A PROJECT REPORT

ON

TOGGLING OF LED's & AUTOMATIC PLANT WATERING SYSTEM.USING 8051 MICROCONTROLLERS

SUBMITTED TO YESHWANTRAO CHAVAN COLLEGE OF ENGINEERING,NAGPUR

SECOND YEAR OF ENGINEERING (SEM-4)

IN

ELECTRONICS AND TELECOMMUNICATION

BY

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UNDER THE GUIDANCE OF

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DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGG
Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

2021 – 2022

CERTIFICATE

This is to certify that the project report entitled

"TOGGLING OF LED's AND AUTOMATIC PLANT WATERING SYSTEM USING 8051 MICROCONTROLLERS"

Submitted by

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is a bonafide work carried out by them under the supervision of **Dr. B.Y.Masram** and it is approved for the partial fulfillment of the requirement of university for the award of the second year of B.Tech of Engineering (Electronics and Telecommunication)

Dr. B.Y.Masram	**Dr.Milind Narlawar**
Guide	**Head**
Department of E&T/C	**Department of E&T/C**

Place: Nagpur

Date: /05/2022

ACKNOWLEDGEMENT

We are grateful to Yeshwantrao Chavan College of Engineering, Nagpur for giving us an opportunity to develop this project with an esteemed organization. The volume of the work would not have been possible without contribution in one form or the other by few names to mention.
We take this opportunity to acknowledge the support and continuous cooperation of all the people whose help was unparalleled importance in making this project a success. We welcome this opportunity to express our heartfelt gratitude and regards to our project guide **Dr.B.Y.Masram**, Department of Electronics and Telecommunication Engineering, Yeshwantrao Chavan College of Engineering, who encouraged and supported us by giving continuous guidance, which kept us motivated throughout the project.

We are thankful to our Honorable Principal, Yeshwantrao Chavan College of Engineering, Nagpur **Dr.B.Y.Masram,** for the support.

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NIKHIL TALATULE
BHARGAV SABLE
OM GATTUWAR

CONTENTS

PART 1 : TOGGLING OF LED's

PART II : AUTOMATIC PLANT WATERING SYSTEM.

PART I

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Light Emitting Diodes are the semiconductor light sources. Commonly used LEDs will have a cut-off voltage of 1.7V and current of 10mA. When an LED is applied with its required voltage and current it glows with full intensity. The Light Emitting Diode is similar to the normal PN diode but it emits energy in the form of light. The colour of light depends on the band gap of the semiconductor.

Thus, LED is connected to the AT89C51 microcontroller with the help of a current limiting resistor.

1.2 PRINCIPLE

The main principle of this circuit is to interface LEDs to the 8051-family microcontroller. Commonly, used LEDs will have voltage drop of 1.7v and current of 10mA to glow at full intensity. This is applied through the output pin of the micro controller.

1.3 SUMMARY

Thus, this chapter contains introduction regarding the project description and working principle needed for this system.

CHAPTER 2

DRAWING AND TESTING

2.1 INTRODUCTION

This chapter explains on how this project will be implemented and components used in the project, brief description of each component. It included each process from the beginning until the end of this project. This chapter includes the project as well as the hardware module wise discussion as the input module and the output module.

