SERI Unity Pro Example Video

Companion Manual

This manual provides more detail on the the SERI Unity Pro Video demonstrating a migration from a SY/MAX PLC to a Unity Pro Quantum PLC.

Effective: July 21, 2011

Niobrara Research & Development Corporation
P.O. Box 3418 Joplin, MO 64803 USA

Telephone: (800) 235-6723 or (417) 624-8918
Facsimile: (417) 624-8920
http://www.niobrara.com

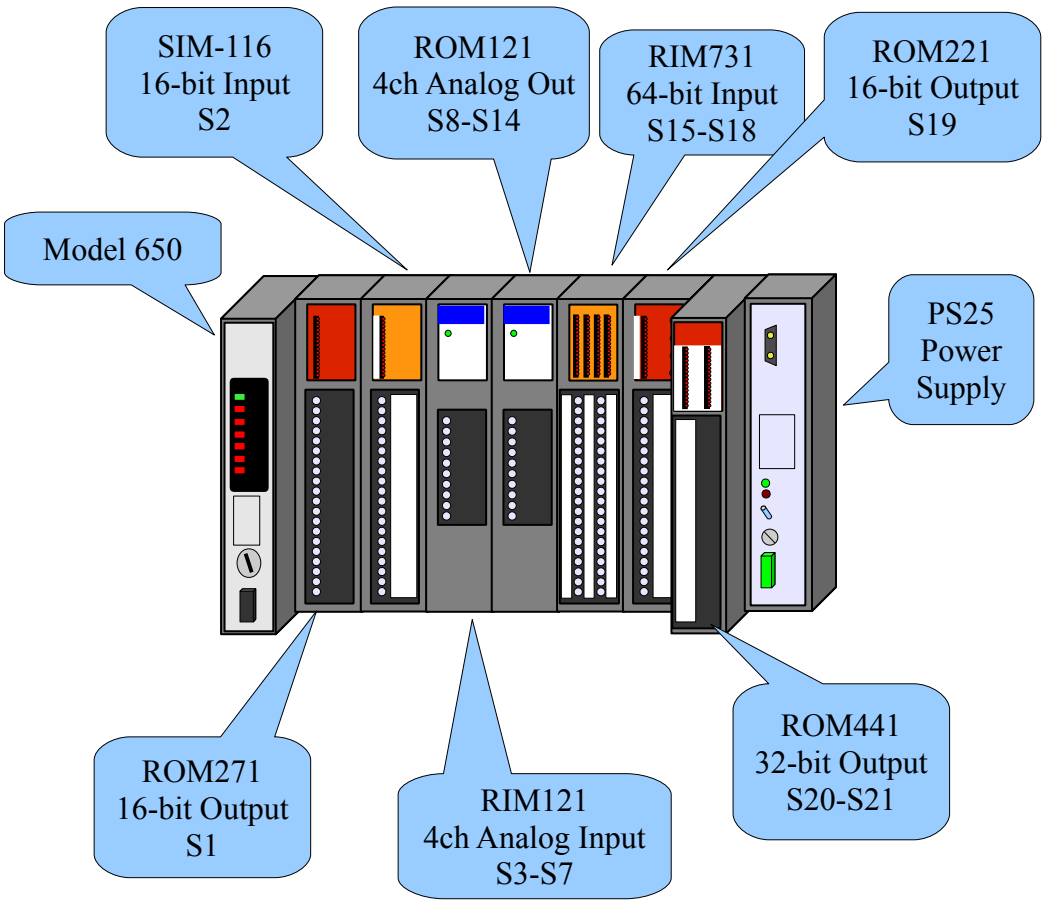
Modicon, Square D, SY/MAX, Compact, Quantum, M340, Momentum, Premium are trademarks of Schneider-Electric.

Subject to change without notice.

Original System Layout

This demonstration video starts with a simple Square D SY/MAX PLC system. The system consists of an RRK-200 rack with a Model 650 CPU with some discrete and analog I/O.

Figure 1 Original System Layout

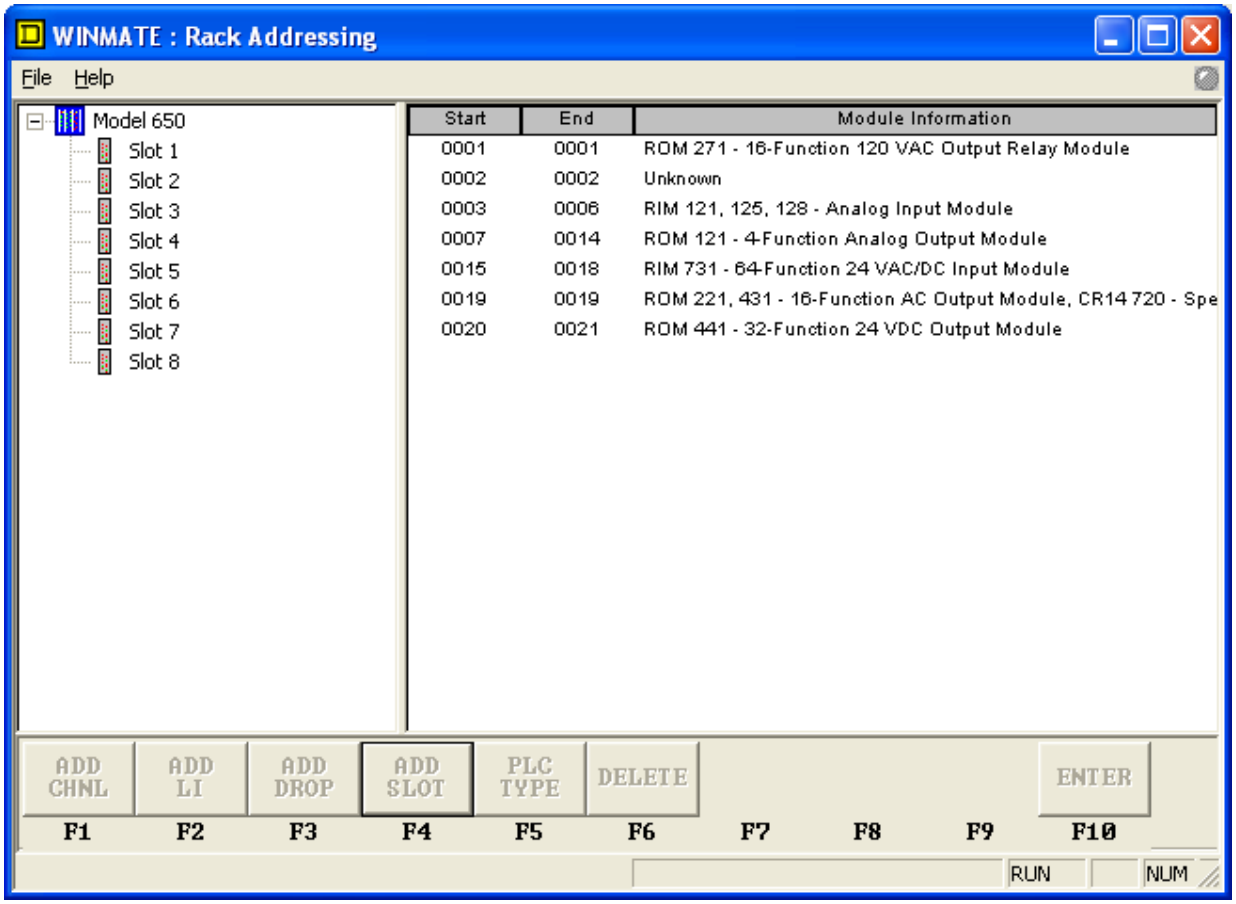


Three toggle switches are connected to the RIM731 inputs 1A7, 8A15, and 8A16.

