

WISE-580x Active I/O Application Example

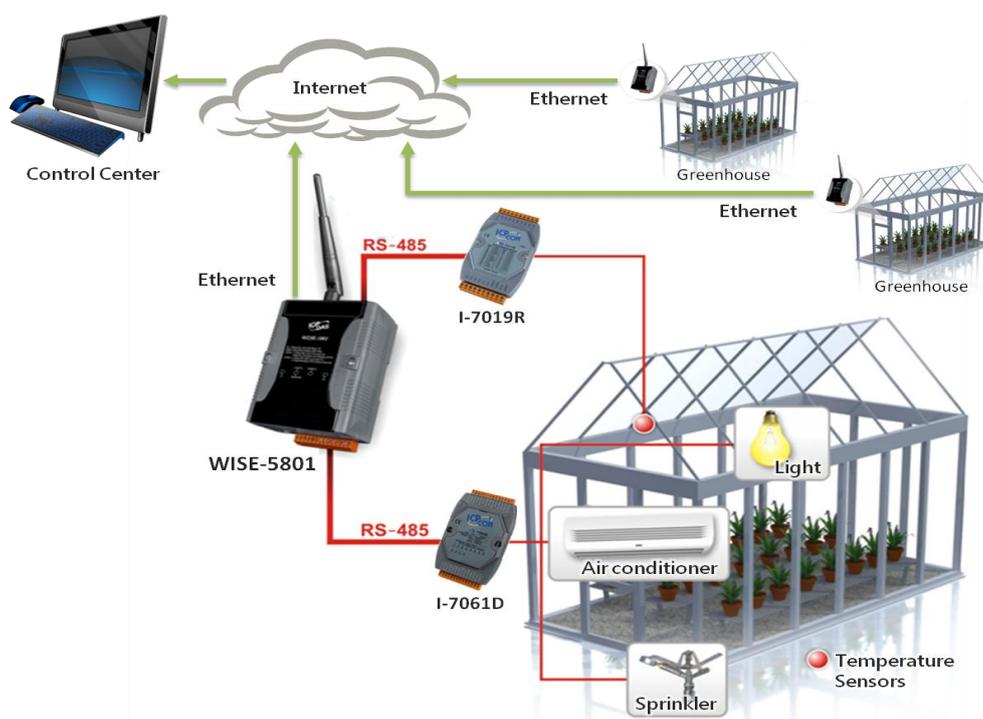


- **Scenario :**

WISE-580x provides “Active I/O” function. Based on this function, WISE-580x can actively send (push) the channels value of the I/O modules that connected to WISE-580x to SCADA software (or HMI device) by event trigger (I/O channel value changed) or periodic cycle. This function greatly enhances the data communication efficiency between WISE-580x and SCADA software (or HMI device) via traditional polling mechanism.

The following scenario assume using WISE-5801 controller in a greenhouse environment monitoring system. It is required to monitor the temperature and device’s status of various greenhouses at the same time. By the traditional polling mechanism, the control center must poll all controllers one by one to get the temperature and device’s status of each greenhouse. Now with this function, the WISE-580x controller in each greenhouse will actively send back the temperature value and device’s status it retrieves to the control center. In this scenario, the update rate is 5 second.

Please note: The SCADA software (or HMI device) must equip the Modbus TCP Slave function to receive the I/O channel values that are actively sent by WISE-580x through Modbus TCP protocol.



