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RFID Based Security System for Mining Industries

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ABSTRACT:
In this project RFID connected to ARM7 through serial interface. The main purpose of the project is to provide automation for mining industries. In all mines, coal will transfer through vehicles or Lorries. All vehicles information proceeds by manual. But in this case lot of chance to manipulate. In this project each vehicle established with RFID cards, if RFID tag detected then microcontroller validates tag and gate will open. If microcontroller detects invalid tag then buzzer will come and gate will not open.

LITERATURE SURVEY:
RFID system consists of three components namely transponder (tag), interrogator (reader) and computer containing the database, as shown in Fig. 1. The interrogator reads the tag data and transmits it to the computer for authentication. The information is processed and upon verification, access is granted. The system offers diverse frequency band ranging from low frequencies to microwave frequencies [5]: • Low Frequency: 125-134 KHz • High Frequency: 13.56 MHz • Ultra High Frequency: 902-928 MHz • Microwave Frequency: 2.4 GHz Depending upon the source of electrical energy, RFID tags are classified as either active or passive. The active tags use a battery for powering the circuit on the tag and transmit the tag information upon the reader request. However, these tags are very expensive and seldom used. On the other hands, passive tags get energy from the reader to power their circuit. These tags are very cost-effective and hence most of the applications use them.

INTRODUCTION:
ARM does not manufacture the CPU itself, but licenses it to other manufacturers to integrate them into their own system.

2.2 ARM architecture:
RISC:
RISC, or Reduced Instruction Set Computer. is a type of microprocessor architecture that utilizes a small, highly-optimized set of instructions, rather than a more specialized set of instructions often found in other types of architectures.

History:
The first RISC projects came from IBM, Stanford, and UC-Berkeley in the late 70s and early 80s. The IBM 801, Stanford MIPS, and Berkeley RISC 1 and 2 were all designed with a similar philosophy which has become known as RISC. Certain design features have been characteristic of most RISC processors:

- One cycle execution time : RISC processors have a CPI (clock per instruction) of one cycle. pipelining : a technique that allows for simultaneous execution of parts, or stages, of instructions to more efficiently process instructions;
- large number of registers : the RISC design philosophy generally incorporates a larger number of registers to prevent in large amounts of interactions with memory

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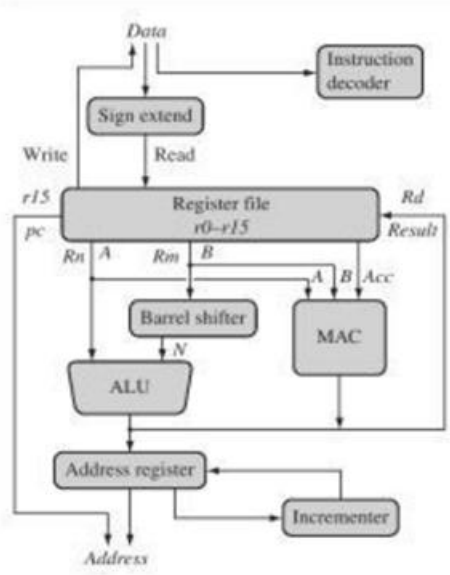
CISC	RISC
Price/Performance Strategies	
Price: move complexity from software to hardware. Performance: make tradeoffs in favor of decreased code size, at the expense of a higher CPI.	Price: move complexity from hardware to software. Performance: make tradeoffs in favor of a lower CPI, at the expense of increased code size.
Design Decisions	
• Execution of instructions takes many cycles • Design rules are simple thus core operates at higher clock frequencies • Memory-to-memory addressing modes. • A microcode control unit. • Spend fewer transistors on registers.	• Simple, single-cycle instructions that perform only basic functions. Assembler instructions correspond to microcode instructions on a CISC machine. • Design rules are more complex and operates at lower clock frequencies • Simple addressing modes that allow only LOAD and STORE to access memory. All operations are register-to-register. • Direct execution control unit. • Spend more transistors on multiple banks of registers. • Use pipelined execution to lower CPI.

