Triconex 4850
HART Multiplexer

Instruction Manual

INM4850-TR

CONTENTS

Related Documents

The following documents contain additional information concerning related Triconex equipment.

- Planning and Installation Guide for Trident v2 Systems
- Planning and Installation Guide for Tricon v9-v10 Systems

1. INTRODUCTION

This instruction manual describes the procedures for installing, checking and maintaining the Triconex 4850 HART Multiplexer, which is a hardware module located between 'smart' devices in the field and their host, that provides an interface to HART instrument management software running on a PC.

This manual is organised in the following manner.

Section 2 describes the system and the solutions available

Section 3 covers safe use information.

Section 4 describes installing the multiplexer

Section 5 covers the configuration

Section 6 provides information on fault finding, and maintenance

Section 7 introduces software connectivity for the HART Multiplexer.

Section 8 has further safety information, for users who are subject to the ATEX Directive.

See the MTL web site (www.mtl-inst.com) for the full specifications of the MTL4850 system components.

2 DESCRIPTION

The Triconex 4850 HART Multiplexer – also called the Triconex 4850 – enables a user to calibrate, configure and maintain an entire network of 'smart' field devices from a single workstation. It can multiplex up to 32 individual field devices, making each one addressable and identifiable.

The multiplexer mounts directly onto either a Tricon (Interface) card or a Trident backplane, which provides the connections via the Field Termination assembles to the Analogue Input or Output field devices. It has a compact 100 pin, plug-in style connector in its base that ensures a quick and easy installation method onto the Triconex Systems.

The HART instrument management system is organised in multiples of 32. The Triconex 4850s are multidropped on an RS485 network that finally connects, via an RS485 to RS232 converter, to the management PC. Depending upon the management software running on the PC, up to 31 of the Triconex 4850s could be connected to it, making a potential overall field device count of 992.

For intrinsically safe applications, consideration must be given to the safety parameters for each loop. For further information, please refer to MTL.

2.1 Safe or hazardous area applications

The Triconex 4850 HART Multiplexer can be used to monitor and maintain field devices that are located in a safe or a hazardous areas.

For safe areas, the standard Tricon FTA's and the Trident baseplates provide the necessary terminals to connect upto 32 field devices.

Hazardous-area field devices can be handled through backplane mounting, IS isolating interfaces. Both Trident and Tricon have integrated IS solutions for both AI and AO IS field devices. For full information refer to the Triconex P&I guides.

2.2 Connection methods

The Triconex 4850 HART Multiplexer will mount directly to either

a) a Tricon Interface card or

b) a Trident AI or AO Backplate

2.2.1 Tricon Interface Card

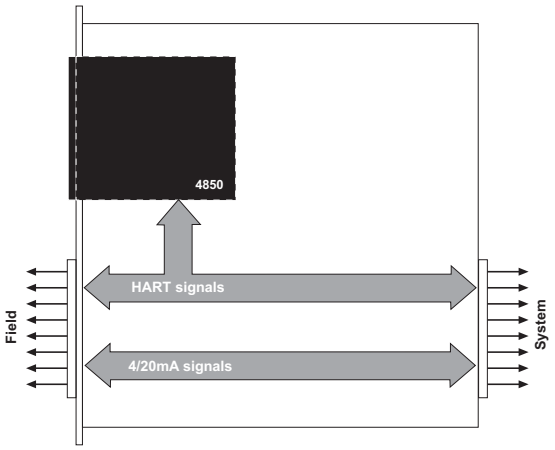


Figure 2 – Tricon Interface Card

The Field Connections from the Field termination Board are made to the front of the Tricon Interface board via the Multiway Connector. The HART signals are picked off from the interface card by the HART Multiplexer.

2.2.2 Trident Backplate

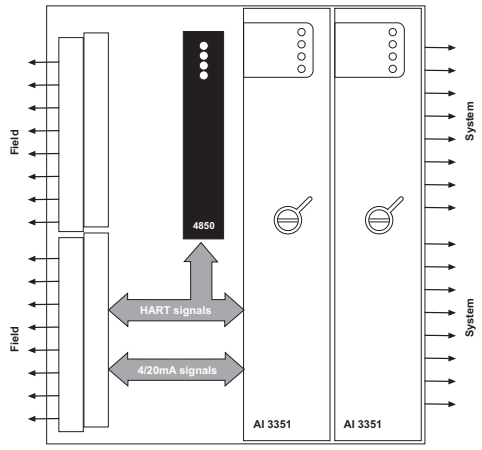


Figure 3 - Trident Backplate

The Trident backplate has one set of screw terminals for connection to the field devices. The HART signals, for routing to the maintenance system, are derived from the signals passing through the backplane to the Trident Modules.

3 SAFETY INFORMATION

Before beginning the installation of any of this equipment it is **IMPORTANT that the information in this section is read and understood**.

3.1 Precautions – General

WARNING: If this product is to be installed in a hazardous area, it must be installed, operated and maintained only by trained competent personnel and in accordance with all appropriate international, national and local standard codes of practice and site regulation for intrinsically safe equipment and in accordance with the instructions contained here.

If in doubt, refer to the certificate/catalogue for clarification of any aspects, or contact MTL, or your local representative, for assistance.

Check that the interface unit(s) has the correct function(s) for the application.

3.2 Special conditions of safe use

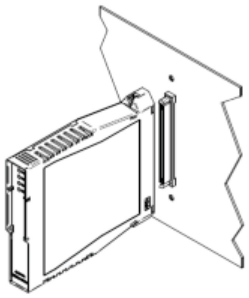
When using the equipment in Division 2 or Zone 2 hazardous areas the following conditions must be met. See also Section 8 for ATEX conditions of safe use.

1. The multi-pin connector of the 4850 either plugs directly into the Trident backplane or via a Trixonix Caddy system into the Tricon Interface card.
2. In Zone 2 installations, the 4850 shall be mounted within an enclosure which meets the requirements of IEC 60079-0 and IEC 60079-15 and is capable of being installed in accordance with IEC 60079-14. Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in locations providing adequate protection against the entry of solid foreign objects or water capable of imparing safety, the enclosure shall, at minimum, meet the requirements of IP4X. In Class 1, Division 2 installations, the 4850 shall be mounted within a tool-secured enclosure installed in accordance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application which is capable of accepting one or more of the Class 1, Division 2 wiring methods specified in the National Electrical Code ANSI/NFPA 70 Article 500.
3. The input voltage for the 4850 shall be limited to 18V dc to 35V dc.
4. The 4850 is approved by FM for mounting in a Class 1, Division 2, Groups A, B, C or D Hazardous (Classified) Location. The MTL4850 is certified by FM under the requirements of the IECEx scheme for mounting in a Zone 2, Group IIC Hazardous Location.
5. The Temperature Class is T4 over an ambient temperature range of –40°C to +70°C.
6. WARNING: EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
7. WARNING: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
8. No assembly or dismantling of the 4850 is possible or necessary . The product is not user serviceable.