Channel 1 of the RIM121 is connected to a variable voltage source.

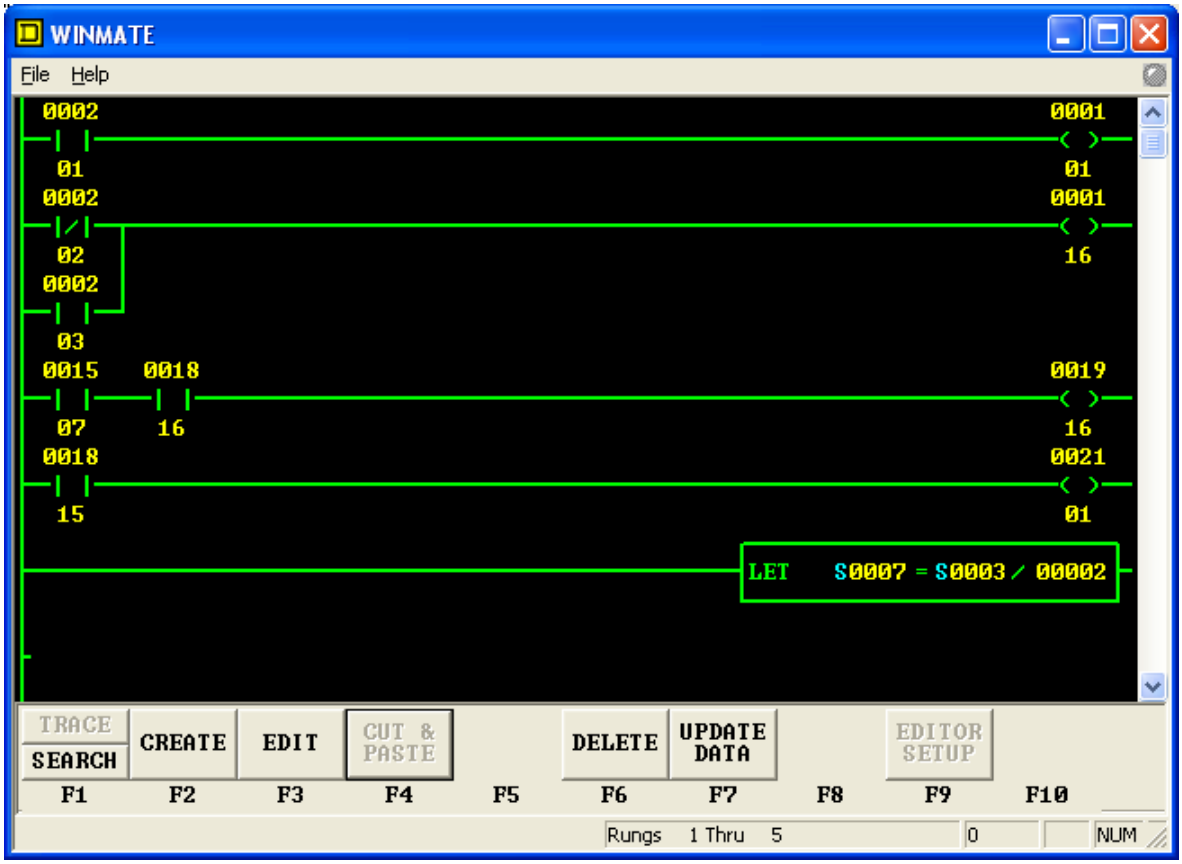
Channel 1 of the ROM121 is connected to an analog volt meter.

The Rack Addressing is shown below:



Register 2 is the 16 function input simulator in slot 3 but WINMATE calls it Unknown.

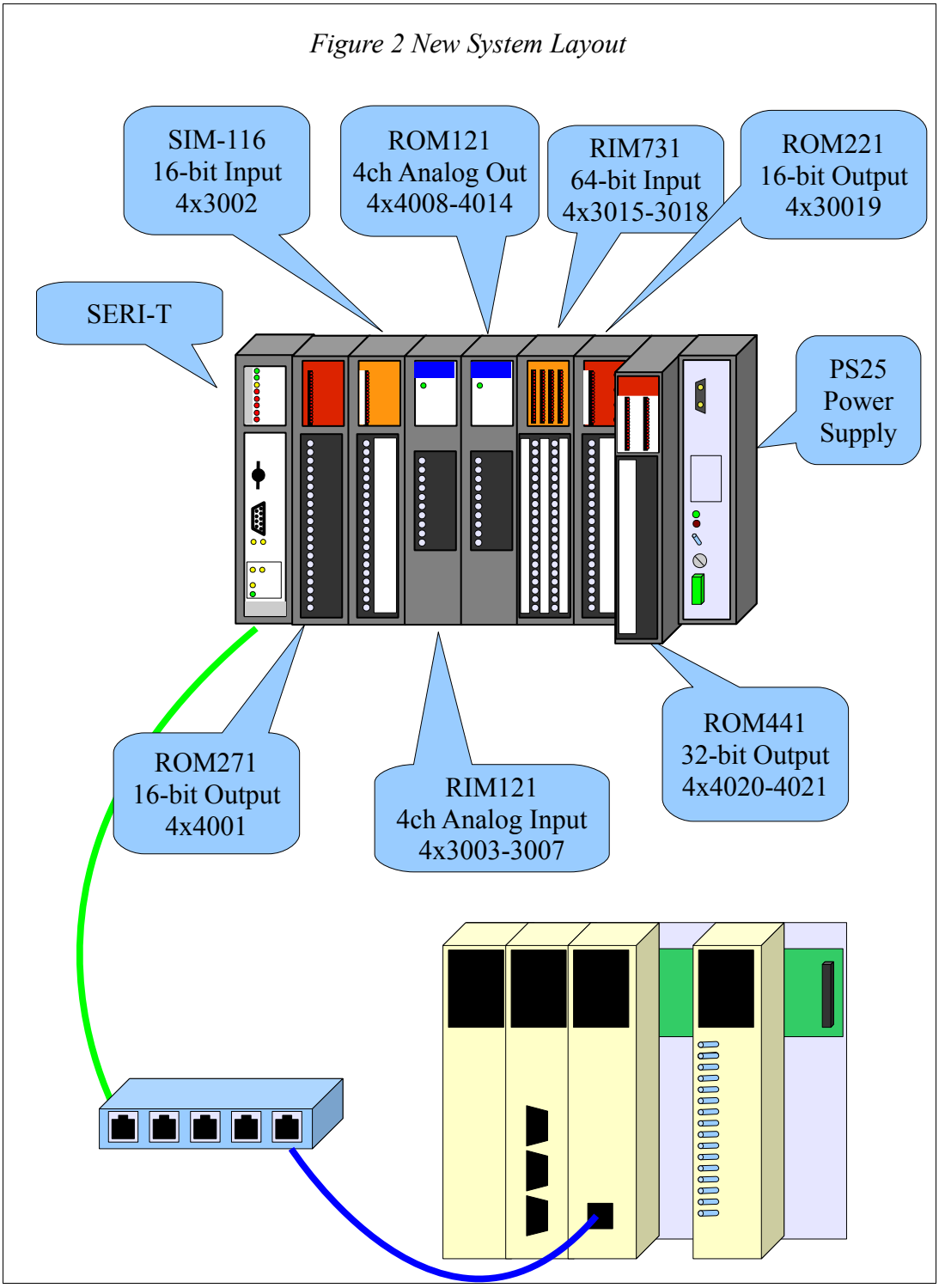
The ladder logic is shown in below:



