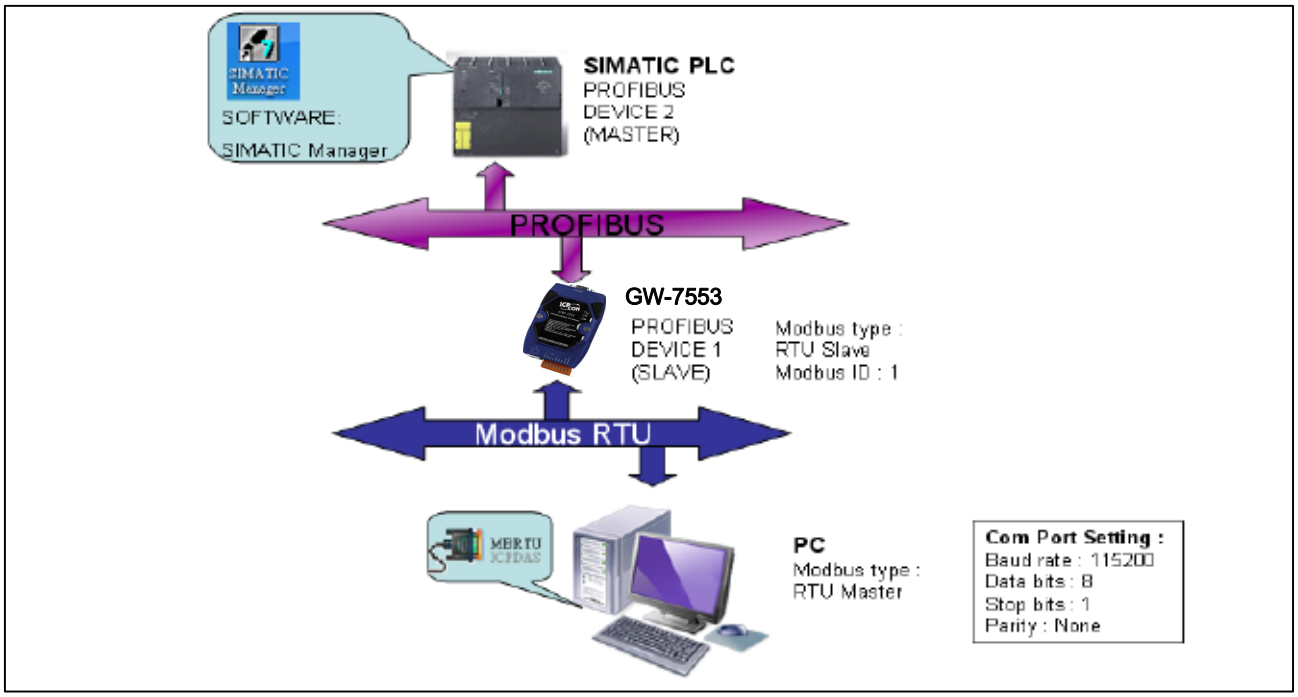
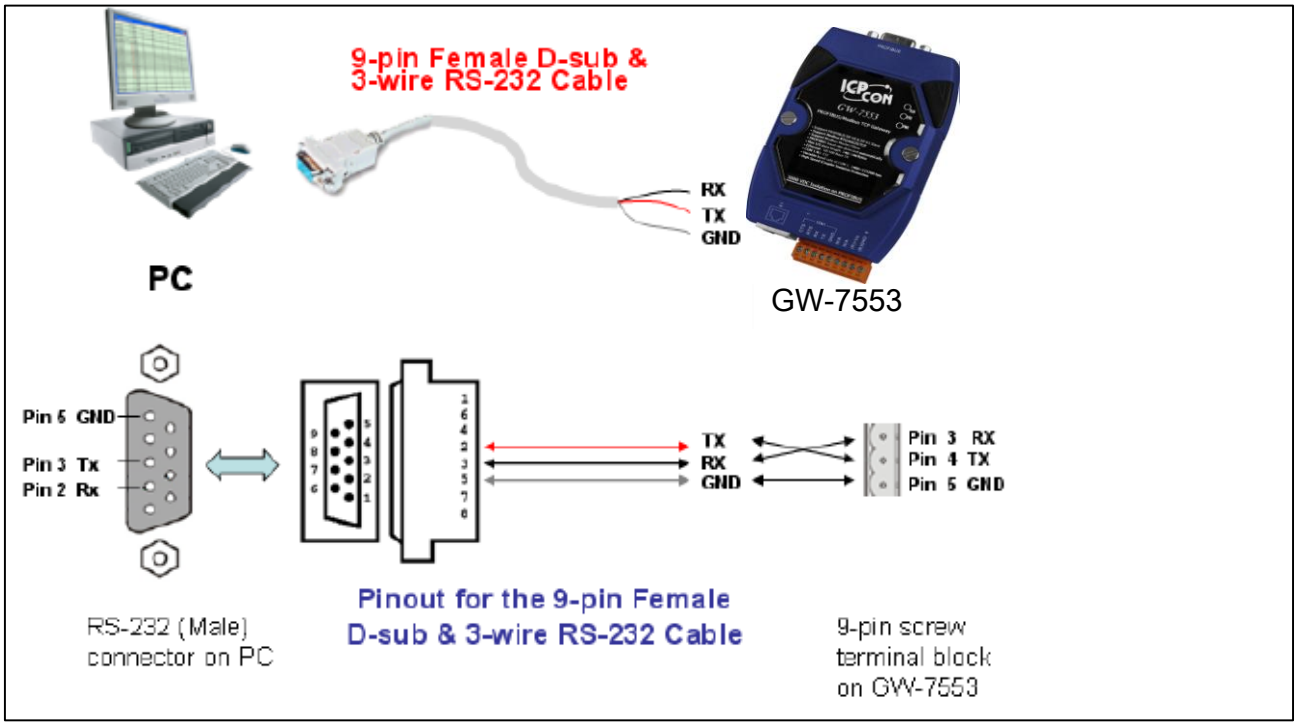
GW-7553 (Modbus RTU Slave)

example for SIMATIC STEP 7

System Architecture: GW-7553 is a PROFIBUS slave and Modbus slave device.





Directory

Example 1:Receives AO data from Modbus master.

Example 2: Rceives DO data from Modbus master.

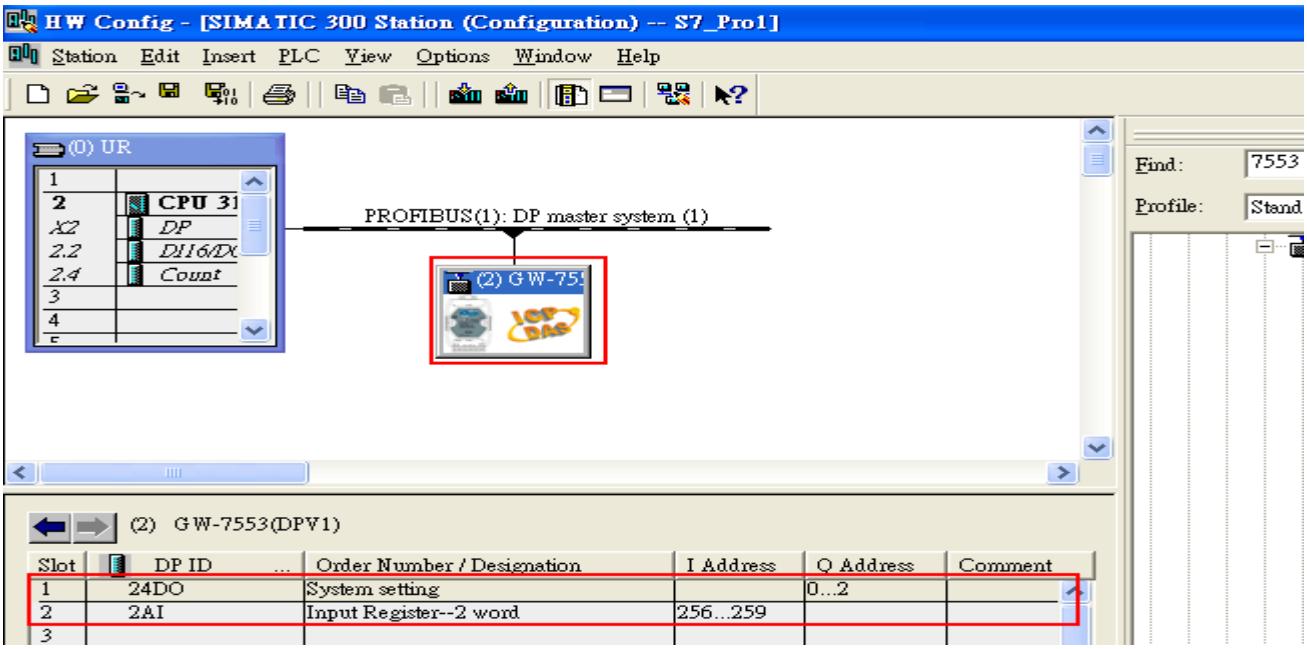
Example 3: Rereshes DI data to Modbus master.

Example 4: Rereshes AI data to Modbus master.

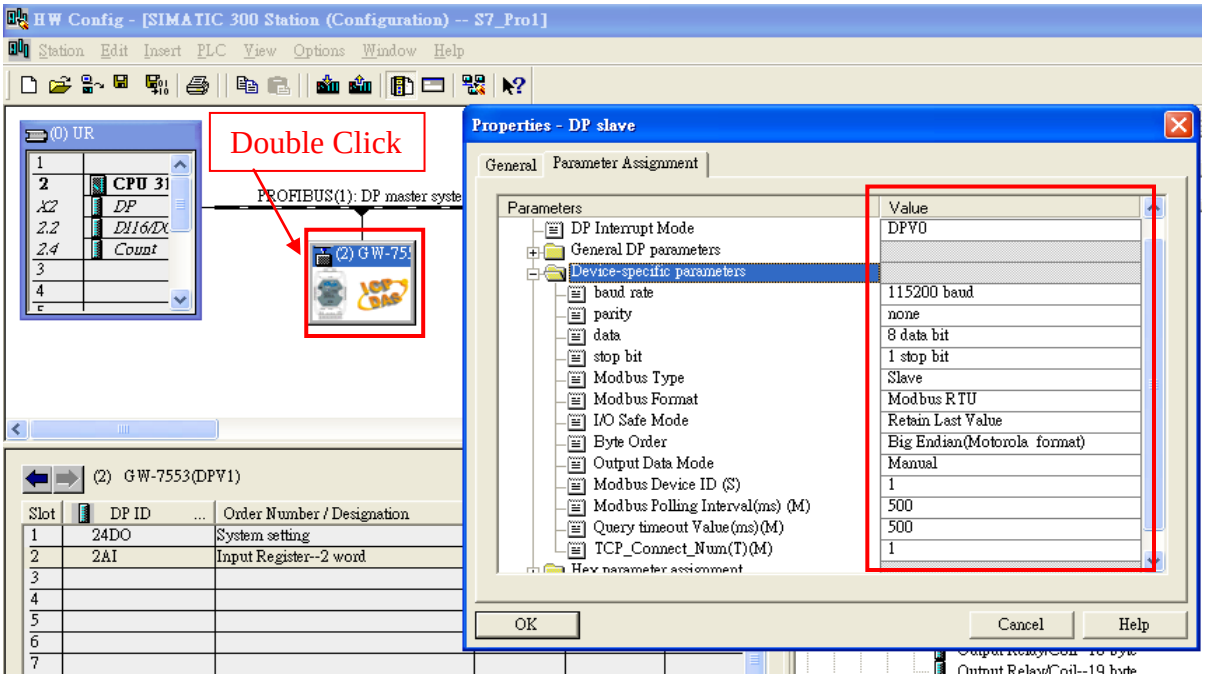
Example 1: PLC receives AO data from Modbus master.

SIMATIC STEP 7 Edit

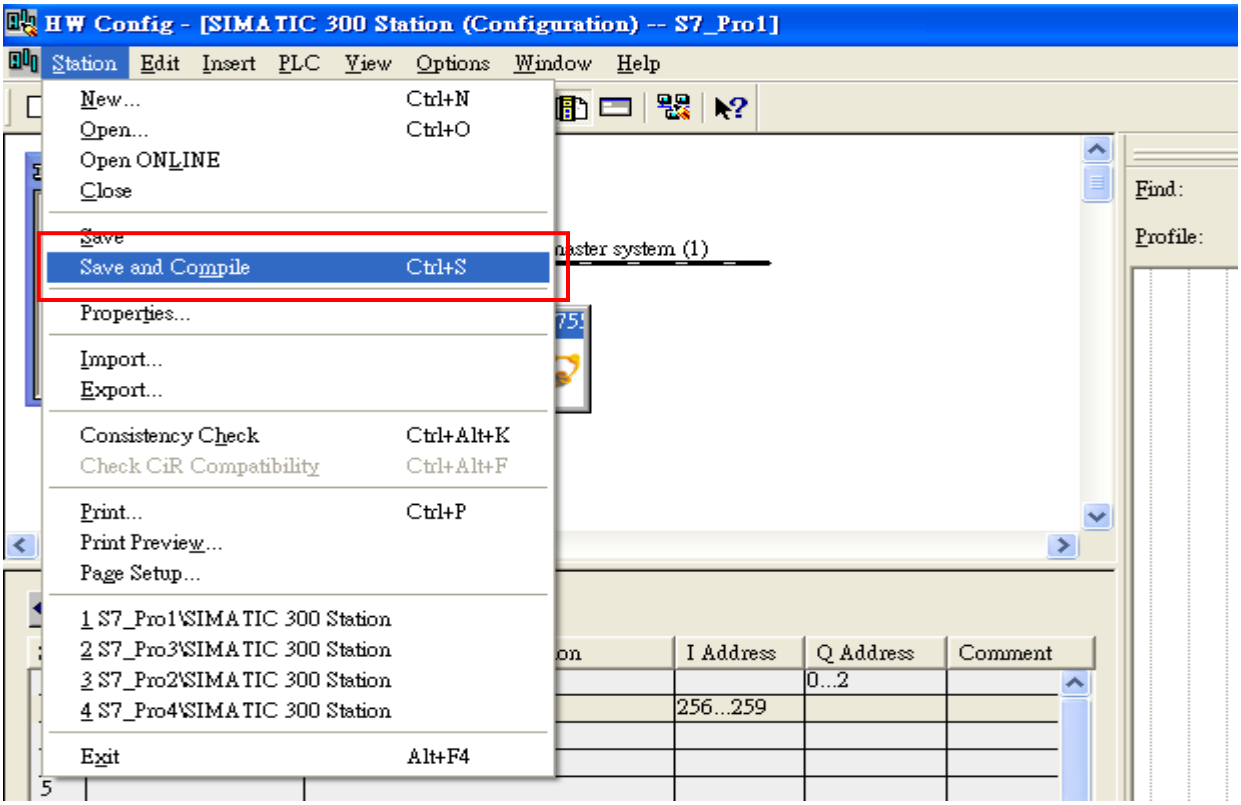
1. HW Config. – configure GW-7553 (ex: System setting module x1, Input Register—2 word module x1)



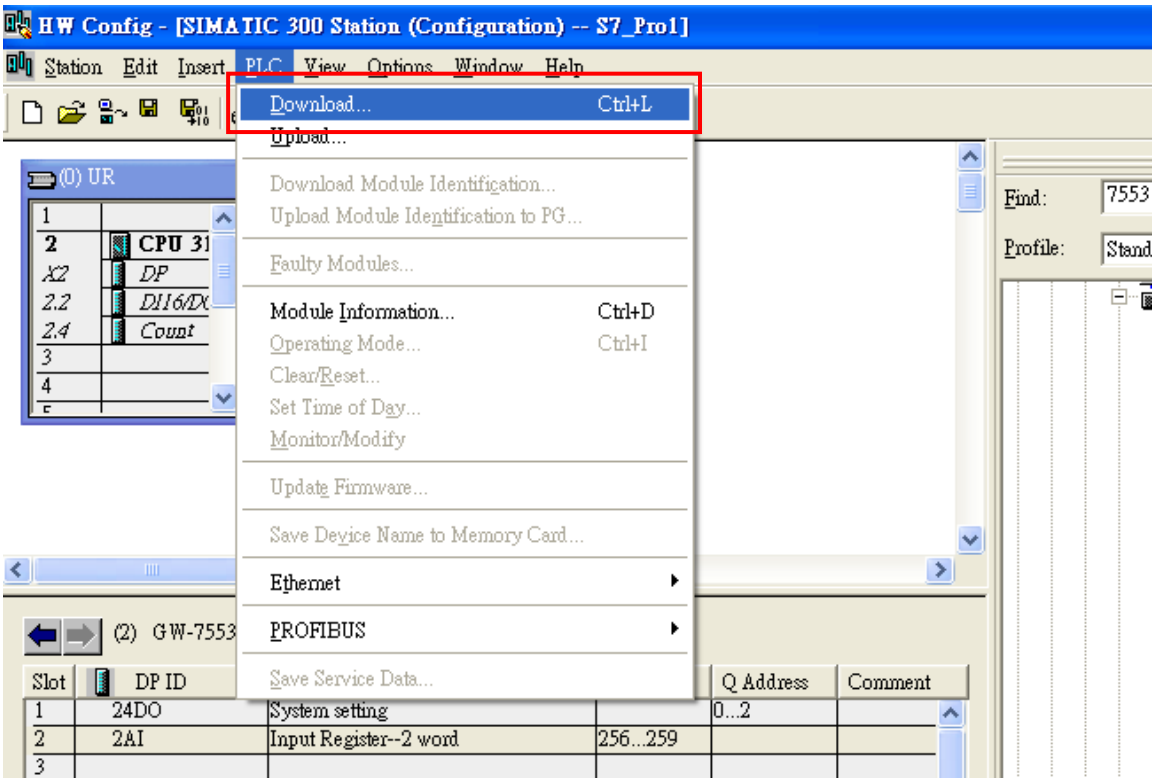
2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.



