Custom Humidity Chamber

A custom humidity chamber for storing popcorn at a consistent temperature

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BOM and Overview

For this project I am in the works of designing a humidity chamber for controlling the temperature of popcorn. My goals for this is for it to be under 50 dollars and to not look like a piece of crap.

Parts

- Sterilite 20 quart airtight container (could be any container)
- W3005 Digital Display Microcomputer Humidity Controller 12V (x2) (13.68)
- Portable Mini Humidifier (3.71)
- Small Thermoelectric cooler kit (5.89)
- Thermoelectric Cooler 12706 (3.35)
- Power Supply 12V 5A (7.90)
- DC-DC Buck Converter Single Square USB (3.60)
- DC-DC Buck Converter 12V-24V to 5V 3A (4.62)

This makes the total cost 42.75$ (excluding the container and other mounting hardware such as 3d prints). I will work on finding cheaper alternatives but as for the time being these are the cheapest parts. I hope to order these parts on 03/08/26.

How to make (DRAFT)

Overview

Building this (In theory) shouldn't be very difficult but I expect there to be some issues that arise. And I already have some in mind.

1. Dehumidifier

I cannot say I'm fully confident in this design but It should work in theory. You are going to want to put the Small Thermoelectric cooler kit together but instead of putting the SR-01 Thermoelectric cooler you will want to put the TEC-12706 into the fixture. Now keep in mind that the cold side should be on the flat side. And the warm side should be outside with the air going into it, an ASCII diagram below should clear any confusions

```
    (air intake)
        ↓
    [   FAN   ]  → pushes air INTO the heatsink
    [ HOT HEATSINK ]
    ------------------- wall -------------------
    [   COLD PLATE   ]
```

I also may have to get a DC-DC Buck converter for the fan in this kit because the Humidity controller proviedes 12V while the fan can only use 5, The Buck converter should only be about 4 dollars though.

2. Humidifier

Now I am not fully sure how all this will work as I don't have it yet but I'll try to explain what I think I need to do. So In order to power this I will NEED the DC-DC Buck converter to change the controllers 12V to 5V (and it also makes it USB as an added bonus). The plan as for the water supply I hope I can just use a Gatorade bottle (or anything for that matter) and just have it shoved in there with it mounted (I have not decided how yet) to the container.

3. Wiring

I (once again) can not be fully confident if I will be explaining this correctly because I do not have my hands on everything yet. But I can make a good assumption. First take the first power supply and strip the wires to give the power and the ground wires. Now going to want to hook the power supply up to the first humidity controller. This humidity controller will provide power for the dehumidifier. So from there plug the thermoelectric cooler (TEC1-12706) into the controller. Now you will need