



10000 SE Pine Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

[www.aimco-global.com](http://www.aimco-global.com)

# Configuring a Rockwell PLC with Modbus TCP

Authors: Kade Olson and Sam Stewart

Date: June 18, 2015

## Introduction

Many AIMCO torque controllers come standard with Modbus TCP. A common use is interfacing them to an Allen-Bradley PLC for error proofing and data collection. This document is intended to configure a Rockwell PLC with Modbus TCP.

## Equipment/Software

- Modbus capable controller from AIMCO.
  - Generation 4 controller (iEC4EGVP).
- 1769-L32E CompactLogix5332E Controller Rev 16.20.
- MVI69-MNET Modbus TCP/IP Master Module.
- ProSoft Configuration Builder version 4.1.0 (Build 4).
- RS-232 to RJ-45 Adapter.

## Initial Setup

- Connect RS-232 to RJ-45 adapter to the Profibus module 'CFG' port.



## ProSoft Configuration Builder

This document was developed in parallel with 'Using an AIMCO Controller on a Rockwell PLC with Modbus TCP'. It will establish the connection between the Modbus TCP Master Network Interface Module and the Modbus TCP capable slave.

### Configuring the Connection

Open the ProSoft Configuration Builder (PCB) software. Open a new project, right click on 'Default Module' and select 'Choose Module Type'. The module we are using in this example is the MVI69-MNET. Mark the correct field in 'Product Line Filter' as well as the drop down menu under 'Select Module Type'. See Figure 1

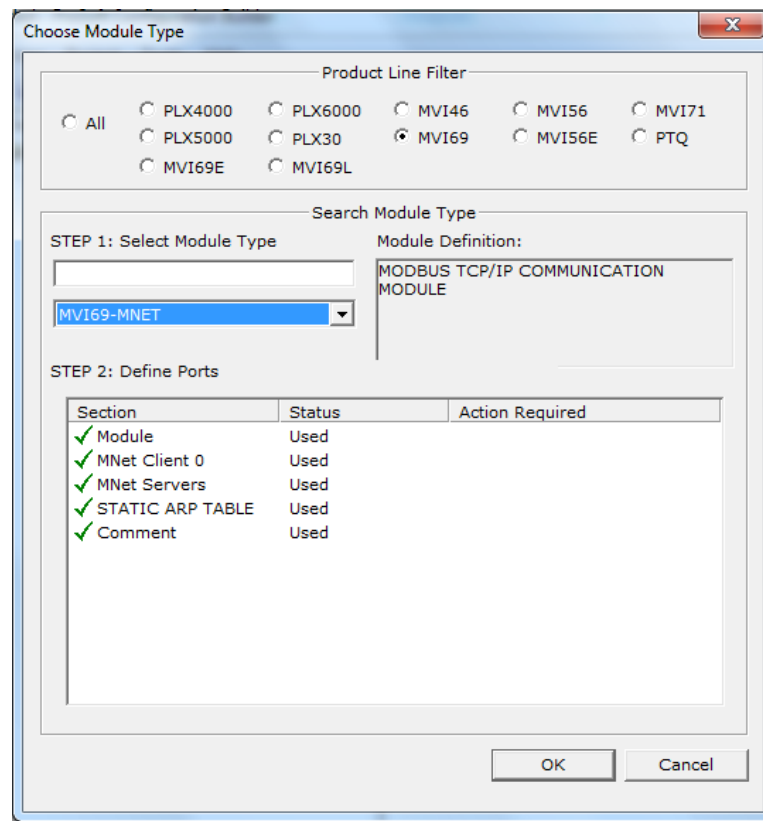


Figure 1 PCB Module Type

Click 'OK' when finished. The following screen should match Figure 2.

