Good afternoon and thanks for subscribing. We hope this email finds you safe and well. We are still open and manufacturing, although with far fewer people on the premises to protect our colleagues. Like many of you, most of us are working from home. We are optimistic that the coronavirus will not significantly impact our ability to provide data acquisition systems for you.

You can download a pdf copy of this newsletter here.

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Using Modbus Devices over TCP/IP

Web link: https://www.windmill.co.uk/modbussettings.html

You can use Windmill to interface modbus devices over TCP/IP. Email monitor@windmillsoft.com to get your free copy.

In ComDebug, edit an existing instrument file (or create a new one) and choose TCPIP Communications.

The master and slave must use the same port, usually port 502.

Using ComDebug to send a message via TCP/IP

Use the prompt grid in ComDebug's Message screen to send commands and data to your Modbus device. Either type directly into the Hex column or use the NumLock key on the keyboard to enter decimal addresses, codes, etc. Address 1, for example, would be shown as Char 001 and Hex 01.

Each message comprises three parts: **modbus application header, function code and data**. When more than one byte specifies an item, the most significant byte is sent first.

The Modbus Application Header (MBAP) is a 7-byte header at the start of the message.
The Function Code specifies the type of message. It contains one byte of information (Byte 8).

|	
Bytes 1 & 2	are a transaction identifier, usually 0 0, but may be different depending on how the system has been set up.
Bytes 3 & 4	are a protocol identifier, always 0 0.
Bytes 5 & 6	identify the number of bytes to follow. Byte 5 is always 0 as messages are shorter than 256 bytes
Byte 7	identifies a unit. It is used when the Modbus device is actually several devices behind a gateway or bridge, and specifies the Slave address of one of those devices.
Byte 8	is the Modbus function code, eg: 03 (read holding register) or 04 (read input registers)
Byte 9	is the msb of register: starting address
Byte 10	is the lsb of register: starting address

Byte 11   is the msb of number of bytes to read: normally 0

Byte 12   is the lsb of number of bytes to read: for example 2
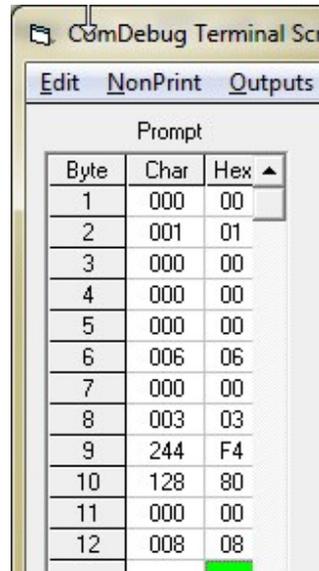
Byte	Char	Hex
1	000	00
2	001	01
3	000	00
4	000	00
5	000	00
6	006	06
7	000	00
8	003	03
9	244	F4
10	128	80
11	000	00
12	008	08

Entering Modbus TCP/IP settings

The function code specifies whether to read, write or perform some other function. Function 03, for example, reads the holding register. This comprises two bytes. You can read or write to a holding register. The function code 04 reads an input register; this can only be read. It may be used to return measured analogue input values such as temperature.

Modbus **input registers** commonly start counting at 40001. They are addressed with addresses starting at 0. You need to subtract 40001 from the register number to find the starting address. If your register address starts with a 6, for example 62592, convert this number to hex. You can use the converter at the bottom of this page. 62592, for example, converts to F480 and so you would enter F4 into the Hex column of Byte 3 and 80 into the Hex column of Byte 4. Similarly **holding register** numbers start at 30001. This is really register 0001 (address 0) and is accessed using Modbus function code 03.

The Reply to a Read Input Register Request (TCP/IP) Comprises

```
Byte 1 = function code (04)
Byte 2 = number of bytes read
Byte 3 = 1st word, msb
Byte 4 = 1st word, lsb
Byte 5 = 2nd word, msb
Byte 6 = 2nd word, lsb
etc
```

For more help on using ComDebug see
https://www.windmill.co.uk/comiml_ts.html
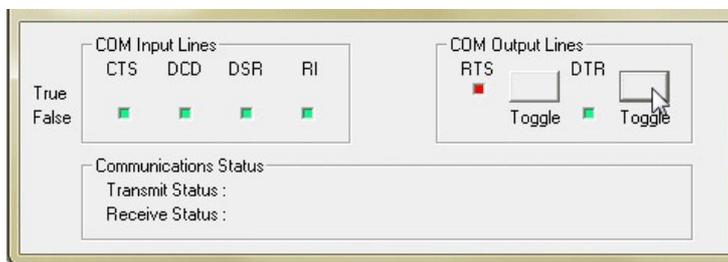
Your Data Acquisition Questions Answered: DTR ON/OFF

Question

    I need to switch the DTR ON/OFF to read the data from my dial gauge

Answer

You can use ComDebug to switch the DTR (Data Terminal Ready) line on and off. ComDebug is free from https://www.windmill.co.uk/serial.html. Go to the Terminal screen and press the Status button.

Red indicates true, high or on; green false, low or off.

Most instruments that use handshaking or flow control need DTR to be high before they will send data, Some, though, need DTR to be low and RTS (Request to Send) to be high. For continuous data logging in this situation you need to change the connections on the RS232 cable.

Connect pins 8 and 7 (i.e. CTS drives RTS)
Connect pins 1, 4, 6 This should maintain the DTR line in the correct state, by connecting it to DCD and DSR

This would normally be done at the instrument end rather than the PC end of the cable.

More information: https://www.windmill.co.uk/rs232-communication.html

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DAQ News Round-up

Welcome to our round-up of the data acquisition and control news. If you would like to receive more timely DAQ news updates then follow us on Twitter - @DataAcquisition - or grab our rss feed.

Scientists tap unused energy source to power smart sensor networks
The electricity that powers our appliances also creates small magnetic fields that are present all around us. Scientists have developed a new mechanism capable of harvesting this wasted magnetic field energy and converting it into enough electricity to power next-generation sensor networks for smart buildings and factories.
Source: Penn State University
https://news.psu.edu/

Tiny "backpack" computers track bats
Lightweight wireless network enables precise mapping of bats' social networks
Source: Ohio State University
https://news.osu.edu/

Carbon dioxide sensor can lower energy use, reduce utility costs
New technology uses carbon dioxide sensor to manage climate control in buildings and homes.
Source: EurekaAlert
https://www.eurekalert.org/

Enhanced underwater robots can boost ocean discoveries
Underwater robots used by the oil and gas industry could be adapted to gather environmental information, providing substantial benefits to science and to resource companies in the long-term. The simple adaptations include the addition of extra sensors, cameras, acoustic transmitters and receivers and sample collection devices.
Source: SCUBA News
https://news.scubatravel.co.uk/

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