MAXCO2 Evaluation kit for precise CO2 measurement

Description Downloads

Product information "MAXCO2 Evaluation kit for precise CO2 measurement"

The Trenz Electronic TEI0024-01 MAXCO$_2$ is a compact evaluation kit for precise CO$_2$ measurement of the ambient air in rooms and displays pre-defined CO$_2$ levels directly via 8 LEDs. MAXCO$_2$ is a combination of the well-known MAX1000 Intel FPGA board, where many tutorials are available, and the high-precision CO$_2$ measurement sensor SCD30 from Sensirion. The board is supplied via a standard micro-USB connector (e.g. mobile phone charger) and shows the current CO$_2$ concentration levels via the LEDs already after a few seconds.

CO$_2$-Levels indicated via LEDs:
<600ppm = LED 1, slow blinking
600-1000ppm= LED 1-2, slow blinking
1000-1400ppm = LED 1-4, slow blinking
1400-2000ppm= LED 1-4 und LED 5-8, toggle blinking
2000- ... ppm= LED 1-8 fast blinking

A Softcore uController is implemented in the Intel MAX10 FPGA of the MAX1000, which controls and reads out the SCD30 sensor. Every 2 seconds a measurement of the CO$_2$ concentration, the humidity and the temperature is provided. These three values in float format are transferred to the FPGA and converted into integer by the FPGA. The corresponding CO$_2$ level is identified and immediately displayed on the LEDs for the user to see. By connecting the MAXCO$_2$ to the PC via a USB cable, the three measured values (CO$_2$ concentration, humidity, temperature) can be displayed on a COM terminal window in real time on the screen. The values are sent via a UART to a USB bridge (FTDI FT2232) from the FPGA to the PC. Users can grab the data points, to store on the PC, to display in graphs or to send into cloud. All software source files are made available so that developers can easily make their own adjustments. In addition, no FPGA knowledge is required, since the Softcore uController used can be accessed via a standard IDE programming environment (e.g. Eclipse) and this can be modified or

debugging).

Since the precise CO_2 concentration measurement with the SCD30 does not allow an ultra-low power application, an FPGA can fully demonstrate its strengths here. With the implemented FPGA Softcore uController, individual interfaces can easily be added and make the Evalkit to a highly flexible user platform. Many adapter boards and own circuits can be connected via the Pmod connector and the unused I/O pins (see available Pmod modules with WIFI / BLE / Interface / Sensor /...). For example, a Pmod display can be used to show the sensor values without a PC and can act as a standalone measurement system powered via USB or battery pack. In principle, a much smaller FPGA in the single dollar area is possible, according the used resources for the code. In addition, FPGAs offer integrated float-to-integer HDL implementations, which simplify the conversion of the measured values, instead of doing this in the software.

The CO_2 sensor SCD30 from Sensirion delivers precise and long-term stable (measured) values, in air condition monitoring systems for humans. The accuracy of the CO_2 sensor is +/- (30ppm + 3% of the measured value) at typical ambient air environments of approx. 400ppm CO_2. The measuring principle of the SCD30 is based on the optical NDIR (Non Dispersive Infra-Red) method. In order not to influence the optical measuring section, movements, mechanical loads, impacts, direct sunlight, dust and airflows must be avoided. At the same time, however, normal air access to the sensor must be ensured. To achieve long-term stability and to maintain measurement accuracy, the intelligent auto-calibration feature of the SCD30 is used, which independently calibrates the sensor at regular intervals.

In order to achieve good measurement results, the DesignIn Guide from Sensirion should be observed.

Key Features

MAX1000 Board

- MAX10 Intel FPGA
  - 8kLE
  - ADC 8x12Bit
  - Internal Flash
- SDRAM 8MB
- Sensor: 3-Axis Acceleration
- 2 x Switch
- 8 x LED (for CO_2 level indication)
- Pmod connector
- Arduino MKR connector (partly used by SCD30)
- USB-Programmer2 (FPGA Programmer und Debugger)
- Small form factor: 61.5 mm x 25 mm

SCD30 – CO_2 Sensor module

- NDIR CO_2 sensor technology
- Integrated temperature and humidity sensor
- Best performance-to-price ratio
- Dual-channel detection for superior stability
- Accuracy CO_2 sensor: ± (30 ppm + 3%)
- Measurement Range: 0 - 40'000 ppm
- Auto calibration feature enabled

Development Support

Latest documentation, design support files and reference designs with source files are available for download free of charge.

Scope of Delivery

- 1 x TEI0001 MAX1000 Trenz Electronic FPGA module with Intel MAX 10 FPGA
- 1 x Sensirion SCD30 CO_2 Sensor module
- 1 x Pmod Connector

Additional Information

- Manufacturer's article number: TEI0024-01
- Trenz Electronic Wiki MAX1000
- Sensirion SCD30 Product Page
- Sensirion SCD30 Download Center
- Support Forum

All modules produced by Trenz Electronic are developed and manufactured in Germany.

Related links to "MAXCO2 Evaluation kit for precise CO2 measurement"

- Do you have any questions concerning this product?
- Further products by Trenz Electronic GmbH

Accessories 1 | Similar products

USB Cable, Type A to Type B micro, 1.8 Mtr.

In Stock: 14

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