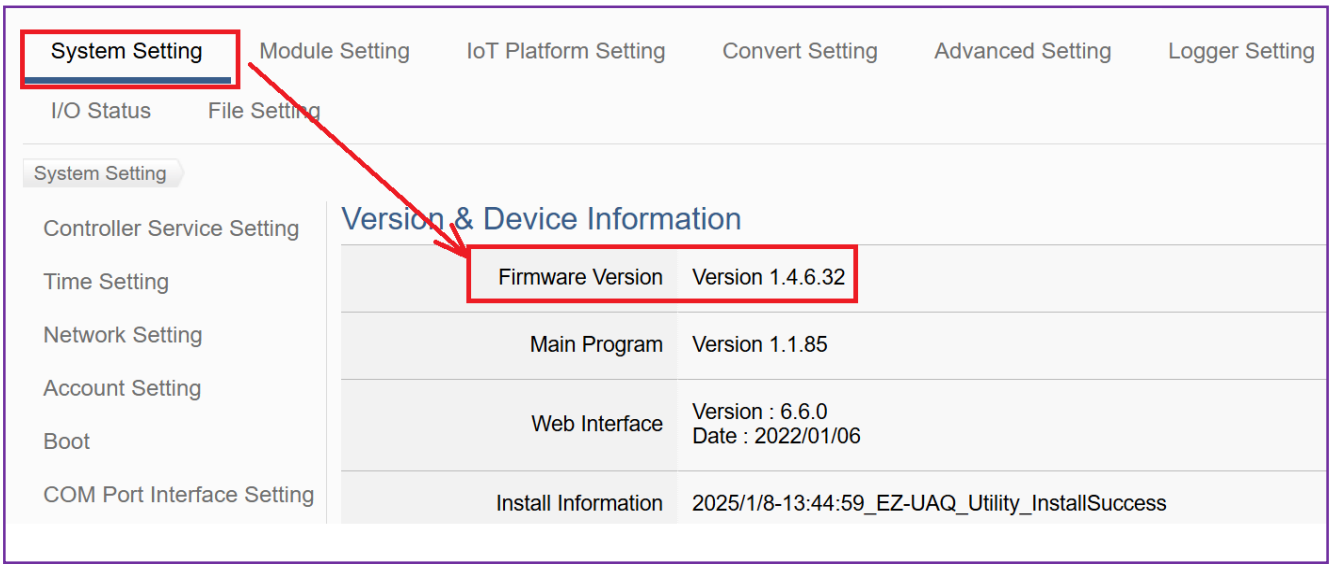
ICP DAS UA series products provide a service to convert Modbus to other communication protocols. This FAQ explains how to use UA-5231 (Modbus Master) to connect Modbus TCP with tGW series (Modbus Slave).

(This example uses **UA-5231 v1.4.6.0 + tGW-715 [RevB241]**)

1. Check the Firmware version of UA products and tGW series products.

Description: Please ensure that the firmware for both products is the latest.

For UA series products, users can go to the product webpage [**System Setting**] to check the current Firmware version number and whether it is the same as the latest Firmware version on the ICP DAS website.



For tGW series products, please check the Firmware version according to the manual p.57.
https://www.icpdas.com/web/product/download/industrial_communication/uart/ethernet/tgw-700/document/manual/tGW-700_GW-2200_User_Manual_en.pdf

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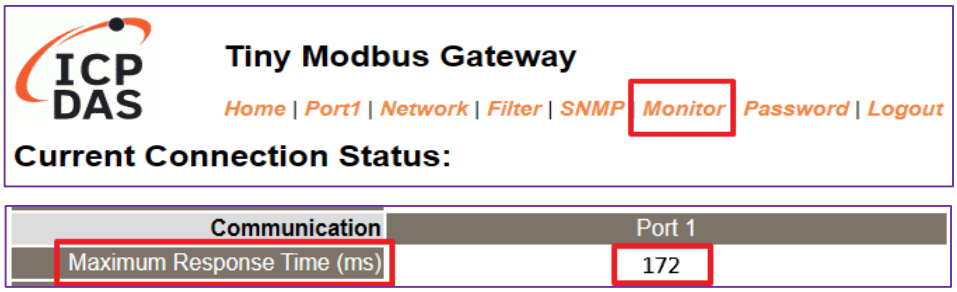
2. Modbus Parameter Setting for tGW Series