The logic is simply a few inputs connected to outputs. The analog output is the analog input divided by 2.

New Setup

Figure 2 New System Layout

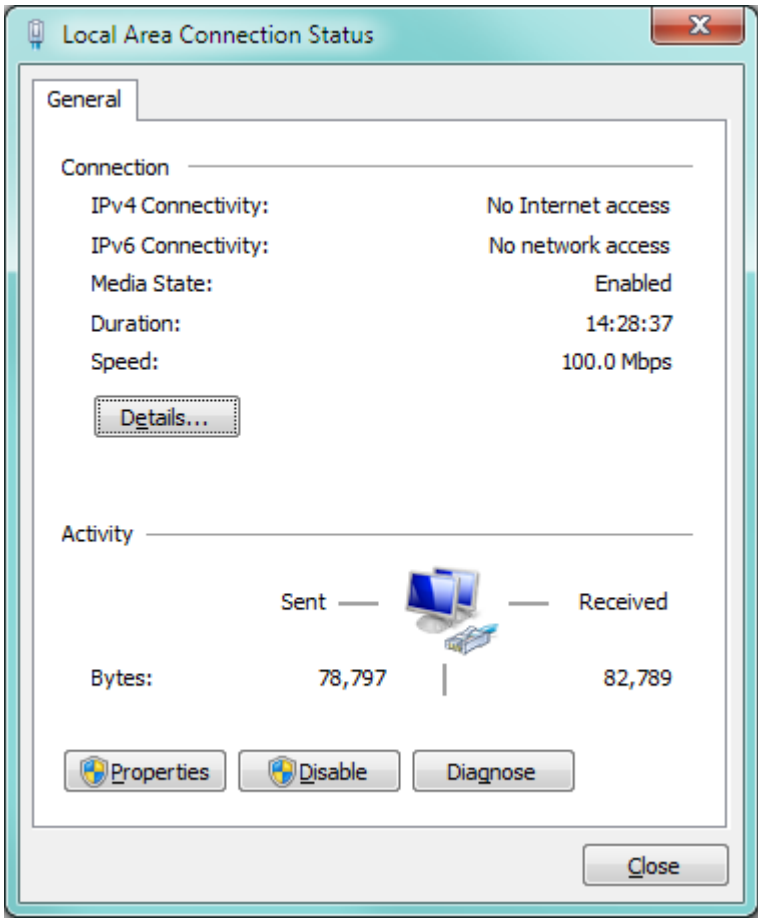


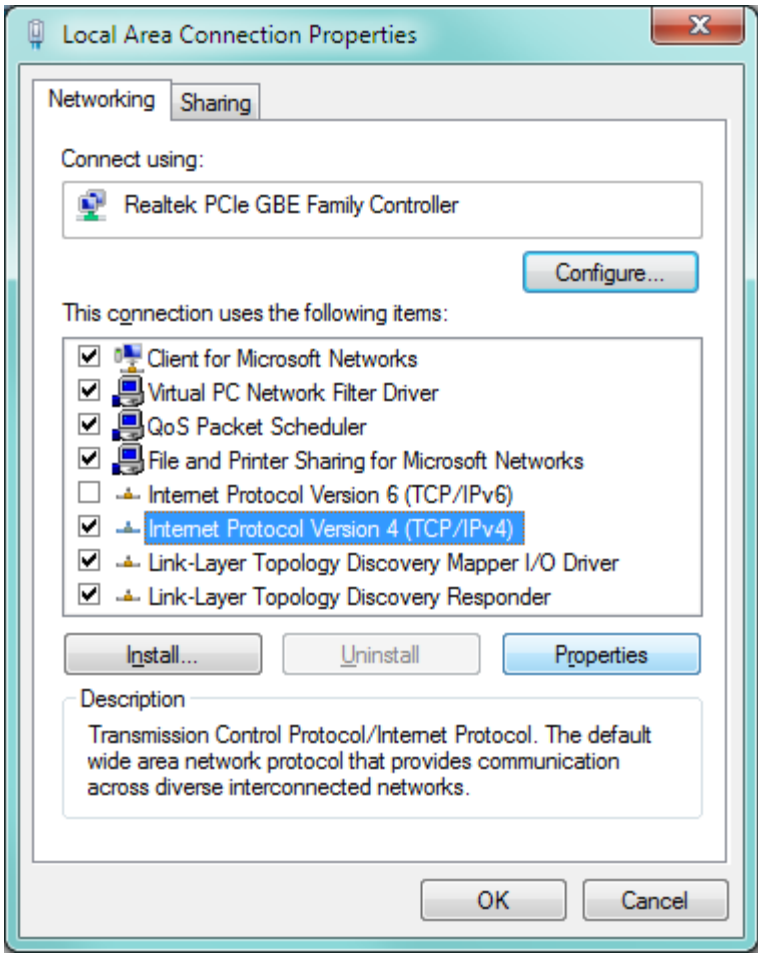
The SY/MAX CPU is removed from the rack and replaced with the SERI-T.

