DEB Setup Video

Companion Manual

This manual provides more detail on the the DEB Serial to Ethernet Bridge Setup Video.

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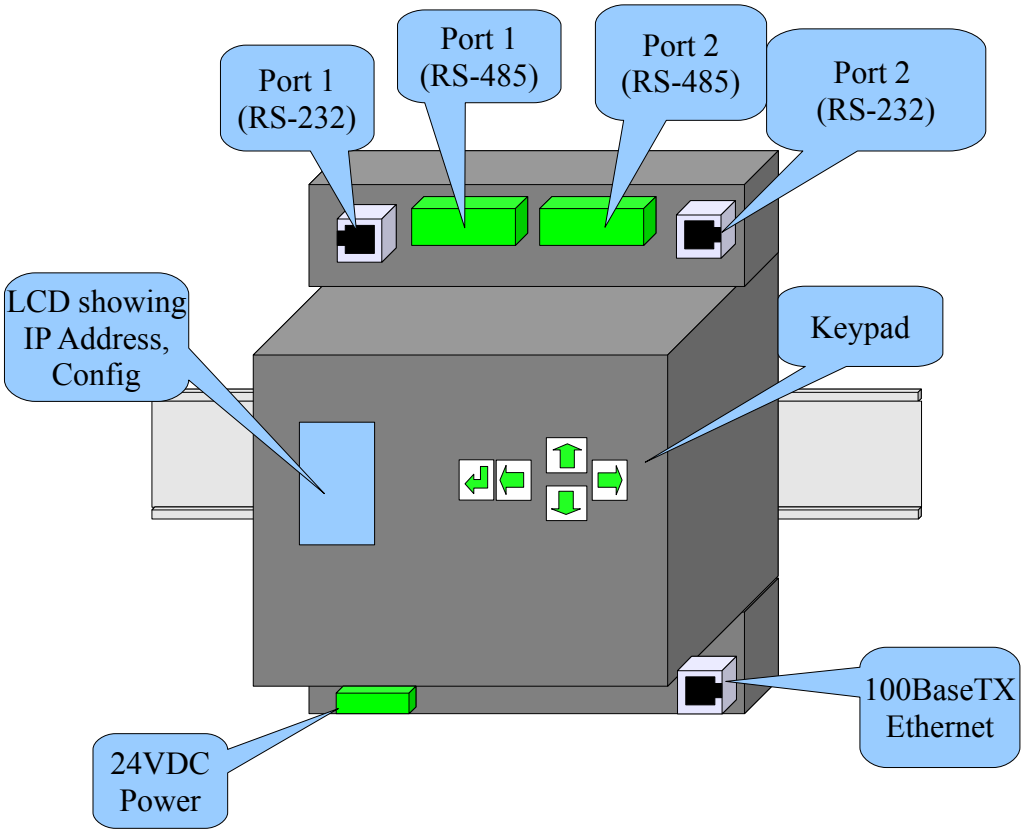
System Layout

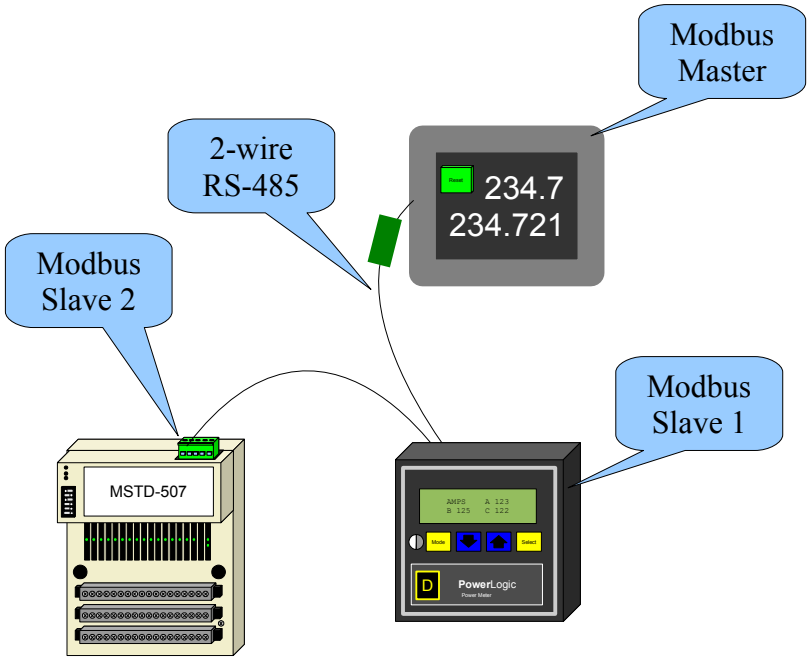
The Niobrara DEB is a stand-alone DIN rail mount Serial to Ethernet Bridge. It features an optional 10/100BaseTX Ethernet port, two isolated serial ports and optionally two additional isolated serial ports. The DEB allows simultaneous pass-through routing data messages from Modbus/TCP Ethernet and Modbus serial between all ports. Full support of PLC programming message pass-through is also provided on all communication ports including Unity Pro, Concept, ProWORX, and Modsoft.

