Smart Garden System

Rakesh Jha[1], Amol Patil[2], Adesh Sonawane[3], Shubham Salunkhe[4]
[1]*Assistant Professor,* [2, 3,4]*UG Student, Department of Electrical Engineering, Sandip Institute of Engineering, Management, Nashik. 422213*

Abstract— the paper will describe about Smart Garden System. This paper has systems that will combine to each other's to create a perfect combination system. This project only involves hardware and embedded software. The first circuit is an Automatic Water Sprinkle that functional to sprinkle the plants or flowers at the garden. This Automatic Water Sprinkler circuit is operating in automatically. Then second is RTC that will automatically switch ON the light at the specified time. The circuit is LM35 which will monitor the Temperature. The function is as automatic system that will operate when temperature sensor (LM35) is used. When the sensor detects heat or no heat, the Water motor will open or close automatically.
This Garden will facilitate and make the users are in a comfortable. Facilities provided by the garden were user friendly and make it easier to users because it can maintain moister on the plant and it also can save the electricity. Here we have also designed the system which will also generate the electricity using solar panel and we have also designed the system which will generate the Energy and that energy will be reused.

I. INTRODUCTION

This project is application based on the electronic circuit that applied at the garden which has functional automatically and manually. "Spinner Based Automation Using PIC" is a model or a prototype for a real project on a large scale. In this prototype, there are four systems that will combine to each other's to make a perfect combination system. This System only involved hardware part.
The first system is an Automatic Water Sprinkle Function is to sprinkle water in automatic condition. It also to ensure the plant or flower at that garden is in good condition. When the soil moister sensor probe detects the soil in dry condition, then the sprinkler will automatically ON. When the soil moister sensor probe detects the soil is in wet condition, then the sprinkler is OFF.
Then the last system is the Motor Canopy Circuit is functional either automatic system or manual system. For automatic action, it functions when the canopy detects heat, then the canopy will automatically open and it will automatically close, when there is no heat detect. For manual action, it depends on the owner or the users of the garden. This circuit is important during the rain season that can provide shelter at for user to rest and hanging out.

II. COMPONENTS

A) Power Supply

This unit is very important part of the project. We use +5V regulated supply which is obtained from regulator LM7805 IC. The power supply unit consists of different unit like – Transformer- step down converts' high voltage ac main voltage ac. Rectifier – this converts ac to dc but the dc obtained is varying dc. First two number shows positive voltage & last two number shows magnitude of voltage. Output Current up to 1A.

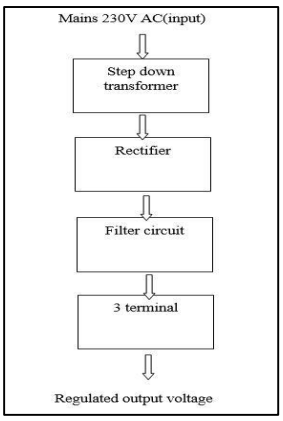

Fig. 1: Power Supply

B) Sprinkler

An Irrigation sprinkler is a device used to irrigate agricultural crops, lawns, landscapes, golf courses, and other areas. They are also used for cooling and for the control of airborne dust. Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall to the ground. The pump, valves, distribution pipes, and sprinklers are generally designed to apply water as uniformly as possible.

Fig. 2: Sprinkler System

C) Relay driver

A relay driver circuit is a circuit which can drive, or operate, a relay so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close, according to the needs of the circuit and its operation. In this project, we will build a relay driver for both DC and AC relays. Since DC and AC voltages operate differently, to build relay drivers for them requires slightly different setup. We will also go over a generic relay driver which can operate from either AC or DC voltage and operate both AC and DC relays. For the relay module, we have used a

5V relay module which nicely integrates a relay on a board, along with all the required components to control the relay from the Arduino board.

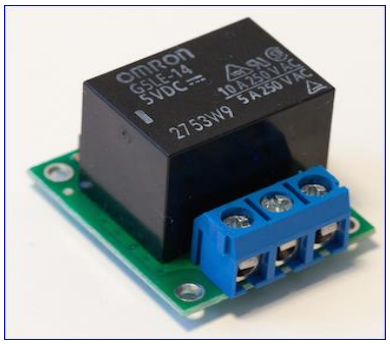

Fig. 3: Relay Component

Relays are most commonly used switching device. To Control (On/Off) Heavy loads at a pre-determined time/condition. Used in safety circuits to disconnect the load from supply in event of failure. For Home Automation projects to switch AC loads. Relay has three high voltage terminals (NC, C, and NO) which connect to the device you want to control. The other side has three low voltage pins (Ground, Vcc, and Signal) which connect to the Arduino.

D) Moisture sensor

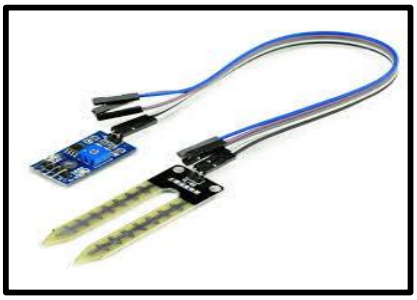

Fig. 6: IC DS1307 Real Time clock

Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners. Soil moisture sensors typically refer to sensors that estimate volumetric water content. Another class of sensors measure another property of moisture in soils called water potential; these sensors are usually referred to as soil water potential sensors and include tensiometers and gypsum blocks.

E) RTC DS1307

The RTC DS1307 IC is used to give the exact time of the system which will allow us to switch the devices The DS1307 serial real-time clock (RTC) is a low power, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I2C, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power-sense circuit that detects power failures and automatically switches to the backup supply. Timekeeping operation continues while the part operates from the backup supply.

