



# RadioShack Heat Gun 120V 60Hz 300W with reflector Teardown

This teardown take a look into a handheld heat gun, useful for everything from insulating wires with heat shrink tubing, bending PCV , or stripping paint

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## INTRODUCTION

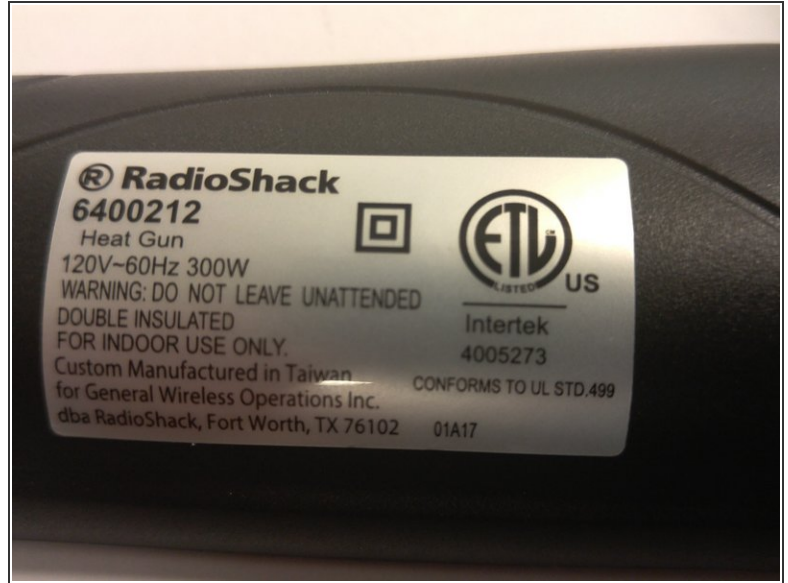
This teardown relates to a reverse engineering homework assignment for EE 460 at Cal Poly San Luis Obispo. This project tears down and analyzes a consumer product, in this case a 300 W heat gun sold by Radio Shack.



### TOOLS:

- [Phillips #1 Screwdriver](#) (1)
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## Step 1 — System overview



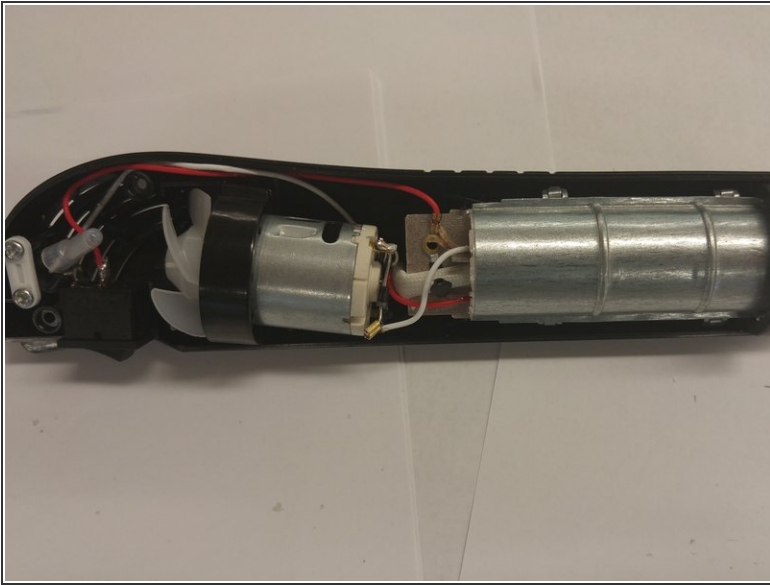
- This heat gun, sold by the now defunct Radio Shack, is a double insulated electric heat gun, converting 120V AC electricity into heated air for all your hot air needs!
- The heat gun is ETL listed and has a power rating of 300W, drawing an average of 2.5Arms.

## Step 2 — Contact Protection



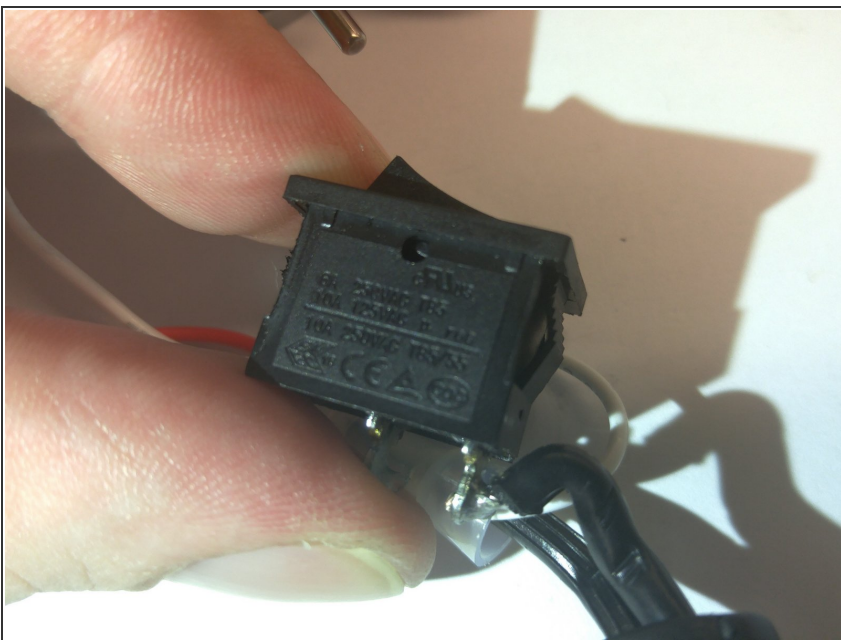
- Removing the protective plastic nozzle cover and wire stand

### Step 3 — Opening the device



- Opening the clam-shell was simply removing two Phillips-head fasteners . To remove the power cable from the clam-shell required removing two more fasteners.
- The clam-shell housing appeared to be made of ABS plastic, but no identification marks were cast with the injection molding.