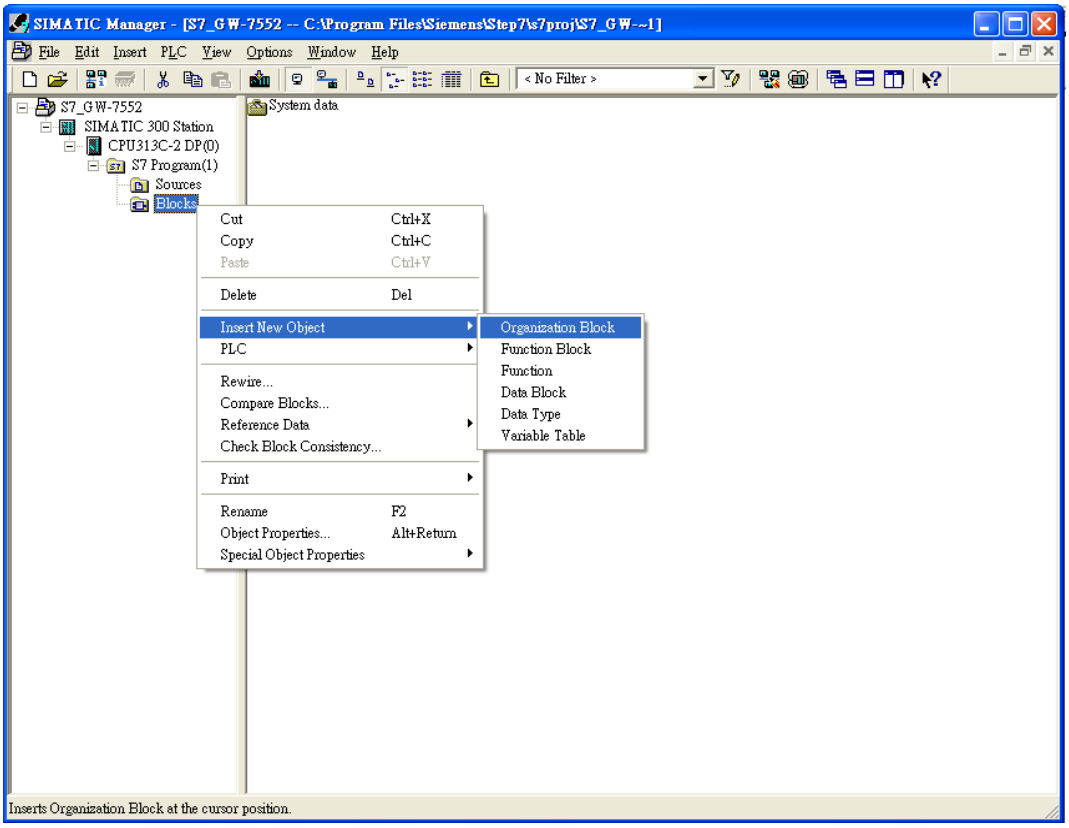
3. Save and Compile

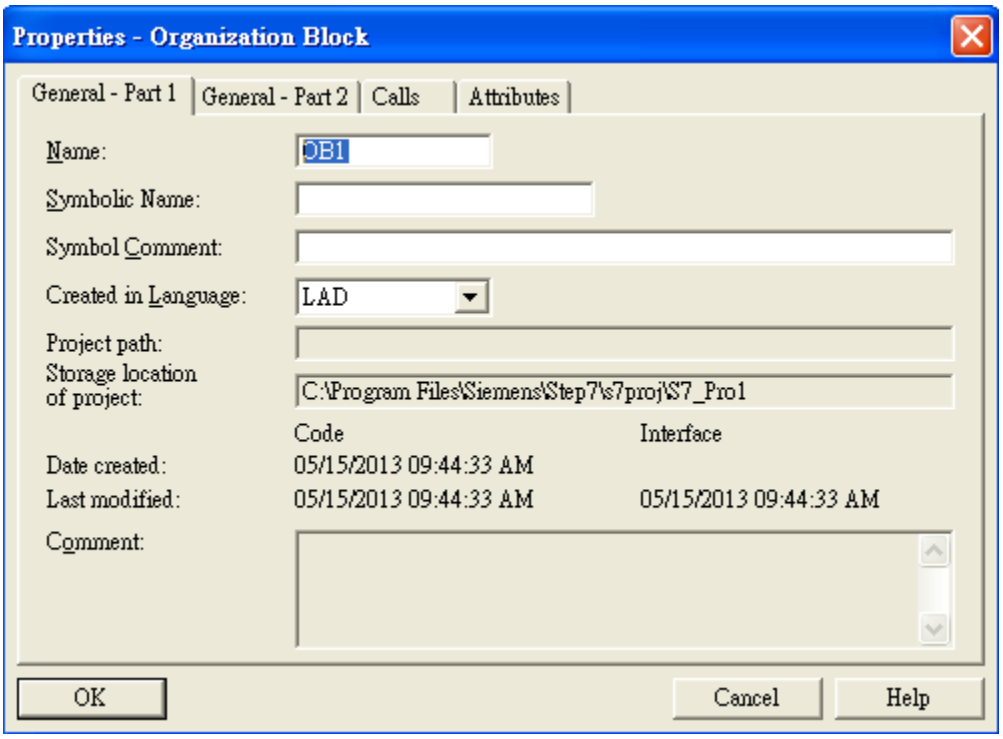


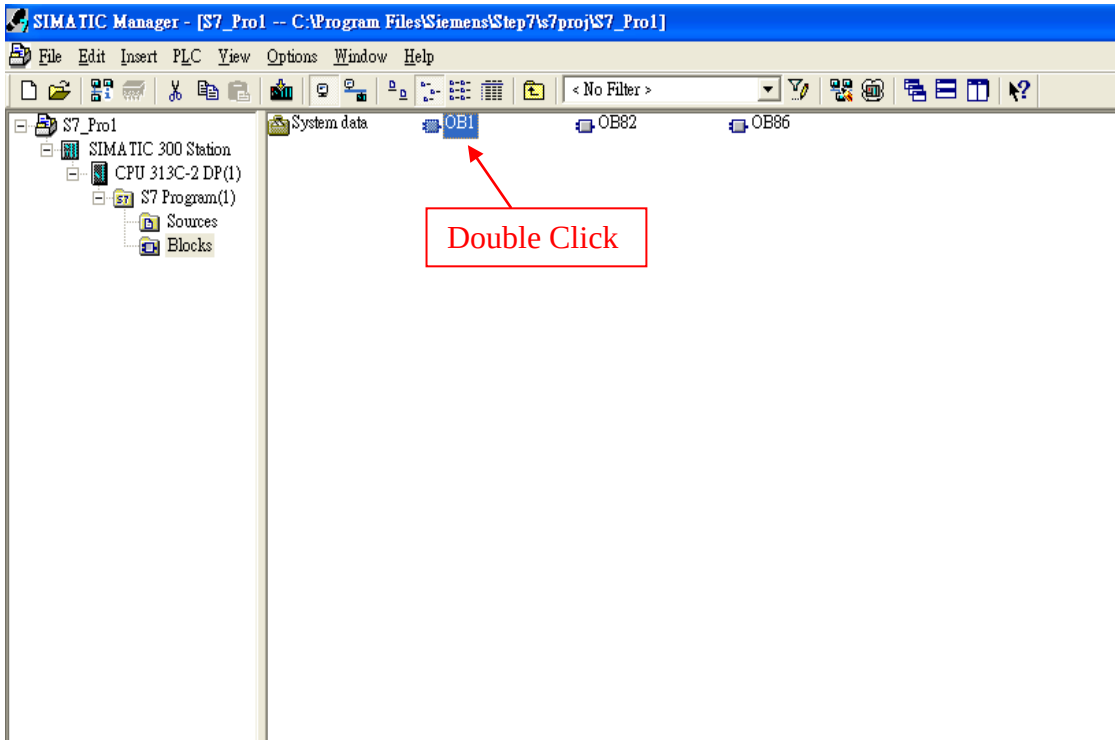
4. Download setting into STEP 7



5.Insert a new Organization Block (OB1,OB82,OB86)

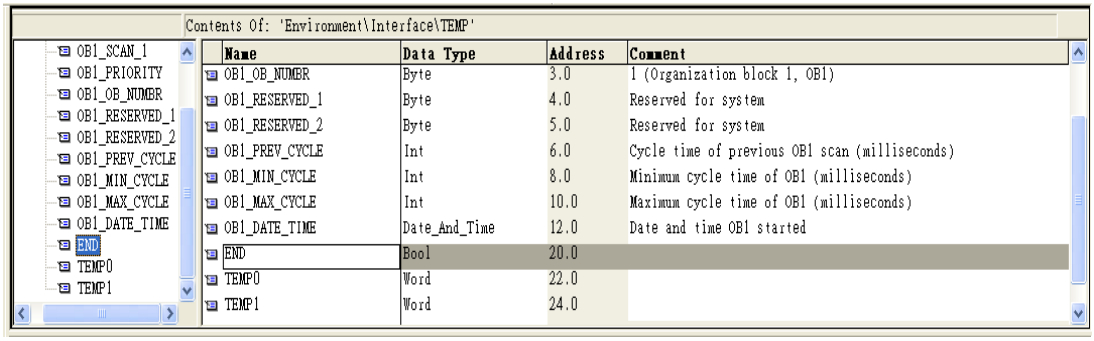




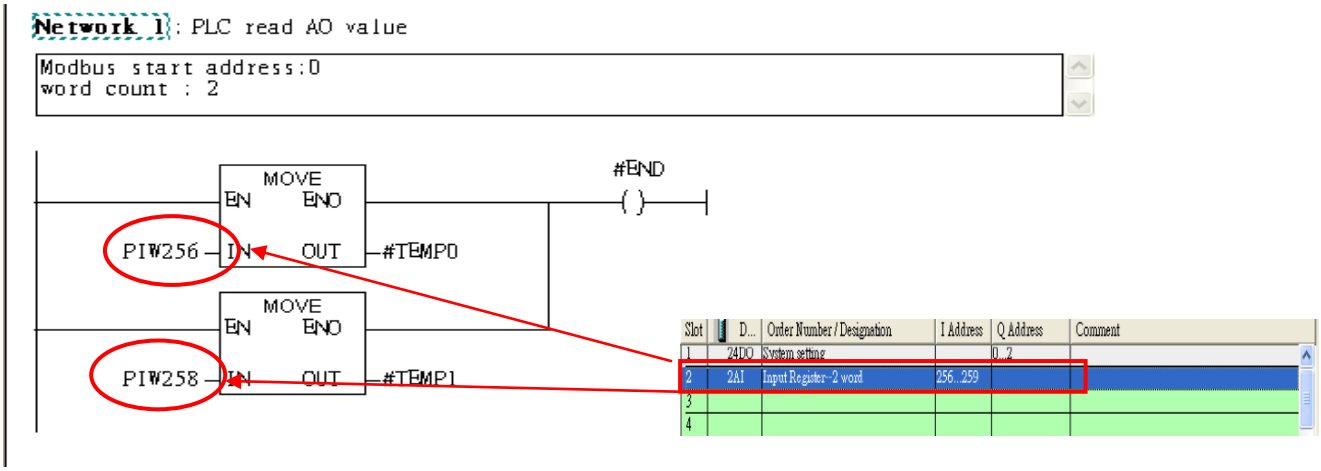


6.S7 program edit

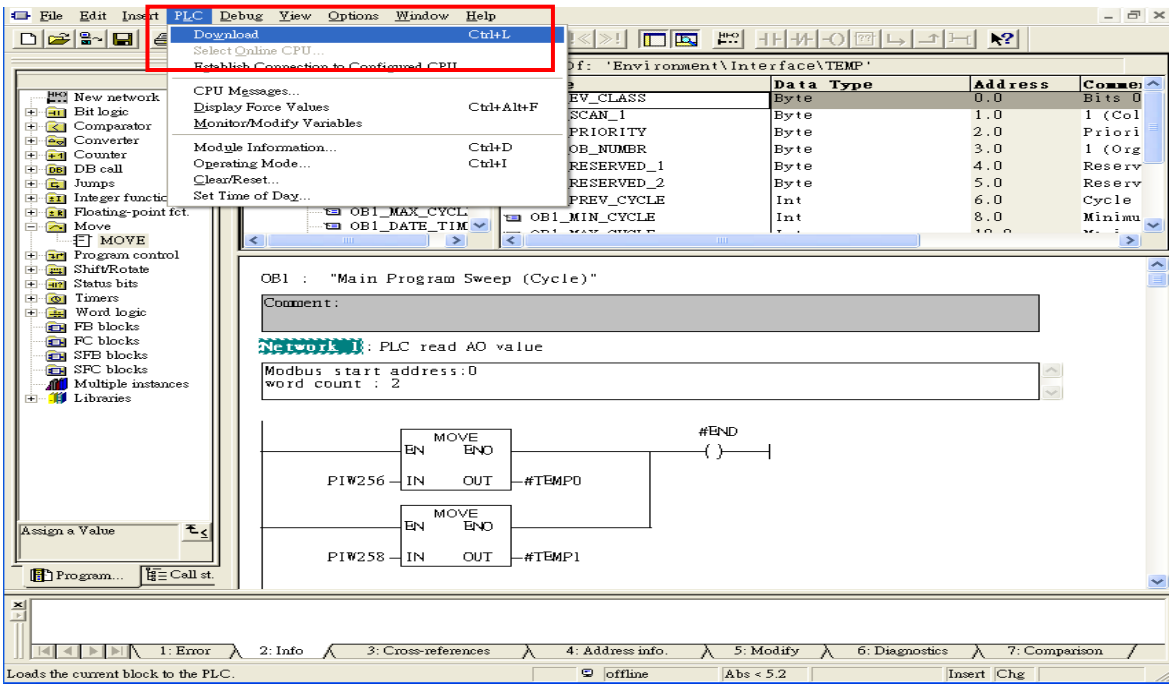
Variables used in the example LD Program:



Name	Data Type	Address	Comment
OB1_OB_NUMBR	Byte	3.0	1 (Organization block 1, OB1)
OB1_RESERVED_1	Byte	4.0	Reserved for system
OB1_RESERVED_2	Byte	5.0	Reserved for system
OB1_PREV_CYCLE	Int	6.0	Cycle time of previous OB1 scan (milliseconds)
OB1_MIN_CYCLE	Int	8.0	Minimum cycle time of OB1 (milliseconds)
OB1_MAX_CYCLE	Int	10.0	Maximum cycle time of OB1 (milliseconds)
OB1_DATE_TIME	Date_And_Time	12.0	Date and time OB1 started
END	Bool	20.0	
TEMP0	Word	22.0	
TEMP1	Word	24.0	



7. S7 program download

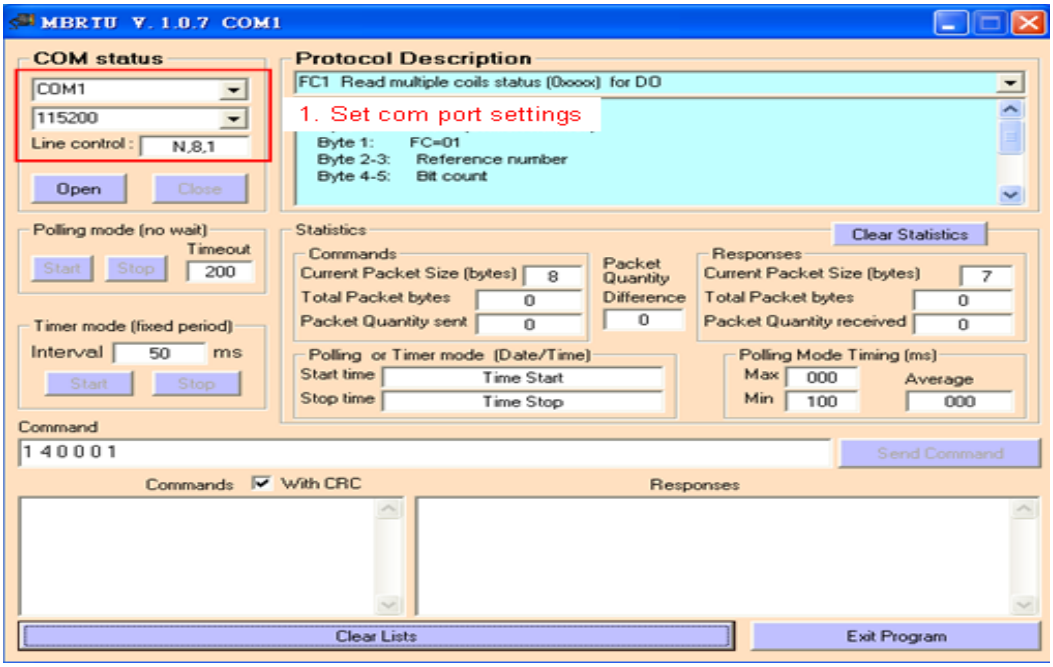


8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.

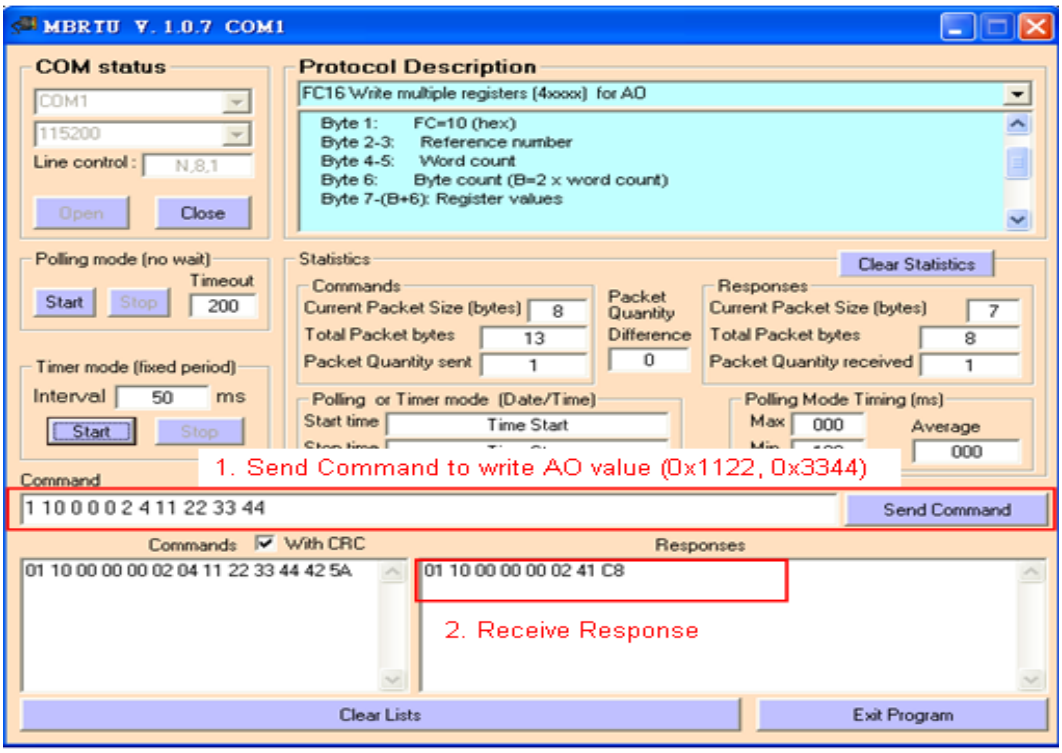
Communication test

1. Confirm the GW-7553's Com Port setting is the same with Modbus Master tool (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/)

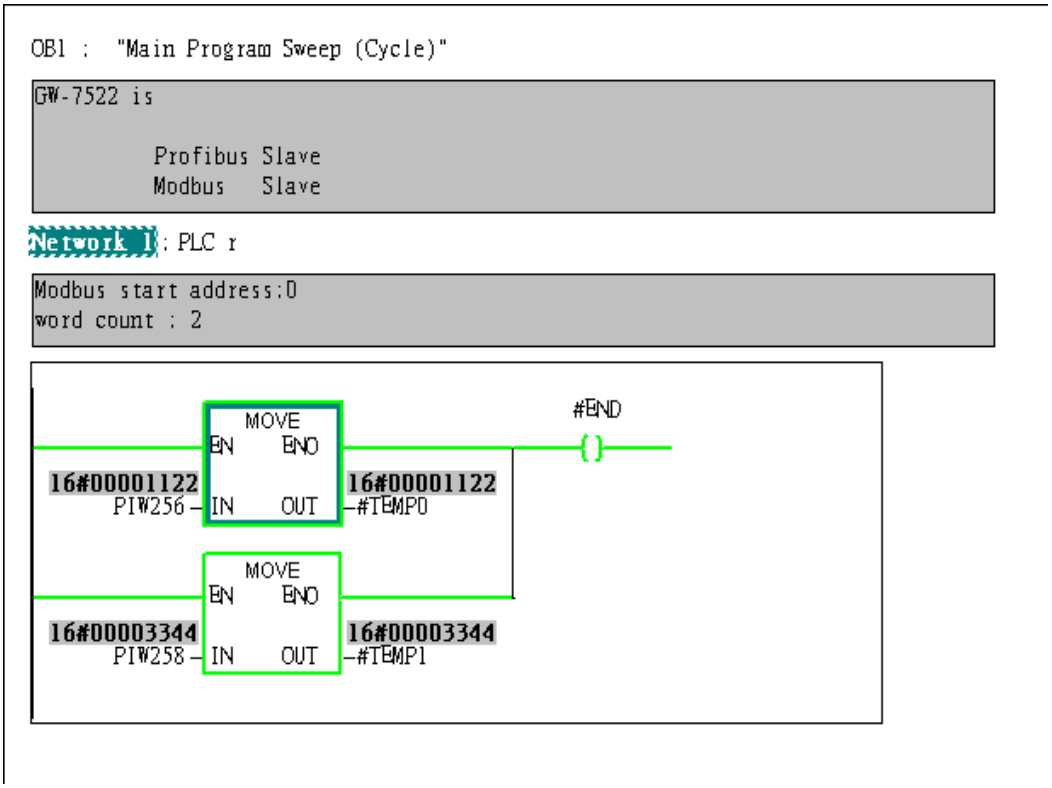
Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none



