PROFIBUS Configuration for Siemens S7-300

Moxa Technical Support Team
support@moxa.com

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About Moxa

Moxa manufactures one of the world's leading brands of device networking solutions. Products include serial boards, USB-to-serial hubs, media converters, device servers, embedded computers, Ethernet I/O servers, terminal servers, Modbus gateways, industrial switches, and Ethernet-to-fiber converters. Our products are key components of many networking applications, including industrial automation, manufacturing, POS, and medical treatment facilities.

How to Contact Moxa

Tel: +886-2-8919-1230 Web: www.moxa.com
Fax: +886-2-8919-1231 Email: info@moxa.com

1. Introduction

This application note describes the configuration of Moxa MGate device as a PROFIBUS DP slave to connect to a Siemens S7-300 PLC as a PROFIBUS DP master. Two bytes input and two bytes output data are configured in this example.

2. Applicable products

Product Line	Model Name
MGate 4000 series	MGate 4101-MB-PBS、MGate 4101I-MB-PBS、MGate 4101-MB-PBS-T、MGate 4101I-MB-PBS-T

3. System requirements

Description	Model / File Name	Version
Siemens S7 PLC	CPU 315-2 PN/DP Article Number: 6ES7315-2EH14-0AB0	3.2.3
Siemens PLC programming software	SIMATIC STEP 7	5.5 + SP2
Moxa PROFIBUS DP slave to Modbus serial gateway	MGate 4101-MB-PBS	1.0
GSD file for Moxa PROFIBUS DP slave	MPBS0D80.gsd	1.0
Software utility to configure Moxa device	MGate Manager	1.5
Modbus RTU/ASCII slave software	ModSim32	2002

4. System overview

In this document, MGate 4101-MB-PBS is used as an example. The system architecture is shown below.

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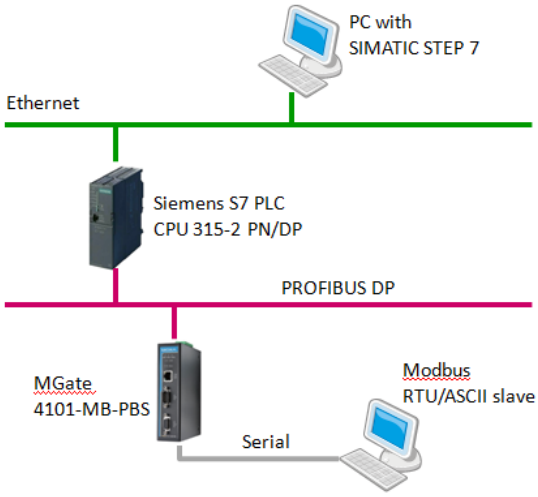
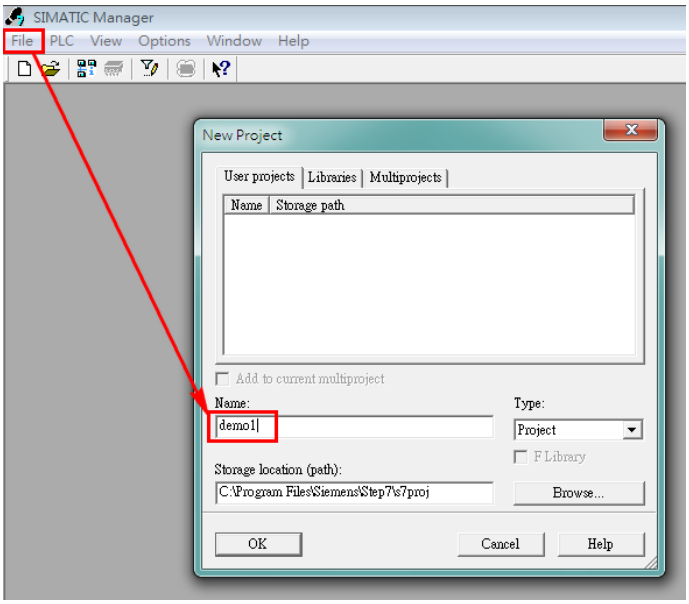


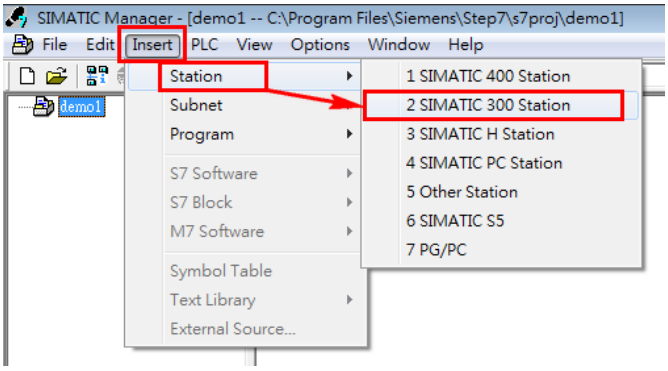
5. PLC configuration

5.1. Create STEP 7 project

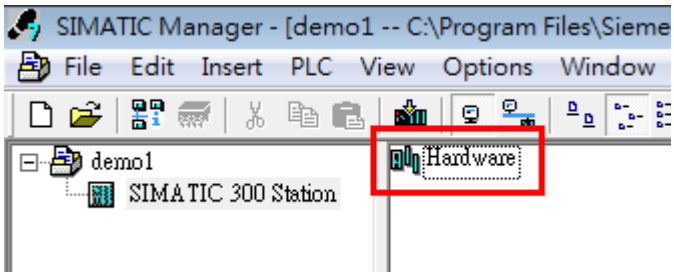
5.1.1. Start SIMATIC Manager and create a new project by selecting "File" menu and then "New" option. The user has to assign a name for this project.

