GW-7663 (Modbus TCP Server) How to Communicate with Modbus client? Example for SIMATIC TIA portal

- Preceding Operation
- Example 1:Modbus client read/write DO from/to PLC
- Example 2:Modbus client read/write AO from/to PLC
- Example 3:Modbus client read DI data from PLC
- Example 4:Modbus client read AI data from PLC

✓Communication with PLC (LED => AP:ON, BOOT:OFF, ERR:OFF).

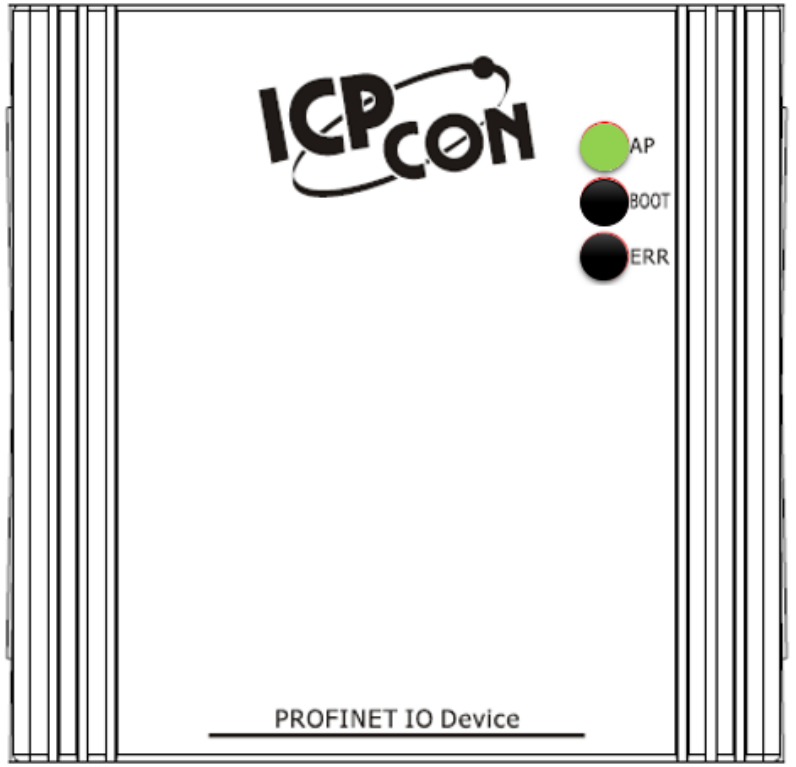
How to configure GW-7663 in SIMATIC TIA portal?

✓ Download PFN_Tool utility.

PFN_Tool

✓Download Modbus TCP client utility.

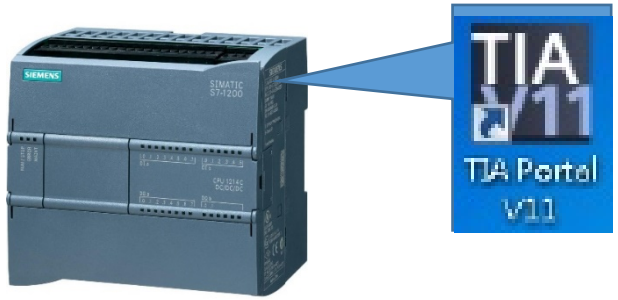
MBTCP tool



Modbus client read/write 16-channel DO from/to PLC

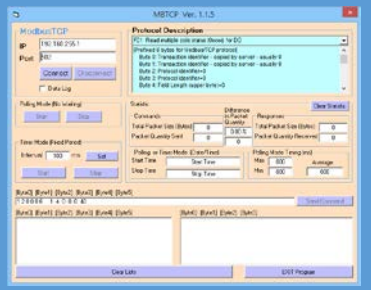
SIMATIC S7-1200

PROFINET IO Controller
(Master)



PROFINET

Modbus Client

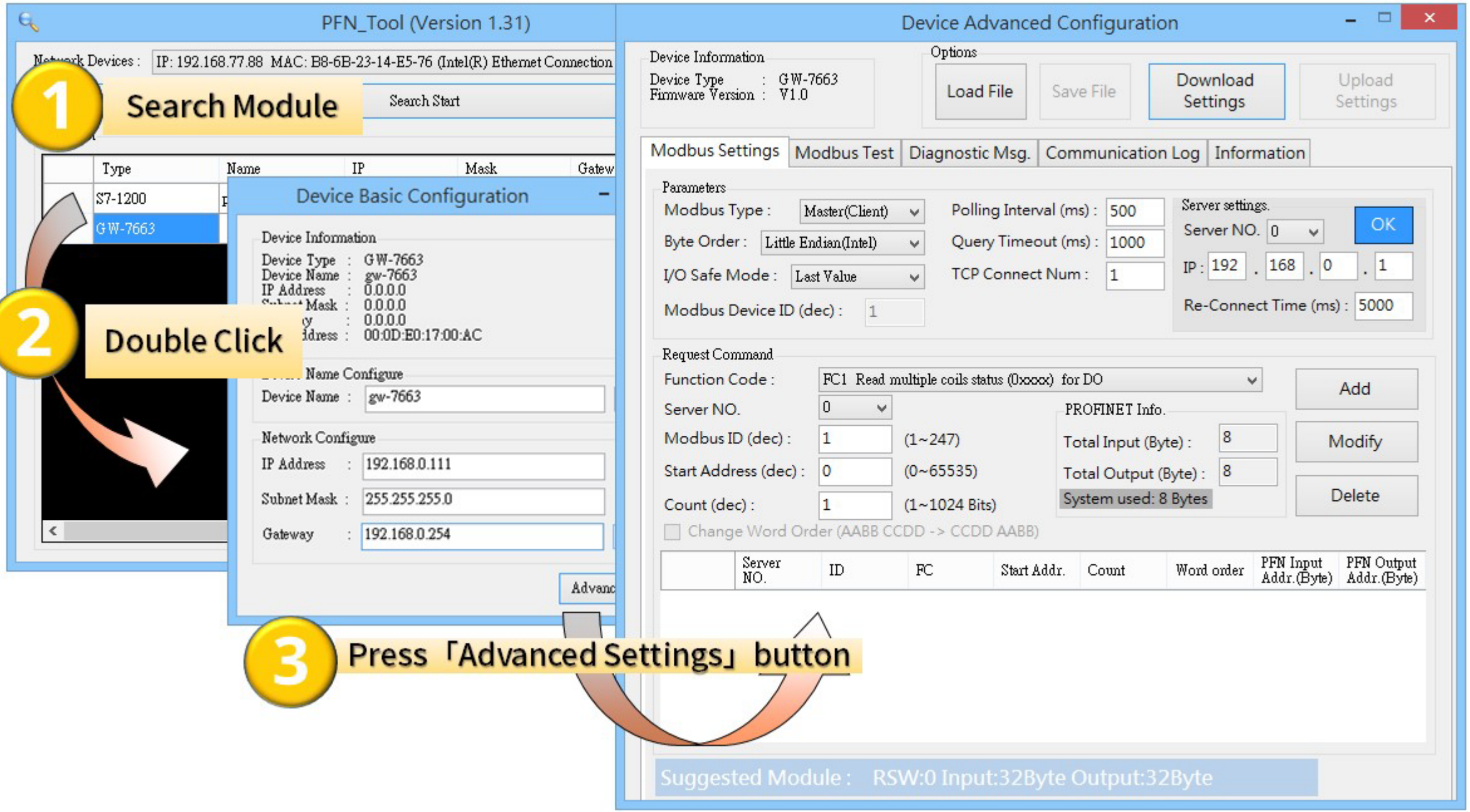


GW-7663

Modbus TCP

PROFINET IO device (Slave)	Modbus TCP Server (DO) • IP:192.168.77.11 • Modbus ID:2 • Data Address: 00001~00016 • Data Length: 2

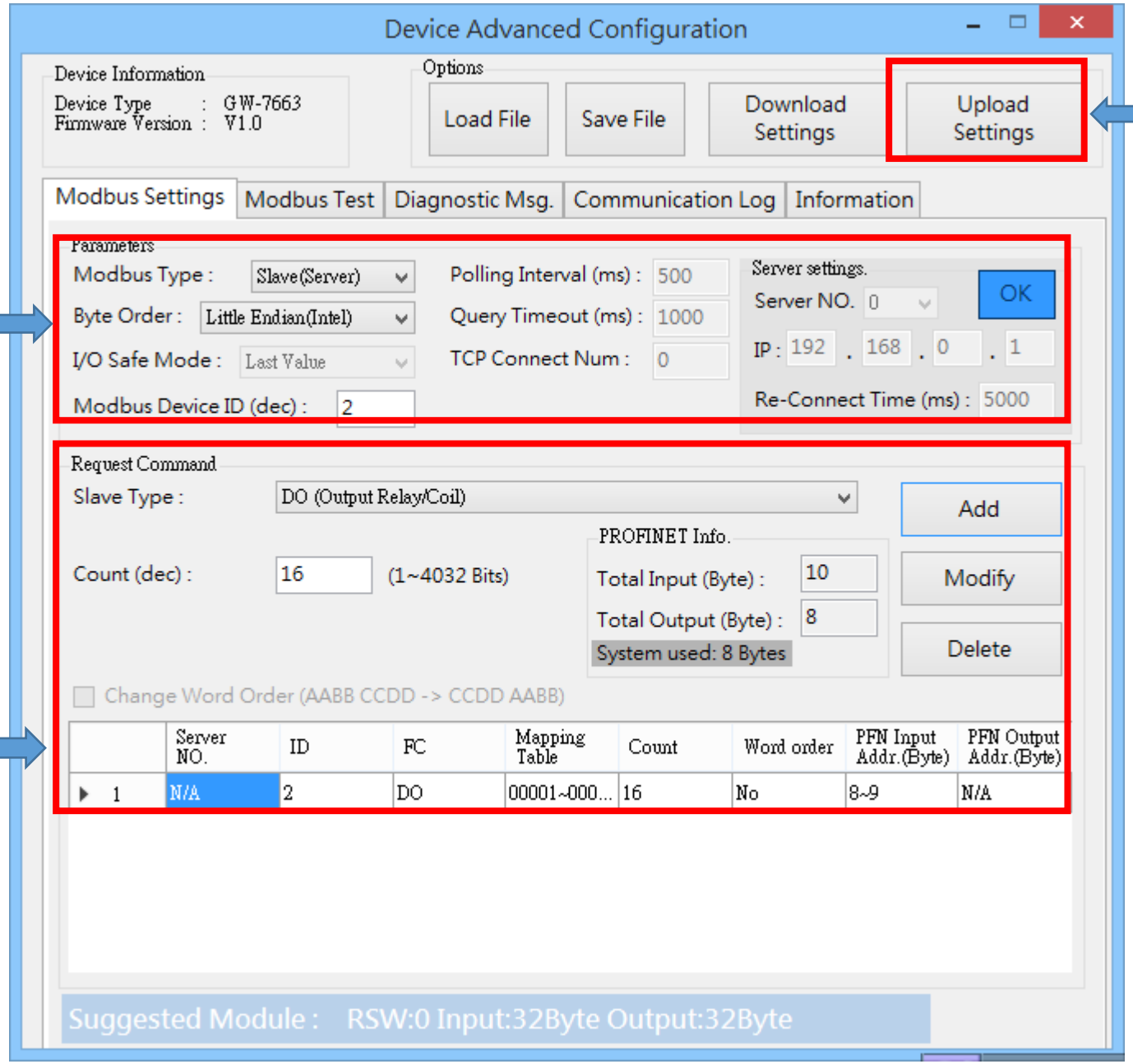
Modbus client read and write 16-channel DO to PLC



Modbus client read and write 16-channel DO to PLC

1. Set Modbus settings

2. Add Modbus Slave Type



3. Upload

Modbus client read and write 16-channel DO to PLC

The first input 8 bytes and output 8 bytes are allocated for system. (64~71)
The 9th byte to the 32th byte are allocated for Modbus. (72~95)

Device overview

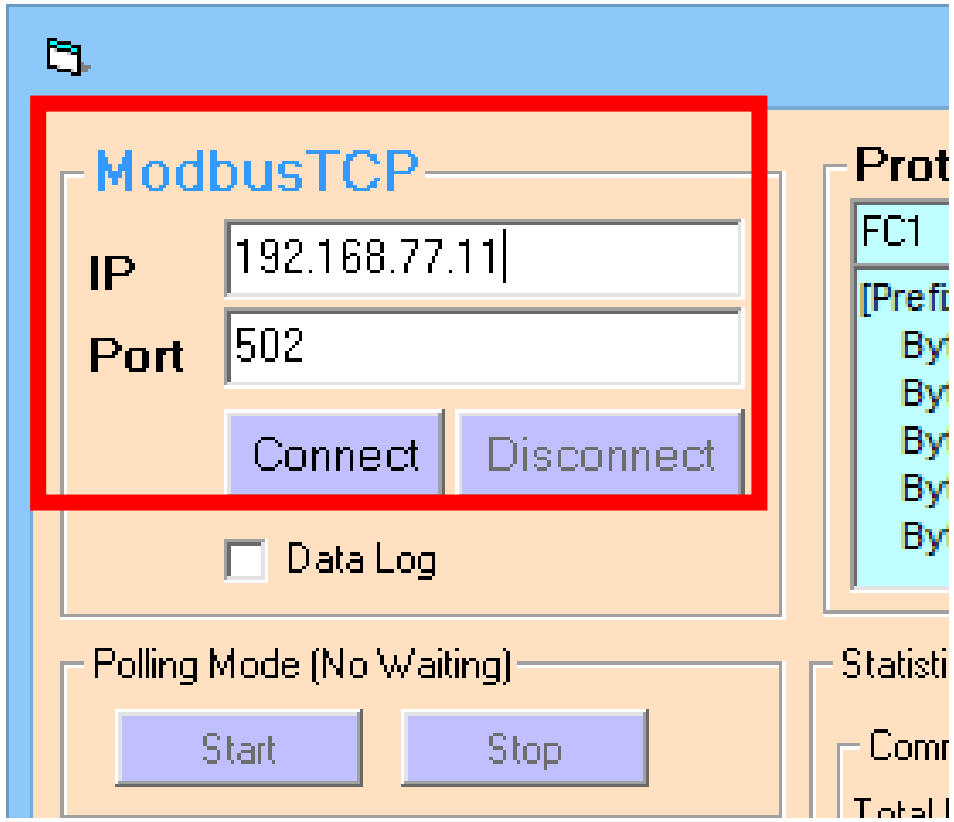
	Module	Rack	Slot	I address	Q addre...	Type	Order no.
	GW-7663	0	0			GW-7663 2-Port De...	GW-7663
	Internal	0	0 X1			GW-7663	
	RSW:0 Input:32Byte Output:...	0	1	64...95	64...95	RSW:0 Input:32Byte...	

