International Journal of Electrical and Electronics Research ISSN 2348-6988 (online)
Vol. 2, Issue 2, pp: (35-41), Month: April - June 2014, Available at: www.researchpublish.com

AUTOMATIC GATE OPENING SYSTEM FOR VEHICLES WITH RFID OR PASSWORD

Prajapati Dipali K, Raj Roshani D, Patel Komal C., Hilali Marhaba A.

Electronics &Communication Engineering, Gujarat Technical University
Bharuch, Gujarat, INDIA

Abstract: **The main objective of this project is to provide security in an organization by allowing only the authorized personnel to access the secure area. The security of any organization is a priority for the authorities. The concern is for the physical property and also for the intellectual property. For this reason only the authorized person with a valid RFID tag is allowed into the secured premises.**
This tag contains an integrated circuit that is used for storing and processing information, modulating and demodulating the radio frequency signal that is being transmitted. Thus, once the person shows the RFID tag to the card reader it scans the data present in the tag and compares it with the data present in the microcontroller. When the data matches with that in the microcontroller, the load will be turned ON which is operated by a relay being driven from the output of the microcontroller. If a valid tag is swiped then the system displays a message "AUTHORIZED" else it states "UNAUTHORIZED" and doesn't allow access. A lamp is used as an indication besides the LCD display.
This project can be further enhanced by interfacing it with GSM technology. Any attempt for unauthorized access can be intimated to the security personnel through an SMS. It can also be interfaced with a finger print module to reduce the drawback of RFID system i.e. exchanging RFID tags.

Keywords: **RFID tags, Security system. Authorized access.**

1. Introduction

Here we are presenting RFID Based Access Control System for College ID Card. Our system includes power supply, LCD display, RFID reader, microcontroller, relay to switch the computer. LCD display consists of one LCD and a potentiometer. RFID reader consists of a RFID reader and a resistor.PIC16F877Ais used us a microcontroller. Relay to switch consists of MAX232, CONN-D9F, capacitors, resistor, BC547, and OMIH-SH-105L.
Initially power supply is provided to the system. When the student shows the ID card, the RFID reader reads the data from the card and it is transferred to the microcontroller. It decodes the data from the reader and checks whether the card is valid or not. If the card is valid, LCD displays it. The microcontroller will transfer the control to the PC through relay.

2. Hardware Requirement

Power Supplies:
A power supply can be broken down into a series of blocks, each of which performs a particular function.
For example a 5V regulated supply:

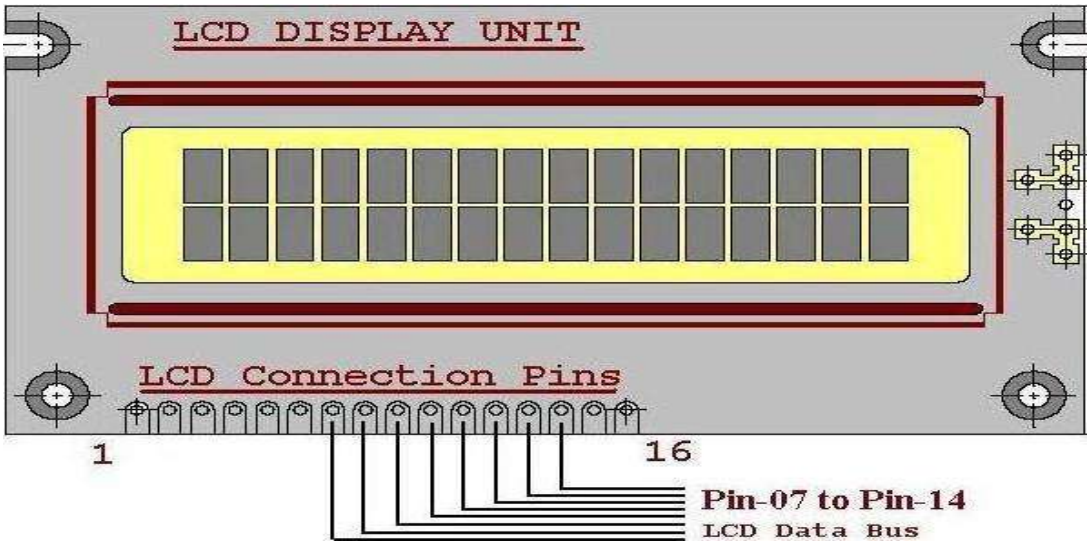
- Each of the blocks is described in more detail below:
- Transformer – steps down ac voltage + provides electrical isolation.
- Rectifier - converts AC to DC.
- Smoothing - smooth the AC to DC , ripples are there.
- Regulator – delivers fixed dc output without ripple.

