Middle-East Journal of Scientific Research 20 (10): 1229-1233, 2014
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2014.20.10.114078

Design of Intelligent Car Security System

R. Anbazhagan, S. Vanangamudi, C. Thamotharan,
S. Prabhakar and C. Coomarasamy

Department of Automobile Engineering, BIST,
Bharath University, Selaiyur, Chennai, Tamilnadu, India

Abstract: The main aim of our project is to lock/unlock the devices by using password. It's highly safe control of the devices from other person. Due to the rapid development in the field of science and technology, many more advancements have been made in automation and controlling the hardware can adopt this technique. This technique is not only applicable to vehicle but also to control the various appliances in home. This marvelous technique is highly confidential as we are the only persons who can access the whole system and control various activities through password settings. Two Wheeler automation project consists of the following operation.

- Fuel supply opens by using Password
- Ignition System is ON by using correct password
- Side Lock or Head Light are controlled by the password

Key words: Many More Advancements · Marvelous Technique is Highly · Project Consists

INTRODUCTION

Nowadays Automation occupies various electronic sections by its comfortable nature. This is an era of automation where it is broadly defined as replacement of manual effort by electronic power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.
Degrees of automation are of two types, viz [1].

- Full automation.
- Semi automation.

In semi automation a combination of manual effort and electronic power is required whereas in full automation human participation is very negligible.

Need for Automation: Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources; electronics form an attractive medium for low cost automation. The main advantages of all electronics systems are economy and simplicity. Automation plays an important role in mass production [2].

- To achieve quick response
- To prevent the accident by alarm indication
- To reduce the work load
- To reduce the fatigue of workers
- To achieve good quality
- Less Maintenance

PCB Designing

Printed Circuit Board (PCB): Nowadays the printed circuit board hereafter mentioned as PCB's makes the electronic circuit manufacturing as easy one. In olden days vast area was required to implement a small circuit. To connect two leads of the components, separate connectors are needed. But PCB's connect the two leads by copper coated lines on the PCB board [3].

PCB's are available in various types' namely single sided and double sided boards. In single sided PCB's the copper layer is one side.

Corresponding Author: R. Anbazhagan, Department of Automobile Engineering, BIST,
Bharath University, Selaiyur, Chennai, Tamilnadu, India.

Manufacturing: First, the wanted circuit is drawn on a paper and it is modified or designed to reduce the space this designed PCB layout is to be drawn on the plain copper coated board. There boards are available in 2 types.

- Phenolic
- Glass epoxy

Most computer PCB's are glass epoxy. To draw the circuit diagrams we can use the black colour paint. Before that the required size of the plane PCB board is determined from the roughly drawn PCB layout. Using black paint the desired circuit is drawn on the board [4].

CAD in PCB: First the PCB layout is designed by CAD. The print out is taken from the computer (of large size) for out clearance. This layer is given to the photography section to get the layout in its actual size. From this we can have the positive and negative images of the layout. This photographic image is exposed in the following three methods.

- Polybluem
- Chrombin
- Five star

The exposed mesh is placed on plain copper coated board in correct alignment by using wooden clamps. Special paints are used to spread over the mesh. Paint flow through the board and the layout lines are made on the copper board. Finally, there are fine layouts on the copper board [5].

Etching: This can be done both by manual and mechanical ways by immersing the board in to a solution of formic chloride and hydrochloric acid and finally cleaning the board with soap.

Regulated Power Supply: The power supply circuit that uses single transformers that produces 12-0-12V. Further, the outputs are full wave rectified. Both +12V and -12V are taken from the two ends of the bridge. They are unregulated outputs and are useful for non-critical applications. In this project 7812 positive and 7912 negative IC regulators are used. They are delivery currents regulators. But they are input voltage can be made adjustable also.

The 12V supplies are obtained by using monolithic voltage regulator IC's and 7912. These IC's provide stabilized outputs of +12V respectively with 1 ampere rating. Heat sinks are required for these IC's.

