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# DATRAN XL4 DNP3 RTU

## Quick Start Guide

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## Configuring the XL4

The XL4 is configured using software called “QTech Workbench”. Connection to your PC is via a USB cable (Type A to Type B). The configuration software is available for download from the QTech Website.

## Factory Defaults

From time to time it may be necessary to reset the XL4 back to factory defaults. There are two ways of doing this.

- 1) There is a jumper on the XL4 main processor board labelled “INIT”. It is normally open, but if the RTU is started up while the jumper is installed it will cause the RTU to restore the factory default settings.
- 2) The factory default settings can also be loaded back into the RTU using the ‘Factory Default’ button at the bottom of the QTech Workbench screen when the Overview branch is selected.

## Status LEDs



- ON: This LED is always on when the XL4 RTU is powered.
- OK : This LED flashes on a 1 second cycle to show the CPU has not locked up. If it is on solidly or stays off, then the XL4 RTU needs attention.
- IP : This LED indicates that the XL4 RTU is currently sending comms out its IPB port to communicate with I/O expansion modules.
- MU : The MUTE signal from the Radio. This indicates the radio is currently receiving an RF signal.
- RX : The RTU modem is receiving and decoding data from the radio. This LED will usually appear to “flicker”
- KY : This indicates the RTU is attempting to key on the radio transmitter.
- TX : The RTU is transmitting data through the radio. This LED will usually appear to “flicker”
- ER : This is the Error Indication LED. The LED will flash a certain number of times to indicate any error messages the XL4 RTU has been configured to display.

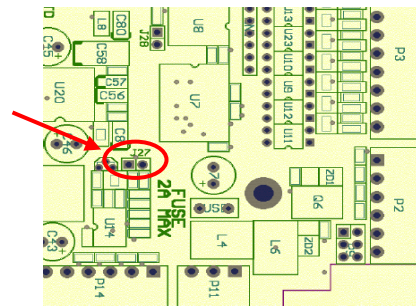
XL4 Error Messages							
Number of Flashes	1	2	3	4	5	6	7
Message	Main Battery Low	Clock Battery Low	Main Comms Fail	IPB Comms Fail	Digital Outputs Fail	Analog Inputs Fail	DLP Error

## Supply Voltage: 12 Volts or 24 Volts

The DATRAN XL4 RTU can be supplied from 12-30V DC. The RTU is factory configured for a nominal 12V DC supply, unless otherwise requested. When configured for 12V, the RTU will automatically shut itself down when the supply voltage drops to 10.5V.

If the RTU is to be supplied from 24V it is necessary to change J27, located on the Q22 (bottom board) in the RTU. This changes the low voltage shutdown voltage to 21V.

Low Voltage Drop Out Threshold	
	J27
12V supply	Installed
24V supply	Open



## Power Supply Connections



The XL4 power connector has three connections:

-V = Power Supply Negative

+V = Power Supply Positive, 12 – 30 V DC

O/P = Control Signal Output. This allows the RTU to turn on devices when it is powered up. This was previously labelled “C” on eXcel RTUs



The “O/P” terminal is an OUTPUT. Do not connect it to the supply. The XL4 and associated peripherals should all share a common earth point.

## RS485 Port



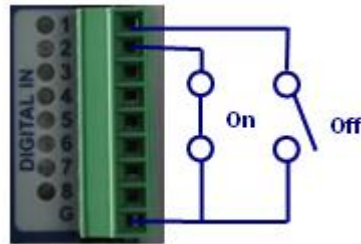
The XL4 RS485 port is an RJ12 connector, identified by having 6 contacts, as shown. The previous Q03 RS485 connectors were an RJ10 connector with 4 contacts. Ensure that the 6 contact RJ12 is plugged into the XL4 RTU. Do not attempt to insert the 4 contact RJ10 into the RTU, this must be inserted in the expansion module (Q23/Q26 etc).



The connector used for the XL4 RS485 port looks similar to the one used on the Q03. Care must be taken as forcing a Q03 RJ10 plug into a Q04 can damage the socket.