2.2 BLOCK DIAGRAM

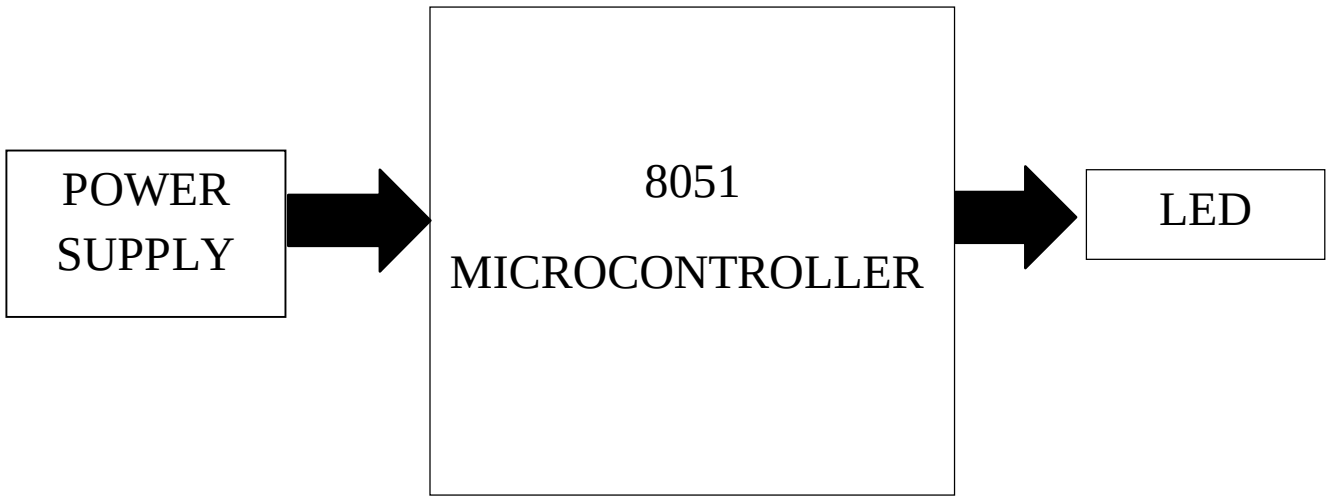

Fig 2.1 Block Diagram

BLOCK DIAGRAM DESCRIPTION

In this arrangement microcontroller is used for implementation of the circuit. LED is used to display the toggling of LED's. The microcontroller verifies the output present in the microcontroller by giving inputs and verifying.

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2.3 HARDWARE DESIGN

2.3.1 AT89C52 MICROCONTROLLER

The AT89C52 is microcontroller with C compiler optimized architecture. It is cost effective and reliable. In the project the .hex file of the code is dumped in this controller.

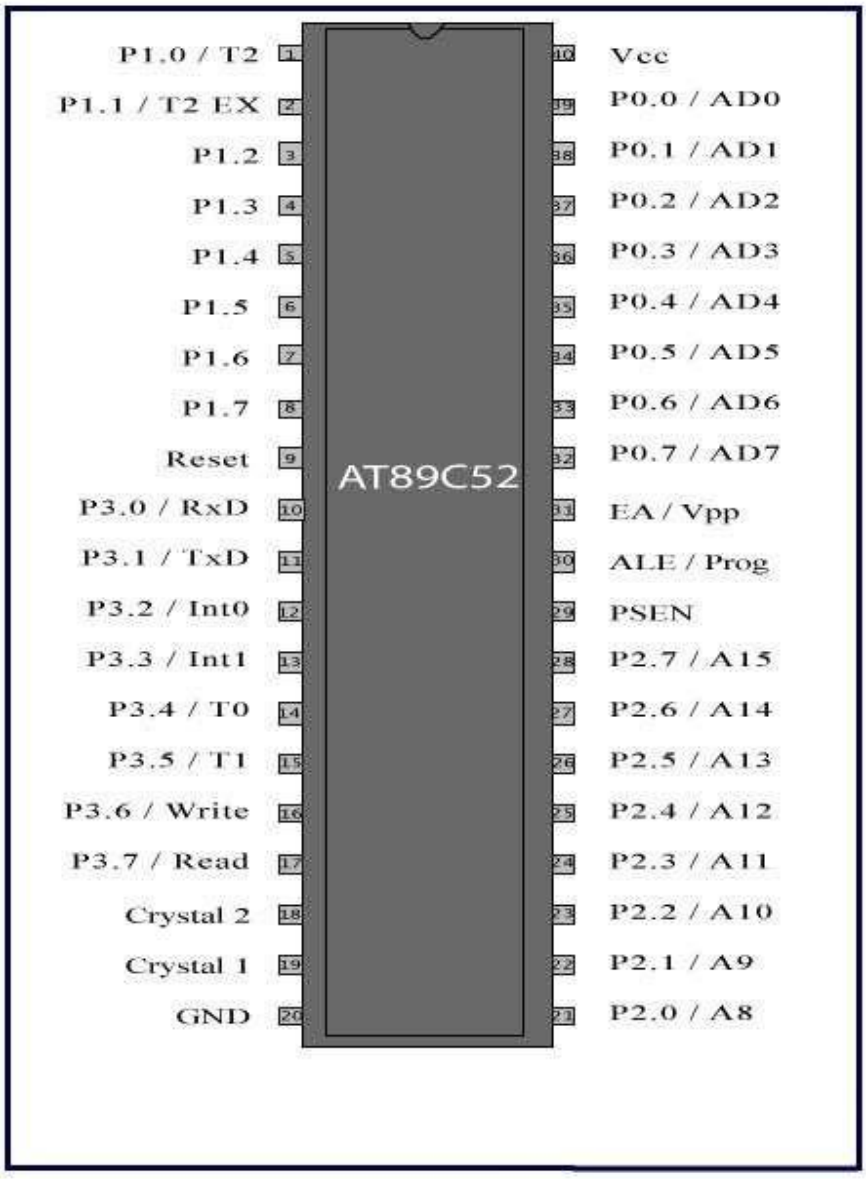

Fig 3.2 Pin Diagram of AT89C52 microcontroller

2.3.2 FEATURES OF AT89C52 MICROCONTROLLER

SOME FEATURES OF AT89C52:

It is a high-performance CMOS microcontroller with Flash Technology. The unit operates at a wide range of 4 – 5.5 volts, so it is a low power IC. The device supports In-system Programming both page and byte mode for the Flash memory.The module has a quick programming time with 10,000 read/write cycles. The Random-Access memory is organized in 256×8 bits. The serial communication takes place through a full duplex UART module. It comes with a reset option, three 16-bit timers and eight interrupts.

