DATRAN XL4 *plus* RTU with Slave RTUs

Introduction

An XL4 *plus* RTU can communicate with up to eight slave RTUs to form a remote network. This is particularly useful when the slave RTUs do not have a direct comms path to the base station or for networks needing a local control loop where interchange of I/O is needed.

There are three scenarios:

1. Polling - The XL4 *plus* can be a master to the slave RTU(s) by polling them
2. Store and Forward - The XL4 *plus* can act as a pure store and forward device to other RTU(s) by passing on commands to/from DATRAN base station
3. Perform both polling and store and forward

In this example we configure scenario 2. All configuration is done with QTech Workbench software.

Figure 1 shows the physical setup.

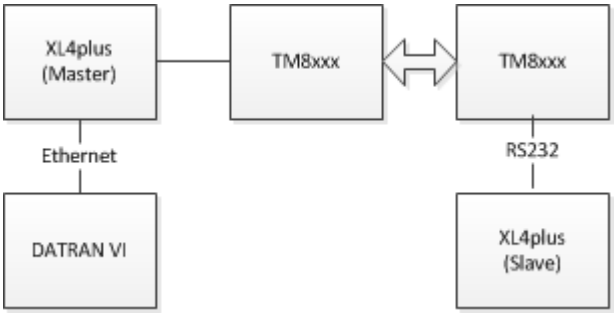

Figure 1.

Ethernet Port Configuration

The XL4 *plus* can use DHCP or have a static IP assigned. If you use DHCP then the RTU will need to be addressed by a name. It uses NetBIOS over TCP for name registration. The NetBIOS default name of the RTU is "xl4-serial number", where serial number is the unique RTU serial number. Optionally this can be changed by entering a name in the Configuration → Name field. This option is useful when testing a system locally on your own network. Usually, it is preferable to use static IP addressing but this may not always be an option.[1]

In this scenario we are using DHCP. The Current State shows the current values greyed out as they are the read only, assigned values from DHCP.

[1] Static IP addressing is preferable because depending on your network configuration NetBIOS over TCP may not be enabled, or it may not be routable (that is it won't work unless you are on the same subnet).

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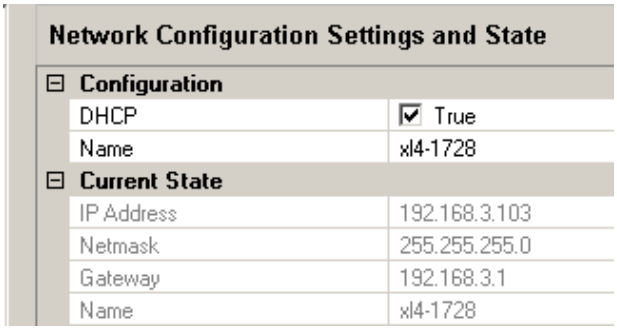
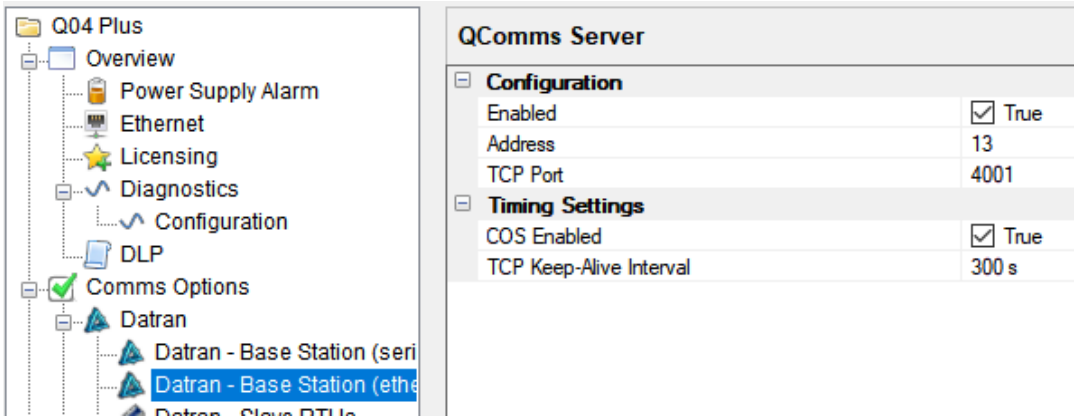


