Accelerometer (ACC)
Sensor Data Sheet

ACC 011020

SPECIFICATIONS

> **Range:** ±3g
> **Bandwidth:** 0-50Hz
> **Consumption:** ~0.35mA
> **Input Voltage Range:** 1.8-3.6V
> **Low power:** 300µA (typical)
> **Shock survival:** 10,000g

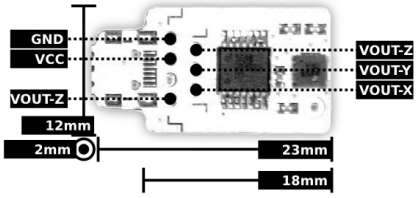

Fig. 1. Pin-out and physical dimensions.

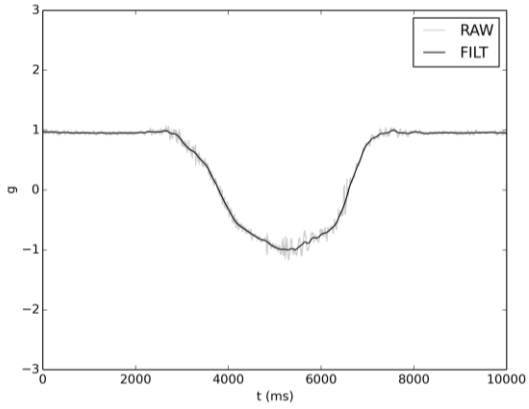

Fig. 2. Raw and filtered ACC data (acquired with BITalino (r)evolution) for a full rotation around the Z-axis.

FEATURES

> 3-axis sensing
> MEMS technology
> Pre-conditioned analog output
> Small form factor
> Raw data output
> Easy-to-use

APPLICATIONS

> Activity monitoring
> Tilt detection
> Vibration measurement
> Human-Computer Interaction
> Robotics & Cybernetics
> Biomechanics
> Biomedical devices prototyping

GENERAL DESCRIPTION

Motion produces accelerations that can be translated into numerical values. Our Accelerometer (ACC) has a limited bandwidth, especially designed to acquire data from kinematic and biomechanical events. The analog output of each axis can be accessed individually, extending its potential use. Typical applications include posture detection, range of motion estimation, step counting, actigraphy, fall detection, vibration analysis, and shock detection. By default only the Z-axis is connected, however the sensor has 3 axis, and the user can choose to connect the X- and Y-axis as well, by following a procedure similar to the one found in:
https://www.youtube.com/watch?v=RaJQ3hcdJqUh
https://www.youtube.com/watch?v=rh8y_NsVLI4h

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REV B

BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD

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TRANSFER FUNCTION

[-3g, 3g]

$$ACC(g) = \frac{ADC - C_{min}}{C_{max} - C_{min}} \times 2 - 1$$

$ACC(g)$ – ACC value in g-force (g)
ADC – Value sampled from the channel
C_{min} – Minimum calibration value[1]
C_{max} – Maximum calibration value[1]

ORDERING GUIDE

Part #	Description
SENS-ACC-NC	Accelerometer (ACC) without connectors
SENS-ACC-UCE6	Accelerometer (ACC) with UC-E6 socket for seamless plug & play connection to a BITalino (r)evolution Plugged or Core
SENS-ACC-SHER4	Accelerometer (ACC) with a Molex Sherlock 4-pin socket for easy power and signal cable connection or pin breakout using PCB wires

[1] Calibration values are determined by performing a very slow 360º rotation of the sensor board to force the accelerometer to cross the gravity-imposed $-1g$ and $1g$ in each axis. It is recommended that filtering or averaging of the data is performed to remove natural tremors (e.g. shaky hands) as illustrated in Fig. 2.