Power supplies made from these blocks are described below with a circuit diagram and a graph of their output:

- Transformer only
- Transformer + Rectifier
- Transformer + Rectifier + Smoothing
- Transformer + Rectifier + Smoothing + Regulator

LCD interfacing:

PIN NUMBER	SYMBOL	FUNCTION
1	Vss	GND
2	Vdd	+ 3V or +5V
3	Vo	Contrast Adjustment
4	RS	H/L Register Select Signal
5	R/$\overline{W}$	H/L Read/Write Signal
6	E	H →L Enable Signal
7	DB0	H/L Data Bus Line
8	DB1	H/L Data Bus Line
9	DB2	H/L Data Bus Line
10	DB3	H/L Data Bus Line
11	DB4	H/L Data Bus Line
12	DB5	H/L Data Bus Line
13	DB6	H/L Data Bus Line
14	DB7	H/L Data Bus Line
15	A/Vee	4.2V for LED/Negative Voltage Output
16	K	Power Supply for B/L (OV)



LCD pin descriptions:

The LCD discussed in this section has 16 pins. The function of each pin is given in Table. Figure shows the pin positions for various LCD's.

Vcc, Vss and VEE:

While Vcc and Vss provide +5V and ground, respectively, VEE is used for controlling LCD contrast.

RS, register select:

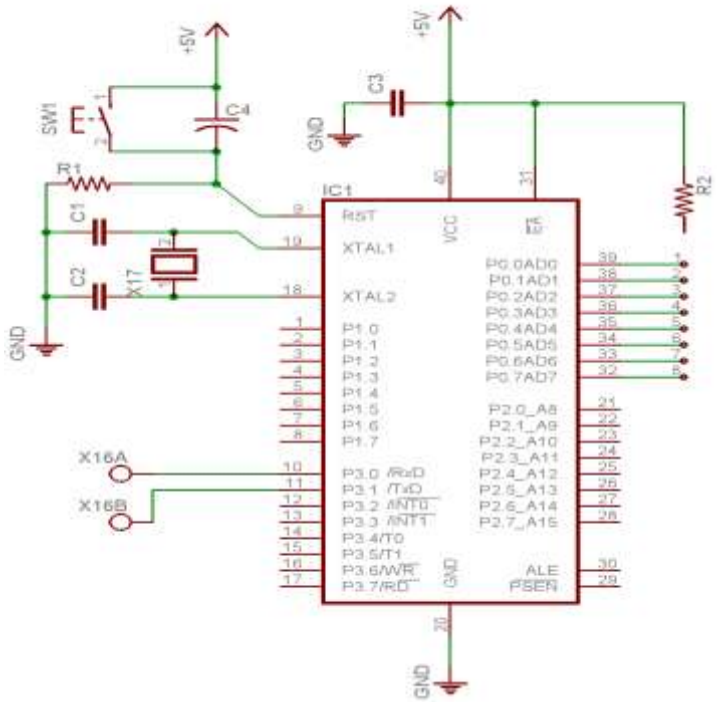
There are two very important registers inside the LCD. The RS pin is used for their selection as follows. If RS = 0. The instruction command code register is selected, allowing the user to send a command such as clear display, cursor at home, etc. If RS = 1 the data register is selected, allowing the user to send data to be displayed on the LCD.

R/W, read/write:
R/W input allows the user to write information to the LCD or read information from it. R/W = I when reading; R/W = 0 when writing.

E, enable:
The enable pin is used by the LCD to latch information presented to its data pins. When data is supplied to data pins, a high-to-low pulse must be applied to this pin in order for the LCD to latch in the data present at the data pins. This pulse must be a minimum of 450 ns wide.

DO-D7:
The 8-bit data pins, DO - D7, are used to send iformation to the LCD or read the contents of the LCD's internal registers.