2. Click "Send Command" button to wirte AO value (0x1122, 0x3344)



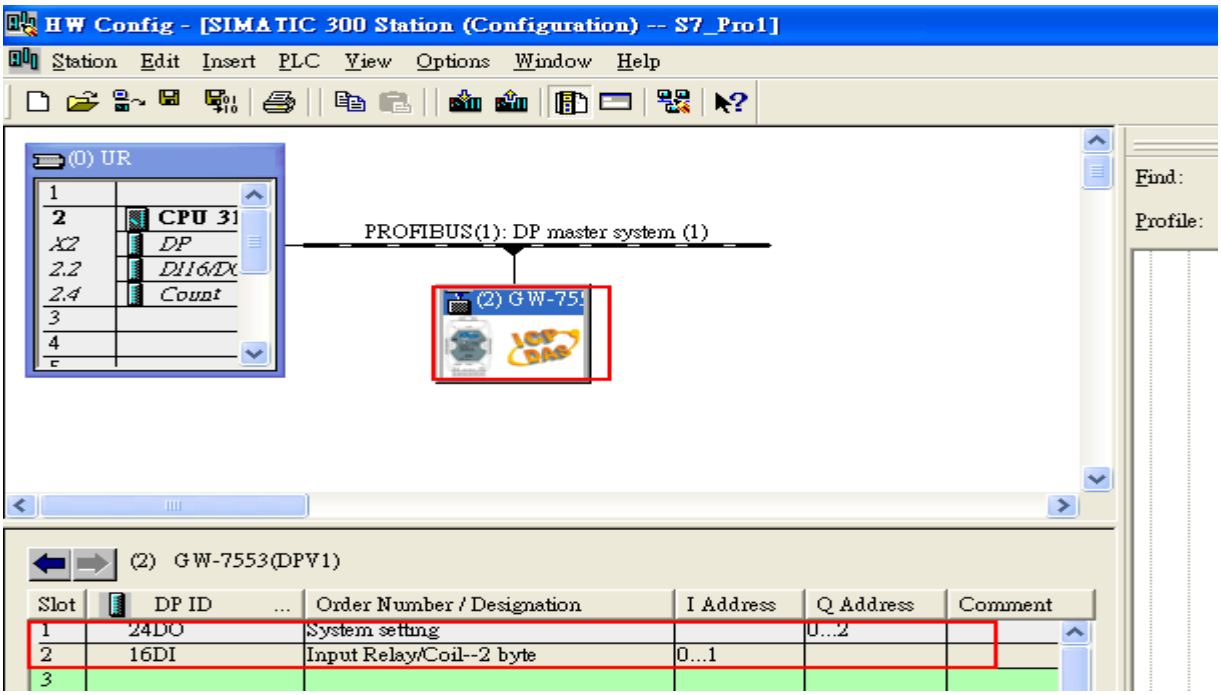
3. PLC will receives the “AI Value (0x1122, 0x3344)” at PLC address PIW256&PIW258



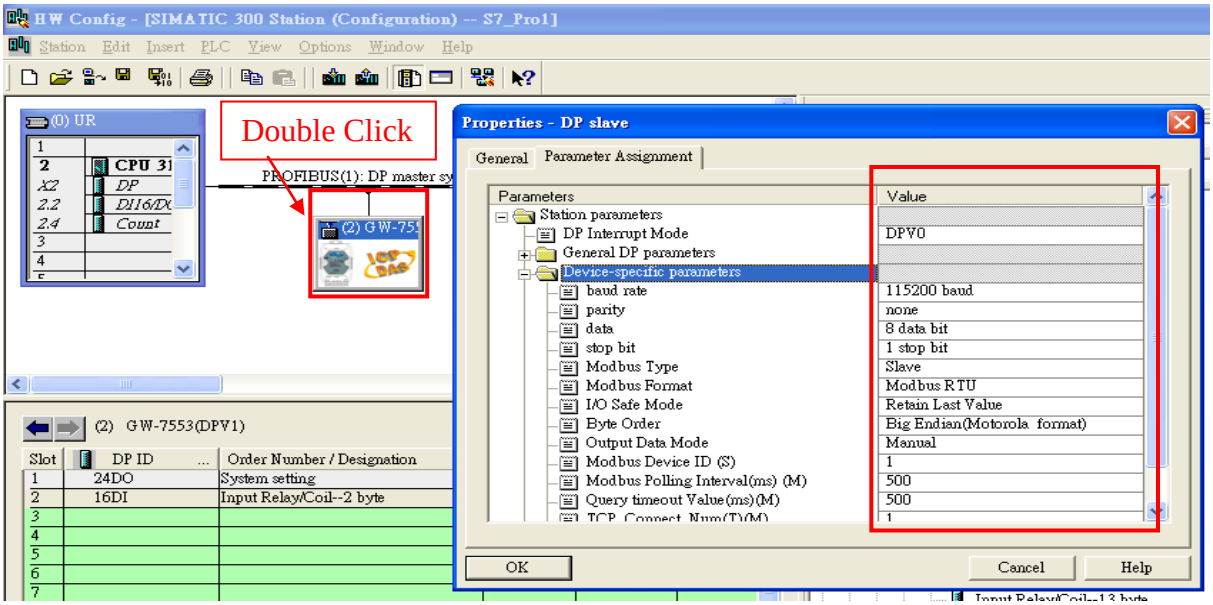
Example 2: PLC receives DO data from Modbus master.

SIMATIC STEP 7 Edit

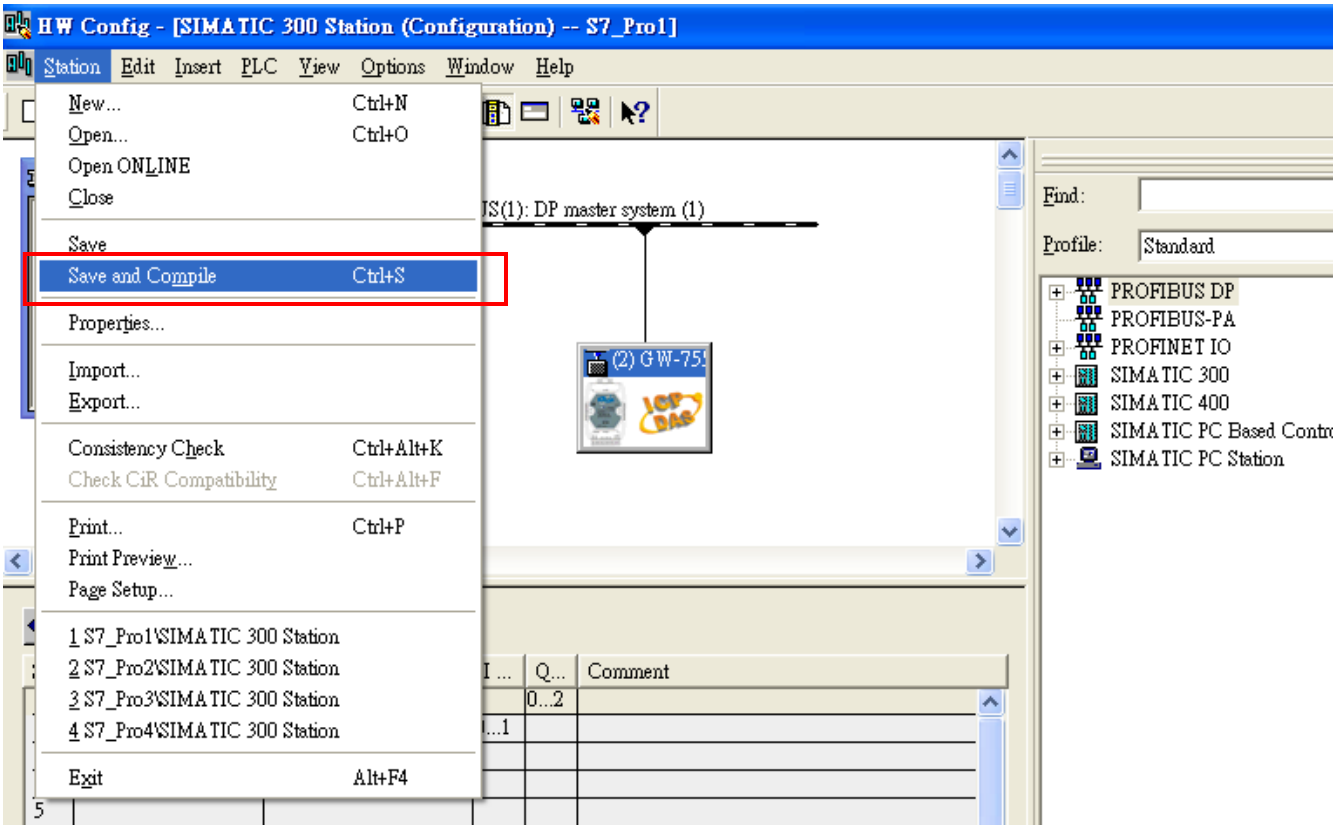
1. HW Config. – configure GW-7553 (ex: System setting module x1, Input Relay/Coil – 2 byte module x1)



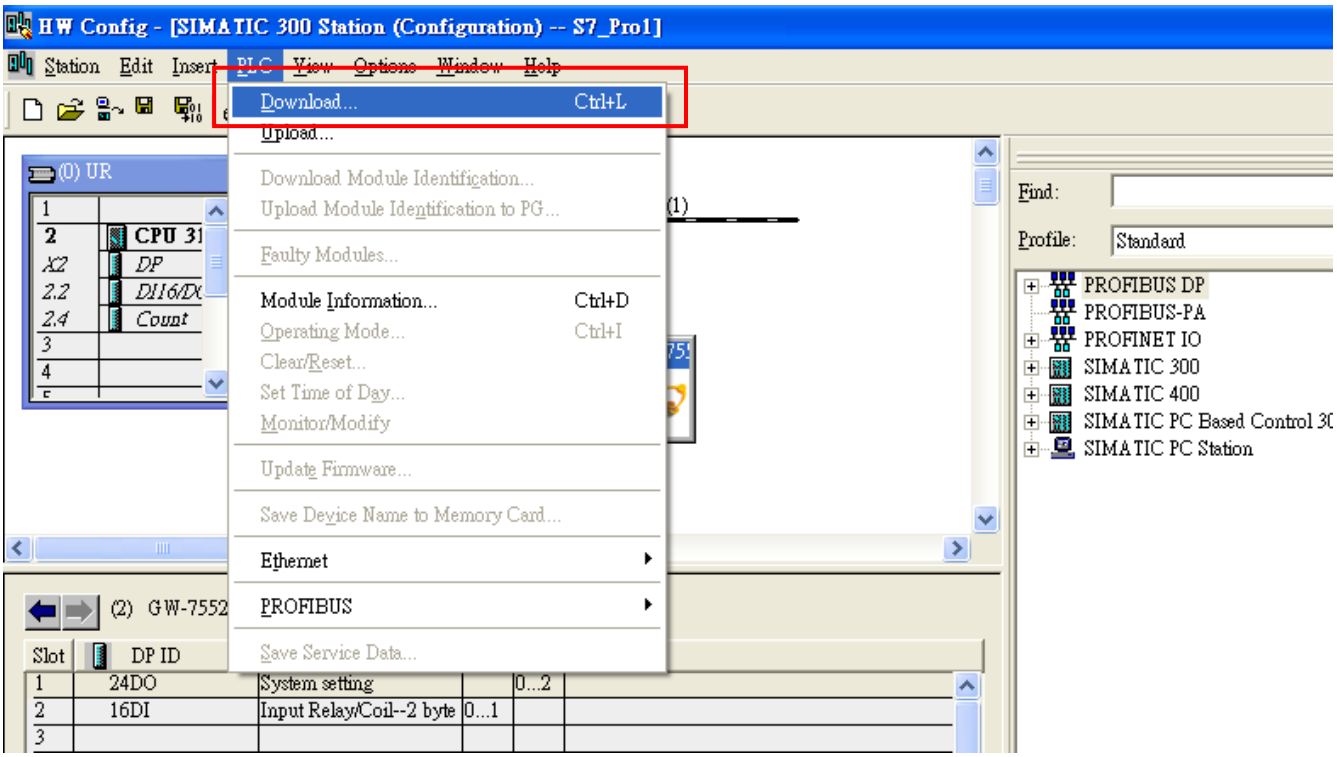
2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.



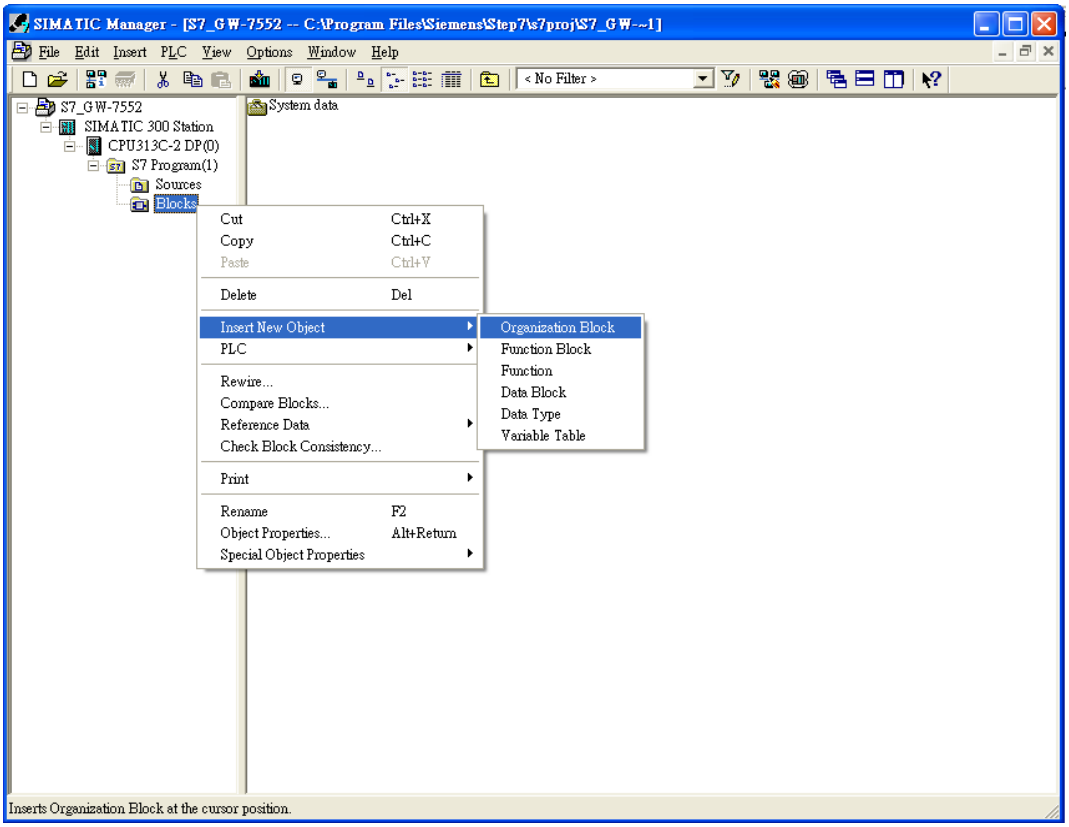
3. Save and Compile

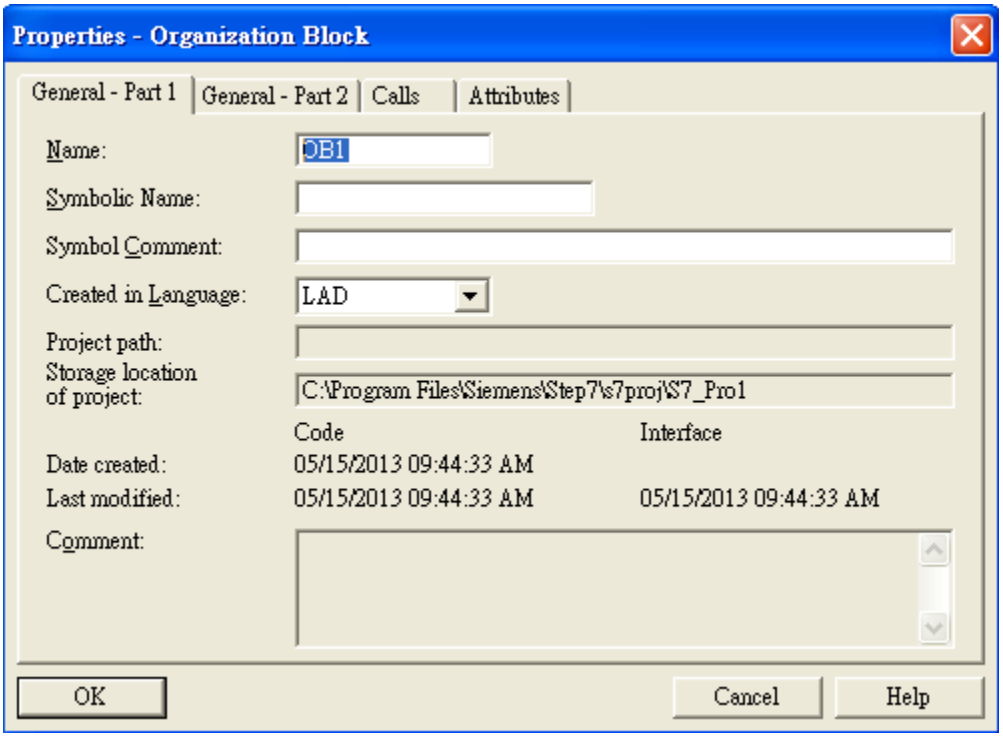


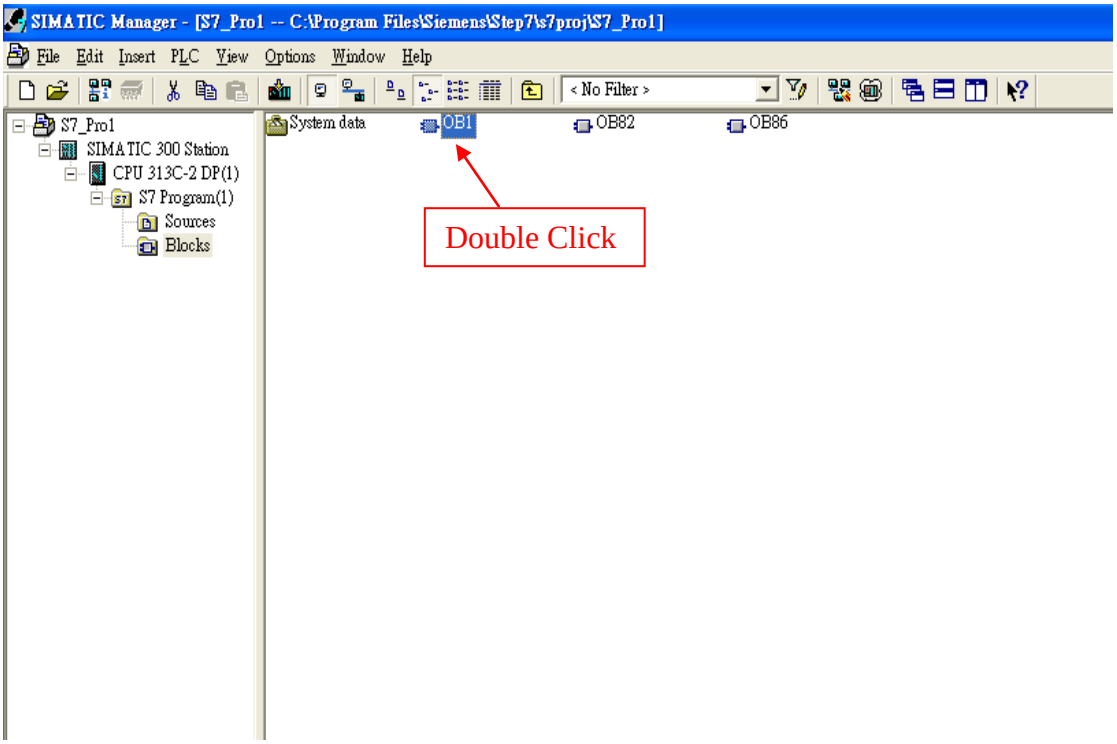
4. Download setting into STEP 7



5.Insert a new Organization Block (OB1,OB82,OB86)