4 MULTIPLEXER INSTALLATION

Depending upon the system into which the Triconex 4850 HART Multiplexer is being installed, choose from the methods given below.

4.1 Trident Systems



Place the Triconex 4850 over its connector, in the position marked on the backplane. Ensure that the module is not tilted, which could damage the connector pins, then press it carefully to the backplane.

All safe-area circuit and power connections are made through this connector. Tighten the two (captive) mounting screws.

4.2 Tricon Systems

For Tricon systems the Triconex 4850 is supplied ready installed in the Tricon Interface Card. For service replacement method, please refer to the Tricon V9-V10 Planning and Installation Guide.

5 MODULES – SETTING AND CONFIGURATION

The baud rate is automatically detected by the multiplexer when it is connected to the RS485 network. Allowed baud rates are 38,400, 19,200, 9,600 and 1,200.

The address is set automatically by the Host Safety System.

5.1 Operation at power-up

When the Triconex 4850 has been installed in either the Trident or Tricon systems it will be powered directly by the Triconex Safety System.

When power is applied to relevant baseplate or Interface card the operations of the LEDs on the Triconex 4850 should follow the following sequence:

- The green PWR LED on the Triconex 4850 will light.
- The red Fault light will start flashing while the HART mux scans the 32 loops for HART devices that may be connected. When all 32 channels have been scanned the Red LED will then indicate one of the following states:

FAULT LED	Meaning
Off	In running state
On	Fault
Blinking	No HART loops found

Note *flash indicates an on/off ratio of approximately 1:1, blink indicates a long on period followed by a short on period.*

- The HART amber LED will start flashing until it detects HART devices connected to the Multiplexer. The LED will then remain on until all 32 channels have been scanned.
- The HOST amber LED will remain off until the HART instrument Management software (IMS) starts communication with the Triconex 4850.

Note: Although the Triconex 4850 is installed directly within the Triconex Safety System and is powered by it, the communication with HART devices is controlled by a host computer running an instrument management software package.

When communication with the HART IMS has been established the Amber LEDs will give an indication of communications on the serial lines.

The HOST amber LED indicates the state of communications on the Host serial line.

HOST LED	Meaning
Short flash (0.25s)	Correctly framed message received by multiplexer.
Long flash (1s)	Response transmitted – this is retriggerable, thus repeated transmissions will leave the LED on permanently.
Off	No communications on channel

The HART amber LED indicates the state of communications on the HART serial line.

HART LED	Meaning
Short flash (0.25s)	Message transmitted
Long flash (1s)	Response received – this is retriggerable, thus repeated reception will leave the LED on permanently.
Off	No communications on channel

6 FAULT FINDING AND ROUTINE MAINTENANCE

6.1 Fault finding

When fault finding, carry out the following steps as far as is necessary:

a. Check the condition of the installation to make sure that no damage or deterioration has occurred.

b. Check the Trident baseplate field power supplies are at required potentials or that the Tricon interface module green pass LED is illuminated. If power conditions/supplies are not correct, refer to the *Triconex P & I guide* for further instructions.

c. Check that the power LEDs on the Triconex 4850 multiplexers are ON.

   If yes, check the status of the Fault LED on the Triconex 4850.

   If the red Fault LED is illuminated there is an alarm condition. This can be cleared either by:

   - the HART software application running on the maintenance PC, or by
   - resetting the power to the Triconex 4850
   - setting the Alarm Clear input

d. If the fault cannot be cleared the multiplexer can be exchanged.

e. If an Triconex 4850 is changed, some software packages do not recognise a replacement device until either:

   - the node name (stored within the new Triconex 4850) is made the same as that of the removed device, using the software or,
   - the network is restarted; when the software will adopt automatically the node name of the replacement device.

6.2 Routine maintenance

It is advisable to check the general condition of the installation occasionally to make sure that no damage or deterioration has occurred.

7 SOFTWARE CONNECTIVITY

7.1 Introduction

The MTL4850 multiplexer provides access from a PC to the HART field devices for configuration, diagnostics and the monitoring of device performance. HART devices may be selected for regular status monitoring, and an alert issued if the status changes.

7.2 Software setup

Having connected the MTL4850 , as described in this manual, set up the HART Configuration software as described in the software manufacturers manual.

For communication with software packages based on the FDT frames the MTL Comms DTM will be required. This can be downloaded from the MTL website - *www.mtl-inst.com*

7.3 MTL4850 Comms DTM

For full details on how to utilise the Comms DTM please refer to the MTL DTM Tutorial included in the installation file.

7.3.1 Installation

Hardware Requirements

A suitable MS Windows based PC capable of executing FDT components. You will also require an MTL4850 HART Multiplexer and connected HART devices.

Software Requirements

Windows XP with up-to-date service packs and security patches applied.

To fully utilize the Communication DTM other FDT components are required. You will need to install a FDT 1.2 compatible frame. You will also need to install device DTMs for any HART devices you plan to use or use Generic HART DTM's?.

7.3.2 How to install/uninstall the Comms DTM

The Communication DTM is supplied as a self-extracting install program.

Using the executable

To install the Communication DTM simply double-click the setup executable and follow the instructions.

How to uninstall the Comms DTM

To uninstall the Communication DTM do the following:

1. Select Start->Settings->Control Panel.

2. Double-click the Add/Remove Programs item.

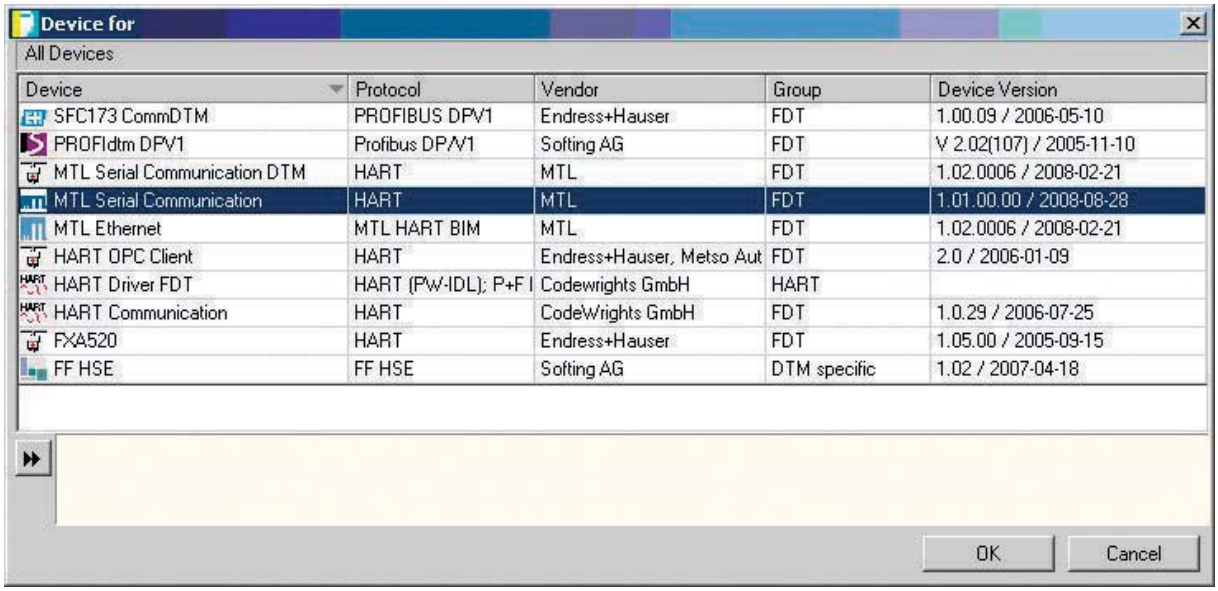
3. Select the software to remove

When the FDT frames and DTMs that you plan to use have been installed, start the FDT Frame and update the DTM catalog so that the installed DTMs are available to use.

