

Car Parking System using RFID

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Abstract

Vehicle parking management is an important issue and its necessity is increasing day by day. RFID Car Parking System is a simple system that offers an efficient car parking management system with the help of RFID Technology. Car parking management consists of many tasks like issuing tokens, noting the check-in and check-out time, calculating fare and finally collecting the amount. As the number of vehicles is increasing, the problems faced by manual parking management system are also increasing. These types of problems can be eliminated to some extent by implementing an intelligent parking system where the entry and exit of cars is monitored and payment is made easy with sensor technology.

1. Introduction

Now days we are still using the manual vehicle parking system and that is why we are facing problems like wastage of time and fuel for finding free space around the parking ground when we need to park our car which requires a good amount of lighting [1]. Another issue is chaos that happens while parking because there is no particular system anyone can park anywhere that sometime causes damage to the vehicles while moving out or in the parking lot. Security is also needed.

Idea of RFID based Car Parking System

RFID Card is explicit to the customer and the card details are pre-programmed in the microcontroller. When the RFID card is swiped against the RFID Reader, it gets energised from the reader and sends the information to the reader. The reader then transmits the card's information to the microcontroller via serial communication protocol. The microcontroller then checks for the received card details with already stored details and checks for authenticity of the card. If the card is existing in the database, the microcontroller will check for the current time in the RTC module and stores the in time details of the particular card in the EEPROM[2].

The communication between the microcontroller and RTC module is using I2C protocol. The communication between the microcontroller and the EEPROM is also using I2C protocol. If the card is swiped again, the in time details from the EEPROM and out time details from the RTC are taken and the fare is calculated as per the tariffs.

RFID Security Access Control System utilizing 8051 Microcontroller

RFID Security Access Control System utilizing 8051 Microcontroller is a RFID Technology based security framework. Utilizing this framework, approval of staff is done with a RFID card and just those with access can enter a verified territory. The security of any association is a need for the specialists. The security concern is for the physical property and furthermore for the protected innovation. Therefore, programmed distinguishing proof and access control framework has turned out to be important to defeat the security dangers looked by numerous associations. Security access control with legitimate cards are permitted to get to the entryway or any protected zone.

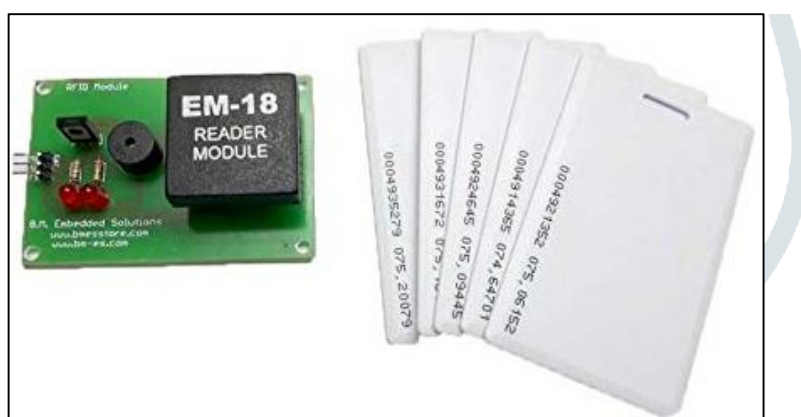
Circuit Principle of RFID Security Access Control System

The guideline of activity depends on the working of the RFID Circuit. A Passive kind RFID Card is utilized in this undertaking. At the point when this card is put close to the RFID Reader Module, the receiving wire loop in the Reader energizes the curl in the RFID card through shared enlistment. Thus, the microchip in the peruser likewise gets enough capacity to turn it on. Presently the curl in the peruser goes about as a reception apparatus and moves the information in the microchip to the peruser module through radio correspondence. The peruser module, at that point speaks with the microcontroller through UART convention to move the information got from the card.

RFID Description

Radio Frequency Identification or basically RFID is a remote innovation for the most part utilized for programmed distinguishing proof and information accumulation. RFID innovation is utilized for getting to information from a remarkably distinguish RFID card or tag by consolidating the radio recurrence and microchip advances for example the information is recovered or put away into the RFID cards without reaching.

