Smart OBDII Interface Development

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Smart OBDII Interface Development is to create all the information about the vehicle's performance and diagnostic trouble code (DTC) easily available to drivers or technician and mechanism by using an output device such as mobile or any display device in the vehicles. This work solves many problems by providing many useful information for driver like reading the battery voltage in real time. The main objectives are shown below depends on the time given as to complete the project planning and the limitation faced in the process used to implement the system. The project planning objectives produce create a development device can integrate with ELM327 interface module to communicate by data link connector in the vehicles to provide reading the real data from the engine control unit and detect the diagnostic trouble code. To implement support for reading the battery voltage which gives for driver and inspector the very important information needed to avoid the trouble in the car. To protect and help when the vehicle battery breakdown and the vehicle does not run so, can use it as a jump starter and as computer memory savers.

Keywords: Diagnostic Trouble Code (DTC), ELM 327, Jump starter

I. Introduction

Today vehicles are very smart in their operation when comparing from earlier years. The old cars controlling the ignition system mechanically so, that operation gives more fuel consumption or more emission because air and fuel mixture not perfect. Smart OBDII interface development comes to helping technicians to detect some minor faults easily without the need for special scanning tools which complex and expensive and also to provide this service for the drivers of vehicles and reduce the cost and shorten the time for them and help those to detect some minor malfunctions without reference to the technical specialist. The idea of the project centered around three main sections: Vehicle diagnoses trouble code read automatically by smart OBDII LEM327 Bluetooth interface Module and display the diagnostic trouble code (DTC) in the android mobile phone or any device working with android operating system by using very famous apps for the diagnostic trouble code called torque pro or display in the vehicle driver LCD. Measuring the vehicle battery voltage and load to display it for a driver or technician to make sure that power in the battery in good condition before any inspection and this information of battery voltage most important for any technical procedures before any inspection.

Used the OBD-II data link port to connect with external battery 12volt to provide the system by power to give charging for external backup 12V battery to use later after reduced the power to 9V and use it as computer memory saver can use in conjunction with a jump starter to preserve vehicle codes and electronic presets, seat sitting and radio channel AM/FM sitting while a vehicle battery disconnected. Also this external battery 12 V connected with dc to dc converter to increasing the capacity of power to use as a jumper starter in emergency situation.

II. Proposed Approach

This project entitled “Smart OBD-II Interface Development” is based on four main components, the data link connector on the vehicle, LEM327 Bluetooth module, microcontroller and DC to DC voltage convertor. That entire component together creates new system using smart technologies of OBD-II to help drivers and technicians to get the important information freely every time about the engine control unit operation and can be able to reading diagnostic trouble codes (DTC). The previous related project uses those technologies in some application separately.

Fig 1.1: Show the interconnected devices

All previous projects used the same technology OBD-II to communicate with the vehicle by the ELM 327 Bluetooth module. So my project differs from others, it focuses on development the interface of the OBD-II to get more use the features of OBD-II pins to reduce the cost of inspection and

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helps the driver in an emergency situation when the vehicle battery breakdown to run vehicle by any source like as backup battry source. The ELM327 is used for translating the on-board diagnostics OBD interface found on most modern cars.

III. SYSTEM BLOCK DIAGRAM

The operation of the system has divided in three main operation processes: The first operation contains two major components in the project, ELM327 Bluetooth interface Module and Data Link Connector. The action starts when connected the ELM327 Bluetooth Interface Module with OBD-II port Data Link Connector in the vehicle and run the engine. The engine control unit sends all information and live data to the ELM327 Bluetooth interface module which used the Bluetooth technology for sharing that useful information for mobile application to display it. The application programmed to read the data live and the Diagnosis trouble code from the engine control unit and provide for users to erase the DTC and gives the drivers warning when fault detected.

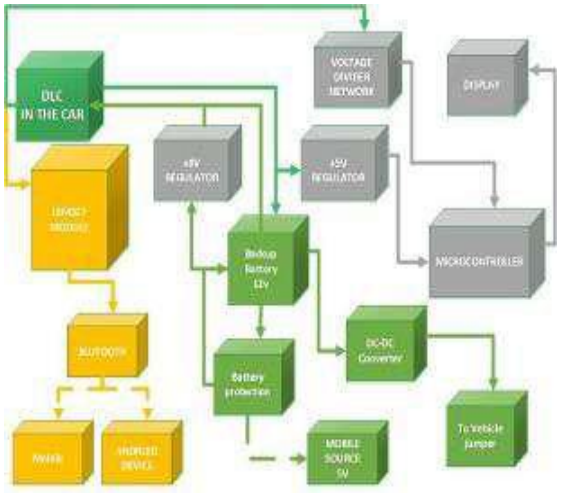

Figure 2: Block details of the process operation

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IV. SYSTEM IMPLEMENTATION PROTOTYPING

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Table 1: shows the battery voltage details of car

The battery voltage when engine is running		
Battery range	Design value	Simulation value
Fully charge	14.7V	14.6V
1- The battery voltage when engine is off		
Battery range	Design value	Simulation value
Fully charged	12.6V	12.5V
Half charged	12.3V	12.2V
dead	11.9V	11.8V

Table 2: Voltage divider bias method for resistors

comparing the value of voltage across R2 by using voltage divider method		
The point	Input voltage Vin	Simulation value (V Out across R2)
1	12V	+2V
2	12.6V	+2V
3	14.7V	+2.45V
4	30V	+5V

Table 3: showing testing the vehicle battery

testing the vehicle battery monitoring unit				
No	The case	Design value	By Using commercial voltmeter	By using the project unit
1	When the engine is off	12.6 V	12.57V	12.8V
2	When the engine is run	14.7V	14.47V	15.9V

Figure 3: The results of OBDII interface connected for malfunctioning

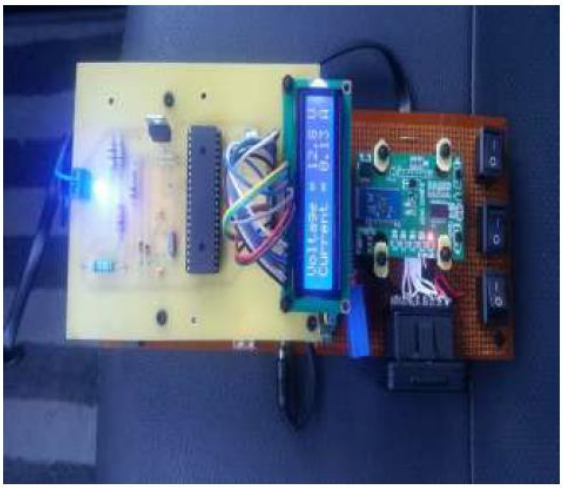

Figure 4: Smart system design interfaced for battery Driving voltage

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