PROFIBUS Configuration for Moxa MGate 5101-PBM-MN and Siemens S7-300

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Contents

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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.

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1. Introduction

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

2. Applicable products

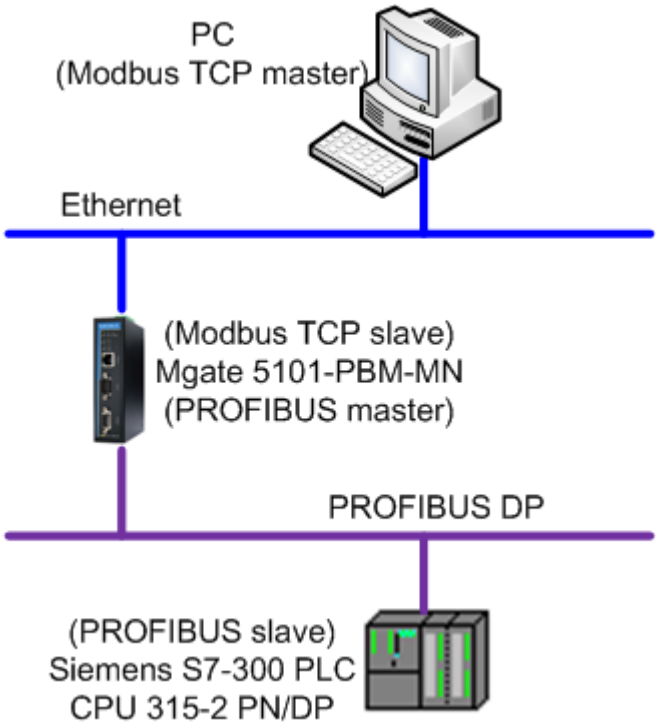
Product Line	Model Name
MGate 5000 series	MGate 5101-PBM-MN, MGate 5101I-PBM-MN, MGate 5101-PBM-MN-T, MGate 5101I-PBM-MN-T

3. System requirements

Description	Model / File Name	Version
Siemens S7-300 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 master to Modbus TCP gateway	MGate 5101-PBM-MN	1.0
GSD file for Siemens S7-300 DP slave	SIEM8180.GSE	13
Software utility to configure Moxa device	MGate Manager	1.6
Modbus TCP master software	Modbus Poll	3.60a

4. System overview

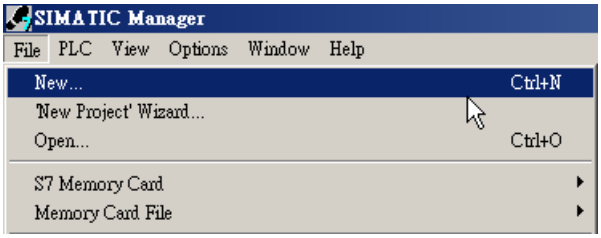
In this document, MGate 5101-PBM-MN is used as an example. The system architecture is shown below.

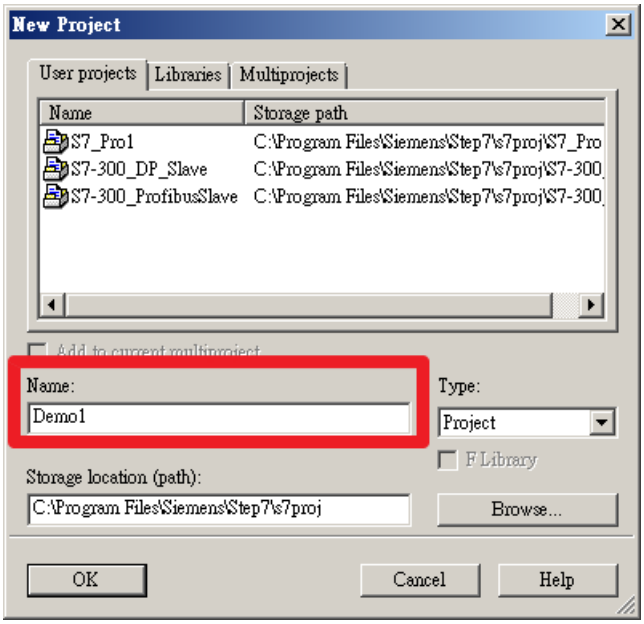


5. PLC configuration

5.1. Create STEP 7 project

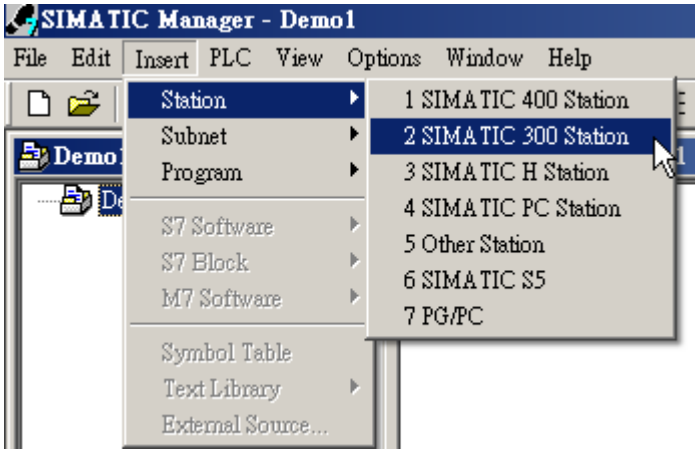
5.1.1. Start SIMATIC Manager and create a new project by selecting **File** → **New**. The user must assign a name for this project. In this example, we use "Demo1" as the project name.



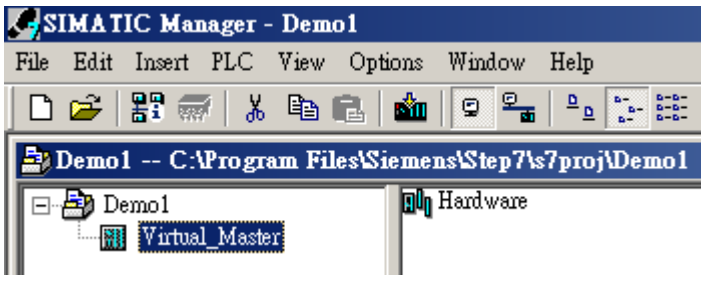


5.2. Create a virtual PROFIBUS master device

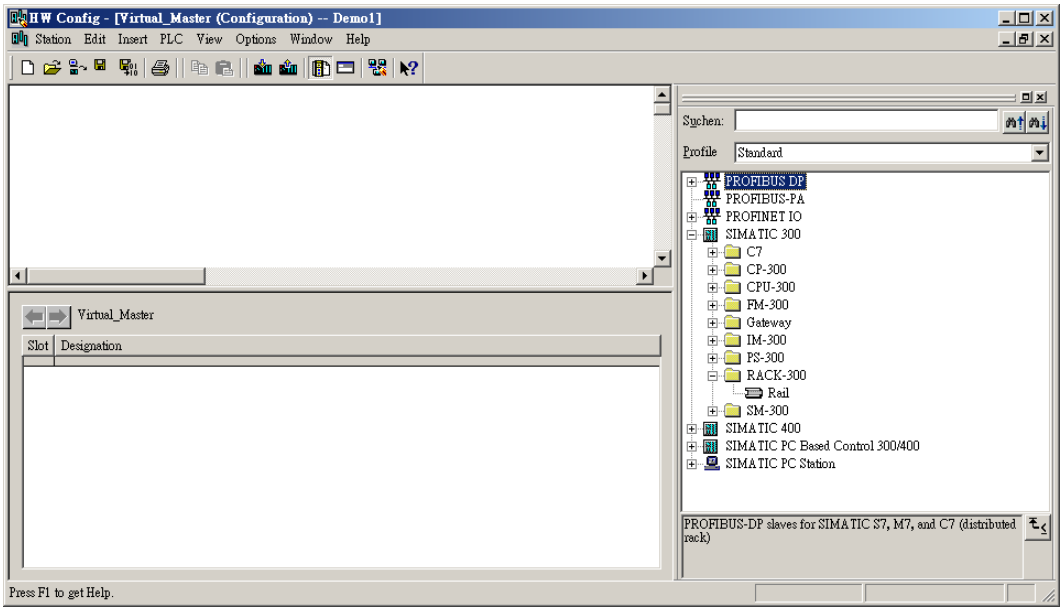
5.2.1. Select **Insert → Station → 2 SIMATIC 300 Station** to insert a SIMATIC 300 Station, which means the Siemens S7-300 PLC in this project.



