Driver's Efficiency Analyzer

An On-Board-Diagnostics Driver's Aid for Passenger Vehicles

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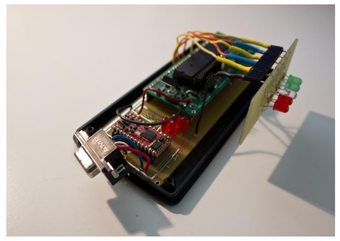
Overview

Driver's Efficiency Analyzer provides drivers with intelligent feedback about their driving habits. This includes providing instantaneous vehicle speed and fuel consumption, while comparing these readings to ideal reference data for the specific vehicle. With the aid of the Driver's Efficiency Analyzer the drivers receive feedback on their performance and can subsequently correct their habits. The device is designed following the On-Board-Diagnostic (OBD) II standard. Serial communication is implemented between the standard OBD-II connection in the vehicle and an AVR microcontroller – Atmega 644. The microcontroller is the core brain of the Driver's Efficiency Analyzer and its task is to request and process the information and then display it to the driver via five LEDs.



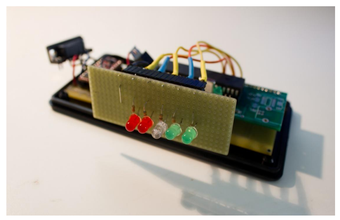


Figure.1 Inside the Black Box

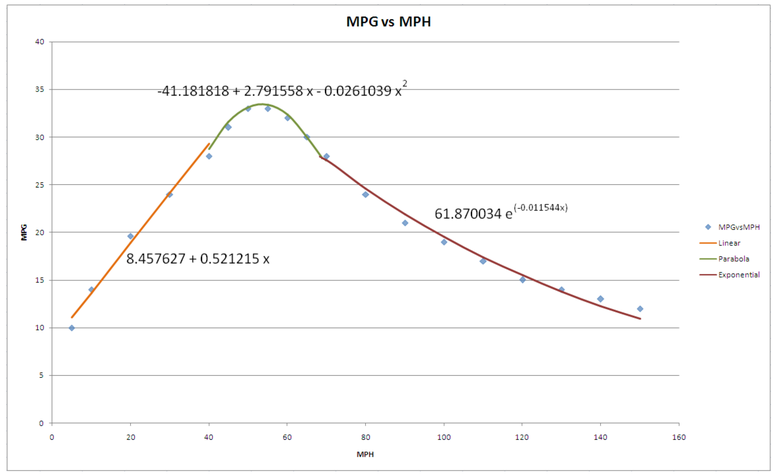


Figure.2 Reference Data

Instantaneous Display

To display instantaneous driving performance, a colored system was created to offer useful information with minimum distraction to the driver. The display system is very simple. It consists of five colored LEDs as shown on Figure 3.

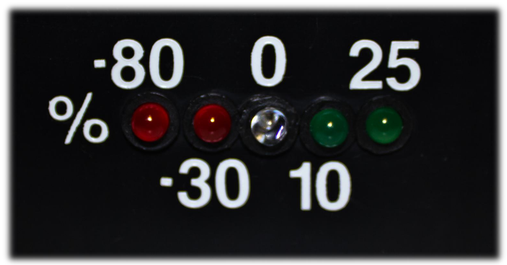


Figure.3 DEA Five LED display

If the driver matches the reference data the blue light at 0% will be lit up. Depending on the manners of driving, the lights on the left or the right of the blue one will light up. As it can be seen in Figure 3, the weights of the red and the green lights are not equal. That is because it is easy to fall below the reference data. It should be pointed out whenever the blue light is on it still means that this is a fuel efficient drive.

Results

The Driver's Efficiency Analyzer was designed for a 1997 BMW M3 E36. Ideally a reference data like the one on Figure.2 will be generated on a Dynamometer. Since access to a full scale one was not possible during the development of the project the readings were done on flat roads at steady speed using data acquisition software. Many interesting facts were discovered during this process. Most importantly, DEA has always assumed a operation in a vehicle with automatic transmission since there is no easy way of keeping track of gear shifts in a manual transmission. However, with acquiring the data it was possible to assist the driver with optimal shifting points. The DEA creates a virtual driving profile that people can use to "learn" driving efficiently.

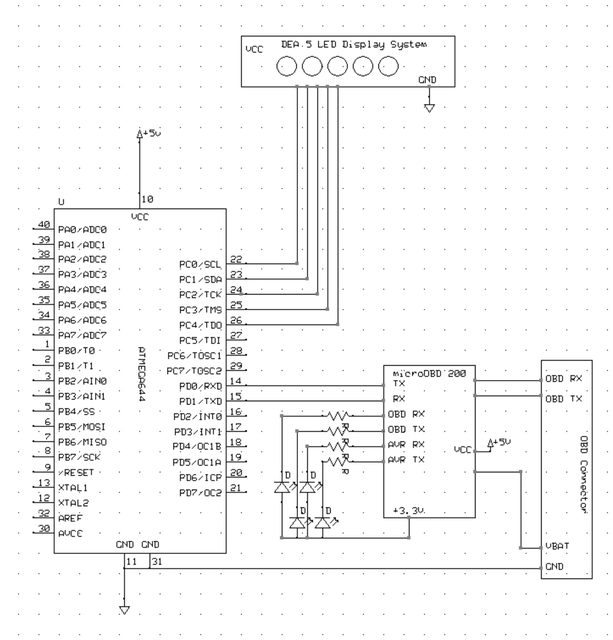


Figure.4 DEA Schematics