2.3.3 PARAMETRIC OF AT89C52 MICROCONTROLLER

Sr. No.	Name	Value
1.	Architecture	8-bit PIC
2.	Pin Count	40
3.	RAM	256 Bytes
4.	EEPROM/HEF	No
5.	Program Memory	8 Kilobytes
6.	CPU speed	33 MHz
7.	Internal Oscillator	No
8.	Number of Comparators	2
9.	ADC	No
10.	DAC	No
11.	Number of Programmable I/O pins	32
12.	Pin Count	40
13.	Number of 16-bit Timers	3
14.	UART module	1
15.	Program Memory Type	Flash

2.4 SOFTWARE DESIGN

The different software used to develop the systems is:

2.4.1 EMBEDDED C LANGUAGE

Source code is written in C language. Programming in C makes the embedded systems more reliable hence code written for the specific microcontroller can be easily transferred to systems using different microcontrollers. It can be reused, easy to maintain and easy to debug and extend. Also writing in C simplifies code development for large projects. It is easier to modify and update the code.

2.4.2 KEIL µVISION FOR SOURCE CODE

Keil µvision was used to write the assembly language and C language for AT89C52. Keil µvision is free software provided Arm Holdings. It runs as a 32-bit as well as a 64-bit application on Microsoft Windows and provides a host of free software. It can convert the source code into a HEX file, which HEX file is needed before it can be program into the microcontroller.

2.4.3 MICROFLASH SOFWARE FOR BURNING CODE INTO IC

The MicroFlash simplify the various programming operations. Automatically identify the connected devices and perform standard processes.

MAIN FEATURES:

- Automatic device identification before programming.
- Supports all operations program, verify, blank check, read, secure, erase & so on.
- Auto Batch Program function for faster programming i.e., Mass Production mode.
- User-friendly interfaces with pull-down menus, pop-up dialogue box and help.
- Supports Intel (linear & segmented) HEX (INHX8M).
- Easy to use integrated HEX Editor on main software window.
- Support for programming only a selected memory in the microcontroller e.g., Code memory, Data memory or configuration memory.

3.4.4 PROTEUS VSM FOR SIMULATION DESIGN

Proteus Virtual System Modeling (VSM) is a software that combines mixed mode SPICE circuit simulation, animated components and microprocessor models to facilitate co-simulation of complete microcontroller-based designs.

When the coding of microcontroller done writing in MPLAB, HEX file of the source code which is compiled by the MPLAB is load into the Proteus VSM circuit for simulation. Through the simulation, we can straight debug the error in the source code and correct the error immediately. Without this software, we need to burn the HEX file into microcontroller and test or debug error in real circuit. Hence, with Proteus VSM will save a lot time when debugging the error.

2.5 SUMMARY

Thus this chapter describes about the components selection and the different software used for implementing our system. It briefly described about the specifications of the components selected and the description about the software used.

CHAPTER 3

COMPONENTS

SR. NO.	COMPONENTS	QUANTITY
1.	LED's	8
2.	Resistors-220 Ohms	8
3.	8051 (AT 89C52)	1
4.	Bread Board	1
5.	Connecting Wires	
6.	Crystal Oscillator -11Mhz	1
7.	Capacitor - 30 pf	2
8.	Resistor-10K ohms	1
9.	Capacitor-10Uf	1
10.	Voltage Regulator	1