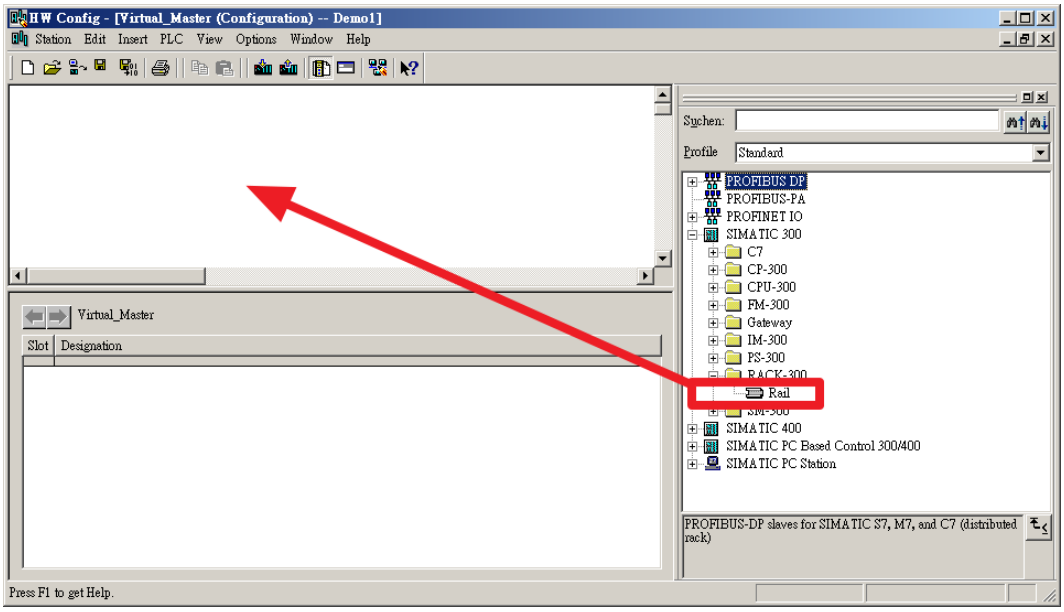
Name the SIMATIC 300 Station "Virtual_Master" and double-click it to perform more configurations.



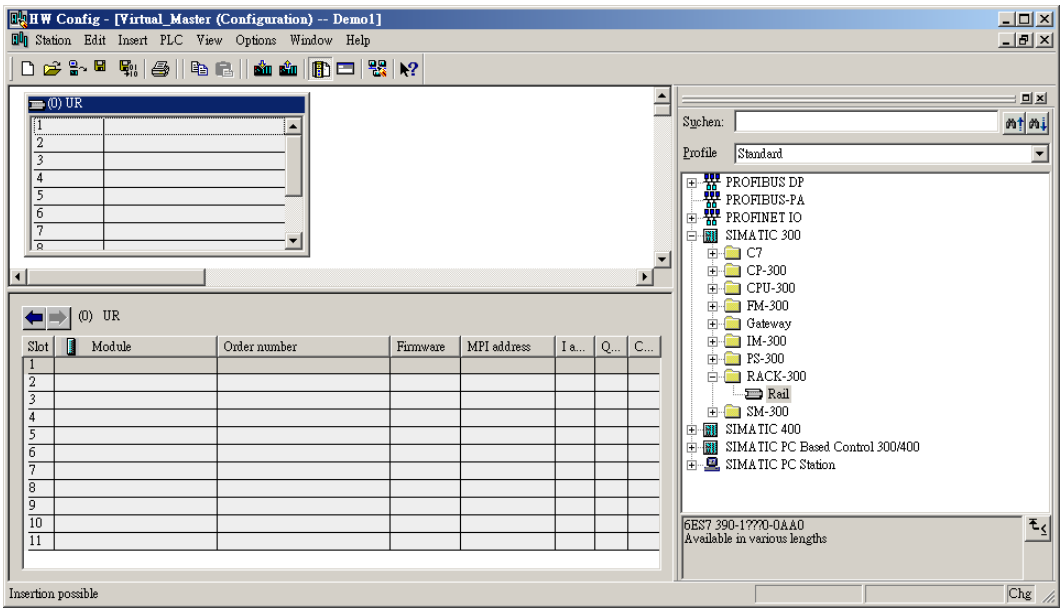
5.2.2. Double-click the **Hardware** icon and the **HW Config** window will appear:



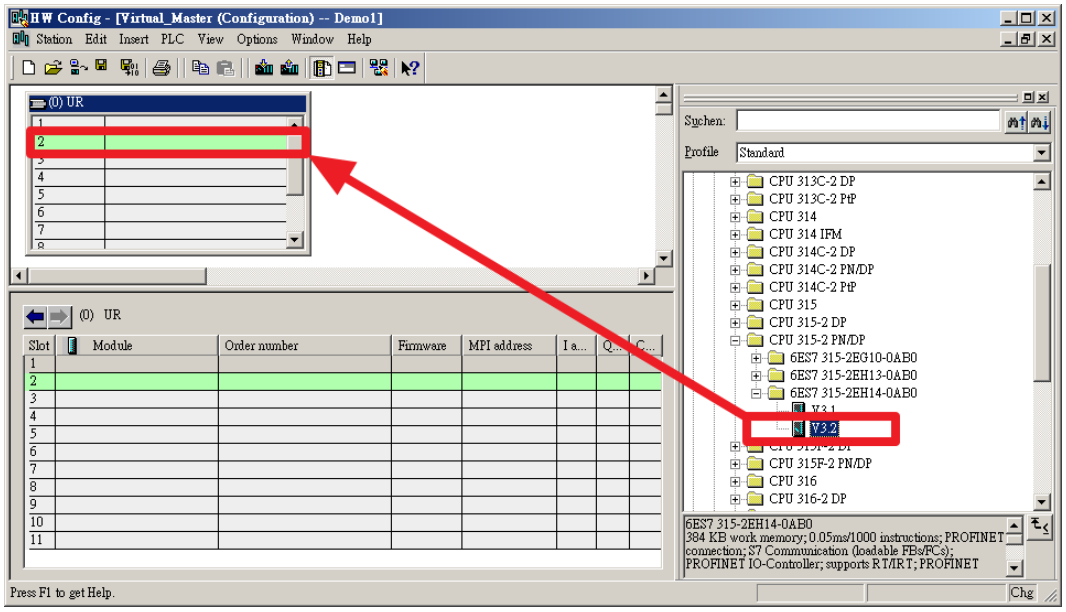
Drag the **Rail** item located under **SIMATIC 300** → **RACK-300** (in the hardware catalog window on the right) to the upper half of the **Station** window on the left:



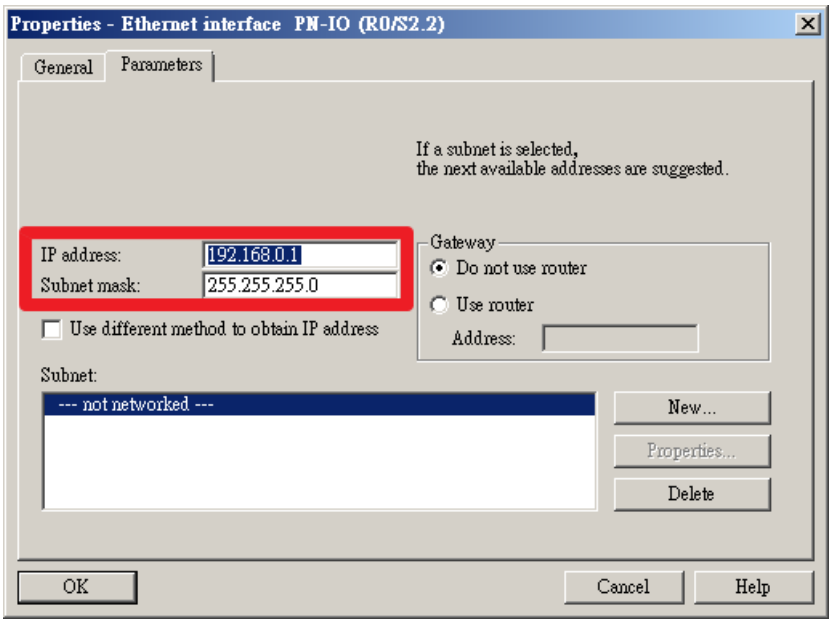
An empty grid will then appear in the upper half of the **Station** window as shown below:



