www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 3 Issue 11 November, 2014 Page No. 9063-9066

An Intelligent Transport Navigation and Vehicle Speed Monitoring System Using Arm9

K. Poornima Naga Jyothi[1], D. Prashanth[2], J. Vamsikrishna[3]

[1]STUDENT (M.TECH) Department of ECE (Embedded systems)
Megha Institute of Engineering & Technology for women, Jawaharlal Nehru Technological University,
Hyderabad- 500098, India.
kasibhotlanaga@gmail.com

[2]Assoc. Professor (M.TECH), Department of ECE
Megha Institute of Engineering & Technology for women, Jawaharlal Nehru Technological University,
Hyderabad- 500098, India.
Prashanth.megha27@gmail.com

[3] Assist. Professor (M.TECH), Department of ECE
Megha Institute of Engineering & Technology for women, Jawaharlal Nehru Technological University,
Hyderabad- 500098, India.
Jupudi.vamsikrishna8@gmail.com

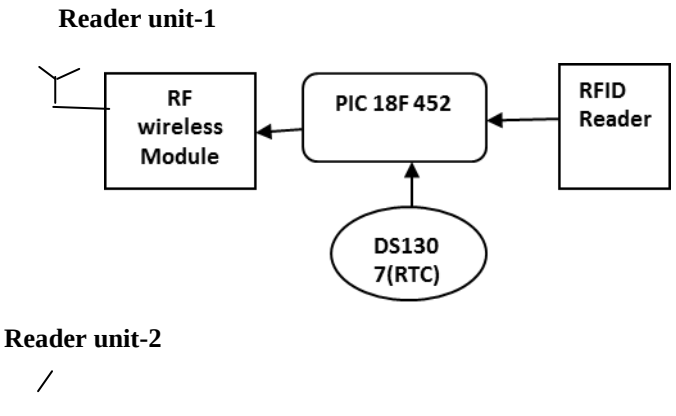
Abstract: *Radio Frequency Identification (RFID) has attracted considerable attentions in recent years for its broad applications and complements to the current GPS navigation system when GPS signals are not available (such as in tunnels) or if the GPS position is ambiguous to a vehicle (such as at cloverleaf intersections). But in practice, GPS does not provide sufficient information for navigation due to its low positioning accuracy (5 to 7 meters).Moreover, even combined with map-matching technologies, GPS still cannot achieve lane level positioning and cannot provide information regarding the traffic direction in the current lane.*

In this paper we use ARM based LPC2148, S3C2440A, PIC18F452, RF434, ZIGBEE, RFID READER. The proposed system contains mainly four nodes vehicle unit, two reader units, central unit. Vehicle unit is implemented on ARM7, Central unit on ARM9. The reader Units is placed in a distance of 50-100 mts to each. When a vehicle crosses first reader unit the tag attached to vehicle read by the reader unit and it starts timer send intimation to central station , when the vehicle reaches the second Reader unit there also the Tag is read by reader unit and it also send the intimation and time details to central station. By taking these details the central station calculates the speed of the vehicle and also detects the location of vehicle based on reader's position and sends this information to Vehicle. If the vehicle is going with high speed than predefined then the speed control unit slowly reduce the vehicle speed. The central unit also provides the next location information to vehicle so that he can decide the route that he wants to go. The communication between Vehicle unit and Central unit is using ZigBee whereas the communication between reader units and Central unit is using RF434 wireless module

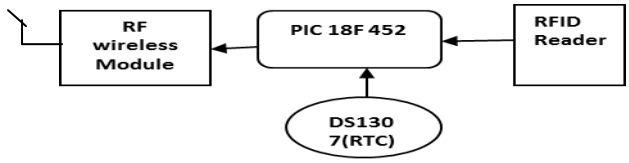
Keywords: ***RF434, RFID READER, LPC2148, S3C2440A, PIC18F452, ZIGBEE.***

1. INTRODUCTION

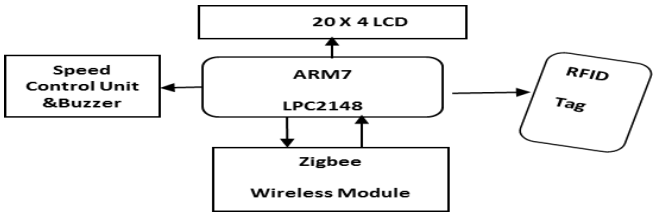
An automated Vehicle monitoring system is developed by using an Active Tag RFID system. The requirement for an active tag arose from the fact that vehicle applications requires a long range as well as sufficient power for the tag to ensure reliable data transfer between the modules. Radio Frequency Identification (RFID) has attracted considerable attentions in recent years for its broad applications in ubiquitous computing. The main aim of the project is to detect the vehicle, find out the present and next locations of the vehicle and easily we can control the speed of the vehicle.



