GW-7662 (Modbus RTU Master) How to Communicate with Modbus slave? Example for SIMATIC TIA portal

- **Preceding Operation**

- **Example 1:Reads and Writes DO data**

- **Example 2:Reads DI data**

- **Example 3:Reads and Writes AO data**

- **Example 4:Reads AI data**

✓ Check wire connection between GW-7662 & Modbus devices.
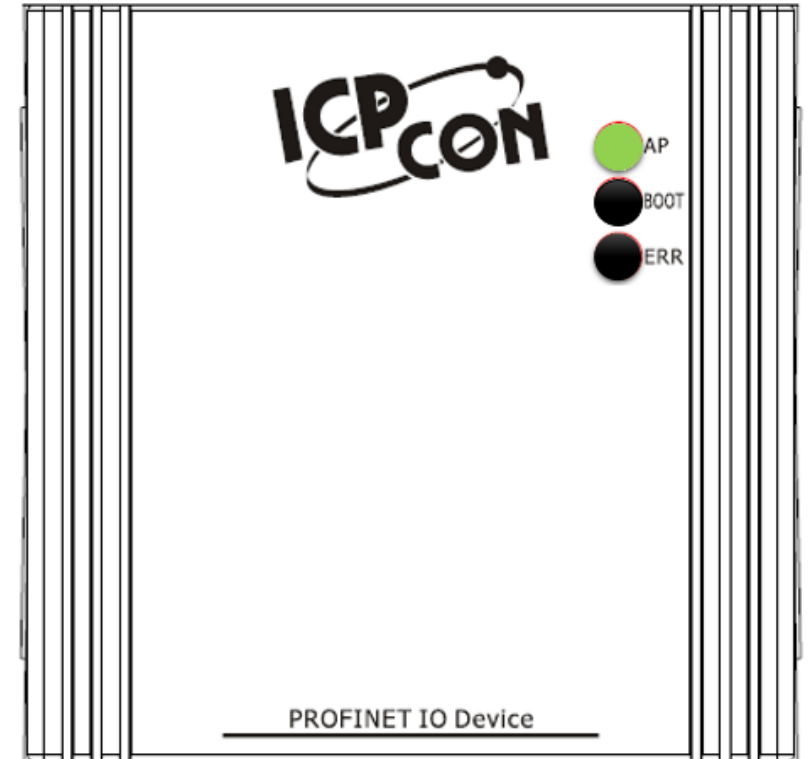
How to check the wire connection?

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

How to configure GW-7662 in SIMATIC TIA portal?
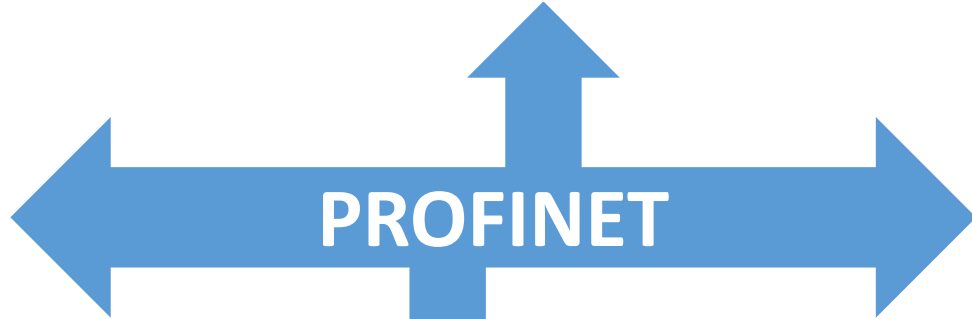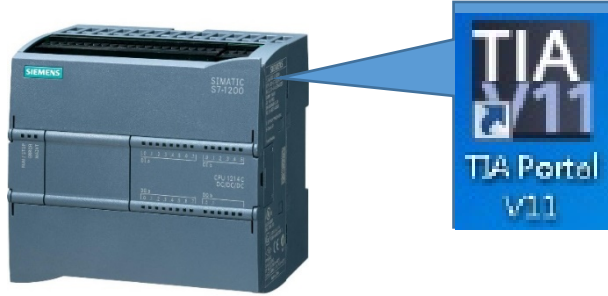
✓ Download PFN_Tool utility from FTP side

PFN_Tool

SIMATIC S7-1200

PROFINET IO Controller
(Master)

