

Sensors Expo 2010 Recap

Chris Warner, Executive Editor

The 2010 Sensors Expo & Conference was held June 7-9 in Rosemont, IL. Rain put a damper on things outside the Donald Stevens Convention Center on Tuesday. But inside, the sun, wind, and all manner of alternative energy sources were on the minds of attendees as products based on energy harvesting continued to play a prominent role at the show.



Flexibility and universality were common themes among the most notable energy harvesting products. MicroStrain's EH-Link hybrid energy harvesting wireless sensor node collects energy from multiple sources including strain, vibration, thermal gradients, ambient light, and thermal and electromagnetic fields. It also features an on-board triaxial accelerometer, relative humidity sensor, temperature sensor, and signal conditioning for a Wheatstone bridge which is compatible with strainload cells, torque sensors, pressure transducers, and magnetic sensors. EH-Link has two energy harvesting inputs and is compatible with piezoelectric, electro-dynamic, solar, RF field, and thermoelectric harvesters.

Cymbet's EnerChip EP CBC915 Energy Processor works universally across all energy harvesting transducer technologies including photovoltaic, thermoelectric, piezoelectric and electromagnetic. The company's Maximum Peak Power Tracking technology is asserted to match any energy harvesting transducer input impedance. It is designed to provide optimal power management for EnerChip CBC050 rechargeable energy storage devices. The EnerChip EP has user selectable modes and communicates with microcontrollers to create "energy aware" products.

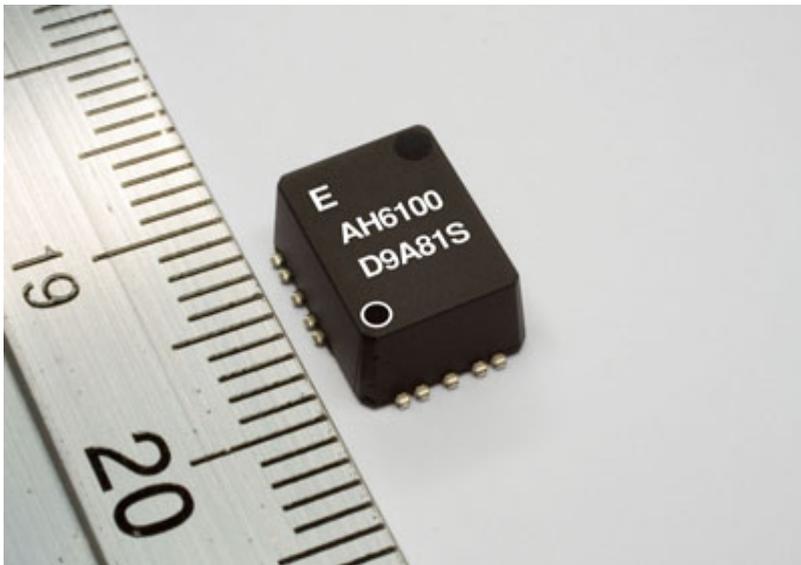
Micropelt showcased its TE-Power PROBE for use with modern WirelessHART, ISA100 and similar transmitters. Mounting the device to a hot side of 20°C above ambient is believed to result in a milliwatt net output, equal to about 3 AA cells per year. According to the company, between 25°C and 90°C 10 mW net are generated,

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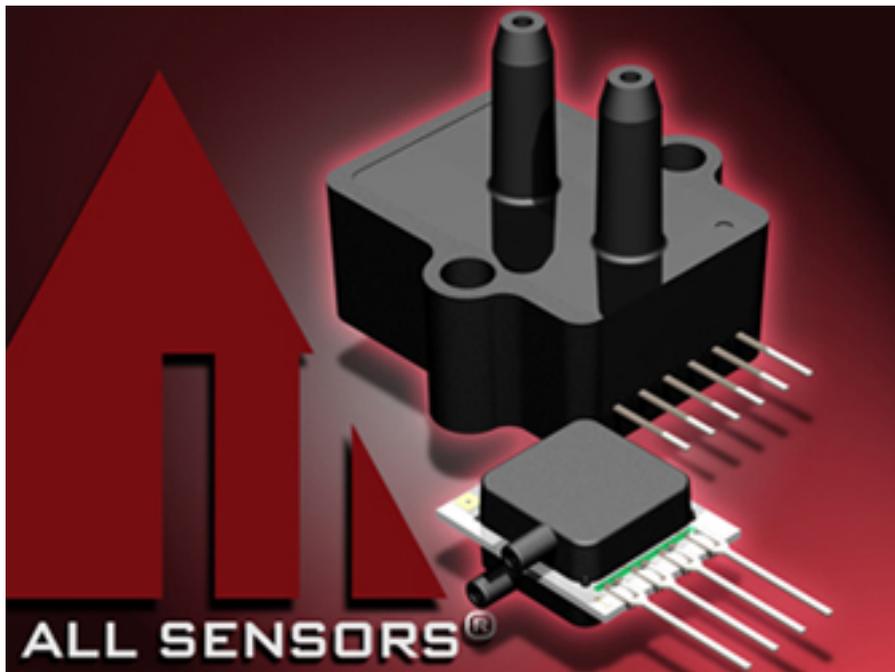
equivalent to as much as 30 AA cells worth of energy as an annual budget for a 3 V application, and the thermoelectrically harvested power is maximized in favor of more energy and better flexibility for the connected application.