	Address	Display format	Monitor value
1	%IB72	Hex	16#00
2	%IB73	Hex	16#00
3	%I72.0	Bool	FALSE
4	%I72.1	Bool	FALSE
5	%I72.2	Bool	FALSE
6	%I72.3	Bool	FALSE
7	%I72.4	Bool	FALSE
8	%I72.5	Bool	FALSE
9	%I72.6	Bool	FALSE
10	%I72.7	Bool	FALSE
11	%I73.0	Bool	FALSE
12	%I73.1	Bool	FALSE
13	%I73.2	Bool	FALSE
14	%I73.3	Bool	FALSE
15	%I73.4	Bool	FALSE
16	%I73.5	Bool	FALSE
17	%I73.6	Bool	FALSE
18	%I73.7	Bool	FALSE

IB72 => used to receive DO 1~8 from Modbus client
IB73 => used to receive DO 9~16 from Modbus client

I72.0~7 => used to receive DO 1~8 from Modbus client
I73.0~7 => used to receive DO 9~16 from Modbus client

Confirm GW-7663's IP address is the same with Modbus client tool

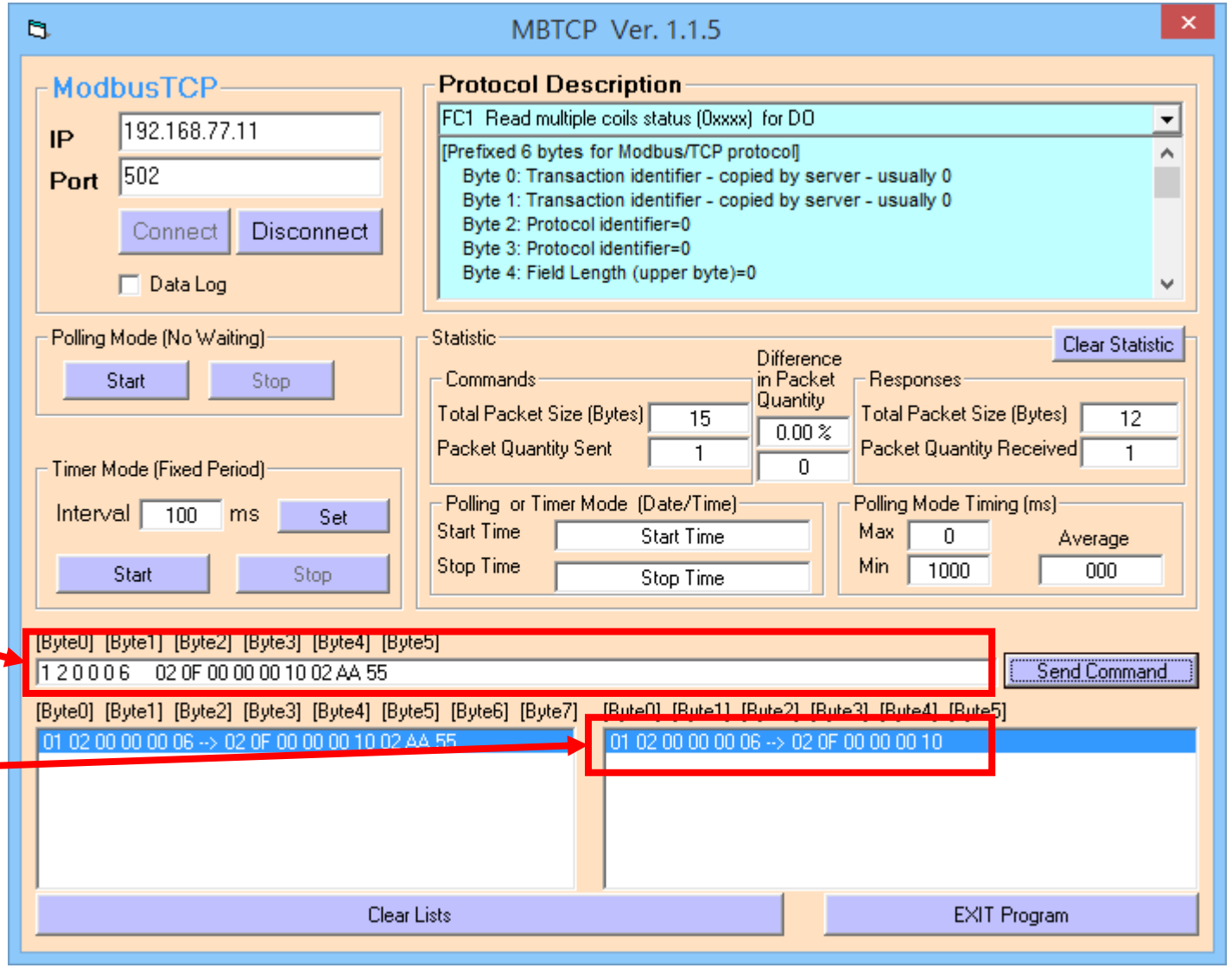


Modbus client read and write 16-channel DO to PLC

Send Modbus command (FC 0F) to change DO status(0xAA, 0x55)

1. Send DO Data
0xAA => for DO 1~8
0x55 => for DO 9~16

2. Receive Resp.



Modbus client read and write 16-channel DO to PLC

PLC will receives DO status(0xAA, 0x55) at PLC address IB72, IB73

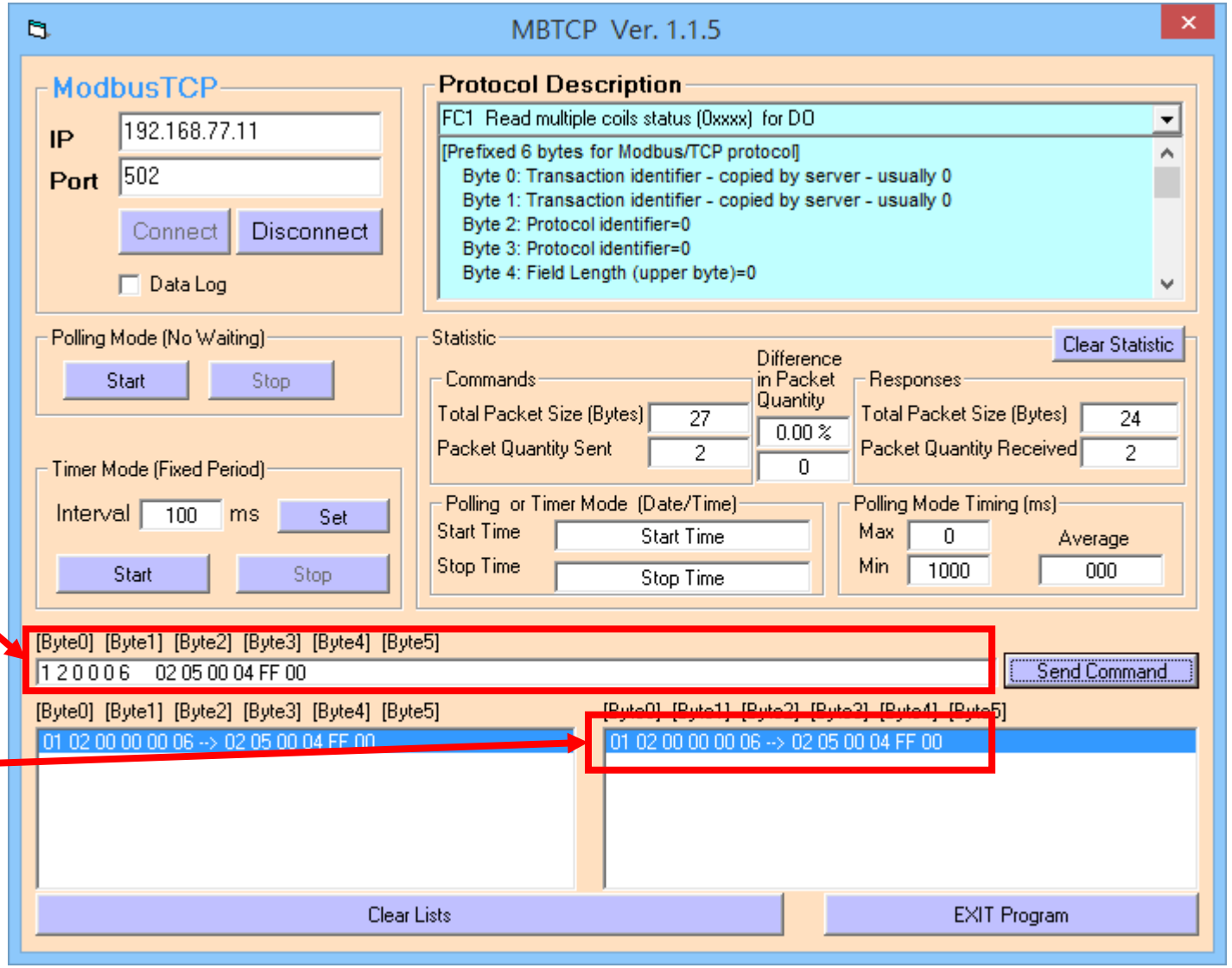
	i	...	Address	Display format	Monitor value
1			%IB72	Hex	16#AA
2			%IB73	Hex	16#55
3			%I72.0	Bool	FALSE
4			%I72.1	Bool	TRUE
5			%I72.2	Bool	FALSE
6			%I72.3	Bool	TRUE
7			%I72.4	Bool	FALSE
8			%I72.5	Bool	TRUE
9			%I72.6	Bool	FALSE
10			%I72.7	Bool	TRUE
11			%I73.0	Bool	TRUE
12			%I73.1	Bool	FALSE
13			%I73.2	Bool	TRUE
14			%I73.3	Bool	FALSE
15			%I73.4	Bool	TRUE
16			%I73.5	Bool	FALSE
17			%I73.6	Bool	TRUE
18			%I73.7	Bool	FALSE

Modbus client read and write 16-channel DO to PLC

Send Modbus command (FC 05) to change DO status
Set DO ch-5(Modbus address: 00005): ON

1. Send query cmd

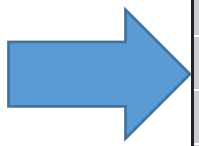
2. Receive Resp.



