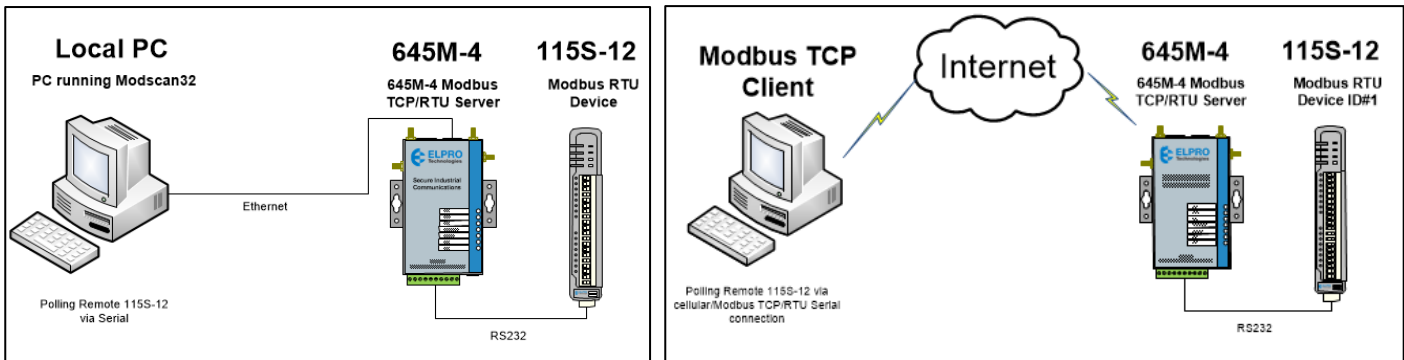


Support Note – 645M-4 Modbus TCP/RTU

The following application note demonstrates the configuration of the ELPRO 645M-4 modem using the Modbus TCP to RTU conversion. This will allow serial devices to be connected to the RS232 on the terminal strip which can then be access via the TCPIP either locally or via the WAN. This guide does not show how to provision the Cellular PPP Connection; details of this can be found in the quick start guide for the 645M-4.

Network Example - Overview

The diagram below depicts a typical connection for a Local TCP Client connecting to the 645M-4 via Ethernet and the 645M-4 Cellular Modems connected to a RS232 Modbus Slave device (115S-12 Elpro Expansion I/O module). The 645M-4 is setup as a Modbus TCP to RTU converter which will convert Modbus TCP data frames and output via the RS232 serial port. Can also connect via the Cellular connection and Poll the serial device using the Modbus TCP to RTU conversion.



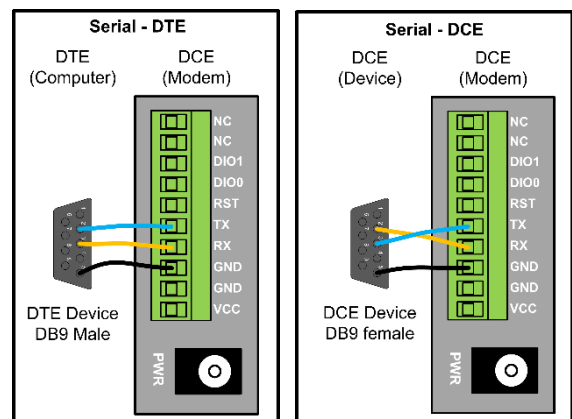
Cable Connections

Devices that communicate over serial are divided into two different types, DTE & DCE.

DTE - Data Terminal Equipment – Computers, Terminals, etc. will require a straight through connection.

