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Non-Intrusive Planning the Roadside Infrastructure for Vehicular Networks

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Abstract

Intelligent Transportation Systems are grounded on vehicular networks, i.e., sophisticated communication networks receiving data from several entities composing thetraffic system. Differently from the previous approaches, we propose a mobility-driven strategy for the deployment of infrastructure for vehicle based on the behavior of drivers.Here we are implementing RFID based driver assistance by maintaining a comfortable way and easy communication for them while travelling.

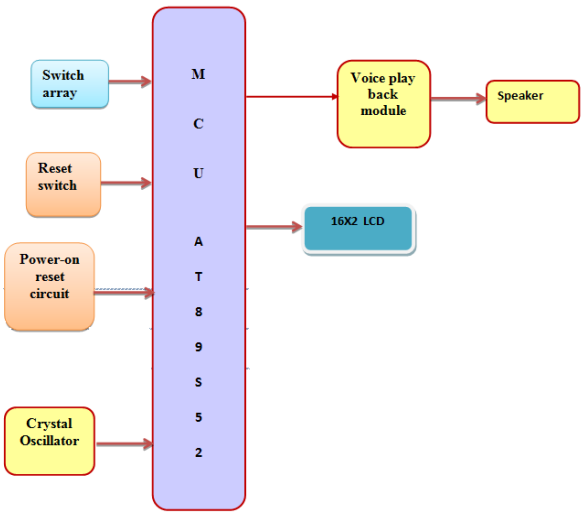
Existing system

This device is designed to provide with a greater advantage producing voice based announcement for the user i.e. the user gets the voice which pronounces his destination location as and when it is about to reach the destination.

Here instead of the alerting sound the user can directly hear the location recorded by the user itself.In this project we are using voice module based audio recording kit which performs the total operation of audio recording and playing back.

Initially there are control switches available for mode selection.

Block Diagram



Draw back:

There is no self identification using RFID cards

Proposed system

Few RFID tags are arranged and when the vehicle moves near that, instructions are received by RFID reader which is interfaced to the controller. This controller speaks out about the instruction using voice module interfaced. Instructions includes the details about parking slots of vehicles. Whether it is correct place or No parking area. This infrastructure also guides whether the vehicle has to take right or left for parking slot while travelling. The deployment of infrastructure for vehicle hasgained a lot of attention

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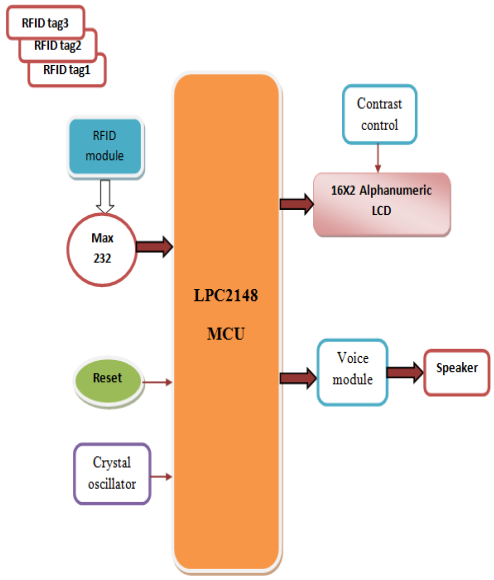
over the past years. Some researchershave devoted their attention in elaborating analytical formulations.

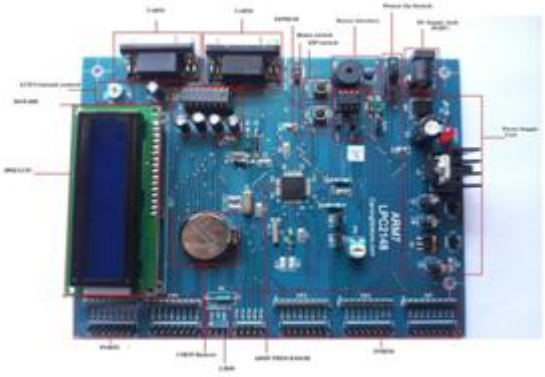


Hardware module used in this project

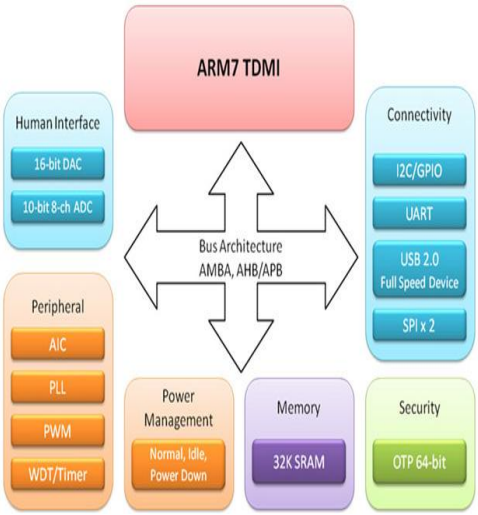
LPC2148

LPC2148 controller

The **LPC2148** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory.

