Application Note – Reading and Writing ISDU from Modbus TCP PLC (Simulator)

Detail: Scheme and Method for using two sessions of MB Poll to read/edit ISDU in any IOL device

Prerequisites:

Any model of IOLM that has Modbus TCP enabled

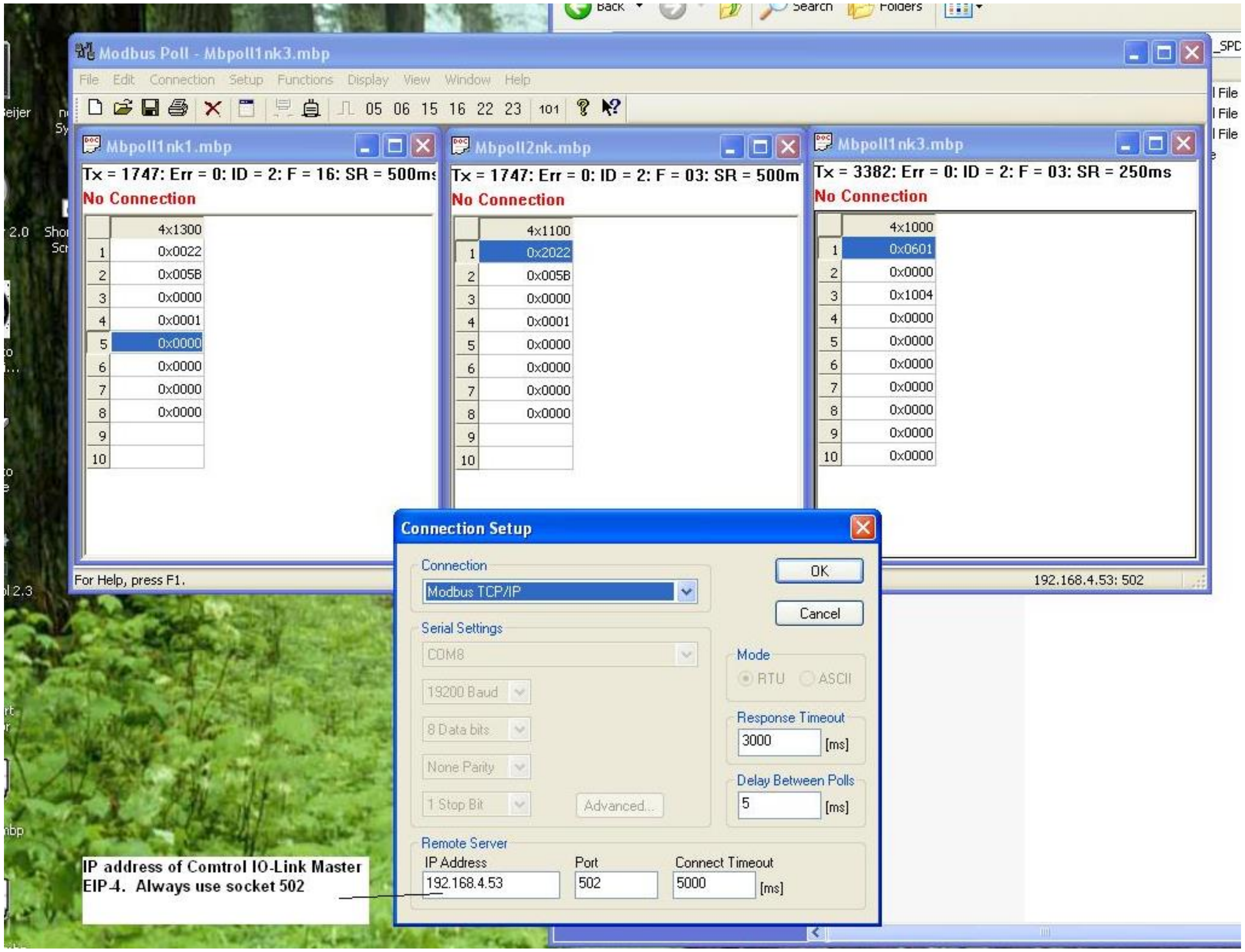
All necessary cables and power supplies and sensors

Powered up with appropriate IP address

No network/security/rules interference between PLC/NIC/ModbusPoll

Date of Note (implies era of relevance): 5/16/19

1) Open Modbus Poll and then open three separate windows within. (Actually the far right one is not needed.) You must already be familiar with Modbus Poll. See Application Note “PDI_to_ModbusTCP” if you have not done that yet.



