

Requirements and Verification

Finite State Machine

Requirements	Verification
1. Follows the flow chart and properly maps all 8 states. 2. Has the availability of a manual reset.	1. State transitions can be tested individually by varying input battery voltage with power supply, decreasing temperature with ice cube, and breathing on sensor to increase humidity. By printing out current state bits and B,C,H, and T as specified in design document, we can ensure the FSM never breaks. a. We have tested this previously and the results are found in datatest8.txt and datatest9.txt. 2. Reset switch is located below battery terminals on PCB. Press it while the sd card is configured to record current state. After doing so, check data.txt file to see a jump to xyz = 000 and then xyz = 001 state that doesn't follow our FSM logic. This is because this reset clears our D flip-flops.

Relay Outputs

Requirements	Verification
1. Microcontroller maintains previous status of the heater and dehumidifier in all other states with bits Q_0 Q_1 at xx.	1. External LED circuits in substitute of the heater and dehumidifier devices will display when each device is powered. Observe that they stay on after an obvious state transition that would turn one on. It can be confirmed by printing the current state to the SD card and the output bits. a. Put the inside sensor in ice, triggering the heater to turn on and observe that the relay stays on for more than an instantaneous moment. b. Breathe on the interior sensor to initiate the dehumidifier and observe that it stays powered for several cycles until humidity has dispersed.

Microsd Card Module

Requirements	Verification
1. Inside and outside temperature data are stored on the microsd card at a regular interval and precise to the tenths place.	1. Collect data for sufficient time to capture ~five lines of data. Insert microsd card into computer (via adapter) and open the created "DATA.TXT" file. Ensure that data is present, makes sense for the sensor conditions, and has precision.

Sensor Inputs and Logic

Requirements	Verification
1. Voltage sensor accurately measures battery voltage to within 0.1 V. 2. Thermometers accurately measure ambient temperature to within one degree Fahrenheit at a rate no slower than once every two seconds. 3. Hygrometers accurately measure relative humidity to within 5%. 4. Code for data processing correctly produces desired digital outputs B, C, H, and T.	1. Use a known power supply to supply 12 V and 5 V. Ensure that the voltage sensor reads 5+- 0.1 V and 12+-0.1 V. 2. Set data sampling rate to two seconds, and use hand to increase temperature and ice cube to decrease temperature and view the "data.txt" file afterward to make sure readings corroborate the test. Using the ice cube for a minute should lower the sensor temperature to 55 F +- 1 degree. 3. Set data sampling rate to two seconds and breathe on the sensor (creating moisture). Check the data.txt file for a rapid increase in humidity to 100% +- 5% and a gradual decrease afterward. 4. Print B,C,H,T bits to microsd card data.txt file and verify that the sensor data which is also printed reinforces these logic bits.