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ARM7 Based Vehicle Theft Identification with Location Alert

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Abstract

The Main aim of the project is to design a system which is capable of tracking theft vehicles location wirelessly with displaying the location number on LCD based on RFID technology. Now a day's technology is running with time, it completely occupied the life style of human beings. It is being used everywhere in our daily life to fulfil our requirements. We can not only increase the speed of life but also increase security with good ideas by making use of advanced technology.

The microcontroller is programmed in such a way that it continuously reads the input from RFID reader. Whenever the vehicle enters a signal junction, the RFID tag will be read by the RF reader at the signal junction. RFID reader decodes the RFID tag of that vehicle data and displays that vehicle details on LCD. And also send the information to the authorized person. The action of these Instructions is already loaded into the Microcontroller using Embedded C programming. The intelligent control software, which has been developed Embedded C programming language.

Keywords: ***ARM7 microcontroller and communicate using GSM modules, GPS, RFID(Reader and Tag), LCD and Buzzer***

1. Introduction

The significant problems in the present society are robbery, crime and theft that increasing. This raises the security system issue. Basically, almost available security systems are personal monitoring by security guards. The disadvantages of these systems are a number of security guards to serve the increasing problems and low efficiency due to unprofessional guards. Therefore, several of security types have studied, applied and implemented automatic systems and modern technologies to secure assets against theft RFID (Radio Frequency Identification), one of the promising technologies, that has been widely applied into the access control and security systems. RFID is a technology that helps to identify the animate or inanimate through radio waves. A typical RFID system consists of a reader and transponder. RFID is a leading automatic identification technology. RFID tags communicate information by radio wave through antenna on small computer chips attached to objects so that such objects may be identified, located, and tracked.

Owing to the RFID technology provides the security systems significant benefit and feasibility, therefore, this study applies the RFID technology into the security system in the car which is "Advanced vehicle Security using RFID System" in order to secure from car theft problem. Car is the important personal property of most people. The number of cars increases with the increasing number of the peoples. This project is a safety system which is filled with features complete and this system will be process without using any wired between the RFID reader and the RFID tag. The project is specifically designed to solve a car theft, especially on luxury cars. RFID is used to car security system which equipped with the RFID (Radio Frequency Identification), which function as key sensors which can activate the car by using radio frequency signals. It can also be said to acts as a key which only a certain frequency can activate the car. Another security and privacy of the RFID technology

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is authentication and access control which is applied in this project. Replacing keys with electronic cards or budges has a number of advantages. The primary one is that cards are more difficult to forge and can be revoked more easily when compromised or lost than having to change the lock as is the case for mechanical keys. The principle of the system is when the passive RFID tag has placed near to the RFID reader, it will transmit the radio frequency to the RFID reader and RFID reader will read that signal and send to the message through GSM module and show the location on LCD by using GPS. Then the message will control all the system inside car. By showing invalid tag GSM send message to the registered number as well as GPS shows the location on LCD and buzzer indicates theft alarm.

2. LITERATURE SURVEY

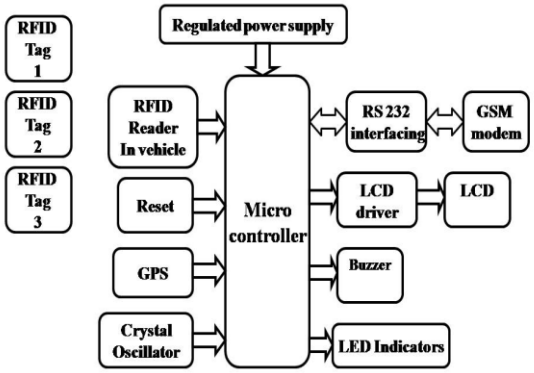
In [2], the hardware and software of the GPS and GSM network were developed. The proposed GPS/GSM based System has the two parts, first is a mobile unit and another is controlling station. The system processes, interfaces, connections, data transmission and reception of data among the mobile unit and control stations are working successfully. These results are compatible with GPS technologies.

In [3], a vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the vehicle's place. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology. This system built based on embedded system, used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design will continuously watch a moving Vehicle and report the status of the Vehicle on demand.

In [4], Face Detection System used to detect the face of the driver, and compare with the predefined face. The car owner is sleeping during the night time and someone theft the car. Then Face Detection System obtains images by one tiny web camera, which is hidden easily in somewhere in the car. Face Detection System compared the obtained images with the stored images. If the images don't match, then the information sends to the owner through MMS. The owners get the images of the thief in mobile phone and trace the place through GPS. The place of the car and its speed displayed to the owner through SMS. The owner can recognize the thief images as well as the place of the car and can easily find out the hijackers image. This system applied in our day-to-day life.

3. IMPLEMENTATION:

ADVANCED VEHICLE SECURITY SYSTEM USING RFID



From the above figure, we can see that the device which is able to perform the task is a LPC 2148 Micro controller. There is RFID reader send data to micro controller then the buzzer indicates alerts and send message through GSM to the predefined numbers, **LPC 2148** Micro Controller is programmed using embedded C programming language.

