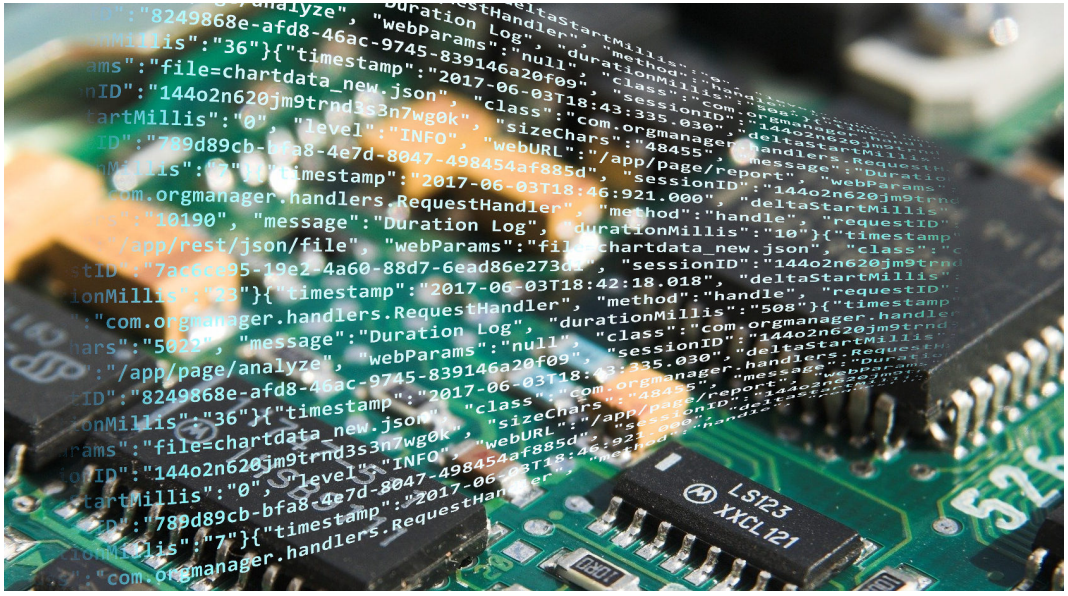
Automatic Generation of a Generic I2C Emulator for Sensor Applications



Most embedded systems comprise a variety of peripheral ICs (e.g., sensors, power management ICs, ...), which are typically connected to the main MCU via field buses like I2C. During the development, it is often necessary to emulate these peripherals in order to test and validate the correct behavior of the system and support the development process. This is especially true if the concrete peripherals are not yet available, and, therefore, the correct timing behaviour can not be validated. Also, it can be difficult or impossible to stimulate sensors in order to provide reproducible data for a test scenario. Another use-case is the validation of the proper behavior of software implementation.

Therefore, a configurable I2C device emulation platform shall be created to emulate arbitrary I2C devices based on a device description. The description of the bus and it's devices may be provided using a JSON file. From this, the developed tool should generate the required I2C devices and bus structure within an FPGA.

Prerequisites: Basic knowledge in Python and VHDL or Verilog

Type of Work: Theory (20%), Conception (20%), Implementation (60%) (BA, Project, . . .)

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