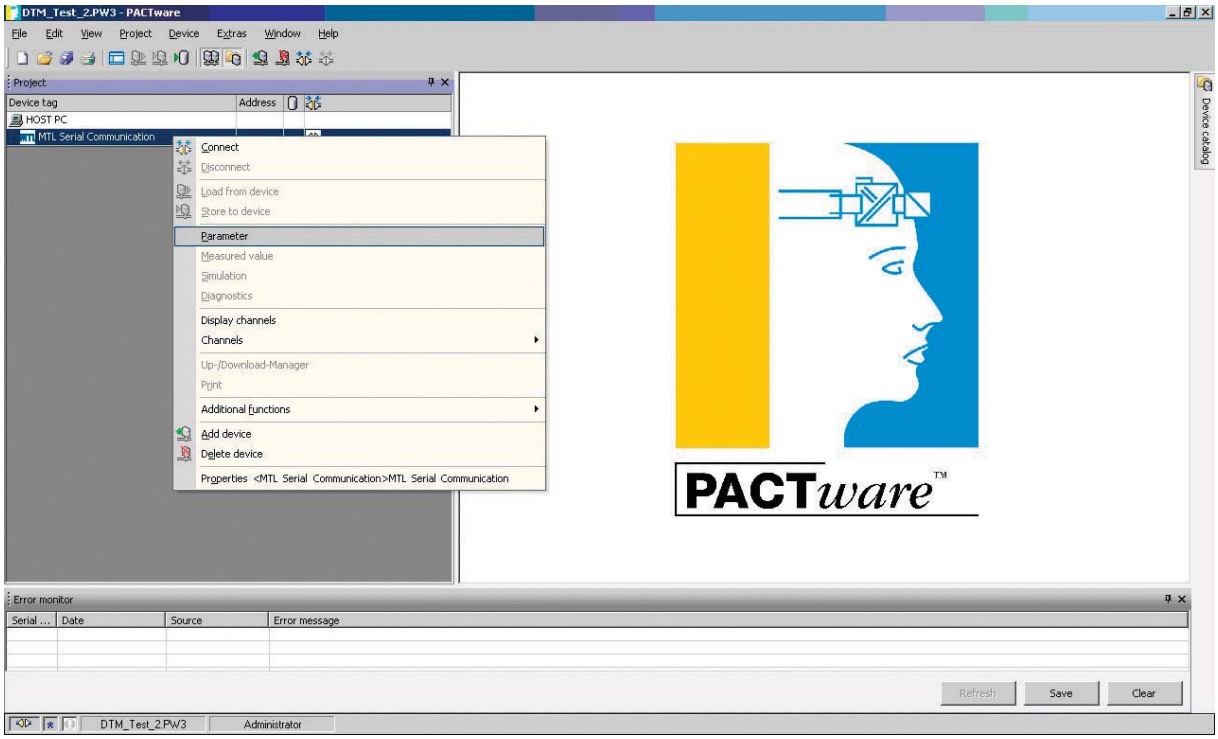
7.4 Using the Pactware Frame

7.4.1 Configuring the Communication DTM

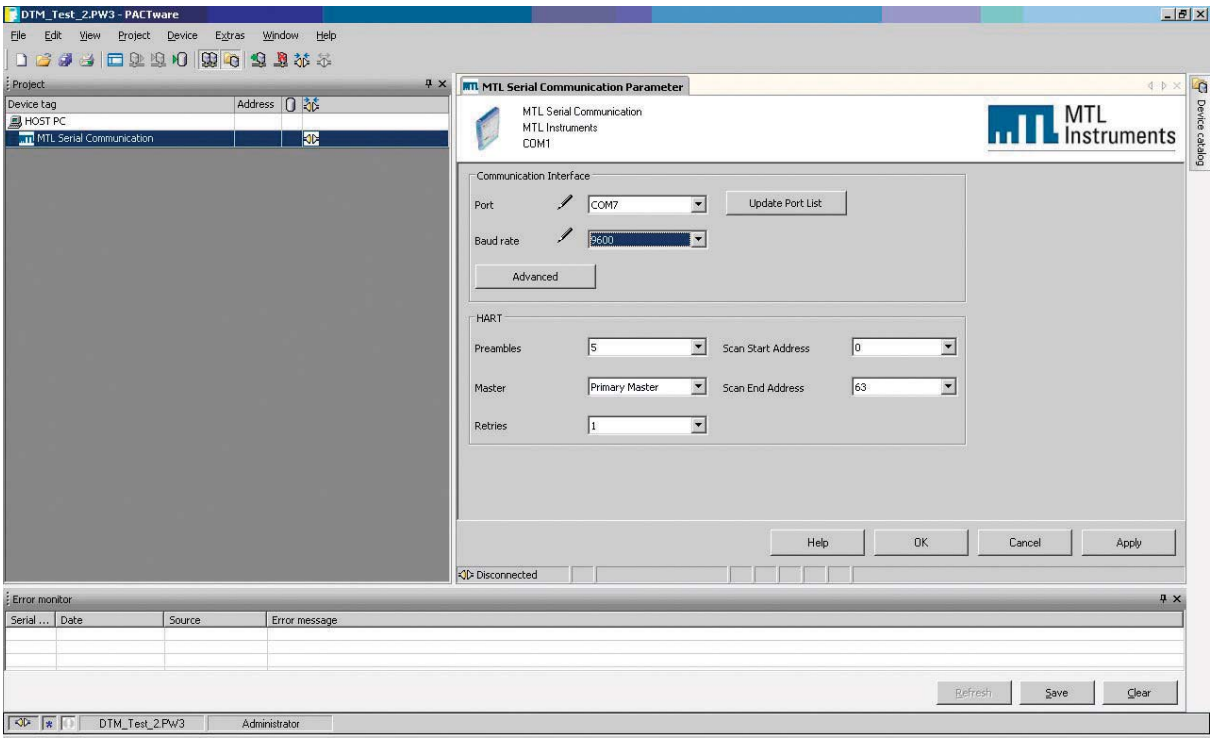
Right click on the HOST PC node and choose 'add device' . From the list that appears select MTL Serial Communication.



Right click on the MTL Serial Communication DTM and select Parameter.

