### **ECE3003: J-Component Project Report**

# RAIN SENSOR INTERFACING WITH 8051MICROCONTROLLER

# Fall Sem 2019-20

## **SLOT L15+L16**

## Submitted By

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### **CERTIFICATE**

This is to certify that the project work entitled <u>"RAIN</u> <u>SENSOR INTERFACING WITH 8051</u> <u>MICROCONTROLLER</u>" that is being submitted by Harshit Parvatiyar(16BEC0784), Rishabh Kaul (17BEC0328) and Prabh Arjun Singh (17BEC0833) for the course Microcontrollers and its Applications (ECE3003) is a record of bonafide work done under my supervision.

### **Signature of Students**

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### Signature of the Faculty

Prof. Sundar S

Date: 21/10/2019 Place: Vellore The objective of our project was:

- This project will display the rain status, so that one can make some actions for rain water harvesting.
  One can also add an alarm circuit to this project.
- 2. Rain water detector helps detect the rain and alert the user. It is used in the irrigation field, home automation, communication, automobiles etc. It may, however, be tinkered for a number of other applications.

### **BLOCK DIAGRAM**





## **Discussion About Components**

To successfully assemble and simulate the project, the following components are required:

### 1.8051 microcontroller

**8051 microcontroller** is designed by Intel in 1981. It is an 8-bit **microcontroller**. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage and 128 bytes of RAM storage, 2 16-bit timers. It consists of are four parallel 8-bit ports, which are programmable as well as addressable as per the requirement.

### 2. Rain water Sensor

A rain sensor or rain switch is a switching device activated by rainfall.

### 3. LCD

The **liquid crystal display** uses the property of light monitoring of liquid crystal and they do not emit the light directly. The Liquid crystal display is a flat panel display or the electronic visual display. With low information, content the LCD' s are obtained in the fixed image or the arbitrary image which are displayed or hidden like present words, digits, or **7 segment display**. The arbitrary images are made up of large no of small pixels and the element has larger elements.

### 4. Connecting wires

- 5. Hole pin
- 6. Plastic pipe
- 7. Battery

### 8. Servo Motor for the automatic wiper

A **servo motor** is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use **servo motor**. It is just made up of simple **motor** which run through **servo** mechanism

### PROCEDURE

The working of the project is divided into 2 major parts. They are:

#### PART I

- The rain sensor used is composed by two parts. The first one is the effective sensor, which is a plaque that is exposed to the rain. This plaque has two strips of conductive material, very close to each other, but without touching.
- If a voltage is applied between the two strips, it will be an open circuit. Nevertheless, when the surface is exposed to the rain, the water that falls closes the circuit between the strips and a different voltage can be measured.
- When the rain drops the two strips will not be short circuited because water is not a perfect conductor. So, this sensor will act as a variable resistor, which will be lower when more water falls on the surface, connecting the stripes in more points.

#### PART II

- The second part is the electronic circuit board responsible to process the signal from the plaque and expose it as two signals, one digital and another analog.
- The digital output pin operates as active-low, indicating that rain is being detected or not. Since this pin is active-low, it will have a value of GND when rain is detected, and VCC when rain is not detected.
- The rain sensor acts as a variable resistor. Its output will be an analog voltage that needs to be converted to digital. So, the electronic circuit uses a LM393 comparator to compare this analog voltage to a certain threshold and output GND or VCC accordingly.
- Additionally, the sensor has an analog output with a variable voltage that depends on the resistance of the sensor and thus, on the amount of water on it. This module can work with voltage supplies of both 3.3 V and 5 V.

#### SIMULATION SCREENSHOT



#### HARDWARE PICTURE



#### **GROUP PHOTO**

