

SPACE POWER SYMPOSIUM (C3)  
Small and Very Small Advanced Space Power Systems (4)

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DESIGN AND IMPLEMENTATION OF POWER DISTRIBUTION CONTROL SUBSYSTEM FOR  
MICRO-SATELLITE BASE ON FPGA

**Abstract**

The distributor and power lower-end computer are important constituent components of the satellite and spacecraft power supply and distribution system, to achieve the goal of on-board energy management, distribution, power telemeter parameter acquisition and processing, reception and execution of the routed OC command, and other functions. In order to satisfy the requirements of the modern micro-satellite, the power supply and distribution system must be lighter, lower power consumption, and higher reliability. In the paper a FPGA-based micro-satellite Power Distribution Control subsystem Design and Implementation is proposed. This method is that using the FPGA as core processor, which is low-power consumption, ability of Anti-single-event-upset, and high reliability, along with the functions of distributor and power lower-end computer. The system can accept and decode the date sent by the on-board-computer through the RS422 bus, and then drive the electrical power control circuit; have the function of analog date acquisition, and provide telemetry acquisition channels for the on-board-computer. The experimental results show that the system runs stably, function and performance can meet the design requirements, the total power consumption of the device can be reduced to 0.6W, reliability can be reached 0.97 / 5 years, and provided with the capability of 100 routed OC command and 14 routed electrical level command output.