

Development of Smart Parking System for Reducing Parking Chaos

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Abstract: *The work on "Development of Smart Parking System for Reducing Parking Chaos" aims at elimination of the parking problems faced in the present world. It uses a Microcontroller8051 and a Metal detector to sense the presence of Vehicle parked in restricted parking zone and it alarms after a particular time span indicating the driver to vacate the premises. It also operates in the 2nd mode where it senses the presence of vehicle and can help greatly as an anti-theft device when it senses the absence or movement and triggers an alarm. A 5V source is needed to entire system and the modes of operations are selected as soon as the device is turned on. The microcontroller and the device is protected by a secure password which when entered would lead to locking or unlocking of the device in order to protect it from unauthorized operation. LEDs indicate the presence of the vehicle and buzzer triggers the alarm. All set of programming is done in the ATMEL 8051 Microprocessor.*

Keywords: *ATMEL Microprocessor, LCD, Sensing, Sunrom Metal Sensor, Transformer 230/12, IC555 timer, Engine Immobilizer, Motion Sensor*

1. INTRODUCTION

In the recent years with the advancement of the Human Race, our population has been expanding at alarming levels. It is expected that by year 2028 India would surpass China as Country with largest population in the world. This ever-growing population has caused many problems as in Food, Medicines, and Infrastructure. An attempt has been made to reduce the problem of Parking in unattended areas of underground parking and residential spaces by creating a Smart Parking System. This system consists of an 8051 Microprocessor connected with a Metal Detector which aims to detect the presence of vehicles in the vicinity and triggering an alarm after a certain delay. As soon as a vehicle enters the detection region of the Detector a counter sets to count of 10 sec, at the end of the count the alarm is triggered indicates the occupants of the car to vacate the restricted zone.

Firstly the Metal Detector detects the presence of the Car in the nearby region and it sends the signal to the Pin 0 of the microprocessor. The detector is itself connected to the 555 Timer which is fed 5V supply. The 555 timer sets the delay at the required value of 10 sec.

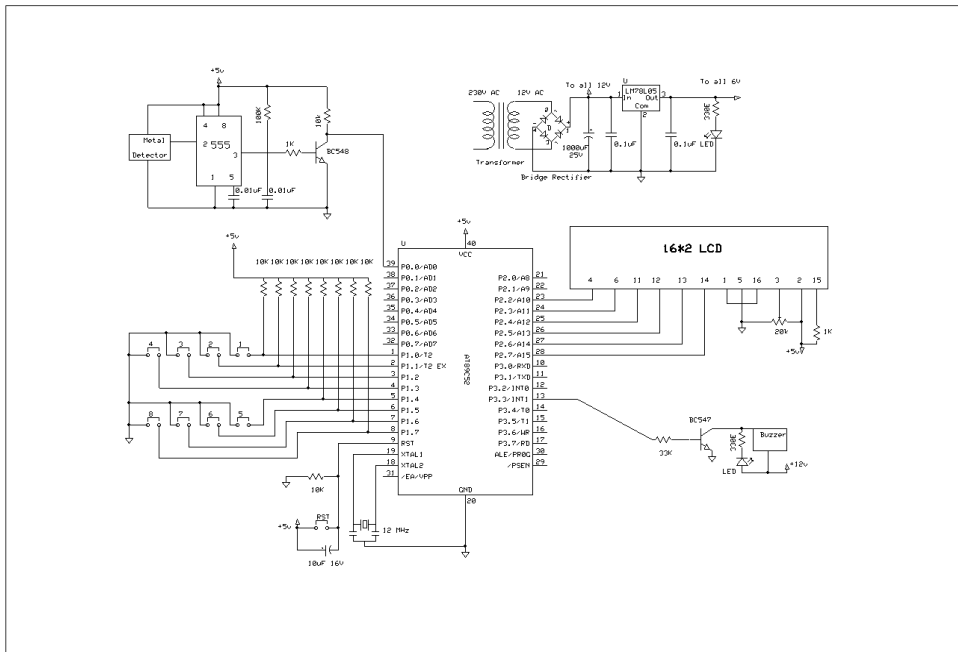
Mode of Operation is selected as:-

- Parking Mode
- Theft Mode.

In parking mode, the as soon as system is activated by entering the password through the keypad, any detection of the vehicle will lead to triggering of alarm. In Theft mode the vehicle is assumed to be placed at the parking lot or in a residential place, as soon as an attempt is made to move the car, the theft alarm triggers indicating a possible attempt of theft. The system is built around the ATMEL 8051 microprocessor along with a variety of electrical equipments. Programs are developed in Embedded C and Universal IC Burner as used to program the microprocessor. Power Supply fed is 230 V AC is converted through 230/12 V single phase transformer which is regulated by LM 7805 Voltage regulator.

2. COMPONENTS USED

The system is constructed with the various set of components. The main components are the metal detector and the 8051 microprocessor. The detector is fed with 5V supply which is step down using a transformer and a voltage regulator. As soon as detection occurs the LEDs connected glow indicating the presence of the vehicle and triggers the buzzer employed for alarming the user. The higher the content of metal, higher the sound is seen. As for the theft mode similar process occurs but the buzzer is indicated in the absence vehicle.



Circuit Diagram Illustrated



Components Connected on PCB



16*2 LCD for Display



Complete Practical Circuitry



Metal Sensor

3. WORKING

The main aim of this attempt is to help develop a smart parking system aimed at solving all our parking problems. Not only the parking systems would be intelligent but also they would be independent to human intervention. Theft of Vehicles can also be controlled by this new parking system.

A 230/12V step down transformer is used to step down the supply to 12V. This 12V supply is fed to the bridge rectifier which converts the AC input to DC output. This output is fed to the electrolytic capacitors which are used to filter the ripple content in the dc output voltage. The electrolytic capacitors are connected to the LM7805 voltage regulator which converts the 12V DC supply into a regulated 5V DC supply. A reset switch is used to reset the microcontroller, which enables the user to use the two different modes of this parking system whose working is described as under:-

In this methodology we are using the programmed microprocessor in order to use the components for efficient detection of the vehicle which may be used for No Parking places and as the “Anti-Theft Mode” for the other residential and private purposes. The Detection theme can be understood as:-

No-Parking mode: - As soon as the vehicle comes in the vicinity of the metal detector the LED connected with it glows which sends a signal to the LM555 timer circuit to set a delay of 10 sec and after this time gap the alarm circuit is triggered and the buzzer starts hooting and the person himself/herself knows that it is a prohibited area and he/she cannot park the car here.

Anti Theft mode: - The reset switch is again pressed to reset the LCD, now theft mode is switched on. In this mode the vehicle is already parked at your home the metal sensor chip is activated as soon as the vehicle is removed from its place which sends the timer a pulse to start the count of 5 sec, after the delay of 5 sec the alarm circuit is triggered and the buzzer starts operating and the person knows of the thievery.

4. CONCLUSION

The Device works efficiently and the purpose of the development of the system is justified, However the system can be made more efficient in working by calibrating the microprocessor to engine immobilizer of cars to stop them from being stolen while the device is being used in the anti theft mode. And an addition of motion sensor to judge whether the vehicle is moving or stationary while using it in the No-parking mode.

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