Microwave Project Status

Project Start Date: 3.25.2021
Team Members: Conrad Wu

Overview:

I'll be disassembling a broken microwave to see what kinds of parts I can get from it. I want to focus on the high voltage transformer, but I do have some projects in mind with the fan and other motors like making a fume hood.

Project Resources & Links:

- TKOR - Lethal Electric Arcs
- ElectroBOOM - Making a Jacob's Ladder
- TKOR - Scavenging Microwave Ovens
- Jacobs Ladder with a Neon Sign Transformer

Next Steps:

This is a list of the next steps for this project. Next time you work on it, these are the steps you are going to work on. Each time you work on this project, you might add or re-order these tasks.

- Ripping off covers of the microwave and expose components
- Take out all of the auxiliary components, anything not high voltage
    - Includes fans, lightbulbs, thermistors, temperature sensors, etc.
- Take out high voltage components
    - Carefully discharge the capacitor, etc.
- Figure out what I can do with the stuff I get
    - Could do a lot of stuff with the microwave transformer like jacob's ladders, tesla coils
    - Might be able to make a powerful ignitor with capacitor
    - Not sure what I can do with the microwave generator
    - Could make a fume extractor with the fan, or a wind tunnel
- Project has kinda shifted to getting a jacob's ladder to work, now using parts not related to the microwave
    - Neon Sign Transformer
    - CRT Flyback Transformer

5.11.2021 - "Safety is the First Priority" is a Mantra Used by the Weak

What Was The Plan:

Swap out with a 10KV Neon Sign Transformer which should supply more current and voltage

What I Learned:

- Safety suuuuuuuuuuuuucks
- GFCI will detect weird changes in current and shut off the component

What Worked - What Steps Did I/We Solve:

- Hooked up the transformer and it did arc, but it stopped working after the first couple of times

Challenges, Questions, or Roadblocks:

- Probably won't be able to bypass the GFCI, however there might be

Details & Descriptions:

The gap was about 1 inch away, but we used a nail on the end of a stick to start the arc. Unfortunately, there wasn't enough current to let that happen. I did notice it arced a little bit when close enough while I was testing voltage with the multimeter at around 1 or 2 centimeters.

5.11.2021 - I Have Myself Been Blasted In These Hopes, Yet Another May Succeed

What Was The Plan:

Finish building the Jacob's Ladder and try it out

What I Learned:

- MOT doesn't supply enough current to jump the gap between the leads

What Worked - What Steps Did I/We Solve:

- Got everything soldered including connections to the leads and the wires taking input from the MOT

Challenges, Questions, or Roadblocks:

- Probably need a stronger transformer, so I'll experiment with a flyback transformer and a neon sign transformer
    - I have pretty high hopes with the neon sign one, I'll have to do research on how a flyback transformer works

Details & Descriptions:

The gap was about 1 inch away, but we used a nail on the end of a stick to start the arc. Unfortunately, there wasn't enough current to let that happen. I did notice it arced a little bit when close enough while I was testing voltage with the multimeter at around 1 or 2 centimeters.

5.4.2021 - Getting Closer

What Was The Plan:

Start constructing the Jacob's ladder by drilling wood, figuring out the leads, connecting stuff, etc.

What Worked - What Steps Did I Solve:

- Drilled a couple holes using the drill press for the leads and the connector
- Crimped connectors to wires and set it up to solder it next time

Details & Descriptions:

Not much really ended up happening, mostly just setting up for tomorrow so that I can finish the project then.

4.29.2021 - "Electrifying," "Shocking," "Amped Up," and Other Puns I Will Refrain From Using

What Was The Plan:

Use the microwave oven transformer to power a Jacob's ladder

What I Learned:

- The transformer increases the voltage to around 400V AC, but only across two certain leads

What Worked - What Steps Did I Solve:

- Used a digital Multimeter to figure out the voltage output of each lead of the transformer.