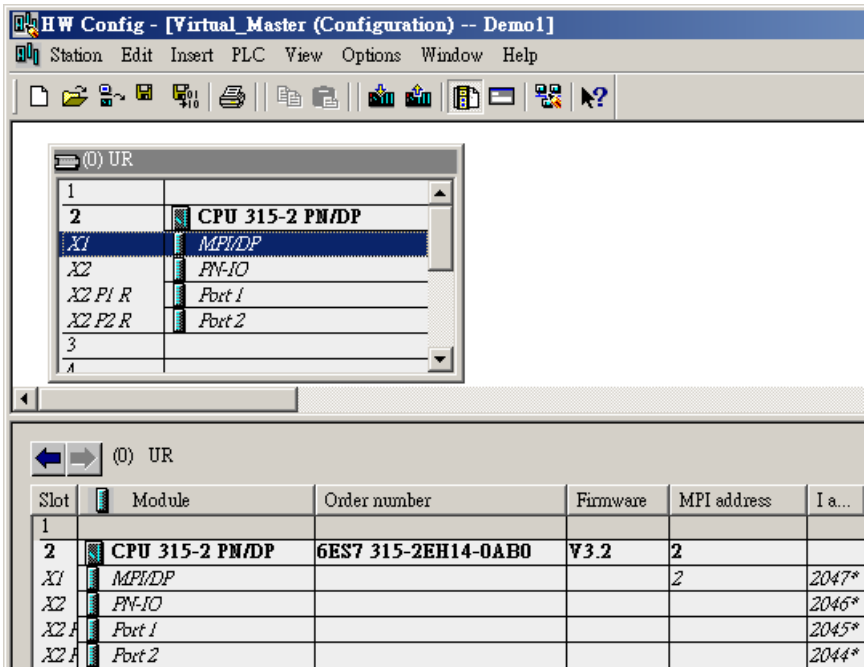
5.2.3. You must add the proper version firmware for the CPU module hardware model. In the figure below, we use **CPU 315-2 PN/DP** as an example. Drag the proper version of the CPU module firmware from the **Hardware Catalog** window on the right and drop it into the empty grid in the **Station** window on the left.



You will then be prompted to enter the proper IP address for the CPU module:

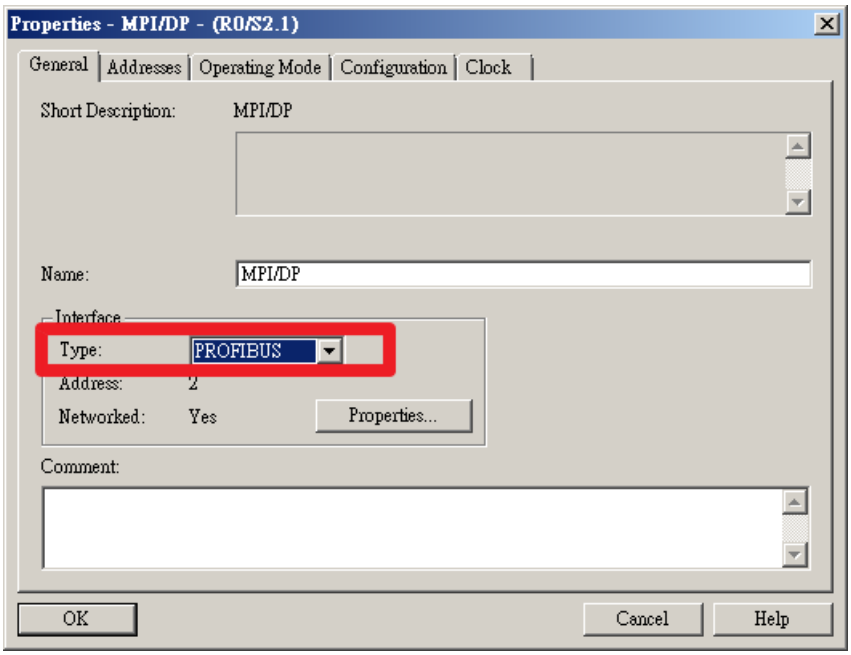


Then the related blocks will be automatically added to the grid as shown below:

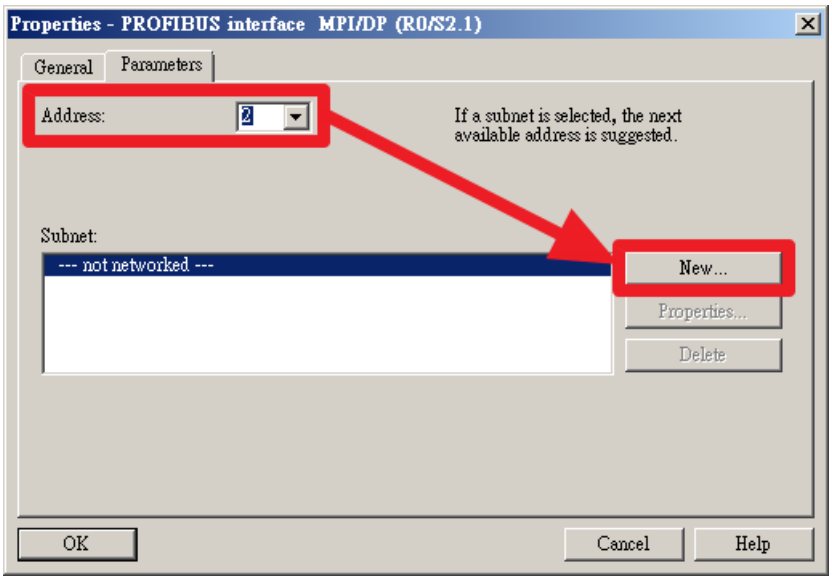


5.3. Create PROFIBUS network

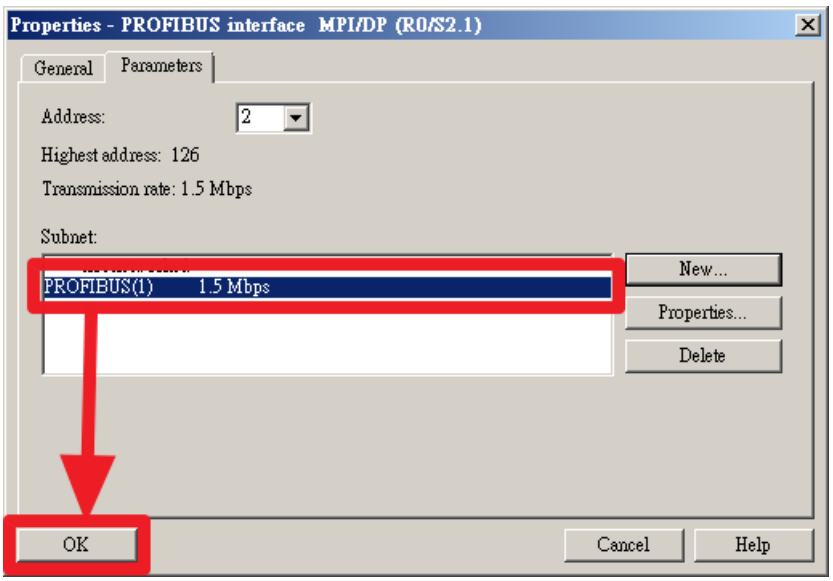
5.3.1. Double-click on the **MPI/DP** field to open the **Properties – MPI/DP** window to configure the PROFIBUS DP module. Set the interface type to PROFIBUS by selecting **PROFIBUS** from the **Interface → Type** dropdown menu.



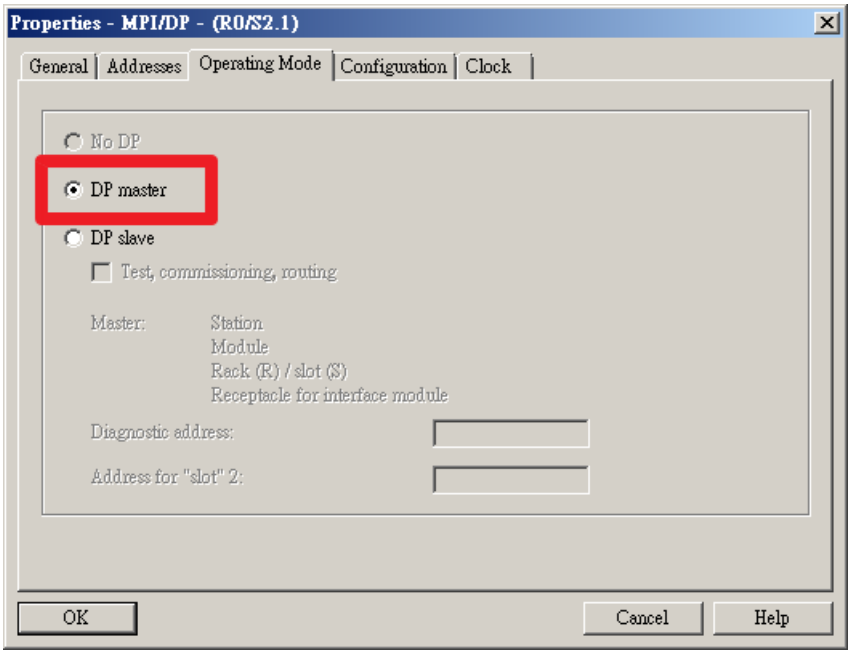
Assign the address for PROFIBUS master module under the **Parameters** tab and click the **New...** button to create a new subnet.



