

Arduino Based Protection System for Wireman

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Abstract: This System is one of the Best Innovations of Normal Circuit Breaker .Normally Circuit Breaker Is Used To Turn On or Turn Off the Flow of Transmission Lines. But In Our System We Includes More Devices Like Arduino Controller Board, Buzzer, Fuse Breaker, RFID Reader, GSM Modem. When Any Fault Occurs Onto The Transmission Lines The Manager Of Power Supply Provider Company Gets Information Of Fault. There Is Individually RFID Reader Implemented Which Operates As A Circuit Breaker To Control The Flow Of Transmission Line.

Keywords: GSM Modem, RFID Reader and Card, Arduino Controller Board, Fuse Breaker.

1. INTRODUCTION

The main focus of this system is to implement the protection system for wireman. Arduino which is the latest controller board and GSM modem are plays very important role in the working of this system.

The system is designed to control a circuit breaker with the help of a RFID CARD. Fatal electrical accidents with the line man are increasing during the electric line repairing due to the lack of communication and co-ordination between the maintenance staff and the electric substation staff.

This system provides a solution, which can ensure that the safety of the maintenance staff e.g. line man. The control to turn ON/OFF the line lies with the line man only. This system has an arrangement such that a RFID is required to operate the circuit breaker (ON/OFF). Line man can turn off the supply and comfortably repair it, and returns to the substation, then turn on the line by scan the correct RFID.

The system is fully controlled by Arduino controller board. RFID is interfaced with the Arduino. If the RFID is correct, then the line can be turned ON/OFF. Activation / deactivation of the circuit breaker are indicated by a load.

It is also being interfaced with a GSM modem to inform power supply Provider Company via SMS when fault is detected and repair the line by wireman. BUZZER is also used to alert when fault is created.

Fuse breaker and buzzer are implemented on to the pole. If any fault is happen on to the pole then buzzer gives the alarm and alert people near the surrounding area and protects the people from the high voltage supply. If any fault is created on to the pole then the fuse breaker sending the data to the Arduino controller board.

Arduino interfaced with the GSM modem. If any fault is introduced in the transmission lines then GSM modem sending the SMS to the manager of the power supply provider company.

Then manager gives the order to the wireman to solve the problem. Wireman goes this place where fault is created and swept the RFID card and cut the power supply then second SMS is sending to inform the manager. Wireman goes to their place and work to solve the problem in transmission line. When fault is solved then wireman again swept the RFID card and again through the GSM modem SMS is transmitted to the manager to inform the fault is solved safely by wireman. And Power supply is ON when correct RFID card is swept. Other person cannot ON this power supply. Thus this system provides safety for wireman.

II. LITERATURE REVIEW

A. *RFID READER:*

This board is based on the EM18 RFID Module. Using the board with microcontrollers to read a card's data is very simple and requires just a serial connection. The board should be powered at 5V, and it requires a direct connection to the microcontroller's Serial (Rx) pin. The card data is transmitted over the serial line when the card is brought near the module.

The board has an onboard power indication LED, a LED and Buzzer to indicate the presence of a RFID Card. All the IO pins are brought out to standard clearly labeled header pins, which reduce prototyping time and effort. An output pin (DET) also indicates the presence of a RFID card. The board can also be used to output data in Wigand format. It can detect cards in the range of 3-8cms.