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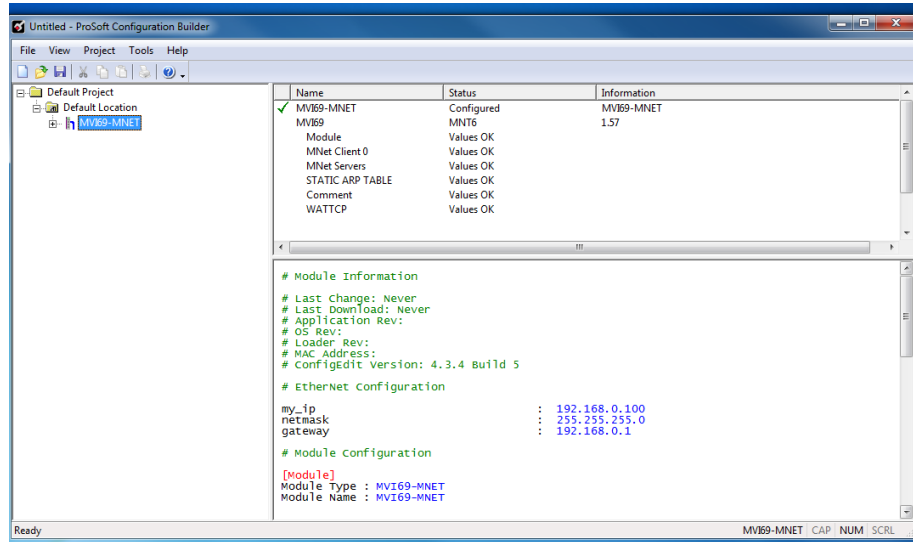


Figure 2 PCB Main Screen

Expand the 'MVI69-MNET' tree under 'Default Location' that now replaces the existing 'Default Module'. In that menu, expand 'Module' and double click 'Module'. Change the 'Read Register Count' and 'Write Register Count' to 300. Also change the 'Write Register Start' to 1000. See Figure 3. Click 'OK'

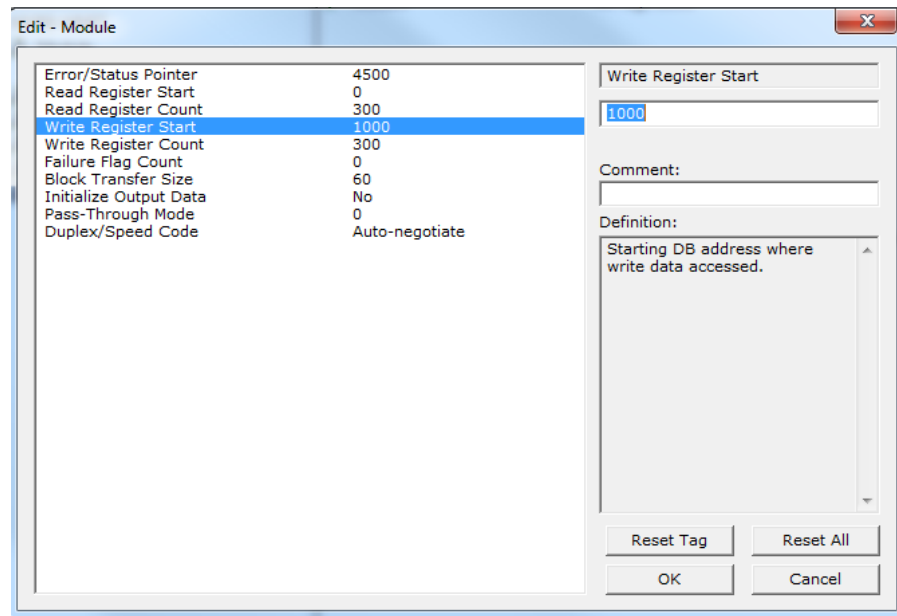


Figure 3 PCB Edit Modbus Module

Now expand 'MNET Client 0' and double click 'MNet Client 0'. Change the following:

- Error/Status Pointer - 4800
- Command Error Pointer - 4810
- Minimum Command Delay - 100
- Response Timeout - 100
- Retry Count - 1

Parameter	Value
Error/Status Pointer	4800
Command Error Pointer	4810
Minimum Command Delay	100
Response Timeout	100
Retry Count	1
Enron-Daniels	No
ARP Timeout	5
Command Error Delay	0

Retry Count: 1

Comment:

Definition: Response failure retry count (0-10)

Reset Tag Reset All

OK Cancel

Click 'OK'.

