Accelerometer (ACC)
Sensor Data Sheet

SPECIFICATIONS
> Range: ±3g
> Bandwidth: 0-50Hz
> Consumption: ~0.35mA
> Input Voltage Range: 1.8-3.6V

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=RaJQ3hcdJqU
https://www.youtube.com/watch?v=rh8y_NsVL4h

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.

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BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD
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**TRANSFER FUNCTION**  
\([-3g, 3g]\)

\[ACC(g) = \frac{ADC - C_{\text{min}}}{C_{\text{max}} - C_{\text{min}}} \cdot 2 - 1\]

*ACC*(\(g\)) – ACC value in g-force (\(g\))  
*ADC* – Value sampled from the channel  
\(C_{\text{min}}\) – Minimum calibration value\(^1\)  
\(C_{\text{max}}\) – Maximum calibration value\(^1\)

**ORDERING GUIDE**

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

\(^1\) 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.