Figure 1:DEB+101 Front Panel



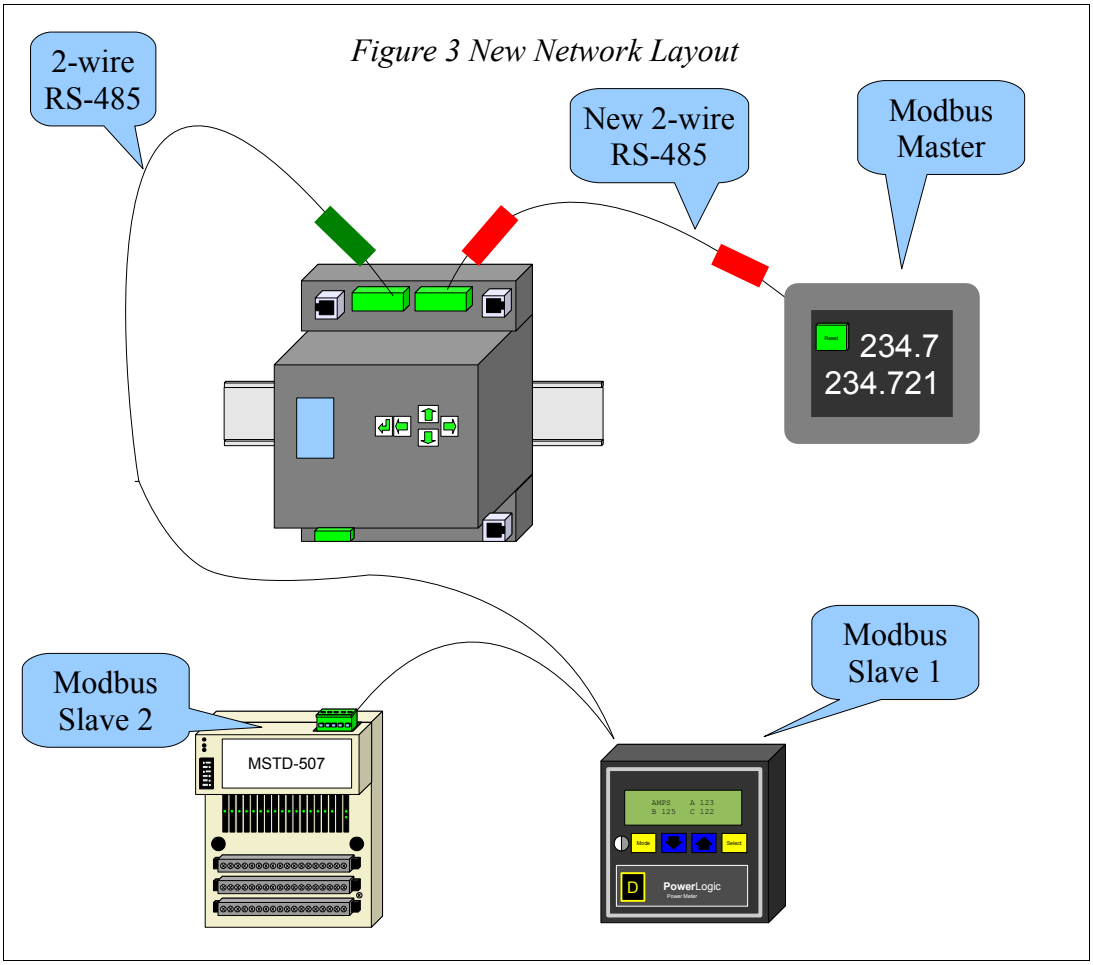
The DEB Example video starts with a simple network setup as shown in Figure 2 Original Network Layout. The Magellis HMI is polling two Modbus slaves via a 2-wire RS-485 network. Modbus slave #1 is a PowerLOGIC PM650 and slave #2 is a Niobrara MSTD+507 acting as a KYZ counter. The HMI polls both slaves continuously.

