Introduction

The Modbus Test Utility uses Modbus Function 3 (Read Holding Registers) to test communication between an Opto 22 SNAP PAC controller and a Modbus device and to help you determine the data type used by your Modbus device. The utility supports Modbus[®]/TCP and Modbus serial using the controller serial port or the SNAP SCM serial module. It also supports Modbus serial RTU mode or ASCII mode.

The Modbus Test Utility is a PAC Display project, which you set up and run in PAC Display Runtime to communicate with your Modbus device.

This document explains how to use the test utility. It assumes you already understand how to use PAC Display, Modbus, and the Modbus device to be used.

The test utility does the following things:

- Reads two registers at the starting register you enter. Data types 2, 3, 4, and 5 use two registers to transport the data.
- Shows the outgoing and incoming Modbus packet in Hex. It also shows the description of any received error.
- Shows the received data as the following data types:

Туре	Description
Raw data	Decimal
Data type 0	16 bit unsigned, decimal
Data type 1	16 bit signed, decimal
Data type 2	Floating point, decimal
Data type 3	Floating point swapped, decimal
Data type 4	32 bit signed, decimal
Data type 5	32 bit signed swapped, decimal

What is Required

You will need a PC with PAC Project 8.1a (Basic or Pro).

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Installation

- 1. Extract the zip file, ModbusTestUtilityv81a.zip, to your hard drive (C:).
- **2.** Open PAC Control, browse to C:\ModbusTestUtility\Strategy, and then open the strategy file, ModbusTestUtility.idb.
- **3.** Select Configure > Control Engines to configure a control engine for the strategy. If you need help with this, see the *PAC Control User's Guide*, form 1700.
- **4.** Download and run the strategy.
- **5.** Open PAC Display, browse to C:\ModbusTestUtility\Display, and then open the project file, ModbusTest.UUI.
- 6. Select Configure > Control Engines to open the Control Engines dialog box.
- **7.** Click Add, select the strategy file, and then click Open to open the Control Engines dialog box.
- **8.** Click the Browse button, and then select the control engine you added to the strategy file.

NOTE: If you unzipped the files to somewhere other than the C: root directory, you will need to browse to the strategy file.

- **9.** Click OK, and then click OK again.
- **10.** Select Tools > AutoCorrect Tags.

The Select Window dialog box opens with all the windows selected.

11. Click OK.

When the process is completed, an AutoCorrect Tags message appears.

- **12.** Click OK.
- **13.** Select Tools > Regenerate IO Scanner Tag Names.
- **14.** Select File > Save Project and Load Runtime.

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Using the Modbus Utility

When the Modbus Utility window first opens in Runtime, a prompt is provided at the top of the window to guide you in using the utility. Use the prompts along the along with the instructions below.

Prompt —	Chart Status = Running Prompt =	Block=1 Select Physical Layer		
	Physical Layer = Not Set	Modbus TCP	Modbus Serial	
	Port Number = Not Set			
	Comm Handle = Not Set			
				Reset

1. In the initial Runtime window, select either Modbus TCP or Modbus Serial to open the appropriate window.

For Modbus TCP:

If you select Modbus TCP, the following window opens:

Setup		
Chart Status = Running (Block = 1	
Prompt = I	Enter Slave IP Address	
Physical Layer = Modbus TCP		
Slave IP = Not Set	Input	
	Enter Slave IP Address	
Port Number = Not Set		
Comm Handle = Not Set		
Committancie - Not Set	7 8 9 Enter	
	4 5 6	
	1 2 3	
	0 • Del	Reset

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a. Enter the slave IP address with your mouse on the on-screen keypad, and then click Enter.

For example: 10.175.52.110

This opens the Enter Port Number window.

- **b.** Enter the port number in the same fashion. Port 502 is the standard port.
- **c.** If the settings are correct, click Yes.

The strategy opens the port to the device.

d. Proceed to step 2 on page 6.

