

# Vehicle speed reduction system

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## Abstract

A very big problem facing by the big-big cities are traffic control, vehicle safety and safety for passengers. Most of the vehicles get accident because no proper safety measures are taken especially at curves and hair pin bends humps and any obstacles in front of the vehicle. In this system we can be used for the prevention of such problems by indicating a pre indication and also reducing the speed of vehicles by reducing the fuel rate of vehicle. As the action is in terms of fuel rate so the vehicle automatically goes to control and avoids the accidents.

In the curves the line of sight is not possible for the drivers the special kind of transmitter which is tuned at some frequency are mounted as these transmitters continuously radiate a RF signal for some particular area. As the vehicle come within this radiation the receiver in the vehicle gets activate. The arrangement at vehicle side is master receiver, which receives the RF signal when the transmitter frequency is interacting. The transmitter sends an encoded signal to the master receiver placed in the vehicle and receiver decodes it and it is interfaced with 89C51 microcontroller.

The same kind of method is implemented for the detection of humps and any obstacle on the roads with the help of IR LED and photo diode technique, the vehicle can be further avoided with accidents by alerting driver when the driver feels drowsiness during long driving or night driving. The road steep edge detection can be done with the help of same technique, photo diode will be placed in the vehicle and IR LED's at the edge of the roads. Some other important functions also controlled automatically by our speed reduction system, some of them are headlight control during night time and horn enable and disable in public areas like schools or colleges. We are using here the solar panels which generate a electrical energy from natural resources like solar light.

**Keywords:** 89C51 microcontroller, transmitter, Receiver, control, frequency, Ir LED.

## 1. Introduction

In this system, we are using microcontroller, IR LED and photodiodes technique, transmitter and receivers. Now the technology is developing that on electronic system replaces manual operations. Many such applications we are considering here.

Vehicle safety and safety of passengers in vehicle are very important parameters. Most of the vehicles gets accident because no proper safety measures are taken especially at curves and hair pin bends humps and any obstacles in front of the vehicle. Our intention is to avoid such problems while driving a vehicle. The main objective of this project is to develop a safe and secure method of developing a new technology of vehicle safety on road and it can be implemented in real-time situations, with low cost and very easy to adopt. Figure 1 shows the preview of speed reduction system.

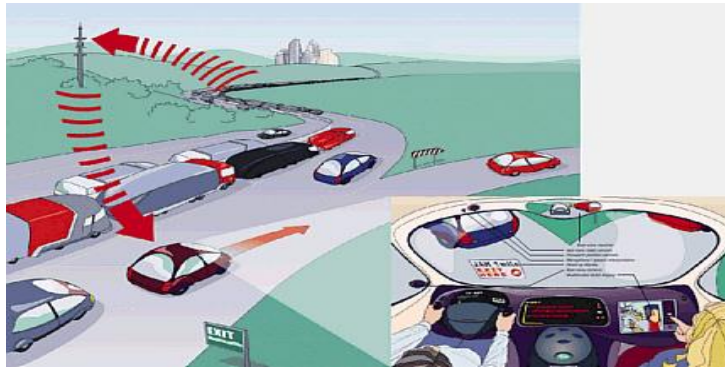


Figure 1. Preview of speed reduction system

## 2. Methodology

In this paper, embedded system and IR Photodiode sensor are used. The embedded system performs the very important tasks to reduce traffic abnormalities. Each applications provided in this project are very useful to prevent accidents and to maintain a non-violent nature in the environment. Each block connected to the microcontroller have different functions to control the vehicle as well as the driver. This project uses a fixed transmitter in a particular area and a master receiver is placed in the vehicle. The encoding and decoding is done between the transmitter and receivers when both are come in contact. The main block used in our speed reduction system is microcontroller (89C51).

## 3. Scope

Several road safety literature databases were searched for articles on speed limiting for cars. Very few articles on this specific subject were found. To reduce traffic problems like accidents and many other problems in India there should be an advanced technical implementations are to be followed and that must be ordered by the government. This system can be used for the prevention of accidents by indicating a pre indication and also reducing the speed of vehicles by reducing the fuel rate of vehicle. As the action is in terms of fuel rate so the vehicle automatically goes to control and avoids the accidents

At the curves and hair pin bends, the line of sight is not possible for the drivers. So, the special kind of transmitter which is tuned at a frequency of 433MHZ are mounted, as these transmitters continuously radiate a RF signal for some particular area. As the vehicle come within this radiation the receiver in the vehicle gets activate.

