System Overview

This system reads in body temperature and displays this temperature on an OLED Screen, there will be a visual and audio indication if this person has a fever or the temperature is above 100.4 F or 38 C. This device operates only if the Obstacle sensor reads an object making it operate without any physical contact.All temperatures are save to a user corresponding file, and once there is no detection from the sensor range, the user file will be closed and incremented assuming the next reading will be to a new user. There is also another obstacle sensor that acts as a data type switch that switches between F and C by waving a hand over the sensor. This allows you to choose between displaying the Temperature between C or F based on the desired type.

Electrical Specification

Interfaces:

Interface Name	Interface Type	Specifics
usb_dcpwr	DC Power	V_{max}: 5.25V V_{min}: 4.4V I_{peak}: 500mA $I_{nominal}$: 100mA
envin_obstacle	Environment Input	Distance: 2 – 30 CM Detection Angle: 35° Comparator chip: LM393
envin_temp	Environment Input	Distance: 2-5cm Temperature range: -20-120 °C
envin_switch	Environment Input	Distance: 2 – 30 CM Detection Angle: 35° Comparator chip: LM393
motion_data	Digital Signal	Active low : 1/On Active high : 0/OFF Vcc: 5V or 3.3V GND ground connection Out: High Signal - OFF Low Signal - ON
temp_read	Wired Communication	

	SDA 10-bit	Output: 10-bit PWM temperature reading Range: -20-120 ˚C accuracy of 0.5°C
Temp_data (to SDcard module)	Standard SPI interface	VCC: 4.5 - 5V Interface Potential: 3.3V Current : typically 80 mA Card type: up to 32GB Size 42x24x12 mm Weight : 5g
SCL	I2C Bus	Clock Speed: 16 MHz Current per Pin: 40 mA Operating Voltage: 5V PWM out : 6 SRAM : 2KB
light_envout	Environment Output	128 x 64 Dot Matrix LED Display VDD: -0.3 to +4 V VCC: 0 to 16 V Input voltage: VSS-0.3 to VDD+0.3 V Operating Temperature: -40 to +85 ºC Temperature Range: -65 to +150 ºC
Switch_Read	Digital Signal (0 or 1)	Active low : 1/On Active high : 0/OFF Vcc: 5V or 3.3V GND ground connection Out: High Signal - OFF Low Signal - ON Distance: 2 - 30CM Detection angle: 35° Comparator chip: LM393
Freq_out	Digital signal	Frequency sent to speaker Frequency : 4000 Hz Size: 3” Diameter Operating : 1W or less

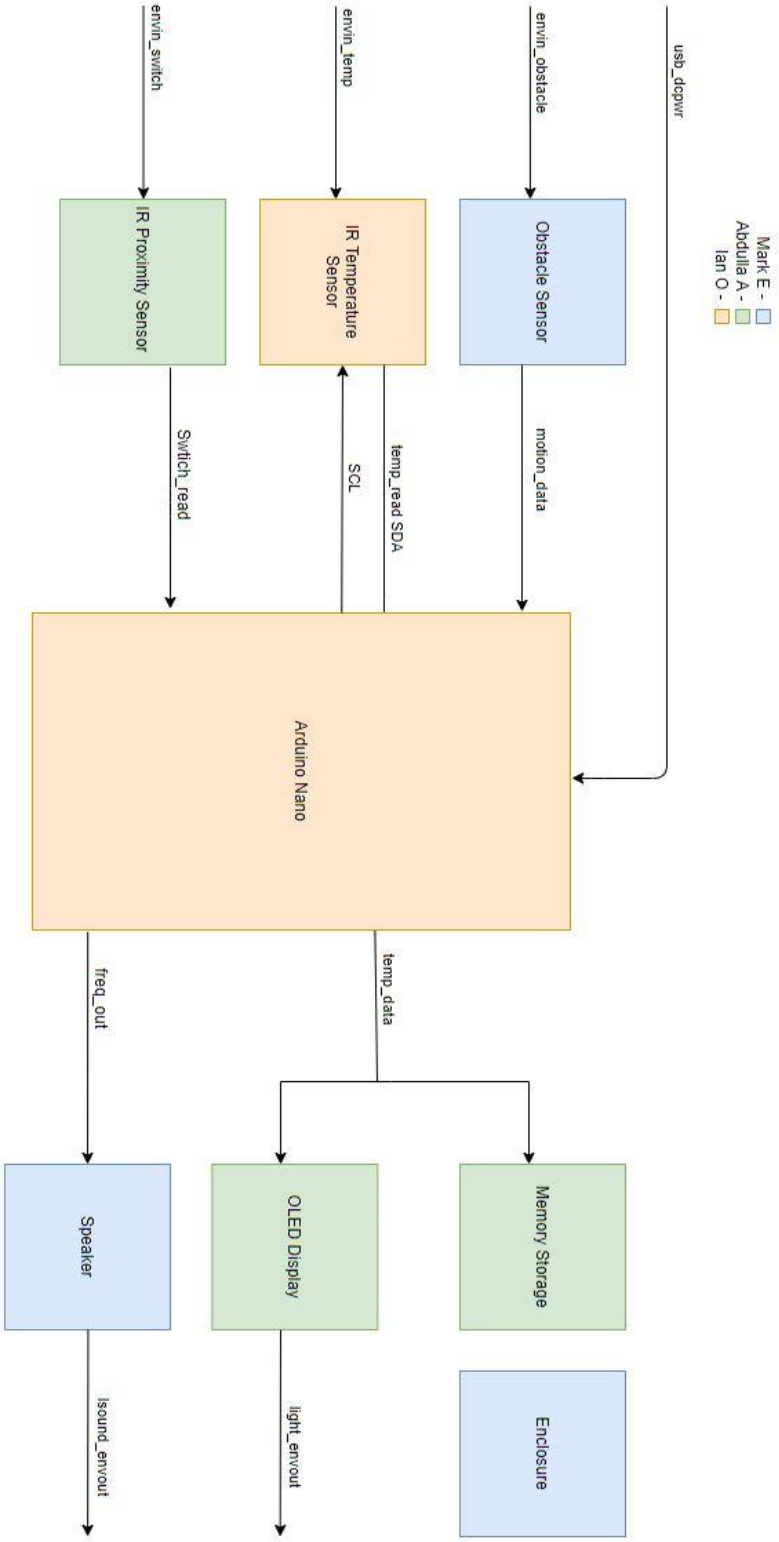
		Impedance : 8 ohm
sound_envout	Environment Output	Sound pressure level: 86 dB/w ± 3 dB Temperature test: 60, +-2 C Operating : 1W or less Impedance : 8 ohm Resonant frequency: 750 Hz± 150 Hz