Modbus client read and write 16-channel DO to PLC

PLC will receives DO status at PLC address I72.4(ch-5)

	Address	Display format	Monitor value
1	%IB72	Hex	16#AA
2	%IB73	Hex	16#55
3	%I72.0	Bool	FALSE
4	%I72.1	Bool	TRUE
5	%I72.2	Bool	FALSE
6	%I72.3	Bool	TRUE
7	%I72.4	Bool	FALSE
8	%I72.5	Bool	TRUE
9	%I72.6	Bool	FALSE
10	%I72.7	Bool	TRUE
11	%I73.0	Bool	TRUE
12	%I73.1	Bool	FALSE
13	%I73.2	Bool	TRUE
14	%I73.3	Bool	FALSE
15	%I73.4	Bool	TRUE
16	%I73.5	Bool	FALSE
17	%I73.6	Bool	TRUE
18	%I73.7	Bool	FALSE



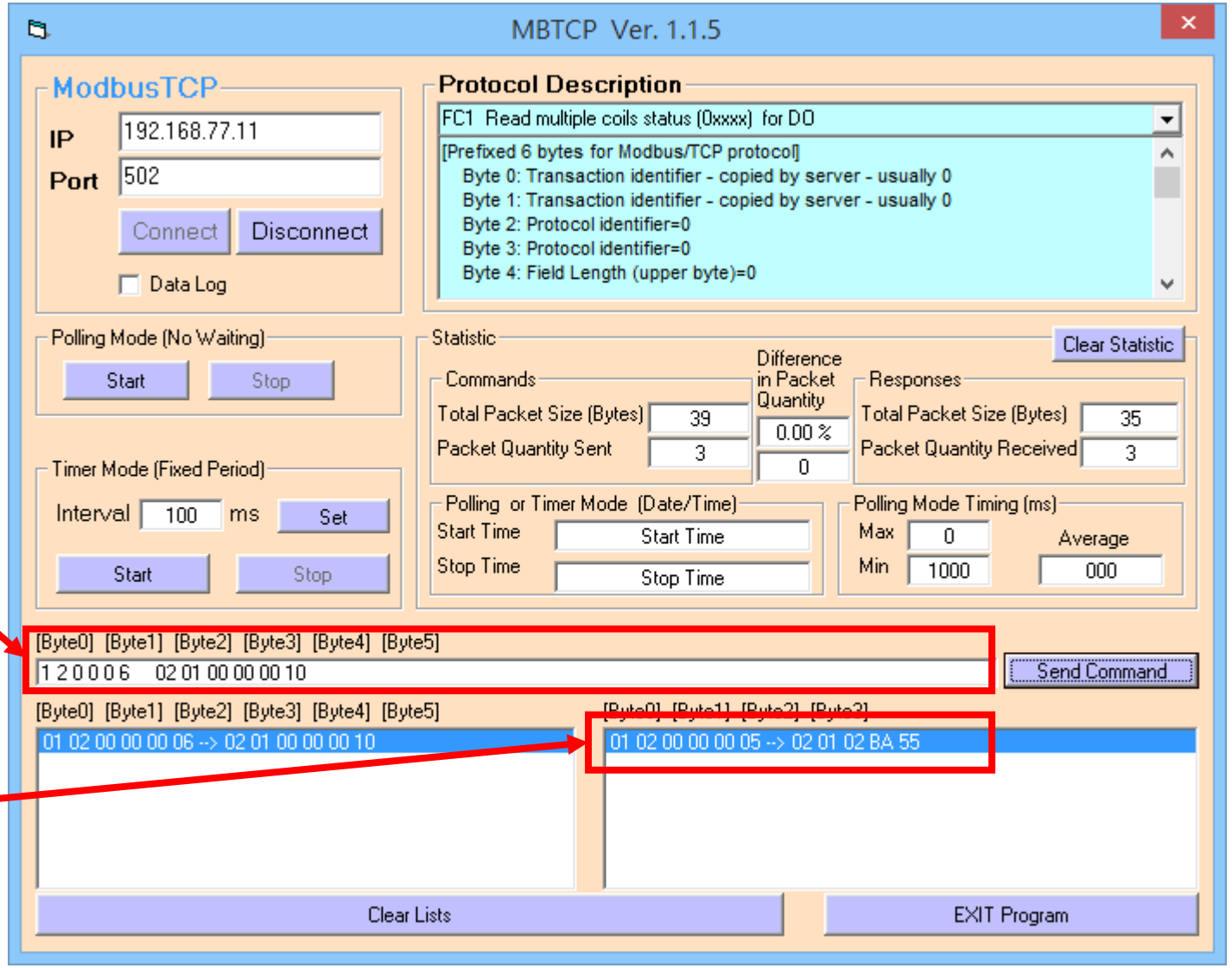
	Address	Display format	Monitor value
1	%IB72	Hex	16#BA
2	%IB73	Hex	16#55
3	%I72.0	Bool	FALSE
4	%I72.1	Bool	TRUE
5	%I72.2	Bool	FALSE
6	%I72.3	Bool	TRUE
7	%I72.4	Bool	TRUE
8	%I72.5	Bool	TRUE
9	%I72.6	Bool	FALSE
10	%I72.7	Bool	TRUE
11	%I73.0	Bool	TRUE
12	%I73.1	Bool	FALSE
13	%I73.2	Bool	TRUE
14	%I73.3	Bool	FALSE
15	%I73.4	Bool	TRUE
16	%I73.5	Bool	FALSE
17	%I73.6	Bool	TRUE
18	%I73.7	Bool	FALSE

Modbus client read and write 16-channel DO to PLC

Send Modbus command (FC 01) to read DO status

1. Send query cmd

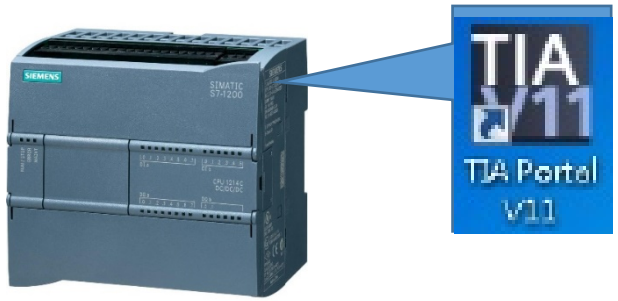
2. Receive DO data
0xBA => for DO 1~8
0x55 => for DO 9~16



Modbus client read/write 3-channel AO from/to PLC

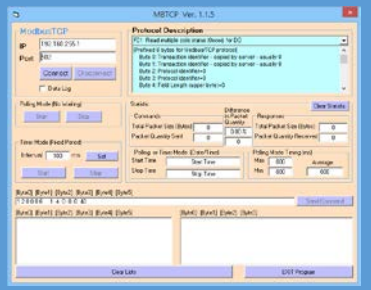
SIMATIC S7-1200

PROFINET IO Controller
(Master)



PROFINET

Modbus Client

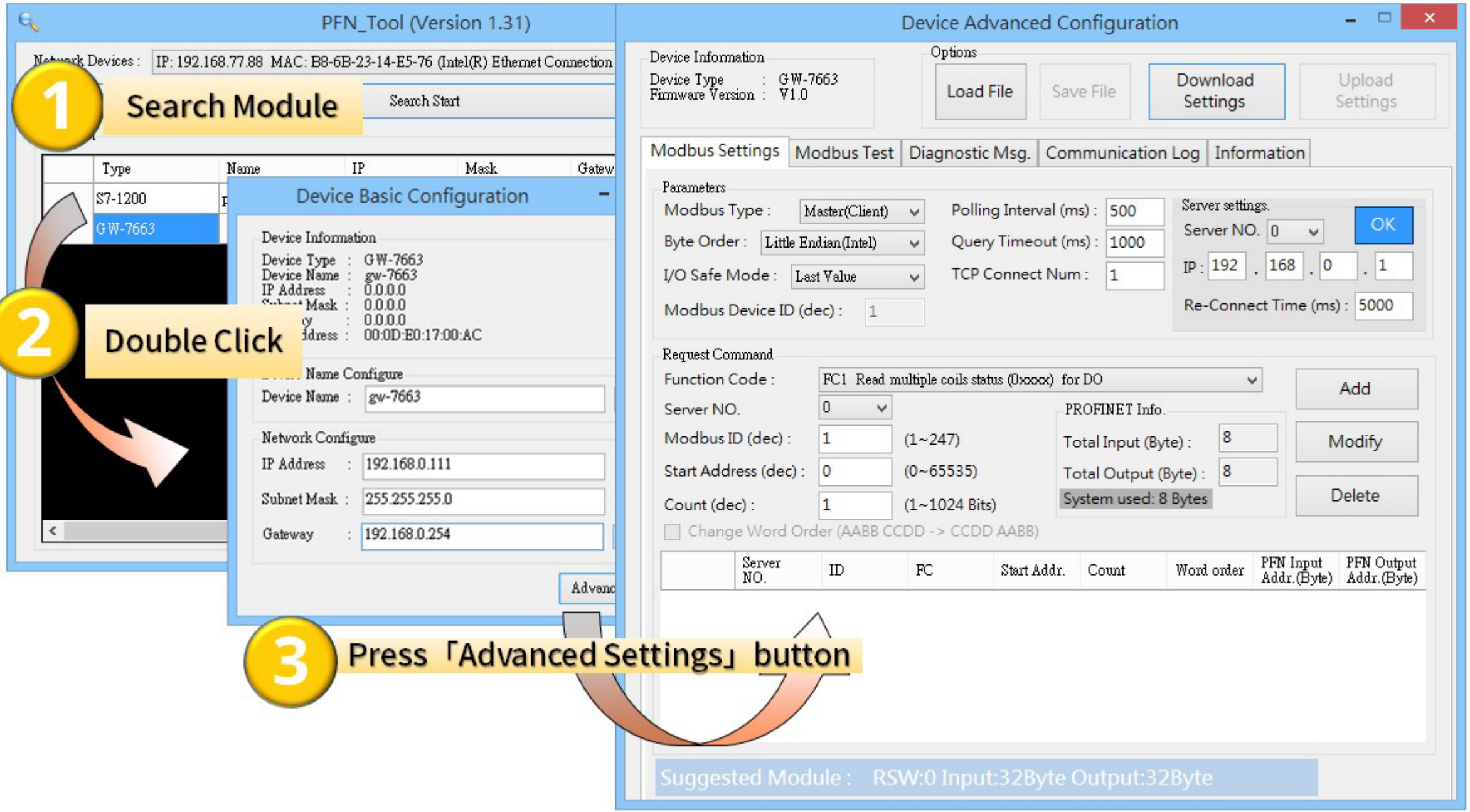


GW-7663

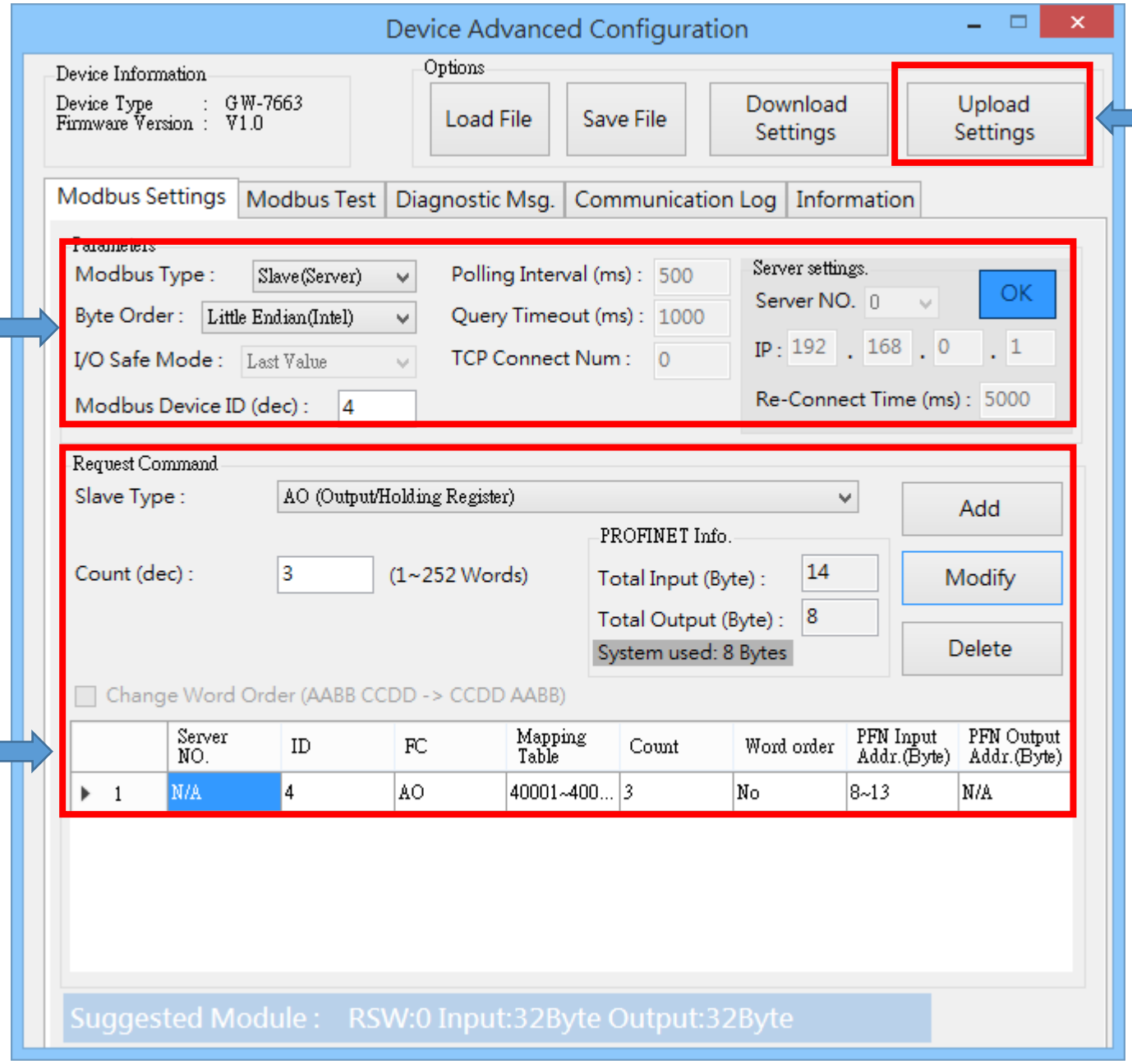
Modbus TCP

PROFINET IO device (Slave)	Modbus TCP Server (AO) • IP:192.168.77.11 • Modbus ID:4 • Data Address: 40001~40003 • Data Length: 3

