

The CPU of the satellite borne experiment Pamela

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The PAMELA experiment aims to measure with great precision the antimatter present in our Galaxy in the form of high energy particles; in the same time it will measure the galactic, solar and trapped components of cosmic rays. The experiment will be housed on board a Russian Resurs-DK1 satellite and launched in the year 2006 in a 350×600 km orbit with an inclination of 70.4 degrees. All operations of the instrument - including data storage - are handled by the PAMELA Storage and Control Unit (PSCU), which is divided in a Central Processing Unit (CPU) and a Mass Memory (MM). The CPU of the experiment is based on a ERC-32 architecture (a SPARC v7 implementation) running a real time operating system (RTEMS). The main purpose of the CPU is to handle slow control, acquire and store data on a 2 GB MM. Communications between PAMELA and the satellite are performed via a 1553B bus. Data acquisition from the sub-detectors (Time-of-Flight counter, Magnetic Spectrometer, Electromagnetic Calorimeter, Anticoincidence shield, Neutron Detector, and Bottom scintillator S4) is performed via a 2 MB/s interface. Download from the PAMELA MM towards the satellite main storage unit is handled by a 16 MB/s bus. The daily amount of data transmitted to ground has been evaluated in not more 20 GB. In this work we describe the CPU of the experiment and the general software scheme.