

Texas Instruments Electronics Challenge



Wireless Router Deconstruction

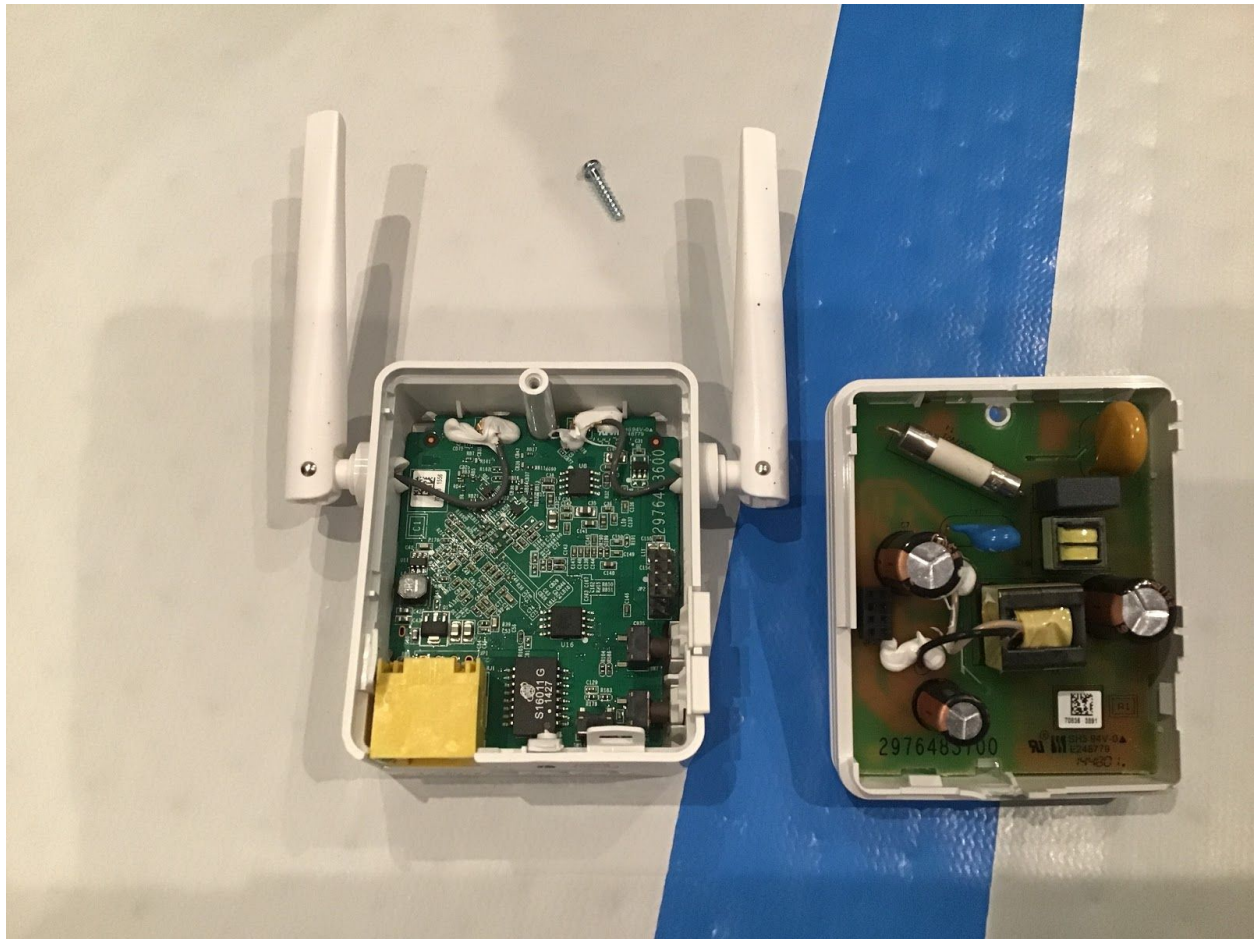
Entrant: Katie Hannah

Team number: 8838A "Discovery" — Robohawks

I chose to deconstruct a Netgear WiFi range extender. This device takes weak WiFi signals and re-broadcasts them, amplifying them in the process. There were many different components to this device, most of which I was unfamiliar with and had to research. The outside of the extender had a plastic housing with two positionable antennas and two screws.

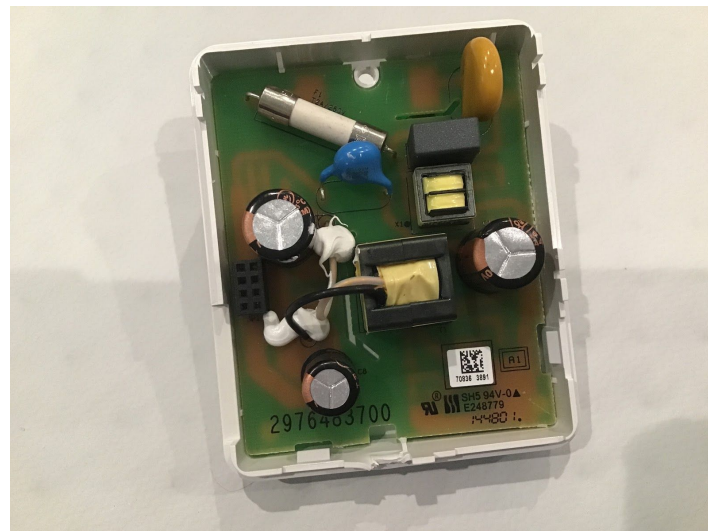


The antennas are used to pick up weak WiFi signals and reproduce them. The housing splits in half in the middle when the screws are removed, revealing the electronic components.



The extender is made up of two sides. The side on the right is the power side. It filters the power and sends it to the left side, the broadcast side. The broadcast side includes a motherboard and an eight pin connector, which transfers power from the power side to the motherboard. The power side has a two prong wall plug. This provides AC power, or alternating power. AC power does not move in a consistent direction. The components on the power side are used to convert the AC power to DC power, which flows all in one direction, and is the only type of power usable on the broadcast side. On the power side, there are four capacitors.

The capacitors are the black cylinders with silver on top, as well as the blue sphere.



The capacitors temporarily store power from the outlet. The yellow sphere is a TVR 1047. It's a metal oxide varistor, which protects the circuit from high voltage surges. Basically, the power side filters the power, and sends it to the broadcast side, which reproduces the signal picked up by the antenna. In this experiment, I learned what capacitors and varistors are, as well as the difference between AC power and DC power. I now fully understand how WiFi extenders work, and am happy to have done this challenge..