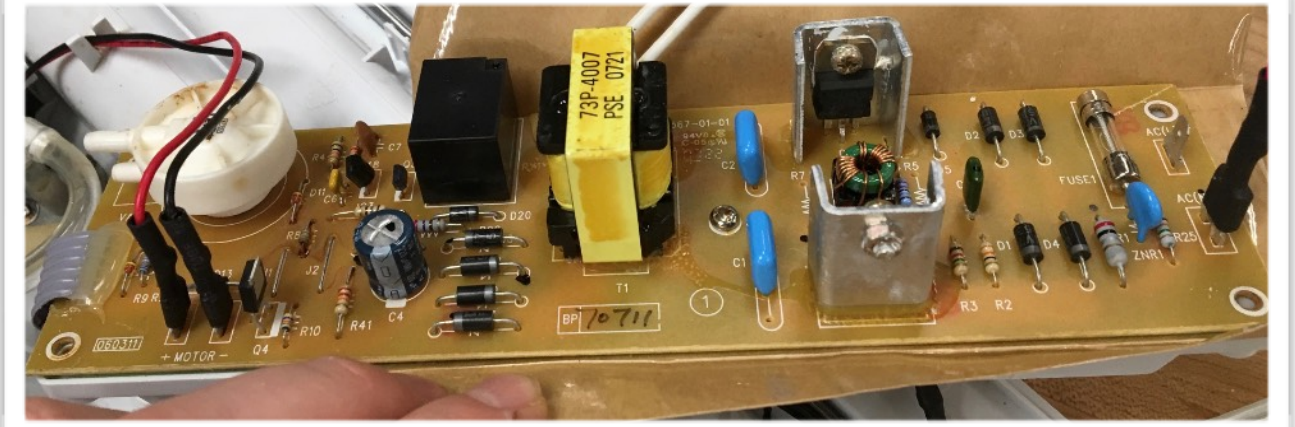
TEAM 32545A ELECTRONICS ONLINE CHALLENGE

The item we chose for our Electronics Online Challenge Sponsored by Texas Instruments is a Foodsaver V2250 vacuum storage system.

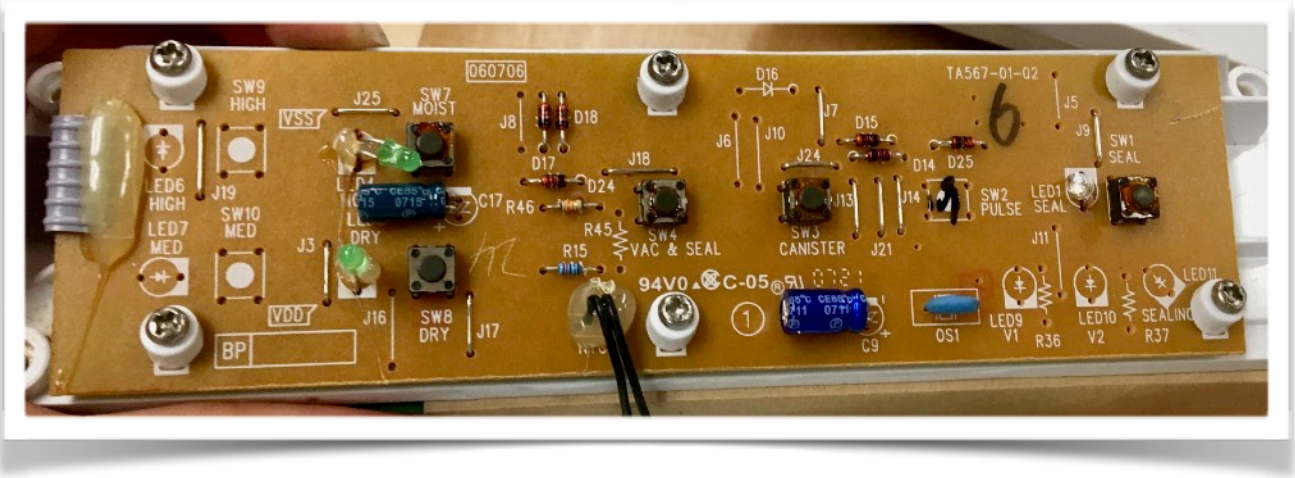
It contains two main circuit boards. The first one has multiple power supply circuits on it, consisting of diodes, transistors, transformers, and capacitors. The purpose of the power supply circuits is to change the wall current of 110 Volts AC into some lower voltage used by the circuits inside the food saver device. Based on the parts we can find it on information from our mentor, the lowered voltages available are probably 12 V and +5 volt.

