

# Design and Implementation of IoT Based Parking System

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## ABSTRACT

The amount of vehicles in the cities is growing everyday while the issues of parking are also increased. The traditional way of parking is, moving to pay station and collecting the ticket at the dashboard. However there are so many draw backs that we have to wait for a long to time to park and need to move our car if the parking time exceeds. To overcome these types of issues a solution is implemented, "Pay-by-phone" by which one can access through their mobile phone.

**Keywords :** Pay by Phone Praking, GPRS, RFID Card, Privacy

## I. INTRODUCTION

In this project we are going to avoid parking problem by pay-by-phone using IoT. IoT innovation develops each day in brilliant application, for example, smart frameworks, shrewd lighting, keen energy, smart city, shrewd wellbeing and so forth this is characterized into detecting, handling and availability. Identifying consolidates recognizing the speed of vehicles and individuals or any articles (accelerometer), temperature, weight et cetera., and these can be handling by utilizing a few processors, for example, organize processor, crossover processor MCU/MPU and so forth. What's more, the gadgets are associated by utilizing a few advances called GPS, Wi-Fi, BT/BTLE, RFID and so on. Most of the people are living in the metro cities so the cities have reached full of its occupancy. Every person uses vehicle their transportation. Most of the time people spend their precise time on searching parking lots to park their vehicles. To avoid this problem we are moving to this work.

## II. EXISTING SYSTEM

In the existing system, pay-by-phone is running through the Bluetooth. It has to collect detailed information about the car regarding parking operations such as time limit and all. Here they are using the technology which is not much advanced in the security purpose. So this existing system is not satisfying the people in the case of providing security.

## III. PROPOSED SYSTEM

In the proposed system, we are implementing applications through RFID which can manage detailed information about the parking operations so that accurate profiles of car owners can be created. In this an inexpensive RFID tag can be attached preventing customers from waiting. Here we are using RFID for reading the IN and OUT timings. The data will be stored in the cloud and automatically information will be updated to the user will display on the LCD. The cloud communication is done through the GPRS

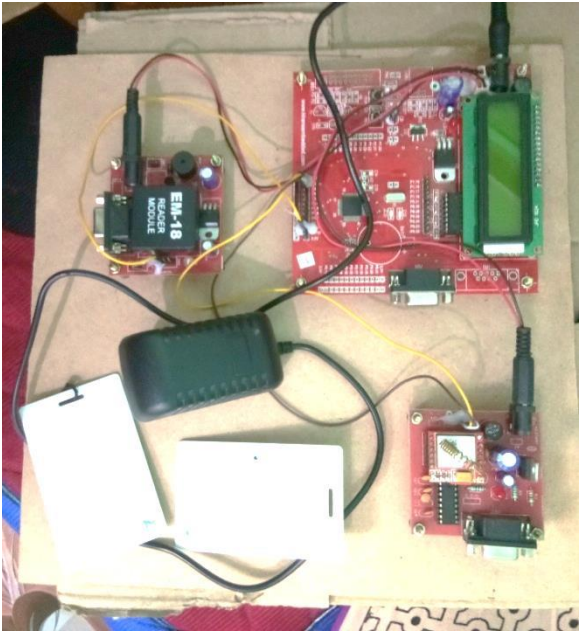


Figure 1

Block Diagram:

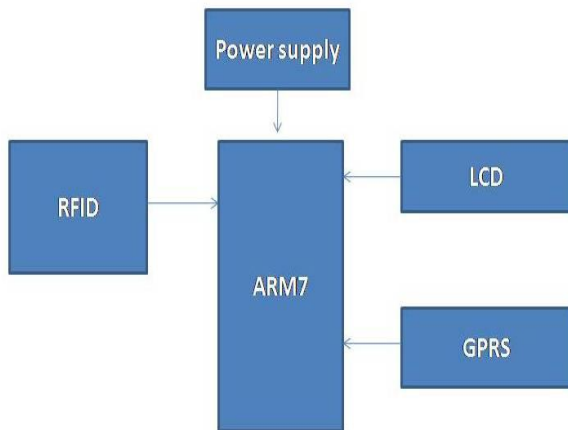


Figure 2 : block diagram

#### IV. METHODS AND MATERIAL

##### HARDWARE DESCRIPTION:

##### ARM7

The LPC2148 microcontrollers are 16-bit/32-bit ARM7TDMI-S controllers with real-time emulation that combines the microcontroller with 8 kB, 16 kB or 32 kB of embedded very high-speed. A 128-bit space memory interface and unique architecture enable 32-bit code processing at the maximum clock frequency. For critical performance in interrupt service routines and DSP meathead, this increases

performance 30 % over Thumb instruction mode. For complex code size applications, the alternative 16-bit Thumb instruction mode reduces code by more than 30 % with minimal performance penalty.