4. RELATED WORK:

This system consists of ARM-7 microcontroller which is the main controlling part of the system. RFID tags are shown near the RFID reader to select the prescribed vehicle. The GSM module is also used as another option to send the message to the owner and GPS shows the location of the vehicle. The brief introduction of different modules used in this project is discussed below:

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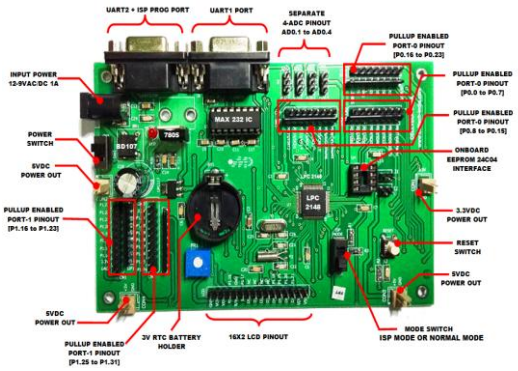
ARM7:



This generation established the Thumb 16-bit instruction set providing improved code density compared to previous designs. The most widely used ARM7 designs execute the ARMv4T architecture, but some implement ARMv3 or ARMv5TEJ. ARM7TDMI has 37 registers (31 GPR and 6 SPR). All these designs use Von Neumann architecture, thus the few versions comprising a cache do not change the data and instruction caches.

Some ARM7 cores are obsolete. One historically significant model, the **ARM7DI** is notable for having established JTAG based on-chip debugging; the preceding ARM6 cores did not support it. The "D" represented a JTAG TAP for debugging; the "I" denoted an ICE Breaker debug module supporting hardware breakpoints and watch points, and letting the structure be stalled for debugging. Subsequent cores included and enhanced this support.

RFID:

RADIO FREQUENCY IDENTIFICATION uses a semiconductor (micro-chip) in a tag or label to transmit stored data when the tag or label is exposed to radio waves of the correct frequency.

The Elements of an RFID System

RFID systems fundamentally consist of four elements:

- The RFID tags.
- The RFID readers
- The antennas and choice of radio characteristics,
- The computer network (if any) that is used to connect the readers.

RFID Tags

The tag is the primary building block of RFID. Each tag consists of an antenna and a small silicon chip that contains a radio receiver, a radio modulator for forwarding a response back to the reader, control logic, some amount of memory, and a power system. The power system can be entirely powered by the incoming RF signal, in which case the tag is known as a passive tag. Alternatively, the tag's power system can have a battery, in which case the tag is known as an active tag.

The primary advantages of operative tags are their reading range and reliability. With the proper antenna on the reader and the tag, a 915MHz tag can be scan from a distance of 100 feet or more. The tags also tend to be more reliable because they do not require a continuous radio signal to power their electronics.

Readers

The RFID reader sends a pulse of radio energy to the tag and hears for the tag's response. The tag detects this energy and sends back a response that contains the tag's serial number and may be other information as well.

In simple RFID systems, the reader's pulse of energy functioned as an on-off switch; in additional sophisticated systems, the reader's RF signal can contain commands to the tag, instructions to read or

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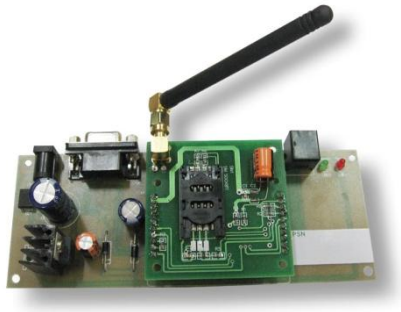
write memory that the tag contains, and even passwords.

Historically, RFID readers were planned to read only a particular type of tag, but so-called multimode readers that can read many dissimilar kinds of tags are becoming increasingly popular.

GSM:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.

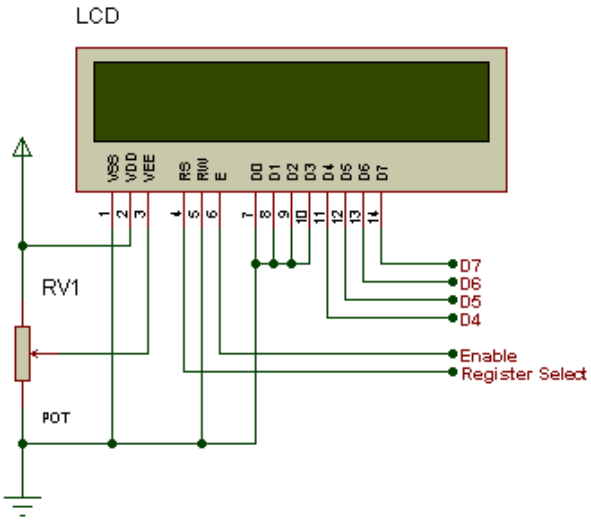


GPS:

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

LCD DISPLAY:

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively



The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus).

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Buzzer:

Basically, the sound source of a piezoelectric sound component is a piezoelectric diaphragm. A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect.

For a misshaped piezoelectric element, the distortion of the piezoelectric element expands in a radial direction. And the piezoelectric diaphragm bends toward the direction. The metal plate bonded to the piezoelectric element does not expand. Conversely, when the piezoelectric element shrinks, the piezoelectric diaphragm bends in the direction Thus, when AC voltage is applied across electrodes, the bending is repeated, producing sound waves in the air.

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