How to use Citect (SCADA) with ioLogik 4000 (Modbus TCP/IP NA-4010 and Modbus Serial NA-4020/NA-4021)

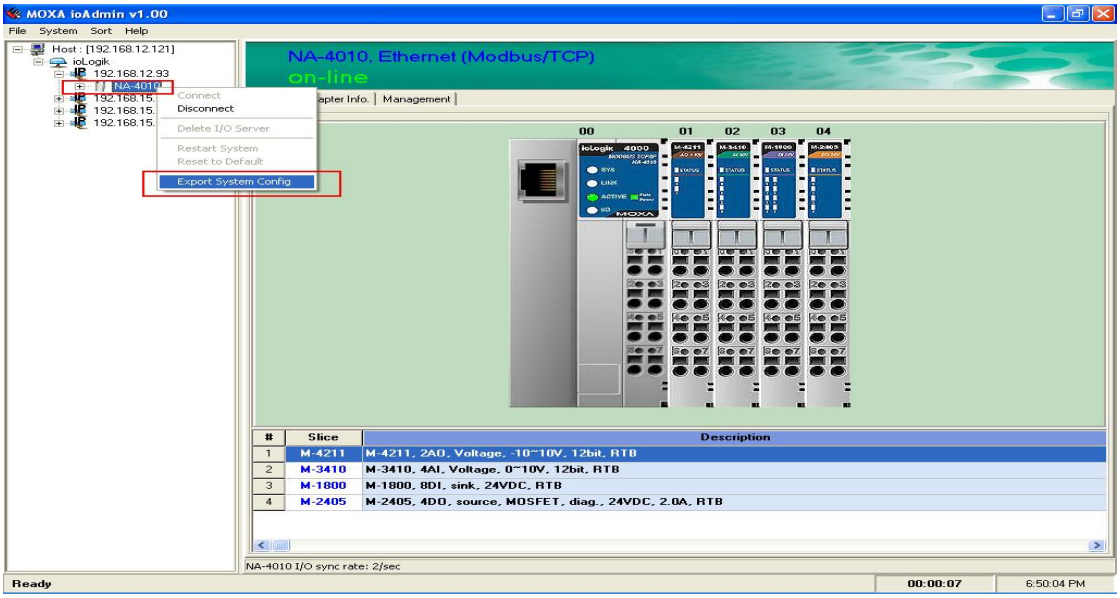
Alex Chen, Senior Engineer, Moxa Technical Support Dept.

In this Technical Note, we cover the following topics:

1. How to export the ioLogik 4000 Modbus address table
2. How to use Citect (SCADA) communication with NA-4010
3. How to use Citect (SCADA) communication with NA-4020 and NA-4021

1. How to export the ioLogik 4000 Modbus address table

1.1 Run ioAdmin by clicking on **Start** → **Program Files** → **ioLogik** → **Utility** → **ioAdmin**. Select the ioLogik4000 whose address table you wish to export, and then press the right mouse button. Next, select **Export System Config** to save the configuration file.



 Released on February 9, 2006

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How to Contact MOXA

Tel: 1-714-528-6777 Web: www.moxa.com
Fax: 1-714-528-6778 Email: info@moxa.com

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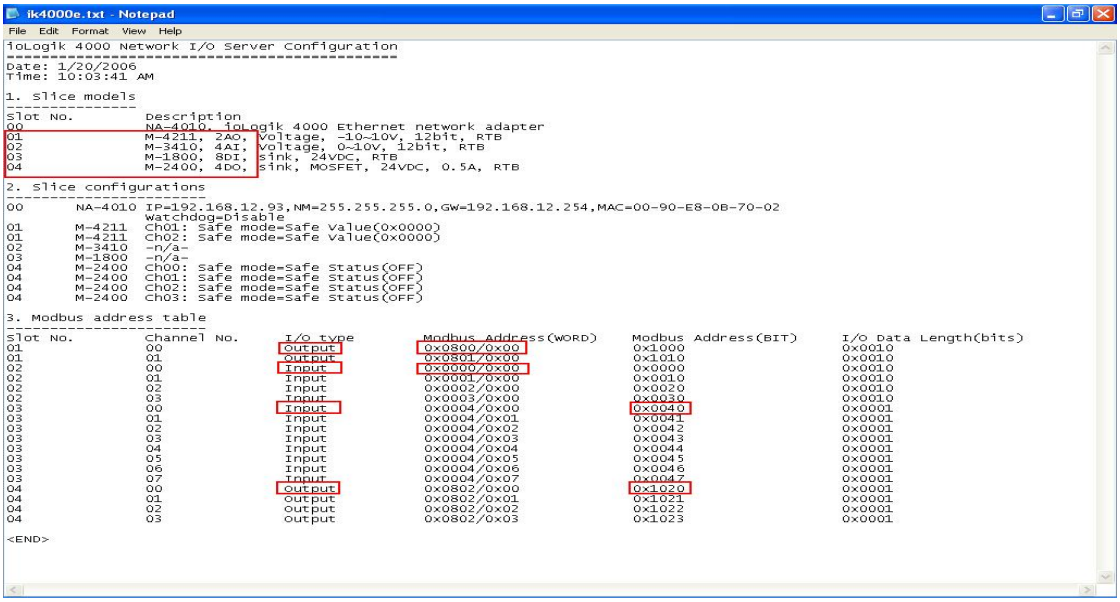