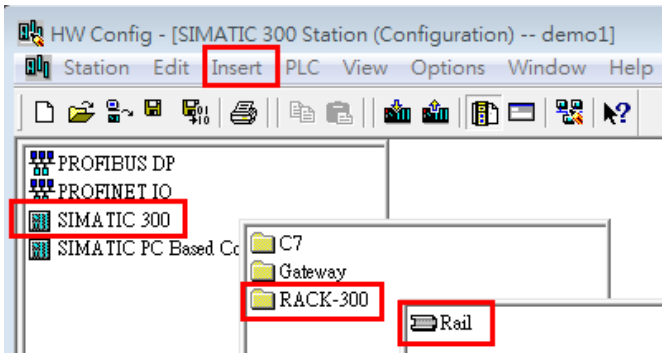


5.1.2. Select "Insert" menu and then "Station" option to insert "SIMATIC 300 Station" to the project.

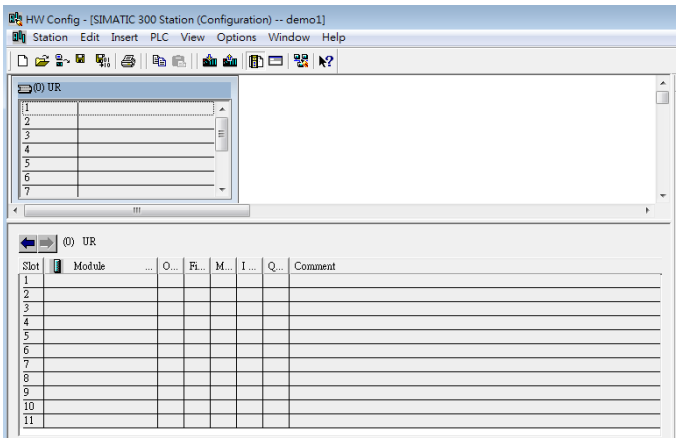


Double click "Hardware" icon, then add a rack to this project by selecting "Insert" menu and then "Insert Object" option.

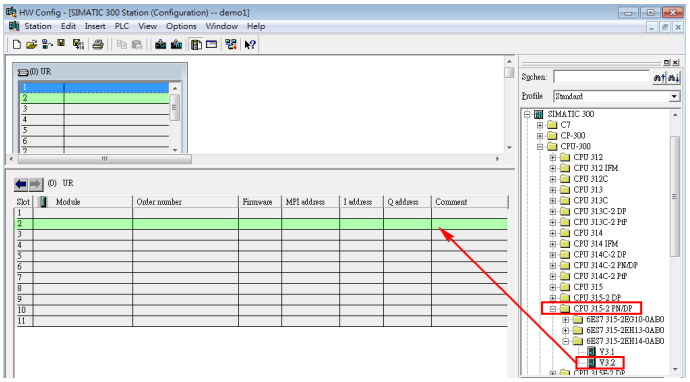


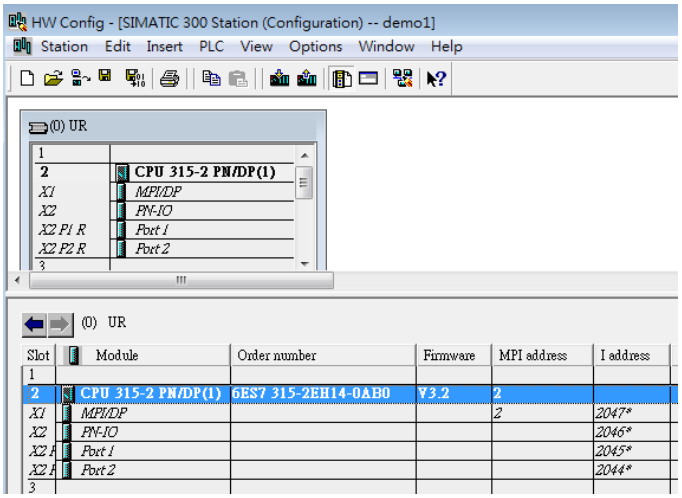


After above steps are done, the "HW Config" window will show as the following figure.



5.1.3. The user has to add the correct CPU module to the STEP 7 project according to his actual hardware model. Here, we use CPU 315-2 PN/DP for example. Select proper CPU module from the menu and drag the icon to the slot.





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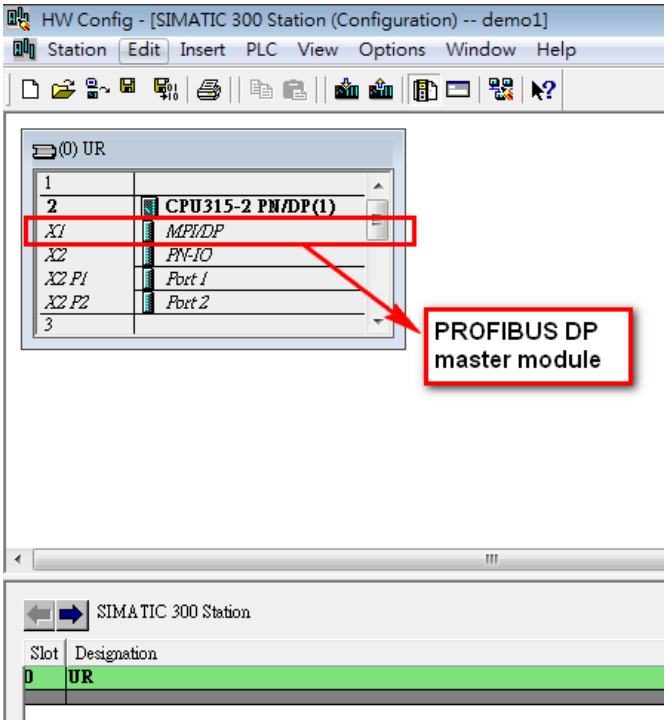
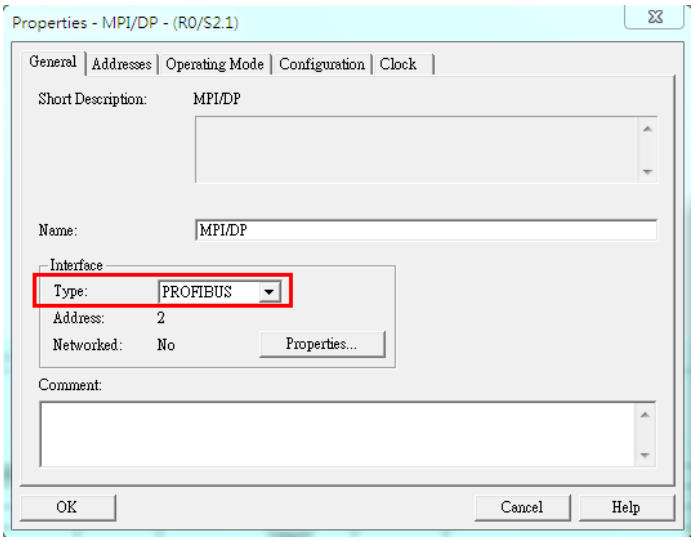
5.2. Create PROFIBUS network

5.2.1. Double click "MPI/DP" block to configure PROFIBUS DP module.



Set the interface type as PROFIBUS



The user should assign the address for PROFIBUS master module here and click "New" button to create a new subnet.

