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Easy Navigation for passengers using Bus Alert System

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Abstract— For most of the city public transport travelers, bus arrival time is a most important information. In the recent year popularity of Bus alert system has been increased to avoid passengers excessively long waiting time at bus stops. The bus alert system may contain ARM controller to process bus route information, RFID reader to read bus route and number arrive at bus stop, LCD to display bus route, bus number and bus arrival status information. The aim of this paper is to get bus time information and bus status like cancel or delay information for passengers who are available on the bus stop using wired and wireless technologies achieved through RS485 and RFID communication. Programming has been developed in Keil environment for ARM controller operation and MPLAB for PIC controller and VB programming for PC database to log the status of bus.

Keywords: ARM, RISC, CISC, RFID, transport travelers, Keil, PC, VB.

I. INTRODUCTION

In world, Public bus transport has been well developed. The most efficient and inexpensive means of public transport, On an average, the bus system in Singapore in 2011 serves over 3.3 million bus rides daily with around 5 million residents [2]. Effective movement of goods and people are possible by effective transportation system, which contribute to the quality of life in every society. Vehicle population is rapidly increasing in India due to outcome of population boom.

Private car usage, fuel Consumption and traffic congestion can be reducing by bus public transport services. Arrival time and the travel time are the primary information for both the passengers and public transport system. Public transportation system should satisfy these passenger's needs who are traveling. By the use of wireless communication and other devices, passengers are able to get information about the arrival time of the transit vehicle. The passenger should know the bus accurate arrival time at bus stops. Traveler may discourage when waits for long time at the bus stop

Timetable provided on the web by bus operating companies which is available easily. Limited information provided by bus timetable ex, time intervals and operating hours which are not timely updated. Accurate real time bus arrival time provide by bus information providers companies to the public. They are providing such services, usually requires the cooperation of the bus driving companies e.g., installation of special location tracking devices on the bus which increases worth cost [3].

This paper presents an efficient and effective way to get bus arrival information at particular bus stop by making use of ARM controller, RFID reader (wireless) and RS485 (wired) technology.

Acorn Reduced Instruction set architecture (ARM), later on it's an Advanced RISC Machine, is a family of reduced instruction set computing architectures for processor. Various environment configured. In the 1980s, Acorn RISC Machine architecture developed by British computer manufacturer. It is to use in its personal computers. For the BBC micro series computers, coprocessor modules based on ARM based products. Processor needs few transistors than complex instruction set in computes means nothing but the RISC based design approach. This design approach decreases costs, heat and use of power. For characteristics for portable, light, battery-power devices including smartphones, tablet and other embedded systems, reductions are desirable. A 32-bit address space and 32-bit arithmetic supported by cores from ARM holdings**.** 32 bits wide fixed-length instructions support by ARM Holdings cores, but in later versions both 32- and 16-bit wide instructions for improved code density supported by variable-length instruction set. Jazzel means hardware execution of Java bytecodes provided by some cores. As of 2014, around 50 billion ARM processors has been produced, in terms of quantity produced ARM is the widely used instruction set architecture.

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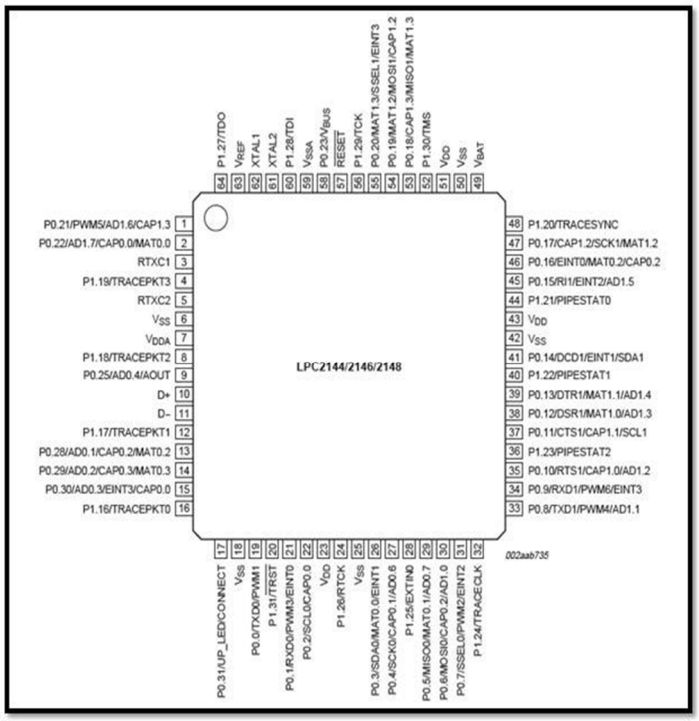