You can now ping the RTU from a command prompt with either

- Ping xl4-1728 or
- Ping 192.168.3.103

Next the communication with Datran needs to be configured

- Assign the RTU address as used in Datran (e.g. 13)
- Assign the TCP Port used by Datran (e.g. 4001)



Store and Forward Configuration

Configure the Master RTU

Select Datran – Slave RTUs, then in the Properties page on the right

- check the Enabled box
- select the serial port (RS232A)
- select the Equipment (Tait Radio)
- For a pure Store and Forward scenario uncheck
    - RTU ACKs COS
    - RTU Controls Outputs

      as we want Datran to have full control of the Slave RTU
- Set the Notional Point Count, this is the point count for the Master RTU

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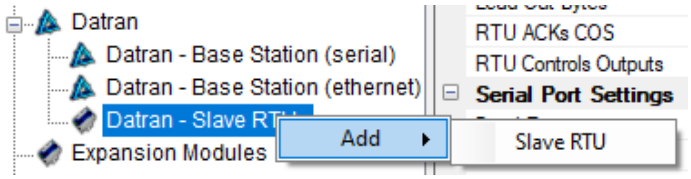
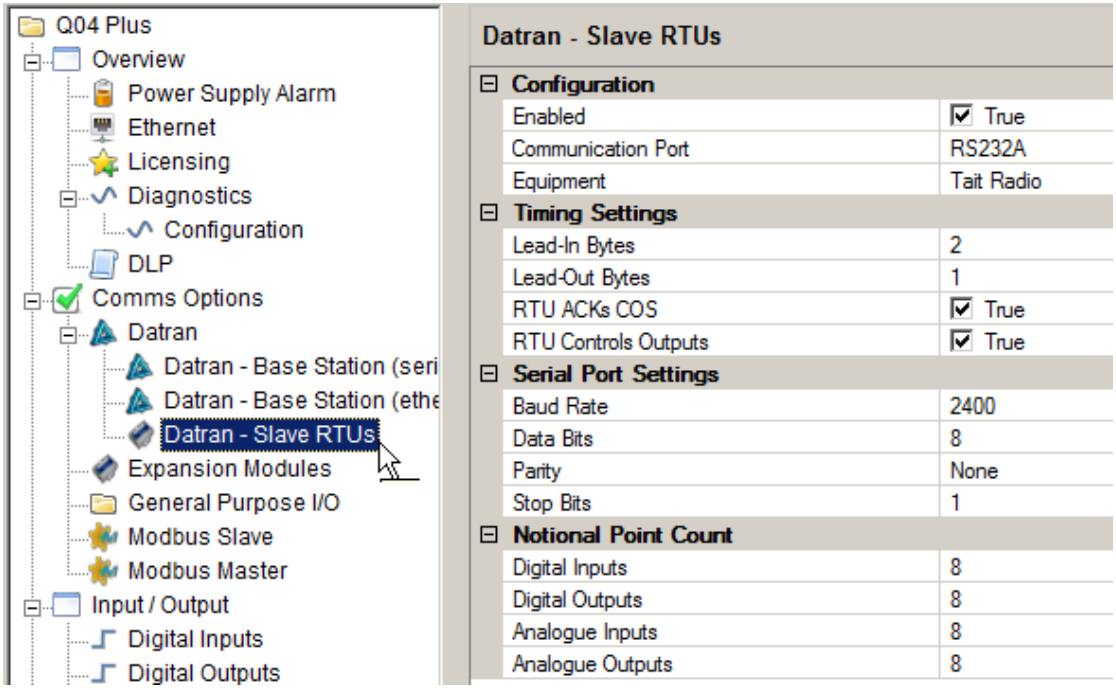
Configure the Slave RTU