Challenges, Questions, or Roadblocks:

- Transformer was humming, which I think may indicate that it's faulty because the microwave broke when it made that humming noise

Details & Descriptions:

4.20.2021 - All the slightly less Fun Parts

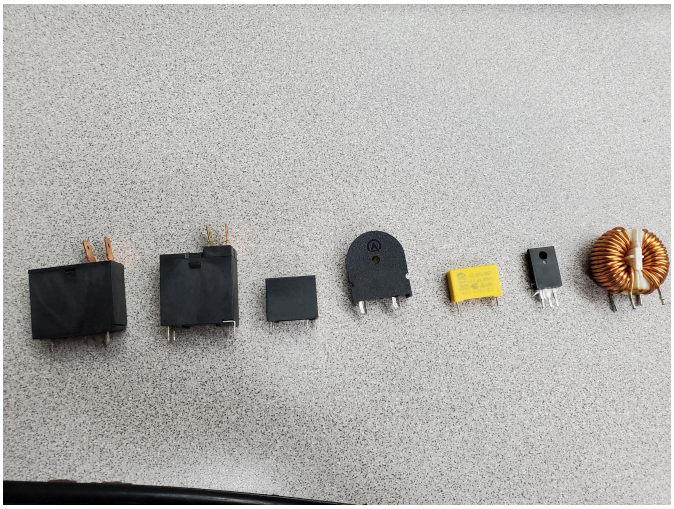
What Was The Plan:

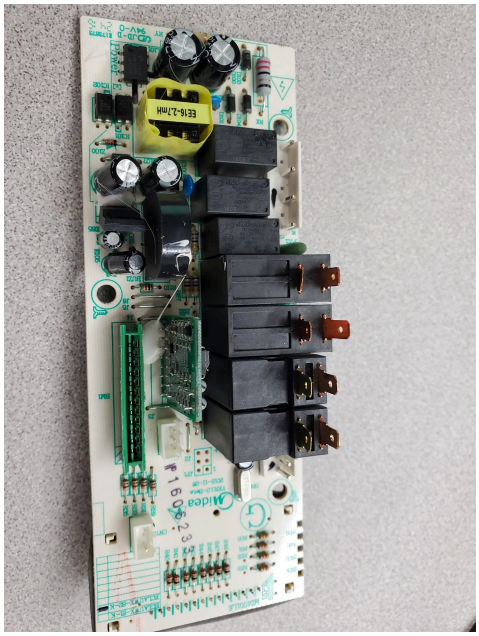
Get into the circuit board and remove components like relays

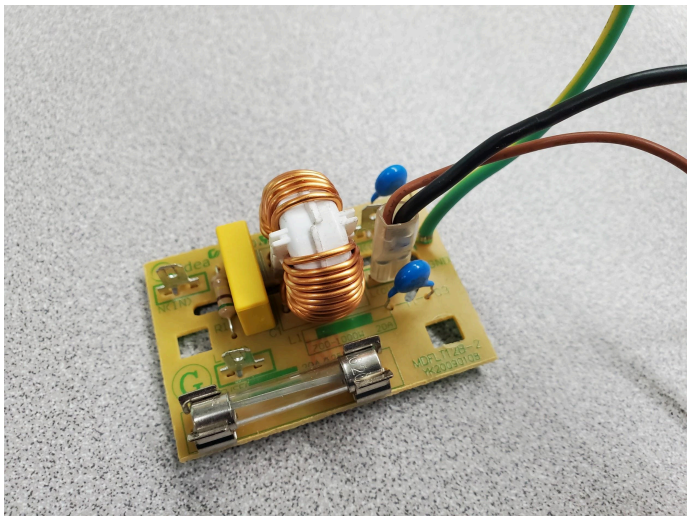
What Worked - What Steps Did I Solve:

- Desoldered some relays

Details & Descriptions:







4.15.2021 - All the Fun Parts

What Was The Plan:

Remove the high voltage components like magnetron, capacitor, and transformer

What I Learned:

Learned more about what each component did in the grand scheme of heating up food

What Worked - What Steps Did I Solve:

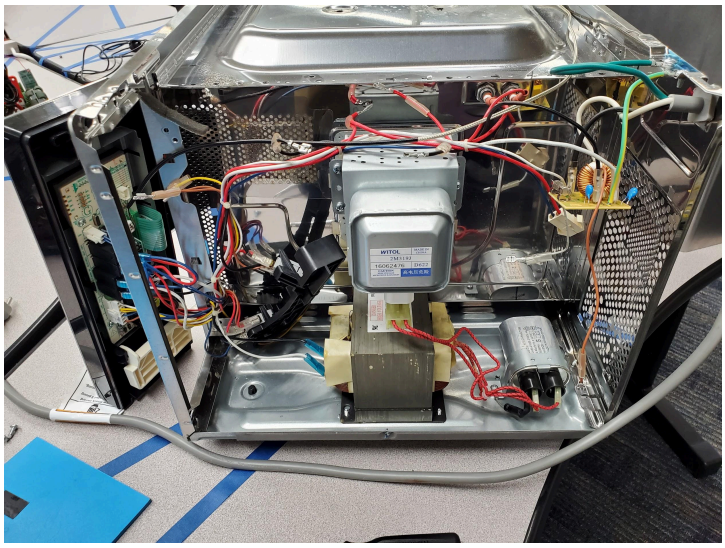
- Removed the high voltage components

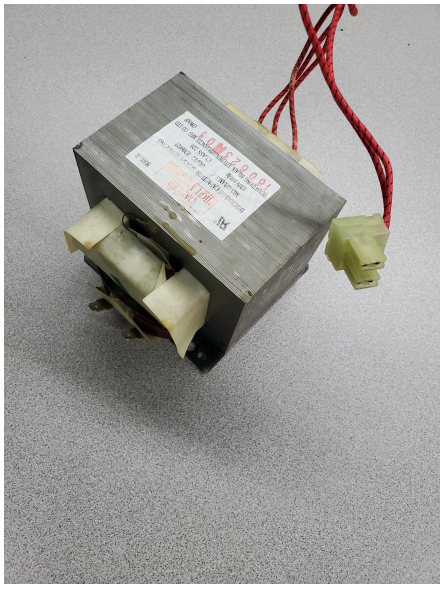
Challenges, Questions, or Roadblocks:

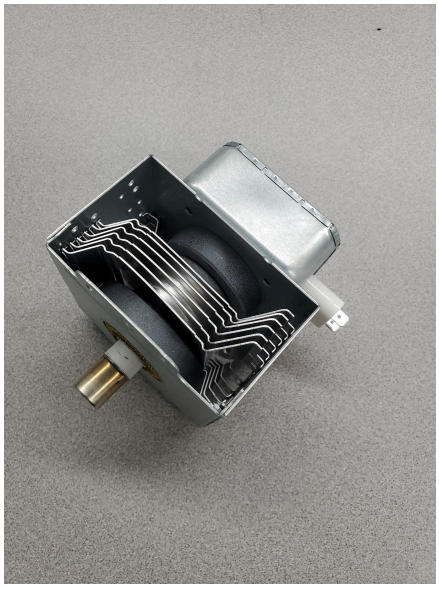
- Some connectors were hard to get to and remove, but brute force seemed to work

Details & Descriptions:

Obtained a microwave oven transformer, high voltage capacitor, and a microwave generator. Microwave oven transformers creates high voltage from 120v wall power to power the microwave generator, which cooks the food, and the high voltage capacitor helps stabilize the current.