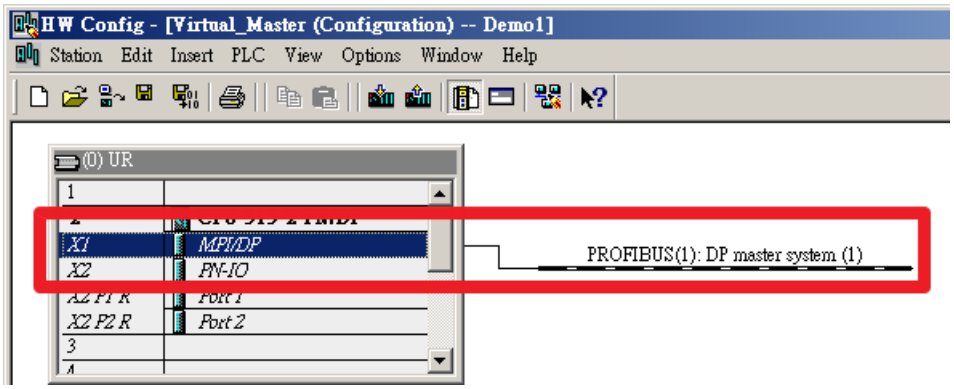
5.3.2. Select the proper transmission rate for this subnet. After completing these modifications, click the **OK** button to return to the **Properties – MPI/DP – (R0/S2.1)** window.



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



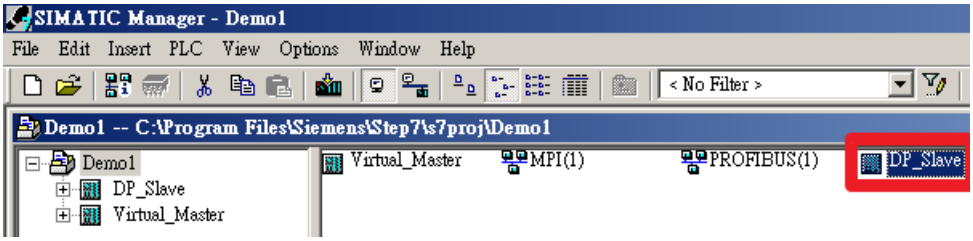
You should then see the results shown in the following figure, indicating that the PROFIBUS network was created successfully.



5.3.3. Close the **HW Config** window and return to the main window of the "Demo1" project.

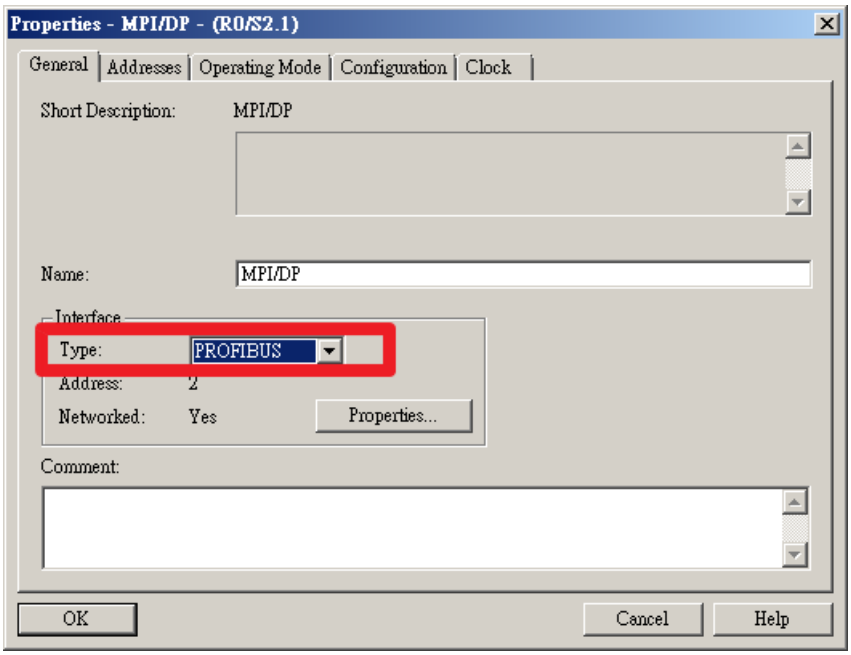
5.4. Create PROFIBUS slave device

5.4.1. Follow Step 5.2 to create a PROFIBUS slave device and name it "DP_Slave."

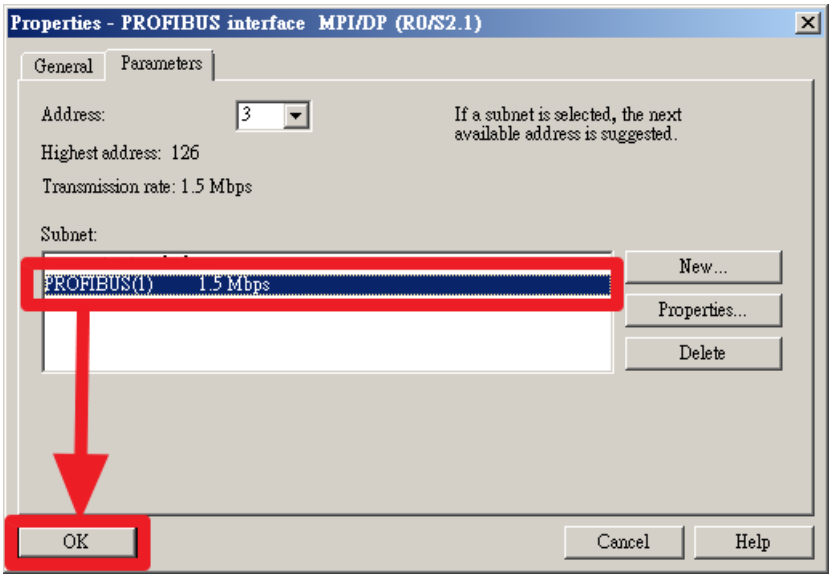


5.4.2. Double-click on **DP_Slave** → **Hardware** to open the **HW Config** window. Repeat steps 5.2.2 to 5.2.3 to add the proper CPU module to the PROFIBUS slave device.

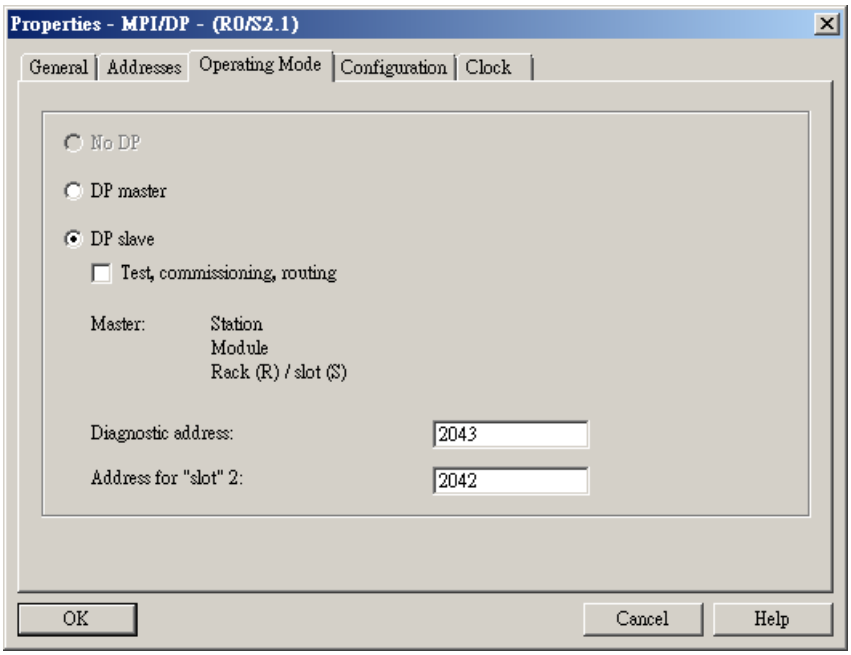
5.4.3. Double-click on the **MPI/DP** field and the **Properties – MPI/DP** window will appear for you to configure the PROFIBUS DP module. Set the interface type to **PROFIBUS**.



5.4.4. Select **PROFIBUS(1)** to connect it to the subnet created in Step 5.3.2. Then click the **OK** button to return to the **Properties – MPI/DP – (R0/S2.1)** window.