1.2 This table can be used to retrieve the ioLogik4000's slice model name, sequence, and Modbus address table.



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 adapter
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>
```

(1) Slice Models

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

(2) 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

1.3 The information can be summarized as follows:

Slice 1: M4211 (2 channel Analog Output)
Modbus address(word) 0x0800=2048(Decimal)

Slice 2: M3410 (4 channel Analog Input)
Modbus address(word) 0x0000=0000(Decimal)

Slice 3: M1800 (8 channel Digital Input)
Modbus address(bit) 0x0040=0064(Decimal)

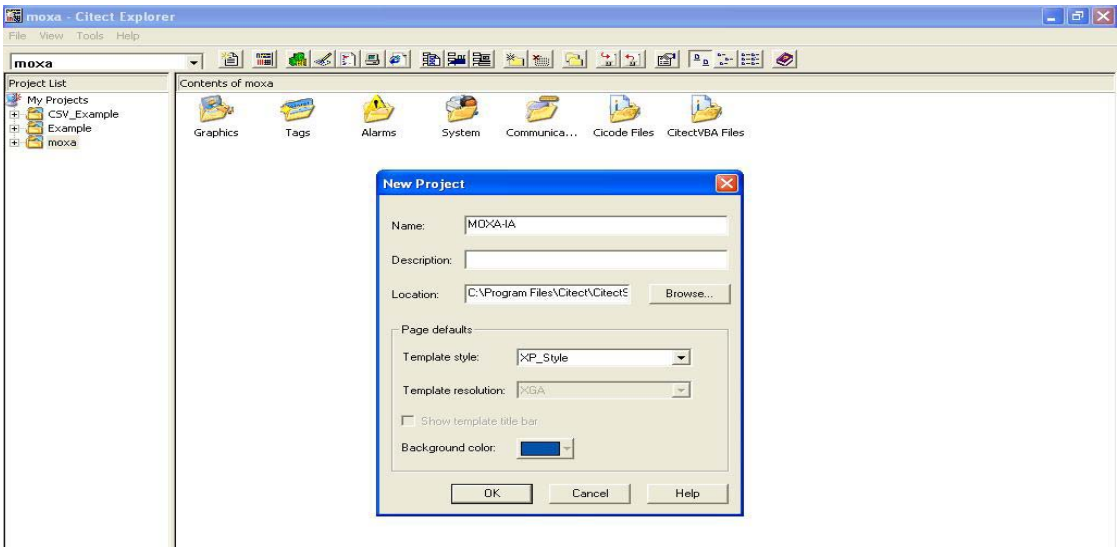
Slice 4: M2400 (4 channel Digital Output)
Modbus address(bit) 0x1020=4128(Decimal)

In the Modbus Memory Map, you need to use different Address Formats to query the different slice models. For example: to Query the Digital Input, you need to use 10065 to get the status of M1800's channel 0. To get the Analog Input, you must use 30001. You will get the M3410 channel 0 value.

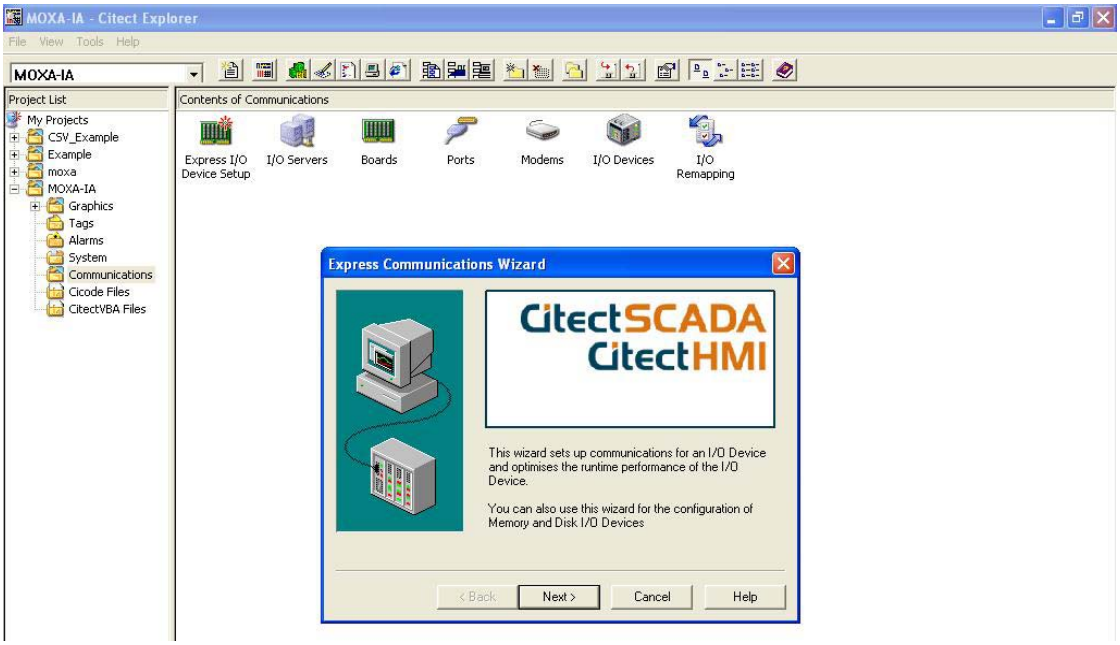
Modbus Data Type	Common Name	Read/Write Behavior	Address Format
Digital Outputs	Bits, binary values, flags	Single bit, alterable by an application program, read-write	00001 09999
Digital Inputs	Binary inputs	Single bit, provided by an I/O system, read-only	10001 19999
Analog Inputs	Analog inputs	16-bit quantity, provided by an I/O system, read-only	30001 39999
Analog Outputs	Analog values, variables, Registers	16-bit quantity, alterable by an application program, read-write	40001 49999

2. How to use Citect (SCADA) communication with NA-4010

