

RFID BASED AUTHENTICATION AND ACCESS OF VEHICLES

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Abstract - now a days each system is automatic so as to face new challenges. in the present days automatic systems have less manual operations, flexibility, reliable and accuracy. thanks to this demand for fewer manual dominant, each one prefers automatic management systems. particularly within the home and industries of physical science, automatic systems are giving smart performance and adaptability to induce dominant while not your involvement. during this project work, image model for the vehicle authentication with RFID has been developed. Here RFID used for the automated trailing and detection of labelled objects through radio waves. It needs RFID tag stores digital info once it comes within the visibility of reader and reader reads the digital info of the RFID tag and send to the monitoring unit for verification.

Key Words: RFID tag, RFID receiver, Microcontroller, Power supply, LCD Display.

I. INTRODUCTION

Radio Frequency Identification (RFID) technology uses radio waves to identify people or objects. There is a device that reads information contained in a wireless device or "tag" from a distance without making any physical contact or requiring a line of sight. RFID technology has been commercially available in one form or another since the 1970s. It is now part of our daily lives and can be found in car keys, employee identification, medical history/billing, highway toll tags and security access cards. As a kind of wireless automatic identification technology, RFID can automatically identify the objective and obtain the relevant data from radio frequency signal without man-made interference. Different from traditional bar code identification technology, RFID technology has characteristics of waterproof, anti-magnetism, high temperature resistance, long service life, far read distance, cryptographic label data, large storage capacity, free information alteration and etc. No personal information is stored on the RFID card – only a number, which points to the information housed in secure databases. The RFID technology has two components – the reader and the tag. The reader has two parts a transceiver and an antenna. The transceiver generates a weak radio signal that may have a range from a few feet to a few yards. The signal is necessary to wake or activate the tag and is transmitted through the antenna. The signal itself is a form of energy that can be used to power the tag.

II. HARDWARE DESCRIPTION

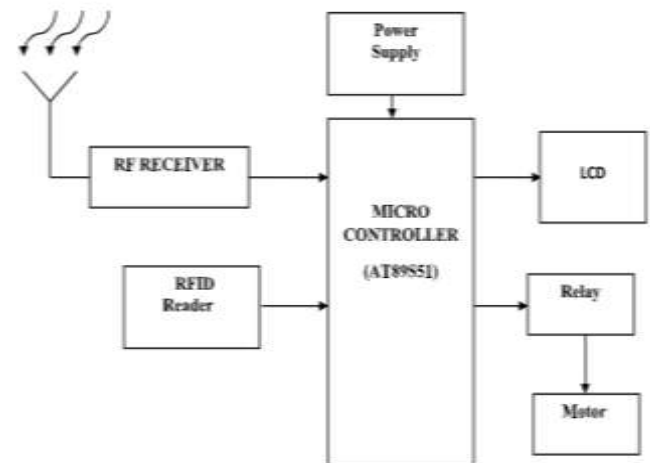


Fig-1:Block Diagram

1. MICROCONTROLLER AT89S51

The AT89S51 is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with In-System Programmable Flash on a monolithic chip, the Atmel AT89S51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timer/counters, a five-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry.

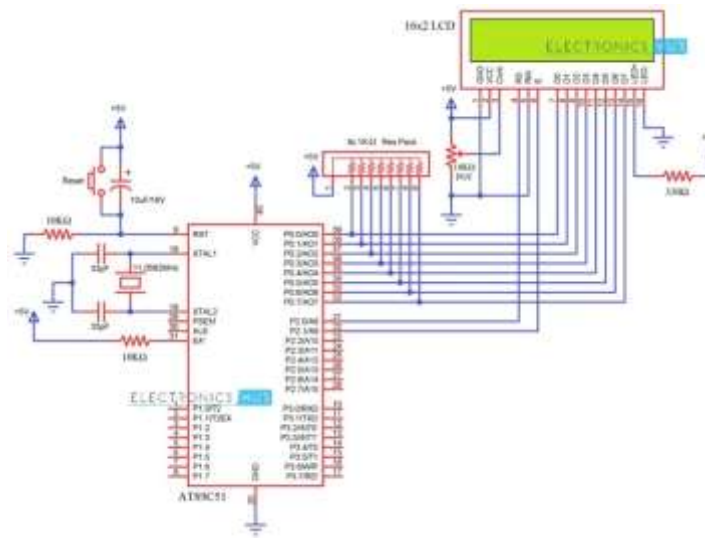


Fig-2: Interfacing 16*2 LCD with 8051 microcontroller

In addition, the AT89S51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes .The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next external interrupt or hardware reset.

