

## Using Wonderware's InTouch with ioLogik 4000 servers (Modbus TCP/IP NA-4010)

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In this Technical Note, we cover the following topics:

1. Obtaining Modbus addresses from the ioLogik 4000 configuration file
2. Configuring Wonderware's InTouch software with the Moxa NA-4010:

### 1. Obtaining Modbus addresses from the ioLogik 4000 configuration file

- 1.1 In order to use ioLogik 4000 servers with Wonderware's InTouch, you will need to obtain the Modbus addresses of each input and output channel that you wish to access. The Modbus address can be obtained by exporting the system configuration.

Run ioAdmin by clicking **Start → Program Files → ioLogik → Utility → ioAdmin**. In the left panel, right click on the ioLogik 4000 server whose address table you wish to export, and then select **Export System Config** to save the configuration file.



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The MOXA Group manufactures one of the world's leading brands of device networking solutions. Products include serial boards, USB-to-serial Hubs, media converters, device servers, embedded computers, Ethernet I/O servers, terminal servers, Modbus gateways, industrial switches, and Ethernet-to-fiber converters. Our products are key components of many networking applications, including industrial automation, manufacturing, POS, and medical treatment facilities.

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## 1.2 The exported system configuration will appear as shown below.

```

ik4000e.txt - Notepad
File Edit Format View Help
ioLogik 4000 Network I/O Server Configuration
=====
Date: 1/20/2006
Time: 10:03:41 AM

1. slice models
-----
Slot No.      Description
00            NA-4010, ioLogik 4000 Ethernet network adaptor
01            M-4211, 2AO, Voltage, -10~10V, 12bit, RTB
02            M-3410, 4AI, Voltage, 0~10V, 12bit, RTB
03            M-1800, 8DI, sink, 24VDC, RTB
04            M-2400, 4DO, sink, MOSFET, 24VDC, 0.5A, RTB

2. slice configurations
-----
00            NA-4010 IP=192.168.12.93,NM=255.255.255.0,GW=192.168.12.254,MAC=00-90-E8-0B-70-02
              watchdog=disable
01            M-4211 Ch01: Safe mode=Safe Value(0x0000)
01            M-4211 Ch02: Safe mode=Safe Value(0x0000)
02            M-3410 -n/a-
03            M-1800 -n/a-
04            M-2400 Ch00: Safe mode=Safe Status(OFF)
04            M-2400 Ch01: Safe mode=Safe Status(OFF)
04            M-2400 Ch02: Safe mode=Safe Status(OFF)
04            M-2400 Ch03: Safe mode=Safe Status(OFF)

3. Modbus address table
-----
Slot No.      Channel No.      I/O type      Modbus Address(WORD)      Modbus Address(BIT)      I/O data Length(bits)
01            00            Output        0x0800/0x00              0x1000                    0x0010
01            01            Output        0x0801/0x00              0x1010                    0x0010
02            00            Input         0x0000/0x00              0x0000                    0x0010
02            01            Input         0x0001/0x00              0x0010                    0x0010
02            02            Input         0x0002/0x00              0x0020                    0x0010
02            03            Input         0x0003/0x00              0x0030                    0x0010
03            00            Input         0x0004/0x00              0x0040                    0x0001
03            01            Input         0x0004/0x01              0x0041                    0x0001
03            02            Input         0x0004/0x02              0x0042                    0x0001
03            03            Input         0x0004/0x03              0x0043                    0x0001
03            04            Input         0x0004/0x04              0x0044                    0x0001
03            05            Input         0x0004/0x05              0x0045                    0x0001
03            06            Input         0x0004/0x06              0x0046                    0x0001
03            07            Input         0x0004/0x07              0x0047                    0x0001
04            00            Output        0x0802/0x00              0x1020                    0x0001
04            01            Output        0x0802/0x01              0x1021                    0x0001
04            02            Output        0x0802/0x02              0x1022                    0x0001
04            03            Output        0x0802/0x03              0x1023                    0x0001

<END>

```

You will use the information in the configuration file to determine each channel's Modbus address. First, you must find the slot number that matches your desired I/O device. In the example shown above, you can see the descriptions for slots 01 to 04 in the first section of the configuration file. Slot 00 is reserved for the ioLogik 4000 network adaptor module.

### Slice modules

Slot No.	Description
01	M-4211, 2AO, Voltage, -10~10V, 12bit, RTB
02	M-3410, 4AI, Voltage, 0~10V, 12bit, RTB
03	M-1800, 8DI, sink, 24VDC, RTB
04	M-2400, 4DO, sink, MOSFET, 24VDC, 0.5A, RTB

- 1.3 Next, you must refer to the third section of the configuration file to determine the Modbus WORD or BIT address that corresponds with the desired slot number and I/O channel. Whether or not you refer to the Modbus WORD or Modbus BIT address depends on that I/O channel's analog/digital configuration. The configuration file will show Modbus WORD/BIT addresses in Hex format, so you will need to convert the information to decimal for Wonderware's InTouch. If we refer to the highlighted areas in the example, we obtain the information below:

### Modbus addresses

Slot No.	Channel No.	I/O type	Modbus Addr.(WORD)	Modbus Addr.(BIT)	I/O Data Length(bits)
01	00	Output	0x0800/0x00	0x1000	0x0010
02	00	Input	0x0000/0x00	0x0000	0x0010
03	00	Input	0x0004/0x00	0x0040	0x0001
04	00	Output	0x0802/0x00	0x1020	0x0001

The information can be summarized as follows:

- (1) Slot 1, Channel 0: M4211(2 channel Analog Output): Modbus address(word) 0x0800 (Hex) = 2048(Decimal)

(2) Slot 2, Channel 0: M3410(4 channel Analog Input): Modbus address(word)  
0x0000 (Hex)=0000(Decimal)

(3) Slot 3, Channel 0: M1800(8 channel Digital Input): Modbus address(bit)  
0x0040 (Hex) =0064(Decimal)

(4) Slot 4, Channel 0: M2400(4 channel Digital Output): Modbus address(bit)  
0x1020 (Hex) =4128(Decimal)

- 1.4 Once you determine the I/O channel's Modbus WORD/BIT address, you obtain its complete Modbus address by referring to the following table.