Some of the leading IC vendors showed how MEMS and motion go hand-in-hand. Analog Devices featured two MEMS inertial sensors from its iSensor motion sensor product line. They offer tactical grade (<10 deg per hour) gyroscope performance and factory calibration. The ADIS16135 precision angular rate gyro and the ADIS16385 iSensor six-degrees-of-freedom internal measurement unit (IMU) are both based on ADI's iMEMS inertial sensor technology cores and offer six-degrees per hour bias stability, and angular random walk of 0.75 deg/?hr. iMEMS is also the basis for the company's award-winning ADIS16223 iSensor accelerometer -- a triple-axis, digital vibration sensor system that includes signal processing, data capture, and a SPI interface. The SPI and data buffer structure provide convenient access to wide-bandwidth sensor data. The 22 kHz sensor resonance and 72.9 kSPS sample rate make them appropriate for machine-health applications and allow a system operator to identify failing equipment long before costly damage is sustained.



Epson Toyocom announced the development of the AH-6100LR, asserted to be the world's smallest six-axis sensor. This low-noise, low-power product comprises a three-axis QMEMS quartz gyro-sensor and an extremely stable three-axis accelerometer within a single package. The AH-6100LR has a wide dynamic range of 81 dB to 83 dB (200 Hz output bandwidth), enabling high-precision control via accurate tracing and helping improve the certainty of motion recognition.

X-FAB Silicon Foundries will expand its foundry service to include 8-inch (200 mm) MEMS wafer processing. Moving to the larger wafer diameter and monolithic MEMS/CMOS integration allows significant reductions in manufacturing costs. The company said it accelerated its MEMS program with 200 mm wafer MEMS manufacturing capability to address explosive growth in MEMS – a need driven by emerging high-volume applications for the consumer market. For example, MEMS accelerometers, gyroscopes, pressure sensors and microphones now are prevalent in consumer products ranging from mobile phones and portable devices to white goods.



All Sensors' Millivolt Low Voltage Pressure Sensors (MLV Series) features a unique packaging stress-reducing technology and improved position sensitivity. Owing to their compensated and calibrate output signal, many errors associated with pressure measurement are corrected, yielding an accurate and stable signal. The company was also touting its low pressure sensor die for high volume applications requiring pressure measurement to as low as a quarter inch of water full scale.

Sensortech's SSI stainless steel OEM pressure sensors measure gauge or absolute pressures in ranges from 3 to 500 psi. These devices offer stability and repeatability, achieving a total error band (TEB) better than ± 1.5 percent FSS over a temperature range of -20°C to $+85^{\circ}\text{C}$ (-4°F to 185°F). The company's LBA Series, meanwhile, offers differential low pressure measurement with ranges of 250 and 500 Pa (1 and 2 inch H₂O) Full Scale. They perform fully analog on-chip CMOS signal conditioning to allow for linear and temperature compensated outputs with high differential pressure resolution of typ. 0.1 percent and response times of typ. 1 ms.

And there were several vendors on hand to help process, test and communicate all that sensor data.

Engineers requiring data acquisition modules with a generous channel count with uncompromised sampling rates or data throughput may consider National Instruments' newly introduced SC Express family for measuring strain gauges, bridge-based transducers, thermocouples and high-voltage analog inputs. PXI Express provides 250 MB/s of dedicated bandwidth for each SC Express module in the chassis. Included with the introduction were the PXIe-4330 24-bit simultaneous bridge input module and PXIe-4353 thermocouple module.



If you're looking for a single portable instrument the features of a high-speed oscilloscope as well as those of a traditional data acquisition recorder, Yokogawa's DL850 "ScopeCorder" features the ability to carry out real-time recording, a powerful user interface, and a range of PC interfacing capabilities. Acquisition speeds go up to 100 MS/s, and a dedicated version for the automotive industry includes a module for monitoring the CAN in-vehicle serial bus.

HBM showcased its data recorder GEN2i, equipped with four, eight or sixteen input channels and therefore offers flexibility, even for demanding measurement tasks. The palette of input amplifiers ranges from isolated voltage inputs with 200 kS/s per channel and bridge and IEPE modules up to fast inputs that support 100 MS/s, which are suitable for fault-tracing in electric systems or transient data acquisition during ballistic tests. In mobile applications, the GEN2i can be controlled completely from the integrated high resolution 17" touchscreen.

Digi International's XBee and XBee-PRO ZB embedded ZigBee modules, based on the Ember EM357 System on Chip (SoC) are now available with surface mount technology (SMT) for high-volume applications in the energy and controls markets and Serial Peripheral Interface (SPI). The addition of Serial Peripheral Interface (SPI) provides high-speed throughput and optimizes integration with embedded microcontrollers.

ESC Chicago

ESC Chicago was co-located with Sensors Expo at The Donald Stevens Convention Center. Microchip Technology was there to introduce its MRF89XA transceiver with a low receive current of 3 mA for longer battery life in 868, 915 and 950 MHz Sub-GHz wireless networks. The 868 MHz MRF89XAM8A and 915 MHz MRF89XAM9A transceiver modules are asserted to accelerate design cycles by removing the complexity of designing RF circuitry and the cost of obtaining agency certification. Microchip also announced its next-gen agency-certified MRF24WB0MA/MB embedded Wi-Fi transceiver modules. The IEEE 802.11 module firmware has an easy-to-use API driver interface to the company's TCP/IP Protocol stack and 8-, 16- or 32-bit PIC microcontrollers. The low-power MRF24WB0MA/MB embedded Wi-Fi modules enable the "Internet of Things" by removing the complexity and cost of developing RF circuitry and obtaining agency certification.

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