Figure 1. Pin Diagram of ARM7

The most widely used ARM7 shown in Fig. 1 designs use a Von Neumann architecture, thus the few versions comprising a cache do not separate data and instruction caches.

Figure 2. RFID Reader and Tag

Identifying information containing by microchip is an RFID tag. Serialized identifier contained by the chip, or bus stop identifier that uniquely identifies that bus stop. The RFID reader has to obtain the data from the tag. The RFID reader continuously transmitting an RF signal, i.e., operating energy or effective isotropic radiated power to the RFID tag. Voltage is induced on the reader's antenna, if the bus station associated with the tag which is be kept within the reader's range, an alternating RF. The voltage is then rectified to provide a direct-current supply voltage for tag operation. Read/write range, identification range between the reader and tag is having been resolved by power level received by the tag.

RS485 driver IC to communicate between the Slaves (microcontrollers) and the Master (PC). RS485 works on differential line Communication which means: For transmitting TTL logic 1 (5volts) the 485 sends a logic 1 on its 'A' line for transmitting a logic '0' it sends A logic 1 (5 volts) on 'B' line.

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II. LITERATURE SURVEY

Several are things available in the Literature Survey for bus alert system.

"*How Long to Wait? Predicting Bus Arrival Time with Mobile Based on Participatory Sensing*". So as to start the existing resource to create the system because the number of sharing passengers makes a difference to the prediction accuracy in system, this Paper propose Prediction of time about Bus Arrival with Mobile which is Based on passenger Participatory Sensing which encourages more participants or passengers. At least one sharing passenger is on the public bus transport willing to report the bus status which makes this system as passenger dependent fully [1].

"*Implementation of Real Time Bus Passenger Information System and Monitoring System*". This system is used in order to find the latest location of all the buses and also calculate their arrival time at different stops in their corresponding routes. Every time the bus sends an update of estimation of time are updated. It shares this information to passengers using display installed bus stops [2].

"*Based on RFID, Intelligent Bus Management and Monitoring System*". For the transfer of data, Cost effective SMS service of GSM modem is used. Passengers came to know about the buses location coming towards bus stop because of LCD displays installed at bus stop. The system is also efficient is handling the emergency situations e.g., in case of any technical fault occurred in the bus ex delayed , cancel , departure time between the buses is reduced and the operator at BASE-Station is informed. In case of the traffic, the passengers waiting at the bus stops can be easily informed with the delay to show on LCD at the bus stop [3].

"*To Enhance Child Safety, Using Passive RFID Smart Tracking System for School Bus is designed*". If children falling asleep, there is possibility that children find themselves locked in a school bus in the bus parking lot, can miss the bus, step into the wrong bus, also children leave at the wrong station with no method to track them. Radio frequency identification (RFID) is used for tracking and monitoring children during their trip to school by school busses and from school by school buses [4].

"*Vehicle Alerting, Tracking and Monitoring System"* The purpose of this paper is to evaluate the past work of vehicle notification system, tracking, and observation system. Vehicle notification, observation and alerting system is challenging problem these days. There are several challenges encounter in vehicle notification, observation and alerting due to shortcoming in real time vehicle location and alerting system problem. In many systems, RFID (Radio Frequency Identification) is one of technology implemented and used for bus monitoring system. [5].

