# ALERT OF HIGH SPEED VEHICLES ON HIGHWAYS USING RFID AND GSM

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***Abstract*: Road safety is one of the main concerns on highways in order to avoid accidents. keeping this in mind we have designed an alert of high speed vehicles on highways using RFID and GSM .The speed of the vehicles can be detected by using IR Sensors, where only the over speed vehicles information can be sent as an SMS to the nearby Police station and a SMS alert can be sent to the vehicle owner using GSM. The main goal of this project is to design and implement a safety system to avoid accidents using RFID technology and GSM.**

***Keywords*: PIC 16F877A, IR Sensors, RFID, GSM module, LCD display, Buzzer, Mobile unit.**

## 1. INTRODUCTION

Presently, Road safety plays an important role inorder to avoid accidents due to rash driving. The present existing system uses CCTV to capture the vehicle number. By observing the CCTV the people are reducing the speed at that particular location. Here we are using a new method to detect the speed of the vehicle and also the over speed vehicle information can be sent to the nearby police station and also to the vehicle owner by using RIFD technology and GSM. The main aim of this embedded system is to provide efficient road safety to reduce accidents occurring due to rash driving.

## 2. LITERATURE REVIEW

The study on the relevant papers related to the topic would not have been possible if the researchers did not routinely place their papers on the Internet for public access. Through various sources like books and papers available on Internet, library, digital library relevant papers were surveyed. One of them is listed below

**Anjaly Anto. M**

In this proposed system it checks an over speeding vehicle or rash driving by calculating the speed of the passing vehicle using the time taken to travel between two check points (at a fixed distance)installed on either side of the road at a fixed distance. The system basically comprises two RF readers, which are installed on the highway some distance apart. RFID tags are embedded on vehicle body. When vehicle crosses the first point its tag is read by RFID and it passes information to micro controller. The speed limit is set by the person who uses the system depending upon the traffic at the very location. The time taken by the vehicle to travel from one set point to the other is calculated by a microcontroller program. If the vehicle exceeds the speed limit, then fine is imposed. The major disadvantage of this system is we can't get an SMS alert to the police in this proposed system. A police official has to be present at the location inorder to know the information.

## 3. PROPOSED METHOD

The proposed system will check on rash driving by calculating the speed of vehicle using the time elapsed between the two set points at a fixed distance. A set points consists of pair of sensors comprising of an IR transmitter and IR receiver ,each of which are installed on same side of the road .The speed limit is set by police i.e.,80kmph who use the system depending upon the traffic at the very location . The time taken by the vehicle to travel from one set point to other is calculated by the PIC micro controller. Based on that time it then calculates the speed by using a formula Speed=distance/time. Vehicle count and speed displays on LCD. Using RFID technology vehicle rfid tag number is also displayed on LCD. Moreover if the vehicle crosses the speed limit 80kmph, a buzzer sounds and also vehicle RFID tag number can be sent as an SMS through GSM to nearby police station and also to the vehicle owner and a fine can be imposed to that particular vehicle owner.

## 4. BLOCK DIAGRAM

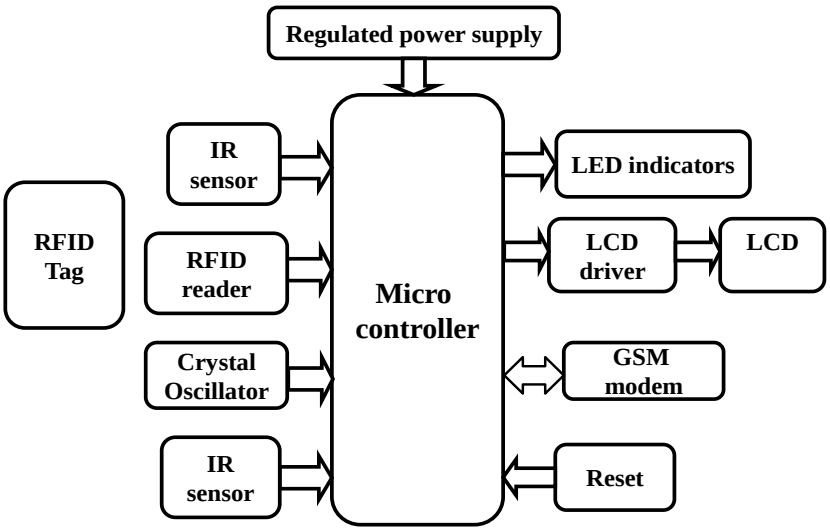


Figure 4.1 Block diagram of Alert of High Speed Vehicles on Highways

### 4.1 PIC16F877A

This powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC architecture into an 40- or 44-pin package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface or the 2-wire Inter-Integrated Circuit bus and a Universal Asynchronous Receiver Transmitter (USART). All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.

