# How to Use Modbus TCP to Connect to the ioThinx 4510 Series

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#### How to Use Modbus TCP to Connect to the ioThinx 4510 Series

In this tutorial, you will learn how to use Modbus to read/write data from/to the ioThinx 4510.

### **Prepare the Following Items**

- ioThinx IIoT Starter Kit (ioThinx 4510, 45MR-1601, 45MR-2600, and 45MR-3800)
- Software: Modbus Poll, ioThinx 4510 (with firmware v1.1 installed)

## **Using Modbus TCP via Modbus Poll**

#### **Introduction to Modbus Poll**

Please refer to the following web page for information about Modbus Poll: <u>https://www.modbustools.com/modbus\_poll.html</u>







Modbus Poll IP address: 192.168.127.200 Moxa ioThinx 4510 IP address: 192.168.127.254

### Install Modbus Poll

Download **Modbus Poll** from the following website and install it: <u>https://www.modbustools.com/download.html</u>

#### Enable Modbus/TCP slave service on the ioThinx 4510

1. Log in to the ioThinx 4510

**Step 1:** Open your web browser and type the default IP address of the device: 192.168.127.254.

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

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2. Enable Modbus/TCP slave service.

| MOXA                | ioThin | nx 4510          |  |  |                            | Save & F  | lestart   l |
|---------------------|--------|------------------|--|--|----------------------------|-----------|-------------|
| Dashboard           | 5      | Service Settings | User Settings  | Account Settings                                       | Access Control             | Certifica | te Settings |
| System              | Servi  | ce Settings      |  |  |                            |           |             |
| Security<br>Network |        | No.              |  | Service  |                            | TCP/UDP   | Port        |
| Nodule              | ×      | 1                | We   | b Service via HTTP                                     |                            | TCP       | 80          |
| erial Port          |        | 2                | Web  | Service via HTTPS                                      |                            | TCP       | 443         |
| nternal Register    |        | MUST impo        | rt the self-signed certificate before | ore enabling the web service via<br>ick the connection | https, or the browsers may |           |             |
| rotocol +           |        | 3                | RE   | STful API via HTTP                                     |                            | TCP       | 80          |
|                     | ×      | 4                | RES  | Tful API via HTTPS                                     |                            | TCP       | 443         |
|                     |        | 5                |  | SNMP Agent   |                            | UDP       | 161         |
|                     | ۲      | 6                | М  | odbus/TCP Slave  |                            | TCP       | 502         |

3. Click **Save & Restart** in the top right of the page and then click **Save and Restart** in the center of the page.

| MOXA ioThinx 4510                                     | Save & Restart   Logout |
|---|-------------------------|
| Dashboard   |                         |
| System  |                         |
| Security  |                         |
| Network   |                         |
| Module  |                         |
| Serial Port   |                         |
| I/O   |                         |
| Internal Register                                     |                         |
| Protocol Configuration has been modified              |                         |
| Modbus Do you want to save current setting to device? |                         |
| SNMP Save and Restart Cancel                          |                         |
| MQTT  |                         |

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#### Set Up a Connection on Modbus Poll

1. Select Connect on Modbus Poll's Connection panel.



2. Enter the IP address of the device (default IP: 192.168.127.254).

| Connection Setup            |                 | ×                             |
|-----------------------------|-----------------|-------------------------------|
| Connection<br>Modbus TCP/IP | ~               | ОК                            |
| Serial Settings             |                 | Cancel                        |
| COM1                        | $\sim$          | Mode                          |
| 9600 Baud $\sim$            |                 | RTU O ASCII                   |
| 8 Data bits $\sim$          |                 | Response Timeout<br>1000 [ms] |
| Even Parity $\sim$          |                 | Delau Between Polls           |
| 1 Stop Bit $\sim$           | Advanced        | 20 [ms]                       |
| Remote Modbus Server        |                 |                               |
| IP Address or Node Name     |                 |                               |
| 192.168.127.254             |                 | ~                             |
| Server Port                 | Connect Timeout | IPv4                          |
| 502                         | 3000 [ms]       | O IPv6                        |