TIA V11
TIA Portal
V11
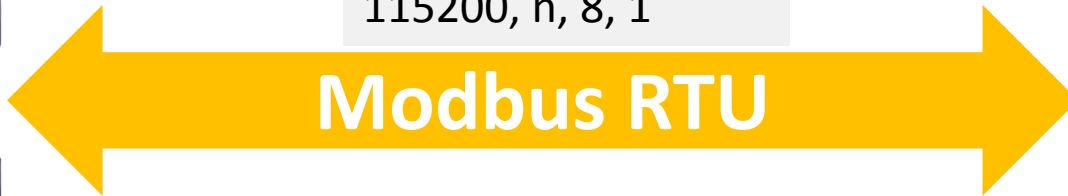
PROFINET

DO module (RTU Slave)
- **Modbus ID: 2**
- **Data Address: 00001~00016**
- **Data Length: 2**

GW-7662

ICP CON
GW-7662

Comport Setting:

115200, n, 8, 1

Modbus RTU

PROFINET IO device (Slave)

Modbus RTU Master

PFN_Tool (Version 1.30)

Network Devices : IP: 192.168.77.88 MAC: B8-6B-23-14-E5-76 (Intel(R) Ethernet Connection

1 Search Module — Search Start

Type	Name	IP	Mask	Gateway
GW-7662				
SIMATIC-PC				
S7-PC				
SIMATIC-PC				

2 Double Click

Device Basic Configuration

Device Information
Device Type : GW-7662
Device Name : gw-7662
IP Address : 0.0.0.0
Subnet Mask : 0.0.0.0
Gateway : 0.0.0.0
MAC Address : 12:34:56:78:9A:BC

Device Name Configure
Device Name : gw-7662

Network Configure
IP Address : 192.168.0.111
Subnet Mask : 255.255.255.0
Gateway : 192.168.0.254

Advanced

3 Press「Advanced Settings」button

Device Advanced Configuration

Device Information
Device Type : GW-7662
Firmware Version : V1.0

Options
Load File | Save File | Download Settings | Upload Settings

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters
Modbus Format : RTU   Byte Order : Little Endian(Intel)   Polling Interval (ms) : 500
Modbus Type : Master   I/O Safe Mode : Last Value   Query Timeout (ms) : 500
Baudrate : 115200
Line Control : n, 8, 1   Modbus Device ID (dec) : 1   (1~247)

Request Command
Function Code : FC1 Read multiple coils status (0xxxx) for DO
Modbus ID (dec) : 1   (1~247)
Start Address (dec) : 0   (0~65535)
Count (dec) : 1   (1~1024 Bits)
☐ Change Word Order (AABB CCDD -> CCDD AABB)

PROFINET Info.
Total Input (Byte) : 8
Total Output (Byte) : 8
System used: 8 Bytes

Add | Modify | Delete

ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)

Suggested Module : RSW:0 Input:32Byte Output:32Byte

The first input 8 bytes and output 8 bytes are allocated for system. (1~8)
The 9th byte to the 32th byte are allocated for Modbus. (9~32)

Device overview

...	Module	Rack	Slot	I address	Q address	Type	Order no.
	▼ GW-7662	0	0			GW-7662 2-Port De...	GW-7662
	▶ Internal	0	0 X1			GW-7662	
	RSW:0 Input:32Byte Output:32Byte_1	0	1	1...32	1...32	RSW:0 Input:32Byte...	

i	Name	Address	Display format
1		%QB9	Hex
2		%QB10	Hex
3		%IB9	Hex
4		%IB10	Hex
5		<Add new>	

QB9   => used to write DO 1~8
QB10 => used to write DO 9~16

IB9 => used to read DO 1~8
IB10 => used to read DO 9~16

Original DO value

PLC Write 0x55 to DO 1~8
PLC Write 0xAA to DO 9~16

Mbslav1
ID = 2

00001 = 0	00009 = 0
00002 = 0	00010 = 0
00003 = 0	00011 = 0
00004 = 0	00012 = 0
00005 = 0	00013 = 0
00006 = 0	00014 = 0
00007 = 0	00015 = 0
00008 = 0	00016 = 0

0x00 0x00

	i	N...	Address	Display format	Monitor value	Modify value
			%QB9	Hex	16#55	16#55
2			%QB10	Hex	16#AA	16#AA
3			<Add new>			

Mbslav1
ID = 2

00001 = 1	00009 = 0
00002 = 0	00010 = 1
00003 = 1	00011 = 0
00004 = 0	00012 = 1
00005 = 1	00013 = 0
00006 = 0	00014 = 1
00007 = 1	00015 = 0
00008 = 0	00016 = 1

