

## DISPOSABLE HEALTH PATCH

**Imec's Health Patch is a smart chest patch that accurately measures ECG, breathing rate and blood oxygen saturation. Want to build a health patch for reliable and continuous monitoring? Start from imec's clinical-grade prototype.**

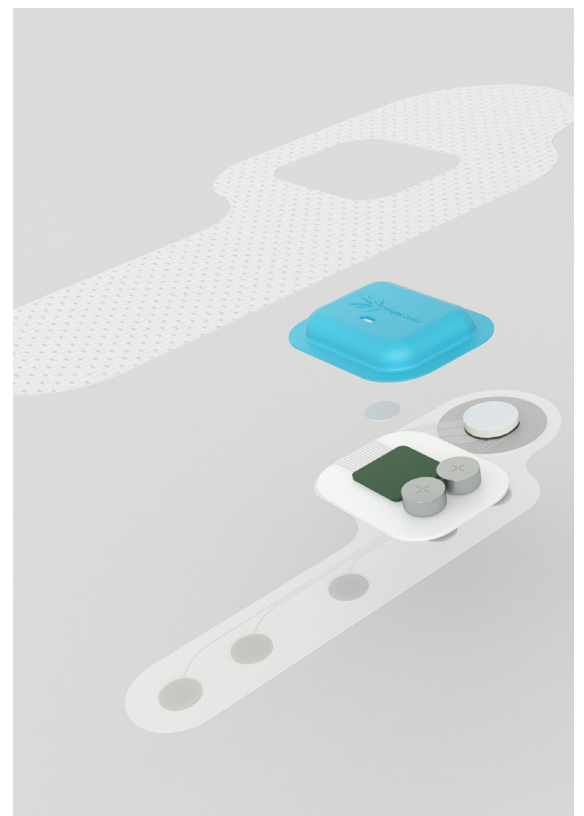
Continuous health monitoring has a promising future. It will enable us to find new diagnostic methods, improve therapies and reduce hospital readmissions. This patch makes it considerably easier: long-term monitoring needs a device that's versatile and reliable, user-friendly and low-cost. Imec has worked out a prototype that meets all these characteristics.

The disposable health patch is built around imec's MUSEIC v3: an all-in-one chip that measures all the vital health signs: heart-rate (derived from ECG), breathing rate (derived from Bio-Impedance) and blood oxygen saturation (derived from the photoplethysmogram).

The collected information is preprocessed on-chip. That significantly reduces the amount of data which is then transmitted to a mobile phone, base station or the cloud through the integrated Bluetooth LE radio connection. The transfer is fully secured by dedicated on-chip hardware for encryption and authentication.

Thanks to the use of printed electronics, dry electrodes and silicone-based skin adhesives, imec's health patch is comfortable to wear and doesn't irritate the skin. It's also fully disposable, because of its low-cost design and non-toxic battery.

This in combination with targeting 7+ days of continuous monitoring makes this health patch an ideal solution for ambulatory long-term monitoring. Think about the benefits for chronic patients or people recovering from surgery: they can be checked continuously at home without having to come to the hospital every day, making their lives easier and their treatments more effective.



Health Patch, exploded view

## KEY FEATURES

- ECG acquisition (sampled at 256 Hz)
- Bio-impedance (current injection at 80 kHz, 50  $\mu$ A, in-phase and quadrature component sampled at 256 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
- 2 Zinc-Air batteries, for 7 - 14 days of continuous acquisition
- Dry electrodes
- Skin friendly silicone adhesives
- Android app available for device control and real-time data visualization

## APPLICATION FIELDS

- General cardio-respiratory monitoring
- Advanced diagnostics
- Post surgical monitoring
- Sleep analysis

## POTENTIAL USERS AND CUSTOMERS

- Original Equipment Manufacturers (OEM)
- Wearable technology device makers (smart bandages, smart patches)
- Healthcare providers (doctor's office, hospitals)
- Insurance companies
- Contract research organizations (CRO) (Biomedical research, data collection, 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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