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STMicroelectronics Breaks Down Barriers to Broad Adoption of Vibration Monitoring in Industry 4.0 Applications

- *IIS3DWB MEMS vibration sensor optimized for industrial monitoring*
- *Plug-and-play evaluation kit accelerates application development*
- *Convenient and economical solution for condition-based maintenance*

Geneva, March 30, 2020 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, is powering the next generation of Industry 4.0 applications with a new vibration-sensing solution optimized to enable smart maintenance of factory equipment.

ST's IIS3DWB vibration sensor and supporting STEVAL-STWINKT1 multi-sensor evaluation kit accelerate development of condition-monitoring systems that boost productivity by inferring equipment maintenance needs. Analyzing the sensed vibration data locally or in the cloud helps owners create strategies that maximize uptime, minimize servicing costs, and avoid emergency repairs.

The IIS3DWB is a 3-axis MEMS[1] accelerometer optimized for industrial vibration sensing. The STEVAL-STWINKT1 simplifies prototyping and testing by integrating the IIS3DWB with additional sensors, an ultra-low-power microcontroller and algorithms for vibration processing, Bluetooth® wireless module, and USB connection. Housed in a plastic enclosure with a battery, the kit is ready to begin application development and presents a convenient reference design. High-speed data-logger and cloud-dashboard utilities are included to help collect, analyze, and visualize the results.

"*Machine-condition monitoring is central to industrial digital transformation, bringing the power to enhance manufacturing performance and safety while enabling new services and business models*," said Alessandro Cremonesi, Vice President of System Research and Applications, STMicroelectronics. "*Our vibration sensor and IIoT multi-sensor development kit and reference design are the best performing and most affordable solutions in the market today, enabling high-performance and cost-effective plug-and-play industrial sensing*."

ST is already supplying the IIS3DWB to IIoT technology innovator SPM Instrument of Sweden, for use in the Company's AIRIUS wireless, battery-powered vibration sensor. Rikard Svärd, Global Sales Director of SPM Instrument commented, "*We chose IIS3DWB for its unique combination of features, including 3-axis sensing, wide bandwidth, and low noise in a low-power, digital device, which helped us achieve the performance, design-cycle time and cost targets we set for AIRIUS*."

[1] MEMS: Micro Electro-mechanical Systems. ST is a leader in MEMS technology, with a product portfolio that includes accelerometers, eCompass ICs, pressure sensors, microphones, and complete inertial measurement units (IMU) for industrial, automotive and consumer applications such as drones, navigation equipment, smartphones and wearables.

The IIS3DWB vibration-sensing system-in-package is in production now and available for $9.00 in a 14-lead plastic land grid array (LGA) package. The STEVAL-STWINKT1 is available from ST for $99.00.

Further technical information

ST's state-of-the-art IIS3DWB 3-axis ultra-wide-bandwidth MEMS accelerometer detects vibrations that are prime indicators of a machine's service requirements. The device, which is covered under ST's 10-year availability assurance for industrial products, is optimized for vibration monitoring. The frequency response is tailored to be fully flat and with low noise up to 6kHz and then with a sharp cutoff and high attenuation to remove frequency-aliasing concerns and to detect machine-related faults with accuracy and consistency. Low power consumption maximizes the operating lifetime of independently powered sensor nodes. Key features of the IIS3DWB include:

- Accelerometer with wide and flat frequency response over 3-axis saves external signal conditioning and complexity needed by competing sensors
- Digital plug-and-play capability, integrating signal conditioning, analog-to-digital converter (ADC), filtering, and bandwidth equalization on-chip
- Low noise: 75µg/√Hz in 3-axis mode or 60µg/√Hz in single-axis mode selectable on the fly
- -40°C to 105°C operating-temperature range
- 1.1mA operating current at full performance in all three axes

Leveraging ST's leading position in MEMS technology, the STEVAL-STWINKT1 evaluation kit integrates multiple miniature sensors on-board in addition to the IIS3DWB. There is also a Bluetooth® Low Energy (BLE) radio for connecting to an edge device or directly to the Internet. The many on-board features let solution integrators bypass labor-intensive sensor integration to focus on their application and accelerate time to market and offer advanced software features like high-speed data logging for the benefits of new field of exploration like machine learning and AI. The price of the kit is more than 75% less than some alternatives in the market and eliminates a significant cost barrier to Industry 4.0 digital transformation.

Features of the STEVAL-STWINKT1 include:

- Best-in-class industrial sensors: inertial sensors, temperature, pressure, and humidity sensors, and digital and wide-bandwidth analog microphones
- Ultra-low-power Arm® Cortex®-M4 MCU (STM32L4R9ZI) running at 120MHz with FPU, 2048 kbytes Flash, and optimized power management
- On-board footprint for STSAFE-100 secure element IC for secure connection and authentication
- Wireless BLE4.2 on-board and wired RS485 and USB OTG connectivity
- Preprocessing algorithms for vibration analysis: RMS moving average and programmable FFT (overlapping, averaging, windowing)
- High-speed data logging with real-time storage on SD-CARD and streaming via USB of data from multiple (22) sensors at their maximum resolution (ODR)
- Companion cloud application and dashboard
- Optional Wi-Fi expansion board (STEVAL-STWINWFV1), and STMod+ cellular expansion board from the P-L496G-CELL02 kit

About STMicroelectronics

ST is a global semiconductor leader delivering intelligent and energy-efficient products and solutions that power the electronics at the heart of everyday life. ST's products are found everywhere today, and together with our customers, we are enabling smarter driving and smarter factories, cities and homes, along with the next generation of mobile and Internet of Things devices.

By getting more from technology to get more from life, ST stands for life.augmented.
In 2019, the Company's net revenues were $9.56 billion, serving more than 100,000 customers worldwide. Further information can be found at www.st.com.

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