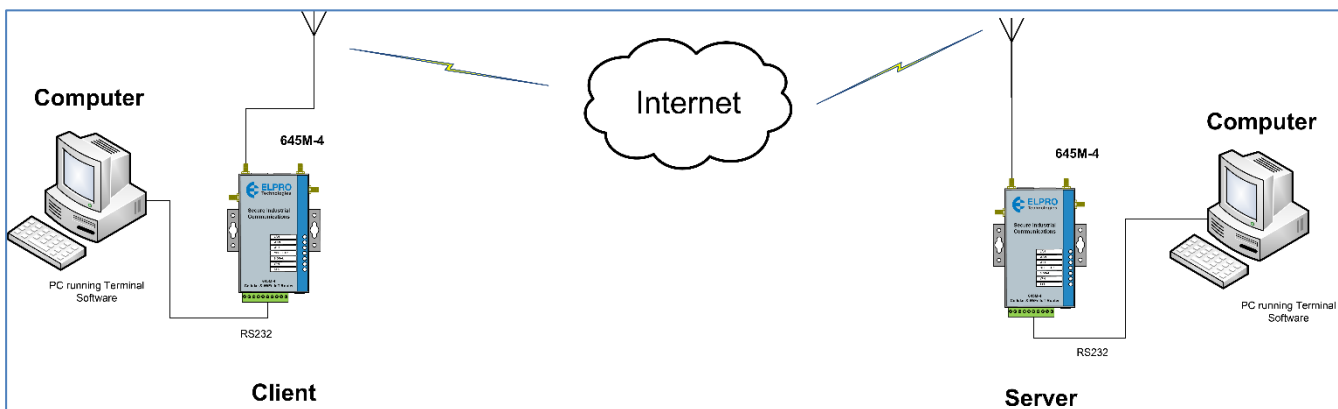


Support Note – 645M-4 Serial Client & Serial Server

The following application note demonstrates the configuration of the ELPRO 645M-4 modem utilizing the **Serial Client and Serial Server** for a point to point RS232 connection. The 645M-4 supports RS232 only and in a point to point configuration. 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 Serial Client and Serial Server connection between two x 645M-4 Cellular Modems and will essentially setup a transparent serial communication link between the two modems RS232 ports. Cellular connections can utilise Fixed Cellular (PPP) IP Addresses or Dynamic IP's which can be Public or Private.



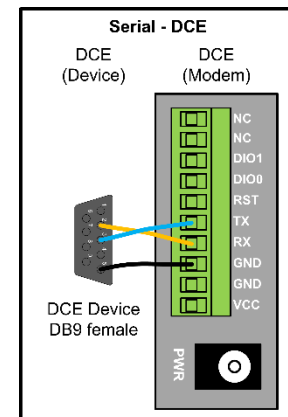
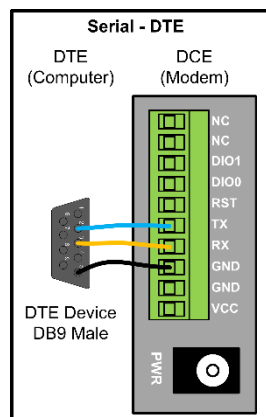
Cable Connections

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

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

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.



Configuration Overview

The ELPRO 645M-4 **DTU Configuration** is located under the *Services* webpage link. At the central location (Client) navigate to the serial page.

The serial port can also be used for GPS and so cannot be used at the same time as the Serial Client/Server function. Please ensure GPS is disabled on the GPS menu.

For this example, we are using basic serial (transparent) connectivity and will setup the serial settings for 9600 baud, parity none, 8 data bits and 1 stop bit. Generally, you will need to match this to your serial device.

Client Configuration

Select “DTU” from Services menu and then select Enable.

Next select “All” from the Debug dropdown list. Default will be “error” but selecting “All” will allow us to see some diagnostics and what messages are being sent.