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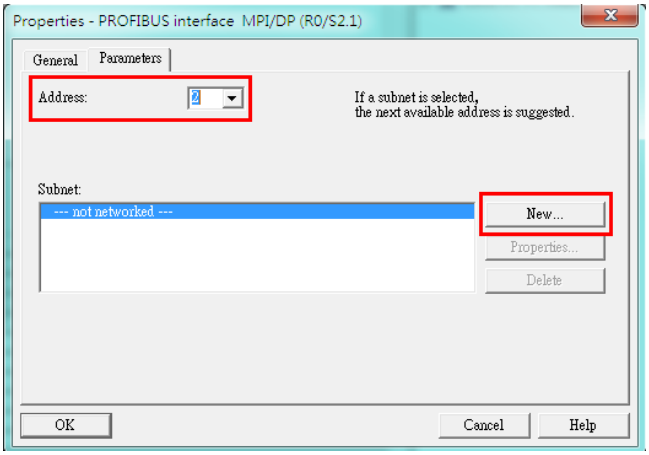
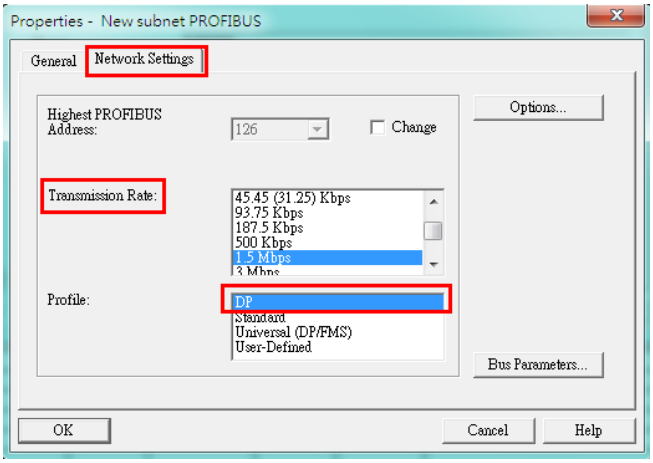
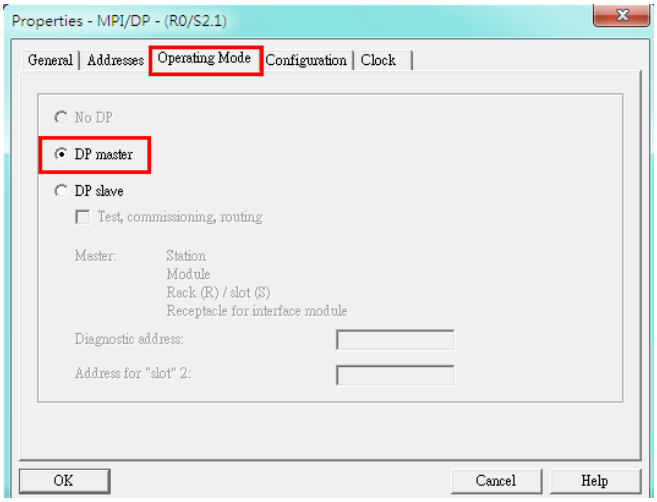


5.2.2. Select the proper transmission rate for this subnet. The profile should be configured as "DP". Click "OK" after these modifications are done.



Switch to "Operating Mode" tab and set the mode as "DP master".



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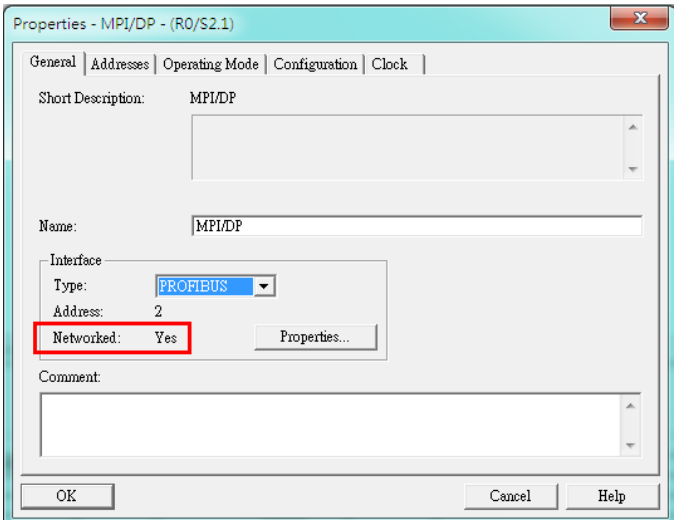
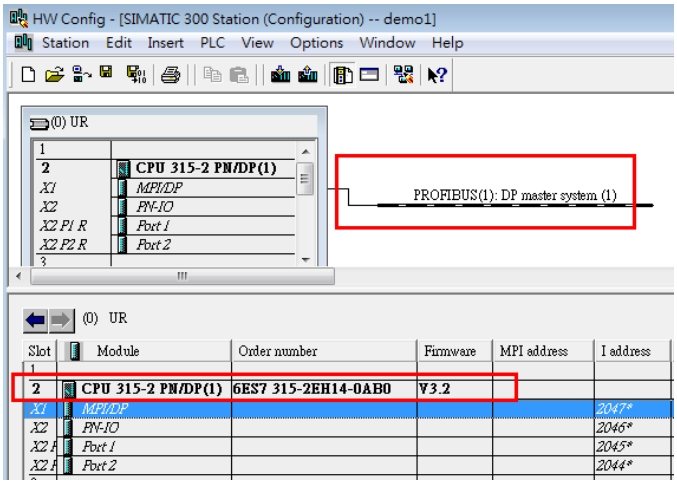
The user will see the result as the following figures. It means that the PROFIBUS network is created successfully.

