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Design of Low-Cost Fault-Tolerant Cubesat Processing Unit  
  
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This work presents the design of a low-cost digital processing unit (DPU-NSEE) for general use in critical applications that require fault-tolerant systems. The core of the proposed processing unit is composed of four or more COTS (Commercial Off-The-Shelf) microcontrollers working with distributed voting based redundancy. Therefore, the use of low-cost equipment in Cubesats, or in other general critical application, could be possible, thus reducing the development cost of such complex systems. In this paper, the main voting based algorithm is presented as well as the specification of the hardware used. Furthermore, Software and Hardware reliability analysis tests with individual processors are made to characterize the system in spatial conditions. At last, the proposed system is tested in the same conditions to prove the fault tolerance for spatial applications.

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