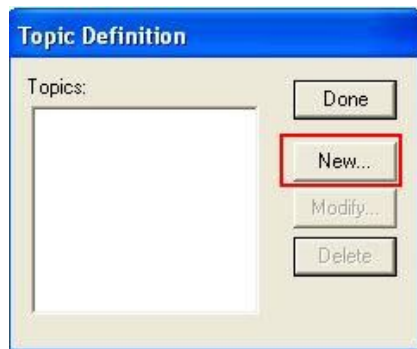
Modbus Data Type	Common names	Read/write behavior	Function codes	Address Format
<b>Digital Output</b>	bits, binary values, flags	single bit, alterable by an application program, read-write	01 = Read Coils 05 = Write Single Coil 15 = Write Multiple Coils	00001 + Modbus WORD/BIT address
<b>Digital Input</b>	binary inputs	single bit, provided by an I/O system, read-only	02 = Read Discrete Inputs	10001 + Modbus WORD/BIT address
<b>Analog Input, Event Counter</b>	analog inputs, event counters	16-bit quantity, provided by an I/O system, read-only	04 = Read Input Registers	30001 + Modbus WORD/BIT address
<b>Analog Output, Pulse Output</b>	analog values, variables, registers, pulse outputs	16-bit quantity, alterable by an application program, read-write	03 = Read Holding Registers 06 = Write Single Register 16 = Write Multiple Registers	40001 + Modbus WORD/BIT address

The Modbus address will be the 5-digit sum of the Modbus WORD/BIT address and the starting address for the data type. For example, channel 0 on slot 3 in the previous example is a digital input. To obtain that channel's Modbus address, you would add the WORD/BIT address, 0064, and the starting address for digital inputs, 10001, to obtain the Modbus address, 10065. The Modbus address of the analog input at channel 0 on slot 02 would be 0000 (Modbus WORD/BIT address) plus 30001 (starting Modbus address for analog inputs), or 30001.

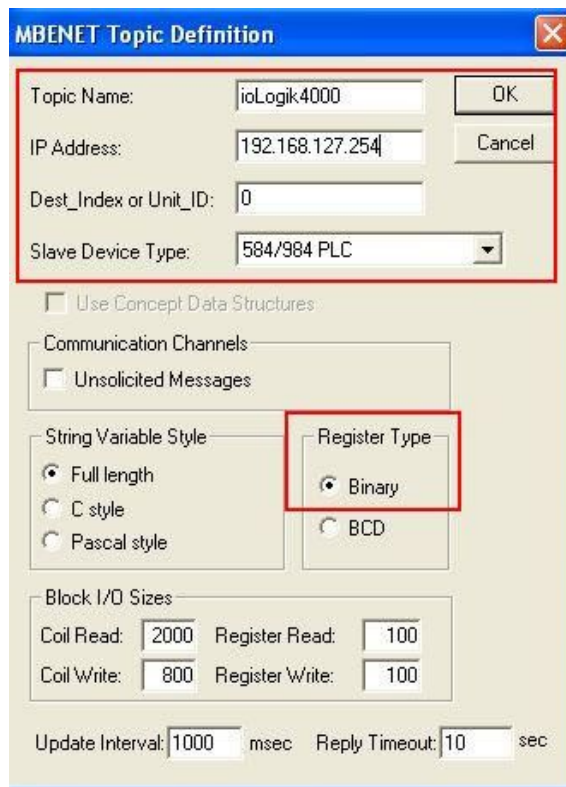
## 2. Configuring Wonderware's InTouch software with the Moxa NA-4010:

- 2.1 Wonderware's InTouch software works with the Wonderware MODBUS Ethernet I/O Server (MBENET) to communicate with ioLogik 4000 servers. The MBENET server supports all devices that support the MODBUS TCP protocol. Make sure that MBENET has been installed before running InTouch. Run the MBENET server by selecting **Start → All Programs → Wonderware → IO Servers**.
- 2.2 Select **Topic Definition** in the **Configure** menu.

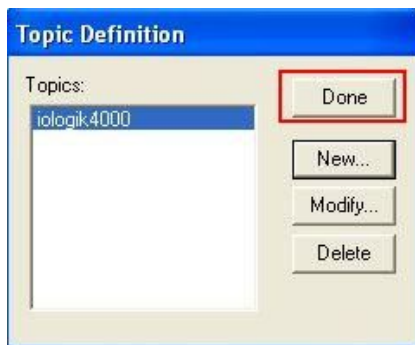


2.3 Select **New**.

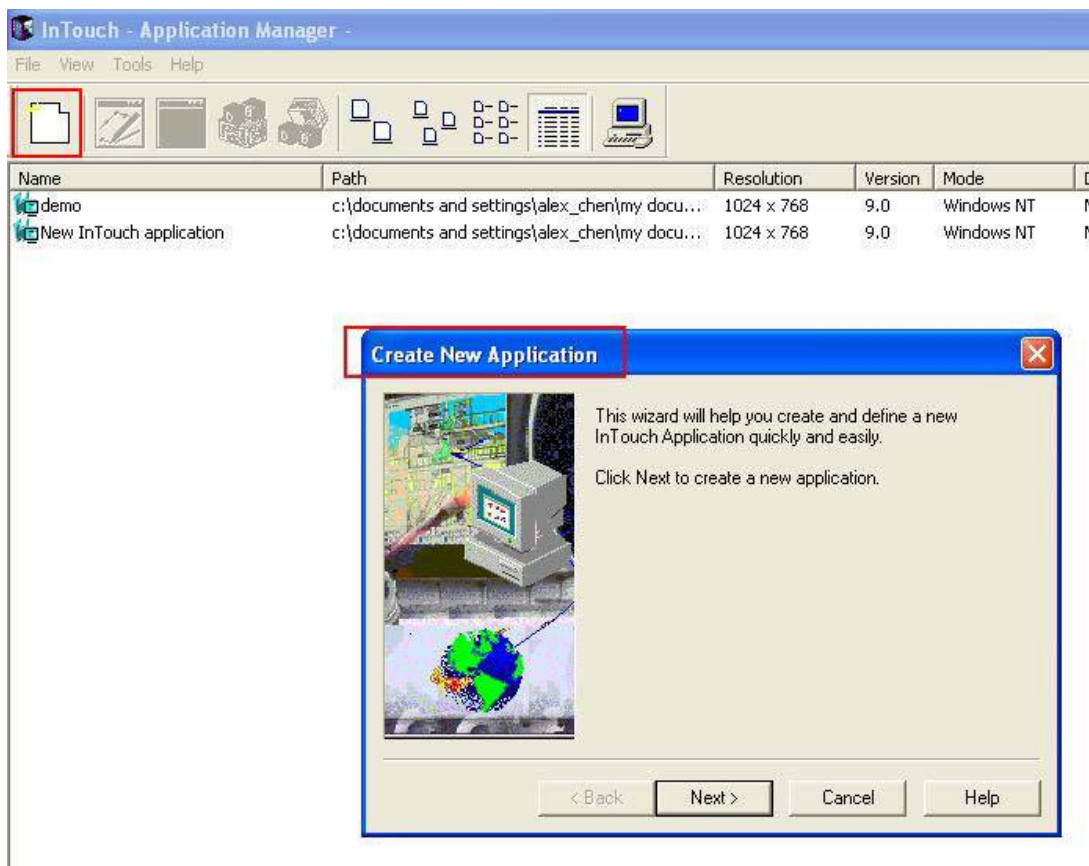
- 2.4 A window for **Topic Definition** will appear. Add "ioLogik4000" as the **Topic Name**, then enter the ioLogik server's IP address (default=192.168.127.254) and the **Dest\_Index or Unit\_ID** as 0. For the **Slave Device Type**, select **584/984 PLC** and for the **Register Type**, select **Binary**.



