OPERATION MANUAL

USB-I²C-adapter
for B+B Temperature-module with I²C-output

Description

Characteristic features

- Universal USB on I²C Adapter
- For all B+B Temperature modules with I²C-output
- Simple serial ASCII-protocol
- Operation possible over terminal

Areas of application

- Probe testing, product development
- Interface for own PC-based products
- Configuring I²C-Bus address
- Calibration of ASICs

Technical data

PC-USB adapter for I²C	
Interface	USB-interface, 1.1 and 2.0 compatible
Dimensions (B x H x T)	79 x 21 x 39 mm
Sensor connection	Over RJ11/RJ12 plug, 6-pin
Serial communication	19200 Baud, 8N1, ASCII protocol
Voltage source	Over USB-interface, 5 V DC
Operating current	max. 80 mA
CC-conformance	2014/30/EU
EMV-noise emission:	EN 61000-6-3:2011
EMV-noise withstanding	EN 61000-6-2:2007
Scope of supply	USB-I²C-adapter, consisting of adapter-cable, USB-adapter, USB-connection cable and software on Download-Center
Articleno.	USB-I2C-KAB

Description

In order to support the user for integration of own ASIC module with I²C-Interface, we have developed this easy to handle PC interface. The probe can be operated with a PC to test the functionality and capture the measured values of sensors.
In principle it is an USB on a I²C-converter, which is addressed by a simple ASCII sequence. The USB-driver software emulates a serial COMinterface.
The ASCII protocol of data communication is well documented. Hence, integration into own programs through standard communication routines of all the modern programming languages is possible.
The interface adapter is also suitable for accessing the ASIC, for example, to program another I²C address.
Further information on ASIC and programming can be obtained on request.

Attention

Please avoid extreme mechanical and inappropriate exposure.

The device/product is not suitable for potential explosive areas and medical-technical applications.

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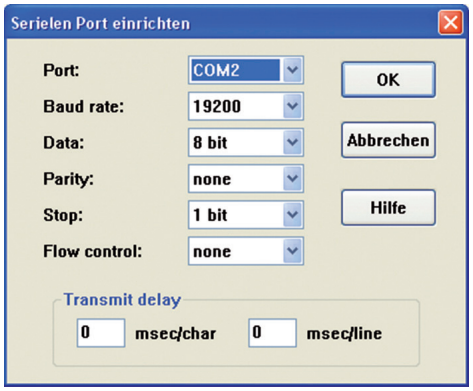
Connection layout of plug module

6-pole multi-pin connector		
1	VDD	Supply voltage 6...12 V
2	GND	Ground
3	SDA	Serial Data I²C
4	SCL	Serial Clock I²C
5	VRH/OWI	RH Voltage Output/OWI
6	---	Not used

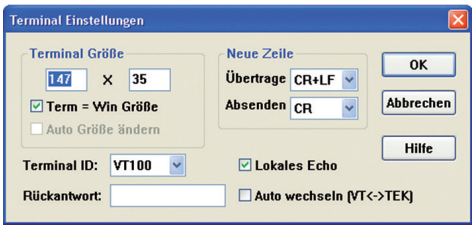
Quick start with ‚TERATERM'

TERATERM is an universal, efficient terminal program which you can find in the installationversion on the following link: https://www.heise.de/download/product/tera-term-51776 . Now install the terminal program TERATERM and start the program. Select the interface under „Serial port" where the device is connected and set the following communication parameters:

Then carry out the following settings under „Terminal settings":

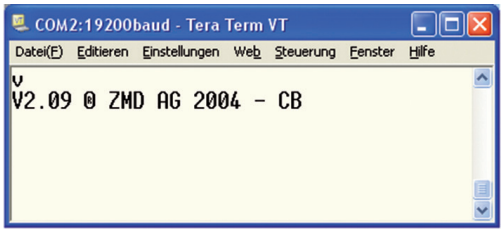


After this, the system should be operational.



