

# Digital Speedometer with Password and Speed Limit Controlling

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**Abstract**---The main aim of this project is to design a digital speedometer with password enabled with speed limit controlling. This simple system shows the ability to apply speed limit controlling techniques to the vehicle. Our digital speedometer takes input from vehicle speedometer cable and executes the speed limit controlling action. The system comprises of keypad, LCD display and microcontroller unit. The user interface includes keypad through which the password will be accepted by the microcontroller. Microcontroller controls the over speed of vehicle.

## I. INTRODUCTION

Digital speedometer with password and speed limit controlling is different think and technology for automobiles. This instrument is normally used in maintaining the speed in that your vehicle is operating, and is extremely useful in roadways and highways that have a fixed speed limit. The system generally consists of numerical keypad, LCD and microcontroller unit. The speed sensor system is easy to build. LCD and keypad are interfaced with microcontroller using program.

Keypad allows us to enter password to access the vehicle. Instead of the numerical password we can also use the finger print scanner as a password. This speedometer system can be used in any vehicle like bikes, cars, trucks, buses and any kind of vehicle. This system is very useful for the beginner drivers and who drives over speedy in city and highways.

This research details the construction and building of a digital speedometer circuit that may be interfaced to control the speed limit of vehicle. The circuit is trained to calculate the speed and check that it is under speed limit or not. If it is over speedy than circuit controls the speed automatically. This system increases the vehicle fuel efficiency and life.

Currently most vehicles are provided with analog speedometer which is less accurate than digital speedometer. Also many vehicles are provided digital speedometer. The limitation of this speedometer is that they don't have speed controlling facility. This limitation is overcome in our project.

## II. WORKING PRINCIPAL

The aim of our project is to design a digital speedometer with password enable speed controlling. Our speedometer can calculate and display the speed of vehicle and also control the speed if it goes over speed.

The system takes password input and check it is correct or not, if it is true than allows to drive over speed but if it is false than activate the speed limit function.

The speed is sensed in form of pulse by op-amp comparator and given to microcontroller which calculates the pulses per second and display the speed. It also compares the speed with stored speed limit data and if it is over the speed limit than turn off the relay which is

connected with the ignition power supply. So speed will decreases and when it comes below speed limit than turn on supply and continues.

## III. SYSTEM DESIGN

This part introduces our approach of creating a system of a Digital speedometer which is password enabled with speed controlling function.

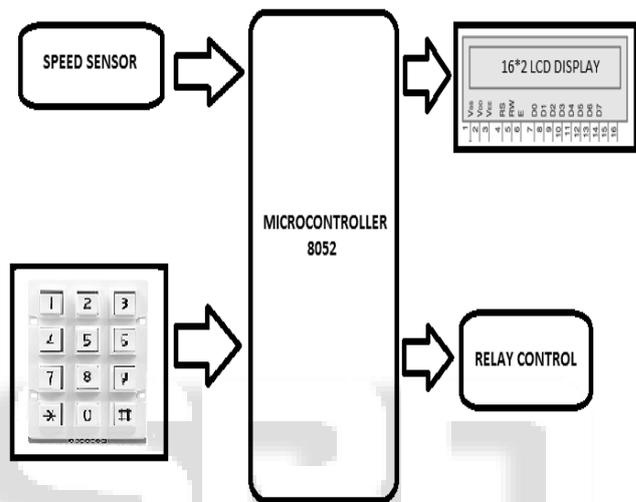


Fig. 1: Basic Block Diagram of Digital Speedometer with Password Enable Speed Controlling

The block diagram consists of five parts as follow:

- Microcontroller 8052
- EL1602 16\*2 LCD
- 3\*4 KEYPAD
- Speed Sensor
- Relay Control

## IV. WORKING

A digital speedometer is an instrument in a vehicle that is used for indicating the speed in which it is actually travelling. It is at the same time useful for knowing the range that was travelled by the vehicle.

First when the key is turn on a message "ENTER PASSWORD" is displayed on the EL1602 16\*2 LCD. The password is entered using 3\*4 numeric keypad. Pre-defined password is stored in the memory of microcontroller AT8052. Entered password is compared with stored password. If it's true than display the second menu display "Drive", "Setting". The setting menu includes the facility to change the speed limit and password. By entering in the "Drive" menu user can drive above the speed limit.

If the password is false than system turn on the speed limit function, in which speed is continuously compared with the stored speed limit and displayed on LCD. If speed is above the limit than system turn off the relay

which is connected with the ignition power supply, so power is disconnected and speed decreases. Now, when speed comes below the speed limit, system turn on the relay and continuously follows this process.

At speed sensor pulses are generated using infrared LED and receiver. It can be also generated by using magnetic reed relay sensor. These pulses are given at the op-amp LM324 comparator which produces pulse train. These pulses given to pin no.14, 15 of port 3.4 & 3.5 of microcontroller 8052.

With the help of pulse input we can calculate the speed by calculating the frequency at input. This frequency is multiplied by the distance travel by wheel in one rotation. The calculations are as follow:

$$\begin{aligned}\text{Circumference of the wheel} &= 2\pi r \text{ (where 'r' is in cm)} \\ &= 2 \times 3.14 \times 30 \\ &= 188.4 \text{ cm or } 1.884 \text{ meters}\end{aligned}$$

Let's assume that in 1 second the wheel completes one revolution. In other words, in one second, the bike has covered 1.88 meters.

$$\begin{aligned}\text{Therefore the speed in km/hour:} \\ &= N \times 1.88 \times 3600 / 1000 \\ &= N \times 6.784 \text{ or } N \times 6.8\end{aligned}$$

Where 'N' is the number of revolutions per second. '6.8' is a constant and only 'N' varies

For example, if 'N' is 5, the speed equals  $5 \times 6.8 = 34$  km/hour.

#### V. FLOWCHART

In digital speedometer when we turn on the key first of all system display the message "Enter Password". Now, we have to enter the password and system checks that it is correct or false. If the entered password is false than system turn on the relay and activates the speed limiting feature.

In speed limiting feature system continuously checks the speed and compares it with the preset value of limit. If speed is less than or equal to speed limit system will turn on the relay and display the speed on LCD.

Now if the speed is higher than the speed limit than the speed limit, than system will turn off the relay until the speed comes below the speed limit and display the speed.

Now at first, if entered password is true than system displays another menu "1.Drive 2.Setting". if we press number 1 than it will calculate and display the speed on LCD. In this mode system never check for speed limit. So we can drive vehicle at any speed.

If we press number 2 than system display other setting menu includes "1.New Password 2.New Limit". With help of this menu we can change the password and speed limit.

#### VI. APPLICATIONS

- In vehicles to display speed
- In vehicles to as over speed protector
- It can be used to control the speed of heavy motor and drive speed

#### VII. MERITS

- Easy user interface

- Speed is easy to read due to back lighted LCD
- Prevent accidents at high speed
- Consumption of fuel is less
- Password protection

#### VIII. CONCLUSIONS

By this digital speedometer we can control the over speed of vehicle and also protect it from theft. By it we observe that consumption of fuel will decreases. This is cost effective product, life is higher than analog speedometer. This product is very useful for vehicles.

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