

Seat Belt- A Precautionary Measure With Micro Controllers

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ABSTRACT: Traffic accidents are major source of fatalities and serious injuries which are the leading cause of death. One important policy tool that has been used to combat this problem is the passing of mandatory seat belt law, which is least, followed. In order to bring a change in the scenario an idea has been introduced here. To keep drivers feel safe while driving this idea could be adopted. If the vehicle speed crosses a set point, the seat belt must be buckled; else the vehicle speed could not be increased further. The predetermined speed of vehicle is maintained constant. It is the only way to solve this problem. This will make everyone to keep seat belt mandatorily that could also avoid a variety of active losses on the motor and there is an at most scope of following all the traffic rules, which can save most of the human lives. The actual system is designed with an intelligent micro controller supported with the rotor machines. Using an IDE with linking software of adaptable debugging feature is to be specially drawn attention. This project is useful for the Road Transport Authority (RTA) and it is one of the measures that play major role to prevent accidents.

KEYWORDS: IDE, Microcontroller, Rotor machines.

Introduction

Traffic crashes are a leading cause of deaths and injuries in all over the world. These accidents happen on a daily basis and the range and severity of injuries caused by road accidents is enormous. Some injuries can have a short term impact on day to day life and then heal permanently. Others can last for life. Road accidents sometimes affect victim's families, too. It can be a very real struggle for family members to provide the care and support needed. The elite and rich drivers often use their mobile phones while being on the move in their cars. This results in accidents and crashes. These phones have added further to the already worsening situation of road deaths and accidents. Driving and using the mobile phone simultaneously may cause loss of control of the vehicle or concentration needed in safe and sane driving.

The World Health Organization (WHO) estimates that approximately 30,131 people die in road crashes annually on roads (WHO 2014). The use of seat belts can be effective in reducing road crash fatalities in India but under existing seat belt laws, seat belt use is mandatory only for drivers and is limited to specific vehicles and roads. Most industrialized countries and many developing countries have passed laws that require the use of seat belts in motor vehicles. It is widely believed that seat belt use is an effective way to reduce road accident fatalities and injuries. Safety belts can prevent accidents. If you know this and are still not wearing a safety belt, you may need to ask yourself why not. In order to avoid these type of situations we are implementing this project.

I. RELATED WORK

In various statistical studies it has been identified that most of the injuries are due to negligence in wearing seat belt. Even there are cases when a sensor is adopted for recognition of seat belt, the driver feel embarrassed for the noise made by the alarm/timer for wearing the seat belt in a stipulated period of time. Also the enhanced features that could be adopted for the circuitry design could be made easy with the use of various auto generated processes like Flash Magic, Proteus etc. The timer and sensors used in identification of delayed response may create some arrears because of the integrated rigid reliability issues.

II. PROPOSED ALGORITHM

A. Design Considerations:

Interfacing of dc motor

In designing embedded robotic projects, interfacing DC motor to 8051 forms an essential part. A well designed 8051-DC motor system has essentially two parts. The first part is suitable software to operate and second part is a suitable driver circuit. Interfacing the DC motor directly to 8051 microcontroller is not possible. Connecting DC motor with microcontroller directly, causes many problems like voltage spikes produced while reversing the direction of rotation could easily damage the microcontroller, maximum current that can be sourced or sunk from a 8051

microcontroller is 15 mA at 5v. But a DC Motor need more currents than the current delivered by microcontroller and to operate motor, can only be fulfilled if the voltages are 6v, 12v, 24v etc, depending upon the type of motor used .The proper functioning of the microcontroller is also affected by the back emf produced by motor. Therefore to overcome such problem H-bridge using freewheeling diode, transistor or clamp diodes are used. Clamp diodes are used to overcome the effect of back emf. But using transistor, diodes makes our circuit bulky. Hence to overcome this we use L293D drivers. It is a quadruple half H-bridge driver .such type of ics needn't need to connect any transistor or diode. We can easily control the switching of L293D using a microcontroller. And hence speed of DC motor is controlled via micro controller.A.C. motors usually come in standard output speeds of 3600, 1800, 1200 or 900 revolutions per minute (rpms), but the machines they power generally require different input speeds. In order to get to the required input speed for a particular piece of machinery, some type of speed reduction method is required. These reductions in speed are accomplished by using gear reducers, v-belt and sheaves, chain drives with sprockets or combinations of each.

