How to Use SNMPv3 to Get Modbus RTU Data From the ioThinx 4510 Series

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Contents

Released on February 9, 2020

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Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 30 years of industry experience, Moxa has connected more than 57 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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How to Use SNMPv3 to Get Modbus RTU Data From the ioThinx 4510 Series

The ioThinx 4510 supports Modbus RTU Master for retrieving field site data from serial meters. After collecting data, users can convert serial data to a variety of protocols, including Modbus TCP, SNMP, MQTT, and RESTful, allowing users to get field site data in their protocol of choice.

In this tutorial, you will learn how to use SNMPv3 to read/write data from/to Modbus RTU devices (we use a UPort device to demonstrate) via the ioThinx 4510.

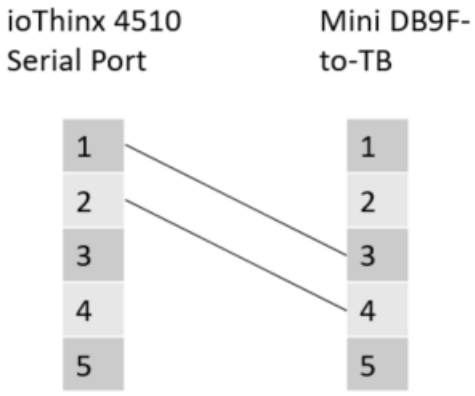
Prepare the Following Items

- ioThinx 4510 device
- UPort device
- Mini DB9F-to-TB

Connect the ioThinx 4510's Serial Port to the UPort

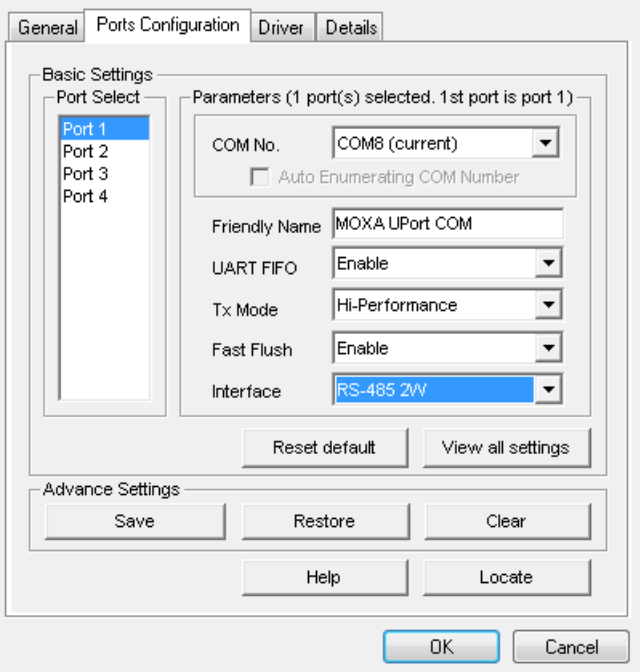
Wiring

Refer to the following diagram for instructions on how to wire the ioThinx 4510 to the Mini DB9F-to-TB:



UPort Configuration

The following screenshot shows how to change the UPort interface to RS-485 2W mode.



For detailed information, see the user's manual of the UPort you are using for this demo.

https://www.moxa.com/en/products/industrial-edge-connectivity/usb-to-serial-converters-usb-hubs/usb-to-serial-converters/uport-1000-series#resources

https://www.moxa.com/en/products/industrial-edge-connectivity/usb-to-serial-converters-usb-hubs/usb-to-serial-converters/uport-2210-2410-series#resources

Connect the ioThinx 4510 to the Modbus RTU Device

Introduction to Modbus Slave Simulator

Modbus slave is a slave simulator for simulating 32 slave device/address areas. See the following web page for more information:

https://www.modbustools.com/modbus_slave.html

Install the Modbus Slave Simulator

Download the Modbus Slave Simulator from the following website, and then install the simulator:

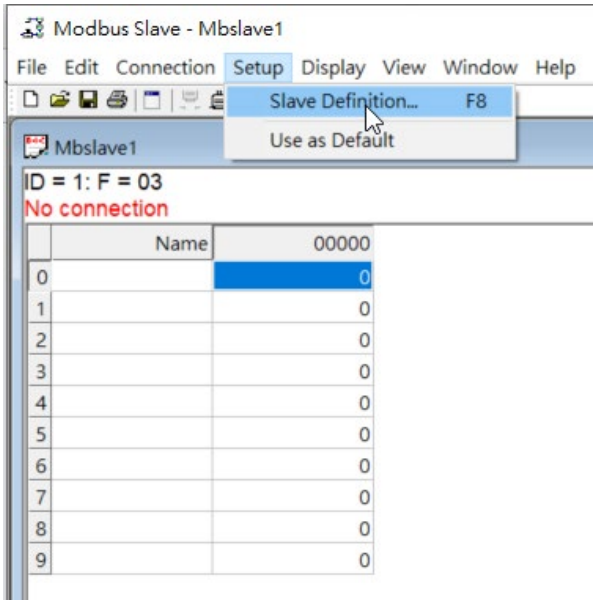
https://www.modbustools.com/download.html