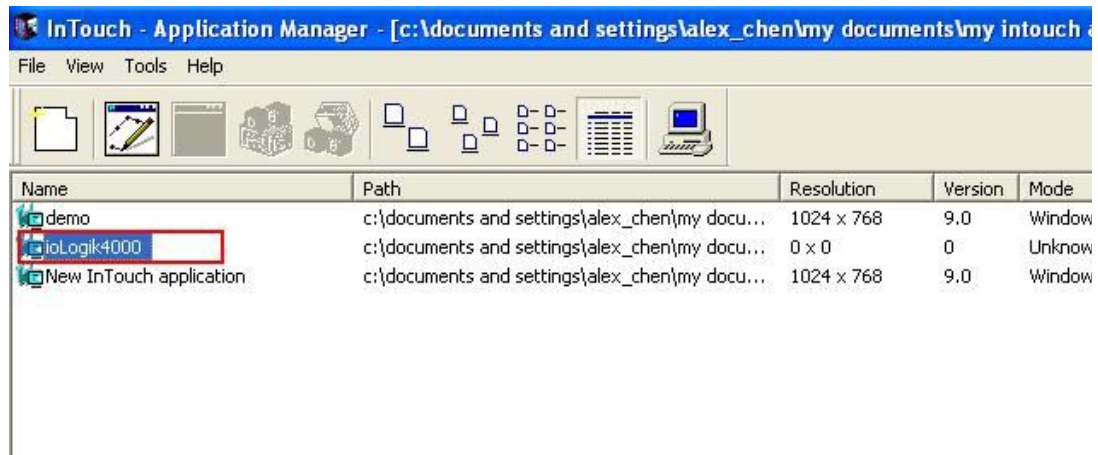
- 2.5 After setting all configurations, click **Done** to save.



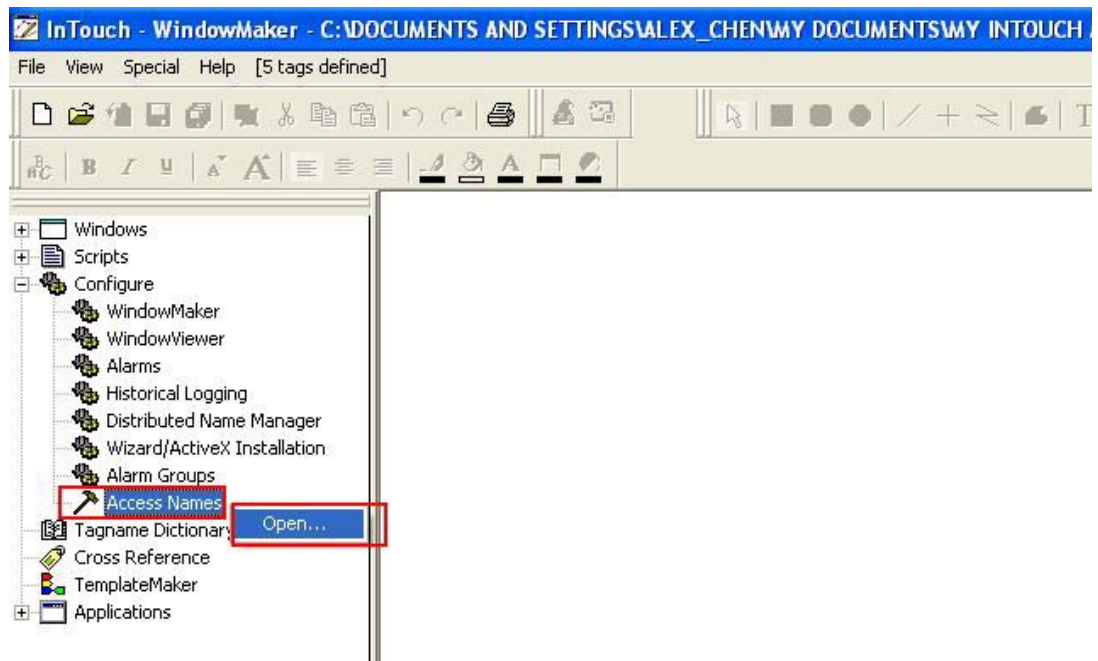
- 2.6 Start InTouch under **Start → All Programs → Wonderware → InTouch**. The **Application Manager** will open. Create a new application in the default path folder and define an application name, such as "ioLogik 4000."