Modbus client read/write 3-channel AO from/to PLC



Modbus client read/write 3-channel AO from/to PLC



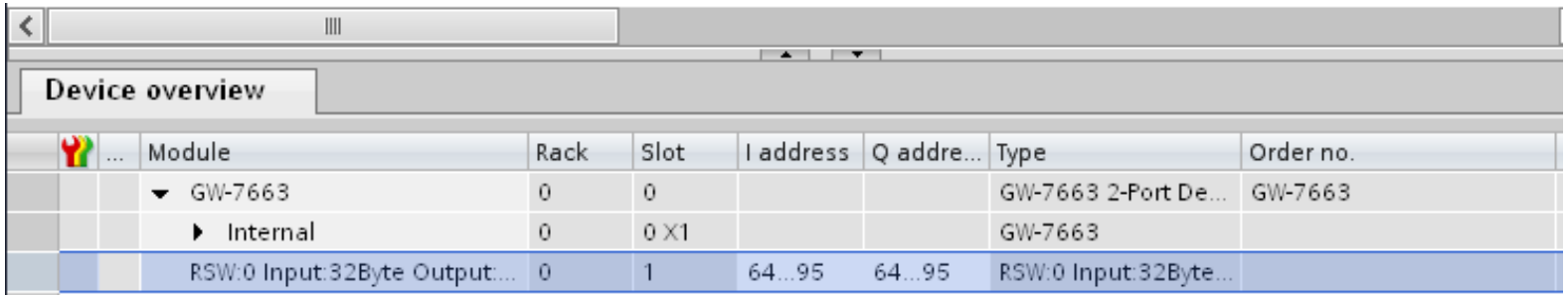
1. Set Modbus settings

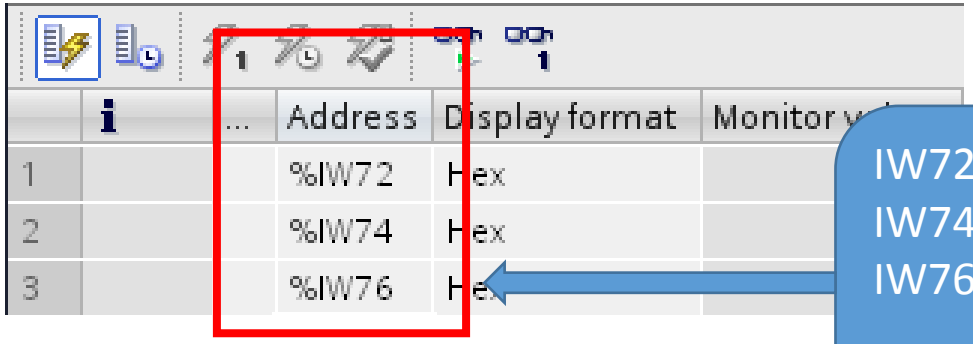
2. Add Modbus Slave Type

3. Upload

Modbus client read/write 3-channel AO from/to PLC

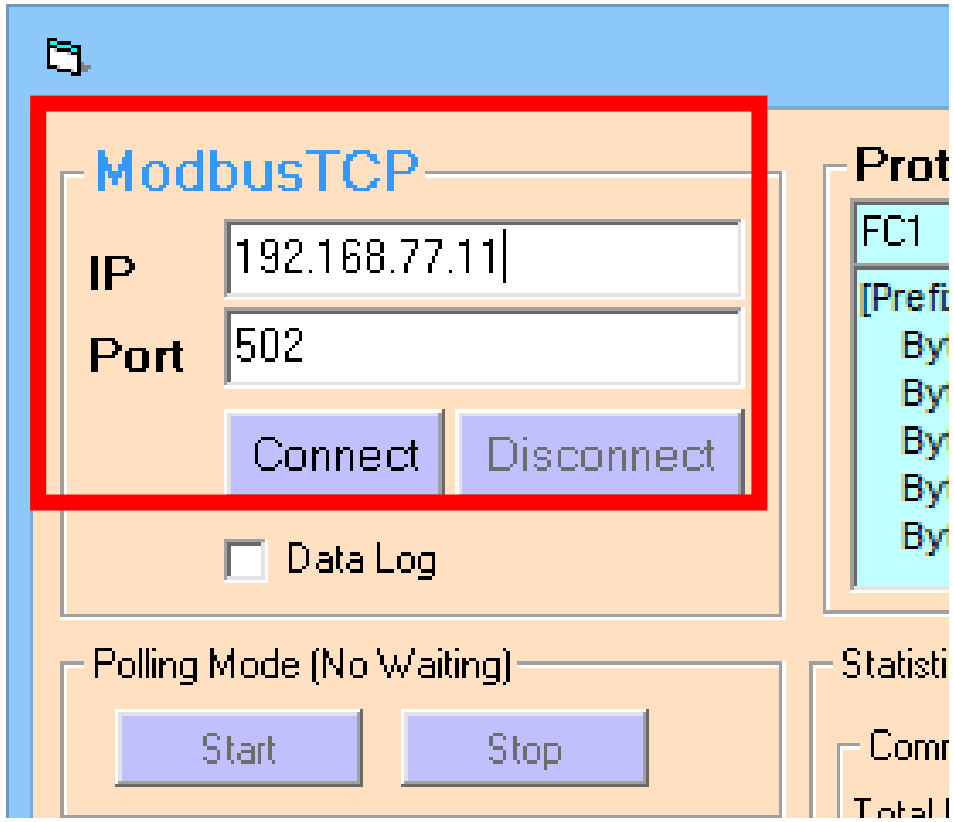
The first input 8 bytes and output 8 bytes are allocated for system. (64~71)
The 9th byte to the 32th byte are allocated for Modbus. (72~95)





IW72 => used to receive AO 1 from Modbus client
IW74 => used to receive AO 2 from Modbus client
IW76 => used to receive AO 3 from Modbus client

Confirm GW-7663's IP address is the same with Modbus client tool

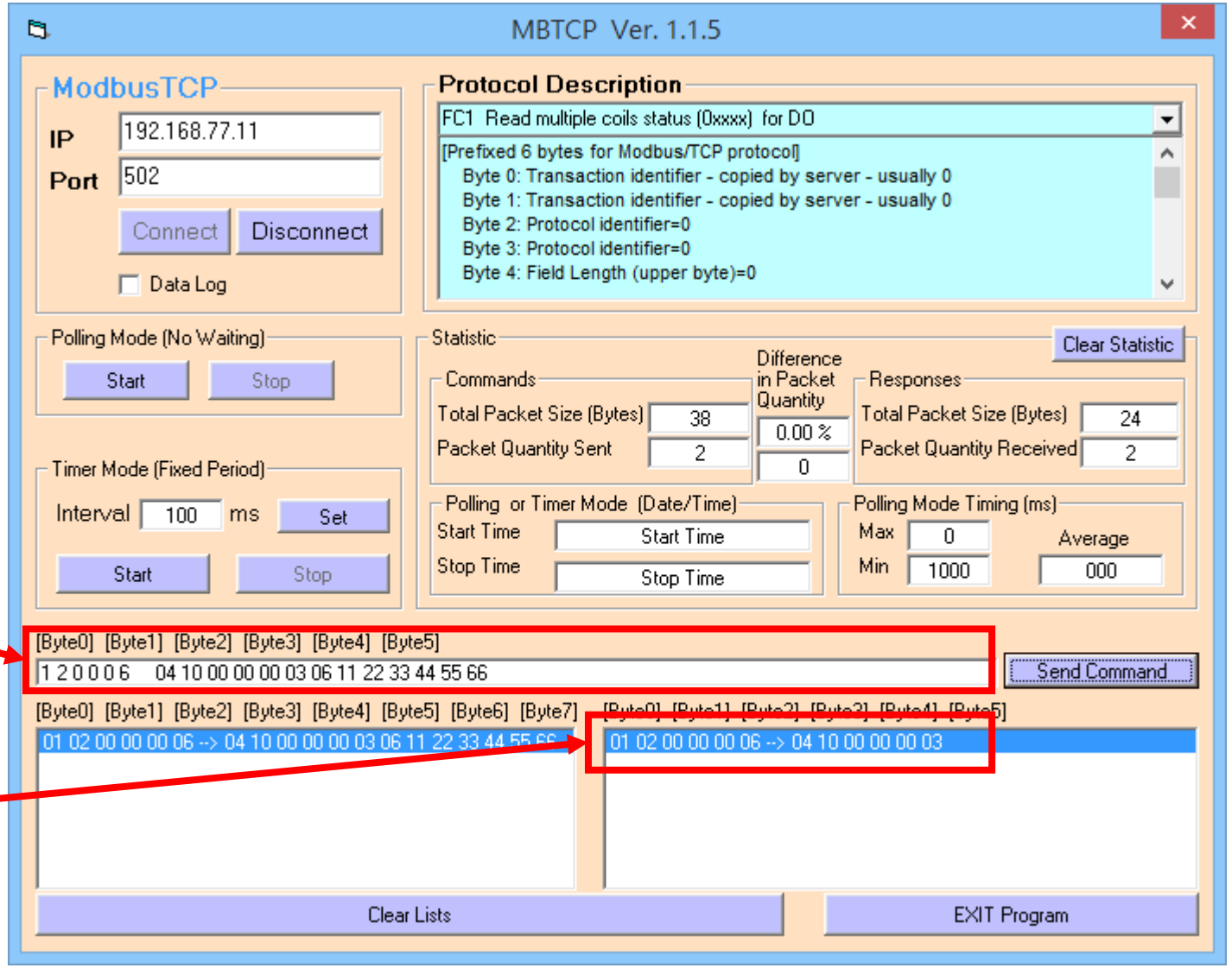


Modbus client read/write 3-channel AO from/to PLC

Send Modbus command (FC 10) to change AO status(0x1122, 0x3344, 0x5566)

1. Send AO Data
0x1122 => for AO 1
0x3344 => for AO 2
0x5566 => for AO 3

2. Receive Resp.



Modbus client read/write 3-channel AO from/to PLC

PLC will receives AO status(0x1122, 0x3344, 0x5566) at PLC address IW72, IW74, IW76

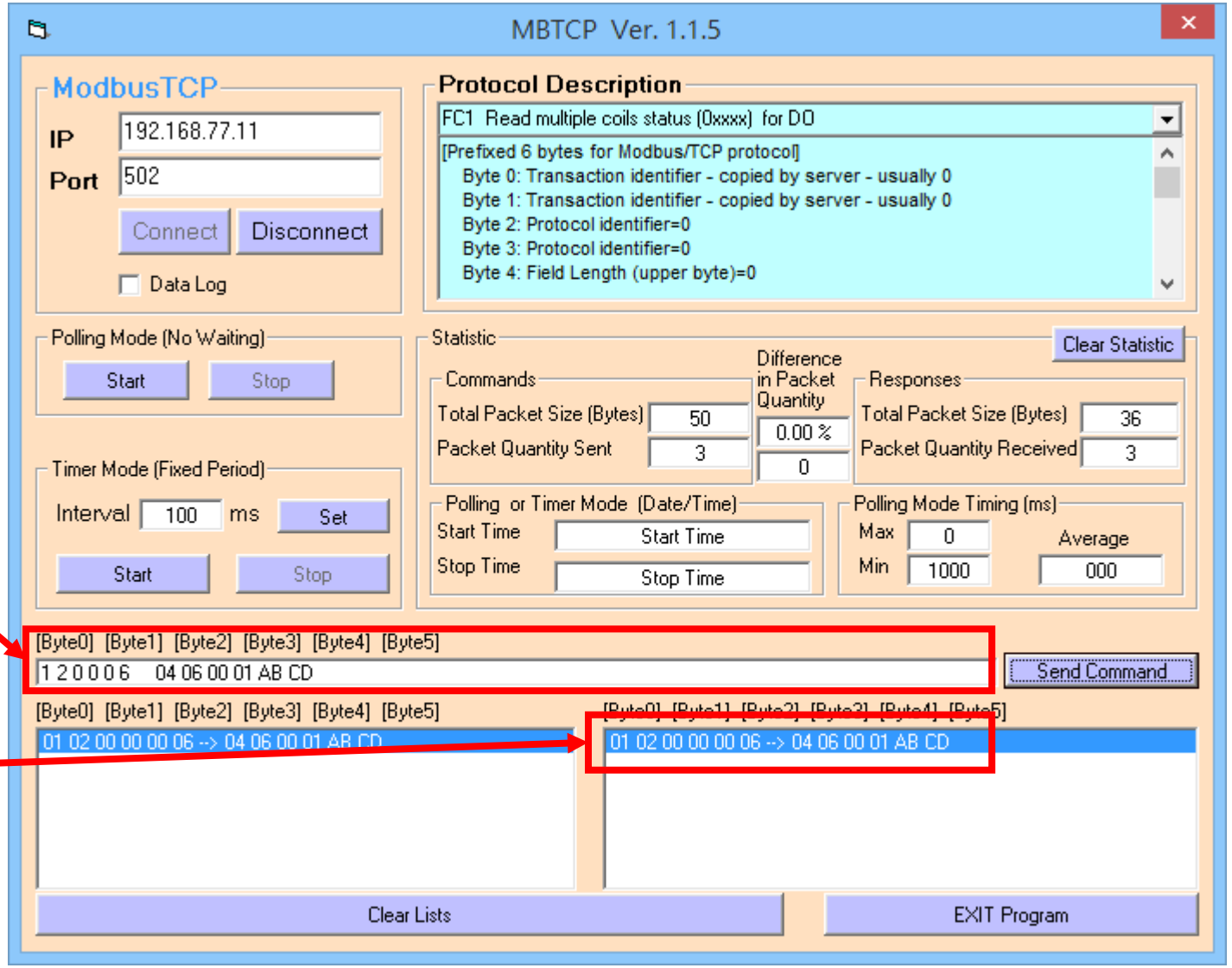
	i	...	Address	Display format	Monitor value
1			%IW72	Hex	16#1122
2			%IW74	Hex	16#3344
3			%IW76	Hex	16#5566

Modbus client read/write 3-channel AO from/to PLC

Send Modbus command (FC 06) to change AO status
Set AO ch-2(Modbus address: 40002): 0xABCD

1. Send query cmd

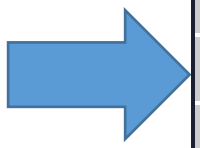
2. Receive Resp.