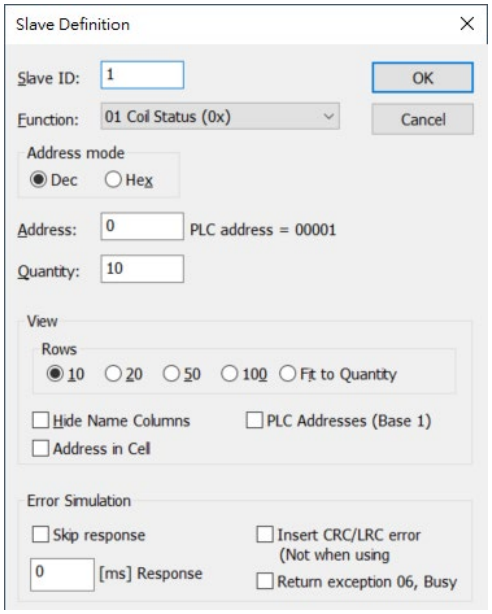
Simulate a Modbus Device

1. Open the **Slave Definition** dialog from **Setup** in the top menu. Configure the device settings as follows:

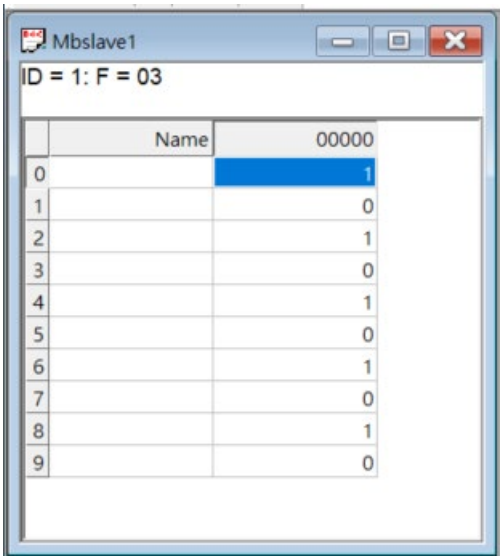
   Slave ID: 1

   Function: 01 Coil Status





2. Double click on the register value and modify the coil value as follows:



3. Click **Connection** in the top menu to open the **Connect** dialog. Configure the Com port settings as shown below, and then press **OK** to start the RTU slave server (in this tutorial we use COM3 as the interface):