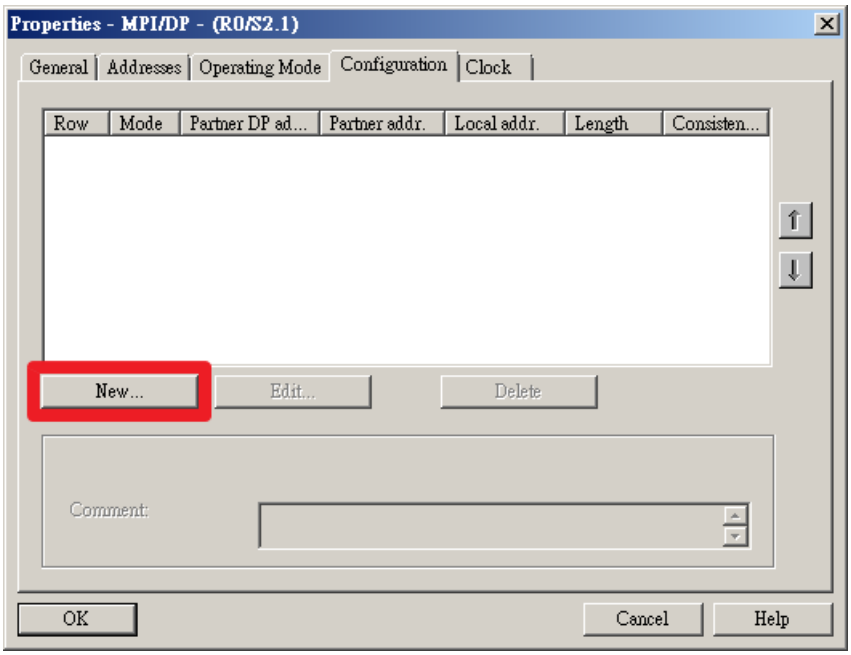
5.4.5. Select the **Operating Mode** tab and set the mode to **DP slave**.

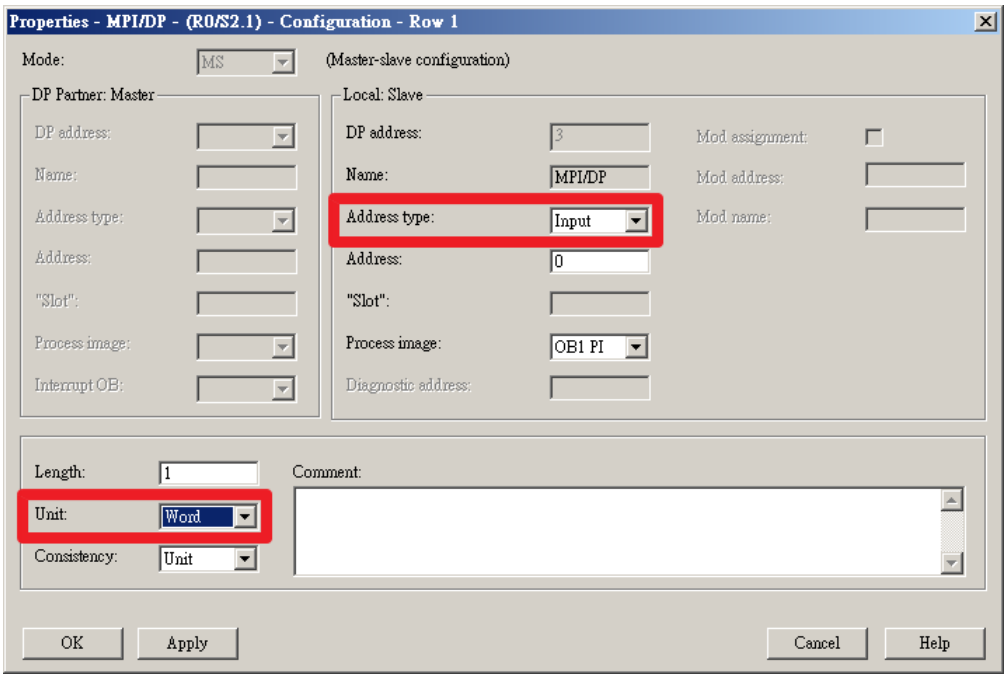


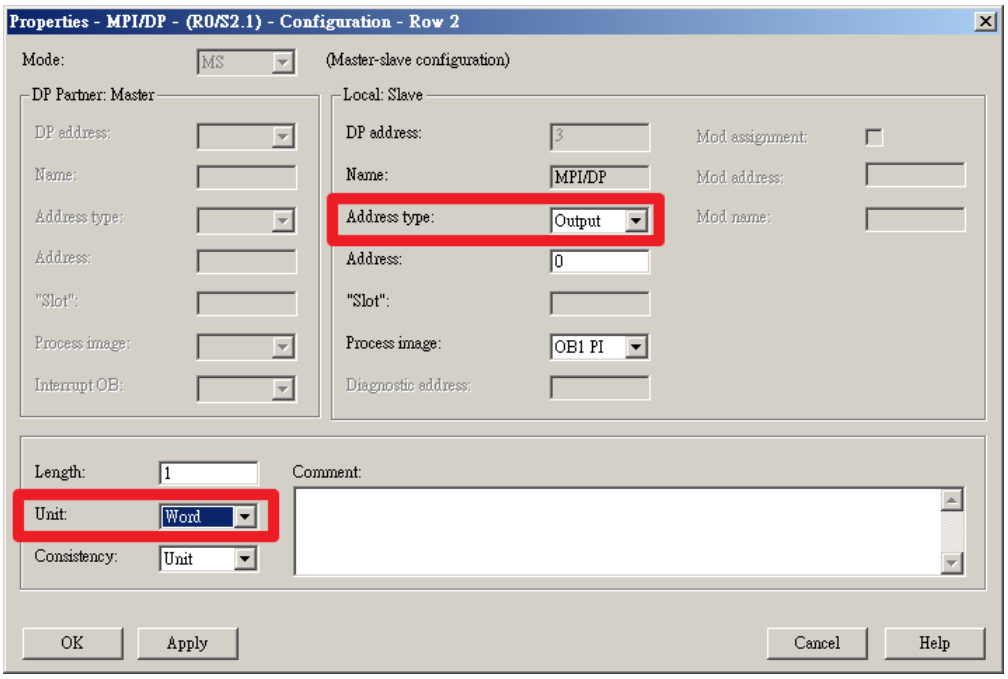
5.5. Create I/O modules

5.5.1. Next, create the I/O modules you would like to add to the S7-300. In the following example, we will use the internal I/O modules for illustration purposes.

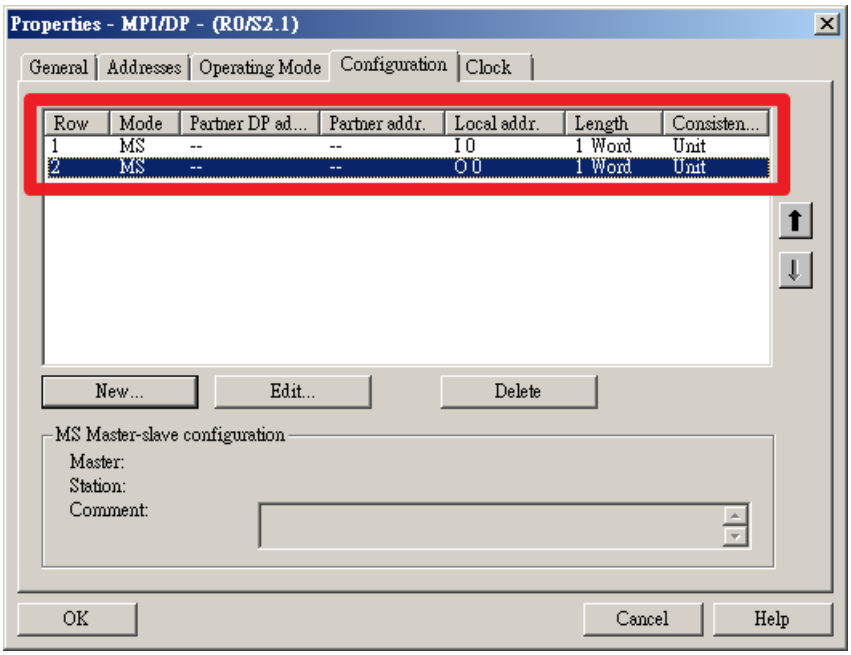
5.5.2. Follow step 5.4.5, select the **Configuration** tab and select **Word** from the **Unit** dropdown menu for both **Input** and **Output** I/O modules.