Figure 2 Original Network Layout



The DEB+101 is added to the system to allow a Modbus/TCP Ethernet client (PC) to access the slaves at the same time as the HMI. The DEB takes care of buffering the Modbus messages from the HMI and Ethernet to allow many "Masters" to poll the single daisy-chain of slaves.

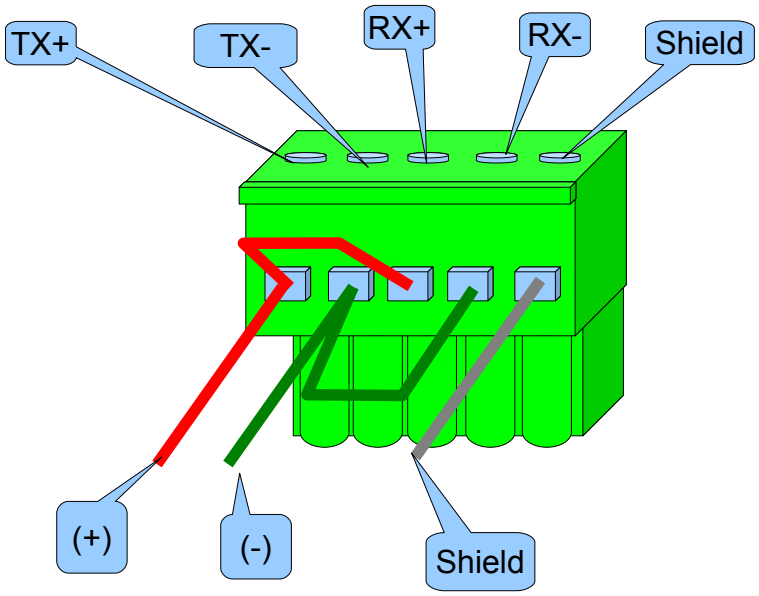
Figure 3 New Network Layout



RS-485 Wiring

The daisy-chain (green tag) is removed from the HMI and connected to the DEB's port 1 RS-485 port. The DEB RS-485 port is native 4-wire RS-485 and may be quickly jumpered to allow 2-wire operation. Simply tie the TX+ to RX+ to make the (+) connection, then jumper the TX- to RX- to make the (-) connection.

Figure 4 2-wire RS-485 Jumpers



A new wire (red tag) is then used to tie DEB port 2 to the HMI. Again, the DEB port has the 2-wire jumpers installed.

Serial Port Settings

Serial port 1 was selected to attach the two slaves because the default Modbus routing tables for both the Ethernet and port 2 may be used with no additional configuration. Table 1 shows the default routes for all three ports on the DEB+101. A message to slave 1 arriving on the Ethernet or port 2 will be routed to slave 1 on port 1. Slaves 1-32 are sent out port 1 while slaves 33-64 are sent out port 2 to targets 1-32.

By choosing to put the slaves on port 1, there is no need to change the HMI. It still access slaves 1 and 2 just the same as when they were hard wired to the unit's port.

Table 1: Default Modbus Routes

Slave/Index	Ethernet Route (Drop 0)	Port 1 Route (Drop 101)	Port 2 Route (Drop 102)
0	NONE	N/A	N/A
1	101,1	NONE	101,1
2	101,2	NONE	101,2
3	101,3	NONE	101,3
4	101,4	NONE	101,4
...	...	...	...
31	101,31	NONE	101,31
32	101,32	NONE	101,32
33	102,1	102,1	NONE
34	102,2	102,2	NONE
35	102,3	102,3	NONE
36	102,4	102,4	NONE
...	...	...	...
63	102,31	102,31	NONE
64	102.32	102.32	NONE

Both serial ports keep most of their default settings of Modbus RTU, Even parity, 8 data bits, 1 stop bit. The HMI and both slaves are set to 19200 baud so each DEB serial port must be changed from the default 9600 to 19200. The driver mode on each port is changed from RS-232 to RS-485+Bias for the port connected to the slaves and RS-485-Bias for the port connected to the HMI.