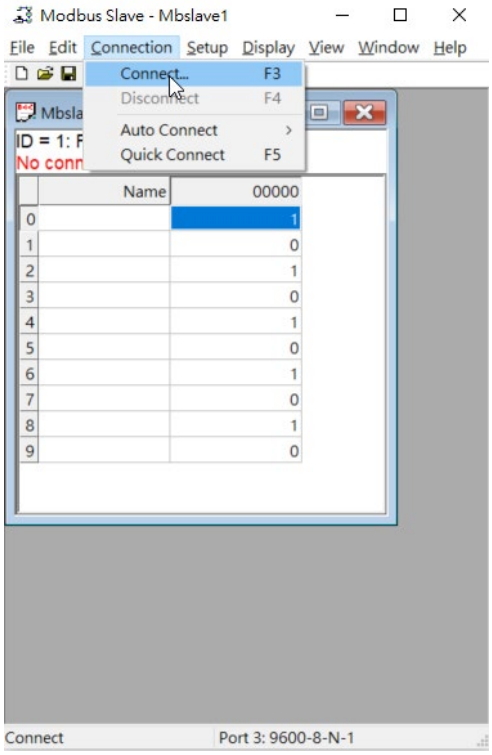
   Baudrate: 9600 bps

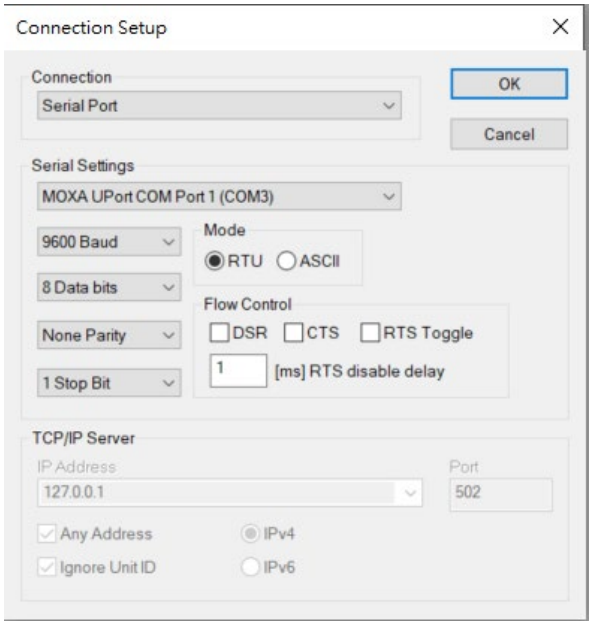
   Data Bits: 8

   Parity: None

   Stop Bits: 1

   Flow Control: None





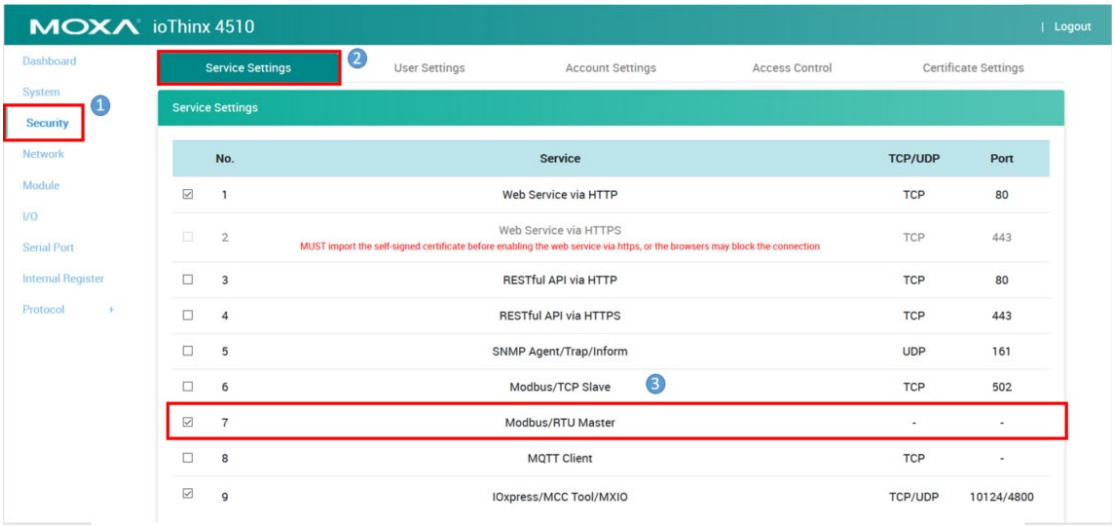
Enable the Modbus RTU Master Service on the ioThinx 4510

1. Log in to the ioThinx 4510

   Step 1: Open your web browser and browse to the IP address of the device (default: 192.168.127.254).

   Step 2: On the login page, type in the username/password (default: admin/moxa) to log in to the Web Console.

2. Click **Security** (item 1) in the left menu. **Select Service Setting** (item 2) at the top of the page and then enable the **Modbus/RTU Master** (item 3) service.