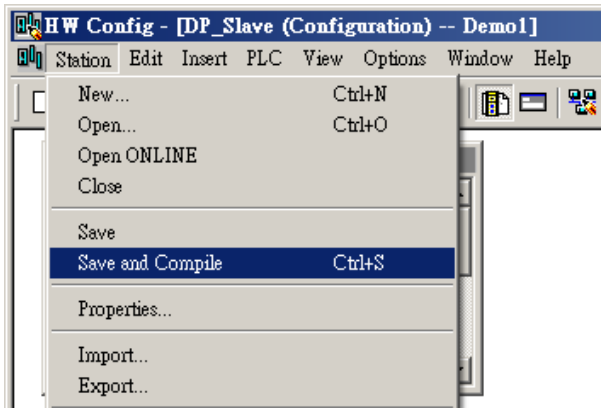




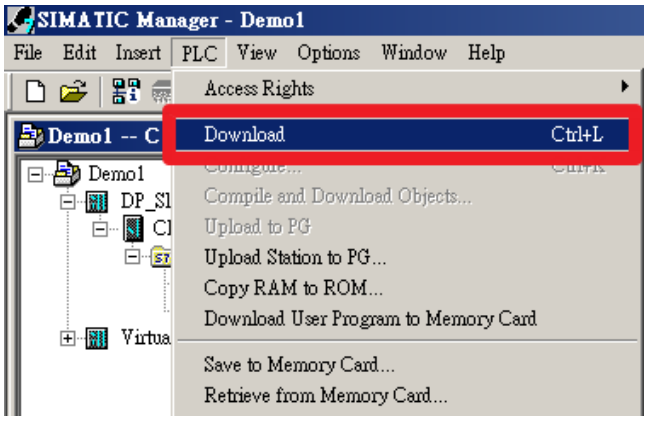
After adding the above I/O modules, you will see the following configurations:



5.5.3. All the configurations are now ready. Choose **Station → Save and Compile** to save and compile the settings for the Siemens S7-300.



5.5.4. Select **PLC → Download** from the menu bar to download all the settings to the Siemens S7-300.

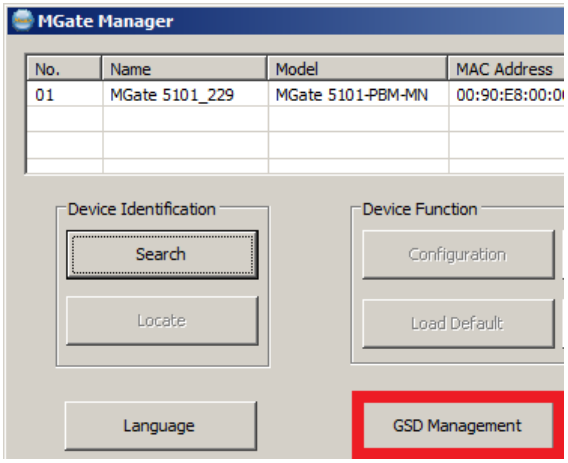


6. Moxa's PROFIBUS device configuration

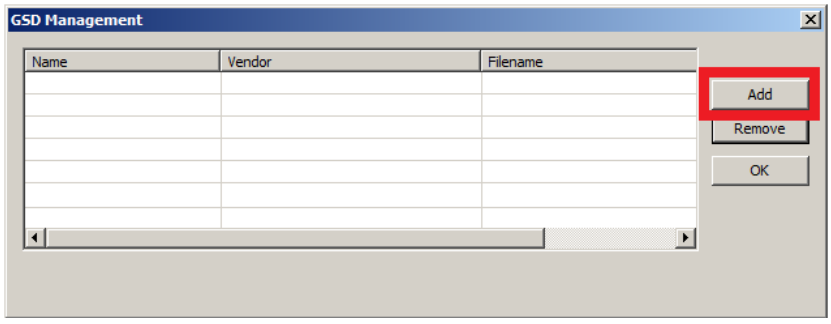
6.1. Install the GSD file

Before configuring the Moxa MGate 5101-PBM-MN, install the GSD file for the PROFIBUS slave device so the MGate 5101-PBM-MN can recognize the device.

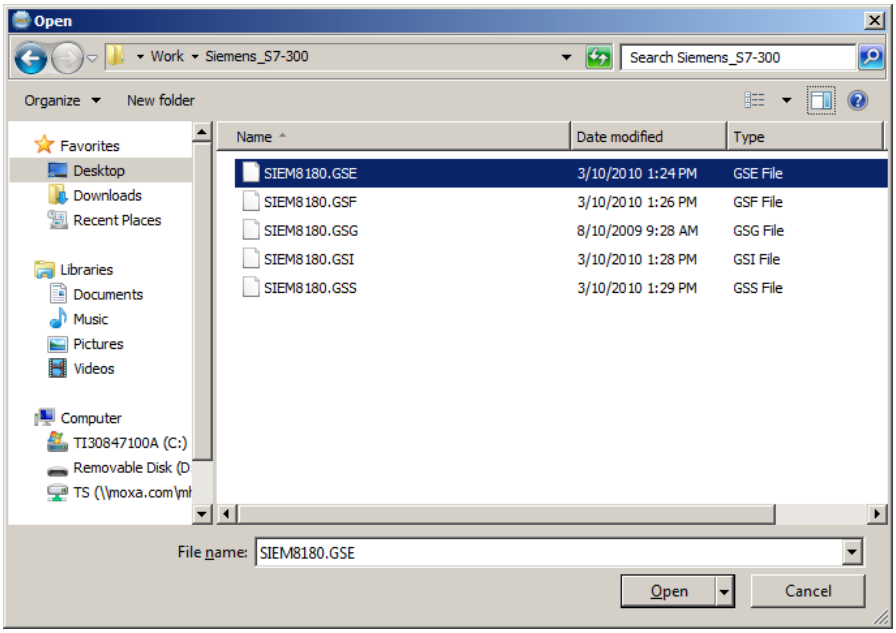
6.1.1. Execute MGate Manager and click the **GSD Management** button to install the GSD file.



Click the **Add** button to locate the GSD file.

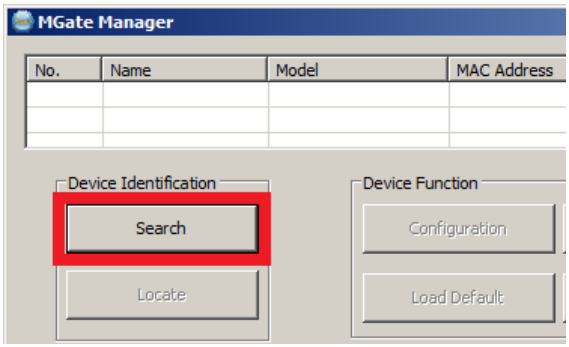


Select the GSD file and click the **Open** button to install it.

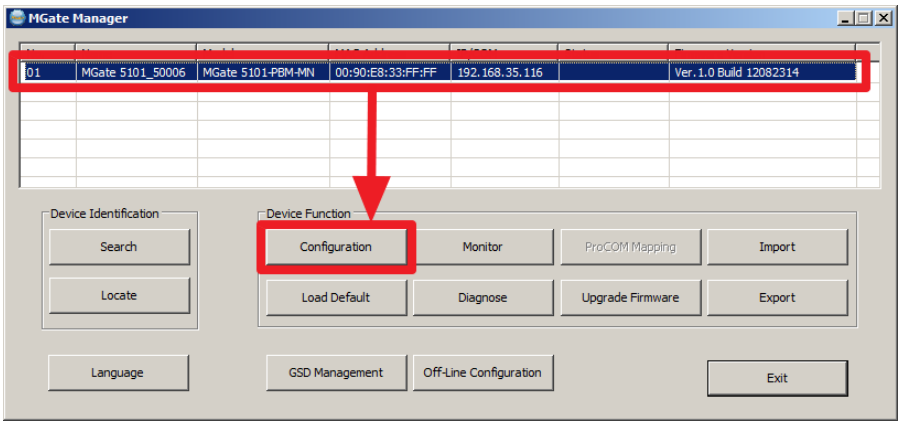


6.2. Device configuration with MGate Manager

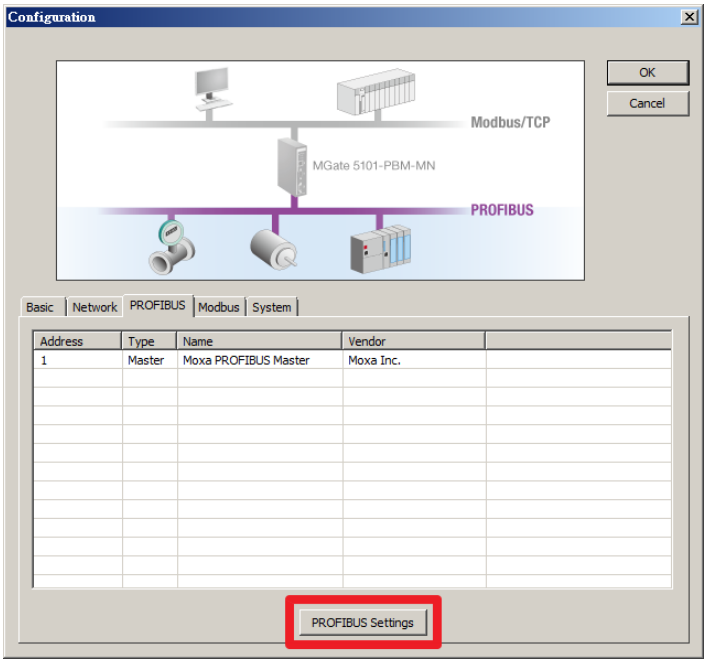
6.2.1. Start MGate Manager and **Search** for the Moxa MGate 5101-PBM-MN.



