

Temperature Gauge

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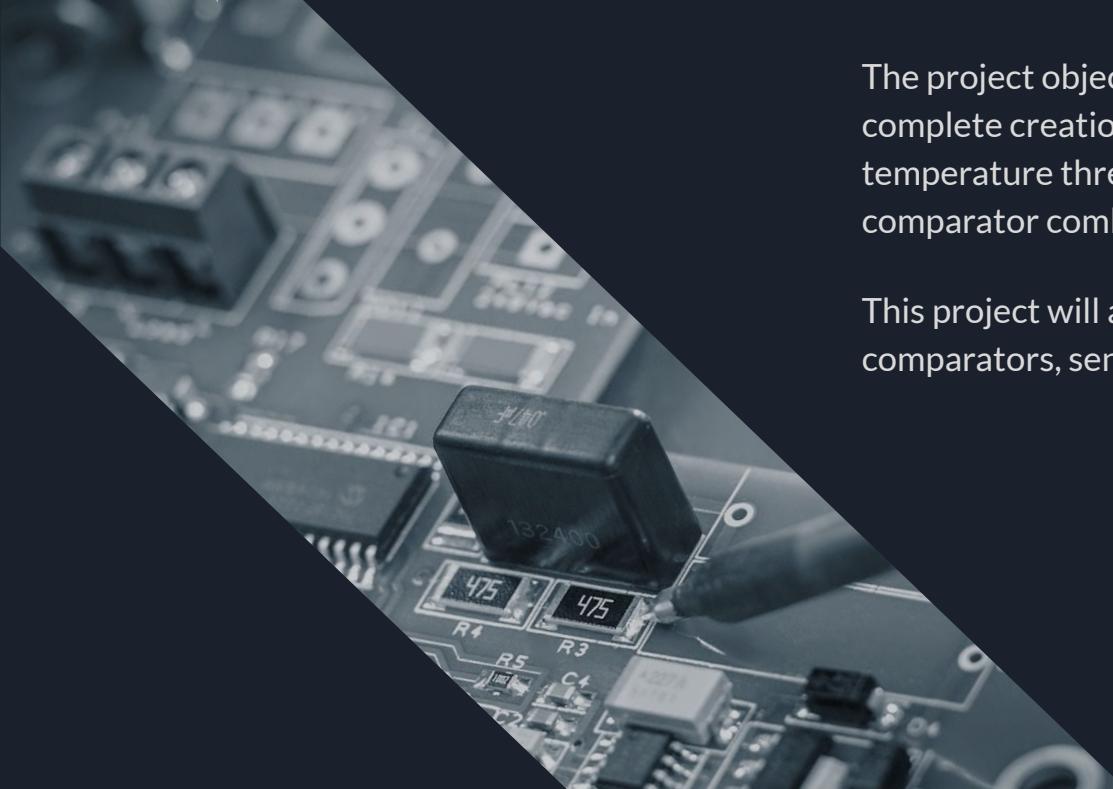


Overview

The Temperature Gauge is an analog circuit that will distinguish when the temperature has reached a certain threshold and it will be illustrated using the LED Colors. This Temperature Gauge will be able to distinguish 5 distinct temperature thresholds, using 5 distinct comparators.



Project objective / Goals



The project objective for this circuit board would be the complete creation of a temperature gauge for 5 distinct temperature thresholds using a voltage divider comparator combination.

This project will allow us to gain a better understanding of comparators, sensors, and analog devices.



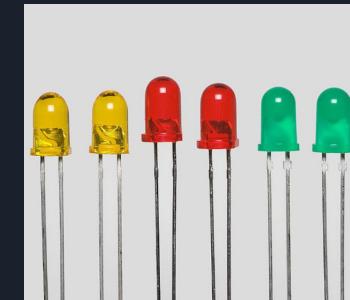
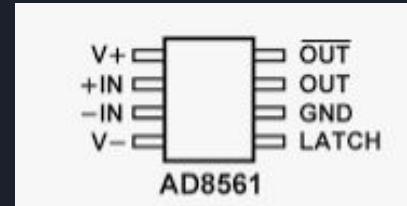
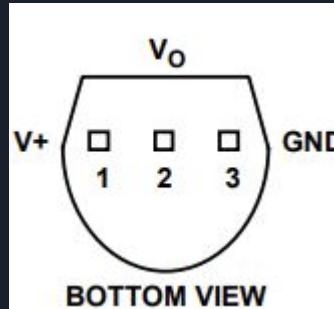
Implementation

The temperature sensor gauge can be used in a variety of applications, for example, this gauge can be used to quickly identify whether any machine is not up to temperature, in operating temperature, or starting to overheat. This gauge can be placed in engine bays, generator housings, electric motors, small motors, or any component that you would like to have a quick temperature reference.

