

Implementation of a Low-power Embedded Processor for IoT Applications and Wearables

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Abstract

—Embedded processors are key building blocks for IoT platforms. Such processors should provide flexible computing and low-power consumption for the small form factor devices to have better battery life. This paper introduces an implementation of a new design for a 32-bit RISC embedded processor optimized for lowpower budget and targeting IoT applications. The proposed processor is capable to execute a small set of simple instructions in few cycles, and hence, efficient for low-power embedded applications. The instruction set is inspired by the state-of-the-art Thumb-2 ISA by ARM. The performance of the processor is analyzed in terms of delay and power. The design is described in VHDL, implemented and simulated on Vivado and tested using Nexys 4 DDR board featuring Xilinx's Artix-7 FPGA.

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