0x55 0xAA

PLC Read 0x55 from DO 1~8
PLC Read 0xAA from DO 9~16

SIMATIC S7-1200

PROFINET IO Controller
(Master)
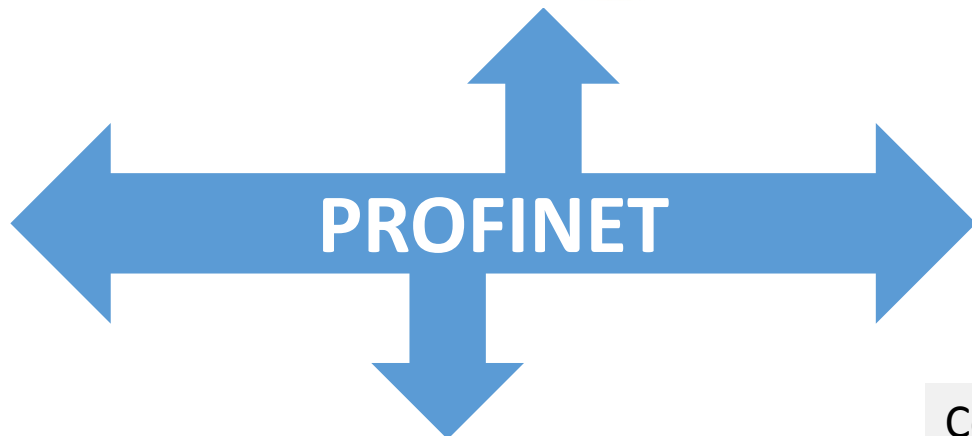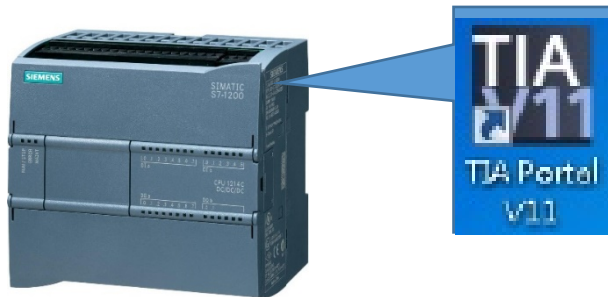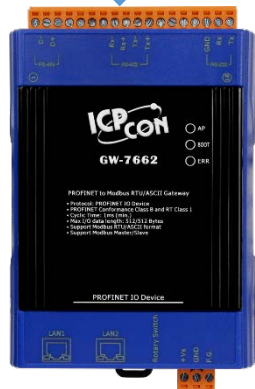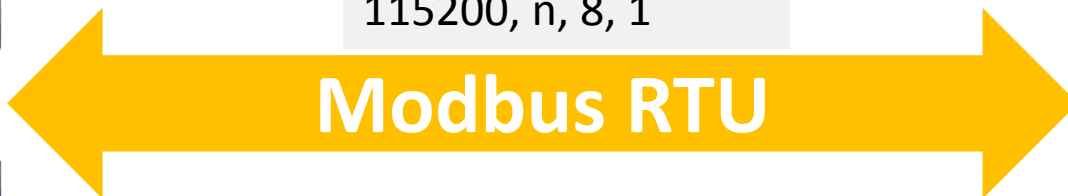
PROFINET

DI module (RTU Slave)
- **Modbus ID: 3**
- **Data Address: 10001~10014**
- **Data Length: 2**

Comport Setting:

115200, n, 8, 1

GW-7662

Modbus RTU

PROFINET IO device (Slave)

Modbus RTU Master

PFN_Tool (Version 1.30)

Network Devices : IP: 192.168.77.88 MAC: B8-6B-23-14-E5-76 (Intel(R) Ethernet Connection

1 **Search Module**   Search Start

Type	Name	IP	Mask	Gateway
GW-7662				
SIMATIC-PC				
S7-PC				
SIMATIC-PC				

2 **Double Click**

Device Basic Configuration

Device Information

Device Type : GW-7662
Device Name : gw-7662
IP Address : 0.0.0.0
Subnet Mask : 0.0.0.0
Gateway : 0.0.0.0
Address : 12:34:56:78:9A:BC

Device Name Configure

Device Name : gw-7662

Network Configure

IP Address : 192.168.0.111

Subnet Mask : 255.255.255.0

Gateway : 192.168.0.254|

Advanc...

