

# ***Electronic circuits II***

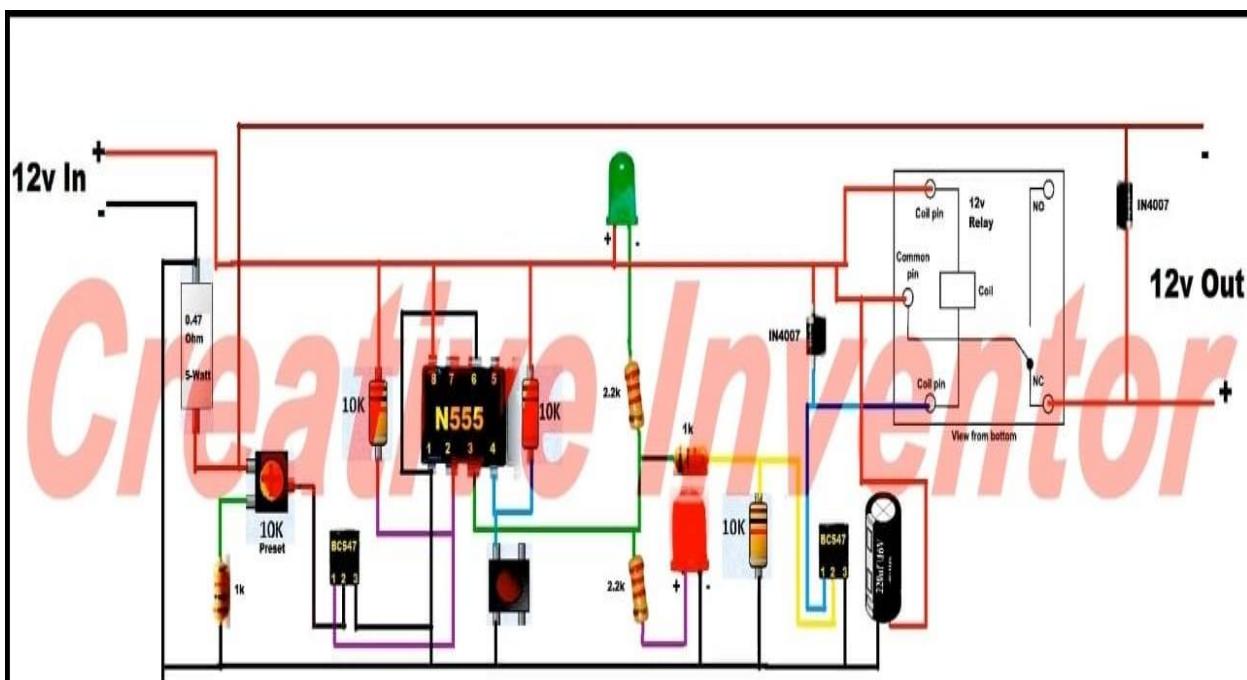
# *Mini Project*

# ***Over Current Protection Circuit***

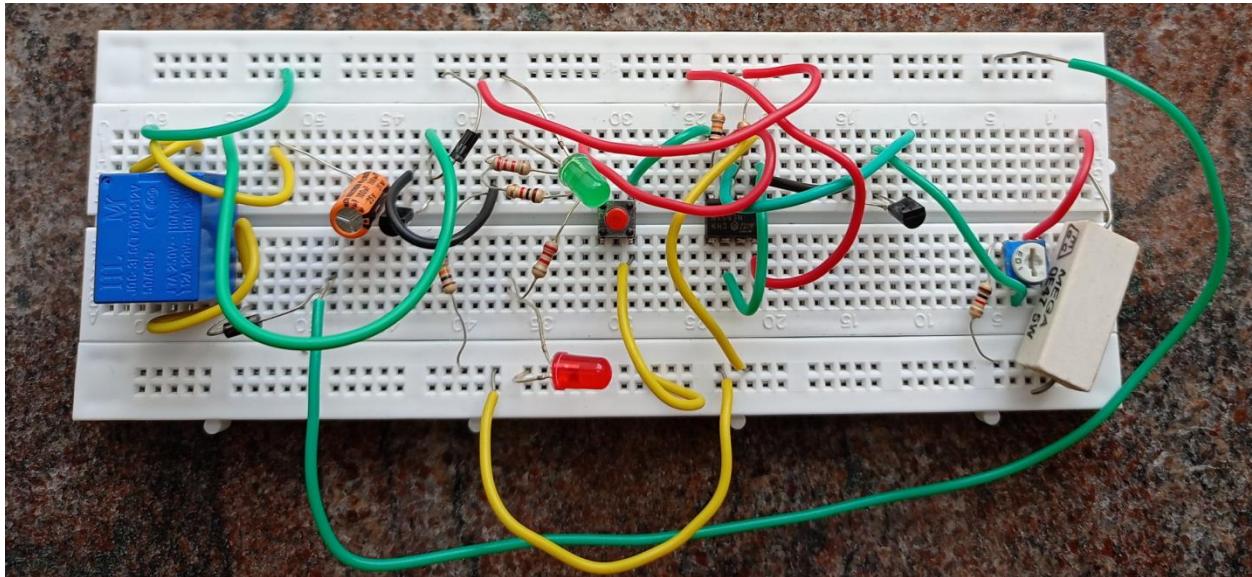
## **Abstract:**

Our Project is basically a tripper circuit that helps us to detect if proper stipulated current is flowing through the circuit creating no harm to the equipments present in the circuit. Tripper circuits are widely used in all the electrical equipments as it helps in the protection of short circuit. Our project include equipments like IC555 , resistors, diodes which we have learnt so far. 2 wires across the diode are used to short. If they are shorted the tripper has played it's role which is indicated by the glow of a red LED.

## ***Circuit Diagram:***



## **CIRCUIT:**



## **Major Equipments Used:**

- Bread Board
  - PCB Board
  - IC 555
  - Resistors – 10K, 2.2K, 2.2K, 10K, 1K, 10K, 1K, 0.47ohms(recommended power = 15W)
  - LED- green, red
  - Push Button
  - BC-547- 2 in number
  - 10K Preset
  - 12V Relay
  - IN4007 Diode – 2 in number
  - 25V, 100uF Capacitor – 1 in number

## **Working:**

- In this project, relay is one of the important parts used. Basically it acts as a switch using the principle of electromagnetic induction. When 12V supply is given, a magnetic field is produced by the coil which attracts the pin and makes the switch closed. It has 2 switches, that uses 4 pins. But 5<sup>th</sup> pin is called as normally connected pin. The name conveys that even when the supply voltage is not given, the switch containing 3 pins remain in closed condition through this pin.
- An NPN transistor in series with 1K resistor is used as normally connected pin is already connected. To make current flow from supply voltage, this setup is used.
- A diode is connected between collector of the NPN transistor and the supply voltage to prevent the over voltage. Also a green LED with a 1K resistor is connected across it to indicate that there is no over current problem.
