# Configure and Switch a Measurlogic Serial DTS Meter Between Modbus RTU and BACnet MS/TP Using DTS Config

## Revision R25A

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**ATTENTION**

**Unless specified at the time of ordering all Measurlogic DTS "-SB" Serial Meters ship from the factory with the active serial protocol set to Modbus RTU 9600,N,8,1 Address #100.**



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# 1 SCOPE

## 1.1 IDENTIFICATION

Some DTS serial meters (such as the DTS SMX and DTS 310) have switches to configure the serial protocol and addresses. In this case follow the instructions on the white label attached to the meter.

This document describes how to use DTS Config to switch the active protocol to BACnet MS/TP as well as setting the desired BACnet MS/TP parameters, such as: baud rate, MAC address, Device ID etc. for DTS serial meters that are not equipped with switches (such as the DTS 307, DTS 305 and DTS SKT meters).

DTS Config is a software application tool that is used to configure Measurlogic DTS meters. This includes configuring the current sensor type and current rating, communication parameters and addresses and I/O mappings etc. DTS Config conveniently displays all the main measurement values on one screen, which also makes it a very useful installation and diagnostic tool.

## 1.2 INTRODUCTION

### 1.2.1 Using DTS Config on DTS Meters with multiple Protocols

DTS Config is a Modbus RTU or Modbus TCP only based tool. For this reason, all Measurlogic meters are capable of communicating using the Modbus protocol, but there are differences in how this is achieved for an Ethernet or Serial meter:

- "-EB" Measurlogic Ethernet BACnet meters can communicate using Modbus TCP **AND** BACnet/IP protocols at the same time. Therefore, DTS Config can always be used in addition to any other protocol being used.
- "-SB" Measurlogic Serial BACnet meters can communicate using either Modbus RTU **OR** BACnet MS/TP as both protocols are resident in the meter. Due to the inherent limitations of the RS-485 bus, only one serial protocol can operate at a time on an RS-485 serial bus. The desired protocol is software selectable.

**ATTENTION**

**Since only one serial protocol can be used on a Serial RS-485 network, the meter you wish to configure MUST be disconnected from any live and placed by itself on a separate RS-485 network.**

The easiest way to do this is:

- Unplug the 3-way green communications connector from the DTS meter.
- Plug a USB to RS-485 adapter directly from a laptop into the DTS meter.

The Measurlogic CCOM-0017 adapter is pre-wired with a 3-way green communications connector, so that it can be plugged into any Measurlogic DTS meter without having to worry about wire colors, which wire is '+', '-', 'A' or 'B', thus eliminating the common RS-485 wiring issues.



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### 1.2.2 Communication Hardware for Modbus RTU

The following will hardware and software will be needed:

- A computer running Microsoft Windows and onto which DTS Config has been installed. DTS Config requires Windows 10 or Windows 11 or later.
- We recommend that you always use the latest version of DTS Config, which can be downloaded from: http://www.measurlogic.com/software-drivers/
- *Either:* A good quality USB to RS-485 adapter (such as Measurlogic's CCOM-0017 adapter), which must be correctly installed according to the manufacturer's instructions. Once installed, the COM port number can be found in the "Ports (COM & LPT)" section of the "Device Manager". This document assumes that this type of communications adapter is used. Select "Serial" in the DTS Config "Connection Setup" and well as the serial parameters and address of the Modbus RTU device you wish to target.
- *Or:* An Ethernet Modbus TCP to serial Modbus RTU gateway can also be used but remember that the gateway itself will need to first be correctly configured with the communication parameters of the Serial RS-485 network. The actual connection from DTSConfig will be a Modbus TCP connection, so in the "Connection Setup" select the "TCP" radio button and enter the IP address of your gateway, and the address of the Modbus RTU device you wish to target.

### 1.2.3 Communication Hardware for BACnet MS/TP

- Any BACnet client explorer tool that is capable of writing to the Present_Value of an Analog_Value object. In this document we will be using the open source YABE (Yet Another BACnet Explorer), which can be downloaded from https://sourceforge.net/projects/yetanotherbacnetexplorer/
- *Either:* A BACnet/IP to BACnet MS/TP router.
- *Or:* A very good quality USB to RS-485 adapter can also be used to connect to a BACnet MS/TP device. Note that success will vary tremendously depending on the adapter used. Many BACnet tools cannot communicate using USB to serial RS-485 adapters, and even if they do, many adapters that work fine with Modbus, do not work well with BACnet MS/TP.
- The Measurlogic CCOM-0017 adapter is an adaptor that does work with BACnet MS/TP.

