## ioThinx 4510 Series User's Manual

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www.moxa.com/product



## ioThinx 4510 Series User's Manual

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## **Safety Symbols**



### DANGER

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.



### WARNING

Indicates a moderate risk, which, if not avoided can cause a potentially hazardous situation.



### CAUTION

Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**NOTE** Indicates a potential malfunction which, if not avoided, will not result in damage to property.

**INFORMATION** This information is important for preventing errors.

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# 1 Preface

In this chapter, we explain the scope of and how to use this document.

The following topics are covered in this chapter:

- Revision History
- Relevant Models
- Package Contents
- Usage Scenarios
- Hardware and Software Requirements
- Safety Precautions
- Additional Resources

## **Revision History**

Version	Change	Date
v1.0	First Release	2018-11-12
v2.0	1. Added 45MR-7210	2019-05-10
	2. Added MQTT	
	3. Added HTTPS	
	4. Added more mass deploy functions in IOxpress	
v2.1	1. Added power calculation links	2019-08-22
v3.0	1. Added 45MR-4420	2019-09-11
	2. Added SNMP Trap and Inform	

## **Relevant Models**

This document is only applicable to the models listed below.

Model Name	Description
ioThinx 4510	Advanced I/O, Ethernet network adapter, 3-in-1 serial port(s), -20 to 60°C operating
	temperature
ioThinx 4510-T	Advanced I/O, Ethernet network adapter, 3-in-1 serial port(s), -40 to 75°C operating
	temperature

## **Package Contents**

The following items are included in the product package.

- The ioThinx 4510 device
- Quick installation guide (Printed)
- Warranty card

## **Usage Scenarios**

The ioThinx 4510 Series can be used for the following applications:

1. PLC I/O expansion

The ioThinx 4510 Series can be used to expand the number of I/O points on a PLC.

2. Remote I/O

The ioThinx 4510 Series can be accessed by master software, such as SCADA software, using IT or OT protocols to collect I/O data.

3. Modbus Gateway

The ioThinx 4510 Series has one or more serial ports to connect serial devices. It collects serial data using a Modbus RTU master protocol, which can be accessed by a PLC or master software with IT or OT protocols.



## **Hardware and Software Requirements**

You will need the following hardware and software to use the ioThinx 4510 Series.

- A power source that provides 12 to 48 VDC, and power wires
- A PC running a Windows OS with Chrome installed and an Ethernet cable
- 45MR modules, if available
- IOxpress software utility (optional)
- Moxa CLI Configuration Tool (optional)

## **Safety Precautions**

Please observe the following safety precautions when installing and using the ioThinx 4510 Series:



### DANGER

Never work on the device while the power source is switched on. Disconnect all power sources to the device before performing installation, repair, or maintenance work.



### DANGER

Disconnect the power when you want to remove or replace components, or disconnect equipment unless the area is known to be free of ignitable substances.

- If you connect or disconnect the Removable Terminal Block when field power is applied, an electrical arc can occur. This could cause an explosion when installed in hazardous locations. Ensure that power is removed or the area is nonhazardous before installation.
- If you connect or disconnect wiring while the power is on, an electrical arc can occur. This could cause an explosion in hazardous environments. Ensure that power is removed or the area is nonhazardous before installation.
- Do not disconnect the unit unless the power has been disconnected or the area is known to be nonhazardous. In a hazardous area, the unit must be powered down before removing it.



#### WARNING

This unit is sensitive to Electrostatic Discharge, which can cause internal damage and affect operations. Follow these guidelines when you handle this unit:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wristband.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the device in appropriate static-safe packaging when not in use.



#### WARNING

Check the voltage supplied by the power source. Make sure the voltage provided by the power source matches the voltage required by the device.



#### WARNING

Check the voltage or current of the sensors or loads. Make sure the voltage and/or current indicated on the sensors or loads corresponds to the specifications of your 45M module before you connect the device.



### WARNING

Connect your device to an earthed ground.



#### CAUTION

Do not use the device if the device is already damaged. Replace defective or damaged devices to ensure that your devices function properly.



#### CAUTION

Do not attempt to repair the device yourself. If your device needs to be repaired, return the device to Moxa's customer service department. Attempting to repair the device yourself could invalidate the device's warranty.

## Additional Resources

Refer to the following documents for additional information.

- Datasheets for the following products:
  - ioThinx 4510 Series
  - ioThinx 4500 Series (45MR) Modules
  - User's Manual for the following products:
  - ioThinx 4500 (45M) Module Series
  - Moxa CLI Configuration Tool

## **Product Overview**

In this chapter, we give an overview of each ioThinx 4510 Series device.

The following topics are covered in this chapter:

#### Technical Data

Common Specifications

### □ Appearance

- > Front View
- Physical Dimensions

#### LED Indicators

## **Technical Data**

### **Common Specifications**

#### Input/Output Interface

**Expansion Slots:** Up to 32 Note: Compatible with the ioThinx 4500 Series (45MR) Modules only

#### Ethernet Interface

10/100BaseT(X) Ports (RJ45 connector): 2, 1 MAC address (Ethernet bypass)

#### **Ethernet Software Features**

Industrial Protocols: Modbus TCP Server (Slave) RESTful API SNMPv1/v2c/v3 SNMPv1/v2c/v3 Trap SNMPv2c/v3 Inform MQTT

#### Serial Interface

**Connector:** Spring-type Euroblock terminal **No. of Ports:** 1 x RS-232/422 or 2 x RS-485 (2 wire)

#### **Serial Software Features**

Industrial Protocols: Modbus RTU Client (Master)

#### **System Power Parameters**

**Connector:** Spring-type Euroblock terminal **Input Voltage:** 12 to 48 VDC

#### **Field Power Parameters**

Input Voltage: 12/24 VDC Connector: Removable terminal block

#### Physical Characteristics

Dimensions: 42.3 x 99 x 75 mm (1.67 x 3.9 x 2.95 in) Installation: DIN-rail mounting Wiring: Serial cable, 16 to 28 AWG

Power cable, 12 to 26 AWG

### **Environmental Limits**

#### **Operating Temperature:**

ioThinx 4510: -20 to 60°C (-4 to 140°F) ioThinx 4510-T: -40 to 75°C (-40 to 167°F)

## Appearance

## **Front View**



## **Physical Dimensions**

Unit: mm (in)





99 (3.9)



83.15 (3.27)





	LED Indicator						
Labeling	Indication	LED Qty	LED Color	LED Action			
CD	System	1	Groop	On: power on			
Sr	Power	1	Green	Off: power off			
FD	Field Power	1	Green	On: power on			
	Tield Tower	1	Green	Off: power off			
				Green: system ready			
		1	Green/Red	Green slow blinking: booting up			
	System (Kernel)			Red: system error or module mismatch			
RDY				Red slow blinking: loading factory default settings,			
				upgrading firmware, or system recovery			
				Red fast blinking: safe mode			
				Off: power off			
				Green: 100mb			
11/10	Ethorpot			Amber: 10mb			
LI/LZ	Luiemer		Green/Amber	Blinking: data transmitting			
				Off: disconnected			
		1 for each		Green: Tx			
רם/ 1ם	Serial		Green/Amber	Amber: Rx			
F1/F2				Non-simultaneous blinking: data transmitting			
				Off: disconnected or no data transmitting			

NOTE DO NOT DISCONNECT THE POWER OR NETWORK CABLE when the RDY LED is blinking slowly.

**INFORMATION** Refer to **Failed to Enter System Ready Mode** in the troubleshooting section for addition information about the system recovery process.

## **Hardware Installation**

In this chapter, we describe how to install the ioThinx 4510 Series devices.

The following topics are covered in this chapter:

#### Wiring System and Field Power

- > System Power
- > Field Power
- Wiring Ethernet Ports
- Wiring Serial Port(s)
- Grounding the Unit
  - > Connecting the System Power Ground
  - > Connecting the Field Power Ground

#### Mounting the Unit

- > Installing the Unit on a DIN Rail
- > Removing the Unit from a DIN Rail
- $\succ~$  Installing Covers on the Device and the Right-Most I/O Module
- > Removing a Cover from the Right-Most Module
- Horizontal Installation

#### Powering on the Unit

## Wiring System and Field Power

Wire range: 12 to 26 AWG (Ferrule diameter: 2.0 to 0.4 mm) Wire strip length: 10 mm

Unit: mm (in.)



- **NOTE** Powering the unit requires connecting both the system and field power to the power supply. If only one of the power sources is connected, the device may not work properly.
- **NOTE** We recommended using different power supplies to ensure that the system power and field power are isolated from each other. If using the same power supply for system power and field power, 3 KV or above isolation between them is recommended.

### **System Power**

This device requires a 12 to 48 VDC system power input. The system power powers this device and the expansion modules via an internal bus, which is galvanically connected to the system power supply.



The amount of system current required to support an expansion module is 1 A. If more modules and more power consumption is needed, an additional power module (45MR-7210) is required. Below is an example:

- 10 x 45MR-1600 (59.4 mA) = 594 mA
- 5 x 45MR-3810 (187 mA) = 935 mA

The total system current is 1.594 A, which is greater than 1 A. Therefore, an additional 45MR-7210 is needed.

**NOTE** Install the 45MR-7210 to the left hand side of the module where the power consumption would be exceeded.

- **NOTE** To avoid damaging your devices, reset all power supplies connected to this device and 45MR-7210 modules at the same time.
- **NOTE** Click the following link to see how many 45MR-7210 power modules you will need to support your ioThinx 4500 series application: <u>http://iothinxcalculator.moxa.com</u>

### **Field Power**

This device provides 12/24 VDC field power input, which is a passive power supply without protection and the maximum current output is 2 A.



**NOTE** The 12/24 VDC field power supply can be connected directly to 45MR modules. If more connection points are needed, purchase 45MR-7820 (8 x FP+ and 8 x FP-) modules.

## **Wiring Ethernet Ports**

The maximum cable length of a 10/100BaseT connection is usually stated as 100 m (350 feet), but the actual limit for your application could be longer or shorter depending on the amount of electrical noise in the environment. To minimize the amount of noise, Ethernet cables should not run parallel to power cables or other types of cables that generate electrical noise. The following diagram and table shows the pin assignments for the RJ45 Ethernet ports:

-		Pin	Media Direct Interface Signal
T-1	Pin 1	1	Tx+ (transmit)
		2	Tx- (transmit)
	Pin 8	3	Rx+ (receive)
170	1	4	Not used
		5	Not used
		6	Rx- (receive)
		7	Not used
4,50		8	Not used

## Wiring Serial Port(s)

Wire range: 16 to 28 AWG (Ferrule diameter: 1.2 to 0.3 mm)

Wire strip length: 9.0 mm

Unit: mm (in.)



Pin	RS-232	RS-422	RS-485 (P1/P2)
1	TXD	TXD+	DATA1+
2	RXD	TXD-	DATA1-
3	RTS	RXD+	DATA2+
4	CTS	RXD-	DATA2-
5	GND	GND	GND

- **NOTE** Connect the signal common pin (e.g. GND pin on the serial port pin assignment) between each of the serial device units. For insulated wire (shielding cable) that is used to reduce electrical noise, connect the cable shield drain wire to the chassis ground.
- **NOTE** To ensure that wires are securely connected to terminal block connectors, strip 7 to 9 mm of insulation off the ends of the wires before connecting them to the terminal block.

## **Grounding the Unit**

This device has two ground pins. One pin is for system power and the other pin is for field power.

### **Connecting the System Power Ground**

The system power ground connector is at the back of the unit. Once the device has been installed on a DIN rail, the system power ground connector will connect to the DIN rail.





### CAUTION

For surge protection, connect the DIN rail to earth ground.

### **Connecting the Field Power Ground**

Connect the field power ground pin  $(\stackrel{\perp}{=})$  to your field power ground.





### CAUTION

Be sure to note the maximum possible current for each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If currents exceed the maximum rating, the wires will overheat, which could cause serious damage to your equipment. For safety reasons, we recommend using 2 mm diameter wire to connect to the power supply (e.g., 12 AWG).

## **Mounting the Unit**

In this section, we describe how to mount the device on a DIN rail and how to unmount the device from a DIN rail.



### DANGER

Never install the device while the power source is switched on.

### Installing the Unit on a DIN Rail

Take the following steps to install the unit on a DIN rail.

**Step 1:** Hook the mounting clip of the unit onto the DIN rail, and then lower the clip onto the DIN rail. At least 55 mm of space above the DIN rail should be kept free to ensure that the installation can be done correctly.



Step 2: Push the unit towards the DIN rail until the end of the mounting clip snaps into place.



**INFORMATION** When the I/O module is inserted into the correct position, the connection between the internal bus and the previous module is established.

## Removing the Unit from a DIN Rail

Take the following steps to remove the unit from a DIN rail.

Step 1: Use your finger to pull the release tab on the lower part of the module.



**Step 2:** Press the release tab (item 1 in the figure) and then remove the CPU module from the DIN rail (item 2 in the figure).



**NOTE** Disconnect all connections, including Ethernet, serial, and power cables, from the device before removing the device from the DIN rail.

## Installing Covers on the Device and the Right-Most I/O

## Module

Insert the covers on the left side of the device and on the right side of the I/O module that is installed furthest to the right. Make sure the covers cover the internal bus of the module.



**NOTE** The covers provide protection against electrostatic discharge.

## **Removing a Cover from the Right-Most Module**

Before adding a new module to the right-most module, remove the cover first. Place your hand on the cover and slide it up as indicated in the diagram below.



## **Horizontal Installation**

Before installing the device, ensure there is enough space around the device so that it can dissipate heat. In order to ensure the device works properly, we suggest reserving the space shown in the figure below.





### CAUTION

DO NOT install the device vertically, as the fan-less heat dissipation design will not perform as intended.

## **Powering on the Unit**

After turning on the power supply, it will take 5 to 10 seconds for the operating system to boot up. The green Ready LED will illuminate continuously until the operating system is ready.

4

## **Software Tools**

In this chapter, we introduce which software tools can be used with this device.

The following topics are covered in this chapter:

#### Preparing Software Tools

- Connecting Web Console
- > Preparing IOxpress Utility
- > Preparing Moxa CLI Configuration Tool

### Web Console

- > Dashboard
- > System
- > Security
- > Network
- Module
- > Serial Port
- ≻ I/O
- > Internal Register
- > Protocol

## **Preparing Software Tools**

## **Connecting Web Console**

The Web Console is already embedded in this device. Use the web console to check the device status, configure settings, or update the firmware of the device. Follow the steps below to connect to the web console.

- 1. Connect the device to your PC through an Ethernet cable.
- 2. Power on the unit.
- 3. Open a web browser (Chrome is recommended) on your PC, and type the default IP address shown on the model label of the unit.

**INFORMATION** Type in the IP address (if the IP address is not set by default). If the IP address is not available, use the IOxpress utility to search for the device, or load the factory default settings by holding down the RESET button to access the device through the default IP address.

### **Preparing IOxpress Utility**

The IOxpress Utility can be downloaded from the Moxa website at <u>www.moxa.com</u>. After downloading the file, unzip it and run setup.exe. The installation program will guide you through the installation process.

Refer to the Mass-deploying the Settings section for detailed instructions.

**NOTE** The ioThinx 4510 Series is only compatible with IOxpress v2.2 or later.

### **Preparing Moxa CLI Configuration Tool**

Moxa CLI Configuration Tool (MCC\_Tool) can be downloaded from the Moxa website at <u>www.moxa.com</u>. After downloading the file, unzip it and run setup.exe. The installation program will guide you through the installation process.

It is a command line tool that provides the following functions to manage field devices.

- Report firmware versions
- Upgrade firmware
- Import/export configuration files
- Change password

Management tasks can be performed according to which devices the user requires (1 for single device or 1 for multiple devices) and across different subnet networks.

Refer to Moxa CLI Configuration Tool User's Manual for detailed instructions.

## Web Console

The Web Console is the main software tool to configure, monitor, and operate a device. If mass deploying to multiple devices is required, use IOxpress utility instead.

MOXA	ioThinx 4510		1	Save & Restart   Logout
Dashboard System	System Information			
2 Security Network Module	Module	<b>]</b> ≘ & I/O	3	<b>≡</b> : Connection
Serial Port				
I/O Internal Register	Device Name System Status	OK		× Exit Safe Mode
Protocol -	Status Description		Ple	ease change the default password in consideration of higher
Modbus	Module Count Firmware Version	10 V0.8 build180606	36	curry revel.
SNMP	Serial Number	3E8INEI93		
	LAN IP Address	192.168.1.1		
	System Date & Time	2019/01/01 00:00:01		
	System Elapsed Time	528:12:31		

The Web Console is divided into three regions:

- 1. Title Panel: It provides Login, Save & Restart, and Logout functions.
- 2. Menu panel: It provides access to configure the functions or services.
- 3. Web page panel: The web page associated with the function selected in the Menu panel.

**INFORMATION** Whenever any configuration is modified, the **Save & Restart** will become red and blink. Click **Save & Restart** to make the changes effective.

Save & Restart | Logout

**NOTE** For security reasons, click **Logout** when no longer accessing this device. DO NOT leave the web console unattended.

### Dashboard

The dashboard provides information about the system, modules, I/Os, and the connection status. It also allows you to exit the safe mode status or to change the I/O status.

### **System Information**

The one page system information provides detailed information for this device. For information regarding modules and I/Os, click **Module & I/O** to get the detailed information. For the status of external connections, click **Connection** to get the detailed information.

ΜΟΧΛ	ioThinx 4510		Save & Restart   Logout
Dashboard	System Information		
System	Cystem monution		
Security		1	
Network	E	F	==
Module	Module	e & I/O	Connection
Serial Port			
1/0	Device Name	Device-00	×
Internal Register	System Status	ОК	Exit Safe Mode
Protocol -	Status Description		Please change the default password in consideration of higher
Modbus	Module Count	10	security level.
SNMP	Firmware Version	V0.8 build180606	
	Serial Number	3E8INEI93	
	LAN IP Address	192.168.1.1	
	LAN MAC Address	00:90:E8:CC:DD:EE	
	System Date & Time	2019/01/01 00:00:01	
	System Elapsed Time	528:12:31	
4			

**Exit Safe Mode:** Manually exit the safe mode status of this device. Refer to the **Security** section for more information about the Safe Mode function.

### Module & I/O

The **Module & I/O** provides information about modules and I/Os status. It also allows you to change the I/O status.

**Module Drop-Down List:** It lists all of the I/O modules of this device. Select the specific module for its module and I/O information.

MOXA° ioThinx 4510							
Dashboard	← System Information	R-1 45MR-1600-0 -					
System	Slot Information	R-1 45MR-1600-0					
Security		R-2 45MR-1601-0					
Network		R-3 45MR-2600-0					
		R-4 45MR-2601-0	10				
Module	P	R-5 45MR-2606-0	)0-0				
Serial Port	Firm	R-6 45MR-2404-0	d1				
1/0		R-7 45MR-6810-0					
		R-8 45MR-6600-0	1				
Internal Register		R-9 45MR-3800-0					
Protocol -	Digital Input	R-10 45MR-3810-0					
Modbus	Digital Input						

Locate: Identify the physical location of the module and the module's status LED will blink green.