"*The distinct Approach of RFID Assisted Navigation Systems for the VANETs"*. This paper approach is to designing and deploying a RFID Assisted Navigation System for VANETs.To obtains the data for navigation guidance, RFID-ANS consists of passive tags installed on roads information, To the center of the vehicle bumper, RFID readers attached query the tag when passing nearby. [6].

III. EXISTING SYSTEM

In Predicting time of Bus Arrival with Mobile Phone Based Participatory Sensing encourages more participants to startup the system because the number of sharing passengers or travelers affects the prediction accuracy in system. This system is user dependent fully as user willing to report bus status.

In RFID Based Intelligent Bus Management and monitoring System. Cost effective SMS service of GSM modem is used to transfer data. To let travelers know the bus location coming towards the bus stop, The LCD displays are installed at bus stop. In handling the emergency situations system is also efficient e.g., delay, cancel, the operator at BASE-Station is informed and also the departure time between the buses is less compared to earlier.

IV. SYSTEM ARCHITECTURE

Propose Architecture of system shown below in fig. 3. ARM7 is a 32 bit architecture processor core. 32 to 512 kB of on-chip flash program memory and also 8 to 40 kB of on-chip static RAM.128 bit wide interface/accelerator useful to enable high speed 60 MHz operation. PIC is 16 bit controller with addressable data space 256 bytes used.

In Bus stop module shown in Fig 3

A. RFID reader and tag is equipped with the bus stop module. When bus arrives at the bus stop and if bus stop associated with the reader detects bus tag, bus stop RFID reader obtained the bus information from the tag equipped with the bus module.
B. Process this bus information using ARM controller and display processed information on LCD connected to Bus module. Log the Bus status to PC database using RS485 communication.

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In Bus Module shown in Fig 4

A. RFID reader and tag is equipped with the bus module. When bus arrives at the bus stop and if bus associated with the reader detects bus stop tag, RFID reader of bus module obtained the bus stop information from the tag equipped with the bus stop module.
B. Process Bus stop information using PIC controller and display processed information on LCD connected to Bus module.
C. Bus Module is also interfaced to keyboard. The keys are used to send standard emergency messages such as Bus Delay, Bus cancel operated by driver via GSM module to PC database to log the status.