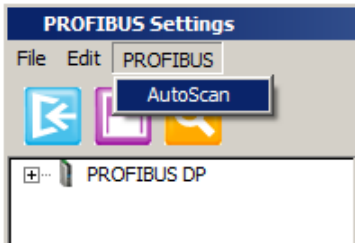
6.2.2. Select the target device and click the **Configuration** button to configure it.



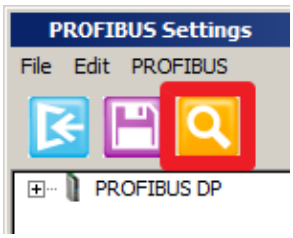
6.2.3. Select the **PROFIBUS** tab and click the **PROFIBUS Settings** button to start PROFIBUS configurations.



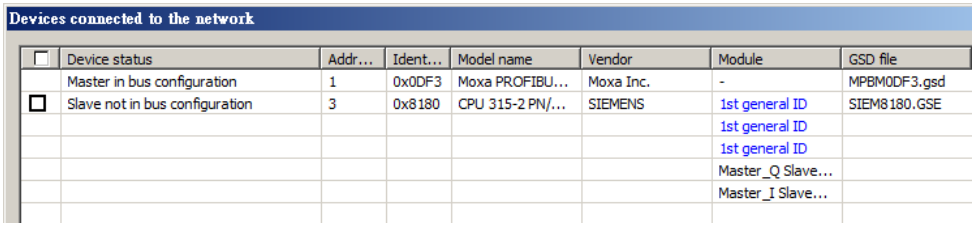
6.2.4. Select **PROFIBUS** → **AutoScan** or click the **AutoScan** button to enable the AutoScan function to scan the network for the PROFIBUS slave device automatically.



or



6.2.5. The MGate 5101-PBM-MN will find the PROFIBUS slave device as shown below:



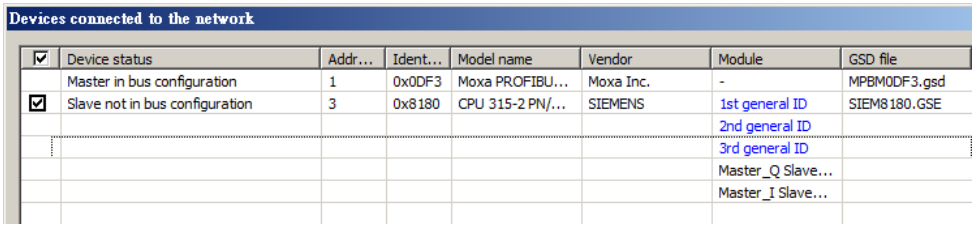
Based on the settings of Siemens S7-300, modify the "general ID" to:

1st general ID

2nd general ID

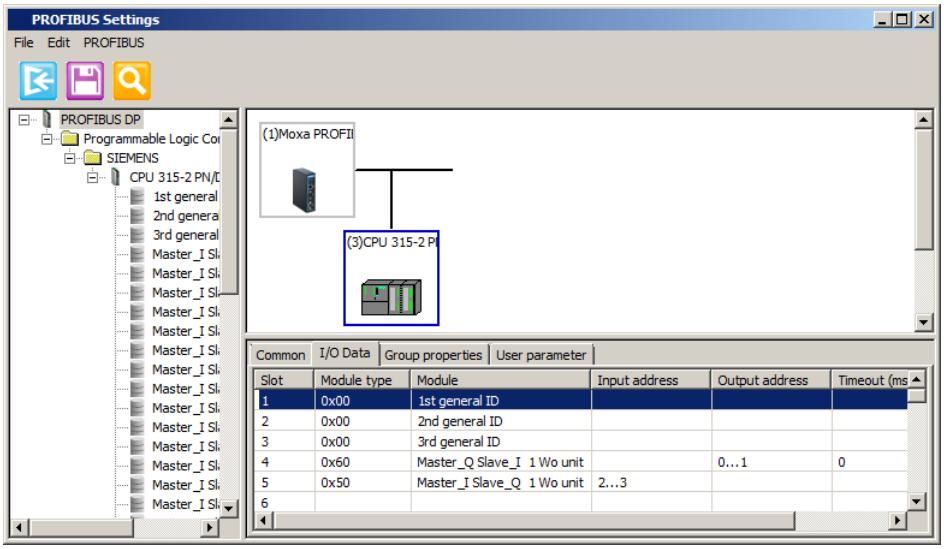
3rd general ID

Select the checkbox as shown in the following screenshot:

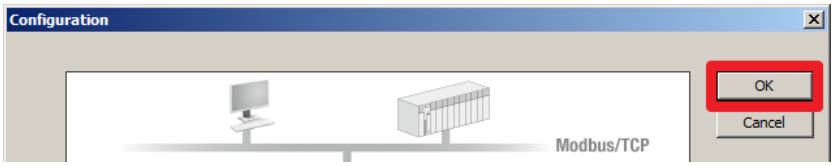


Then click **OK** button and the MGate 5101-PBM-MN will finish the configuration for you.

6.2.6. After verifying all the settings, click **File → Save** to save the configuration and click **File → Exit** to exit the **PROFIBUS Settings** window.



6.2.7. On the main window, click the **OK** button to save the changes and the MGate 5101-PBM-MN will reboot for the changes to take effect.

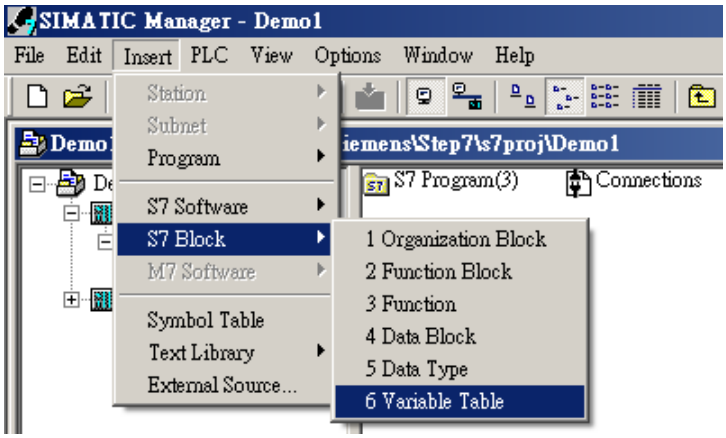


7. Communication Test

7.1. Create Variable Table

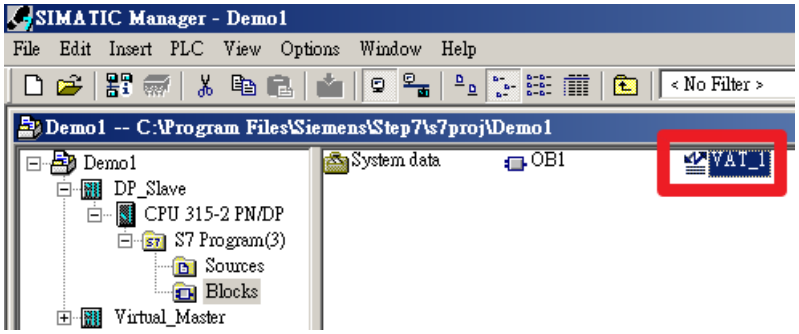
To monitor the internal memory of the Siemens S7-300, add a Variable Table to modify or monitor the I/O modules we have created.

7.1.1. Return to the Step 7 in project "Demo1" and click **DP_Slave → CPU 315-2 PN/DP**. You will then be able to select **Insert → S7 Block → Variable Tables** from the menu bar to add a Variable Table.

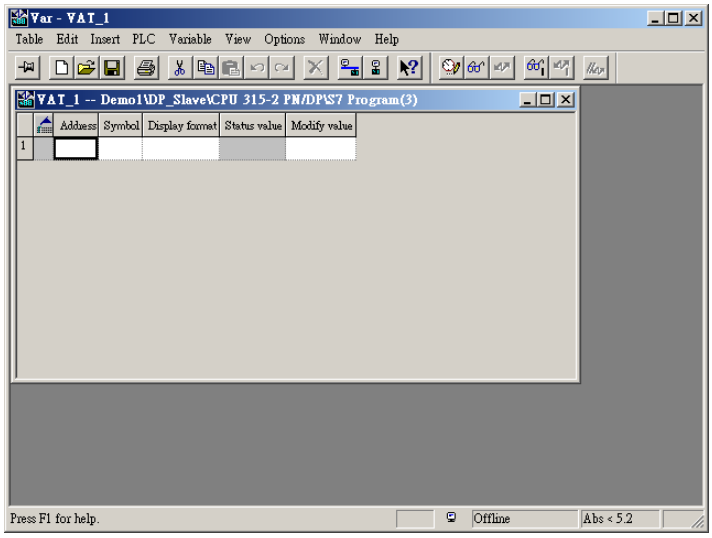


(Here, we use the default name VAT_1 for the Variable Table.)