User Guide

Once all the parts are acquired, connection should be made as referenced in the wiring diagram presented below. Next step is to connect the Arduino to download the code for the system by compiling and uploading the code to the Arduino connected. Once the code is uploaded successfully, the Device should be ready to use. Start by pointing the device to a person's forehead or wrist, once the device is close enough, the temperature should be displayed on the screen. To switch between the temperature type displayed, wave your hand close enough to the second sensor located behind the OLED screen slowly and the display type should change from F to C. Once you move the device far enough, the display screen should be cleared and all the detected temperatures should be logged to an SD card, then the device will assume that a new user will be taking his/her temperature next therefore moving on to a new user file for the new readings .

Design Artifact Figures:

1. Block Diagram:



All Blocks are connected to the Brain of the Device that is the Arduino nano, that is because all parts communicate with the arduino to execute certain commands for the operation of the device such as taking in data from input blocks to the left of the Arduino in reference to figure 1 to send outputs to the blocks to the right of the Arduino .

2. Wiring Diagram:

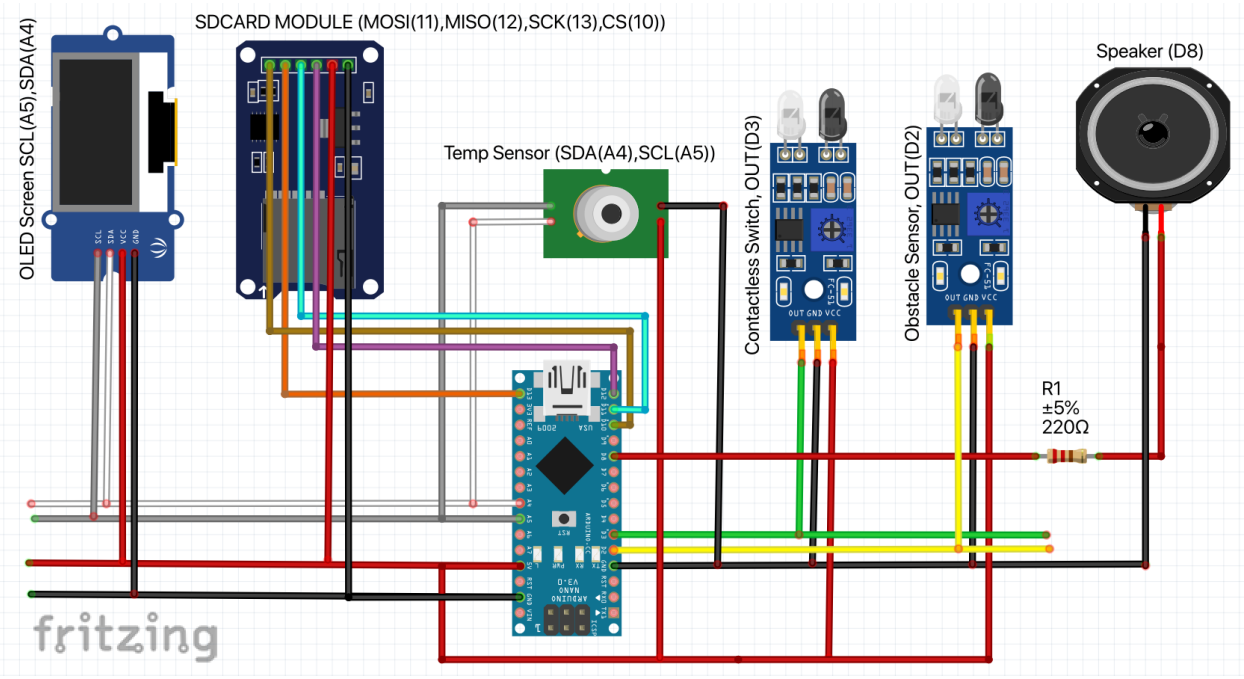


Figure 1: Full wiring diagram for the complete device

The Diagram above shows the connection for each parts used in this system to the Arduino because all parts are powered by and operate based on the commands of the Arduino, these connections should be made exactly as shown for the system to work since the code operates based on certain pins and connections that are set for the parts and each part has a specific input connection and output connection.

3. 3D model

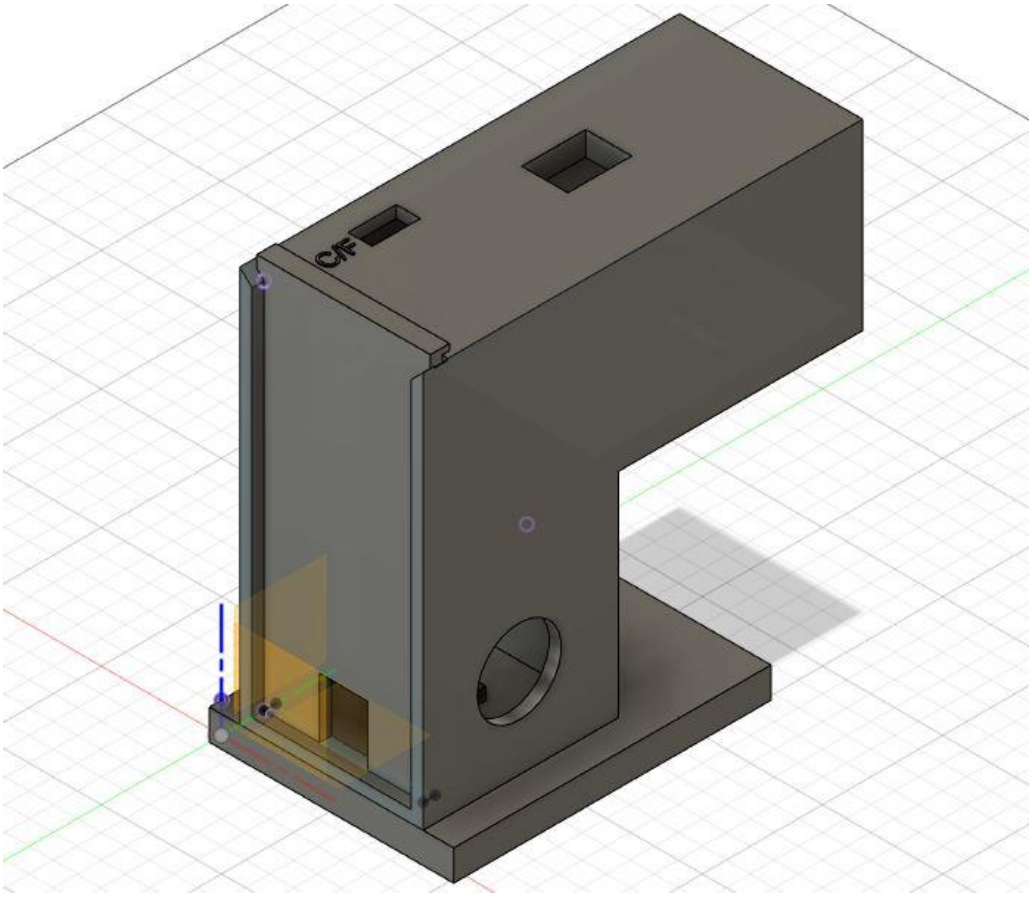


Figure 2: 3D model of the enclosure for the device

Figure 2 shows the 3D model used to create our enclosure. The design would allow all sensors to be unobstructed while also being mounted onto the enclosure. To ensure easy access to the microSD card on our device, the backplate is easily removable by simply sliding in and out of place.