Modbus Poll - Mbpoll1nk3.mbp
File Edit Connection Setup Functions Display View Window Help
05 06 15 16 22 23 101

Mbpoll1nk1.mbp

Tx = 1747: Err = 0: ID = 2: F = 16: SR = 500ms

No Connection

	4x1300
1	0x0022
2	0x005B
3	0x0000
4	0x0001
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	
10	

Mbpoll2nk.mbp

Tx = 1747: Err = 0: ID = 2: F = 03: SR = 500m

No Connection

	4x1100
1	0x2022
2	0x005B
3	0x0000
4	0x0001
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	
10	

Mbpoll1nk3.mbp

Tx = 3382: Err = 0: ID = 2: F = 03: SR = 250ms

No Connection

	4x1000
1	0x0601
2	0x0000
3	0x1004
4	0x0000
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	0x0000
10	0x0000

For Help, press F1.

192.168.4.53: 502

Connection Setup

Connection: Modbus TCP/IP

Serial Settings: COM8, 19200 Baud, 8 Data bits, None Parity, 1 Stop Bit

Mode: ● RTU ○ ASCII

Response Timeout: 3000 [ms]

Delay Between Polls: 5 [ms]

Remote Server

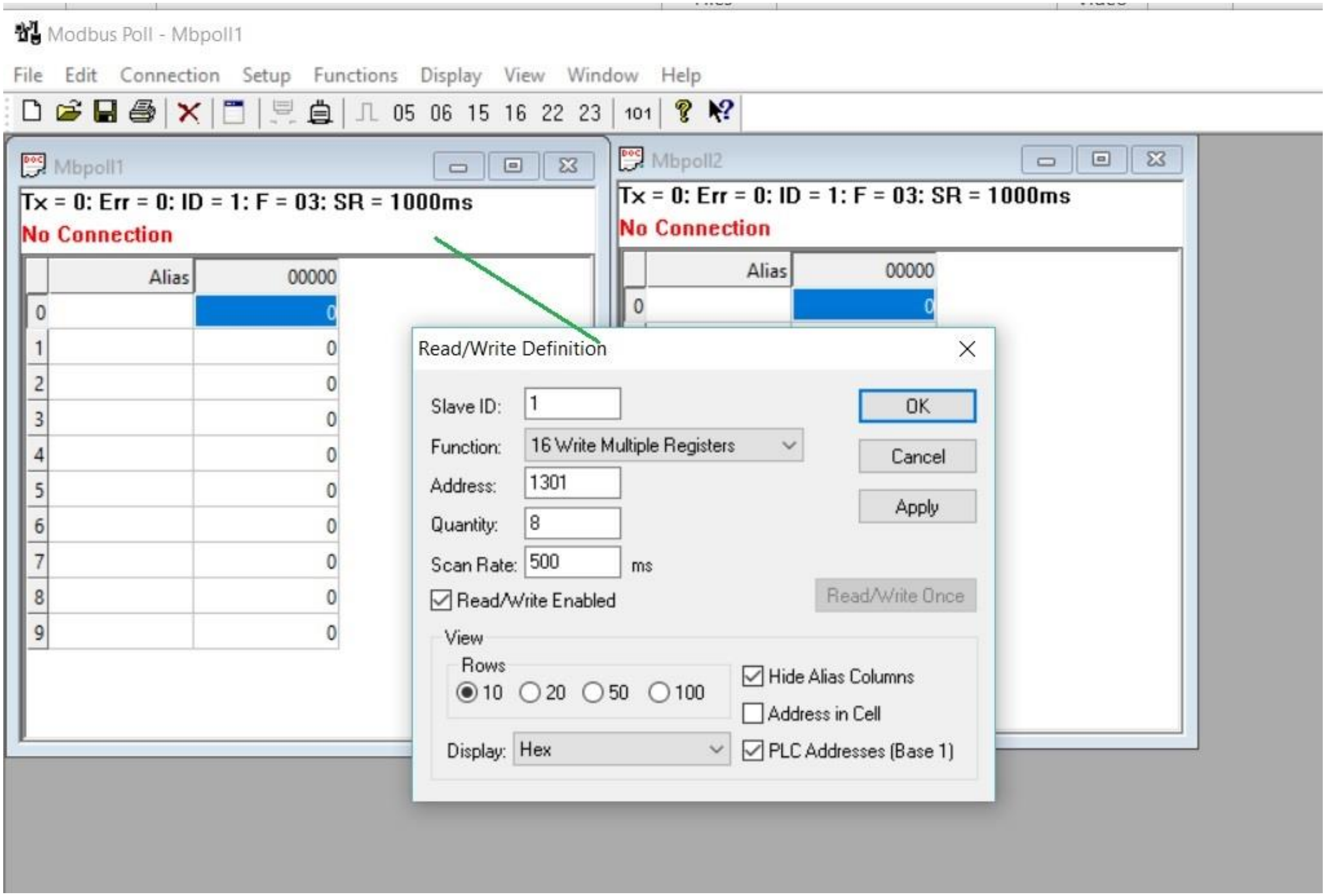
IP Address: 192.168.4.53

Port: 502

Connect Timeout: 5000 [ms]

IP address of Comtrol IO-Link Master EIP-4. Always use socket 502

2) Note that under setup “Read write Definition,” you will need the following settings:



Tx = 0: Err = 0: ID = 1: F = 03: SR = 1000ms

No Connection

	Alias	00000
0		0
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Read/Write Definition