With the assistance of RFID innovation, we can make keen frameworks that can be utilized faculty recognizable proof, item checking, individual or association security, transportation, support of stock and store network following. RFID frameworks more often than not contain three segments: a RFID Card, a RFID Reader Module and a host gadget. RFID Card or Tag comprises of the information in the implanted microchip. RFID Reader is utilized to peruse the information from the RFID Card and move it to the host gadget.



The communication between the Reader and Card is using Radio Technology whereas the communication between RFID Reader and the host device like a microcontroller is through serial protocol. RFID tags are generally classified into two types: Active RFID Tags and Passive RFID Tags.

Active RFID Tags are battery controlled and they have an electronically erasable and programmable memory. Thus, the vital information can be sent in to the memory by the client and read utilizing a RFID Reader. As they are battery fuelled gadgets, Active RFID Tags can speak with the RFID Reader over separations bigger than 100 feet.

Passive RFID Tags then again, don't contain any battery. Passive RFID Tags comprises of a curl and a microchip[3]. The loop goes about as a radio wire just as the wellspring of intensity through enlistment. The microchip is a perused just sort memory and the client can just peruse the information that previously put away by the producer. Passive RFID Tags are utilized for short separation correspondence, as a rule 10 feet or less. The most normally utilized RFID peruser is EM-18 peruser module. This module has a worked in receiving wire which is utilized to control the RFID Cards and furthermore extricate the data from the Card's microchip.

Circuit Design RFID Security Access Control System using 8051 Microcontroller

The primary segments required are Microcontroller, RFID Reader, RFID Cards or Tags, a LCD show, L293D Motor Driver IC and a Motor. For the microcontroller to work appropriately, we have to interface a 11.0592 MHz oscillator alongside two artistic capacitors of capacitance 33pF to the microcontroller[4]. Stick 31 of the microcontroller for example EA Pin is associated with 5V utilizing a present restricting resistor of opposition 10K Ω . So as to reset the microcontroller, the RST stick (Pin 9) must be quickly associated with 5V. Thus, a mix of push catch, 10K Ω resistor and 10 μ F capacitor is utilized in the reset circuit.

A LCD Display is utilized in this undertaking to show the subtleties of the card. The information pins of the LCD are associated with PORT1. The control pins are associated with P3.6, GND and P3.7 and a 10K Ω potentiometer is associated with modify the complexity. The following part we have to interface with the microcontroller is the RFID peruser module. The correspondence between the Reader and the microcontroller is utilizing UART convention.

Subsequently, we have to utilize the TX and RX pins for correspondence. Interface the RXD stick (Pin 3.0) of the microcontroller to the TX stick of the RFID Reader module. So also, associate the TXD stick (P3.1) of the microcontroller to the RX stick of the RFID Reader module. At long last, we have to associate the engine driver IC to the PORT0 of the microcontroller. A significant note is that Port 0 pins must be remotely dismantled high so as to utilize them as info/yield pins. Associate the two information pins of the engine driver for example IN1 and IN2 (Pins 2 and 7) to Port 0 pins for example P0.0 and P0.1 of the microcontroller. An engine is associated with yield pins of the engine driver.

Working of RFID Security Access Control System

The point of this undertaking is to plan a RFID based security access control framework utilizing 8051 microcontroller, in which just approved work force are enabled access to a safe zone. The working of the undertaking is clarified here[5]. At the point when the circuit is controlled ON, the microcontroller will at first showcase a message as "Swipe the Card" on the LCD show.

At the point when the RFID Card or Tag is swiped against the RFID peruser, it will identify the ID card and sends the special card no. to the microcontroller by means of sequential terminal. With the assistance of appropriate programming, we have to analyze the gotten card no. with the numbers that are as of now put away in the microcontroller or any database like outside memory unit.

In the event that the got number is coordinated with the as of now put away number, at that point the microcontroller will show the name of the card holder on the LCD and enacts the engine driver IC. Thus, the entryway is opened for a predefined length after which the entryway is naturally shut.

On the off chance that there is no counterpart for the gotten numbers with the put away numbers, at that point the microcontroller won't open the entryway and presentations a message as "Access Denied" on the LCD show.

