# 1 Purpose

The purpose of the TEC LabVIEW Control Software is to facilitate the implementation of a TEC controller into a LabVIEW based environment or to provide a base to build own LabVIEW programs.

This document applies to the version 0.14 of the TEC LabVIEW Control Software.

The LabVIEW project can be downloaded here:

http://meerstetter.ch/category/31-latest-software?download=344

## 1.1 Support

The software is provided "as is" and we cannot provide support for LabVIEW implementations or changes in the TEC LabVIEW Control Software. However, suggestions for improvement are always welcome.

# 2 Function Overview

The following functions are available in the corresponding tabs of the TEC LabVIEW Control Software:
- Monitor:
  - o General information about the TEC Controller
  - o Live operating values for both channels
  - o Error information
- Chart:
  - o Plot of the measured object temperature for both channels
- Operation:
  - o Set value for "Object Target Temperature"
  - o Set value for "Live Set Current"
  - o Set value for "Live Set Voltage"
  - o "Live Enable" (switch TEC controller on and off, must be configured prior in service software)
  - o "Input Selection" (change between temperature controller and live current/voltage)
  - o "Object Target Temperature Source Selection"
- Error History:
  - o List of the TEC controller device errors and TEC server (communication) errors that occurred
  - o Communication error test (Read Device Type button)
    - ▪ Tries to read Device Type (Parameter 100) with wrong parameter 114
  - o Implement own test cases (Perform Test button)

It is possible to connect to multiple TEC controllers using multiple instances of the TEC LabVIEW Control Software.

# 3 Documents

Please refer to the document 5136 "TEC Controller Communication Protocol" for an overview of the commands available.

You may also consult the document 5117 "MeCom Protocol Specification" for general information about the communication protocol used to address the TEC controllers.

# 4 Requirements

To run or build the application and to connect the TEC controller you need the following components:

- LabVIEW: http://www.ni.com/labview/
  - TEC LabVIEW Software is compatible to LabVIEW 2010 or higher and to the base version or higher
- NI-VISA Runtime 16: http://www.ni.com/download/ni-visa-16.0/6184/en/
  - Or an older version of NI-VISA (compatibility with NI-VISA 5.0)

After the installation you should find in the NI Measurement & Automation Explorer (NI-MAX) the NI-VISA runtime in the menu "Software" in the sidebar. If not, NI-VISA runtime is probably not installed.

## 5 Operation

- Open the LabVIEW project TEC LabVIEW Control Software.lvproj
- Find the VI TEC LabVIEW Control Software.vi in the Source folder and open it
- Run the Control Software by clicking on the arrow in the toolbar or CTRL+R
- The VI is now searching TEC controllers available on the COM ports
- Finding a TEC controller and connecting can take some seconds

### 5.1 Configuration for LTR-1200

If you use TEC controllers inside an LTR-1200 rack, there are two possibilities to configure the communication.

Use the TEC LabVIEW Control Software without changes in the communication and set the default routing of the LTR-1200 to the corresponding device in the rack. This can be done using the buttons on the front panel or using the Rack HMI Service Software. The "Maintenance" tab in the service software lets you choose the "Device to be Adressed". (Please refer to the document 5171 "LTR-1200 User Manual" for more information.)

Another way is to configure the TEC LabVIEW Control Software, such that it connects to a given device. In the VI "Initialize System", choose "preset" for the case selector instead of "auto" and then in the case "preset" choose the device address and COM port to be used.

### 5.2 USB / RS-485

For the usage of USB/RS-485 converters, e.g. USB-485 device from National Instruments (http://www.ni.com/en-us/support/model.usb-485.html), you must follow these steps:

- The TEC controller only has 3 pins for RS-485 communication (GND, A, B). If the converter has separate TX and RX lines, the corresponding must be jumpered together. (E.g. RXD+ with TXD+and RXD- with TXD-) Refer to the following picture as an example for the USB-485 device from NI. (More information: http://digital.ni.com/public.nsf/allkb/47B83A8BF108021786257602004FE968)
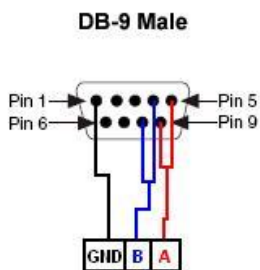


- Set the converter's wire mode to "RS485/Wire2-Auto"

The last setting can be set in NI MAX (more information: http://digital.ni.com/public.nsf/allkb/47B83A8BF108021786257602004FE968) or programmatically in the VI "meTEC_Open Session" by using property nodes. Please refer to the following screenhot.
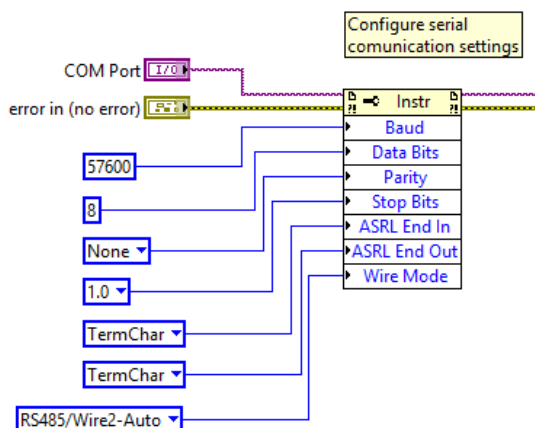
## 6 Remarks

Parameters should not be read or written repeatedly from and to flash. Please use volatile parameters (RAM) if they change repeatedly during operation. Please refer to the document 5136 section 1.3 for more information.

Prior to connecting the LabVIEW application to the TEC controller, you need to close the service software and vice versa. Otherwise the COM port is blocked.

## 7 License