Description: The parameter settings are according to the tGW series [FAQ-SW030: How to set the Timeout Value in tSH-700?]. For tGW series Timeout parameter and setting, please refer to the FAQ-SW030:
https://www.icpdas.com/web/product/download/industrial_communication/uart/tiny_series_faq/faq_sw_en_30.pdf

The brief formula mentioned in the FAQ is listed above:

A = **Max. Response time of all Slave devices**
B = A + 100 = **Slave Timeout value in tGW Series**
C1 = B + 100 = **Response Timeout value in Master program (Apply in 1 Master to 1 Slave)**
C2 = C1 * [Number of Connections] = **Response Timeout value in Master program (Apply in 2 Masters to 1 Slave)**

The [**Max. Response time of all Slave devices**] of the tGW product in this example:
Enter the tGW-715 setting webpage, check the value of **Module Website > Monitor > Communication > Maximum Response Time (ms)**



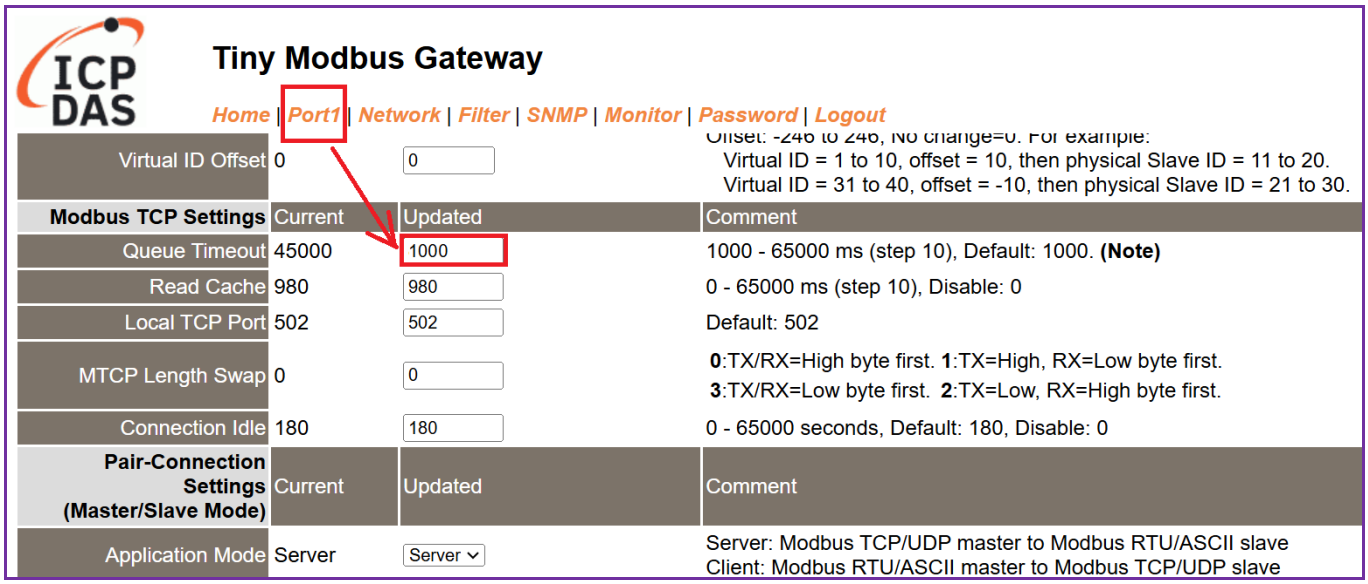
The value of [**Max. Response time of all Slave devices**] is 172 ms. So, follow the formula:

A = 172 ms [**Max. Response time of all Slave devices**]
B = A + 100 = 272 ≈ 300 ms [**Slave Timeout value in tGW Series**]
C1 = B + 100 = 400 ms [**Response Timeout value in Master program (Apply in 1 Master to 1 Slave)**]
C2 = C1 * 2 Connections = 800 ms [**Response Timeout value in Master program (Apply in 2 Masters to 1 Slave)**]

According to the formula, the [Maximum response value of the Slave devices] is 800 ms.

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Here is an example of two Modbus TCP Masters connecting to the same tGW-715.
We need to adjust the Queue Timeout of Port1 on the module web page to the Timeout value of C2.
If C2 is less than or equal to the default value of 1000, then no adjustment is needed.
The value calculated here is 800, which is less than 1000.
Therefore, no further adjustment is needed here, and the set value of 1000 is retained.

