

ENG152 Circuits Lab

Sensor signal conditioning

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The maximum sensor current is $50\mu A$, and the voltage range is between $2.7 - 5V$, so a $1k-1k$ resistor divider is sufficient to provide a stable voltage for the sensor in that range (around half of $9V$).

A dual OpAmp chip (LM358) used as a comparator. Reference voltages were set with a potentiometer, which from the datasheet are around $1V$ and $1.2V$. One (opamp A) to output a high signal when the temperature is lower than $75^{\circ}C$ and the other (opamp B) when the temperature is higher than $50^{\circ}C$. However, this method is not strict and other combinations are also plausible.

If A is high and B is low, then the temperature is below 50°C . Therefore A is connected to NMOS and B is connected to PMOS and the mosfets are conencted in series to an LED with a current limiting resistor of 330Ω

If both outputs are high, then the temperature is in the middle range, therefore they are connected to NMOSs and the LED.

If A is low and B is high, then the temperature is above 75°C , so A is connected to PMOS and B is connected to NMOS, both in series to the LED.

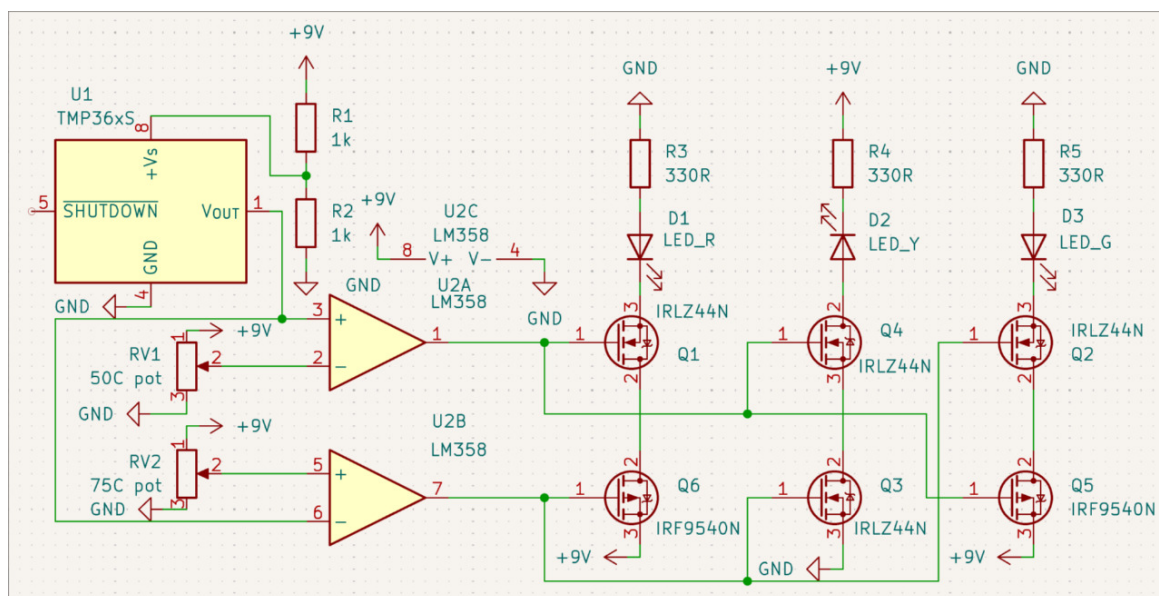


Figure 1: Schematic

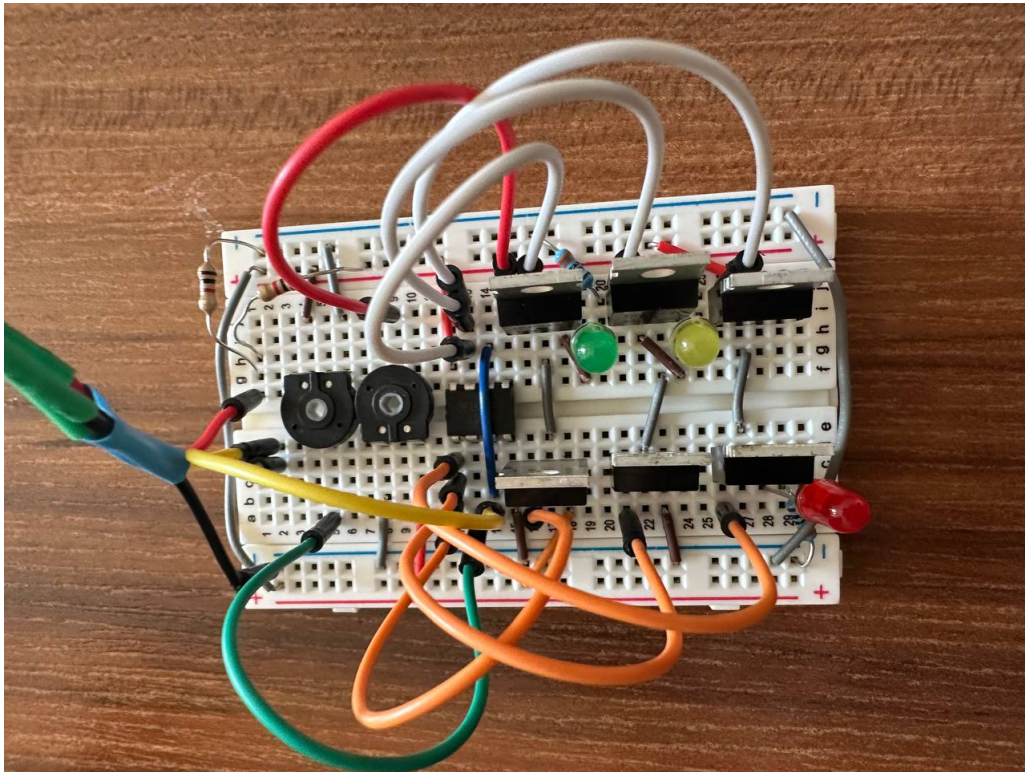


Figure 2: Circuit

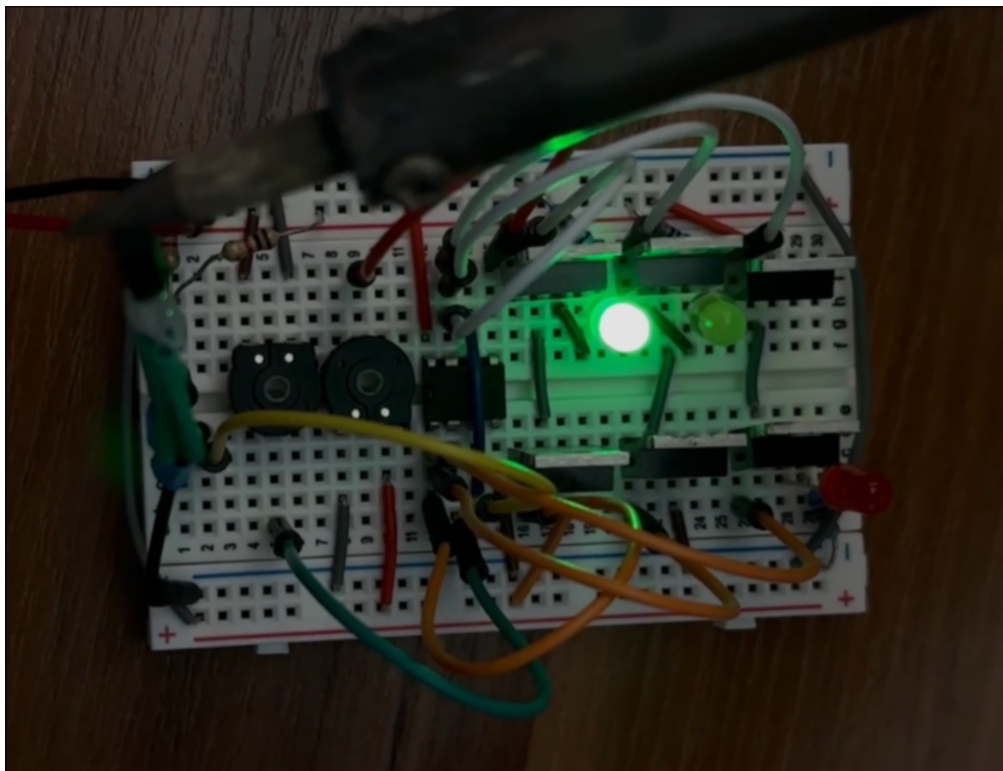


Figure 3: Cold state

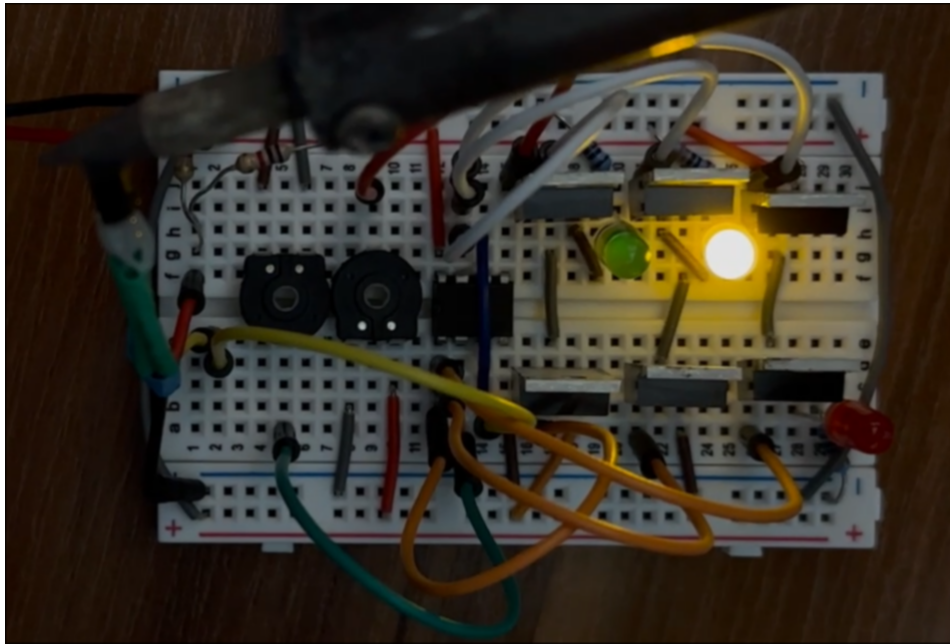


Figure 4: Warm state

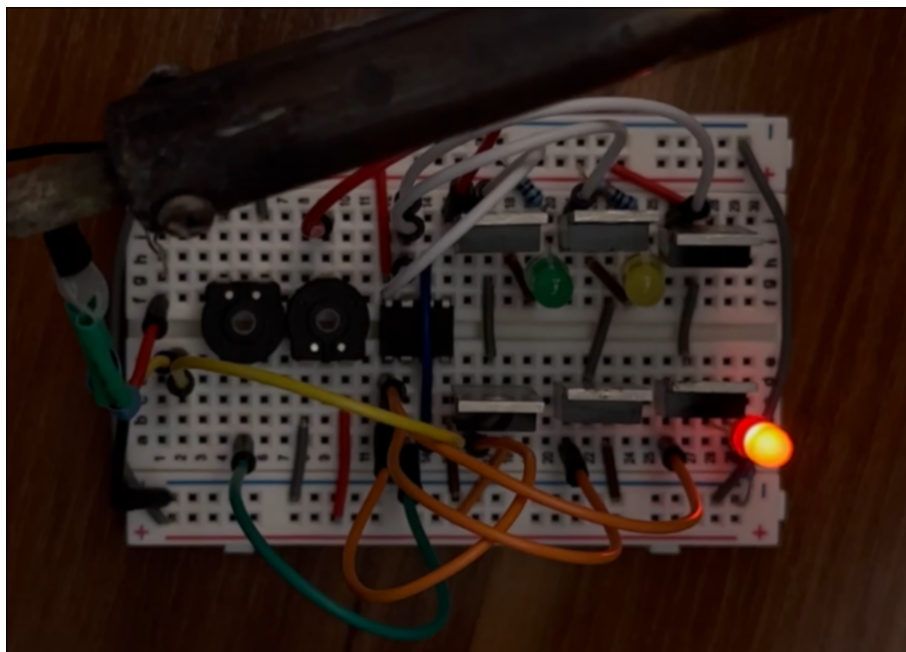


Figure 5: Hot state