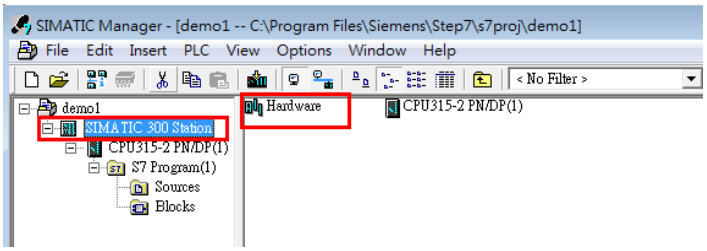




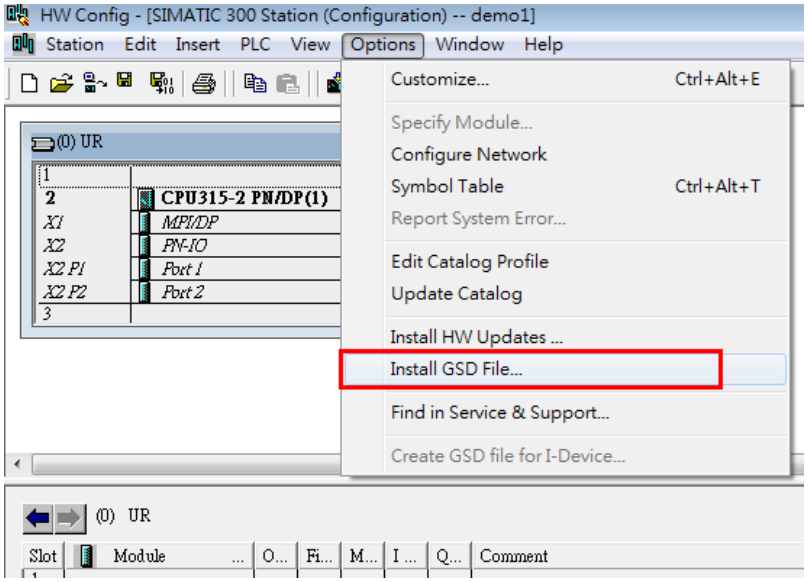
5.3. Install the GSD file

For engineering and configuring purpose, user has to install device's GSD file to the configuration tool - SIMATIC Manager.

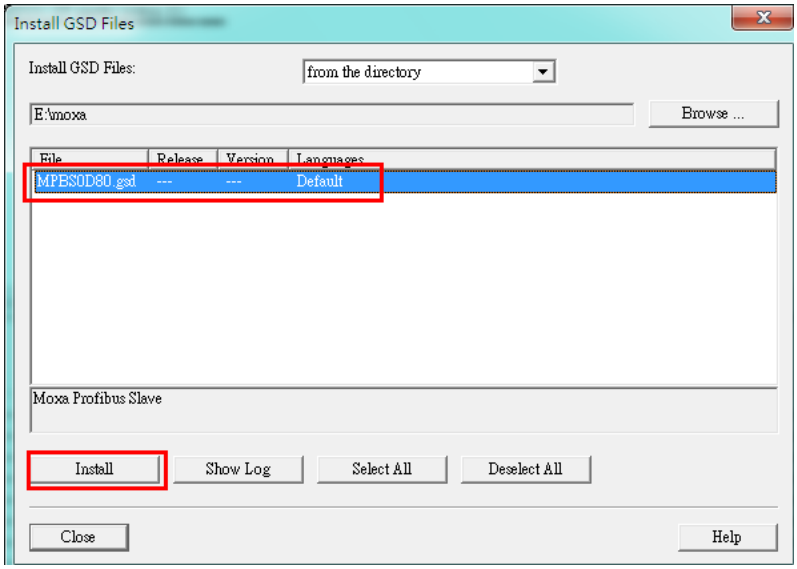
Double click "Hardware" button.



Select "Options -> Install GSD File".



Select the GSD file for Moxa PROFIBUS slave module and click "Install" button.



If the GSD file is installed successfully then the user can find "Moxa Profibus Slave" from the hardware catalog list.

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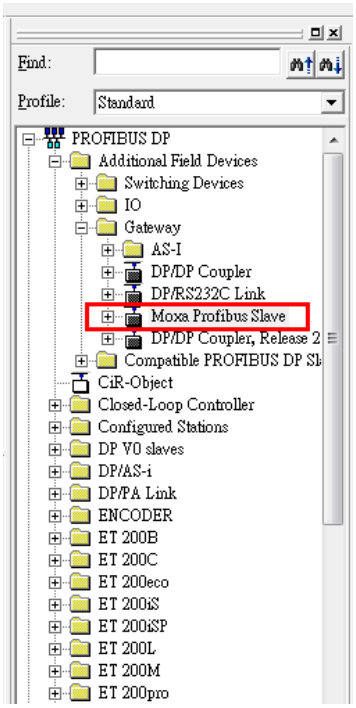
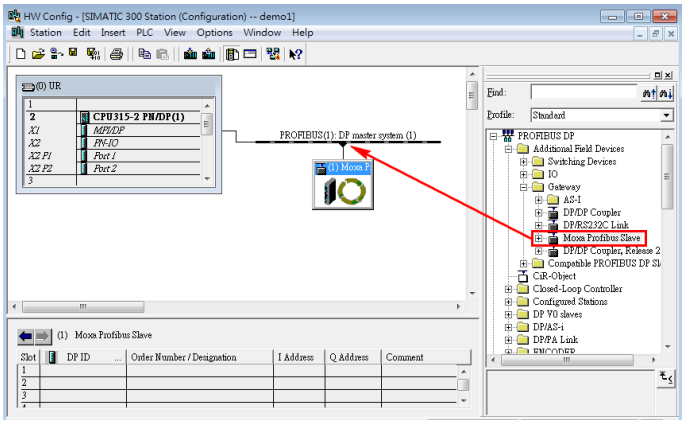


5.4. Configure PROFIBUS interface

5.4.1. Drag and drop "Moxa Profibus Slave" device from the catalog to "DP master system".



Select "Moxa Profibus Slave" icon and right click the mouse to select "Object Properties". The PROFIBUS address of Moxa device can be configured here. Please be noted that this value should be identical to the value of address rotary switch on Moxa's PROFIBUS slave.

