

RFID and GSM Based Intelligent Courier Mailbox System

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ABSTRACT:

This paper describes a device which is capable of identifying the arrival of the courier and forward the same to the receiver. The idea behind this project is to employ an RFID tag to the courier and send the identity number to the user. The user feeds the identity number in the microcontroller using GSM. On the receiver side there is a letterbox which has a RFID reader, GSM module and a LCD screen. The courier person scans the RFID tag on the courier using the RFID Reader present at the letterbox. If the identity number matches with the identity number fed by the user, the RFID reader sends a command to the microcontroller to open the gate of the letterbox. The Microcontroller is connected to the DC motor which rotates resulting in the opening of gate. The Microcontroller is programmed in such a manner that after the opening of the gate it automatically closes after 15 seconds. In the event of mismatch of identity number an error message is displayed on the LCD screen.

KEYWORDS: RFID tag, RFID reader, Identity number.

INTRODUCTION:

The task points in outlining a dispatch letter drop framework which is prepared to do consequently sending data about mail to client and conveyance warning to messenger authorities. As the time moves the way of life of the persons has totally changed and there is no time for the general population for small scale administration of each issue by and by. Along these lines, this is the ideal time to give some space to the innovation into our lives for checking the issues which requires our own vicinity for the things to happen. One among those issues which require our own vicinity is accepting the messenger which is sent back on the off chance that we are not present at the time the dispatcher goes to our home. This might prompt the postponement in getting the essential data and in a few situations it might likewise prompt intense circumstances. So our undertaking points in giving an exceptionally dependable and extremely easy to understand answer for beat this sort of issue.

By using the Radio Frequency and GSM technology we can make a device which is capable of identifying the arrival of the courier and forward the same to the receiver furthermore send an affirmation to the dispatch office with the goal that they don't require the signature of the specific individual for whom the messenger is implied for.

The basic idea of the system is to employ an RFID tag to the courier and send the identity number to the receiver. On the receiver side there is a letter box which will open and close using DC motor, on the receiver side there is a RF reader and a dedicated GSM modem. By using mobile phone the unique identity number is activated which is fed into the microcontroller. When the identity number on the courier and on the receiver side matches there is an opening of letter box for 15 seconds In letter box there is an IR sensor which is used to send message to the receiver about the arrival of the courier.

PROJECT DESCRIPTION:

This project is basically includes two parts :

1. Hardware
- 2 .Software

To design the whole system we need a microcontroller which acts as a medium of communication for the RF reader and the GSM modem. The main advantage of this system is the presence of the GSM modem which enables the system to communicate with the receiver no matter where ever he is present on the earth.

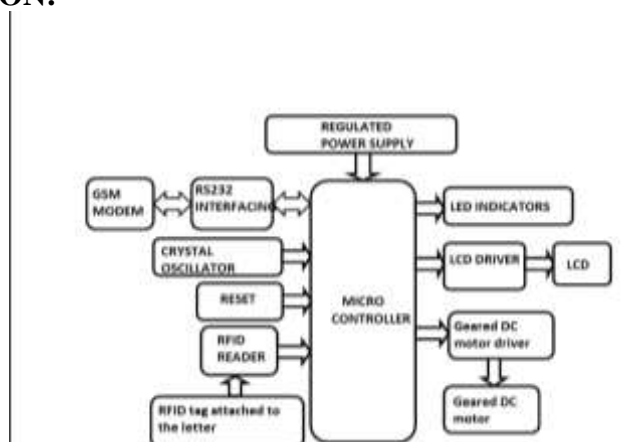
HARDWARE DESCRIPTION:

Figure: 1 Block Diagram

Block diagram shows the components used in this project.

1. ATMEL 8 BIT MICROCONTROLLER:

Here we are using Atmega 8-bit microcontroller which is operated at 4 MHz frequency, it is used because of high performance and low power consumption. As it consists of 28 pins it is very easy to use. The device carry throughput of 16 MIPS at 16 MHz and operates between 2.7-5.5 volts.

2. RFID READER:

It contains a semiconductor on a label which is used to transmit the stored data when the label is exposed to radio wave of required frequency. RFID module used in this project is EM-8 which is operated at 125 KHz frequency. It gives Serial 26 Output. Specifications: Voltage: 5 V dc Current: <50ma Operating Frequency: 125 khz.

3. GSM MODULE:

GSM module is used to build communication between computer and GSM system. In this project it is used to activate the identity number and to notify the user about the delivery. In this project we are using SIM 300 tri band GSM solution modem. It operates at 3.5-4.5 volts.

4. RFID CARD:

The tag is the essential building piece of RFID. Every label comprises of a receiving wire and a little silicon chip that contains a radio collector, a radio modulator for sending a response back to the reader, control logic, some amount of memory, and a power system. It is the innovation to record the presence of an object using radio signal. It is used for automatically identifying a person, a package or an item.

