Developer Guide

1. System overview

The project will be to design, build, test an temperature monitoring system, a system that records the temperature from at least two positions and tracks/stores/and displays the temperature information. There are three parts to my project. First, making the temperature sensor to test the temperature. Second, programming the code makes the temperature data out in Arduino. Third, transfer the data from Aruino to Matlab and display the data in Figures on PC.

2. Electrical specifications

The Max and min supply voltage of this system is 0 to 5v. The Max and nominal supply current is 5v.

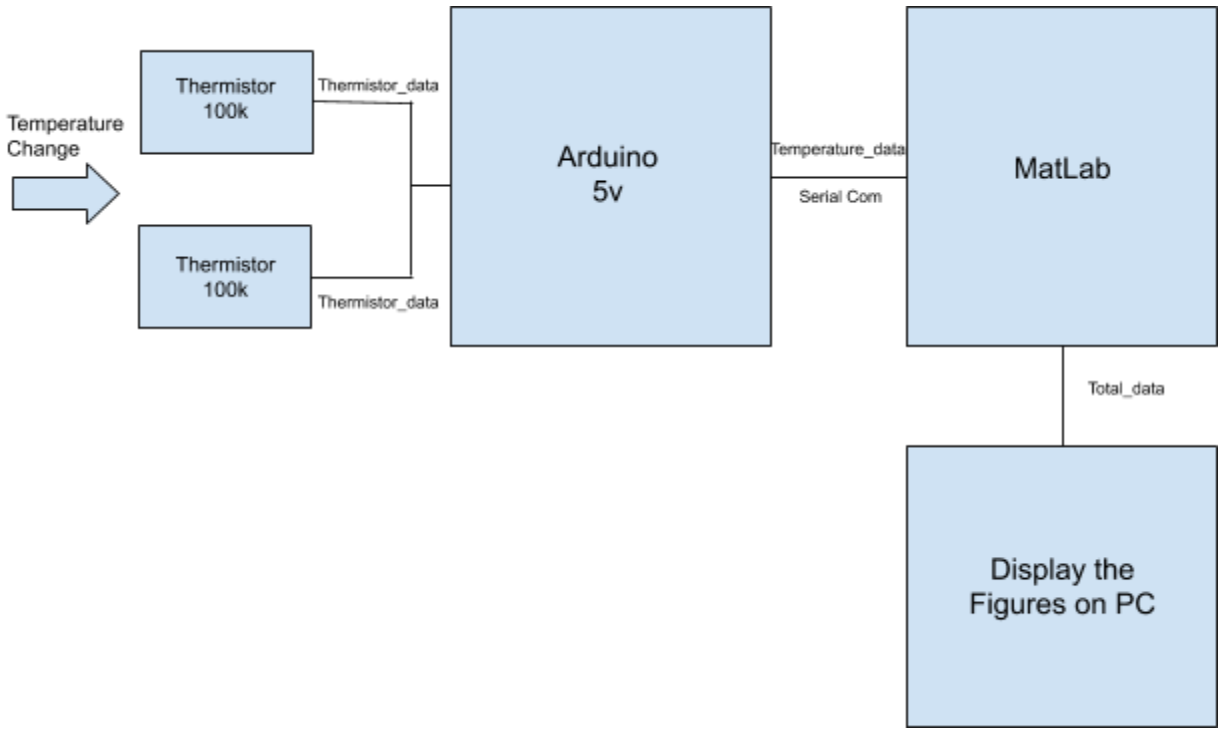
Thermistor	The tolerance of thermistor_data will be accurate to 2%. The Thermistor typically available from -60° to 150°C, with best accuracy between 0° to 300°C. The resistance will be accurate to 9.8k ohms to 100k ohms.
Resistor	The tolerance will be accurate to 0.05%. The Resistor available from -55°C to 150 °C. The resistance is 100k ohms.
Arduino board	The voltage will be accurate to 0 to 5v.

3. User guide

Using this project, the user just needs to connect the Arduino board with their computer. Then, users can put everythings that they want to test the temperature on the thermistor. Users can also put the system in different terrain to monitor the temperature for analysis of the terrain. The user will get the figures of the temperature in Celsius and Fahrenheit and the average temperature in Celsius and Fahrenheit.

