

The CADT OEM Pulse Oximetry Module SPO4025

A component of your technology



Our pulse oximetry OEM module SPO4025 is not only a new product in the market, but it is very innovative. A new approach sets new standards:

New preamplifier for photo signal

The 70 times larger dynamic range of the photo signal preamplifier guarantees an improved security and linearity of the measurement, even in the presence of strong ambient light.

New pattern recognition method for the plethysmogram.

We developed a new median method for the pattern recognition, which systematically excludes motion artefacts – without multiple nested search loops. This also reduces the necessary computing power, thus reducing also the power supply to the essential.

Extended measurements at 3 optical wavelengths

Besides the two wavelength measurement with a standard finger sensor the SPO4025 pulse oximeter supports measurements at three wavelengths using a special sensor, which contains two red LEDs with slightly different wavelengths. With that it is possible to determine the HbCO level of the arterial blood.

It offers on minimum space the performance of the big ones, with first-class price performance ratio.

This excellent price performance ratio opens new applications in the areas of home care and sports, where until now only the simplest oximeters were feasible. This results in a quality leap, since we implement full requirements of clinical application in an economical and affordable way.

Safe investment with firmware update support via serial interface

Production and engineering in Germany

We guarantee short links between production and client. This gives you advantages during project development, integration, for guarantee handling and - of course - in case of special features to be realised by us for you rapidly and without problems.

Client specific firmware possible

With its bidirectional serial interface it can execute complex data exchange protocols via that interface, e.g. for firmware upgrade.



New Modernism

TECHNICAL INFORMATION

Measurement range

- SpO₂ (functional) 0 – 100 %
- Pulse 30 – 240 bpm
- Perfusion 0,1 – 20 %

Accuracy

- SpO₂ (functional) 0.1 %
- Pulse 0.1 bpm
- Perfusion 0,1 %

Interfaces

9-pole connector for finger sensor

- Photo diode
- LEDs (IR, Red1, Red2)
- Coding resistor
- 2 ground cables
- +3 V output

9-pole connector for host system

- Power supply
- UART serial interface
- Analog output 0 – 1 V for saturation
- Pulse LED
- SPI interface for flash memory

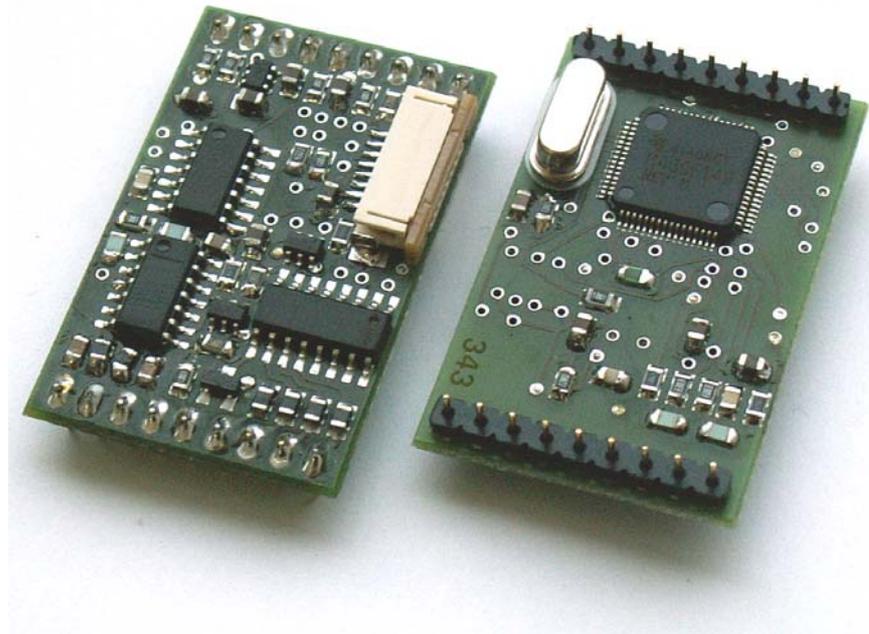
Power supply

3.0 – 3.3 V
10 mA maximum
7 mA typical

Temperature

from –40°C until 85°C

DIMENSION: only 25 x 40 mm



PRECISION

Linearity and production tolerances allow, depending on the sensor used, a **measurement accuracy** of 1% for the measurement of pulse oximetric R value, that means an accuracy for oxygen saturation of 1% between 70% and 100% saturation.

DESCRIPTION

The SPO4025 pulse oximeter works with 30 mW power supply at 3,0 - 3,3 V supply voltage, including LED drive. The module includes a voltage doubler and a 5 V linear regulator for the analog section. For easy monitoring applications with good perfusion and normal artefacts, power consumption reduces another 50 %.

The software calculates the saturation and the pulse. It repeats the calculation again every one or two seconds. Depending on amplitude and frequency of artefacts and the perfusion level the reaction time after drastic pulse and/or saturation changes is between 5 and 15 seconds.

The module is a four layer board realized with ground plane and has only quality semiconductors from Dallas Maxim Semiconductors, Linear Technology, Microchip und Texas Instruments for the industrial temperature range from –40°C bis 85°C. It doesn't have any tantal or electrolyte capacitors anymore.

It measures actual LED currents and controls LED currents and the gain factor of the photo amplifier. Under critical

signal-to-noise conditions (e.g. because of low perfusion) one can perform a low-noise measurement at high LED current and low amplification factor, while under normal conditions one would try to save on sensor and batteries. Through regulation of both circuits our SPO4025c module can operate different kinds of sensors, also the ones with rather low transfer ratio $I_{\text{photo}} / I_{\text{LED}}$.

The module with its bi-directional serial interface supports complex file protocols, e.g. for firmware upgrade through download over serial interface. This also concerns the adaption of sensor calibration curves through feeding in calibration files. The pulse oximeter automatically selects one of up to four calibration curves according to the measurement of a coding resistor built into the sensor.

The module can be produced such as to fit into the enclosure of the D-SUB connector of the sensor cable. Then the OEM module becomes part of the patient cable, increasing reliability and reducing costs.

ARTEFACT PROPERTIES

Artefact tests with the Biotec Index-2 simulator demonstrated that the algorithms employed for artefact suppression, are effective and conform to the up-to-date technology level. Of 16 important tests 12 are passed. Using our SPO4025c OEM module, it is possible to realize pulse oximeters, that are competitive with the market leaders (few wrong alarms).

An innovation of

CADT

Dipl.-Phys. D. Teuchert

Software and Systems

Rommelstr. 6

D-76571 Gaggenau

<http://www.cadt.de>