ARM Processor Core:

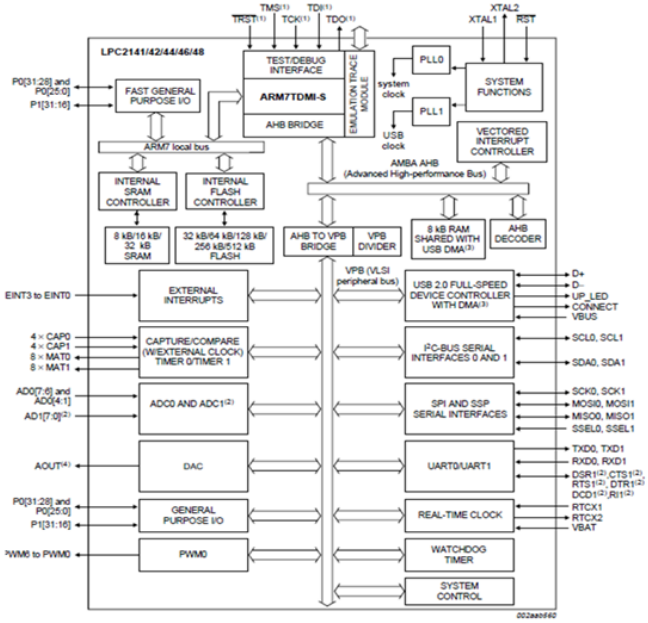
The figure shows the ARM core dataflow model. In which the ARM core as functional units connected by data buses,. And the arrows represent the flow of data, the lines represent the buses, and boxes represent either an operation unit or a storage area.

Fig: ARM core dataflow model



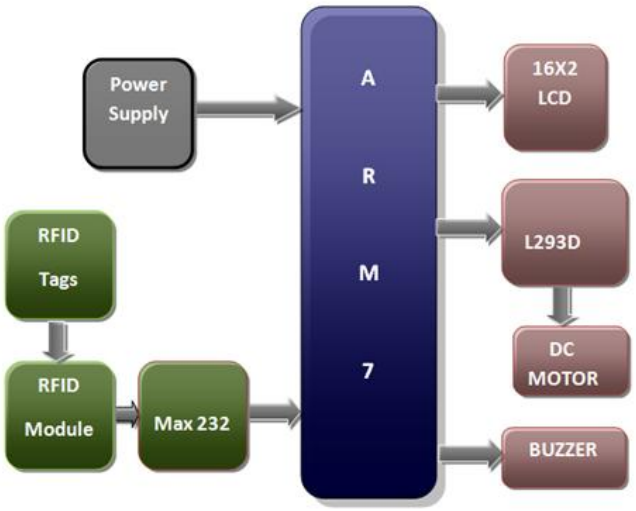
In the above figure the Data enters the processor core through the Data bus. The data may be an instruction to execute or a data item. This ARM core represents the Von Neumann implementation of the ARM data items and instructions share the same bus. In contrast, Harvard implementations of the ARM use two different buses. The instruction decoder translates instructions before they are executed. Each instruction executed belongs to a particular instruction set.

FUNCTIONAL BLOCK DIAGRAM:



1. HARDWARE IMPLEMENTATION:

BLOCK DIAGRAM:



REGULATED POWER SUPPLY:

A variable regulated power supply, also called a variable bench power supply, is one where you can continuously adjust the output voltage to your requirements. Varying the output of the power supply is the recommended way to test a project after having double checked parts placement against circuit drawings and the parts placement guide.