Output Voltage (V0) = $V_{xx} + (V_{xx}/R1) + I_Q R2$

= $Vxx + (R2/R1) + I_Q R2$

Where,

V_{xx} = The fixed Voltage

I_Q = The Regular quircent current

Power Dissipation (RS) = $\frac{Vi (min) - Vo - 2}{Ii (max) + IQ}$

Where,

Ii (max) = Maximum Load Current

IQ (min) = Regulate Quircent current

Vi (min) = Minimum input voltage

Vo = Output Voltage

$\therefore Rs = (Ii (max) + IQ)^2 RS$

Transformer: A transformer is a static (or stationary) piece of which electric power in one circuit is transformed into electric power of the same frequency in another circuit. It can raise or lower the voltage in a circuit but with a corresponding decrease or increase in current. It works with the principle of mutual induction.

Rectifier: The DC level obtained from a sinusoidal input can be improved 100% using a process called full-wave rectification. It used 4 diodes in a bridge configuration.

From the basic bridge configuration we see that two diodes are conducting while the other two diodes are in "off" state during the period t = 0 to T/2 Accordingly for the negative of the input the conducting diodes. Thus the polarity across the load is the same.

Filter: The filter circuit used here is the capacitor filter circuit where a capacitor is connected at the rectifier output, and a DC is obtained across it. The filtered waveform is essentially a DC voltage with negligible ripples, which is ultimately fed to the load.

Regulator: The output voltage from the capacitor is more filtered and finally regulated. The voltage regulator is a device, which maintains the output voltage constant irrespective of the change in supply variations, load variation and temperature changes. Here we use two fixed voltage regulators namely LM 7812, LM 7805 and LM 7912. The IC 7812 is a +12V regulator IC 7912 is a –12V regulator and IC 7805 is a +5V regulator.

Battery

Introduction: In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern. To be economically attractive the storage of solar electricity requires a battery with a particular combination of properties:

- Low cost
- Long life
- High reliability
- High overall efficiency
- Low discharge
- Minimum maintenance
- Ampere hour efficiency
- Watt hour efficiency

We use lead acid battery for storing the electrical energy from the solar panel for lighting the street and so about the lead acid cells are explained below.

Lead-Acid Wet Cell: Where high values of load current are necessary, the lead-acid cell is the type most commonly used. The electrolyte is a dilute solution of sulfuric acid (H_2SO_4). In the application of battery power to start the engine in an auto mobile, for example, the load current to the starter motor is typically 200 to 400A. One cell has a nominal output of 2.1V, but lead-acid cells are often used in a series combination of three for a 6-V battery and six for a 12-V battery. The lead acid cell type is a secondary cell or storage cell, which can be recharged. The charge and discharge cycle can be repeated many times to restore the output voltage, as long as the cell is in good physical condition. However, heat with excessive charge and discharge currents shortends the useful life to about 3 to 5 years for an automobile battery. Of the different types of secondary cells, the lead-acid type has the highest output voltage, which allows fewer cells for a specified battery voltage.

Construction: Inside a lead-acid battery, the positive and negative electrodes consist of a group of plates welded to a connecting strap. The plates are immersed in the electrolyte, consisting of 8 parts of water to 3 parts of concentrated sulfuric acid. Each plate is a grid or framework, made of a lead-antimony alloy. This construction enables the active material, which is lead oxide, to be pasted into the grid. In manufacture of the cell, a forming charge produces the positive and negative electrodes. In the forming process, the active material in the positive plate is changed to lead peroxide (pbo2). The negative electrode is spongy lead (pb).

Data Memory Organization: The data memory is partitioned into two areas. The first is the Special Function Registers (SFR) area, while the second is the General Purpose Registers (GPR) area. The SFRs control the operation of the device. Portions of data memory are banked. This is for both the SFR area and the GPR area. The GPR area is banked to allow greater than 116 bytes of general purpose RAM.

The banked areas of the SFR are for the registers that control the peripheral functions. Banking requires the use of control bits for bank selection. These control bits are located in the STATUS Register. Figure 2-1 shows the data memory map organization. Instructions MOVWF and MOVF can move values from the W register to any location in the register file (“F”) and vice-versa.