## Digital Inputs

The RTU digital inputs are designed to interface easily with physical switching devices. They have an internal pull-up resistor that will pull the input terminal to the power supply ‘+’ when the input is open circuit (the “OFF” state).



To turn a digital input ON, connect it (via a set of contacts if necessary) to the common “G” terminal on the Digital Input terminal block. All “G” terminals on the XL4 RTU are tied internally to the “V-” terminal on the power supply connector.

The LED associated with each digital input will light up when the input is Active/On/Closed.



The pull up / pull down convention is different from some PLCs. If required, the active state of I/O can be inverted in the XL4 RTU DLP control program or PLC

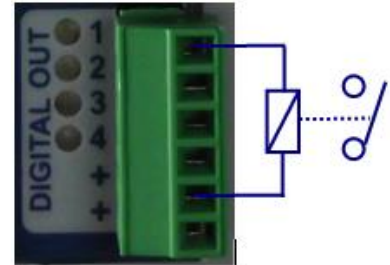
## Digital Outputs

The XL4 RTU Digital Outputs are designed to be easily interfaced with relays and contactors.

The XL4 RTU has 8 Digital Outputs in total. Digital Outputs 1 to 4 are located on the front panel adjacent to the Digital Inputs and have LED indicators to show if the output is active or not. Digital Outputs 5 to 8 are located on the underside of the RTU next to the power connector.

The Digital Outputs work as “Current Sinks”. This means that when they are turned on, they will be connected to power supply ground, allowing current to flow into the output terminal to ground. In the “OFF” state, they have a high impedance to ground and will float up to + Supply.

To use a digital output with a relay, wire as shown in the diagram opposite:



## Analog Inputs

The XL4 RTU has 6 analog channels. All analog channels are independently capable of operation as either 0-20mA, 4-20mA, 0-5V or 0-10V. In addition to this, channels 5 and 6 are independently able to be configured as either inputs or outputs. The XL4 RTU is factory shipped with all analog channels configured as 4-20 mA inputs. For details on how to reconfigure them, refer to the Owners Manual.

For all analog inputs, the current return path is via the ground of the XL4 RTU power supply. It is important to understand the implications of this when wiring certain analog devices to the RTU, as detailed below.

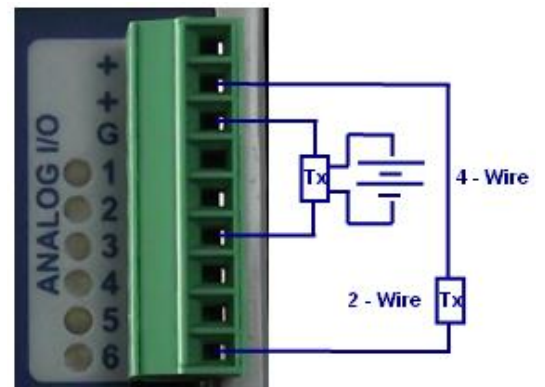
The LEDs adjacent to each Analog Input show the status of the signal the XL4 RTU is receiving. If the LED is off, it means the input signal is zero, or under-range. When the LED is on, it indicates the signal is within the measuring range that the input has been configured for. If the LED is flashing, it shows the signal is over-range.

## Loop Powered Devices

“Loop-Powered”, or “2-Wire” devices derive their power supply from the current flowing in the loop itself. It is important to make sure that any device is rated to operate at the voltage that will be available to it taking into account that the XL4 RTU Analog Input will drop 5V across it at 20mA loop current.

For example: If the system is being powered from 13.7V DC, the analog transducer will only have a maximum of 8.7V available to it for its power supply.

To wire a “2-Wire” device, refer to the diagram opposite:



## Separately Supplied Devices

“Separately Supplied”, or “4-Wire” devices are analog transmitters that have a separate power supply from the analog signal loop. If suitable, these devices can be powered from the XL4 RTU power supply. If the XL4 RTU power supply is not suitable, the analog sensor can be powered from a separate power supply as long as the grounds of both the XL4 RTU and the other power supply are connected together.