PCB information:

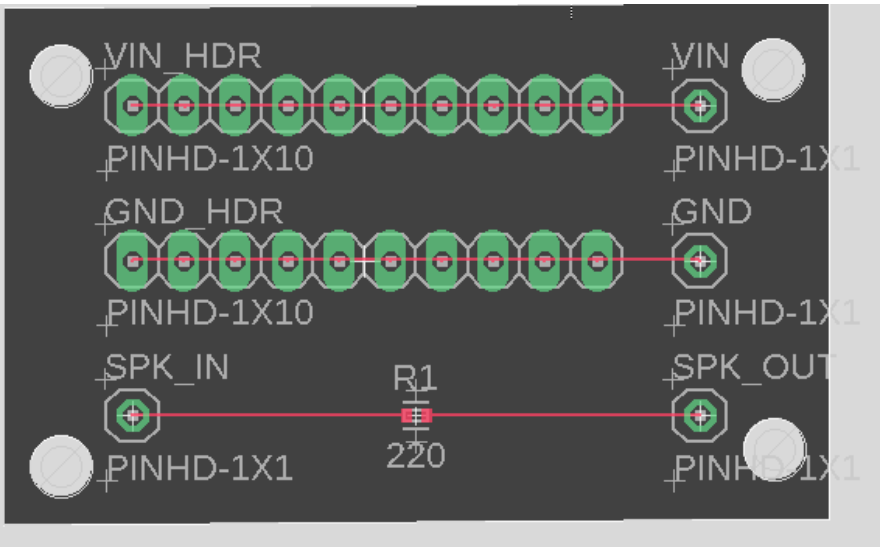


Figure 3.1: Schematic diagram of the PCB layout for device connection

The PCB is 40.9 x 26.0 mm. It has three lines, both the ground and voltage source from the Arduino are given their own headers for the additional devices to jump to. Then the bottom line, with the 220 resistor, is for the speaker connection.

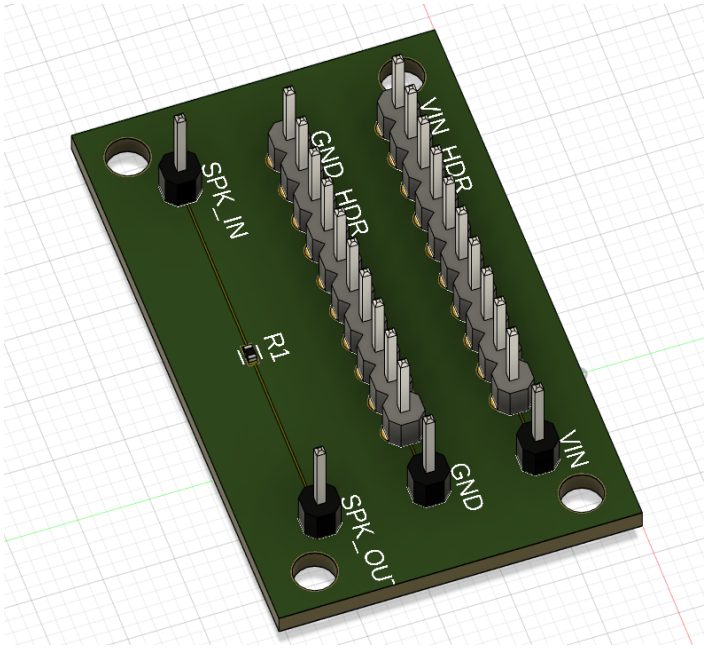


Figure 3.2: 3D design of the PCB

Part information:

Bill Of Materials				
Part Number	Part Name	Quantity	Price	Description
MLX90614	Infra-Red Temperature Sensor	1	$14.99	IR Sensor for Temperature detection
100448	Micro SD card Module	1	$10.77	SD card module for saving and reading data
SSD1306	128x64 OLED Screen Display	1	$6.99	OLED Screen to display temperature
B07W97H2WS	Obstacle Avoidance Sensor	2	$7.99 For 10 Pack	Obstacle Sensor for enabling and disabling, and switching between F to C
7630049200173	Arduino Nano	1	$14.99 For 3 Pack	Microcontroller to receive data and send data and perform functions on components attached
Adafruit 1313	8 ohm Speaker	1	$8.21	Speaker for indication of Fever