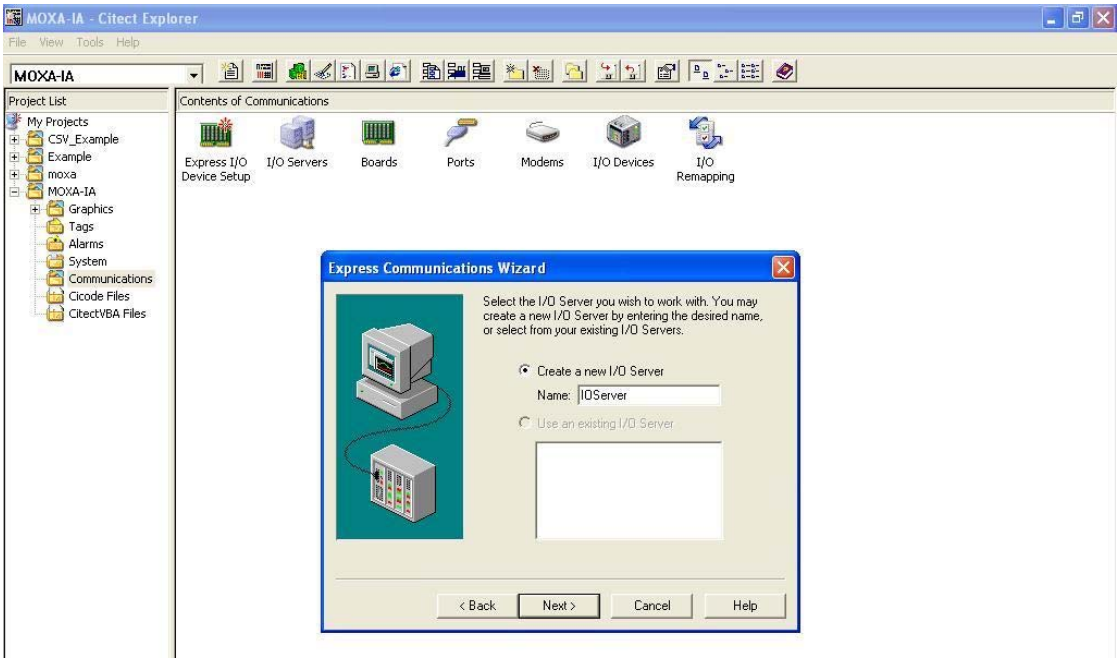
2.1 Run the Citect (SCADA) Explorer and create a new project.



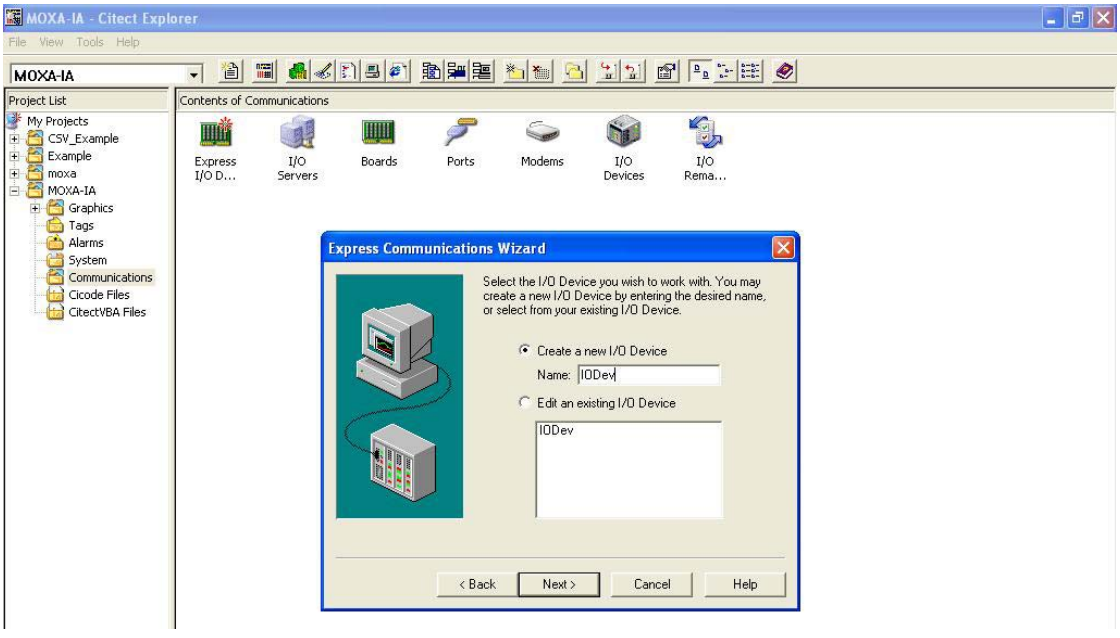
2.2 Select **Communications** and then click on **Next**.



