last update
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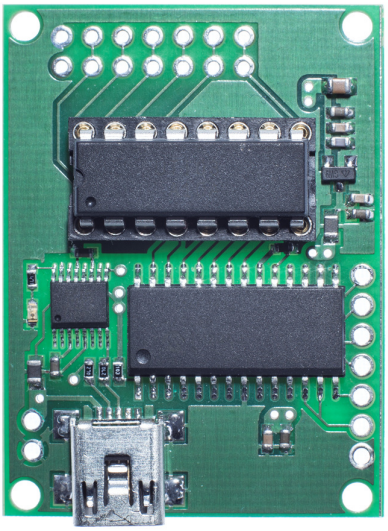
reference
utitoolkitusbmini.docx

Universal Transducer Interface (UTI) Evaluation Board (With mini USB connection)



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1. Introduction

This manual describes an evaluation board for the UTI. The UTI is a complete front-end interface for many types of passive sensors, such as resistive, resistive-bridge and capacitive sensors. The UTI converts low-level sensor signals to a period-modulated microcontrollercompatible signal. Continuous auto-calibration guarantees a high accuracy, up to 13 bits. Full data of the UTI is available in the UTI specification sheet and should be consulted in conjunction with this Application Note when using the Evaluation Board.

The evaluation board is equipped with a microcontroller (Microchip PIC16F1933) and a FTDI chip for interfacing to the USB standard. For loading the software interface for PC or laptop please refer to our website.

The evaluation-board connection diagram is shown in Figure 2, while a full circuit diagram and a photograph of the evaluation board are shown in Figure 1.