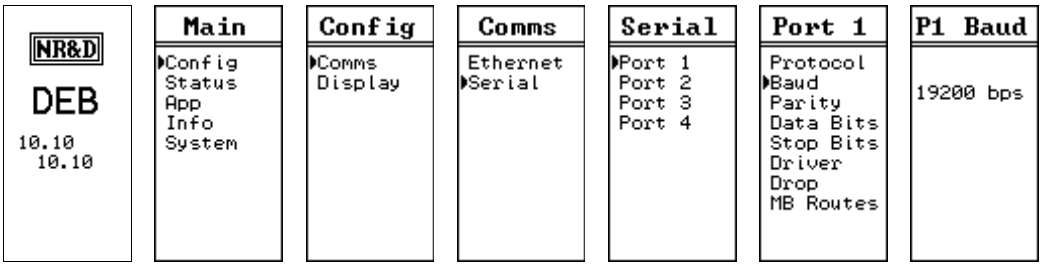


Figure 5: Serial Port 1 Baud Rate

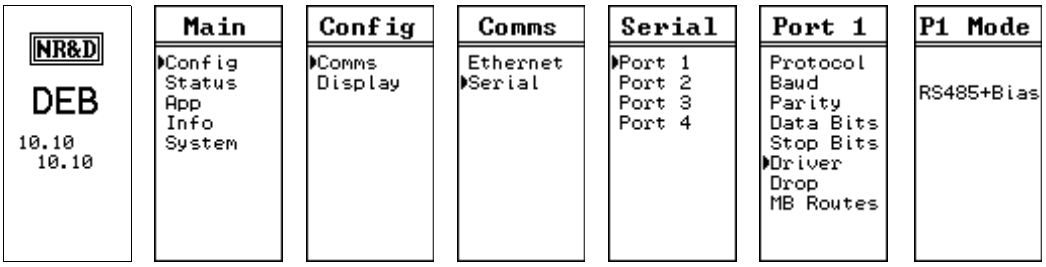


Figure 6: Serial Port 1 Driver Mode

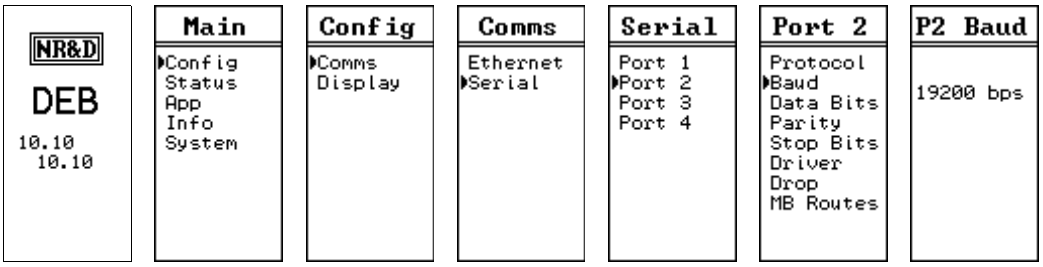