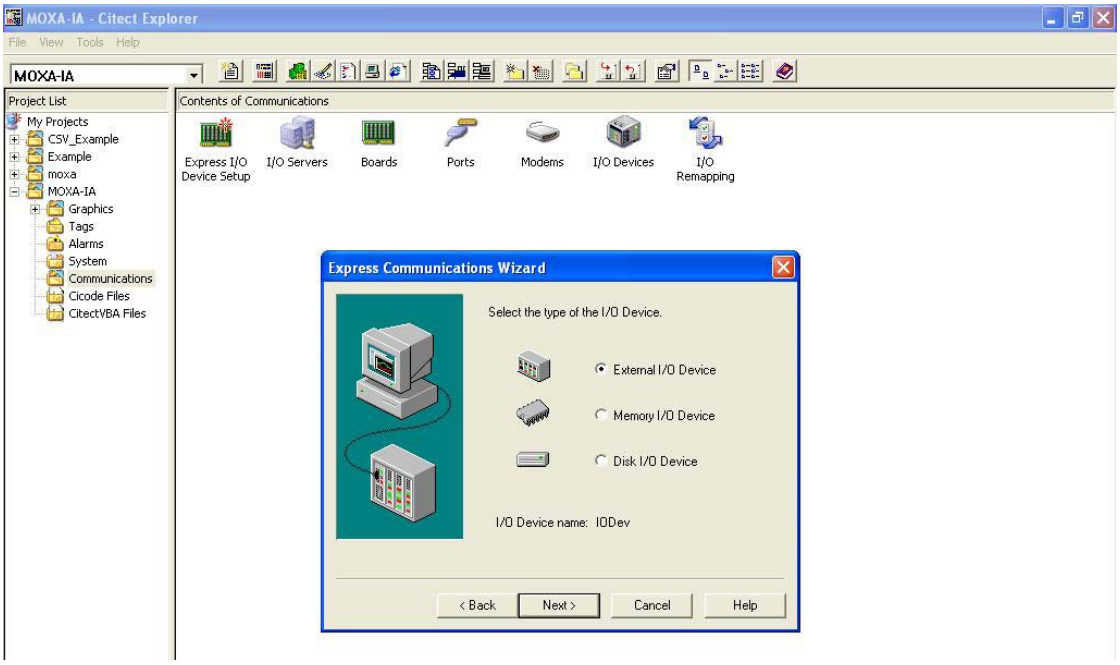
2.3 Create a new I/O Server.



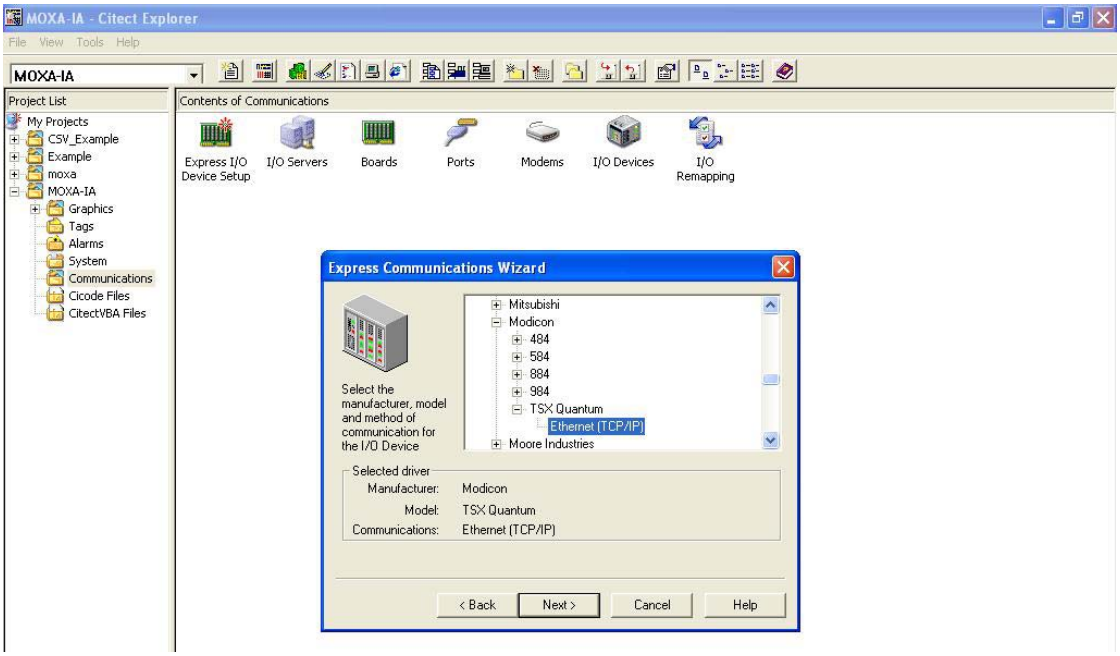
2.4 Create a new I/O Device.