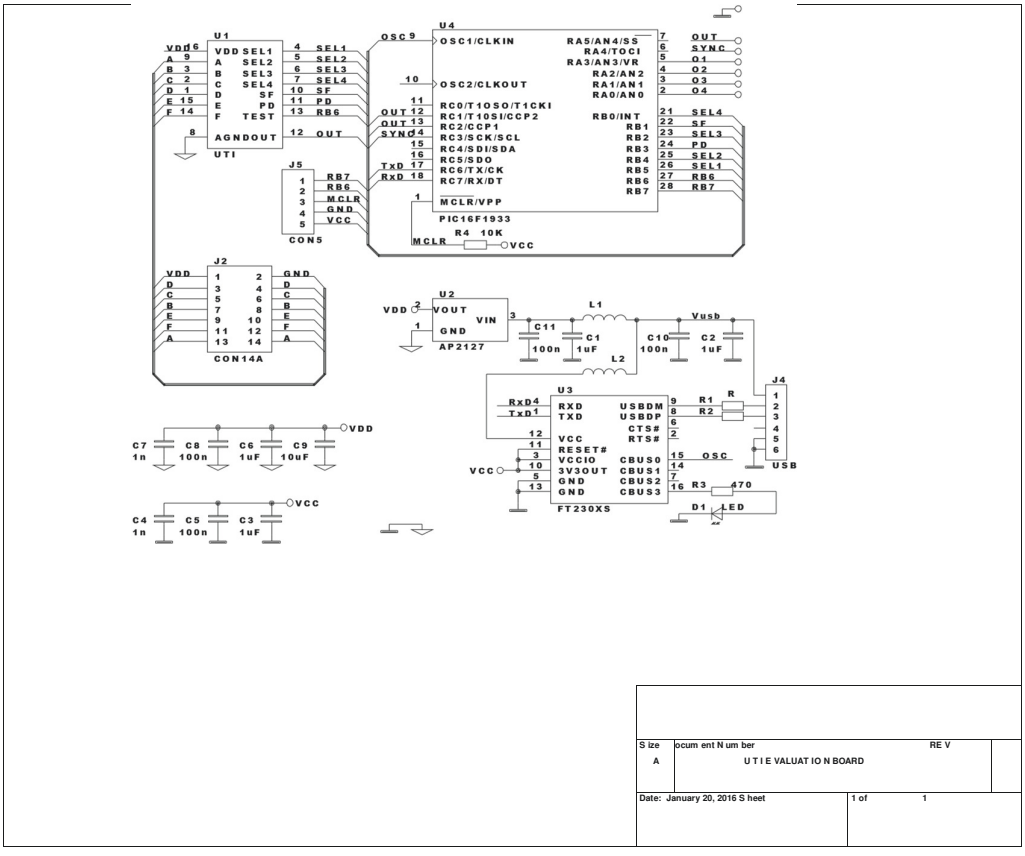


Figure 1 Circuit diagram of the UTI evaluation board

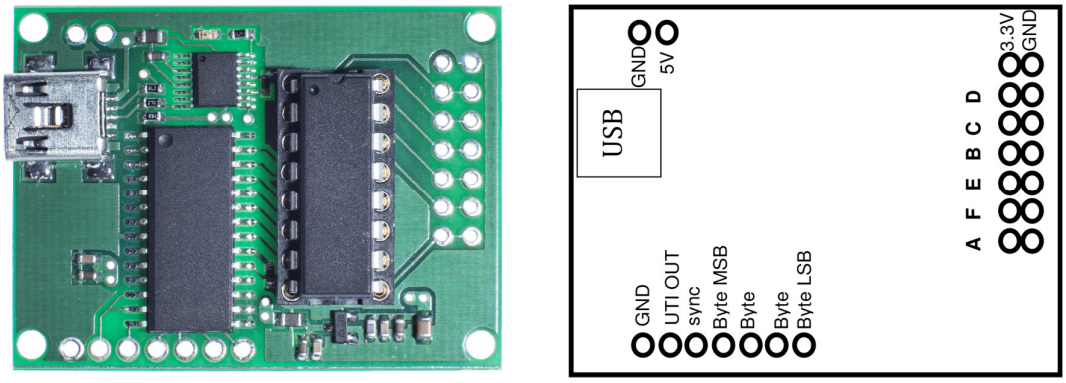


Figure 2 A photograph and layout of the UTI evaluation board.

2. Operating the UTI evaluation board

Functions

The evaluation board can be used for all functions of the UTI except for the function needed in combination with the MUX for multiple capacitor measurement. The microcontroller measures the output signal of the UTI and communicate with the outside digital world and deals with all the UTI details.

Power supply

The interface board is powered by the USB port; if needed a 5 V. power supply can be connected.

3. Connections to the board

The UTI evaluation board is equipped with four connectors/connecting pads (see figure 2):

USBmini	Connection to the PC or laptop (please see the appropriate manual on our site how to download the FTDI VCOM port)
GND-5V.	Can be used in case an external 5 V. power supply is needed. Sometimes the USB power is unreliable and noisy; in that case the evaluation board can be powered via the 5 V.
UTI out/sync	These connection can be used to monitor the output of the UTI directly on an oscilloscope. The sync (trigger) signal is generated on phase 0 of the UTI output.
Byte LSB-MSB	A four digit signal that can be controlled by the software. These bits can be used to create a simple control system based on the UTI evaluation kit. Each bit can sink/source about 25 mA with depending on the power delivered by the USB port.
3.3V-Gnd	Is a 3.3V output. The UTI is working on 3.3 V that voltage is available for low power extensions.
A,B,C,D,E,F	I/O of the UTI, see the UTI data sheet

All connections (except USB connector) are based on 0.1" spacing.