CHAPTER 4

SCHEMATIC DIAGRAM

4.1 SCHEMATIC DIAGRAM

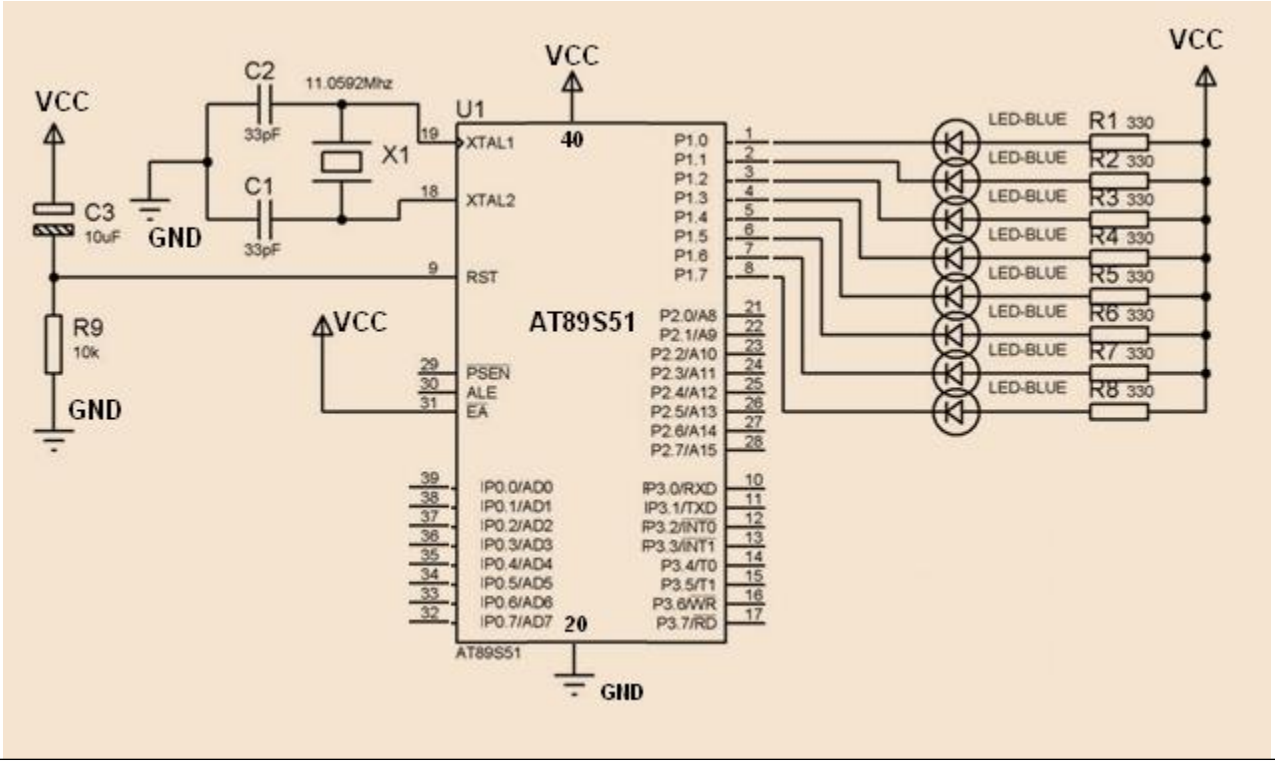

Fig 4.1 Schematic Diagram for Interfacing of LEDs with 8051 microcontrollers.

CHAPTER 5

CIRCUIT DESIGN

5.1 CIRCUIT DESIGN

The circuit mainly consists of AT89C51 microcontroller. AT89C51 belongs to the family of 8051 microcontroller. It is an 8-bit microcontroller. This microcontroller has 4KB of Flash Programmable and Erasable Read Only Memory and 128 bytes of RAM. This can be programmed and erased a maximum of 1000 times.
It has two 16-bit timers/counters. It supports USART communication protocol. It has 40 pins. There are four ports are designated as P0, P1, P2, and P3. Port P0 will not have internal pull- ups, while the other ports have internal pull-ups.