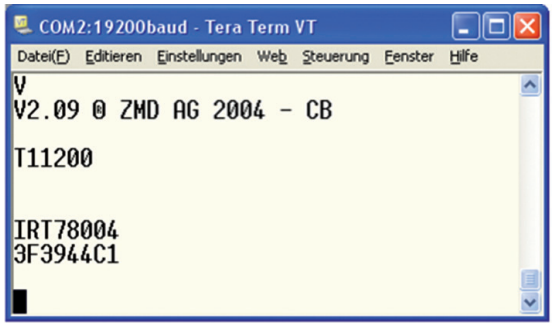
Reading the values

Note: <CR> means "pressing the carriage return key".
First test the connection with the hardware: For each character sent, the red LED on the USBAdapter shortly blinks. If the device answers a telegram, the green LED also blinks. First send the character V <CR>. In response, the USB adapter should reply back the version string:



As per the revision status of the software the contents can vary, if needed, but a response must come.
If you can not establish the connection here, then check the hardware in Windows control panel and also all other settings mentioned before.After the connection to the module is functional, first you must initialise the adapter:
T11200 <CR>
To start the reading, the operating voltage to the sensor must be switched on:
IRT78004 <CR>
After this command, the LED near the probe connection glows red and it shows that the operating voltage is present at the measuring probe.The sensor replies with 8 characters, in the example it is :3F3944C1. These are the first set of measured values.

Now, in order to fetch further measured values, every time you will have to



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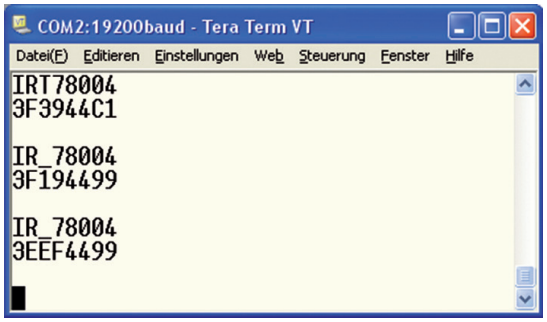
enter:
IR_78004 <CR>



Each time the USB-module replies with the current measured values.

Interpretation of values

The left four hex numbers are the first channel (e.g. humidity or pressure) and the following four hex numbers are the values of second channel, usually for the temperature of the module, if used.

Module	Channel 1	Channel 2
Humidity module	rel. humidity	un-calibrated
Feuchte- Humidity-Temp. module	rel. humidity	Temperature
PT1000 PT1000 Temp. module	PT1000 Temperature	un-calibrated
Thermoelemente Thermo element Temp. module	Thermovoltage	Temperature calibration point
Pressure module	Pressure	un-calibrated

Conversion of measured values

The following example refers to the **Humidity-Temperature module** and the transmitted string ‚3EEF4499 , in the answer:
The front four digits ‚3EEF' are the humidity value, the following digits ‚4499' are for the temperature value in hexadecimal format.
Now, first the **Humidity value** is converted from HEX to decimal (in example 16111) and then divided by 327,68 as per the data sheet. On
rounding the two post comma places, the humidity value in decimal format comes out as 49.17 % RH.
The **Temperature value** is also first converted into decimal (17561) and then divided by 256 as per data sheet and 32 is subtracted from the result.
After rounding off the two post comma places, it results in the temperature value of 36.60 °C.
With the other modules under consideration. One has to proceed in the same way as per data sheet.

Command overview for examples

The USB-adapter has a very extensive command set. Detailed description is available on the enclosed CD. The following explanations are only related to the commands used in the above examples:

‚V' Statement of version string
This command responds back with the version string of the controller Firmware.

‚T11200' Initialising
Definition of operating voltage and the time delay before the first communication. This command must be sent before the first I²C communication takes place. The last 3 digits are for the time delay after switching on the operating voltage and before the first reading of measured value.

‚IRT78004' I²C Read with on-timing
This command switches on the operating voltage, waits for the time delay as defined in the initialising sequence and then finishes reading over I²C at the address stated in the ASIC.
The first two digits (78) are the 7-bit I²C address of the ASIC. The following 3 digits (in example 004) determines the number of digits to be read.
The ASIC always responds to the address 78, however it can also be programmed at another address, so that it is possible to operate several ASICs at the same I²C-Bus.
The time delay enables the ASIC to carry out a measurement after feeding the operating voltage,
before the measured values are read out first time.
The operating voltage remains switched on even afterwards. Hence, the IRT command is required only for the first time to switch on the operating voltage.

‚IR_78004' I²C read
This command is identical to the previous one, however without switch on of the operating voltage and without time delay.
This I²C-read command is used for all further read operations in response.

