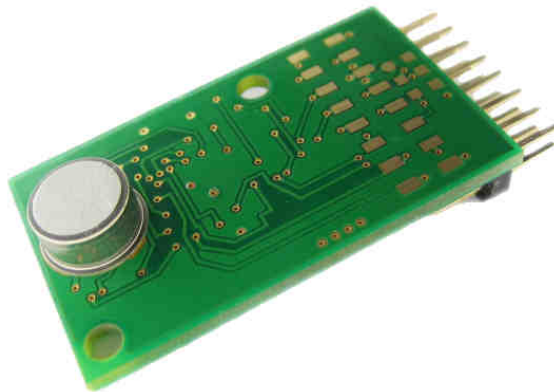

IAQ-2000

Engineering samples

This document describes the readout of the IAQ-2000 sensor stamp with I²C, RS232 TTL, analog and PWM interface.

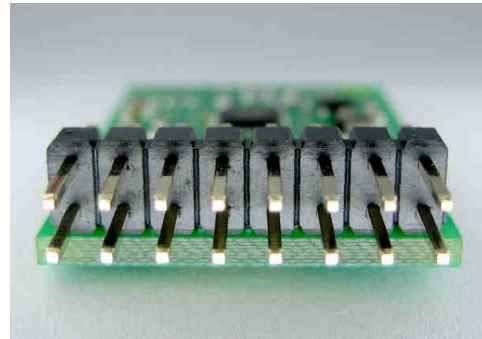
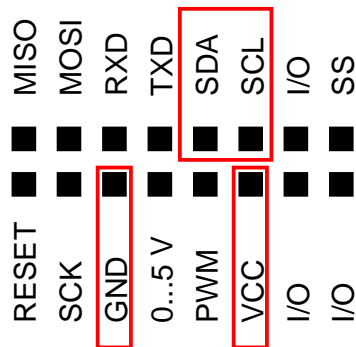
Chapter 1: I²C
Chapter 2: PWM
Chapter 3: RS232 TTL
Chapter 4: Analog output 0...5V



During the first 6 hours of continuous operation (burn-in) the module will display 350ppm, 2.5VDC, 50%PWM. The successful burn-in is saved to the EEPROM, the run-in time after restart is 15min.

1 I²C

Pin configuration:



VCC = 5VDC. The I²C-Bus, also called TWI-Bus (Two Wire Interface), allows reading the sensor prediction by I²C-master. The I²C functionality is optimized for a single-master system and can be implemented with the following parameters and addresses:

The address of the slave module is set to 90 + r/w-bit:

bit	ADDR 7	ADDR 6	ADDR 5	ADDR 4	ADDR 3	ADDR 2	ADDR 1	READ 0
ADDRESS	1	0	1	1	0	1	0	r/w

Clock rate: 100 kHz

Data formats and communication:

<START CONDITION>

Master:

bit	ADDR 8	ADDR 7	ADDR 6	ADDR 5	ADDR 4	ADDR 3	ADDR 2	READ 1	N/ACK 0
ADDRESS	X	X	X	X	X	X	X	1	1

Slave:

Bit	DATA1 8	DATA1 7	DATA1 6	DATA1 5	DATA1 4	DATA1 3	DATA1 2	DATA1 1	N/ACK 0
DATA1	X	X	X	X	X	X	X	X	1

Slave:

bit	DATA2 8	DATA2 7	DATA2 6	DATA2 5	DATA2 4	DATA2 3	DATA2 2	DATA2 1	N/ACK 0
DATA2	X	X	X	X	X	X	X	X	0

<STOP CONDITION>

<DATA1> + <DATA2> = module prediction

The module must be addressed by the master with the preset slave address. By sending the read command with acknowledge the master change to the receive state and the slave is initiated to send the first data-byte. This needs to be acknowledged by the master, the second data byte is not acknowledged. The CO₂ prediction is calculated by adding the two data bytes.