- Right Click on Datran – Slave RTUs → Add → Slave RTU



- Optionally give it a name (Midas Place)
- Set the slave RTU address (11)
- Uncheck the Poll Enabled box. For a pure store and forward site this is unchecked. Optionally it can be checked for testing purposes (to establish comms with the slave is working) or if the Master RTU needs to use the slave I/O (e.g., in its DLP)
  Note: If this is checked with DATRAN as full control when the Master RTU polls the Slave the I/O the master will set to its I/Os to the slave regardless of what is at the base (when there is no DLP in the Master). E.g., DATRAN sets the slave output to 1, when the master does a poll to the slave the output will be set to 0. To fix this put a dummy DLP with telinp and telout inside.
- Set the Telemetry Point Count for the Slave RTU
- Set the Notional Point Count for the Slave RTU



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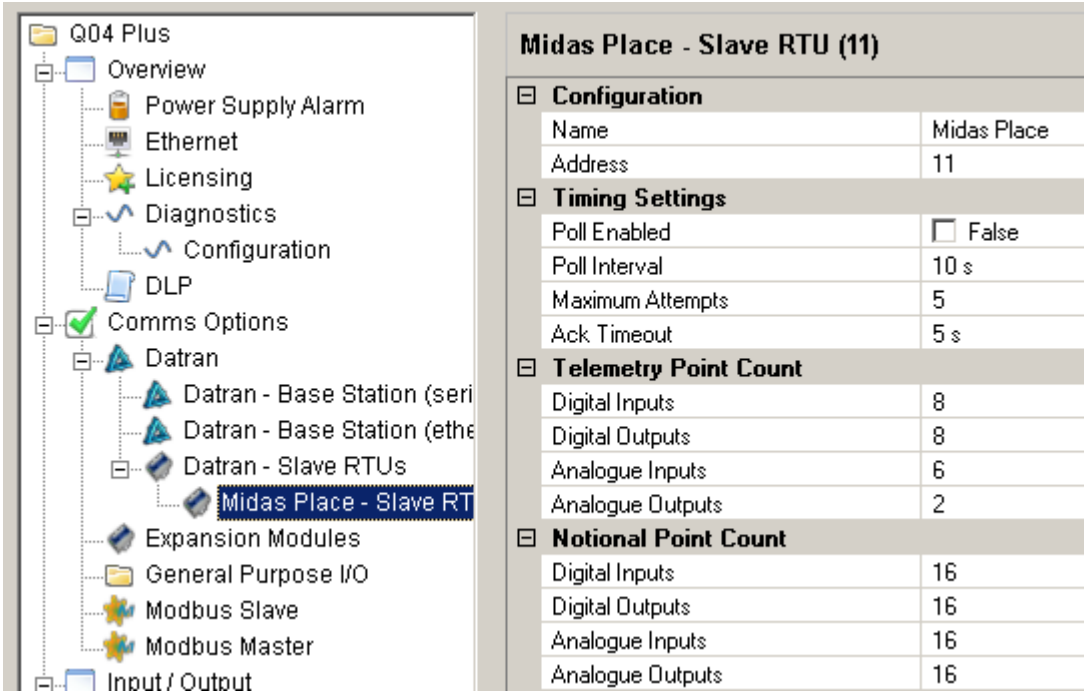

Slave RTU Configuration

The slave RTU is configured as a normal RTU, as if it is communicating directly with DATRAN. There are no store and forward options to configure.

- Select Datran – Base Station (serial)
- check the Enabled box
- select the serial port (RS232A)
- select the Equipment (Tait Radio)
- set the address (11) - this must be the same as that specified at the Master RTU