Figure 4 PCB Modbus TCP Client

Expand 'MNet Client 0 Commands'. To create a command, simply click 'Add Row' and make editions using 'Edit Row'. Configure the commands according to Figure 5. Click 'OK'.

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Figure 5 shows the 'Edit - MNet Client 0 Commands' window. It contains a table with 11 columns: Enable, Internal Address, Poll Interval, Reg Count, Swap Code, Node IP Address, Serv Port, Slave Address, ModBus Function, MB Address in Device, and Comment. The table lists 8 commands, all with a Poll Interval of 0 and a Reg Count of 20. The ModBus Functions are FC 1 - Read Coil (0x), FC 2 - Read Input (1x), FC 3 - Read Holding Registers (4x), FC 4 - Read Input Registers (3x), FC 5 - Force (Write) Single Coil (0x), FC 6 - Preset (Write) Single Register (4x), FC 16 - Preset (Write) Multiple Register (4x), and FC 4 - Read Input Registers (3x). The MB Address in Device is 1000 for most, and 0 for the last two.

	Enable	Internal Address	Poll Interval	Reg Count	Swap Code	Node IP Address	Serv Port	Slave Address	ModBus Function	MB Address in Device	Comment
✓ 1	No	0	0	20	No Change	10.10.13.117	502	1	FC 1 - Read Coil (0x)	1000	
✓ 2	No	0	0	20	No Change	10.10.13.117	502	1	FC 2 - Read Input (1x)	0	
✓ 3	No	0	0	20	No Change	10.10.13.117	502	1	FC 3 - Read Holding Registers (4x)	1000	
✓ 4	Yes	0	0	20	No Change	10.10.13.117	502	1	FC 4 - Read Input Registers (3x)	0	
✓ 5	No	1000	0	20	No Change	10.10.13.117	502	1	FC 5 - Force (Write) Single Coil (0x)	1000	
✓ 6	No	1000	0	20	No Change	10.10.13.117	502	1	FC 6 - Preset (Write) Single Register (4x)	1000	
✓ 7	Yes	1000	0	20	No Change	10.10.13.117	502	1	FC 16 - Preset (Write) Multiple Register (4x)	1000	
✓ 8	Yes	30	0	20	No Change	10.10.13.117	502	1	FC 4 - Read Input Registers (3x)	0	

Figure 5 PCB Modbus TCP Client Commands

Expand 'MNet Servers' and double click 'MNet Servers'. The only value to change here is 'Output Offset' from 0 to 15. Click 'OK'.

Figure 6 shows the 'Edit - MNet Servers' window. The 'Output Offset' is set to 15. The 'Comment' field is empty. The 'Definition' field contains the following text:

0 to 4999  
This parameter defines the start register for Modbus Command data in the internal database. This parameter is enabled when a value greater than 0 is set. For example, if the Output Offset value is set to 3000, data requests for Modbus Coil register address 00001 will use the internal database register 3000, bit 0. If the Output Offset value is set to 3000, data requests for Modbus Coil register address

Figure 6 PCB Modbus TCP MNet Servers

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The last step in this process is to change the 'Ethernet Configuration' under the 'MVI69-MNET' tree. These values need to match the values on the Modbus module. If this does not match up, there will be no communication between the two devices. Click 'OK' when finished.

The screenshot shows a Windows-style dialog box titled "Edit - WATTCP". It contains a table of configuration parameters and a right-hand panel for editing a specific parameter.