Save & Restart   Logo					Logout
Dashboard	← System Information	R-1 45MR-1600-0 ▼			
System	Slot Information				
Security					
Network	Slot	R-1			
Module	Module Name	45MR-1600-0	Model Name	45MR-1600	
Serial Port	Firmware Version	V0.87 build180608	Serial Number	3E8INEI94	
1/0	Locating	<b>X</b> STOP			

#### DI Channel (DI Mode): It shows the status of this channel. No operation is allowed.

No.	Name	Mode	Value	Trigger	Filter	Status	Operation
0	DI-00	DI	-	-	500 us	On	-

**DI Channel (Counter Mode):** It shows the status of this channel. Type a value between 0 and 4294967295, and then click **SET** to set the current counter value. Click **RUN** or **PAUSE** to change the counter status.

No.	Name	Mode	Value	Trigger	Filter	Status	Operation
0	DI-00	Counter	65535	Rising edge	500000 us	Running	65535 SET @ PAUSE

#### **DO Channel (DO Mode):** It shows the status of this channel. Click **ON** or **OFF** to change the DO status.

No.	Name	Mode	ON Width	OFF Width	Pulse Count	Status	Operation
0	DO-00	DO	-	-	-	On	S OFF

**DO Channel (Pulse Mode):** It shows the status of this channel. Click **START** or **STOP** to change the pulse output status.

No.	Name	Mode	ON Width	OFF Width	Pulse Count	Status	Operation
0	DO-00	Pulse	500 us	500 us	10	Start	© STOP

Relay Channel: It shows the status of this channel. Click ON or OFF to change the relay status.

No.	Name	Mode	Status	Operation
0	RELAY-00	Relay	On	• OFF

AI Channel: It shows the status of this channel. Click RESET to reset the minimum and maximum values.

No.	Name	Scaled Range	Value	Min	Max	Min/Max
0	AI-00	0.000 - 20.000 mA	11.000 mA	8.000 mA	16.000 mA	RESET

AO Channel: It shows the status of this channel. Key in the value and click SET to set the output value.

#	Name	Scaled Range	Status	Value	Operation
0	45MR-4420-0@AO-00	4.000 - 20.000 mA	ОК	4.000 mA	4.000 SET

**NOTE** The AO channel **Status** will change to **Fault** when the channel is open in current mode, when the channel is short in voltage mode, or when field power is not connected.

**RTD Channel:** It shows the status of this channel. Click **RESET** to reset the minimum and maximum values. Apply the reference temperature value in the calibration field and click **SET** to execute calibration.

#	Name	Sensor Type	Value	Min	Max	Min/Max	Calibration
0	45MR-6600-0@RTD-00	PT 100	0.000 C	0.000 C	0.025 C	RESET	0 SET

**TC Channel:** It shows the status of this channel. Click **RESET** to reset the minimum and maximum values. Apply the reference temperature value in the calibration field and click **SET** to execute calibration.

#	Name	Sensor Type	Value	Min	Max	Min/Max	Calibration
0	45MR-6810-0@TC-00	K TYPE	0.000 C	0.000 C	0.000 C	RESET	0 SET

**SP Channel:** It shows the status of this channel. No operation is allowed.

#	Name	Status
0	45MR-7210-0@SP-00	Good

FP Channel: It shows the status of this channel. No operation is allowed.

#	Name	Status
0	45MR-7210-0@FP-00	Under Limit

### Connection

The connection page shows the connection status from other hosts. This information can assist you with managing your devices.

ΜΟΧΛ	ioThinx 451	0		Save & Restart
Dashboard	← System Info	ormation		
System	Connection Li	st		
Security				
Network	#	Source Host Address	Туре	Port
Module	1	192.168.1.1	Web/Http	80
Serial Port	2	192.168.1.2	SNMP	161
Internal Register	3	192.168.1.3	Modbus TCP Slave	502
Protocol +	4	192.168.1.4	Web/Https	443

### System

This section introduces the functions of the device's system.

### **Device Settings**

MOXA	ioThinx 4510				Save & Restart   Logo	ut
Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware	
System	Device Settings					
Security						
Network	D	evice Name Ser	ver00			
Module		Language En	glish	v		
Serial Port						
VO						

**Device Name:** Set the name of this device (max length = 16, '.' is not allowed).

Language: Select the language of the web console.

### **Time Settings**

MOXA	ioThinx 4510				Save & Restart   Lo
Dashboard	Device Settings	ne Settings	Watchdog	Configuration	Firmware
System	Time Settings				
Security					
Network	System Date & Time	Select Date		Set Time	
Module					
Serial Port	Enable NTP Server				
I/O					
Internal Register	NTP Server	pool.ntp.org			
Protocol +	Sync Interval	1440			

System Date & Time: Select the date for the device. Click Set Time to set the time of the device.

Enable NTP Server: Click the checkbox to enable date and time synchronization with the NTP sever.

NTP Server: Set the URL or IP address of the NTP server.

**Sync Interval:** Set the synchronization interval with the NTP sever (unit: min(s), 1 to 43200, default = 1440).

**INFORMATION** This device does not have a battery. Therefore, if the device is powered off, the system date and time will have to be set again. If the NTP server is not available, set the date and time of the device after rebooting.

### Watchdog

MOXA	ioThinx 4510			Save & Restart   Logout
Dashboard	Device Settings Time Settin	gs Watchdog	Configuration	Firmware
System	Watabdog			
Security	watchuog			
Network	Safe Mode On Service	Modbus TCP Slave	T	
Module	Communication WatchDog	0		
Serial Port	for Safe Mode			
1/0	Auto Clear Safe Mode	Enable/Disable		
Internal Register				

**Safe Mode on Service:** Select the service that you want to link the watchdog to in order to keep monitoring the connection status (option: Modbus TCP Slave).

**Communication Watchdog for Safe Mode:** The timeout value when the master of **Safe Mode on Service** is disconnected (unit: sec(s), 0 to 65535, 0 is disable).

Auto Clear Safe Mode: Click the checkbox to enable or disable automatically clearing the safe mode status.

Once the communication watchdog is timeout, the safe mode will be enabled. The behavior of ioThinx 4510 and 45MR modules are listed below:

	ioThinx 4510	45MR modules
Behavior	• Wait for Modbus/TCP Master's re-connection	<ul> <li>Input channels: no change</li> </ul>
	• Output channels cannot be controlled via any access e.g. RESTful API or web console	<ul> <li>Output channels: set the channel status according to pre-defined safe mode settings</li> </ul>
LED status	RDY: Red fast blinking	Status: Red fast blinking (applied to the
		modules which have output channels only)

Once the connection is recovered, the behavior of the ioThinx 4510 and 45MR modules are listed below.

1. Auto Clear Safe Mode: Enabled

	ioThinx 4510	45MR modules		
Behavior	Recovered to normal status	Recovered to normal status		
LED status	RDY: Green	Status: Green		

#### 2. Auto Clear Safe Mode: Disabled

	ioThinx 4510	45MR modules
Behavior	Status will remain on safe mode until the safe	Status will remain on safe mode until the
	mode flag is cleared.	safe mode flag is cleared.
LED status	RDY: Red fast blinking until the error flag is	Status: Red fast blinking until the error
	cleared manually	flag is cleared manually

**NOTE** To exit the safe mode status, click the "Exit Safe Mode" button on the dashboard or type "0" to the "watchdogAlarmFlagClear" register through Modbus. Otherwise, output channels cannot be controlled via any access e.g. RESTful API or web console.

### Configuration

ΜΟΧΛ	ioThinx 4510				Save & Restart   Logout
Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware
System	Configuration				
Security					
Network		Select File	Browse	Please select a configuration f	file.
Module	Update network settings (	IP, Gateway, etc.)			
Serial Port		ndate to Device*	Undate		
1/0			opuare		
Internal Register		Get from Device	Download		
Protocol +	1	oad to Default**	Reset		
	*DO NOT DISCONNECT	POWER OR NETWORK CA	ABLE during the update proce	ess!	
	**Backup configuration	file before loading factor	y default configuration.		

Select File: Click Browse to select a configuration file to update the device.

**Update network settings (IP, Gateway, etc.):** Click the checkbox if the network settings need to be updated.

Update to Device: Click Update to update the firmware to the device.

Get from Device: Get the configuration file of the device.

Load to Default: Load the factory default settings of the current firmware version.

**NOTE** Do not disconnect the power or network cable during the update process.

**INFORMATION** Back up the configuration file before loading the factory default configurations.

### Firmware

	oThinx 4510				Save & Restart   Logou
Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware
Security	Firmware				
Network		Firmware	Browse	Please select a firmware file.	
Module	ι	Ipdate to Device*	Update		
Serial Port	*DO NOT DISCONNECT	POWER OR NETWORK CAB	LE during the update proc	ess!	
Internal Register	*Do not cancel the upda	te process after clicking th	e "Update" button.		
Protocol +	*Backup configuration	ïle before updating device f	îrmware.		

Firmware: Click Browse to select a firmware file to update the device.

Update to Device: Click Update to update the firmware to the device.

**NOTE** Do not disconnect the power or network cable during the update process.

**NOTE** This device supports firmware automatic recovery function. If the firmware in the device is corrupted, the system will load the backup firmware automatically to overwrite the corrupted one. When the system is in recovery mode, the RDY LED will slowly blink red. DO NOT DISCONNECT the power cable when the recovery process is underway. After the recovery process is complete, you can update the firmware again.



#### CAUTION

If you downgrade the device to firmware version v1.0.0, IOxpress will not be able to access the device. In this case, please connect to the device via a web service instead.

**INFORMATION** The update process cannot be canceled after "Update" is clicked.

**INFORMATION** Back up the configuration file before updating the device firmware.

**NOTE** Configurations saved when using v1.0/v1.1 firmware may not be compatible with v1.2 firmware. Please back up the configuration file before upgrading the firmware.

### Security

The **Security** section allows you to manage the security policy of the device.

**NOTE** Do not expose the device to the public Internet without any security protection. To increase the security of the device, we suggest configuring security settings prior to other settings.

### **Service Settings**

Enable/disable services to prevent unwanted access. The default configuration has Web Server via HTTP and IOxpress/MCC Tool/MXIO enabled.

MOXV	ioThin	x 4510					Sa	ve & Restart   I
Dashboard		Service Settings User Settings Account Settings Access Control		Certifi	cate Settings			
System Security	Servio	ce Settings						
letwork		No.			Service		TCP/UDP	Port
Nodule		1		w	eb Service via HTTP		TCP	80
erial Port		2	MUST import t	We he self-signed certificate before ena	b Service via HTTPS bling the web service via https, or the brows	ers may block the connection	TCP	443
ternal Register		3		RI	ESTful API via HTTP		TCP	80
rotocol +		4		RE	STful API via HTTPS		TCP	443
		5		SNM	IP Agent/Trap/Inform		UDP	161
		6		,	Modbus/TCP Slave		TCP	502
		7		Ν	odbus/RTU Master		-	-
		8			MQTT Client		TCP	-
		9		lOxp	press/MCC Tool/MXIO		TCP/UDP	10124/4800

## **NOTE** If all services are disabled, this device will no longer be accessible, and you will need to load the factory default configurations to access the device.

**NOTE** For security reasons, we suggest disabling those services that your application will not use.

**NOTE** Because of device limitations, MQTT, RESTful API, and SNMP cannot be used at the same time.

**NOTE** Web Service via HTTPS is designed for configuration purposes. Because of device limitations, the https web service only works with Web service, IOxpress, MCC Tools, and MXIO.

**NOTE** Before using the web service, import the self-signed certificate via https. Otherwise, the browser may block the connection.

### **User Settings**

Enable/Disable user type, or configure the username and password for Administrator, Operator, and Users.

ΜΟΧΛ	oThinx 4510			Save & Restart   Logou
Dashboard	Service Settings	User Settings	Account Settings	Access Control
System Security	User Settings			
Network	No. Type	Username	Permissi	ons
Module	1 Administr	ator admin	Full cont	trol
Serial Port	2 Operato	or operator	Dashboard and I/O	status change
Internal Register	3 User	user	Dashboa	ard
Protocol +	Type Enable New Username Admin Password New Password Confirm Password	Administrator	Must be 1-30 characters. Cannot include s numbers, and symbols are allowed. Must be 4-16 characters. Letters, numbers allowed. Must include at least one number a	spaces, but letters, s, and symbols are nd one symbol.

**Type:** Select a user type to change the username and password.

**Enable:** Enable or disable the type you select.

**New Username:** It allows you to change the username of the selected user type (Must be 1 to 30 characters in length. Letters, numbers, and symbols are allowed, but not spaces).

Admin Password: Type the password for the administrator to gain authorization to make changes.

**New Password:** It allows you to change the password of the selected user type (Must be 4 to 16 characters in length and include at least one number and one symbol. Letters, numbers, and symbols are allowed but spaces are not).

**Confirm Password:** Type in your new password again.

**NOTE** Change the default password in order to enhance security when you first login.

**INFORMATION** The default username is admin, and the default password is moxa.

### **Account Settings**

MOXA	oThinx 4510			Save & Restart   Logout
Dashboard	Service Settings User Setting	s Account Settings	Access Control	Certificate Settings
System	Account Settings			
Security	Account octaings			
Network	Idle Timeout (Unit: min(s))	5		
Module	Retry Failure Threshold (Unit: time(s))	5		
Serial Port				
I/O	Lockout Time (Unit: min(s))	5		
Internal Register	System Log	Export (max: 4000 records)		
Protocol +	Login Failure Message	Login Failed.		
			10	
	System Use Notification			
			le	

**Idle Timeout:** The timeout value when the user account is idle (unit: min(s), 0 to 1440 mins, default: 5 mins) Note: 0 for disabled.

**Retry Failure Threshold:** The maximum number of retries for the user account to log in (unit: time(s), 1 to 10 times, default: 5 times).

**Lockout Time:** The timeout value for when the user account will be locked due to reaching the retry failure threshold (unit: min(s), 1 to 60 mins, default: 5 mins).

**System Log:** Users can download the system log by clicking the export button. You can access the most recent 2,000 records. The device will overwrite the oldest data when the memory is full.

**Login Failure Message:** Create the message shown on the login webpage after the user account fails to log in (character limit = 200).

**System Use Notification:** Define the message shown on the login webpage when the user account connects to the Web Console (character limit = 200).

### **Access Control**

Use IP Address/Netmask combinations to control which devices can access the device.

MOXA	ioThinx 45	10			
Dashboard	Serv	vice Settings	User Settings	Account Settings	Access Control
System Security	Access Con	trol			
Network	Warning	Note: Only	allow below IP address to access this device		
Module Serial Port		No.	IP Address		Netmask
/0		1	0 . 0 . 0 . 0	255 .	255 . 255 . 0
nternal Register		2	0 . 0 . 0 . 0	255	255 . 255 . 0
rotocol +		3	0.0.0.0	255	255 . 255 . 0
		4	0 . 0 . 0 . 0	255	255.255.0
		5	0 . 0 . 0 . 0	255	255.255.0
		6	0 . 0 . 0 . 0	255	255.255.0
		7	0 . 0 . 0 . 0	255 .	255.255.0
		8	0 . 0 . 0 . 0	255 .	255 . 255 . 0
		9	0 , 0 , 0 , 0	255 .	255 . 255 . 0
		10	0,0,0,0	255	255 , 255 , 0

### **Certificate Settings**

The ioThinx 4510 will generate a self-signed certificate based on the IP address. Users can download the certificate by clicking the **Export** button, and then import the certificate through the browser to enhance security.

MOXA <sup>®</sup> ioThinx 4510					
Dashboard	Service Settings	User Settings	Account Settings	Access Control	Certificate Settings
System	Certificate Settings				
Security					
Module		HTTPS Certificate	Export		
Serial Port					
1/0					
Internal Register					
Protocol +					

### Network

This section introduces the Network settings function.

### **LAN Settings**

ΜΟΧΛ°	ioThinx 4510	Save & Restart   Logout
Dashboard	I AN Settings	
System	Directings	
Security	IP Configuration	Static IP •
Network	IP Address	192 . 168 . 127 . 254
Module		
Serial Port	Netmask	255 .255 .255 . 0
Ι/Ο	Gateway	0 . 0 . 0 . 0
Internal Register	DNS1	0 . 0 . 0 . 0
Protocol +	DNS2	0 . 0 . 0 . 0

**IP Configuration:** Configure the following settings if **Static IP** is selected. If **DHCP** is selected, the following settings are not allowed (option: Static IP or DHCP).

IP Address: Set the IP address of the device (0 to 255).

**Netmask:** Define the logical subdivision of an IP network and specify the network's available hosts (0 to 255).

Gateway: Define the router that can route the network traffic to the other network or Internet (0 to 255).

DNS1 and DNS2: Define DNS server(s) that can translate URL to IP address (0 to 255).

**INFORMATION** The IP address of the device must be unique. Two devices in the network cannot share the same IP address as it causes an IP address conflict.
## Module

This section introduces the Module settings function.

ΜΟΧΛ	MOXA° ioThinx 4510							
Dashboard	Madula Sa	ttioge						
System	Module Se	tungs						
Security	Match							
Network	Edit							
Module								
Serial Port	Slot	Detected Module	Configured Module					
I/O	1	45MR-1600 →	45MR-1600 45MR-1600-0					
Internal Desister								

Edit: Click this button to enter edit mode.

ΜΟΧΛ	ioThinx 4510		Save & Restart   Logout
Module	Module Settings		
	Match Click finish button to com	plete module settings.	
	Save Settings × Cancel	◄ =	
	Slot Detected Module	Configured Module	
	1 45MR-1600 →	45MR-1600 45MR-1600-0	

**Save Settings:** This button only appears in edit mode. Click this button to finish module settings and exit edit mode.

**Cancel:** This button only appears in edit mode. Click this button to cancel module settings and exit edit mode.

**Auto Matching** Click this button to automatically match all configured modules with all detected modules.

**Load Default Click** this button to load the default settings of all configured modules.

**Reload** Click this button to reload the module settings before entering edit mode.

Slot: The slot position of the detected module.

**Detected Module:** The physical module detected by the system. The yellow arrow allows you to insert the specific module into the configured module.



**Configured Module:** The module settings for the detected module. A unique module name is required in the textbox (max. length = 16, "." character is not allowed).

Configured Device	
45MR-1600-0	
45MR-1600	

The delete icon appears when you place your mouse over the place indicated below. It allows you to delete the configured module.



The drag icon allows you to drag the configured module and drop it to the position you need.



**NOTE** The detected module should match the configured module. Otherwise, the Web Console will not allow you to configure other settings.

**NOTE** The detected module should match the configured module. Otherwise, the Web Console will not allow you to click **Finish**.

**INFORMATION** Use **Auto Matching** to quickly match the configured module with the detected module.

**INFORMATION** Once the setting of a configured module is changed, the configured module will be highlighted by an orange rectangle.



module will be highlighted by a red rectangle. 1 45MR-1600 $\rightarrow$ 45MR-2600-0 = 45MR-2600	INFORMATION If the configured module does not match the detected module, the configured	Slot	Detected Device	Configured Device
	module, the computed module will be highlighted by a red rectangle.	1	45MR-1600 →	45MR-2600-0 45MR-2600

## **I/O**

This section introduces the I/O and IR (Internal Register) settings functions.

