Q-BEAT 1-Lead ECG

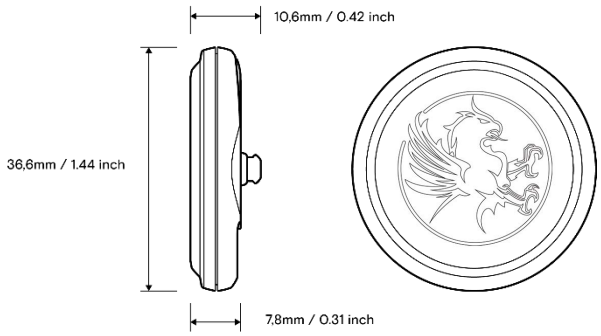
Q-Beat is a wireless, programmable, wearable sensor, used as an ECG and movement signal measurement device to provide data for medical applications and host devices for analysis. Q-Beat is capable of measuring and sending processed derivatives of the measurement data wirelessly via Bluetooth LE. Open APIs enable the development of unique on-device apps to tailor the sensor functionality to the exact needs of each specific use case.

- Clinical grade single channel ECG measurement
- Clinical grade motion measurement
- Direct access to unprocessed raw sensor data
- Full control over storing measured data
- Swim and shock proof construction, suitable for daily use and independent operation by patients
- User replaceable coin cell battery
- State of the art ultra-low power design
- Developed, designed, and manufactured in Finland in accordance with the ISO 13485 quality system
- Available with custom branding

TECHNICAL HIGHLIGHTS

- Single channel ECG, heart rate, R-R intervals, BLE heart rate service
- 9-axis motion sensing: accelerometer, gyroscope, magnetometer
- Data logging memory
- Bluetooth Low Energy radio
- Open API for integration with existing health applications and electronic health record systems
- Tools for developing custom applications that run on the sensor
- Software libraries for developing compatible mobile applications
- Wireless firmware update capability
- Size, weight, and operation optimized for wearability and user experience
- Can be operated by the end user - enables use in remote patient monitoring
- Certified as a Class IIa Medical Device according to the EU Medical Device Regulation

Technical Specifications (SW VERSIONS 1.9.5.1 AND 2.1.5)



DIMENSIONS

- 36.6mm/1.44” diam. x 10.6mm/0.42” thickness
- Weight 9.4g / 0.33oz with battery
- Water resistant to 30m/100ft

I / O

- Red led on the front, SW controllable
- Interface via studs, stud center-to-center distance: 27.0mm/1.06”

SENSORS

- Single channel ECG
  - Sampling frequency: 125/128/200/250/256/500/512Hz
  - Measurement bandwidth: 0.5Hz-40Hz as defined in IEC 60601-2-47
  - Dynamic range 60mVp-p, max offset: 500mV, resolution: 15 bits
  - Heart rate: 20BPM-240BPM, resolution: 1BPM, accuracy: ±1BPM
  - R-R intervals[1]: 250ms-3000ms, resolution: 1ms, timing accuracy: ±1ms
- Acceleration (16-bit output resolution)
  - Range: ±2/±4/±8/±16g, output unit: m/s^2, accuracy: ±2%
  - Sampling frequency: 12.5/26/52/104/208Hz
- Angular velocity/gyroscope (16-bit output resolution)
  - Range: ±125/±245/±500/±1000/±2000°/s, output unit: °/s, accuracy: ±2%
  - Sampling frequency: 12.5/26/52/104/208Hz
- Magnetic field
  - ±49 gauss, 1.5±10% mgauss /LSB, output unit: mgauss
- Non-medical, device internal temperature
  - Accuracy <±0.5°C, 0°C to +65°C

LOGGER MEMORY

- 3Mbit EEPROM

SOFTWARE

- SDK for developing apps for the sensor
- Sensors and peripherals controllable via API incl. Bluetooth advertising, power schemes
- Easy to use C++ Device API
- iOS and Android mobile libraries with wireless sensor firmware update capability, custom GATT for connecting with other operating systems
- GNU toolchain for embedded ARM

MCU

- Nordic Semiconductor nRF52832
- 32-bit ARM® Cortex®-M4
- 64kB on-chip RAM[2]
- 512kB on-chip FLASH[2]
- Bluetooth Low Energy radio

BATTERY

- CR 2025 Lithium coin cell battery (operating time: 7 days of continuous ECG measurement at 256Hz sample rate)

APPROVALS AND COMPLIANCES

- CE, FCC, IC, C-Tick, CMIIT
- REACH and RoHS
- Bluetooth Low Energy radio

PATENTS

US 13/071,624, US 13/832,049, US 13/832,598, US 13/917,668, US 13/397,872, USD 667,127, US 8,386,009, US 8,750,959, US 8,814,574, US 8,886,281, others pending

[1] Modified Pan-Tompkins algorithm used for R-peak detection, 1ms R-R resolution only available simultaneously with 125Hz ECG sampling rate. With other ECG sampling rates, R-R resolution is 8ms.

[2] Shared between the device OS and the custom user application

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