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Highway Speed Control and Automatic Breaking System

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Abstract: we could alert the driver on the highway, could save many precious lives. Usually fixing some sort of transmitter system on the highways which can detect the speed of the vehicle and convey to the driver that he is not in the permitted speed limit in a particular area is quite common and expensive. As a simple solution, we have pre installed low cost transmitters on required locations to convey the speed limit information, even further, if the automatic breaking system could be actuated on over speed is a decent approach. We have designed and developed a transmitter and receiver modules. Receiver(s) is (are) kept in the vehicle(s) and transmitter(s) are set up on the road side. These modules are now widely and cheaply available with the operating frequency of 434 MHz As it is a prototype, we have used four switches alternative. The four switches represents or assumes various speed limits say limit 80 switch, limit60 switch, School ahead switch and Don't blow horn area. Whenever these switches are pressed, they will transmit the corresponding alert message to the driver so that the driver can handle the situation sensibly.

Index Terms: RF Modules, Microcontroller.

1. INTRODUCTION

Road transport is important mode of transport in India. India has large network of road throughout the country. India faces the highest number of accidents and accidental fatalities in the world. Ministry of Road Transport & Highways report reveals that India witnessed one road accident every minute in the year 2011 which claimed one life in 3 minutes. A total of 497,000 road accidents were reported in the year 2011 in India which was less than the number of accidents reported in 2010. However, the number of deaths at 142,485 recorded an increase of nearly 7, 000 deaths in 2011 from 2010. Contrary to the popular belief, only 1.5% of the accidents are caused by defective roads. In majority of the cases (77%), driver is at fault. This becomes more dangerous in populated regions like schools or hospitals. In school areas speed breakers are provided to reduce the speed of vehicles, but the drivers do this manually. Many times due to driver's fault speed is not controlled. This process can be automated by means of RF communication i.e. speed is controlled automatically.

2. LITERATURE SURVEY

Radio Frequency (RF) is an upcoming technology which has recently attracted the interest of the research community because of the extraordinary benefits it offers over the other existing identification and data capturing technologies.

This chapter is formatted to review the existing RF literature and explore the issues in the present RF systems since the technology is still in its acceptance phase. Since the growth of RF technology from 1900's, apart from its stated positive aspects, the technology also bears some concerns or issues.

The intended purpose of this chapter is to examine the literature related to Radio Frequency further extend academic research, and providing an insight into some of the outstanding and crucial issues hindering the growth of the RF technology. There is a strong need to address these issues in order to provide a greater visibility and an increased product velocity of the RF technology.

3. RF MODULES: (RF TRANSMITTER & RF RECEIVER)

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).

Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can

travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more

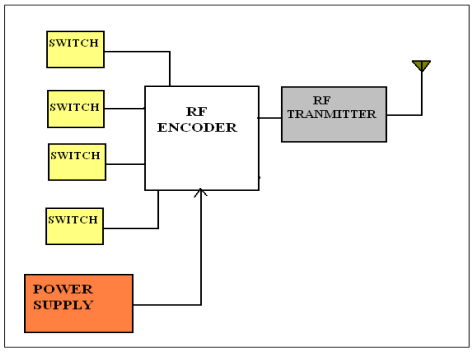

Fig 1: Transmitter section

strong and reliable than IR transmission. RF communication uses a specific frequency unlike IR signals which are affected by other IR emitting sources.

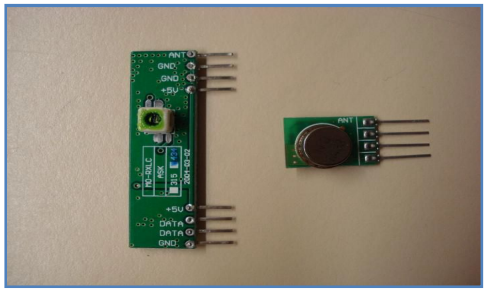

Fig 2: RF Tx & RF Rx

`This **RF module** comprises of an **RF Transmitter** and an **RF Receiver**. The transmitter/receiver (Tx/Rx) pair operates at a frequency of **434 MHz** An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

The RF module is often used along with a pair of encoder/decoder. The encoder is used for encoding parallel data for transmission feed while reception is decoded by a decoder. HT12E-HT12D, HT640-HT648, etc. are some commonly used encoder/decoder pair ICs.

