Electroencephalography (EEG) Sensor Data Sheet

EEG 26012018

SPECIFICATIONS

> **Gain:** 40000
> **Range:** ±37.5µV (with VCC = 3V)
> **Bandwidth:** 0.8-49Hz
> **Consumption:** ~3mA
> **Input Impedance:** >100GOhm
> **CMRR:** 100dB

FEATURES

> Single-channel differential sensor
> Discrete elastic head band
> Pre-conditioned analog output
> High signal-to-noise ratio
> Shielded miniaturized cables
> Medical-grade raw data output
> Ready-to-use form factor

APPLICATIONS

> Evoked potentials analysis
> Neurofeedback
> Sleep studies
> Human-Computer Interaction
> Neurophysiology studies
> Psychophysiology

GENERAL DESCRIPTION

Our electroencephalography (EEG) sensor has been especially designed for both classic and localized EEG measurement. When a cap is too intrusive, only a limited number of channels are needed, or you'd like to synchronously record EEG and non-EEG biosignals, this is the perfect solution. The bipolar configuration, with two measurement electrodes detects the electrical potentials in the specific scalp region with respect to a reference electrode, which should be placed in a region of low muscular activity. The resulting signal is the amplified difference between these two signals, eliminating the common unwanted signals detected by the surfaces. Its convenient form factor enables a discrete placement in regions such as the forehead, occipital, and others. Examples:
http://bit.ly/1E7VenV
http://bit.ly/1PEskAZ

Fig. 1. The sensor is provided with a convenient elastic head band to help secure the electrodes in place.

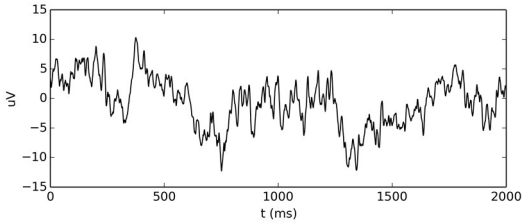

Fig. 2. Typical raw EEG data (acquired with biosignals).

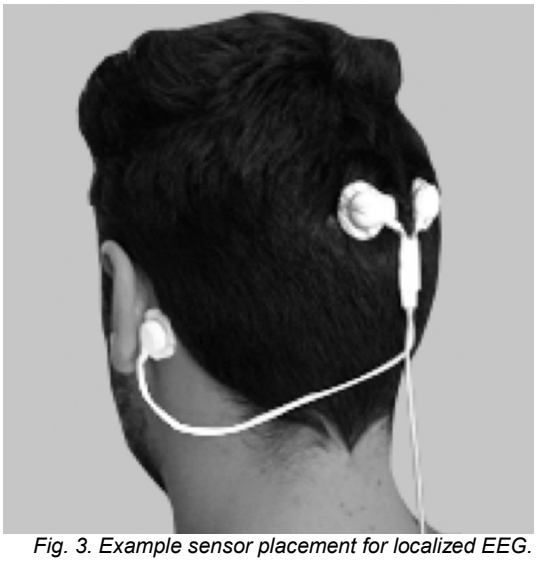

Fig. 3. Example sensor placement for localized EEG.

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REV A

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PLACEMENT RECOMMENDATIONS

reference electrode placement

sensor electrodes must be 1cm-3cm apart

place the sensor on the electrodes

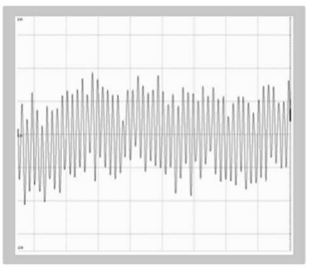
place the elastic band covering the snaps

USAGE RECOMMENDATIONS

with noise influence

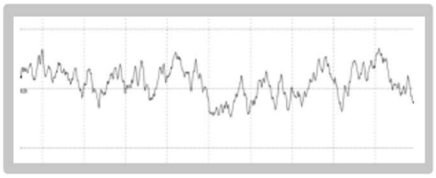
EEG signal acquisition must be performed in a low electromagnetic noise environment.