## I/O Settings

**Module Drop-Down List:** It lists all the I/O modules of this device. Select the specific module for I/O configuration.

IO Settings						
45MR-1600-0 ▼						
45MR-1600-0	Â					
45MR-1601-0						
45MR-2600-0	P					
45MR-2601-0	P					
45MR-2606-0						
45MR-2404-0						
<u>1,5)1</u> R-6810-0	•					

## **Digital Input Channel Settings**

Pilter (Unit: boogs)	DI-00	DI	¥	DI-00	
2	Filter (Unit:	DI Coun	ter		
	2				

**Channel Mode Drop-Down List:** It lists all of the channel modes, which can be operated by this channel. Select **DI** or **Counter** mode for each channel (option: DI or Counter).

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

**INFORMATION** Every channel in each module must have a different name.

#### **DI Mode**

DI-00	DI	T	DI-00		
Filter (Unit:	500us)				
2					

Filter: Software filtering is used to avoid switch bounces (unit: 500µs, 0 to 65535).

Counter Mode	
DI-00 Counter • DI-00	•
Filter (Unit: 500us)	Power On Value
Power On Status	Power Off Storage
Trigger	
Rising edge	•
Rising edge	
Both	

Filter: Software filtering is used to avoid switch bounces (unit: 500µs, 0 to 65535).

Power on Value: The initial counter value upon powering up (0 to 4294927695).

Power on Status: The counter status upon powering up (option: ON or OFF).

**Power off Storage:** Save counter value to memory during powering off. The saved value will be the initial value upon next powering up (option: ON or OFF).

**Trigger:** The channel accepts limit or proximity switches and counts events according to the ON/OFF status. When **Rising edge** is selected, the counter value increases when the attached switch is pushed. When **Falling edge** is selected, the counter value increases when the switch is released. When **Both** is selected, the counter value increases when the switch is released. When **Both** is selected, the counter value increases when the switch is released. When **Both** is selected, the counter value increases of the switch is pushed or released (option: Rising edge, Falling edge, or Both).

**NOTE** Not all DI channels support counter mode. Refer to the **ioThinx 4500 Series (45MR) Modules** datasheet for detailed specifications.

### **Digital Output Channel Settings**

DO-00	DO	•	D0-00	
	DO			
Power On S	Pulse		Safe Mode Status	

**Channel Mode Drop-Down List:** It lists all of the channel modes, which can be operated by this channel. Select **DO** or **Pulse** mode for each channel (option: DO or Pulse).

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

#### **DO Mode**

DO-00	DO	T		DO-00					•
Power On S	itatus					Safe Mode Status	5		
Power On E	elay (Un	it: se	c)						
0									

Power on Status: The DO status upon powering up (option: ON or OFF).

Safe Mode Status: The DO status when the device is in safe mode (option: ON or OFF).

**Power on Delay:** The time delay before triggering **Power on Status** after powering up (unit: sec(s), 0 to 65535).

#### **Pulse Mode**

DO-00 Pulse V DO-00	
Power On Status	Safe Mode Status
Power On Delay (Unit: sec)	Pulse Count
0 ON Width (Unit: 500us)	0 OFF Width (Unit: 500us)
1	1

Power on Status: The Pulse status upon powering up (option: ON or OFF).

Safe Mode Status: The Pulse status when the device is in safe mode (option: ON, OFF, or Hold Last).

**Power on Delay:** The time delay before triggering **Power on Status** after powering up (unit: sec(s), 0 to 65535).

Pulse Count: The number of pulses per triggering (0 to 4294967295, "0" for continuous pulse output).

On Width/Off Width: The high and low level widths of a pulse (unit: 500µs, 1 to 65535).



**NOTE** Not all DO channels support pulse mode. Refer to the **ioThinx 4500 Series (45MR) Modules** datasheet for detailed specifications.

### **Relay Channel Settings**

Relay- 00	RELAY-00		
Power On Status		Safe Mode Status	
Power On Delay (Unit: sec)			

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

Power on Status: The Relay status upon powering up (option: ON or OFF).

Safe Mode Status: The Relay status when the device is in safe mode (option: ON or OFF).

**Power on Delay:** The time delay before triggering **Power on Status** after powering up (unit: sec(s), 0 to 65535).

## **Analog Input Channel Settings**

#### **Current Module**

AI-00	4-20 mA burnout 🔹	AI-00		
	0-20 mA			
Monsured M	4-20 mA burnout	Measured Max Value	Unit	
weasured w	4-20mA		Offic	

#### Voltage Module

AI-00	0-10 V 🔻	AI-00		
	0-10 V			
Measured N	±10V	Measured Max Value	Unit	

**Channel Mode Drop-Down List:** It lists all of the channel modes, which can be operated by this channel. Select **0-20 mA**, **4-20 mA burnout**, or **4-20 mA** mode for each channel of the current module. Select **0-10 V** or **±10 V** mode for each channel of the voltage module.

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

#### **Disable Mode**

AI-07	4-20 mA burnout 🔹	AI-07	
	0-20 mA 4-20 mA burnout 4-20mA		
	Disable		

The AI channel can be disabled. It only allows you to disable channels one-by-one. When a channel has been disabled, the sample rate of the remaining channels will be increased automatically.

#### 0-20 mA/4-20 mA burnout/4-20 mA/0-10 V/±10 V Mode

AI-00	4-20 mA burnout • Al-0	0		8
Burnout Valu	e (Unit: mA)			
2.000				
1 <sup>st</sup> Point Mea	usred Value	2 <sup>nd</sup> Point Meausred Value	Unit	
4.000		20.000	mA	
1 <sup>st</sup> Point Scal	led Value	2 <sup>nd</sup> Point Scaled Value	Scaled Unit	
4.000		20.000	mA	

**Burnout Value (only for 4-20 mA burnout mode):** The 4–20 mA burnout mode is shown in the diagram below.



The Burnout Value (default = 2 mA) is definable (unit: mA, 0.000 to 4.000). When input values are in the burnout range, raw data will register as 0000h to indicate that the analog input has burned out. The definition of raw data can be found in the table below.

Range	Modbus Data
$0.000 \leq AI < Burnout Value$	0x0000h
Burnout Value $\leq$ AI $\leq$ 20.000 mA	Raw Data
AI > 20.000 mA	0xFFFFh



1<sup>st</sup> Point Measured Value: The 1<sup>st</sup> point value in the range of channel mode to be scaled to the **1st Point** Scaled Value (unit: mA, 4.000 to 20.000).

**2<sup>nd</sup> Point Measured Value:** The 2<sup>nd</sup> point value in the range of channel mode to be scaled to the **2nd Point Scaled Value** (unit: mA, 4.000 to 20.000).

Unit: The unit of the measured value.

1<sup>st</sup> Point Scaled Value: The scaled value of the 1<sup>st</sup> point (-4294967295 to 4294967295).

2<sup>nd</sup> Point Scaled Value: The scaled value of the 2<sup>nd</sup> point (-4294967295 to 4294967295).

**Scaled Unit:** The unit of the scaled value (max. length = 8, "." character is not allowed).

### **Analog Output Channel Settings**

I/O Settings				
45MR-4420-	Disable 0-10V			
AO-00	0-20mA 4-20mA	AO-00		•
AO-01	4-20mA 🕏	A0-01		•
AO-02	4-20mA \$	AO-02		-
AO-03	4-20mA \$	AO-03		•

**Channel Mode Drop-down List:** It lists all of the channel modes which can be operated by this channel. Select **Disable**, **0-10 V**, **0-20 mA**, or **4-20 mA** for each channel.

**Channel Name:** The channel name is used to represent this channel (max. length = 16, "." character is not allowed).

### **Disable Mode**

AO-00	✓ Disable 0-10V	A0-00	
	0-20mA 4-20mA		
AO-01	4-20mA 🕈	A0-01	•

Disable the AO channel. Channels must be disabled one-by-one.

#### 0-10 V/0-20 mA/4-20 mA Mode

0-00 4-20mA 🗘	AO-00		
1 <sup>st</sup> Point Output Value	2 <sup>nd</sup> Point Output Value	Unit	
4.000	20.000	mA	
1 <sup>st</sup> Point Scaled Value	2 <sup>nd</sup> Point Scaled Value	Scaled Unit	
4.000	20.000	mA	
Power On Scaled Value	Safe Mode Status	Safe Mode Scaled Value	
4.000	User Define	♦ 4.000	

1<sup>st</sup> Point Output Value: The 1<sup>st</sup> point value in the range of channel mode to be scaled to the 1<sup>st</sup> Point Scaled Value (range: 0-20 mA mode: 0.000 to 20.000, 4-20 mA mode: 4.000 to 20.000, 0-10V mode: 0.000 to 10.000).

2<sup>nd</sup> Point Output Value: The 2<sup>nd</sup> point value in the range of channel mode to be scaled to the 2<sup>nd</sup> Point Scaled Value (range: 0-20 mA mode: 0.000 to 20.000, 4-20 mA mode: 4.000 to 20.000, 0-10V mode: 0.000 to 10.000).

Unit: The unit of the output value.

1<sup>st</sup> Point Scaled Value: The scaled value of the 1<sup>st</sup> point (range: -4294967295 to 4294967295).

2<sup>nd</sup> Point Scaled Value: The scaled value of the 2<sup>nd</sup> point (range: -4294967295 to 4294967295).

**Scaled Unit:** The unit of the scaled value (max. length = 8, "." character is not allowed).

Power On Scaled Value: The AO scaled value upon powering on.

Safe Mode Status: There are two options for defining the safe mode value: User Define and Hold Last.

Safe Mode Value: The safe mode AO scaled value when the Safe Mode Status is set to User Define.

### **RTD Channel Settings**

RTD-00	PT100 •	RTD-00	•
	PT50		
	PT100		
RTD-01	PT200	RTD-01	•
	PT500		
	PT1000		
PTD-02	310 Ohm	PTD.02	
110-02	620 Ohm	110-02	
	1250 Ohm		
	2200 Ohm		
RTD-03	JPT100	RTD-03	•
	JPT200		
	JP1500		
RTD-04	JPTTUUU	RTD-04	•
	NI200		
	NI500		
BTD-05	NI1000	BTD-05	
110 00	NI120		
		l	

**Sensor Type Drop-Down List:** It lists all of the sensor types, which can be connected to this channel. Select the sensor type for each channel (option: PT50, PT100, PT200, PT500, PT1000, 310 ohms, 620 ohms, 1250 ohms, 2200 ohms, JPT100, JPT200, JPT500, JPT1000, NI100, NI200, NI500, NI1000, NI120, or Disable).

/O Settings				
45MR-660	<b>D-0 +</b>			
RTD-00	PT 50 ✓ PT 100 PT 200	RTD-00		•
RTD-01	PT 500 PT 1000 310 Ohm 620 Ohm	RTD-01		•
RTD-02	1250 Ohm 2200 Ohm JPT 100	RTD-02		•
RTD-03	JPT 500 JPT 1000 NI 100	RTD-03		•
RTD-04	NI 200 NI 500 NI 1000 NI 120	RTD-04		•
RTD-05	Disable PT 100 \$	RTD-05		-

#### **Disable Mode**

The RTD channel can be disabled. You may only disable channels one-by-one. When a channel has been disabled, the sample rate of the remaining channels will be increased automatically.

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

RTD-00 PT 100 •	RTD-00		1ª
1 <sup>st</sup> Point Meausred Value	2 <sup>nd</sup> Point Meausred Value	Unit	
-200.000	850.000	С	
1 <sup>st</sup> Point Scaled Value	2 <sup>nd</sup> Point Scaled Value	Scaled Unit	
-200.000	850.000	С	

1<sup>st</sup> Point Measured Value: The 1<sup>st</sup> point value in the range of channel mode to be scaled to the **1st Point** Scaled Value (acceptable input value depends on the type of sensor).

**2<sup>nd</sup> Point Measured Value:** The 2<sup>nd</sup> point value in the range of channel mode to be scaled to the **2nd Point Scaled Value** (acceptable input value depends on the type of sensor).

Unit: The unit of the measured value.

1<sup>st</sup> Point Scaled Value: The scaled value of the 1<sup>st</sup> point (-4294967295 to 4294967295).

2<sup>nd</sup> Point Scaled Value: The scaled value of the 2<sup>nd</sup> point (-4294967295 to 4294967295).

**Scaled Unit:** The unit of the scaled value (max. length = 8, "." character is not allowed).

### **TC Channel Settings**



**Sensor Type Drop-Down List:** It lists all of the sensor types, which can be connected to this channel. Select the sensor type for each channel (option: J Type, K Type, T Type, E Type, R Type, S Type, B Type, N Type, ±19.532 mV, ±39.062 mV, ±78.126 mV, or Disable).

#### **Disable Mode**

I/O Settings				
45MR-681	0-0 -			
TC-00	J TYPE K TYPE T TYPE	TC-00		 •
TC-01	R TYPE S TYPE B TYPE	TC-01		-
TC-02	N TYPE ±78.126mV ±39.062mV ±19.532mV	TC-02		•
TC-03	Disable K TYPE 🗣	TC-03		•
TC-04	K TYPE 🛟	TC-04		•
TC-05	K TYPE 🛟	TC-05		•
TC-06	K TYPE 🗳	TC-06		•
TC-07	K TYPE 💠	TC-07		•

The TC channel can be disabled. You may only disable channels one-by-one. When a channel has been disabled, the sample rate of the remaining channels will be increased automatically.

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

TC-00 K TYPE	TC-00		*
1 <sup>st</sup> Point Meausred Value	2 <sup>nd</sup> Point Meausred Value0.000	Unit	
-200.000	1250.000	С	
1 <sup>st</sup> Point Scaled Value	2 <sup>nd</sup> Point Scaled Value	Scaled Unit	
-200.000	1250.000	С	

1<sup>st</sup> Point Measured Value: The 1<sup>st</sup> point value in the range of the channel mode to be scaled to the 1st Point Scaled Value (acceptable input value depends on the type of sensor).

**2<sup>nd</sup> Point Measured Value:** The 2<sup>nd</sup> point value in the range of the channel mode to be scaled to the **2nd Point Scaled Value** (acceptable input value depends on the type of sensor).

Unit: The unit of the measured value.

1<sup>st</sup> Point Scaled Value: The scaled value of the 1<sup>st</sup> point (-4294967295 to 4294967295).

2<sup>nd</sup> Point Scaled Value: The scaled value of the 2<sup>nd</sup> point (-4294967295 to 4294967295).

Scaled Unit: The unit of the scaled value (max. length = 8, "." character is not allowed).

### System Power (SP) channel Setting

SP-00	System Power	SP-00	
System Pov	ver Lower Limit Value (	Init: V)	
9.000			

**Channel Name:** The channel name is used for representing this channel (max. length = 16, "." character is not allowed).

**System Power Lower Limit Value:** When the system power voltage drops below the limit, the system power alarm will be triggered.

## Field Power (FP) channel Setting

|--|

**Channel Name:** The channel name (FP-00) is used to represent this channel (max. length = 16, "." character is not allowed).

## **Serial Port**

This section introduces the serial port settings function.

### Port 1/Port 2

Click the tab to configure the settings of Port 1 or Port 2.

**NOTE** The Port 2 tab is only available when the **Mode** of the Port 1 is **RS-485 2-Wire**.

ΜΟΧΛ	ioThinx 4510			Save & Restart   Logout
Dashboard	Port 1			Port 2
System Security	Port Settings			
Network	Mode		Baudrate	
Module	RS-485 2-Wire	×	9600	×
Serial Port	Parity		Data Bits	
I/O	NONE	•	8	•
Internal Register	Stop Bits		Flow Control	
Protocol +	1		None	Ψ.

**Mode:** The standard of the serial device connected to this port (option: RS-232, RS-422, or RS-485 2-Wire).

**Baudrate:** The data transmission rate (option: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps).

Parity: The method of detecting errors in transmission (option: Even, Odd, or None).

Data Bits: The data bits in each character (option: 5, 6, 7, or 8).

**Stop Bits:** The stop bits sent at the end of every character (option: 1 or 2).

Flow Control: The handshaking method (option: None, RTC/CTS, or XON/XOFF).

### **Modbus RTU Device**

ModbusRTUDev_1 🔱 🗸		
Device Setting		
Enable Device		
Device Name	Device ID	
ModbusRTUDev_1	1	
Advanced		
Delay between Polls (Unit: 100ms)		
10		
Polling Timeout (Unit: 100ms)	Polling Retries	
30	3	

**Device Drop-Down List:** It shows the device name of the Modbus RTU devices. Select one of the devices to configure its settings. The green icon shows that data collection from the device is enabled.



**Enable Device:** Click the checkbox to enable data collection from the device. The icon beside the Modbus device in the **Device Drop-Down List** will change from red to green after being enabled.

Device Name: Name of the Modbus device (max. length = 16; "." character is not allowed).

Device ID: The device ID of this Modbus device (options: 1 to 247; default: 1).

Advanced Button: Click this button to show/hide the following settings.

**Delay between Polls:** The delay time after polling the Modbus register(s) of the Modbus device (unit: 100 ms; 100 to 3600000; 0 disabled; default: 10).

**Polling Timeout:** The timeout value when polling data from the Modbus device (unit: 100 ms; 0 to 30000; default: 30).

**Polling Retries:** The maximum number of retries after a polling timeout occurs (options: 0 to 10; default: 3).

**NOTE** A maximum of four Modbus RTU devices can be connected to one serial port when the RS-485 mode is selected.

### **Modbus RTU Device Profile**

Click **Add New Profile** to create a profile of the selected device.

New Profile Setting		
	ADD new Profile	l

After creating a new profile, configure the settings of the profile.

Point Type
01: Coll Status (R/W)
Length
1
IR Start Index
IR Start Index

Profile Name: Name the profile of the Modbus device (max. length = 16; "." character is not allowed).

**Point Type:** Set the corresponding Modbus point type setting (option: 01: Coil Status (R/W), 02: Input Status (R), 03: Holding Register (R/W), or 04: Input Register (R))

Start Address: Define the start address of this Modbus tag (0 to 65535).

Length: Define the length of the coil (1 to 2000) or the register (1 to 125).

Scan Rate: Define how quickly to poll the profile data (unit: 100 ms; 100 to 3600000; default: 10).

IR Type: Set the internal register data type (option: BOOL, WORD, DWORD, or FLOAT).

**IR Start Index:** Set the start number of the internal register for storing data. It only allows you to select available internal registers, depending on the length you define.

IR Type	Option
WORD	1. HiByte & LoByte
	2. LoByte & HiByte
DWORD	1. HiWord & LoWord
	2. LoWord & HiWord
FLOAT	1. HiWord & LoWord
	2. LoWord & HiWord

Swapped Value: Select a data conversion option.

**Exception Code Setting - WORD IR Index:** Set the internal register for exception code. It only allows you to select one of the available internal registers.

**Delete this Profile:** Click this button to delete this profile.

**NOTE** The maximum number of Modbus RTU device profiles that can be created is 8.

## **Internal Register**

This section introduces functions of Internal Register settings.