Serial Port and Modbus RTU Master Service Setting on the ioThinx 4510

1. Click **Serial Port** in the left menu and configure the serial interface as shown below:

   Port 1

   Mode: RS-485 2-Wire

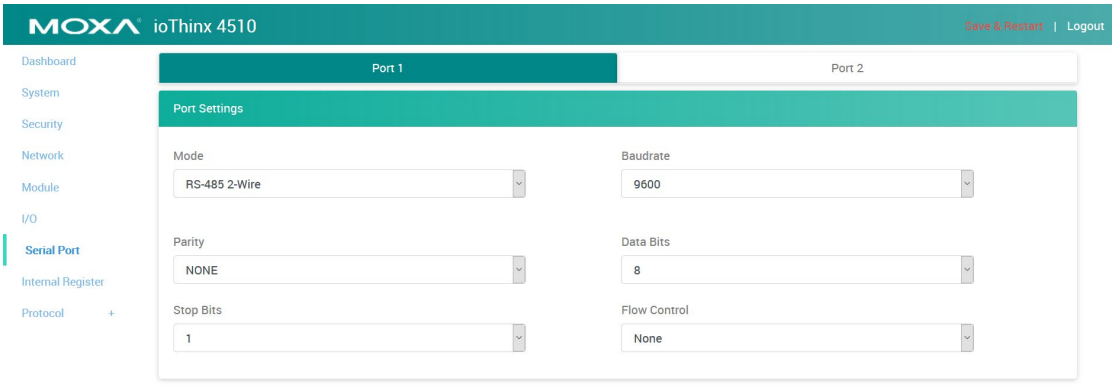
   Baudrate: 9600 bps

   Data Bits: 8

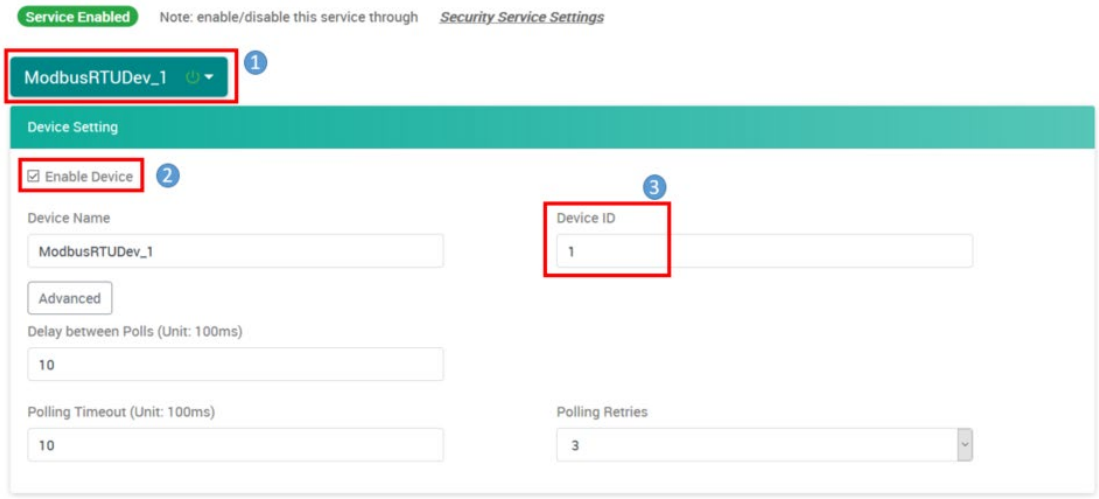
   Parity: None

   Stop Bits: 1

   Flow Control: None



2. Select **ModbusRTUDev_1** (item 1), **Enable Device** (item 2), and set the **Device ID** (item 3) to 1.



3. Set up the Modbus RTU parameters to poll the data from the RTU devices.

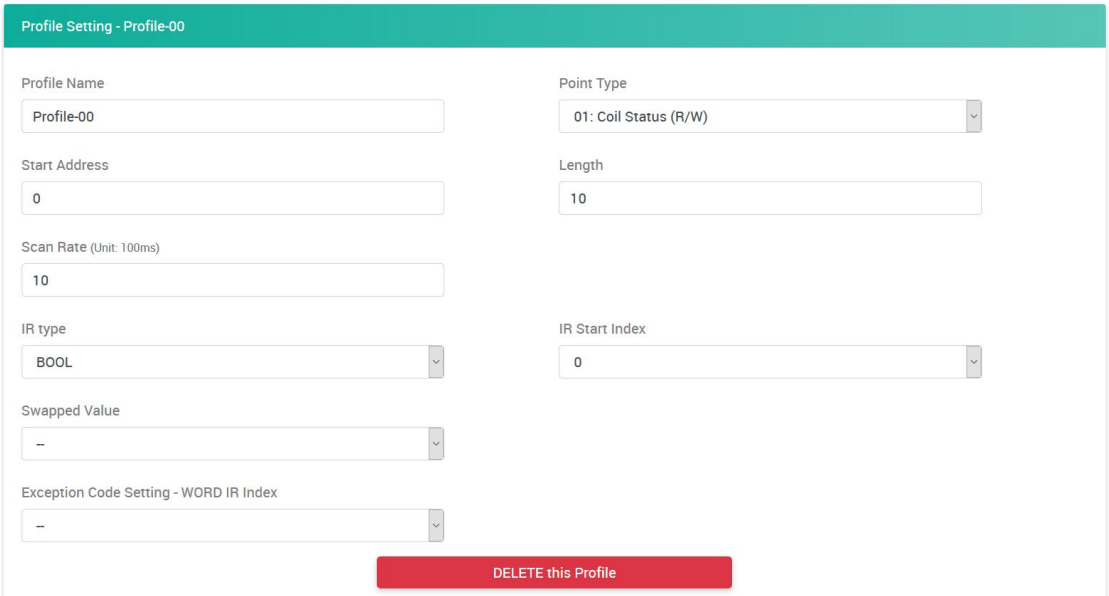
   Point Type: 01 Coil Status (R/W)

   Start Address: 0

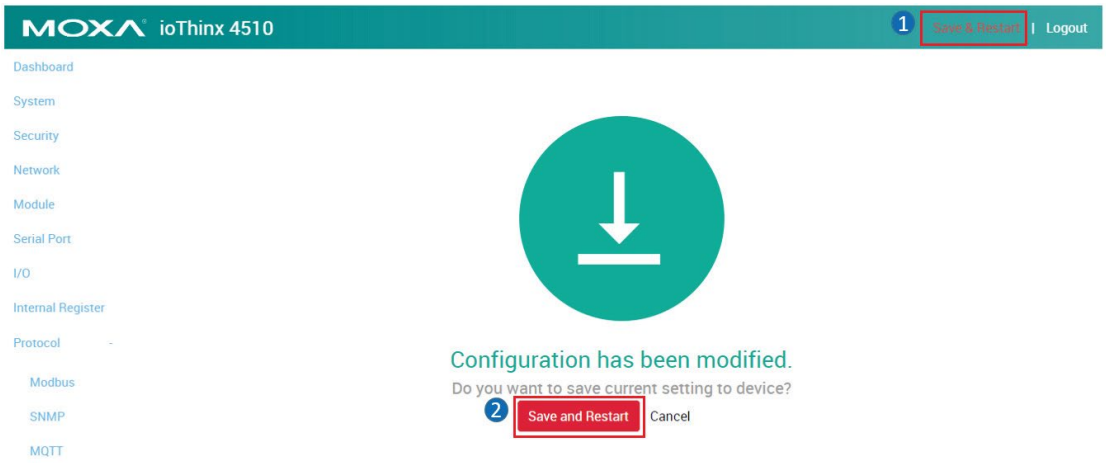
   Length: 10

   IR Type: BOOL

   IR Start Index: 0



4. Click **Save & Restart** (item 1) in the top right corner of the page and then click **Save and Restart** (item 2) in the center of the page.



The ioThinx 4510 will now poll the data from Modbus RTU devices and save the data to the internal register (IR). You can use either Modbus TCP, MQTT, RESTful API, or SNMP to get the data.

Using SNMP via the iReasoning MIB Browser

Introduction to the iReasoning MIB Browser

The iReasoning MIB browser is a tool for managing SNMP-enabled network devices and applications. It allows users to load MIBs, issue SNMP requests, and receive traps.

Refer to the following web page for detailed information about the iReasoning MIB Browser: http://ireasoning.com/mibbrowser.shtml