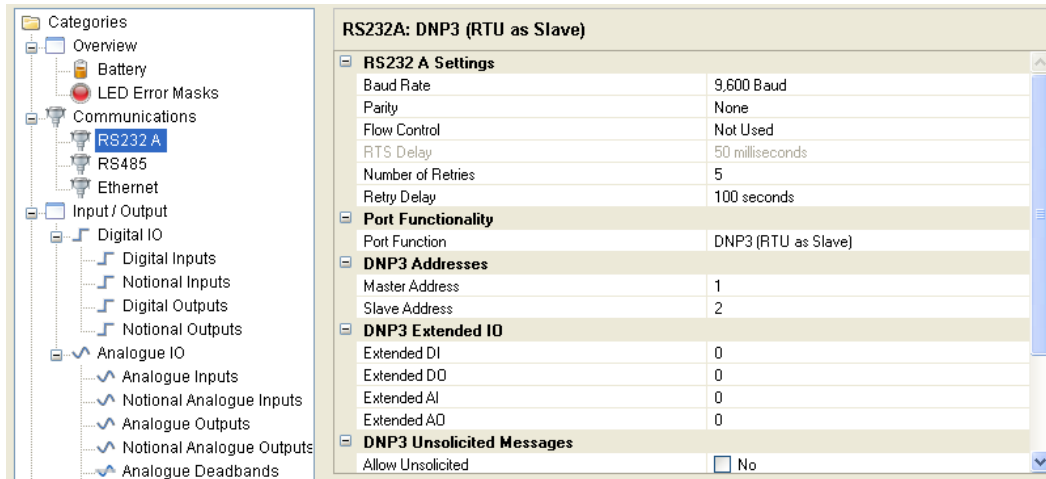
Wiring of a 4-Wire device is as shown:

## DNP3 Configuration

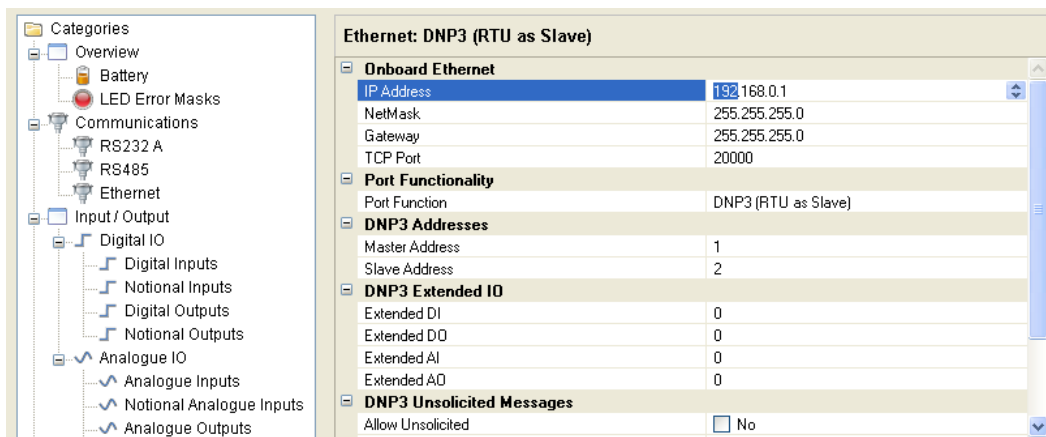
The factory default settings for the XL4 DNP RTU are as follows:

Master (base station) Address = 1  
 Slave (XL4 DNP3 RTU) Address = 2  
 Allow Unsolicited Messages = OFF  
 DNP3 Communications through the RS232A port at 9600 baud with no parity.  
 DNP3 is not currently available on the port labeled RS232B

These values are easy to reconfigure using the Workbench Configuration Tool. With Workbench installed and running, connect the USB cable to the port labeled CNFG on the XL4 DNP3 RTU and to a USB port on the PC.