Figure 7: Serial Port 2 Baud Rate

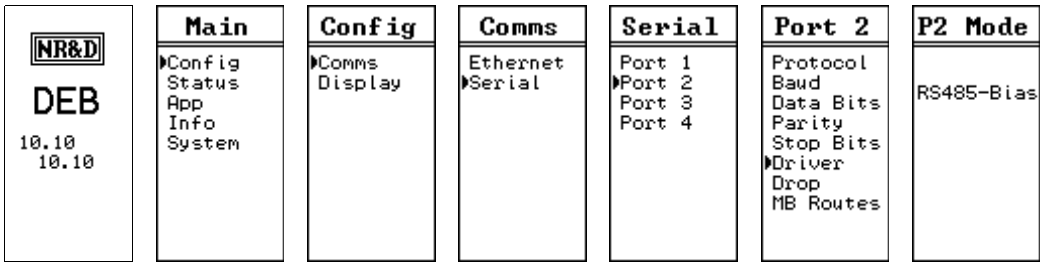


Figure 8: Serial Port 2 Driver Mode

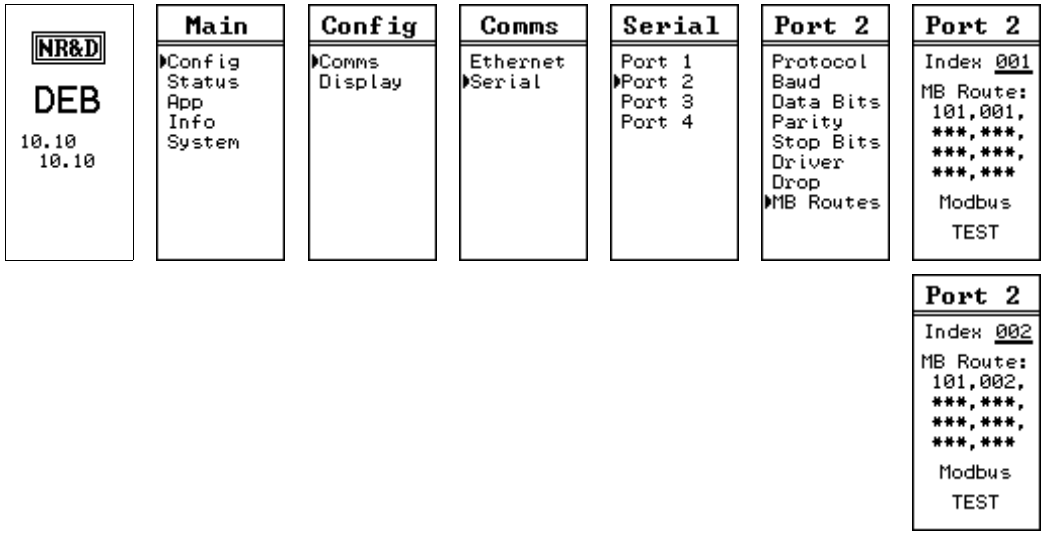
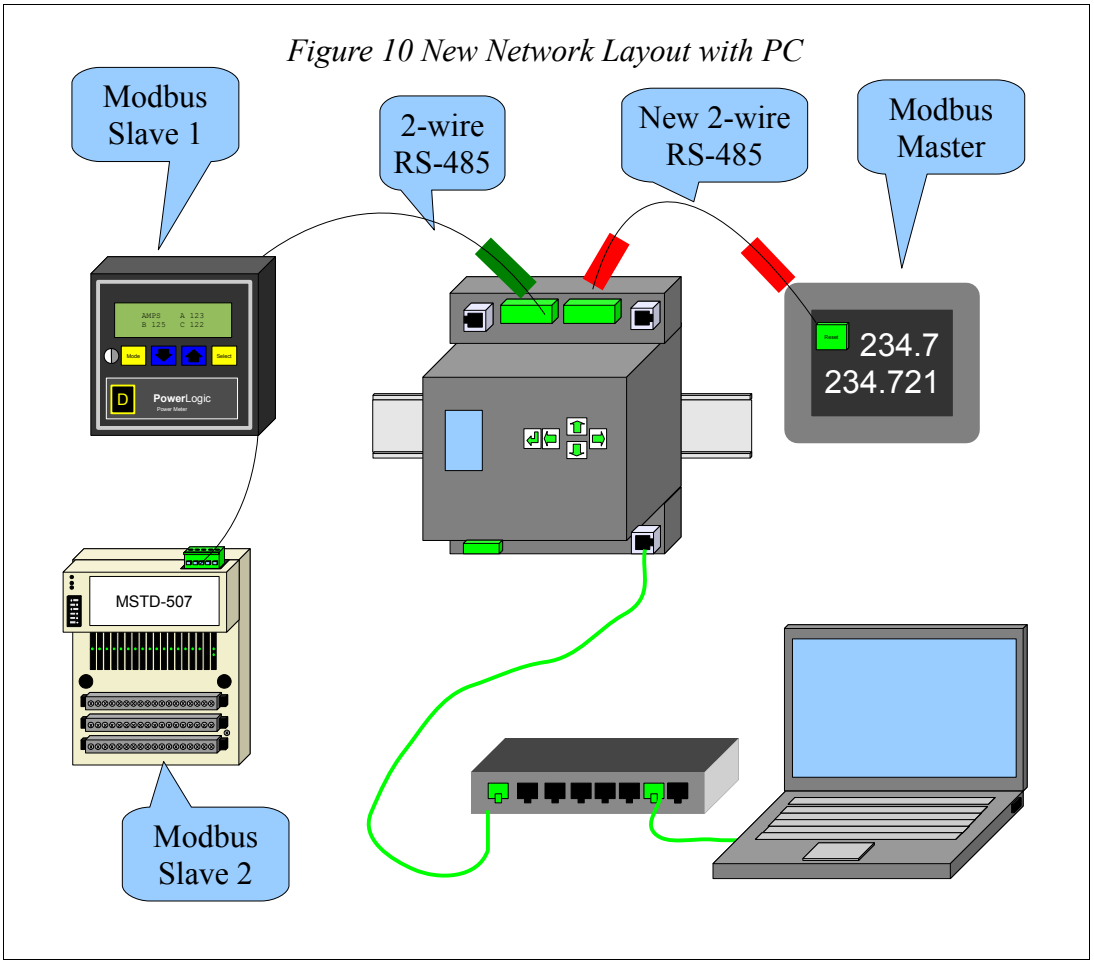