3 **Press 「Advanced Settings」 button**

Device Advanced Configuration

Device Information

Device Type : GW-7662
Firmware Version : V1.0

Options

Load File | Save File | Download Settings | Upload Settings

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters

Modbus Format : RTU   Byte Order : Little Endian(Intel)   Polling Interval (ms) : 500

Modbus Type : Master   I/O Safe Mode : Last Value   Query Timeout (ms) : 500

Baudrate : 115200

Line Control : n, 8, 1   Modbus Device ID (dec) : 1   (1~247)

Request Command

Function Code : FC1 Read multiple coils status (0xxxx) for DO   Add

Modbus ID (dec) : 1   (1~247)   PROFINET Info.   Modify

Start Address (dec) : 0   (0~65535)   Total Input (Byte) : 8

Count (dec) : 1   (1~1024 Bits)   Total Output (Byte) : 8   Delete

☐ Change Word Order (AABB CCDD -> CCDD AABB)   System used: 8 Bytes

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)

Suggested Module : RSW:0 Input:32Byte Output:32Byte

Device Advanced Configuration

Device Information
Device Type : GW-7662
Firmware Version : V1.0

Options
Load File | Save File | Download Settings | Upload Settings

3. Upload

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters

Modbus Format : RTU	Byte Order : Little Endian(Intel)	Polling Interval (ms) : 500
Modbus Type : Master	I/O Safe Mode : Last Value	Query Timeout (ms) : 500
Baudrate : 115200		
Line Control : n, 8, 1	Modbus Device ID (dec) : 1	(1~247)

1. Set Modbus settings

Request Command

Function Code : FC2 Read multiple input discretes (1xxxx) for DI

Modbus ID (dec) : 3   (1~247)

Start Address (dec) : 0   (0~65535)

Count (dec) : 14   (1~1024 Bits)

☐ Change Word Order (AABB CCDD -> CCDD AABB)

PROFINET Info.
Total Input (Byte) : 10
Total Output (Byte) : 8
System used: 8 Bytes

Add | Modify | Delete

2. Add Modbus Command

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)
▶ 1	3	2 (RDI)	0	14	No	8~9	N/A

Suggested Module : RSW:0 Input:32Byte Output:32Byte

The first input 8 bytes and output 8 bytes are allocated for system. (1~8)
The 9th byte to the 32th byte are allocated for Modbus. (9~32)

Device overview

	...	Module	Rack	Slot	I address	Q address	Type	Order no.
		▼ GW-7662	0	0			GW-7662 2-Port De...	GW-7662
		▶ Internal	0	0 X1			GW-7662	
		RSW:0 Input:32Byte Output:32Byte_1	0	1	1...32	1...32	RSW:0 Input:32Byte...	

	i	N...	Address	Display format	Monitor value
1			%IB9	Hex	16#00
2			%IB10	Hex	16#00
3			%I9.0	Bool	FALSE
4			%I9.1	Bool	FALSE
5			%I9.2	Bool	FALSE
6			%I9.3	Bool	FALSE
7			%I9.4	Bool	FALSE
8			%I9.5	Bool	FALSE
9			%I9.6	Bool	FALSE
10			%I9.7	Bool	FALSE
11			%I10.0	Bool	FALSE
12			%I10.1	Bool	FALSE
13			%I10.2	Bool	FALSE
14			%I10.3	Bool	FALSE
15			%I10.4	Bool	FALSE
16			%I10.5	Bool	FALSE

IB9   => used to read DI 1~8
IB10 => used to read DI 9~14

I9.0~I9.7 => used to read DI 1~8
I10.0~I10.5 => used to read DI 9~14

PLC Read 0x00 from DI 1~8
PLC Read 0x00 from DI 9~14

Original DI value

Mbslav1

ID = 3

10001 = 0	10009 = 0
10002 = 0	10010 = 0
10003 = 0	10011 = 0
10004 = 0	10012 = 0
10005 = 0	10013 = 0
10006 = 0	10014 = 0
10007 = 0	
10008 = 0	

0x00   0x00
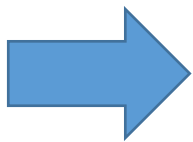
	i	N...	Address	Display format	Monitor value	M
1			%IB9	Hex	16#00	
2			%IB10	Hex	16#00	
3			%I9.0	Bool	FALSE	
4			%I9.1	Bool	FALSE	
5			%I9.2	Bool	FALSE	
6			%I9.3	Bool	FALSE	
7			%I9.4	Bool	FALSE	
8			%I9.5	Bool	FALSE	
9			%I9.6	Bool	FALSE	
10			%I9.7	Bool	FALSE	
11			%I10.0	Bool	FALSE	
12			%I10.1	Bool	FALSE	
13			%I10.2	Bool	FALSE	
14			%I10.3	Bool	FALSE	
15			%I10.4	Bool	FALSE	
16			%I10.5	Bool	FALSE	

PLC Read 0xAB from DI 1~8
PLC Read 0x2A from DI 9~14

Change DI value

Mbslav1

ID = 3

10001 = 1	10009 = 0
10002 = 1	10010 = 1
10003 = 0	10011 = 0
10004 = 1	10012 = 1
10005 = 0	10013 = 0
10006 = 1	10014 = 1
10007 = 0	
10008 = 1	