- **Steps :**

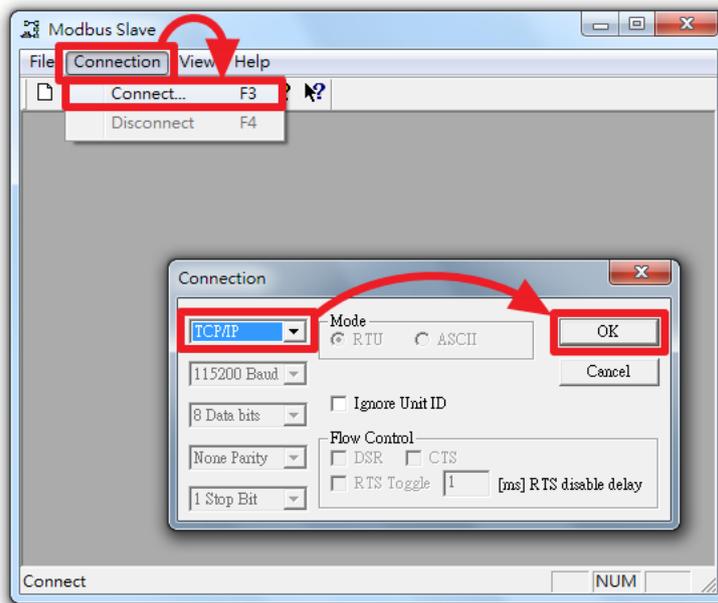
0. This example will focus on the settings of Active I/O function, the procedure of I/O module and rule setting will be skipped. For more detailed description of these setting, please refer to the document of “WISE-5801 SMS Application Example”.

In this example, assuming it is required to monitor and control 3 greenhouses.

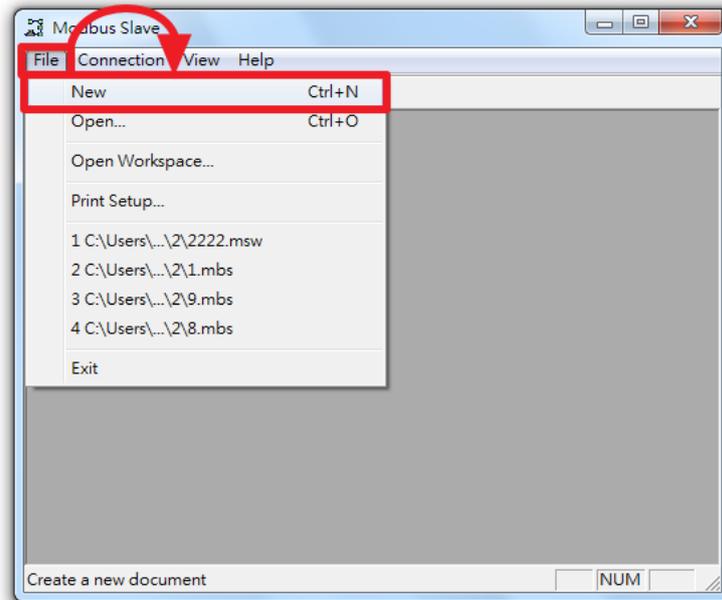
1. Arrange the SCADA software’s Modbus Address table to receive the I/O channel data that is actively sent by WISE-5801 through Modbus TCP protocol. In this example, we use Modbus Slave utility from ModbusTools company as the SCADA software.

Select “Connect” from the “Connection” dropdown list to build a Modbus TCP connection between Modbus Slave utility and WISE controllers.

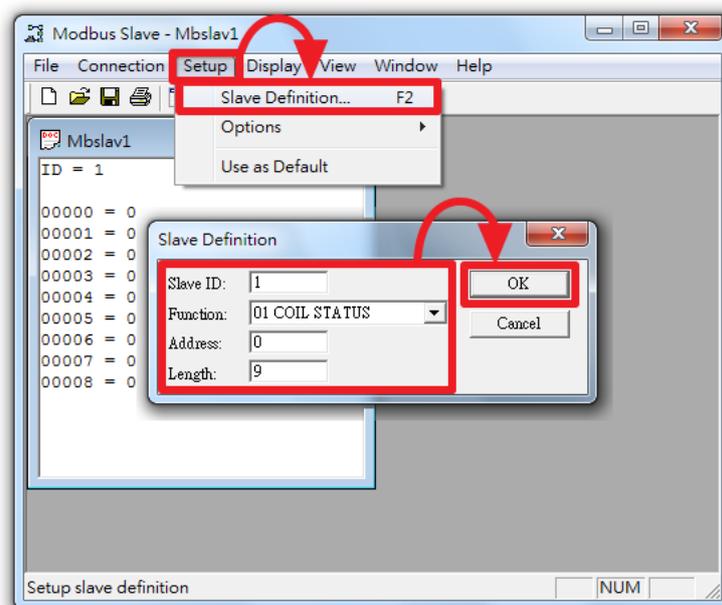
Please note: Different SCADA software may require different setting for the Modbus TCP Slave function, please refer to the user manual for detailed information.