4. Running the UTI evaluation board

There are many ways to display evaluated results, such as any terminal program under Windows. On our website evaluation software is available. This software is graphic based and will give the user also the possibility to store the data in excel compatible files. See the software application in our engineering website**:** http://notes.smartec-sensors.com

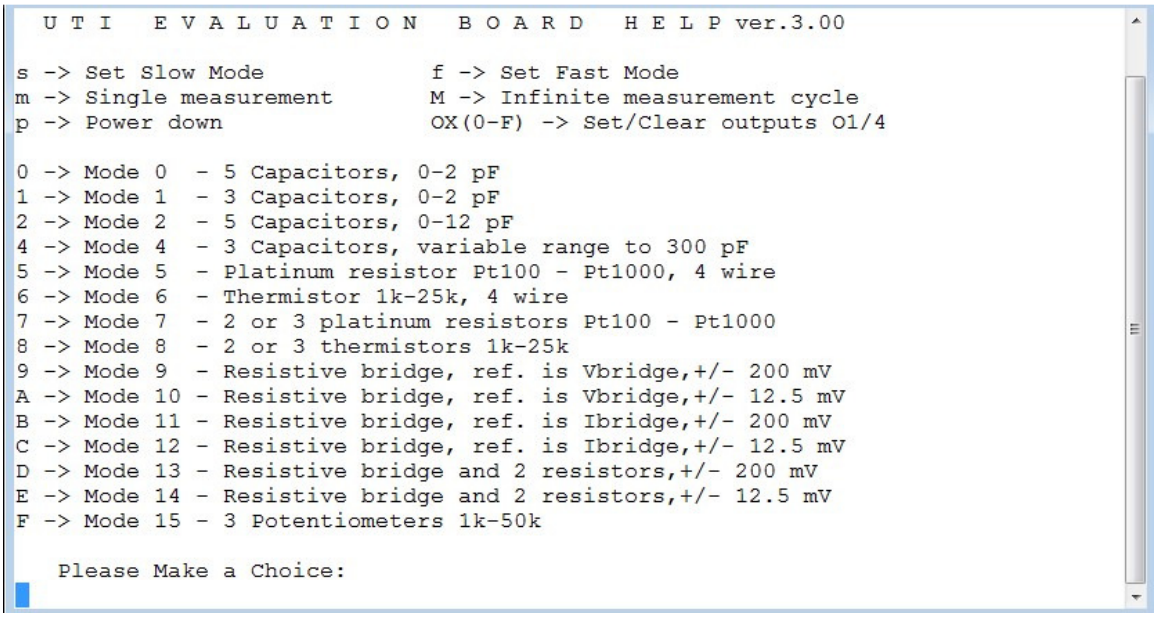
Quick start use with a terminal program under Windows

A terminal program (like **Hyper terminal, Putty**) under Windows can easily display the measurement results via the USB port of the PC. After installing the VCOM port (FTDI) and finding the appropriate COM-port using the Windows device manager the board can be used.

Once the communication between the microcontroller and the PC is established start with sending an @ sign to the board in order to set the correct communication speed.

By typing “H”, “h” or “?”, you can get on-line help. With this on-line help, it is easy to manage the evaluation board and to display the result. On the PC screen the built-in help function will be displayed.

In case something similar appears on your PC screen you can be sure the UTI board is connected in a correct way.



The functions of this help screen are evident. By typing 0-F the mode can be selected and by typing m the first measurement will come out of the board. The example below is mode 1 with single measurements. In order to do so we have connected two capacitors (between A-C and A-D)

```
  Please Make a Choice:

02BB65 05ABC1 048845

02BBC9 05AC42 0488E1

02BB86 05ABDE 048880

02BBDE 05AC0B 0488BE

02BB61 05ABD0 04883A
```

We typed in 1 (for the mode) and 5 times ‘m’ (Single measurement).

The displayed data is in Hex format and gives the three values as defined in the UTI datasheet (Cba, Cca and Cda). Calculation of the end result has to be done by converting these values to decimal first.

<p> Power down the board; sending p will stop all actions and the board has to be restarted by reconnecting the board

For software, including graphics and storing capabilities, please visit our engineering notes : http://notes.smartec-sensors.com

5. Ordering information

UTI toolkit USB mini	UTI evaluation kit with mini USB connection
UTI03 DIL	UTI in Dil 16-pins encapsulation
UTI03 SOIC	UTI in SOIC-18L encapsulation
UTI die	UTI as die

sales@smartec-sensors.com