0xAB   0x2A
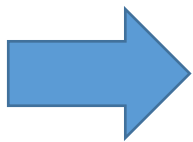
	i	N...	Address	Display format	Monitor value	M
1			%IB9	Hex	16#AB	
2			%IB10	Hex	16#2A	
3			%I9.0	Bool	TRUE	
4			%I9.1	Bool	TRUE	
5			%I9.2	Bool	FALSE	
6			%I9.3	Bool	TRUE	
7			%I9.4	Bool	FALSE	
8			%I9.5	Bool	TRUE	
9			%I9.6	Bool	FALSE	
10			%I9.7	Bool	TRUE	
11			%I10.0	Bool	FALSE	
12			%I10.1	Bool	TRUE	
13			%I10.2	Bool	FALSE	
14			%I10.3	Bool	TRUE	
15			%I10.4	Bool	FALSE	
16			%I10.5	Bool	TRUE	

SIMATIC S7-1200

PROFINET IO Controller
(Master)

TIA V11

TIA Portal V11
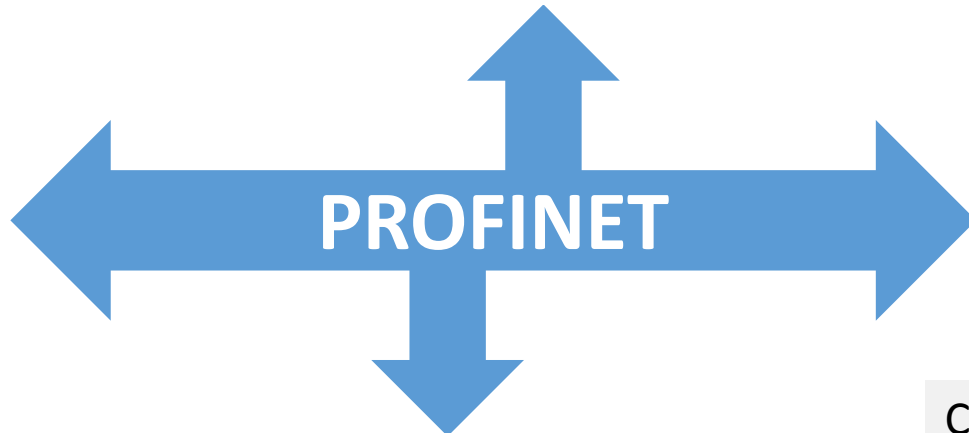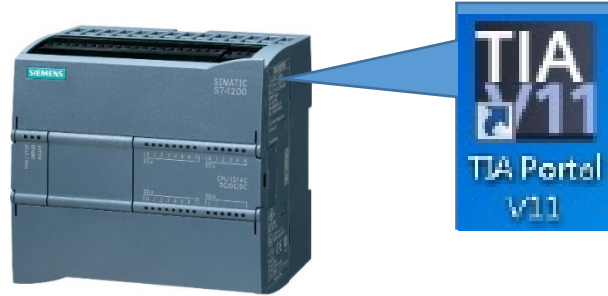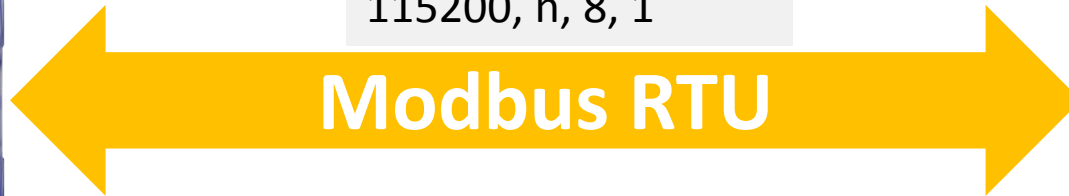
PROFINET

AO module (RTU Slave)
- **Modbus ID: 4**
- **Data Address: 40001~40003**
- **Data Length: 3**

Comport Setting:

115200, n, 8, 1

GW-7662

ICP CON

GW-7662

PROFINET to Modbus RTU/ASCII Gateway

PROFINET IO Device

Modbus RTU

PROFINET IO device (Slave)

Modbus RTU Master

PFN_Tool (Version 1.30)

Network Devices : IP: 192.168.77.88 MAC: B8-6B-23-14-E5-76 (Intel(R) Ethernet Connection

1 Search Module

Search Start

Type	Name	IP	Mask	Gateway
GW-7662				
SIMATIC-PC				
S7-PC				
SIMATIC-PC				

2 Double Click

Device Basic Configuration

Device Information

Device Type   GW-7662
Device Name   gw-7662
IP Address   0.0.0.0
Subnet Mask   0.0.0.0
Gateway   0.0.0.0
Address   12:34:56:78:9A:BC

