Design of RFID based Security System for College Campus

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Abstract

The main purpose of the campus security system is to make the college campus secured in every way that is need to be done and also maintaining the discipline in the educational campus in the way by reducing the loudness of the horn and the proper main functions are listed below.

- *Keep log the person entering the campus automatically.*
- *Limit the speed of vehicle and horn loudness automatically when it enters the campus.*
- *Only RFID installed vehicle can enter in college campus*

1. INTRODUCTION

RFID technology is used in many different applications, such as television, radio, cellular phones, radar, and automatic identification systems. The term RFID (radio frequency identification) describes the use of radio frequency signals to provide automatic identification of items.

Radio frequency (RF) refers to electromagnetic waves that have a wavelength suited for use in radio communication. Radio waves are classified by their frequencies, which are expressed in kilohertz, megahertz, or gigahertz. Radio frequencies range from very low frequency (VLF), which has a range of 10 to 30 kHz, to extremely high frequency (EHF), which has a range of 30 to 300 GHz.

An RFID system contains RFID device (transponder or tag) that contains data about an item, antenna used to transmit the RF signals between the reader and the RFID device, RF transceiver that generates the RF signals, reader that receives RF transmissions from an RFID device and passes the data to a host system for processing

The RFID tag contains information such as vehicle number. The RFID tags based on the mode of operation are classified as active and passive tags. The classification is done on basis of the tags ability to transmit the code embedded in it. Hence an active tag is capable of transmitting to a reader independently, whereas the passive tag needs an external excitation to transmit the code. The reader usually provides the excitation. Further each of the tags either active or passive has their own frequency of operation.

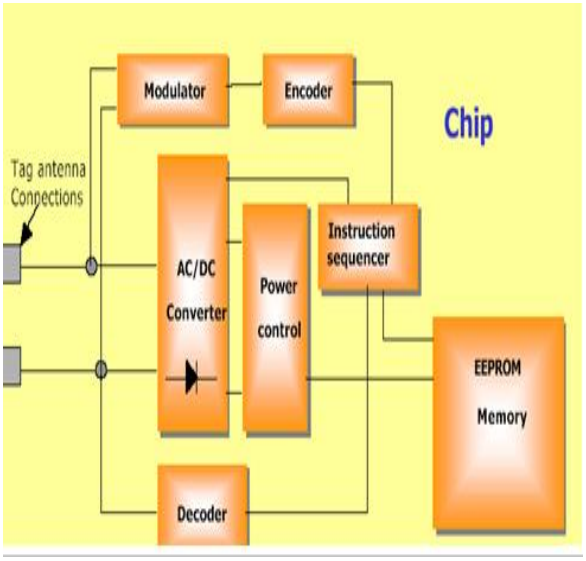

Fig.1: Internal structure of tag

If a vehicle has entered in campus then its maximum speed and loudness of its horn is automatically limited to some predefined value depending upon vehicle type. Identity of vehicle (vehicle number) is automatically recorded by RFID reader placed near main gate. By controlling its fuel injection mechanism and horn mechanism, its speed and horn volume is controlled. Also identity and mobility in campus of each person campus will be monitored and recorded by no. of RFID readers placed in campus and a central database station.

2. RFID MODULE: CC2500

The CC2500 is a low cost true single chip 2.4 GHz transceiver designed for very low power wireless applications. The circuit is intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency band at 2400-2483.5MHz. The RF transceiver is integrated with a highly configurable baseband modem. The modem supports various modulation formats and has a configurable data rate up to 500 kbps. The communication range can be increased by enabling a Forward Error Correction option, which is integrated in the modem. CC2500 provides extensive hardware support for packet handling, data buffering, burst transmissions, clear channel assessment, link quality indication and wake-on-radio.

The main operating parameters and the 64-byte transmit/receive FIFOs of CC2500 can be controlled via an SPI interface. In a typical system, the CC2500 will be used together with a microcontroller and a few additional passive components.

2.1 P89V51RB2/RC2/RD2

The P89V51RB2/RC2/RD2 are 80C51 microcontrollers with 16/32/64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RB2/RC2/RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI. The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible.

2.2 MOTOR DRIVER IC:L293D

The current provided by the MCU is of the order of 5mA and that required by a motor is ~500mA. Hence, motor can't be controlled directly

by MCU and we need an interface between the MCU and the motor. A Motor Driver IC like L293D or L298 is used for this purpose which has two H-bridge drivers. Hence, each IC can drive two motors.