ΜΟΧΛ	ioThinx 451	0							Save	& Restart   Logout
Dashboard	Internal Degic	tor Cottingo								
System	internal Regis	ster settings								
Security		BOOL (64)		WORD (	54)		DWORD (64)		FLOA	T (64)
Network	BOOL	-				64				
Module										
Serial Port	0	1	2	3	4	5	6	7	8	
I/O										
Internal Register		_								
Protocol +	20	21								

4-30

IR Type Drop-Down List: It lists all of the IR types. Select the IR type to modify or view its settings.



**IR Quantity:** Apply a number to adjust the quantity of the selected IR type. The total available IR quantity is 256.

BOOL (64)	WORD (64)	DWORD (64)	FLOAT (64)
BOOL -		64	

**IR Information:** The IR status window will pop-up after you click one of the IR blocks. The name is used for representing this internal register (max. length = 16, "." character is not allowed).

BC	OOL (64)			×	FLOA	F (64)
BOOL 🕶		BOOL #20				
_		Name			 	
.0		BIR-20				
		Use				
		Modbus RTU Master				
		Device Name	Device ID			
		ModbusRTUDev_5	5			
		Profile Name	Point Type			
		Profile_22	01: Coil Status (R/W)			
		Start Address	Length			
		0	2			
		Scan Rate (Unit: 100ms)	Swapped Value			
		10	-			

## Protocol

This section introduces the protocol settings functions.

## **Modbus TCP Slave**

The **Modbus TCP Slave** section shows the definition of the device's Modbus registers. It allows you to define your own data point type or address of the Modbus registers. The point type and address of a register can be default, existing configuration, or user-defined.

Load Default: Click this button to load default settings of all Modbus registers.



Reload Configuration: Click this button to reload the configuration settings of all Modbus registers.



Filter: Type characters into the textbox to filter the items in the Modbus Table.

Modi	bus TCP SI	ave						
Se	rvice Disat	Note: enable/disa	ble this service through <u>Security Se</u>	rvice Settings				
4	Φ 01: Coil	Status (R/W)	02: Input Status (R)	03: Holdina	Register (R/W)	Filter 04: Inp	R-01 ut Register (	R)
					riegiotal (1977)	Start	ar negleter (	
#	Slot	Module Name 🗘	Parameter 💲	Point Type	Start Address (DEC) 🗘	Register (DEC) 🗘	Length	Data Type
1	R-00	ioThinx4510	watchdogAlarmFlagClear	01 •	44800	044801	1	BOOL
2	R-00	ioThinx4510	birValue	01 🔻	2560	002561	64	BOOL

Point Type Category: Click 01: Coil Status (R/W), 02: Input Status (R), 03: Holding Register (R/W), or 04: Input Register (R) tab to see the registers under the specific point type.

01: Coil Status (R/W) 02: Input Status (R) 03: Holding Register (R/W) 04: Input Register (	R)

**Point Type Drop-Down List:** Select the point type of the parameter when it needs to move to the other point type. After you select the other point type, the parameter will disappear in the current-viewed category and will move to the point type category you just selected (option: 01, 02, 03, or 04).

	01: Coil	Status (R/W)	02: Input Status (R)	03: Holding Reg
#	Slot 🗸	Module Name 🗘	Parameter 🗘	Point Type
1	R-00	ioThinx4510	INTERNAL_REGISTER_BOOL	01 •
				02 03 04

**Start Address Textbox:** Change the value of the Start Address in the textbox (0 to 65535 or leave it blank). When there is no value in the textbox, it will be displayed in light yellow. When it conflicts with another register, it will be displayed in red. Revise the value to prevent address conflict. You can use the **Sort** function to see where there is a conflict of addresses.

#	Slot 🗘	Module Name 🗘	Parameter 🗘	Point Type	Start Address (DEC) ~	Start Register (DEC) 🗘	Length	Data Type
1	R-04	45MR-2601-0	doStatus	01 🔹		-	16	BOOL
2	R-03	45MR-2600-0	doStatus	01 •	32 Overlapped with	000001	16	BOOL
3	R-05	45MR-2606-0	doStatus	01 🔹	#3 32	000033	8	BOOL

**Sort:** The default-sorted column is the **Slot** from the lowest to highest slot number. Click the green arrow to change the sorting method. Click the gray arrows on the other columns to sort that specific column.

#	sla	Module Nam	Parameter	Point Type	Start Address (DEC	Start Register	Length	Data Type
1	R-00	ioThinx4510	SYS_WATCHDOG_ALARM_FLAG_CLEAR	01 •	44800	044801	1	BOOL
2	R-00	ioThinx4510	INTERNAL_REGISTER_BOOL	01 •	2560	02561	1	BOOL

**INFORMATION** Enable/disable this service through **Security**  $\rightarrow$  **Service Settings**.

**INFORMATION** In the event that a conflict address value is entered, whenever you click on a different point type tab, the previous configurations will be restored to avoid the conflict.

**INFORMATION** Refer to **Modbus/TCP Slave Rules** for the available Modbus register.

### SNMP

In the SNMP page, settings are divided into three tabs: SNMP, SNMP Trap/Inform, and Event Settings.

Dashboard	SNMP	SNMP Trap/Inform	Event Settings
System	SNMP Settings		
Security			
Network	Service Enabled Note: en	able/disable this service through <u>Secu</u>	urity Service Settings
Module	Version v1	and v2c and v3	
Serial Port	Contact		
I/O	contact		
Internal Register	Location		
Protocol -			
Modbus	SNMPv1, SNMPv2c Settings		
SNMP	Read Community pr	ublic	
ΜQTT	Write Community pr	ivate	

#### **SNMP Settings**

SNMP Settings				
Service Disabled	Note: enable	e/disable this service throu	gh <u>Security Service Settings</u>	
	Version	v1 and v2c	¥	
	Contact			
	Location			

**Version:** Select one of the SNMP version options (option: v1 and v2c, v3 only, or v1 and v2c and v3), through which the SNMP Manager can access the SNMP agent of the device.

**Contact:** Type the contact of the SNMP server (max length = 30).

**Location:** Type the physical location of the SNMP server (max length = 30).

 $\label{eq:intro} \textbf{INFORMATION} \quad \textbf{Enable/disable this service through Security} \rightarrow \textbf{Service Settings}.$ 

#### SNMPv1, SNMPv2c Settings

Read Community public	;				
Write Community private	e				

**Read Community:** Type the community string matching for read authentication (max length = 30, default = "public").

**Write Community:** Type the community string matching for write authentication (max length = 30, default = "private").

#### SNMPv3 Settings – Read Only

Username	v3ro		
Authentication Protocol	MD5	•	
Authentication Password			
Privacy Protocol	CBC-DES	v	
Privacy Password			

**Username:** Type the username for SNMP v3 settings (min. length = 1; max length = 30; A to Z, a to z, 0 to 9, symbols, spaces and .()[]{}/\"@;: symbols are not allowed, default = "v3ro").

Authentication Protocol: Select Disable, MD5, SHA1, SHA-224, or SHA-256 for the authentication protocol setting (default: MD5).

**Authentication Password:** Type the password for the authentication password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\'"@;: symbols are not allowed, default = "moxa-123").

Privacy Protocol: Select Disable, CBC-DES, or AES-128 for privacy protocol setting (default: CBC-DES).

**Privacy Password:** Type the password for the privacy password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\"@;: symbols are not allowed, default = "moxa-123").

#### SNMPv3 Settings – Read/Write

SNMPv3 Settings – Read/Write			
Username	v3rw		
Authentication Protocol	MD5 •		
Authentication Password			
Privacy Protocol	CBC-DES •		
Privacy Password			

**Username:** Type the username for the SNMP v3 settings (min. length = 1; max length = 30; A to Z, a to z, 0 to 9, symbols, spaces and .()[]{}/\''@;: symbols are not allowed, default = "v3rw").

Authentication Protocol: Select Disable, MD5, SHA1, SHA-224, or SHA-256 for the authentication protocol settings (default: MD5).

**Authentication Password:** Type the password for the authentication password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\'"@;: symbols are not allowed, default = "moxa-123").

Privacy Protocol: Select Disable, CBC-DES, or AES-128 for privacy protocol settings (default: CBC-DES).

**Privacy Password:** Type the password for the privacy password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\"@;: symbols are not allowed, default = "moxa-123").

### **SNMP Trap and SNMP Inform**

Service Disabled (Invalid IP) Note: enable/disal	ble this service through <u>Security Service Setti</u>	ings	
SNMP Trap	v1 \$		
SNMP Inform	v2c \$		
1st Server IP	0.0.0.0	2nd Server IP	0.0.0.0
1st Server Port	162	2nd Server Port	162

**SNMP Trap:** Select one of the SNMP version options (option: v1, v2c, or v3), through which the SNMP server can receive the SNMP Trap from the SNMP agent.

**SNMP Inform:** Select one of the SNMP version options (option: v2c or v3), through which the SNMP server can receive the SNMP Inform from the SNMP agent.

**IP:** Type the IP address of the SNMP server.

**NOTE** If the IP is 0.0.0.0, the ioThinx 4510 will not update the SNMP Trap/Inform to the server.

**Port:** Enter the port of the SNMP server(default = 162).

SNMPv1 And SNMPv2c			
1st Server Trap Community	public	2nd Server Trap Community	public

**Trap Community:** Type the community string matching for read authentication (max length = 30, default = "public").

SNMPv3					
1st Server Username	v3		2nd Server Username	v3	
1st Server Authentication Protocol	MD5	*	2nd Server Authentication Protocol	MD5	*
1st Server Authentication Password	••••••		2nd Server Authentication Password	******	
1st Server Privacy Protocol	CBC-DES	*	2nd Server Privacy Protocol	CBC-DES	*
1st Server Privacy Password	••••••		2nd Server Privacy Password	******	
1st Server Engine ID Format	ASCII	*	2nd Server Engine ID Format	ASCII	*
1st Server Engine ID	moxa-123		2nd Server Engine ID	moxa-123	

**Username:** Type the username for the SNMP v3 settings (min. length = 1; max length = 30; A to Z, a to z, 0 to 9, symbols, spaces and .()[]{}/\"@;: symbols are not allowed, default = "v3").

**Authentication Protocol:** Select **Disable**, **MD5**, **SHA1**, **SHA-224**, or **SHA-256** for the authentication protocol settings (default = MD5).

**Authentication Password:** Type the password for the authentication password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\"@;: symbols are not allowed, default = "moxa-123").

**Privacy Protocol:** Select **Disable, CBC-DES,** or **AES-128** for privacy protocol settings (default = CBC-DES).

**Privacy Password:** Type the password for the privacy password settings (min. length = 8; max length = 16; A to Z, a to z, 0 to 9, symbols, at least one symbol and one number, spaces and .()[]{}/\"@;: symbols are not allowed, default = "moxa-123").

Engine ID format: Select ASCII or HEX for the engine ID (default = ASCII).

Engine ID: Type the engine ID to use (max length = 32 (ASCII) / 64 (HEX), default = "moxa-123")

**NOTE** In HEX format, please add a "0" for single-digit engine IDs. (e.g. "3" should be "03").

#### **Event Settings**

Event	Setting	S											
		#	Module Name		Channel Name	Mode/Range	Trigger		Value	Hysteresis	Alert Type		Specific ID
0	Ō	1	45MR-2606-0	¢	DI-01	\$ DI	On Change	¢	-	-	SNMP TRAP	¢	1
0	ō	2	45MR-3800-0	\$	AI-00	\$ 4.000 - 20.000	Greater	\$	4.000	0.000	SNMP Inform	\$	1
							ADD NEW ALERT	(2/64	)	l.			

Each row in this page represents one monitored event. You can click the 🤷 icon to delete the event, or

click the cicon to duplicate the event. The ioThinx 4510 supports a maximum of 64 events. Click **ADD NEW ALERT** to create a new event.

Module Name: Select a module. Only input modules will be listed here.

Channel Name: Select the channel you want to monitor the event.

**Trigger:** Select the event trigger type. For Digital Input, there are three options, **On Change**, **ON to OFF**, and **OFF to ON**. For Analog Input, the two trigger options are **Greater** and **Less**.

Value: Type the threshold value of the trigger. This is only used for Analog Input events.

Hysteresis: Type the hysteresis value of the trigger. This is only used for Analog Input events.

For illustration purposes, consider the following example where we set the AI-00 channel's trigger value to be greater than 5 with a hysteresis of 1, and also smaller than 5 with a hysteresis of 1.

		#	Module Name	Channel Name	Mode/Range	Trigger	Value	Hysteresis	Alert Type	Specific ID
$\odot$	Ō	1	45MR-3800-0	¢ Al-00 ¢	4.000 - 20.000	Greater	\$ 5.000	1.000	SNMP TRAP	\$ 1
$\odot$	Ō	2	45MR-3800-0	¢ Al-01 ¢	4.000 - 20.000	Less	\$ 5.000	1.000	SNMP TRAP	\$ 1

When Trigger = Greater, Value = 5, and Hysteresis = 1, the SNMP trap will only be triggered if the analog signal fluctuates from 4 to 5, as depicted in Scenario 1 below. However, if we change the settings to Value = 5 and Hysteresis = 2, the SNMP trap will only be triggered if the analog signal fluctuates from 3 to 5.



When Trigger = Less, Value = 5, and Hysteresis = 1, the SNMP trap will only be triggered if the analog signal fluctuates from 6 to 5, as depicted in Scenario 1 below. However, if we change the settings to Value = 5 and Hysteresis = 2, the SNMP trap will only be triggered if the analog signal fluctuates from 7 to 5.



### MQTT

In this section we introduce the MQTT settings. The MQTT configuration page has two channels: **Connection Settings** and **Topic Settings**.

MOXA	ioThinx 4510	Save & Restart   Logout
Dashboard	Connection Settings	Topic Settings
System	Connection Settings	
Network Module	(Service Disabled) Note: enable/disable this service through <u>Security Service Settings</u>	
Serial Port	Broker IP	
1/0	192.168.127.200	
Internal Register	Broker Port	Device ID
Protocol -	1883	moxa_io_0090e8eb3214
Modbus	Keep Alive Interval (Unit: sec)	
SNMP	60	
MQTT	Retry Period (Unit: sec)	
	30	
	TLS	
	Disable \$	
	Authentication	
	User	Password
	Advanced	

### **Connection Settings**

Broker IP Specifies the broker IP name.

Broker Port: Specifies the broker port in this column.

**Authentication:** Select the Authentication checkbox to enable the username and password settings. The username and password are used when an MQTT client connects to a broker.

**Keep Alive Interval:** Keep alive is designed to ensure that a connection between the MQTT client and broker exists. The ioThinx 4510 will send the keep alive packets to the broker at designated intervals.

**Device ID:** The Device ID is used by the broker to identify each client that is connected to it. The ioThinx 4510's Device ID is unique and cannot be changed. The ID consists of the prefix **moxa\_io\_** followed by the MAC address of the ioThinx 4510.

TLS: The ioThinx 4510 uses TLS to encrypt MQTT transmissions. You may enable or disable TLS.



#### WARNING

If TLS encryption is disabled, the username and password will be transmitted in plain text.

#### Advanced

Click the Advanced button to view the Last Will & Testament Settings.

Advanced			
Last Will & Testament			
Last Will Topic		Last Will Message	
ioThinx_4510/read/lastwill		Device is offline	
Last Will QoS		Retained	
0	<b>\$</b>	Disable	*

**Last Will Topic:** The "topic" of the last will message that will be sent to the broker. This item is not configurable.

**Last Will Message:** The message that will be sent to the broker when the connection between the ioThinx 4510 and the broker is disconnected. This item is not configurable.

Last Will QoS: The ioThinx supports three QoS levels:

- QoS 0 (at most once): Data is delivered without acknowledgement. This level of QoS provides best-effort delivery but without guarantee.
- QoS 1 (at least once): Data is delivered with acknowledgement. In this case, when the ioThinx 4510 sends data, it expects to receive an Ack back from broker. With this level of QoS, data may be delivered multiple times.
- QoS 2 (exactly once): Data is delivered exactly once using a "four-part-handshake". This level of QoS is the most reliable, but is generally slower than QoS 0 and QoS 1.

**Retained:** The broker will save messages that are not delivered to a subscriber who is offline when the message is first delivered, and then resend the message when the subscriber comes back online.

### **Topic Settings**

All the topics provided by the ioThinx 4510 will be listed here. The topics are default disabled. User needs to select which topics are needed to be enabled. The topic which can be published or subscribed are listed in the page **Publication** or **Subscription**, respectively.

MOXV	ioThinx	4510										Save & Re
ashboard				Connection	Settings				Topic Se	ettings		
stem	Topic S	ettings										
work						UNUSED 256						
dule				Batch Edit			Filter	Filter Value A	ttribute En	able Disable	Keywords	. 132 result(s)
al Port	🔧 Batcl	h Edit										
ernal Register	Enable	Enable Dis	sable QoS	QoS 0 QoS 1	QoS 2 Retained ON OFF							
otocol -	Trigger	Interval 5	(Unit: s	ec) On Change	50 (Unit: %)	Topic Tab	le					
Modbus				Publ	isher				Subscri	ber		
NMP	#	Enable	Slot	Channel	Торіс			QoS	Retained	Trigger		Condition
.QTT	1	OFF	R-01	DI-00	ioThinx_4510/read/45MR-1601-0@	DI-00/diStatus		0 \$	OFF	On Change	\$	- (Unit: %)
	2	OFF	R-01	DI-01	ioThinx_4510/read/45MR-1601-0@	)DI-01/diStatus		0 \$	OFF	On Change	\$	- (Unit: %)
	3	OFF	R-01	DI-02	ioThinx_4510/read/45MR-1601-0@	DI-02/diStatus		0 \$	OFF	On Change	\$	- (Unit: %)
	4	OFF	R-01	DI-03	ioThinx_4510/read/45MR-1601-0@	DI-03/diStatus		0 \$	OFF	Interval	\$	5 (Unit: sec)
	5	OFF	R-01	DI-04	ioThinx_4510/read/45MR-1601-0@	)DI-04/diStatus		0 \$	OFF	Interval	¢	5 (Unit: sec)
	6	OFF	R-01	DI-05	ioThinx_4510/read/45MR-1601-0@	DI-05/diStatus		0 \$	OFF	On Change	\$	- (Unit: %)
	7	OFF	R-01	DI-06	ioThinx_4510/read/45MR-1601-0@	DI-06/diStatus		0 \$	OFF	On Change	\$	- (Unit: %)

**Filter:** The ioThinx 4510 has a filter function in the top right corner of the subscribe page that allows users to find topics more easily. Click the **Value/Attribute/Enable/Disable** buttons and then type a keyword to find a topic within several seconds. The number of filtered topics will be shown as well.

Value/Attribute: The following most frequently used IO data will be filtered by Value. Other IO data, which is not listed, will be filtered by Attribute.

- diStatus
- diCounterValue
- diCounterStauts
- doStatus
- doPulseStatus
- relayStatus
- relayCurrentCount
- aiStatus

- aiValueScaled
- aoStatus
- aoValueScaled
- rtdStatus
- rtdValueScaled
- tcStatus
- tcValueScaled

Enable/Disable: Filter out the enabled or disabled topic.

Textbox: Type in the topic that you would like to filter.

