



Predicting Bus Arrival Time with Mobile Phone

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ABSTRACT: In day to day life we generally face problem of public transport system. It's like somebody is waiting for some bus for an hour, but when bus arrives at his stop, it could be fully loaded with passengers and he/she will not even get a chance to enter into it. Sometimes driver would not bother to stop the bus. So the time he waited is wasted. If that person would know about the exact location of his bus and had a rough idea of the number of passengers onboard in advance, then if needed he/she can look for an alternative. It saves a lot time and makes things a lot friendlier. Here we are developing a system which will have android application. We can use our Smartphone to track a particular bus. This can work offline also. Bus unit will have GSM module which will receive call and save the mobile number of sender. It will check for seat count by using obstacle sensors at entry door and exit door. It will send a return SMS specifying seat count along with the GPS location of the bus to that sender. We have also added some more applications to it to make this system a lot friendlier.

KEYWORDS: ARM, GSM, GPS, Intelligent Transport System.

I. INTRODUCTION

One of the most daunting problems faced by the cities in the country is that urban transport Failed to provide facilities thus increasing travel time and cost both for passenger and goods Traffic. It is now well accepted that lack of adequate public transport offering comfort and Convenience, has resulted in steep increase in the ownership of private vehicles particularly Two wheelers with subsequent effects on pollution both noise and air. In most cities two wheelers comprise more than 70% of total motor vehicles. Lack of appropriate information system for transportation, particularly for passengers who use public transport, specifically buses for commuting is causing lot of anxiety among the commuter. Passengers wait for long time at the bus terminus expecting the bus to arrive as per the schedule. At present there is no such system in place for the benefit of the passengers who take buses for commuting. It would be good to have such a system like in railway stations, bus terminus which provides information about the arriving and departing trains, buses. We propose a system which could track the current position of buses and the dynamic arrival and departure time and inform the passengers via display boards at the terminus or through an App installed in the smart phone. It has a GPS system that tracks the position of a particular bus and the data is transmitted by a GSM modem to the bus terminus. The receiver part of the system which is installed at the bus terminus processes the received data and calculates the arrival time and delay time of a particular bus. The initial testing shows that it will be a boon for the commuters who often meet with boredom and anxiety without knowing when the buses will arrive. The purpose of this project is to develop a system for public transport system which will have an android application. We can use our Smartphone to track a particular bus. This can work offline also. Bus unit will have GSM module which will receive call and save the mobile number of sender. It will check for seat count by using obstacle sensors at entry door and exit door. It will send a return SMS specifying seat count along with the GPS location of the bus to that sender. This document provides background information and describes the tools used to make the "Smart Assistance for Public Transport System". As well, it explains the design methodology of the Smart Assistance for Public Transport System. The layout process is discussed in this paper. Finally, recommendations from others working on similar projects and scope of possible future work are provided.