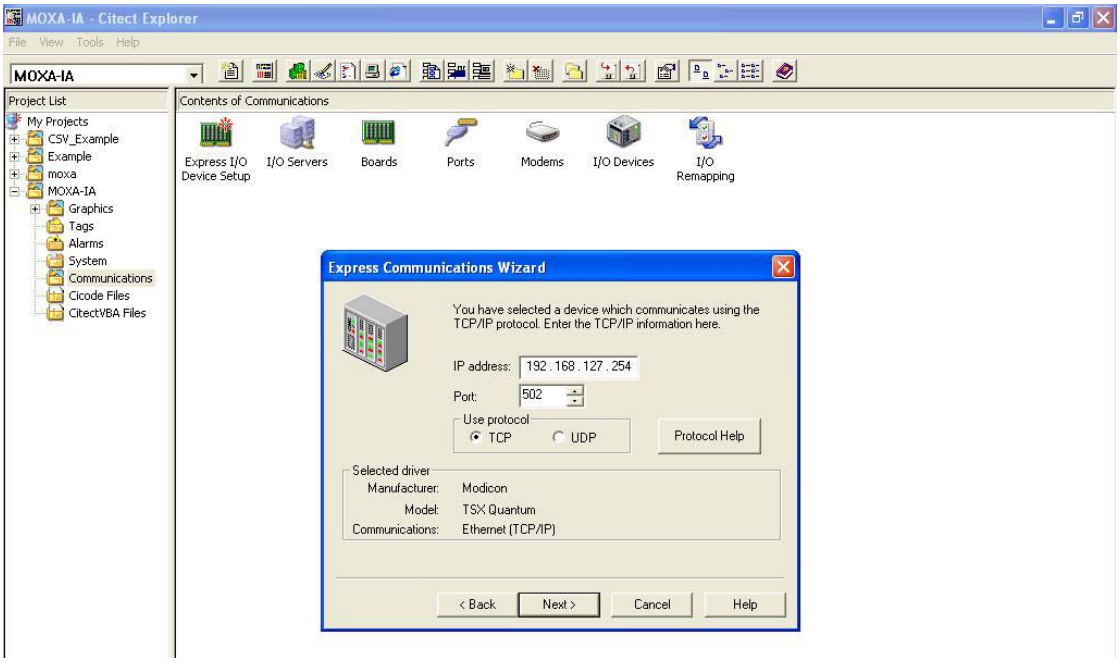
2.5 Select the External I/O device.



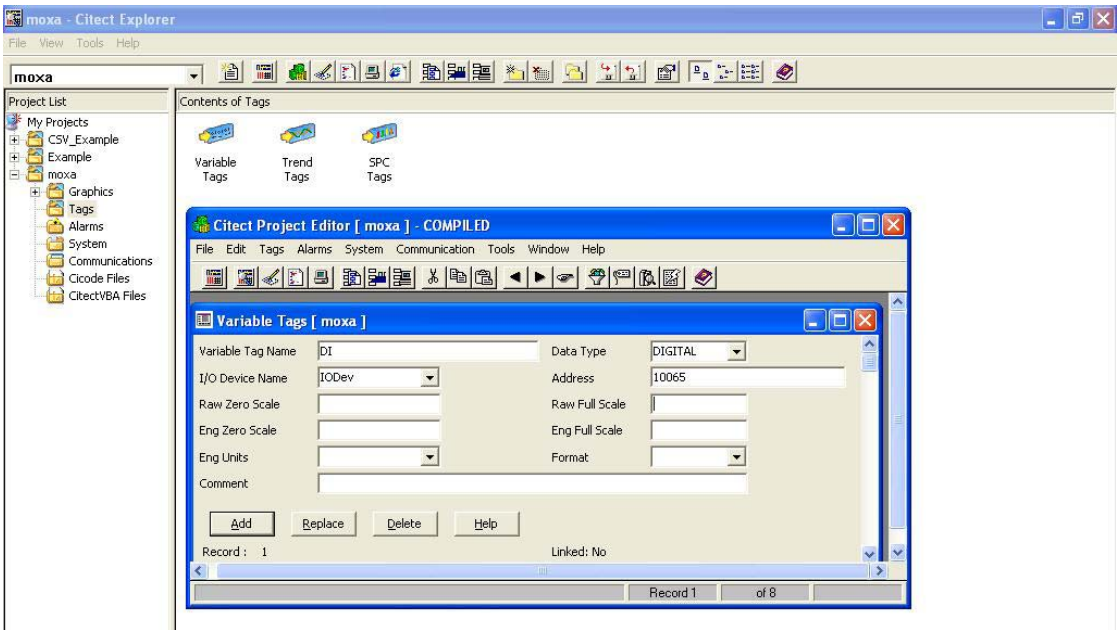
2.6 Select Drivers → Modicon → TSX Qnantum → Ethernet (TCP/IP).



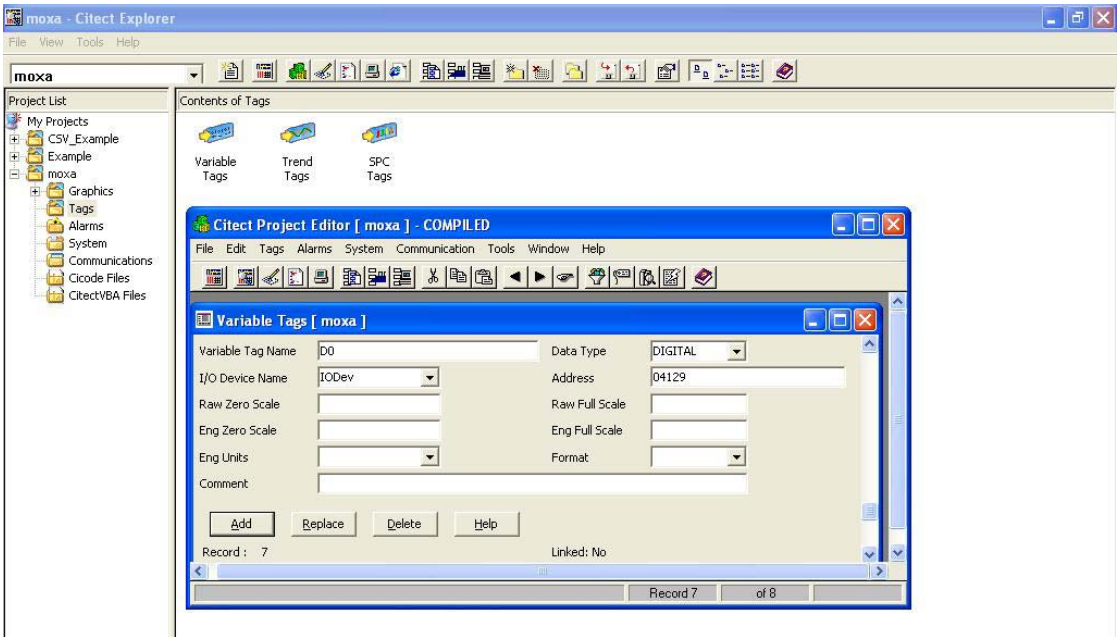
2.7 Define the NA-4010's default IP (192.168.127.254) and Modbus TCP port (502).