**Batch Edit:** The ioThinx 4510 supports the **Enable/Disable/QoS/Retain/Trigger** function for batch editing. When the batch edit function is clicked, all filtered topics will be set. If the topic does not support the batch edit function (e.g., the topic does not support On Change but the user batch edits all), the edit will be skipped by the topic.

**NOTE** The ioThinx 4510 only supports 256 topics. If there are more than 256 filtered topics, the enable button will be disabled.

**Topic Table:** All data that can be published or subscribed are listed in the table on the Publisher or Subscriber page.

**Slot:** The slot associated with the data.

**Channel:** The channel associated with the data.

**Topic:** Topics include the following items:

- Publish: {deviceName}/read/{ioName}/{parameters}
- Subscribe: {deviceName}/write/{ioName}/{parameters}
  - > {deviceName}: the device name which user specified in Device Setting Page
  - {ioName}: the {ioName} is in the format {moduleName@channelName}. User can specify the module name in Module page and channel name in I/O pages, respectively.
  - For the parameters is indicated the data which will be accessed by MQTT. Please refer to the Appendix for the detail description about data.

QoS: The QoS of each topic. It shares the same level with Slot/Channel/Topic.

**Retain:** Enables the retain function to force the broker to keep the latest data and send it to subscribers when subscribers are back online.

Trigger and Condition: Determines how the topic will be published.

- Interval: The topic will be published at specific intervals.
- OnChange: The topic will be published when the change criteria are met:
- > For Digital Input, the topic will be published when the value changes.
- For Analog Input, the topic will be published when a specific percentage of the data changes compared with previous update. The percentage refers to the full range.

**NOTE** Setting a short interval may result in an unsuccessful publish.

5

# **Quick Start Guide**

The following topics are covered in this chapter:

#### **Configuring the Unit**

- Login to the Unit
- > Configuring Module Settings
- Changing Device Name
- > Changing Username & Password
- Configuring Service Settings
- > Configuring Account Settings
- > Configuring Network Settings
- > Configuring Serial Port & IR Settings
- > Configuring I/O Settings
- > Configuring Modbus Address Settings
- > Configuring SNMP Settings
- > Configuring MQTT Settings

#### Mass-deploying the Settings

- > Updating Configuration to Multiple Units
- > Setting Date and Time to Multiple Units
- > Changing IP Addresses to Multiple Devices
- > Changing the Device Name of Multiple Devices
- > Retrieving the System Log from Multiple Devices
- > Getting a Self-signed Certificate from Multiple Devices

#### **Monitoring & Operating the Unit**

- > Monitoring Module & I/O Status
- Monitoring Connection Status
- Exiting Safe Mode Status

#### Maintaining the Unit

- Backing up Configuration Files
- > Updating the Firmware
- Restarting the Unit
- Loading Factory Default Settings

# **Configuring the Unit**

This section explains how to configure this device through the Web Console from the beginning. If you require additional information, please refer to Preparing Software Tools before reading this section.

## Login to the Unit

Follow the steps to log in to the unit.

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.

<b>MOX</b> ioThinx 4510		
	Username	
	admin	
	Password	
	••••	
	Login	

## **Configuring Module Settings**

After you have logged in, you can see the dashboard or the module settings page. If the detected module matches the configured module, you will see the **Dashboard** as below. Then click **Module** in the Menu panel to go to the module settings page.

ΜΟΧΛ	oThinx 4510		Save & Restart   Logout
Dashboard	Custom Information		
System	System mormation		
Security	-	<b>-</b> ,	
Network	E	<b>3</b> F	=:
Module	Modul	e & I/O	Connection
Serial Port			
I/O	Device Name	Device-00	×
Internal Register	System Status	ОК	Exit Safe Mode
Protocol +	Status Description		Please change the default password in consideration of higher
	Module Count	10	security level.
	Firmware Version	V0.8 build180606	
	Serial Number	3E8INEI93	
	LAN IP Address	192.168.1.1	
	LAN MAC Address	00:90:E8:CC:DD:EE	
	System Date & Time	2018/12/31 23:59:01	
	System Elapsed Time	528:12:30	

If you see the module settings page as opposed to the dashboard, click **Edit** to enter the edit mode and start editing the module settings.

ΜΟΧΛ	ioThinx 4	510			Save & Restart   Logout
Module	Module Se	ettings			
	Mismat	tch			
	🛹 Sav	e Settings × Cancel	<b>∢</b>		
	Slot	Detected Module	Configured Module		
	1	45MR-1600 →	45MR-1600 45MR-1600-0	© ≡	
	2	45MR-2404-T →	45MR-2404- T	□ =	
	3	45MR-1601 →			
	4	45MR-3800 →			

In edit mode, if any detected module and configured module do not match, the configured module will be highlighted as shown below.

Slot	Detected Module	Configured Module
1	45MR-1600 →	45MR-1601 45MR-1601-1

Click Auto Matching to match the conflicted modules.

If not, you can use the "Auto Match" function or swap the module to change the module sequence.

If you want to re-arrange the 45MR modules automatically, you can click "Auto Match".



If you want to change configurations, you can use the swap function. To swap the module sequence, move the point to the module, click the left button on the mouse and hold it. After the module color changes to green, you can move it to change the position of the module.

Configured Module							
45MR-1600	45MR-1600-0	© ≡					
8 45MR-1601	45MR-1601-0	© ≡					

## **Changing Device Name**

Set the name of this device through **System**  $\rightarrow$  **Device Settings**. We recommend choosing a unique name for the device in order to easily differentiate it from other devices.

MOXA	ioThinx 4510				Save & Restart   Logout
Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware
System	Device Settings				
Network		Device Name	Server00		
Module		Language	English	T	
Serial Port					

## **Changing Username & Password**

In order to have higher levels of security, we recommend changing the username and password after your first log in. Click **Security**  $\rightarrow$  **User Settings** as shown in the screenshot below.

ΜΟΧΛ	ioThinx 451	0			Save & Restart   Logou
Dashboard	Servic	e Settings	User Settings	Account Settings	Access Control
System Security	User Settings	5			
Network	No.	Туре	Username	Permissio	ons
Module	1	Administrato	admin	Full cont	rol
Serial Port	2	Operator	operator	Dashboard and I/O s	status change
Internal Register	3	User	user	Dashboa	rd
Protocol +		Туре	Administrator		
		Enable	×.		
		New Username		Must be 1-30 characters. Cannot include s numbers, and symbols are allowed.	paces, but letters,
		Admin Password			
		New Password		Must be 4-16 characters. Letters, numbers allowed. Must include at least one number ar	, and symbols are Id one symbol.
		Confirm Password			

**INFORMATION** The default username is admin, and the default password is moxa.

## **Configuring Service Settings**

Click **Security** on the menu panel to enter the security settings page as shown below. For service settings, the user can enable or disable the service in order to control access.

	oThinx 45	10			Save & Restart   Logout
Dashboard	Service Settings		User Settings	Account Settings	Access Control
System Security	Service Sett	ings			
Network		No	Comico	TOP/UDD	Dest
Module		NO.	Service	TCP/ODP	POR
Serial Port		1	Web Server	TCP	80
1/0		2	RESTful API	TCP	80
Internal Register		3	SNMP Agent	UDP	161
Protocol +		4	Modbus/TCP Slave	TCP	502
		5	IOxpress/MCC Tool	TCP/UDP	10124/4800

## **Configuring Account Settings**

For account settings, the user can modify the parameters and define the login failure message and system usage notifications. If the user wants to know the access history, the ioThinx 4510 Series supports access log export, which can store up to 1000 records.

MOXA	CAN INTERNAL Save & Restart   Logout						
Dashboard	Service Settings	User Settings	Account Settings	Access Control			
System Security	Account Settings						
Network	Idle Timeout (Unit: min(s))	5					
Module	Retry Faliure Threshold (Unit: time(s))	5					
Serial Port	Lockout Time (Unit: min(s))	5					
Internal Register	Login Failure Message	Login Failed.					
Protocol +							
	System Use Notification		h				

## **Configuring Network Settings**

Click **Network** on the menu panel to enter the network settings page as shown below. The ioThinx 4510 Series supports Ethernet daisy-chain topology with one MAC address. For this LAN port, it supports static IP and DHCP mode. The user can configure it via the LAN settings.

MOXA	ioThinx 4510		Save & Restart   Logout
Dashboard	LAN Sottings		
System	LAN Settings		
Security	IP Configuration	Static IP 🔹	
Network	IP Address	192 . 168 . 127 . 254	
Module			
Serial Port	Netmask	255,255,255,0	
1/0	Gateway	0 . 0 . 0 . 0	
Internal Register	DNS1	0 . 0 . 0 . 0	
Protocol +	DNS2	0.0.0.0	

## **Configuring Serial Port & IR Settings**

Click **Serial Port** on the menu panel to enter the serial port settings page. For more detailed information, please refer to the **Serial Port** chapter.

ΜΟΧΛ ί	oThinx 4510	Save & Restart   Logout
Dashboard	Port 1	Port 2
System	Port Settings	
Security		
Network	Mode	Baudrate
Module	RS-485 2-Wire 🔻	9600 •
Serial Port	Parity	Data Bits
1/0	NONE	8
Internal Register	Stop Bits	Flow Control
Protocol +	1	None

Click **Internal Register** on the menu panel to enter the internal register settings page. For more detailed information, please refer to the **Internal Register** chapter.

MOXV	ioThinx 451	0							Save & Restart
iboard	Internal Regis	ster Settings							
stem curity		BOOL (64)		WORD (64)		DW	ORD (64)	_	FLOAT (64)
letwork	BOOL					64			
Nodule		_							_
erial Port	0	1	2	3	4	5	6	7	8
1/0									
Internal Register Protocol +			20	21					
	63								

## **Configuring I/O Settings**

Click **I/O** on the menu panel to enter the I/O settings page. For more detailed information, please refer to the **I/O Settings** chapter.

MOXA					
Dashboard	10 Sattings				
System	io securitys				
Security	45MR-1600-0 -				
Network					
Module	DI-00 DI v DI-00	•			
Serial Port					
I/O	DI-01 DI V DI-01	•			
Internal Register					
Protocol +	DI-02 DI • DI-02	•			

## **Configuring Modbus Address Settings**

Click **Modbus** on the menu panel to enter the Modbus TCP Slave setting page. On this page, users can see all of the Modbus TCP addresses categorized by coil status, input status, holding register, and input register.

MOXA*         ioThinx 4510         Save & Restart         Logout									
Dashboard	Modb	ous TCP Slav	re						
System Security	Ser	vice Disable	d Note: enable/disa	able this service through <i>Security Service</i>	Settinas				
Network	4	lo		,,,,,,			Filter R-	01	
Module		01: Coil	Status (R/W)	02: Input Status (R)	03: Holding R	egister (R/W)	04: Input	Register (F	{)
I/O					P-1-4				
Internal Register	#	Slot ~	Module Name 🗘	Parameter 💲	Туре	(DEC) 🗘	(DEC) 🗘	Length	Туре
Protocol -	1	R-00	ioThinx4510	watchdogAlarmFlagClear	01 🔹	44800	044801	1	BOOL
Modbus	2	P-00	ioThinx4510	hir\/alue	01 *	2560	002561	48	BOOL
SNMP	2	n-00	1011111114510	birvalue	01 1	2000	002001	40	DUUL

To change Modbus addresses, users can click **Reload default Modbus address**, **Reload current device address**, or manually modify the addresses.

## **Configuring SNMP Settings**

Click **SNMP** on the menu panel to enter the SNMP settings page as shown below.

MOXA	ioThinx 4510		Save & Restart   Logout
Dashboard	SNMP	SNMP Trap/Inform	Event Settings
System	SNMP Settings		
Security			
Network	Service Disabled Note: enable/disabled	le this service through <u>Security Service Settings</u>	
Module	Version	/1 and v2c \$	
Serial Port	Contact		
I/O Internal Register	Location		
Protocol -			
Modbus	SNMPv1, SNMPv2c Settings		
SNMP	Read Community	public	
MQTT	Write Community	private	

The ioThinx 4510 Series supports SNMP, SNMP Trap, and SNMP Inform. After configuring these settings, please download the mib file from Moxa's website. For detailed information on the structure of the mib file, please refer to the **SNMP** chapter.

## **Configuring MQTT Settings**

Click MQTT on the menu panel to enter the MQTT settings page, as shown below.

ΜΟΧΛ	ioThinx 4510			Save & Restart   Logout
Dashboard	Connection Settings		Topic Settings	
System Security	Connection Settings			
Network Module	Service Disabled Note: enable/disable this service through <u>Security Service Settings</u>			
Serial Port	Broker IP			
1/0	192.168.127.200			
Internal Register	Broker Port	Device ID		
Protocol -	1883	moxa_io_0090e8eb3214		
Modbus	Keep Alive Interval (Unit: sec)			
SNMP	60			
MQTT	Retry Period (Unit: sec)			
	30			
	TLS			
	Disable			
	Authentication			
	User	Password		
	Advanced			

The ioThinx 4510 supports generic MQTT, and after configuring it, the ioThinx 4510 will connect the MQTT broker automatically. For detailed information about topics and payloads, refer to the MQTT section.
# **Mass-deploying the Settings**

The mass-deploying function can be performed by IOxpress utility. IOxpress is a Windows utility and the system requirements are listed below:

OS	Microsoft Windows 2000, XP or later
CPU	Intel Pentium 4 CPU or higher
RAM	Min. 512 MB, 1024 MB is recommended
Network	10/100 Ethernet

**NOTE** The ioThinx 4510 Series is only compatible with IOxpress v2.4 or later.

#### **INFORMATION** To get the latest version of IOxpress, please download it from <u>www.moxa.com</u>

Users can change IP address, update configurations, change the device name, and set the date and time to multiple units by IOxpress. Before starting to use the mass-deploying function, please complete the following steps to search for all devices first.

ard		Service Settings	User Settings	Account Settings	Access Control	Certifi	cate Settings
ly	Service	e Settings					
c.		No.		Service		TCP/UDP	Port
		1	We	eb Service via HTTP		TCP	80
ort		2	Wel MUST import the self-signed certificate before enab	TCP	443		
Register		3	RE	STful API via HTTP		TCP	80
+		4	RES	STful API via HTTPS		TCP	443
		5		SNMP Agent		UDP	161
		6	N	Nodbus/TCP Slave		TCP	502
		7	M	odbus/RTU Master		-	-
		8		MQTT Client		TCP	-
		9	IOva	ress/MCC Tool/MXIO		TCP/UDP	10124/4800

**Step 1:** Make sure the IOxpress service is enabled in **Security**  $\rightarrow$  **Service Settings**.

Step 2: Connect the devices by Ethernet cables and then power them on.

😽 Moxa IOxpress		_	-	-	_
Project Device	Configuration	Options	Help		
Se Se	arch		Ctrl+F		
w	b Console	(	Ctrl+W	14	
D De	lete	C	trl+Del	plo	yment
Era	ise Internal Mem	ory			
			Locat	evevi	ce
			All		
				No.	Device Name
Device	Library				
Configu	ration Library		•		

**Step 4:** In the **Search for Devices** window, choose the product series you would like to search for in the **By Product Series** dropdown menu, and then click **Submit**. IOxpress will start to search the devices and list them in the table.

LAN	WAN		CDA	
By Product Series	All			
By Product Model	All			
By MAC Address	00;90;E8; 00 : 00 :	01		
By IP Address	192 . 168 . 1 . 1	() to	192 . 168 . 1 . 254	(leave second IP blank if searching for a single device)
		🔘 Mask	255 . 255 . 255 . 0	
			Submit	Cancel

NOTE	If the devices cannot be found	, check the network setting of the devices.
------	--------------------------------	---

### **Updating Configuration to Multiple Units**

IOxpress supports updating configuration of multiple units. Follow the steps to complete this task.

**Step 1:** Export the configuration file of a device through the Web Console. Refer to **Backing up Configuration Files** for more details.

Step 2: Select Update Configuration to Device in the dropdown menu.

😽 Moxa IOxpress		
Project Device Configuration Options	Help	
💼 🗊 💼 🚳 🕋		
Device Library	Deployment	
	Update Configuration to Device Locate Device Get Configuration from Device Update Firmware Set Device Date & Time Retrieve System Log Restart Device Load Factory Default Change IP Address Change Device Name	Apply to All odel Name (Cellular

**Step 3:** Click the **File** column of the selected device in the table and then choose the configuration file from Step 1.

₩ Moxa IOxpress - C:\Users\Public\Documen	its\Mox	a\IOx	press\Database\IOxp	oress.prj						W-			_ <b>_</b> ×
Project Device Configuration Options	Help												
🗊 🗊 🖀 🔮 🙆		E	1 🔒										
Device Library     isoThinx_4510 - 192.168.127.254	Deployment         MOXA           Update Configuration to Device         •           I// Overwrite Network Setting												MOXA
		No	Deuice Name	Model Name	(Calkdar) ID Addrage	CDA IR Address	MAC Address	Configuration	File	Lock	licercame	Parruard	Perult
		0	loThinx_4510	ioThinx 4510	192.168.127.254	-	00-90-68-71-48-6D			Y			E
Device Library													
Conference I former													
Configuration Library		Submi	it										-
Date Time Event													
•				m									F

**Step 4:** Select the device(s), type the **Username** and **Password**, and then click **Submit**. Then, IOxpress will start to execute the task on the selected devices. The success message will show up in the **Result** column if the process is successfully completed.

**INFORMATION** Click **Apply to All** if the selected devices have the same settings.

**INFORMATION** Back up the configuration before updating to a new configuration.

### Setting Date and Time to Multiple Units

The IOxpress supports setting the date and time of multiple units. Follow these steps to complete this task.

Step 1: Select Set Device Date & Time in the dropdown button

₩ Moxa IOxpress - C:\Users\Public\Docume	nts\Moxa\IOxpress\Database\IOxpress.prj	
Project Device Configuration Options	Help	
🔲 🗊 📻 🖓 🚔 🧟		
	Deployment	
	Change Device Name Locate Device Update Configuration to Device Get Configuration from Device Update Firmware Set Device Date & Time Retrieve System Log Restart Device Load Factory Default Change IP Address Change Device Name	Apply to All Restore  odel Name (Cellular) IP Address

**Step 2:** Select either **Sync with PC** or **Manual Setting**. For Manual Setting, type the Local Date and Time, which will be set on the device(s).

**Step 3:** Select the device(s), type the **Username** and **Password**, and then click **Submit**. IOxpress will start to execute the task on the selected devices. The success message will show up in the **Result** column if the process is successfully completed.

**INFORMATION** Click **Apply to All** if the selected devices have the same settings.

Device Library	3 🔤	Deployn	ment									мо
	Set	Device Da	ite & Time	•								
	0	Sync with	h PC 💮 Manua	Setting Date: 201	B/10/22 🔍 🛪 Time: 1	7:26:28 🔄 (UTC:)						
		No. E	Device Name	Apply     Model Name	(Cellular) IP Address	CDA IP Address	MAC Address	Lock	Username	Password	Result	
		0 ic	oThinx_4510	ioThinx 4510	192.168.127.254		00-90-E8-71-48-6D	Y				
Device Library												
Configuration Library		Submit										
Time Event												

### **Changing IP Addresses to Multiple Devices**

IOxpress supports changing IP addresses for multiple devices:

Step 1: Select Change IP Address in the dropdown button list.