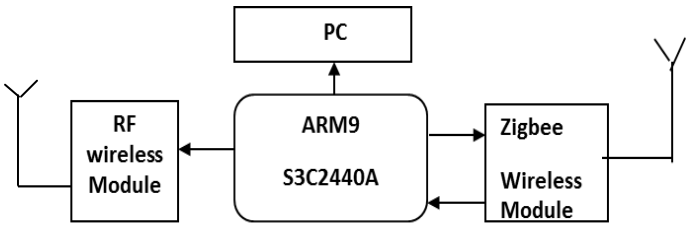
2. BLOCK DIAGRAM & HARDWARE MODULES



Vehicle unit

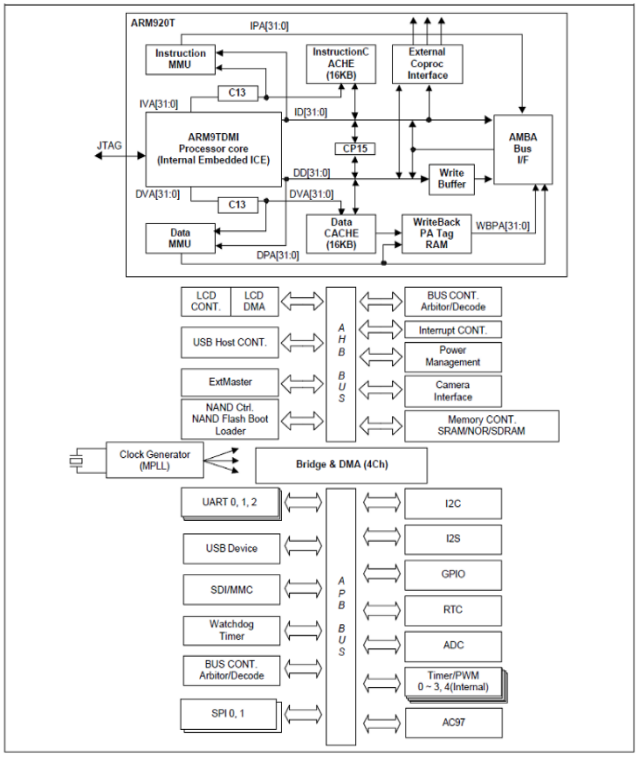


Central unit



2.1 S3C2440A MICROCONTROLLER:

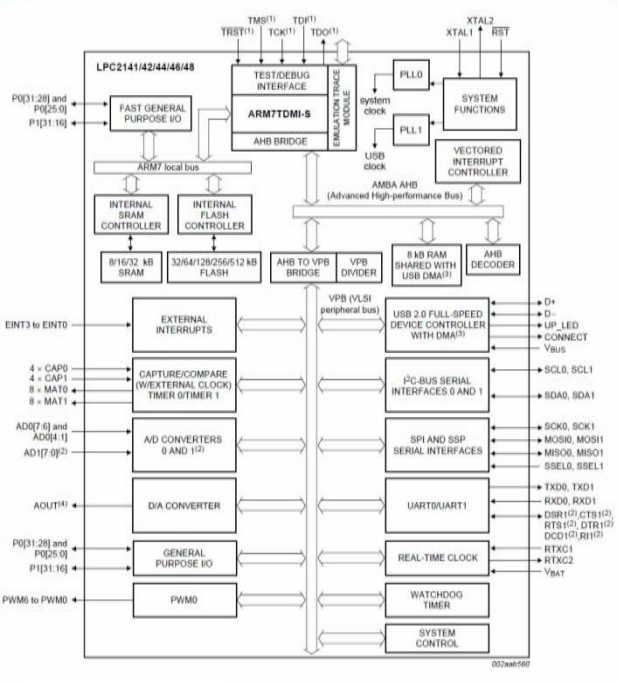
The S3C2440A is developed with ARM920T core, 0.13um CMOS standard cells and a memory complier. Its low power, simple, elegant and fully static design is particularly suitable for cost and power sensitive applications. It adopts a new bus architecture known as Advanced Micro controller Bus Architecture (AMBA).



