Abstract

In parallel with the fast technical growth of the vehicle industry there are more and more complex electronic components implemented into commercial vehicles. The aim is to monitor the most essential information and the main characteristics of the vehicles in real-time, which makes it possible to eliminate a problem in case of an emergency, or to optimise the operation of the vehicle. In modern commercial vehicles there are safety systems located, such as the ABS (Antilock Breaking System), the ESP (Electronic Stability Program), or the ASR (Anti-Slip Regulation). However, the development of the new features needs a lot of long testing processes, which would be faster, more convenient and even cheaper to do in simulation enviroment which can fit on a desktop.

To solve this kind of problem, Knorr Brem developed a system called LabCar, which is able to provide a totally life-like enviroment for the ECU with imitating the behavior of a real vehicle. The analogue and digital signals of the sensor are produced by the SimCard (simulation card), which makes it one of the key elements of the LabCar. This hardware is able to create almost every possible situation for the ECU, which can occur during the movement of a vehicle.

My main objective was to develop and implement a system, which is able to automatically examine the electric functionality of the new manufactured simulation cards, and to determine if the device is working correctly. If there are any problems in the operation, the tester can reveal the location of the fault.

My job was to work out the logical structure of the test, to create the schematic of the circuit, to design the layout of the printed ciruit board, to supervise the manufacturing process, to solder the parts and finally to write the software component for controlling the tests. The most interesting and also the most challenging part of the development was to create a circuit for a precision amplitude and frequency measurement, where I have checked more different methods before deciding by the final one.

In the first part of my thesis I am going to present all the necessary backround knowledge, and in the next stage I will discuss every step of the development process in detail, and will also describe the steps of implementation.

The device is ready, and it is working, currently is the functionality of the controlling software being tested. During the first tests a few smaller faults have been found, these could be corrected easily though. The main objectives for the next version of the device were to correct these small mistakes in the circuit, to order the test points in one group, and to make the hardware more robust and more durable.