Slave ID: 1

Function: 16 Write Multiple Registers

Address: 1301

Quantity: 8

Scan Rate: 500 ms

☑ Read/Write Enabled

View

Rows ● 10 ○ 20 ○ 50 ○ 100

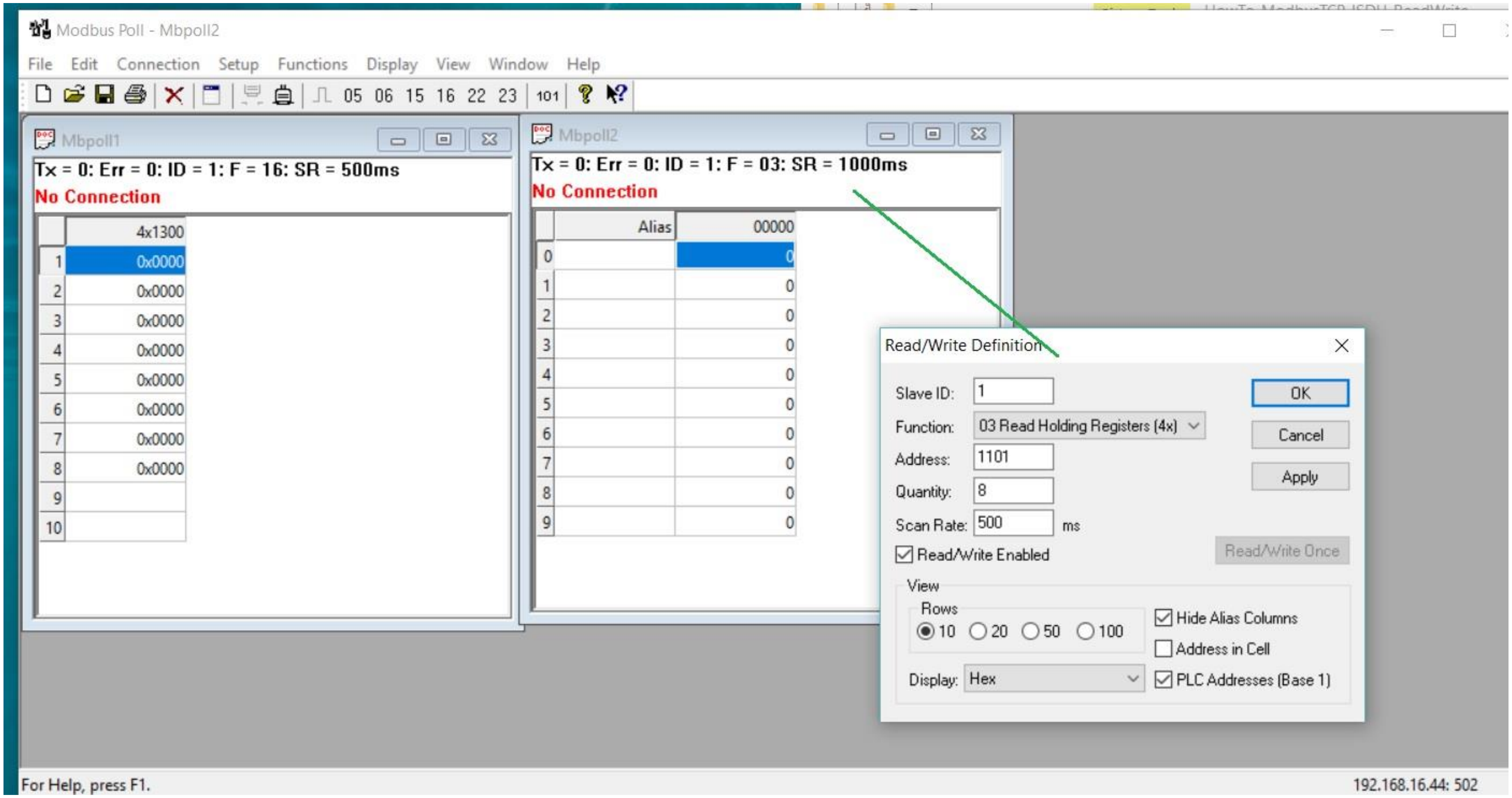
☑ Hide Alias Columns

☐ Address in Cell

☑ PLC Addresses (Base 1)

Display: Hex

3) Under the window immediately to its right, use these settings (for a device on port X, the first digit should be X.) For port 1, 1101.



Modbus Poll - Mbpoll2
File Edit Connection Setup Functions Display View Window Help
05 06 15 16 22 23 101

Mbpoll1

Tx = 0: Err = 0: ID = 1: F = 16: SR = 500ms

No Connection

	4x1300
1	0x0000
2	0x0000
3	0x0000
4	0x0000
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	
10	

Mbpoll2

Tx = 0: Err = 0: ID = 1: F = 03: SR = 1000ms

No Connection

	Alias	00000
0		0
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Read/Write Definition

Slave ID: 1

Function: 03 Read Holding Registers (4x)