Device Name Configure
Device Name :   gw-7662

Network Configure
IP Address   : 192.168.0.111
Subnet Mask   : 255.255.255.0
Gateway   : 192.168.0.254

Advanced

3 Press 「Advanced Settings」 button

Device Advanced Configuration

Device Information
Device Type   : GW-7662
Firmware Version : V1.0

Options
Load File | Save File | Download Settings | Upload Settings

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters

Modbus Format : RTU   Byte Order : Little Endian(Intel)   Polling Interval (ms) : 500
Modbus Type :   Master   I/O Safe Mode : Last Value   Query Timeout (ms) : 500
Baudrate :   115200
Line Control :   n, 8, 1   Modbus Device ID (dec) : 1   (1~247)

Request Command

Function Code :   FC1 Read multiple coils status (0xxxx) for DO   Add

Modbus ID (dec) :   1   (1~247)   PROFINET Info.
Start Address (dec) : 0   (0~65535)   Total Input (Byte) :   8   Modify
Count (dec) :   1   (1~1024 Bits)   Total Output (Byte) :   8
☐ Change Word Order (AABB CCDD -> CCDD AABB)   System used: 8 Bytes   Delete

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)

Suggested Module :   RSW:0 Input:32Byte Output:32Byte

Device Advanced Configuration

Device Information
Device Type : GW-7662
Firmware Version : V1.0

Options
| Load File | Save File | Download Settings | Upload Settings |

3. Upload

Tabs
Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

1. Set Modbus settings

Parameters
Modbus Format :	RTU	Byte Order : Little Endian(Intel)	Polling Interval (ms) : 500
Modbus Type :	Master	I/O Safe Mode : Last Value	Query Timeout (ms) : 500
Baudrate :	115200		
Line Control :	n, 8, 1	Modbus Device ID (dec) : 1 (1~247)	

2. Add Modbus Command

Request Command
Function Code : FC3 Read multiple registers (4xxxx) for AO

Modbus ID (dec) : 4   (1~247)

Start Address (dec) : 0   (0~65535)

Count (dec) : 3   (1~64 Words)

☐ Change Word Order (AABB CCDD -> CCDD AABB)

PROFINET Info.
Total Input (Byte) : 14
Total Output (Byte) : 14
System used: 8 Bytes

| Add | Modify | Delete |

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)
1	4	16 (WAO)	0	3	No	N/A	8~13
2	4	3 (RAO)	0	3	No	8~13	N/A

Suggested Module : RSW:0 Input:32Byte Output:32Byte

The first input 8 bytes and output 8 bytes are allocated for system. (1~8)
The 9th byte to the 32th byte are allocated for Modbus. (9~32)

Device overview

	...	Module	Rack	Slot	I address	Q address	Type	Order no.
		▼ GW-7662	0	0			GW-7662 2-Port De...	GW-7662
		▶ Internal	0	0 X1			GW-7662	
		RSW:0 Input:32Byte Output:32Byte_1	0	1	1...32	1...32	RSW:0 Input:32Byte...	

	i		...	Address	Display format
1			"...	%QW9	Hex
2				%QW11	Hex
3				%QW13	Hex
4				%IW9	Hex
5				%IW11	Hex
6				%IW13	Hex

QW9   => used to write AO 1
QW11 => used to write AO 2
QW13 => used to write AO 3

IW9   => used to read AO 1
IW11 => used to read AO 2
IW13 => used to read AO 3

Original AO value

PLC Write 0x1234 to AO 1
PLC Write 0x5678 to AO 2
PLC Write 0x9ABC to AO 3

Mbsla...
ID = 4

40001 = 0x0000
40002 = 0x0000
40003 = 0x0000

i	...	Address	Display format	Monitor value	Modify value
1	"...	%QW9	Hex	16#1234	16#1234
2		%QW11	Hex	16#5678	16#5678
3		%QW13	Hex	16#9ABC	16#9ABC

Mbsla...
ID = 4

40001 = 0x1234
40002 = 0x5678
40003 = 0x9ABC

PLC Read 0x1234 from AO 1
PLC Read 0x5678 from AO 2
PLC Read 0x9ABC from AO 3
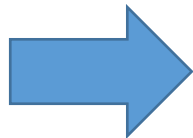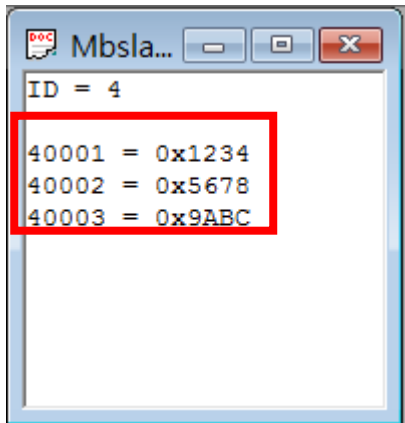
Mbsla...
ID = 4