2. RFID RECEIVER

A radio receiver is the opposite of a radio transmitter. It uses an antenna to capture radio waves, processes those waves to extract only those waves that are vibrating at the desired frequency, extracts the audio signals that were added to those waves, amplifies the audio signals, and finally plays them on a speaker.

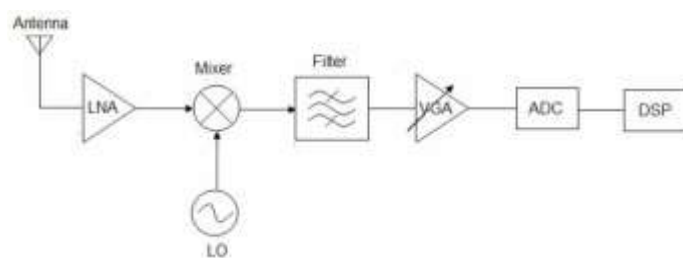


Fig-1: Block diagram of RF receiver

3. RFID READER:

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even

when it is surrounded by several other items. RFID tags have not replaced bar codes because of their cost and the need to individually identify every item. This RFID reader works with 125 kHz tags in credit card size shape cards and with 125 kHz key fobs The EM4100 protocol is used. When you approach an RFID Tag close enough (4-5 cm) to the reader's coil (L1) the reader will read the 10-digit unique ID of the Tag and transmit it as ASCII characters through the serial output with 2400 bits per second. The RFID reader provides energy to the transponder (Tag) by creating an electromagnetic field.

4. RFID TAG

RFID Tag uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tags don't need to be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of automatic identification and data capture (AIDC). RFID tags are used in many industries. For example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets enables positive identification of animals .Radio Frequency Identification (RFID) tags or transponders are small devices that utilize low-power radio waves to receive, store, and transmit data to nearby readers. RFID tags are comprised of the following main components: a microchip or integrated circuit (IC), an antenna, and a substrate or protective material layer that holds all the components together. There are three basic types of RFID tags: passive, active, and semi- passive or battery-assisted passive (BAP). Passive RFID tags do not have an internal power source, rather, they are powered by the electromagnetic energy transmitted from an RFID reader. Active RFID tags have their own transmitter and power source on-board the tag. Semi-passive or battery-assisted passive (BAP) tags are comprised of a power source incorporated into a passive tag configuration. Additionally, RFID tags operate in three frequency ranges: Ultra-high Frequency (UHF), High Frequency (HF), and Low Frequency (LF).

Active tags

There are two main frequencies utilized by active systems 433 mhz and 915 mhz. User preference, tag choice, or environmental concerns typically dictate that frequency to use for many applications. corporations usually favor RFID systems that operate the 433 mhz as a result of it's a extended wavelength facultative it to figure a bit higher with non-RF friendly materials like metal and water. Typically, active RFID tags area unit powered by battery which will last between three – five years, however once the battery fails,

the active tag can need to get replaced. because the active tag market matures, replaceable batteries are a value saving choice. The system's practicality depends entirely on the kind of tag chosen for the appliance. Active RFID systems have three essential elements – a reader or querier, antenna, and a tag. Active RFID tags possess their own power supply – an interior battery that allows them to possess extraordinarily long browse ranges further as giant memory banks. Essentially, two different types of active RFID tags area unit accessible– transponders and beacons.

Transponders

In a system that uses an active transponder tag, the reader (like passive systems) can send a proof 1st, so the active electrical device can send a proof back with the relevant data. Electrical device tags area unit terribly economical as a result, they conserve battery life once the tag is out of very of the reader. Active RFID transponders area unit normally employed in secure access management and in toll booth payment systems. Beacons-In a system that uses an active beacon tag, the tag will not wait to listen to the reader's signal. Instead, true to its name, the tag can 'beacon', or transfer its specific data each three — five seconds. Beacon tags area unit quite common within the oil and gas business, as well as mining and freight following applications. Active tag's beacons are often scan many meters away, but, to conserve battery life, they will be set to a lower transmit power to achieve around a hundred meters scan vary.