Modbus client read/write 3-channel AO from/to PLC

PLC will receives AO status(0xABCD) at PLC address IW74

	i	...	Address	Display format	Monitor value
1			%IW72	Hex	16#1122
2			%IW74	Hex	16#3344
3			%IW76	Hex	16#5566



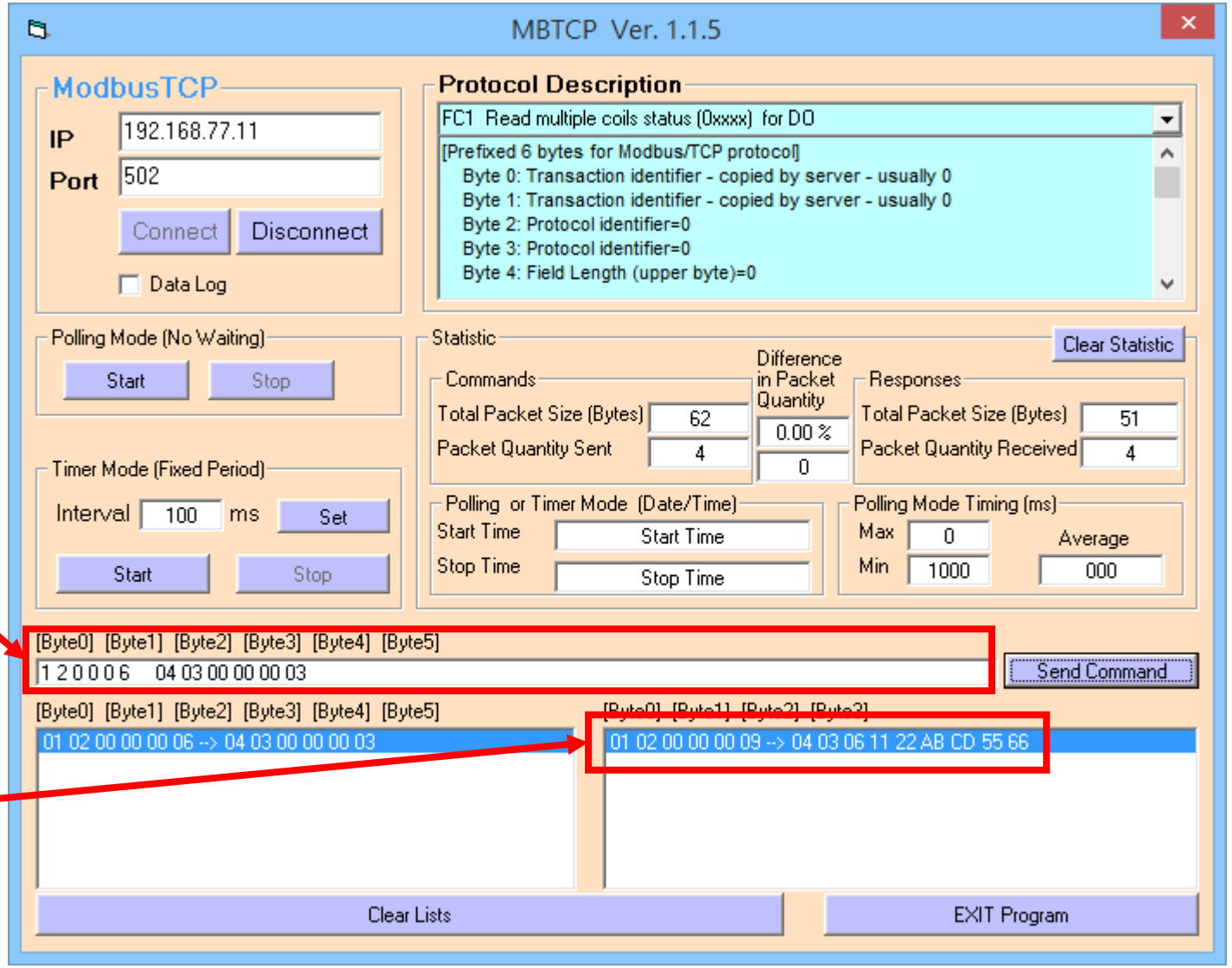
	i	...	Address	Display format	Monitor value
1			%IW72	Hex	16#1122
2			%IW74	Hex	16#ABCD
3			%IW76	Hex	16#5566

Modbus client read/write 3-channel AO from/to PLC

Send Modbus command (FC 03) to read AO status

1. Send query cmd

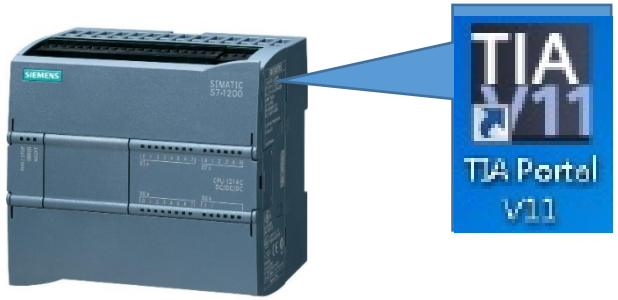
2. Receive AO data
0x1122 => for AO 1
0xABCD => for AO 2
0x5566 => for AO 3



Modbus client read 14-channel DI from PLC

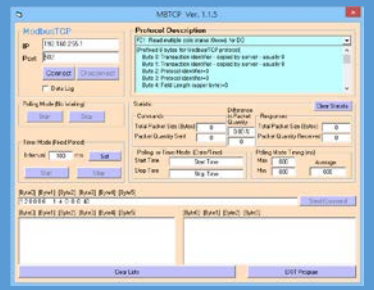
SIMATIC S7-1200

PROFINET IO Controller
(Master)



PROFINET

Modbus Client

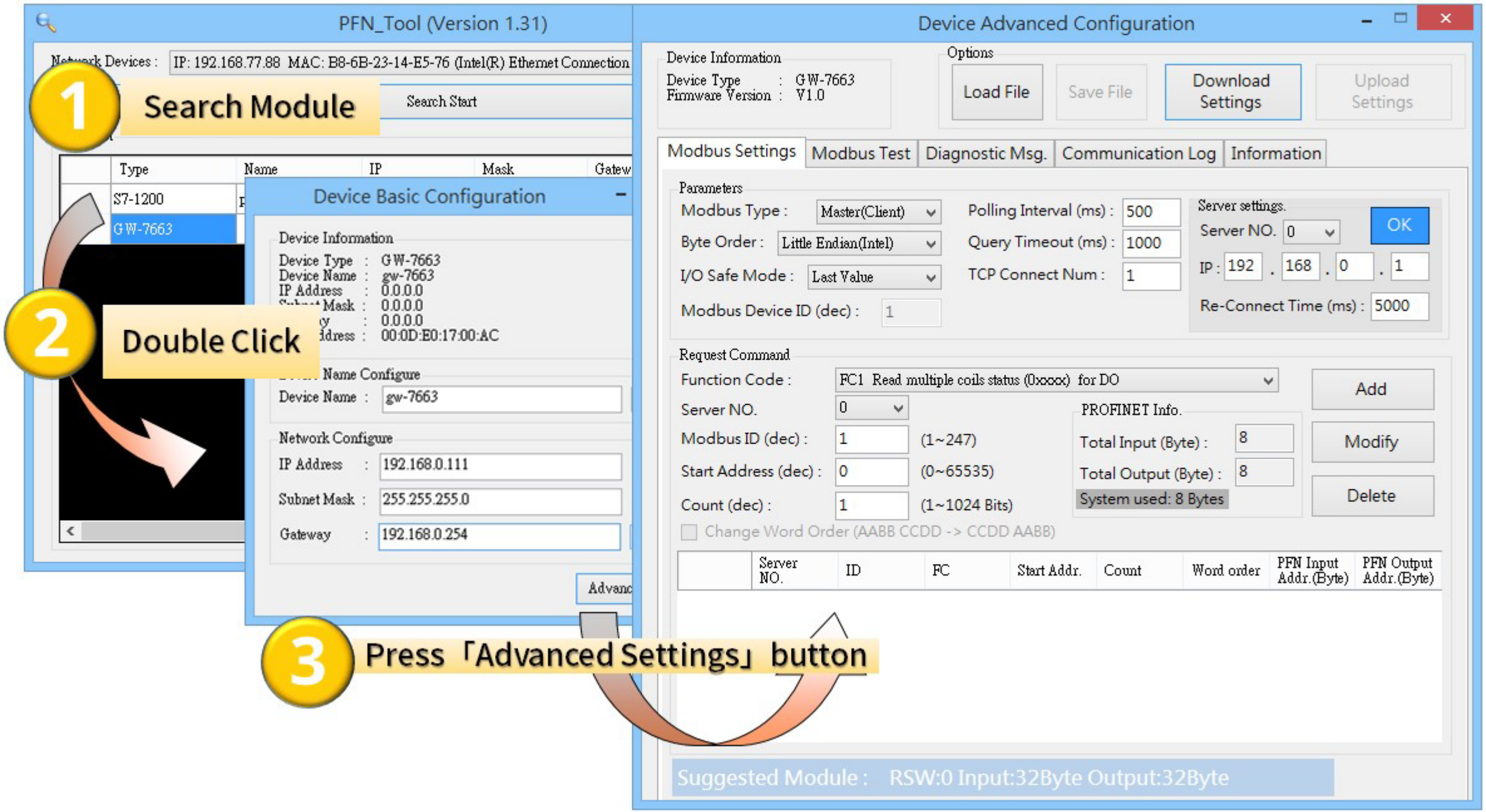


GW-7663

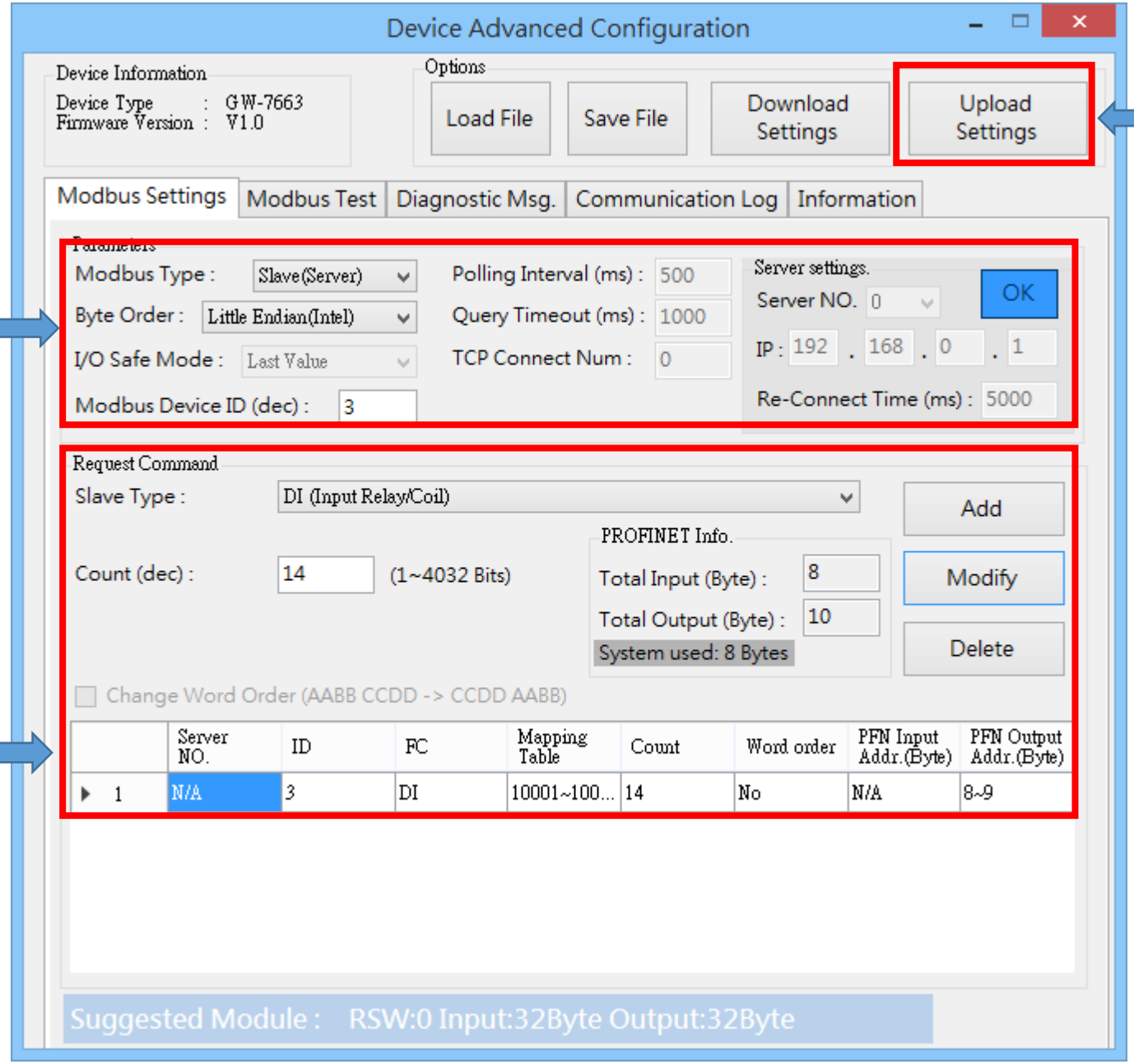
Modbus TCP

PROFINET IO device (Slave)	Modbus TCP Server (DI) • IP:192.168.77.11 • Modbus ID:3 • Data Address: 10001~10014 • Data Length: 2

Modbus client read 14-channel DI from PLC



Modbus client read 14-channel DI from PLC



1. Set Modbus settings

2. Add Modbus Slave Type

3. Upload

Modbus client read 14-channel DI from PLC

The first input 8 bytes and output 8 bytes are allocated for system. (64~71)
The 9th byte to the 32th byte are allocated for Modbus. (72~95)

Device overview

	Module	Rack	Slot	I address	Q addre...	Type	Order no.
	GW-7663	0	0			GW-7663 2-Port De...	GW-7663
	Internal	0	0 X1			GW-7663	
	RSW:0 Input:32Byte Output:...	0	1	64...95	64...95	RSW:0 Input:32Byte...	