8051 Microcontroller

The Intel 8051 microcontroller is one of the most popular general purpose microcontrollers in use today. The Intel 8051 is an 8-bit microcontroller which means that most available operations are limited to 8 bits.8051 chips are used in a wide variety of control systems, telecom applications, robotics as well as in the automotive industry.

LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

B. Interface requirements:

KEIL MDK Version 5

Keil MDK Version 5 is the latest release of our compute ARM, Cortex-M, and Cortex-R based microcontroller devices. MDK includes the μ Vision IDE/Debugger; ARM C/C++ Compiler, and essential middleware components. It's easy to use. By using this software we can write the code compile, execute in the form of **.hex** and thus related to embedded systems we can burn it to the 8051 microcontroller. The methodology used in this project is related to embedded systems. The MDK Core contains all development tools including IDE (Fig1), Compiler, and Debugger. The new Pack Installer adds and updates Software Packs for devices, CMSIS, and middleware. Software Packs that add support for a complete microcontroller family are called Device Family Packs (Fig.2).

The varieties of other hardware needs for interface design are as followed.

1. AT89C51 Microcontroller
2. PCB Board
3. RS232 9 PIN Serial Cable
- 4.12V DC Battery or Adaptor
5. L293D Motor Driver
6. DC Motor
7. Electrolytic Capacitor
8. Ceramic Capacitors
9. Resistors
10. Crystal Oscillator
11. Connecting Wires.