Address: 1101

Quantity: 8

Scan Rate: 500 ms

☑ Read/Write Enabled

View

Rows ● 10 ○ 20 ○ 50 ○ 100

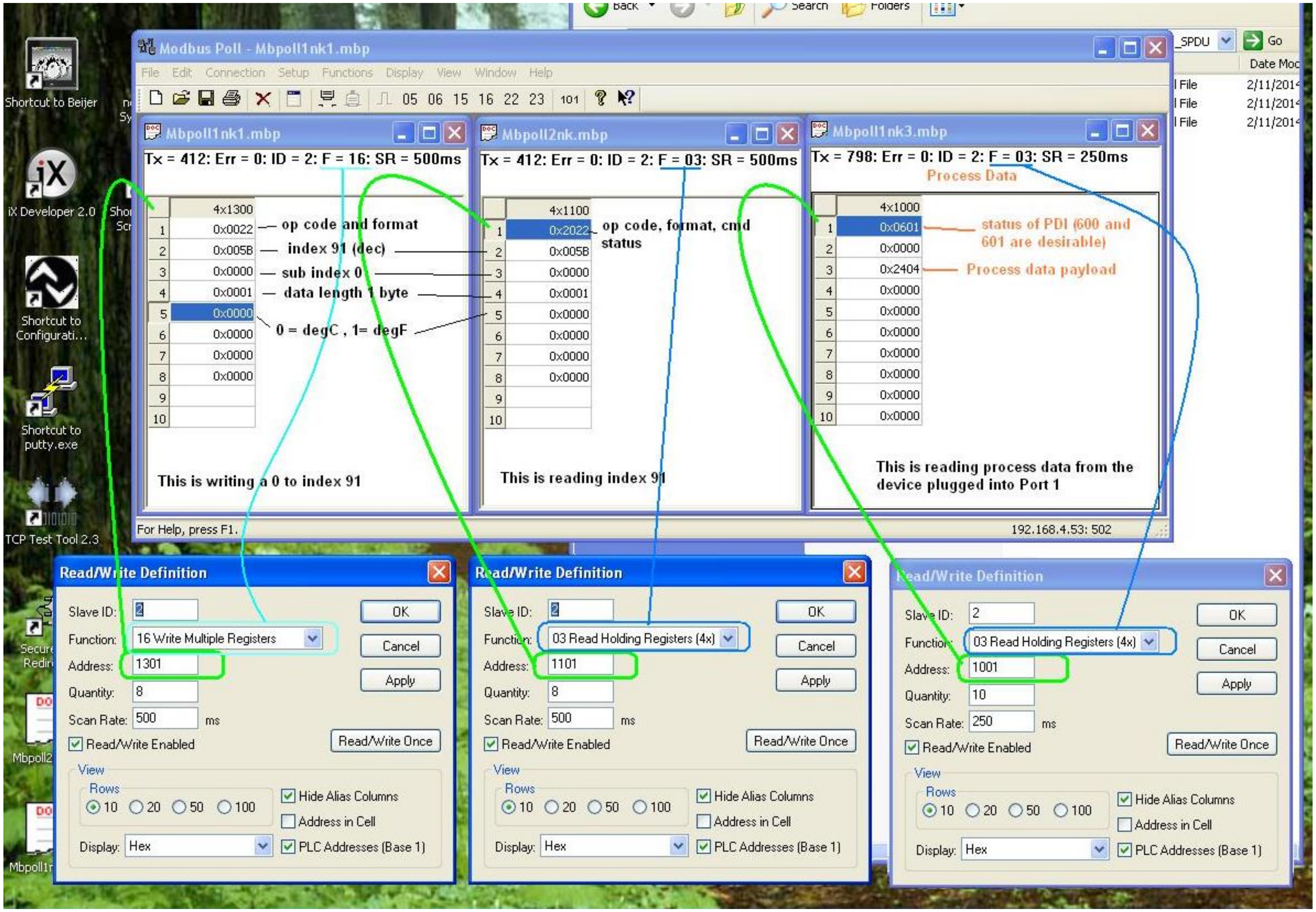
☑ Hide Alias Columns

☐ Address in Cell

☑ PLC Addresses (Base 1)

Display: Hex

4) See the annotated guide below. Important always are opcode (0021h = read, 0022h = write), index, subindex, length, and (if writing) data



Mbpoll1nk1.mbp

Tx = 412: Err = 0: ID = 2: F = 16: SR = 500ms

	4x1300	
1	0x0022	op code and format
2	0x005B	index 91 (dec)
3	0x0000	sub index 0
4	0x0001	data length 1 byte
5	0x0000	0 = degC , 1= degF
6	0x0000	
7	0x0000	
8	0x0000	
9		
10		

This is writing a 0 to index 91

Mbpoll2nk.mbp

Tx = 412: Err = 0: ID = 2: F = 03: SR = 500ms

	4x1100	
1	0x2022	op code, format, cmd status
2	0x005B	
3	0x0000	
4	0x0001	
5	0x0000	
6	0x0000	
7	0x0000	
8	0x0000	
9		
10		

This is reading index 91

Mbpoll1nk3.mbp

Tx = 798: Err = 0: ID = 2: F = 03: SR = 250ms

Process Data

	4x1000	
1	0x0601	status of PDI (600 and 601 are desirable)
2	0x0000	
3	0x2404	Process data payload
4	0x0000	
5	0x0000	
6	0x0000	
7	0x0000	
8	0x0000	
9	0x0000	
10	0x0000	