S3C2440A Architecture

2.2 LPC2148 MICROCONTROLLER:

The LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory of 512 kB. A 128-bit wide memory interface and 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 the code by more than 30 % with minimal performance penalty.



Block diagram of LPC2148

2.3 PIC18F452:

It is a 'C' compiler optimized instruction set architecture. It can operate up to 10 MIPS. Power consumed is 40 MHz osc/clock input and 4 MHz - 10 MHz osc/clock input with PLL active. It is of 16-bit instructions, 8-bit wide data path. Three external interrupt pins

2.4 ZIGBEE:

ZigBee is an open technology developed by the ZigBee Alliance to overcome the limitations of BLUETOOTH and Wi-Fi. ZigBee is an IEEE 802.15.4 standard for data communications with business and consumer devices. It is designed around low power consumption allowing batteries to essentially last forever. BLUETOOTH as we know was developed to replace wires and Wi-Fi to achieve higher data transfer rate, as such till now nothing has been developed for sensor networking and control machines which require longer battery life and continuous working without human intervention.

2.5 RF434:

The purpose of an RF434 system is to enable data to be transmitted by a portable device, called a tag, which is read by an RF434 reader and processed according to the needs of a particular application. The data transmitted by the tag may provide identification or location information, or specifics about the product tagged, such as price, color, date of purchase, etc. RF434 technology has been used by thousands of companies for a decade or more.

Active RF434 uses an internal power source (battery) within the tag to continuously power the tag and its RF communication circuitry, whereas passive RF434 relies on RF energy transferred from the reader to the tag to power the tag.

3. IMPLEMENTATION

Reader unit 1 and 2 contains PIC18F452, RFID reader and RF434 Wireless module. Tx pin of RFID reader is interfaced to Rx pin of PIC18F. Rx pin of RF434 is interfaced to Tx pin of PIC18F. Vcc is given as 5v.When a vehicle crosses first reader unit the tag attached to vehicle read by the reader unit and it starts timer send intimation to central station.

By taking these details the central stations calculates the Speed of the vehicle and also detects the location of vehicle based on reader's position and send this information to Vehicle. So the vehicle in this system is going to know the location and the speed that it is going, if the vehicle is going with high speed than predefined then the speed control unit slowly reduce the vehicle speed. The central unit also provides the next location information to vehicle so that he can decide the route that he wants to go. The communication between Vehicle unit and Central unit is using ZigBee whereas the communication between reader units and Central unit is using RF434 wireless module.

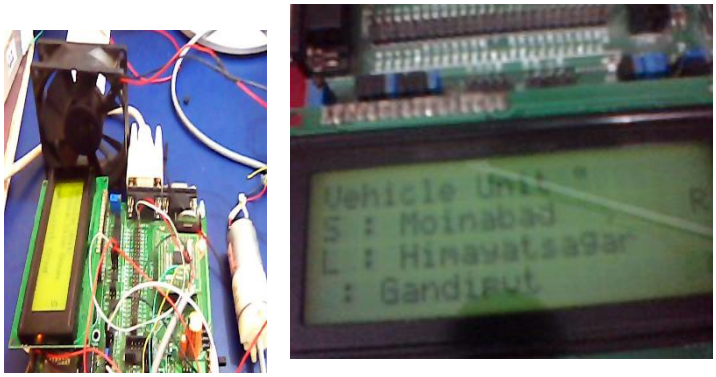
Vehicle unit contains ARM7 LPC2148 Controller, speed control unit & buzzer, ZigBee wireless module, RFID tag and LCD. ZigBee is present on board itself for ARM7.

External interrupts: Switch 1 to P0.15; for increment

Switch 2 to P0.3; for decrement

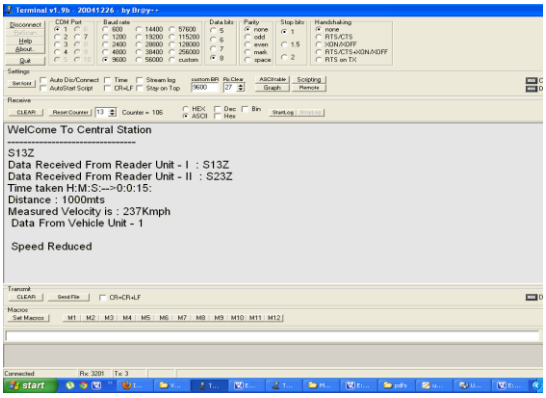
Central unit consists of ARM9S3C2440A, RF Wireless module, ZigBee wireless module and PC. ARM9 board is interfaced to PC via serial port. The Tx pin of S3C2440A is interfaced with Rx pin of RF434. Rx pin of S3C2440A is interfaced with Tx pin of RF434. Another Tx pin of S3C2440A is interfaced with Rx pin of ZigBee and Rx pin of S3C2440A is interfaced with Tx pin of ZigBee. Through ZigBee the data is transmitted and received from central unit to vehicle unit.