2.3 SPEED CONTROL:

To control motor speed we can use pulse width modulation (PWM), applied to the enable pins of L293 driver. PWM is the scheme in which the duty cycle of a square wave output from the microcontroller is varied to provide a varying average DC output. What actually happens by applying a PWM pulse is that the motor is switched ON and OFF at a given frequency. In this way, the motor reacts to the time average of the power supply.

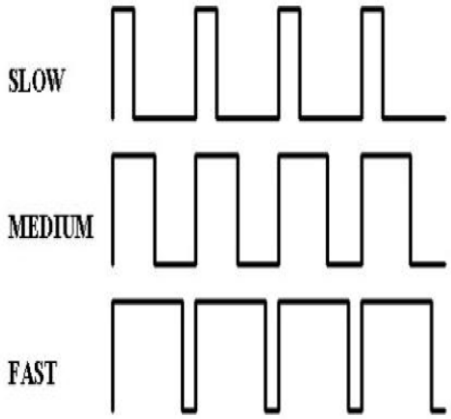

Fig.2: Velocity Control of Motor Using PWM

2.4 SERIAL COMMUNICATION RS232

RS232 is used for serial communication. RS232 is most widely used for I/O interfacing standards. In RS232, 1 is represented by -3 to -25V and 0 is represented as +3 to +25V making -3 to +3 undefined. Therefore to this reason, to connect RS232 to a microcontroller, MAX232 is needed to convert TTL logic levels to RS232 voltage levels. MAX232 is known as Line drivers.

2.5 MAX232:

RS232's voltage levels are not compatible with microcontroller so to make it compatible MAX232 is used which is known as line drivers. It converts the TTL levels to RS232 voltage levels and vice versa.

Advantage of MAX232 is that it uses 5V power supply which is same as for microcontroller.

3. RESULT

The automatic vehicle tracking facility delivers the flexibility, suitability, and responsiveness for different organizations. In a global marketplace where productivity is crucial to success, vehicle fleet operators use vehicle management systems as a formidable tool to drive down costs and increase the value of their service.

With the concept of stationary transceiver kept in college campus and the vehicle with the RFID transceiver which is CC2500 and when the vehicle enters in the campus the stationary RF module reads the another module entered in the campus attached to the vehicle and vehicle number is displayed in host computer

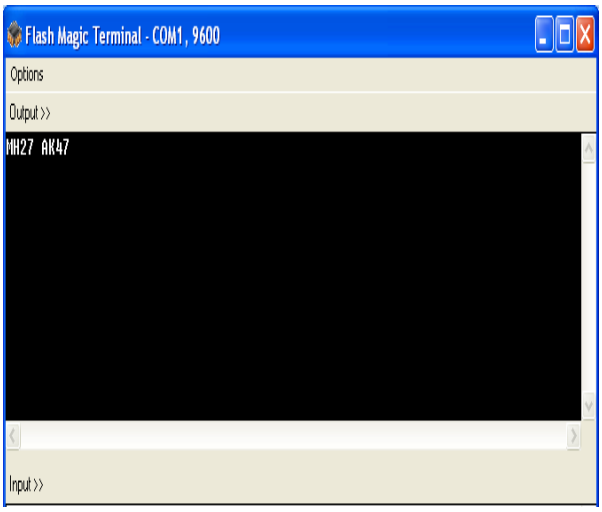

Fig. 3: Vehicle no. display in host computer

4. CONCLUSION

RFID technologies offers practical benefits to almost anyone who needs to keep track of physical assets. Manufacturers improve supply chain planning and execution by incorporating RFID technologies. Retailers use RFID to control theft, increase efficiency in their supply chains, and improve demand planning. Pharmaceutical manufacturers use RFID systems to combat the counterfeit drug trade and reduce errors in filling prescriptions. Machine shops track their tools with RFID to avoid misplacing tools and to track which tools touched a piece of work. RFID-enabled smart cards help control perimeter access to buildings. And in the last couple of years, owing in large part to Wal-Mart and DoD mandates, many major retail chains and consumer goods manufacturers have begun testing pallet- and case-level merchandise tagging to improve management of shipments to customers.

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