Figure 9: Serial Port 2 Modbus Routes for Slaves 1 and 2

Figure 10 New Network Layout with PC



IP Settings

The IP Address of the DEB+101 is set to 192.168.1.19. The video demonstrates setting this value with the following screens:

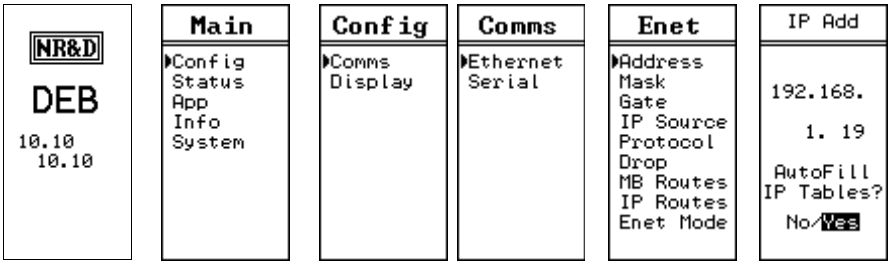


Figure 11: Fixed IP Address Screen

The Subnet Mask and Default Gate are also configured through the front panel.

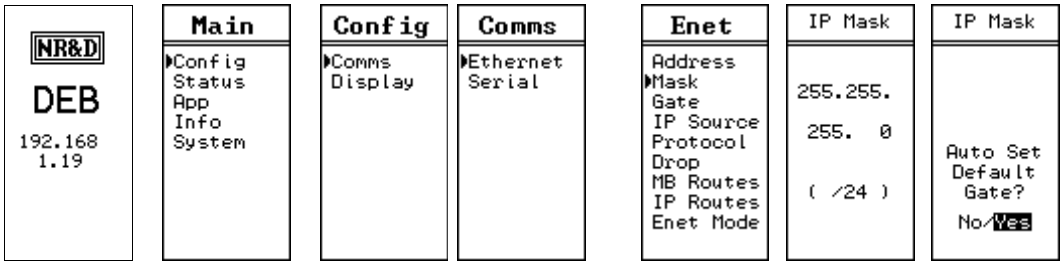


Figure 12: Subnet Mask Screens

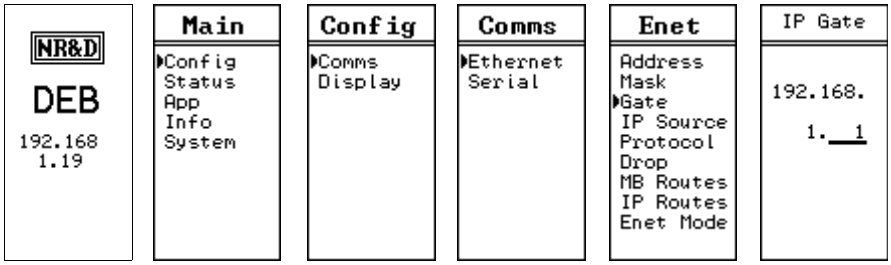


Figure 13: Default Gate Screens

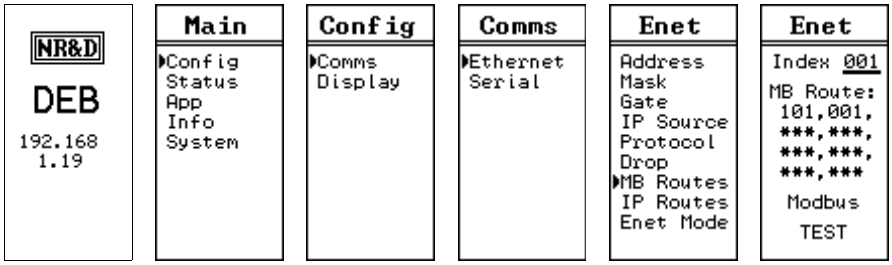


Figure 15: Modbus Routes for Ethernet Index 1 and 2

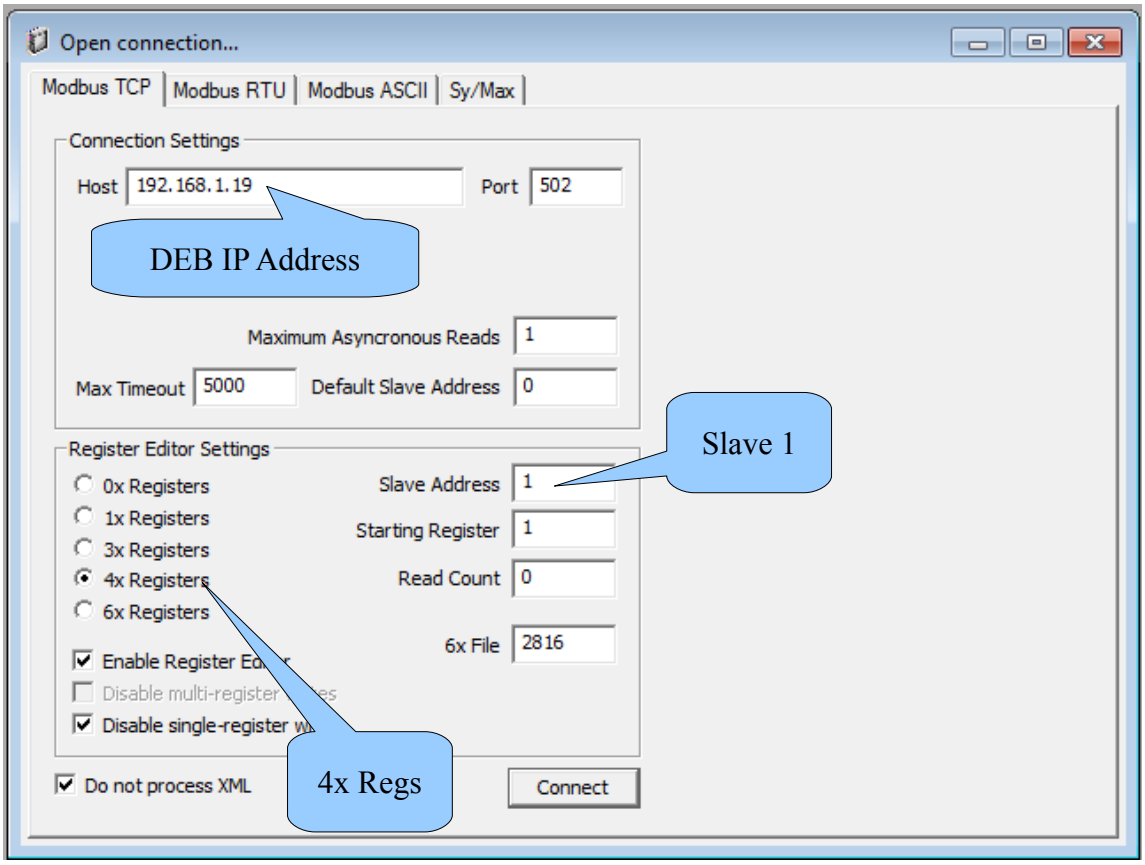
Modbus/TCP index values 1 and 2 will route to slaves 1 and 2 on DEB port 1.

