Energy Harvesting Kit Includes Solar Cell and a Thermo-Generator

Energy Micro, Linear Technology and Würth Elektronik present the development platform Energy Harvesting Solution To Go.

The Energy Harvesting Solution To Go-Kit provides a very easy access to energy harvesting technologies which helps developers to apply them in future battery less products.

The kit has the following advantages:
Developers receive a complete solution from harvesting of the energy, energy management and storage to the application. The transfer of this solution to the development of a battery-less product is made easy by providing the selection of the right components, schematics and software examples. The application of the highest efficient components in the market allows utilizing the precious harvested energy for the application.

The two basic parts of the kits are an energy harvesting board and the Giant Gecko starter kit.

There are four voltage converters of Linear Technology on the multisource energy harvesting board. These are optimized for the different energy sources like for solar, electromagnetic, piezo-electric or thermal energy converters. The energy harvesting board offers two integrated energy sources to start the evaluation immediately: A solar cell (32mm x 50mm) and a thermo-generator (40mm x 40mm). In addition you can add further external energy sources to the board.

Linear Technology offers the LTC3588 for AC sources up to 20V like for piezo-electric and inductive energy generators. The IC LTC3108 supports very small input voltages of a few mV which are usually supplied by thermo-electric generators (TEG). Solar cells would be utilized ideally with the LTC3105, because this IC provides "maximum power point control" (MPPC). The LTC3459, together with the LTC2935, is a unique solution, because they can harvest energy from very small solar cells with interior light.

The user can select the appropriate energy converter on the energy harvesting board by setting a jumper. Optionally a bigger capacity could be selected if the energy harvesting cannot be performed well continuously.

The Giant Gecko Starter Kit is the second part of this development kit. The board contains the most energy friendly microcontroller EFM32 Giant Gecko with the most comprehensive feature set: ARM Cortex M3, 48MHz, 1024KB Flash, 128KB RAM, USB, LCD Control, Low Energy Sense, etc.. The EFM32GG990F1024 can perform complex tasks in the Deep Sleep Mode with a few microamperes and consumes only 200?A/MHz in active mode. The following features of the starter kits can be used: 160-segment LCD display, 2 programmable buttons, a touch slider, ambient light sensor, an inductive-capacitive metal sensor, 32 MB NAND Flash, and a 0.03F super capacitor to evaluate the integrated backup power domain. The programming and debugging of the on board
MCU is support by the integrated Segger J-Link interface.

All necessary development tools, code examples, software libraries and application notes can be found in Energy Micro’s Simplicity Studio. One part of the Simplicity Studio is the energy Aware Profiler. The Profiler helps to display the current consumption and to create an energy profile of each software function by getting data from the on board Advanced Energy Monitor and the Segger debugger. Thus energy bugs of the application can be found easily.

The Giant Gecko Starter Kit can be connected by a 20-pin expansion header to the energy harvesting board. You can connect all starter kits of the EFM32 family – which consist of 240 compatible parts (4KB-1024KB Flash, 24-120pins) – to the energy harvesting board by this expansion header.

The high efficient passive components of Würth Elektronik are integrated on the energy harvesting board as well as on the Giant Gecko Starter Kit. The coupled power inductors, WE-EHPI, deserve particular notice. They impress because of the efficiency based on a very low ohmic resistance of each winding and a core especially developed for a rugged environment. In addition, a very efficient EMI suppression is realized by adding SMD ferrites at each plug contacts. Würth Elektronik’s tact switches survive at least 1 million use cycles. The LED series WESMCW display the current status with an angle of radiation of 140° and a brightness of 110 mcd.

The microcontroller is preprogrammed with one example. This helps to experience very quickly how easy it is to realize a design with energy harvesting thanks to the

availability of innovative standard products. The energy which is harvested from a small solar cell in a room or by the heat of your palm is sufficient enough to run an application permanently. The Energy Harvesting Solution To Go-Kit is available at Würth Elektronik for 199 Euro.

More information at http://www.we-online.com/harvest [1]

October 09, 2012

Source URL (retrieved on *03/11/2014 - 11:25am*):
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