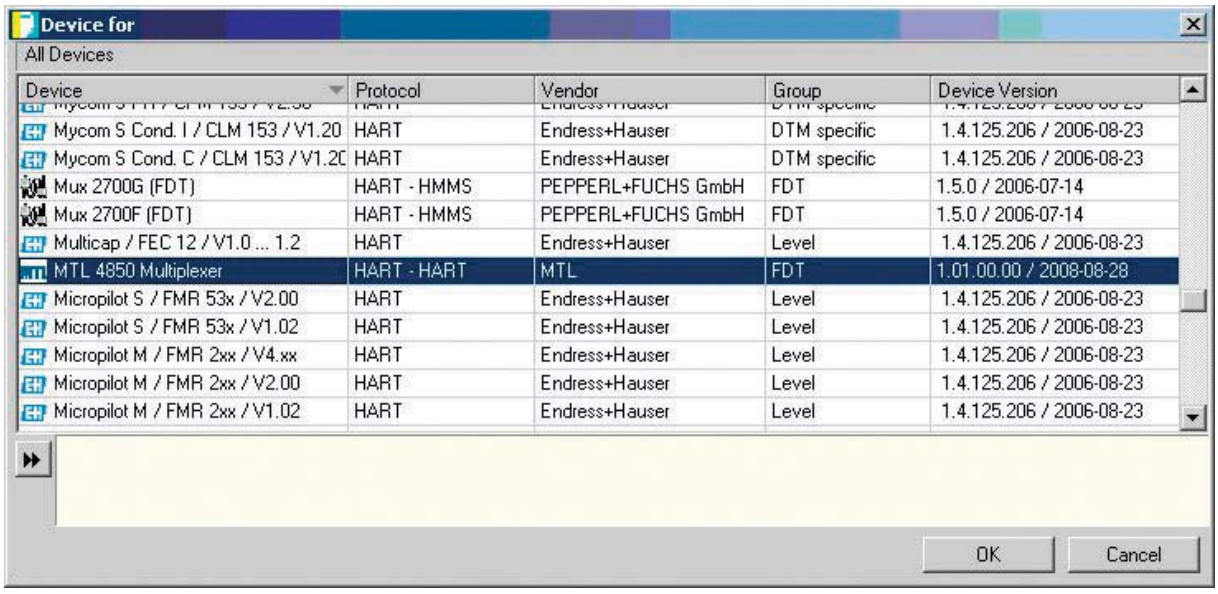


You can now select the Com Port and Baud Rate you want to use, make sure you apply after choosing your settings.

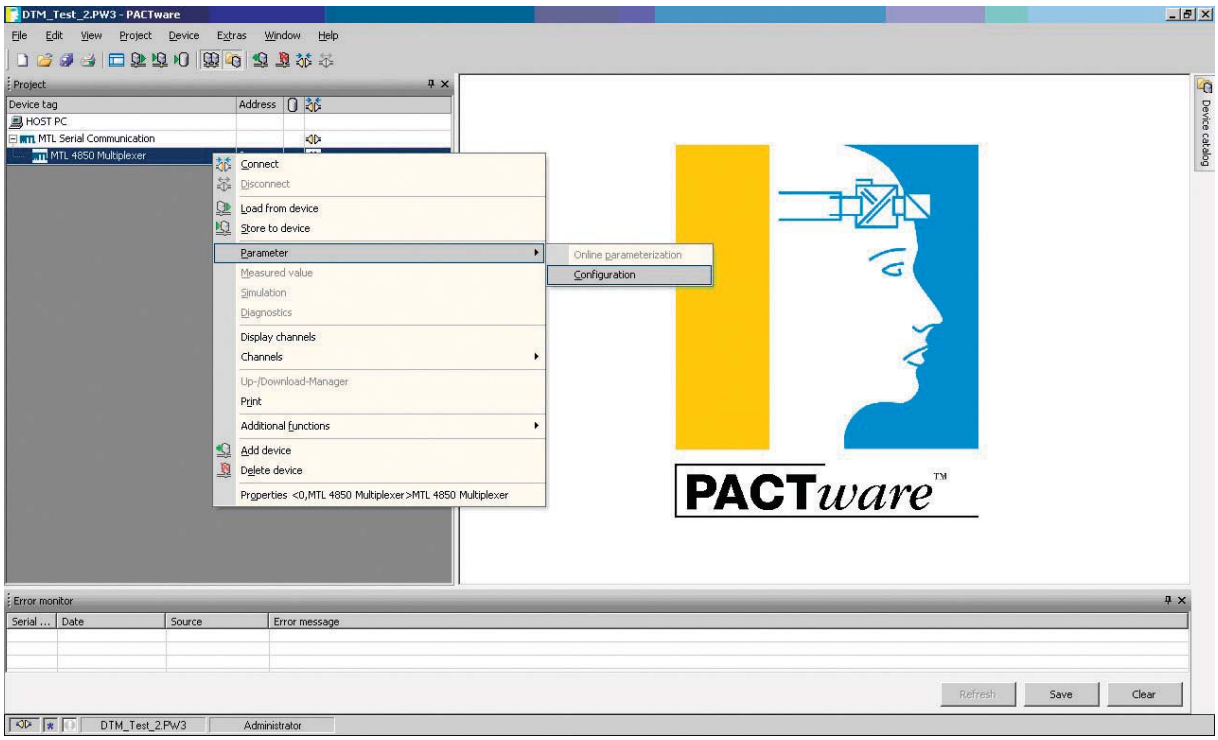


Note: The available communication ports should be listed. If a communication port is missing from the list select Update Port List and then check that it is not being used by another application.

Now right click on the MTL Serial Communication and select 'Add Device'. From the list that appears - choose MTL4850 Multiplexer DTM.