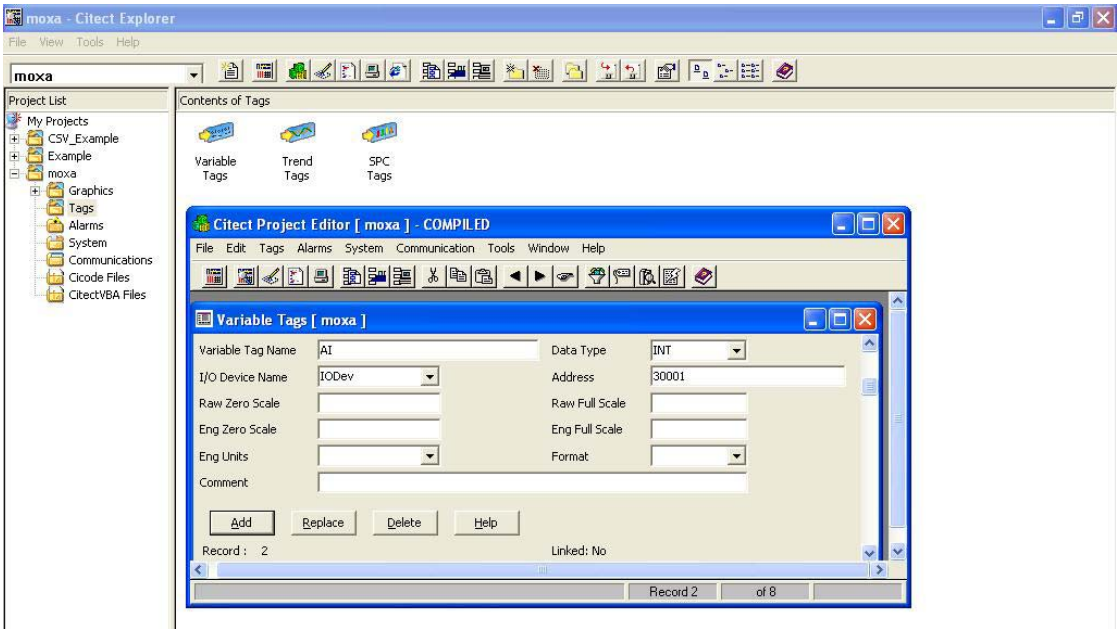
2.8 Select the Tags and choose the Variable Tag. Then, define the DI tag (Data type = DIGITAL, Address = 10065).



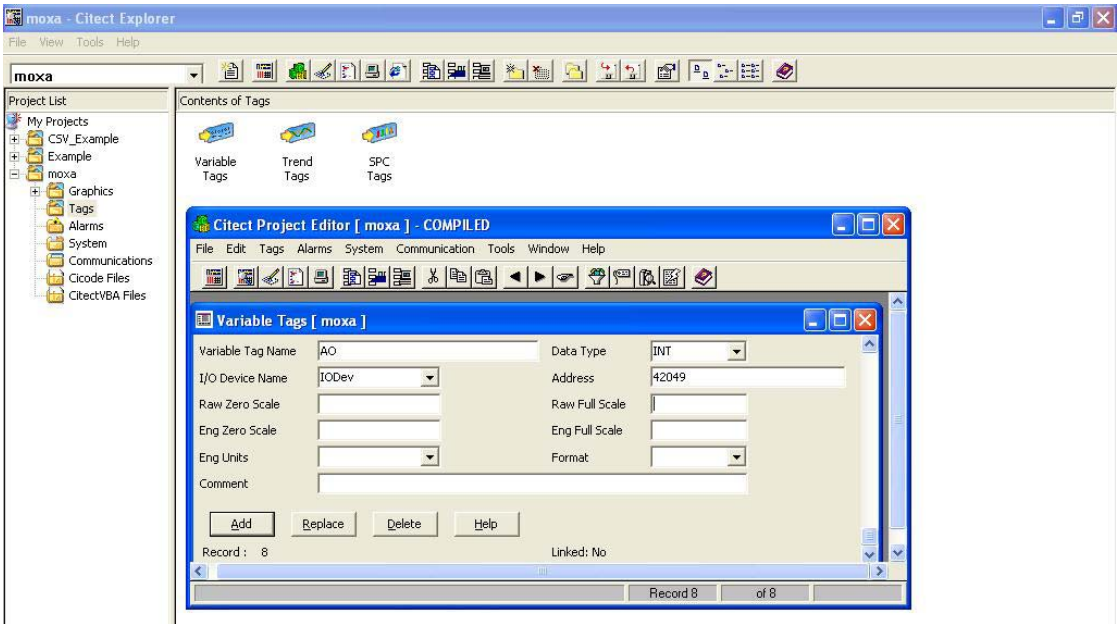
2.9 Define the DO tag (Data type = DIGITAL, Address = 04129).