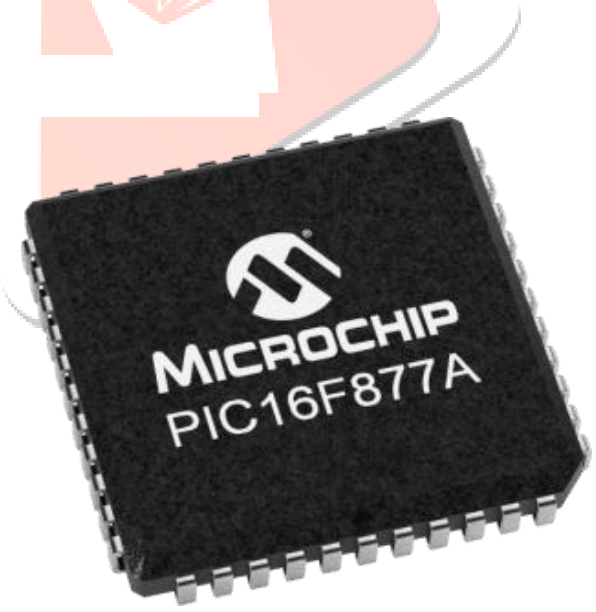


Fig 4.2 PIC 16F877A

### 4.2 RADIO FREQUENCY IDENTIFICATION (RFID)

**RFID Tags**

The tag is the basic building block of RFID. Each tag consists of an antenna and a small silicon chip that contains a radio receiver, a radio modulator for sending a response back to the reader, control logic, some amount of memory, and a power system. The power system can be completely powered by the incoming RF signal, in which case the tag is known as a passive tag. Alternatively, the tag's power system can have a battery, in which case the tag is known as an active tag.

Fig 4.3 Internal circuit of RFID tag

**RFID Readers**

The RFID reader sends a pulse of radio energy to the tag and listens for the tag's response. The tag detects this energy and sends back a response that contains the tag's serial number and possibly other information as well.

**4.3. IR SENSOR(LM_358):**

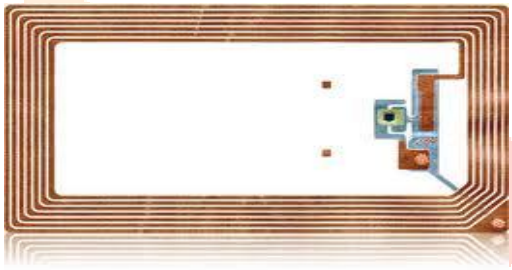

Fig 4.4 IR sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received

**4.4 GSM Module (SIM800L):**

SIM800L is a quad-band GSM/GPRS module that works on frequencies GSM850MHz, EGSM900MHz, DCS1800MHz and PCS1900MHz. SIM800L features GPRS multi-slot class 12/class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3, CS-4.With a tiny configuration of 15.8*17.8*2.4mm, SIM800L can meet almost all the space requirements in user applications such as smart phones, PDA and other mobile devices.

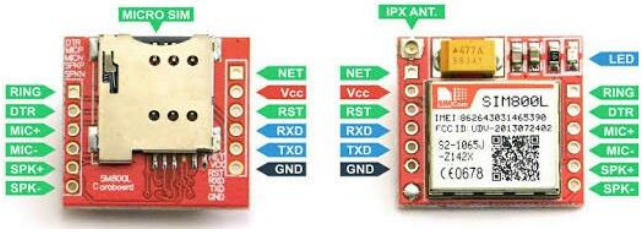


Fig 4.5 GSM Module

**Features of GSM Module:**

- Supply voltage: 3.4V - 4.2V
- Module size: 25 x 23cm

- Interface: UART (max. 2.8V) and AT commands
- SIM card socket: micro SIM (bottom side)
- Supported frequencies: Quad Band (850 / 950 / 1800 /1900 MHz)

**4.5 LCD (Liquid Crystal Display):**

A liquid crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light modulating properties of liquid crystal. A model described here is for its low price and great possibilities most frequently used in practice.