1. Result of vehicle unit

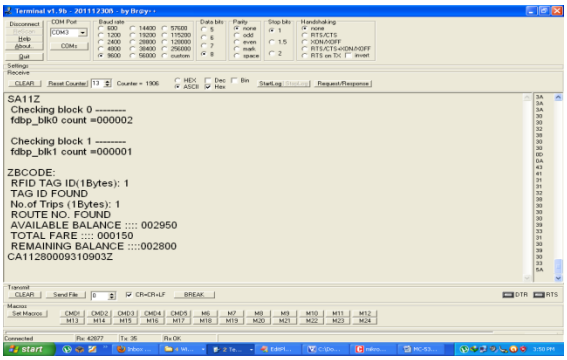


Vehicle unit is connected to the vehicle. This is developed by ARM7 LPC2148 controller. 9V supply will be given to this vehicle unit. Speed of the vehicle will be controlled in this module. If the speed is high, automatically speed will be reduced. If it is reduced by the user then that information will be displayed in the central unit. LCD is also connected to the ARM7 board, this displays the next location of the vehicle from the junction point is shown in below fig.

1. Result of Central unit



If the vehicle is going with very high speed through the command user will reduce the speed. This reducing information reaches the central unit through the wireless module and that will be displayed in pc of central unit.



Central station screen shot

4. CONCLUSION

Hence this project can conclude that this plays a very important role in the remote areas. If any vehicle will be entered in GPS signals insufficient areas easily owner of the vehicle can detect the vehicle, easily owner of the vehicle knows the present location of the vehicle and next location of the vehicle. Speed of the vehicle is also controlled by the user from the central station only.

5. FUTURE SCOPE

1. If GSM technology will be used in this project then the location of the vehicle for each reader unit will be sent to the vehicles owner's mobile.
2. Wi-Fi technology is also used in this project. With this application the location of the vehicle for every reader unit will be sent to the vehicle owner's mail id.

6. REFERENCES

[1] Kavitha Boddupally, M. Srinivasa Rao, Dr. D.N. Rao, "An Intelligent Speed Monitoring Navigation System using RFID" IJSETR Volume.02, IssueNo.09, and Sep -2013, pages: 860-866.

[2] E.K. Lee, Y.M. Yoo, C.G. Park, M. Kim and M. Gerla, "Installation and Evaluation of RFID readers on Moving Vehicles," Proc. ACM sixth Int'l Workshop Vehicular Internetworking (VANET'09), Sept- 2009, pages: 99-108.

[3] H.D .Chon, S. Jun, H. Jung, "Using RFID for Accurate Positioning," J. Global Positioning Systems, vol. 3, 2004, pages: 32-39.
[4] M. Kodialam and T. Nandagopal, "Fast and Reliable Estimation Schemes in RFID Systems," Proc.MobiCom'06, 2006, pages: 322-333.
[5] L. Xie, B. Sheng, C.C.Tan, Q.Li and D. Chen, "Efficient Tag IdentificationinMobileRFIDSystems,"Proc.IEEEINFOCOM'10, Mar.2010.
[6] S.R. Lee, S.D .Joo and C.W. Lee, "An Enhanced Dynamic Framed Slotted Aloha algorithm for RFID Tag Identification, "Proc. The Second Ann. Int'l Conf. Mobile and Ubiquitous Systems: Networking and Services (MOBIQUITOUS '05), 2005, pages: 166-174.
[7] J. Myung and W. Lee, "Adaptive Splitting Protocols for RFID Tag Collision Arbitration, "Proc. Seventh ACM Int'l Symp. Mobile Ad Hoc Networking and Computing (MobiHoc'06), 2006, pages: 202-213.
[8] Z. Pala and N. Inanc, "Smart Parking Applications Using RFID Technology," Proc. First Ann. RFID Eurasia, 2007.