This is reading process data from the device plugged into Port 1

For Help, press F1. 192.168.4.53: 502

Read/Write Definition

Slave ID: 2
Function: 16 Write Multiple Registers
Address: 1301
Quantity: 8
Scan Rate: 500 ms
☑ Read/Write Enabled
View
Rows ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
☐ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

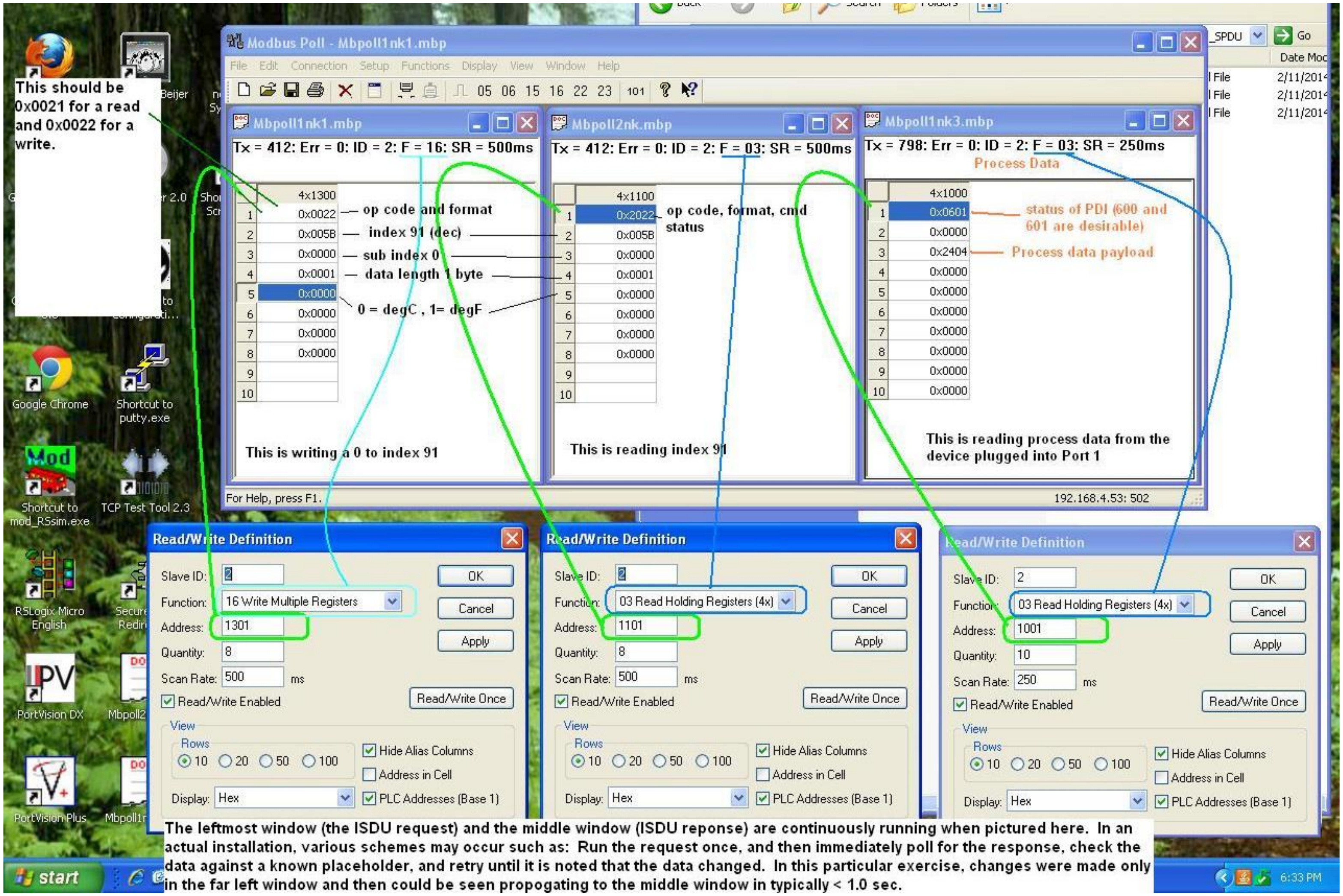
Read/Write Definition

Slave ID: 2
Function: 03 Read Holding Registers (4x)
Address: 1101
Quantity: 8
Scan Rate: 500 ms
☑ Read/Write Enabled
View
Rows ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
☐ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