# 2 DTS Config

## 2.1 Connection to the DTS meter using DTS Config

DTS Config remembers the communication parameters that were used for the last meter that it was connected to. When DTS Config is started, it will attempt to connect to a DTS meter using the same communications parameters. If the connected DTS meter uses different communication parameters, then this dialog box will appear.



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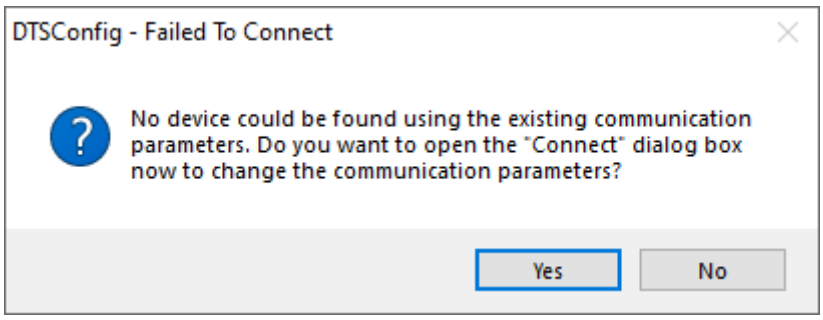
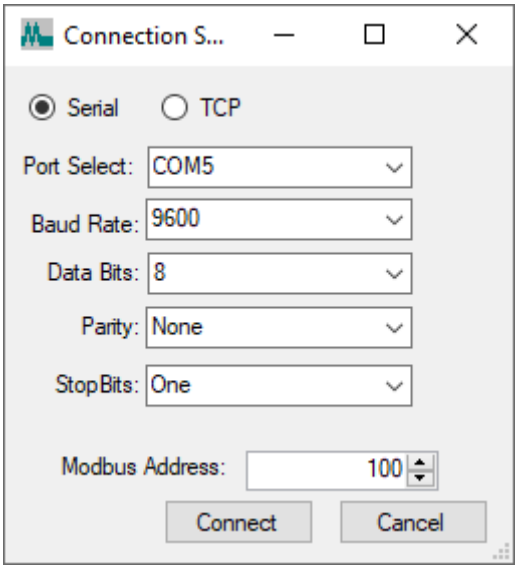



| | |
|---|---|
| Press the "Yes" button to immediately open the "Connection Setup" dialog box shown below. | If the "No" button is pressed, or the above dialog does not appear: **Press "Connect" on the menu bar to open the "Connection Setup" dialog box configure the connection.** |

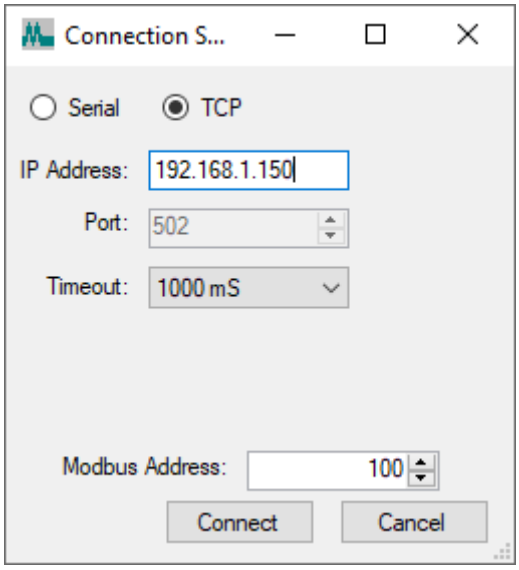
Depending on whether you are connecting to the DTS meter using a USB to RS-485 adapter, or Ethernet Modbus TCP to RTU gateway, choose the appropriate radio button, as shown below.

**USB to RS-485 Serial adapter (Modbus RTU)**




Set the COMx Port set to 9600, N, 8, 1 #100
Get the COM Port number of the USB to RS-485 Adapter from the Windows "Device Manager"

**Modbus TCP to RTU Ethernet Gateway**




Enter IP Address of the Gateway and Modbus Address #100. Set the Modbus TCP to RTU Gateway to 9600, No Parity, 8 Data Bits, 1 Stop Bit

**Unless specified at the time of ordering, all Measurlogic DTS "-SB" Serial Meters ship from the factory with the active serial protocol selected as Modbus RTU at address #100 and with the serial parameters set to 9600, No Parity, 8 Data Bits, 1 Stop Bit.**

DTS Config will show the "Monitor" page of instantaneous values when a successful connection is made to the DTS meter.

