



Speed Reducer for Two Wheelers Using Radio Frequency Sensors

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Received 12 October, 2015; Accepted 26 November, 2015 © The author(s) 2015. Published with open access at www.questjournals.org

ABSTRACT:- The major threat faced by today's world is increasing number of accidents. Nowadays people are driving very fast; (school zone, hills area, and highways). So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed. In this paper we are controlling the speed of two wheelers. This paper is composed of two separate units: zone status transmitter unit and receiver (speed display and control) unit. Once the information is received from the zones, the receiver unit sends signal to vehicle's microcontroller unit automatically alerts the driver, to reduce the speed according to the zone, it waits for few seconds, and otherwise vehicle's speed control unit automatically reduces the speed by controlling the spark timing.

Keywords:- Radio Frequency sensor, CDI-Capacitive discharge ignition, Proteus 8.0.

I. INTRODUCTION

One of the major causes of road accident in the world is driving too fast, recent studies shows that one third of the serious road accidents are due to inappropriate speed, as well as change in road way (like presence of road work or unexpected obstacles). So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may not be possible to view that kind of signboards and there is a chance for accident. So there is an utmost need to design a system which can control the speed of vehicles. Here we are designing a speed control system for vehicles which can intimate the driver about the zones and limit speed of the vehicle automatically. This paper develops an intelligent speed adaptation, which can monitor the vehicle speed and implements an action when the vehicle is detected to be exceeding the speed displayed in the speed display (sign) boards. The speed display boards are working as per the highway speed limiting protocol. The driver should take great attention on the speed of the vehicle especially when driving through busy junctions, school and college zones etc. The citizens are ought to obey the speed enforcement rules in order to avoid the accidents, any violation in this are considered as a greater offence. Traffic Police are authorized to check every vehicle and take actions against the violation. But it may not be practically possible always. The proposed system is designed in such a way that the vehicle speed is automatically controlled through over a wireless communication.

II. OBJECTIVE

- Our main objective is to ensure the safety of the pedestrians and the driver
- Speed reducer is designed with the aim of dynamically limiting the speed of the vehicle to a preset value, when the driver drives through an area that has a preset speed limit, thereby encouraging safe driving and preventing accidents.
- By the use of RADIO FREQUENCY [RF] signals, speed of two wheelers can be controlled based on its location. The speed restriction can be changed over time and area and this enhances safety for drivers and the pedestrians.

DESIGN AND CONSTRUCTION

2.1 RF TRANSMITTER:

. Range in open space (standard condition): 100 meter

.RX receiver frequency: 433MHz

.RX typical sensitivity: 105Dbm

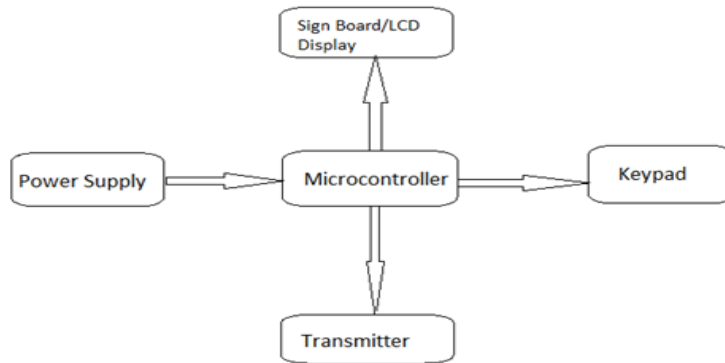
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.RX supply current: 3.5 mA

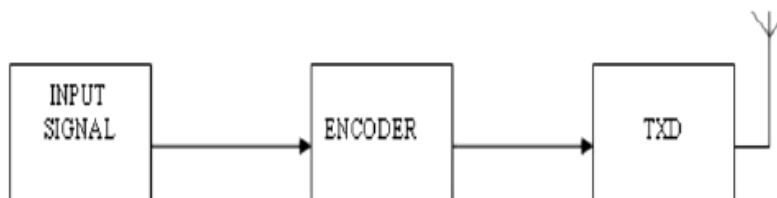
. RX IF frequency: 1MHz

The TWS-434 extremely small, and are excellent for applications requiring short-range RF remote controls. The transmitter module is only 1/3 the size of a standard postage stamp, and can easily be placed inside a small plastic enclosure. TWS-434: The transmitter output is up to 8mW at 433.92MHz with a range of Approximately 400 foot (open area) outdoors. Indoors, the range is approximately 200 foot, and will go through most walls. The TWS-434 transmitter accepts both linear and digital inputs can operate from 1.5 to 12 Volts-DC, and makes building a miniature hand-held RF transmitter very Easy. The TWS-434 is approximately 1/3 the size of a standard postage stamp