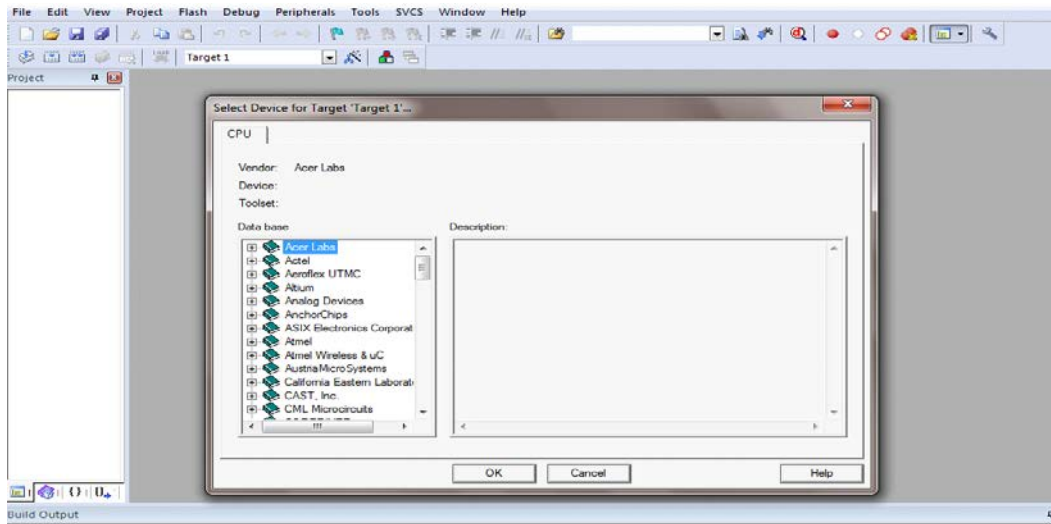


Fig 1. Vendor Selection in Keil IDE

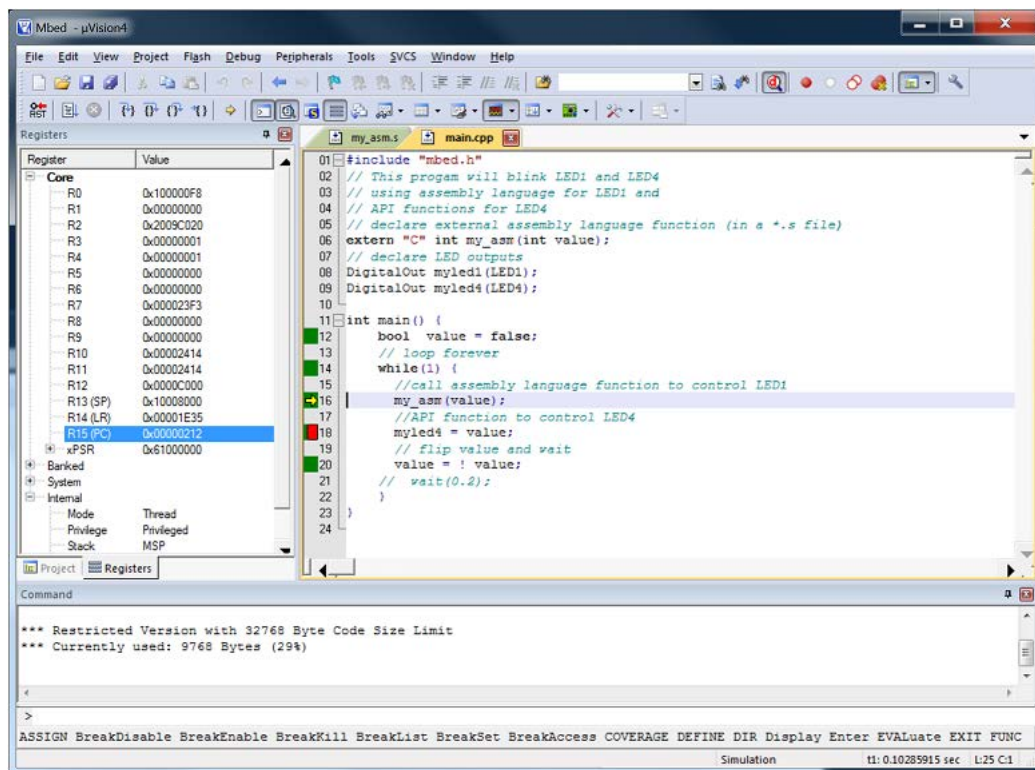


Fig 2. Keil Editor

Proteus version 8

Proteus is a Virtual System Modelling and circuit simulation application. This suite combines mixed mode SPICE circuit simulation, animated components and microprocessor models to facilitate co-simulation of complete microcontroller based designs.