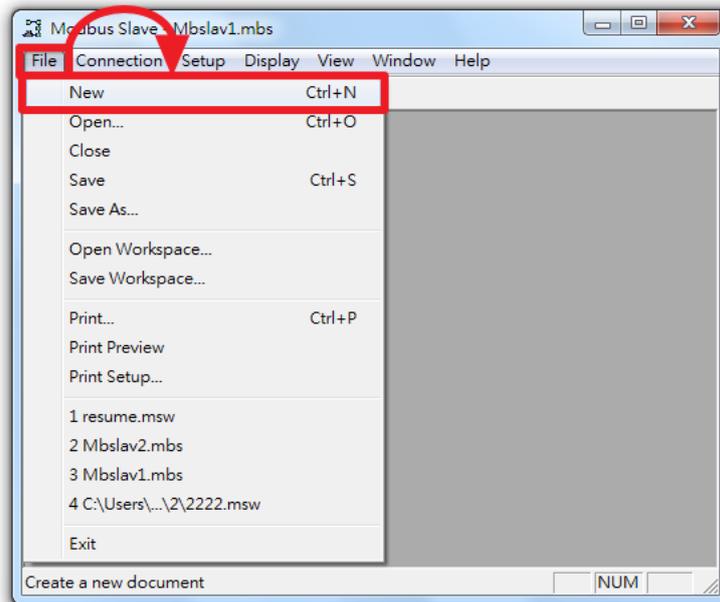
2. Select “New” from the “File” dropdown list to bring up the “Mbslav1.mbs” window.



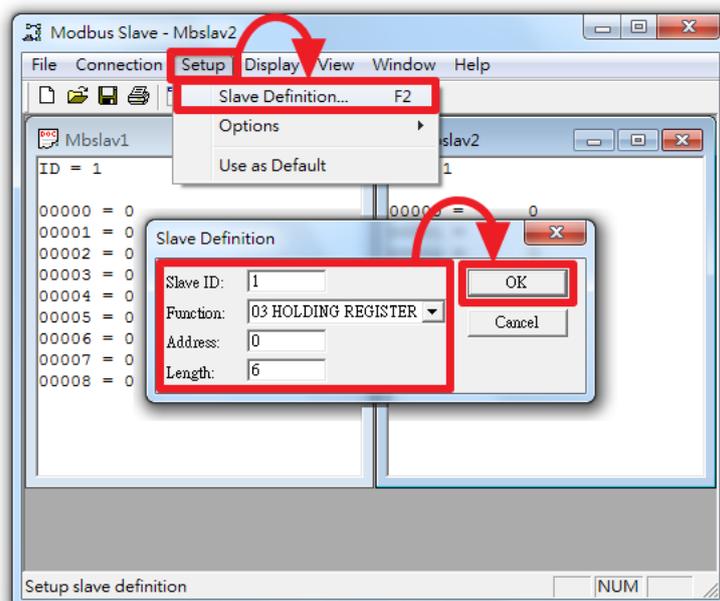
3. After the “Mbslav1.mbs” window is brought up, select the “Slave Definition...” from the “Setup” dropdown list. Input the following information in the “Slave Definition” window, then click “OK” to complete the setting. In the “Mbslav1.mbs” window, it will display the status of Air conditioner, Sprinkler and light of the 3 greenhouses.
- i. “Slave ID” as “1”
 - ii. “Function” as “01 COIL STATUS”
 - iii. “Address” as “0”
 - iv. “Length” as “9”