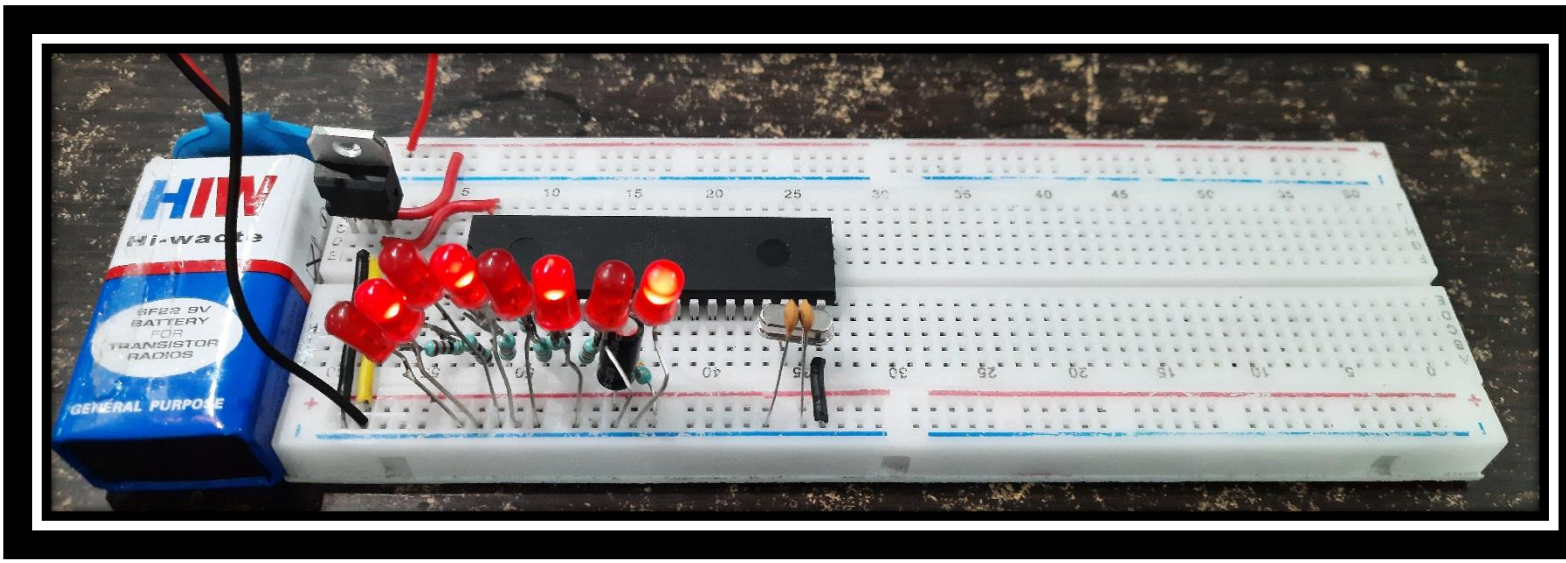

Fig. 5.1 Circuit connection for interfacing 8-LEDs with 8051 Microcontrollers.

In this circuit, LEDs are connected to the port P0. The controller is connected with external crystal oscillator to pin 18 and 19 pins. Crystal pins are connected to the ground through capacitors of 33pf.

CHAPTER 6

ALGORITHM & CODE FOR TOGGLING OF LEDs

6.1 ALGORITHM FOR TOGGLING OF LEDs

1. Initially, include the "reg51.h" header file in your code.
2. Now write a function for producing delay using for loop.
3. Start the main function.
4. Inside the while loop write the condition to port pin for making it logic high or low.
5. Initially, make it high for some delay of 250 microseconds.
6. Now make the port pin low.
7. Again, give some delay of 250 microseconds.
8. Repeat this for 8 times using for loop.
9. In another loop, try to represent the binary equivalent of the first 255 number using LEDs.
10. Now close the while loop and also main.

6.2 CODE

Fig 4.1 Schematic Diagram for Interfacing of LEDs with 8051 microcontrollers.

CHAPTER 7

APPLICATIONS

7.1 CIRCUIT APPLICATIONS

1.) LEDs are widely used in many applications like in seven

segments.

2.) They are used in dot matrix displays.

3.) They can be used for street

lights.4.) They are used as

indicators.

5.) They can be used in traffic

lights. 6.) They are used in

emergency lights

7.) They can used to make electronic designs.

CHAPTER 8

CONCLUSIONS

8.1 CONCLUSION:- THUS WE LEARNED THE TOGGLING IF LEDS USING 8051 MICROCONTROLLER.

REFERENCES

1.) https://www.electronicshub.org/led-interfacing-8051/

3.) https://microcontrollerslab.com/at89s52-8-bit-microcontroller-pinout-programming-features-applications/

4.) https://www.engineersgallery.com/microcontrol-at89c52/

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AUTOMATIC PLANT WATERING SYSTEM

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Water Level Controller using 8051 microcontroller projects will help in automatically controlling the water motor by sensing the water level in a tank. This article explains you how to detect and control the water level in an overhead tank or any other container. This system monitors the water level of the tank and automatically switches ON the motor whenever tank is empty.
The motor is switched OFF when the overhead tank or container is FULL. Here, the water level of the tank is indicated on LCD (Liquid crystal Display). Using this system, we can avoid the overflow of the water.

1.2 PRINCIPLE

This system mainly works on a principle that "water conducts electricity". The four wires which are dipped into the tank will indicate the different water levels. Based on the outputs of these wires, microcontroller displays water level on LCD as well as controls the motor.
Initially when the tank is empty, LCD will display the message LOW and motor runs automatically. When water level reaches to half level, now LCD displays HALF and still motor runs.
When the tank is full, LCD displays FULL and motor automatically stops. Again, the motor runs when water level in the tank becomes LOW.

1.3 SUMMARY

Thus, this chapter contains introduction regarding the project description and working principle needed for this system. It gives us idea why 8051 microcontrollers need behind development of such system is discussed.

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2.2 BLOCK DIAGRAM

Fig 2.1 Block Diagram

PART II

BLOCK DIAGRAM DESCRIPTION

In this arrangement microcontroller is used for implementation of the circuit. LED and buzzer are used to display the water level in tank. The microcontroller verifies the output present in the microcontroller by giving inputs and verifying outputs with the truth table of logic gates.