NRDTOOL

The nrdtool.exe program is used to quickly view Modbus registers in both slaves. This Windows program is a Modbus register viewer that can make connections to multiple slaves and display realtime data.

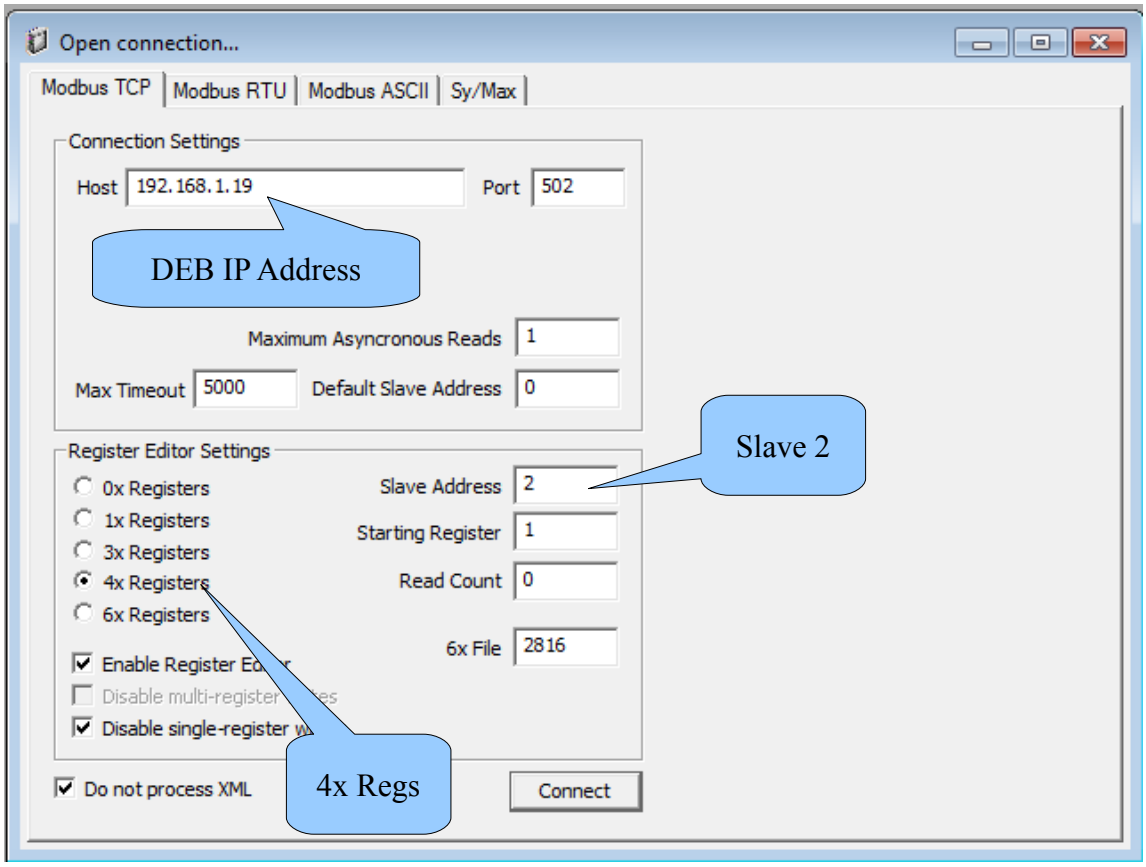
Two connections are made from nrdtool to the DEB. The first connects using Modbus/TCP Index 1 to communicate with the Powerlogic meter. The second connection uses Modbus/TCP Index 2 to communicate with the Momentum. All of this communication is happening at the same time that the Magellis is polling the two slaves.

Figure 16: NRDTOOL open connection for slave 1



A second Modbus/TCP conection is established to the DEB targeting slave 2 (Momentum).

Figure 17: NRDTOOL open connection for slave 2



The register viewer shows the Modbus registers for the KYZ (Momentum) and Powerlogic meter. The Momentum is showing the Kwh in register 2 while the Powerlogic meter is showing the value in registers 1621 and 1620 modulo 10,000.

Figure 18: NRDTOOL registers