Data Sheet

# BHI160 / BHI160B

## Ultra low-power sensor hub incl. integrated IMU

Bosch Sensortec

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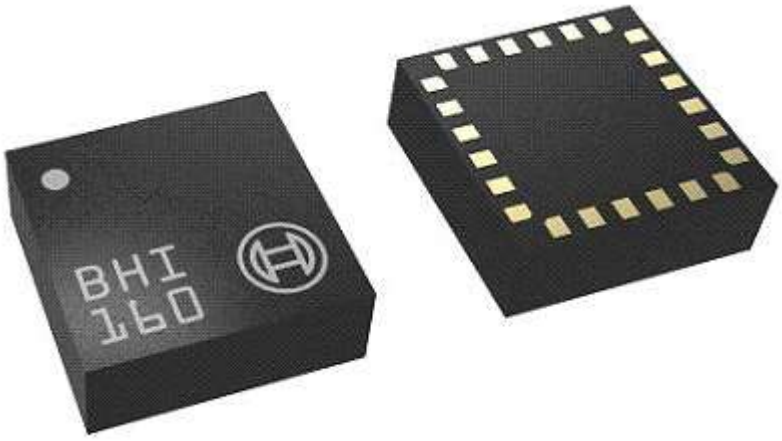


**Restricted Data Sheet**

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| Notes | Data in this document are subject to change without notice. Product photos and pictures are for illustration purposes only and may differ from the real product's appearance. |

## Features

- All-in-one smart-hub solution for always-on motion sensing at a fraction of current consumption which is commonly required using discrete components.
- 32-bit floating-point microcontroller (Fuser Core). Optimized for data fusion, motion sensing and activity recognition at ultralow power consumption. All in order to offload the power hungry data processing from the main application processor to the smart-hub.
- Powerful BSX sensor fusion library integrated in ROM for lowest design-in effort and fastest time-to-market.
- Additional software and algorithms for RAM processing, provided as ready to use FW patch files. Visit our web site to check available downloads.
- Onboard calculation power for data fusion, 3D- and absolute orientation, rotation vector, quaternions and Euler angles.
- Gesture recognition of significant motion, tilt, pickup, wake up and glance. Enabling customer specific gesture based HMI interfaces for smartphones and wearables.
- Activity recognition of standing, walking, running, biking and in vehicle. Enabling health & fitness applications or any other use case where highly accurate and reliable detection and/or monitoring of user activities is required.
- Step detection and step counting.
- Android 5 / L / Lollipop & Android 6 / M / Marshmallow (non-HiFi) support, incl. batching with dual FIFO buffer for wakeup and non-wakeup events. Implements the full Android sensor stack although an Android OS or any other Android environment is not required.
- High speed I2C interface, with data rates up to 3.4 MBit/s for power-efficient data transfer.
- Highly configurable internal RAM for either feature extension and/or FIFO data buffering.
- SW / FW based functionality. Can be updated, optimized, customized or upgraded with totally new features to support future requirements.
- Smart-hub plus microcontroller, MEMS sensors and software all highly integrated in one 3.0x3.0x0.95 mm3 LGA package with extension interface for additional sensors.

## Implemented Sensor Types

**With integrated IMU only:**
Accelerometer, Gravity, Linear acceleration, Gyroscope, Gyroscope uncalibrated, Game rotation vector, Step counter, Step detector, Significant motion, Tilt detector, Pickup gesture, Wake up gesture, Glance gesture, Activity recognition

**With attached magnetometer:**
Geomagnetic field, Magnetic field uncalibrated, Orientation, Rotation vector, Geomagnetic rotation vector

## General Description

The BHI160(B) is a small, low-power smart-hub with an integrated three axis gyroscope plus an integrated three axis accelerometer plus a programmable microcontroller. Containing pre-installed software and specific algorithms for activity recognition it is specifically designed to enable always-on motion sensing. It perfectly matches the requirements of smartphones, wearables or any other application which demands highly accurate, real-time motion data at very low power consumption.
The device integrates our best-in-class 6-axis IMU (BMI160) with an MCU – the new Bosch Sensortec Fuser core. It is bringing you the full Android sensor stack inside your devices – even without having an Android OS or an Android environment. Combining this with the built in computing power and the highly configurable on-board memory the BHI smart-hub offers you a low power solution for motion sensing and data processing.

## Target applications

- Activity recognition of standing, walking, running, biking or in vehicle
- Step-counting, indoor navigation, PDR
- HMI interfaces incl. gesture detection of motion, tilt, pickup, wake up, glance or other gestures for wearables
- Augmented reality, immersive gaming
- Tilt compensated eCompass
- Full 9DoF data fusion for highly accurate 3D orientation, quaternions, Euler angles, etc.

## Target devices

- Mobile phones and tablets
- Wearables such as smart watches, wrist- or neck-bands
- Smart-sports and smart-fitness devices
- Hearables, smart earphones and other head worn devices
- Smart-TV- or AR/VR controllers
- Smart-pens