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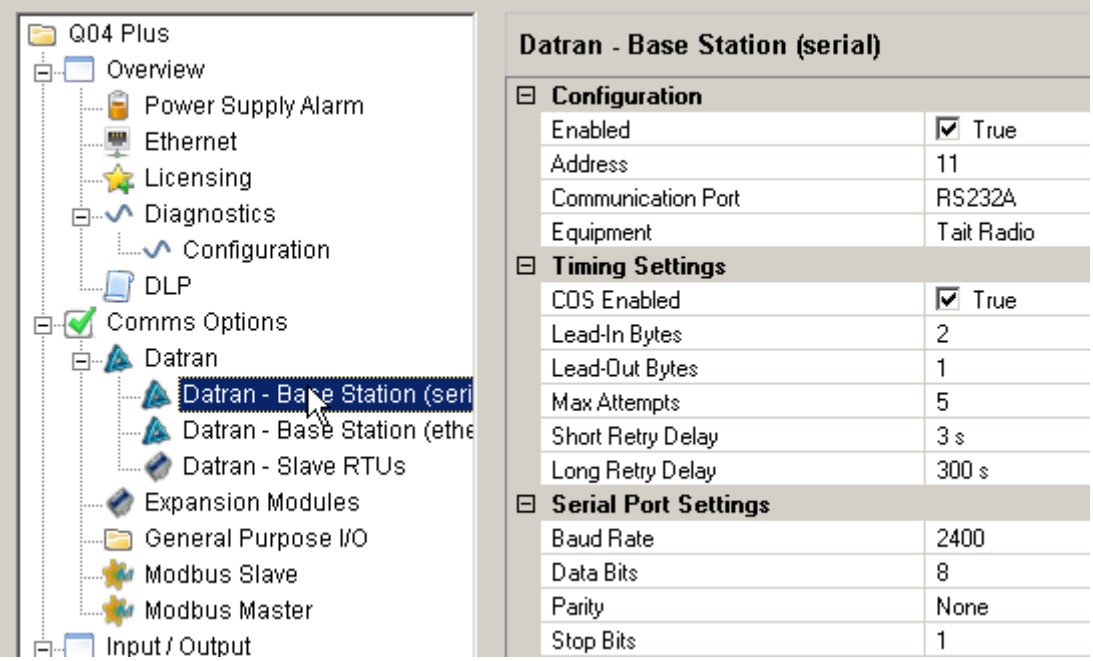
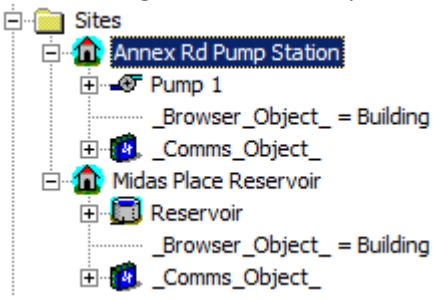


DATRAN Configuration

Both sites appear in the DATRAN configuration as separate, unique sites. At this level there is nothing to indicate that Midas Place Reservoir is a slave RTU, i.e. all comms with it are passed through Annex Rd Pump Station which is the master RTU.



DATRAN Configuration – Master Site

Annex Rd PumpStation (RTU 13) is configured as shown in the screens below. Particularly note the following:

- Slave addresses tab, we enter the address of the slave (RTU 11). There can be up to eight slave RTUs.
- The Point Count tab settings need to agree with those entered in Workbench

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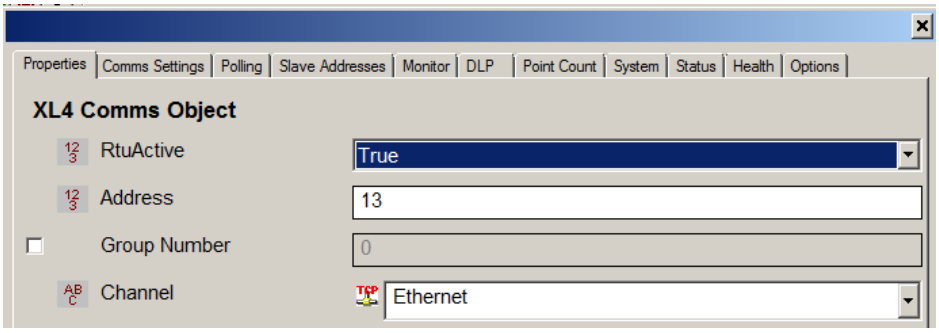