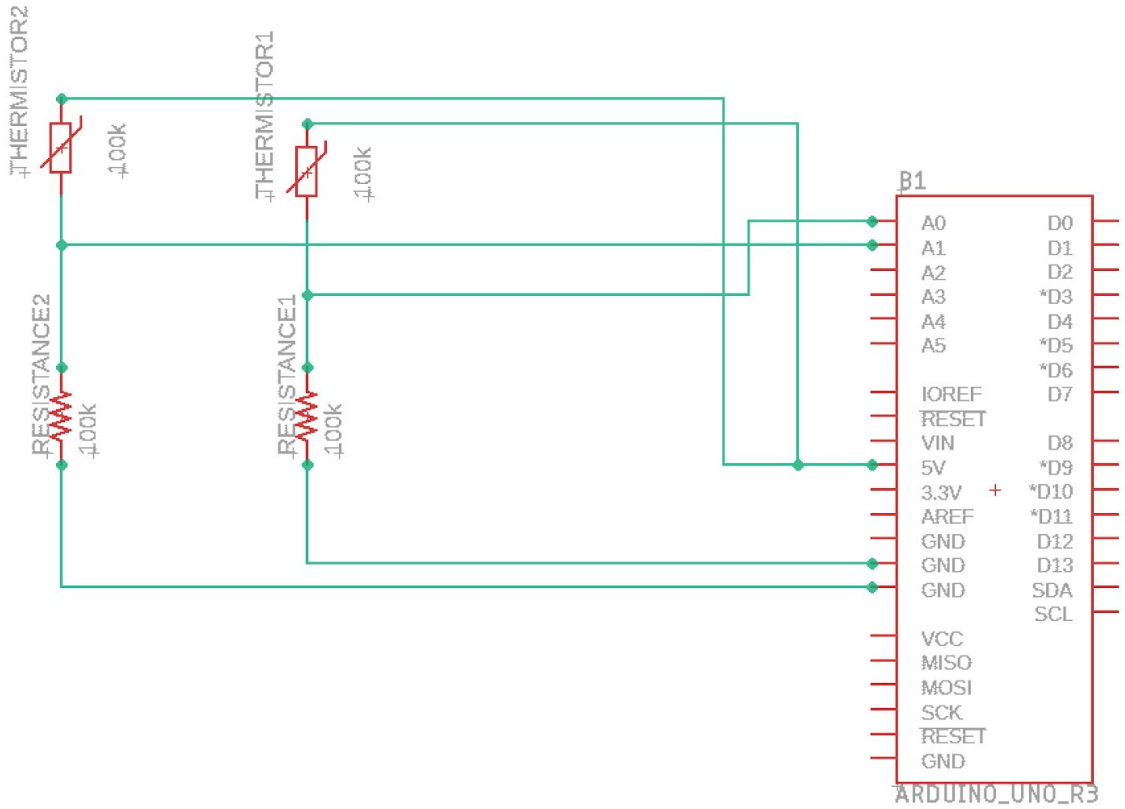
4. Design artifact figures (block diagram, schematic, 3D model)

Figure1. Block Diagram:



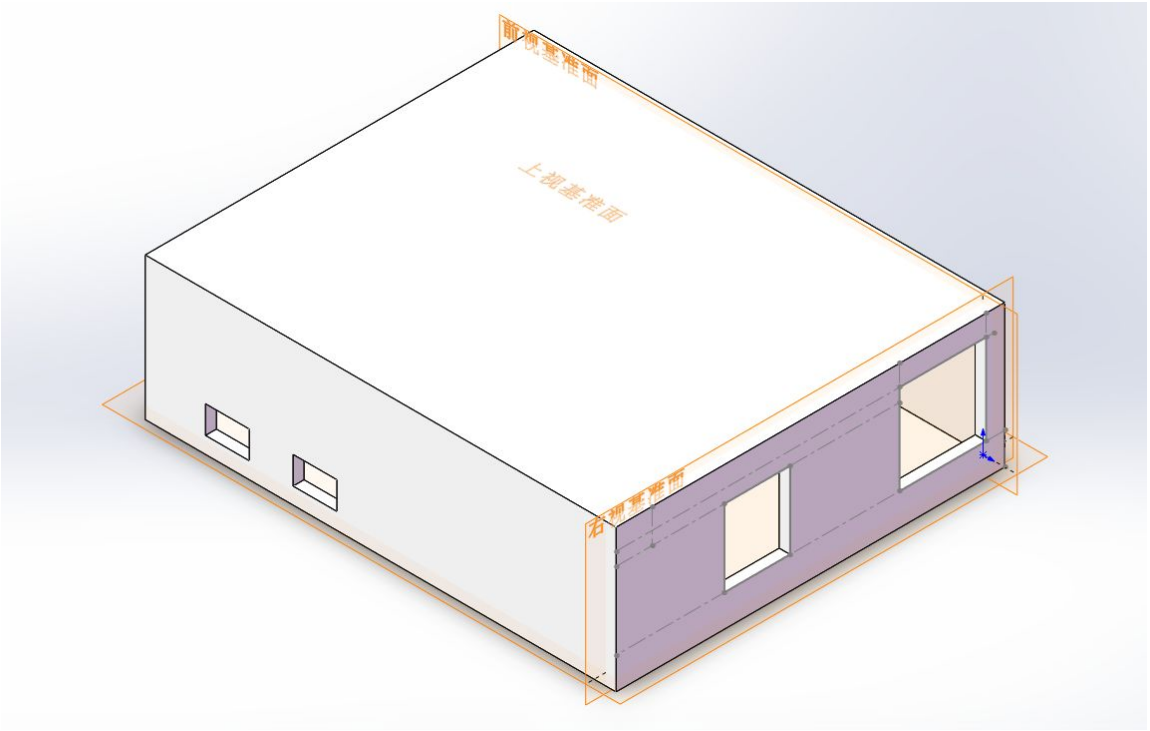
We can see that using two thermistors test the temperatures. Thermistor circuit is a voltage divider consisting of a fixed resistor and a variable resistor. The Arduino measures the voltage at a point between the two resistors, and converts it to resistance. After we get the data from Arduino, we transfer the data to Matlab. And, Matlab will get the data from Arduino and draw the figures to show the final data.