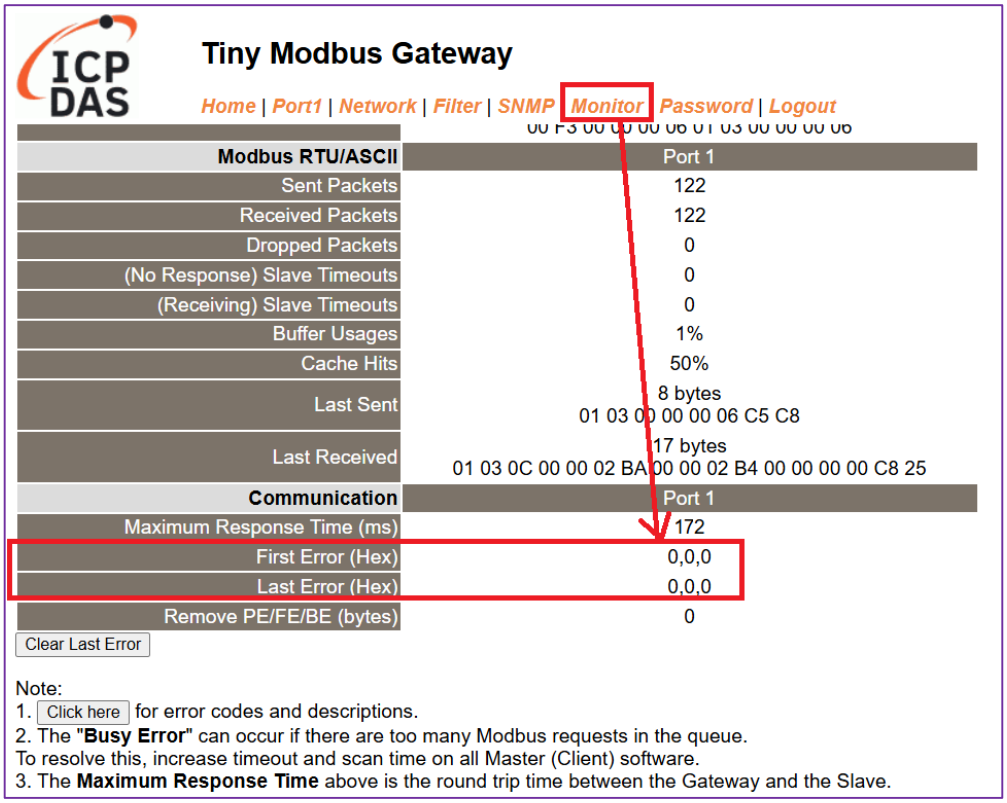


Tiny Modbus Gateway

Home | Port1 | Network | Filter | SNMP | Monitor | Password | Logout

Virtual ID Offset	0	0	Offset: -246 to 246, No change=0. For example: Virtual ID = 1 to 10, offset = 10, then physical Slave ID = 11 to 20. Virtual ID = 31 to 40, offset = -10, then physical Slave ID = 21 to 30.
Modbus TCP Settings	Current	Updated	Comment
Queue Timeout	45000	1000	1000 - 65000 ms (step 10), Default: 1000. **(Note)**
Read Cache	980	980	0 - 65000 ms (step 10), Disable: 0
Local TCP Port	502	502	Default: 502
MTCP Length Swap	0	0	**0**:TX/RX=High byte first. **1**:TX=High, RX=Low byte first. **3**:TX/RX=Low byte first. **2**:TX=Low, RX=High byte first.
Connection Idle	180	180	0 - 65000 seconds, Default: 180, Disable: 0
Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Server	Server	Server: Modbus TCP/UDP master to Modbus RTU/ASCII slave Client: Modbus RTU/ASCII master to Modbus TCP/UDP slave

Please make sure there are no error codes in the Monitor.



Tiny Modbus Gateway

Home | Port1 | Network | Filter | SNMP | Monitor | Password | Logout

Modbus RTU/ASCII	Port 1
Sent Packets	122
Received Packets	122
Dropped Packets	0
(No Response) Slave Timeouts	0
(Receiving) Slave Timeouts	0
Buffer Usages	1%
Cache Hits	50%
Last Sent	8 bytes 01 03 00 00 00 06 C5 C8
Last Received	17 bytes 01 03 0C 00 00 02 BA 00 00 02 B4 00 00 00 00 C8 25
Communication	**Port 1**
Maximum Response Time (ms)	172
First Error (Hex)	0,0,0
Last Error (Hex)	0,0,0
Remove PE/FE/BE (bytes)	0