😽 Moxa IOxpress	And a result of the	. 7.
Project Device Configuration Options	Help	
🔲 🗊 📻 🚳 🕋		
Device Library	Deployment	
	Change IP Address	-
	Locate Device Update Configuration to Device Get Configuration from Device Update Firmware Set Device Date & Time Retrieve System Log Restart Device Load Factory Default Change IP Address Change Device Name Get Certificate from Device	odel Na

**Step 2:** Select the device(s), change the IP address, type the **Username** and **Password**, and then click **Submit**. IOxpress will start to execute the task on the selected devices. A message indicating success will appear in the **Result** column if the process was completed successfully.

### **Changing the Device Name of Multiple Devices**

IOxpress supports changing the device name of multiple devices:

Step 1: Select Chang Device Name from the dropdown list.



**Step 2:** Select the device(s), change the device name, type the **Username** and **Password**, and then click **Submit**. IOxpress will start to execute the task on the selected devices. A indicating success message will appear in the **Result** column if the process was completed successfully.

### **Retrieving the System Log from Multiple Devices**

IOxpress supports retrieving the system log from multiple devices.

Step 1: Select Retrieve System Log from the dropdown list.



Step 2: Specify the folder location.

Deployment										
Retrieve System Log	•									
System Log Folder: C:\Users\Public\Documents\Moxa\IOxpress										
All	✓ Apply	r to All								
No. Device Name	Model Name	(Cellular) IP Address	CDA IP Address	MAC Address	Lock	Usen				

**Step 3:** Select the device(s), type the **Username** and **Password**, and then click **Submit**. IOxpress will start to execute the task on the selected devices. A success message will appear in the **Result** column if the process is completed successfully.

### **Getting a Self-signed Certificate from Multiple Devices**

IOxpress supports getting self-signed certificates from multiple devices.

Step 1: Select Retrieve System Log from the dropdown list.

😽 Moxa IOxpress	And a local data and the					
Project Device Configuration Options Help						
🔲 🗊 💼 🗟 🕋 🧕						
Device Library	Deployment					
	Change IP Address  Locate Device Update Configuration to Device Get Configuration from Device Update Firmware Set Device Date & Time Retrieve System Log Restart Device Load Factory Default Change IP Address Change Device Name Get Certificate from Device					

Step 2: Specify the folder location.

Deployment		
Get Certificate from Dev	ice 🔹	
Certificate File Folder:	C:\Users\Public\Documents\Moxa\IOxpress	٩
All		

**Step 3:** Select the device(s), type the **Username** and **Password**, and then click **Submit**. IOxpress will start to execute the task on the selected devices. A success message will appear in the **Result** column if the process is completed successfully.

# Monitoring & Operating the Unit

To monitor and operate the device, go to the **Dashboard** of the Web Console.

INFORMATION	The ioThinx 4510 Series supports three different user profiles (Administrator, Operator, and User).
	Refer to User Settings for the permission information of each profile.

**NOTE** The HTTPS web service can only be used for configuration purposes; it cannot be used to monitor or operate the unit.

### **Monitoring Module & I/O Status**

Under the **Dashboard** of the Web Console, click **Module & I/O** to go to the module and I/O status web page.

MOXA	ioThinx 4510	Save & Restart   Logout
Dashboard	Sustam Information	
System	System mormation	
Security		
Network	E	=:
Module	Module & I/O	Connection
Serial Port		
1/0	Device Name Device-00	×
Internal Register	System Status OK	Exit Safe Mode
Protocol +	Status Description	Please change the default password in consideration of higher security level.

The upper side of this page shows the module status, including **Slot** position, module **Status**, **Firmware Version**, **Module Name**, **Model Name**, and **Serial Number**. Click **Locate** to identify the physical location of the module. The module's LED will blink green.

The lower side of the page shows the I/O status and allows you to operate the status of the output channels, such as DO, Pulse, or Relay channels. Refer to the **Module & I/O** section for detailed information.

MOXA	ioThinx	4510							Save & Restart   Lo
Dashboard	← Syste	em Information R-1	45MR-1600-0 -						
System	Slot Inf	formation							
Security			Slot R	-1					
Module			Module Name 4	5MR-1600-0				Model Name	45MR-1600
Serial Port		F	Firmware Version V	0.87 build180608				Serial Number	3E8INEI94
1/0			Locating	START					
Internal Register									
Protocol +	Digital	Input							
	No.	Name	Mode	Value	Trigger	Filter	Status	C	Operation
	0	DI-00	DI	-		500 us	On		-
	1	DI-01	DI	-	-	750000 us	Off		
	2	DI-02	DI	-	-	750000 us	On		-

### **Monitoring Connection Status**

Under the **Dashboard** of the Web Console, click the **Connection** button to go to the connection status web page.



The connection status page lists the connection information from other hosts.

ΜΟΧΛ	ioThinx 4510 Save & Restart   Log					
Dashboard	← System Information					
System	Connection List					
Network	#	Source Host Address	Type	Port		
Module	1	192,168,1,1	Web/Http	80		
Serial Port	2	192.168.1.2	SNMP	161		
1/0	3	192.168.1.3	Modbus TCP Slave	502		
Protocol +	4	192.168.1.4	Web/Https	443		

**NOTE** Some browsers may create more than one Web Https connection at the beginning. Once the connection is established, the browsers will only keep one and drop the others. Thus, it is normal that more than one Web Https connection is listed in the table at the beginning.

### **Exiting Safe Mode Status**

This device has a watchdog service to monitor the status of the pre-defined TCP connection (refer to **Account Settings** for detailed settings). If the pre-defined TCP connection has no response for a designated period, the device will enter the safe mode status. To exit safe mode status, log in to the device's Web Console and click the **Exit Safe Mode** button to revert the device back to the normal mode.

ΜΟΧΛ	Save & Restart   Logout					
Dashboard	System Information					
Security						
Network	Module & I/O	=: Connection				
Module Serial Port						
1/0	Device Name Device-00	×				
Internal Register	System Status OK	Exit Safe Mode				
Protocol +	Status Description	Please change the default password in consideration of higher security level.				

# **Maintaining the Unit**

This section introduces the maintenance functions of the ioThinx 4510 Series.

### **Backing up Configuration Files**

This device can only be configured through the web console. After configuration, the configuration file can be retrieved from the device to perform backup and mass deployment. Follow the steps to retrieve the configuration file from the device.

**Step 1:** Go to the configuration page via **Menu**  $\rightarrow$  **System**  $\rightarrow$  **Configuration** 

Step 2: Click Download from Get from Device and choose the location to save the .cfg file.

MOXA	ioThinx 4510			Save & Restart   Logout	
Dashboard	Device Settings Time Settings	Watchdog	Configuration	Firmware	
System	Configuration				
Network	Select File	Browse	Please select a configuration file.		
Module	Update network settings (IP, Gateway, etc)	•			
Serial Port	Update to Device *	Update			
Internal Register	Get from Device	Download			
Protocol +	Load to Default**	Reset			
	* DO NOT DISCONNECT POWER OR NETWORK CABLE	during the update process!			
	** Backup configuration file before loading factory default configuration.				

### **Updating the Firmware**

Follow the steps to update the firmware to the device.

**Step 1:** Go to the configuration page via **Menu** → **System** → **Firmware** 

Step 2: Click the Browse button to select a firmware file to update

Step 3: Click the Update button to start the update process

Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware
Security	Firmware				
Vetwork		Firmware	Browse	Please select a firmware file.	
Module	L	Ipdate to Device*	Update		
/0	*DO NOT DISCONNECT	POWER OR NETWORK CA	BLE during the update proc	cess!	
nternal Register	*Do not cancel the upda	ate process after clicking t	ne "Update" button.		
	*Backup configuration	file before updating device	firmware.		

**NOTE** When the device is updating, do not turn the power off as it might corrupt the device.

**NOTE** The firmware cannot be updated via https.

**NOTE** Performing a firmware update will delete the configurations in the device. Backup the configurations before performing the firmware update.

### **Restarting the Unit**

This device will restart automatically after the firmware and configurations have been updated. The user can also restart the device manually.

Step 1: Click Save & Restart on the right upper corner of the page.

MO	KA ioThinx 4510	Save & Restart   Logout
Menu	System Information	
System		

**Step 2:** The device will confirm that you want to perform a restart. Click **Restart Device** in order to restart the device.



**INFORMATION** This device does not have a battery. Therefore, if the device is powered off, the system date and time will have to be set again. If the NTP server is not available, set the date and time of the device after rebooting.

### **Loading Factory Default Settings**

There are three ways to restore the device to factory default settings.

- 1. Follow the steps to load the factory default settings from the web console.
  - **Step 1:** Go to the configuration page via **Menu**  $\rightarrow$  **System**  $\rightarrow$  **Configuration**

Step 2: Click Reset located under Load to Default and then the device will return to default settings.

ΜΟΧΛ	oThinx 4510				Save & Restart   Logou
Dashboard	Device Settings	Time Settings	Watchdog	Configuration	Firmware
Security	Configuration				
Network		Select File	Browse	Please select a configuration file.	
Module	Update network setting	ngs (IP, Gateway, etc)			
Serial Port		Update to Device *	Update		
Internal Register		Get from Device	Download		
Protocol +		Load to Default**	Reset		
	* DO NOT DISCONNECT POWER	R OR NETWORK CABLE during the	update process!		
	** Backup configuration file before loading factory default configuration.				

- **NOTE** Loading the factory default settings will delete the configurations from this device. Please back up the configurations before loading the factory default settings.
  - 2. Follow the steps to load the factory default settings from IOxpress.

**Step 1:** Select **Load Factory Default** from the dropdown menu.

😽 Moxa IOxpress						
Project Device Configuration Options	Help					
🔲 🗊 🖷 📓 🕋 🗟						
Device Library	Deployment					
	Locate Device Locate Device Update Configuration to Device Get Configuration from Device Update Firmware Set Device Date & Time Retrieve System Log Restart Device Load Factory Default Change IP Address Change Device Name					

**Step 2:** Select the device(s), type the **Username** and **Password**, and then click **Submit**. IOxpress will start to perform the task on the selected devices. The success message will show up in the **Result** column when the process has been completed.

**INFORMATION** Click **Apply to All** if the selected devices have the same settings.

3. Hold down the RESET button for 10 seconds to load factory default settings. The system will load the default settings and then restart the device. The system is ready when the RDY LED turns green.



# **A** Appendix

The following topics are covered in this appendix:

#### Network Port Usage

- Modbus/TCP Slave Rules
  - Supported Function Code
  - Exception Code
  - > System Registers
  - > 45MR-1600 (-T), 16 DIs Registers
  - > 45MR-1601 (-T), 16 DIs Registers
  - > 45MR-2404 (-T), 4 Relays Registers
  - > 45MR-2600 (-T), 16 DOs Registers
  - > 45MR-2601 (-T), 16 DOs Registers
  - > 45MR-2606 (-T), 8 DIs, 8 DOs Registers
  - > 45MR-3800 (-T), 8 AIs Registers
  - > 45MR-3810 (-T), 8 AIs Registers
  - > 45MR-4420 (-T), 4 AOs Registers
  - > 45MR-6600 (-T), 6 RTDs Registers
  - > 45MR-6810 (-T), 8 TCs Registers
  - > 45MR-7210(-T), System and Field Power Input Registers

#### SNMP Rules

#### RESTful API Rules

- Supported Request Method
- > GET Request Components
- > PUT Request Components
- RESTful API List
- Exception Code

#### MQTT Rules

#### Import Self-Signed Certificate

#### Troubleshooting

- Forgot username & password
- Forgot IP address of the unit
- > Failed to update firmware
- > Failed to update configuration
- > Failed to access the unit through IP address & IOxpress
- > Failed to enter System Ready Mode

# **Network Port Usage**

Service Type	TCP/UDP	Port	Default
DHCP	UDP	68	Disabled
Web Server	ТСР	80	Enabled
RESTful API	ТСР	80	Disabled
SNMP Agent	UDP	161	Disabled
HTTPs	ТСР	443	Disabled
Modbus/TCP Slave	ТСР	502	Enabled
Auto Search	UDP	4800	Enabled
IOxpress/CLI	ТСР	10124	Enabled

# Modbus/TCP Slave Rules

### **Supported Function Code**

Point Type	Register (decimal)	Access	Туре	Supported Function Code
01: COIL STATUS	0xxxx	R/W	bit	1, 5, 15
02: INPUT STATUS	1xxxx	R	bit	2
03: HOLDING REGISTER	4xxxx	R/W	word	3, 6, 16
04: INPUT REGISTER	Зхххх	R	word	4

### **Exception Code**

Code	Name	Comments
1	ILLEGAL FUNCTION	Function code is not valid.
2	ILLEGAL DATA ADDRESS	Data address is not valid.
3	ILLEGAL DATA VALUE	Writing value is not accepted.
4	SLAVE DEVICE FAILURE	Unrecoverable error occurred.

### **System Registers**

### 01: COIL STATUS

Parameter	Description	Length	Туре
boolInternalRegister	BOOL Internal Register (BIR)	48	BOOL

#### 02: INPUT STATUS

Parameter	Description	Length	Туре
watchdogAlarmFlag	Watchdog alarm flag status (0: Normal, 1: alarm)	1	BOOL

### 03: HOLDING REGISTER

Parameter	Description	Length	Туре
wirValue	WORD IR - Value	48	WORD
dirValue	DWORD IR - Value	96	DWORD
firValue	FLOAT IR - Value	96	REAL

### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
modbusRtuMasterDeviceStatus	Modbus/RTU Master - device status	4	WORD
modbusRtuMasterprofileErrorCode	Modbus/RTU Master - profile error code	8	WORD
deviceName	device name	8	BYTE
deviceDate	device date	2	DWORD
	e.g. 2016/06/28 -> 20160628		
deviceTime	device local time	2	DWORD
	e.g. 15:48:25 -> 154825		
deviceUpTime	unit: sec(s)	2	DWORD
firmwareVersion	Each byte represents ASCII code. e.g. 1.2.3	4	BYTE
	> V1.2.3 , 11.13.12>V11.13.12		
firmwareBuildDate	Each byte represents ASCII code. E.g.	4	BYTE
	16051718> Build16051718		
serialNumber	Each byte represents ASCII code of serial	6	BYTE
	number English character : e.g.		
	TAGCB1100001		
lanMac	MAC address	4	BYTE
lanIp	IP address	2	BYTE
systemError	System Error	1	WORD

### 45MR-1600 (-T), 16 DIs Registers

### **01: COIL STATUS**

Parameter	Description	Length	Туре
diCounterStatus	DI - Counter mode - status (0: Pause, 1: Run)	4	BOOL
diCounterOverflowFlagClear	DI - Counter mode - clear overflow flag (1: Clear)	4	BOOL

#### **02: INPUT STATUS**

Parameter	Description	Length	Туре
diStatus	DI - DI mode - status (0: OFF, 1: ON)	16	BOOL
diMode	DI - mode (0: DI, 1: Counter)	16	BOOL
diCounterOverflowFlag	DI - Counter mode - overflow flag (0: Normal, 1:	4	BOOL
	Overflow)		

### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
diCounterValue	DI - Counter mode - value	8	DWORD
diCounterStatusAll	DI - Counter mode - status (0: Pause, 1: Run)	1	WORD
diCounterOverflowFlagClearAll	DI - Counter mode - clear overflow flag (1: Clear)	1	WORD

Parameter	Description	Length	Туре
diStatusAll	DI - DI mode - status (0: OFF, 1: ON)	1	WORD
diCounterOverflowFlagAll	DI - Counter mode - overflow flag (0: Normal, 1:	1	WORD
	Overflow)		
diModeAll	DI - mode (0: DI, 1: Counter)	1	WORD

### 45MR-1601 (-T), 16 DIs Registers

### 01: COIL STATUS

Parameter	Description	Length	Туре
diCounterStatus	DI - Counter mode - status (0: Pause, 1: Run)	4	BOOL
diCounterOverflowFlagClear	DI - Counter mode - clear overflow flag (1: Clear)	4	BOOL

#### **02: INPUT STATUS?**

Parameter	Description	Length	Туре
diStatus	DI - DI mode - status (0: OFF, 1: ON)	16	BOOL
diMode	DI - mode (0: DI, 1: Counter)	16	BOOL
diCounterOverflowFlag	DI - Counter mode - overflow flag (0: Normal, 1:	4	BOOL
	Overflow)		

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
diCounterValue	DI - Counter mode - value	8	DWORD
diCounterStatusAll	DI - Counter mode - status (0: Pause, 1: Run)	1	WORD
diCounterOverflowFlagClearAll	DI - Counter mode - clear overflow flag (1: Clear)	1	WORD

#### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
diStatusAll	DI - DI mode - status (0: OFF, 1: ON)	1	WORD
diCounterOverflowFlagAll	DI - Counter mode - overflow flag (0: Normal, 1:	1	WORD
	Overflow)		
diModeAll	DI - mode (0: DI, 1: Counter)	1	WORD

### 45MR-2404 (-T), 4 Relays Registers

#### 01: COIL STATUS

Parameter	Description	Length	Туре
relayStatus	Relay - Relay mode - status (0: OFF, 1: ON)	4	BOOL
relayCurrentCountReset	Relay - reset current count (1: Reset)	4	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
relayStatusAll	Relay - Relay mode - status (0: OFF, 1: ON)	1	WORD

Parameter	Description	Length	Туре
relayTotalCount	Relay - total count	8	DWORD
relayCurrentCount	Relay - current count	8	DWORD

### 45MR-2600 (-T), 16 DOs Registers

### 01: COIL STATUS

Parameter	Description	Length	Туре
doStatus	DO - status (0: OFF, 1: ON)	16	BOOL
doPulseStatus	DO - Pulse mode - status (0: Stop, 1: Start)	4	BOOL

#### 02: INPUT STATUS?

Parameter	Description	Length	Туре
doMode	DO - mode (0: DO, 1: Pulse)	16	BOOL

### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
doStatusAll	DO - status (0: OFF, 1: ON)	1	WORD
doPulseCount	DO - Pulse mode - count	8	DWORD
doPulseOnWidth	DO - Pulse mode - ON width (unit: 500 us)	4	WORD
doPulseOffWidth	DO - Pulse mode - OFF width (unit: 500 us)	4	WORD
doPulseStatusAll	DO - Pulse mode - status (0: Stop, 1: Start)	1	WORD

#### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
doModeAll	DO - mode (0: DO, 1: Pulse)	1	WORD

### 45MR-2601 (-T), 16 DOs Registers

#### 01: COIL STATUS

Parameter	Description	Length	Туре
doStatus	DO - status (0: OFF, 1: ON)	16	BOOL
doPulseStatus	DO - Pulse mode - status (0: Stop, 1: Start)	4	BOOL

#### **02: INPUT STATUS?**

Parameter	Description	Length	Туре
doMode	DO - mode (0: DO, 1: Pulse)	16	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
doStatusAll	DO - status (0: OFF, 1: ON)	1	WORD
doPulseCount	DO - Pulse mode - count	8	DWORD
doPulseOnWidth	DO - Pulse mode - ON width (unit: 500 us)	4	WORD
doPulseOffWidth	DO - Pulse mode - OFF width (unit: 500 us)	4	WORD
doPulseStatusAll	DO - Pulse mode - status (0: Stop, 1: Start)	1	WORD