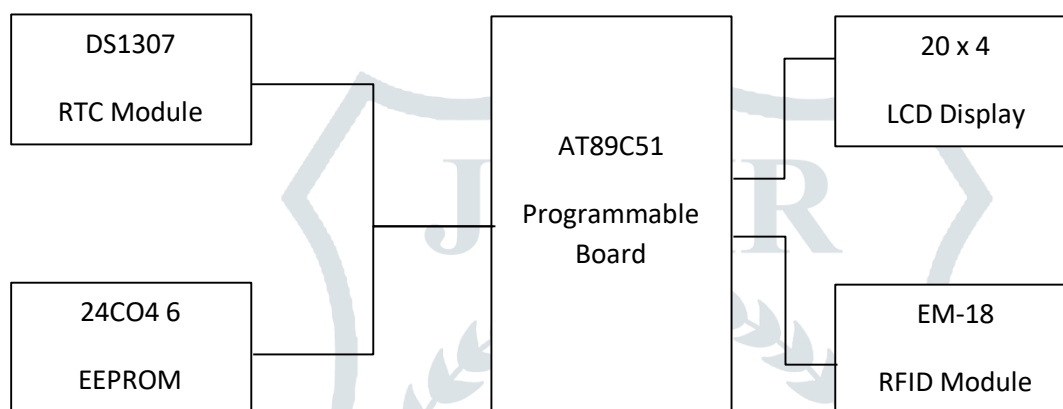
Circuit Design of Car Parking Management System

The primary associations for fundamental working of the microcontroller incorporate a reset circuit, oscillator circuit and EA Pin. Reset circuit comprises of a push catch, 10K Ω resistor and a 10 μ F capacitor. Outer oscillator circuit comprises of a 11.0592 MHz quartz precious stone and two 33pF capacitors. At long last, a 10K Ω resistor is utilized with EA stick to pull it high.

The following equipment we have to interface is the 20 x 4 LCD. The stick setup of a 20 x 4 LCD is like that of a 16 x 2 LCD. The main contrast is that a 20 x 4 LCD has couple of additional sections. So as to get to those additional portions, we have to program the microcontroller in like manner. P3.6, GND and P3.7 pins are associated with the three control pins of the 20 x 4 LCD for example RS, RW and E. The information pins of the 20 x 4 LCD are associated with Port 1 of the microcontroller. The following

segment is to associated with the RTC. First we need to associate a 32.786 MHz precious stone oscillator between the oscillator pins of the RTC IC.

At that point associate a 3V coin sort Lithium battery to the VBAT terminal of the RTC IC. At last, the I2C terminals for example SCL and SDA of the RTC IC are associated with PORT0 pins. Subsequently, they should be pulled high with 1K resistors. Presently you can associate SCL and SDA to P0.0 and P0.1 of the microcontroller. Subsequent to associating the RTC, presently we will interface the EEPROM. First associate the SCL and SDA pins of the EEPROM IC to the P0.0 and P0.1 pins of the microcontroller. At that point, interface the location info pins of the EEPROM to Ground. At last, interface the RFID peruser to the controller. Associate the TX stick of the RFID Reader to RXD stick (P3.0) of the Controller and RX of RFID is associated with TXD (P3.1) of microcontroller.



Working of the Model

- The task demonstrates the structure of a RFID based vehicle leaving framework utilizing 8051 microcontroller, in which just approved staff with legitimate RFID card are enabled access to leave and furthermore the IN/OUT time subtleties alongside the admission are naturally determined.
- When the circuit is exchanged ON, current time is shown on the LCD show.
- When the ID card is recognized by the peruser, a one of a kind card number is sent to the microcontroller.
- If the card number is coordinated with spared number in microcontroller or database, the microcontroller will enable the vehicle so as to leave in the verified region.
- The passage time subtleties of the specific card are put away in the EEPROM. An appreciated message alongside the in time subtleties are shown on the LCD.
- When a similar card is swiped once more, the microcontroller will show the in and out time alongside the determined toll subtleties on the LCD.

Advantages

- RFID based Car Parking System is executed in this venture and can be utilized to dispense with the problem of manual activity of leaving framework.
- This framework can help in lessening cost, increment in profitability and spares time.

- Accurate timing subtleties are estimated with the assistance of RTC Module.
- Prepaid and postpaid cards can be coordinated with the framework for simple installment alternatives.

Limitations

- Only admission subtleties are determined yet can be stretched out to Mastercard or other money related card framework where the passage sum is naturally deducted.
- Further following frameworks like number plate following, face following and so forth can be actualized for precision and security.

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