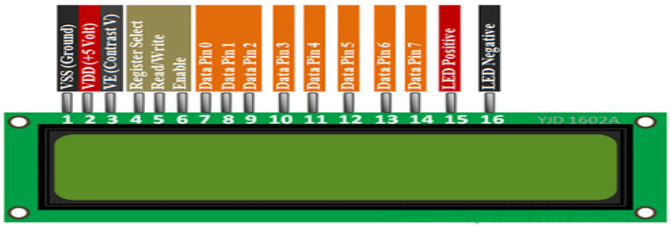


Fig 4.6 16*2 LCD

It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics. 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.

**Features of 16*2 LCD:**

- Operating Voltage is 4.7V to 5.3V
- Current consumption is 1mA without backlight
- Alphanumeric LCD display module, meaning can display alphabets and numbers
- Each character is build by a 5×8 pixel box
- Can work on both 8-bit and 4-bit mode
- It can also display any custom generated characters

## 5. RESULTS

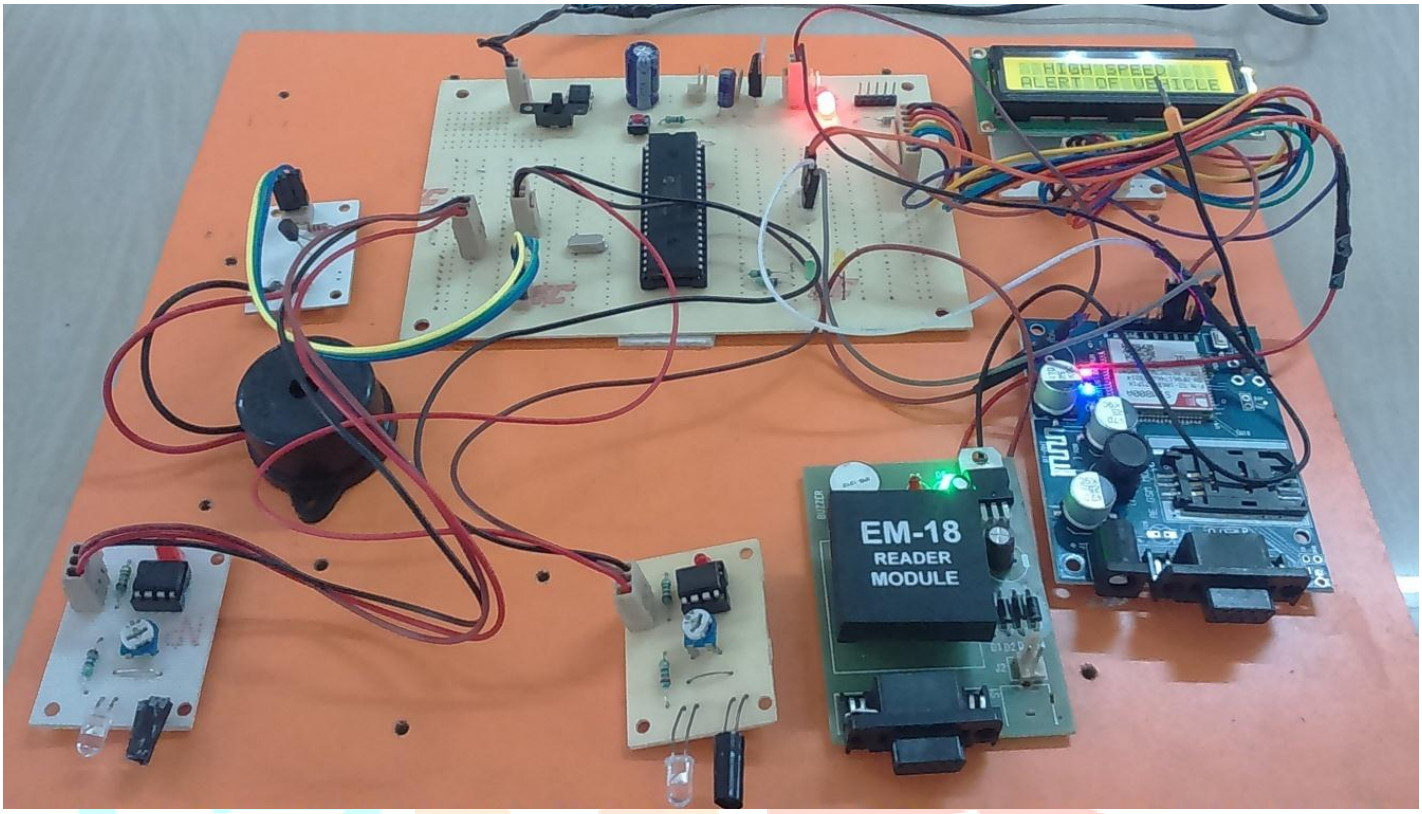


Fig 5.1 Experimental Observation

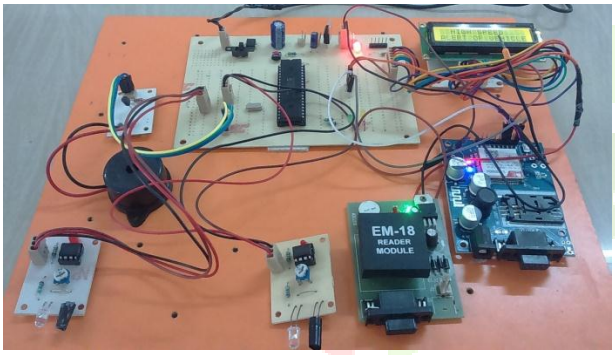


Fig 5.2 ON the circuit

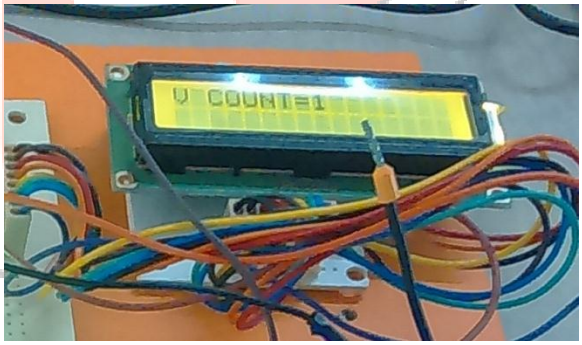


Fig 5.3 Waiting for the Vehicle


Fig 5.4 Count and Speed displayed on the LCD


Fig 5.5 Reading RFID tag


Fig 5.6 RFID tag number displayed on the LCD