6.1.1 transmitter block diagram

1) TRANSMITTER



2.1.2 Transmitter model

1) TRANSMITTER

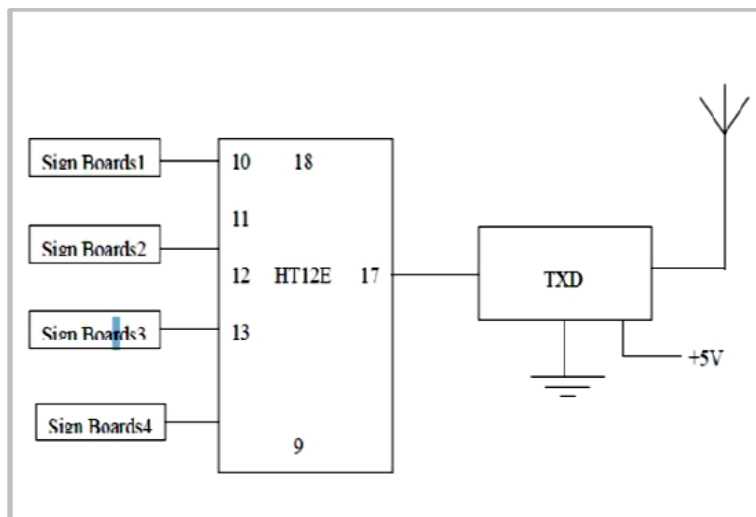


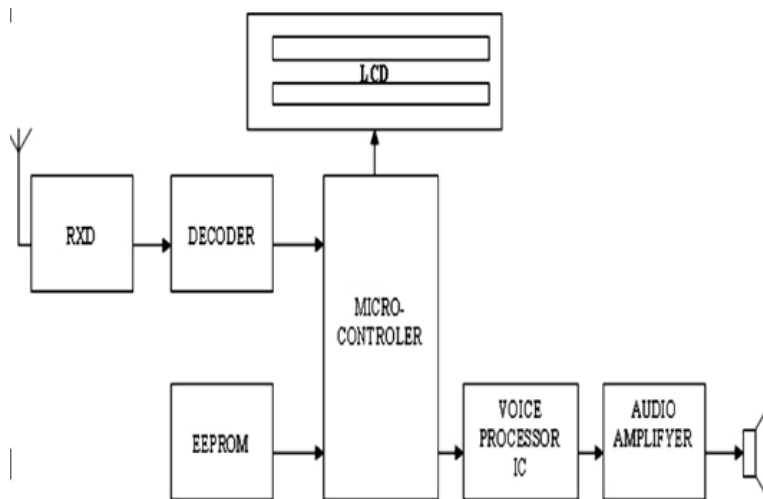
Fig 2.1.3 Transmitter

2.2RF RECEIVER

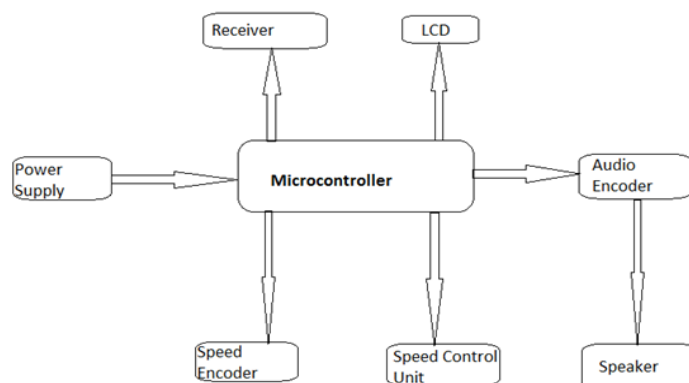
- .RX operating voltage: 5v
- .TX frequency range: 433.92MHz
- .TX supply voltage: 3v ~6v
- .TX Output power: 4~12Dbm
- .low power consumption

The receiver also operates at 433.92MHz, and has a sensitivity of 3uV. The RWS-434 receiver operates from 4.5 to 5.5 volts-DC, and has both linear and digital outputs.