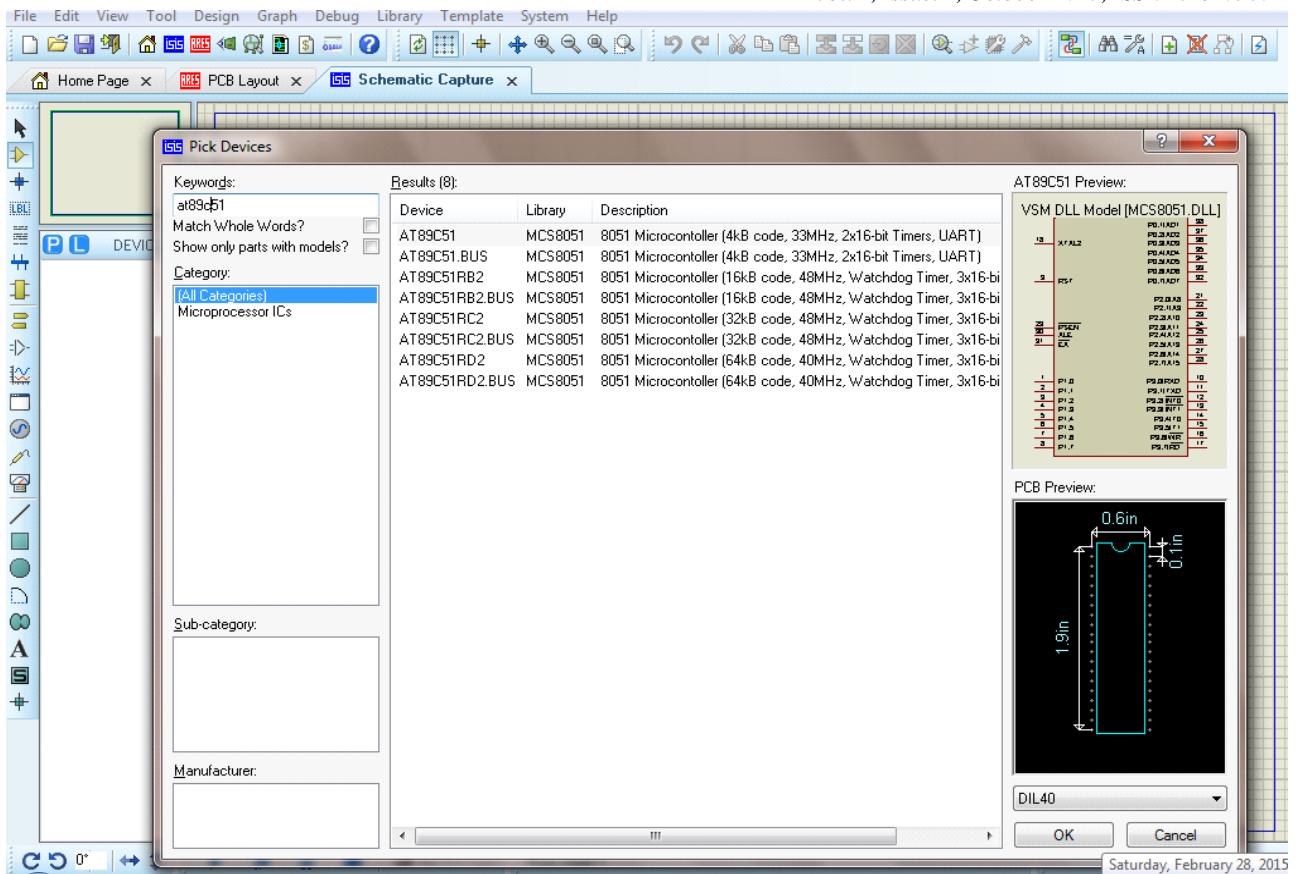


Fig 3. Proteus software with IC design.

Flash magic

Flash Magic (Fig 4) is an application developed by Embedded Systems Academy to allow you to easily access the features of a microcontroller device. With this program you can erase individual blocks or the entire Flash memory of the microcontroller.