Parameter	Description	Length	Туре
doModeAll	DO - mode (0: DO, 1: Pulse)	1	WORD

### 45MR-2606 (-T), 8 DIs, 8 DOs Registers

### 01: COIL STATUS

Parameter	Description	Length	Туре
doStatus	DO - status (0: OFF, 1: ON)	8	BOOL
diCounterStatus	DI - Counter mode - status (0: Pause, 1: Run)	2	BOOL
diCounterOverflowFlagClear	DI - Counter mode - clear overflow flag (1:	2	BOOL
	Clear)		
doPulseStatus	DO - Pulse mode - status (0: Stop, 1: Start)	2	BOOL

#### **02: INPUT STATUS?**

Parameter	Description	Length	Туре
diStatus	DI - DI mode - status (0: OFF, 1: ON)	8	BOOL
diMode	DI - mode (0: DI, 1: Counter)	8	BOOL
doMode	DO - mode (0: DO, 1: Pulse)	8	BOOL
diCounterOverflowFlag	DI - Counter mode - overflow flag (0: Normal,	2	BOOL
	1: Overflow)		

### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
diCounterValue	DI - Counter mode - value	4	DWORD
doStatusAll	DO - status (0: OFF, 1: ON)	1	WORD
doPulseCount	DO - Pulse mode - count	4	DWORD
doPulseOnWidth	DO - Pulse mode - ON width (unit: 500 us)	2	WORD
doPulseOffWidth	DO - Pulse mode - OFF width (unit: 500 us)	2	WORD
doPulseStatusAll	DO - Pulse mode - status (0: Stop, 1: Start)	1	WORD
diCounterStatusAll	DI - Counter mode - status (0: Pause, 1: Run)	1	WORD
diCounterOverflowFlagClearAll	DI - Counter mode - clear overflow flag (1:	1	WORD
	Clear)		

Parameter	Description	Length	Туре
diStatusAll	DI - DI mode - status (0: OFF, 1: ON)	1	WORD
diCounterOverflowFlagAll	DI - Counter mode - overflow flag (0: Normal, 1:	1	WORD
	Overflow)		
diModeAll	DI - mode (0: DI, 1: Counter)	1	WORD
doModeAll	DO - mode (0: DO, 1: Pulse)	1	WORD

### 45MR-3800 (-T), 8 AIs Registers

#### 01: COIL STATUS

Parameter	Description	Length	Туре
aiResetMinValue	AI - reset minimum value (1: Reset)	8	BOOL
aiResetMaxValue	AI - reset maximum value (1: Reset)	8	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
aiResetMinValueAll	AI - reset minimum value (1: Reset)	1	WORD
aiResetMaxValueAll	AI - reset maximum value (1: Reset)	1	WORD

#### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
aiValueRaw	AI - raw value	8	WORD
aiValueRawMin	AI - minimum raw value	8	WORD
aiValueRawMax	AI - maximum raw value	8	WORD
aiValueScaled	AI - scaled value	16	REAL
aiValueScaledMin	AI - minimum scaled value	16	REAL
aiValueScaledMax	AI - maximum scaled value	16	REAL
aiStatus	AI - status (0: normal, 1: burnout, 2: over	8	WORD
	range, 3. under range)		
aiBurnoutValueScaled	AI - scaled burnout value	16	REAL
aiMode	AI - mode (0: disable, 1: 0-10 V, 2: 0-20 mA,	8	WORD
	3: 4-20 mA burnout, 4: 4-20 mA, 5: ±10 V)		

### 45MR-3810 (-T), 8 AIs Registers

### 01: COIL STATUS

Parameter	Description	Length	Туре
aiResetMinValue	AI - reset minimum value (1: Reset)	8	BOOL
aiResetMaxValue	AI - reset maximum value (1: Reset)	8	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
aiResetMinValueAll	AI - reset minimum value (1: Reset)	1	WORD
aiResetMaxValueAll	AI - reset maximum value (1: Reset)	1	WORD

Parameter	Description	Length	Туре
aiValueRaw	AI - raw value	8	WORD
aiValueRawMin	AI - minimum raw value	8	WORD
aiValueRawMax	AI - maximum raw value	8	WORD
aiValueScaled	AI - scaled value	16	REAL
aiValueScaledMin	AI - minimum scaled value	16	REAL
aiValueScaledMax	AI - maximum scaled value	16	REAL
aiStatus	AI - status (0: normal, 1: burnout, 2: over	8	WORD
	range, 3. under range)		
aiBurnoutValueScaled	AI - scaled burnout value	16	REAL
aiMode	AI - mode (0: disable, 1: 0-10 V, 2: 0-20 mA, 3:	8	WORD
	4-20 mA burnout, 4: 4-20 mA, 5: ±10 V)		

### 45MR-4420 (-T), 4 AOs Registers

### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
aoValueRaw	AO - raw value	4	WORD
aoValueScaled	AO - scaled value	8	REAL

#### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
aoMode	AO - mode (0: disable, 1: 0-10 V, 2: 0-20 mA,	4	WORD
	3: 4-20 mA, 4: ±10 V)		

### 45MR-6600 (-T), 6 RTDs Registers

### 01: COIL STATUS

Parameter	Description	Length	Туре
rtdResetMinValue	RTD - reset minimum value (1: Reset)	6	BOOL
rtdResetMaxValue	RTD - reset maximum value (1: Reset)	6	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
rtdResetMinValueAll	RTD - reset minimum value (1: Reset)	1	WORD
rtdResetMaxValueAll	RTD - reset maximum value (1: Reset)	1	WORD

Parameter	Description	Length	Туре
rtdValueScaled	RTD - scaled value	12	REAL
rtdValueScaledMin	RTD - minimum scaled value	12	REAL
rtdValueScaledMax	RTD - maximum scaled value	12	REAL
rtdType	RTD - Type (0: PT50, 1: PT100, 2: PT200, 3:	6	WORD
	PT500, 4: PT1000; 14: 310 Ohm, 15: 620 Ohm,		
	16: 1250 Ohm, 17: 2200 Ohm; 20: JPT100, 21:		
	JPT200, 22: JPT500, 23: JPT1000; 30: NI100,		
	31: NI200, 32: NI500, 33: NI1000, 34: NI120)		
rtdStatus	RTD - Status (0: normal, 1:burnout)	6	WORD

### 45MR-6810 (-T), 8 TCs Registers

#### 01: COIL STATUS

Parameter	Description	Length	Туре
tcResetMinValue	TC - reset minimum value (1: Reset)	8	BOOL
tcResetMaxValue	TC - reset maximum value (1: Reset)	8	BOOL

#### **03: HOLDING REGISTER**

Parameter	Description	Length	Туре
tcResetMinValueAll	TC - reset minimum value (1: Reset)	1	WORD
tcResetMaxValueAll	TC - reset maximum value (1: Reset)	1	WORD

#### **04: INPUT REGISTER**

Parameter	Description	Length	Туре
tcValueScaled	TC - scaled value	16	REAL
tcValueScaledMin	TC - minimum scaled value	16	REAL
tcValueScaledMax	TC - maximum scaled value	16	REAL
tcType	ТС - Туре (0: Ј Туре, 1: К Туре, 2: Т Туре, 3: Е	8	WORD
	Туре, 4: R Туре, 5: S Туре, 6: В Туре, 7: N		
	Type, 14: ±78.126 mV, 15: ±39.062 mV, 16:		
	±19.532 mV)		
tcStatus	TC - Status (0: normal, 1:burnout)	8	WORD

### 45MR-7210(-T), System and Field Power Input Registers

Parameters	Description	Length	Туре
spStatus	SP - system power Status	1	WORD
spLowerLimitValue	SP - system power lower limit value	2	REAL
spUpperLimitValue	SP - system power upper limit value	2	REAL
fpStatus	FP - Field Power Status	1	WORD

# **SNMP Rules**

All OIDs of this device begin with .1.3.6.1.4.1.8691.10.4510. The data can be read or written by a network management software with the following OIDs. Download the latest version of the MIB file from <a href="http://www.moxa.com">www.moxa.com</a> for additional information.

OID	Туре
.1.3.6.1.4.1.8691.10.4510.1	systemInfo
.1.3.6.1.4.1.8691.10.4510.2	systemPower
.1.3.6.1.4.1.8691.10.4510.3	fieldPower
.1.3.6.1.4.1.8691.10.4510.11	di
.1.3.6.1.4.1.8691.10.4510.12	do
.1.3.6.1.4.1.8691.10.4510.13	relay
.1.3.6.1.4.1.8691.10.4510.21	ai
.1.3.6.1.4.1.8691.10.4510.22	ао
.1.3.6.1.4.1.8691.10.4510.23	rtd
.1.3.6.1.4.1.8691.10.4510.24	tc
.1.3.6.1.4.1.8691.10.4510.41	internalRegister
.1.3.6.1.4.1.8691.10.4510.91	event
.1.3.6.1.4.1.8691.10.4510.92	eventTriggerType

# **RESTful API Rules**

### **Supported Request Method**

Request	Description
GET	The GET method is used to retrieve information from the given server using a given URI.
	Requests using GET should only retrieve data and should have no other effect on the data.
PUT	Replaces all the current representations of the target resource with the uploaded content.
OPTIONS	Describe the communication options for the target resource.

### **GET Request Components**

Component	Content	Description
Request Method	GET	Use GET request to retrieve information
URL	http://{IP address}/{RESTful API}	Refer to <b>RESTful API List</b>
Headers	Accept: vdn.dac.v2	Headers are mandatory for all RESTful API requests
	Content-Type: application/json	

### **PUT Request Components**

Component	Content	Description
Request Method	PUT	Use PUT request to replace current representation
URL	http://{IP address}/{RESTful API}	Refer to RESTful API List
Headers	Accept: vdn.dac.v2	Headers are mandatory for all RESTful API requests
	Content-Type: application/json	
Body	{"value":1}	Uploaded content for replacing current
		representation

### **RESTful API List**

Here lists the RESTful APIs supported by this device. The {ioName} is composed with three elements, including **Module\_Name**, @, and **I/O\_Channel\_Name**. For example, the {ioName} of the module name "45MR-1600-0" and the DI channel name "DI-00" is 45MR-1600-0@DI-00.

RESTful API	Description	Access	Format
/api/sysInfo	All system information	R	
/api/sysInfo/device	Device name	R	
	Device local date and time	R	yyyy/mm/dd
			hh:mm:ss
	Device up time	R	hh:mm:ss
	Firmware version	R	
	Serial number	R	
	System error	R	
/api/sysInfo/network	All network information	R	
/api/sysInfo/network/LAN	All LAN information	R	
/api/sysInfo/network/LAN/1	MAC address	R	xx:xx:xx:xx:xx:xx
	IP address	R	xxx.xxx.xxx.xxx
/api/io/ir/{ioName}	IR - value	R	By data type
/api/io/ir/{ioname}/irvalue	IR - value	RW	By data type
/api/io/sp/{ioName}/spStatus	SP - system power Status	R	0, 1, 2
/api/io/sp/{ioName}/spLowerLimitValue	SP - system power lower	R	Float
	limit value		

RESTful API	Description	Access	Format
/api/io/sp/{ioName}/spUpperLimitValue	SP - system power upper	R	Float
	limit value		
/api/io/fp/{ioName}/fpStatus	FP - Field Power Status	R	
/api/io/di/{ioName}/diMode	DI - mode (0: DI, 1:	R	0 or 1
	Counter)		
/api/io/di/{ioName}/diStatus	DI - DI mode - status (0:	R	0 or 1
	OFF, 1: ON)		
/api/io/di/{ioName}/diCounterValue	DI - Counter mode - value	R/W	0 to 4294967295
/api/io/di/{ioName}/diCounterOverflowFlag	DI - Counter mode -	R	0 or 1
	overflow flag (0: Normal,		
	1: Overflow)		
/api/io/di/{ioName}/diCounterOverflowFlag	DI - Counter mode - clear	R/W	0 or 1
Clear	overflow flag (1: Clear)		
/api/io/di/{ioName}/diCounterStatus	DI - Counter mode - status	R/W	0 or 1
	(0: pause, 1: run)		
/api/io/do/{ioName}/doMode	DO - mode (0: DO, 1:	R	0 or 1
	Pulse)		
/api/io/do/{ioName}/doStatus	DO - status (0: OFF, 1:	R/W	0 or 1
	ON)		
/api/io/do/{ioName}/doPulseCount	DO - Pulse mode - count	R/W	0 to 65535
/api/io/do/{ioName}/doPulseOnWidth	DO - Pulse mode - ON	R/W	1 to 65535
	width (unit: 500us)	D (IM	1
/api/io/do/{ioName}/doPulseOffWidth	DO - Pulse mode - OFF	R/W	1 to 65535
	Width (unit: 500us)	D (M)	0 == 1
/api/io/do/{ioivame}/doPuiseStatus	DO - Puise mode - status	R/W	U OF I
(ani/ia/rolay/(iaNama)/rolay/TotalCount	(0: Stop 1: Start)	D	0 to 4204067205
/api/io/relay/{ioName}/relay/otalCount	Relay - total count	R	0 to 4294967295
/api/io/relay/{ioName}/relayCurrentCount	Relay - current count		0 to 4294907295
osot	(1: Posot)	K/ W	0 01 1
esel	(1. Reset)	D /\\/	0 or 1
	status (0: OFF 1: ON)	r, v	0011
/ani/io/ai/fioName}/aiMode	AI - mode (0: disable 1: 0-	D	0 1 2 3 4 5
	$10 \vee 2 \cdot 0.20 \text{ m} = 3 \cdot 4.20$	ĸ	0, 1, 2, 3, 4, 5
	mA burnout 4: 4-20 mA		
	5: ±10 V)		
/api/io/ai/{ioName}/aiValueRaw	AI - raw value	R	0 to 65535
/api/io/ai/{ioName}/aiValueRawMin	AI - minimum raw value	R	0 to 65535
/api/io/ai/{ioName}/aiValueRawMax	AI - maximum raw value	R	0 to 65535
/api/io/ai/{ioName}/aiResetMinValue	AI - reset minimum value	R/W	1
	(1: Reset)		
/api/io/ai/{ioName}/aiResetMaxValue	AI - reset maximum value	R/W	1
	(1: Reset)		
/api/io/ai/{ioName}/aiStatus	AI - status (0: normal, 1:	R	0, 1, 2, 3
	burnout, 2: over range, 3.		
	under range)		
/api/io/ai/{ioName}/aiBurnoutValueScaled	AI - scaled burnout value	R	Float
/api/io/ai/{ioName}/aiValueScaled	AI - scaled value	R	Float
/api/io/ai/{ioName}/aiValueScaledMin	AI - minimum scaled value	R	Float
/api/io/ai/{ioName}/aiValueScaledMax	AI - maximum scaled value	R	Float

RESTful API	Description	Access	Format
/api/io/ao/{ioName}/aoMode	AO - mode (0: disable, 1:	R	0, 1, 2, 3, 4
	0-10 V, 2: 0-20mA, 3: 4-		
	20 mA, 4: +/-10V)		
/api/io/ao/{ioName}/aoValueRaw	AO - raw value	R/W	0 to 65535
/api/io/ao/{ioName}/aoValueScaled	AO - scaled value	R/W	0 to 4294967295
/api/io/rtd/{ioName}/rtdStatus	RTD - Status (0: normal,	R	0 or 1
	1: burnout)		
/api/io/rtd/{ioName}/rtdMode	RTD - Type (0: PT50, 1:	R	
	PT100, 2: PT200, 3:		
	PT500, 4: PT1000; 14: 310		
	Ohm, 15: 620 Ohm, 16:		
	1250 Ohm, 17: 2200 Ohm;		
	20: JPT100, 21: JPT200,		
	22: JPT500, 23: JPT1000;		
	30: NI100, 31: NI200, 32:		
	NI500, 33: NI1000, 34:		
	NI120)		
/api/io/rtd/{ioName}/rtdValueScaled	RTD - scaled value	R	Float
/api/io/rtd/{ioName}/rtdValueScaledMin	RTD - minimum scaled	R	Float
	value		
/api/io/rtd/{ioName}/rtdValueScaledMax	RTD - maximum scaled	R	Float
	value		
/api/io/rtd/{ioName}/rtdResetMinValue	RTD - reset minimum value	R/W	1
	(1: RESET)		
/api/io/rtd/{ioName}/rtdResetMaxValue	RTD - reset maximum	R/W	1
	value (1: RESET)		
/api/io/tc/{ioName}/tcStatus	TC - Status (0: normal, 1:	R	0 or 1
	burnout)		
/api/io/tc/{ioName}/tcType	ТС - Туре (0: Ј Туре, 1: К	R	
	Туре, 2: Т Туре, 3: Е Туре,		
	4: R Type, 5: S Type, 6: B		
	Туре, 7: N Туре, 14:		
	±78.126 mV, 15: ±39.062		
	mV, 16: ±19.532 mV)		
/api/io/tc/{ioName}/tcValueScaled	TC - scaled value	R	Float
/api/io/tc/{ioName}/tcValueScaledMin	TC - minimum scaled value	R	Float
/api/io/tc/{ioName}/tcValueScaledMax	TC - maximum scaled	R	Float
	value		
/api/io/tc/{ioName}/tcResetMinValue	TC - reset minimum value	R/W	1
	(1: RESET)		
/api/io/tc/{ioName}/tcResetMaxValue	TC - reset maximum value	R/W	1
	(1: RESET)		

### **Exception Code**

HTTP S	Status Code	Моха	Status Code/Description	User message
400	Bad Request	101	UnsupportedVersion	The content version specified in
				the request is not supported.
400	Bad Request	102	UnsupportedDocFormat	The document format specified
				in the request is not supported.
400	Bad Request	201	InvalidJsonFormat	The json format in the request
				is not valid.
400	Bad Request	202	InvalidNodeValue	One of the node value is
				invalid.
400	Bad Request	203	WrongChannelOrder	The I/O channels are
				disordered.
400	Bad Request	204	MissingRequiredChannel	A required channel index was
				not specified in the request
				body.
400	Bad Request	206	MissingRequiredNode	A required node was not
				specified in the request body.
400	Bad Request	300	ContentFailed	One of the channel contents in
				the request could not be set.
				Please refer to the detailed
				information.
400	Bad Request	301	ContentFailedToSet	The content in the request
				could not be set (invalid value).
200	ОК	N/A		
404	Bad Request	N/A		
405	Method Not Allowed	N/A		

# **MQTT Rules**

### **Publish Topic**

Торіс	Description	Category	Trigger
{deviceName}/read/device/deviceName	device name	attribute	Interval
{deviceName}/read/device/deviceLocalDateTime	device local date and	attribute	Interval
	time		
{deviceName}/read/device/deviceUpTime	device up time	attribute	Interval
{deviceName}/read/device/firmwareVersion	firmware version	attribute	Interval
{deviceName}/read/device/serialNumber	serial number	attribute	Interval
{deviceName}/read/device/systemError	system error	attribute	Interval
{deviceName}/read/network/lanMac/1	MAC address	attribute	Interval
{deviceName}/read/network/lanIp/1	IP address	attribute	Interval
{deviceName}/read/lastWill	Last Will Topic	attribute	Interval
{deviceName}/read/{ioName}/birValue	BIR - value	attribute	both
			(OnChange)
{deviceName}/read/{ioName}/wirValue	WIR - value	attribute	Interval
{deviceName}/read/{ioName}/dirValue	DIR - value	attribute	Interval
{deviceName}/read/{ioName}/firValue	FIR - value	attribute	Interval
{deviceName}/read/{ioName}/spStatus	SP - system power	attribute	Interval
	Status		