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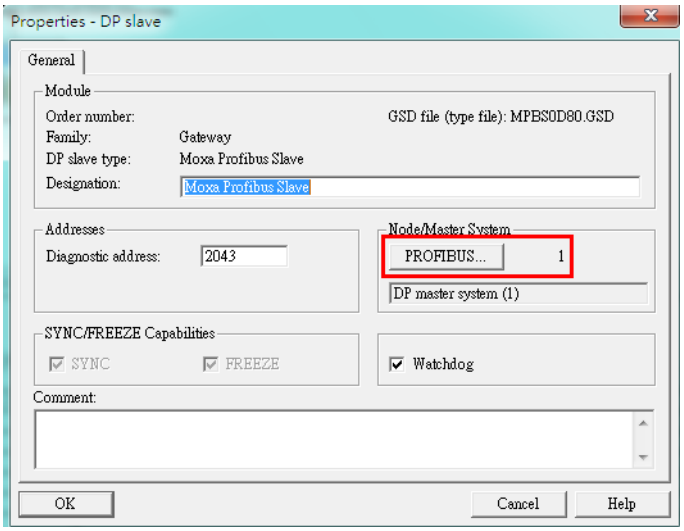

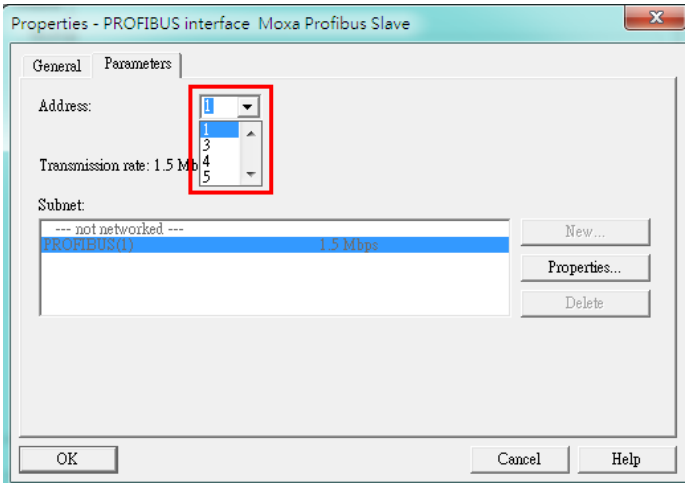

5.4.2. Configure the desired I/O modules for data exchange with the PROFIBUS master. The user can freely to choose proper combination of I/O modules according to his real application. In this example, 2 bytes input and 2 bytes output are chosen.

Drag "Input: 2 Bytes" module from the module list of Moxa Profibus Slave to slot 1 and "Output: 2 Bytes" to slot 2. Please save these changes after all configurations are done.

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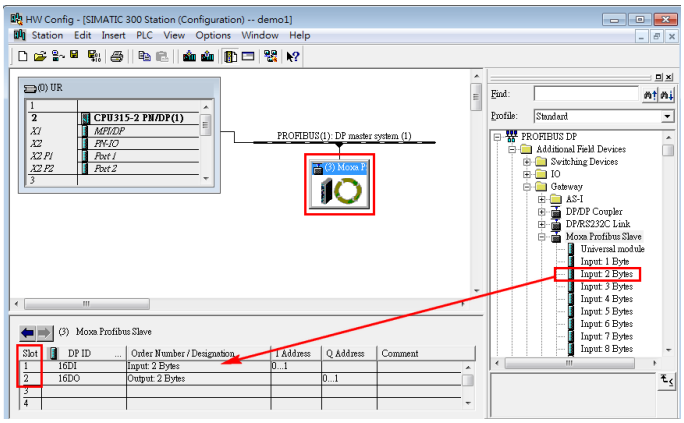
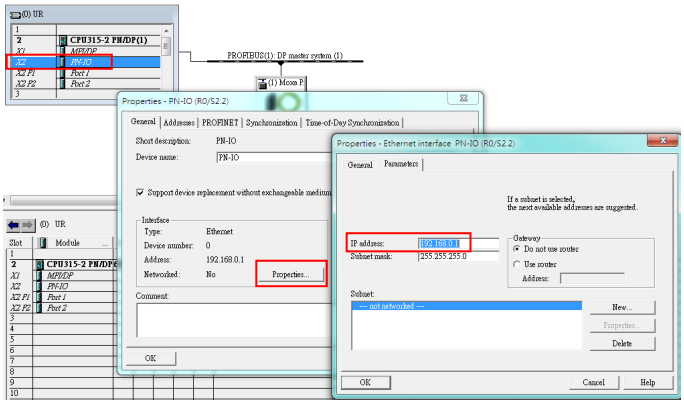


5.4.3. The user has to download the new configuration to the CPU 315-2 PN/DP after all settings are configured properly. Before that, please make sure the Ethernet connection between the PC and the CPU 315-2 PN/DP has already built. The user can modify the IP address of the CPU 315-2 PN/DP by double clicking the "PN-IO" block.



Click "Download to Module" button to download the configuration to the CPU 315-2 PN/DP.