5. POWER SUPPLY

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters. Some power supplies are separate standalone pieces of equipment, while others are built into the load appliances that they power. Examples of the latter include power supplies found in desktop computers and consumer electronics devices. Other functions that power supplies may perform include limiting the current drawn by the load to safe levels, shutting off the current in the event of an electrical fault, power conditioning to prevent electronic noise or voltage surges on the input from reaching the load, power-factor correction, and storing energy so it can continue to power the load in the event of a temporary interruption in the source

6. LCD

A liquid-crystal display (LCD) could be a flat-panel show or different electronically modulated device that uses the light-modulating properties of liquid crystals. Liquid crystals don't emit lightweight directly, instead using a backlight or reflector to provide pictures in color or monochrome. LCD's square measure out there to show arbitrary pictures (as during a general laptop display) or fixed pictures with low data content, which might be displayed or hidden, like preset

words, digits, and seven-segment displays, as during a digital clock. They use constant basic technology, except that discretionary pictures square measure created from several little pixels, whereas different displays have larger parts. LCD's will either be usually on (positive) or off (negative), reckoning on the polarizer arrangement.

7. RELAY

A relay is an electrically operated switch. It consists of a group of input terminals for one or multiple management signals, and a group of operative contact terminals. The switch could have any variety of contacts in multiple contact forms alike create contacts, break contacts. The standard variety of a relay uses a magnet to shut or open the contacts, however different operative principles are fictional, like in solid-state relays that use semiconductor properties for management while not counting on moving elements. Relays with tag operative characteristics, and typically multiple operatives coils square measure wont to defend electrical circuits from overload or fault; in trendy electrical power systems these functions square measure performed by digital instruments still referred to as protecting relays. Latching relays need solely one pulse of management power to control the switch persistently. Another pulse applied to a second set of management terminals, or a pulse with opposite polarity; resets the switch, whereas continual pulses of constant kind haven't any effects. Magnetic latching relays square measure helpful in applications once interrupted power should not have an effect on the circuits that the relay is dominant.

Applications

- A relay circuit is used to realize logic functions.
- Relays are used to provide time delay functions.
- Similarly they are used to control high current circuits with the assistance of low current signals.

8. MOTOR

Motor is outlined as an electrical or mechanic device that may produce a motion. whereas interfacing with the controller a number of the motors like DC motor, stepper motor and brushless dc motor could need a driver IC or driver circuit. DC motor may be a sort of motor that may convert DC into a mechanical power. in an exceedingly brushless DC motor, it consists of a DC power supply, AN electrical converter manufacturing AN AC signal to drive the motor. whereas stepper motor may be a brushless DC motor that converts electrical pulses into separate mechanical motions. Here we tend to square measure mistreatment Gear motor of thirty rate.

III. SOFTWARE DESCRIPTION

Keil is that the complete code development atmosphere for a large vary of Arm Cortex-M based mostly microcontroller devices. MDK includes the μ Vision IDE and program, Arm C/C++ compiler, and essential middleware elements. It

supports all element vendors with over vi,000 devices and is simple to find out and use Keil small Vision may be a free code that solves several of the pain points for an embedded program developer. This code is an integrated development atmosphere (IDE), that integrated a text editor to write down programs, a compiler and it'll convert the ASCII text file to hex files too. Like all code supported Keil's μ Vision IDE, the toolsets offer a strong, simple to use and simple to find out atmosphere for developing embedded applications. They embody the elements you wish to form, debug, and assemble your C/C++ supply files, and incorporate simulation for microcontrollers and connected peripherals. The RTX RTOS Kernel helps you to implement advanced and time-critical code. These elements square measure designed to resolve communication and period challenges of embedded systems. whereas it's attainable to implement embedded applications while not employing a period kernel, a proved kernel saves time and shortens the event cycle.

RESULT



CONCLUSION

The existing system contains some issues like slow manual checks cause queuing of needers, inconvenience of real time data, misinformation concerning vehicle homeowners. to get rid of the issues, we advise vehicle authentication with sensible tag mistreatment RFID in order that we are able to management time intense throughout vehicle scrutiny. A period high economical RFID-GSM based mostly vehicle identification system is intended and enforced . Integration of GSM and active RFID technologies has resulted fully automation of periodic scanning. so as to resolve the problem associated with identity authentication and privacy protection of the RFID application in recent years and cut back security risks to supply a security, harmonious and comfy field learning and living atmosphere, supported the RFID technology application.

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