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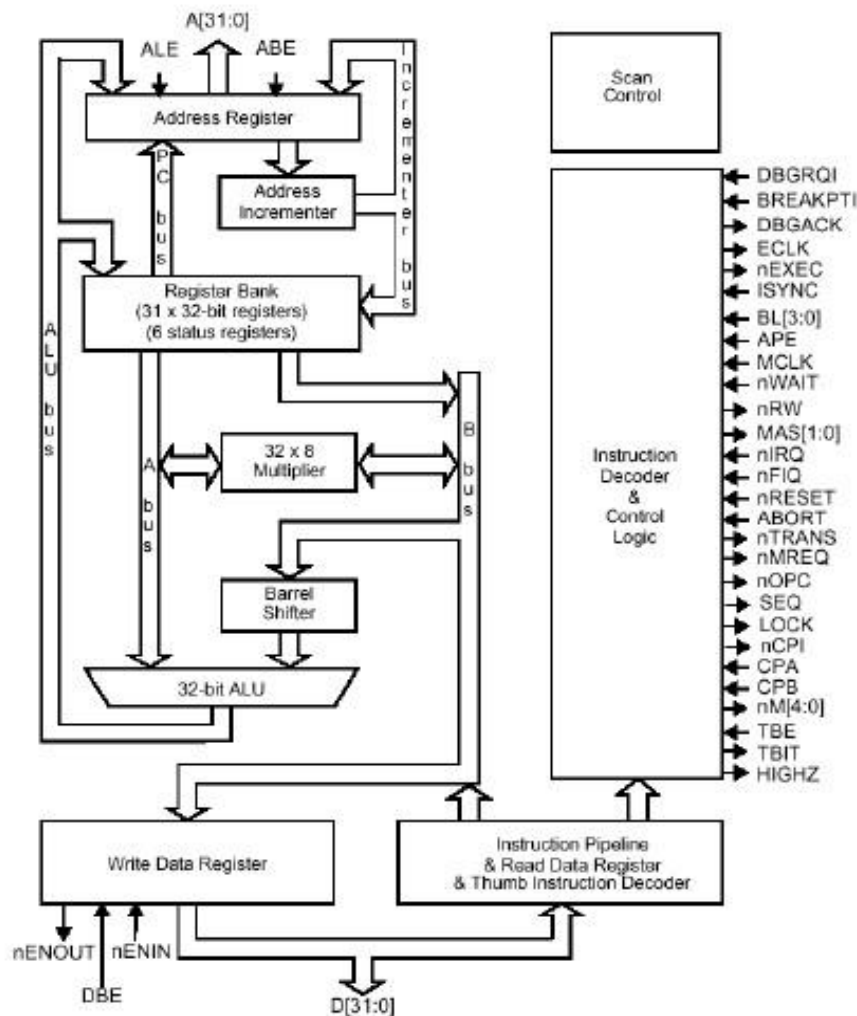
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II. BACKGROUND INFORMATION

In this section of the report, background information concerning the project will be provided.

1. ARM PROCESSOR



2. ARM 7 - LPC2141/42/44/46/48

LPC2148 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32kB to 512kB. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30% with minimal performance penalty. Due to their tiny size and low power

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consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0

III. SPECIFICATIONS & DESIGN

3.1 POWER SUPPLY

When working with electronics, you always need one basic thing: Power. In every electronic circuit power supply is required. The proper working of each and every component, the exact amount of voltage and current to be supplied to it. If the power exceed its limit, it can be fatal. Below is the circuit diagram of power supply which gives output of 5V, as only that much is required for microcontroller. Its circuit diagram and designing calculation are given below.

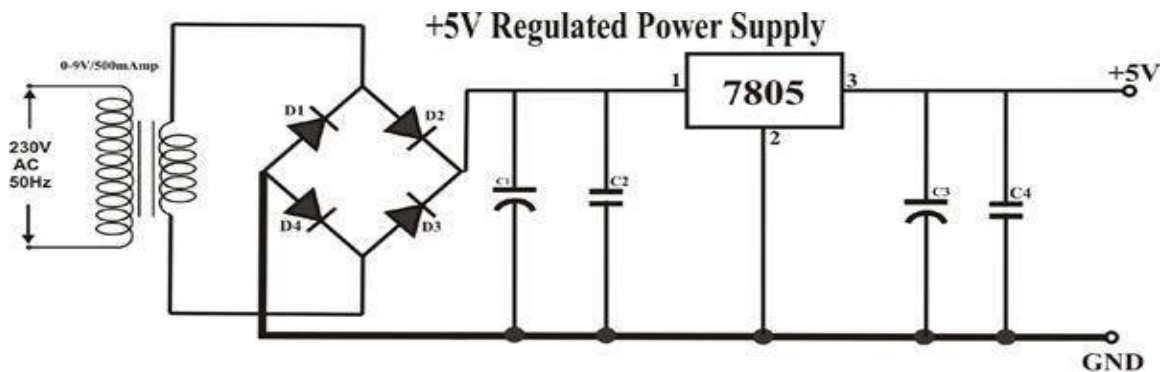
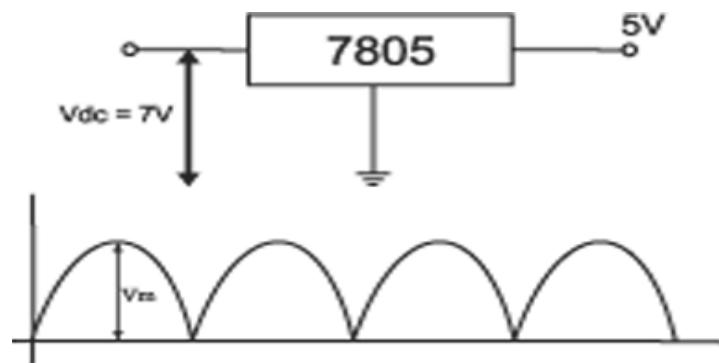


