

On-Board Spaceborne Real-time Digital Signal Processing

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Abstract

This paper reports a preliminary study result of an on-board digital signal processing system. It consists of the on-board processing requirement analysis, functional specifications, and implementation with the radiation tolerant field-programmable gate array (FPGA) technology. The FPGA program is designed in the VHDL hardware description language and implemented onto a high density FPGA chip. The design takes full advantage of the massively parallel architecture of the VirtexII FPGA logic slices to achieve real-time processing at a big data rate. Further more, an FFT algorithm's implementation with the system is provided as an illustration.