The Roundtable - Wireless

What application do you feel will lead the pack in finding increased energy efficiencies in technologies or processes in 2012?

Joe Tillison, Avnet Electronics Marketing, www.avnet.com **[1]**

Wireless connectivity and Smart Energy are the name of the game for 2012. As the fringe of the internet rapidly expands to include individual sensors and control nodes, many of these are implemented as small, battery-powered wireless nodes. Design-in activity for ubiquitous protocols like Wi-Fi and Bluetooth is still increasing. ZigBee, with its strength in low power, self-organizing mesh networks has come of age for the smart energy and home/building automation market. This year, expect the Consortium for SEP2 Interoperability to lay out the guidelines for ensuring interoperability of devices for home energy management. SEP2 (Smart Energy Profile 2.0) is an IP-based application layer protocol that will operate over both wired and wireless networks including Wi-Fi, ZigBee and HomePlug, providing unprecedented interoperability for the Smart Grid ecosystem.

This year, at Avnet Electronics Marketing, we are hosting our first-ever Smart Energy Forum on May 16 (www.em.avnet.com/smartenergy [2]), to provide engineers with access to a host of solutions for these smart energy applications. With many component suppliers now offering completely integrated, pre-certified modules with built-in network stacks, it’s easier than ever to add wireless connectivity to embedded products with little or no wireless experience. Combined with the greenfield opportunity in the smart energy market this will ensure a multitude of interesting new, connected products looking to capitalize on the growing need to better manage energy efficiency.

Chad Lucien, Hillcrest Labs, www.hillcrestlabs.com **[3]**

Smartphones will lead the pack due to embedded software, such as Hillcrest Labs' Freespace MotionEngine, that can offload the processing of sensor data from the main app processor to a low-power MCU, preserving both power and processor cycles. With smartphones commonly featuring as many as sixteen separate sensors, this migration can reduce sensor-driven battery consumption manyfold, enabling constant background monitoring of inertial, magnetic and radio sensors. This allows for precise tracking of a phone's motions and surroundings that can be applied to context awareness applications such as virtual personal assistant apps, in which your phone can detect whether it is in your pocket, in your hand or on a table, as well as whether you are at home, at work or driving. That information can then be used to change functionality and deliver a more efficient user experience – from altering the sound profile, to monitoring battery life, to tracking daily activity for accurate calorie consumption.

In addition, embedded software automatically manages the power states of the sensors, minimizing power consumption by adjusting sampling frequency for various sensors to an appropriate rate for current activity and application requirements, even deactivating motion sensors when the phone is not in use.

Joe Rash, Open-Silicon, www.open-silicon.com **[4]**

With the demand for device mobility showing no signs of slowing down, power remains a top concern. Tablet computers will lead the pack in leveraging a new form of hybrid processing chip that is emerging. This hybrid chip architecture has different sizes of engines (processing elements) and engine resources (memories and IO) that interoperate seamlessly, and can adapt to the processing workload

(processing tasks). For example, in 2011 ARM announced their big.LITTLE architecture that enables seamless task migration from the larger power hungry Cortex A15 CPU cores to the smaller, more power-efficient Cortex A7 CPU cores.

These same concepts can apply to the pool of interconnected CPU resources like memory and IO as well. For example, IO clock rates can slow down in response to lighter workloads in the system. This is all very similar to hybrid cars that have both an electric motor and a small gasoline engine. When the demand is greatest, the gasoline engine kicks in to propel the vehicle, and when the demand is lower, the electric motor can propel the vehicle. The net result is much greater energy efficiency and for tablet computers that means longer battery life in the active mode.

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