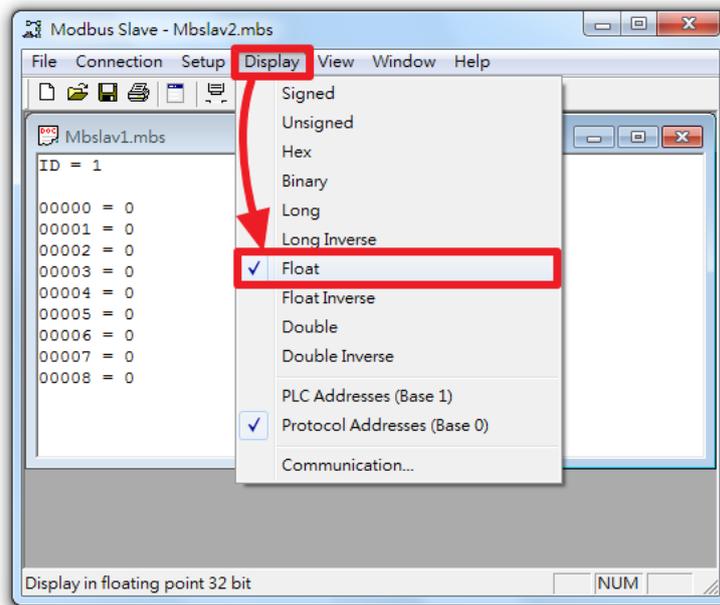
4. Select “New” from the “File” dropdown list to bring up the “Mbslav2.mbs” window.



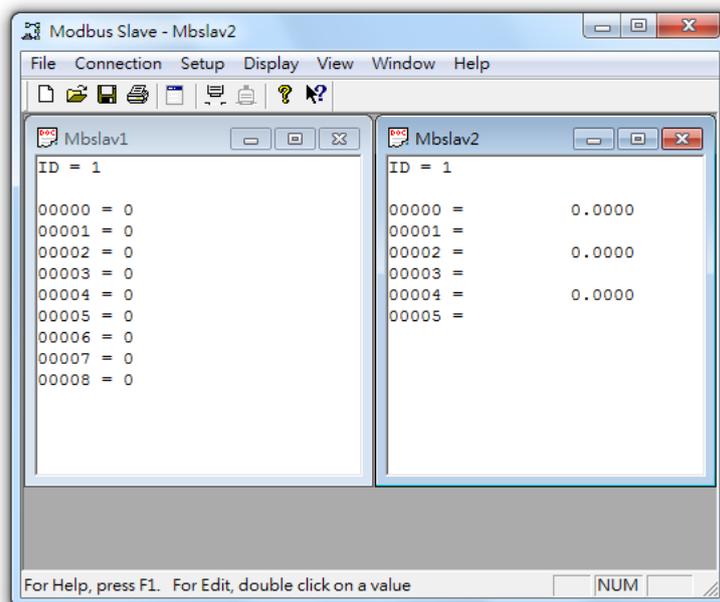
5. After the “Mbslav2.mbs” window is brought up, select the “Slave Definition...” from the “Setup” dropdown list. Input the following information in the “Slave Definition” window, then click “OK” to complete the setting. In the “Mbslav2.mbs” window, it will display the temperature value of the 3 greenhouses.
 - i. “Slave ID” as “1”
 - ii. “Function” as “03 HOLDING REGISTER”
 - iii. “Address” as “0”
 - iv. “Length” as “6”



- Click on the "Mbslav2.mbs" window; and then select the "Float" from the "Display" dropdown list to display the greenhouse's temperature value in floating point format.