The entire data memory can be accessed either directly using the absolute address of each register file or indirectly through the File Select Register (FSR) (Section 2.4). Indirect addressing uses the present value of the RP0 bit for access into the banked areas of data memory. Data memory is partitioned into two banks which contain the general purpose registers and the special function registers. Bank 0 is selected by clearing the RP0 bit (STATUS<5>). Setting the RP0 bit selects Bank 1. Each Bank extends up to 7Fh (128 bytes). The first twelve locations of each Bank are reserved for the Special Function Registers. The remainders are General Purpose Registers implemented as static RAM.

General Purpose Register File: Each General Purpose Register (GPR) is 8 bits wide and is accessed either directly or indirectly through the FSR (Section 2.4). The GPR addresses in bank 1 are mapped to addresses in bank 0. As an example, addressing location 0Ch or 8Ch will access the same GPR.

PCL and Pclath: The program counter (PC) specifies the address of the instruction to fetch for xecution. The PC is 13 bits wide. The low byte is called the PCL register. This register is readable and writable. The high byte is called the PCH register. This register contains the PC<12:8> bits and is not directly readable or writable. All updates to the PCH register go through the PCLATH register.

Stack: The stack allows a combination of up to 8 program calls and interrupts to occur. he stack contains the return address from this branch in program execution. Midrange devices have an 8 level deep x 13-bit wide hardware stack. The stack space is not part of either program or data space and the stack pointer is not readable or writable. The PC is PUSHed onto the stack when a CALL instruction is executed or an interrupt causes a branch.

The stack is POPed in the event of a RETURN, RETLW or a RETFIE instruction execution. PCLATH is not modified when the stack is PUSHed or POPed. After the stack has been PUSHed eight times, the ninth push overwrites the value that was stored from the first push. The tenth push overwrites the second push (and so on).

Indirect Addressing; INDF and FSR Registers: The INDF register is not a physical register. Addressing INDF actually addresses the register whose address is contained in the FSR register (FSR is a pointer). This is indirect addressing.

Working Principle: The password is setted by the microcontroller unit is stored in a memory space of the unit. When the microcontroller receives the signals from Keypad, it will be taking a decision to ON the relay when the password is in correct otherwise the alarm will be ON.

In our project, the 16F84 is used as a microcontroller unit. The input signal is received from the key pad buttons. The microcontroller gives the output signal to the relay unit. The ignition unit, fuel supply (solenoid coil) and side lock are connected to this relay, so that it will ON at the time of relay is ON

The microcontroller compares the two signals, one is from the keypad setting time and another one is for already stored password. The microcontroller gives the output signal when the two passwords are in matching condition. The 4 MHz crystal oscillator is used for this PIC microcontroller unit. In our project lead-acid battery is used. The lead-acid batteries output is given to the control unit. Control unit having two relays, they are connected to the vehicle.

- Relay 1 - Ignition Unit
- Relay 2 - Fuel Supply, side lock and head light

Solenoid Valve (Or) Cut off Valve: The Solenoid control valve is used to control the flow direction is called cut off valve or solenoid valve. This solenoid cut off valve is controlled by the microcontroller unit which is attached in the pass word itself. The solenoid valve is used to ON/OFF the fuel supply to the engine.

The directional valve is one of the important parts of a fluid system. Commonly known as DCV, this valve is used to control the direction of air flow in the fluid system. The directional valve does this by changing the position of its internal movable parts.

This valve was selected for speedy operation and to reduce the manual effort and also for the modification of the machine into automatic machine by means of using a solenoid valve. A solenoid is an electrical device that converts electrical energy into straight line motion and force. These are also used to operate a mechanical operation which in turn operates the valve mechanism. Solenoids may be push type or pull type. The push type solenoid is one in which the plunger is pushed when the solenoid is energized electrically. The pull type solenoid is one is which the plunger is pulled when the solenoid is energized. The name of the parts of the solenoid should be learned so that they can be recognized when called upon to make repairs, to do service work or to install them.