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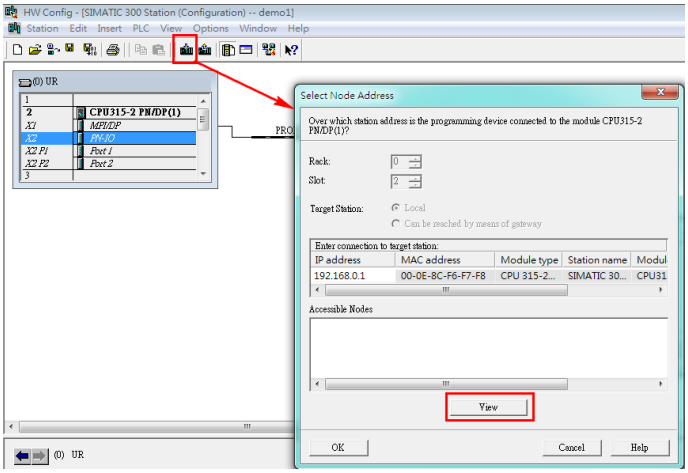

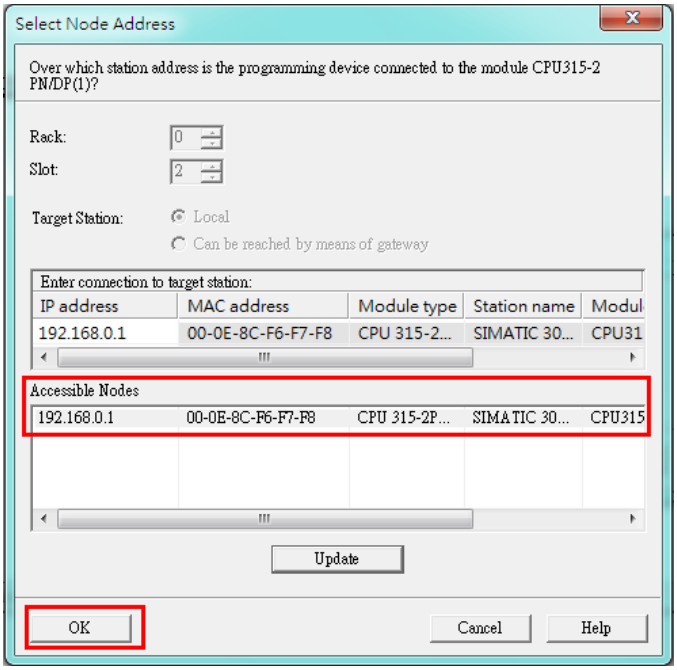

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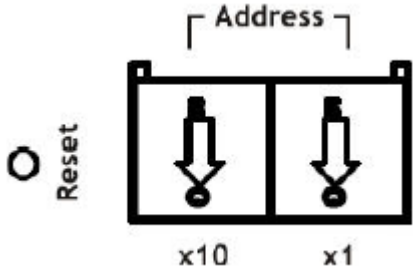
6. Moxa's PROFIBUS device configuration

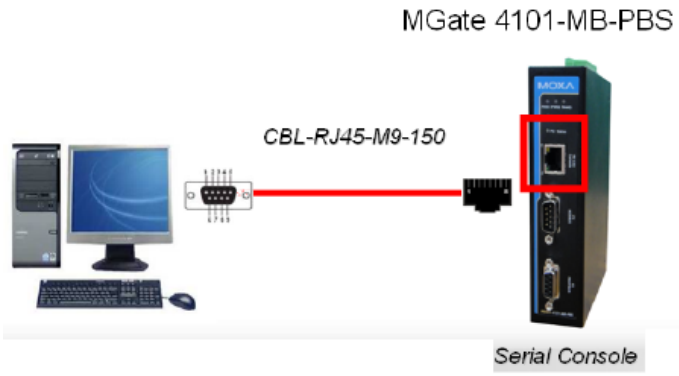
6.1. Assign a PROFIBUS address

Before communication, the user has to assign an address to Moxa's PROFIBUS slave. This address should be in accordance with the value which is configured in the STEP 7 project. The user can assign an address 0 to 99 by using the rotary switch. If the desired address is over 99, please configure it via MGate Manager.



6.2. Device configuration with MGate Manager

6.2.1. For configuration purpose, the user has to connect the COM port of PC to the MGate 4101-MB-PBS.



6.2.2. Start MGate Manager and search for the device.

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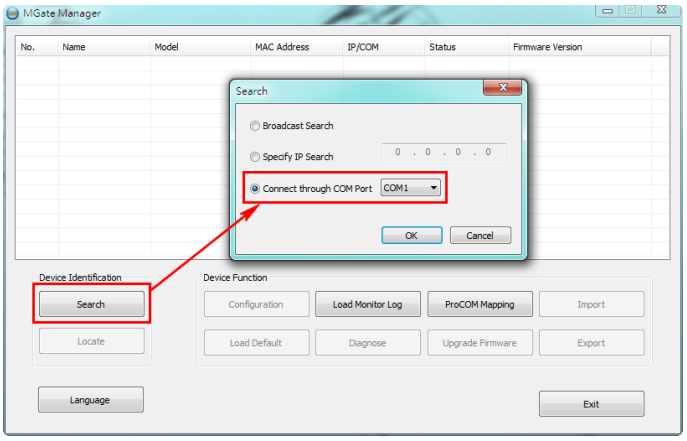
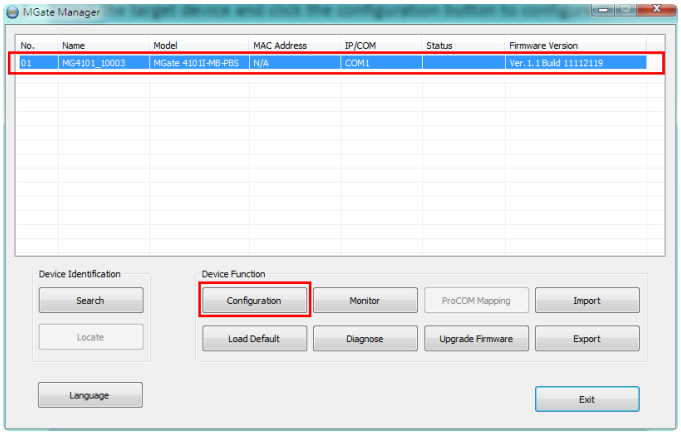
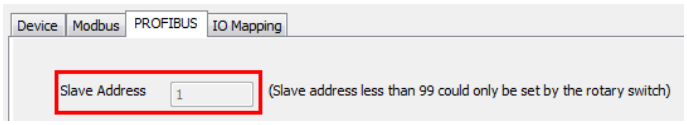


6.2.3. Select the target device and click the configuration button to configure it.



6.2.4. Select "PROFIBUS" tab. The user does not need to change the PROFIBUS settings since the address is set via the rotary switch.