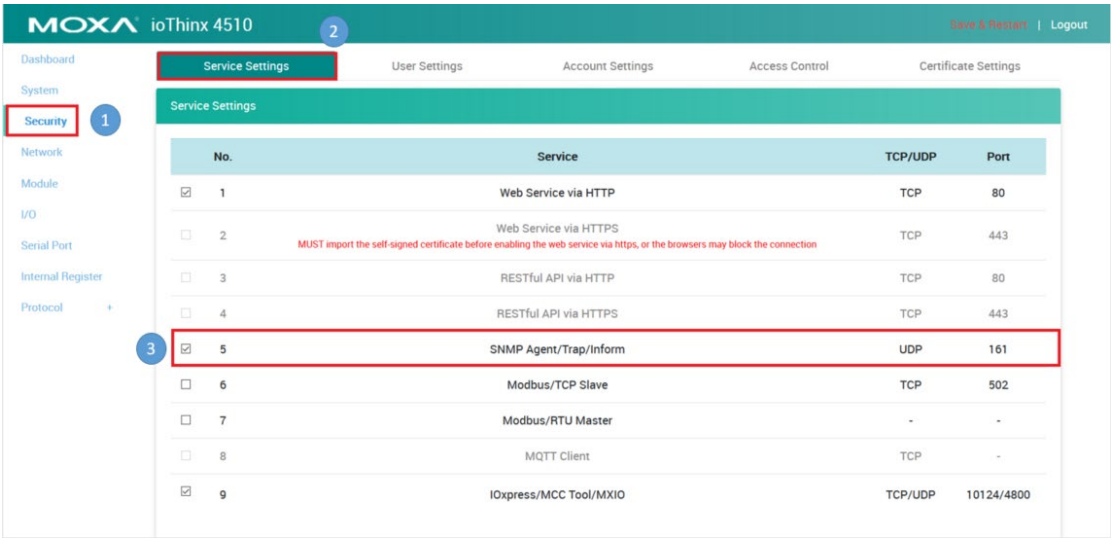
Note: You will need to download the **Professional** or **Enterprise** Edition to use SNMPv3.

Enable SNMP Service on the ioThinx 4510

1. Log in to the ioThinx 4510

   Step 1: Open your web browser and browse to the IP Address (default: 192.168.127.254).
   Step2: On the login page, type in the username/password (default: admin/moxa) to log in to the Web Console.

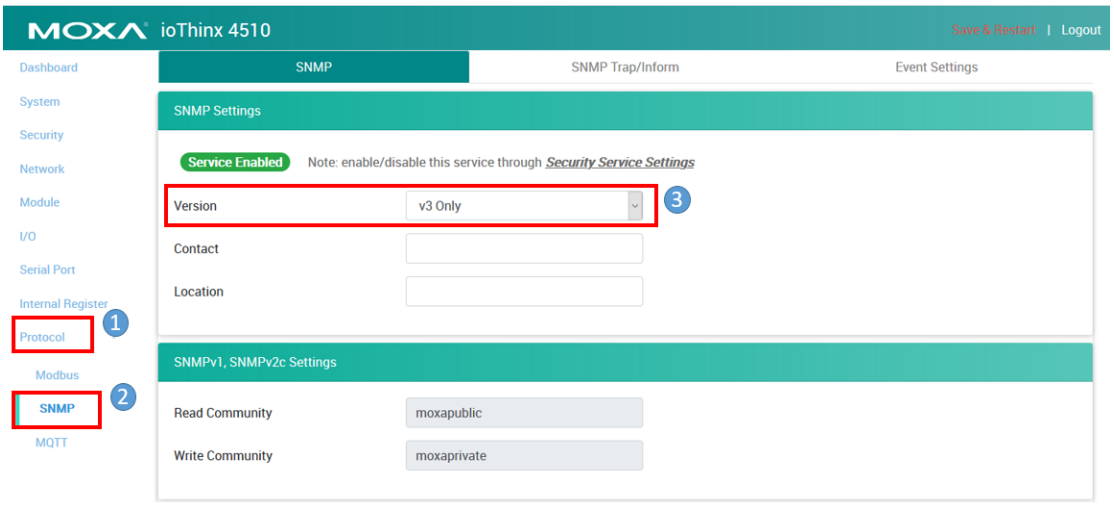
2. Click **Security** (item 1) in the left menu. Select **Service Setting** (item 2) at the top of the page and then enable the **SNMP Agent/Trap/Inform** (item 3) service.



SNMP Settings on the ioThinx 4510

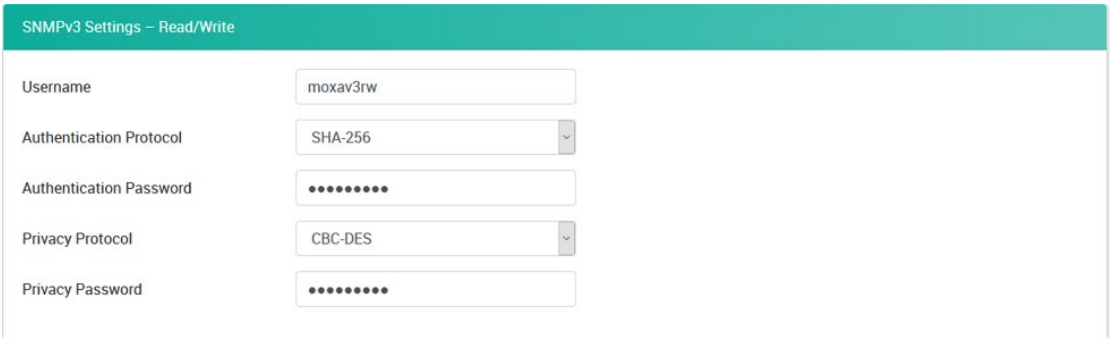
1. Modify the community settings:

   Click **Protocol** (item 1) in the left menu, and select **SNMP** (item 2) from the extended menu. Set **Version** (item 3) to **v3 Only**.