- To deactivate the coil when any problem occur, we use a second NPN transistor whose collector is connected to the base of the 1<sup>st</sup> transistor and a 1K resistor is connected to the collector of 2<sup>nd</sup> transistor and to the supply voltage.
- To detect the over current, a small value power resistor is connected in series to the supply voltage and to a pin in relay, it creates a voltage drop proportional to the flowing current.
- But since the voltage drop is lower, we use IC 555 that amplifies this voltage.
- This IC also does the function of a comparator to which the preset and the amplified voltage is given. Preset is like a potentiometer which provides a variable reference voltage and the comparator connection compares the amplified voltage and this variable reference voltage and pulls the output that is high. 10K resistors are used to connection of feedback circuits in the comparator. The output of the comparator is connected to the base of the

$2^{\text{nd}}$  transistor through a 1K resistor in series . This setup turns off the relay when an over current flows.

- But when over current flows, the relay is deactivated and the comparator output turns low which activates the relay which makes comparator trigger once again and the cycle repeats.
- So to stop this, we connect a resistor, a pushbutton and the other normally closed contact of the relay in series to the base of the  $2^{\text{nd}}$  transistor.
- Also a red LED is connected to indicate that the tripper circuit has worked when over current is flowed or a short circuit has occurred.

### **Conclusion:**

- Hence the over current protection circuit was constructed and we learnt the functions of different parts used in the circuit. It gave us the desired output and a good experience in handling circuits and increased the managing capability when working in teams.

### **Applications:**

- Used as protection circuits in transmission lines, generators, transformers.
- Used as protection circuit in home appliances.
- Used in Different circuits to protect the flow of over current that causes heavy damage.

### **Team Members:**

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