Project Type: Master thesis

RISC-V-based microcontroller based on FPGA applied to develop an I2C master to Bluetooth low energy bridge

RISC-V is a new open RISC instruction set architecture developed (ISA) at UC Berkeley. Based on this instruction set, some microprocessors soft IP have been developed. The main advantages of this initiative are the optimized instruction set focused on mobile phones and portable embedded systems requirements and the independence between the software toolchains and the hardware implementation.

Because the open BSD licenses, many international teams are adopting this ISA for developing their own microcontroller soft IP.

https://github.com/riscv/riscv-wiki/wiki/RISC-V-Cores-and-SoCs

The goal of this project proposal is to develop an application using one of this existing microprocessor soft IPs. In deep an I2C master to Bluetooth low energy bridge for sensor readout will be developed. In other words, the final device will be able to read data from a specified I2C sensor and send the results once pre-processed through a Bluetooth low energy connection.

Background & skills required
- Advanced microprocessor architecture
- Register transfer Level HDL design
- Firmware development

Tasks
- Set up of the toolchain, microprocessor IP configuration
- RISC-V microprocessor configuration
- Synthesis and place & route into FPGA device
- Firmware development
- Write final report

Contact
Group ICAS GRUP @ IMB-CNM (CSIC)
Ricardo Martínez Ricardo.Martinez@imb-cnm.csic.es
Lluís Terés Lluis.Teres@imb-cnm.csic.es