cardioBAN | biosignalsplux
Datasheet

SPECIFICATIONS

> **Communication:** Bluetooth Classic and Bluetooth Low Energy (BLE) (iOS only)
> **Range:** up to ~10m (in line of sight)
> **On-board Sensors:**
1x ECG; 1x Triaxial Accelerometer (±4g); 1x Triaxial Magnetometer (±1200μT)
> **ECG resolution:** 16-bit
> **ECG signal noise:** 3μV
> **ACC resolution:** 14-bit
> **MAG resolution:** 16-bit
> **Battery:** 155mA 3.7 LiPo rechargeable (enables up to 4h in continuous operation)
> **Micro-USB charging:** Isolated via operation mode.
> **Size:** 31x71x11mm
> **Weight:** 25g

Fig. 1. CardioBAN form factor.

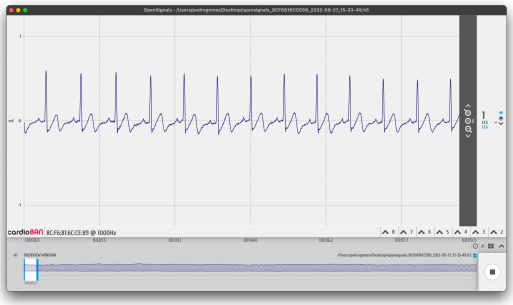

Fig. 2. Typical raw cardioBAN ECG data.

> Wearable for single-channel ECG & motion data acquisition
> Raw signal acquired with a selectable base frequency from 1Hz to 1000Hz [1]
> Miniaturized and bendable form factor for better adaption to the body shape

> Heart Rate extraction & heart rate variability
> Life sciences studies
> Biomedical research
> Human-Computer Interaction
> Robotics & Cybernetics
> Physiology studies
> Psychophysiology
> Biomechanics
> Ergonomics

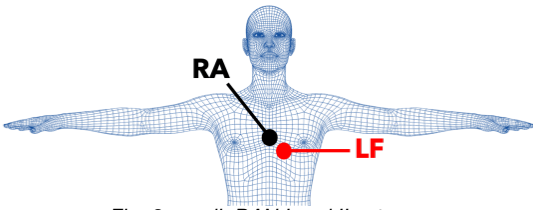

Fig. 3. cardioBAN Lead II setup.

GENERAL DESCRIPTION

This wearable device measures Electrocardiography (ECG) and motion data, enabling a wide array of biomedical research, sport and physioteraphy applications.

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REV A

APPLICATION NOTES

A detailed Getting Started guide covering everything needed around the cardioBAN is available on our support page:

https://support.pluxbiosignals.com/knowledge-base/cardioban-getting-started/

The cardioBAN can be used with ECG electrodes and with a gel-free chest band.

Note that while most ECG electrodes are compatible with this device, the small surface area of traditional electrodes might not be sufficient to hold the cardioBAN in place during prolonged acquisitions.

We recommend the use of our cardioBAN electrodes as their bigger surface ensures a better and longer wear of the wearable:

https://www.pluxbiosignals.com/products/cardioban-electrodes-pack-of-25

TRANSFER FUNCTION

The ECG input voltage range = [-1.14mV, 1.14mV]

$$V_{ECG}[V] = \frac{V_{REF}(ADC - 2^{n-1})}{2^n \times Gain}$$

$$V_{ECG}[mV] = V_{ECG}[V] * 1000$$

Where:
V_{REF} - ADC voltage reference, 2.5[V]
$Gain$ - Analogue voltage gain, 1100
$V_{ECG}[V]$ – Raw ECG value in Volt [V]
$V_{ECG}[mV]$ – Raw ECG value in millivolt [mV]
ADC – Value sampled from the channel
n - ADC number of bits, 16 bit

ACCELEROMETER TRANSFER FUNCTION

[-4G, 4G]

$$Acc(g) = \left(ADC - \frac{2^n}{2}\right).\left(\frac{8}{2^n}\right)$$

$Acc(g)$ – Accelerometer value in g
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

[1] The number of bits for each channel depends on the resolution of the Analog-to-Digital Converter (ADC); in cardioBAN the default is 16-bit resolution (n=16)

MAGNETOMETER TRANSFER FUNCTION

[-1200μT, 1200μT]

$$Mag(\mu T) = \left(ADC - \frac{2^n}{2}\right).0{,}1$$

$Mag(\mu T)$ – Magnetometer value in microTesla (μT)
ADC – Value sampled from the channel
n – Number of bits of the channel[3]

ELECTRODE SETUP

LED COLOR CODE

STANDBY

Bat LED state	System LED State	Device State	Battery	Charging	Switch	On-body
OFF	OFF	OFF	-	No	OFF	-
OFF	OFF	OFF	Discharged	No	ON	-
OFF	GREEN blink[2]	Standby	Good	No	ON	-
OFF	RED blink[1]	Standby	Low bat	No	ON	-

REAL-TIME STREAMING

Bat LED State	System LED State	Device State	Battery	Charging	Switch	On-body
OFF	GREEN fast blink[3]	Streaming	Good	No	ON	Yes
OFF	RED fast blink[2]	Streaming	Low bat	No	ON	Yes
OFF	ORANGE steady	Streaming	-	No	ON	No

CHARGING

Bat LED State	System LED State	Device State	Battery	Charging	Switch	On-body
GREEN and RED (steady)	OFF	OFF	Charging	Yes	OFF/ON	-
GREEN steady)	OFF	OFF	Fully charged	Yes	OFF/ON	-

PHYSICAL CHARACTERISTICS

> **W x L x H:** 31x71x11mm
> **S:** Red.

[2] One blink per second
[3] Two blinks per second

ORDERING GUIDE

Reference	Package Description
820202415	**cardioBAN Kit** cardioBAN is the ideal wireless wearable for reliable short-term acquisitions of raw ECG and motion data. Its small and lightweight form factor allows a comfortable and discrete application of the wearable in any in- or out-of-the-lab research application. Webstore: https://www.pluxbiosignals.com/products/cardioban