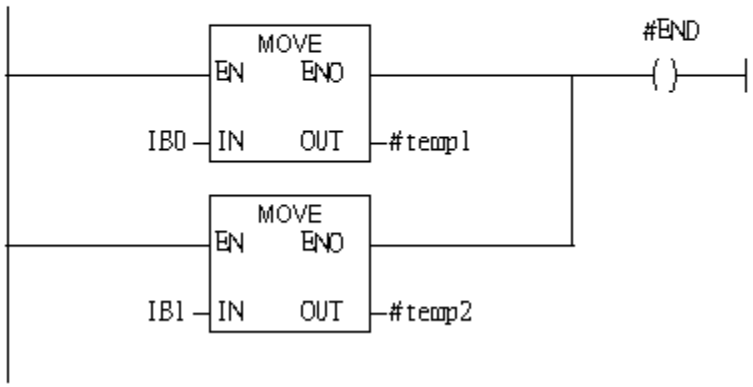
6. S7 program edit

Variables used in the example LD Program:

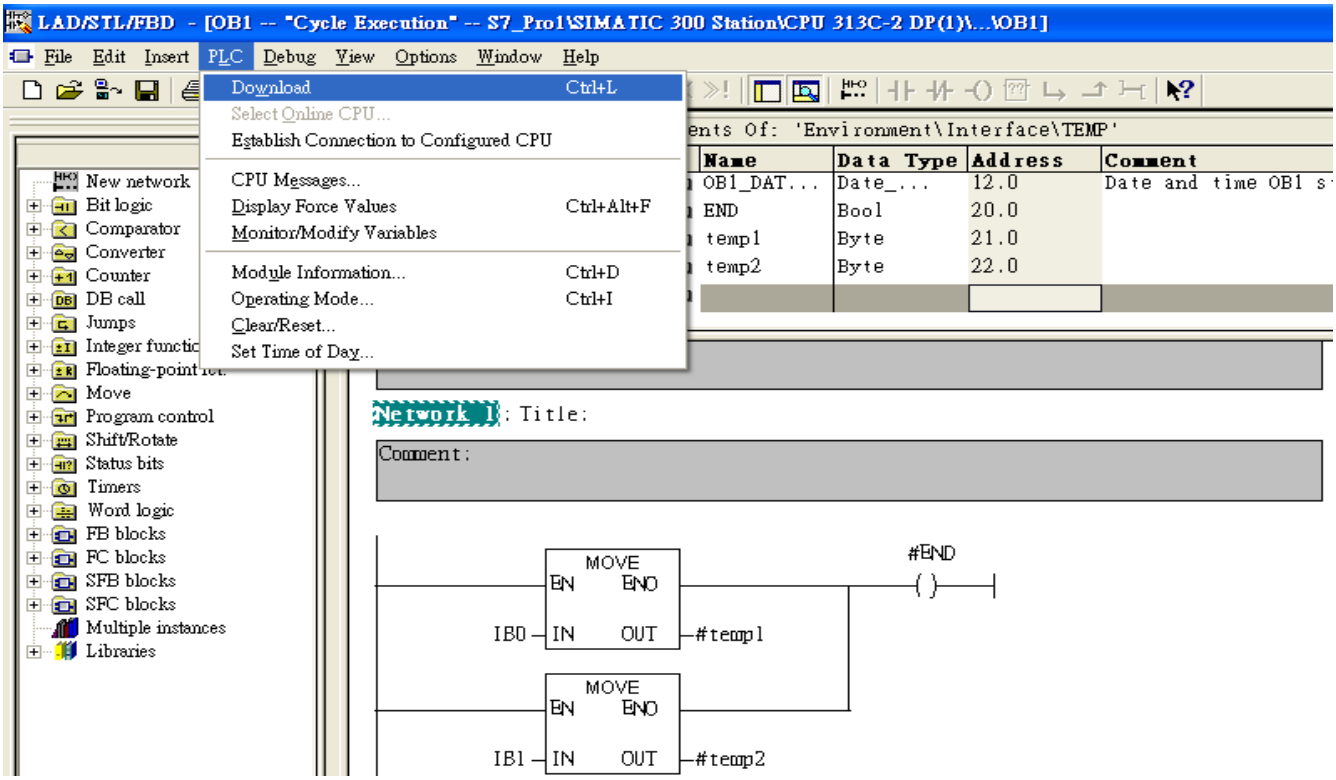
	Name	Data Type	Address	Comment
	OB1_DAT...	Date_...	12.0	Date and time OB1 started
	END	Bool	20.0	
	temp1	Byte	21.0	
	temp2	Byte	22.0	

Network 1: Title:

Comment:



7. S7 program download

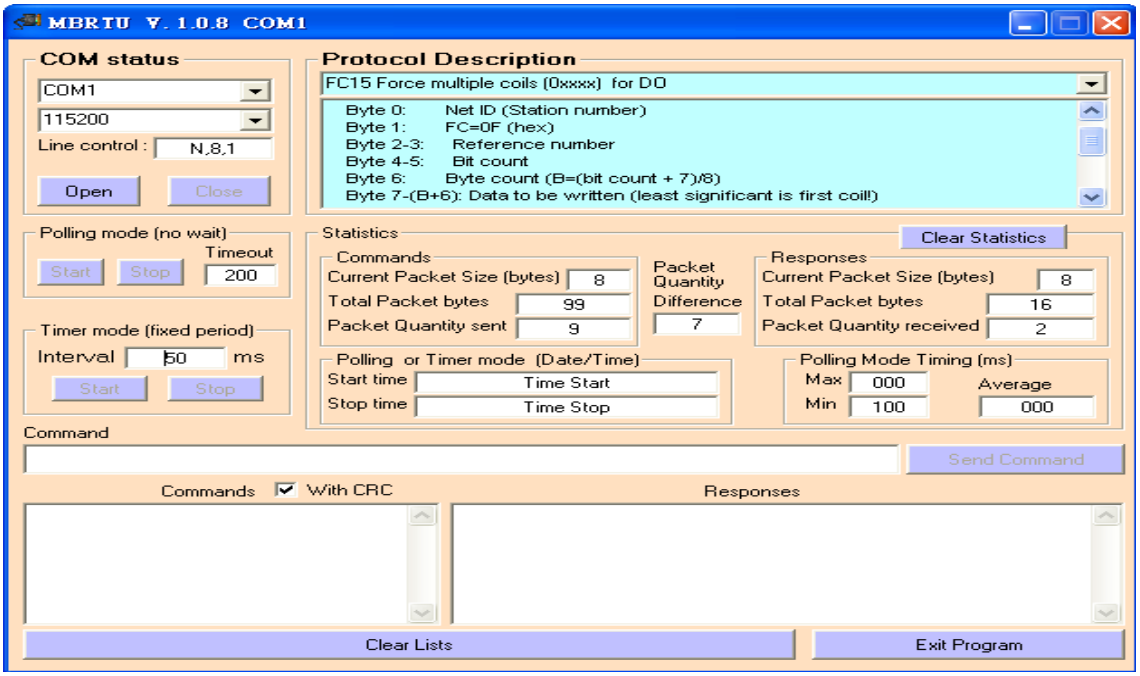


8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.

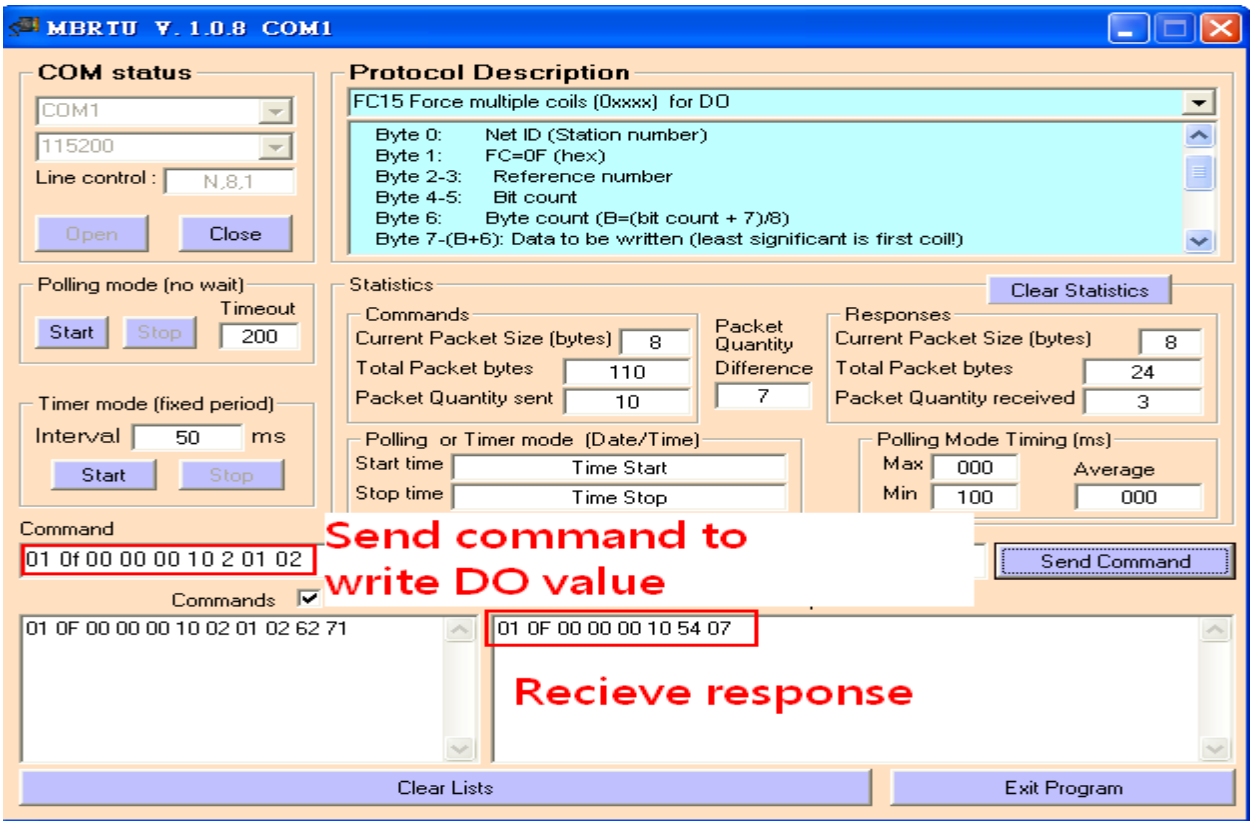
Communication test

1. Confirm the GW-7553's Com Port setting is the same with Modbus Master tool (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/)

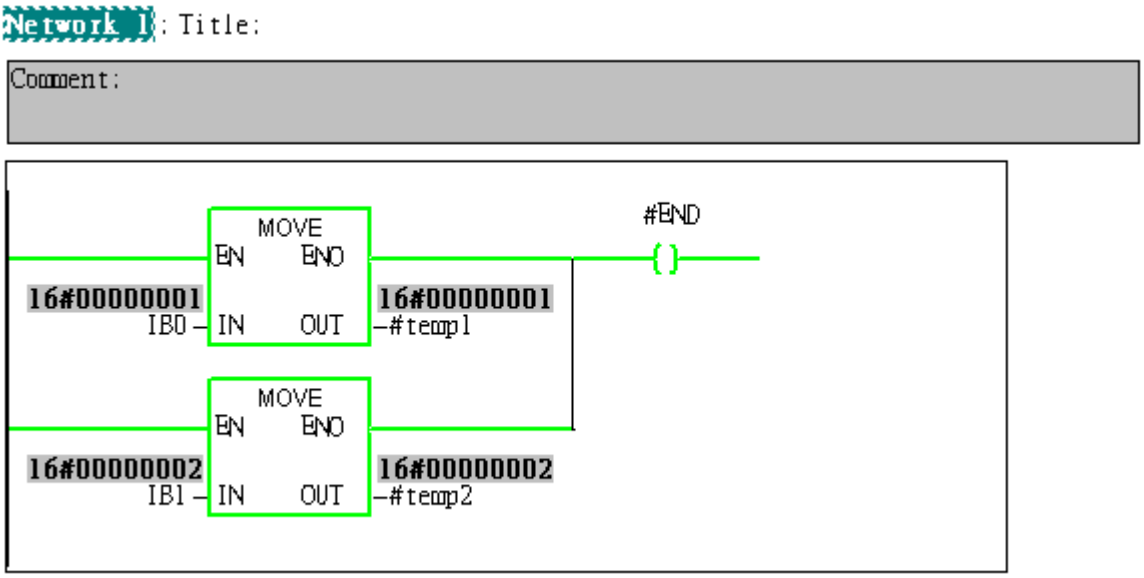
Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none



2. Click "Send Command" button to wirte DO value (0x0102,)



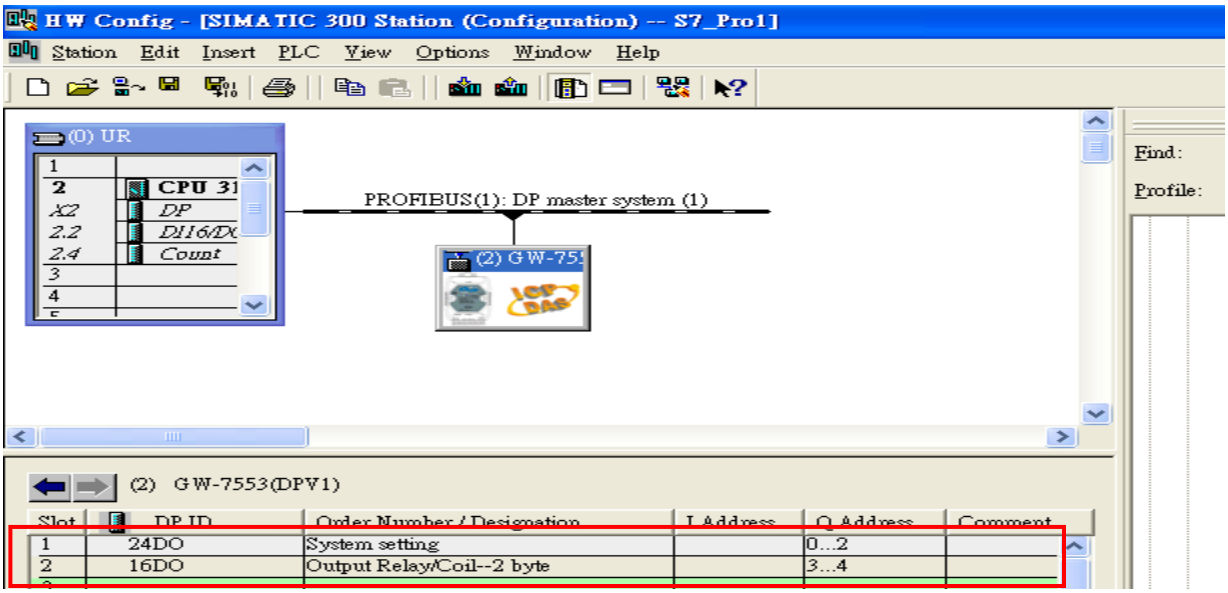
3. PLC will receives the “DO Value (0x01, 0x02)” at PLC address IB0&IB1



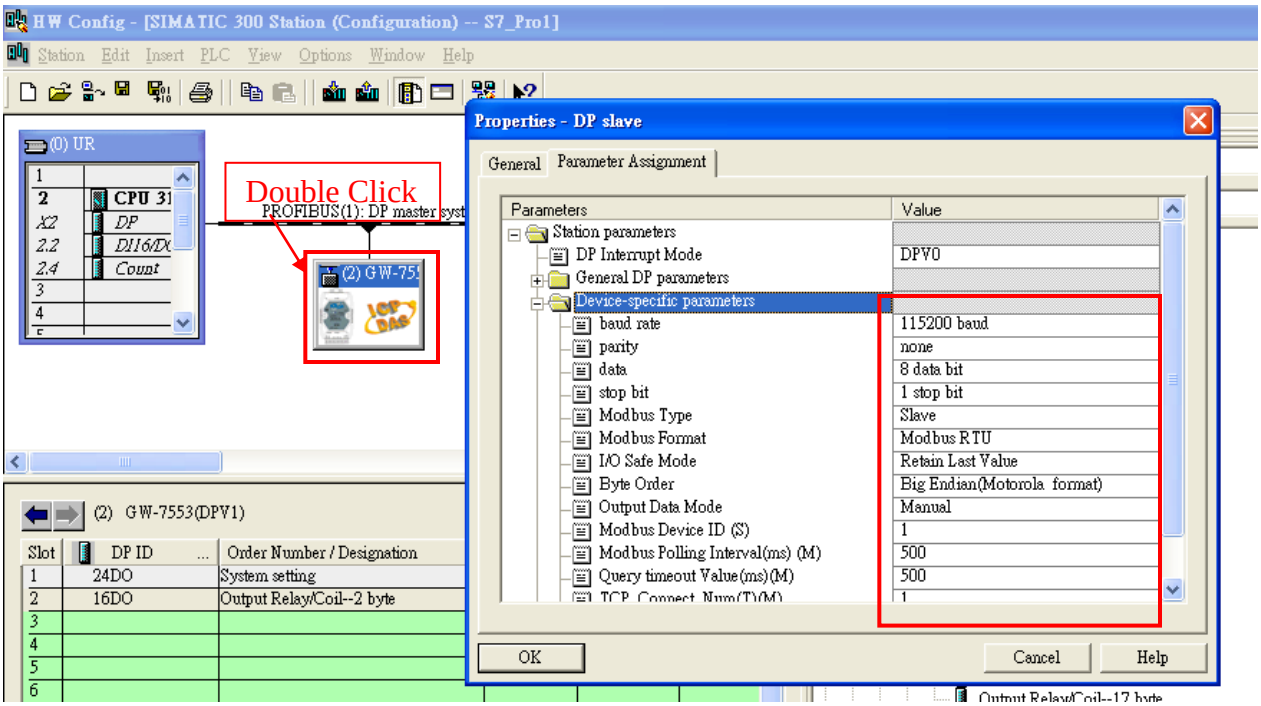
Example 3: PLC refreshes DI data to Modbus master.

