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SECURITY SYSTEM WITH AUTOMATED TOLL GATE COLLECTION SYSTEM

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Abstract: Now-a-days the dedicated short-range communication (DSRC)is an emerging technique especially for the intelligent transportation systems (ITC) which acts a protocol for simplex (or) duplex medium range communication.Basically DSRC standards mainly includes FM0(Flexible Macro Ordering) and Manchester codes inorder to reach the dc-balance and to enhancing the signal reliability. However, the potential to design a fully reused VLSI architecture is seriously limited by the coding-diversity between FM0 and Manchester encoding techniques. To overcome this limitation, a technique is introduced i.e the similarity-oriented logic simplification (SOLS) which is proposed by VLSI architecture.With this SOLS technique the hardware utilization rate(HUR) for both FM0 and Manchester encodings can improves from 57.14% to 100%. The maximum operation frequency is for Manchester and FM0encodings is 2 GHz and 900 MHz respectively. The performance of this paper is evaluated on the postlayout simulation in Taiwan Semiconductor Manufacturing Company (TSMC)0.18-μm 1P6M CMOS technology. The power consumption is 1.58 mW for Manchester encoding and 1.14 mW for FM0 encoding. The core circuit area is 65.98 × 30.43 μm2.This paper concentrates not only to develop a fully reused VLSI architecture, but also exhibits an efficient performance compared with the existing works.

***Keywords**: GSM,LPC2148,RFID.*

INTRODUCTION

In the developing countries we have seen a lot of crime happening at the bridges and highways. Specially, during evening and midnight many occurrence like- hijacks, murders etc. are commonly taking place. However, those criminals easily get escaped from the crime zone and victims lose their valuable assets including cars, jewelries etc. Although the presence of police, sometimes it gets difficult for them to identify the right vehicle and stop it for the checking. Most of the cases those vehicles pass the toll booth area by giving toll amount and no one can identify the criminals. To avoid those problems we have built an advanced security system which is integrated with the automated RFID based tolling system. This system will not let the criminals pass the toll booth area even after paying the toll amount. Thus, the crime rates at highways and bridges can be reduced. The overall system is user friendly, fast responsive and convenient for the developing countries. By implementing this system in the highways and bridges, primary steps can be taken to resist a criminal or any sort of crime. As the data of each vehicle owner should be recorded in the database previously, so when any information of that vehicle owner is needed by the authority or police, it can be easily found from the database to ease the investigation process.

THE HARDWARE SYSTEM

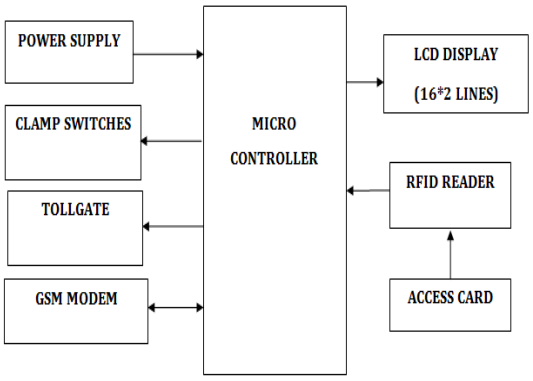

Fig.1.Block diagram

BOARD HARDWARE FEATURES

Micro Controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI:

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-Crystal Display:

Lcd is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. Lcds are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

GPRS:

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

Fig .2: GPRS module

RFID:

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology which uses tags as a

component in an integrated supply chain solution set that will evolve over the next several years. RFID tags contain a chip which holds an electronic product code (EPC) number that points to additional data detailing the contents of the package. Readers identify the EPC numbers at a distance, without line-of-sight scanning or involving physical contact. Middleware can perform initial filtering on data from the readers. Applications are evolving to comply with shipping products to automatically processing transactions based on RFID technology RFID Reader Module, are also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to Communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.

Fig .3: RFID Reader

Tags are classified into two types based on operating power supply fed to it.

1. Active Tags
2. Passive Tags

Active Tags: These tags have integrated batteries for powering the chip. Active Tags are powered by batteries and either have to be recharged, have their batteries replaced or be disposed of when the batteries fail.

Passive Tags: Passive tags are the tags that do not have batteries and have indefinite life expectancies.

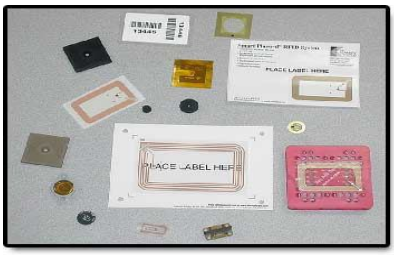

Fig .4: Different types of tags

DC Motor:

A DC motor relies on the fact that like magnet poles repels and unlike magnetic poles attracts each other. A coil of wire with a current running through it generates an electromagnetic field aligned with the center of the coil. By switching the current on or off in a coil its magnetic field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°.

Fig .5: DC Motor

Motor driver (L293D):

DC motors are typically controlled by using a transistor configuration called an "H-bridge". This consists of a minimum of four mechanical or solid-state switches, such as two NPN and two PNP transistors. One NPN and one PNP transistor are activated at a time. Both NPN and PNP transistors can be activated to cause a short across the motor

terminals, which can be useful for slowing down the motor from the back EMF it creates. H-bridge. Sometimes called a "full bridge" the H-bridge is so named because it has four switching elements at the "corners" of the H and the motor forms the cross bar. The switches are turned on in pairs, either high left and lower right, or lower left and high right, but never both switches on the same "side" of the bridge. If both switches on one side of a bridge are turned on it creates a short circuit between the battery plus and battery minus terminals. If the bridge is sufficiently powerful it will absorb that load and your batteries will simply drain quickly. Usually however the switches in question melt.

RESULT

Fig .5: Hardware component

Fig .6: Detecting GPRS module

Fig .7: WEB page

CONCLUSION

In this paper we tried to design an embedded system to ensure a faster toll collection system along with security feature that will contribute a lot to stop crimes at the highways and bridges. It will also ease the work of the police authority to catch a criminal. The system performs the whole task by processing the data received through GSM shield from the police authority. However, the same concept can be implemented at the car parking system or any other security concern places. The real life model construction cost of the system is very less and sustainable too. As a whole, the integrated toll collection with security system is very beneficial and effective system.

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