Electrocardiography (ECG) Sensor Data Sheet

ECG 26012018

SPECIFICATIONS

> **Gain:** 1000
> **Range:** ±1.5mV (with VCC = 3V)
> **Bandwidth:** 0.5-100Hz
> **Consumption:** ~1mA
> **Input Impedance:** >100GOhm
> **CMRR:** 100dB

FEATURES

> Bipolar differential measurement
> Pre-conditioned analog output
> High signal-to-noise ratio
> Shielded miniaturized cables
> Medical-grade raw data output
> Ready-to-use form factor

APPLICATIONS

> Life sciences studies
> Heart rate & heart rate variability
> Human-Computer Interaction
> Biometrics
> Affective computing
> Physiology studies
> Psychophysiology
> Biofeedback
> Biomedical devices prototyping

GENERAL DESCRIPTION

Electrocardiography (ECG) records electrical activity of the heart over time. Variations in the duration, amplitude, and morphology of the ECG waves are used for diagnosing abnormal cardiac rhythms and conduction patterns. Our low-noise ECG local differential triode configuration enables fast application and unobtrusive data acquisition (although custom electrode cable configurations are available). The state-of-the-art design of the analog frontend on this sensor is specifically targeted at analyzing minutiae in the data. Together with the Heart Rate Variability (HRV) plugin on our OpenSignals software, one can easily record and extract meaningful information from the collected data. Examples:
http://bit.ly/1ddQnsv
http://bit.ly/1JEW2lk

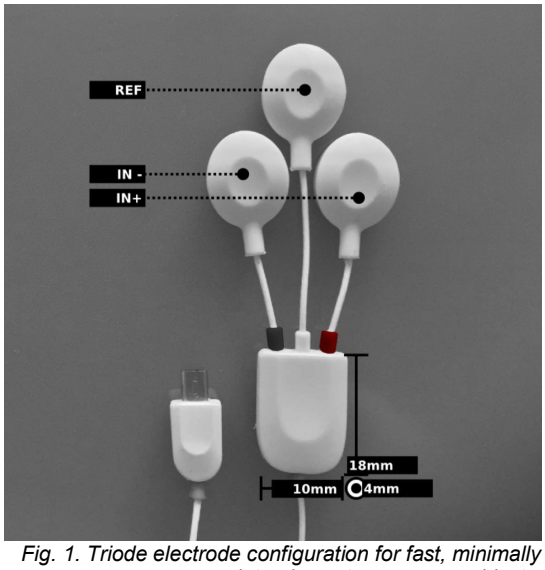

Fig. 1. Triode electrode configuration for fast, minimally intrusive setup on your subjects.

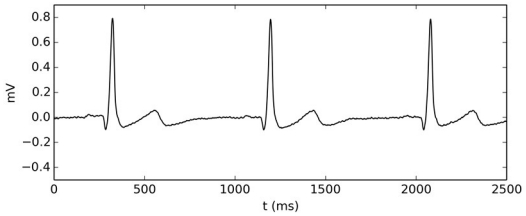

Fig. 2. Typical raw ECG data (acquired with biosignals).

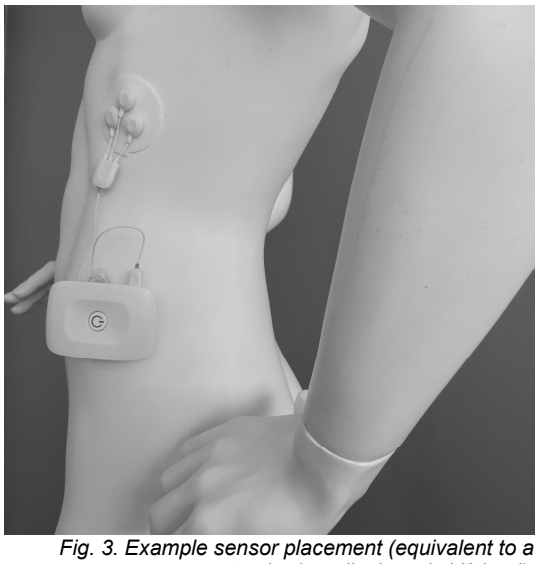

Fig. 3. Example sensor placement (equivalent to a standard medical-grade V6 lead).