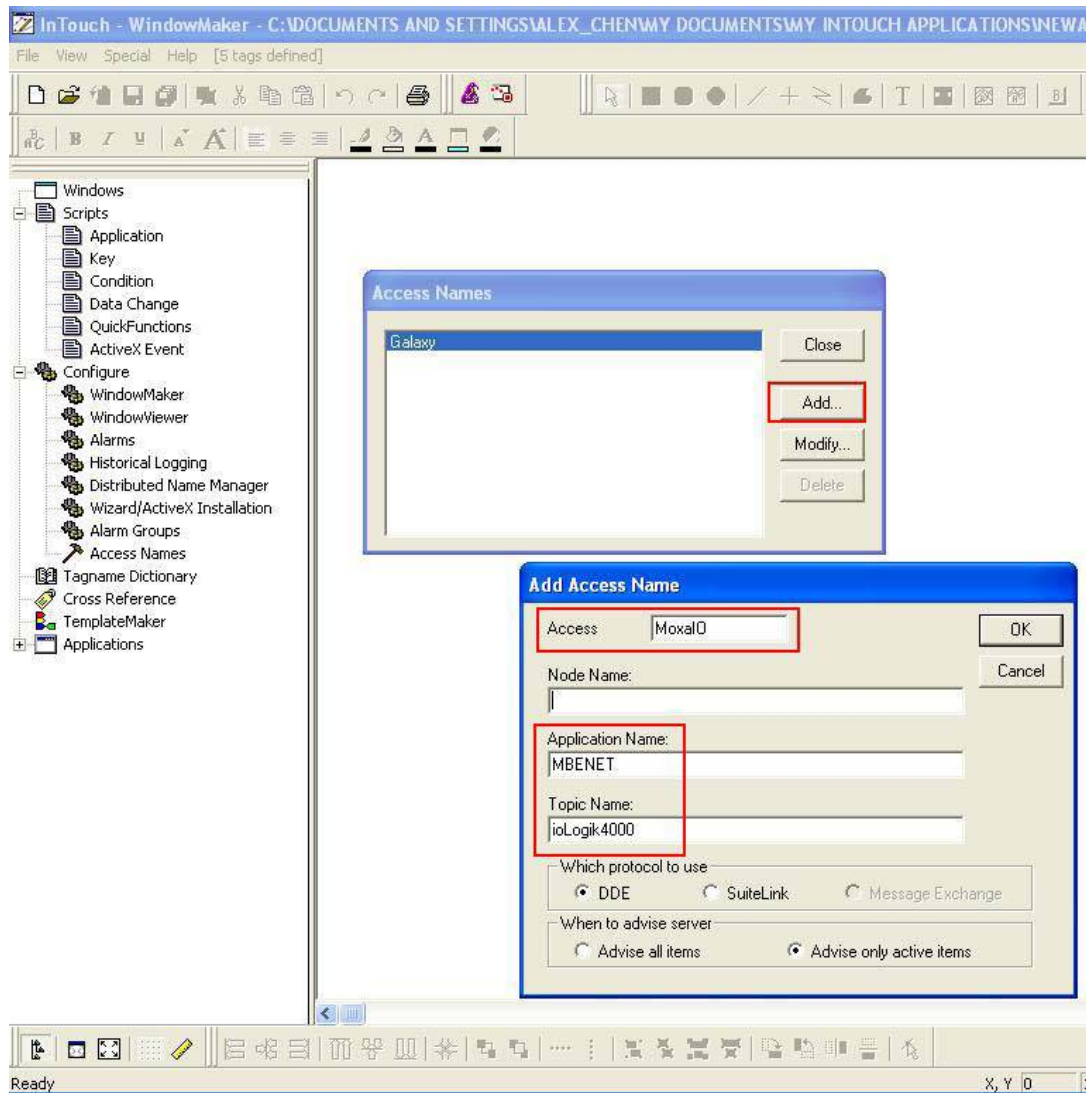
- 2.7 Double-click the application that you defined earlier in order to open **InTouch-WindowMaker**.



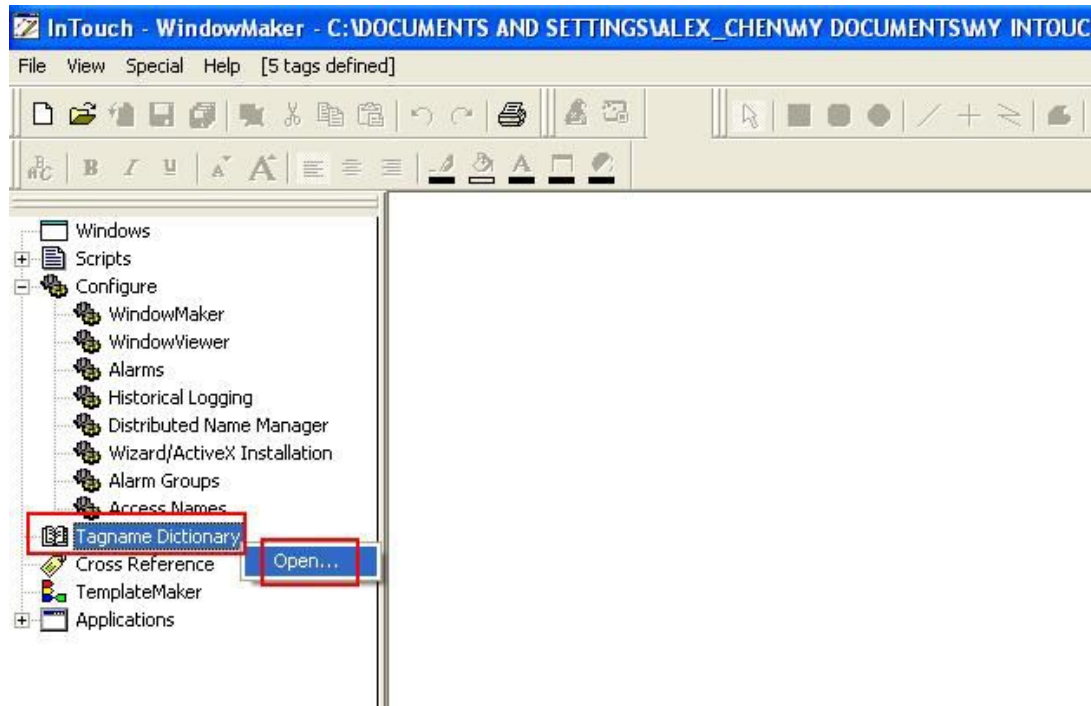
- 2.8 In **InTouch-WindowMaker**, go to **Configure → Access Names → Open...** and click on **Add** in the dialog box that appears. Enter an Access Name, such as "MoxaIO". The Application Name must be "**MBENET**" and the Topic Name must be the same as the MBENET Topic Definition that was defined earlier (i.e. "ioLogik4000").