6.2.5. Select "IO Mapping" tab. Please add proper I/O modules with the same size and sequence as we did in previous STEP 7 project. Here, for example, is 2 bytes input and 2 bytes output.

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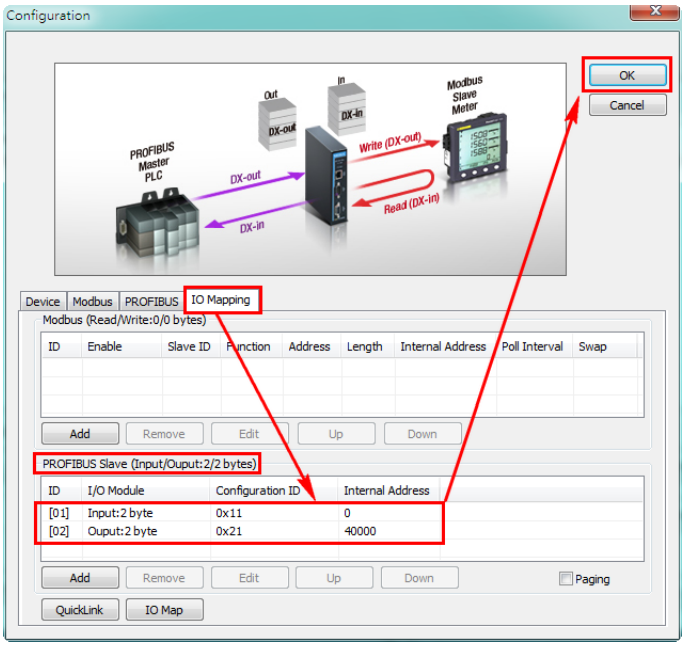

After clicking "OK" button, the MGate 4101-MB-PBS will reboot with new configuration. The "P2 Status (PROFIBUS)" LED will be in steady green which indicates the device is in data exchange mode.

7. Verification

7.1. Create Modbus commands

The user can verify his PROFIBUS communication works correctly or not by creating Modbus commands for testing.

Start MGate Manager and select "IO Mapping" tab to add two Modbus commands as the following figure. The MGate 4101-MB-PBS will read a register (2 bytes) from Modbus slave by using the first command and write a register (2 bytes) to Modbus slave by using the second command. With these two commands, the I/O data can be exchanged between PROFIBUS and Modbus networks.

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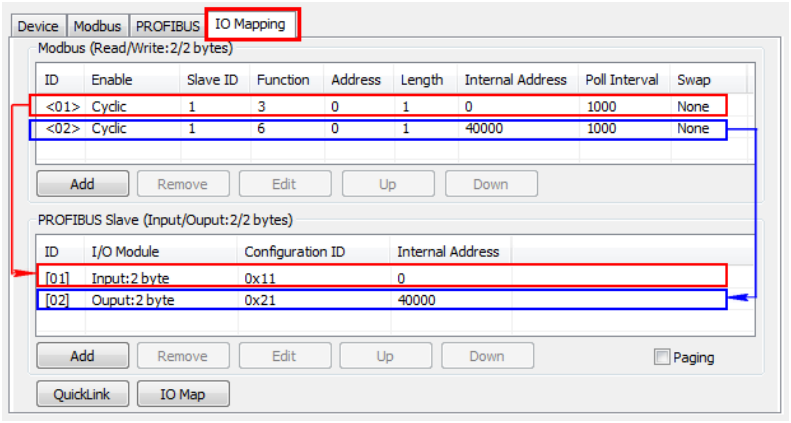
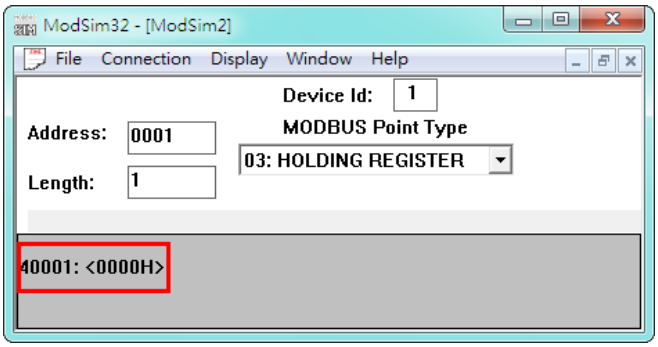


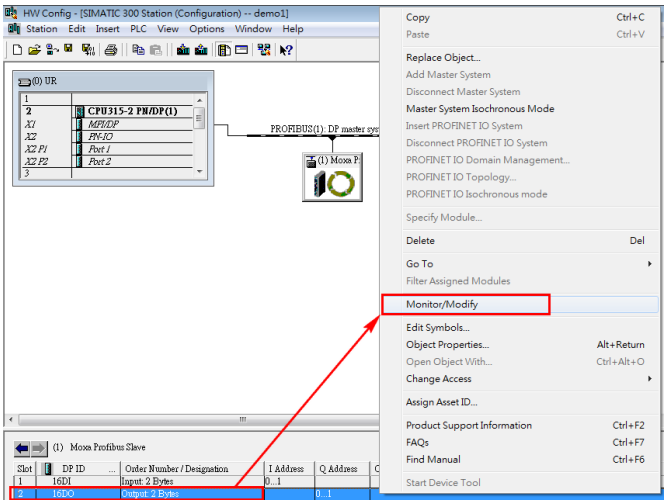
7.2. Modify and monitor I/O data

7.2.1. Set the hardware switch on the CPU 315-2 PN/DP to "Run" mode. The CPU 315-2 PN/DP starts to exchange I/O data with Moxa's PROFIBUS slave interface.