biosignalsplux
wearable body sensing platform

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REV A

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TRANSFER FUNCTION

[-1.5mV, 1.5mV]

$$ECG(V) = \frac{\left(\frac{ADC}{2^n} - \frac{1}{2}\right).VCC}{G_{ECG}}$$

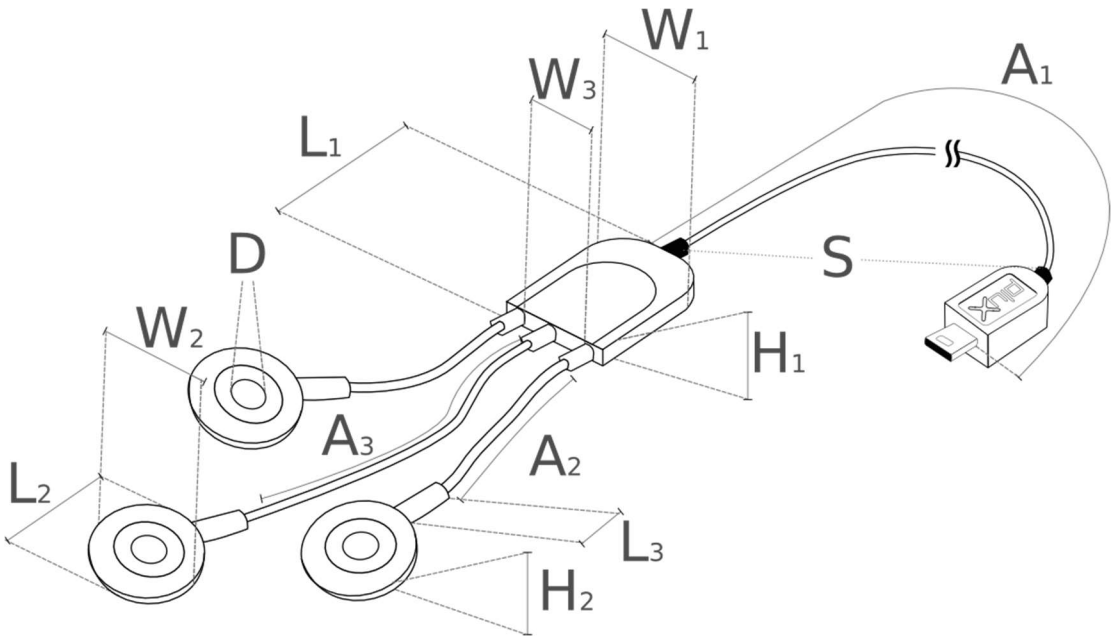
$$ECG(mV) = ECG(V).1000$$

$VCC = 3V$ (operating voltage)
$G_{ECG} = 1000$ (sensor gain)

$ECG(V)$ – ECG value in Volt (V)
$ECG(mV)$ – ECG value in millivolt (mV)
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

PHYSICAL CHARACTERISTICS

> **W1 x L1 x H1:** 1.0x1.8x0.4cm
> **W2 x L2 x H2:** 1.5x2.3x0.4cm
> **A1:** 105.0±0.5cm
> **A2:** 1.5±0.5cm
> **A3:** 3.0±0.5cm
> **D:** 0.4cm
> **S:** White, Black, Blue, Green, Red, Yellow, Gray, or Brown



[1] The number of bits for each channel depends on the resolution of the Analog-to-Digital Converter (ADC); in biosignalsplux the default is 16-bit resolution ($n = 16$), although 12-bit ($n = 12$) and 8-bit ($n = 8$) may also be found.

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ORDERING GUIDE

Reference	Package Description
ECG1	Electrocardiography (ECG) sensor with standard physical characteristics and a random cable sleeve color
ECG1-A1-A2-A3-S	Electrocardiography (ECG) sensor built with custom lengths A1, A2 and/or A3 (all in cm), and custom sleeve color S; for standard physical characteristics in A1, A2, A3, or S use 0. Examples: > ECG1-200-0-0-0: Otherwise all-standard ECG sensor except for a 200cm cable A1 > ECG1-0-0-0-Yellow: Otherwise all-standard ECG sensor except for a yellow cable sleeve > ECG1-50-10-10-Red: Fully custom ECG sensor with a 50cm cable A1, 10cm electrode cables A2 & A3, and a red cable sleeve