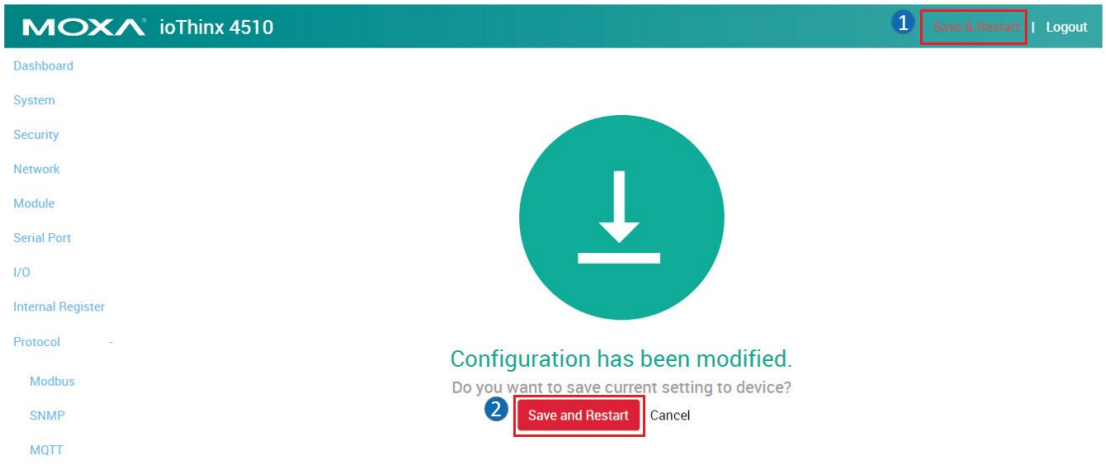


2. Type the SNMP parameters shown below in the **SNMPv3 Setting – Read/Write** panel.

   Username: moxav3rw
   Authentication Protocol: SHA-256
   Authentication Password: Moxav3rw!
   Privacy Protocol: CBC-DES
   Privacy Password: Moxav3rw!



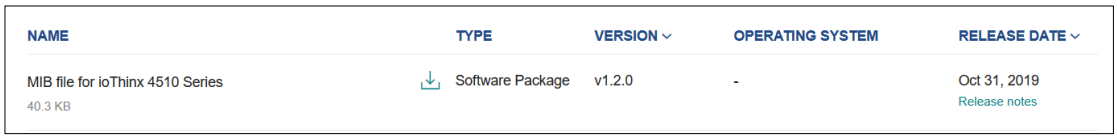
3. Click **Save & Restart** (item 1) in the top right of the page and then click **Save and Restart** (item 2) in the center of the page.



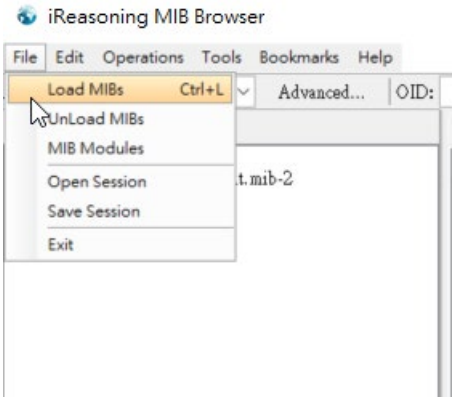
Load the MIB File into the iReasoning MIB Browser

1. Download the appropriate version of the ioThinx 4510 MIB firmware from the product page.

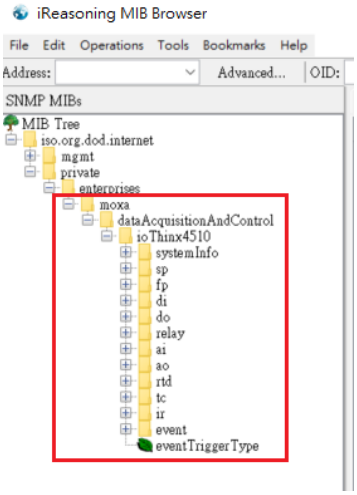
   https://www.moxa.com/en/products/industrial-edge-connectivity/controllers-and-ios/advanced-controllers-and-i-os/iothinx-4510-series#resources



2. Select **File** → **Load MIBs**, and then choose the downloaded ioThinx 4510 MIB file.



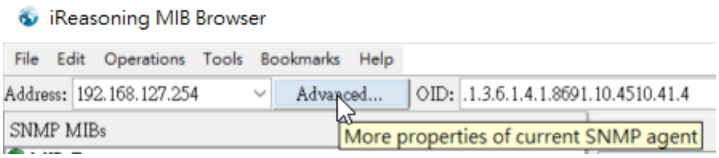
3. Expand the MIB Tree in the SNMP MIBs box. If the file was loaded successfully, you will see the ioThinx 4510 private MIB tree.
(Note: This is the only way to verify that the iReasoning MIB Browser was loaded successfully.)