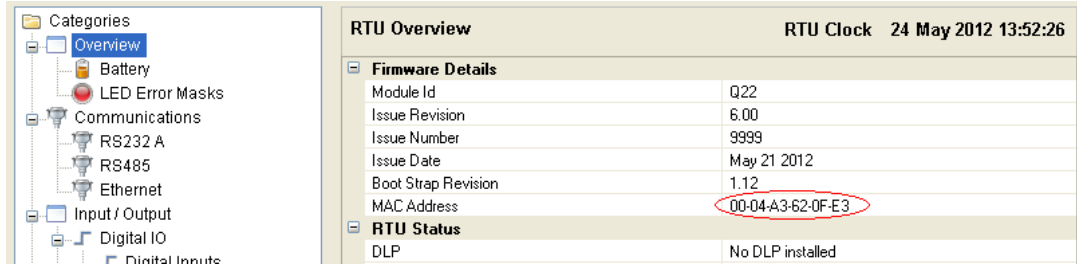


The DNP3 configuration can be found under the “Communications” branch of the Workbench Configuration Tool. DNP3 protocol can be configured by selecting DNP3 as the port function on either the RS232A port or the Ethernet port, but not both. In-fact it will be removed from the list of possible options for Ethernet if it’s already selected on RS232A and vice-versa.



Ethernet configuration uses a static IP address, by default it is 192.168.0.1 This should be changed to a free IP address along with the Netmask and Gateway settings suitable for your network; these should be obtained from your Network Administrator. In order to setup a static IP address the RTU has a unique MAC address that will be needed by your Network Administrator.

The MAC address can be found in the Overview branch of Workbench.



Here you can change the Baud Rate, Parity and Flow Control, Master and Slave addresses and also the Unsolicited Message defaults and for which classes of data.

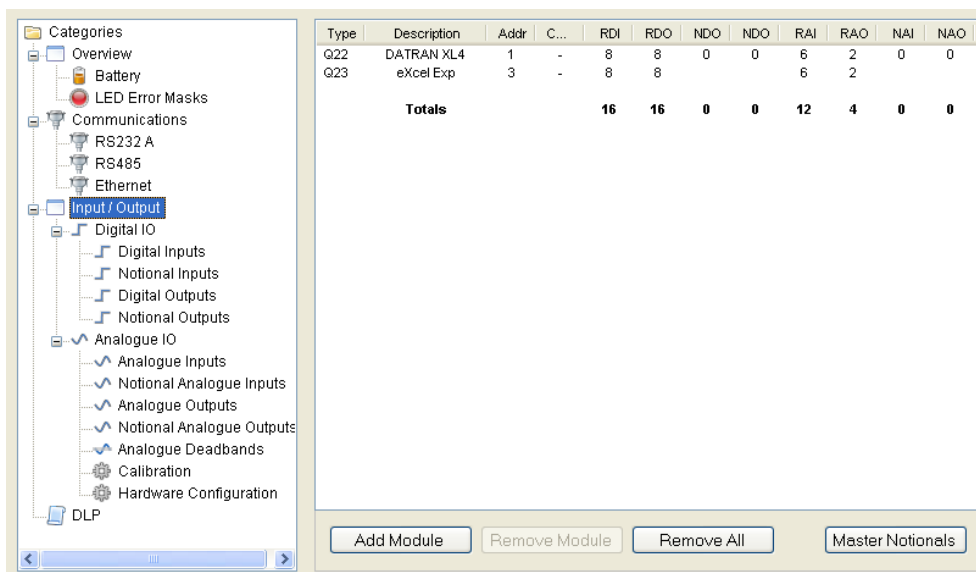
The Extended I/O can be used for creating additional virtual points such as set-points etc. that can be accessed via the XL4 DNP3 RTUs downloadable program (DLP).

## DNP3 I/O

The XL4 DNP RTU has the following I/O:

XL4 DNP3 RTU	DNP3 Access
8 Digital Inputs	Object 1 or 2 (Binary Inputs)
8 Digital Outputs	Object 10 or 12 (Binary Outputs or CROB)
6 Analog Inputs	Object 30 or 32 (Analog Inputs)
2 Analog Outputs	Object 40 or 41 (Analog Outputs)
Health Information	Object 20 (Counters) :- Counter 0 represents the RTU supply voltage Counter 1 represents RTU reset count Counter 2 represents the firmware version

Additional DATRAN I/O expansion modules are available and connected to the RS485 port. Expansion modules are added to the XL4 configuration by simply clicking the “Add Module” button at the bottom of the screen under the Input/Output branch of Workbench.







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