Parts of a Solenoid Valve

Coil: The solenoid coil is made of copper wire. The layers of wire are separated by insulating layer. The entire solenoid coil is covered with an varnish that is not affected by solvents, moisture, cutting oil or often fluids. Coils are rated in various voltages such as 115 volts AC, 230 volts AC, 460 volts AC, 575 Volts AC, 6 Volts DC, 12 Volts DC, 24 Volts DC, 115 Volts DC and 230 Volts DC. They are designed for such frequencies as 50 Hz to 60 Hz.

Frame: The solenoid frame serves several purposes. Since it is made of laminated sheets, it is magnetized when the current passes through the coil. The magnetized coil attracts the metal plunger to move. The frame has provisions for attaching the mounting. They are usually bolted or welded to the frame. The frame has provisions for receivers, the plunger. The wear strips are mounted to the solenoid frame, and are made of materials such as metal or impregnated less fiber cloth.

Solenoid Plunger: The Solenoid plunger is the mover mechanism of the solenoid. The plunger is made of steel laminations which are riveted together under high pressure, so that there will be no movement of the lamination with respect to one another. At the top of the plunger a pin hole is placed for making a connection to some device. The solenoid plunger is moved by a magnetic force in one direction and is usually returned by spring action. Solenoid operated valves are usually provided with cover over either the solenoid or the entire valve. This protects the solenoid from dirt and other foreign matter, and protects the actuator. In many applications it is necessary to use explosion proof solenoids.

Technical Data:

Size : ¼"
Pressure : 0 to 7 kg / cm2
Media : Air
Type : 3/2
Applied Voltage : 230V A.C
Frequency: 50 Hz

Advantages

- Using a single transmitter keypad we can control many appliances like side lock, light, fuel supply.
- It is very economical.
- As we said earlier it is easy to control the devices by setting password.
- Receiving problem is restricted.
- This project provides another facility to change the password.
- Wrong password three times only allowed.

Applications and Disadvantages
Applications:

- Four Wheeler Application
- Two Wheeler Application

Disadvantages:

- Number of digit is four digit password only
- Additional cost is required to doing automation of vehicle

CONCLUSION

A strong multidiscipline team with a good engineering base is necessary for the Development and refinement of advanced computer programming, editing techniques, diagnostic Software, algorithms for the dynamic exchange of informational different levels of hierarchy. Simulation techniques are suitable for solving some of the problems. But a good quantitative model and a test set-up will help to understand the systems. This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries.

We are proud that we have completed the work with the limited time successfully. The INTELLIGENT CAR SECURITY SYSTEM is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a "*INTELLIGENT CAR SECURITY SYSTEM"* which helps to know how to achieve low cost automation. By using more techniques, they can be modified and developed according to the applications.

RFFERENCES

1. Shafaq Sherazi and Habib Ahmad, 2014. Volatility of Stock Market and Capital Flow Middle-East Journal of Scientific Research, 19(5): 688-692.
2. Kishwar Sultana, Najm ul Hassan Khan and Khadija Shahid, 2013. Efficient Solvent Free Synthesis and X Ray Crystal Structure of Some Cyclic Moieties Containing N-Aryl Imide and Amide, Middle-East Journal of Scientific Research, 18(4): 438-443.
3. Pattanayak, Monalisa. and P.L. Nayak, 2013. Green Synthesis of Gold Nanoparticles Using Elettaria cardamomum (ELAICHI) Aqueous Extract World Journal of Nano Science and Technology, 2(1): 01-05.
4. Chahataray, Rajashree and P.L. Nayak, 2013. Synthesis and Characterization of Conducting Polymers Multi Walled Carbon Nanotube-Chitosan Composites Coupled with Poly (P-Aminophenol) World Journal of Nano Science and Technology, 2(1): 18-25.
5. Parida, Umesh Kumar, S.K. Biswal, P.L. Nayak and B.K. Bindhani, 2013. Gold Nano Particles for Biomedical Applications World Journal of Nano Science and Technology, 2(1): 47-57.