#### How to Use Modbus TCP to Connect to the ioThinx 4510 Series

Write Single Coil: Use Modbus Poll to turn on an ioThinx 4510 DO channel

1. Select **Read/Write Definition** under the **Setup** menu.

| Modbus Poll - Mbpoll1    |  |                  | - 🗆 ×                  | ( |
|--------------------------|--|------------------|------------------------|---|
| File Edit Connection Set | up Functions Display                   | View Window      | Help                   |   |
| D 📽 🖬 🖨 🗙 🛙              | Read/Write Definition                  | F8               | TC 🖻 🖁 🌾               |   |
| Mbpoll1                  | Read/Write Once<br>Read/Write Disabled | F6<br>Shift+F6   |                        |   |
| Alias                    | Excel Log<br>Excel Logging Off         | Alt+X<br>Alt+Q   |                        |   |
| 1 2                      | Log<br>Logging Off                     | Alt+L<br>Alt+O   |                        |   |
| 3                        | Reset Counters<br>Reset All Counters   | F12<br>Shift+F12 |                        |   |
| 6<br>7<br>8              | Use as Default                         |                  |                        |   |
|                          |  |                  |                        |   |
| Read/write definition    |  |                  | [192.168.127.254]: 502 |   |

 Select the function code 05 Write Single Coil and then enter 0, the start Address of the DO channel.

| Read/Write Definition                                       | ×                     |
|---|-----------------------|
| Slave ID: 1   | OK                    |
| Function: 05 Write Single Coil ~                            | Cancel                |
| Address: 0 Protocol address. E.g. 10                        | 011 -> 10             |
| Quantity: 1   |                       |
| Scan Rate: 1000 [ms]  | Apply                 |
| Disable Read/Write Disabled Disable on error R              | ead/Write Once        |
| View<br>Rows<br>● 10 ○ 20 ○ 50 ○ 100 ○ Fit to Qu            | Jantity               |
| Hide Alias Columns PLC Address Address in Cell Enron/Daniel | es (Base 1)<br>I Mode |

#### How to Use Modbus TCP to Connect to the ioThinx 4510 Series

Note 1: Take the following steps to check the Start Address of the device in the web console.

 Open the web console and then click **Modbus** in the left panel. On this page, the Modbus TCP addresses are categorized as **Coil Status**, **Input Status**, **Holding Register**, and **Input Register**.

| MOXA                     | ioThir | 1x 4510   | )              |                      |               |                          | Filter                       | Save & Rest   | art   Lo     |
|--------------------------|--------|-----------|----------------|----------------------|---------------|--------------------------|------------------------------|---------------|--------------|
| Serial Port              |        | 01: Coi   | l Status (R/W) | 02: Input Status (R) | 03: Holding   | J Register (R/W)         | 04: Inp                      | ut Register ( | R)           |
| I/O<br>Internal Register | #      | Slot<br>¢ | Module Name 🗘  | Parameter 🗘          | Point<br>Type | Start Address<br>(DEC) ~ | Start<br>Register<br>(DEC) 0 | Length        | Data<br>Type |
| Protocol -<br>Modbus     | 1      | R-02      | 45MR-2600-0    | doStatus             | 01 🔹          | 0                        | 000001                       | 16            | BOOL         |
| SNMP<br>MQTT             | 2      | R-00      | ioThinx4510    | birValue             | 01 🔻          | 2560                     | 002561                       | 64            | BOOL         |