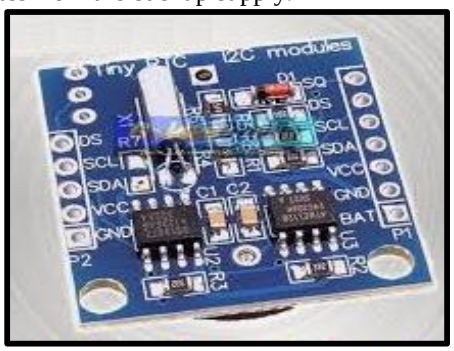

Fig. 6: IC DS1307 Real Time clock

*F) LCD 16*2*

Fig. 7: LCD Display

Table 1- LCD Features

S. No	Features	Ratings
1	Display construction	16 Characters * 2 Lines
2	Display type	Positive Trans-reflective
3	Backlight	LED(B/5.0V)
4	Operating Area	Indoor
5	Power Type	Single power
6	No. of data line	8-bit parallel

A liquid-crystal display (LCD) is a flat display, electronics visual display, or video display that uses the light modulating properties of liquid crystal LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits. LCDs are used in a wide range of applications including computer monitors, televisions, and instrument. They are common in consumer devices such as video players, gaming devices, clocks watches, calculators, and telephones and have replaced cathode ray tube (CRT) displays in most applications.

G) LM 35 Sensor

It is a temperature sensor. We use this sensor because it directly sense temperature in centigrade. So the conversion time required for converting centigrade to kelvin is reduced. It can sense temp from-40 to 110 degree centigrade.

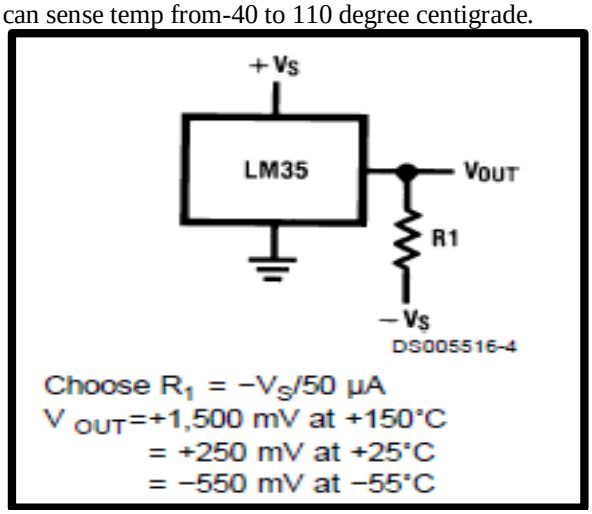

Fig. 8: LM35

III. SYSTEM INFORMATION

This project will describe about Smart Garden System. This project has four systems that will combine to each other's to create a perfect combination system. This project only involves hardware & software. There are four circuits that are automatic functional. This circuits are:-

[1]. Controller circuit.
[2]. Sensor's circuit.
[3]. Electricity generation.
[4]. Output circuit.

Electricity Generation:-

[1]. Roller-skate, Rounder, See-saw.
[2]. Foot-step electricity generation.
[3]. Solar energy

Hard ware Requirement:-

[1]. Microcontroller PIC
[2]. DS1307
[3]. LM35
[4]. Battery
[5]. Motor
[6]. Transformer (230v input/9v output)
[7]. Diodes , Transistors , Resistors, crystal 12Mhz
[8]. PCB Board.

Software Requirement:-

[1]. PCB Designing Software Protel / Orcad
[2]. Programming software Systems
[3]. Proteous 8.1

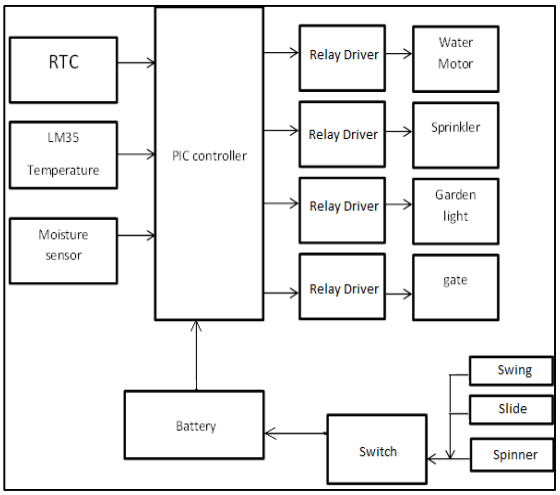

Fig. 9: Block diagram of spinner based automation using PIC

IV. RESULTS

Here we have designed the system which will monitor and control the garden equipment's it will also help the user to generate energy using various equipment and technic. The system is designed using RTC i.e. so that everything is controlled with precise timing. Our project is going to generate energy from gym equipment's place in garden and use the same energy for functioning of garden. Our project is very handy and cost effective.

V. CONCLUSION

Design such a project and implement it, we gather great practical experience. We tried to implement our theoretical knowledge successfully. This course teaches us about the far difference between theoretical and practical knowledge. This project increases our ability to work as a group and it helps us in future life. But we face several problems because of unavailability of quality goods, technical support and inexperience. Despite that we enjoyed our work very much and successfully finished that work in perfection. In this dynamic world motor is the most convenient and useful tool in industry. Large rated motor required flexible control and protection. We hope our project can bring dynamic change in our industrial level motor controlling system.

VI. REFERENCES

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