Parameter	Value
my_ip	10.10.30.21
netmask	255.255.224.0
gateway	10.10.0.1

On the right, the "my\_ip" parameter is selected. Below the label "my\_ip", the IP address is displayed as "10 . 10 . 30 . 21". Below this is a "Comment:" field (empty) and a "Definition:" field containing the text "Default private class 3 address". At the bottom right are four buttons: "Reset Tag", "Reset All", "OK", and "Cancel".

Figure 7 PCB Modbus TCP Ethernet Configuration

Save your settings. Right click on 'MVI69-MNET' and select 'Download from PC to Device'.

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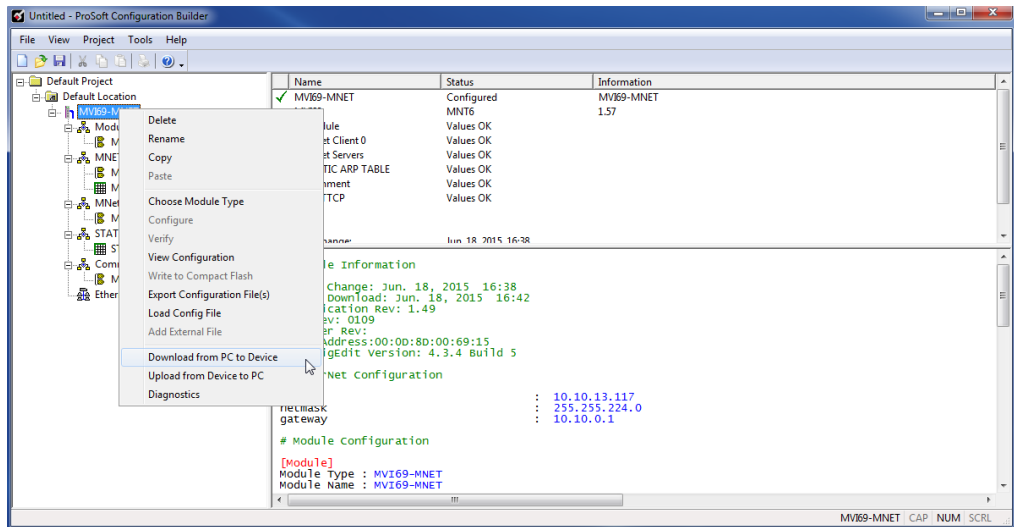


Figure 8 PCB Download

Select the 'Com' port being used to communicate with the Modbus master module. Click 'Download' when ready.

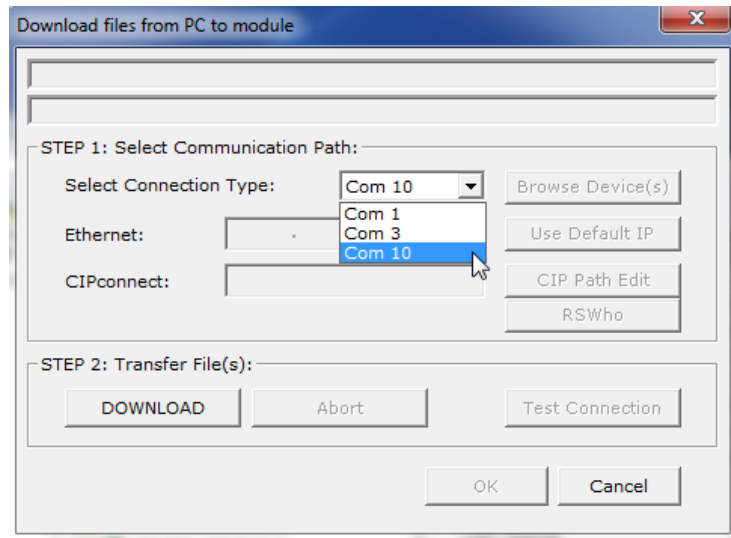


Figure 11 PCB Download

The AIMCO controller may need to be rebooted when the download has finished.