2. Type the text "doStatus" in the filter to find the **Start Address** of the DO channel.

| shooard      | Modb | us TCP Slave |                                       |                                       |                     |                          |                        |                  |
|--------------|------|--------------|---------------------------------------|---------------------------------------|---------------------|--------------------------|------------------------|------------------|
| surity       | Se   | vice Enabled | Note: enable/disable this service thr | ough <u>Security Service Settings</u> |                     |                          |                        |                  |
| dule         | 1    | •            |                                       |                                       |                     |                          | Filter doStat          | us               |
| al Port      |      | 01: Coi      | Status (R/W)                          | 02: Input Status (R)                  | U3: Holding Registe | r (H/W)                  | 04: Input H            | egister (H)      |
| mal Register |      | Slot ~       | Module Name 0                         | Parameter 0                           | Point<br>Type       | Start Address<br>(DEC) 0 | Start Register (DEC) 🗘 | Length Data Type |
| iocol -      | 1    | R-02         | 45MR-2600-0                           | doStatus                              | 01 •                | 0                        | 000001                 | 16 BOOL          |

**Note 2:** You can also manually modify the addresses if needed. To do so, click **Save & Restart** in the top right of the page after changing the **Start Address**.

| ial Port      |   | 01: Coi   | l Status (R/W) | 02: Input Status (R) | 03: Holding   | Register (R/W)           | 04: Inp                      | ut Register ( | R)           |
|---------------|---|-----------|----------------|----------------------|---------------|--------------------------|------------------------------|---------------|--------------|
| rnal Register | # | Slot<br>¢ | Module Name 🗘  | Parameter 🗘          | Point<br>Type | Start Address<br>(DEC) ~ | Start<br>Register<br>(DEC) 0 | Length        | Data<br>Type |
| Modbus        | 1 | R-02      | 45MR-2600-0    | doStatus             | 01 🔹          | 0                        | 000001                       | 16            | BOOL         |
| IMP<br>QTT    | 2 | R-00      | ioThinx4510    | birValue             | 01 •          | 2560                     | 002561                       | 64            | BOOL         |
|               | 3 | R-03      | 45MR-3810-0    | aiResetMinValue      | 01 •          | 36608                    | 036609                       | 8             | BOOL         |
|               | 4 | R-03      | 45MR-3810-0    | aiResetMaxValue      | 01 •          | 37632                    | 037633                       | 8             | BOOL         |
|               | 5 | R-01      | 45MR-1600-0    | diCounterStatus      | 01 •          | 42240                    | 042241                       | 4             | BOOL         |

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3. Change the DO-00 value from 0 to 1; DO-00 will respond by turning on the LED.

| 함 Modbus Poll - Mbpoll1   | - | × |
|---|---|---|
| File Edit Connection Setup Functions Display View Window Help                                       |   |   |
|   |   |   |
| 💭 Mbpoll1   |   |   |
| Tx = 112: Err = 0: ID = 1: F = 05: SR = 1000ms  |   |   |
| Alias     00000       0     1       1     2       3     3       4     4       5     6       7     - |   |   |
| For Help, press F1. [192.168.127.254]: 502  |   |   |

# Read Coils: Use Modbus Poll to read the ioThinx 4510 DO channel status.

- 1. Select **Read/Write Definition** in the **Setup** panel.
- 2. Select the **function** code **01 Read Coils** and enter **0**, the start **Address** of the DO channel.

| Read/Write Definition ×   |
|---|
| Slave ID: 1 OK  |
| Function: 01 Read Coils (0x)  V Cancel  |
| Address: 0 Protocol address. E.g. 11 -> 10  |
| Quantity: 10  |
| Scan Rate: 1000 [ms] Apply  |
| Disable<br>Read/Write Disabled<br>Disable on error<br>Read/Write Once                   |
| View<br>Rows<br>10 0 20 0 50 0 100 0 Fit to Quantity                                    |
| Hide Alias Columns     PLC Addresses (Base 1)     Address in Cell     Enron/Daniel Mode |

#### How to Use Modbus TCP to Connect to the ioThinx 4510 Series

3. The status will be shown in the table; when the DO-00 channel is turned on, the value should be 1).



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