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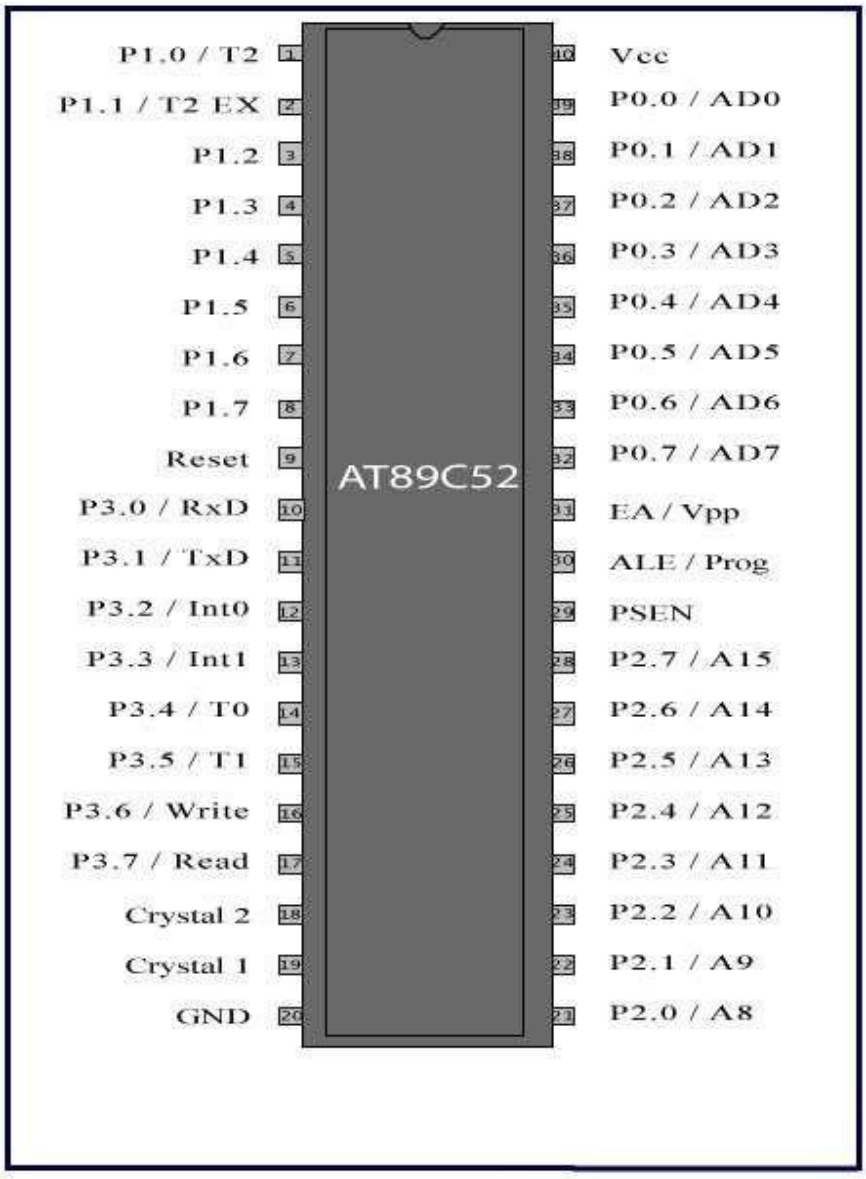