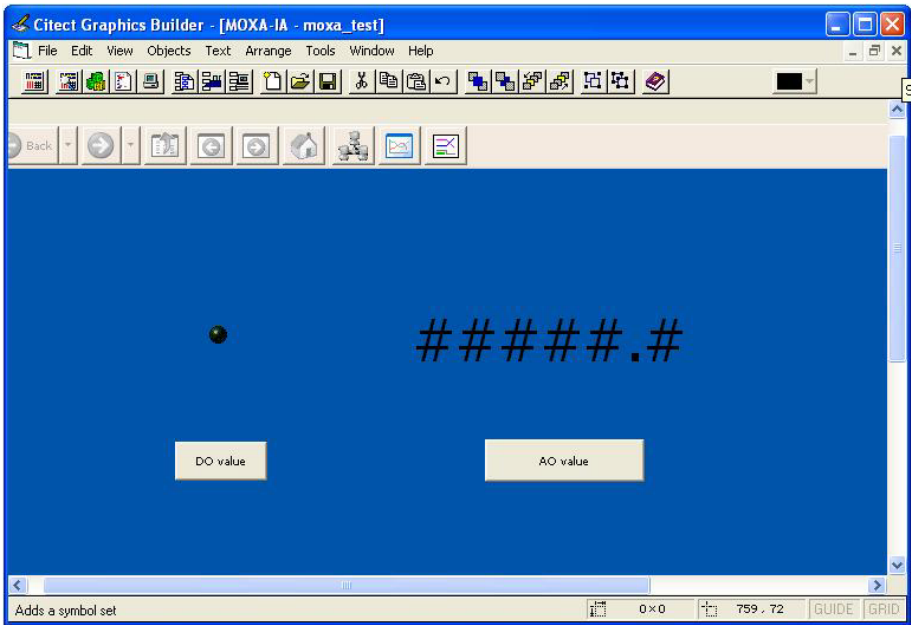
2.10 Define the AI tag (Data type = INT, Address = 30001).



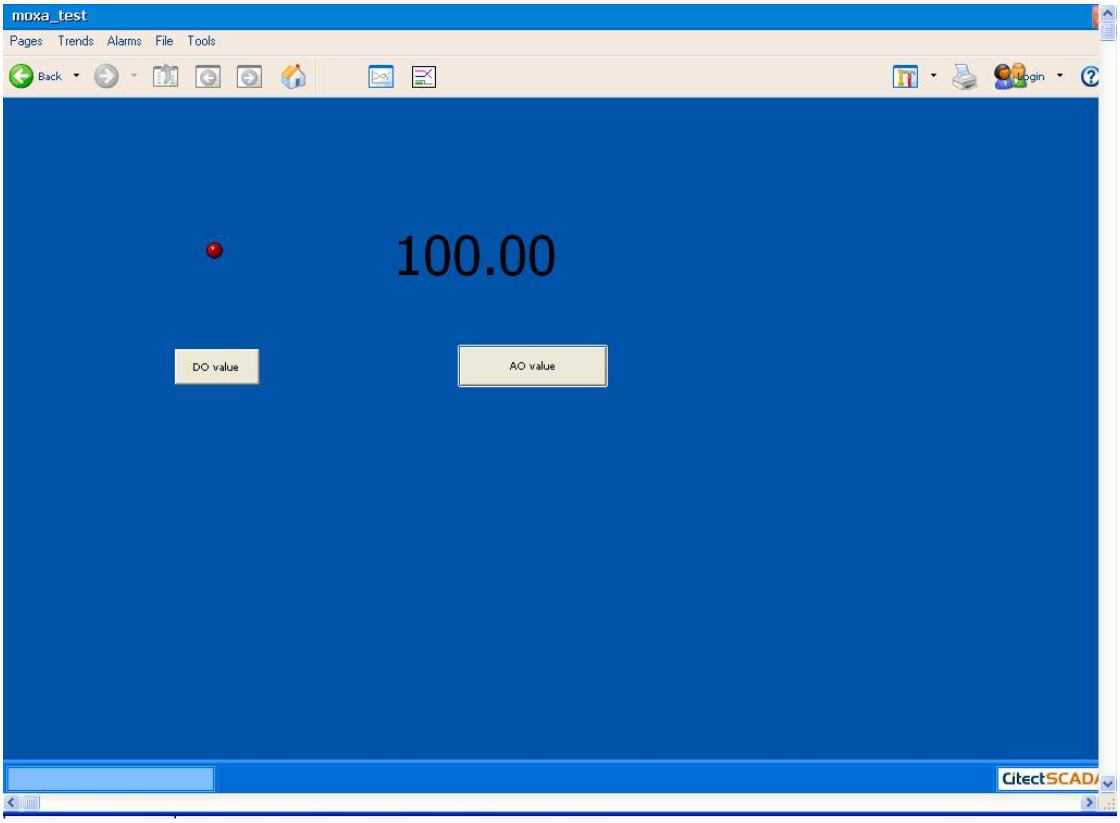
2.11 Define the AO tag (Data type = INT, Address = 42049).



2.12 Then, from the Citect Graphics builder, select the Symbol Set to represent the DI, and select the Number to represent the AI. Finally, select the button to set up the DO and AO values.



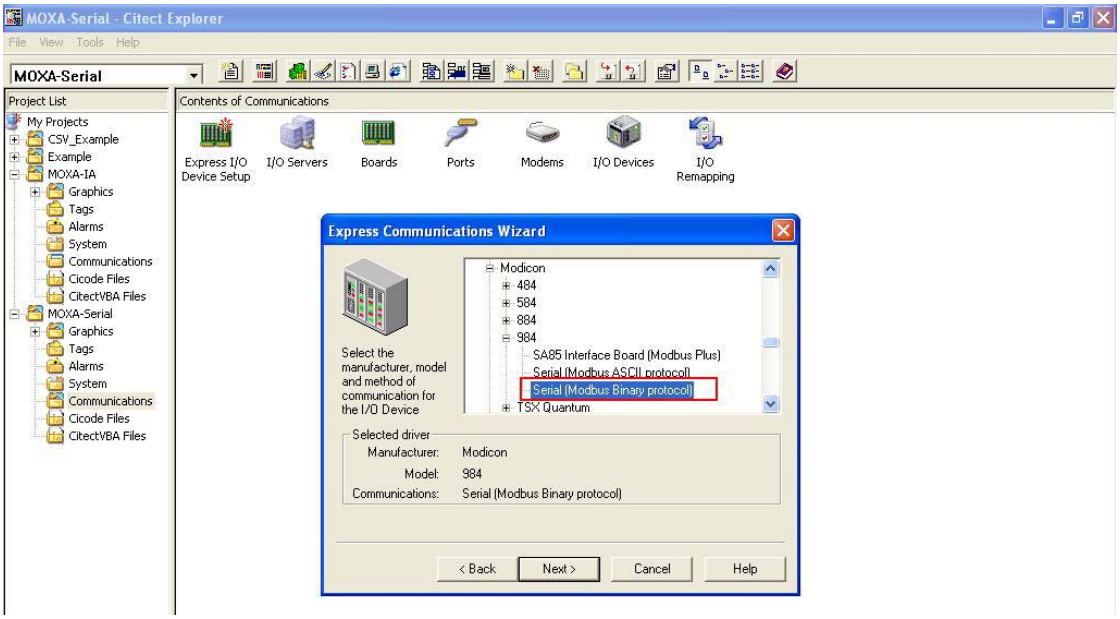
2.13 You will get the following result.



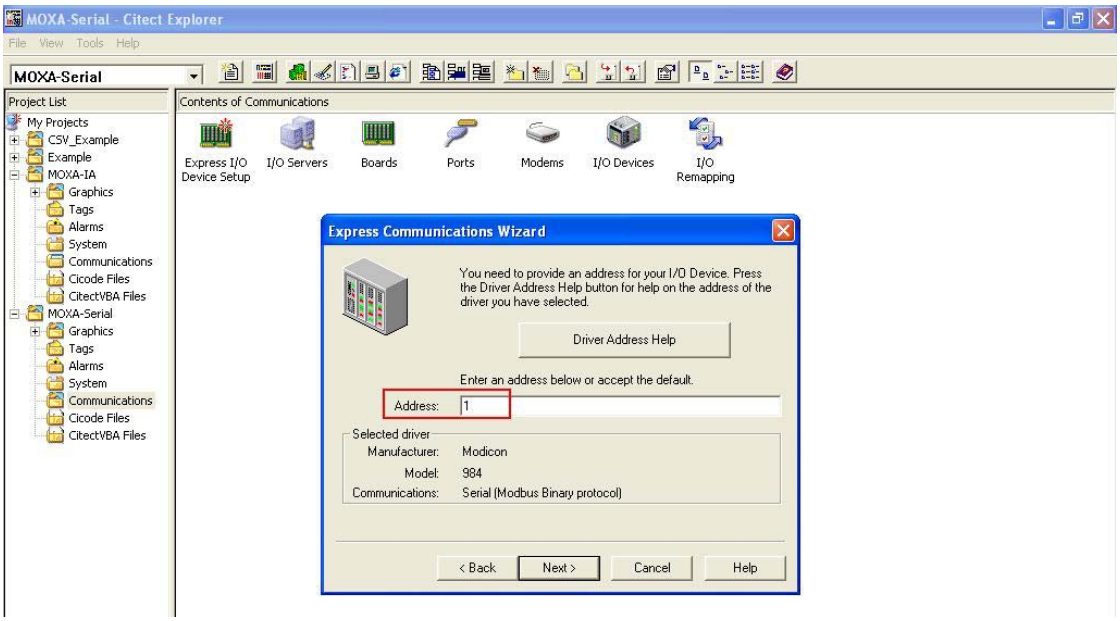
3. How to use Citect (SCADA) communication with NA-4020 and NA-4021