Below is a picture of the power supply circuit board. Note that there are no integrated circuits on the board, and no TI components that we could identify:



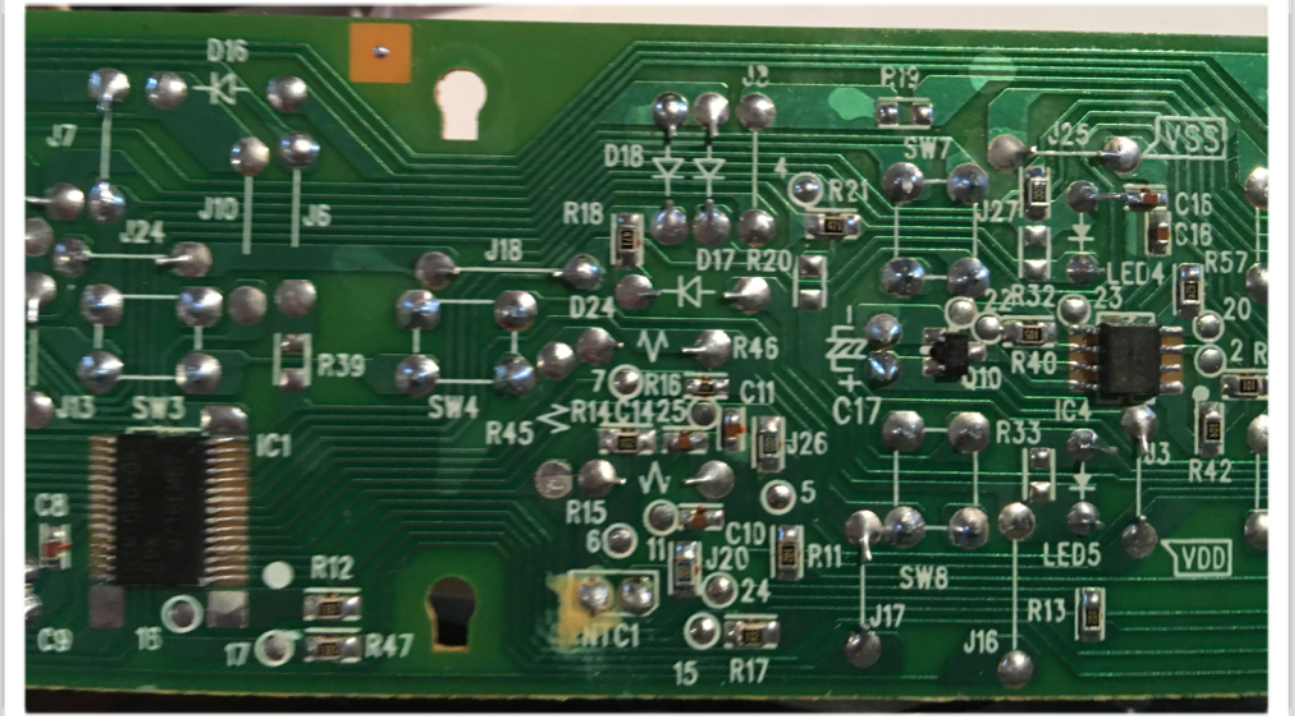
The power supply board provide power to the vacuum motor, the heat sealer, and the control electronics board.

Here is a picture of the front side of the control electronics board:



There are a total of four switches on this board. All of them can be pressed from the front panel of the Foodsaver device. The switches are how the user tells the device what they want it to do. On the circuit board, the switches are labeled “SEAL”, “CANISTER”, “VAC & SEAL”, “MOIST”, and “DRY”. This lets the user tell the device whether to seal a plastic bag, to pump out the air and then seal the bag, or to pump the air out of an external canister. The “Moist” and “Dry” settings are use to tell the machine whether you’re sealing in a liquid or something solid.

In addition to the four switches, the front panel also contains three LEDs to indicate how it’s operating.