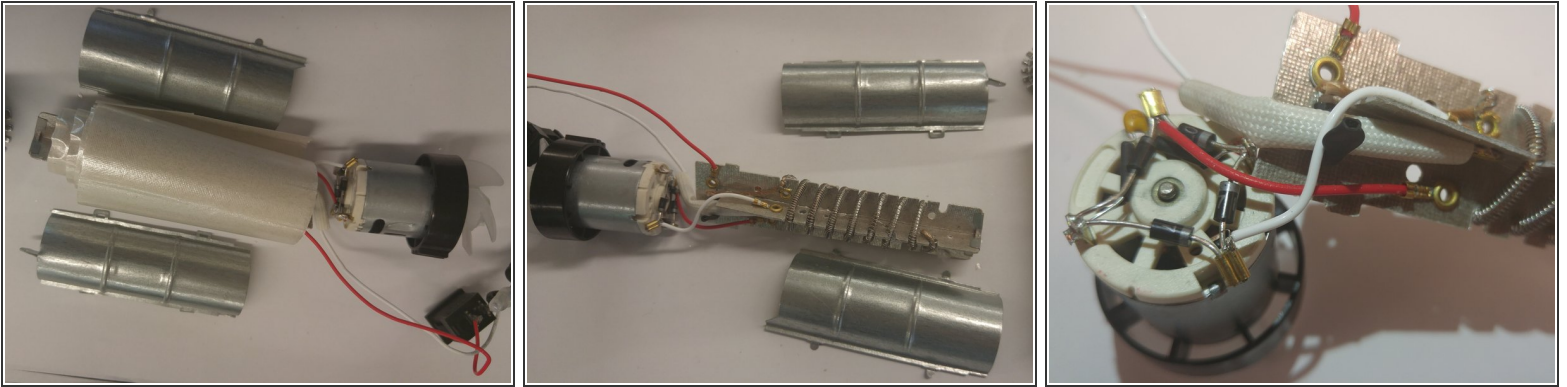
### Step 4 — Switch



- The switch slid out of the housing easily. The switch itself was rated for 10 amps, far more than the rated 2.5 amps for the heat gun, and for 250 Vac. The soldering looked like it was done by hand.

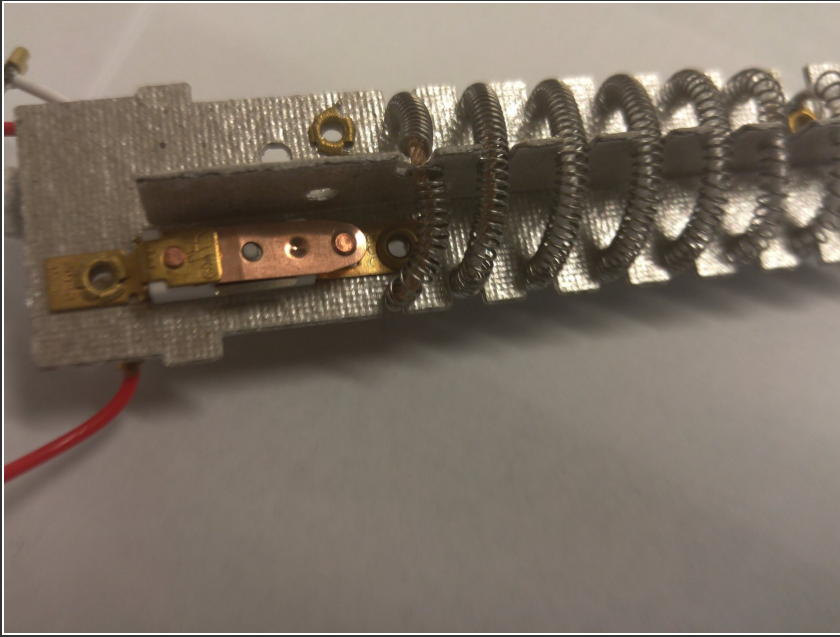


## Step 5 — The guts



- The primary assembly has a metal tube which directed the hot air out of the nozzle. The tube enclosed a heating element spiraled around a framework insulated by a heat resistant paper. The heating element is essentially a resistor wound around a synthetic thread that resisted burning.
- The other element of the assembly was a brushless DC motor. The input AC voltage is put through a 4-diode full bridge rectifier with a smoothing capacitor before the DC voltage is fed into the motor and the resistor. The DC motor is attached to a plastic fan which drives the air through vent holes and down the metal tube across the heating elements

## Step 6 — Over-temperature protection



- The copper colored contact seen in this image acts as thermal protection.
- The copper colored contact is normally closed switch, underneath the contact is a strip of a different type of metal. During heavy use, the two metal will both heat up.
- The metal underneath the contact expands faster than the contact, so if the heat gun gets too hot, the expanded metal will force the switch open, and shut off the resistor, but still allow the fan to spin and cool down the device.