40001 = 0x1234
40002 = 0x5678
40003 = 0x9ABC

	i	...	Address	Display format	Monitor value	Modify value
1		"...	%QW9	Hex	16#1234	16#1234
2			%QW11	Hex	16#5678	16#5678
3			%QW13	Hex	16#9ABC	16#9ABC
4			%IW9	Hex	16#1234	
5			%IW11	Hex	16#5678	
6			%IW13	Hex	16#9ABC	

SIMATIC S7-1200

PROFINET IO Controller
(Master)

TIA V11
TIA Portal
V11

PROFINET

GW-7662

ICP CON
GW-7662
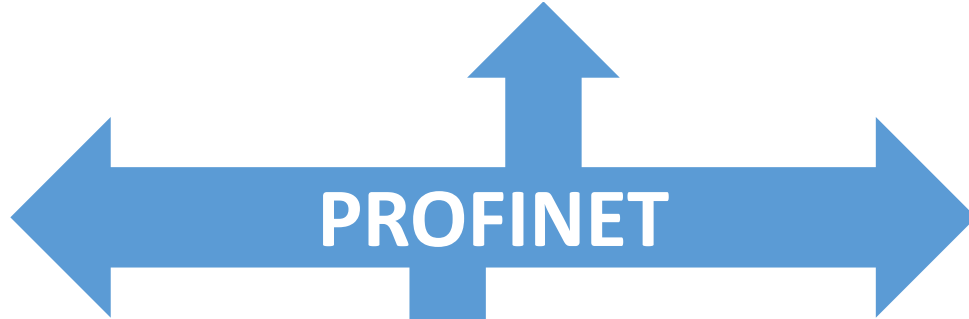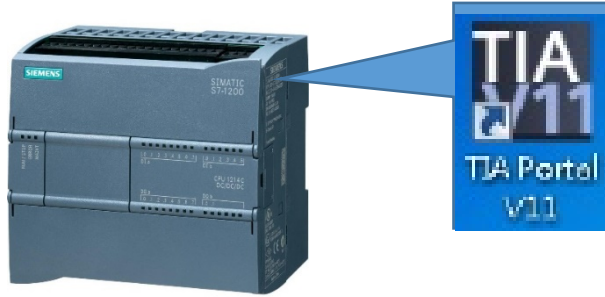
Comport Setting:

115200, n, 8, 1

Modbus RTU

AI module (RTU Slave)
- **Modbus ID: 5**
- **Data Address: 30001~30004**
- **Data Length: 4**

PROFINET IO device (Slave)

Modbus RTU Master

PFN_Tool (Version 1.30)

Network Devices : IP: 192.168.77.88 MAC: B8-6B-23-14-E5-76 (Intel(R) Ethernet Connection

1 **Search Module**

Search Start

Type	Name	IP	Mask	Gatewa
GW-7662				
SIMATIC-PC	id			
S7-PC	id			
SIMATIC-PC	n			

2 **Double Click**

Device Basic Configuration

Device Information

Device Type : GW-7662
Device Name : gw-7662
IP Address : 0.0.0.0
Subnet Mask : 0.0.0.0
  ay : 0.0.0.0
  ddress : 12:34:56:78:9A:BC

  Name Configure

Device Name : gw-7662

Network Configure

IP Address : 192.168.0.111

Subnet Mask : 255.255.255.0

Gateway : 192.168.0.254|

Advanc

3 **Press「Advanced Settings」button**

Device Advanced Configuration

Device Information

Device Type : GW-7662
Firmware Version : V1.0

Options

Load File | Save File | Download Settings | Upload Settings

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters

Modbus Format : RTU   Byte Order : Little Endian(Intel)   Polling Interval (ms) : 500

Modbus Type : Master   I/O Safe Mode : Last Value   Query Timeout (ms) : 500

Baudrate : 115200

Line Control : n, 8, 1   Modbus Device ID (dec) : 1   (1~247)

Request Command

Function Code : FC1 Read multiple coils status (0xxxxx) for DO   Add

Modbus ID (dec) : 1   (1~247)   PROFINET Info.