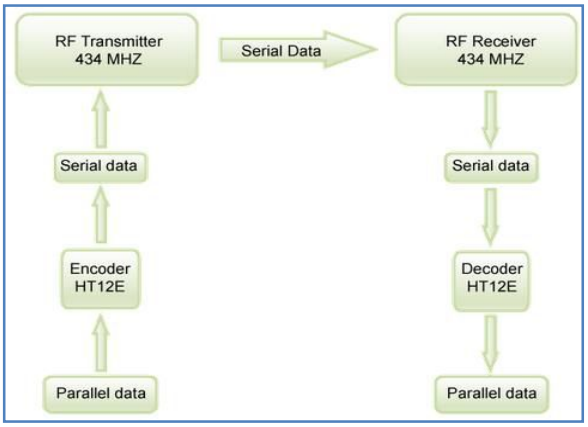

Fig 3: Block diagram of RF Modules

This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

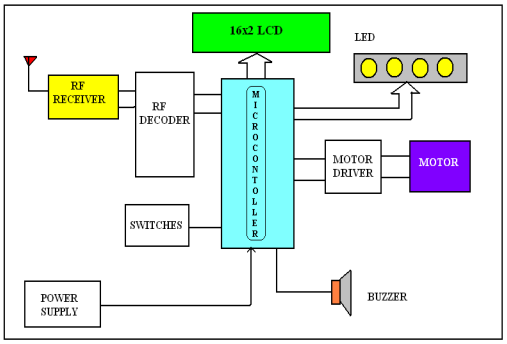

Fig 4: Receiver section

The system allows one way communication reception. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs (from the remote switches) into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs. An LED is connected to VT pin (pin17) of the decoder. This LED works as an indicator to indicate a valid transmission. The corresponding output is thus generated at the data pins of decoder IC.