Read/Write Definition

Slave ID: 2
Function: 03 Read Holding Registers (4x)
Address: 1001
Quantity: 10
Scan Rate: 250 ms
☑ Read/Write Enabled
View
Rows ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
☐ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

5) Please see the additional annotations in this image


Modbus Poll - Mbpoll1nk1.mbp
File Edit Connection Setup Functions Display View Window Help
05 06 15 16 22 23 101
For Help, press F1.
192.168.4.53: 502
6:33 PM

This should be 0x0021 for a read and 0x0022 for a write.

Mbpoll1nk1.mbp

Tx = 412: Err = 0: ID = 2: F = 16: SR = 500ms

	4x1300	
1	0x0022	op code and format
2	0x005B	index 91 (dec)
3	0x0000	sub index 0
4	0x0001	data length 1 byte
5	0x0000	0 = degC , 1= degF
6	0x0000	
7	0x0000	
8	0x0000	
9		
10		

This is writing a 0 to index 91

Mbpoll2nk.mbp

Tx = 412: Err = 0: ID = 2: F = 03: SR = 500ms

	4x1100	
1	0x2022	op code, format, cmd status
2	0x005B	
3	0x0000	
4	0x0001	
5	0x0000	
6	0x0000	
7	0x0000	
8	0x0000	
9		
10		

This is reading index 91

Mbpoll1nk3.mbp

Tx = 798: Err = 0: ID = 2: F = 03: SR = 250ms

Process Data

	4x1000	
1	0x0601	status of PDI (600 and 601 are desirable)
2	0x0000	
3	0x2404	Process data payload
4	0x0000	
5	0x0000	
6	0x0000	
7	0x0000	
8	0x0000	
9	0x0000	
10	0x0000	

This is reading process data from the device plugged into Port 1

Read/Write Definition

Slave ID: 2
Function: 16 Write Multiple Registers
Address: 1301
Quantity: 8
Scan Rate: 500 ms
☑ Read/Write Enabled
View — Rows: ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
□ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

Read/Write Definition

Slave ID: 2
Function: 03 Read Holding Registers (4x)
Address: 1101
Quantity: 8
Scan Rate: 500 ms
☑ Read/Write Enabled
View — Rows: ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
□ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