4.1.2021 - Ripping Out of It

What Was The Plan:

Take out any less scary components I could find, basically anything excluding high voltage transformer, high voltage capacitor, and the microwave generator

What I Learned:

Learned more about what each component did in the grand scheme of heating up food

What Worked - What Steps Did I/We Solve:

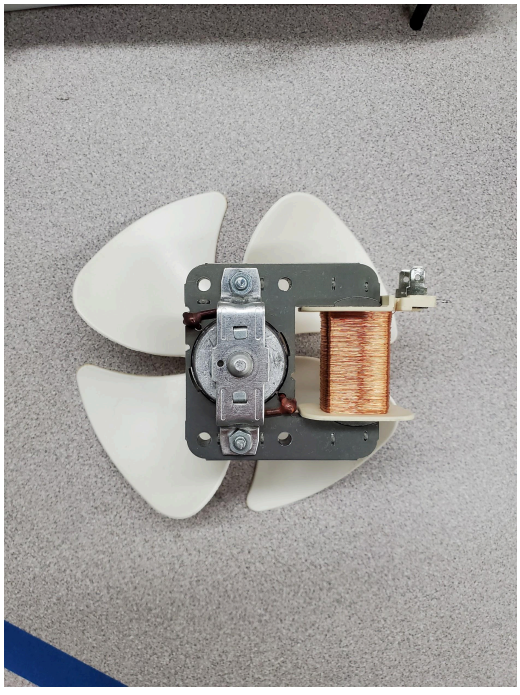
- Stopped bleeding
- Removed Fan, some limit switches, removed light bulb, removed some thermistors, and removed door.
- Discharged capacitor

Challenges, Questions, or Roadblocks:

- The connectors were unique, so I had to use a pair of pliers to remove most of the connections

Details & Descriptions:

Found some thermistors, but also found an interesting probe that stuck into the microwave which presumably records temperature as, when heated, the resistance goes down. Probably used for the convection bake function, since microwaves work by vibrating the particles in food, rather than heating the surroundings, thus rendering such a probe useless. Also found a light bulb which apparently would cost $300 to replace, and got to remove the cooling fan.



3.25.2021 - Ripping Into It

What Was The Plan:

I just wanted to open the microwave up and see the components

What I Learned:

I Learned about the smaller components outside of the high-voltage stuff; there are thermistors that help control temperature, multiple limit switches that make sure the door is closed, and two fans for cooling the high-voltage stuff and for convection cooking.

What Worked - What Steps Did I/We Solve:

- Got open the shell, which required special screwdriver heads
    a. Unbelievably crusty
- Saw what was inside
- Gained access to a diagram of the componentry once inside

Challenges, Questions, or Roadblocks:

- Had to find the right fitting screw head to open it up, which ate up a lot of time
- Started bleeding twice; metal is sharp
- Still need to discharge capacitor

Details & Descriptions:

There are a few layers of metal covering the components. Off the back, there's a convection unit that houses a fan and a heating element. Incredibly rusty and gross. Then there's the shell that surrounds most of the microwave. Once opened, most of the components are on one side of the microwave, with most of the box being empty space. The transformer, capacitor, and microwave generator are all clearly visible and the largest objects on the inside.

Historical Team Members:

2020-2021 - AM Team - <add this years AM teams>
2020-2021 - PM Team - <add this years PM teams>

2017-2018 - AM Team - Francisco Esparza, Hazel Feldman, Eldin Hernandez, Jacob Gillaspie, Zachary Moody
2017-2018 - PM Team - Jose Arellanes Aldaco, Stuart Bettencourt, William Diaz, Adrian Holmes, Charman Keo

Note: Make this like a blog, where the latest henry is at the top. Copy this template for new entries above.

<New Date> <Title... Compelling Title of today's work, success, etc... Like "10/12/2018 - Got Motors Connected"

What Was The Plan:

Tell a short story about what you wanted to do today…

What I Learned:

Briefly tell what you learned… What did you not know and now you do?

What Worked - What Steps Did I/We Solve:

- Short description of what your team did today… Date driven... as you enter entries, keep the latest at the top. Also, whenever you post an update here, also update the Project Resource Page as well…
- Other things that worked…

Challenges, Questions, or Roadblocks:
List all the current issues that are a challenge and preventing forward progress on this project

- Next step..
- Next Step…

Details & Descriptions:
Here you can do into a deep dive of what you did. Show images and diagrams, and more detailed descriptions on how to recreate the work. The goal is to let someone else be able to replicate your work… so more information can go here.

Team Members: <list the individuals who worked on this entry>