5. LCD DISPLAY:

One of the most common devices attached to a microcontroller is an LCD display. It is used to display words, digits or any message. Most normal LCD's associated with the microcontrollers are 16x2 and 20x2 presentations. This implies 16 characters for every line by 2 lines and 20 characters for each line by 2 lines, separately.

6. CRYSTAL OSCILLATOR:

It is used to create an electrical signal of precise frequency. This frequency is used to keep track of time. Basically it is used to provide clock signal for the serial communication.

7. VOLTAGE REGULATOR:

Here 9 volts of dry cell battery is used. The most commonly used battery is the carbon-zinc dry cell battery. In this project we are using IC7805 which gives constant power supply of 5 Volts.

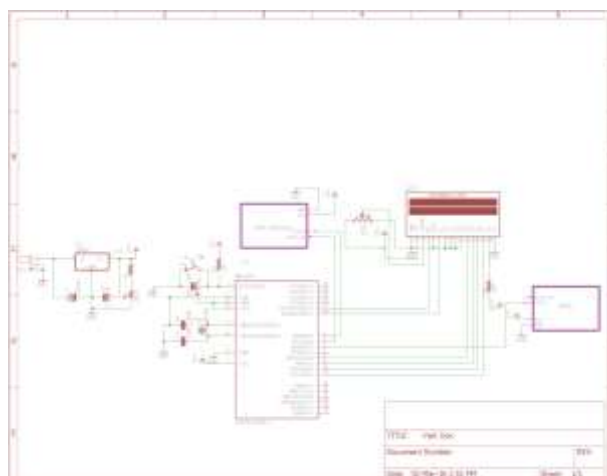
SOFTWARE DESCRIPTION:

Figure: 2 Circuit Diagram

Circuit diagram shows the interfacing of the microcontroller with the RFID reader, GSM modem and LCD screen. It gives the whole idea about the working of the system.

In this project following software's are used:

1. Express PCB – for designing circuit
2. Microc pro for AVR– for compilation part
3. AVR program loader – for simulation part

RESULT:

The Result of the whole circuit would be if a situation occurs when a courier is arriving when the person is not at home then in that case he would feed the identity number in the microcontroller and leave. The courier boy scans the RFID tag through the RFID Reader. On successful matching of the identity number with that fed to the microcontroller the letter box gate opens up and the courier boy places the courier inside the letter box. The controller is programmed in such a way that the gate automatically closes after 15seconds of the opening of gate.

CONCLUSION:

Joining components of all the hardware parts used have been made as a piece of it. Region of every module has been thought about out and place definitely, in this way adding to the best working of the unit. Besides, utilizing profoundly propelled IC's with the assistance of developing innovation, the venture has been effectively executed. In this manner the task has been effectively composed and tested.

FUTURE SCOPE:

This system can be practically implemented in houses where all the members of the family are working. It is used to avoid physical presence of receiver to collect any mail. This system can also be implemented where security is a major concern like in banks, schools, hospitals etc. This system can be used at places where there are multiple mails to be received. As the RFID system is not too high it can be adopted by everyone.

REFERENCES:

1. Chien-Wu Chen (2012) His research focuses on the topics about 3G Communication Network, Mobility Management, IPv6, and Sensor Network.
2. Yao-Chung Chang (2011) His main research focuses on the network related topics including Transition of IPv4/IPv6, Network Mobility, EPC Network and Sensor Network.
3. Michael Nystrom (2010) His current research interest lies in the impact of technology on society and market forecasting.
4. Ming-Chiao Chen (2004) His research interests include Quality of Service, Sensor Network, and Home Networking.
5. B. Jiang, K. P. Fishkin, S. Roy, and Matthai Philipose (2006) "Unobtrusive Long-Range Detection of Passive RFID Tag Motion", IEEE Transactions On Instrumentation And Measurement, 2006. [Juels06] Ari Juels, "RFID Security and Privacy: A Research Survey", IEEE Journal On Selected Areas In Communications.
6. V. Subramanian, P. C. Chang, D. Huang, J. B. Lee, S. E. Moles, D. R. Redinger, and S. K. Volkman (2008), "Printed organic transistors for ultra-low-cost RFID applications", IEEE Transactions On Components And Packaging Technologies.
7. S. P. Singh, M. McCartney, J. Singh, and R. Clarke (2013) Rfid research and testing for packages of apparel, consumer goods and fresh produce in the retail distribution environment.
8. Mohammad Shaifur Rahman, Youngil Park, and Ki-Doo Kim (2014) CDMA technology and Rfid tags with synchronisation of mechanical constraints.
9. E. Nettleton, S. Thrun, and H. Durrant-Whyte (2015) Decentralised SLAM with Low-Bandwidth Communication for Teams of compact and nano technology. In Proc. of the International Conference on Field and Service Robotics, 2003.
10. Mischa Schwartz (2012) Point-to-Multipoint: Effective Rural Broadband Wireless Access A Comparison with Fixed Cellular Technologies.