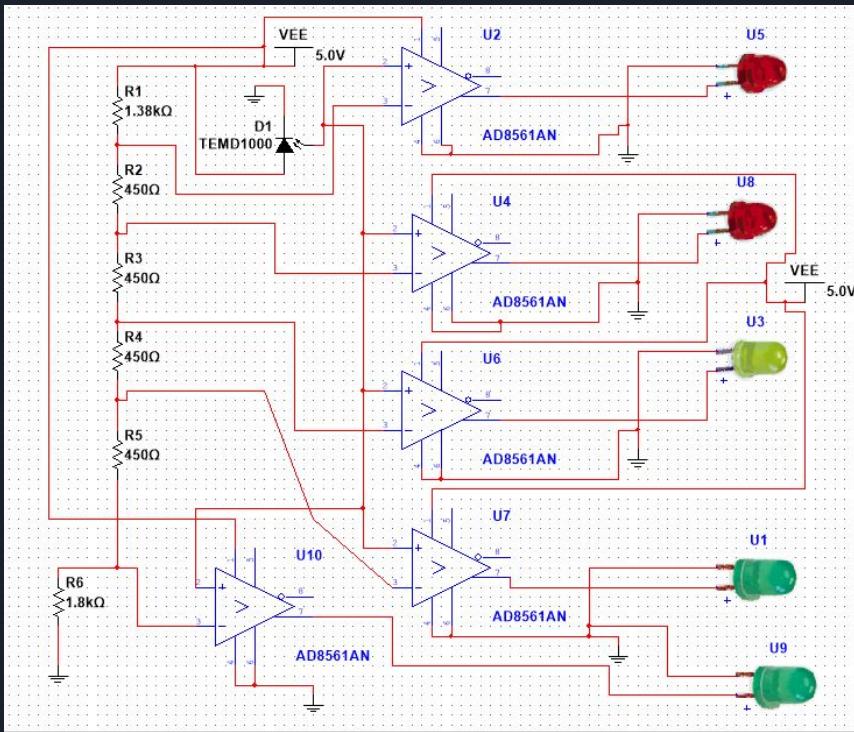


Operations / Components of Temperature Gauge

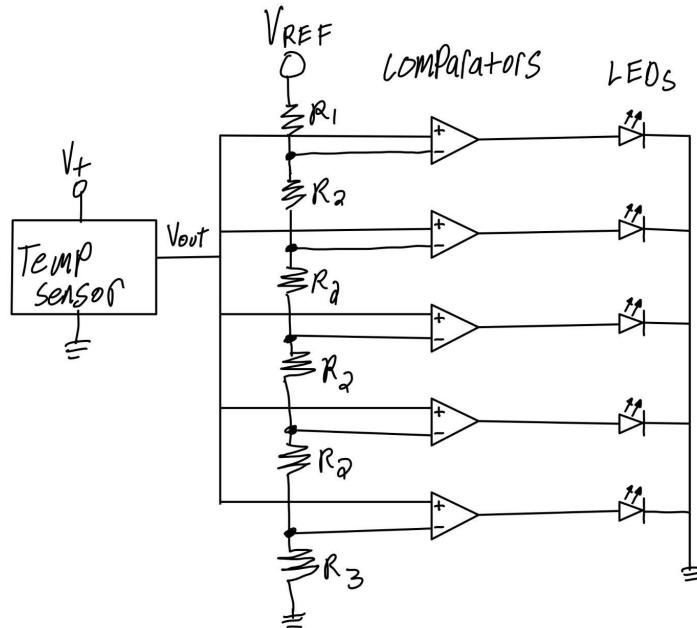
- AD22100 Temperature Sensor
- AD8561 Comparator
- Voltage Divider
- Assortment of Multi-Colored LEDs

