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AVID'S EXPERTISE IN BATTERY-POWERED DESIGNS

Battery safety is the primary concern in the design of any battery powered device. Li-Ion batteries are desirable to make a product smaller and lightweight, but they require careful monitoring and protection schemes. We have developed cell protection circuitry and firmware algorithms to meet manufacturers' requirements for operating temperature, voltage and current for Li-Ion cells and other battery chemistries. One of our unique HW/FW approaches to over-current protection is having the ability to disconnect the pack from a load within microseconds and the flexibility to adjust timing and current levels in firmware, ultimately allowing the battery pack to immediately be used again once the load is removed; unlike other protection methods, such as PTC or fuses, which decrease efficiency or leave the pack unusable after a single over current event. -

Here at AVID, we focus on creating efficient designs that meet our customers' needs, maximize run time and give long battery life. Overall attention to power management by utilizing deep sleep enabled hardware and cell monitoring/balancing circuitry greatly extends run time between charges and the life of the battery. Our designs have included state of charge indicators ranging from simple LEDs to QVGA graphics displays, which enhance the user's experience. We have also implemented firmware algorithms for detecting battery chemistry; allowing a product to accommodate different battery types while providing accurate battery status to the user.

Maintaining several battery packs during development can be time-consuming and involves safety concerns. Our solution to these challenges was the development of a multiple cell battery pack simulator. The analog circuitry is able to independently simulate and monitor up to five (5) cells in a series string. PC control through a USB interface allows the simulator to replicate various battery chemistries and charge levels. This level of control is essential for proving battery protection and management algorithms. In addition to its uses in product development, the pack simulator is an integral part of production test equipment which can simulate motor loads, verify battery charge control and exercises user interface displays.

We have expertise in various charging algorithms including NiMH, NiCd, Li-Ion, Li-Polymer and other battery chemistries, as well as ultra-capacitors. Our charge control designs have included stand-alone charge management ICs and microcontroller-based charges for multi-cell packs - an area where integrated solutions are still under development. We have also implemented digital communication protocols for packs and chargers in cases where redundant monitoring is required for safety. We are partnering with leading companies like Fulton Innovations to develop the next generation of battery charging solutions including solar harvesting and eCoupled wireless power transfer.

AVID's website can be reviewed at www.avid-tech.com. Inquiries may be made at 330.487.0770.