AHSANULLAH UNIVERSITY OF SCIENCE & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

COURSE NO : EEE 2211

COURSE TITLE : Measurement & Instrumentation

PROJECT NAME : Temperature controlled LEDs

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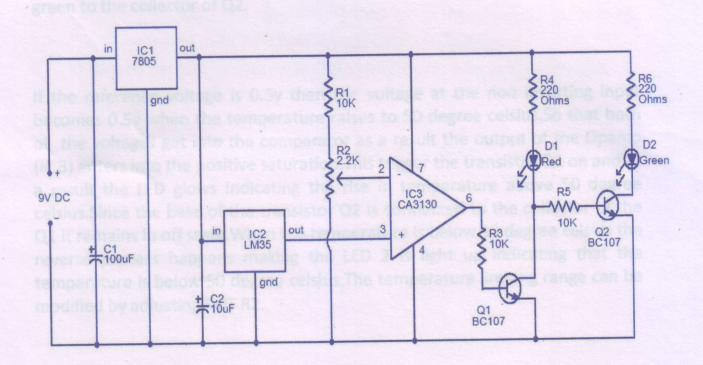ID:11.01.05.209

⬇ Circuit Diagram :

Fig: Temperature Controlled LEDs

⬇ Working Principle :

Here in the above circuit 9v DC supply is used to operate the circuit.Then the 9v is given into the 5v regulator(IC1). We can also use 5v voltage supply.Then the temperature sensor (IC 2) is connected to it. The output of the LM35 increases by 10mv per degree rise in temperature.Output of the LM35 is given to the non inverting terminal of the Opamp.The inverting

input of the same Opamp can be given with any reference voltage using any resistor R2. And the output of the Opamp is connected to the base of the transistor Q1 and the collector of the transistor Q1 is coupled to the base of the Transistor Q2.And red colored LED is connected to the collector of Q1 and green to the collector of Q2.

If the reference voltage is 0.5v then the voltage at the non inverting input becomes 0.5v when the temperature raises to 50 degree celsius.So that both of the voltages get into the comparator as a result the output of the Opamp (IC 3) enters into the positive saturation.This trigger the transistor Q1 on and as a result the LED glows indicating the rise in temperature above 50 degree celsius.Since the base of the transistor Q2 is connected to the collector of the Q1 it remains in off state.When the temperature is below 50 degree celsius the reverse process happens making the LED 2 is light up indicating that the temperature is below 50 degree celsius.The temperature limiting range can be modified by adjusting POT R2.

⚓ Equipments :

- **IC** : 7805, LM35, CA3130 (1 pcs each)
- **Transistor:** BC 107 (2 pcs)
- **Capacitor:** 100µF, 10µF (1 pcs each)
- **LED:** Green & Red 1 pcs each)
- **Resistor:** 10KΩ (3 pcs), 2.2KΩ POT (1 pcs), 220Ω (2 pcs)

Temperature Controlled LEDs

✦ Application :

- Ideal for high precision testing equipment for automotive parts.
- Low cost program control of industrial furnaces.
- Easy temp setting with inverted communication part on front panel.
- Ideal for increasing the control performance of industrial hot air blowers.
- Temp control of railroad operation guidance indicators.
- Inside the cabinet of expressway sign boards for instruction detection for security purposes.
- Multi-loop control with a single temp controller.
- Ideal for improving or upgrading facilities for automatic parts.
- Archive optimum temp profiles in semiconductor equipment test .
- Control performance for heating and cooling of molding machines.
- Used for space-saving and easy connection of semiconductor manufacturing equipment.
- In some equipments where short temp stabilization needs.
- Inside chemical flow machine.
- In food processing equipment of multiple temp control.
- Hot melt application system.
- Monitoring temp of continuous firing of electronic components.
- Used as stable control of water supply and drainage for advanced water tanks.
- In control panel downsizing.
- Over temp equalization for PCB mounting process.
- Used for automatic fine-tuning of heating temps when mounting PCB components.
- Detects heater or sensor errors in control loops during heating process.
- Performs Batch setting for temp controller.
- Time sequence temp management for constant temp tanks.
- Prevents rapid heating ceramic fire process.

Temperature Controlled LEDs

- ➤ Prevent temp to prevent ignitions.
- ➤ Monitors temp errors in greenhouse.
- ➤ In coating and ac temp control.
- ➤ Redundancy in temp control and temp monitoring.
- ➤ Used to make sure of higher efficiency for bread baking process.
- ➤ Detects cream filling.
- ➤ Energy saving measures for solder tank idling.
- ➤ Dioxin counter-measure for incinerators.
- ➤ In two color display.
- ➤ In turbine power generation control.
- ➤ Control switching for Sp and heating/cooling.
- ➤ Flow control of diaphram pump.
- ➤ Uniform control of metallic mold temp.
- ➤ Food factories hot water valve control.
- ➤ In tea baking equipment temp control.

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