DTS Config may now be used to configure the current sensor type and current rating, I/O mappings etc. We suggest you do this before switching to the BACnet MS/TP protocol.



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# 3 CHANGING THE PROTOCOL IN THE DTS METER

**ATTENTION**

**Since only one serial protocol can be used on a Serial RS-485 network, the meter you wish to configure to a different protocol MUST be disconnected from any live network and placed by itself on a separate RS-485 network.**

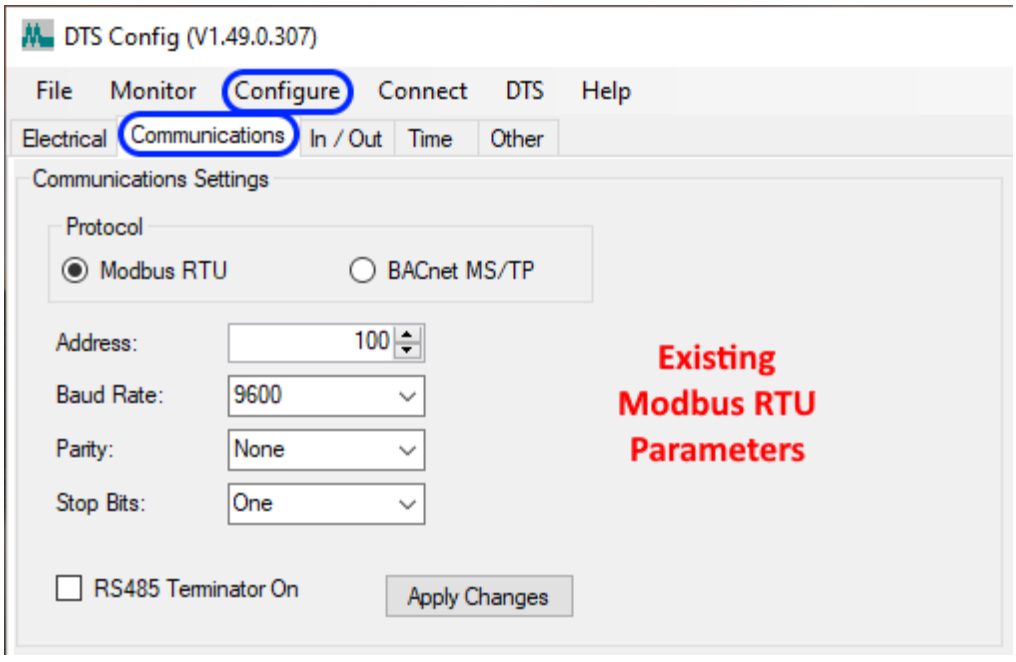
## 3.1 Switching from Modbus RTU to BACnet MS/TP Using DTS Config

Ensure that your DTS meter is connected to a separate RS-485 bus using either of the Modbus hardware communication options described in section 1.2.2 above.

Connect to your DTS meter using DTS Config as described above.

To change the communications settings, select "Configure" from the menu, and select the "Communications" tab.

The "Modbus RTU" radio button will be selected, and the existing Modbus communications parameters will be shown.