The transmitter used here is ASK type (amplitude shift keying) which emits the RF radiation. The arrangement at vehicle side is shown above a 433MHZ receiver which receives the RF signal when the transmitter frequency is interacting.

The decoded data is interfaced to microcontroller and the controller is so programmed that it now driving system drives the signal to a suitable level that which controls the action of electromechanical valve or pump. The valve regulates the fuel rate when the RF frequency is interacting with receiver. The fuel rate goes to low level which reduces the speed of vehicle so the accidents can avoided.

## 5. Block diagram of proposed system

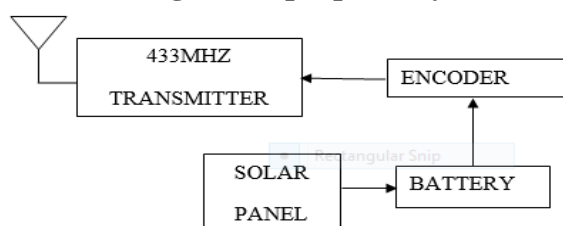


Figure 2. Transmitter of speed reduction system

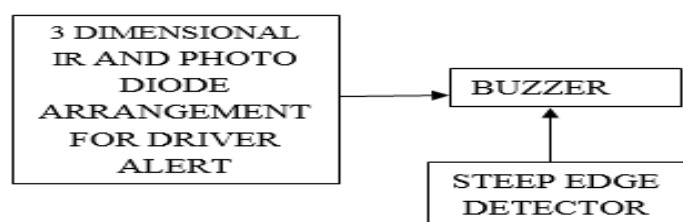


Figure 3. Buzzer system

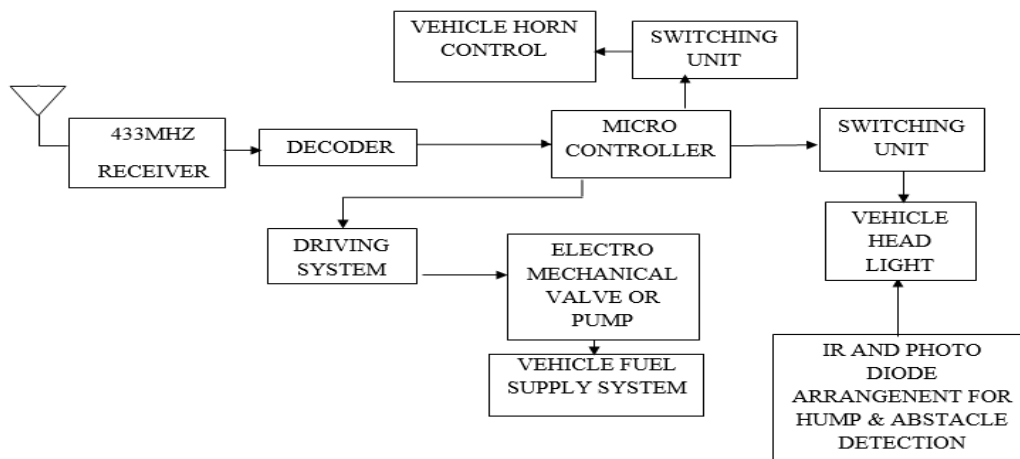


Figure 4. Receiver of speed reduction system

**Transmitter:** The curves and hair pin bends the line of sight is not possible for the drivers the special kind of transmitter which is tuned at a frequency of 433MHZ are mounted as these transmitters continuously radiate a RF signal for some particular area. As the vehicle come within this radiation the receiver in the vehicle gets activate.

**Receiver:** The arrangement at vehicle side is shown above a 433MHZ receiver which receives the RF signal when the transmitter frequency is interacting. The data available from receiver is in terms of serial this data has to be converted back in terms of parallel through a decoder which decodes the data and it is in the form of parallel. The decoded data is interfaced to microcontroller and the controller is so programmed that it now driving system drives the signal to a suitable level that which controls the action of electromechanical valve or pump. The valve regulates the fuel rate when the RF frequency is interacting with receiver.

