Electrocardiography (ECG) Sensor Datasheet

ECG 10082020

SPECIFICATIONS

> **Gain:** 1019
> **Range:** ±1.47mV (with VCC=3V)
> **Bandwidth:** 25-100Hz
> **Input Impedance:** >100GOhm
> **CMRR:** 100dB
> **Cable Length:** 100±0.5cm (customizable)
> **Connector Type:** UC-E6 (Male)

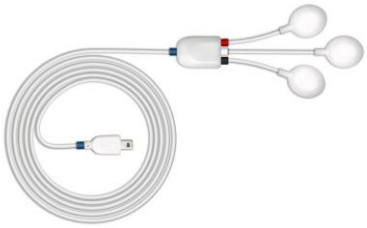


Fig. 1. Standard biosignalsplux ECG sensor with short electrode cables (4cm + 6cm + 4cm).

FEATURES

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

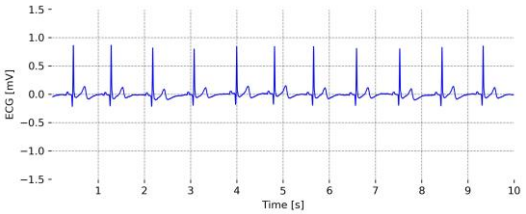


Fig. 2. Typical raw ECG data (acquired with biosignals).

APPLICATIONS

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

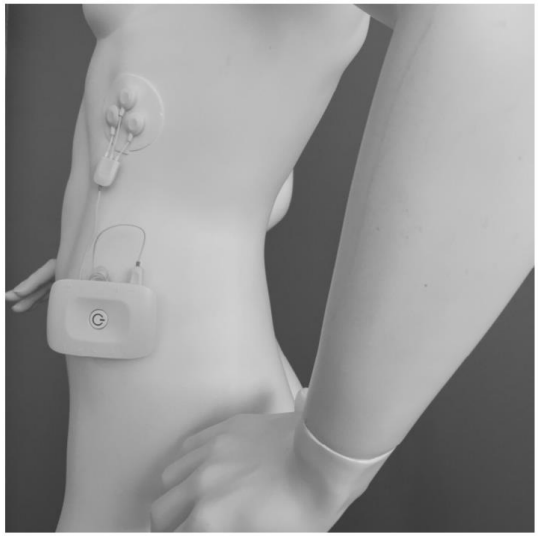


Fig. 3. Example sensor placement using an ECG triod (equivalent to a standard medical-grade V6 lead).

GENERAL DESCRIPTION

Our low-noise ECG local differential triode configuration enables fast application and unobtrusive single-lead ECG 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 and provides medical-grade raw sensor data.

This sensor can be used to extract heart rate data and other ECG features, enabling its application in research fields such as biomedical, biofeedback, psychophysiology, and sports, among many others.

PLUX – Wireless Biosignals, S.A.
Av. 5 de Outubro, n. 70 – 2.
1050-059 Lisbon, Portugal
plux@plux.info
http://biosignalsplux.com/

REV C

TRANSFER FUNCTION

[-1.47mV, +1.47mV]

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

$$ECG(mV) = ECG(V) \times 1000$$

$VCC = 3V$ (operating voltage)
$G_{\mathrm{ECG}} = 1019$ (sensor gain)