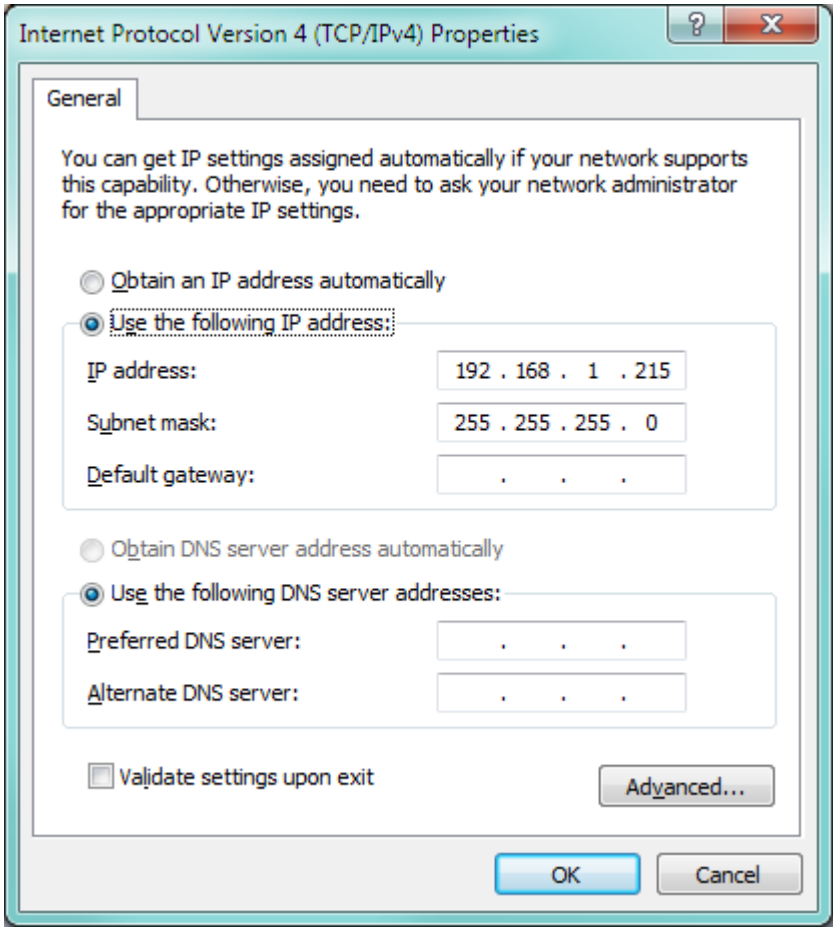
The new PLC is a Quantum Unity 140 CPU 311 10. The 140 NOE 771 01 Ethernet card is located in slot 3 of the Quantum rack. An input simulator card (140 DAI 540 00) is located in slot 5 and is traffic copped to input bits %I1 through %I16.

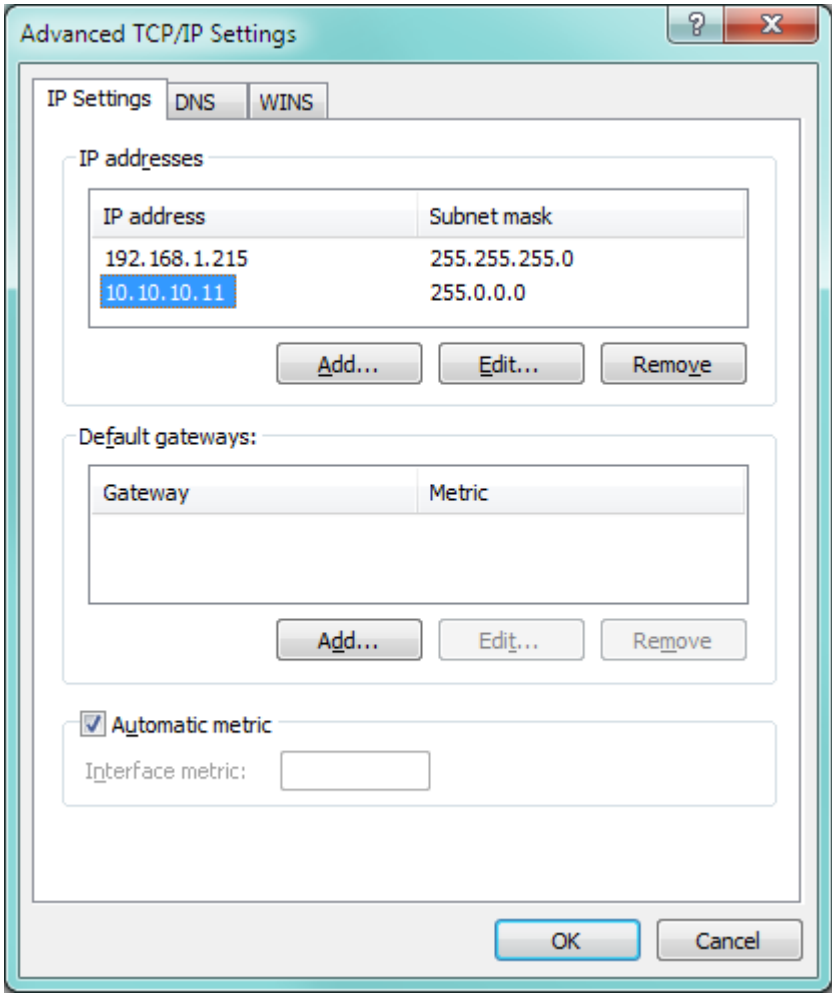
IP Settings

The IP Address of the SERI defaults to 10.10.10.10. The video demonstrates the process of setting the PC to this same address range to allow communication with the card.




Local Area Connection Properties
Networking
Sharing
Connect using:
Realtek PCIe GBE Family Controller
Configure...
This connection uses the following items:
Client for Microsoft Networks
Virtual PC Network Filter Driver
QoS Packet Scheduler
File and Printer Sharing for Microsoft Networks
Internet Protocol Version 6 (TCP/IPv6)
Internet Protocol Version 4 (TCP/IPv4)
Link-Layer Topology Discovery Mapper I/O Driver
Link-Layer Topology Discovery Responder
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
OK
Cancel


Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 215
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel



After the new IP Address of 10.10.10.11 is added to the PC, a web browser is then used to change the IP Address of the SERI to is proper value.

SERI Web Configuration

The default web page is seen when the PC connects to the SERI at address 10.10.10.10.

The first time the SERI"s configuration pages are accessed, the password must be entered. The user name does not matter but the password must be entered correctly and is case sensitive. The default password is “master”.