4. FLOWCHART

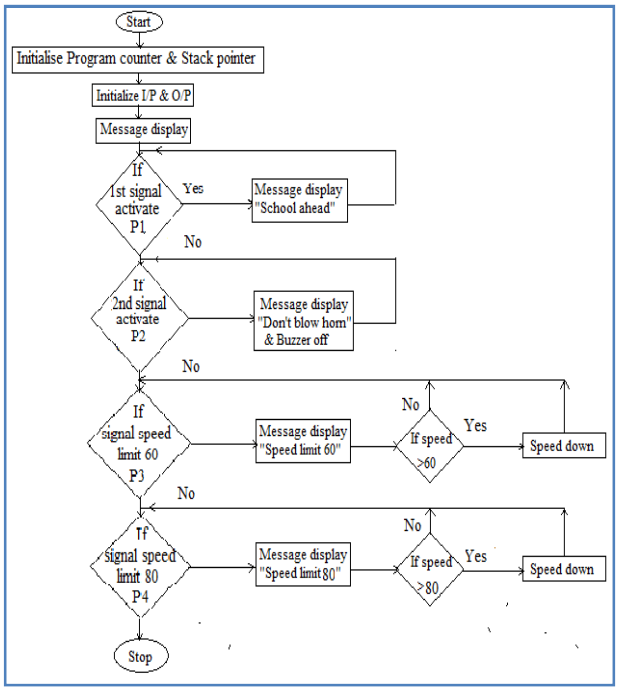

Fig 5: Flowchart of a project

5. RESULT

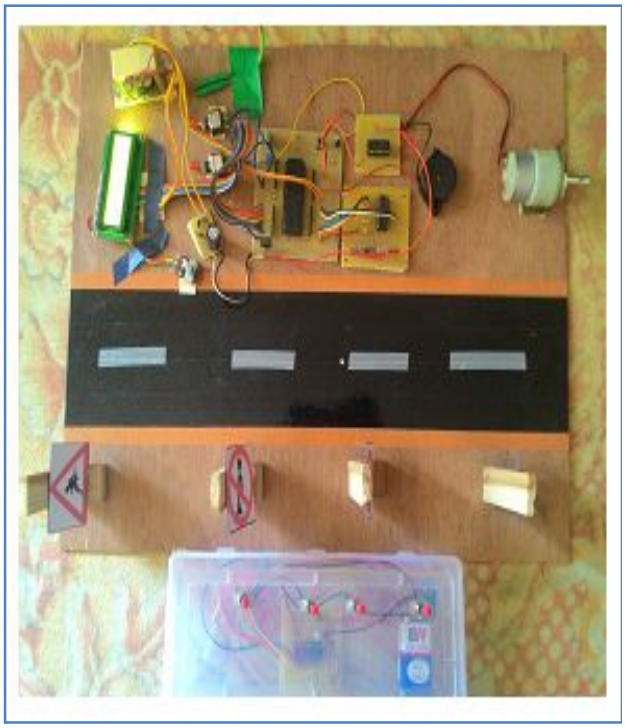

Fig 6: Setup of project

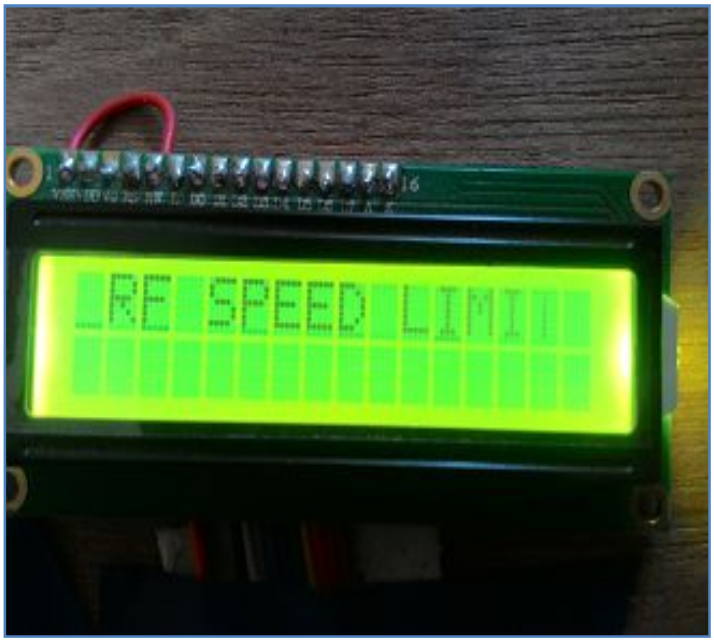

Fig 7: Output Image 1

Fig 8: Output image 2

When the vehicle enters in school zone, the presence of the school will be indicated by the transmitter. This indication will be received by the receiver and it shows the message on the display as shown in fig 8. So the driver can slow down the speed.

Fig 9: Output Image 3

When the vehicle enters in Don't blow horn zone, the indication will send by the transmitter. This indication will be received by receiver and the message will be shown on display and the horn will be automatically off.

Fig 10: Output Image 4

When the vehicle enters in the speed limit zone having the speed limit of 80km/h, if the speed of vehicle is above 80km/h then indication will be shown on the display as shown in above fig no 10 to slow down the speed of vehicle. Even after indication, if the speed will remain same then it will be automatically slow down to the limit of 80km/h.

When the vehicle enters in the speed limit zone having the speed limit of 60km/h, if the speed of vehicle is above 60km/h then indication will be shown on the display as shown in above fig no 11 to

Fig 11: Output Image 5

slow down the speed of vehicle. Even after indication, if the speed will remain same then it will be automatically slow down to the limit of 60km/h.

6. CONCLUSION

The prototype work "HIGWAY VEHICLE SPEED CONTROL AND AUTOMATIC BRAKING SYSTEM" has been successfully designed and tested. Integrating features of all the components have used developed it .Presence of every module has been reasoned out and placed carefully thus contributing the best working of the unit. Secondly using highly advanced IC's and with the help of growing technology the project has been implemented successfully.

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