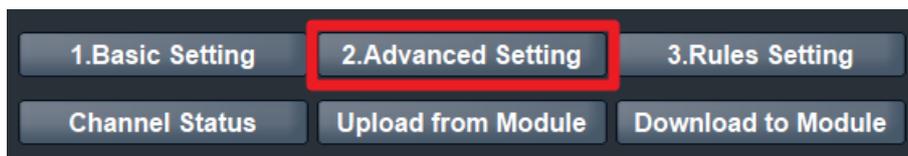
- The final status of the setting will be shown as below.



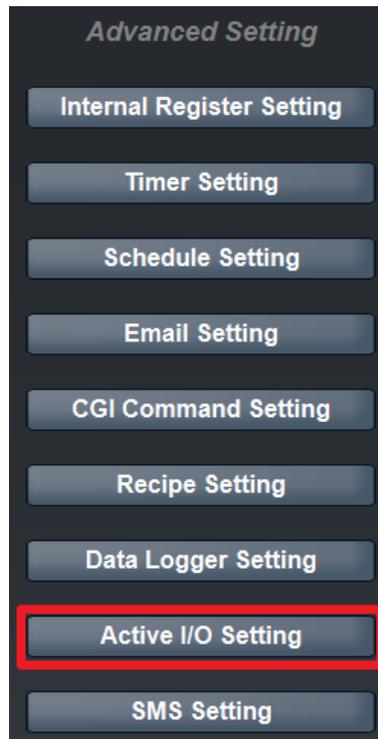
The following is the Modbus Slave utility's (SCADA software) Modbus address table for each greenhouse's temperature value and device's status.

Modbus Address table in SCADA (Mbslav1.mbs)		Modbus Address table in SCADA (Mbslav2.mbs)	
Modbus Address (0xxxx)	Description	Modbus Address (4xxxx)	Description
0000	Greenhouse 1, Air conditioner status	0000	Greenhouse 1, Temperature value
0001	Greenhouse 1, Sprinkler status	0002	Greenhouse 2, Temperature value
0002	Greenhouse 1, Light status	0004	Greenhouse 3, Temperature value
0003	Greenhouse 2, Air conditioner status		
0004	Greenhouse 2, Sprinkler status		
0005	Greenhouse 2, Light status		
0006	Greenhouse 3, Air conditioner status		
0007	Greenhouse 3, Sprinkler status		
0008	Greenhouse 3, Light status		

8. For the I/O module and rule setting of WISE-580x in this scenario, please refer to Step1~Step41 in the "WISE-5801 SMS Application Example" document. This document is intended to give a more detailed information about the settings of Active I/O function. After complete the I/O module and rule setting, please click on "2.Advanced Setting" to get into the Advanced Setting page for the Active I/O function setting.



9. On the “Advanced Setting” page; click on “Active I/O Setting” to get into the setting page.



10. On the “Active I/O Setting” page, check the box of “Enable I/O Data Table configuration”.



11. On the “Active sending of I/O Data Table” field, check the box of “Enable”. According to the environment and attribute of the control center(SCADA software) in the scenario, complete the settings in the “Attributes of Active I/O Data sending” field as follows:
- Receiver IP as “192.168.1.1”.
 - Receiver Port as “502”.
 - Receiver NetID as “1”.
 - Timeout as “300”.
 - Select the periodic time cycle for the “Timing to send out I/O Data”. Make sure the setting is “Every 5 seconds”.

<input checked="" type="checkbox"/> Enable I/O Data Table configuration	
Active sending of I/O Data Table	<input checked="" type="checkbox"/> Enable
Attributes of Active I/O Data sending	
Receiver IP	192 . 168 . 1 . 1
Receiver Port	502
Receiver NetID	1 (Range: 1 ~ 255)
Timeout	300 milliseconds (Range: 1 ~ 65535)
Timing to send out I/O Data	<input type="radio"/> When an I/O change take place <input checked="" type="radio"/> Every 5 seconds

12. In the “I/O Data Table Configuration” section, select the data arrangement types as “Coil and Register”, and then select “Module”, “Channel” and “Index” from the dropdown lists to add the I/O channels into the I/O Data Table, input the settings in the following sequence:
- i. Module as “I-7019(1)”, Channel as “AI”, Index as “0”.
 - ii. Module as “I-7061(2)”, Channel as “DO”, Index as “0”.
 - iii. Module as “I-7061(2)”, Channel as “DO”, Index as “1”.
 - iv. Module as “I-7061(2)”, Channel as “DO”, Index as “2”.