ARM LPC 2148 Introduction:

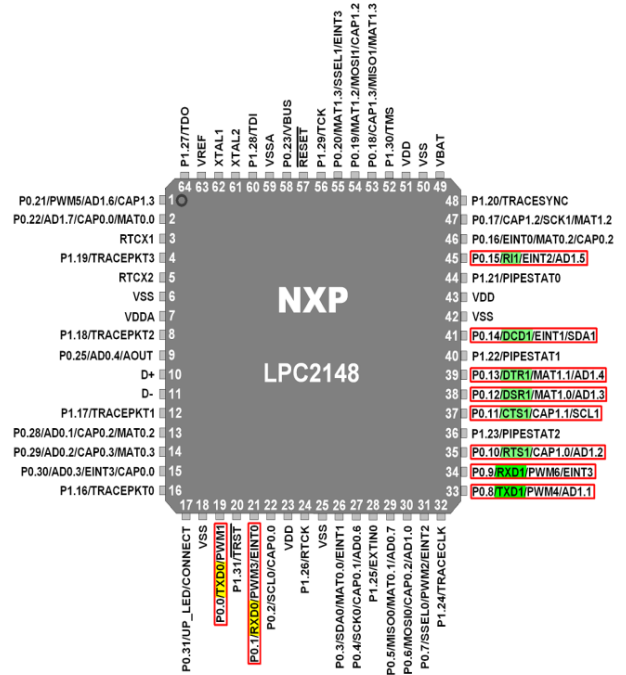


Figure 3

The ARM 16/32-bit ARM7TDMI-S microcontroller development board is especially mean to help students with mastering the specified talents within the region of inserted frameworks. The unit consists in such method that each one the conceivable highlights of the small controller are going to be effortlessly used by the understudies. The unit underpins in framework programming (ISP) that is finished through interface. ARM Board has new and propel alternatives which is able to offers hopper the liberty of execution complicated explanation utilized as an area of arrange of Embedded Systems. The improvement stumble upon on the ARM Board will represent a hazard to exceed expectations inside the discipline of embedded systems.

The ARM7 is a widely beneficial 32-bit chip, which offers elite and occasional electricity usage. The ARM

engineering relies upon on reduced instruction Set computer (RISC) standards, and the guideline set and associated decipher thing are drastically much less difficult than those of miniaturized scale custom designed complex instruction Set computers (CISC). This effortlessness brings about an excessive guiding principle throughput and noteworthy ongoing intervene with reaction from a bit and financially savvy processor middle.

Pipeline techniques are applied with the purpose that all components of the handling and memory frameworks can work continually. typically, even as one direction is being accomplished, its successor is being decoded and a third guiding principle is being gotten from memory. The ARM7TDMI-S processor likewise makes use of a certainly one of a type engineering procedure referred to as Thumb, which makes it in a perfect global suitable to excessive-volume programs with memory confinements, or applications where code is an issue. The key notion in the back of Thumb is that of a brilliant-lessened direction set.

The ARM7 is part of the advanced RISC Machines (ARM) institution of universally useful 32-bit chip, which offer low electricity utilization and cost for elite devices. The design depends on Reduced Instruction Set Computer (RISC) standards, and the rule set and associated disentangle issue are significantly much less complex in examination with small scale modified complex instruction Set computers. This consequences in an excessive direction throughput and terrific continuous interfere on reaction from a bit and savvy chip.

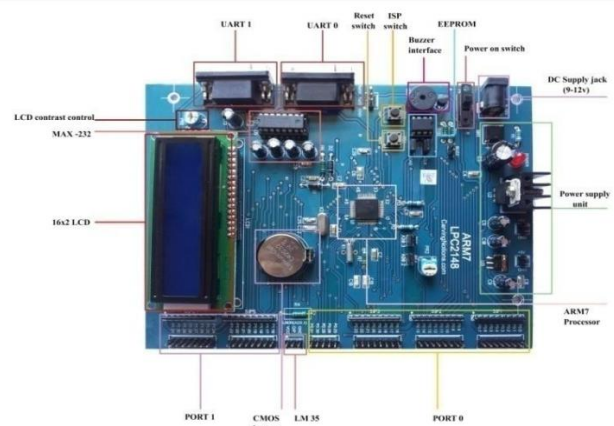


Figure 4 :ARM development board

### ARM Project KIT (LPC 2148)

#### Board Features:

- controller: LPC2148
- 2xSerial ports(One for ISP and other for Serial Communication)
- 12.00 MHz crystal oscillator
- On board Reset Circuit with a switch.
- Power on LED indication.
- Three on-board voltage regulators 1.8V, 3.3V and 5V with up to 800mA current
- Extension headers for  $\mu$ C ports.
- Graphic LCD display interfacing port.
- CAN controller interfacing.
- 8 Bit LCD interfacing.
- EEPROM Interfacing.
- On board UART.