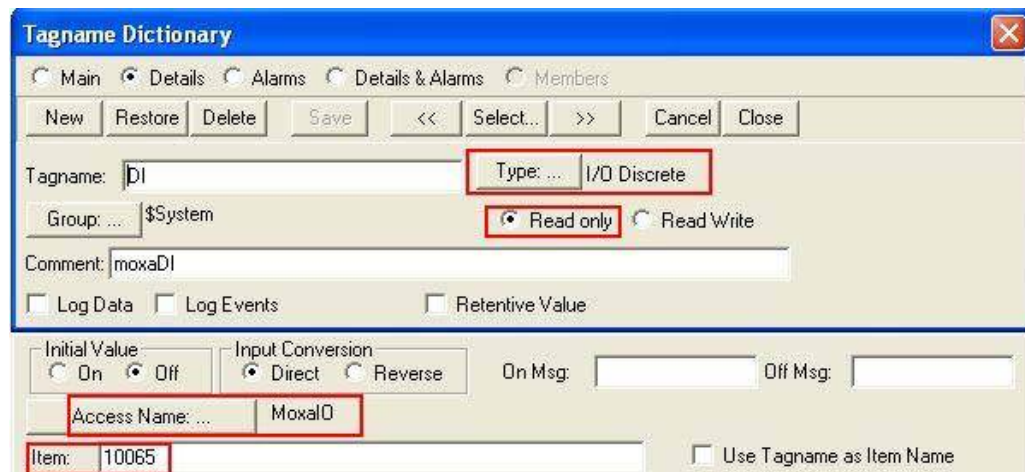




- 2.9 Each I/O channel that you wish to access will need to be defined as a tag with a unique tagname. Go to **Tagname Dictionary** → **Open...** in order to define the tags.



To define a digital input channel, set Type=I/O Discrete, Access Name=the name you defined earlier, and Item=the Modbus address as determined using the configuration file.





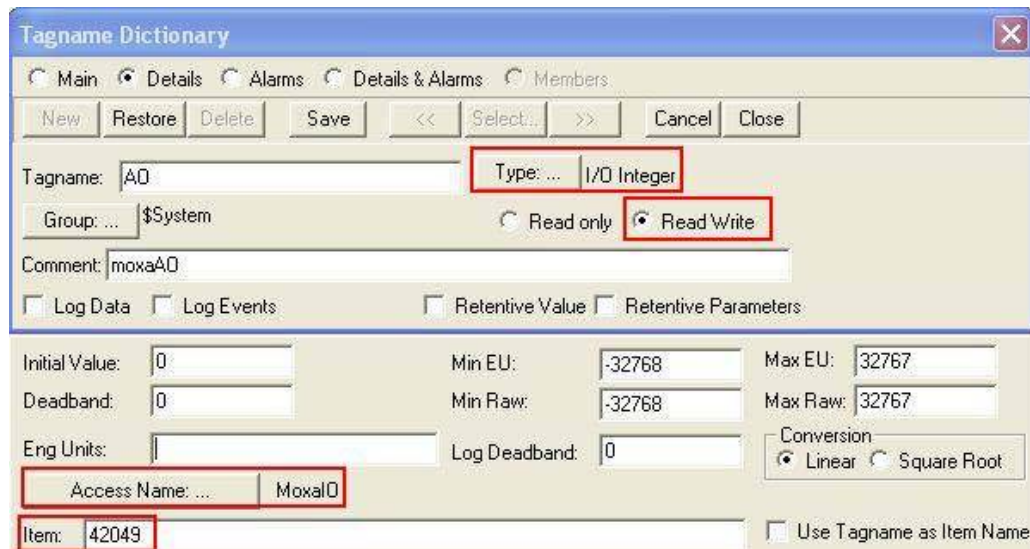
To define a digital output channel, set Type=I/O Discrete, Access Name=the name you defined earlier, and Item=the Modbus address as determined using the configuration file.

The screenshot shows the 'Tagname Dictionary' dialog box with the 'Details' tab selected. The 'Tagname' field contains 'DO'. The 'Type' dropdown is set to 'I/O Discrete'. The 'Group' is '\$System'. The 'Access Name' is 'MoxaDO'. The 'Item' is '04129'. The 'Read/Write' radio button is selected. Other fields include 'Comment' (moxaDO), 'Log Data', 'Log Events', 'Retentive Value', 'Initial Value' (On), 'Input Conversion' (Direct), 'On Msg' (ON), 'Off Msg' (OFF), and 'Use Tagname as Item Name' (unchecked).

To define an analog input channel, set Type=I/O Integer, Access Name=the name you defined earlier, and Item=the Modbus address as determined using the configuration file.

The screenshot shows the 'Tagname Dictionary' dialog box with the 'Details' tab selected. The 'Tagname' field contains 'AI'. The 'Type' dropdown is set to 'I/O Integer'. The 'Group' is '\$System'. The 'Access Name' is 'MoxaAI'. The 'Item' is '30001'. The 'Read only' radio button is selected. Other fields include 'Comment' (moxaAI), 'Log Data', 'Log Events', 'Retentive Value', 'Retentive Parameters', 'Initial Value' (0), 'Deadband' (0), 'Eng Units', 'Min EU' (-32768), 'Max EU' (32767), 'Min Raw' (-32768), 'Max Raw' (32767), 'Log Deadband' (0), 'Conversion' (Linear), and 'Use Tagname as Item Name' (unchecked).

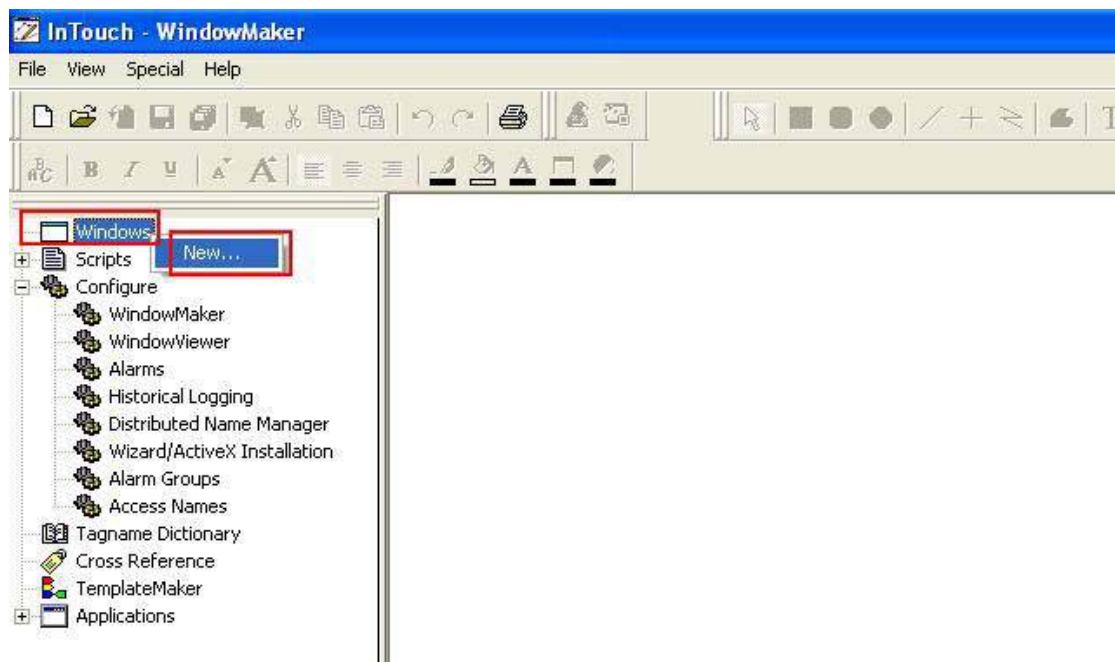
To define an analog output channel, set Type=I/O Integer, Access Name=the name you defined earlier, and Item=the Modbus address as determined using the configuration file.