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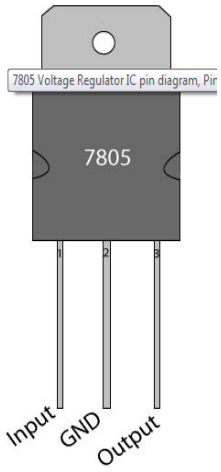
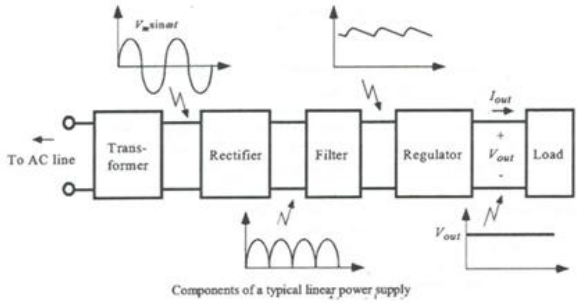


Fig. Pin configuration of 7805 voltage regulator

ICs regulator is mainly used in the circuit to maintain the exact voltage which is followed by the power supply. A regulator is mainly employed with the capacitor connected in parallel to the input terminal and the output terminal of the IC regulator. For the checking of gigantic alterations in the input as well as in the output filter, capacitors are used. While the bypass capacitors are used to check the small period spikes on the input and output level. Bypass capacitors are mainly of small values that are used to bypass the small period pulses straightly into the Earth.

BLOCK DIAGRAM:



Components of a typical linear power supply

RFID MODULE:

RFID reader module, are also called as interrogators. They convert radio waves returned form the RFID tag into a form that can be pressed 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 and supported by our Reader 125 KHz.

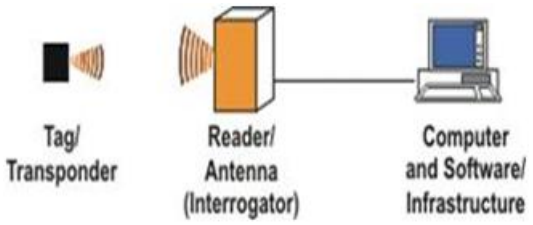
RFID Reader

RFID Tag

Components:

A basic RFID system consists of three components:

- An antenna or coil
- A transceiver (with decoder)
- A transponder (RF tag) electronically programmed with unique information.



The antenna emits radio signals to activate the tag and read and write data to it. Antennas are available in a variety of shapes and sizes; they can be built into a doorframe to receive tag data from persons or things passing through the door, or mounted on an interstate tollbooth to monitor traffic passing by on a freeway.

Transceiver:

Often the antenna is packaged with the transceiver and decoder to become a reader (a.k.a. interrogator), which

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can be configured either as a handheld or a fixed-mount device. The reader emits radio waves in ranges of anywhere from one inch to 100 feet or more, depending upon its power output and the radio frequency used. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal.

1. WORKING PRINCIPLE:

This project represents for mining industries we may able to transfer the coal in vehicles such as Lorries, etc. So in order to make security to do that operation we are implementing the RFID based detection for authentication users. Whenever any user has to enter into the mining area he has on tag with him that tag only used for entering or leaving that area. When inserting the tag near by the reader it detects for authentication based on predefined tags which were initially enrolled. That tag will needs to identify the exact person and make him access to enter into it. Suppose if RFID card will put at two times it would not give authentication the highly security implementation in this project is one tag will works at one time if it exceeded to use gives indication to us, in terms of buzzer. From this we can achieve the highly security on the mining areas.

CONCLUSION:

The main issue for the success of integrated solutions in street is to define appropriate communication protocol and the media for the information transfer. Wireless Sensor networks may present a new solution to bring the installed cost down and to ensure energy efficiency. Over the past 10years many new RF solutions have been developed into our every-day life. It is expected that soon a reliable, robust, easy-to-install and secure wireless network technology for connecting devices on streets and in buildings will gain market acceptance and substantial shares of new and retrofit installations.

Nevertheless it is still not well defined on a semantic point of view.

Future Development:

1. We can send this data to a remote location using mobile or internet
2. We can add the module of voice alarm system to indicate valid or invalid card entry.

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