Fig 5.7 Sending SMS to the police station and to the vehicle owner

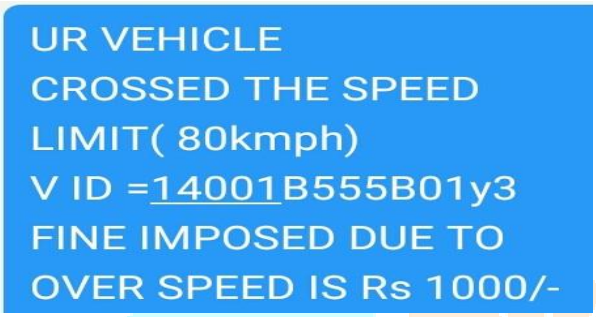


Fig 5.8 SMS received by the vehicle owner

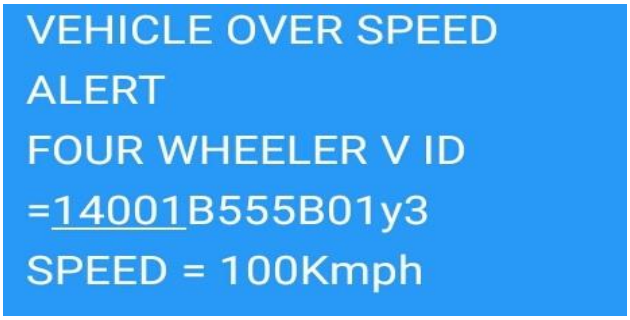


Fig 5.9 SMS received by the vehicle owner

## 6. CONCLUSION

Therefore, number of accidents are increasing day by day it is necessary to check speed of the vehicles on highways so as to decrease accident cases and to provide a safe journey by controlling high speed of the vehicle. If the vehicle crosses the limited speed i.e., 80kmph vehicle information is sent as an SMS to the control room and fine will be imposed on the vehicle owner through an alert SMS. It also minimizes the difficulties of traffic police department and make ease to control the rash driving on highways. The police can get the information about the over speed vehicles just by sitting in control room

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