**Obstacle And Humps Detection:** The same kind of method is implemented for the detection of humps and any obstacle on the roads with the help of IR LED and photo diode technique which acts as a proximity sensor when the IR signals transmitted from LED depending upon the distance of the obstacle or humps there is reflection of IR beam from that, material the circuit provides the signal to the microcontroller.

**Driver Alert and Buzzer System:** The vehicle can be further avoided with accidents by alerting driver when the driver feels drowsiness during long driving or night driving. A three dimensional IR led and photo diode are arranged so that whenever an abstraction takes place between triggers the photodiode which generate a buzzer sound to alert the vehicle driver.

**Steep Edge Detection:** The road steep edge detection can be done with the help of IR LED and photo diode technique, photodiode will be placed in the vehicle and IR LED's at the edge of the roads. If the edge is steep then link goes between IR led and photodiode which generate a buzzer sound to alert the vehicle driver.

**Dc Power Supply:** We are using here the solar panels which generate an electrical energy from natural resources like solar light. The energy generated from solar panel cannot be used directly, the energy has to be stored in the battery then it can be used as per our requirement. . It is also possible that the required amount of the voltage can be detect through this circuit and connect to the battery. The battery used here is either a lead acid type or maintenance free sealed lead acid battery or even a tubular battery can also be possible to use.

**Horn Control System:** The horn of the vehicle can be controlled through the controller action the microcontroller is so programmed that when at certain places or locations the horn is restricted the o/p of controller disable the horn and stops its working to prevents unnecessary noise generation near hospitals and school zones. When the vehicle passes from schools, hospitals etc. controlling the vehicle horn is done. Within certain area across the schools, hospitals the transmitter will be keep, if the vehicle passes from that area the receiver kept in the vehicle receives the signal from that transmitter and that signal is fed to the controller and with the help of switching circuit the horn of the vehicle is controlled.

**Vehicle Head Light Control:** Headlights of the vehicle are controlled with the help of LDR (Light dependent resistor). When the head lights focus of the vehicle coming in front is more, then the LDR sensor in the vehicle senses that signal and the light beam of headlight goes low. As soon as that vehicle passes, the light beam of headlight goes high.

## 6. PINNACLE 52

Welcome to Pinnacle 52, the new IDE from Vault Information Services (VIS). Development on Pinnacle 52 began soon after we released our 8052 Simulator for Windows in January 1997. The Simulator instantly became a very popular product, and it became apparent that there was still wide-spread interest in the MCS-51 architecture.

Our Simulator, while an important and easy-to-use product, was dependent on the applications of third parties to assemble and compile source. With Pinnacle, it is our intention to provide the MCS-51 market with an affordable, integrated IDE which performs all the functions necessary to deploy an 8051 application.

Now, it is no longer necessary to purchase an assembler from one company, an editor from a second company, and a Simulator from a third company. VIS has combined all these features into a single, affordable product. This is Pinnacle 52.

Pinnacle 52 is a full-featured Integrated Development Environment (IDE) that should meet the needs of 90% of the MCS-51 developers. If you find that your development requires features not supported by Pinnacle 52, it is possible you will have no option but to purchase one of the many existing expensive alternatives. To assist you in evaluating Pinnacle 52, we provide the following list of features.

## FEATURES

- 8051 Assembly Language. Pinnacle supports standard 8051 assembly language, including all standard 8051 assembly language instructions.
- Library Modules. Pinnacle supports the concept of Library modules. Library modules are standard OBJ files which are linked into a final project on an as-needed basis. This allows the developer to prepare a reusable library of program code which is subsequently linked into other projects
- Absolute Code Segments. Pinnacle gives the developer the ability to locate code at a specific memory address using the ORG directive.
- Conditional Assembly. Conditional assembly is supported by way of the standard IF...ELSE...ENDIF structure.
- Macro Facility. Pinnacle has a fairly sophisticated macro facility which will meet the needs of most developers.
- Editor. Included in the product is a full-featured editor. This editor will allow you to edit your source code within the IDE, without need for an external editor. Additionally, the editor is syntax-sensitive, coloring 8051 keywords and operands for easier reading.