Fig.12 +5 V Regulated Power Supply

The +5 volt power supply is based on the commercial 7805 voltage regulator IC. This IC contains all the circuitry needed to accept any input voltage from 8 to 18 volts and produce a steady +5 volt output, accurate to within 5% (0.25 volt). It also contains current-limiting circuitry and thermal overload protection, so that the IC won't be damaged in case of excessive load current; it will reduce its output voltage instead. The advantage of a bridge rectifier is you don't need a centre tap on the secondary of the transformer. A further but significant advantage is that the ripple frequency at the output is twice the line frequency (i.e. 50Hz) and makes filtering somewhat easier. The use of capacitor c1, c2, c3 and c4 is to make signal ripple free. The two capacitor used before the regulator is to make ac signal ripple free and then later which we are using is for safety, if incase there is a ripple left after regulating, then c3 and c4 will remove it.3.2

3.2 Transformer Design:





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- We require 5V at the o/p of the regulator.
- Considering the above transformer rating.
- We take the transformer of 0-9V/500mA
- TRANSFORMER- 0-9V/500mA Step-down transformer.
- 8.2.2 Rectifier Design:
- PIV of diode = $V_m = 12.39V$
- $I_m = 628mA$

3.3 BRIDGE RECTIFIER

We select the bridge IC of 1 Ampere rating.

IV. DESIGNING OF PCB

The connections on the PCB should be identical to the circuit diagram, but while the circuit diagram is arranged to be readable, the PCB layout is arranged to be functional, so there is rarely any visible correlation between the circuit diagram and the layout. PCB layout can be performed manually (using CAD) or in combination with an AutoRoute. The best results are usually still achieved using at least some manual routing - simply because the design engineer has a far better judgment of how to arrange circuitry. Surprisingly, many auto routed boards are often completely illogical in their track routing - the program has optimized the connections, and sacrificed any small amount of order that may have been put in place by manual routing. Generally auto routed boards are somewhat harder for a technician to repair or debug, for this reason. Historically, PCBs used to be laid out by drawing or using stick on paper shapes on Mylar film, - that really WAS manual routing.

The printed circuit board manufacturing process is a difficult and complex series of operations to make a printed circuit board. The process starts once our files and specifications have been decided.

Testing

Unpopulated circuit boards are subjected to a bare board test where each test circuit connection (as defined in a netlist) is verified as correct on the finished circuit board. In high volume circuit board production, a bed of nails tester or fixture is used to make contact with the copper lands or holes on one or both sides of the board to facilitate testing. Computers are used to control their electrical testing unit to send a small current through each contact point on the bed of nails and verify that such current can be detected on the appropriate contact points.

For small to medium volume production runs, a flying probe tester is used to check electrical contacts. These flying probes employ moving heads to make contact with the copper lands and holes to validate the electrical connectivity of the board being tested.

Debugging and testing

Check over your work for proper assembly and short circuits. Make sure that each IC is correctly oriented and in its proper place. Check each resistor and make sure the resistor values are in the proper location as well.

Use an oscilloscope to look at the signal at the collector of Q2. You should see a pulse train with peak-to-peak amplitude of approximately 8 volts. The positive-going pulses should be approximately 300-milliseconds wide and should be separated by approximately 1500- millisecond spaces.

If you don't have an oscilloscope, connect the ground lead of an analog(non digital) voltmeter to the negative terminal of the battery. Set the voltmeter for 10 volts or higher. Connect the positive lead of the voltmeter to the collector of Q2. The meter reading should repeatedly pulse from about 1 to about 9 volts.