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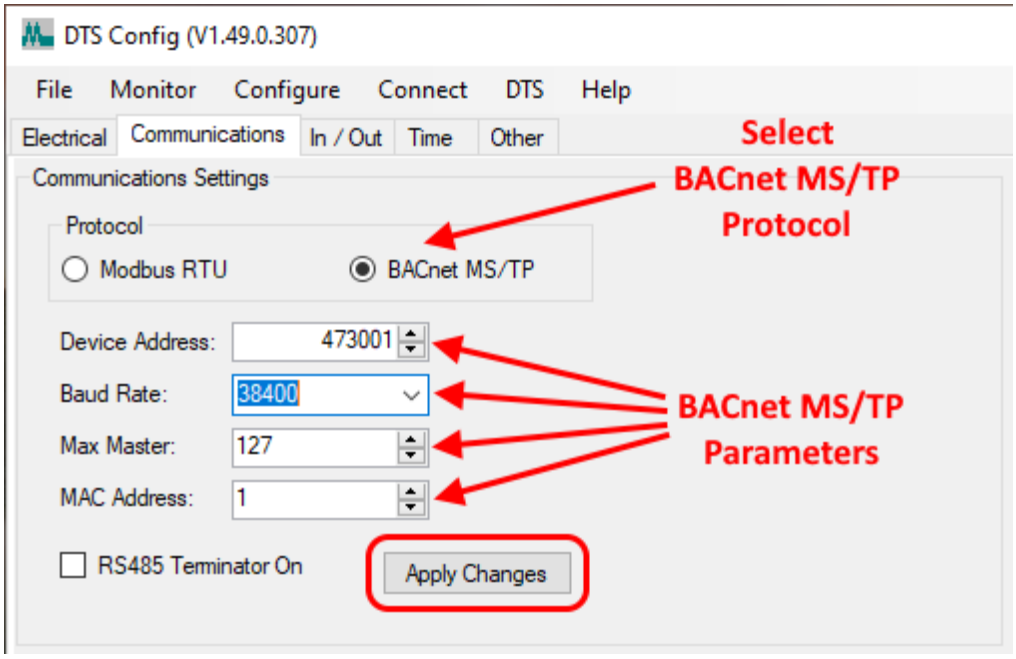
To switch the Protocol to BACnet MS/TP:

1. Select the "BACnet MS/TP" radio button.
2. Enter the BACnet MS/TP parameters that you need for your network:
   - The "Device Address" will default to 473nnn where "nnn" is the MAC Address. This number needs to be unique on the BACnet network.
   - Select the correct "Baud Rate" from the drop-down list. This must match the baud rate for the local RS-485 sub-network.
   - Enter the "Max Master" number. If this parameter is not known, then leave as 127.
   - Enter the "MAC Address", which is a number in the range [1..127]. This must be unique on the local RS-485 sub-network.
3. Press the "Apply Changes" button.




Pressing "Apply Changes" will bring up the following WARNING dialog box.
This dialog explains the implications of changing

**Please read the text contained in this WARNING dialog box carefully.**



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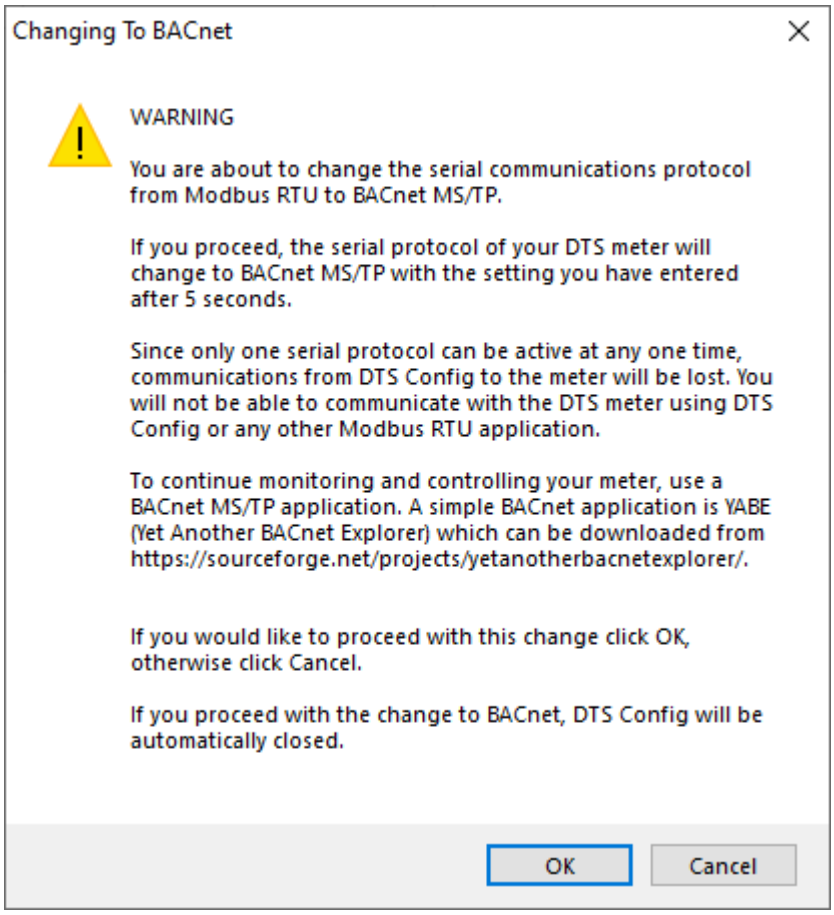


After "OK" is pressed, the protocol in the DTS meter will change to BACnet MS/TP with the communications parameters that you entered.