### RFID

RFID is a following innovation used to understand and validate tags which might be related to any object, character or creature. Radio recurrence identity and Detection is a general time period utilized for innovations that have an effect on utilization of radio waves if you want to understand protests and people.



Figure 5 : RFID Cards

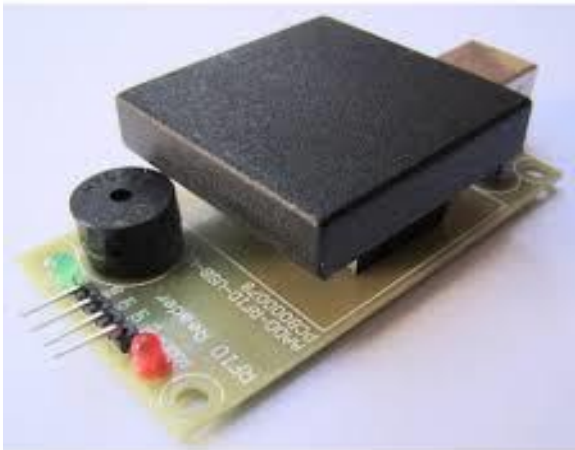
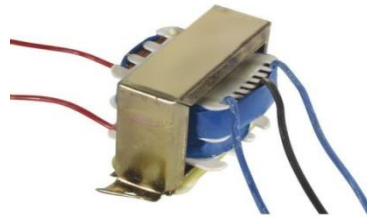


Figure 6 : RFID reader

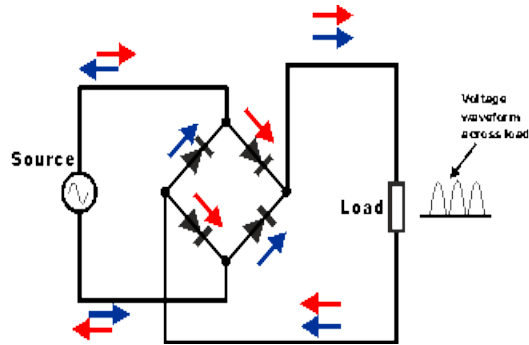
reason for Radio recurrence identity and Detection framework is to encourage information transmission through the flexible device known as label that is perused with the assistance of RFID peruse; and method it according to the necessities of an software. Information transmitted with the assistance of label offers area or distinguishing proof along distinctive specifics of item categorized – buy date, shading, and price. normal RFID tag carries microchip with radio reception apparatus, installed on substrate. numerous RFID labels take a shot at diverse frequencies. right here low recurrence, a hundred twenty five kHz, RFID cards have been applied. Those cards paintings inner a scope of 10 cm. at the factor when a RFID card comes in this range peruse recognizes it and sends a certainly one of a kind code of the tag serially. This serial code, comprising of 12 bytes, is gotten by the micro controller.

A serial level converter is required for micro controller to get these serial signs. IC MAX232 has been utilized for this reason to interface the RFID peruse with micro controller.

**Power Supply:  
Transformer**



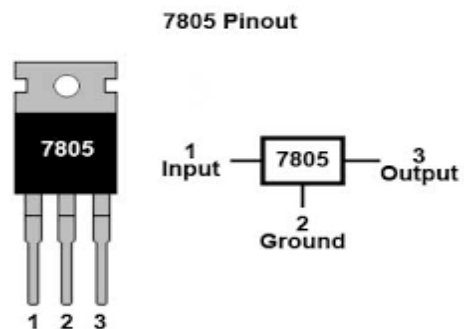
**Bridge rectifier circuit**



**Capacitor:**

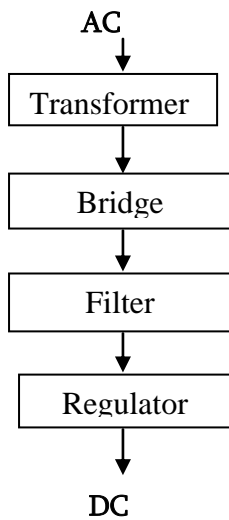


**Regulator:**



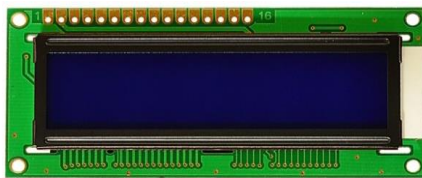
The above components are used to convert AC to DC

**Flow chart of power supply:**



**LCD:**

Here we are using LCD (liquid crystal display) with size 16\*2 which means 16 columns and 2 rows. We can use LCD in two modes: 1. 4-bit mode and 2. 8-Bit mode.