Get and Send Data from iReasoning

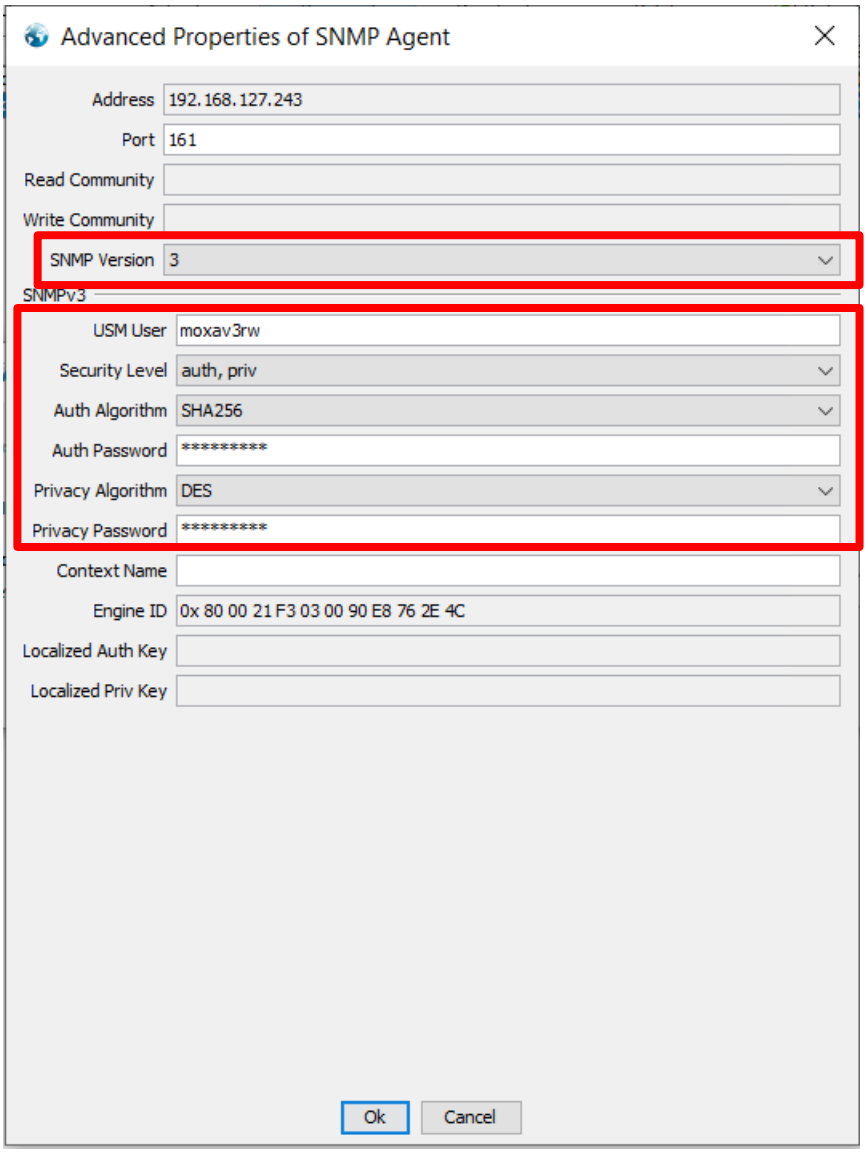
Establish a Connection to the ioThinx 4510

1. Enter the IP address of the ioThinx 4510 in the Address field and then click the **Advanced** button.



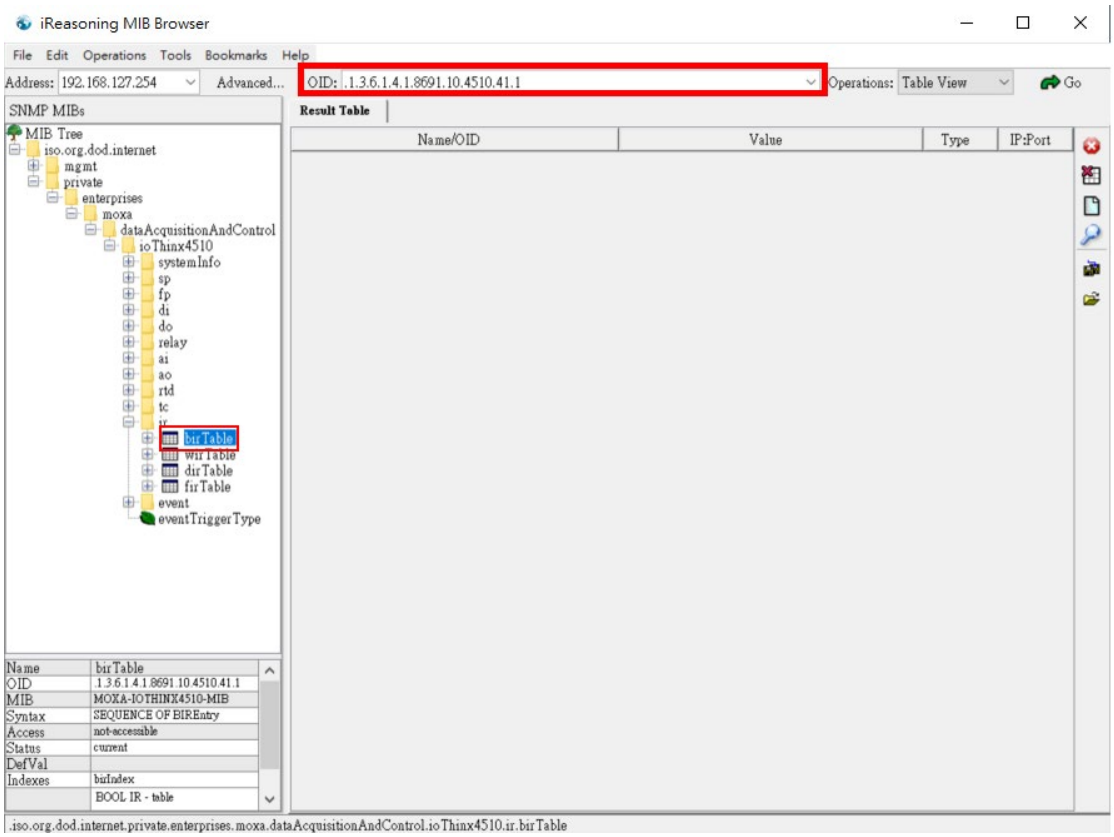
2. Change the SNMP Version to 3. Fill in the required parameter as shown below, and then click **OK** to finish the configuration of the SNMP agent.