7.1.2. After creating the Variable Table, double-click on the **VAT_1** icon to configure which I/O module to monitor.



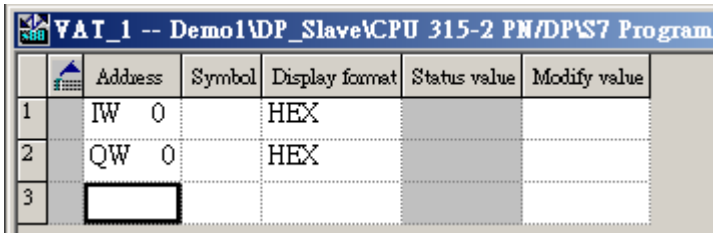
7.1.3. Enter the address we configured into the **Address** column:



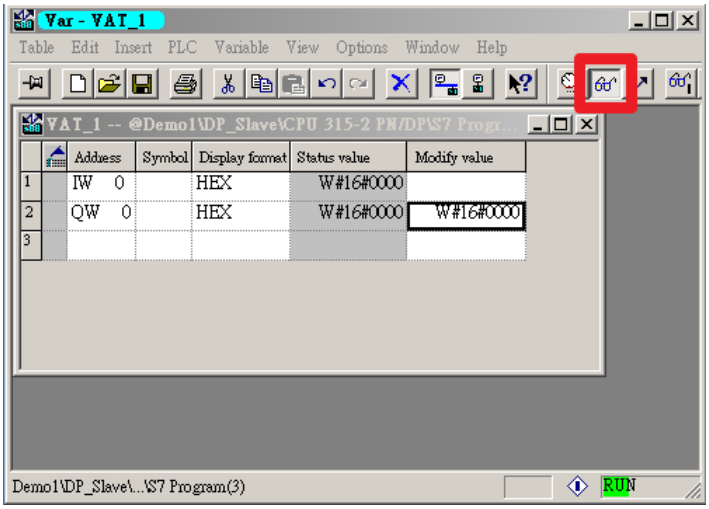
For this example:

IW0 for the Input module has a length of 1 word.

QW0 for the Output module has a length 1 word.

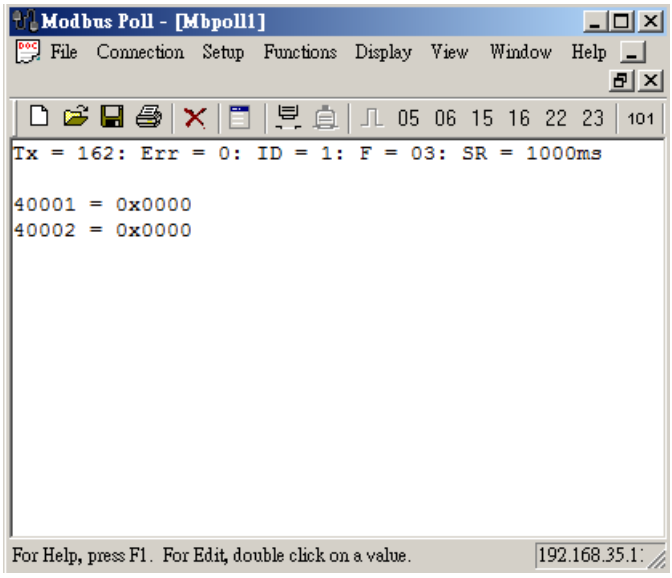


7.1.4. Click the **Monitor** button to start monitoring.

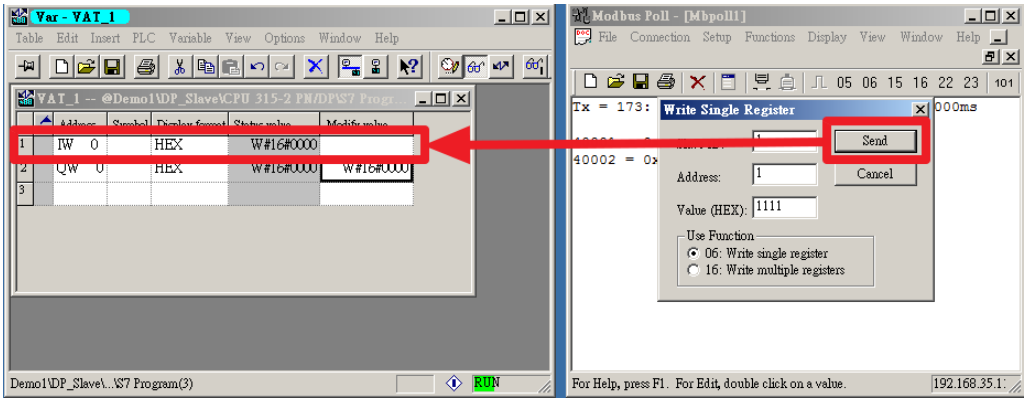


7.2. Modify and monitor I/O data

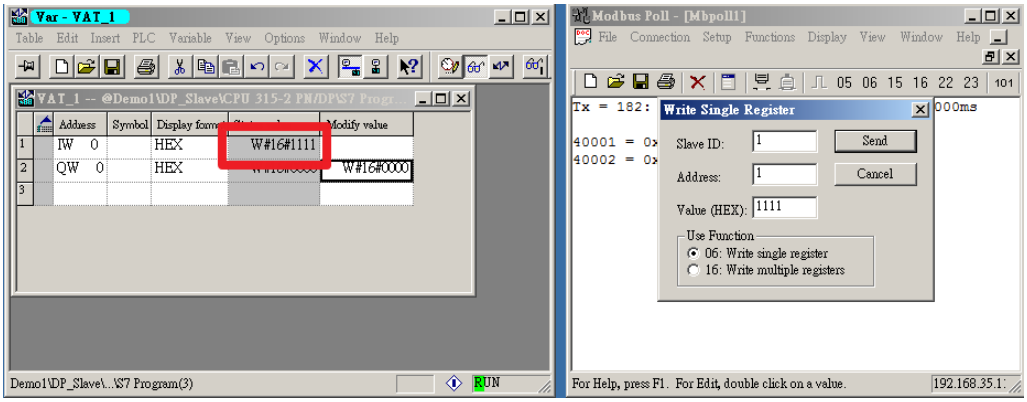
7.2.1. Execute the Modbus Poll function on the PC to simulate data exchange from the Modbus TCP master to the MGate 5101-PBM-MN.



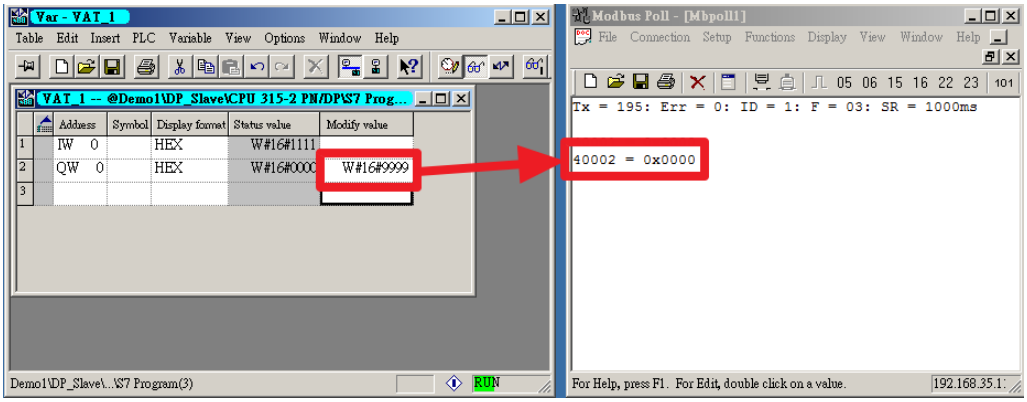
7.2.2. The first test is to write data to the Input module of the PROFIBUS slave.



The Input module of the PROFIBUS slave device is updated by the Modbus Poll's command from 0x0000 to 0x1111.



7.2.3. The next test is to read data from the Output module of the PROFIBUS slave.



The value of address 40002 is updated by the Output module of the PROFIBUS slave device from 0x0000 to 0x9999.