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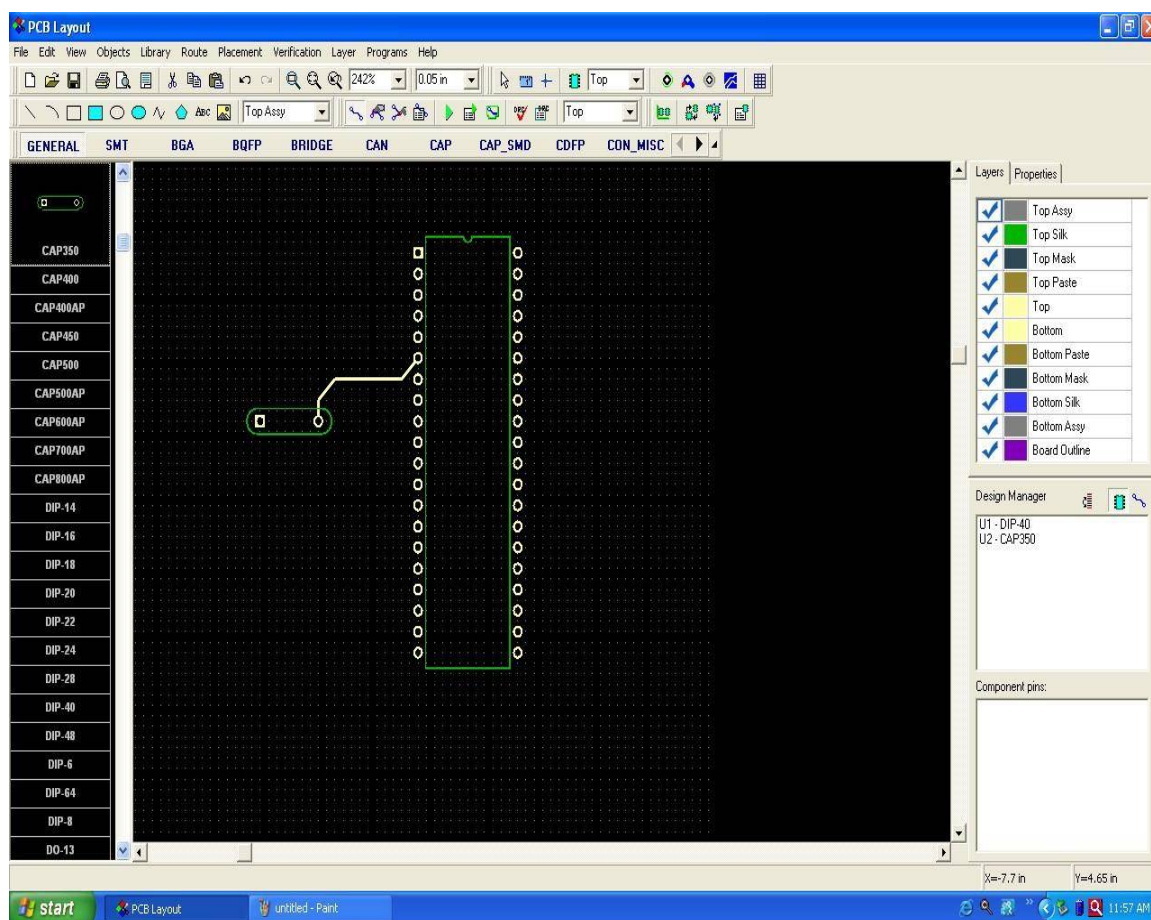
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V. DESIGN METHODOLOGY

5.1 PCB DESIGN SOFTWARE: (DIPTRACE)



To design a schematic, simply select and place components onto your document and connect them together using the wire and bus tools. Multispeed design is supported. Then select the menu option 'Switch to Board' to convert the schematic to PCB. Layout can be updated from Schematic in a few clicks at any time. When you create or edit design objects they are highlighted to improve your work. Step-by-step tutorial available from web-site guides you through the design process and allows to get started with ease.

