

ANALOG ELECTRONICS PROJECT SYNOPSIS

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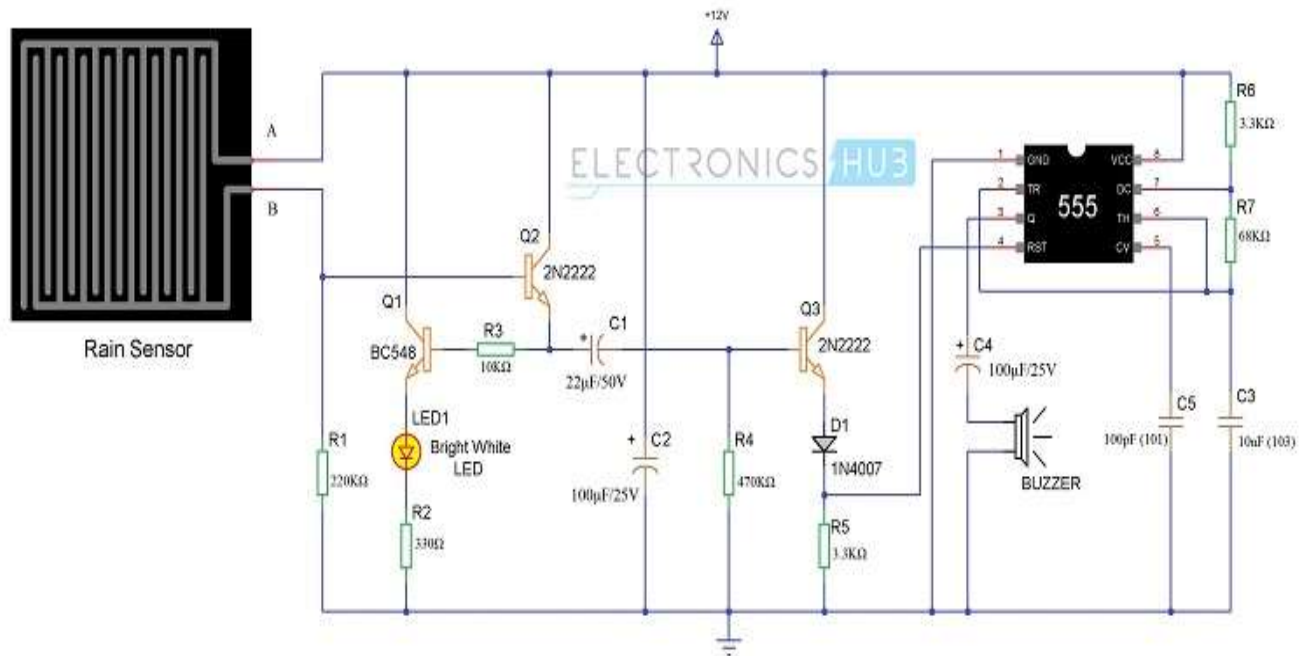
Branch: ECE 3rd SEM

Project title: RAIN ALARM CIRCUIT (using npn transistors)

Components required:

- Small Rain Sensor
- 555 Timer IC
- BC548 NPN Transistor
- 2N2222 NPN Transistor
- Bright White LED
- 1N4007 PN Junction Diode
- 220 K Ω Resistor (1/4 Watt)
- 330 Ω Resistor (1/4 Watt)
- 10 K Ω Resistor (1/4 Watt)
- 470 K Ω Resistor (1/4 Watt)
- 3.3 K Ω Resistor (1/4 Watt)
- 68 K Ω Resistor (1/4 Watt)
- 22 μ F Capacitor (Polarized)
- 100 μ F Capacitor (Polarized)
- 10nF Ceramic Capacitor (Code – 103)
- 100pF Ceramic Capacitor (Code – 101)
- Buzzer (or Speaker – 8 Ω)
- Connecting Wires
- Breadboard
- 12V Power Supply

Circuit diagram:



Working of the circuit:

When rain falls on the sensor, the Aluminium Wires on the Sensor Board will start conducting and close the path between the supply and base of the transistor Q2. As a result, the Transistor Q2 will turn ON, which will also turn ON the Transistor Q1. This will turn ON the Bright White LED connected to the emitter of the Transistor Q1.

When the transistor Q2 is saturated, the capacitor C1 will be shorted and will make the transistor Q3 to be turned ON. C1 will get charged by the resistor R4. When the Transistor Q3 reaches the saturation mode, the Reset Pin of the 555 Timer IC, which is connected to the emitter of Q3, will be made positive.

The 555 timer is configured in Astable Mode. As the Reset pin of the 555 Timer IC is given positive voltage, it becomes active and we will get a Pulse signal at the output pin 3 of the 555 Timer IC. This will turn ON the buzzer and the alarm is activated.

When there is no rain, the aluminium wire on the sensor will not conduct as they do not have any conduction path (open circuit). As a result, the sensor cannot trigger the 555 Timer IC and there will be no alarm.

Applications of rain alarm circuit:

1. In the irrigation, it will detect the rain and immediately alert the farmer.
2. In automobiles, when the rain detector detects the rain it will immediately active the wipers and inform the driver.
3. In communications, it will boost the power of the antenna and increase the signal strength to send or receive the signals.
4. In normal house hold, with the help of rain water detector we can automatically save the rain water. (This can be done only when home automation is done and there is proper equipment to save the rain water. In this, rain water detector will detect the rain and helps to switch ON the equipment which will automatically save rain water for different purposes).