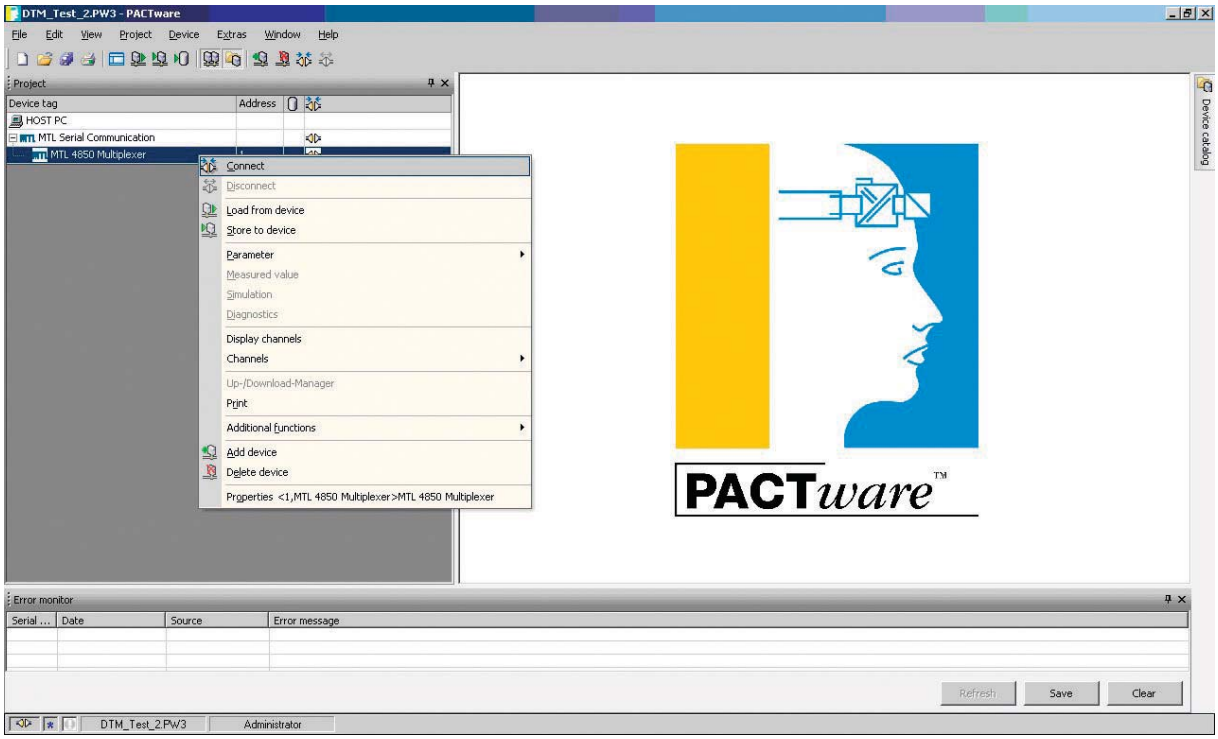


Right click on the MTL4850 Multiplexer DTM and select Parameter / Configuration.



You can now select the RS485 Address of your Multiplexer, again make sure you apply after choosing your address.

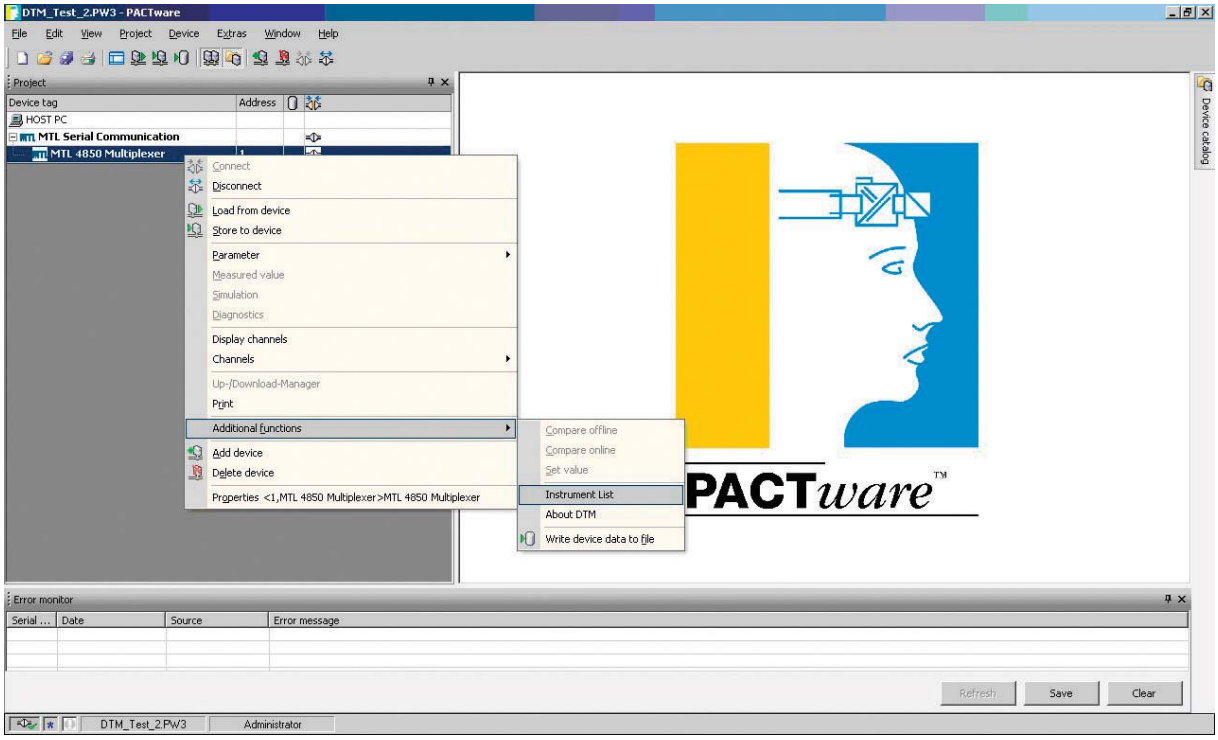
Right click on the MTL4850 Multiplexer DTM again and choose connect.