**ATTENTION**

**Once the protocol in the DTS meter has been changed to BACnet MS/TP DTS Config can no longer be used with the DTS meter.**

**For this reason, DTS Config will automatically close after "OK" is pressed.**

**Your DTS meter can now be connected onto your BACnet MS/TP Network**



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## 3.2 Switching from BACnet MS/TP to Modbus RTU Using YABE

This section explains how to change the protocol in a DTS meter is from BACnet MS/TP to Modbus RTU. Many parameters in the DTS meter can be changed using BACnet. However, if you need to use DTS Config to perform some advanced changes in the DTS meter then it is necessary to change the protocol back to Modbus RTU.

Follow these steps to switch the active serial protocol in the DTS meter from BACnet MS/TP to Modbus RTU. *(If you are familiar with your BACnet software, skip to steps **7, 8** and **9** below.)*

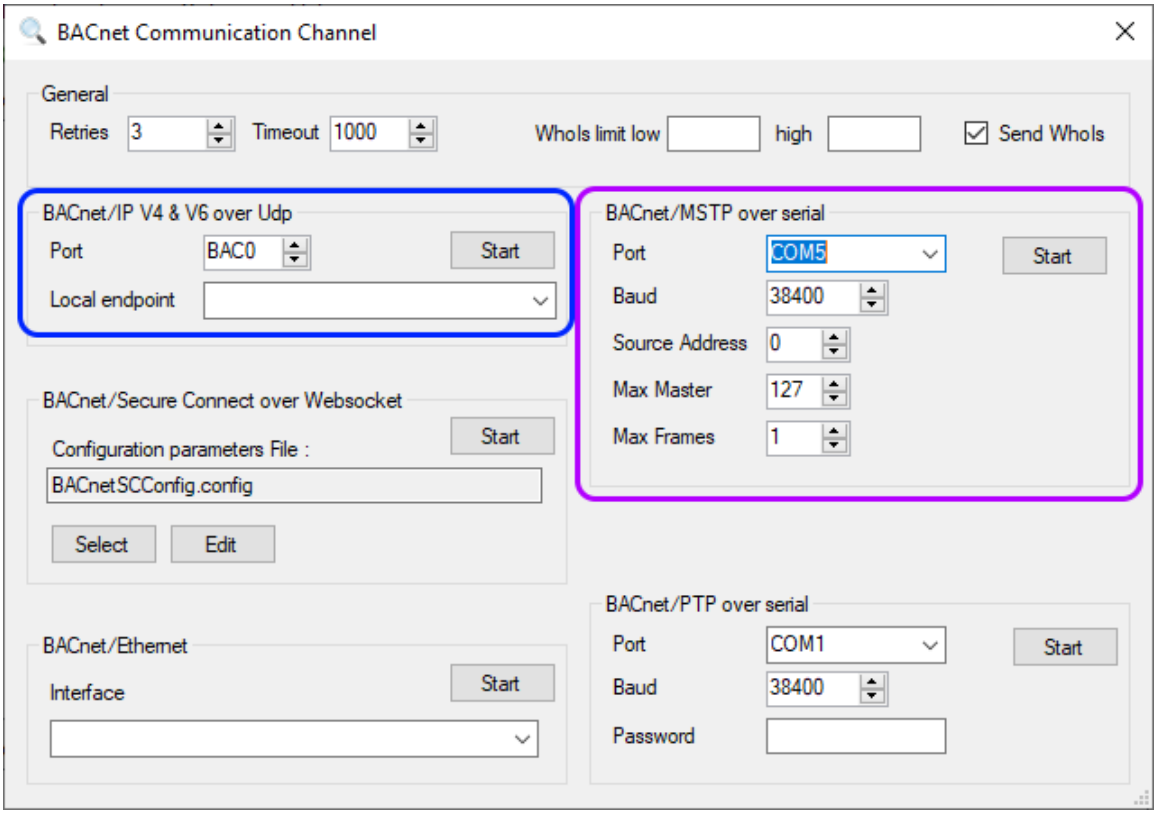
1. Ensure that your DTS meter is connected to a separate RS-485 bus using either of the BACnet hardware communication options described in section 1.2.3 above

2. Start your BACnet client software. (We will be using YABE for this document.)

3. Initiate a connection to the DTS meter.

   - If you are using an Ethernet BACnet router select "Functions > Add device". In the "BACnet/IP over UDP" group, ensure that the "Port" is set to "BAC0", then press the "Start" button for that group.