The WC418 is made of 26 gauge carbon steel music wire that can be soldered to a PC board. This antenna has a plastic coated tip for safety and is 6.8 inches long, allowing.1 inch for insertion in a terminal or PC board. The following should help in achieving optimum antenna performance: • Proximity to objects such a users hand or body, or metal objects will cause an antenna to detune. For this reason the antenna shaft and tip should be positioned as far away from such objects as possible. • Optimum performance will be obtained from a 1/4 or 1/2 wave straight whip Mounted at a right angle to the ground plane. A 1/4 wave antenna for 418 MHz is 6.7 inches long. • In many antenna designs, particularly 1/4 wave whips, the ground plane acts as a counterpoise, forming in essence, a 1/2 wave dipole. Adequate ground plane area will give maximum performance. As a general rule the ground plane to be used as counterpoise should have a surface area equal to or greater than the overall length of the 1/4 wave radiating element (2.6 X 2.6 inches for a 6.7 inch long antenna). Remove the antenna as far as possible from potential interference sources. Place adequate ground plane under all potential sources of noise.



2.2.1 Receiver block diagram



2.2.2 Receiver control unit

2.3 MICROCONTROLLER

A microcontroller (abbreviated μC , uC or MCU) is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals. This programmes memory in the form of NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM.

2.3.18051 MICROCONTROLLER

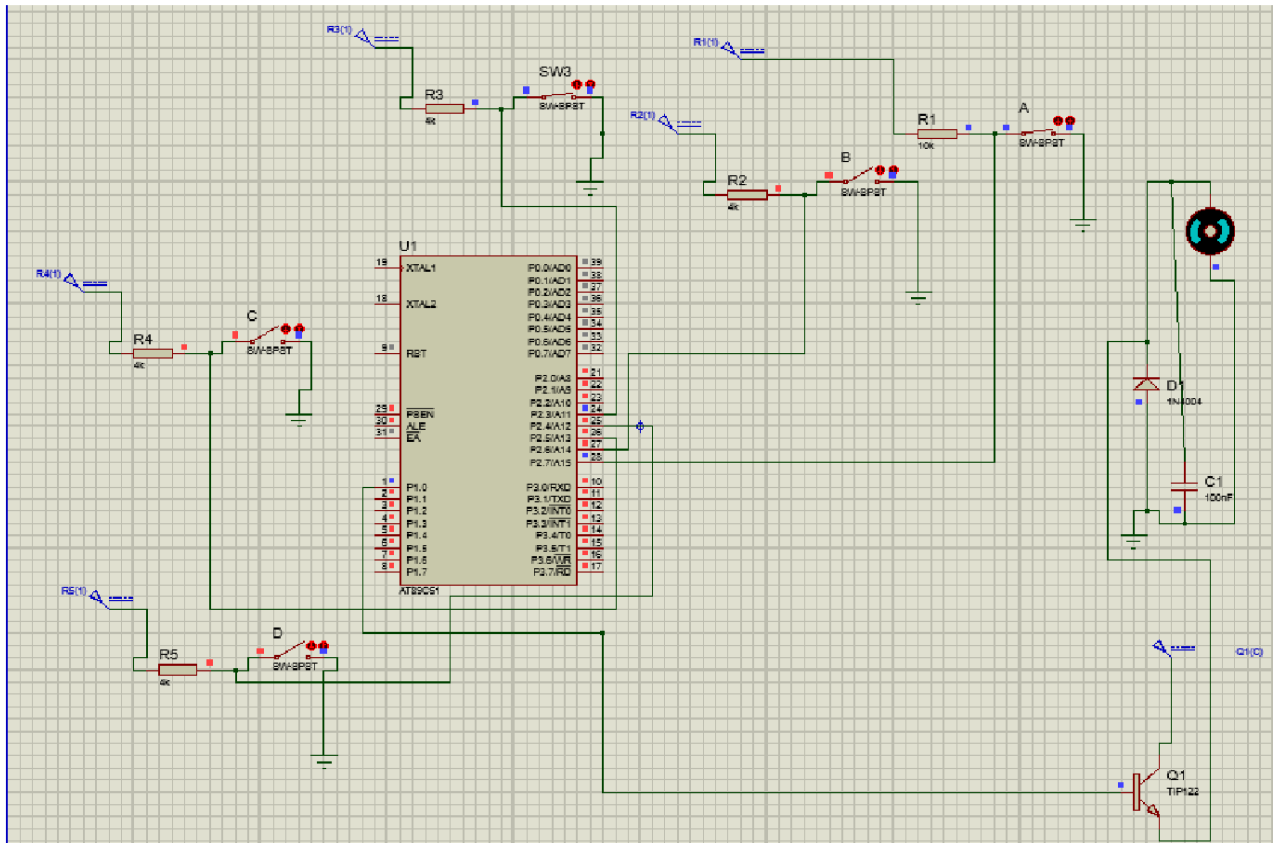
The microcontroller incorporates all the features that are found in microprocessor. The microcontroller has built in ROM, RAM, Input Output ports, Serial Port, timers, interrupts and clock circuit. A microcontroller is an entire computer manufactured on a single chip. Microcontrollers are usually dedicated devices embedded within an application. For example, microcontrollers are used as engine controllers in automobiles and as exposure and focus controllers in cameras. In order to serve these applications; they have a high concentration of on-chip facilities such as serial ports, parallel input output ports, timers, counters, interrupt control, analog-to-digital converters, random access memory, read only memory, etc. The I/O, memory, and on-chip peripherals of a microcontroller are selected depending on the specifics of the target application. Since microcontrollers are powerful digital processors, the degree of control and programmability they provide significantly enhances the effectiveness of the application. The 8051 microcontroller of the MCS-51 family introduced by Intel Corporation at the end of the 1970s. The 8051 family with its many enhanced members enjoys the largest market share, estimated to be about 40%, among the various microcontrollers architectures. The microcontroller has on chip peripheral devices. In this unit firstly we differentiate microcontroller from microprocessor then we will discuss about hardware details of 8051 and then introduces the assembly level language in brief. Microcontroller (MC) may be called computer on chip since it has basic features of microprocessor with internal ROM, RAM, Parallel and serial ports within single chip. Or we can say microprocessor with memory and ports are called as microcontroller. This is widely used in washing machines, vcd player, microwave oven, robotics or in industries. Microcontroller can be classified on the basis of their bits processed like 8bit MC, 16bit MC. 8 bit microcontroller means it can read write and process 8 bit data. Ex. 8051 microcontroller. Basically 8 bit specifies the size of data bus. 8 bit microcontroller means 8 bit data can travel on the data bus or we can read, write process 8 bit data.