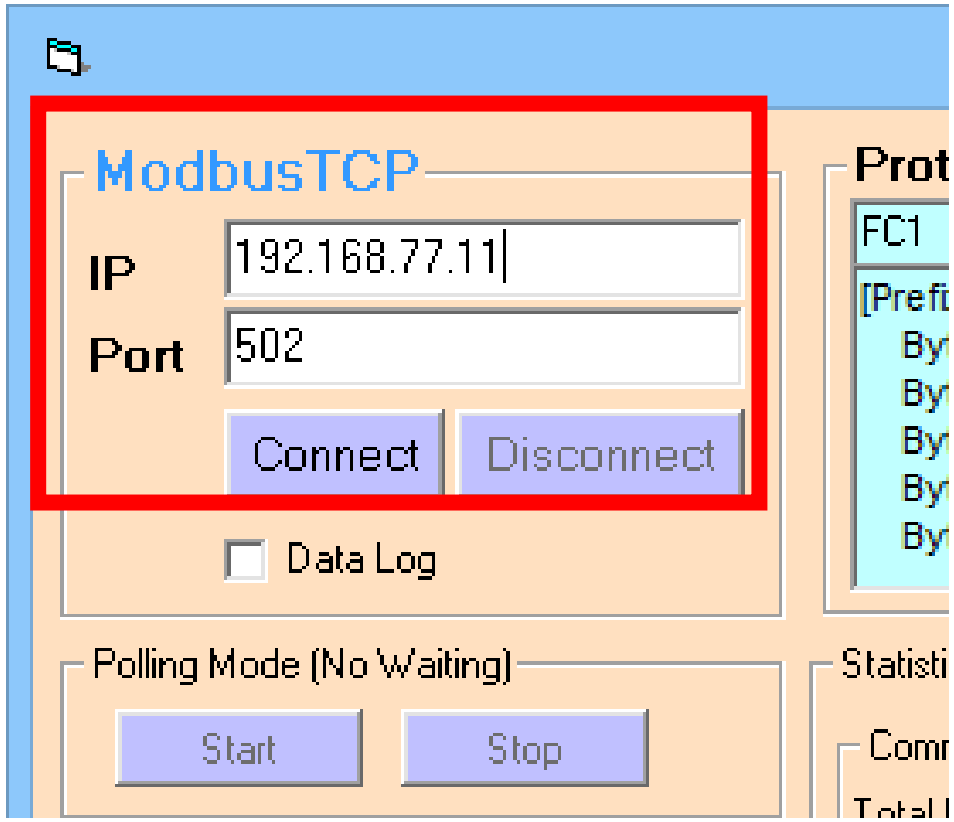
	Address	Display format	Monitor value
1	%QB72	Hex	16#0000
2	%QB73	Hex	16#0000
3	%Q72.0	Bool	16#0000
4	%Q72.1	Bool	
5	%Q72.2	Bool	
6	%Q72.3	Bool	
7	%Q72.4	Bool	
8	%Q72.5	Bool	
9	%Q72.6	Bool	
10	%Q72.7	Bool	
11	%Q73.0	Bool	
12	%Q73.1	Bool	
13	%Q73.2	Bool	
14	%Q73.3	Bool	
15	%Q73.4	Bool	
16	%Q73.5	Bool	

QB72 => used to refresh DI 1~8
QB73 => used to refresh DI 9~14

Q72.0~7 => used to refresh DI 1~8
Q73.0~5 => used to refresh DI 9~14

Modbus client read 14-channel DI from PLC

Confirm GW-7663's IP address is the same with Modbus client tool

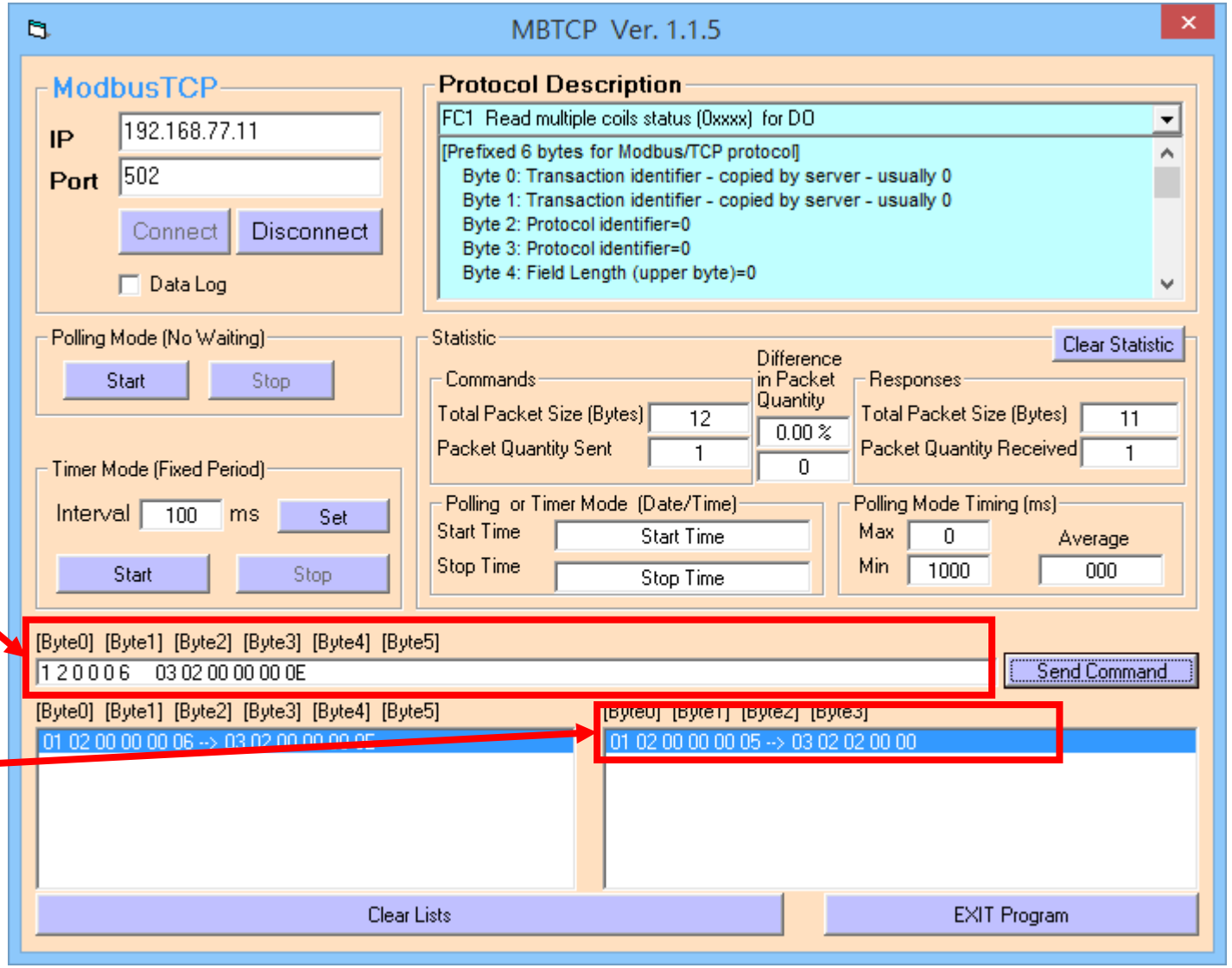


Modbus client read 14-channel DI from PLC

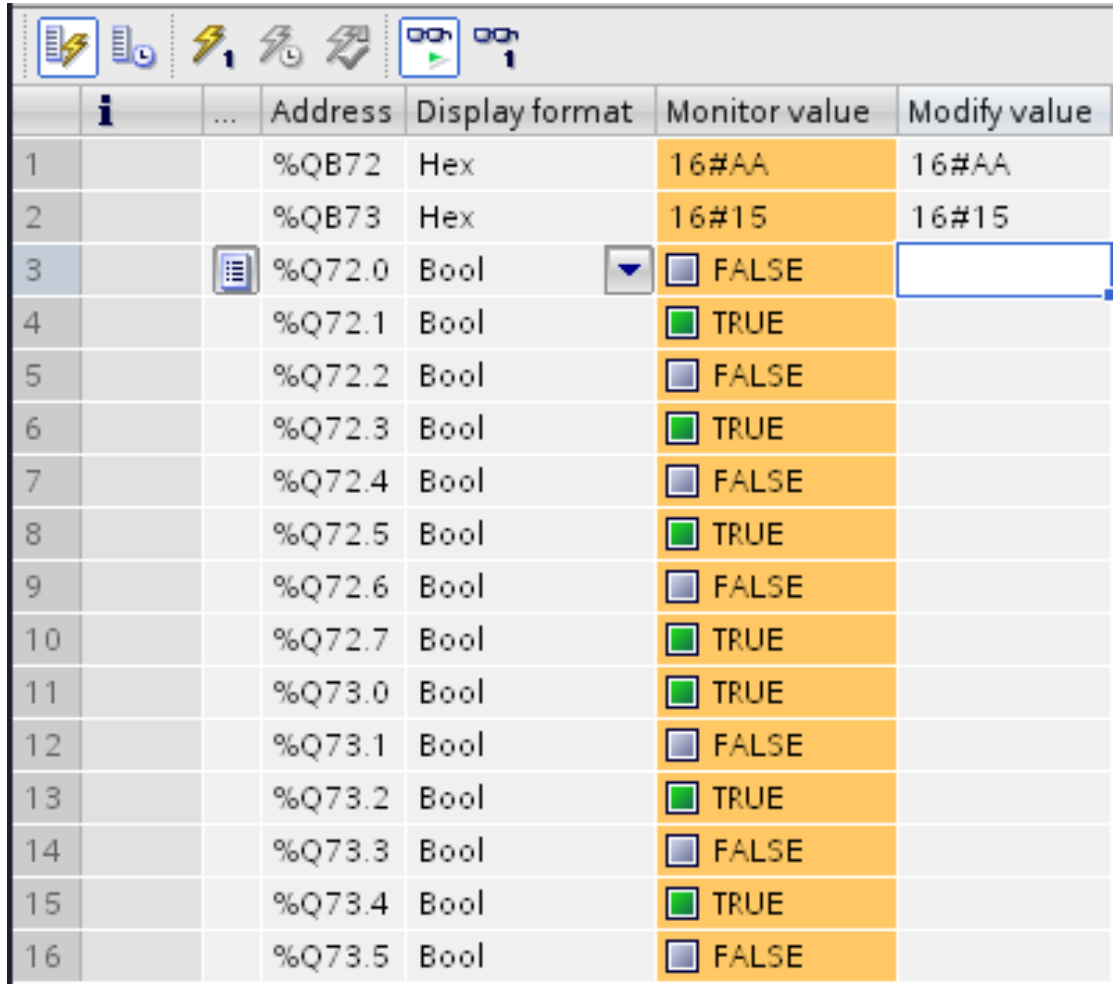
Send Modbus command (FC 02) to read DI status