For further information, visit our website:
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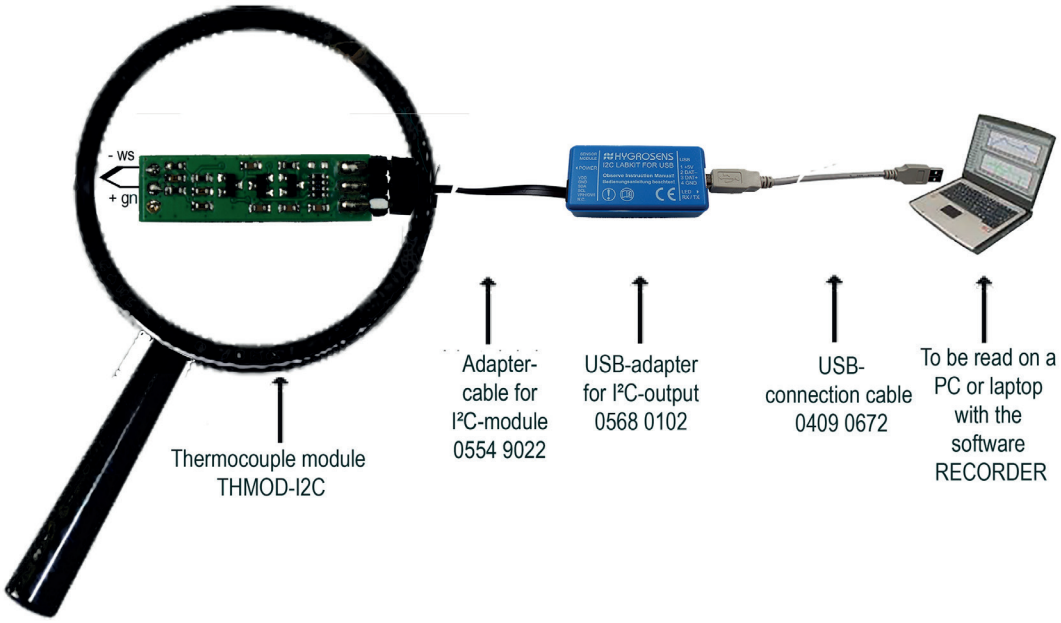
Accessories

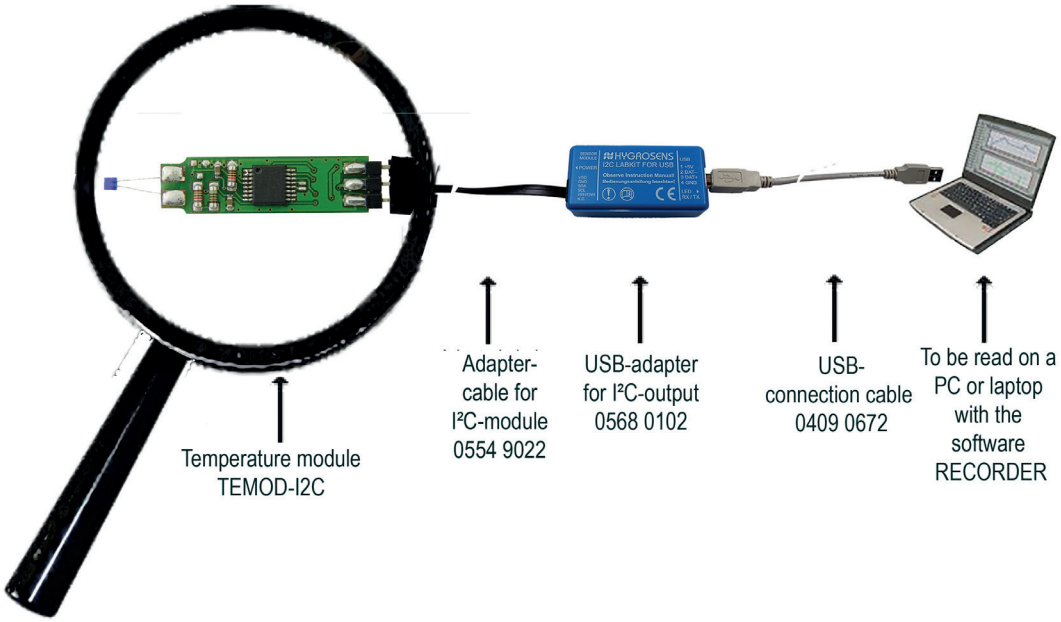
Temperature-module Thermocouple, Scope of delivery: Module + Thermocouple type K

Article	Article number
Measuring range -270...+300 °C	THMOD-I2C-300
Measuring range -270...+800 °C	THMOD-I2C-800
Measuring range -270...+1370 °C	THMOD-I2C-1370



Temperature-module Pt1000 with voltage output 0...5 V and I²C-bus

Article	Article number
Measuring range -32...+95,9961 °C	TEMOD-I2C-R1
Measuring range -32...+223,992 °C	TEMOD-I2C-R2
Measuring range -32...+479,984 °C	TEMOD-I2C-R3



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