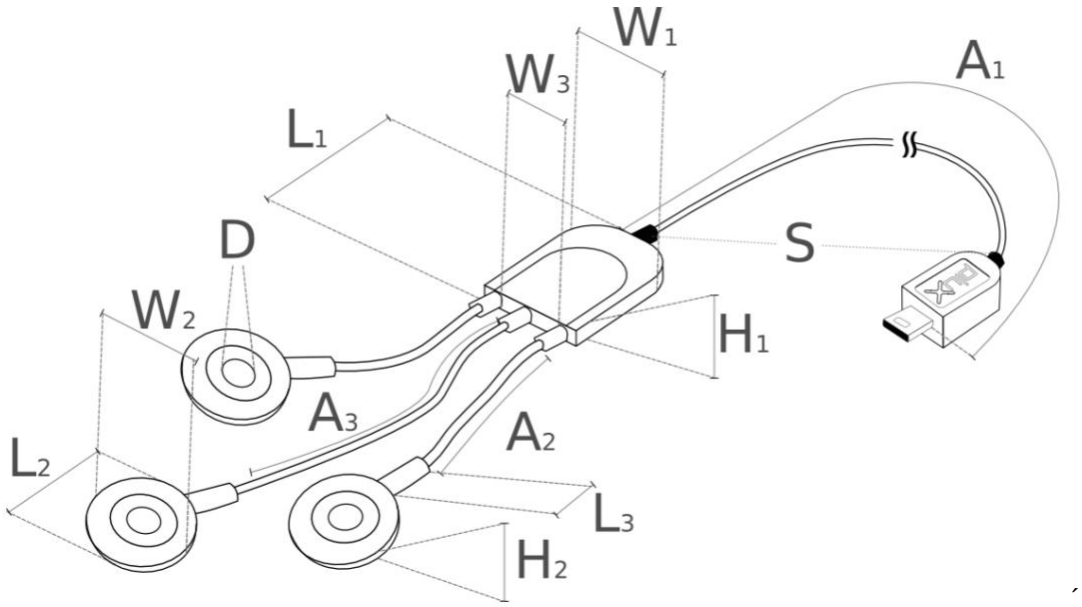
$ECG(V)$ – ECG value in Volt (V)
$ECG(mV)$ – ECG value in millivolt (mV)
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

ELECTRODE CONNECTIONS

Sleeve Color	Red	Black	White
Electrode Cable	+	-	Reference

PHYSICAL CHARACTERISTICS

> W1 x L1 x H1: 1.5 x 2.1 x 0.4cm
> W2 x L2 x H2: 1.4 x 1.7 x 0.5cm
> A1: 105±0.5cm
> A2: 4±0.5cm
> A3: 6±0.5cm
> D: 0.4cm
> Weight: 9g
> Available Sleeve Colors: White, Black, Blue, Green, Red, Yellow, Gray, and Brown



Note: *This sensor is also available with the electrodes cables (A2 & A3) in 30cm lengths.*

[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 on older devices.

ORDERING GUIDE

Reference	Package Description
SENSPRO-ECG1	Electrocardiography (ECG) sensor with standard physical characteristics and a random cable sleeve color

Electrocardiography ECG (3 x 30 cm)
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-useform 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 usedfor diagnosing abnormal cardiac rhythms and conduction patterns. Our low-noise ECG local differentialtriodeconfiguration enablesfast application and unobtrusive data acquisition(although customelectrode 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

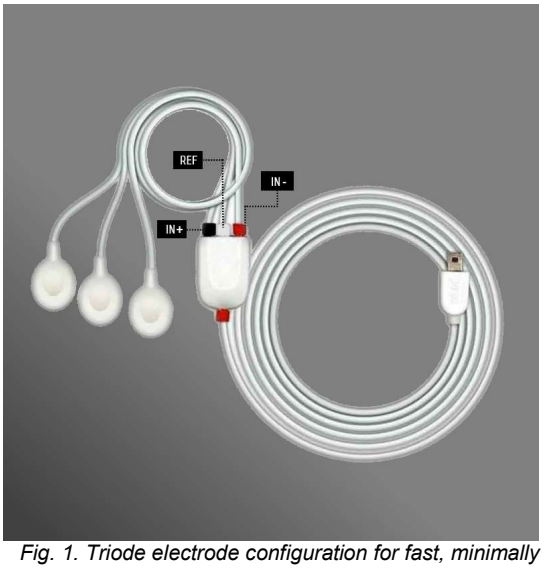


Fig. 1. Triode electrode configuration for fast, minimally intrusive setup on your subjects.

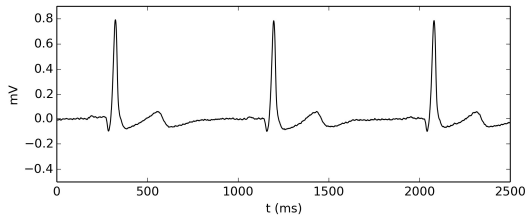


Fig. 2. Typical raw ECG data (acquired with biosignals).