1. Send query cmd

2. Receive DI data
0x00 => for DI 1~8
0x00 => for DI 9~14



Modify QB72, QB73 to 0xAA, 0x15



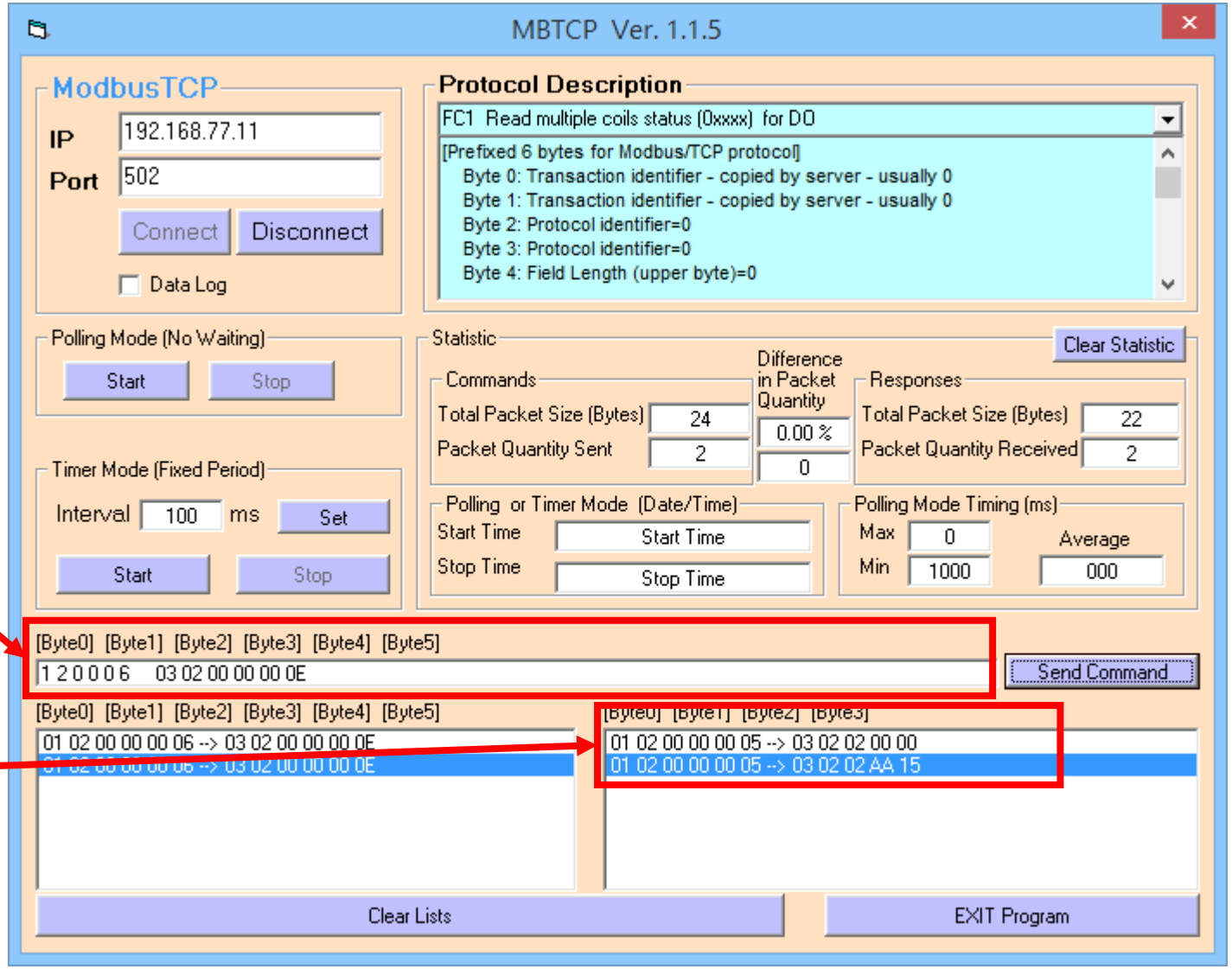
	i	...	Address	Display format	Monitor value	Modify value
1			%QB72	Hex	16#AA	16#AA
2			%QB73	Hex	16#15	16#15
3			%Q72.0	Bool	FALSE	
4			%Q72.1	Bool	TRUE	
5			%Q72.2	Bool	FALSE	
6			%Q72.3	Bool	TRUE	
7			%Q72.4	Bool	FALSE	
8			%Q72.5	Bool	TRUE	
9			%Q72.6	Bool	FALSE	
10			%Q72.7	Bool	TRUE	
11			%Q73.0	Bool	TRUE	
12			%Q73.1	Bool	FALSE	
13			%Q73.2	Bool	TRUE	
14			%Q73.3	Bool	FALSE	
15			%Q73.4	Bool	TRUE	
16			%Q73.5	Bool	FALSE	

Modbus client read 14-channel DI from PLC

Send Modbus command (FC 02) to read DI status again

1. Send query cmd

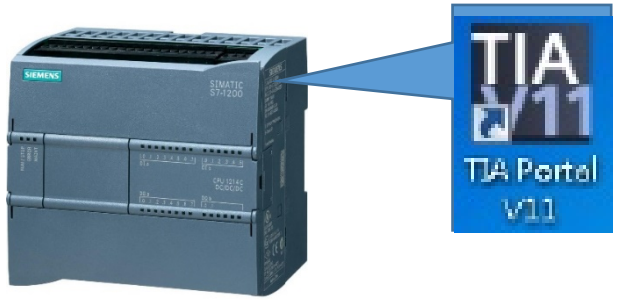
2. Receive DI data
0xAA => for DI 1~8
0x15 => for DI 9~14



Modbus client read 4-channel AI from PLC

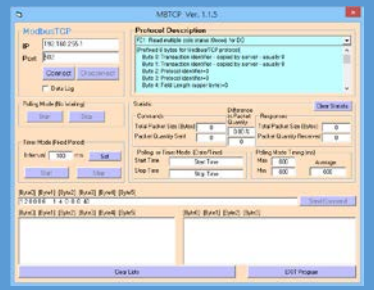
SIMATIC S7-1200

PROFINET IO Controller
(Master)



PROFINET

Modbus Client



GW-7663

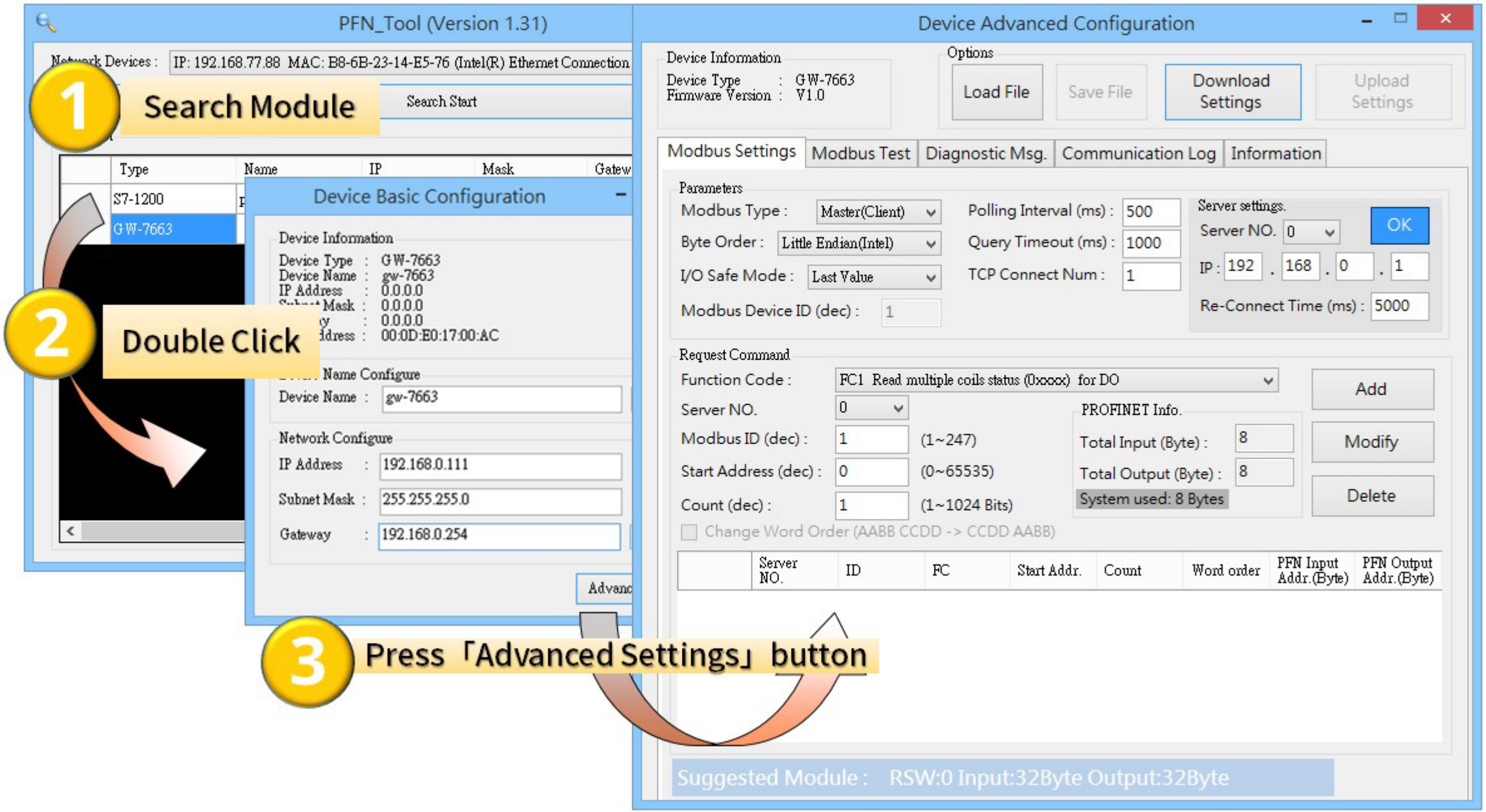
Modbus TCP

PROFINET IO device (Slave)

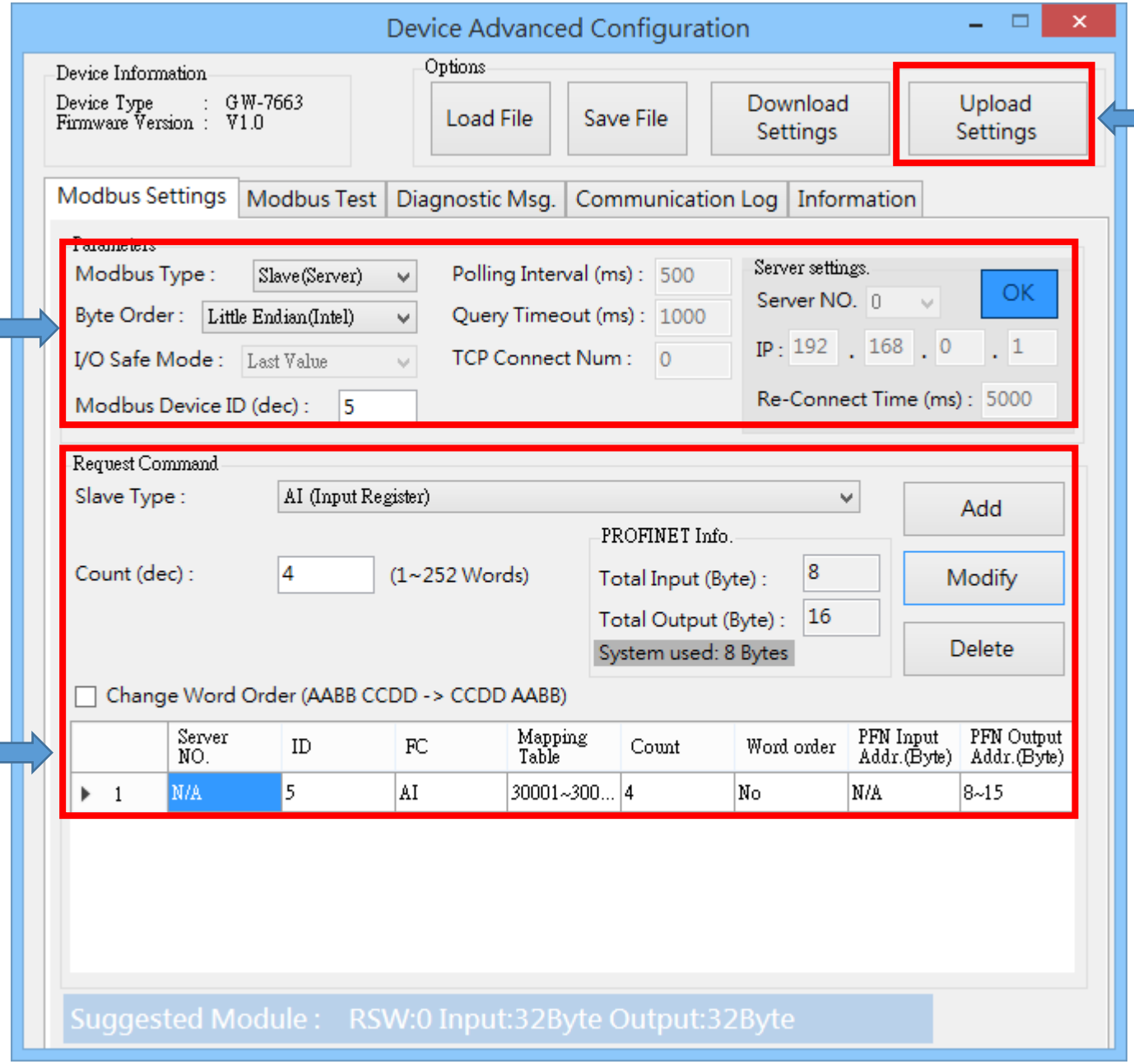
Modbus TCP Server (AI)

- **IP:192.168.77.11**
- **Modbus ID:5**
- **Data Address: 30001~30004**
- **Data Length: 4**