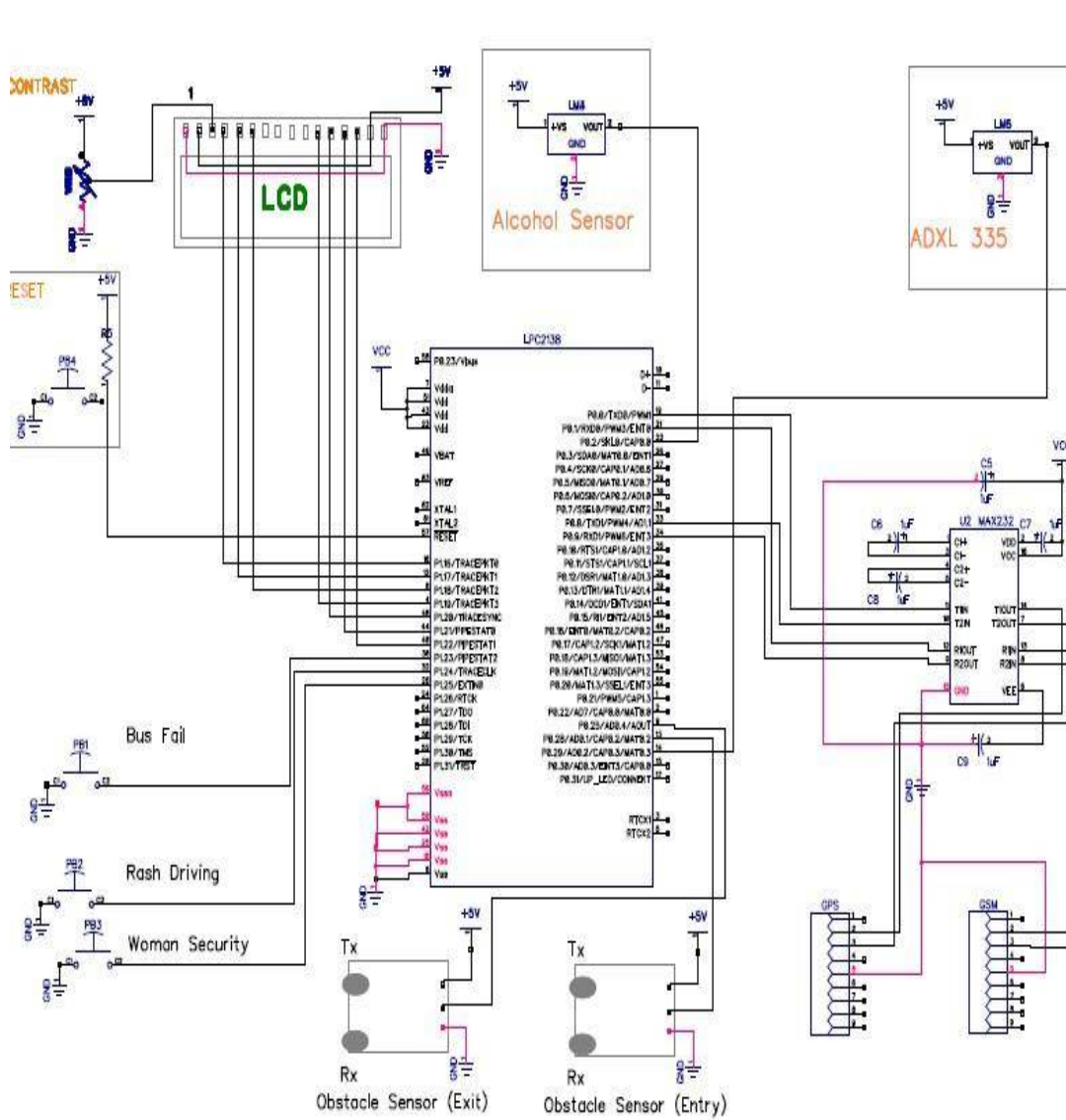
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5.2 Circuit Design



VI. CONCLUSION

This document is a Detailed Project Report that will facilitate the transportation system Management to take the next steps in finalizing the Request for Proposal specifications covering the functional, Technical, operational specifications including detailed definition of various service level metrics. This Detailed Project Report also covers the ease of implementing the System with scope for expansion of the number of buses, routes and commuters increases. This project addresses a critical component Intelligent Transport system (ITS) is Building intelligence into the transport system brings in the convergence of technologies providing a synergetic transformation in the commuter experience. It provides benefits in terms of Reduce waiting time and uncertainty, Increase the accessibility of the system, Increase the safety of users Reduce the operational costs, Improve traffic efficiency, and Reduce traffic congestion, Improve economic productivity. The proposed project implementation will include



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core components such as: Vehicle Tracking System, Real Time Passenger Information System and Central Control Station. Core technologies include Geographical Positioning System (GPS), Electronic Display Systems, and Information & Communication Technologies.

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