

A Customize Battery Management Approach for Satellite

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Abstract : This work is attributed to the battery management unit design of student Satellites under Pakistan National Student Satellite Program (PNSSP). The aim has been to design a customized, low-cost, efficient, reliable and less-complex battery management scheme for the Satellite. Nowadays, Lithium Ion (Li-ion) batteries have become the de-facto standard for remote applications, especially for satellites. Li-ion cells are selected for secondary storage. The design also addresses Li-ion safety requirements by monitoring, balancing and protecting cells for safe and prolonged operation. Accurate voltage measurement of individual cells was the main challenge because all the actions triggered were based on the digital voltage measurement. For this purpose, a resistive-divider network is used to maintain simplicity and cost-effectiveness. To cater the problem of insufficient i/o pins on microcontroller, fast multiplexers and de-multiplexers were used. The discrepancy inherited in the given design is the dissipation of heat due to the dissipative resistors. However, it is still considered to be the optimum adoption, considering the simple and cost-effective nature of the passive balancing technique. Furthermore, it is a completely unique solution, customized to meet specific requirements. However, there is still an option for a more advanced and expensive design.

Keywords : satellite, battery module, passive balancing, dissipative

Conference Title : ICSSC 2022 : International Conference on Satellite and Space Communications

Conference Location : Paris, France

Conference Dates : October 27-28, 2022