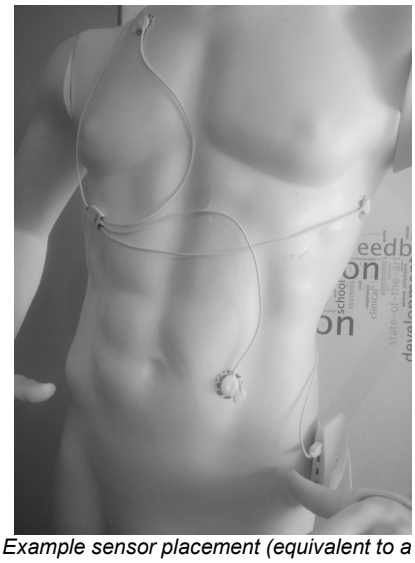


Fig. 3. Example sensor placement (equivalent to a standard medical-grade lead I).

PLUX – Wireless Biosignals, S.A.
Av. 5 de Outubro, n. 70 – 8.
1050-059 Lisbon, Portugal
plux@plux.info
http://biosignalsplux.com/

Electrocardiography ECG (3 x 30 cm)
Sensor Data Sheet

TRANSFER FUNCTION

[-1.5mV, 1.5mV]

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

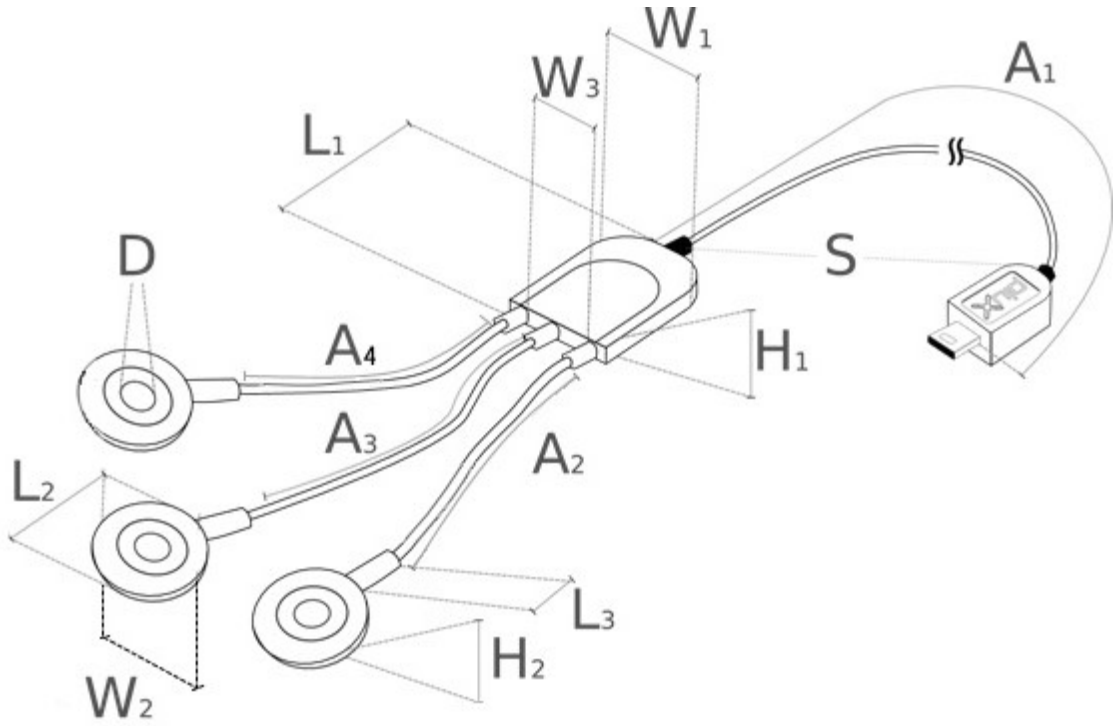
$$ECG(mV) = ECG(V) \times 1000$$

$VCC = 3V$(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:**100.0±0.5cm
>**A2:**30.0±0.5cm
>**A3:**30.0±0.5cm
>**A4:**30.0±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.

Electrocardiography ECG (3 x 30 cm)
Sensor Data Sheet

ORDERING GUIDE

Reference	Package Description
SENSPRO-ECG1	Electrocardiography (ECG) sensor with standard physical characteristics and a random cable sleeve color.
SENSPROECG1-100-30-30-S	Electrocardiography (ECG) sensor built with electrode cables of 30cm (A2 & A3 in illustration above) and custom sleeve color.
SENSPROECG1-A1-A2-A3-S	Electrocardiography (ECG) sensor built with custom lengths for A1, A2, and 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