Торіс	Description	Category	Trigger
{deviceName}/read/{ioName}/spLowerLimitValue	SP - system power	attribute	Interval
	lower limit value		
{deviceName}/read/{ioName}/spUpperLimitValue	SP - system power	attribute	Interval
	upper limit value		
{deviceName}/read/{ioName}/fpStatus	FP - Field Power Status	attribute	Interval
{deviceName}/read/{ioName}/diMode	DI - mode (0: DI, 1:	attribute	Interval
	Counter)		
{deviceName}/read/{ioName}/diStatus	DI - DI mode - status	value	both
	(0: OFF, 1: ON)		(OnChange)
{deviceName}/read/{ioName}/diCounterValue	DI - Counter mode -	value	Interval
	value		
{deviceName}/read/{ioName}/diCounterOverflow	DI - Counter mode -	attribute	Interval
Flag	overflow flag (0:		
	Normal, 1: Overflow)		
{deviceName}/read/{ioName}/diCounterOverflow	DI - Counter mode -	attribute	Interval
FlagClear	clear overflow flag (1:		
	Clear)		
{deviceName}/read/{ioName}/diCounterStatus	DI - Counter mode -	value	both
	status (0: pause, 1:		(OnChange)
	run)		
{deviceName}/read/{ioName}/doMode	DO - mode (0: DO, 1:	attribute	Interval
	Pulse)		
{deviceName}/read/{ioName}/doStatus	DO - status (0: OFF,	value	both
	1: ON)		(OnChange)
{deviceName}/read/{ioName}/doPulseCount	DO - Pulse mode -	attribute	Interval
	count		
{deviceName}/read/{ioName}/doPulseOnWidth	DO - Pulse mode - ON	attribute	Interval
	width (unit: 500us)		
{deviceName}/read/{ioName}/doPulseOffWidth	DO - Pulse mode - OFF	attribute	Interval
	width (unit: 500us)		
{deviceName}/read/{ioName}/doPulseStatus	DO - Pulse mode -	value	both
	status (0: Stop 1:		(OnChange)
	Start)		
{deviceName}/read/{ioName}/relayTotalCount	Relay - total count	attribute	Interval
{deviceName}/read/{ioName}/relayCurrentCount	Relay - current count	value	Interval
{deviceName}/read/{ioName}/relayCurrentCount	Relay - reset current	attribute	Interval
Reset	count (1: Reset)		
{deviceName}/read/{ioName}/relayStatus	Relay - Relay mode -	value	both
	status (0: OFF, 1: ON)		(OnChange)
{deviceName}/read/{ioName}/aiMode	AI - mode (0: disable	attribute	Interval
	1: 0-10 V, 2: 0-20		
	mA, 3: 4-20 mA		
	burnout, 4: 4-20 mA,		
	5: ±10 V)		
{deviceName}/read/{ioName}/aiValueRaw	AI - raw value	attribute	Interval
{deviceName}/read/{ioName}/aiValueRawMin	AI - minimum raw	attribute	Interval
	value		- · ·
{deviceName}/read/{ioName}/aiValueRawMax	AI - maximum raw	attribute	Interval
	value		
{deviceName}/read/{ioName}/aiResetMinValue	AI - reset minimum	attribute	Interval
	value (1: Keset)		
{deviceName}/read/{ioName}/aiResetMaxValue	AI - reset maximum	attribute	Interval
	value (1: Reset)	1	1

Торіс	Description	Category	Trigger
{deviceName}/read/{ioName}/aiStatus	AI - status (0: normal,	value	both
	1: burnout, 2: over		(OnChange)
	range, 3. under range)		
{deviceName}/read/{ioName}/aiBurnoutValueSc	AI - scaled burnout	attribute	Interval
aled	value		
{deviceName}/read/{ioName}/aiValueScaled	AI - scaled value	value	both (interval)
{deviceName}/read/{ioName}/aiValueScaledMin	AI - minimum scaled	attribute	Interval
	value		
{deviceName}/read/{ioName}/aiValueScaledMax	AI - maximum scaled	attribute	Interval
	value		
{deviceName}/read/{ioName}/aoMode	AO - mode (0:	attribute	Interval
	Disable, 1: 0-10 V, 2:		
	0-20mA, 3: 4-20 mA)		
{deviceName}/read/{ioName}/aoValueRaw	AO - raw value	attribute	Interval
{deviceName}/read/{ioName}/aoValueScaled	AO - scaled value	value	both (interval)
{deviceName}/read/{ioName}/aoStatus	AO – status (0:	value	both
	Normal, 1: Fault)		(OnChange)
{deviceName}/read/{ioName}/rtdStatus	RTD - Status (0:	value	both
	normal, 1: burnout)		(OnChange)
{deviceName}/read/{ioName}/rtdMode	RTD - Type (0: PT50,	attribute	Interval
	1: PT100, 2: PT200, 3:		
	PT500, 4: PT1000; 14:		
	310 Ohm, 15: 620		
	Ohm, 16: 1250 Ohm,		
	17: 2200 Ohm; 20:		
	JPT100, 21: JPT200,		
	22: JPT500, 23:		
	JPT1000; 30: NI100,		
	31: NI200, 32: NI500,		
	33: NI1000, 34:		
	NI120, 50: disable)		
{deviceName}/read/{ioName}/rtdValueScaled	RTD - scaled value	value	both (interval)
{deviceName}/read/{ioName}/rtdValueScaledMin	RTD - minimum scaled	attribute	Interval
	value		
{deviceName}/read/{ioName}/rtdValueScaledMa	RTD - maximum	attribute	Interval
x	scaled value		
{deviceName}/read/{ioName}/rtdResetMinValue	RTD - reset minimum	attribute	Interval
	value (1: RESET)		
{deviceName}/read/{ioName}/rtdResetMaxValue	RTD - reset maximum	attribute	Interval
	value (1: RESET)		
{deviceName}/read/{ioName}/tcStatus	TC - Status (0:	value	both
	normal, 1: burnout)		(OnChange)
{deviceName}/read/{ioName}/tcType	TC - Type (0: J Type,	attribute	Interval
	1: K Type, 2: T Type,		
	3: E Type, 4: R Type,		
	5: S Type, 6: B Type,		
	7: N Type, 14:		
	±78.126 mV, 15:		
	±39.062 mV, 16:		
	±19,532 mV. 50:		
	disable)		
{deviceName}/read/{ioName}/tcValueScaled	, TC - scaled value	value	both (interval)

Торіс	Description	Category	Trigger
{deviceName}/read/{ioName}/tcValueScaledMin	TC - minimum scaled	attribute	Interval
	value		
{deviceName}/read/{ioName}/tcValueScaledMax	TC - maximum scaled	attribute	Interval
	value		
{deviceName}/read/{ioName}/tcResetMinValue	TC - reset minimum	attribute	Interval
	value (1: RESET)		
{deviceName}/read/{ioName}/tcResetMaxValue	TC - reset maximum	attribute	Interval
	value (1: RESET)		
{deviceName}/write/{ioName}/tcResetMinValue	TC - reset minimum	attribute	Interval
	value (1: RESET)		
{deviceName}/write/{ioName}/tcResetMaxValue	TC - reset maximum	attribute	N/A
	value (1: RESET)		

### Subscribe Topic

Торіс	Description	Template	Category
{deviceName}/write/{ioName}/birValue	BIR - value	0 to 1	value
{deviceName}/write/{ioName}/wirValue	WIR - value	-32768 to 32767	value
{deviceName}/write/{ioName}/dirValue	DIR - value	-2147483648 to	value
		2147483647	
{deviceName}/write/{ioName}/firValue	FIR - value	Float	value
{deviceName}/write/{ioName}/diCounterVal	DI - Counter mode -	0 to	value
ue	value	4294967295	
{deviceName}/write/{ioName}/diCounterOv	DI - Counter mode -	0 or 1	attribute
erflowFlagClear	clear overflow flag (1:		
	Clear)		
{deviceName}/write/{ioName}/diCounterSta	DI - Counter mode -	0 or 1	value
tus	status (0: pause, 1: run)		
{deviceName}/write/{ioName}/doStatus	DO - status (0: OFF, 1:	0 or 1	value
	ON)		
{deviceName}/write/{ioName}/doPulseCoun	DO - Pulse mode - count	0 to 65535	attribute
t			
{deviceName}/write/{ioName}/doPulseOnWi	DO - Pulse mode - ON	1 to 65535	attribute
dth	width (unit: 500us)		
{deviceName}/write/{ioName}/doPulseOffWi	DO - Pulse mode - OFF	1 to 65535	attribute
dth	width (unit: 500us)		
{deviceName}/write/{ioName}/doPulseStatu	DO - Pulse mode -	0 or 1	value
s	status (0: Stop 1: Start)		
{deviceName}/write/{ioName}/relayCurrent	Relay - reset current	0 or 1	attribute
CountReset	count (1: Reset)		
{deviceName}/write/{ioName}/relayStatus	Relay - Relay mode -	0 or 1	value
	status (0: OFF, 1: ON)		
{deviceName}/write/{ioName}/aiResetMinV	AI - reset minimum	1	attribute
alue	value (1: Reset)		
{deviceName}/write/{ioName}/aiResetMaxV	AI - reset maximum	1	attribute
alue	value (1: Reset)		
{deviceName}/write/{ioName}/aoValueRaw	AO - raw value	0 to 65535	attribute
{deviceName}/write/{ioName}/aoValueScale	AO - scaled value	0 to	value
d		4294967295	
{deviceName}/write/{ioName}/rtdResetMinV	RTD - reset minimum	1	attribute
alue	value (1: RESET)		

{deviceName}/write/{ioName}/rtdResetMax	RTD - reset maximum	1	attribute
Value	value (1: RESET)		
{deviceName}/write/{ioName}/tcResetMinV	TC - reset minimum	1	attribute
alue	value (1: RESET)		
{deviceName}/write/{ioName}/tcResetMaxV	TC - reset maximum	1	attribute
alue	value (1: RESET)		

## **Import Self-Signed Certificate**

When using web service via https, you must import the self-signed certificate before using the web service via https, or the browser may block the connection. Take the following steps to import the self-signed certificate, which was generated by the ioThinx 4510, into the browser.

- 1. Download the self-signed certificate from the ioThinx 4510.
- 2. From the Chrome browser, click **Settings**.



3. Click **Advanced** at the bottom of the browser window and then locate **Manage certificates**.

🔅 Settings	× +		- 🗆 X
$\leftrightarrow$ $\rightarrow$ $C$ $\odot$ Chron	me   chrome://settings		☆ \varTheta :
≡ Settings	Q Search settings		
	Safe Browsing Protects you and your device from dangerous sites	-	-
	Help improve Safe Browsing Sends some system information and page content to Google		
	Automatically send usage statistics and crash reports to Google		
	Use a web service to help resolve spelling errors Smarter spell-checking by sending what you type in the browser to Google		
	Send a "Do Not Track" request with your browsing traffic		
	Allow sites to check if you have payment methods saved	-	
	Use a prediction service to load pages more quickly	-	
	Manage certificates Manage HTTPS/SSL certificates and settings	Z	
	Content settings Control what information websites can use and what content they can show you	Þ	-
	Clear browsing data Clear history, cookies, cache, and more	•	•

4. Click the Trusted Root Certification Authorities tab and then click Import

Certificates					×
Intended purpose:	<all></all>				~
Intermediate Certifica	tion Au	Ithorities Trusted Root Co	ertification Aut	horities Trusted Pub	+ +
Issued To AddTrust Extern Baltimore Cyber Class 3 Public Pri Copyright (c) 19 DigiCert Assured DigiCert Global R DigiCert Global R	al Tru 97 1 ID 100 100	Issued By AddTrust External CA Baltimore CyberTrust Class 3 Public Primary Copyright (c) 1997 Mi DigiCert Assured ID R DigiCert Global Root CA DigiCert Global Root G2 DigiCert Global Root G3 DigiCert High Aggrega	Expiratio 5/30/2020 5/13/2025 8/2/2028 12/31/1999 11/10/2031 11/10/2031 1/15/2038 1/15/2038	Friendly Name The USERTrust DigiCert Baltimor VeriSign Class 3 Microsoft Timest DigiCert DigiCert DigiCert Global R DigiCert Global R DigiCert Global R	
Import Exp	oort	<u>R</u> emove	1110/2001	<u>A</u> dva <u>V</u> iew	nced
				Clo	se

5. Choose the certificate exported by the ioThinx 4510 and then click  $\ensuremath{\textbf{Next}}.$ 

←	Certificate Import Wizard	×
	File to Import Specify the file you want to import.	
	Eile name: \\Mac\Home\Downloads\device.crt Browse	
	Note: More than one certificate can be stored in a single file in the following formats:	
	Personal Information Exchange- PKCS #12 (.PFX,.P12)	
	Cryptographic Message Syntax Standard-PKCS #7 Certificates (.P7B)	
	Microsoft Serialized Certificate Store (.SST)	
	<u>N</u> ext Canc	el

6. Click **Next** until you see the following page, and then click **Finish** to complete the certificate import.

🗧 😺 Certificate Import Wizard	×
Completing the Certificate Impo	ort Wizard
The certificate will be imported after you click Finis	h.
You have specified the following settings:	
Certificate Store Selected by User Trusted Root	Certification Authorities
File Name \\Mac\Home	Downloads\device.crt
	<u>F</u> inish Cancel

7. When the security warning message pops up, click **Yes** to complete the certificate installation.

Security W	/arning	$\times$
	You are about to install a certificate from a certification authority (CA) claiming to represent:	
	192.168.127.254	
	Windows cannot validate that the certificate is actually from "192.168.127.254". You should confirm its origin by contacting "192.168.127.254". The following number will assist you in this process:	
	Thumbprint (sha1): DDF09B0E 6468A0E9 A717B860 93A44498 4A82D46E	
	Warning: If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.	
	Do you want to install this certificate?	
	<u>Y</u> es <u>N</u> o	]

8. Open the browser and open the ioThinx 4510's web console. You should see the lock icon to the left of the web address.

M ioThinx 4510 × +		- 0	×
← → C		☆ 0	:
MOXA <sup>®</sup> ioThinx 4510			
	Username		
	Username		
	Password		
	Password		
	Login		
4			ŀ

# Troubleshooting

This section provides troubleshooting instructions for this device.

### Forgot username & password

If you forget your username and password, use a pointed object such as a straightened paper clip to hold down the Reset Button for 10 seconds. This will restart the unit and reset all settings on the device, including the username and password. The factory defaults will be loaded once the READY LED turns green again.

**INFORMATION** The default username is admin, and the default password is moxa.

### Forgot IP address of the unit

If you forget the IP address of the unit, use IOxpress utility to search for the device if IOxpress service is already enabled in **Security**  $\rightarrow$  **Service Settings**. Otherwise, load the factory default settings and access the unit with the default IP address.

**Step 1:** Open IOxpress, go to **Device Library** and click **Device**  $\rightarrow$  **Search** in the menu.

😽 Moxa	IOxpress	_	-		-	-
Project	Device	Configuration	Options	Help	_	
	Se	arch		Ctrl+F		
	W	b Console		Ctrl+W	1	
	De	lete	0	Ctrl+Del	splo	yment
	Era	ise Internal Mem	ory	LUCAL	e Devi	ce
				All		
					No	Device Name
					NO.	Device Martie
	Device	Library				
<b>O</b>	Configu	ration Library		•		
**Step 2:** In the **Search for Devices** window, choose the product series you would like to search in the **By Product Series** dropdown menu, and then click the **Submit** button. IOxpress will start to search the devices and list them in the table.

Search for Devices		0	X
LAN	WAN	CDA	
By Product Series	All		
🔘 By Product Model	All		
🔿 By MAC Address	00;90;E8; 00 : 00 :	01	
🔘 By IP Address	192 . 168 . 1 . 1	(e) to 192 . 168 . 1 . 254	(leave second IP blank if searching for a single device)
		⊙ Mask 255 . 255 . 255 . 0	
		Submit	Cancel

## Failed to update firmware

If the firmware update process fails, the firmware file may be corrupted. Download the firmware file from Moxa's official website. Otherwise, check if the power supply is stable. An unstable power supply can lead to an incomplete firmware update.

**NOTE** This device supports firmware automatic recovery function. If the firmware in the device is corrupted, the system will load the backup firmware automatically to overwrite the corrupted one. When the system is in recovery mode, the RDY LED will blink RED slowly. Do not disconnect the power cable when performing the recovery process. After the recovery process is complete, you can update firmware again.

## Failed to update configuration

If the configuration update process fails, the configuration file may be corrupted. Get the configuration file and update it again. Otherwise, check to see if the power supply is stable. An unstable power supply can result in the configurations not being successfully updated.

## Failed to access the unit through IP address & IOxpress

Incorrect network configurations can result in the user not being able to access the unit. Check if the device and PC are in the same subnet by following the procedure below.

General		Networking Sharing General		
Connection IPv4 Connectivity: IPv6 Connectivity:	No network access	Connect using: You can get IP settings assigned this capability. Otherwise, you n for the appropriate IP settings.	automatically if your network supports sed to ask your network administrator	
Media State:	Enabled	Configure Obtain an IP address auton	atically 4	
Duration:	00:02:37	This connection uses the following items:	Use the following IP address:	
Speed: Details	100.0 Mbps	☑ ? Clert for Morosoft Networks IP address:   ☑ @ Trend Micro NDIS 6.0 Filter Driver Subnet mask:   ☑ @ Ene and Pricer Sharing for Morosoft Networks Default gateway:	192 . 168 . 127 . 1 255 . 255 . 255 . 0 	
Activity ————————————————————————————————————	- Received		automatically r addresses:	
Packets: 3	53 0	Description 3 Alternate DNS server:		
Properties Disable	e Diagnose	Transmission Control Protocol/Internet Protocol. The default wide area network protocol into provides communication across diverse interconnected networks.	Advanced	
	Close		OK Cancel	

**INFORMATION** The default IP address of the device is 192.168.127.254.

This may also occur when you try to configure multiple devices with the same computer. The reason for this could be that multiple devices have the same default IP address. When sending TCP/IP packets, the packet may get sent to the wrong MAC address, as it follows the previous record in the computer's ARP Cache. To rectify this problem, you can erase the ARP Cache records by entering "arp-d" command in the built-in Command-Line tools.



## Failed to enter System Ready Mode

If the RDY LED stays red, and your web console is not accessible, it means that the system is experiencing an error. Follow the steps to recover the system.

**Step 1:** Hold down the RESET button for 30 seconds to trigger the system recovery process. The system will load the backup firmware and then restart the unit. The system is ready when the RDY LED is green.

Step 2: Open the web console and then update the firmware and configurations to the device.