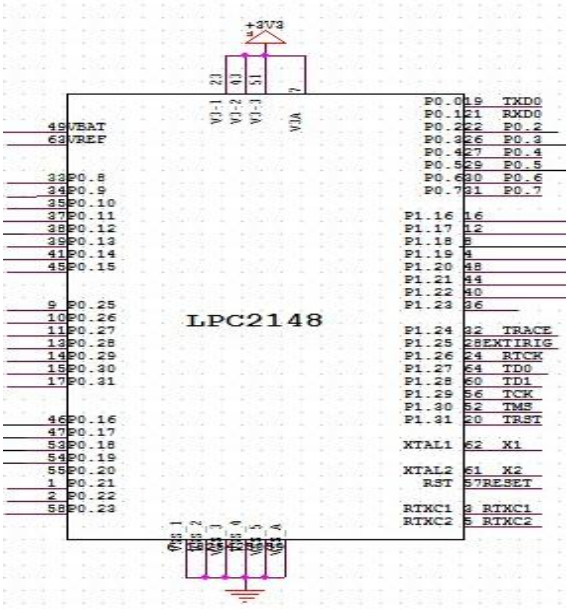


A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



Key features

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory.



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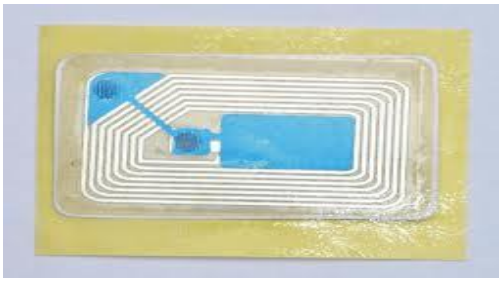
- 128-bit wide interface/accelerator enables high-speed 60 MHz operation.
- In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader Software.
- Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.
- EmbeddedICE RT and Embedded Trace interfaces offer real-time debugging with the On-chip RealMonitor software and high-speed tracing of instruction execution.
- USB 2.0 Full-speed compliant device controller with 2 kB of endpoint RAM.
- In addition, the LPC2146/48 provides 8 kB of on-chip RAM accessible to USB by DMA.
- One or two (LPC2141/42 vs. LPC2144/46/48) 10-bit ADCs provide a total of 6/14

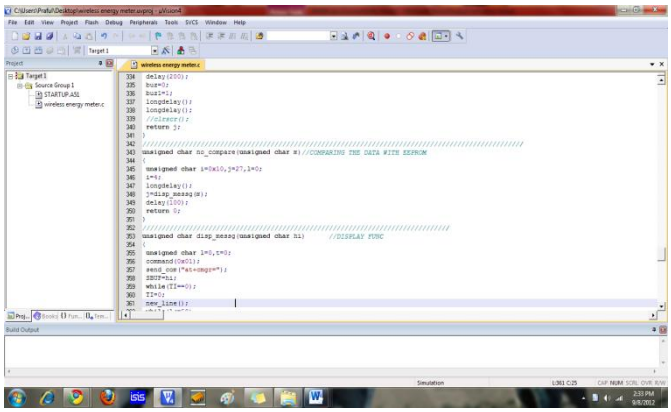
RFID

Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. Some tags require no battery and are powered by the electromagnetic fields used to read them. Others use a local power source and emit radio waves (electromagnetic radiation at radio frequencies).



Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.



Flash Magic

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**

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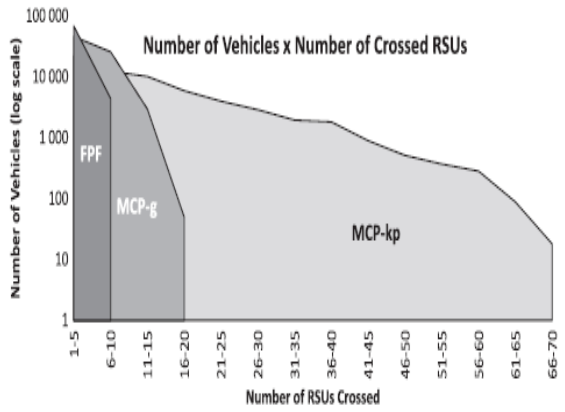
Applications

- Banks and ATM
- Voter Identification and electoral enrollment
- Personal Computers
- Automotives and high end cars

Advantages

- Sophisticated security
- No manual errors
- No false intrusion
- Need not remember any password



Number of crossed RSUs per vehicle. The x-axis indicates the amount of RSUs crossed. The y-axis indicates the number of vehicles ($\log_{10}$).

Conclusion

In this project work, we have studied and implemented a complete working model using a Microcontroller. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of **ARM7 & RFID modules.**

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