Modbus client read 4-channel AI from PLC



Modbus client read 4-channel AI from PLC



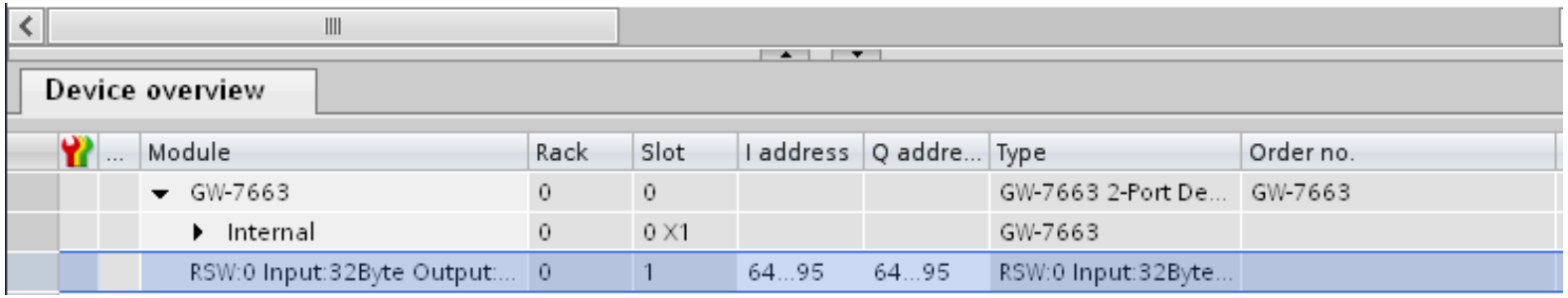
1. Set Modbus settings

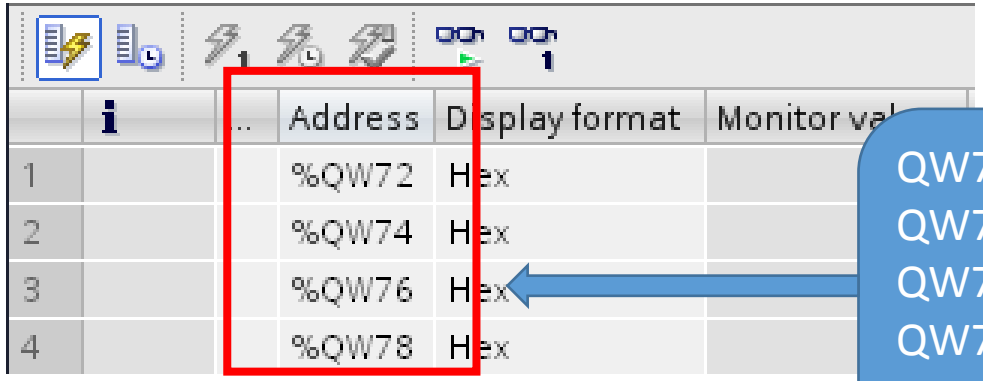
2. Add Modbus Slave Type

3. Upload

Modbus client read 4-channel AI from PLC

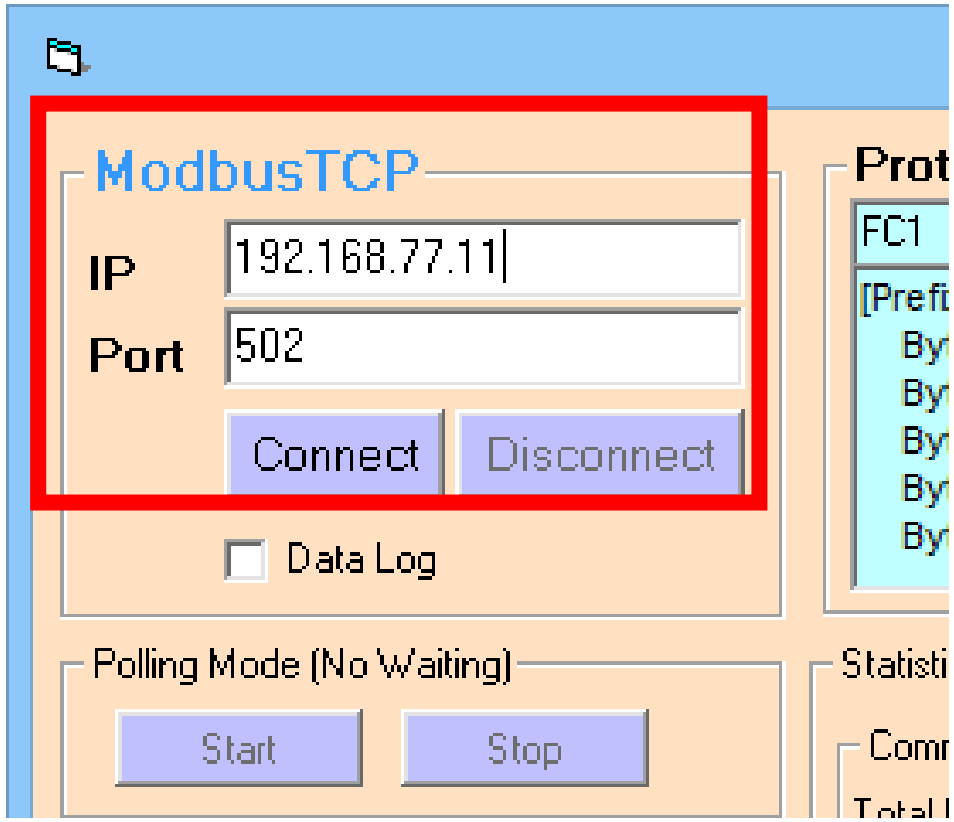
The first input 8 bytes and output 8 bytes are allocated for system. (64~71)
The 9th byte to the 32th byte are allocated for Modbus. (72~95)





QW72 => used to refresh AI 1
QW74 => used to refresh AI 2
QW76 => used to refresh AI 3
QW78 => used to refresh AI 4

Confirm GW-7663's IP address is the same with Modbus client tool

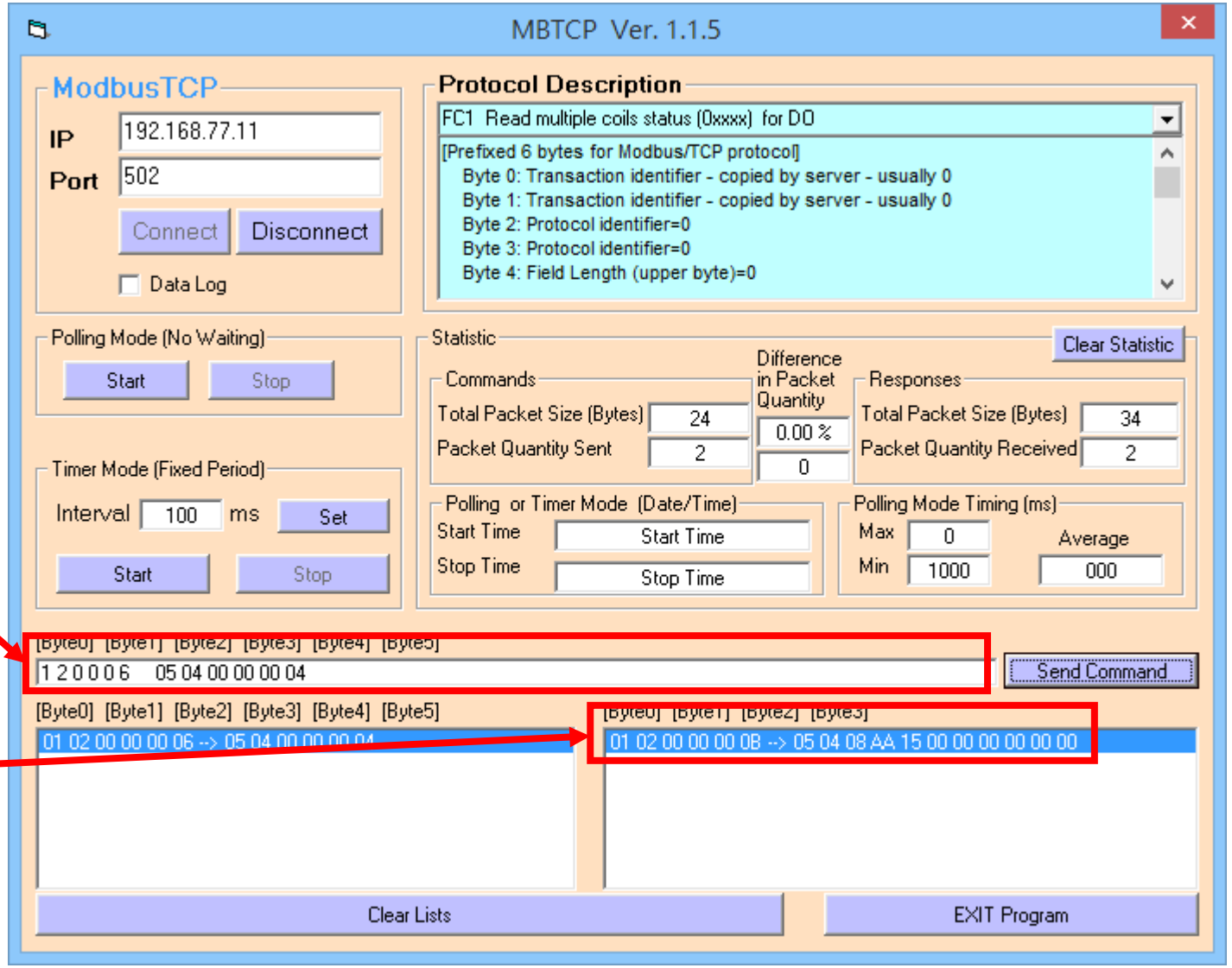


Modbus client read 4-channel AI from PLC

Send Modbus command (FC 04) to read AI status

1. Send query cmd

2. Receive AI data
0x0000 => for AI 1
0x0000 => for AI 2
0x0000 => for AI 3
0x0000 => for AI 4

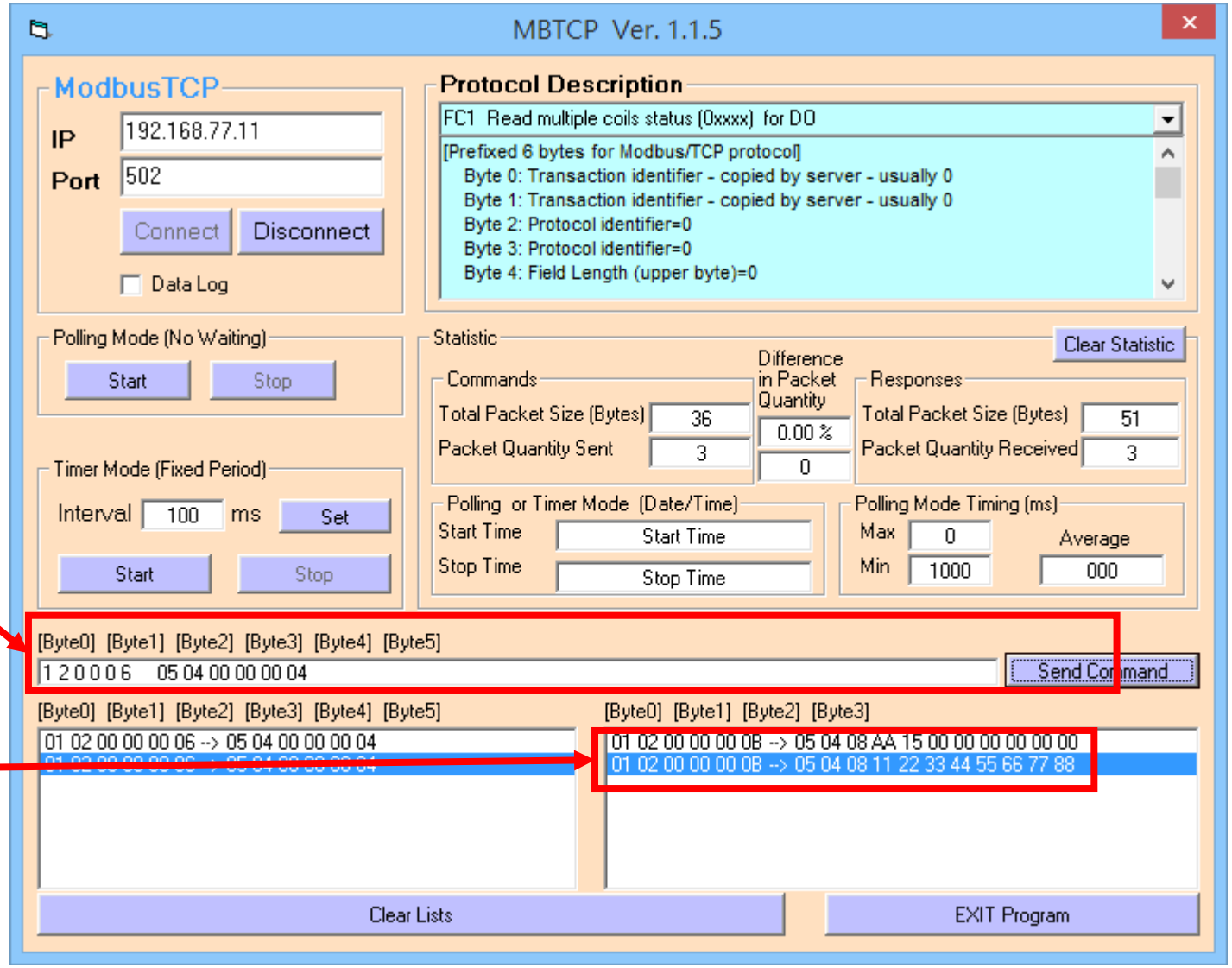


Modify QW72, QW74, QW76, QW78 to 0x1122, 0x3344, 0x5566, 0x7788

	i	...	Address	Display format	Monitor value	Modify value
1			%QW72	Hex	16#1122	16#1122
2			%QW74	Hex	16#3344	16#3344
3			%QW76	Hex	16#5566	16#5566
4			%QW78	Hex	16#7788	16#7788

Modbus client read 4-channel AI from PLC

Send Modbus command (FC 04) to read AI status again

1. Send query cmd

2. Receive AI data
0x1122 => for AI 1
0x3344 => for AI 2
0x5566 => for AI 3
0x7788 => for AI 4