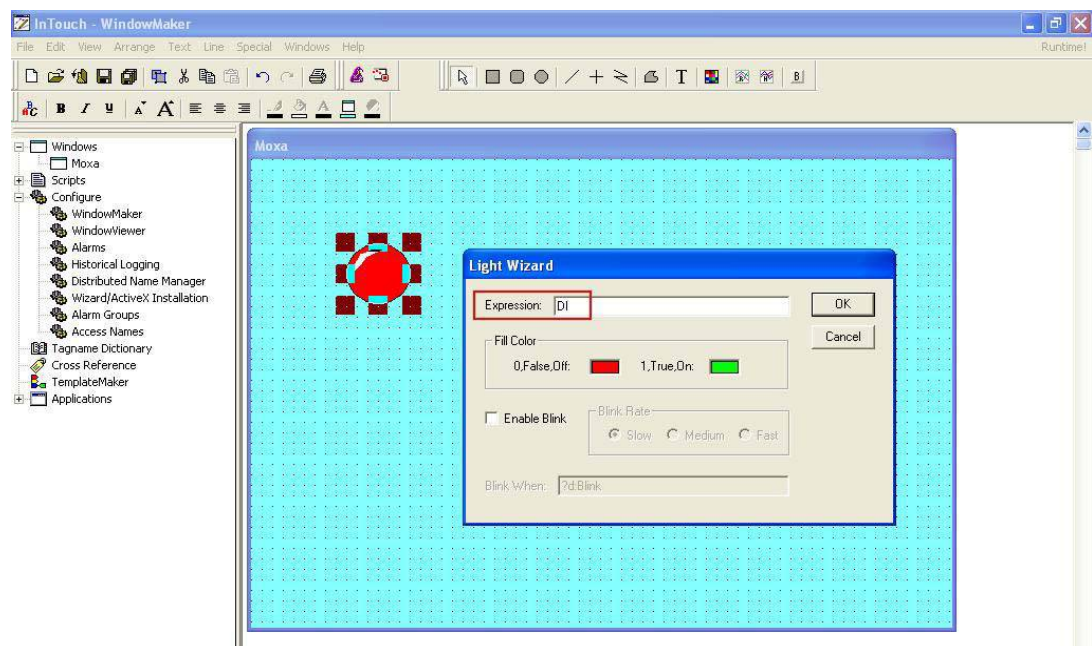
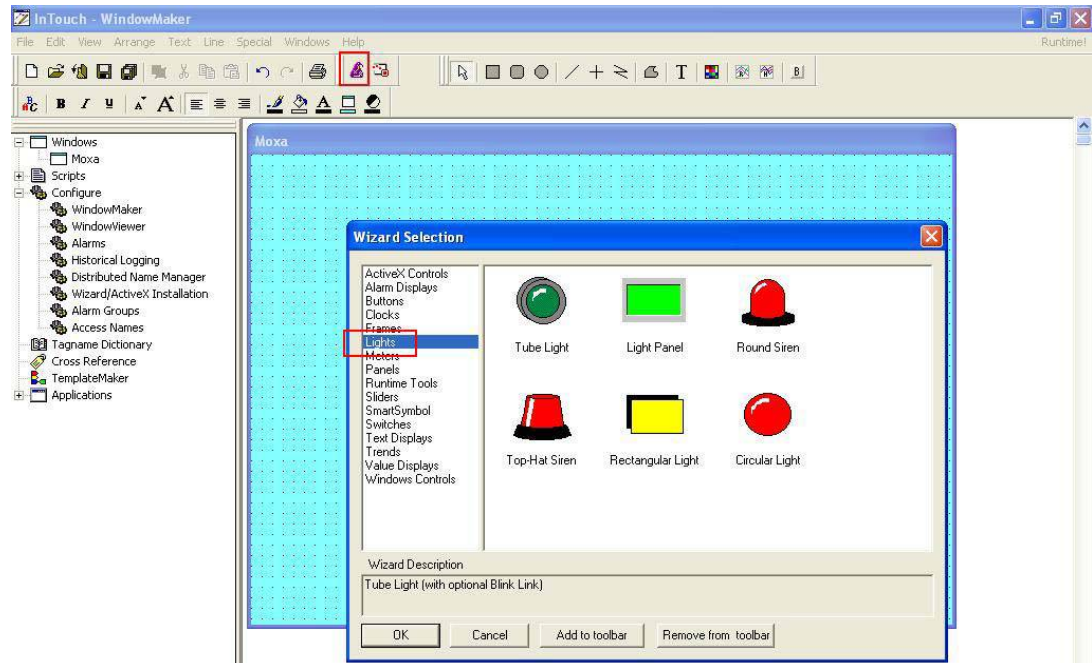
The Tagname Dictionary dialog box is shown with the following settings:

- Tab: Details
- Buttons: New, Restore, Delete, Save, Select..., Cancel, Close
- Tagname: AO
- Type: I/O Integer
- Group: \$System
- Read only: ☐ Read Write: ☒
- Comment: moxaAO
- Log Data: ☐ Log Events: ☐ Retentive Value: ☐ Retentive Parameters: ☐
- Initial Value: 0
- Deadband: 0
- Eng Units:
- Min EU: -32768
- Max EU: 32767
- Min Raw: -32768
- Max Raw: 32767
- Log Deadband: 0
- Conversion: ☒ Linear ☐ Square Root
- Access Name: MoxaIO
- Item: 42049
- Use Tagname as Item Name: ☐

- 2.10 With your I/O channels defined as tags, you will now need to create a window application in order to access the information from these tags. Go to **Windows** → **New...** to create a new window application.