SIMATIC STEP 7 Edit

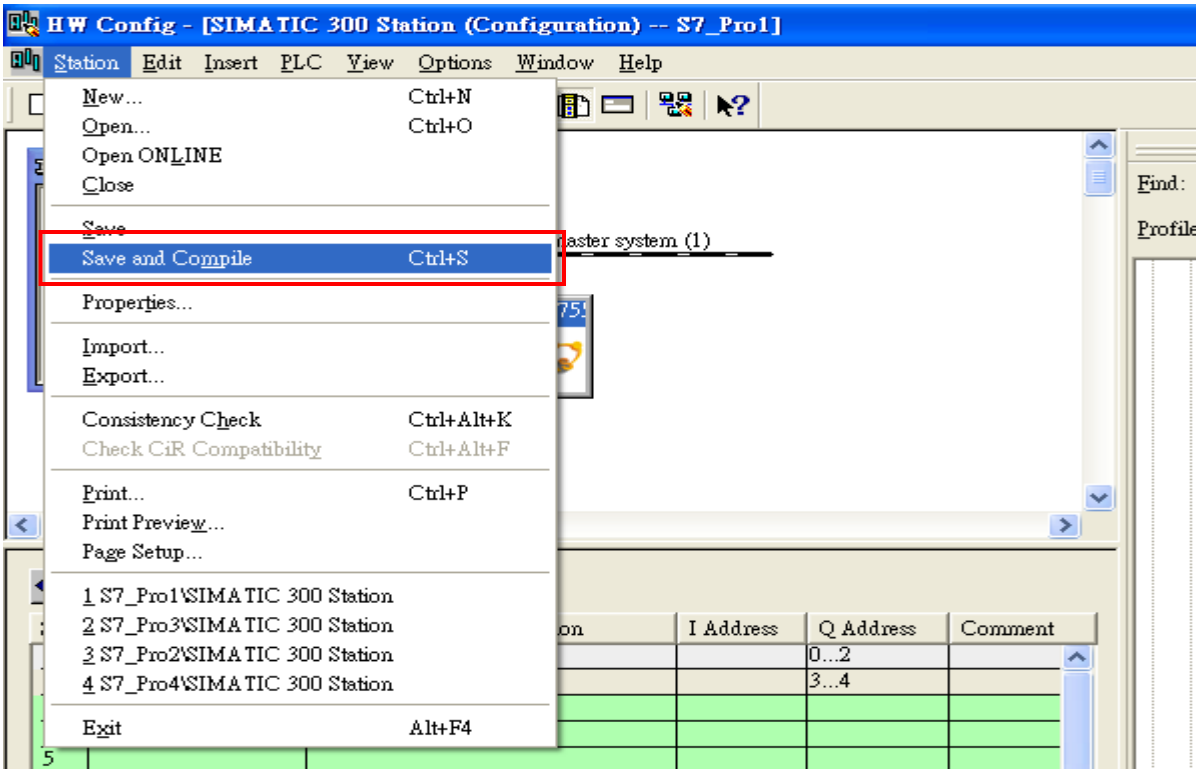
1.HW Config. – configure GW-7553 (ex: System setting module x1, Output Relay/Coil—2 byte module x1)



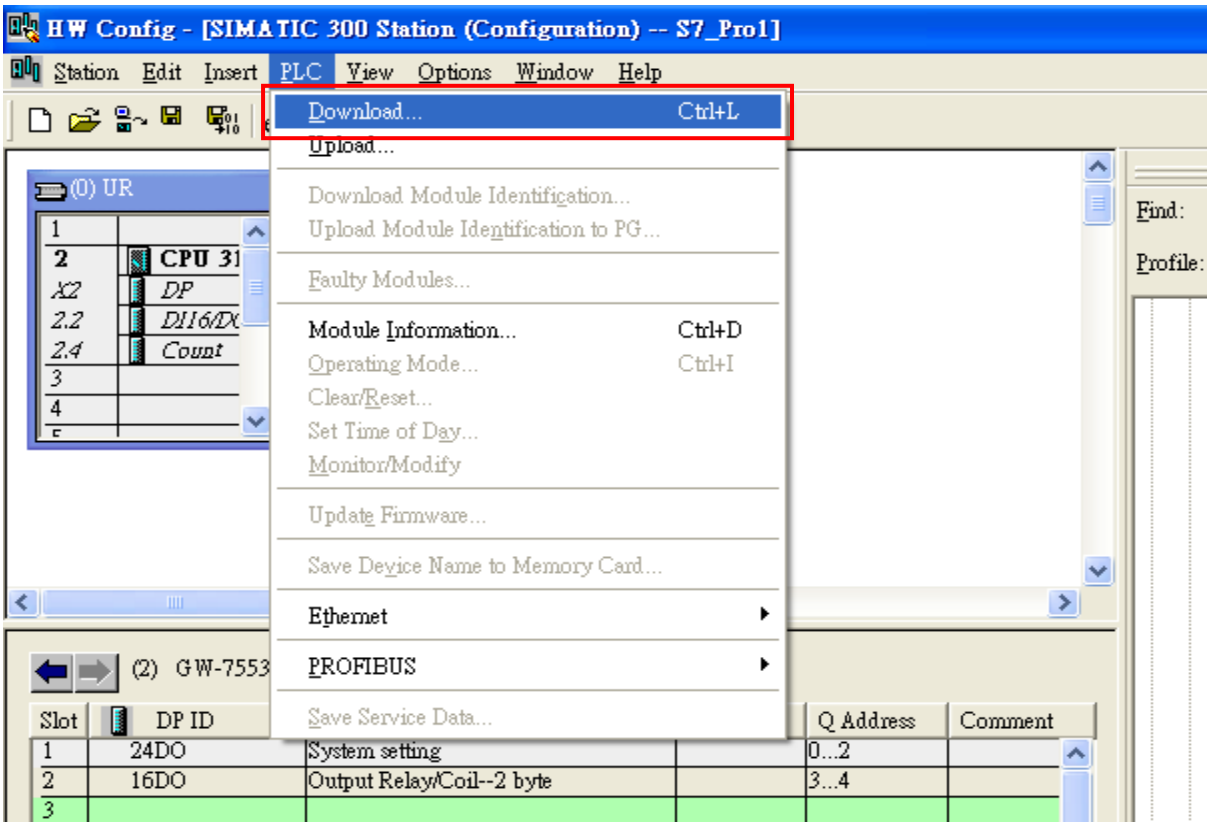
2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.



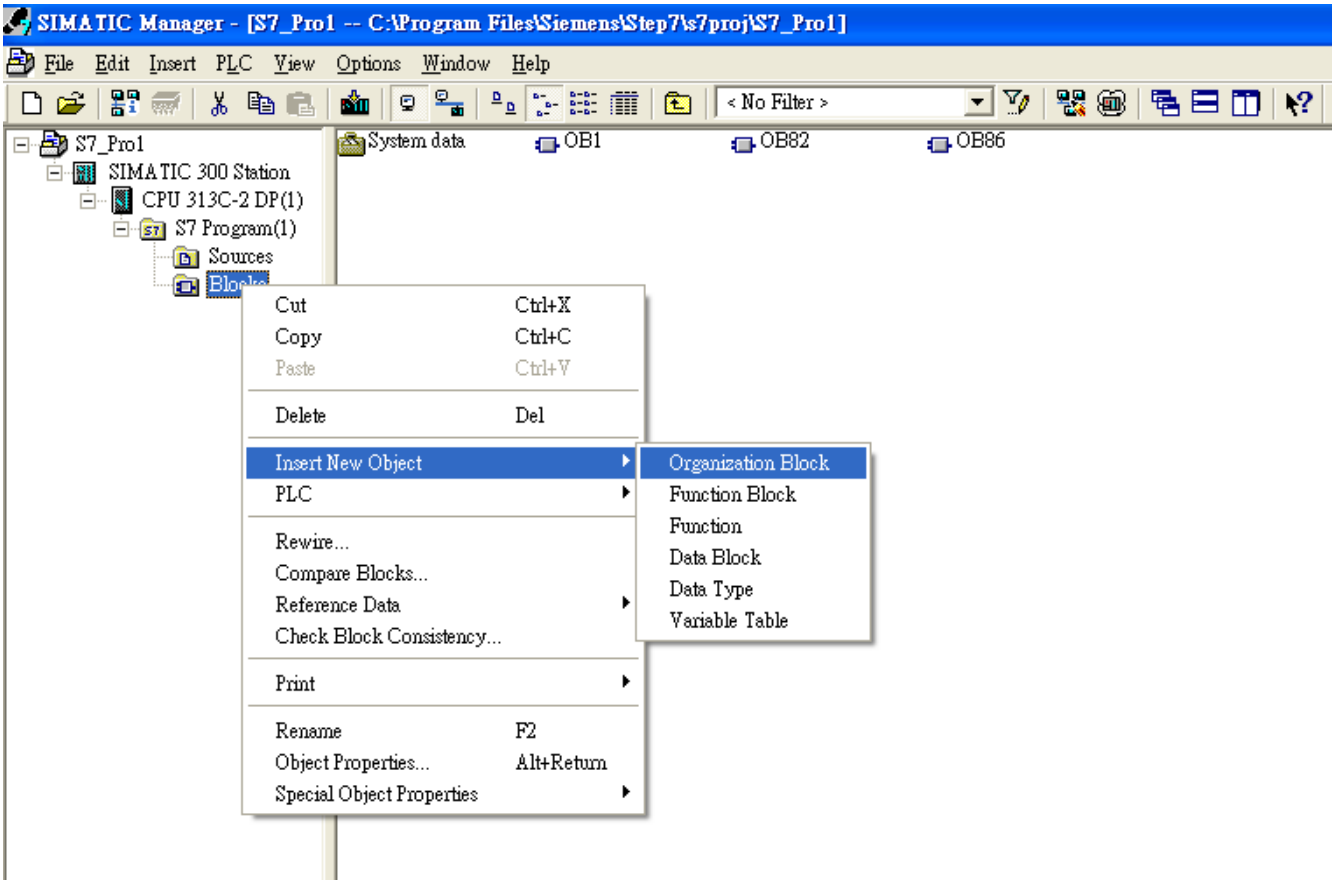
3. Save and Compile

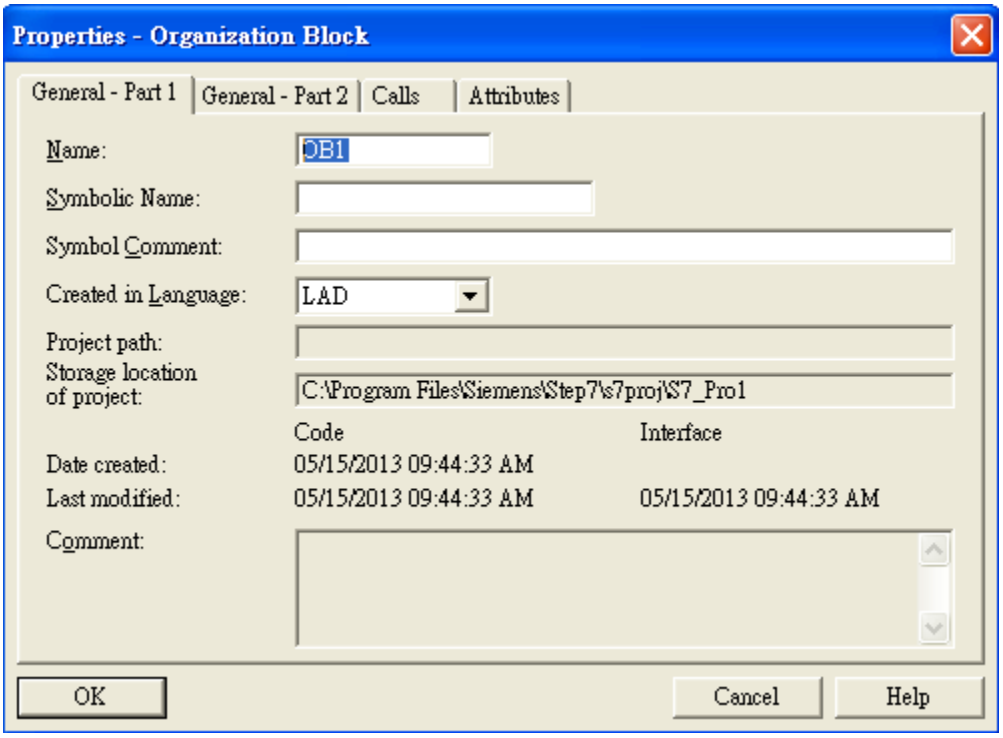


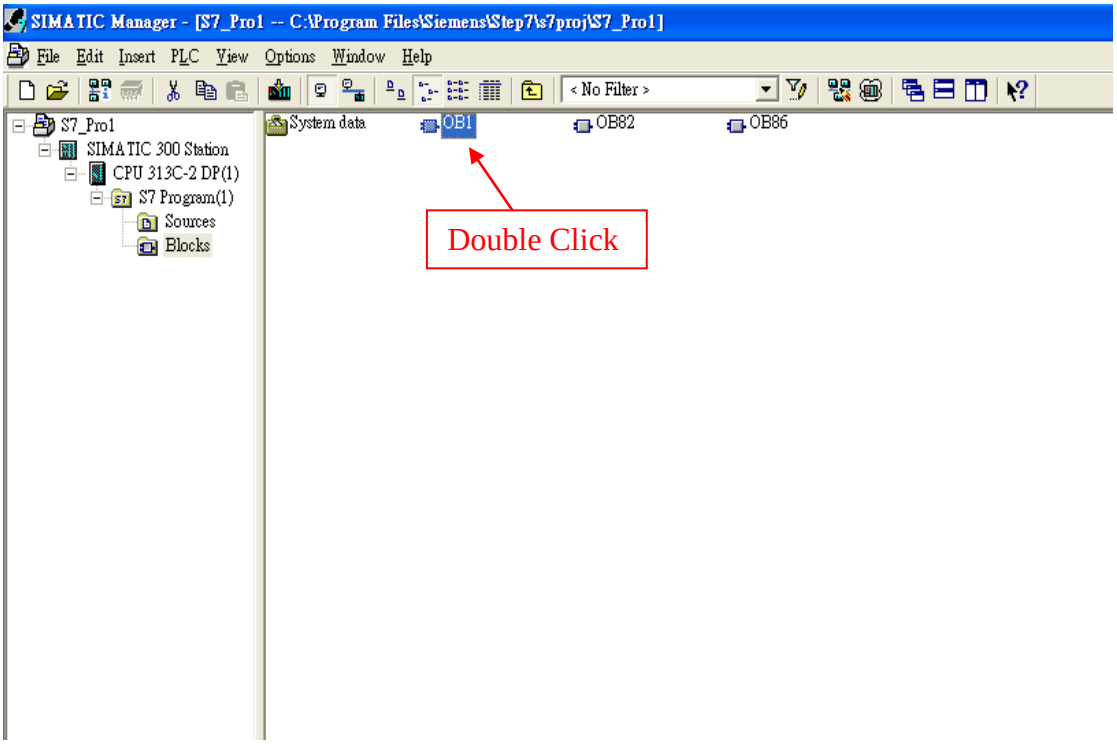
4. Download setting into STEP 7



5.Insert a new Organization Block (OB1,OB82,OB86)







6.S7 program edit

Variables used in the example LD Program:

	Name	Data Type	Address	Comment
	OB1_MAX...	Int	10.0	Maximum cycle time of OB1 (milliseconds)
	OB1_DAT...	Date_...	12.0	Date and time OB1 started
	END	Bool	20.0	
	Init	Bool	20.1	
	tri	Int	22.0	

Network 2: Initial Cl

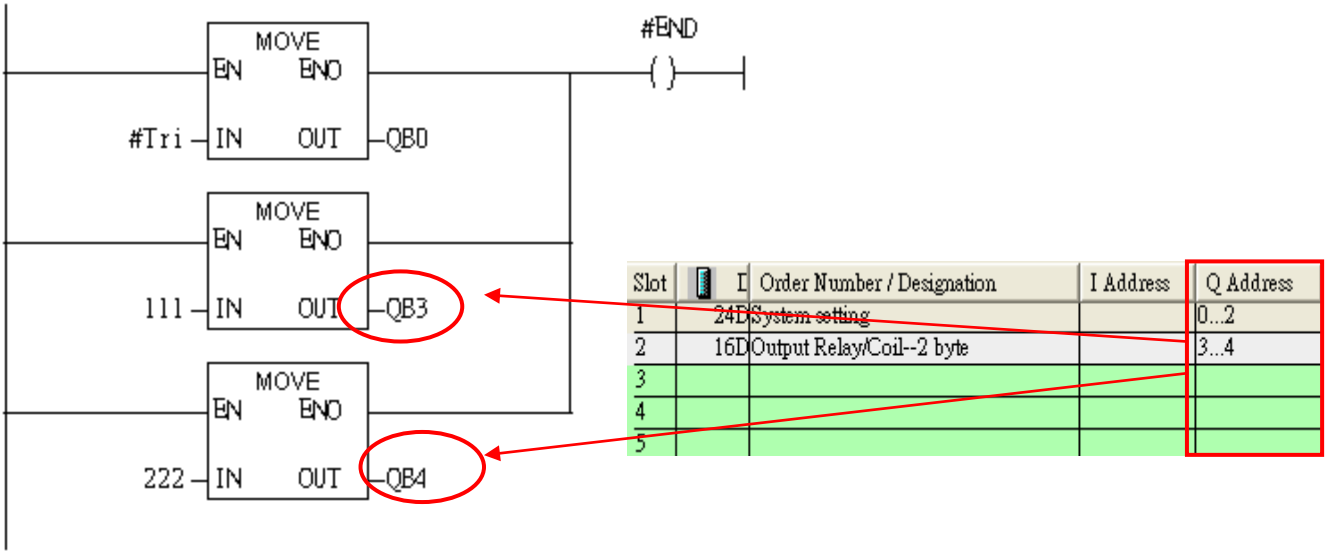
Initial Cl

OB1 : "Main Program Sweep (Cycle)"

```
PROFIBUS slave
Modbus   slave
```

Network 1: QB0 add "1" refresh DO value

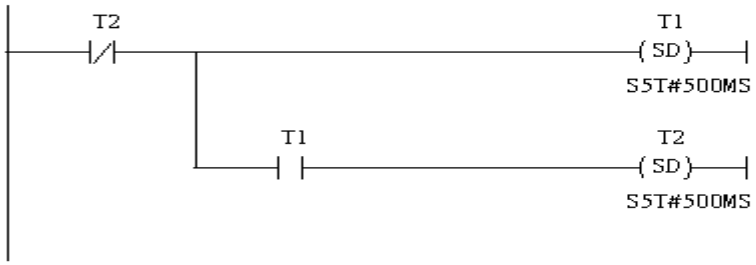
```
2 byte 16 DO
```



Using T2 trigger T1 .C1 and Tri will add 1 every 1s.

