Silicon Labs Powers Wireless Networking Solution with Energy Harvesting System

May 25, 2011 12:00 PM EDT

Turnkey Energy Harvesting Reference Design Enables Industry's Most Power-Efficient Wireless Sensor Node Applications

AUSTIN, Texas--(BUSINESS WIRE)-- Silicon Laboratories Inc. (NASDAQ: SLAB), a leader in high-performance, analog-intensive, mixed-signal ICs, today introduced the industry's most energy-efficient wireless sensor node solution powered by a solar energy harvesting source. The new turnkey energy harvesting reference design enables developers to implement self-sustaining, ultra-low-power wireless sensor networks for home and building automation, security systems, industrial control applications, medical monitoring devices, asset tracking systems and infrastructure and agricultural monitoring systems.

The market for energy harvesting devices is poised to grow exponentially this decade. IDTechEx forecasts that more than ten billion energy harvesting devices will ship by 2019 — a 20x increase over the roughly 500 million units that shipped in 2009. Although systems powered by harvested energy sources have existed for many years, developers have been challenged to implement wireless sensor nodes within very low power budgets. Silicon Labs has met this design challenge by creating a wireless energy harvesting system based on its Si10xx wireless microcontroller (MCU) family, the industry's most power-efficient, single-chip MCU and wireless transceiver solution, which can perform control and wireless interface functions at ultra-low power levels.

In addition to being environmentally friendly and virtually inexhaustible, harvested energy provides a cost-effective, convenient alternative to batteries in many applications such as wireless networking systems. Batteries can be costly and inconvenient to replace, especially in large-scale wireless sensor node applications, and they are unreliable in extreme temperature conditions. Wireless sensor nodes often use batteries because they are placed in locations where it is not possible or convenient to run mains power. Energy harvesting simplifies these applications by eliminating the inconvenience of replacing batteries in inaccessible locations, while also reducing the quantity of depleted batteries for recycling or dumped in landfills.

Silicon Labs' comprehensive energy harvesting reference design includes wireless network and USB software and a complete circuit design with RF layout, bill of materials (BOM), schematics and Gerber files. The design consists of three components:

- A solar-powered wireless sensor node that measures temperature, light level and charge level, using an Si10xx wireless MCU to control the sensor system and transmit data wirelessly and a thin-film battery to store harvested energy.
- A wireless USB adapter that connects the wireless sensor node to a PC for displaying sensor data; the adapter features Silicon Labs' Si4431 EZRadioPRO® transceiver with an MCU running USB-HID class software and EZMac® wireless software stack.
- A wireless sensor network GUI that displays data from up to four sensor nodes.

The thin film battery used in the energy harvesting reference design has a capacity of 0.7 mAh. In direct sunlight, the battery can be recharged fully in only two hours. While in sleep mode, the wireless sensor node will retain a charge for 7,000 hours. If the wireless system is transmitting continuously, it will operate non-stop for about three hours, although it is designed to constantly recharge itself at an appropriate level to keep the thin-film battery from completely discharging.

"As part of our global commitment to green technology, Silicon Labs has advanced the use of energy harvesting technology to free wireless networking systems from the cost, inconvenience and negative environmental impact of conventional batteries," said Mark Thompson, vice president of Silicon Labs' Embedded Mixed-Signal products. "By combining ultra-low-power wireless MCU technology with a state-of-the-art energy harvesting system, Silicon Labs has delivered the industry's most energy-efficient, self-sustaining wireless networking solution."

Silicon Labs' energy harvesting reference design accommodates a wide range of harvested energy sources. An on-board bypass connector gives developers the flexibility to bypass the solar cell and tap other energy harvesting sources such as vibration (piezoelectric), thermal and RF.

Pricing and Availability

Silicon Labs energy harvesting reference design is available now and priced at $45 (USD). For more information, please visit www.silabs.com/pr/energyharvesting. For more details about Silicon Labs' Si10xx wireless MCU family, visit www.silabs.com/pr/wirelessmcu.

Silicon Laboratories Inc.

Silicon Laboratories is an industry leader in the innovation of high-performance, analog-intensive, mixed-signal ICs. Developed by a world-class engineering team with unsurpassed expertise in mixed-signal design, Silicon Labs' diverse portfolio of patented semiconductor solutions offers customers significant advantages in performance, size and power consumption. For more information about Silicon Labs, please visit www.silabs.com.

Cautionary Language

This press release may contain forward-looking statements based on Silicon Laboratories' current expectations. These forward-looking statements involve risks and uncertainties. A number of important factors could cause actual results to differ materially from those in the forward-looking statements. For a discussion of factors that could impact Silicon Laboratories' financial results and cause actual results to differ materially from those in the forward-looking statements, please refer to Silicon Laboratories' filings with the SEC. Silicon Laboratories disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

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