8051 Micro controller:



Pin Description:

Pins 1-8: Port 1 Each of these pins can be configured as an input or an output.
Pin 9: RS A logic one on this pin disables the microcontroller and clears the contents of most registers. In other words, the positive voltage on this pin resets the microcontroller. By applying logic zero to this pin, the program starts execution from the beginning.
Pins10-17: Port 3 Similar to port 1, each of these pins can serve as general input or output. Besides, all of them have alternative functions:
Pin 10: RXD Serial asynchronous communication input or Serial synchronous communication output.
Pin 11: TXD Serial asynchronous communication output or Serial synchronous communication clock output.
Pin 12: INT0 Interrupt 0 input.
Pin 13: INT1 Interrupt 1 input.
Pin 14: T0 Counter 0 clock input.
Pin 15: T1 Counter 1 clock input.
Pin 16: WR Write to external (additional) RAM.
Pin 17: RD Read from external RAM.

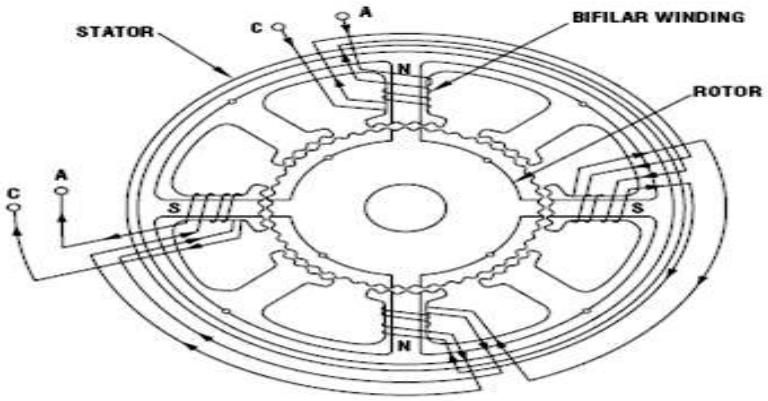
Pin 18, 19: X2, X1 Internal oscillator input and output. A quartz crystal which specifies operating frequency is usually connected to these pins. Instead of it, miniature ceramics resonators can also be used for frequency stability. Later versions of microcontrollers operate at a frequency of 0 Hz up to over 50 Hz.
Pin 20: GND Ground.
Pin 21-28: Port 2 If there is no intention to use external memory then these port pins are configured as general inputs/outputs. In case external memory is used, the higher address byte, i.e. addresses A8-A15 will appear on this port. Even though memory with capacity of 64Kb is not used, which means that not all eight port bits are used for its addressing, the rest of them are not available as inputs/outputs.
Pin 29: PSEN If external ROM is used for storing program then a logic zero (0) appears on it every time the microcontroller reads a byte from memory.
Pin 30: ALE Prior to reading from external memory, the microcontroller puts the lower address byte (A0-A7) on P0 and activates the ALE output. After receiving signal from the ALE pin, the external register memorizes the state of P0 and uses it as a memory chip address. Immediately after that, the ALU pin is returned its previous logic state and P0 is now used as a Data Bus. As seen, port data multiplexing is performed by means of only one additional integrated circuit. In other words, this port is used for both data and address transmission.
Pin 31: EA By applying logic zero to this pin, P2 and P3 are used for data and address transmission with no regard to whether there is internal memory or not. It means that even there is a program written to the microcontroller, it will not be executed. Instead, the program written to external ROM will be executed. By applying logic one to the EA pin, the microcontroller will use both memories, first internal then external.
Pin 32-39: Port 0 Similar to P2, if external memory is not used, these pins can be used as general inputs/outputs. Otherwise, P0 is configured as address output (A0-A7) when the ALE pin is driven high (1) or as data output (Data Bus) when the ALE pin is driven low (0).
Pin 40: VCC +5V power supply.
A stepper motor is an electromechanical device which converts electrical pulses into discrete mechanical movements. The shaft or spindle of a stepper motor rotates in discrete step increments when electrical command pulses are applied to it in the proper sequence. The motors rotation has several direct relationships to these applied input pulses. The sequence of the applied pulses is directly related to the direction of motor shafts rotation. The speed of the motor shafts rotation is directly related to the frequency of the input pulses and the length of rotation is directly related to the number of input pulses applied.

Stepper Motor Advantages and Disadvantages:

Advantages:

1. The rotation angle of the motor is proportional to the input pulse.
2. The motor has full torque at standstill.
3. Precise positioning and repeatability of movement since good stepper motors have an accuracy of 3 – 5% of a step and this error is non cumulative from one step to the next.
4. Excellent response to starting/stopping/reversing.
5. Very reliable since there are no contact brushes in the motor. Therefore the life of the motor is simply dependant on the life of the bearing.
6. The motors response to digital input pulses provides open-loop control, making the motor simpler and less costly to control.
7. It is possible to achieve very low speed synchronous rotation with a load that is directly coupled to the shaft.
8. A wide range of rotational speeds can be realized as the speed is proportional to the frequency of the input pulses.

