imec

embracing a better life

HEALTH PATCH

Imec's Health Patch is a smart chest patch that accurately measures ECG, respiration rate, respiration depth and motion, and that in a most stable and robust way. The patch consists of a disposable part and a reusable module with the electronics.

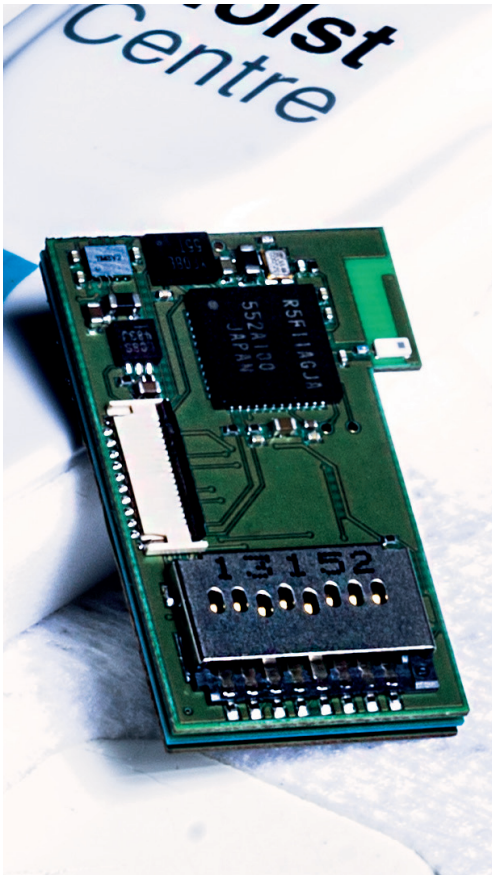
The adhesive, disposable patch is made of non-toxic, skin-friendly materials. It is based on a printed PET substrate with pre-gelled Ag/AgCl electrodes. The patch can be worn continuously and in full comfort for several days.

The pulmonary signals are captured by a 4-electrode bio-impedance measurement used in a tetrapolar configuration that captures changes in lung volume. It works independently from the ECG measurement and is much more accurate than ECG-derived respiration (EDR) measurements.

At the heart of the electronics module is imec's MUSEIC v1.1 chip, specifically designed to acquire biomedical signals. It captures both the ECG and bio-impedance signals with a medical-grade accuracy, while consuming very little electrical power. The data is stored in the device's internal memory and can be streamed in real-time to a host computer or Android device through Bluetooth Low Energy. The entire patch is battery-operated and has an autonomy of at least 10 hours.

This particular prototype is derived from imec's Health Patch platform and MUSEIC family of chips and can be extended beyond cardio-respiratory applications. The shape of the patch, the adhesives, electrodes and battery size can all be modified to suit the need of a particular application.

The Health Patch is a demonstrator that can be used for data collection in research and clinical environments. It is not a product and does not have certifications or testing to be marketed and sold to the public.



Health Patch, detail

KEY FEATURES

- ECG acquisition (sampled at 128 Hz)
- Bio-Impedance (current injection at 80 kHz, 100 µA, sampled at 16 Hz)
- Motion sensing (3-axis accelerometer, sampled at 32 Hz)
- Bluetooth-enabled (Bluetooth Low Energy)
- Storage of data in local memory and/or through wireless connection
- Rechargeable battery (can measure for 10 hours continuously on a single charge)
- Skin-friendly, stretchable patch
- Hypoallergenic materials

Health Patch

APPLICATION FIELDS

- General cardio-respiratory monitoring
- COPD monitoring
- Asthma monitoring
- Sleep analysis
- Relaxation therapy
- Caloric expenditure estimations

POTENTIAL USERS AND CUSTOMERS

- Original Equipment Manufacturers (OEM)
- Wearable technology device makers (smart bandages, smart patches)
- Healthcare providers (doctor's office, hospitals)
- Insurance companies
- Research professionals (data collection, clinical trials, algorithm development)

KEY BENEFITS

- Novel sensing modalities
- Quality data from subjects acquired in a convenient form factor
- Multi-parameter acquisition focused on cardio-respiratory diseases
- Easy to apply, suitable for home studies
- Adding functionality to existing wearables
- Adding functionality to existing applications and services
- Development of next-generation tools for health and lifestyle technologies

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