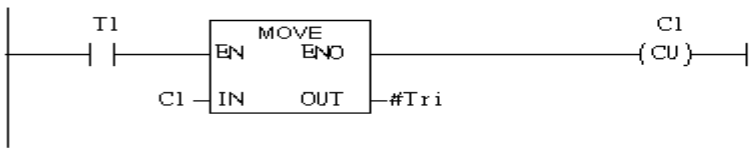
Network 2 : Timer T1 & T2

```
Using T2 triggle T1
```



Network 3 : T1 triggle Counter(C1)

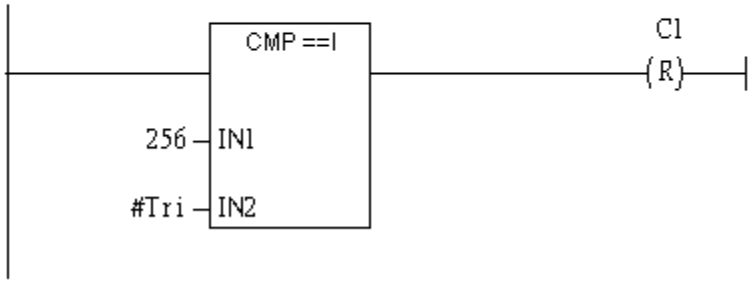
```
Counter(C1) add "1" and Tri add "1" , too.
```



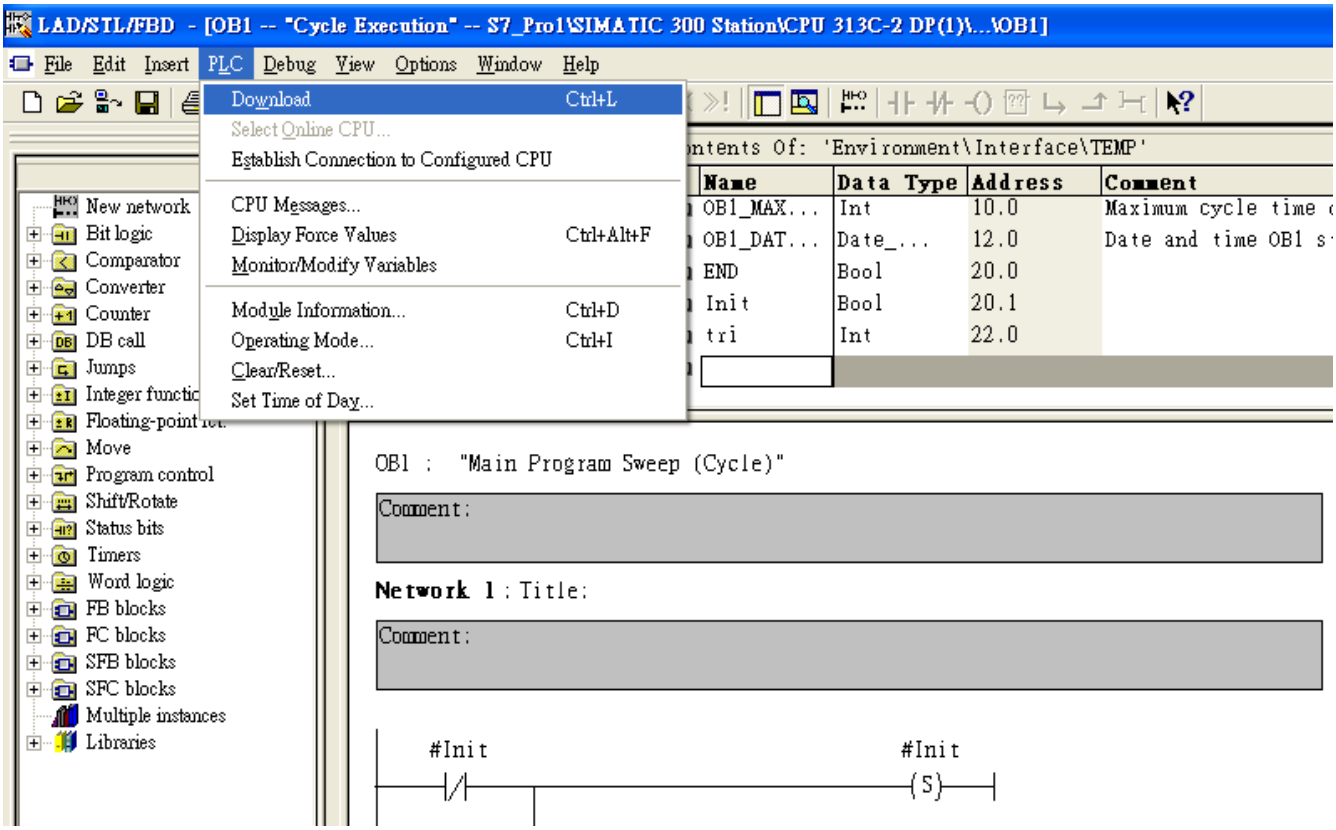
If Tri is equal to 256, reset counter (C1)

Network 4 : Compare Tri with 256

If Tri is equal to 256 that will reset C1.



7. S7 program download

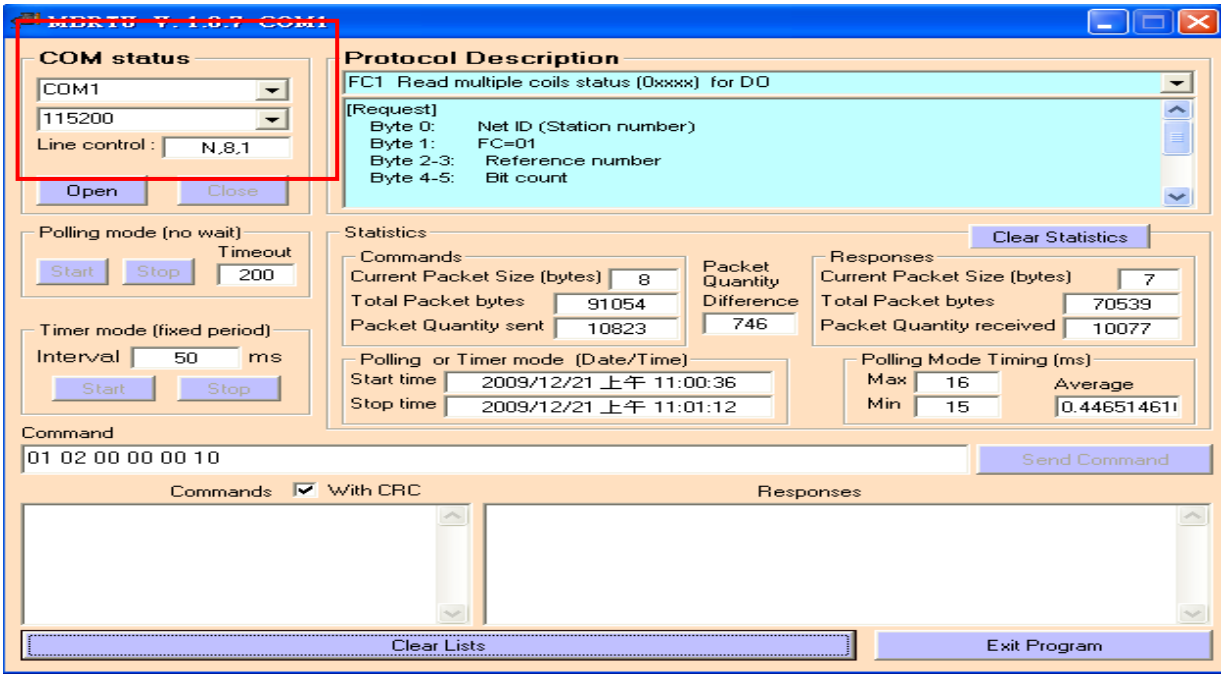


8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.

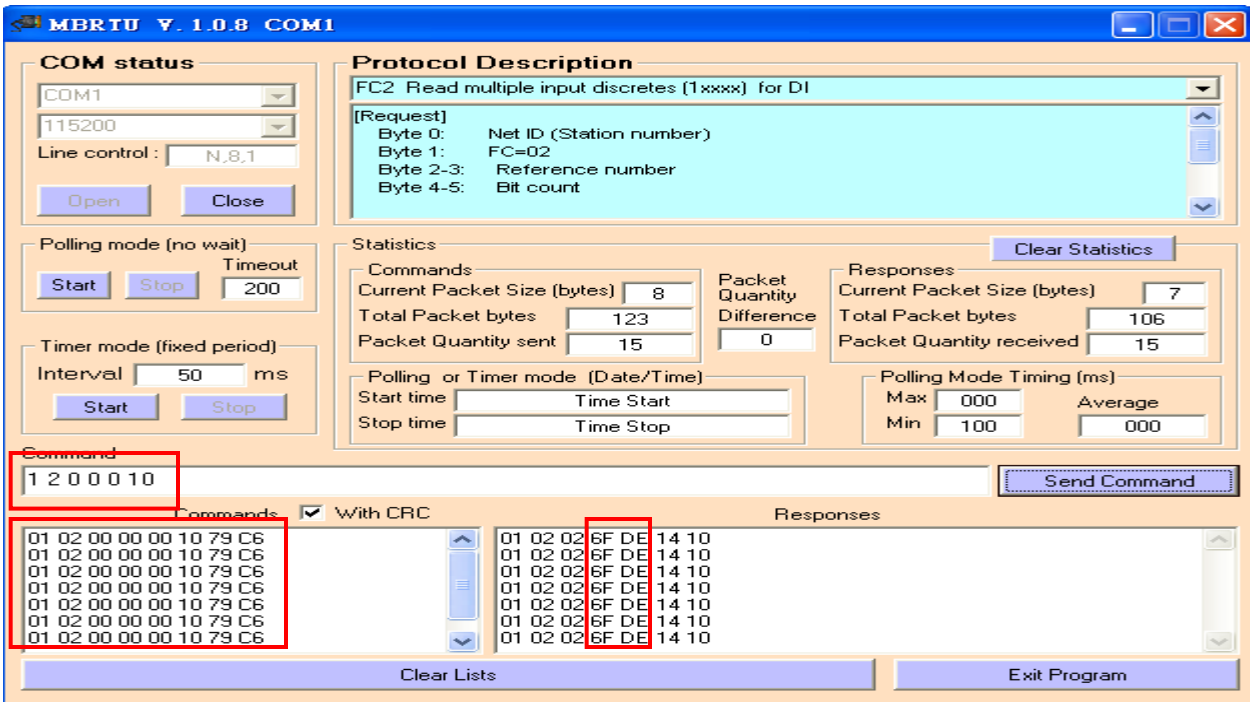
Communication test

1. Confirm the Com Port setting of Modbus Master tool is the same with GW-7553's (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/)

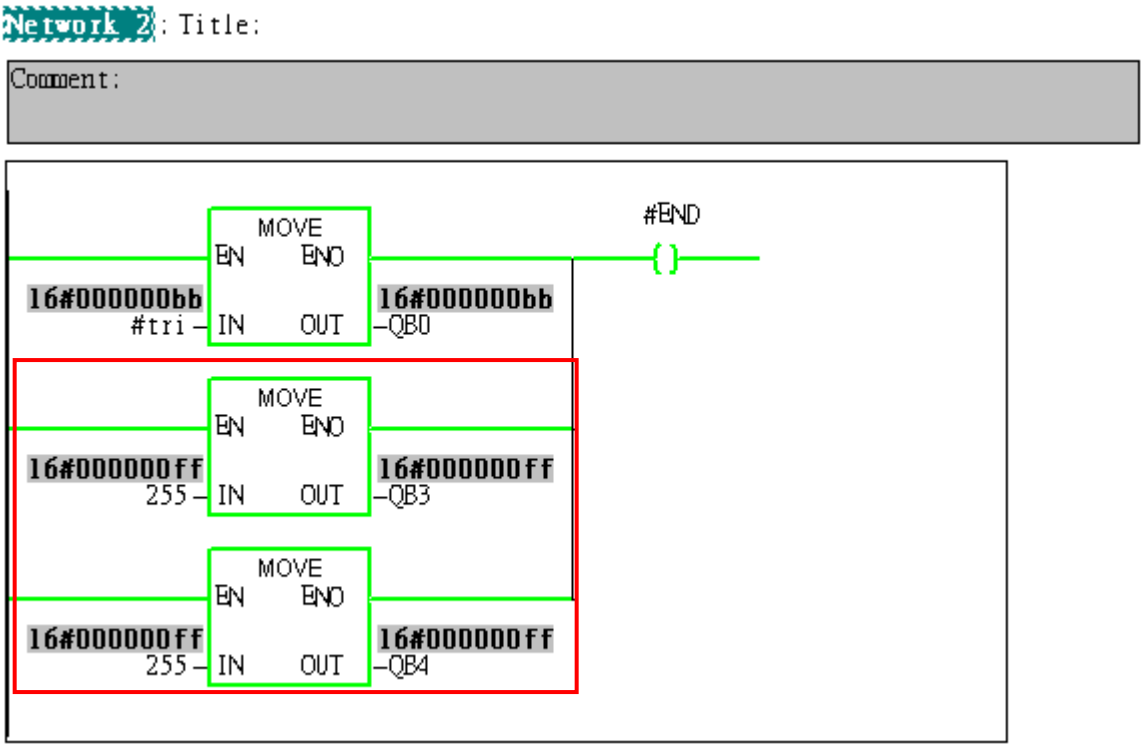
Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

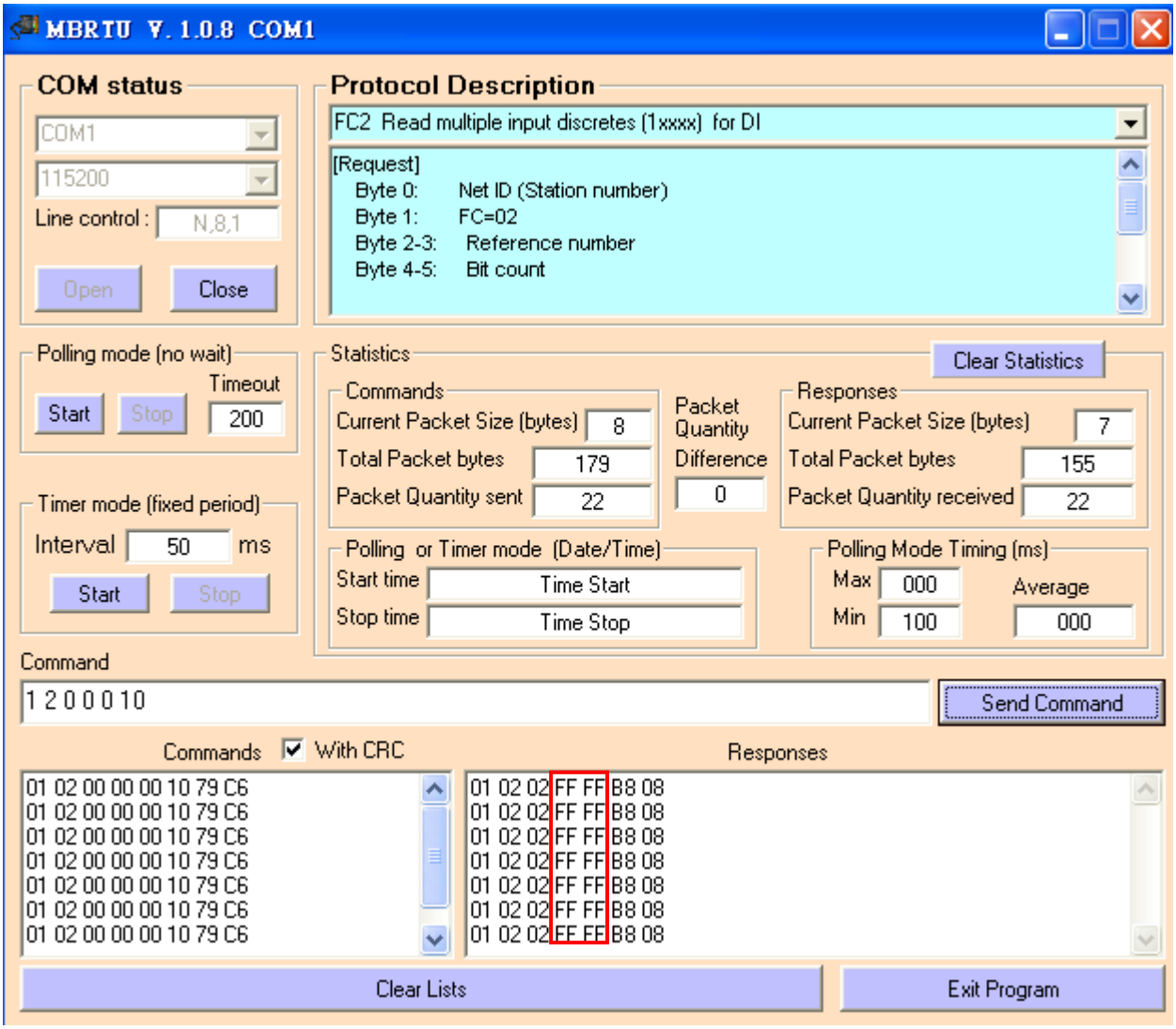


2. Input command (" 01 02 00 00 00 10") in MBRTU and click <Send Command> button to send Modbus command: "01 02 00 00 00 10 79 C6". We can get the DI value (0x6F, 0xDE) from the response message.



3. We change QB3 to 0xFF and QB4 to 0xFF, and then we can click <Send Command> button to read DI again at MBRTU and we will get the new DI value (0xFF, 0xFF) from the response message.

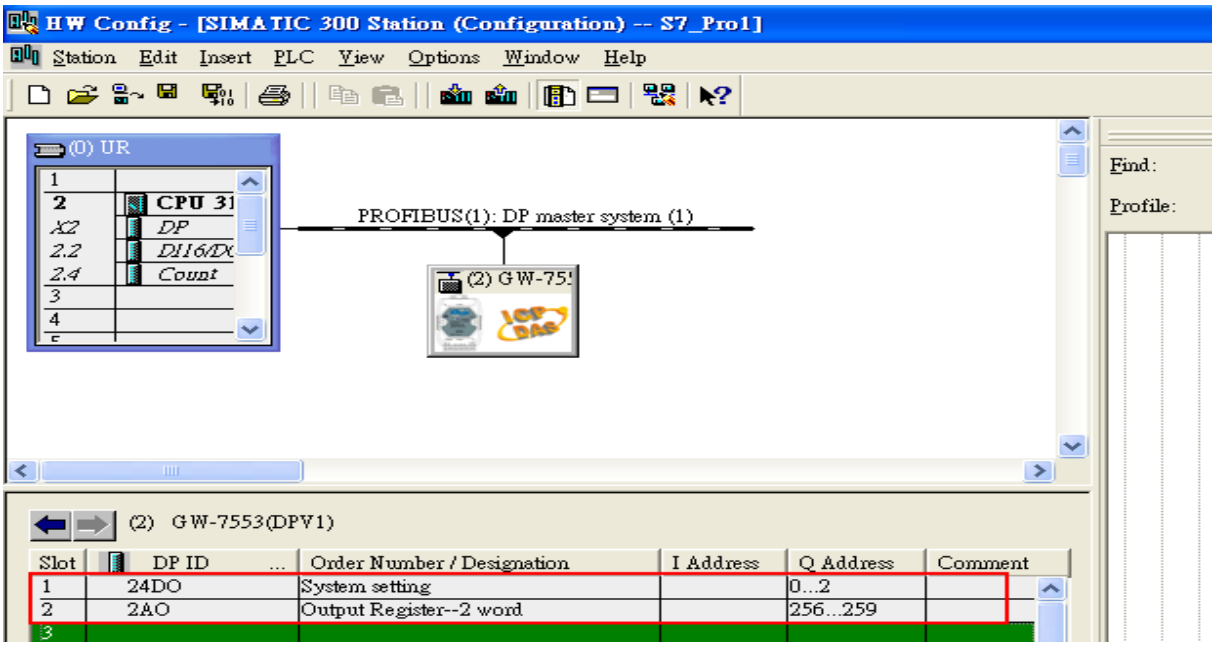



MBRTU V. 1.0.8 COM1
COM status
COM1
115200
Line control :
N,8,1
Open
Close
Protocol Description
FC2 Read multiple input discretes (1xxxx) for DI
[Request]
Byte 0: Net ID (Station number)
Byte 1: FC=02
Byte 2-3: Reference number
Byte 4-5: Bit count
Polling mode (no wait)
Timeout
Start
Stop
200
Timer mode (fixed period)
Interval
50
ms
Start
Stop
Statistics
Clear Statistics
Commands
Current Packet Size (bytes) 8
Total Packet bytes 179
Packet Quantity sent 22
Packet Quantity Difference 0
Responses
Current Packet Size (bytes) 7
Total Packet bytes 155
Packet Quantity received 22
Polling or Timer mode (Date/Time)
Start time Time Start
Stop time Time Stop
Polling Mode Timing (ms)
Max 000
Min 100
Average 000
Command
1 2 0 0 0 10
Send Command
Commands
With CRC
Responses
01 02 00 00 00 10 79 C6
01 02 02 FF FF B8 08
01 02 02 FF FF B8 08
Clear Lists
Exit Program

