

SPACE SYSTEMS SYMPOSIUM (D1)  
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## DESIGN AND IMPLEMENTATION OF A SUPPORT SOC FOR ON BOARD PROCESSORS

**Abstract**

The use of System on Chip (SoC) in space applications has supposed an undeniable advance in the reduction of development period, power consumption and size, at the same time the reliability is increased. The Space Research Group of the University of Alcalá (Spain) has designed and implemented a SoC aimed at serving of support in the design of on-board computers. The implemented system is independent from the architecture and it is easily adaptable to different families of processors. The SoC provides the most commonly elements used in microprocessor-based systems, which includes I/Os ports, communication buses and control logic. The version described in this paper was implemented on an ACTEL RTAX250 FPGA. It was validated on a platform based on the ATMEL SPARC V-7 TSC695 microprocessor. The SoC provides data interface capabilities, including a 2.0 CAN controller based on the SJA1000 from Philips; a general purpose digital I/Os; and four UART interfaces. The main features of these interfaces are easily configurable from software. The SoC also includes configurable control logic for memory mapping, error control, interrupt handling, variable frequency generation, watchdog and system monitoring and reset. Its modular design allows a quick migration to other FPGA devices. Together with the SoC, a complete set of configuration and synthesis file generation tools is provided. A description of the SoC architecture and its main features are presented. The main functional and performance tests and their results are also discussed.