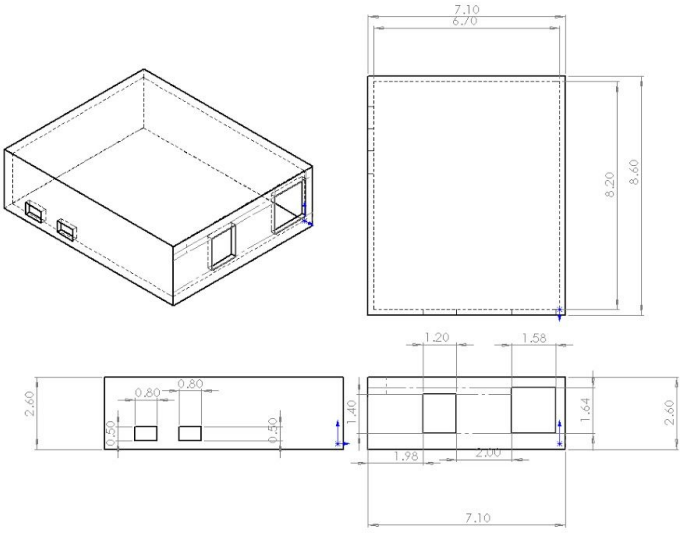
Figure2. Schematic.



For this project, we have an easy Schematic. First, We just need to connect the 100k thermistor and 100k resistors together. Then, connecting the thermistor to 5V, the resistors to ground, and the point between thermistor and resistor to A0 and A1.

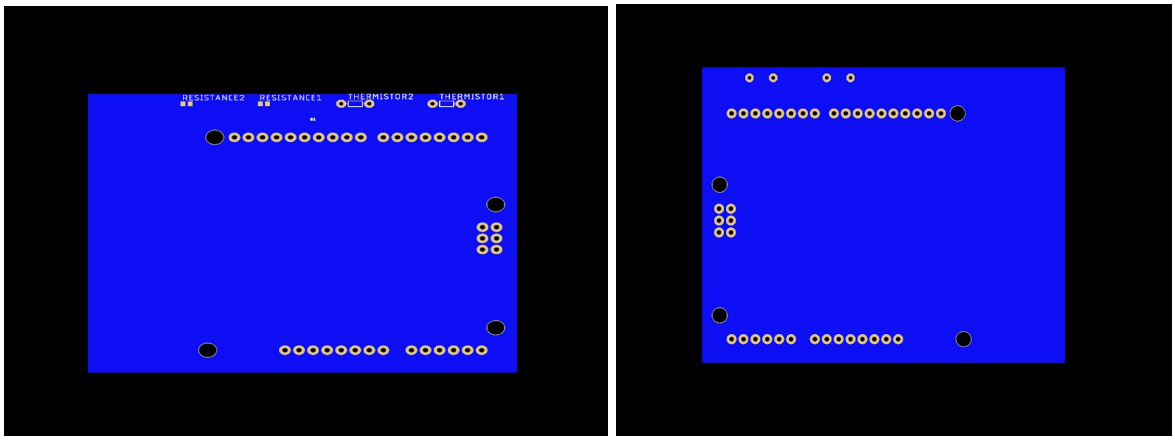
Figure3. Enclosure 3D Model.
PCB Dimension: 77mm*63mm.
The box thickness is 0.2cm, the total height is 2.2cm. The length is 8.2cm and wide is 7.1cm. The PCB will be put inside the box. The two small holes on the left are for the thermistors, and the other two big holes are for the line to connect with the computer.





5. PCB information

   layers:



Layers: 2
Dimension: 77mm*63mm
PCB Thickness: 1.6
PCB Color: Blue
Surface Finish: HASL(with lead)
Copper Weight: 1
Flying Probe Test:Fully Test
Material Type: FR4-Standard Tg 130-140C

6. Part information

Bill of Materials:

Material	quantity	unit price	total cost	Manufacturer	Manufacture Number	Description
Arduino board	1	$8	$8	TekBots	3817533	Arduino compatible clone board
Thermistor	2	$3.99	$7.98	Honeywell	135-104QAD-J01	NTC Thermistors 100KOHM 2% Axial Thermistor NTC GLASS
Resistor	2	$3.04	$6.08	Vishay	PTF56100K00AZEK	Metal Film Resistors - Through Hole 1/8watt 100Kohms .05% 5ppm
Jumpers	40	$0.13	$5.00	TekBots	4356315	An easy way to connect between .1" male header. Wires are able to be torn apart for specific project needs
PCB	1	$4.00	$4.00	JLCPCB	Y1-3058602A	make the Arduino connect with the resistor and thermistor without using the jumpers.