Setup the “Serial Setting” set Baud Rate, Data/Stop Bits and parity to suit the application, i.e. the serial device it will be connecting to. In this example we used are 9600, 8, 1, N

Next select Protocol for TCP, and the Service Mode to be “Client”

DTU Configuration

Notes: DTU feature and "GPS Send to Serial" cannot be used at the same time

Enable

Send DTU ID

DTU ID

Send DTU ID on initial connection

Forward delay milliseconds (range[10,10000])

Terminate character(s)

Debug

Serial Setting

Serial baudrate

Serial parity

Serial databits

Serial stopbits

Network Setting

Protocol

Service mode

Enable Heartbeat

Heartbeat Interval

Heartbeat Content

Next under DTU Center configuration choose a “New Center name: and select “Add” or edit the existing configuration.

Enable the Center and enter the Cellular IP address or the DDNS name of the Server Modem into the “Center IP/domain” field. If you are using Fixed Private IP you can just enter the IP address of the Server Cellular modem, i.e. 10.100.1.70, etc or if you have public dynamic IP’s then you can enter in a DDNS name.

Also enter a port number.

DTU center configuration

ELPROTECHDDNSNET

Center enable

Center IP/Domain

Center Port

If using DDNs you will need to have setup the Dynamic DNS name through one of the Dynamic DNS Services, i.e. No-IP.com, DynDNS, Etc

When this is done you will also need to Enable the Dynamic DNS functionality on the DDNS page under Services and enter in the DDNS service, DDNS name and Login details, etc.

When all of this is completed on the Server you will also need to configure the Server Modem.

Server Configuration

Connect to the Server modem and again navigate to “DTU” on the Services menu and select Enable.

Configure the same DTU settings as the Client, i.e. Debug and Serial setting to match the serial device.

Then select “TCP” for Protocol and “Client” for the Service Mode and the Server port to be 23 and leave the Max connections at the default 128.

Then under DTU Center configuration choose a “New Center name: and select “Add” or edit the existing configuration.

Enable the Center and enter a Center IP/domain address.

Again, if you are using Fixed Private IP you can enter the IP address of the Server modem, i.e. 10.100.1.71, etc or if you have public dynamic IP’s then you can enter in a DDNS name after you have enabled DDNS and setup the parameters.

Dynamic DNS

Dynamic DNS allows that your router can be reached with a fixed hostname while ha

Details for: **elprosupportddnsnet**

Basic Settings **Advanced Settings** Timer Settings Log File Viewer

Enabled

IP address version IPv4-Address
 IPv6-Address

DDNS Service provider [IPv4]

Hostname/Domain

Username

Password

Use HTTP Secure

DTU Configuration

Notes: DTU feature and “GPS Send to Serial” cannot be used at the same time

Enable

Send DTU ID

DTU ID

Send DTU ID on initial connection

Forward delay milliseconds (range[10,10000])

Terminate character(s)

Debug

Serial Setting

Serial baudrate

Serial parity

Serial databits

Serial stopbits

Network Setting

Protocol

Service mode

Server port

Max connections

DTU center configuration

ELPROTECHDDNSNET

Center enable

Center IP/Domain

Center Port

Serial Communication tests:

When both modems have been programmed confirm under the Status Overview page of the modems that the Cellular status is **UP**. This indicates that there is a Cellular connection. The WAN IP Address is the Cellular IP Address provided from the Carrier and is the IP address used in the Serial Page Configuration for the Incoming Friendly IP Address and the Remote Host IP Address.