   - If you are using a Serial USB to RS-485 Adapter select "Functions > Add device". In the "BACnet/MSTP over serial" group, set the "Port" to match the COM port number of your USB to RS-485 adapter. The Baud must match what was used in your DTS meter. Then press the "Start" button for that group.





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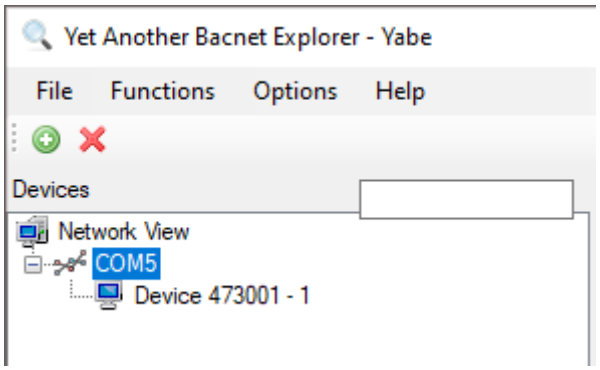
4. In the "Devices" pane you should see your DTS meter in the network tree, which includes your COM port number or your router name and IP Address.

   Your DTS meter can be identified using your device's Object_Identifier (Device_ID) number and the MAC_Address.

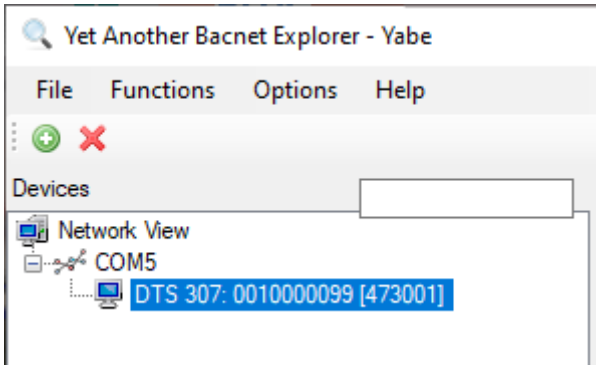
   In this example it is "Device 473001 - 1".