I/O Data Table Configuration	
Type	<input checked="" type="radio"/> Coil and Register <input type="radio"/> Register (Merge Coil into Register)
Module	I-7019(1) ▼
Channel	AI ▼
Index	0 ▼
<input checked="" type="button"/> Add <input type="button"/> Clear All <input type="button"/> Trim	

13. For each WISE-5801 controller will actively send back 3 Coil and 1 Register data to the control center (SCADA software), and the control center (SCADA software) need to receive the data from the 3 WISE-5801 controllers concurrently; therefore it is required to define the “Receiver Start Address” value in each WISE-5801 “Active I/O Setting” page to make sure the data of each WISE-5801 will be sent to the correct address of the control center (SCADA software).

In the Coil section, the “Receiver Start address” of the three greenhouses in the control center (SCADA software) is “0000”, “0003” and “0006”. In the Register section, the “Receiver Start address” of the three greenhouses in the control center (SCADA software) is “0000”, “0002” and “0004”. The following figure is an example for the first WISE-5801 controller setting.

Local Address	Coil		Register	
	Receiver Start Address	0 0000	Receiver Start Address	4 0000
1230	(2)DO0		(1)AI0	
1231	(2)DO1			
1232	(2)DO2			
Length	3		1	

14. Make sure all settings are accurate, click “Save” button to save the settings.

Active I/O Setting Page

Enable I/O Data Table configuration

Active sending of I/O Data Table Enable

Attributes of Active I/O Data sending

Receiver IP: 192 . 168 . 1 . 1

Receiver Port: 502

Receiver NetID: 1 (Range: 1 ~ 255)

Timeout: 300 milliseconds (Range: 1 ~ 65535)

Timing to send out I/O Data: When an I/O change take place Every 5 seconds

I/O Data Table Configuration

Type: Coil and Register Register (Merge Coil into Register)

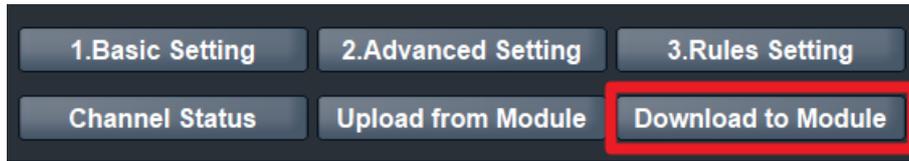
Module: I-7061(2)

Channel: DO

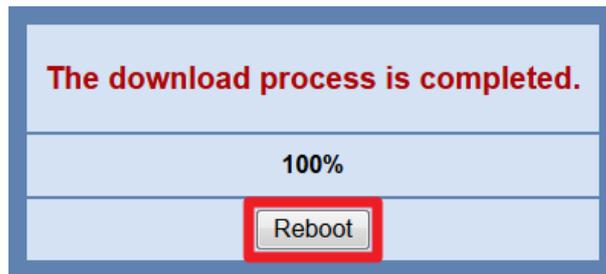
Index: 2

Local Address	Coil		Register	
	Receiver Start Address	0 0000	Receiver Start Address	4 0000
1230	(2)DO0		(1)AI0	
1231	(2)DO1			
1232	(2)DO2			
Length	3		1	

15. After finish the rule editing, click the “Download to Module” button to download the rule setting.



16. After the download process is completed, click “Reboot” button to make the new updated settings take effect.



17. If the settings are accurate, the SCADA software at the control center will display each greenhouse’s temperature values and device’s status that are sent by each WISE controller.