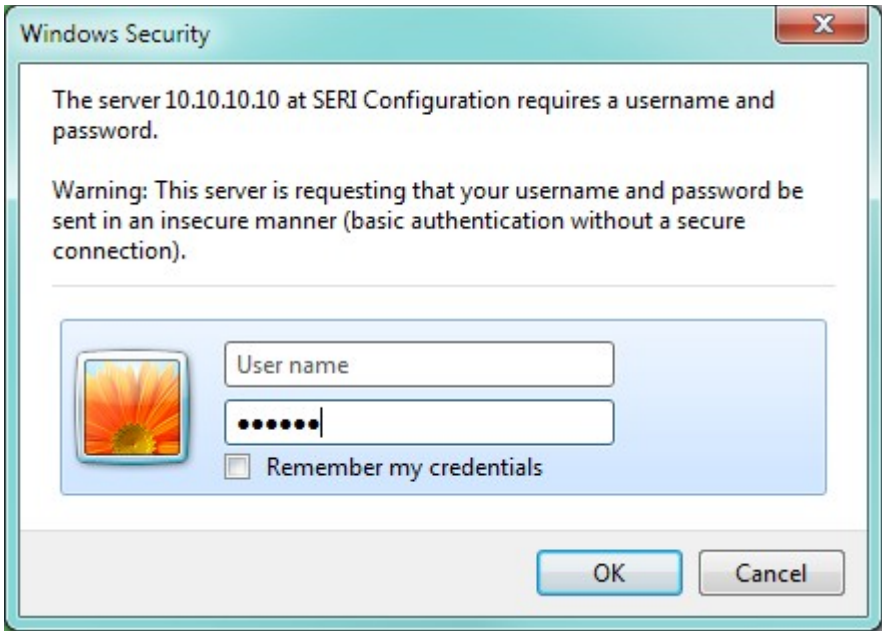
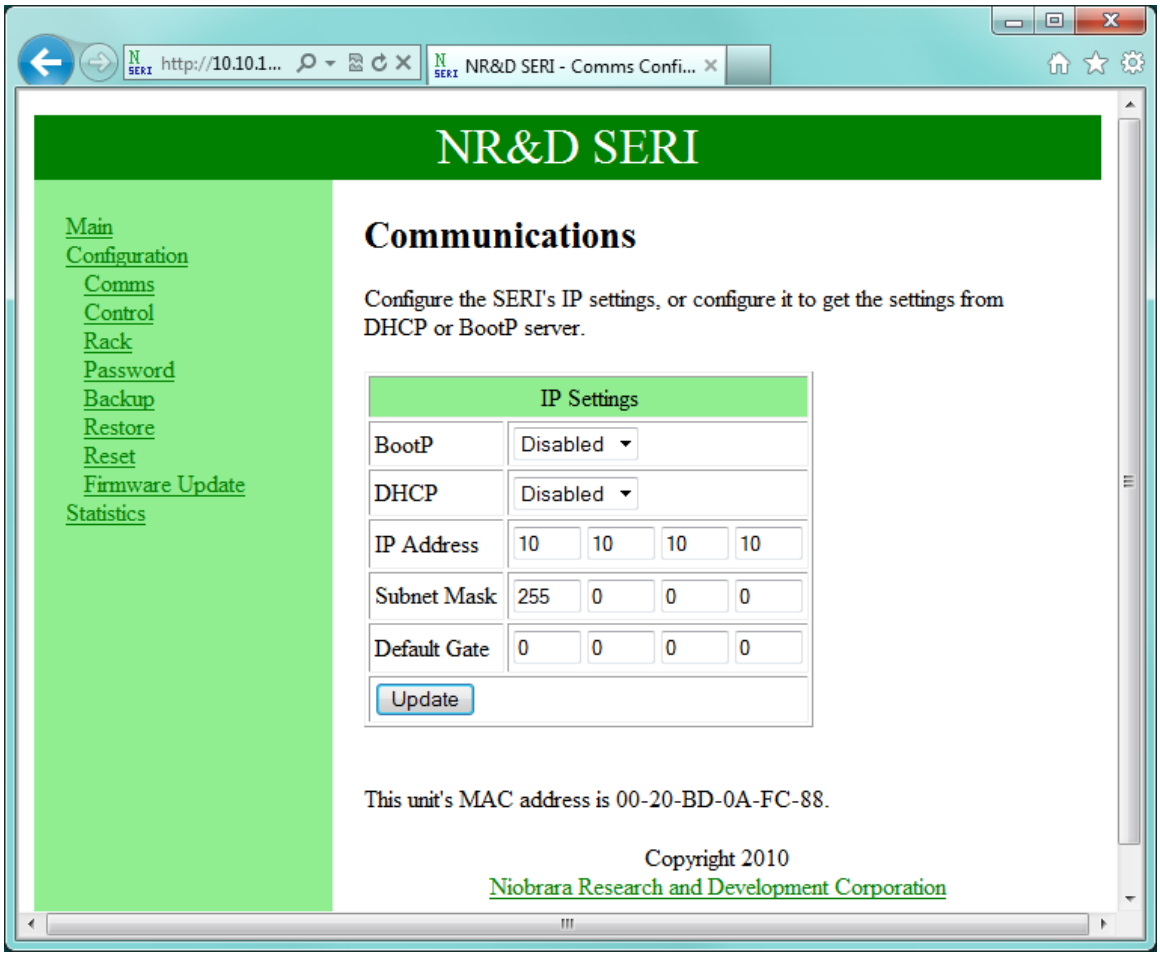


Figure 3: Password = master



The SERI's IP Address is changed to the final address by selecting "Configuration, Comms". After the address is changed to 192.168.1.27, the PC will automatically reconnect to the SERI.

NOTE: It is a good idea to remove the 10.10.10.11 address from the PC after changing the SERI's address.

NOTE: It is a good idea to save the setup to FLASH after changing the IP Address of the SERI. Otherwise, a power cycle will revert the card back to the previous value.