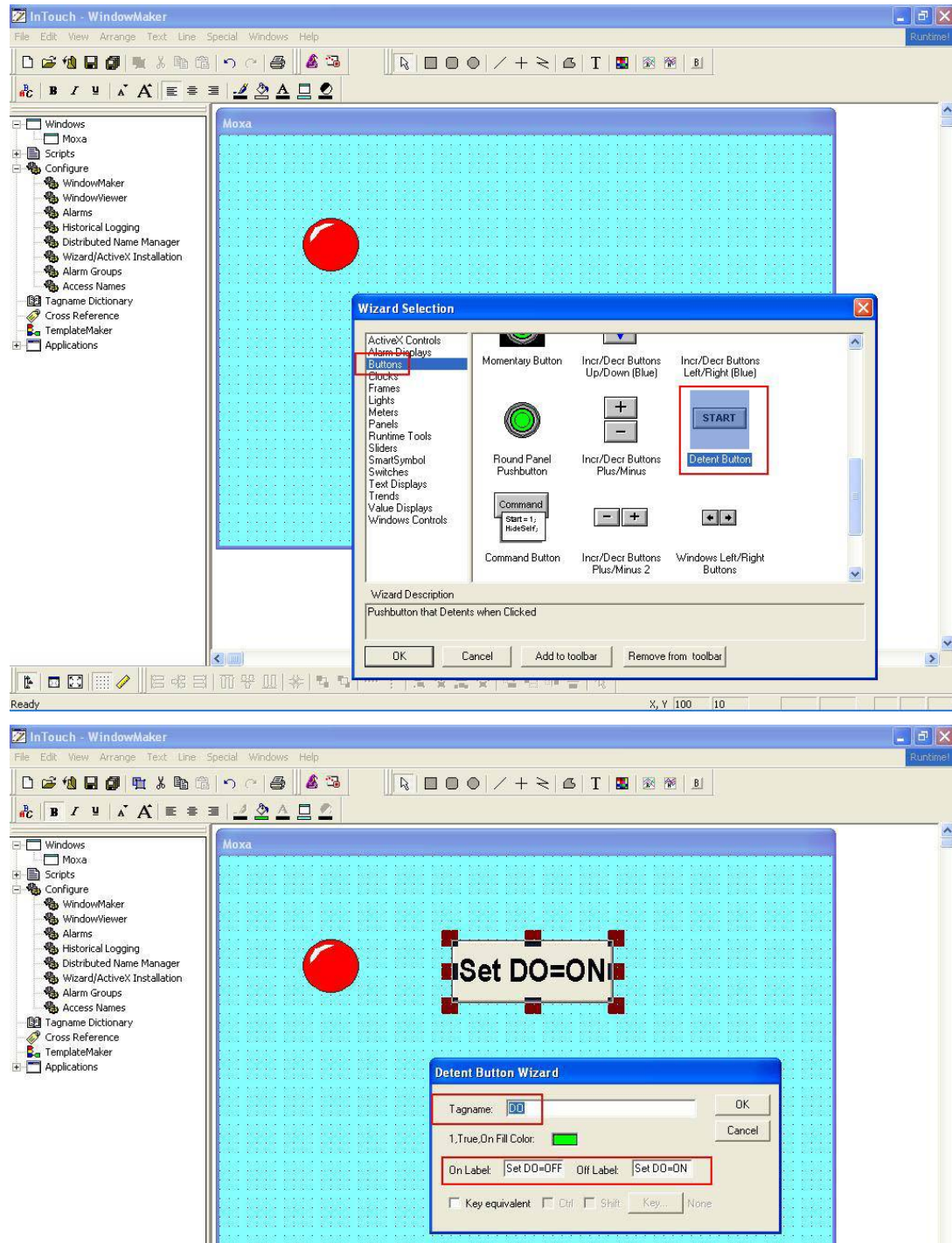


Use the Wizard icon to add lights. Under **Expression**, enter the tag name that corresponds to the desired digital input channel. The light will correspond to that channel's events. You may also set the ON and OFF colors.