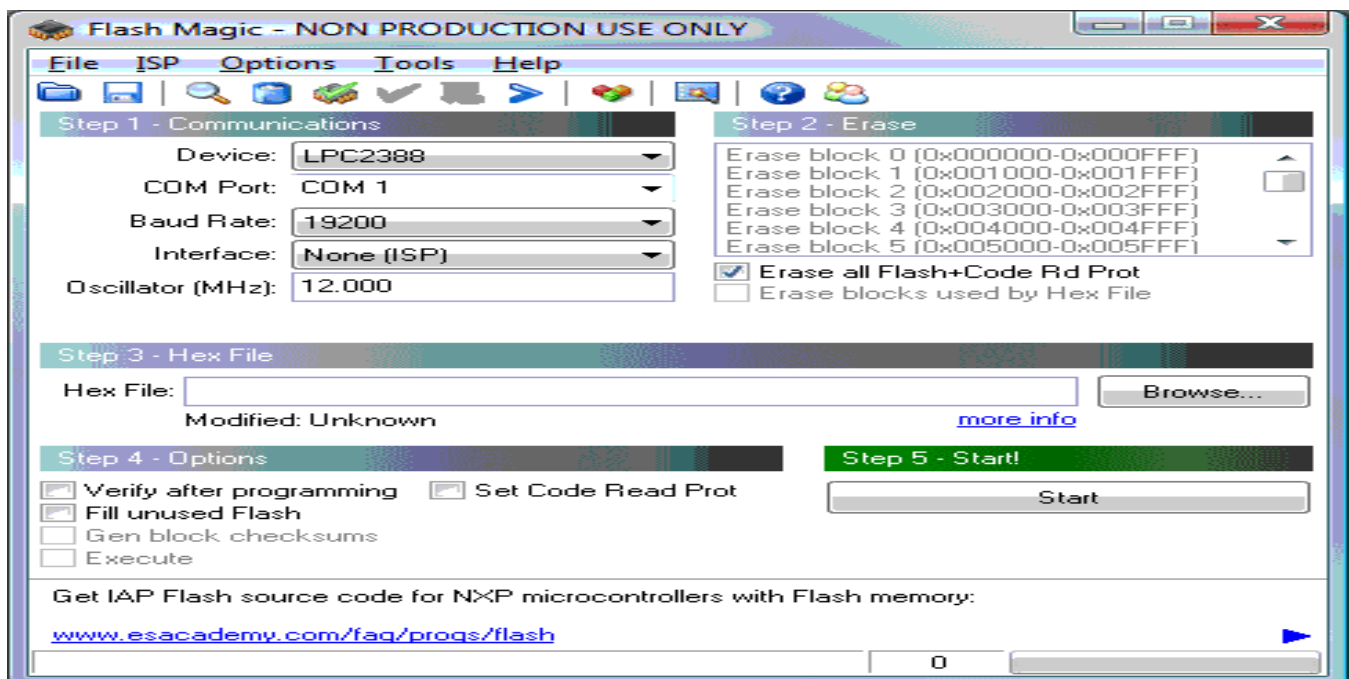


Fig 4. Proteus for circuit design

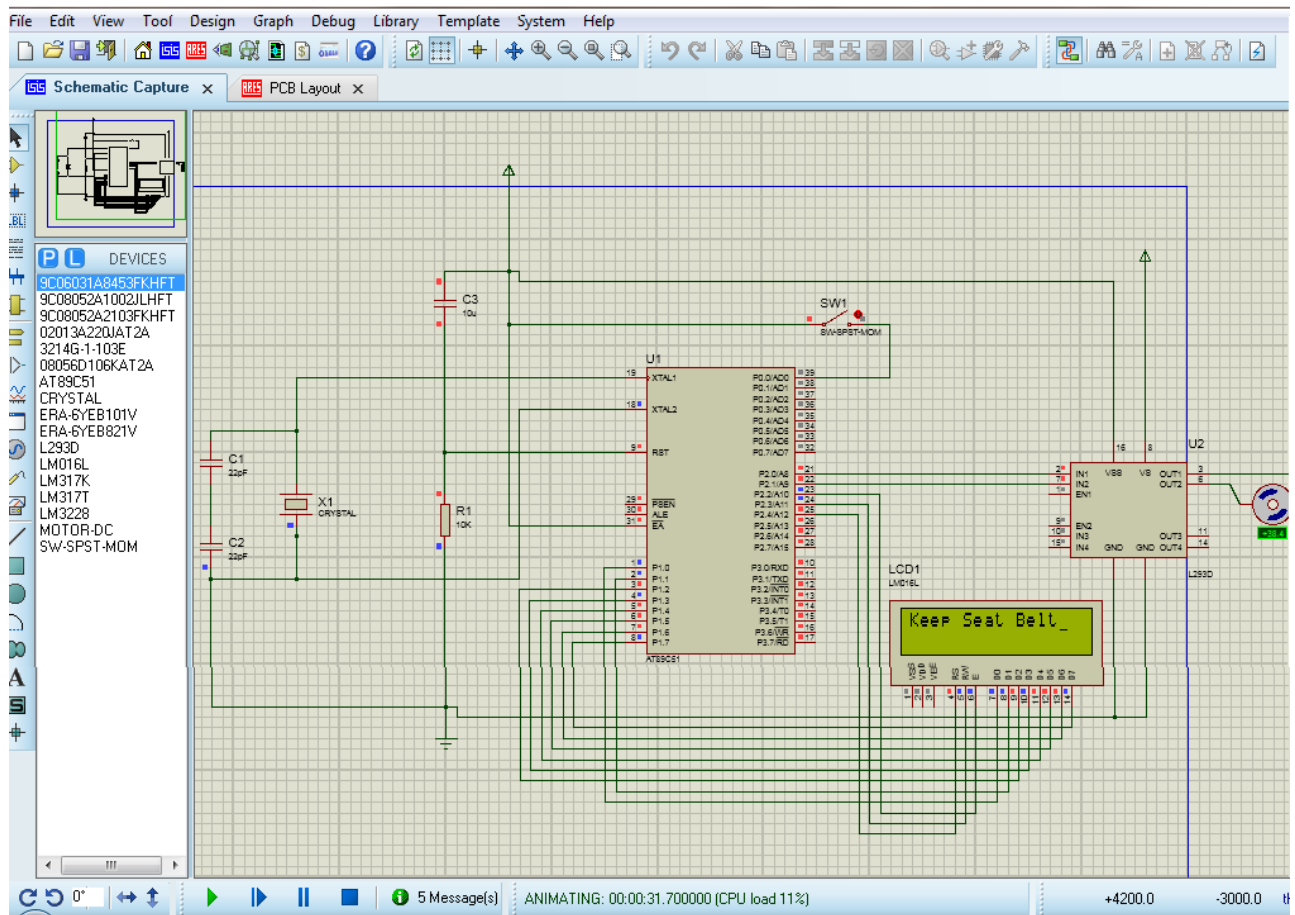


Fig 5. Circuit Design of the system

The Circuit design (Fig 5) includes the basic components like AT89c51, a motor, LCD display etc; that shows the displayed output KEEP THE SEAT BELT when the vehicle motor rotates beyond the set point.

C. Description of the Proposed System:

The proposed system has three major sections that could successfully enhance the system response after deployment. First, it will records the speed of vehicle by checking the motor rotations and secondly limits the speed automatically to the constant value until the seat belt is locked/buckled. Finally the motor is locked at a speed which could be unlocked when the seat belt is buckled, which is a final solution for the problem statement given.

III. PSEUDO CODE

- Step 1: Design the circuit with a initial set up value of speed as 60kmph.
- Step 2: After the process start, generate an infinite loop for the regular check of vehicle speed which activates the lock up function.
- Step 3: Always check the LCD for message to KEEP THE SEAT BELT that will acts as a warning to the driver.
- Step 4: Calculate the lock up time which should not go beyond 30 seconds.
- Step 5: Then the switch which is closed for a certain period is to be open after these 30 seconds which could again make the motor to run safely.

IV. SIMULATION RESULTS

The results are achieved in terms of number of times the switch closed with the number turns the message displayed in the display screen. Even after the vehicle speed crossing the set up point, vehicle could be able to adopt an automate process of rectifying the repeated generation of input message after buckling up the seat belt.

V. CONCLUSION AND FUTURE WORK

The Complete system proposed here can extend the work that may not need control of speed even the seat belt is not used. Also the steady time of vehicle speed could also be removed for those systems where the traffic is very heavy. Even the relay could also be used to rectify the malfunctions of switch.

REFERENCES

1. 8051 Micro controller interfacing, programming and its applications by Kenneth J Ayala.
2. Seat belt safety and its importance- Google search.
3. Seat Belt Safety Features Using Sensors to Protect Occupant S.D. Rahul Bhardwaj, Shraddha R. Jogdhankar
4. AUTOMATIC BELT CONTROLLED WHEEL CHAIR Gopu G., Geetha Devasena M. S. and Lavanya G. 1
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BIOGRAPHY



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