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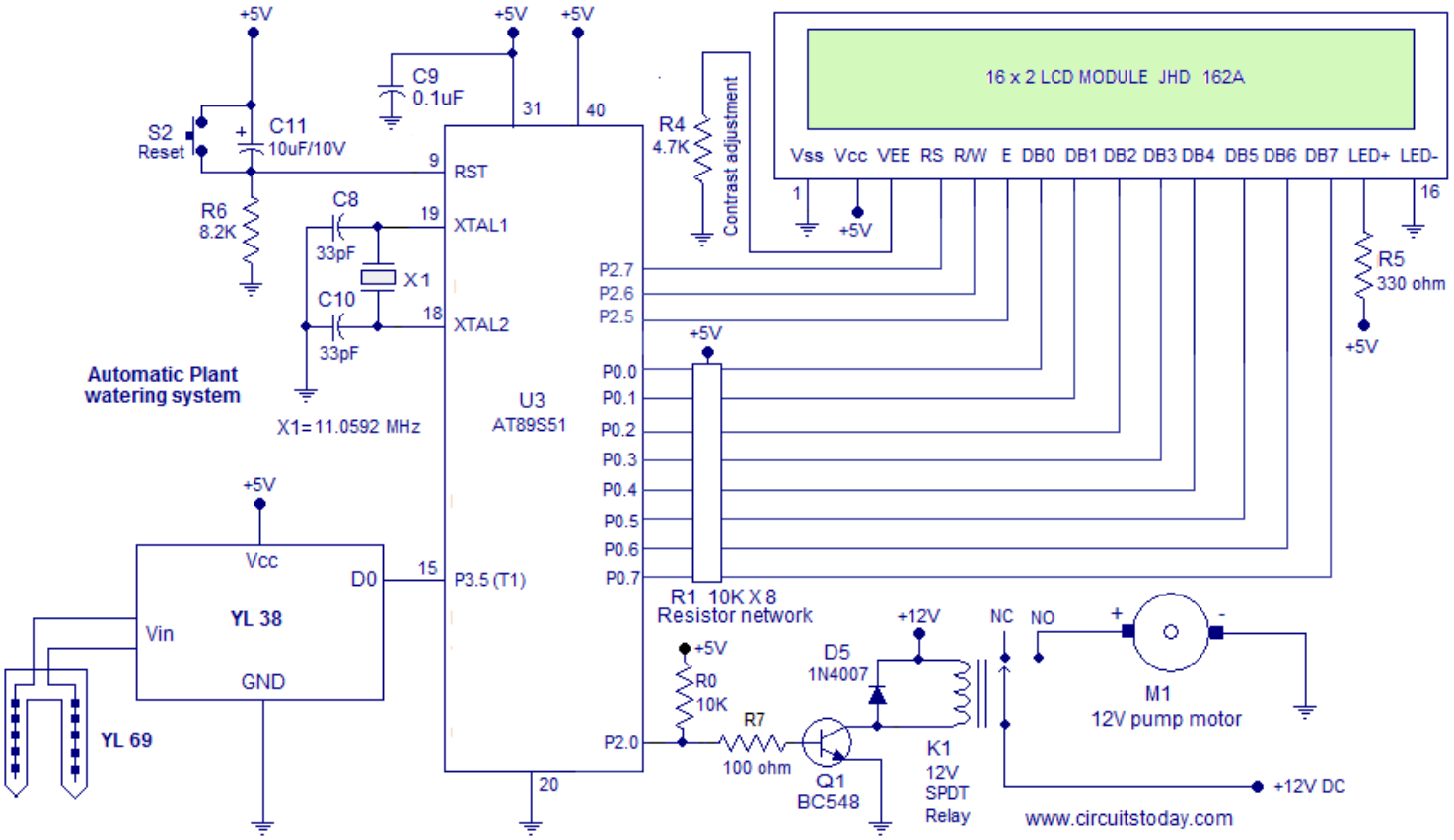
8.	Capacitor - 30 pf	2
9.	Resistor-10K ohms	1
10.	Capacitor-10uF	1

CHAPTER 4

SCHEMATIC

4.1 SCHEMATIC

Fig 3.1 Schematic Diagram for plant watering system using 8051 microcontroller



CHAPTER 5

CIRCUIT DESIGN

5.1 CIRCUIT DESIGN

The heart of the Automatic Plant Watering System using 8051 Microcontroller project is the AT89C51 Microcontroller. The water level probes are connected to the P0.0, P0.1 and P0.2 through the transistors (they are connected to the base of the transistors through corresponding current limitingresistors). P0.0 for LOW level, P0.1 for HALF Level and P0.2 for HIGH Level.

