

Ultra-compact 3-axis accelerometer with embedded microcontroller: Advanced motion-recognition capabilities, sensor hub

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STMicroelectronics, a global semiconductor leader serving customers across the spectrum of electronics applications and the world's top manufacturer of MEMS (Micro-Electro-Mechanical Systems), today announced details of a miniature smart sensor that combines a 3-axis

accelerometer with an embedded microcontroller together in an ultra-compact 3x3x1mm LGA package for advanced custom motion-recognition capabilities.

ST has combined the microcontroller, operating as a sensor hub that runs sensor-fusion algorithms, and a high-precision 3-axis digital accelerometer into a single package it calls iNEMO-A. The device reduces the demand on the host controller and [application processor](#) and decreases [power consumption](#) in portable devices. Both benefits deliver greater freedom and flexibility to the design of motion-enabled consumer electronics. The integration of high-resolution linear-motion sensing and the sensor hub in a single package increases system robustness and is ideally suited for board-layout optimization.

"Customers want smarter [motion sensors](#) that integrate both sensing and intelligent decision making in a single package," said Fabio Pasolini, STMicroelectronics General Manager, Motion MEMS Division, Analog, MEMS and Sensors Group, Industrial and Multisegment Sector. "The iNEMO family gives ST an unrivalled ability to integrate any combination of accelerometers, gyroscopes, magnetometers and other sensors with a powerful ARM-based sensor-hub microcontroller to give our customers the maximum flexibility and scalability in system partitioning."

[The LIS331EB iNEMO-A smart sensor](#) targets a wide range of applications that include wearable sensor applications, motion-activated user interfaces in phones and tablets, and augmented reality. The device embeds an ultra-low-power ARM Cortex-M0 with functional capability, power consumption and memory size that is perfectly suited for sensor-hub applications and iNEMO sensor fusion on mobile applications. The sensor hub supports the connection of a 3-axis gyroscope, 3-axis magnetometer and a pressure sensor to deliver a full sensor-fusion solution. Additional sensors, such as temperature and humidity [sensors](#),

may also be connected.

Addressing power constraints in battery-operated portable devices, the [LIS331EB](#) iNEMO-A 3-axis digital accelerometer also contains two embedded finite state machines (FSM) and an embedded FIFO (first-in first-out). The FSM and FIFO enable custom motion-recognition detection, including specific gesture detection, and a pedometer that can run without using the embedded microcontroller, further reducing the overall power consumption. The FSM can also be used to wake up the microcontroller, enabling advanced power management techniques.

The high performance 3-axis accelerometer in the LIS331EB iNEMO-A features a selectable full-scale range of $\pm 2g/\pm 4g/\pm 8g/\pm 16g$ and houses an ultra-low-power ARM Cortex-M0 core with 64KB Flash Memory and 128KB RAM memory, as well as multiple timers and I/O ports (GPIOs/SPI/I2C/UART).

The LIS331EB smart motion sensor will start sampling in Q2 2013. Unit pricing is US\$2.4 for volumes in the range of 1,000 pieces. If your company has a high-volume need, please contact your ST sales office.

More information: For further information on ST's complete MEMS portfolio see www.st.com/mems.

Provided by STMicroelectronics

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