Battery Management Systems (BMS)

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DESIGN HIGHLIGHTS
Complete Battery Management System
Designed for Spacecraft Li-Ion Cells

EXTENSIVE TELEMETRY
+/-50mV Cell Voltage Accuracy
+/-1% Battery Current Telemetry
Cell Temperature Telemetry

EASY INTEGRATION
Packaged with Battery Cells
Small, Lightweight Rigid-Flex Design
Powered from Battery Cells
Hardware Shutdown Mode
Outputs Data via SPI Serial Bus
Does Not Unbalance Cells

COST EFFECTIVE
No COTS upscreening required
Modular design fits many battery types
No series cell limitation

MISSION CRITICAL DESIGN
Complete Internal Redundancy Options
EEE Parts Selection per:
EEE-INST-002 / MSFC-STD-3012
Radiation-Hardened: 100kRAD
Size, Weight & Power Efficient Design
MIL-STD-461 EMC Tests
Thermal Vacuum Cycling / Outgassing
Shock and Vibration

Spacecraft such as the Sierra Nevada Corporation's Dream Chaser and the International Space Station (ISS) rely on high power Li-Ion batteries. Spacecraft batteries have strict safety requirements that dictate that cell voltages, temperatures, and currents be measured. And controlled.

ZIN developed a Battery Management solution, which is fully EEE-INST-002 compliant and radiation hardened to 100Krad and 80 MeV-cm^2/mg. This is a compelling option for a wide variety of missions. ZIN's Spacecraft BMS integrates cell voltage, temperature, and current telemetry into a printed wiring board that can be packaged within the battery.

ZIN's BMS system offers extraordinary flexibility. Its innovative approach to cell voltage monitoring measures the voltage of a Li-Ion cell within +/-50mV, even in series stacks with hundreds of volts of common mode voltage. ZIN's modular system is extendable to handle an arbitrary number of series cells, and performs equally well in low voltage and high voltage batteries.

Unlike existing Battery Management Solutions, ZIN's system requires no upscreening to meet EEE Parts specifications.

- **ZIN Technologies develops innovative spacecraft battery management solutions that monitor Li-Ion Cells during charging and discharging.**
- **For simple integration, the BMS can be powered directly from the Li-Ion cells that it monitors.**
- **ZIN provides a hardware shutdown mode to completely disconnect the battery from the cells when the system is inactive.**
- **ZIN's BMS prevents overcharging, overcurrent, and overtemperature from harming space power systems.**
- **ZIN BMS is designed for critical applications and meets requirements for EMC, Shock, Vibration, Thermal Vacuum, Outgassing, Radiation, and EEE parts control.**

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