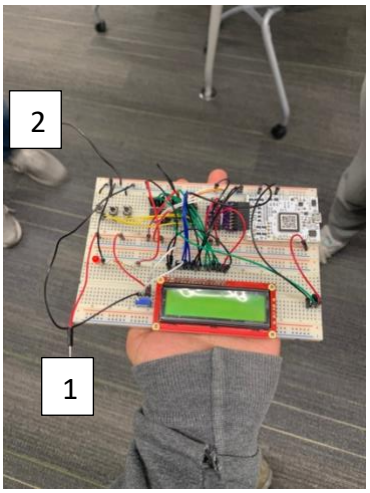
Specification sheet:

Digital Thermometer/ Temperature Controller:

This is a simple temperature controller which takes in the surrounding temperature using the two sensors (internal and external). From there it compares the surrounding temperature to the temperature that the user has set, and if the room needs to be heated then the furnace will turn on (LED is on means the furnace is on).



To operate the device:
You need to power it up with a power supply, set to 5 volts and 0.1 Amps to the red and black jumper labelled 1 and 2 in figure 1. Run the code on MPLABx and the temperature sensor will start working. From there on the user can switch between modes and set their desired temperature with the 3 buttons available.

Troubleshooting:
If the LCD does not display anything then try and increase or decrease the resistance on the potentiometer.

Testing:
To test the device, and all its functionality, I put my 2 fingers to pinch the LM-35 sensor and put a finger on the internal sensor, which resulted in an increase in temperature, which shows that the device is taking in values from its surrounding. The room temperature sensor also read a value that is within 0.5 degrees of room temperature. The buttons were all pressed and held to see if there was any continuous input and to ensure that the user can set the temperature (10-35) degrees and switch between internal and external modes. The dead band was tested by setting the user temperature to 23 and the monitoring the externa temperature fluctuate up and down 23.4 – 22.9, which would leave the furnace on the same state as it entered the dead band of 1. It only turned on or off if the external temperature went above or below 0.5 degrees of the user set temperature.

Temperature range	-40°C to +85°C
Voltage rating	1.8 – 5.5 (volts)
Programmable pins (I/O)	23
Nominal weight	200 grams
Power Consumption	Active Mode: 0.2mA Power-down Mode: 0.1μA

	Power-save Mode: 0.75μA (including 32 kH RTC)
Speed Grades	0-4 MHz @ 1.8 to 5.5V 0-10 MHz @ 2.7 to 5.5V 0-20 MHz @ 4.5 to 5.5V
Memory Capacity	32KB Flash Memory

Warning: To avoid damage to the unit keep these points in mind

1. Do not use this unit in the environment of rain
2. Do not leave unit near high temperatures
3. Do hold the unit from the loops of the jumper cables

System requirements:

- MPLAB x software installed – Support for the following OS: Windows 7, Mac OS X 10,11 or higher, Windows 10, Linux 18.04 or higher
- USB 2.0/ USB3.0 for connection to the device
- Power supply/ Analogue discovery, supplying power at 5 volts and 0.1A
- Intel core i5, 10GB hard disk space and 4GB ram