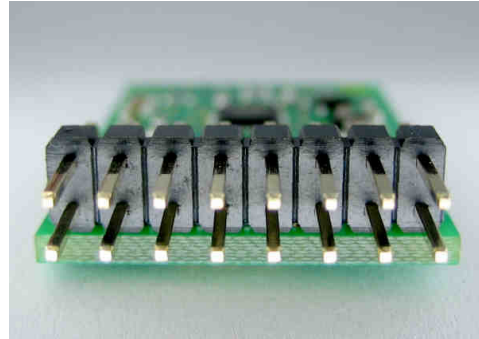
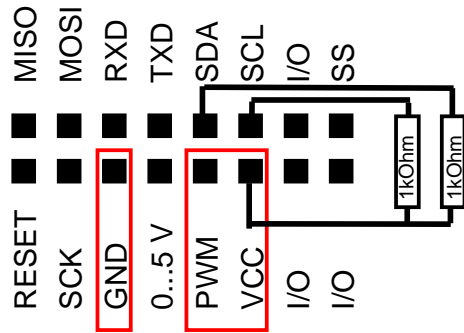
Example:

DATA1: 0000 0101 (05hex)

DATA2: 1101 1100 (DChex)

<DATA1> + <DATA2>: 0000 0101 1101 1100 = 1500

2 PWM

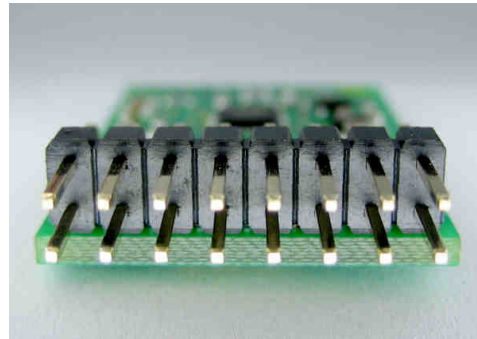
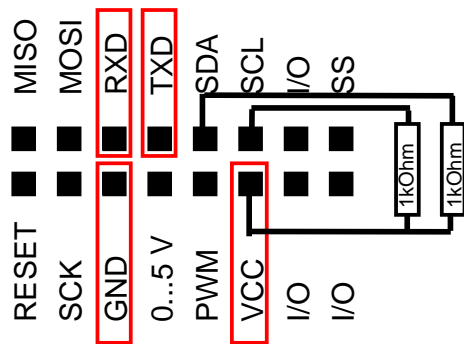


VCC = 5VDC.

Frequency 6.5kHz

Duty cycle 0...100% according to 350...2000ppm CO₂ prediction.

3 RS232 TTL

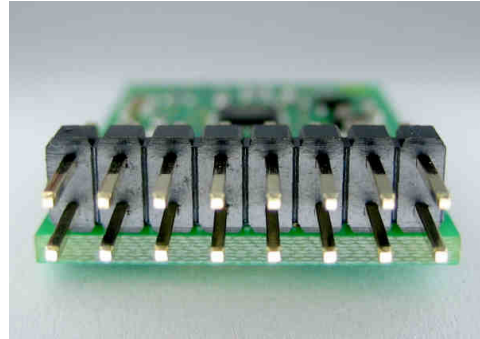
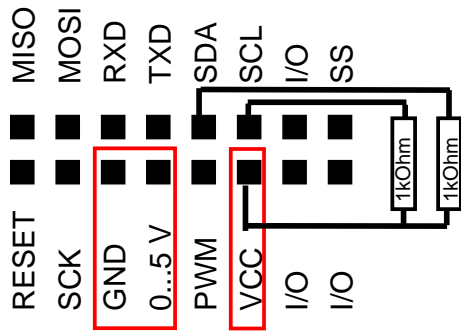


VCC = 5VDC.

COM Port settings: 9600, 8, N, 1

At start-up the module will send 7 header lines followed by data with an interval of 1s. First column is prediction of CO₂ equivalents [ppm], second column is sensor resistance [Ohm].

4 Analog output 0...5V



VCC = 5VDC. The analog output of the IAQ-2000 is specified for 0...5V corresponding to 350- 2000ppm CO₂ equivalents.