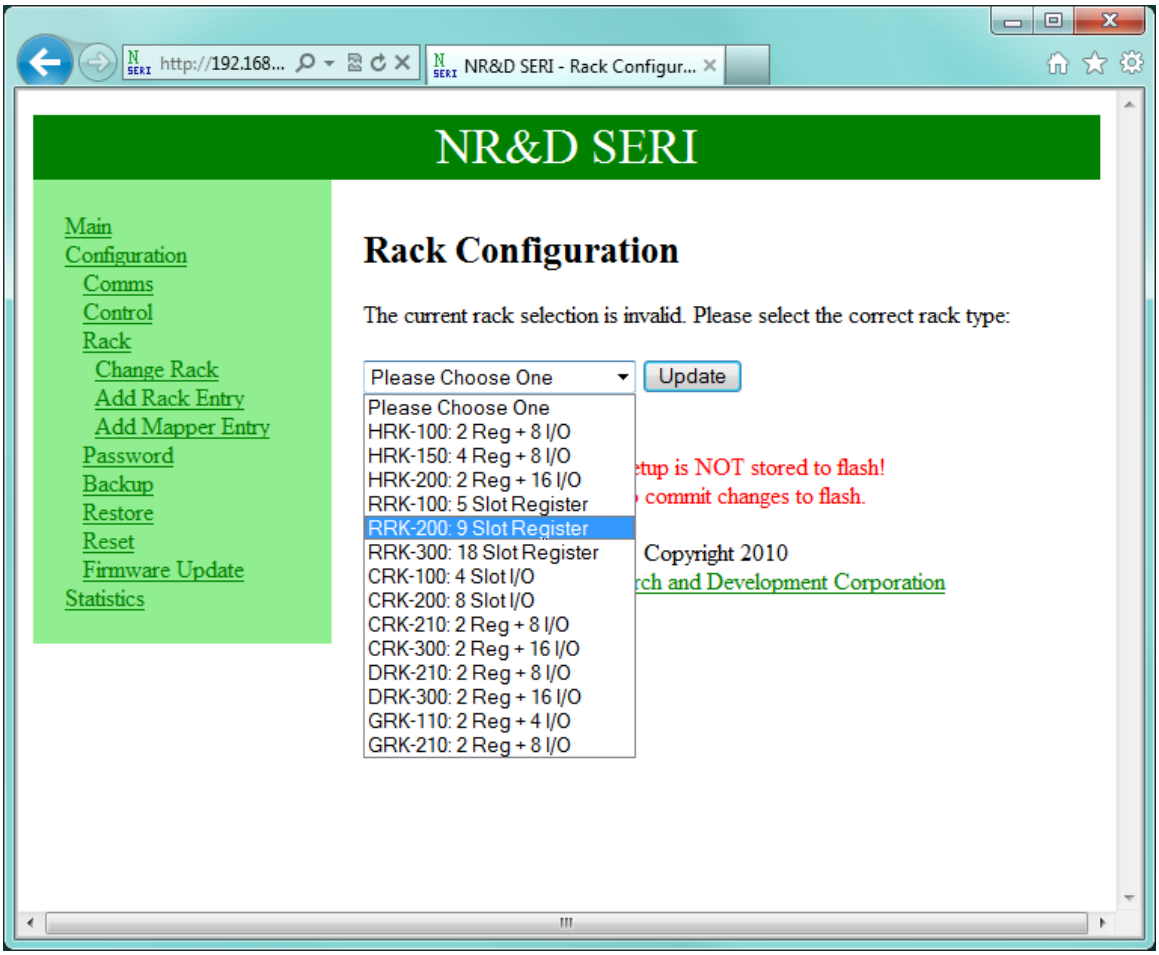


Figure 4: Configure Rack Web Page

The goal of this setup is to replicate the original SY/MAX register layout in the new Quantum controller. This is simple if we group all of the inputs together and all of the outputs together so they may be read/written with a single I/O Scanner entry. By reserving the first 21 %IW and %MW words in the new PLC, it is a simple matter to overlay the appropriate values and minimize the Ethernet communication.

Table 1: Quantum I/O Map

%IW	Description		%MW	Description
1	skip		1	Relay outputs
2	Input simulator		2	skip
3	Analog IN #1		3	skip
4	Analog IN #2		4	skip
5	Analog IN #3		5	skip
6	Analog IN #4		6	skip
7	skip		7	Analog OUT #1
8	skip		8	Analog OUT #2
9	skip		9	Analog OUT #3
10	skip		10	Analog OUT #4
11	skip		11	AO #1 Preset
12	skip		12	AO #2 Preset
13	skip		13	AO #3 Preset
14	skip		14	AO #4 Preset
15	Inputs 1A1-2A16		15	skip
16	Inputs 3A1-4A16		16	skip
17	Inputs 5A1-6A16		17	skip
18	Inputs 7A1-8A16		18	skip
19	skip		19	120VAC outputs
20	skip		20	24V Outputs 1V1-1V16
21	skip		21	24V Outputs 2V1-2V16

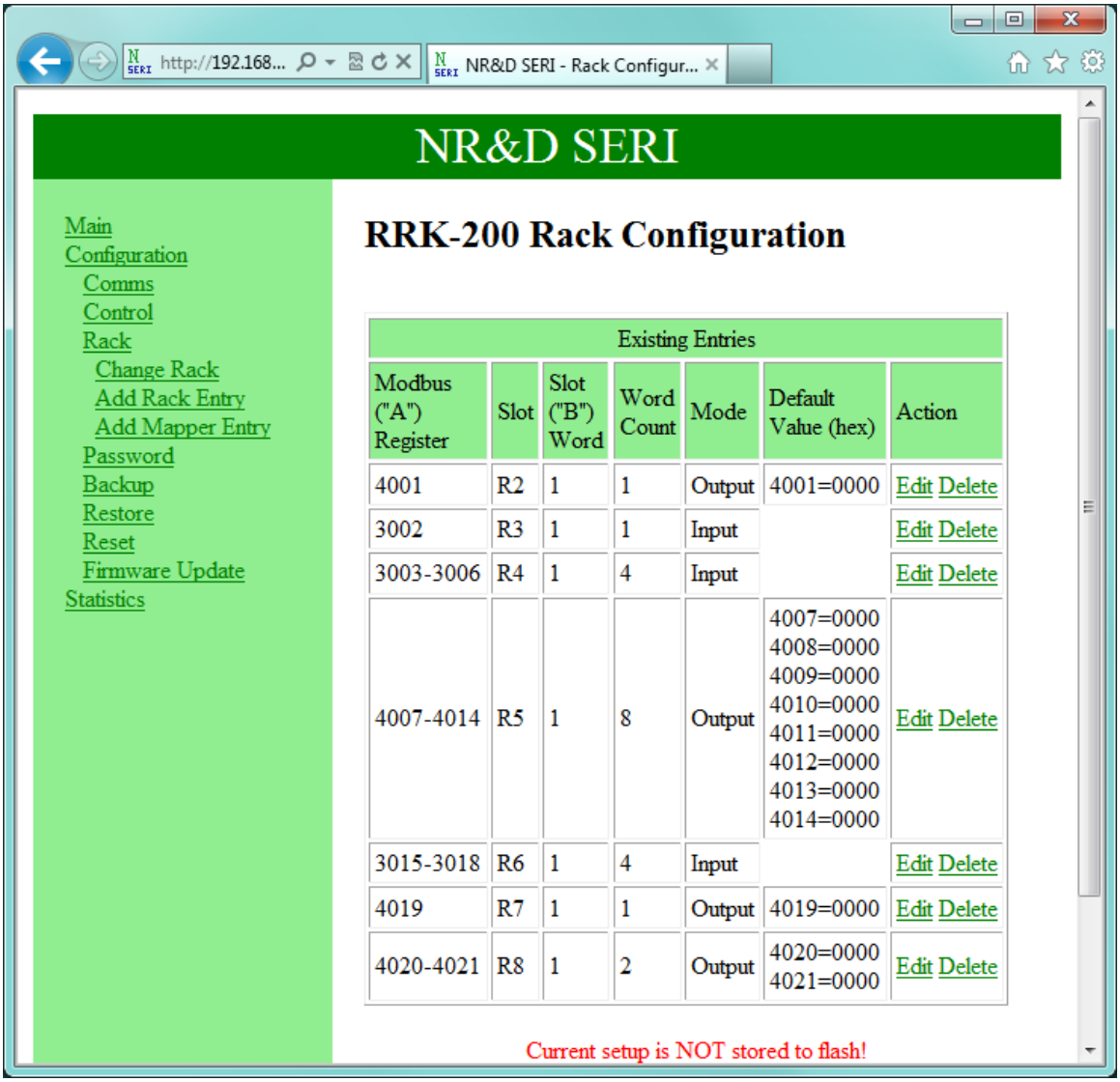


Figure 5: Rack Overview after all entries are added

The IP Address of the new Quantum NOE is entered on the “Control” page. This page also shows the communication Timeout value of 1000mS. If the PLC stops writing to the SERI for 1000mS then the SERI will revert all outputs to their default values.