Connect to the Client Modem and check the DTU Log page and you should see something like the screenshot showing a successful connection to a Server.

```

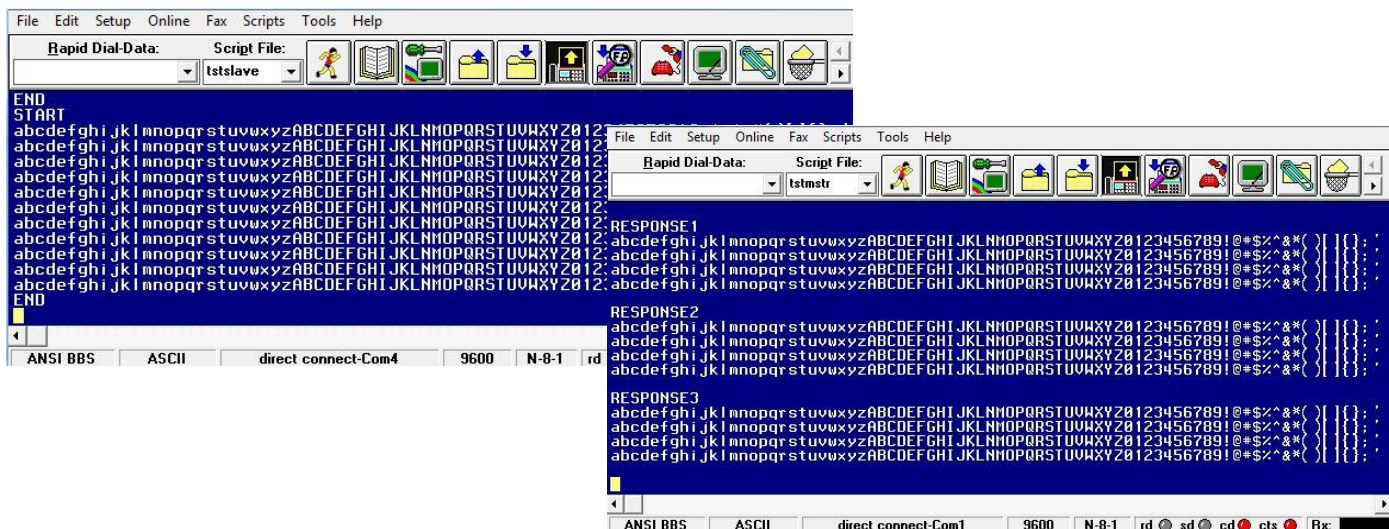
DTU Log
2019-08-06 14:32:51.789,T0 [dtu.c 57] Info: dtu config : 1.elprosupport.ddns.net,23, client_index=0
2019-08-06 14:32:51.789,T0 [dtu.c 426] Trace: open1 serial port /dev/ttyS0
2019-08-06 14:32:51.790,T0 [dtu.c 435] Trace: open /dev/ttyS0 successfully
2019-08-06 14:32:51.790,T0 [dtu.c 451] Error: Standard input is not a terminal device.
2019-08-06 14:32:51.791,T0 [TcpClient.c 169] Debug: TcpClientStart called
2019-08-06 14:32:51.791,T0 [TcpClient.c 114] Info: try to re-connecting
2019-08-06 14:32:51.792,T0 [TcpClient.c 27] Debug: thread starting...
2019-08-06 14:32:51.792,T0 [TcpClient.c 39] Debug: socket created
2019-08-06 14:32:51.792,T0 [TcpClient.c 47] Debug: set_TCP_NODELAY
2019-08-06 14:32:51.882,T0 [TcpClient.c 66] Debug: gethostbyname success: 120.157.103.200!
2019-08-06 14:32:51.882,T0 [TcpClient.c 77] Trace: connect to 120.157.103.200
2019-08-06 14:32:51.980,T0 [TcpClient.c 83] Debug: server connected
    
```

Likewise, on the Server you should get a similar connection log showing a successful link to a Client.

```

DTU Log
2019-08-06 14:32:46.617,T0 [dtu.c 426] Trace: open1 serial port /dev/ttyS0
2019-08-06 14:32:46.618,T0 [dtu.c 435] Trace: open /dev/ttyS0 successfully
2019-08-06 14:32:46.618,T0 [dtu.c 451] Error: Standard input is not a terminal device.
2019-08-06 14:32:46.619,T0 [TcpServer.c 254] Debug: TcpServerStart called
2019-08-06 14:32:46.620,T0 [TcpServer.c 39] Debug: Tcp Server starting...
2019-08-06 14:32:46.620,T0 [TcpServer.c 75] Debug: listen port : 23
2019-08-06 14:32:52.144,T0 [TcpServer.c 153] Info: conn num++ = 1,index=0
2019-08-06 14:32:52.144,T0 [TcpServer.c 156] Info: new client[0],total=1, 120.157.29.9:55974, fd=5
    
```

Connect serial cables and open a Terminal session on both PC's, connect to the modems and you should be able to pass serial data from one end to the other.



You can also check the DTU log at both Client & Server to make sure you have a connection, see any errors or disgnose the raw data packets being sent between the radios.

Amendment Register:

| Issue No. | Date | Details of Amendment |
|-----------|---------|----------------------|
| 1.0 | 6/08/19 | Draft Issue |