Disadvantages:
1. Resonances can occur if not properly controlled.
2. Not easy to operate at extremely high speeds.



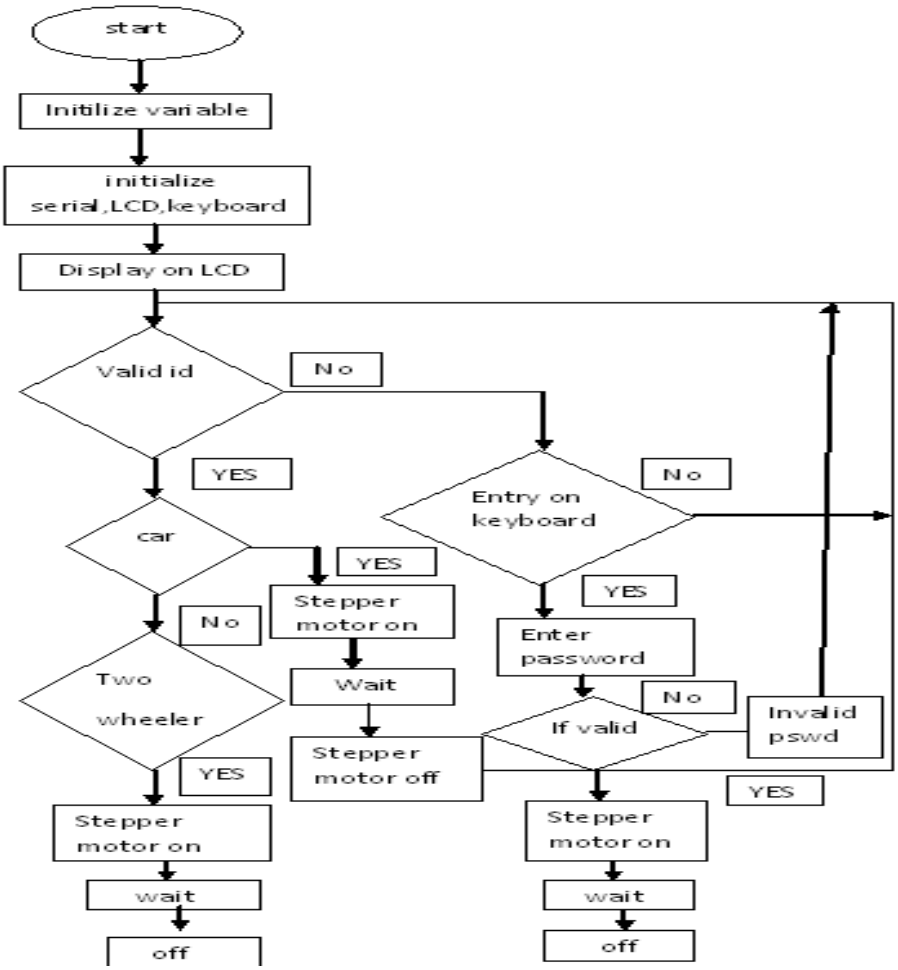
1.8° Hybrid motor.

When to Use a Stepper Motor:

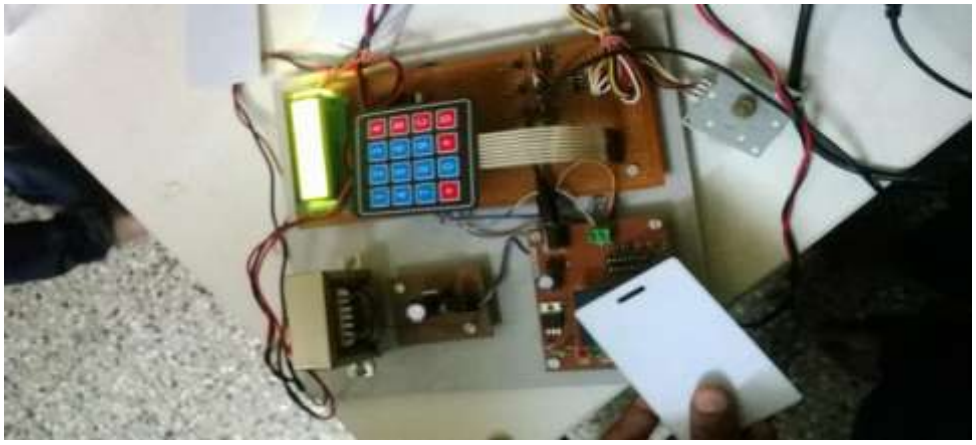
A stepper motor can be a good choice whenever controlled movement is required. They can be used to advantage in applications where you need to control rotation angle, speed, position and synchronism. Because of the inherent advantages listed previously, stepper motors have found their place in many different applications. Some of these include printers, plotters, high end office equipment, hard disk drives, medical equipment, fax machines, automotive and many more.