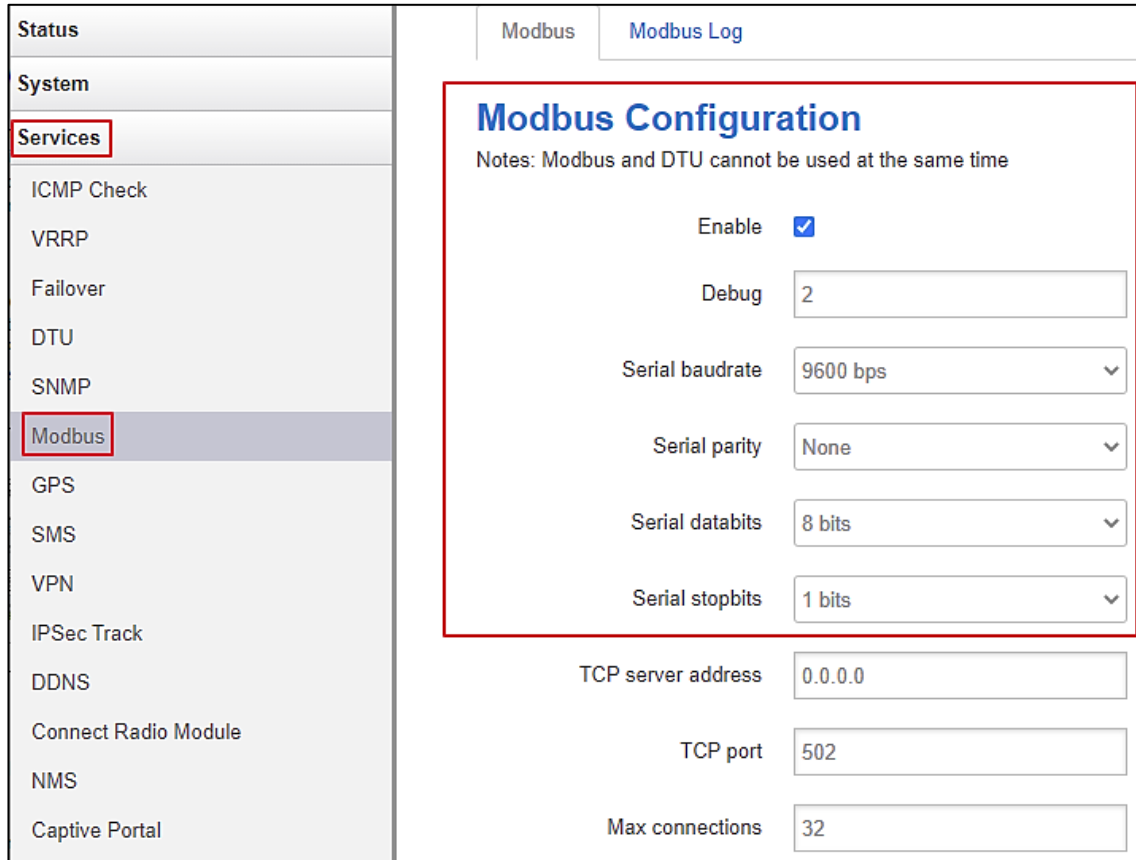
DCE – Modems, Etc. will require a cross over of the TX & RX data lines.

The serial port on the modem is a DTE (data Terminal Equipment) and cabling will depend on the type of device it is being connected to.



Configuration Overview

The ELPRO 645M-4 **Modbus** Configuration is located under the **Services/Modbus** webpage link. Enable the Modbus feature and configure the serial parameters per your application.

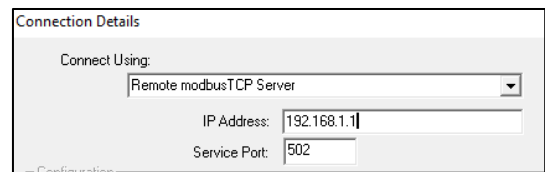


The screenshot shows the configuration interface with a sidebar on the left containing menu items: Status, System, Services (highlighted), ICMP Check, VRRP, Failover, DTU, SNMP, Modbus (highlighted), GPS, SMS, VPN, IPsec Track, DDNS, Connect Radio Module, NMS, and Captive Portal. The main content area is titled 'Modbus Configuration' and includes a note: 'Notes: Modbus and DTU cannot be used at the same time'. The configuration fields are as follows:

- Enable:
- Debug: 2
- Serial baudrate: 9600 bps
- Serial parity: None
- Serial databits: 8 bits
- Serial stopbits: 1 bits
- TCP server address: 0.0.0.0
- TCP port: 502
- Max connections: 32

In this Example the 115S-12 Serial Expansion module is setup with 9600 baud, 8 data bits, 1 Stop bits and No Parity and has a Modbus RTU ID of #1.