For Modbus Serial:

If you select Modbus Serial in the initial window, the following window appears:

Serial Port							
Mode RTU Mode ASCII Mode	Port Number -1	Baud Rate 0	Parity None Even Odd	Data Bits 8 7	Stop Bits 1 2	rts-cts Off On	Timeout 1.5
							Data Complete Reset

a. Select the data that you want to change.

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b. For Port Number and Baud, a secondary window opens; make your selection, and the window disappears. For all the rest, simply click your selection in the main window.

Baud Rate	Secondary baud rate window
230400	
115200	
76800	
57600	
38400	
19200	
9600	
4800	
2400	
1200	
300	

Setup Chart	Status = Running Block = 3 Prompt = Comm Handle Open	
Physica	Layer = Modbus Serial 1,19200	
Port Nu	nber = 1	
Comm H	andle = ser:1,19200,N,8,1,0, 1.5	
	Open Test Window	
		Reset

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2. Click Open Test Window.

After communicating with your Modbus device, a test window similar to the following example opens:

Chart Status = Running	Block = 77				
Brompt	- Brock Sond Pack				Reset
Saccion Statuc = Open	Modbus Serial 1 19	200			
Slave Modbus Address = 1	infounds Serial 1,15	This is a te	st using func	tion 03 Read Holdi	ng Registers.
Starting Degister = 1		It will read	two holding r	egisters starting at	"Starting Register".
Starting Register - 1		It will displ	ay the receive	d data as all supp	orted data types.
	Send Packet	Data Type	2, 3, 4 and 5 u	ise two register to i	transport data.
Send Count = 1		Re	ceive Count =	1	
Displayed A	s Hex			Displayed As He	ex
Send Packet = 01030000002	0BC4	Re	ceive Packet	= 010304028F45B2	27885
-					
Claus Address = 04				.01	
Function = 03		5 III	nction = 03	.01	
Start Register = 0000		By	te Count = 04		
Quantity = 0002	.CRC = 0BC4	Da	ta Hex = 028F		
		Da	ta Hex = 45B2	.C	RC = 7885
Send OK Count = 1	Send Fail Count = 0			•	NARA ANARA
	Received Da	ata Displayed As [ecimal		
	10				
	Raw Data =	2 143 69	178		
Data Type 0 Data Ty	Raw Data =	2 143 69 Data Type	178 3	Data Type 4	Data Type 5
Data Type 0 Data Ty 16 bit Unsigned 16 bit Si	Pe 1 Data Type 2 gned Floating pt.	2 143 69 Data Type Floating p	178 3 t.	Data Type 4 32 bit Signed	Data Type 5 32 bit Signed
Data Type 0 16 bit Unsigned 655 655	Raw Data = pe 1 gned Data Type 2 Floating pt.	2 143 69 Data Type Floating p Swapped	178 3 t.	Data Type 4 32 bit Signed	Data Type 5 32 bit Signed Swapped
Data Type 0 Data Ty 16 bit Unsigned 16 bit Si 655 655 17,842 17,842	Raw Data = The field of the fie	2 143 69 Data Type Floating p Swapped	178 3 t.	Data Type 4 32 bit Signed 1,169,293,967	Data Type 5 32 bit Signed Swapped 42,943,922

- **3.** Click Send Packet to test communications and obtain packet data from the device. The test window shows the following things:
 - A **Send Box** contains the send packet data, the raw Modbus data in Hex
 - A **Receive Box** contains the received packet data, the raw Modbus data in Hex
 - A **Raw Data Box** shows the data portion in decimal
 - Five Data Type Boxes at the bottom of the test window show the received packet converted to all five data types
- **4.** To determine the correct data type, find the Data Type Box that contains the value you would expect from the Modbus device.

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In the following example for slave address 1 and starting register 1, the value expected from the Modbus device is 5,700.0000, which is very close to the value returned for Data Type 2.

Data type

Data Type 0 16 bit Unsigned	Data Type 1 16 bit Signed	Data Type 2 Floating pt.	Data Type 3 Floating pt.	Data Type 4 32 bit Signed	Data Type 5 32 bit Signed
655 17,842	655 17,842	5,696.3198	Swapped	1,169,293,967	Swapped 42,943,922
			0.0000		

Expected value