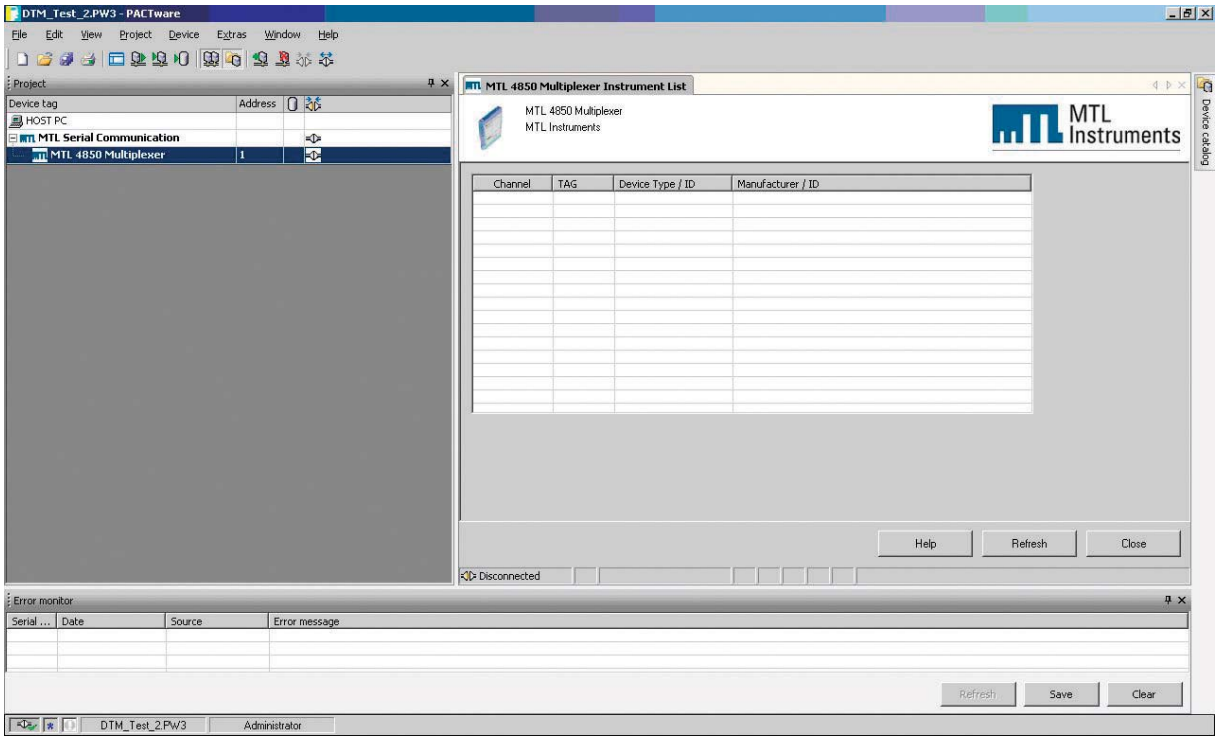
7.4.2 Scanning for Devices

To build device topologies you need to know which physical devices exist on the communication bus. The support for scanning varies from frame to frame. The MTL Communication DTM provides full support for scanning the HART bus for devices.

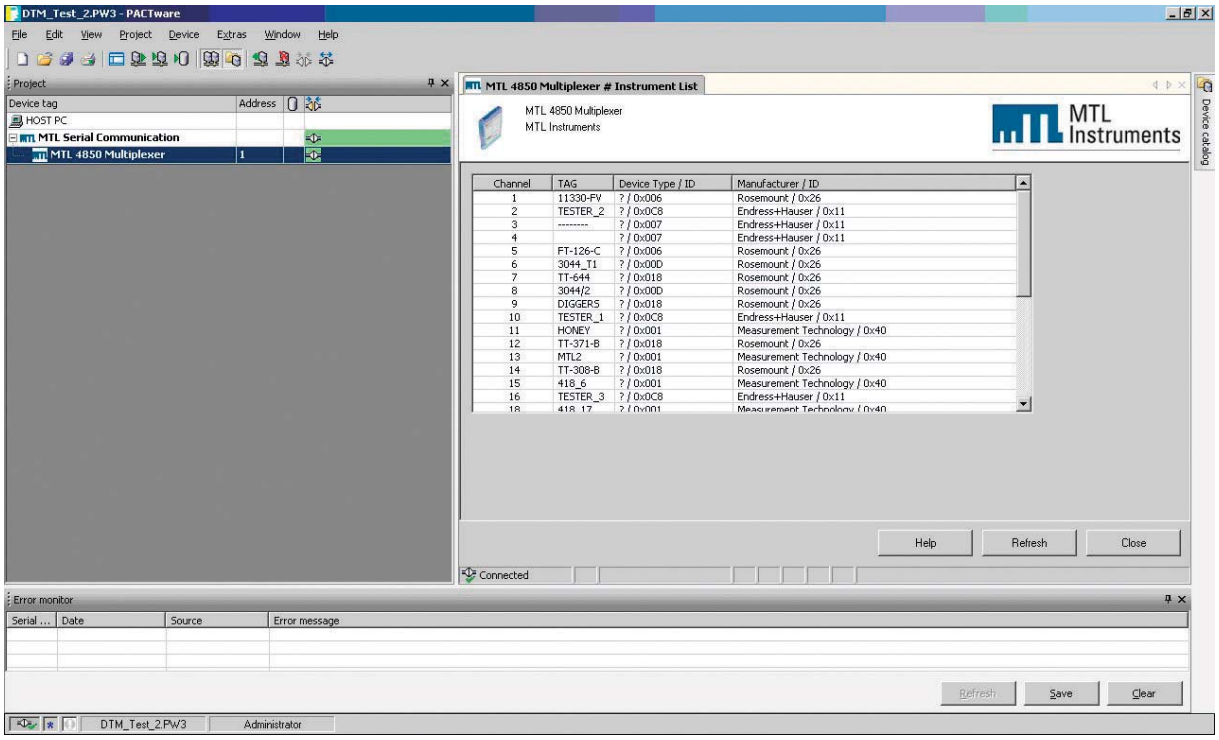
To perform scanning right click on the MTL4850 Multiplexer and select Additional Functions/ Instrument List.



You will now see a blank Instrument List as shown below. To populate this with your HART Devices select Refresh.



Pressing refresh, resets the multiplexer which then scans to see what devices are connected to it. At the end of the refresh an updated instrument list will be displayed. E.g

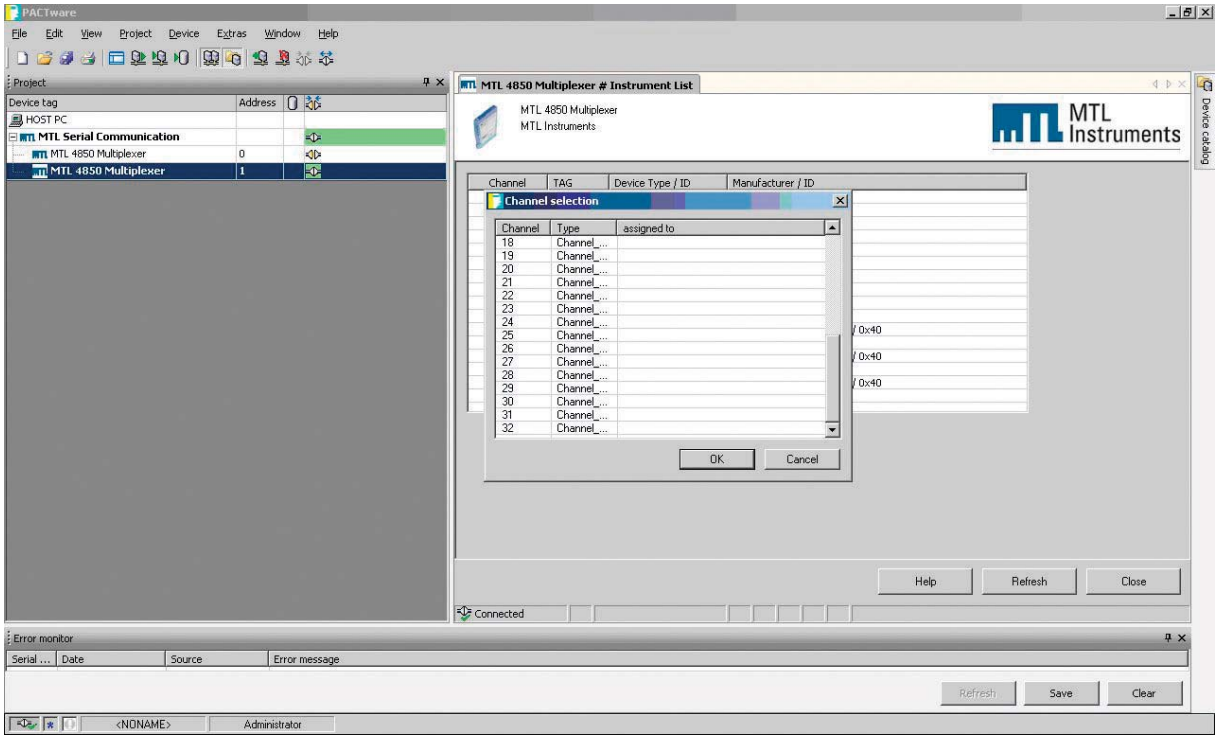


Pactware supports scanning for devices but does not try to automatically assign the devices found to available DTMs. You need to manually assign the device tag to the device DTM.