- Simulator. Pinnacle includes an integrated Simulator. Upon assembling a project, the resulting code may be automatically loaded into the IDE's Simulator and tested immediately without having to use an external application and without additional hardware.
- Disassembly Capability. As an important part of the Simulator, Pinnacle has a powerful disassembly capability. The disassembly feature allows the developer to load an existing, compiled 8051 project (in HEX format, etc.) and disassemble it. The developer may subsequently declare symbols, assign labels, and insert comments throughout the code. The resulting disassembly may be exported to an ASCII file that is ready-to-assemble. This is extremely useful in reverse engineering existing programs, modifying them, and re-assembling them with your new modifications.

## 7. Results

Figure 5 shows the complete model of speed reduction system.



Figure 5. Speed reduction system

The assembly of the project consists of a fixed transmitter located in an area and a master receiver which is placed in the vehicle. The receiver part consists of microcontroller part relay circuits, sensor circuits and buffers.

Figure 6 shows that when a vehicle reaches near schools or colleges zones the speed reduces automatically and horn is enabled.



Figure 6. School zone

Figure 7 shows that when a vehicle reaches hospital zone which is placed inside area limited by the transmitter, the speed reduces automatically and also horn is disabled.



Figure 8 shows the special kind of transmitter which is tuned at a frequency of 433MHZ are mounted as these transmitters continuously radiate a RF signal and figure 9 shows the arrangement at vehicle side is shown above a 433MHZ receiver which receives the RF signal when the transmitter frequency is



interacting.

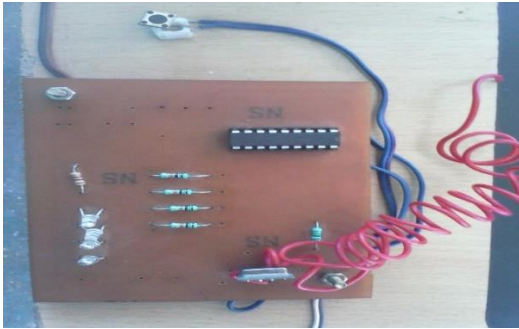


Figure 8. Fixed transmitter



Figure 9. Master receiver circuit

The figure 10 shows an Obstacle or humps detection circuit is designed with IR LED, OP\_AMP(IC 741), Photodiode and Transistor. This system indicates humps or any Obstacle found by blinking LED.



Figure 10. An Obstacle or hump is detected

Figure 11 shows when the edge is steep then link goes between IR led and photodiode which generate a buzzer sound to alert the vehicle driver.



Figure 11. Steep edge detection by IR LED sensor

Figure 12 shows the vehicle can be further avoided with accidents by alerting driver when the driver feels drowsiness during long driving or night driving. A three dimensional IR led and photo diode are arranged so that whenever an abstraction takes place between triggers the photodiode which generate a buzzer sound to alert the vehicle driver.

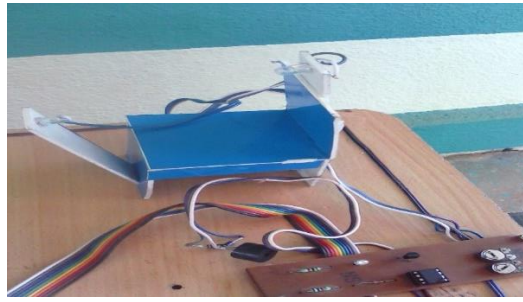


Figure 12. Driver alert system

Figure 13 shows that when the head lights focus of the vehicle coming in front is more, then the LDR sensor in the vehicle senses that signal and the light beam of headlight goes low. As soon as that vehicle passes, the light beam of headlight goes high.



Figure 13. Dim or dip of headlights

## 8. Conclusion

In this system we have incorporated transmitter, receivers, IR LED and photodiode sensors with the 89C51 Microcontroller. This system can be applicable for all vehicles in real time conditions to avoid accidents. Some of the important parameters that our system controls are as speed reduction, driver alert, obstacle or hump detection, steep edge detection, dim or dip of headlights, etc. So these are the techniques to alert the driver by alarm or by signaling lights while driving a vehicle. Thus finally we conclude that our system gives a complete protection and safety for the vehicles as well as passengers.

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