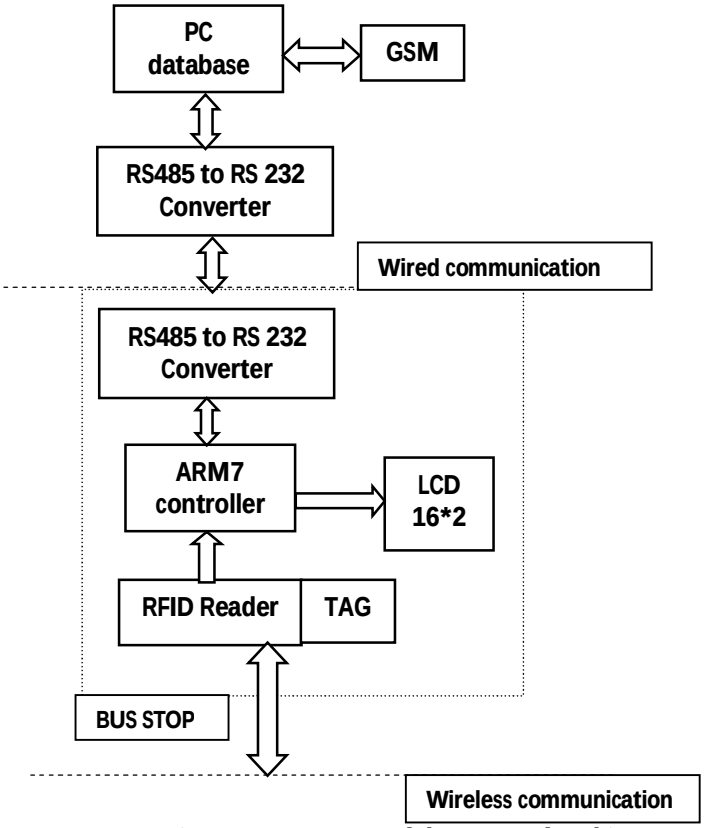

Figure 3. Bus stop module proposed architecture

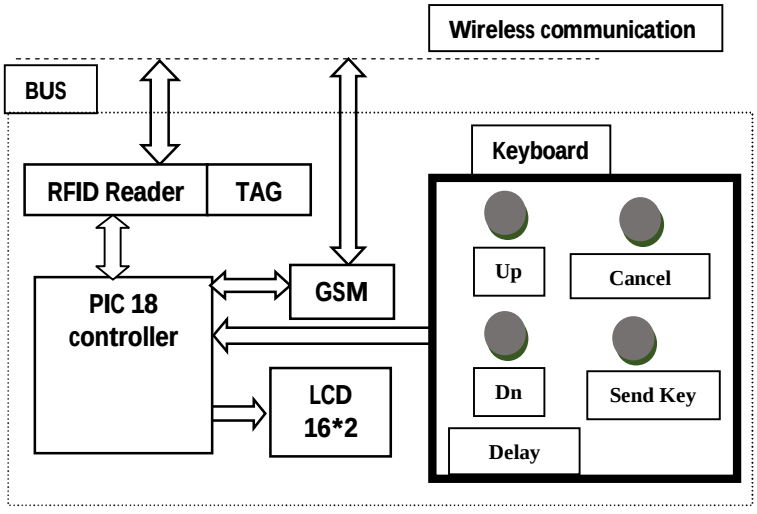

Figure 4. Bus module proposed architecture

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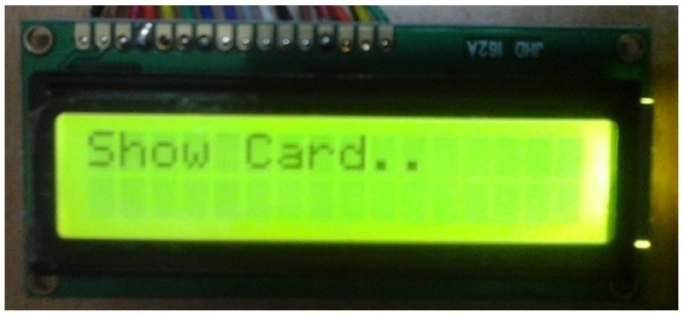
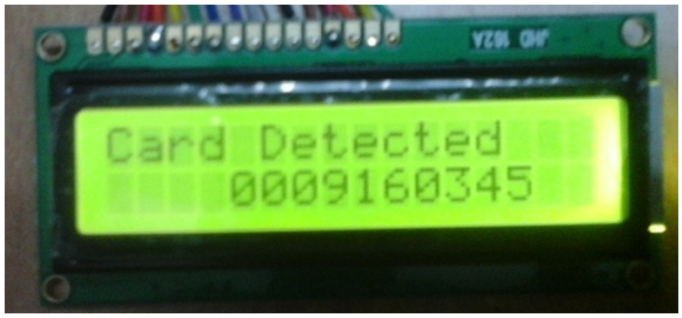
V. RESULTS





VI. CONCLUSION

We design a new smart bus management system by using RFID technology and GSM Technology to integrate with the condition of the public transport management system at present. For the transfer of data between the modules in the project, cost effective SMS service of GSM modem is used. Its low cost makes it easy to accept by public transportation Corporation. The LCD displays are deployed at bus stop and bus to let people understand the buses current location and also bus stop information. The code provided is generic and flexible. Code written in Embedded C language for Bus operations and VB language for PC DB.

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