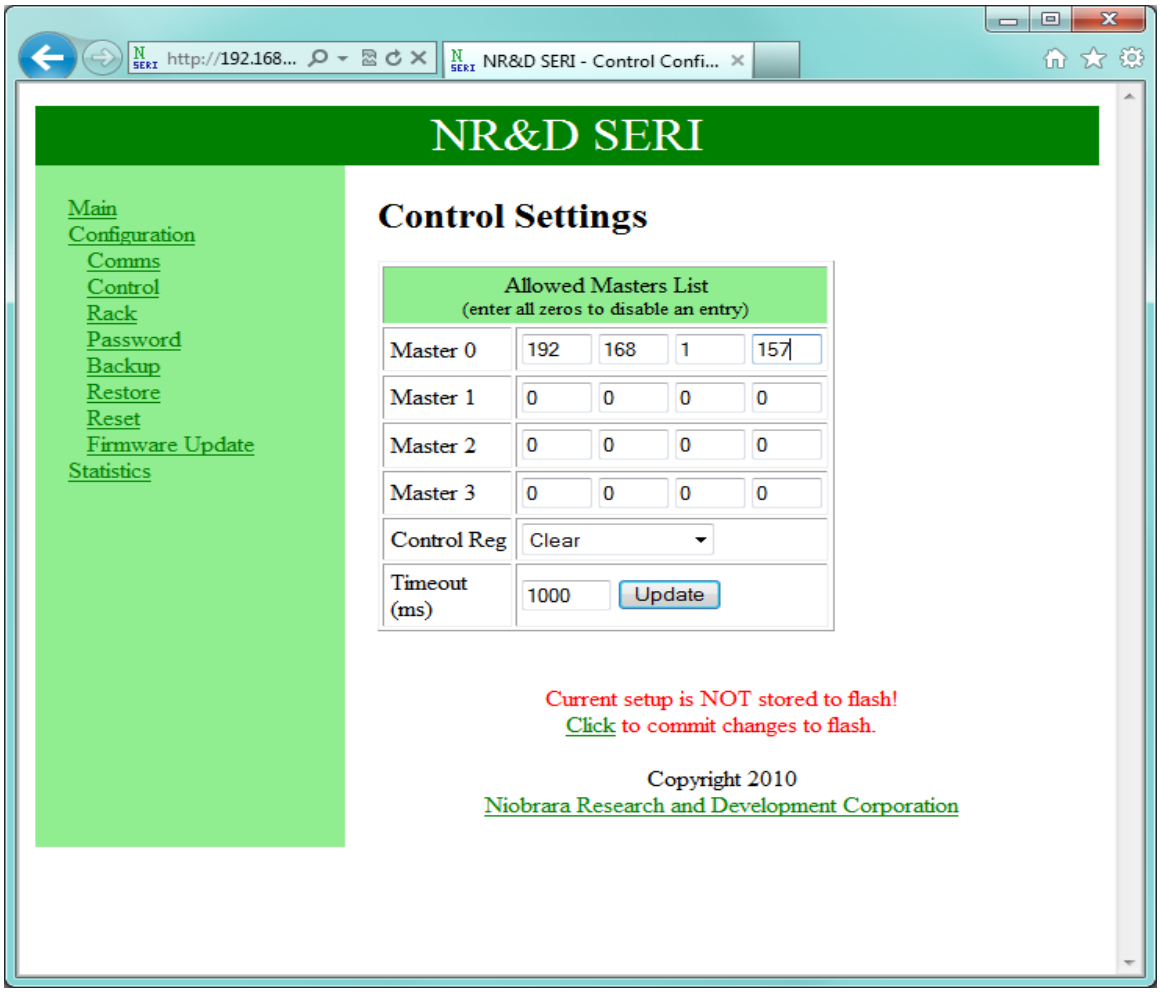


Figure 6: Master IP Address

PLC I/O Scanner Setup

The Ethernet I/O Scanner is configured with a single entry to transfer the data to/from the SERI.

#	IP Address	Unit ID	RD Master	RD Slave	RD Len	Last Value	WR Master	WR Slave	WR Len
1	192.168.1.127	0	%IW1	403001	21	0	%MW1	404001	21