**Figure 7 : 16\*2 LCD**

The expense enroll shops the summon bearings given to the LCD. A summon is a making a beeline for LCD to complete a predefined undertaking like introducing it, clearing its show, setting the cursor work, controlling display and so forth. The estimations select shops the bits of knowledge to be showed up on the LCD. The realities are the ASCII estimation of the character to be demonstrated at the LCD Snap to douse up additional about inward structure of a LCD. There are various styles of LCD resembles 16x2 and 20x4. Here on this test we utilize 16x2 LCD. Here we utilize speck grid LCD.

**GPRS:**



**Figure 8 : SIM800 module**

It is a standard set made by the European Telecommunications Standards Institute (ETSI) to portray customs for second time (2G) electronic mobile systems utilized by mobile phones. A Modem is a contraption which changes and demodulates movements as required to meet the correspondence necessities. It directs a straightforward transporter banner to encode modernized information, and besides demodulates such a conveyor banner to translate the transmitted information.

GPRS module is interfaced with lpc2148 controller by changing the TX, RX and ground pins in it. The guideline to the GPRS is adjusted in the code itself when there is need of the GPRS, ARM processor starts the direction through the AT commands.

**SOFTWARE REQUIREMENTS:**

**KEIL:**

The µVision IDE from Keil joins venture administration, make offices, source code altering, system investigating, and finish recreation in one effective environment. The µVision advancement stage is anything but difficult to-utilize and helping you rapidly make inserted programs that work. The µVision editorial manager and debugger are coordinated in a solitary application that gives a



consistent inserted venture advancement environment.

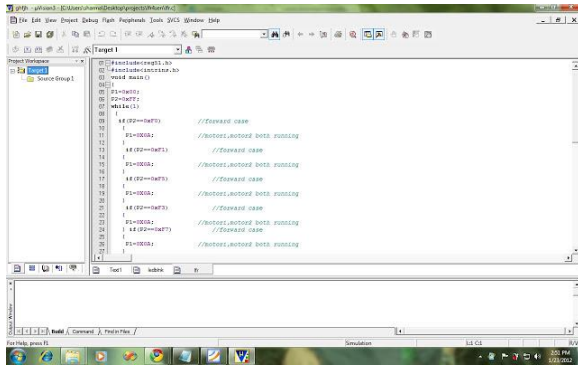


Figure 9 : keil project window

**WORKING PROCESS**

This project working principle is very simple and easily understands. Any vehicle is entering to parking place; it will read all data about vehicle and give information of slots. When vehicle is moving to return from parking place it will show how much time you spent time in slot, how much money you have to pay. This technical save the time and easily identify which slot is empty.

**V. RESULTS AND DISCUSSION**

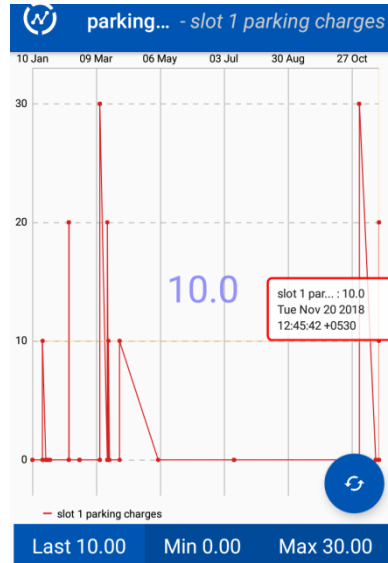


Figure 10

**VI. CONCLUSION**

In this project we have completed a privacy smart parking system by using IoT technology. In this an inexpensive RFID tag can be attached preventing customers from waiting. Thus we implemented this project very user friendly to the existing society.

|    |           |    |    |
|----|-----------|----|----|
| 66 | 2018-07-1 | 64 | 0  |
| 67 | 2018-07-1 | 65 | 10 |
| 68 | 2018-07-1 | 66 | 0  |
| 69 | 2018-07-1 | 67 | 20 |
| 70 | 2018-11-0 | 68 | 0  |
| 71 | 2018-11-0 | 69 | 0  |
| 72 | 2018-11-0 | 70 | 10 |
| 73 | 2018-11-0 | 71 | 10 |
| 74 | 2018-11-0 | 72 | 10 |
| 75 | 2018-11-0 | 73 | 10 |
| 76 | 2018-11-0 | 74 | 10 |
| 77 | 2018-11-0 | 75 | 10 |
| 78 | 2018-11-0 | 76 | 20 |
| 79 | 2018-11-1 | 77 | 0  |
| 80 | 2018-11-1 | 78 | 20 |
| 81 | 2018-11-1 | 79 | 0  |
| 82 | 2018-11-2 | 80 | 0  |
| 83 | 2018-11-2 | 81 | 0  |
|    |           | 82 | 0  |

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