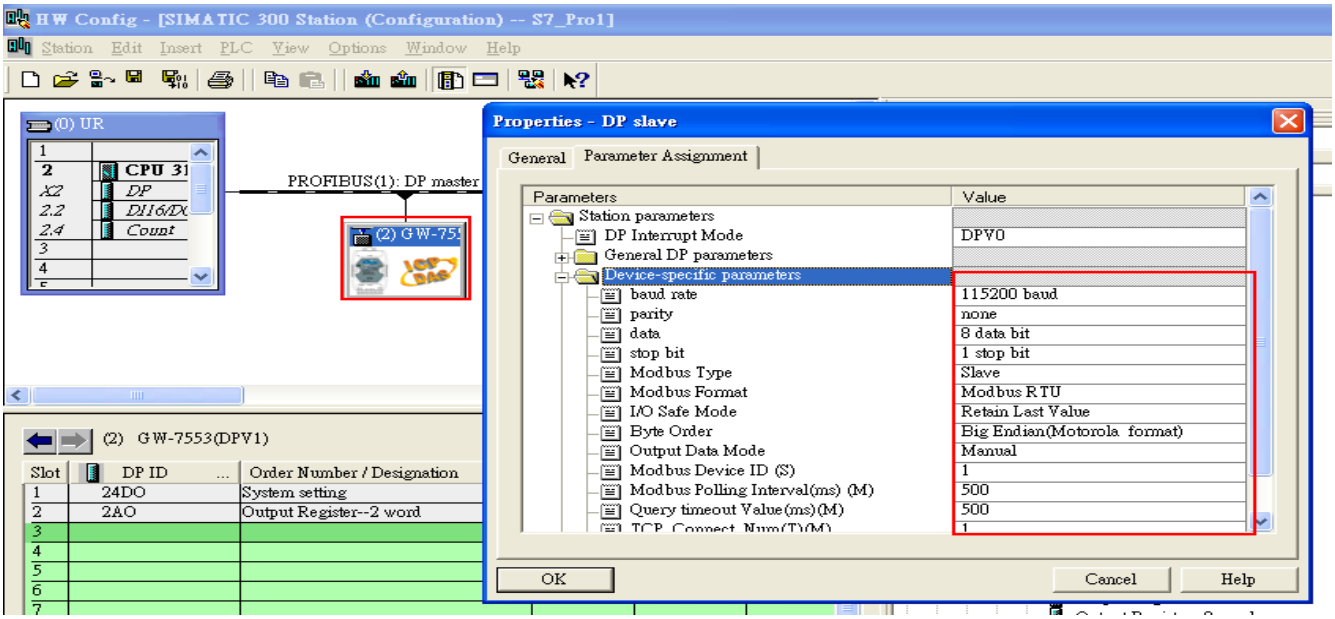
Example 4: PLC refreshes AI data to Modbus master.

SIMATIC STEP 7 Edit

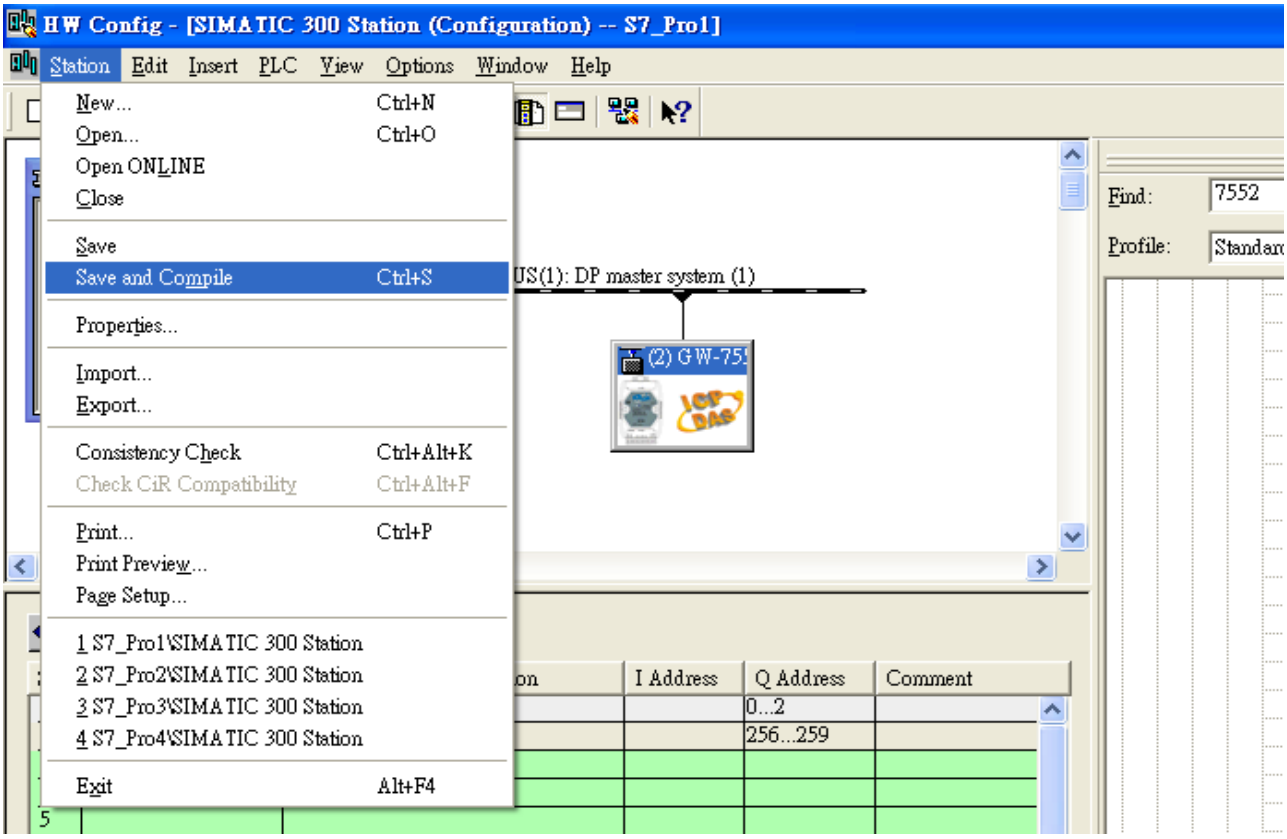
1.HW Config. – configure GW-7553 (ex: System setting module x1, Output Register—2 word module x1)



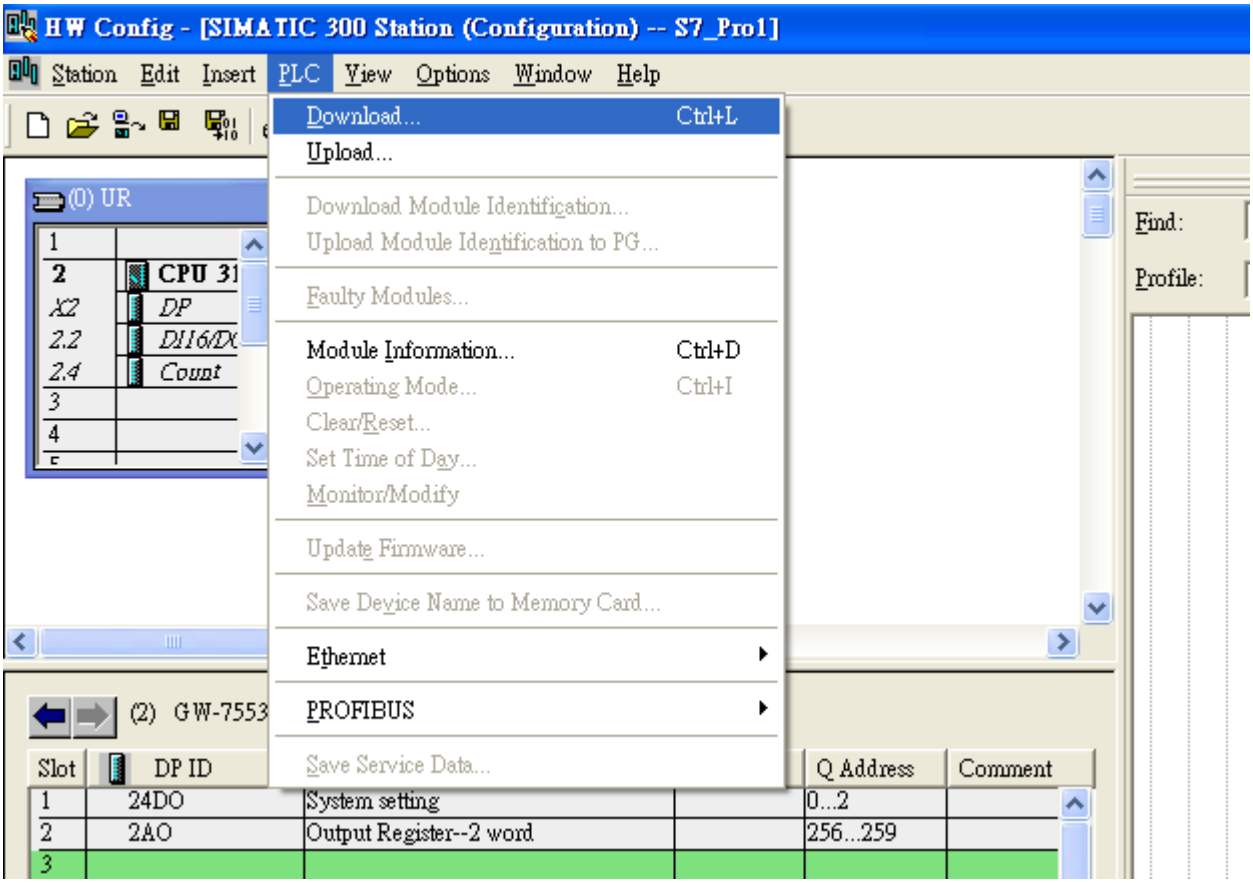
2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.



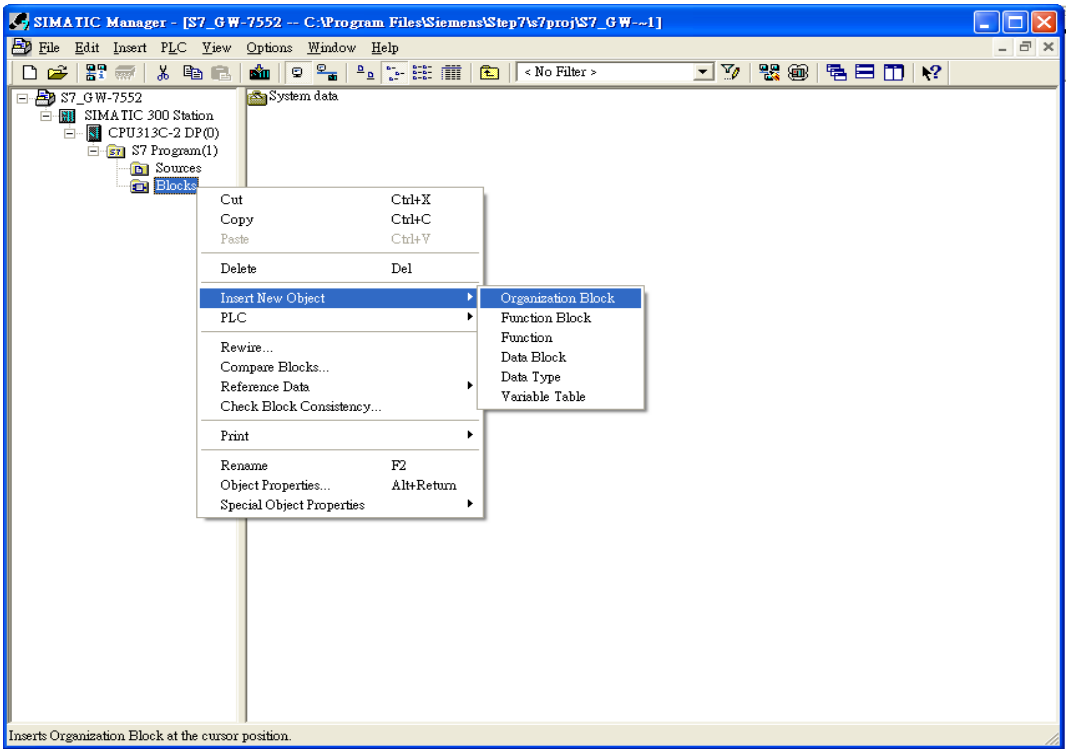
3. Save and Compile

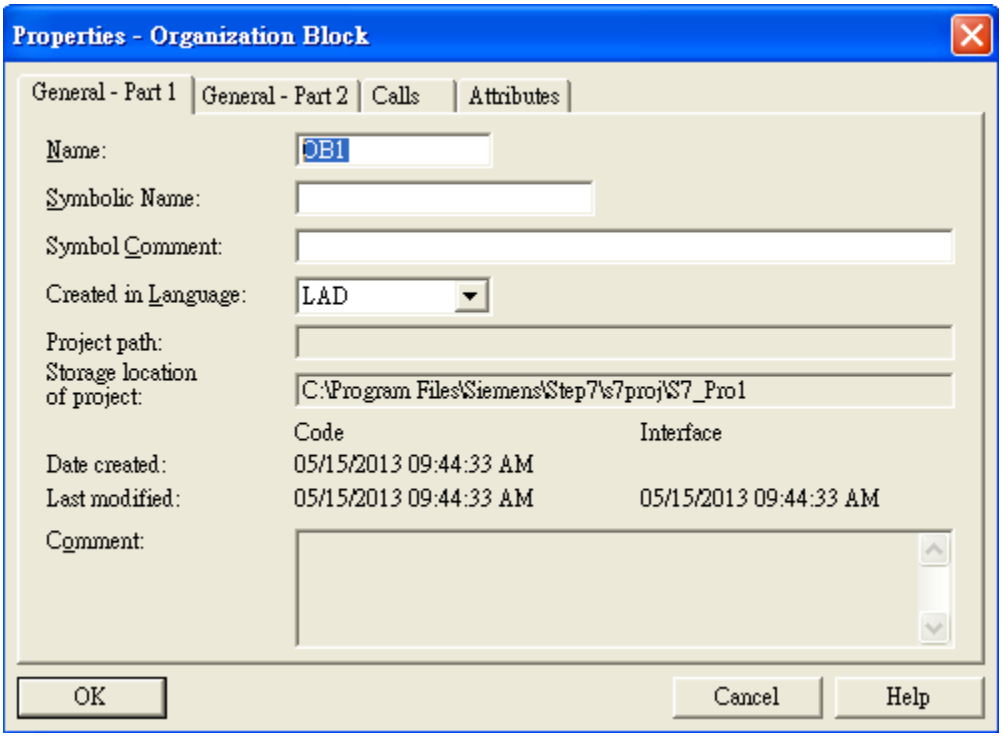


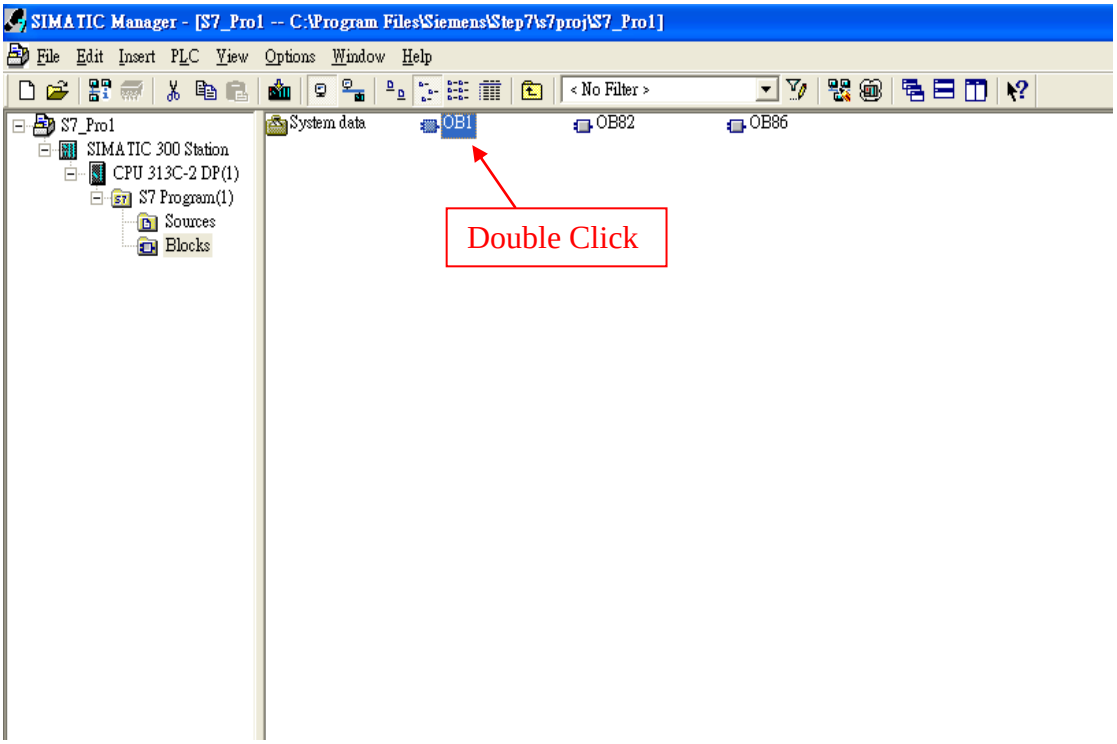
4. Download setting into STEP 7



5.Insert a new Organization Block (OB1,OB82,OB86)







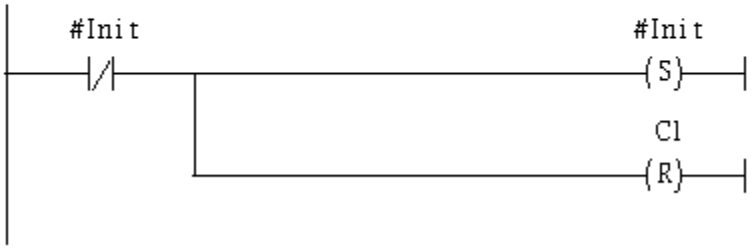
6.S7 program edit

Variables used in the example LD Program:

	Name	Data Type	Address	Comment
	OB1_DAT...	Date_...	12.0	Date and time OB1 started
	END	Bool	20.0	
	Tri	Int	22.0	
	Init	Bool	24.0	

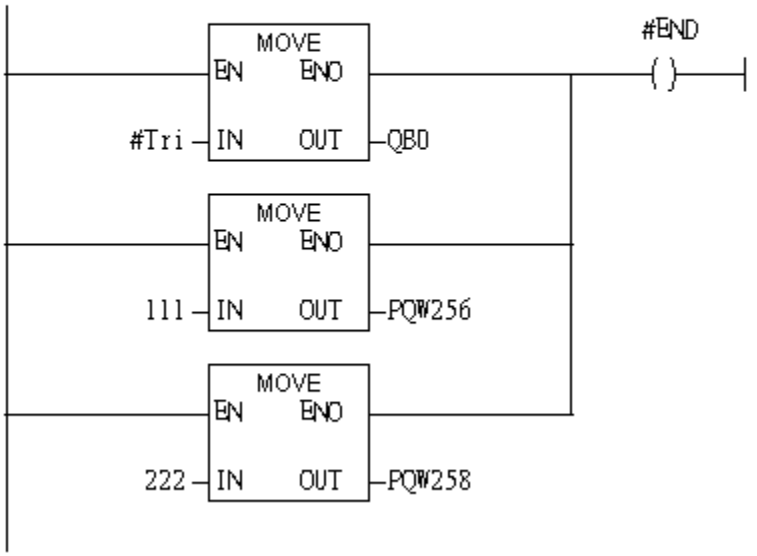
Network 1: Initial Cl

Initial Cl



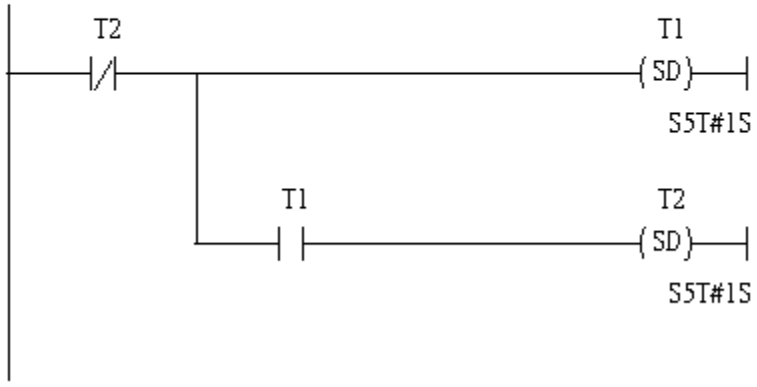
Network 2 : QB0 add "1" refresh AO value

2 word 2AO



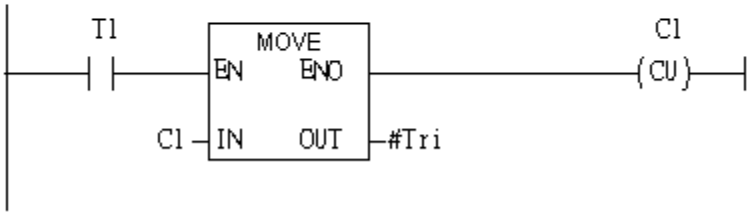
Network 3 : Timer T1 & T2

Using T2 trigger T1



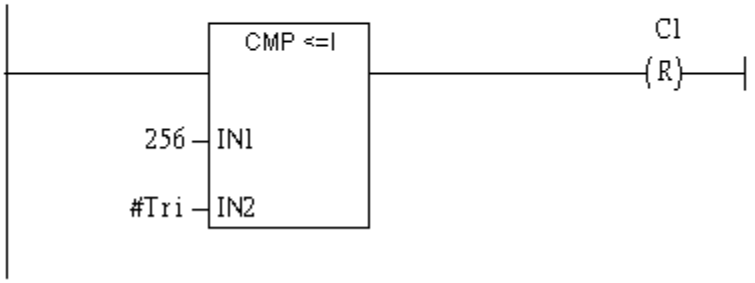
Network 4 : T1 trigger C1

Counter(C1) add "1" and Tri add "1" ,too.