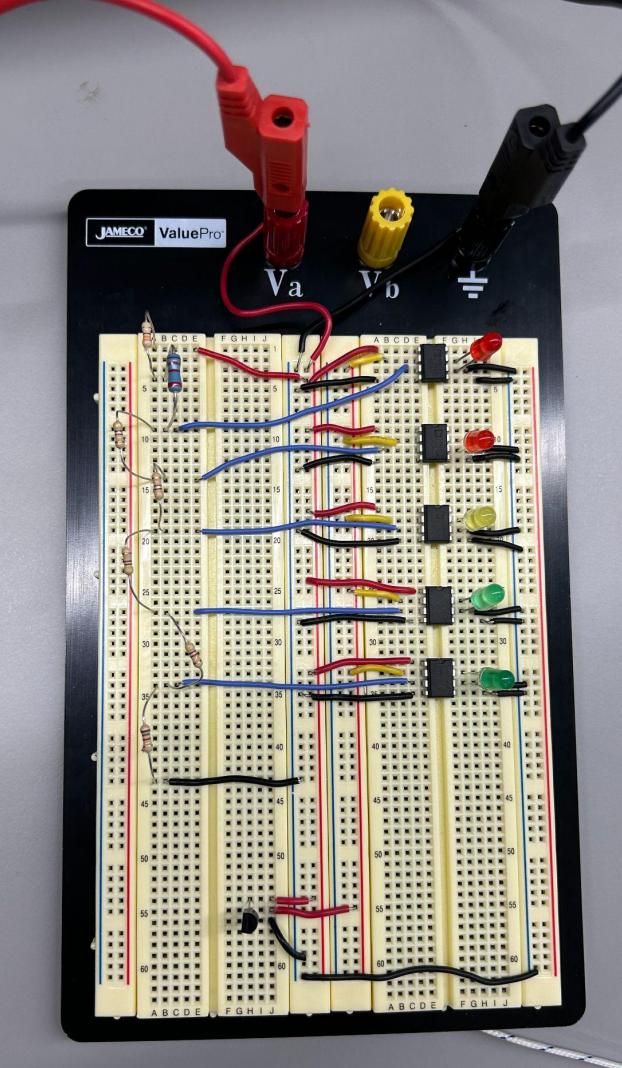


Schematics Done...



Block Diagram







Temperature Calculations - AD22100 Sensor

- $V_{OUT} = (V+/5\text{ V}) \times [1.375\text{ V} + (22.5\text{ mV}/^\circ\text{C}) \times TA]$
- $V+$ is our power supply
- TA is our target temperature

<u>Temperature:</u>	<u>Voltage:</u>
100 °C	3.625V
80 °C	3.175V
60 °C	2.725V
40 °C	2.275V
20 °C	1.825V

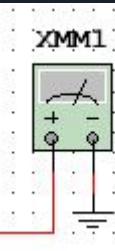
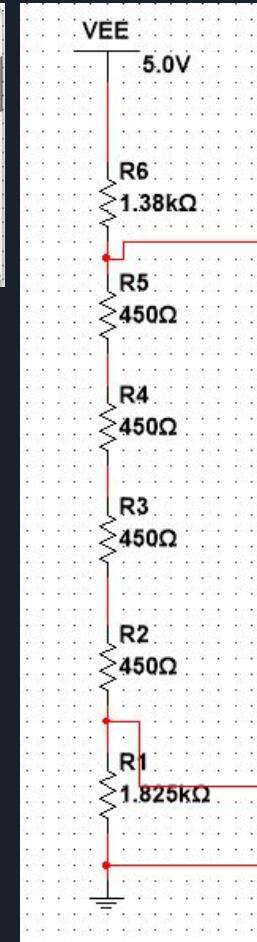
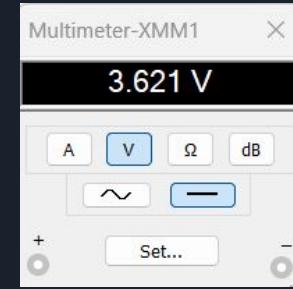
Voltage Divider

We will set a constant current of 1 mA.

We were able to get the resistance at each point by using the required voltage at each point:

$$R = \frac{V_A - V_{Desired}}{1mA}$$

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100 °C	3.625V
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60 °C	2.725V
40 °C	2.275V
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Temperature Gauge Circuit Demonstration





Problems We Encountered.

- Issues with the comparator switching
 - Leaving the Latch and float ungrounded causing our LED to have a voltage when it was not supposed to.

Thank you!

Any Questions?