Table 2: NOE I/O Scanner

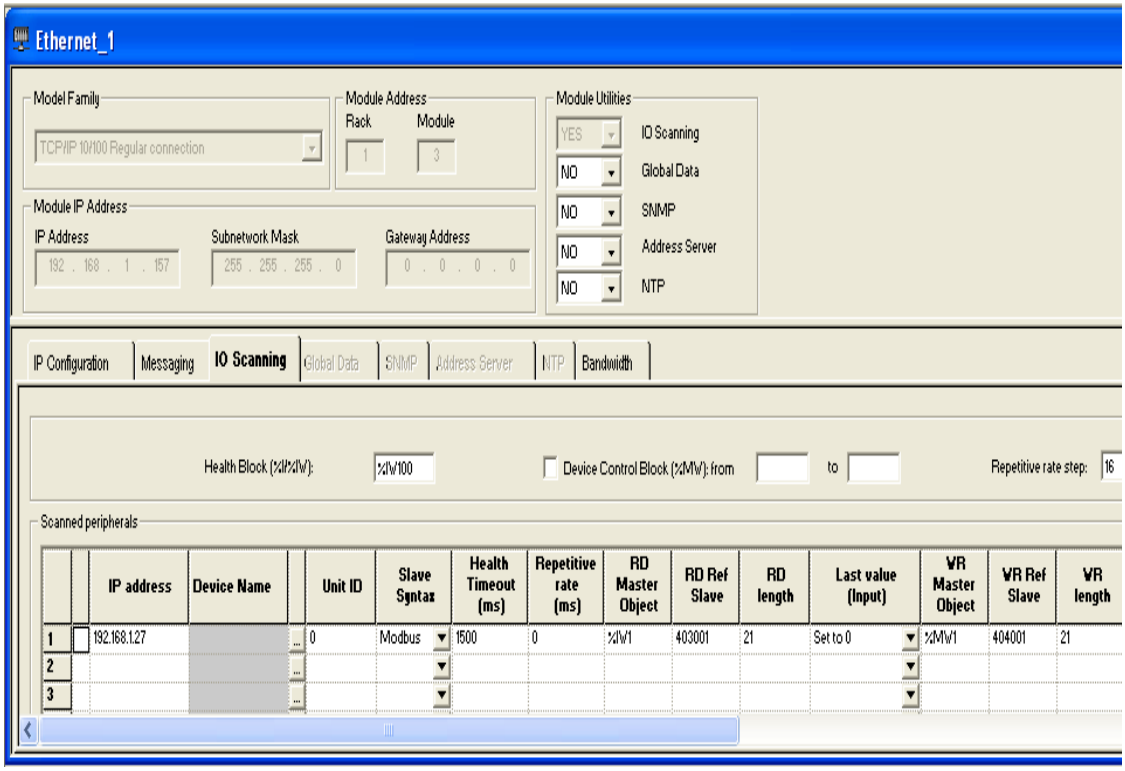


Figure 7: NOE I/O Scanner

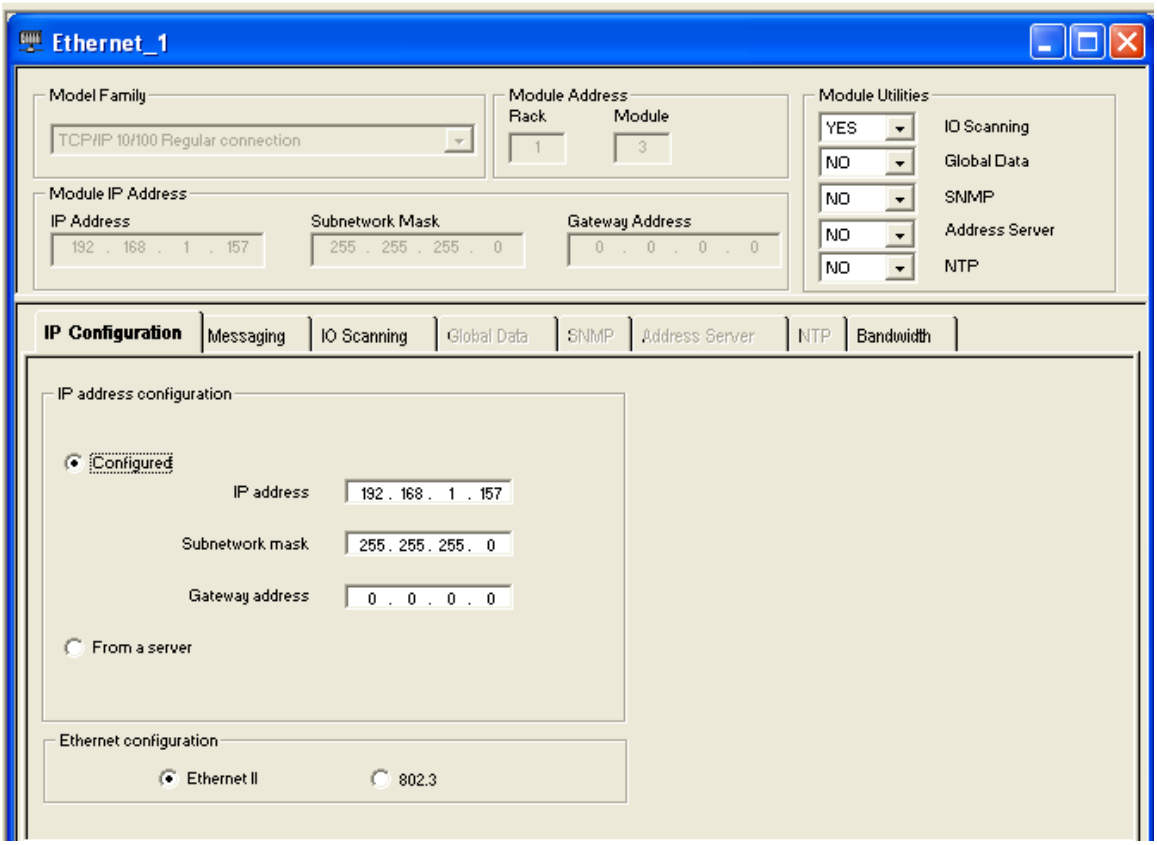


Figure 8: NOE Configuration

Ladder Program

The I/O Scanner and SERI configuration is carefully configured to allow the Quantum CPU to have the I/O in exactly the same words/bits as the original SY/MAX CPU. The very simple ladder program is simply replicated in Unity Pro Ladder.

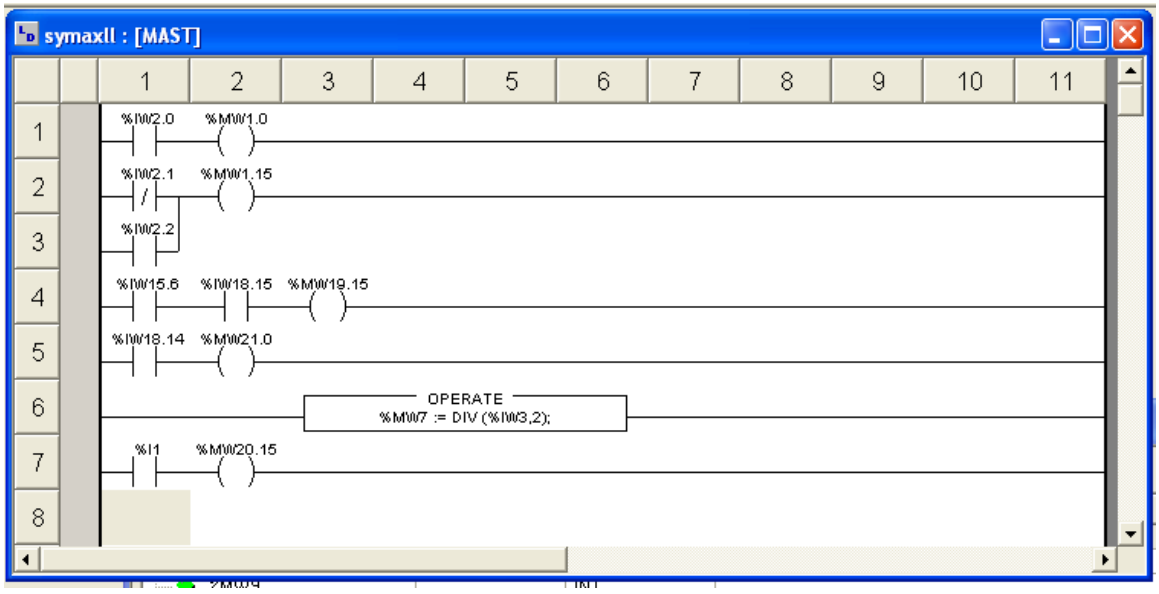


Figure 9: Unity Ladder Section

Figure 9 shows this simple ladder segment.

Notice that the register numbers are the same as the SY/MAX ladder but the bit numbers are off by 1. This is because SY/MAX numbers the bits 16-1 while Unity numbers the bits 15-0.

The OPERATE block is used to perform the division by 2 on the analog output.