III. CONSTRUCTION AND WORKING

The simulation is done using Proteus 8.0, showing that the speed of the vehicle is limited to a particular level when the vehicle enters that particular zone irrespective of the current speed of the vehicle. In this simulation the speed limiting of the vehicle is shown using the electrical circuits. The electrical circuit consists of an IC, a small rotor which acts as a motor and four relay switches which acts as gears. A-first gear speed; B-second gear speed ;C-third gear speed ;D-fourth gear speed

Each relay is given an input of 5N, but the speed of the vehicle differs for different gears. The simulation is done for HERO Splendor, at maximum acceleration. For the first gear the vehicle has a maximum speed of 3132 rpm. For the second gear the vehicle has a maximum speed of 4250 rpm. For the third gear the vehicle has a maximum speed of 4840 rpm. For the fourth gear the vehicle has a maximum speed of 7000 rpm. This variation of speed for the same input of relays is encoded in the program. The circuit also has a fifth relay switch which is controlled by an actuator which works under the signal from the receiver of the sensor. This fifth relay switch is a limiting switch which limits the speed of the vehicle when the signal is received. The first switch is connected to the microcontroller in the pin 6 of port 2. The second switch is connected to the microcontroller in the pin 7 of port 2. The third switch is connected to the microcontroller in the pin 8 of port 2. The fourth switch is connected to the microcontroller in the pin 9 of port 2. The fifth switch is connected to the microcontroller in the pin 10 of port 2. Each switch is grounded, and connected with the resistors. The vehicle is connected to the diode and capacitor for storing charge. The microcontroller gets input from the receiver section and the wheel rpm from which the engine rpm can be calculated comparing this inputs, the microcontroller control the speed of the vehicle by activating the fifth switch if the vehicle speed is higher than the received speed else the speed is maintained.

3.1.1 SIMULATION OF TWO WHEELER SPEED REDUCTION



IV. CONCLUSION

The paper succeeded in implementing a system to reduce the traffic violations. The driver is made aware of his driving behavior and violations made so that careful and conscious driving can be achieved. Wireless transmission is achieved with the help of Radio Frequency. The simulation is done to reduce the speed of the vehicle, the initial speed of the vehicle is compared with the zone speed, if the initial speed is higher than the zone speed then the microcontroller unit reduces the speed of the vehicle with Capacitive Discharge Ignition unit, which is analyzed and simulated by using PROTEUS 8.0. The prototype of the model will be developed using transmitter and receiver sections and other mechanical components. This project is further enhanced by automatic speed control when the vehicle gets any hazard signal from outside environment.

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