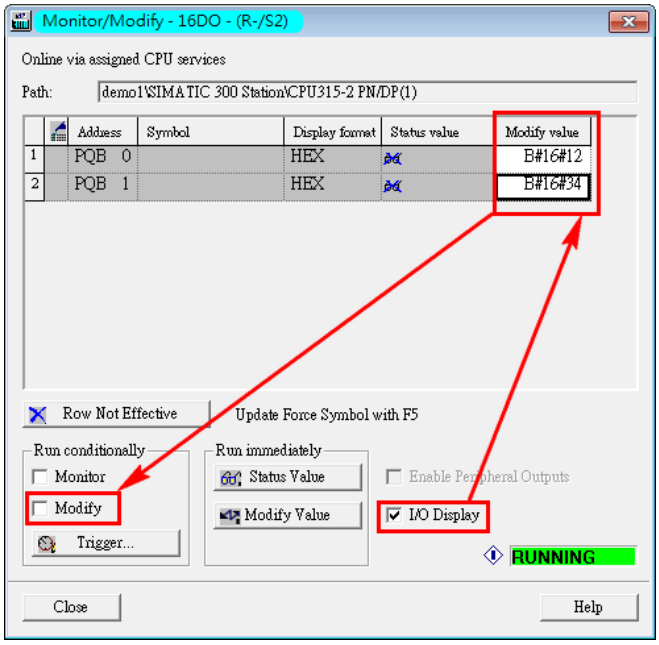
The initial value of I/O data at Modbus slave side is 0x0000.



7.2.2. Select the slot of output I/O module and "Monitor/Modify" option.



Change the output value from 0x0000 to 0x1234 and then check the "Modify" option to trigger this modification to take effect.



7.2.3. The new output I/O data has been successfully written from CPU 315-2 PN/DP to the Modbus slave via the MGate 4101-MB-PBS.

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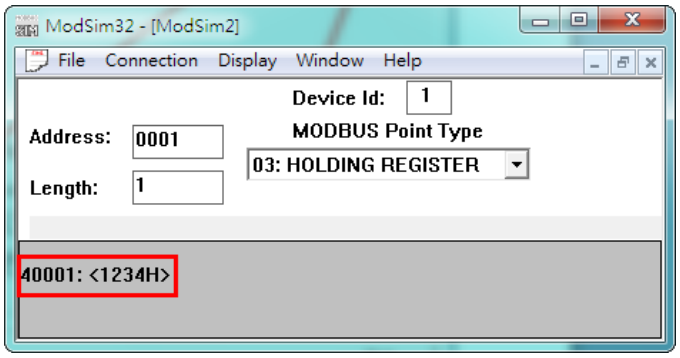
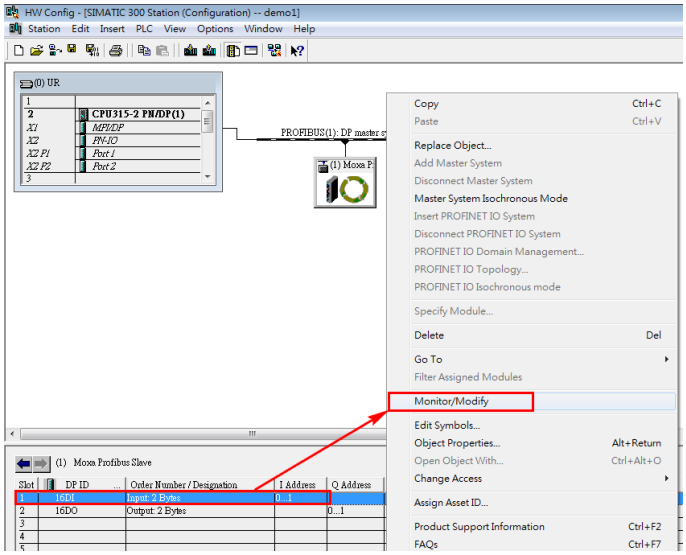


Meanwhile, the input I/O data is read from the Modbus slave to the input I/O module of CPU 315-2 PN/DP via the MGate 4101-MB-PBS. The new value 0x1234 will be seen in the "Monitor/Modify" window of SIMATIC Manager.



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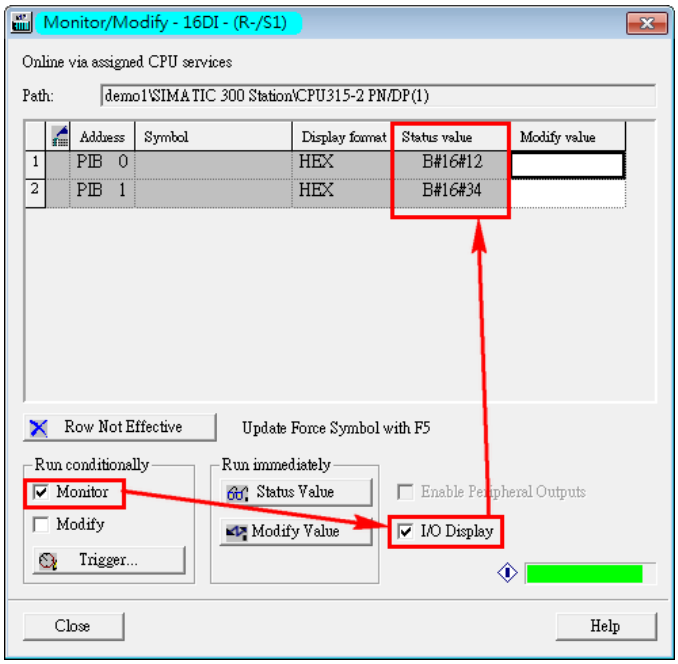
Monitor/Modify - 16DI - (R-/S1)
Online via assigned CPU services
Path:
demo1\SIMATIC 300 Station\CPU315-2 PN/DP(1)
Address
Symbol
Display format
Status value
Modify value
1
PIB 0
HEX
B#16#12
2
PIB 1
HEX
B#16#34
Row Not Effective
Update Force Symbol with F5
Run conditionally
Monitor
Modify
Trigger...
Run immediately
Status Value
Modify Value
Enable Peripheral Outputs
I/O Display
Close
Help