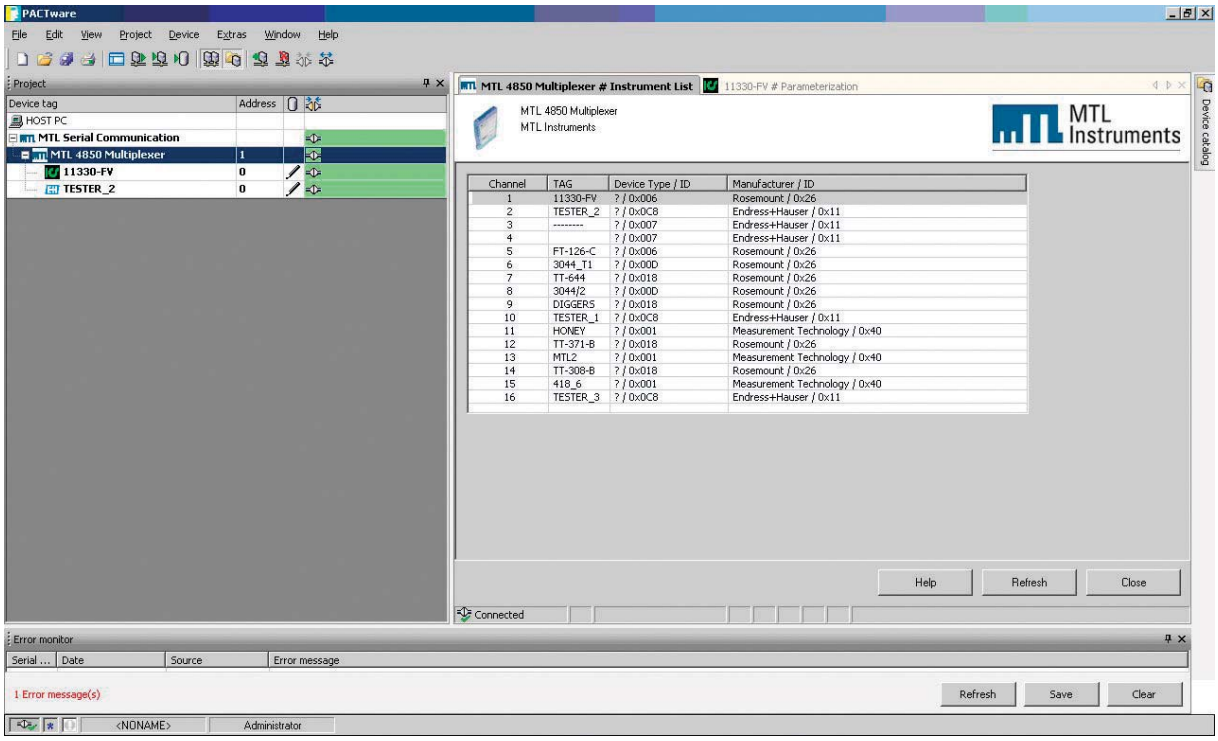
You can see that the device tags of the HART devices are listed along with the communication channels that device DTMs should be added to. The channels listed are the channels that device DTMs should be added to when manually adding device DTMs in the network topology. How to manually associate a device DTM with a channel is described in the section 'Manually adding Device DTMs'.

7.4.3 Manually adding Device DTMs

To add a device DTM to the MTL4850 Multiplexer DTM, right click on the MTL4850 and select "Add Device". After choosing the device DTM to add, a list of channels will be displayed. There will be 32 channels in the case of the MTL4850.



The channel selected should correspond to the listed channels in the 'Instrument List'

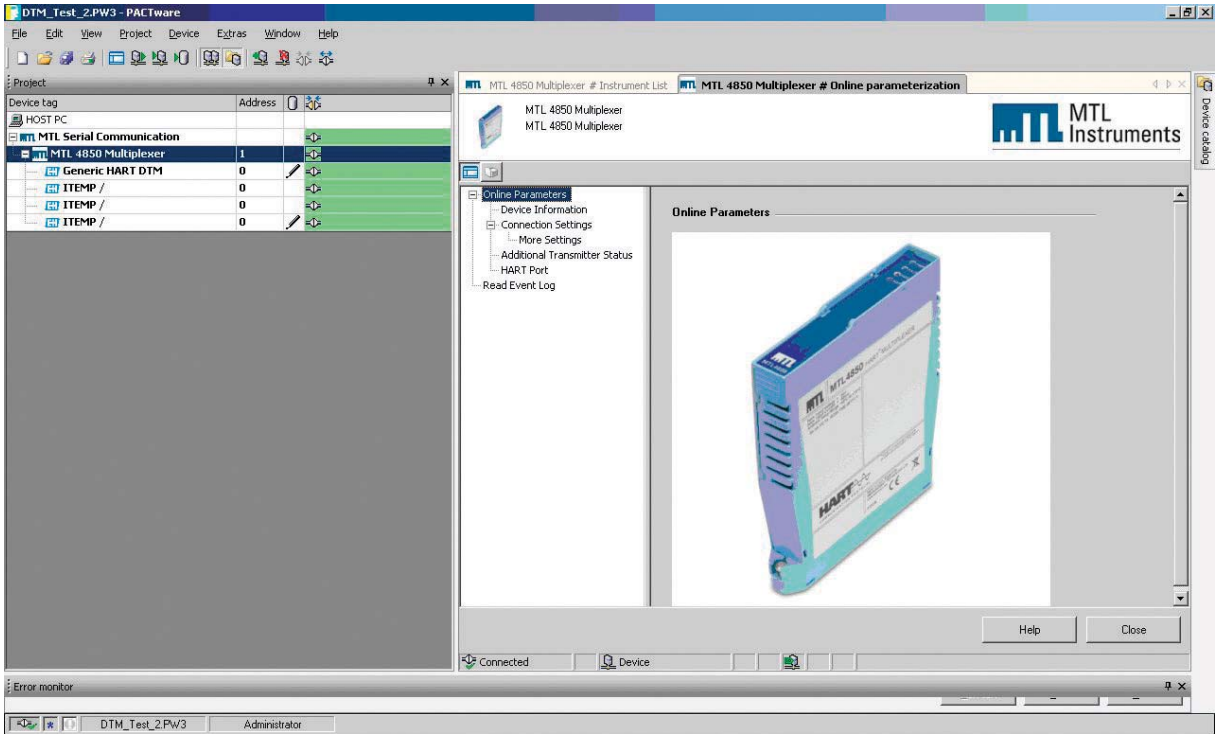


7.4.4 Online Parameterisation of Multiplexer

If you right click on the MTL4850 Multiplexer DTM and choose parameter/online parameterisation you now have the option to

