

BNO080



Freespace® 9-axis System in Package Product Brief

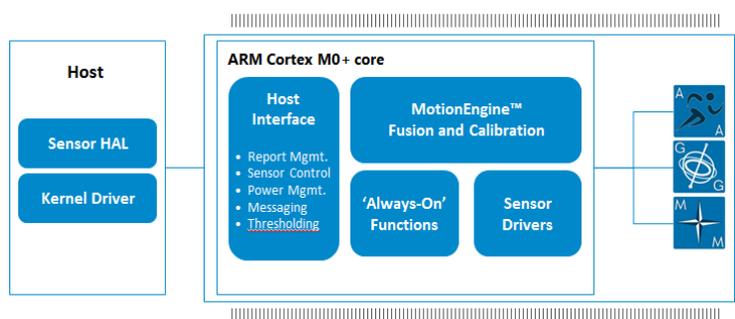


Co-developed by Hillcrest Labs and Bosch Sensortec, the BNO080 is a single chip solution that integrates an accelerometer, a gyroscope, a magnetometer, and a low-power 32-bit ARM Cortex M0+ MCU, running Hillcrest’s high-performance sensor hub software stack.

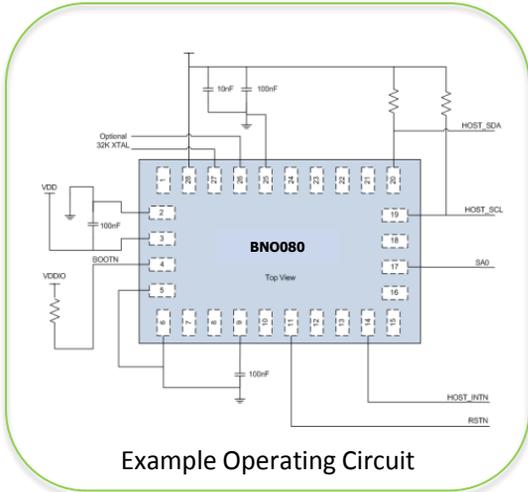
The BNO080 provides application specific configurations, features, and performance in a small turn-key component that benefits OEMs through faster time-to-market, reductions in development time and BOM cost, and delivering the highest precision and quality.

GENERAL FEATURE HIGHLIGHTS

- ✓ **MotionEngine™ 9-Axis and 6-Axis Sensor Fusion** - Provides raw, calibrated and fused sensor orientation data with best in class accuracy and stability
- ✓ **Application Based Fusion** - Sensor fusion is tuned for the specific needs of AR, VR and Robotics applications
- ✓ **Intelligent Power Management** - Manages sensor states to conserve power without sacrificing quality of motion data
- ✓ **Calibration** – Supports both Dynamic and Factory-Based calibration to deliver the highest performance
- ✓ **Control via I²C, SPI or UART Interfaces** – Freedom to optimize overall circuit design requirements
- ✓ **Secondary I²C interface** - Allows attachment of additional environmental sensors
- ✓ **‘Always-on’ Capabilities** - Includes software to enable low power, high accuracy step counter and gesture recognition
- ✓ **Android Compatible** – Provides support for sensors defined in Android 5.x and 6.0, but can be used with any operating system



BNO080 Block Diagram



Example Operating Circuit

BNO080 Freespace® 9-axis System in Package

Product Brief

The BNO080 can be used in many applications, but is tuned specifically for use in Virtual Reality, Augmented Reality and Robotics applications.



VR/AR

The BNO080 provides a head tracking solution for head mounted displays (HMD).

Low power consumption and compact size (5.2 x 3.8 x 1.1 mm³) make the BNO080 ideal for head worn devices, where both power and space are limited.

The BNO080 provides low latency, high sample rate, exceptional tracking accuracy and smooth orientation updates, yielding superior head tracking performance.

KEY VR/AR FEATURES

- ✓ **1KHz Sample Rate** - Enables flawless, smooth head-tracking with low latency and support for time-warping for immersive experiences
- ✓ **Predictive Head Tracking** – Use of this feature can help to offset overall high system latency
- ✓ **AR/VR Stabilization** - Adjusts the angular position estimate gradually over time to avoid “jumps”
- ✓ **Tare** - Allows for arbitrary mounting of the BNO080 in the end product
- ✓ **Context and Activity Tracking** – Step based activity features for head mounted devices including stationary, walking, running, and step count



ROBOTICS

The BNO080 is optimized for service robots such as cleaners that employ Simultaneous Localization And Mapping (SLAM) or other ‘intelligent’ navigation solutions.

The combination of Hillcrest’s proprietary software and 9-axis sensors delivers superior heading performance even when the surface is not level.

The BNO080 also provides features such as bump detection and inclination that eliminate the cost of additional sensors in robot device designs.

KEY ROBOTICS FEATURES

- ✓ **Accurate Heading Angle** - Less than 1.0° typical error rate
- ✓ **Tilt Independent Heading** – Allows for proper heading output when surface is uneven
- ✓ **Bump Detection** – Calibrated Accelerometer output provides bump detection without having to use a separate sensor
- ✓ **Inclination Detection** – Provides full 3DOF robot orientation allowing detection of surface and device issues

ABOUT HILLCREST LABS

Hillcrest Labs is the leading global supplier of software, hardware and intellectual property for sensor-enabled TV, AR, VR, and Robotics products and various other CE and IoT applications. Our Freespace® technology transforms human and machine movement into high quality, application-ready information. With more than a decade of development and many unique patented features, products come to life with Freespace® sensor processing technology. Find out more at www.hillcrestlabs.com, or contact us at sales@hillcrestlabs.com.