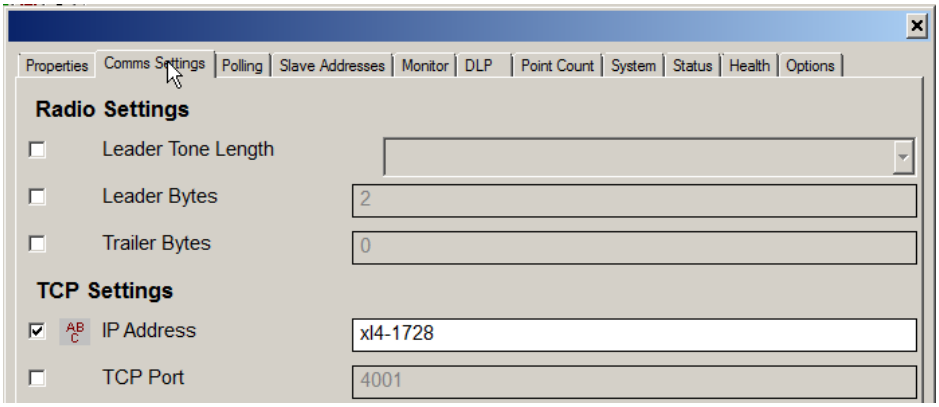

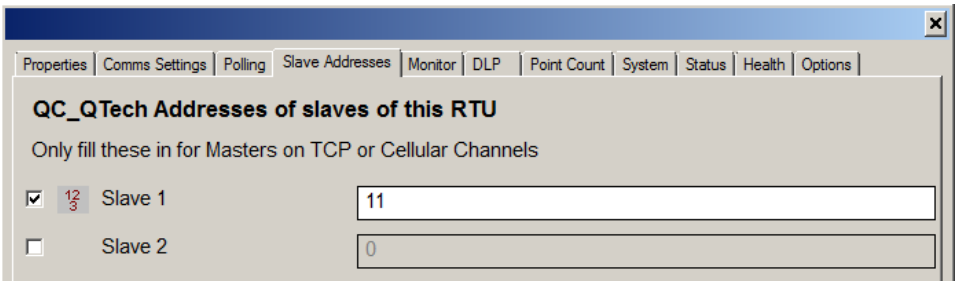

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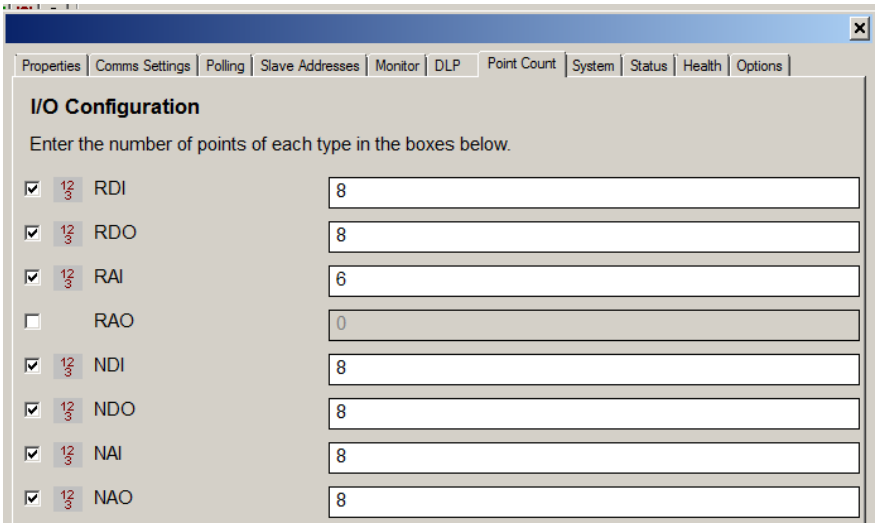
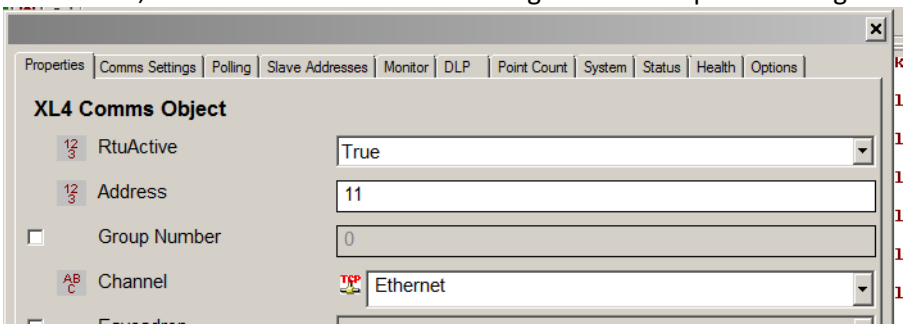
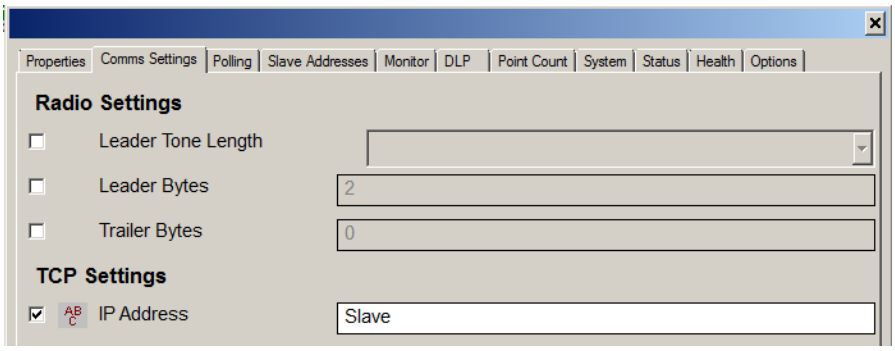