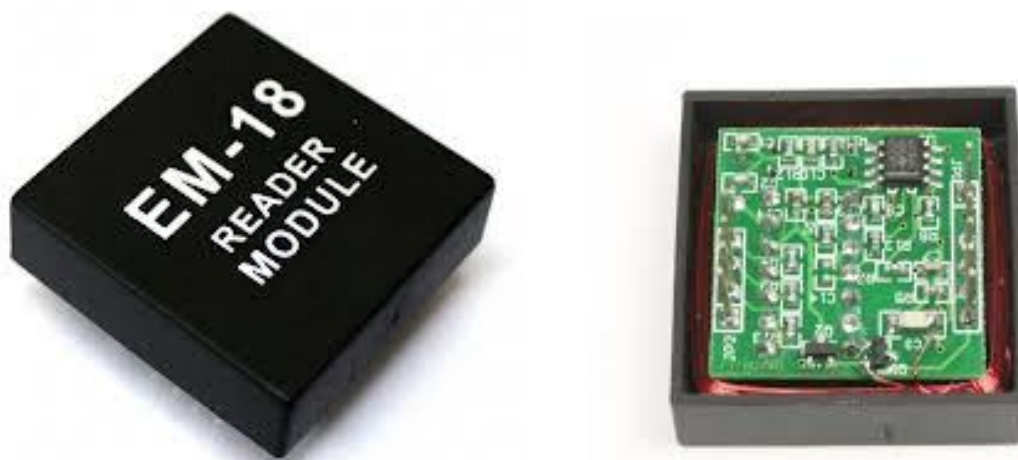


Fig: RFID reader

B. *RFID CARD:*



Fig: RFID card

Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain

electronically stored information. Some tags are powered by and read at short ranges (a few meters) via magnetic fields (electromagnetic induction). Others use a local power source such as a battery, or else have no battery but collect energy from the interrogating EM field, and then act as a passive transponder to emit microwaves or UHF radio waves (i.e., electromagnetic radiation at high frequencies). Battery powered tags may operate at hundreds of meters. Unlike a barcode, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object.

Radio frequency identification (RFID) is part of the family of Automatic Identification and Data Capture (AIDC) technologies that includes 1D and 2D bar codes. RFID uses an electronic chip, usually applied to a substrate to form a label that is affixed to a product, case, pallet or other package. The information it contains may be read, recorded, or rewritten.^[1]

RFID tags are used in many industries. An RFID tag attached to an automobile during production can be used to track its progress through the assembly line. Pharmaceuticals can be tracked through warehouses. Livestock and pets may have tags injected, allowing positive identification of the animal.

Since RFID tags can be attached to cash, clothing, everyday possessions, or even implanted within people, the possibility of reading personally-linked information without consent has raised serious privacy concerns.

C. ARDUINO CONTROLLER BOARD:

Arduino is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. Current models feature a USB interface, 6 analog input pins, as well as 14 digital I/O pins which allow the user to attach various extension boards.

Introduced in 2005, the Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices that interact with their environment using sensors and actuators. Common examples for beginner hobbyists include simple robots, thermostats and motion detectors. It comes with a simple integrated development environment (IDE) that runs on regular personal computers and allows users to write programs for Arduino using C or C++.

The current prices of Arduino boards run around €20, or \$27 and those of related "clones" as low as \$9. Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduino had been commercially produced, and in 2013 that 700,000 official boards were in users' hands.

- Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than \$50
- Cross-platform - The Arduino software runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.
- Simple, clear programming environment - The Arduino programming environment is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with the look and feel of Arduino
- Open source and extensible software- The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.
- Open source and extensible hardware - The Arduino is based on Atmel's ATMEGA8 and ATMEGA168 micro controllers. The plans for the modules are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

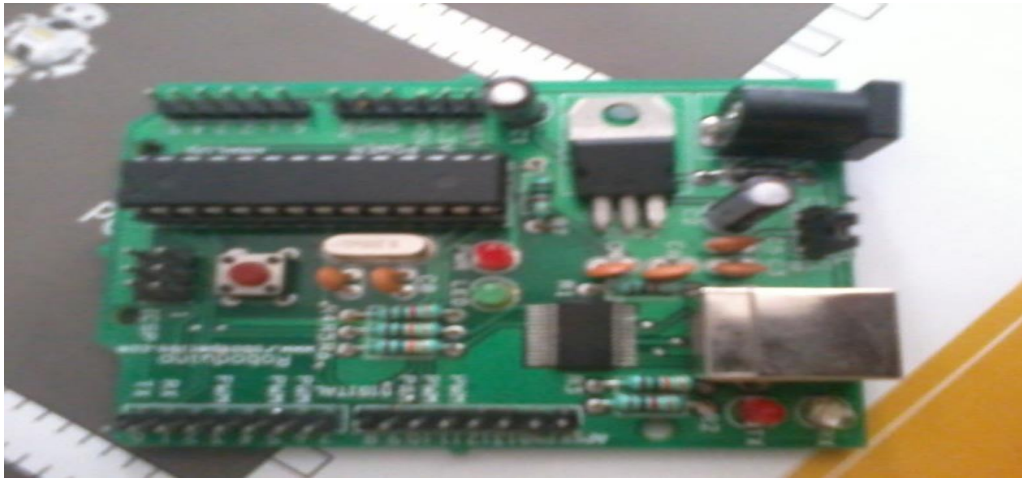


Fig: Arduino controller board

III. CONCLUSION

In this system we are notice that in transmission line fault is occurs then wireman goes to repair this fault but unfortunately line supply is on by due to human error or any other reason than this time wireman safety is very important so in this is system latest technology used for wireman safety. This system is also used for protection of people surrounding near the transmission line when fault is occurs then buzzer is alert the people near the surrounding near the transmission line. This system is first time introduced in electronics field for safety of line man or power producing company staff.

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