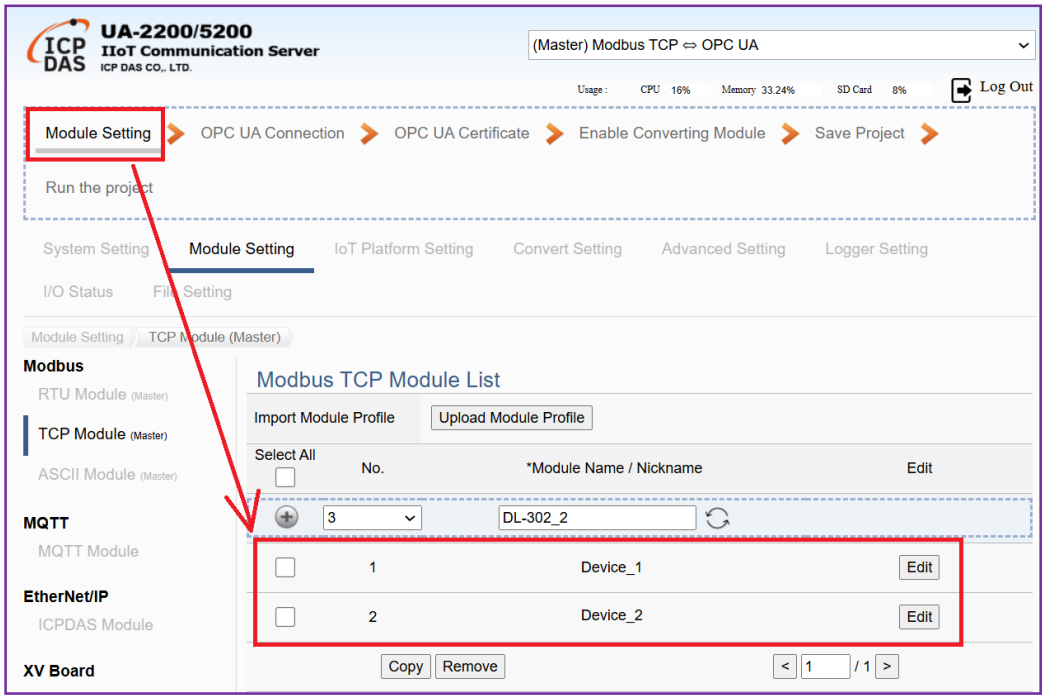
Clear Last Error

Note:
1. Click here for error codes and descriptions.
2. The **"Busy Error"** can occur if there are too many Modbus requests in the queue.
To resolve this, increase timeout and scan time on all Master (Client) software.
3. The **Maximum Response Time** above is the round trip time between the Gateway and the Slave.

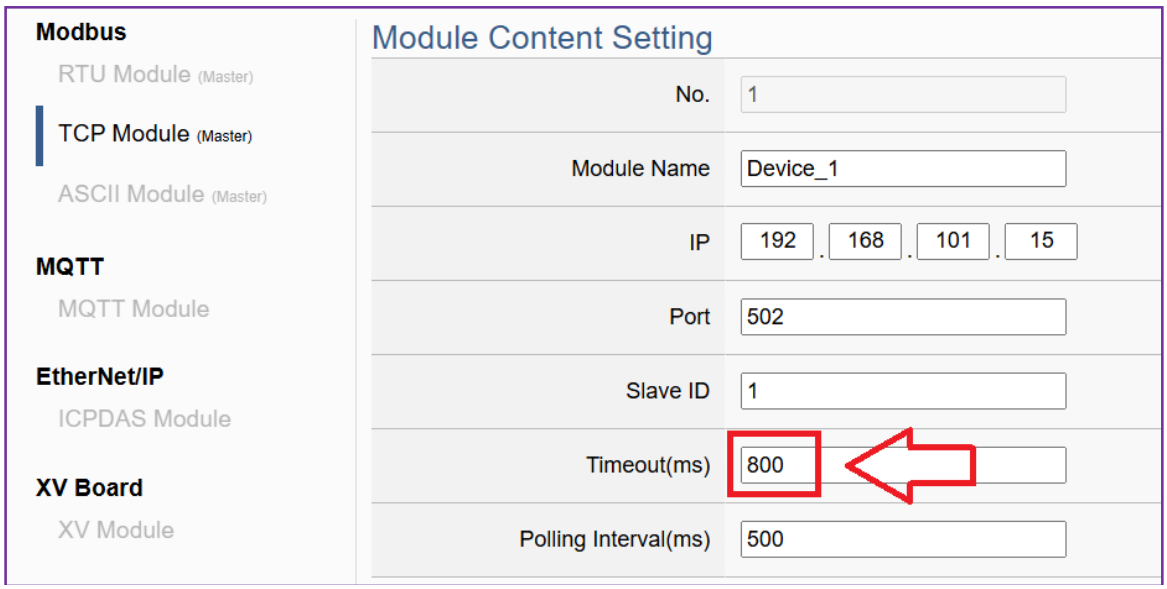
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3. Modbus Parameter Setting for UA Series