   USM User: moxav3rw
   Security Level: auth, priv
   Auth Algorithm: SHA-256
   Auth Password: Moxav3rw!
   Privacy Algorithm: DES
   Privacy Algorithm Moxav3rw!

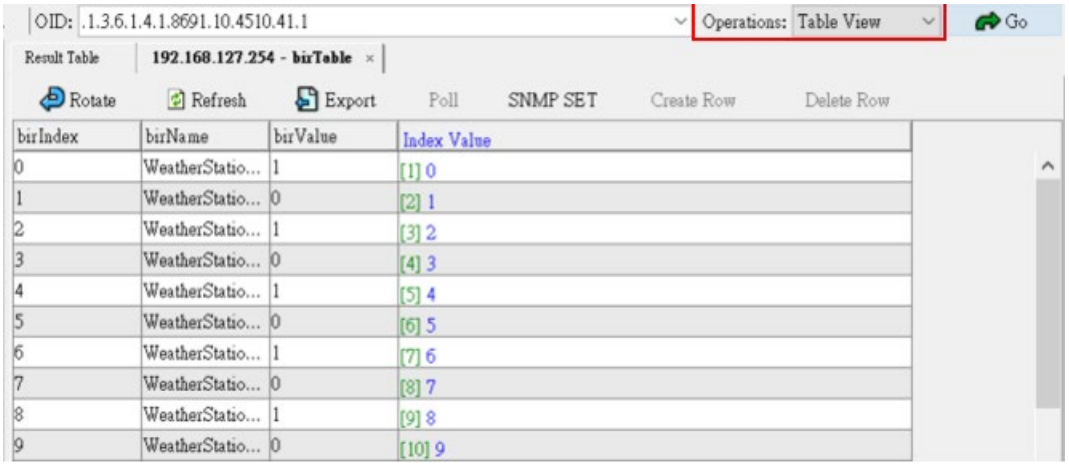


Get Data from the ioThinx 4510

1. Find the **birTable** in the MIB Tree and then click it. The OID will show up in the OID field.

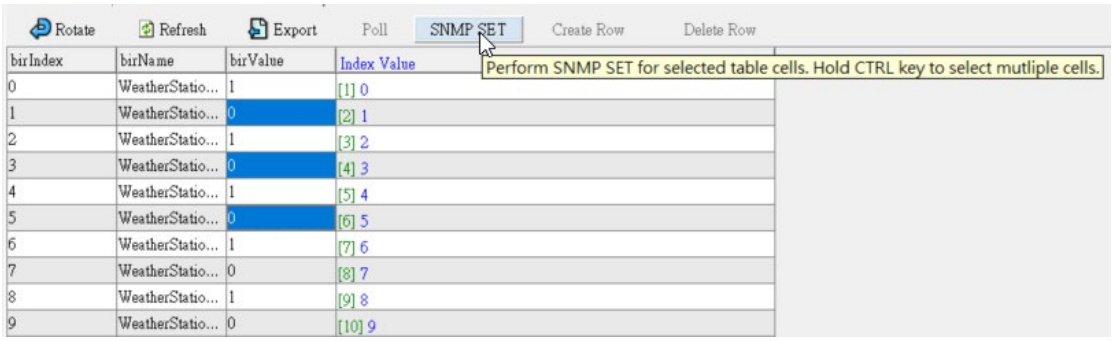


2. Change the **Operation** to **Table View** and then click the Go button. The MIB Browser will generate the birTable and the data from the Modbus RTU devices will be displayed.

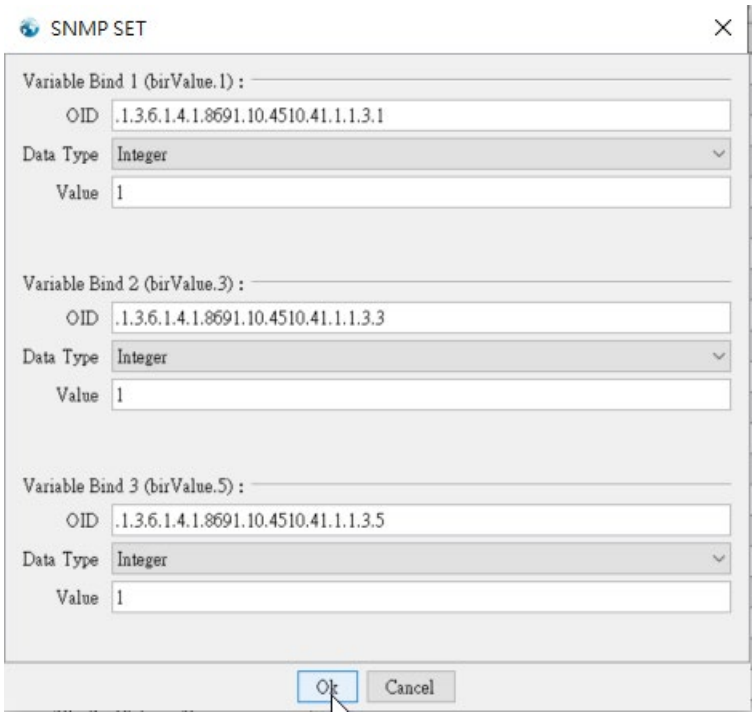


Send Data to the ioThinx 4510

1. Choose the value you want to modify and then click the SNMP SET button.



2. Modify the value in the **SNMP SET** dialog then click **OK** to send the data.



3. Check the Modbus Slave Simulator. If the value has been successfully written to the Modbus RTU devices, the value will appear in the table.