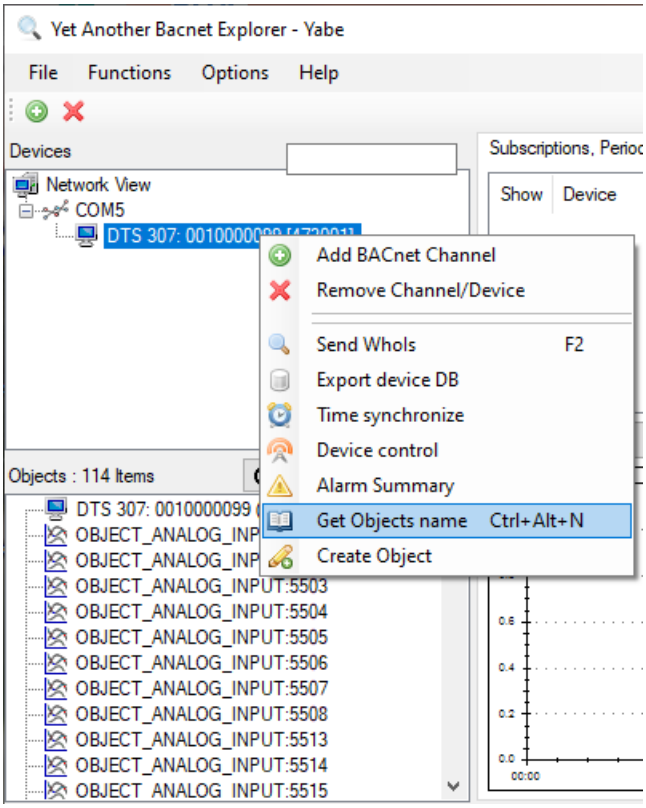


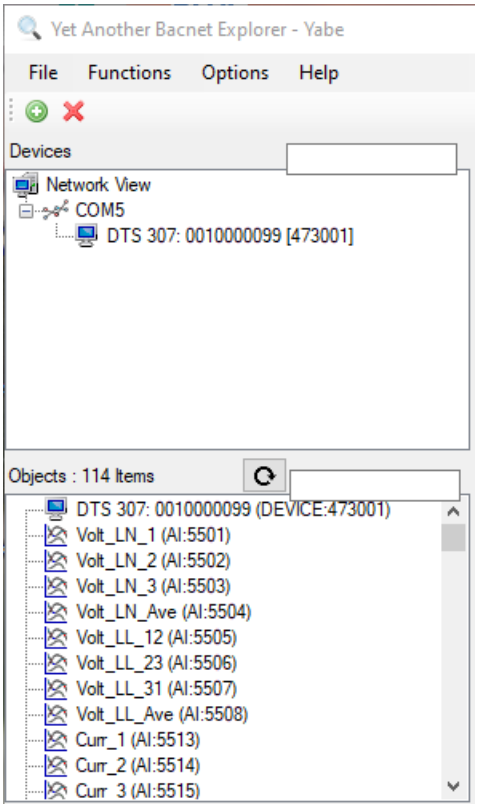

5. Left-clicking on the "Device 473001 – 1" changes the description to show the Object_Name and the Object_Identifier (Device_ID) number.

   For example, "DTS 307: 0010000099 [473001]". The "Objects" pane should now populate with the available objects in the DTS meter.

   Right-click on the device and select "Get Objects name" to populate the names of all the objects as shown below.





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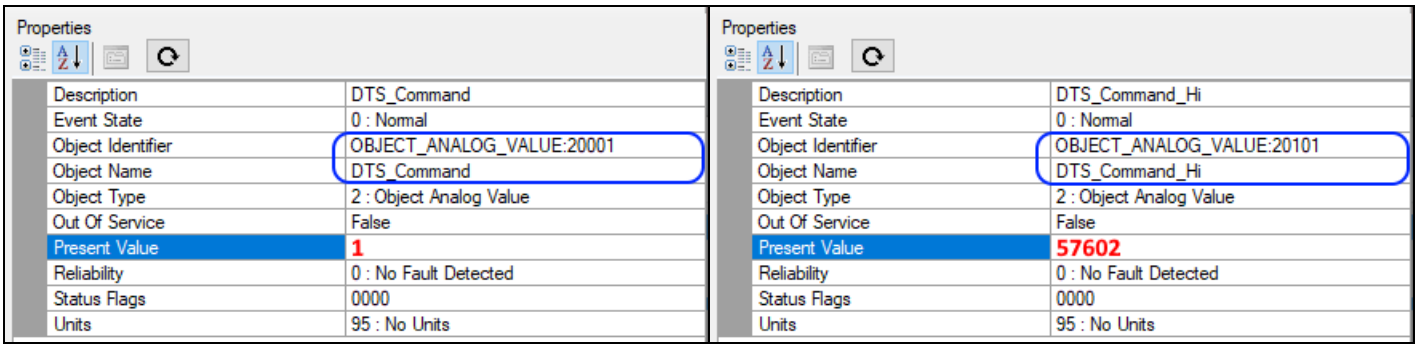
6. Scroll down the list of objects till you get to the "DTS_Command (AV:20001)" object.

7. Left-click on the "DTS_Command (AV:20001)" to show the properties of this Object, and change the "Present Value" to the number "**1**". This is the protocol number for Modbus RTU. *This must be done before the next step.*

8. Now left-click on the "DTS_Command_Hi (AV:20101)" to show the properties of this Object, and change the "Present Value" to the number "**57602**". This is the command to change the protocol. *Note that the "Present Value" will immediately revert to zero. This is normal and it means that the Command has been accepted and executed.*




**9. Cycle the power to the DTS meter. The meter protocol will now be Modbus RTU.**

**ATTENTION**

**Once the protocol in the DTS meter has been changed to Modbus RTU YABE can no longer be used with the DTS meter.**

10. Some hardware reconnections may be required:

- If you were using a BACnet router, you would need to disconnect the DTS meter from the router and reconnect your DTS meter to a separate RS-485 bus using either of the Modbus hardware communication options described in section 1.2.2 above.

- If you were using a USB to RS-485 adapter, you can continue using this for Modbus RTU.

**11. After the protocol switch, the Modbus communications will be as follows:**

- **The baud rate will be the same baud rate as was used for BACnet MS/TP (for example 38,400).**

- **The Modbus address will be set to 100.**



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