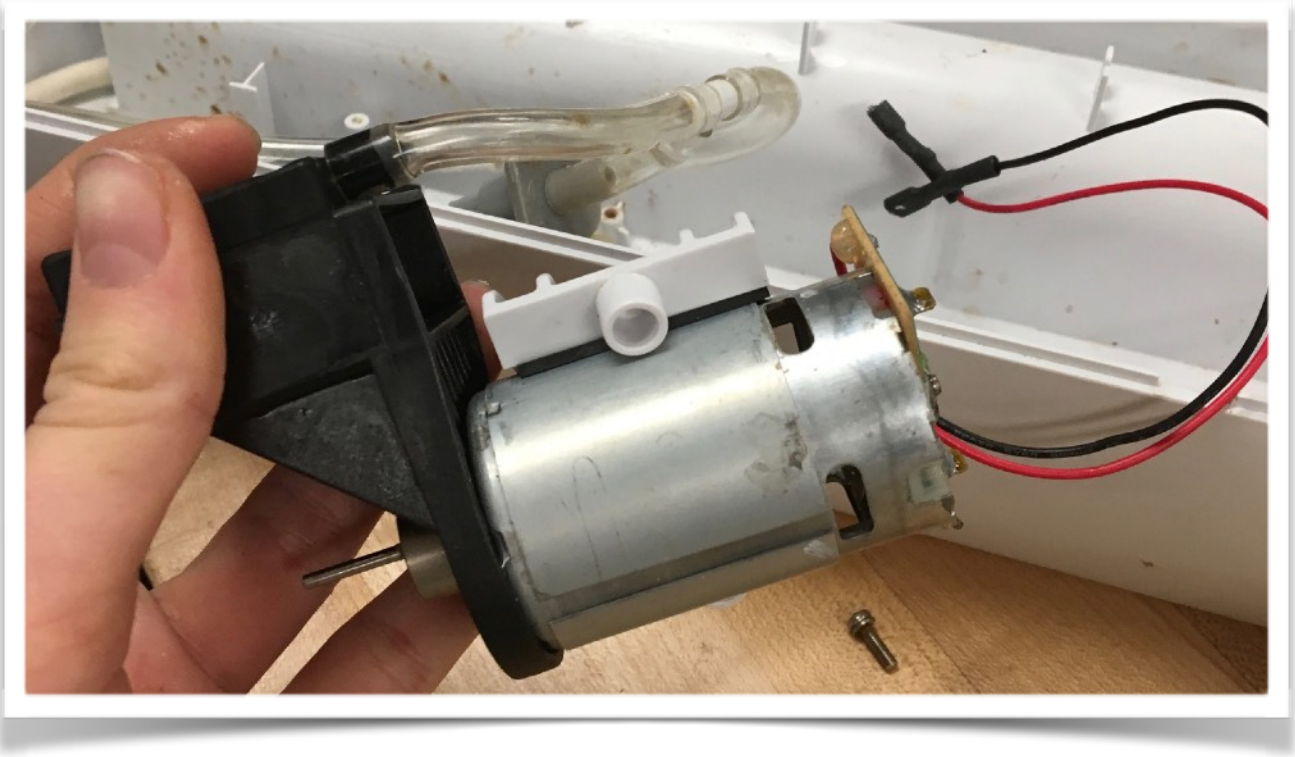
In addition to the control electronics on the front of the board, there are some chips on the back of the board, as seen in this picture:

There are only two integrated circuits on this board. Neither of them is from TI. The chip on the right side of the board is a 555 timer. Based on what we could find, this has lots of uses in electronic circuits. In this device, it may be what turns off the heater. It could be set up so that it runs the heater for a specified period of time, and then turns it off. Based on information from our mentor and a digital electronics instructor, that seems like the most likely use of the device in this food saver unit.

There is a also a main processor of some sort, but we were unable to find much information about the device using any of the online resources for looking up that sort of thing. The number on the chip is BSMICRO-03 598 0716EM517. We found some Chinese suppliers for the chip, and from one of their listings it said the chip was made by NEC. However, NEC did not have details of it.

However, based on information from our mentor and electronics instructors at our local high school, the circuit almost certainly is an embedded micro-controller. It is hooked to some sensors that sense the vacuum drawn, and it also turns on the motor for the pump that creates a vacuum.

Here is a picture of the vacuum pump:



We learned a lot from taking this device apart and trying to figure out how all of it works. It's unfortunate that there were so few integrated circuit components, but it was still a very useful exercise. We'll be looking for other take-apart devices in the future.