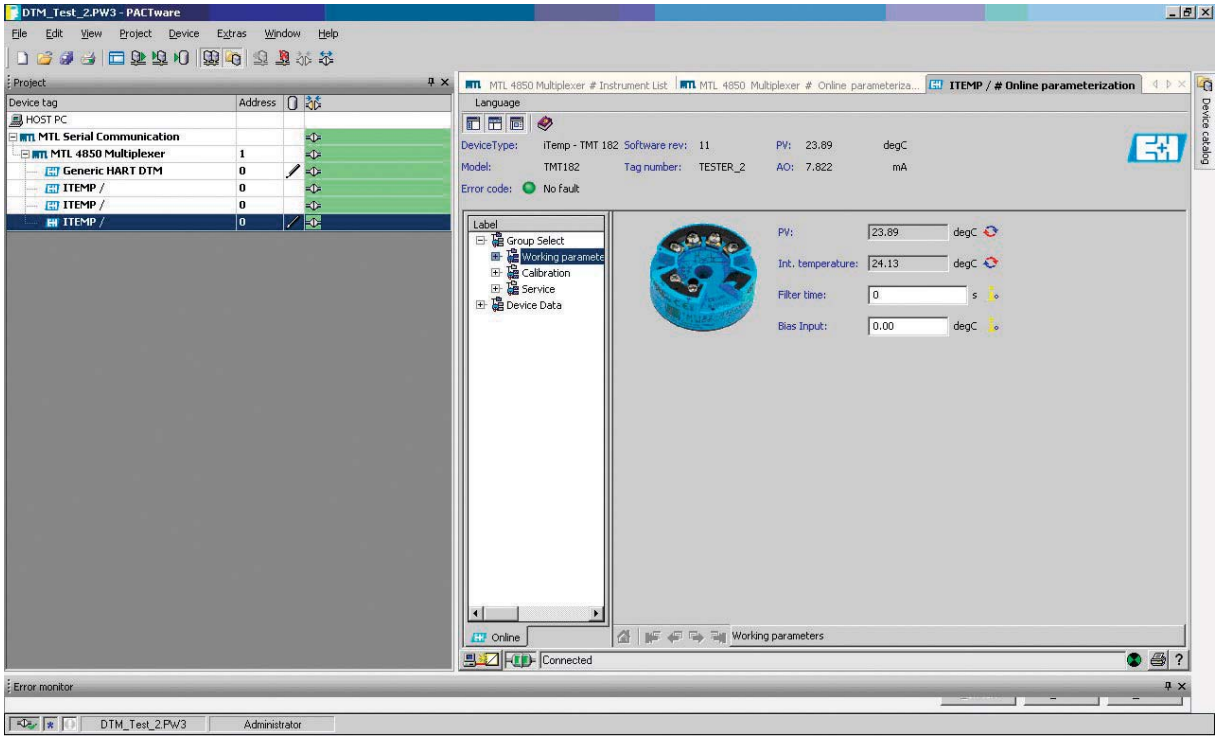
- set the tag name and descriptor of the multiplexer
- read further status information
- Access the Event Log

For further details consult the DTM Tutorial



7.4.5 Online Parameterisation of Devices

If you right click on your chosen device and click connect, you can then right click again to access the online parameterisation of your device.



8 ATEX SAFETY INSTRUCTIONS

The following information is in accordance with the Essential Health and Safety Requirements (Annex II) of the EU Directive 94/9/EC [the ATEX Directive - safety of apparatus] and is provided for those locations where the ATEX Directive is applicable.

8.1 General

a) This equipment must only be installed, operated and maintained by competent personnel. Such personnel shall have undergone training, which included instruction on the various types of protection and installation practices, the relevant rules and regulations, and on the general principles of area classification. Appropriate refresher training shall be given on a regular basis. [See clause 4.2 of EN 60079-17].

c) This equipment has been designed to provide protection against all the relevant additional hazards referred to in Annex II of the directive, such as those in clause 1.2.7.

b) This equipment has been designed to meet the requirements of EN 60079-15.

8.2 Installation

a) The installation must comply with the appropriate European, national and local regulations, which may include reference to EN 60079-14. In addition, particular industries or end users may have specific requirements relating to the safety of their installations and these requirements should also be met. For the majority of installations the Directive 1999/92/EC [the ATEX Directive - safety of installations] is also applicable.

b) Unless already protected by design, this equipment must be protected by a suitable enclosure against:
i) mechanical and thermal stresses in excess of those noted in the certification documentation and the product specification

ii) aggressive substances, excessive dust, moisture and other contaminants.

Read also the Special Conditions for Safe Use (below) for any additional or more specific information.

Special Conditions of Safe Use for Zone 2 applications

a) The equipment must be installed in an enclosure or an environment that provides a degree of protection not less than IP54.

b) The equipment must not be inserted or removed unless either:

i) the area in which the equipment is installed is known to be non-hazardous or

ii) the circuit to which it is connected has been de-energised.

c) The 24V supply for this equipment must be derived from a regulated power supply complying with the requirements of European Community Directives.

8.3 Inspection and maintenance

a) Inspection and maintenance should be carried out in accordance with European, national and local regulations which may refer to EN 60079-17. In addition specific industries or end users may have specific requirements which should also be met.

b) Access to the internal circuitry must not be made during operation.

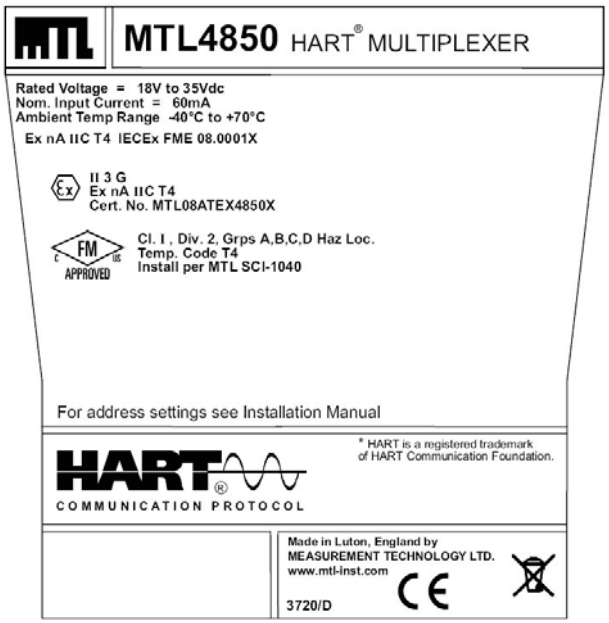
8.4 Repair

a) This product cannot be repaired by the user and must be replaced with an equivalent certified product.

8.5 Marking

Each device is marked in compliance with the Directive and CE marked with the Notified Body Identification Number.

This information applies to MTL4850 products manufactured during or after the year 2008.



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