Start Address (dec) : 0   (0~65535)   Total Input (Byte) : 8   Modify

Count (dec) : 1   (1~1024 Bits)   Total Output (Byte) : 8

☐ Change Word Order (AABB CCDD -> CCDD AABB)   System used: 8 Bytes   Delete

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)

Suggested Module : RSW:0 Input:32Byte Output:32Byte

Device Advanced Configuration

Device Information
Device Type : GW-7662
Firmware Version : V1.0

Options
Load File | Save File | Download Settings | Upload Settings

3. Upload

Modbus Settings | Modbus Test | Diagnostic Msg. | Communication Log | Information

Parameters

1. Set Modbus settings

Modbus Format :	RTU	Byte Order : Little Endian(Intel)	Polling Interval (ms) : 500
Modbus Type :	Master	I/O Safe Mode : Last Value	Query Timeout (ms) : 500
Baudrate :	115200		
Line Control :	n, 8, 1	Modbus Device ID (dec) : 1	(1~247)

Request Command

2. Add Modbus Command

Function Code : FC4 Read multiple input registers (3xxxx) for AI

Modbus ID (dec) : 5 (1~247)

Start Address (dec) : 0 (0~65535)

Count (dec) : 4 (1~64 Words)

☐ Change Word Order (AABB CCDD -> CCDD AABB)

PROFINET Info.
Total Input (Byte) : 16
Total Output (Byte) : 8
System used: 8 Bytes

Add | Modify | Delete

	ID	FC	Start Addr.	Count	Word order	PFN Input Addr.(Byte)	PFN Output Addr.(Byte)
▶ 1	5	4 (RAI)	0	4	No	8~15	N/A

Suggested Module : RSW:0 Input:32Byte Output:32Byte

The first input 8 bytes and output 8 bytes are allocated for system. (1~8)
The 9th byte to the 32th byte are allocated for Modbus. (9~32)

Device overview

	...	Module	Rack	Slot	I address	Q address	Type	Order no.
		▼ GW-7662	0	0			GW-7662 2-Port De...	GW-7662
		▶ Internal	0	0 X1			GW-7662	
		RSW:0 Input:32Byte Output:32Byte_1	0	1	1...32	1...32	RSW:0 Input:32Byte...	

	i	...	Address	Display format	Monitor va
1		📋	%IW9	Hex	16#0000
2			%IW11	Hex	16#0000
3			%IW13	Hex	16#0000
4			%IW15	Hex	16#0000

IW9 => used to read AI 1
IW11 => used to read AI 2
IW13 => used to read AI 3
IW15 => used to read AI 4

PLC Read 0x0000 from AI 1
PLC Read 0x0000 from AI 2
PLC Read 0x0000 from AI 3
PLC Read 0x0000 from AI 4

Original AI value

Mbsla...

30001 = 0x0000
30002 = 0x0000
30003 = 0x0000
30004 = 0x0000
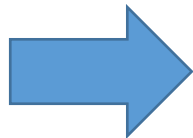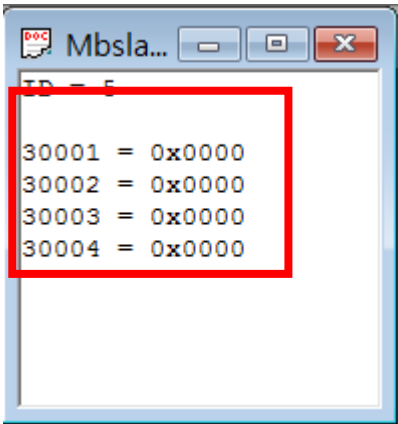
	i	...	Address	Display format	Monitor value	
1			%IW9	Hex	16#0000	
2			%IW11	Hex	16#0000	
3			%IW13	Hex	16#0000	
4			%IW15	Hex	16#0000	

PLC Read 0x1234 from AI 1
PLC Read 0x5678 from AI 2
PLC Read 0x9ABC from AI 3
PLC Read 0xDEF0 from AI 4

Change AI value

Mbsla...

30001 = 0x1234
30002 = 0x5678
30003 = 0x9ABC
30004 = 0xDEF0
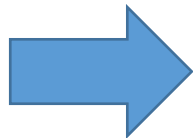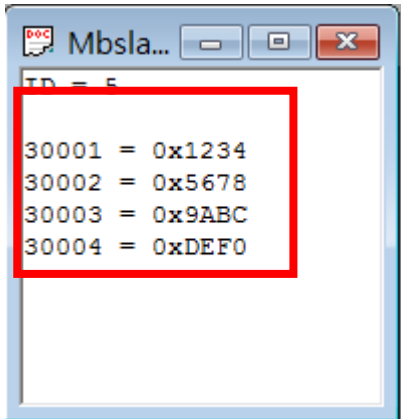
	i	...	Address	Display format	Monitor value
1			%IW9	Hex	16#1234
2			%IW11	Hex	16#5678
3			%IW13	Hex	16#9ABC
4			%IW15	Hex	16#DEF0