3.1 Follow the procedure in Sec. 2.1 to 2.6 to create a new I/O Server and Device.

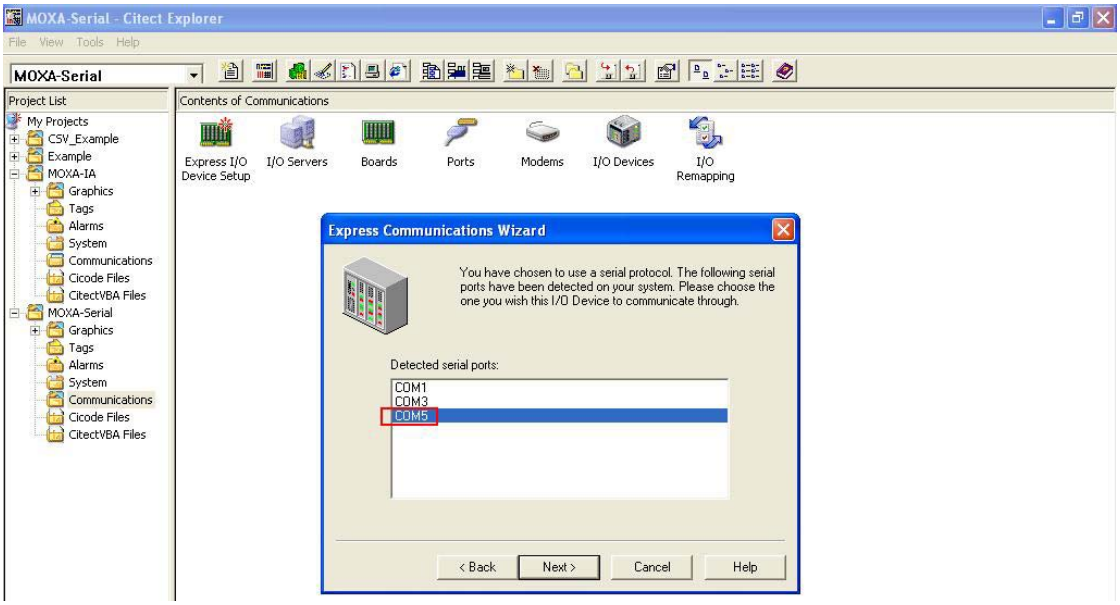
3.2 However, you must select different drivers for NA-4020/NA-4021.
(Select the /Modicon/984/Serial Modbus (Binary protocol)).



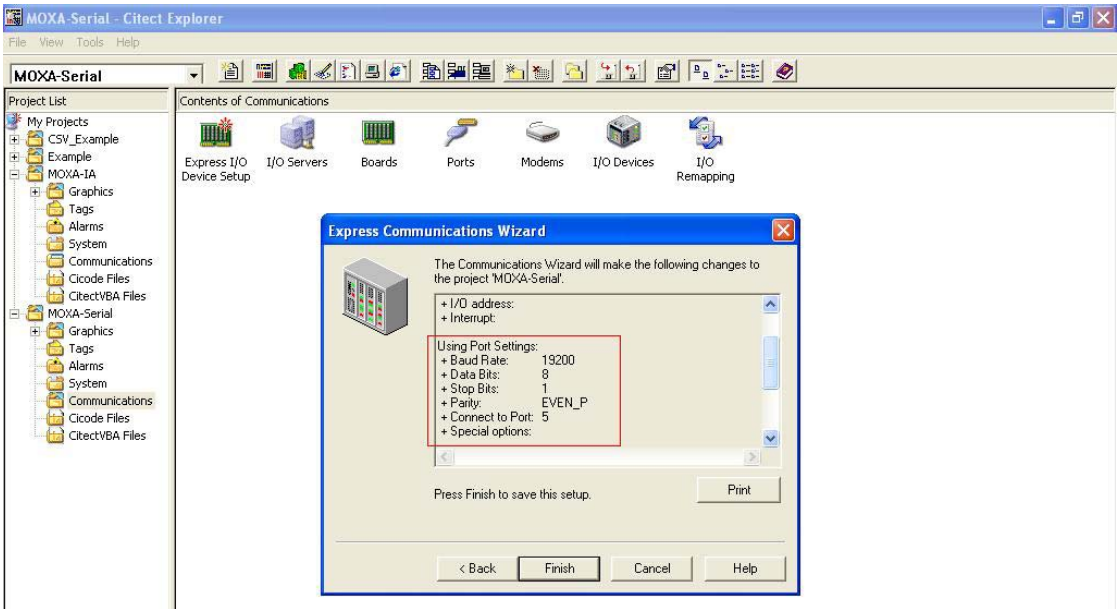
3.3 Fill in the correct Address (Modbus address) and then click on Next.



3.4 Select the COM Port that connects with NA-4020 and NA-4021.



3.5 The current serial parameters will show (baud rate = 19200, Data bit = 8, Parity = Even and COM Port = 5). Adjust the NA-4020/NA4021 DIP Switch to match the above serial parameters.



3.6 Next, follow steps 2.8 to 2.13 to complete the tag definition and get a correct result for DI, DO, AI, and AO values.