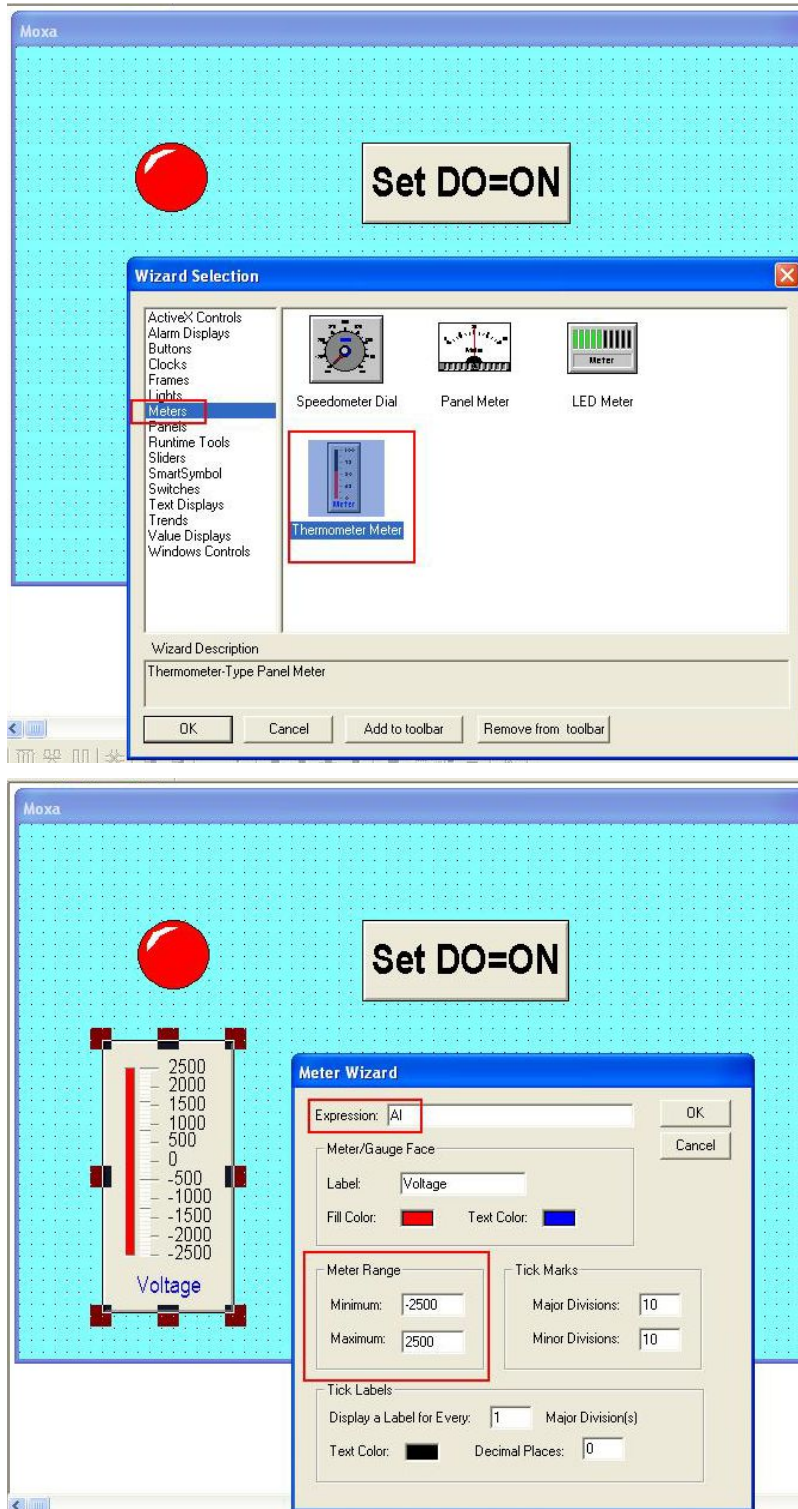




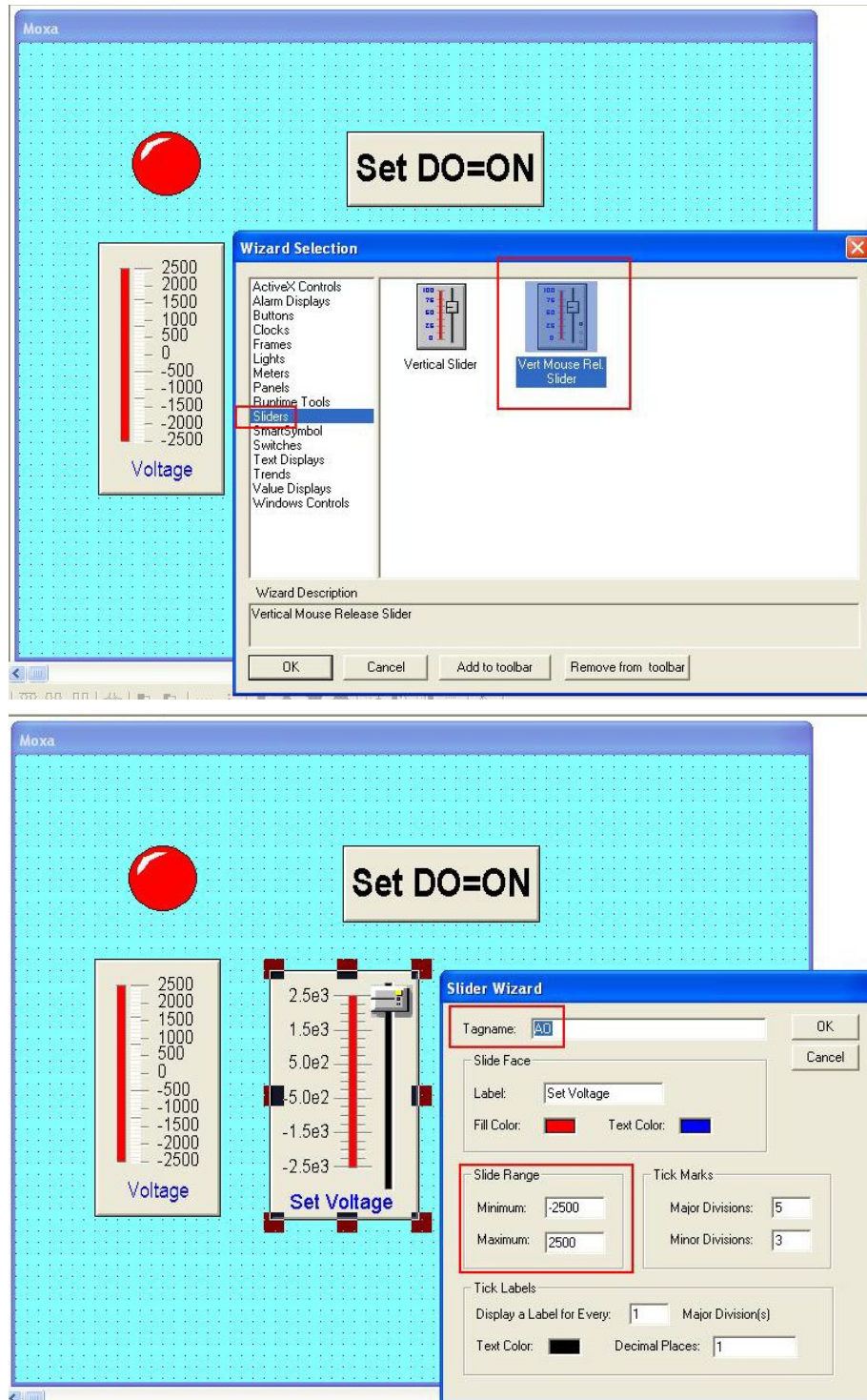
Use the Wizard icon to add a Detent button. Under **Expression** enter the tag name that corresponds to the desired digital output channel and configure the On and Off Labels. The button will correspond to that channel's events.



Use the Wizard icon to add a meter for analog input. Under **Expression**, enter the tag name that corresponds to the desired analog input channel and add a matching meter range.



Use the Wizard icon to add sliders for analog output. Under **Expression**, enter the tag name that corresponds to the desired analog output and set an appropriate slider range.





- 2.11 After you finish configuring your application, click **Runtime** to run the application and view the operation of your I/O devices. You may also view the status of communication between the MBENET server and the ioLogik 4000 server.