Please check the number of Modbus connections for UA series. In the UA setting webpage, two modules are connected to Modbus TCP, so the UA series will initiate 2 Modbus TCP Master connections.
In this example, two modules are connected to the same tGW series.



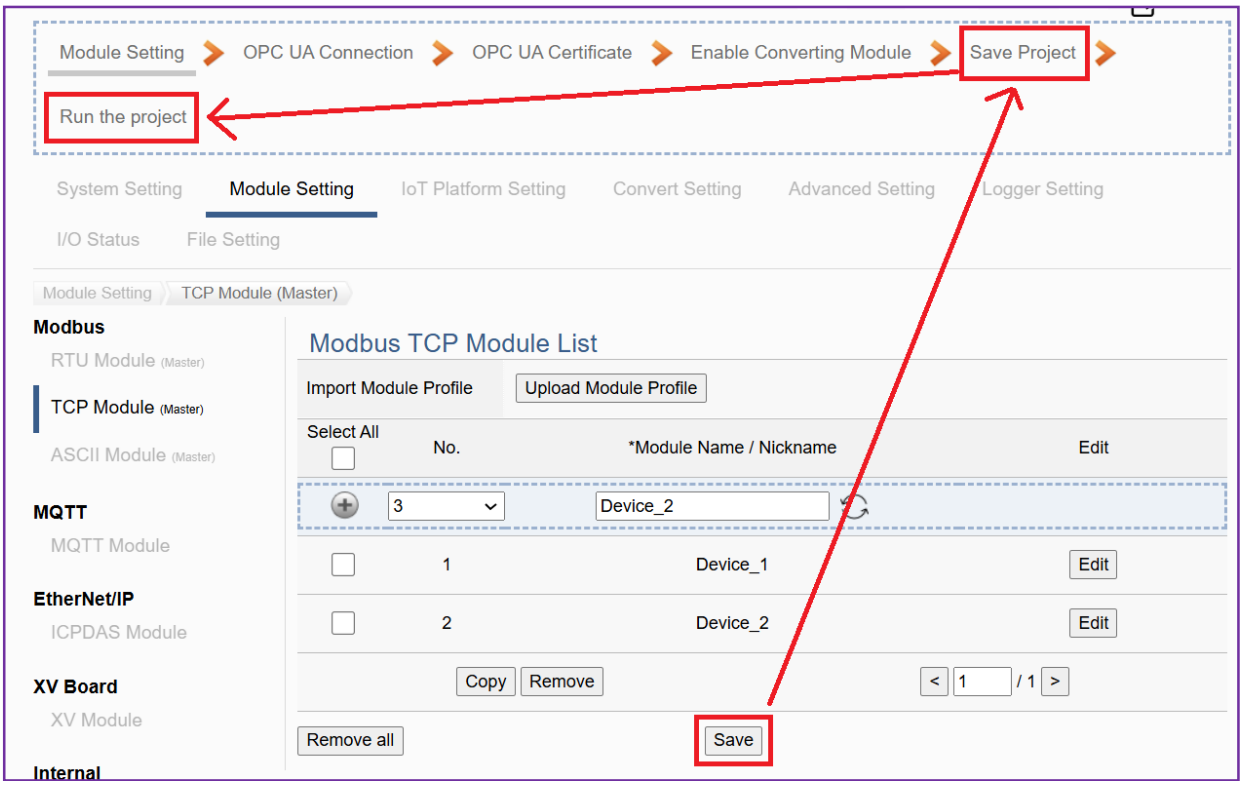
Click [Edit] to enter the setting screen. Since there are 2 connections initiated, so:
C2 = C1 * 2 Connections = 800 ms [**Response Timeout value in Master program (Apply in 2 Masters to 1 Slave)**]
Fill in the Timeout(ms) field with the C2 value according to the formula above (as shown below).



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After setting the Timeout Time (ms) for the module, click [**Save**] and then follow the steps to set up for all the modules.

Then click [**Save Project**] and then [**Run the Project**] to finish the setting (as shown below).



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