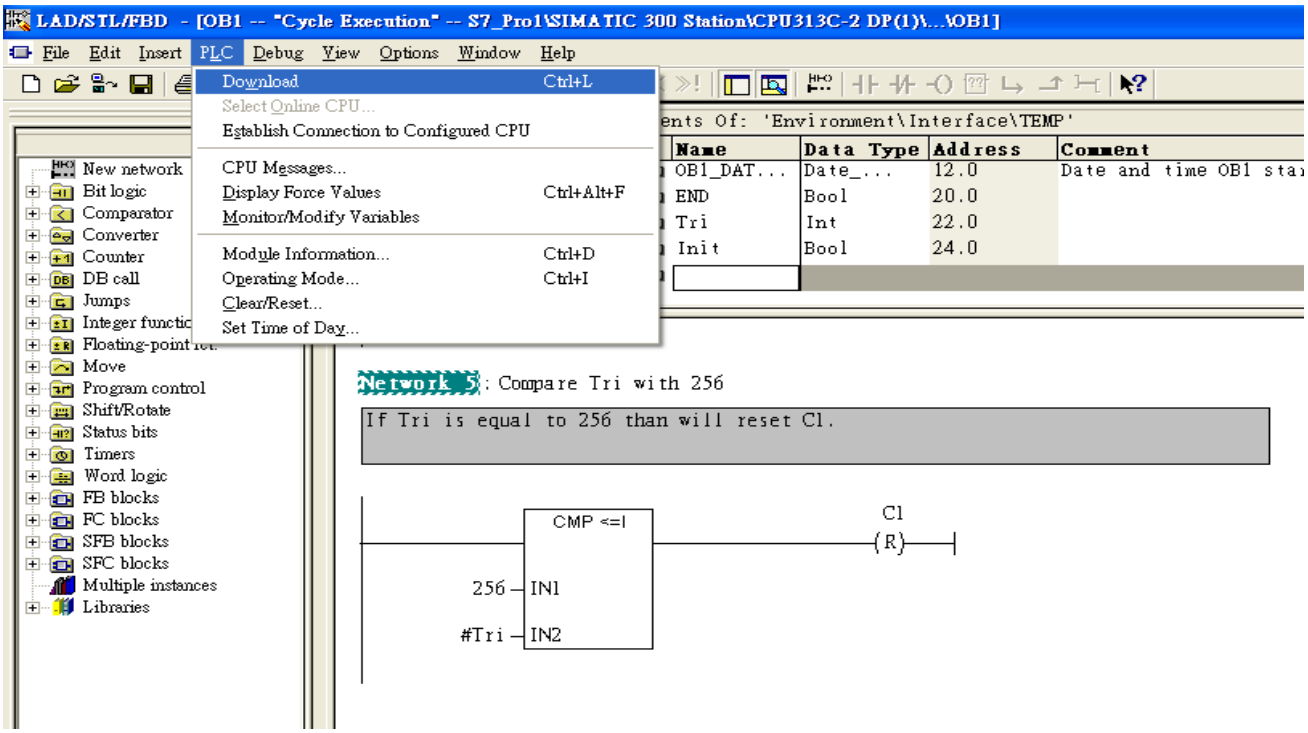


Network 5 : Compare Tri with 256

If Tri is equal to 256 than will reset C1.



7. S7 program download

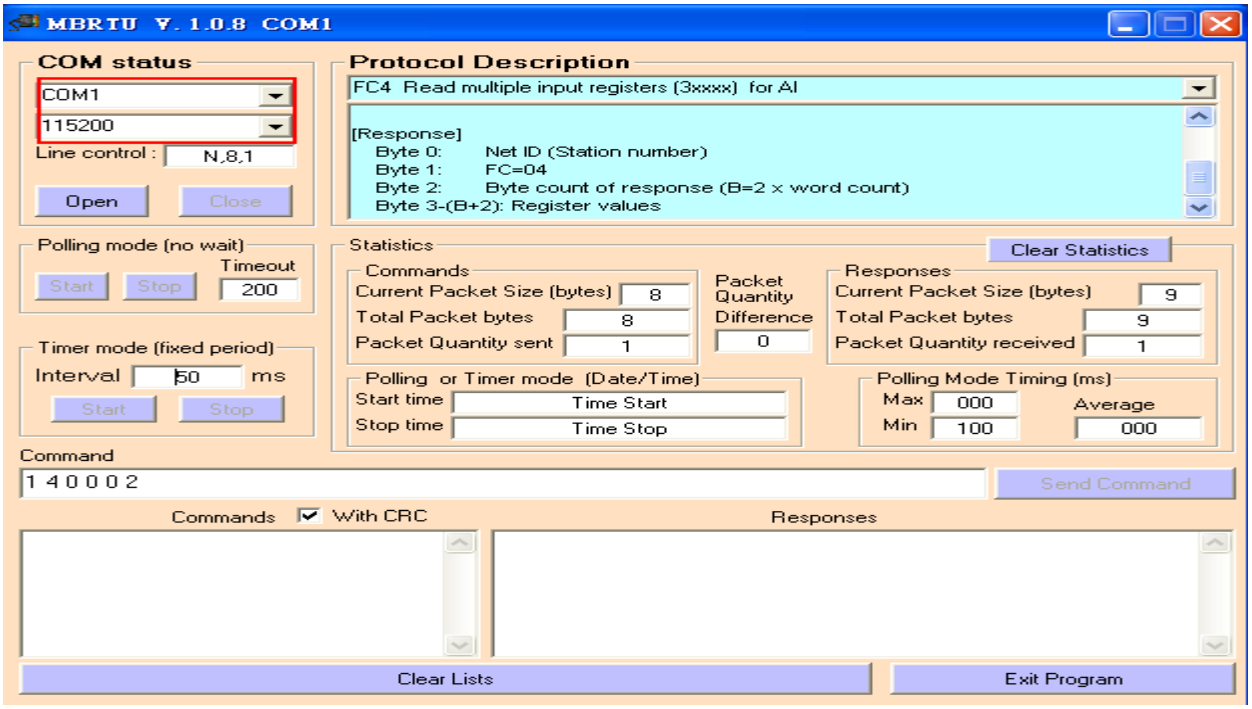


8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.

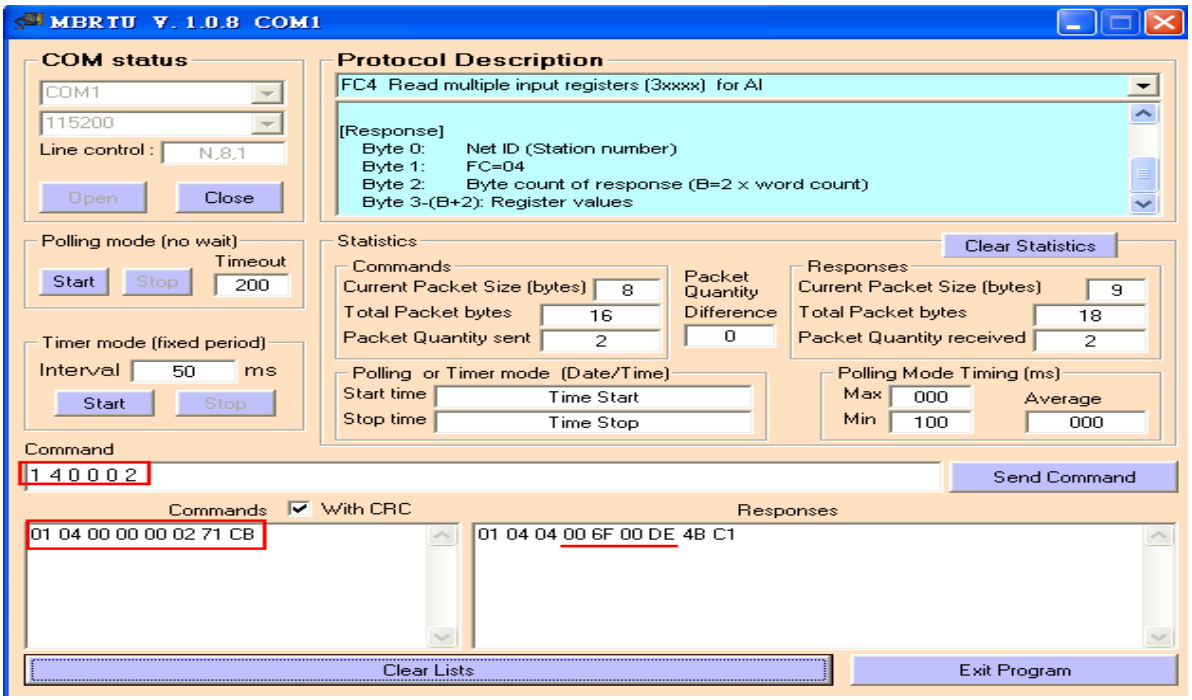
Communication test

1. Confirm the Com Port setting of Modbus Master tool is the same with GW-7553's (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/)

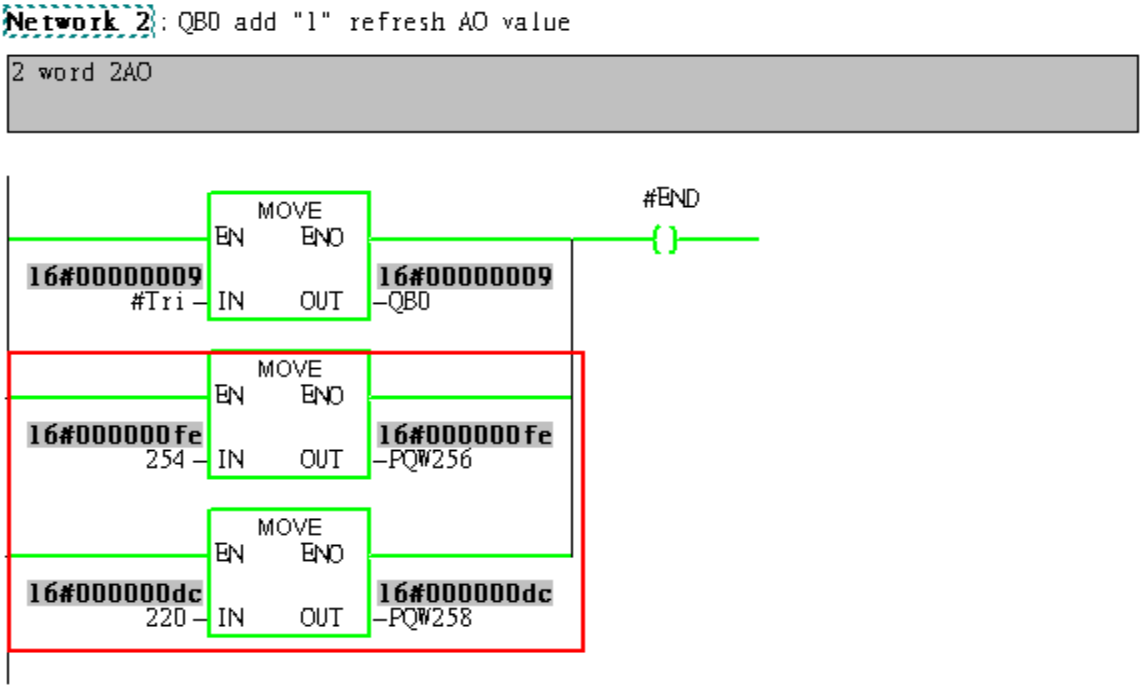
Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

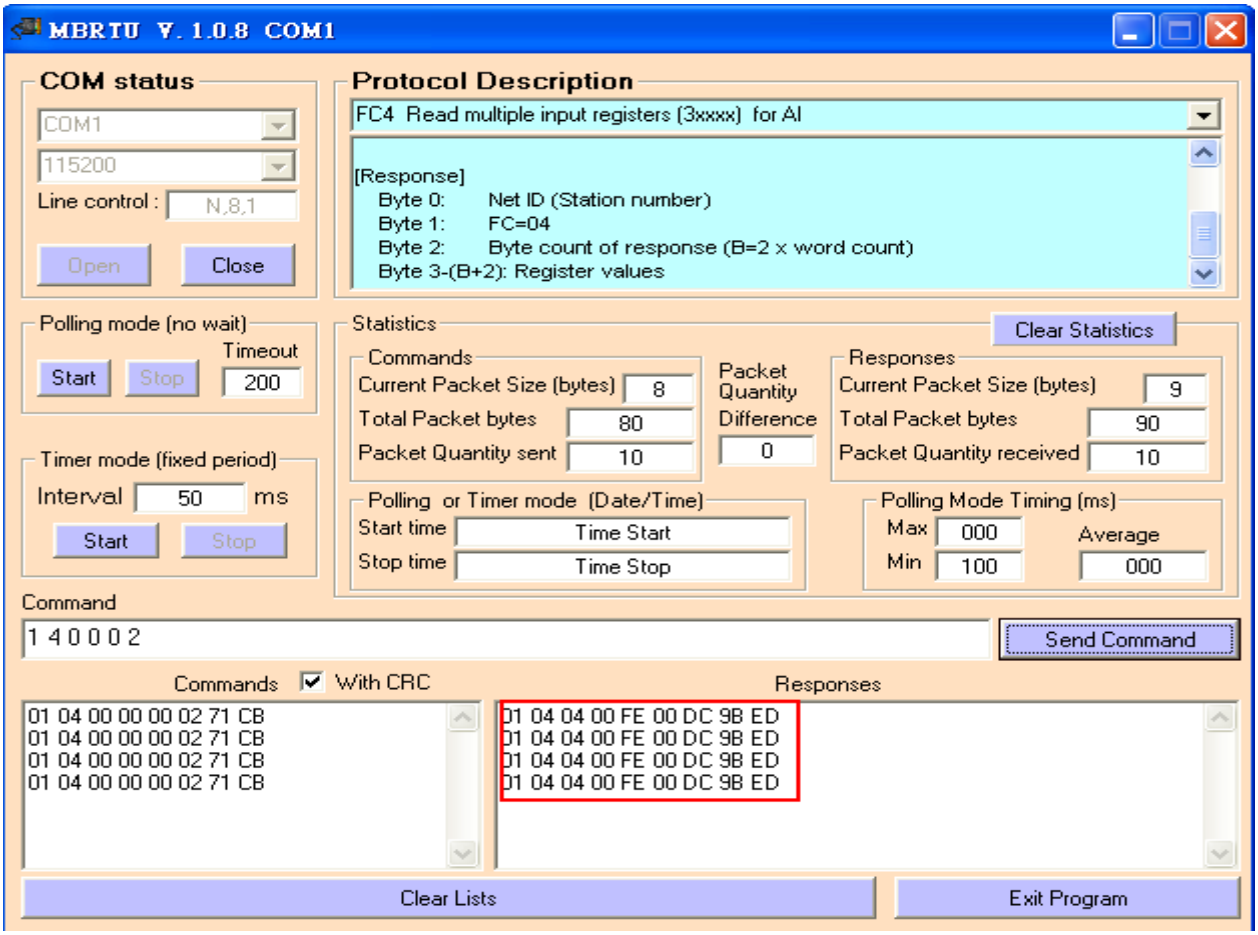


2. Input command (" 01 04 00 00 00 02") in MBRTU and click <Send Command> button to send Modbus command: "01 04 00 00 00 02 71 CB". We can get the AI value (0x006F, 0x00DE) from the response message.



3. We change PQW256 to 0x00FE and PQW258 to 0x00DC, and then we can click <Send Command> button to read AI again at MBRTU and we will get the new AI value (0x00FE, 0x00DC) from the response message.




MBRTU V. 1.0.8 COM1
COM status
COM1
115200
Line control :
N,8,1
Open
Close
Protocol Description
FC4 Read multiple input registers (3xxxx) for AI
[Response]
Byte 0: Net ID (Station number)
Byte 1: FC=04
Byte 2: Byte count of response (B=2 x word count)
Byte 3-(B+2): Register values
Polling mode (no wait)
Timeout
Start
Stop
200
Timer mode (fixed period)
Interval
50
ms
Start
Stop
Statistics
Clear Statistics
Commands
Current Packet Size (bytes)
8
Total Packet bytes
80
Packet Quantity sent
10
Packet Quantity
Difference
0
Responses
Current Packet Size (bytes)
9
Total Packet bytes
90
Packet Quantity received
10
Polling or Timer mode (Date/Time)
Start time
Time Start
Stop time
Time Stop
Polling Mode Timing (ms)
Max
000
Min
100
Average
000
Command
1 4 0 0 0 2
Send Command
Commands
With CRC
01 04 00 00 00 02 71 CB
01 04 00 00 00 02 71 CB
01 04 00 00 00 02 71 CB
01 04 00 00 00 02 71 CB
Responses
01 04 04 00 FE 00 DC 9B ED
01 04 04 00 FE 00 DC 9B ED
01 04 04 00 FE 00 DC 9B ED
01 04 04 00 FE 00 DC 9B ED
Clear Lists
Exit Program