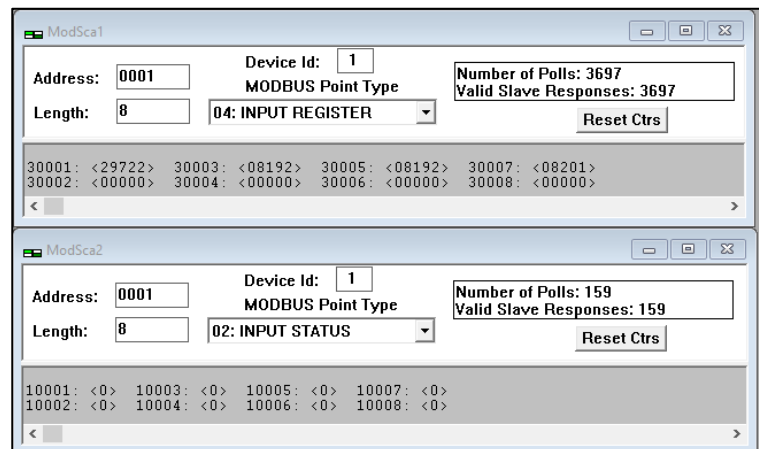
I then setup the Modbus TCP Master (in this case I am testing with Modscan32 Modbus Simulator) to Poll the LAN IP address of the 645M-4 192.168.1.1 and Modbus port 502.



The 'Connection Details' window shows the following configuration:

- Connect Using: Remote modbusTCP Server
- IP Address: 192.168.1.1
- Service Port: 502

I then setup the Modbus TCP Master (Modscan32) to Poll the RTU Device ID (#1) and the known register locations and command types. I.e., 30001 x 8 for 8 x analog inputs and 10001 x 8 for 8 x Digital inputs.



The screenshot shows two windows from the Modbus Simulator:

- ModSca1:** Address: 0001, Device Id: 1, MODBUS Point Type: 04: INPUT REGISTER, Length: 8. Number of Polls: 3697, Valid Slave Responses: 3697. Data: 30001: <29722> 30003: <08192> 30005: <08192> 30007: <08201> 30002: <00000> 30004: <00000> 30006: <00000> 30008: <00000>
- ModSca2:** Address: 0001, Device Id: 1, MODBUS Point Type: 02: INPUT STATUS, Length: 8. Number of Polls: 159, Valid Slave Responses: 159. Data: 10001: <0> 10003: <0> 10005: <0> 10007: <0> 10002: <0> 10004: <0> 10006: <0> 10008: <0>

If you are connecting to the 645M-4 via the cellular network, then you will need to use the assigned static Cellular IP address or Hostname/Domain if using Dynamic DNS.

Connection Details

Connect Using: Remote modbusTCP Server

IP Address: elprotech.ddns.net

Service Port: 502

Note: If you want to access the Modbus server from the WAN or Cell port, then you may need to configure the Firewall settings to open the TCP port for 502 (ModbusTCP).

Status

System

Services

Network

Operation Mode

Mobile

LAN

Interfaces

Wi-Fi

Firewall

Switch

[General Settings](#)
[Port Forwards](#)
Traffic Rules
[Source NAT](#)
[DMZ](#)
[Security](#)
[MAC Filter](#)

Firewall - Traffic Rules

Traffic rules define policies for packets traveling between different zones, for example to reject traffic between certain hosts or to open WAN ports on the router.

Traffic Rules

Name	Match	Action	Enable	Sort	
Modbus	Any TCP, UDP From any host in wan To any router IP at port 502 on this device	Accept input	<input checked="" type="checkbox"/>	<div style="display: flex; gap: 5px;"> <div style="border: 1px solid gray; padding: 2px;">↑</div> <div style="border: 1px solid gray; padding: 2px;">↓</div> </div>	<div style="display: flex; gap: 5px;"> <div style="border: 1px solid gray; padding: 2px;">Edit</div> <div style="border: 1px solid gray; padding: 2px;">Delete</div> </div>
Allow-All-LAN-Ports	Any traffic From any host in wan To any host, ports 1-65535 in lan	Accept forward	<input type="checkbox"/>	<div style="display: flex; gap: 5px;"> <div style="border: 1px solid gray; padding: 2px;">↑</div> <div style="border: 1px solid gray; padding: 2px;">↓</div> </div>	<div style="display: flex; gap: 5px;"> <div style="border: 1px solid gray; padding: 2px;">Edit</div> <div style="border: 1px solid gray; padding: 2px;">Delete</div> </div>

Amendment Register:

Issue No.	Date	Details of Amendment
1.0	13/05/20	Draft Issue