

Brainstorm

Portable Power

In this month's edition of Brainstorm, we ask industry experts in the portable power market what they consider to be the most important factors that will further the development of power management in portable systems, and what they think are some of the customer misconceptions about power management that must be overcome to move the industry forward.

Tony Armstrong, Linear Technologies

"The demands on the battery to deliver the necessary power have grown drastically. However, the batteries' form factor has remained relatively small, and only modest gains in power density have been realized. As a result, battery run-time has become a significant selling feature in most portable handheld devices creating a need for very compact and high efficiency multiple output synchronous buck converters."

"The fact is that most battery-powered handheld products have used an application specific integrated circuit (ASIC, or PMIC) to deal with the requirements of battery charging, power-path control, providing multiple supply voltages, as well as protection features such as true output disconnect and accurate USB current limiting. ...Customers have adopted such an approach so they can obtain a single device that meets all of their power management needs."

"However, there are also drawbacks to this approach. First of all, ASICs are manufactured on a specific wafer fabrication process, making it difficult to maximize their performance for each of these functions. Secondly, and becoming more important in these times of short, dynamic design cycles, is the long lead-time associated with the definition and development of an ASIC. It is common for a power management ASIC to take two years or more to produce from conception to delivery. During this time, the design needs for a particular product could have changed three or more times."

Mel Berman, Lambda Americas, Inc.

"...It is obvious that battery technology advances will play a major role in the development of portable devices and systems. As the newer battery technologies come to fruition, the power management controls and ICs will need to adapt in order to maximize the battery's power-on time, reduce the recharge time, and extend its useful life. ...Within the portable devices, the DC/DC and POL (point-of-load) converters' improved efficiencies will play a major role in reducing any wasted energy drains from the battery."

"The OEM may not be aware of the power management techniques that can best facilitate these results. Many times we hear about customer dissatisfaction with short-battery operate times, long recharge-times, and even catastrophic failures of the products, which in some cases may have been avoided by the use of improved power management and monitoring techniques."

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Doug Bailey, Power Integrations

"Several converging market factors are acting as agents of change in power supplies for portable systems. First, Apple's leadership in industrial design for portable computing and communication products has educated consumers to expect sleek, thin and sexy design — an expectation that extends to the peripherals, including AC adapters. Consumers are also more environmentally conscious, better informed and able to exercise eco-choices when making purchasing decisions. Coupled with the ever tightening mesh of efficiency regulations worldwide, these consumer preferences for small size and low weight are pushing the market towards thin, energy efficient power adapters."

"The favorite historical debate in the power community is whether the feedback in a PWM should be voltage mode or current mode. The new faiths competing for attention contrast the effectiveness of analog and digital power control loops. ...The recent clamor and promotion of digital power management in some circles has helped to highlight the benefits of a number of very useful techniques. However, dogmatic adherence to digital as the way forward for all power products can close minds to some very elegant and effective analog alternatives."

"Consumers are also more environmentally conscious..."

Dr. Paul Magill, Nextreme, Inc.

"The heat rejection system is the critical link in the thermal path. For portable systems, properly engineering this part of the system is essential for realizing the potential for this technology. ...One other area that needs a concomitant focus is the conversion efficiency of the thermally derived energy to electrical energy. Finally, combining portable power with power storage (batteries) may also further the development of power management in portable systems."

"Customers tend to focus their buying decisions on what gives them the biggest bang or what in other words what offers the most power. The customer instead should focus on which solution provides the best match to their needs.... Thermoelectrics offer a long-term power solution. Batteries offer a short-term power solution. Battery disposal is an issue that is creeping up and will require increasing attention."

Tim Phillips, International Rectifier Corp.

"Typically, power management was a secondary consideration when architecting a system and the 'management' segment of power management became mainly a game of thermal management. However, energy costs and environmental concerns are driving performance metrics to move from 'instructions per second' to 'instructions per Watt', and efficiency has become as important — or more important — than absolute performance."

"Extending battery life continues to be one of the most important goals in portable power systems. Battery technology has not kept pace with the new functions (and power demand) in shrinking form factors. The role of the power management system is to intelligently and efficiently parcel battery charge to the most valuable function(s) at a given moment."