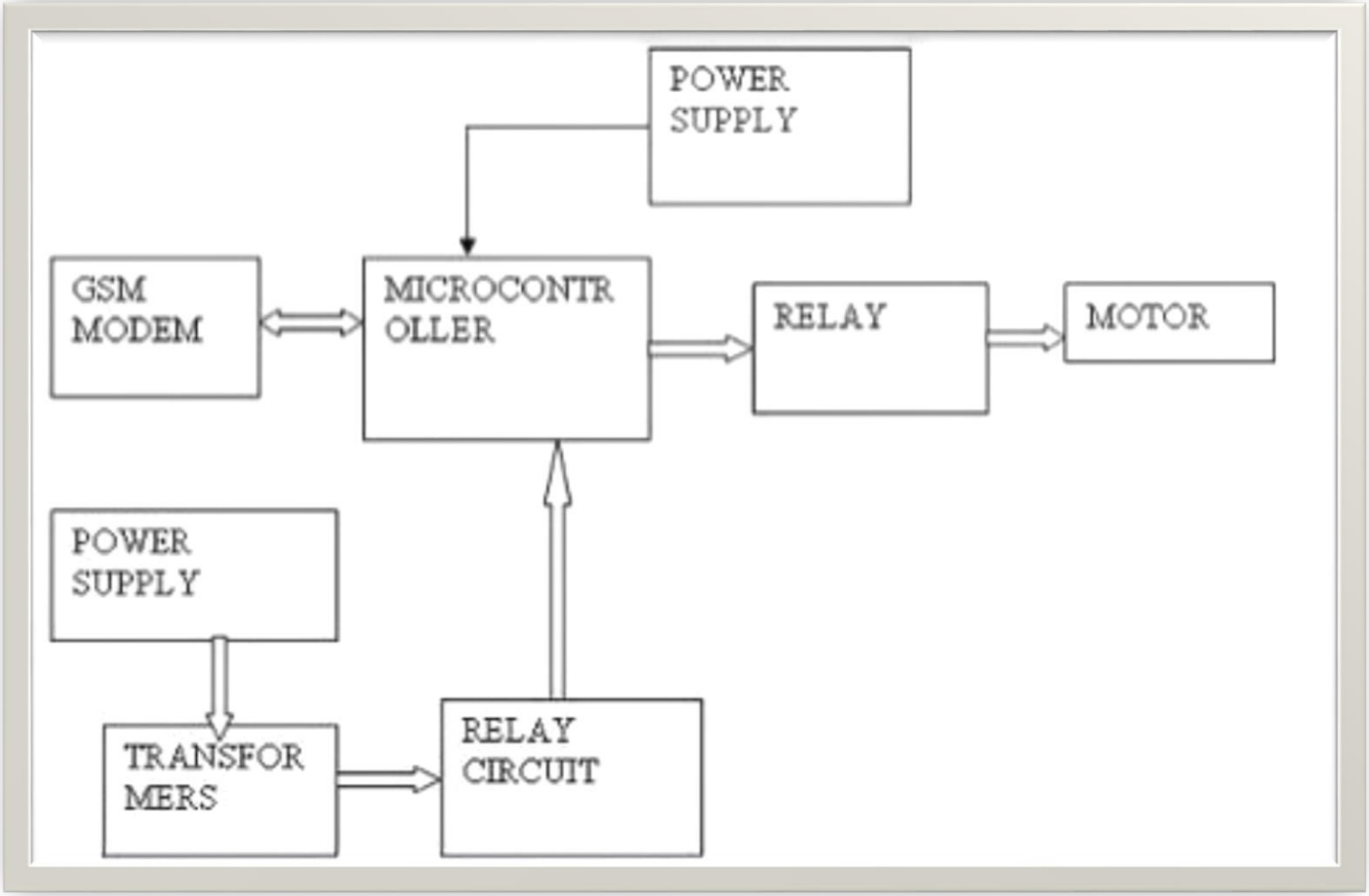
The Collector terminals of the Transistors are connected to VCC and the Emitter terminals are connected to PORT0 terminals (P0.0, P0.1 and P0.2).

PORT1 of the microcontroller is connected to the data pins of LED and the control pins RS, RW and EN of the LED Display are connected to the P3.6, GND and P3.7 respectively.

CHAPTER 6

ALGORITHM & CODE FOR AUTOMATIC PLANT WATERING SYSTEM

6.1 ALGORITHM FOR Automatic Plant Watering System CIRCUIT



6.2 CODE

```
#include<reg51.h>
sbit relay=P2^0;
sbit sensor=P3^5;
void main(void)
{
relay =0;
sensor=1;

while(1)
 {
  if(sensor==1)

  relay=1;
  else
   relay=0;

 }
}
```

CHAPTER 7

ADVANTAGES AND APPLICATIONS

7.1 ADVANTAGES

- **FREE YOURSELF FROM THE MANUAL LABOR. To begin, one of the advantages of installing an automatic irrigation system is that it will do the watering work for you.**
- **SAVE WATER WHILE KEEPING A LUSH LAWN. Moreover, another one of the advantages of installing an automatic irrigation system is that it saves a lot of water.**
- **ACHIEVE A THRIVING YARD WHILE SAVING MONEY. Here is the thing, we are sure you have heard of the saying that goes; "Time is money." An automatic irrigation system saves ...**
- **AUTOMATIC IRRIGATION SYSTEM: PREVENTS WEEDS AND DISEASES. Specialized irrigation systems direct water specifically to each plant's roots. ...**
- **PRESERVERS SOIL STRUCTURE AND NUTRIENTS. Also, when you water your lawn with a hose, you allow for too much water to seep into the soil. ...**

CHAPTER 8

CONCLUSIONS

8.1 CONCLUSION:- HENCE WE LEARNED INTERFACING WITH RELAY AND AND MOISTURE SENSOR.

REFERENCES

1.) https://www.electronicshub.org/water-level-controller-using-8051-microcontroller/

2.)https://aticleworld.com/water-level-controller-using-8051microcontroller/#:~:text=Below%20I%20am%20mentioning%20a,whenever%20the%20tank%20is%20full.

https://microcontrollerslab.com/at89s52-8-bit-microcontroller-pinout-programming-features-applications/

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