

# Abstract

Testing is one of the main important part of all development process, through we make sure that what we planned is working the way we would like to. In the automotive industry there is an important emphasis on testing, because the products have safety-critical functions. Checking the operation of the more complex devices requires continues development and more efficient implementation of testing methods and tools.

The electronic battery sensor is developed by Robert Bosch GmbH., the main function of it to monitor the battery of the vehicle and estimates its charge and internal states. Despite its small size it needs a advanced test devices.

The aim of thesis is design a custom made device that able to stimulate the battery sensor and reproduce real situations from the car. The document describes a design of microcontroller based system. After analyzing the requirements, the system plan available to get a comprehensive picture about the structure and meaning of the functions. To simulate the behaviour of a lead-acid battery it contains an impedance model built from discrete components. In the hardware design section the considerations of digital and analog circuit design are explained, finally the software is implemented. The device introduces a new cost-effective test environment, that can be used successfully for both hardware and software testing.