NPort Real COM Mode for Modbus Applications

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1. Introduction

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Modbus has become a standard protocol for TCP/IP networks, e.g. Modbus TCP. But some legacy applications can't support Modbus TCP. In this situation, when users want to extend their communication to TCP/IP networks, they can use NPort's Real COM Mode.

Real COM Mode can provide a virtual COM port on a computer, just as if it is on a computer's native serial port. Users can install the Real COM driver on the Modbus system, which creates an additional COM port. This serial port is mapped to the IP address of the remote NPort.

Hence, the NPort can be located at remote locations, eliminating costly modem connections while providing real-time access to Modbus RTU/ASCII slave devices via Ethernet (Figure 1).



Figure 1: System Topology

2. Applicable Products

Product Line	Model Names
NPort 5000A	NPort 5100A series, NPort 5200A series, NPort 5400A series,
	NPort IA5250A
NPort 5000	NPort 5100 series, NPort 5200 series, NPort 5400 series,
	NPort 5600 series, NPort IA5150, NPort IA5250

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3. System Overview

In this example, we use the application "Modbus Poll" to simulate a Modbus master, and we use "Modbus Slave" to simulate a Modbus slave (Figure 2). These applications can be found at <u>http://www.modbustools.com</u>.



PC: 192.168.32.146

NPort: 192.168.32.31

Figure 2: Demo topology

If you would like to use the Protocol Test Harness application, you can refer to this link: http://www.trianglemicroworks.com/products/testing-and-configuration-tools/test-ha rness-pages

4. NPort Settings

4.1. Mapping COM Port

Run "NPort Windows Driver Manager", then click "Add" to map the COM port of the NPort's Port 1 (Figure 3).

<u>F</u> ile <u>C</u>	0M Mapping Configuration ⊻iew <u>H</u> elp	
E xit	Add Remove Apply Undo Setting	
No	COM Port / Address 1	Address 2
1	COM7 192.168.32.31 950:966 (Port1)	
2	COM8 192.168.32.31 951:967 (Port2)	
	m	

Figure 3: Mapping COM Port

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4.2. Serial Settings

In the NPort web console, click "Serial Settings \rightarrow Port 1" to set serial parameters as shown in Figure 4 below. Parameter settings should be the same as the Modbus slave settings.

	Port=1
Port alias	
	Serial Parameters
Baud rate	115200 💌
Data bits	8 -
Stop bits	1 -
Parity	None 🔻
Flow control	None -
FIFO	🖲 Enable 💿 Disable
Interface	RS-232 -
Apply the above settings to all serial ports	

Figure 4: Serial Settings Parameters

4.3. Operation Mode Settings

In the NPort web console, click "Operation Settings \rightarrow Port 1" to set operation mode. Select "Real COM Mode" and the NPort will provide the virtual COM port (Figure 5).

Operating Settings	
Port=1	
Operation mode	Real COM Mode -
TCP alive check time	7 (0 - 99 min)
Max connection	1 -
Ignore jammed IP	
Allow driver control	◎ No ○ Yes
Data Packing	
Packing length	0 (0 - 1024)
Delimiter 1	0 (Hex) 🗆 Enable
Delimiter 2	0 (Hex) Enable
Delimiter process	Do Nothing • (Processed only when Packing length is 0)
Force transmit	0 (0 - 65535 ms)
Apply the above settings to all serial ports	
Submit	

Figure 5: Operating Settings

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5. Modbus Slave Settings

To input slave settings, run "Modbus Slave" application. Click "Setup \rightarrow Slave Definition" and input slave settings as in Figure 6 below.

Modbus Slave - Mbslav1		¢
	ietup <u>D</u> isplay <u>V</u> iew <u>W</u> indow <u>H</u> elp	
Image: Constraint of the second se	Image: Slave Definition Slave ID: Image: Slave ID: Image: Slave ID: Function: 03 Holding Register (4x) Address: 0 Quantity: 10 View Rows Hide Alias Columns	
3 4 5 6	Il 20 50 100 PLC Addresses (Base 1) Display: Signed Error Simulation Skip response Insert CRC/LRC error (Not when using TCP/IP) 0 [ms] Response Delay Return exception 06, Busy	-

Figure 6: Slave Settings

Click "Connection \rightarrow Connect" to set connection parameters and connect to Serial Port1 (COM1). This example is for Modbus RTU communication (Figure 7).

Modbus Slave - Mk	oslav1
<u>File Edit</u> Connection	on <u>S</u> etup <u>D</u> isplay <u>V</u> iew <u>W</u> indow <u>H</u> elp
D 🗳 🖥 🎒 🛅	Ne 🖞 🕅 🕅 🕺
Mbslav1	Connection Setup
No connection Alia 0 1 2 3 4 5 6	Connection OK Image: Serial Port TCP/IP UDP/IP Port 1 Mode Cancel Image: Serial Port Image: Serial Port Cancel Port 1 Image: Serial Port Image: Serial Port Cancel Port 1 Image: Serial Port Image: Serial Port Cancel Image: Serial Port Image: Serial Port Cancel Cancel Image: Serial Port Image: Serial Port Image: Serial Port Cancel Image: Serial Port Image: Serial Port Image: Serial Port Serial Port Image: Serial Port Image: Serial Port Image: Serial Port Serial Port Image: Serial Port Image: Serial Port Image: Serial Port Serial Port Image: Serial Port Image: Serial Port Image: Serial Port Serial Port Image: Serial Port Image: Serial Port Image: Serial Port Serial Port

Figure 7: Connecting to Serial Port 1

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6. Modbus Master Settings

To input Modbus master settings, run the "Modbus Poll" application. Click "Setup \rightarrow Poll Definition" to set poll definition (Figure 8).



Figure 8: Setting Poll Definition

Click "Connection \rightarrow Connect" to set connection parameters and connect to Serial Port 7 (COM7) which is NPort's port1 mapping port. This example is for Modbus RTU communication (Figure 9).

Modbus Poll - Mbp	oll1
File Connection Se	tup Functions Display View Window Help
🗅 🖻 🖬 🎒 📉	🛅 🖳 📋 Л. 05 06 15 16 22 23 101 💡 隆
Mbpoll1	
Tx = 0: Err = 0 No Connection	: ID = 1: F = 03: SR = 1000ms
40001 = 0	Connection
40002 = 0 40003 = 0 40004 = 0	Port 7 Mode OK
40005 = 0 40006 = 0	115200 Baud
40007 = 0 40008 = 0 40009 = 0	8 Data bits I 1000 [ms] None Parity Delay Between Polls
40009 = 0 40010 = 0	I Stop Bit 0 [ms]
	Remote Server Port IP Address Port 192.168.32.196 502

Figure 9: Connecting to Serial Port 7

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7. Modbus Communication Verification

When Modbus Poll starts polling, if the Modbus slave responds correctly, the "Tx" count will be increasing. Otherwise the "Err" count will be increasing.

Additionally, we can change the Modbus slave register's value. For example, we can modify register 40001 value as "1234", and then Modbus Poll would get its updated value on the next polling (Figure 10).



Figure 10: Changing the Modbus Slave Register Value

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