A room without power supplies and with the lights off is on appropriate environment to perform the signal acquisitions.

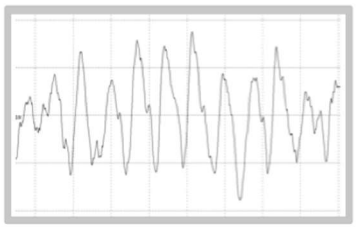


signal acquired in a noisy environment

our results in a noise controled room:



eyes open



eyes closed

noise input

The electromagnetic noise enters through the snaps and the cable wich connects the sensor to the snaps.

This is a result of not using shielding structures.

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TRANSFER FUNCTION

[-37.5μV, 37.5μV]

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

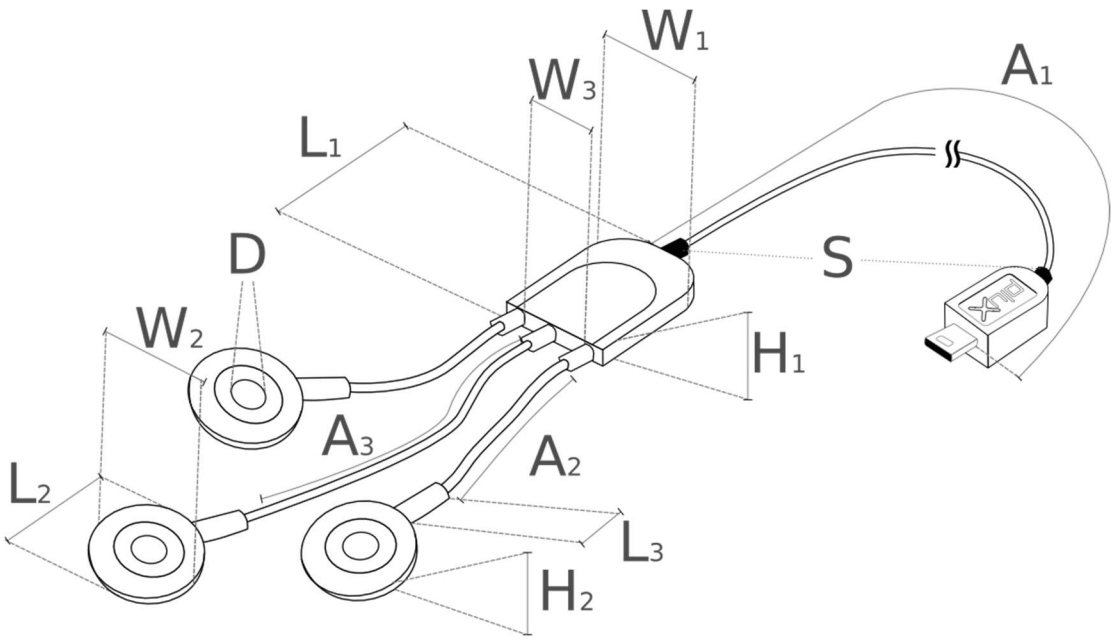
$$EEG(\mu V) = EEG(V).1 \times 10^6$$

$VCC = 3V$ (operating voltage)
$G_{EEG} = 40000$ (sensor gain)

$EEG(V)$ – EEG value in Volt (V)
$EEG(\mu V)$ – EEG value in microvolt (μV)
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:** 2.5±0.5cm
> **A3:** 10.0±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
EEG1	Electroencephalography (EEG) sensor with standard physical characteristics and a random cable sleeve color
EEG1-A1-A2-A3-S	Electroencephalography (EEG) 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: > EEG1-200-0-0-0: Otherwise all-standard EEG sensor except for a 200cm cable A1 > EEG1-0-0-0-Yellow: Otherwise all-standard EEG sensor except for a yellow cable sleeve > EEG1-50-10-10-Red: Fully custom EEG sensor with a 50cm cable A1, 10cm electrode cables A2 & A3, and a red cable sleeve