3. Software requirement

Flowchart:



4. Hardware of our project



5. Results and Discussions

Our project, RFID based automated gate control system is implemented as per the design. It is an extremely valuable project. This project introduces a new way to automate the gate.
We take this opportunity to express our sincere gratitude to all those who have helped us for the successful completion of our project.

6. Conclusions and Future Scope

This project is a 8051 based one. During the course of carrying out the project, many obstacles and minor mistakes forced us to thoroughly analysis the circuit and design. This made us to acquire more knowledge in 8051. Now our system has been designed and constructed successfully. Through this project we get courage and confidence to undertake this kind of work in future also. It enriches our knowledge regarding designing, construction, fabrication and other aspect of many devices. The system can be used to automate the gate control.

REFERENCES

[1] **IET. 2009.** Radio Frequency Identification Device Technology (RFID), The Institution of Engineering and Technology, Available at: http://www.theiet.org/factfiles/it/rfidpage.cfm? Type=pdf, Accessed on 15/06/12.

[2] **Want, R. 2006.** An Introduction to RED) Technology, IEEE Pervasive Computing, 5(1),pp. 25-33**.**

[3] **Stanford, V. 2003.** Pervasive computing goes the last hundred feet with RFID systems, IEEE Pervasive Computing, 2(2), pp 9–14.

[4] **Soldatos, J., Kefalakis, N., Leontiadis, N. et al. 2010.** Core ASPIRE Middleware Infrastructure (Final Version), ASPIRE Consortium, ID: WP3/D3.4b, Revision 1.9, Available at: http://www.fp7- aspire.eu/ fileadmin/ aspire/ docs/ deliverables/ASPIRE_D3.4b_Final.pdf, Accessed on: 11/06/12

[5] **Landt, J. 2005.** The History of RFID, IEEE Potentials, 24(4), pp 8-11.

[6] **Beford, S. 2005**. Future Location-based experiences, JISC Technology and Standards watch, Available at: http://www.jisc.ac.uk/media/documents/techwatch/jisctsw_05_01.pdf, Accessed on 19/06/12.

[7] **Fuhrer, P., Guinard, D. and Lietchi, O. 2005.** RFID: From concepts tom concrete implementation, In Proceedings of the International Conference on Advances in the Internet, Processing, Systems and Interdisciplinary Research, IPSI - 2006 Marbella, February 10-13, 2006, Marbella, Spain.

[8] **Cheekiralla, S. and Engels, D.W. 2005.** A functional taxonomy of wireless sensor network devices. Proceedings of 2nd International Conference on Broadband networks, Vol 2, pp 949-956.

[9] **Soon, T.J. 2004.** EPC: Electronic Product Code - The new generation RFID-based product identification system. Synthesis Journal 2004, Available at: http://www.itsc.org.sg/pdf/Journal%202004/ Section_Three_04/ Three_ Water_ 2a.pdf, Accessed on: 15/06/12.

[10] **McFarlane, D. and Sheffi, Y. 2003.** The Impact of Automatic Identification on Supply Chain Operations, International Journal of Logistics Management, 14(1), pp.1 - 17.

[11] **Krotov, V. and Junglas, I. 2008.** RFID as a Disruptive Innovation, Journal of Theoretical and Applied Electronic Commerce Research,3(2), pp 44-59.

[12] **Khaddar, M.A., Boulmalf, M., Harroud, H. and Elkoutbi, M. 2010.** RFID middleware design and architecture, Intechopen, Available at: http://cdn.intechweb.org/pdfs/18099.pdf, Accessed on: 19/06/12.