DATRAN Configuration – Slave Site

Note that the channel is set to Ethernet, even though the Master to Slave comms is via radio. The store and forward comms from DATRAN is first to RTU 11 which is on the Ethernet channel. The Comms Settings tab has the IP address automatically set to “Slave”. As for the Master site, the Point Count tab must also agree with the points configured in Workbench.





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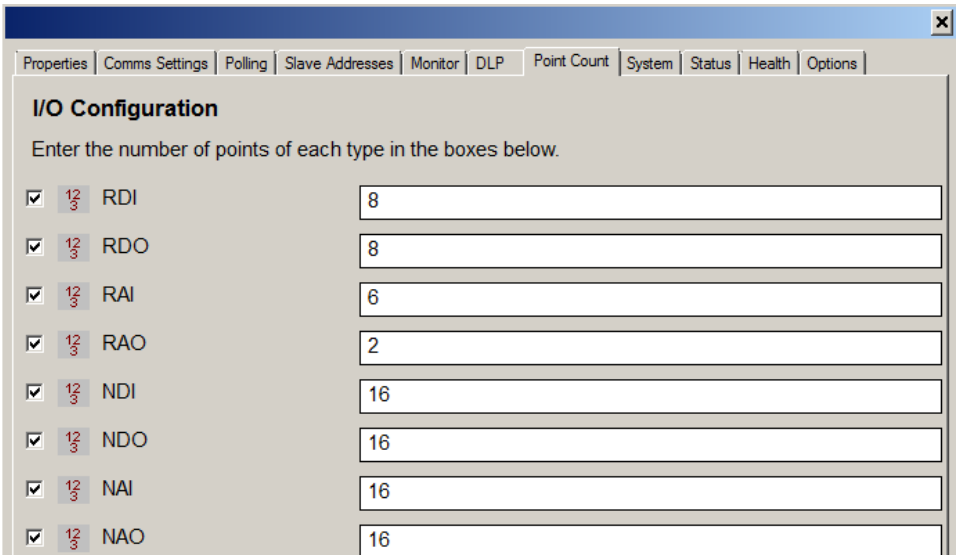

Other Considerations

Base Comms channel

A master RTU with store and forward or multiple slave RTUs will become a busy and operationally critical site. Please ensure the base comms channel has sufficient bandwidth and capacity. We recommend these channels to be high speed radio, ethernet or cellular.

Power Supply

The duty cycle of the master RTU and radio will be higher than a regular site as the radio will transmit more frequently. The capacity and rating of the UPS or battery backup system needs to be considered to ensure sufficient up time is provided during power outages etc.

I/O Point Count

The cumulative total of the I/O for the master RTU and all its slave RTUs needs to be considered. Whilst unlikely is most situations, if the I/O count is greater than 255 digitals and/or 128 analogues, then the DATRAN “Extended Point Count” feature must be utilised. This was released in DATRAN VI v6.70 and provides up to 65,535 data points.

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