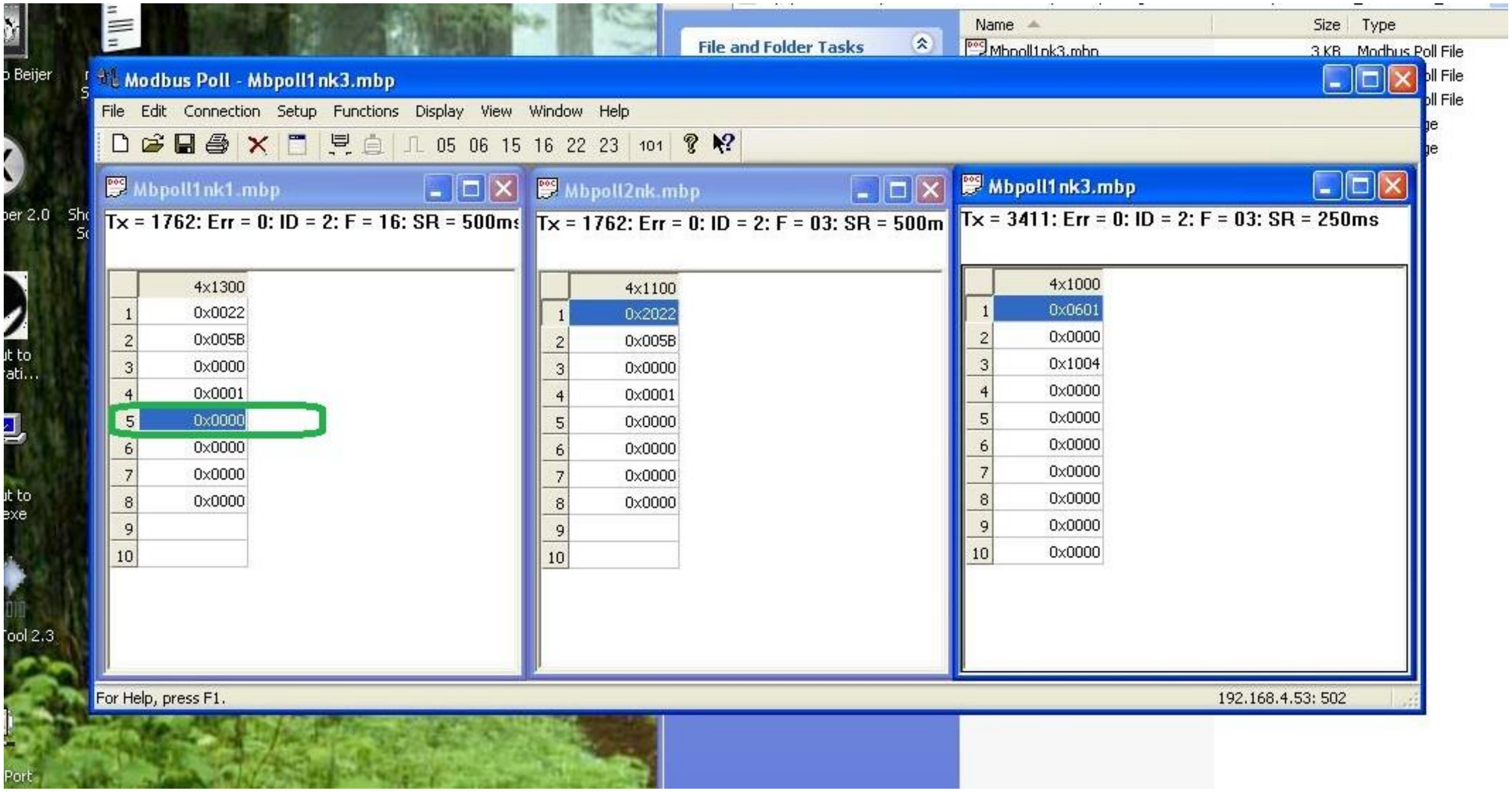
Read/Write Definition

Slave ID: 2
Function: 03 Read Holding Registers (4x)
Address: 1001
Quantity: 10
Scan Rate: 250 ms
☑ Read/Write Enabled
View — Rows: ● 10 ○ 20 ○ 50 ○ 100
☑ Hide Alias Columns
□ Address in Cell
Display: Hex
☑ PLC Addresses (Base 1)

The leftmost window (the ISDU request) and the middle window (ISDU reponse) are continuously running when pictured here. In an actual installation, various schemes may occur such as: Run the request once, and then immediately poll for the response, check the data against a known placeholder, and retry until it is noted that the data changed. In this particular exercise, changes were made only in the far left window and then could be seen propogating to the middle window in typically < 1.0 sec.

6) Once you connect, the left side is used to send an IOlink ISDU command which can be “get” (op code 21) or “set” (op code 22).

You can now send any (valid) value to the index.



Mbpoll1nk1.mbp

Tx = 1762: Err = 0: ID = 2: F = 16: SR = 500ms

	4x1300
1	0x0022
2	0x005B
3	0x0000
4	0x0001
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	
10	

Mbpoll2nk.mbp

Tx = 1762: Err = 0: ID = 2: F = 03: SR = 500m

	4x1100
1	0x2022
2	0x005B
3	0x0000
4	0x0001
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	
10	

Mbpoll1nk3.mbp

Tx = 3411: Err = 0: ID = 2: F = 03: SR = 250ms

	4x1000
1	0x0601
2	0x0000
3	0x1004
4	0x0000
5	0x0000
6	0x0000
7	0x0000
8	0x0000
9	0x0000
10	0x0000