

VRC High School - Reverse Engineering Online Challenge

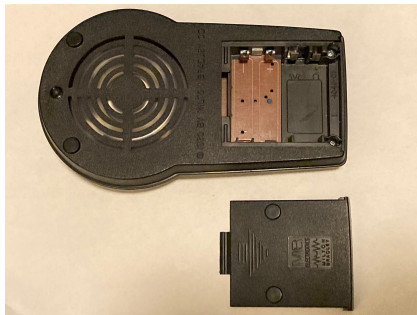
Isaac Spencer

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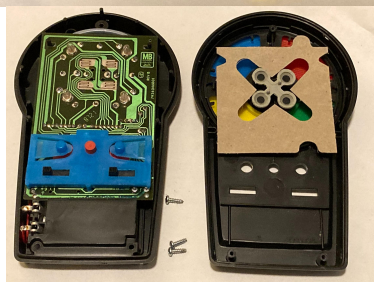
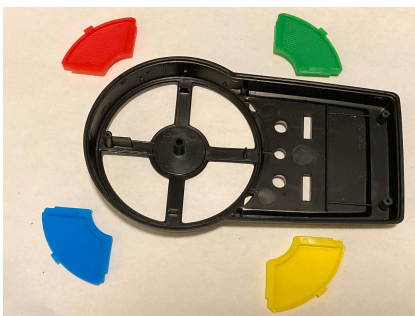
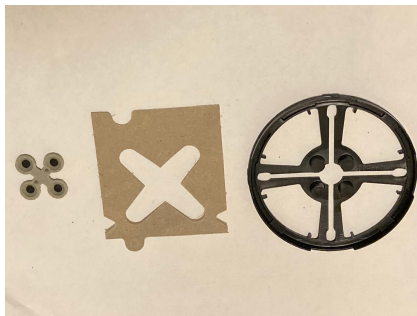
Indianapolis, IN

I chose the “Pocket Simon”, a pocket-sized Simon Says game to take apart. I chose this toy because it combined my love for engineering with my passion for music. It has 4 big colored buttons at the top that form a circle, 2 smaller switches at the bottom, and 1 small off/on button in the middle of the switches. I took this apart because the batteries were corroded, and the game wasn’t being used anymore. When I opened up the battery holder, it used 2 double-A’s and one 9-volt battery. This made me intrigued as to why there were 2 different battery types.

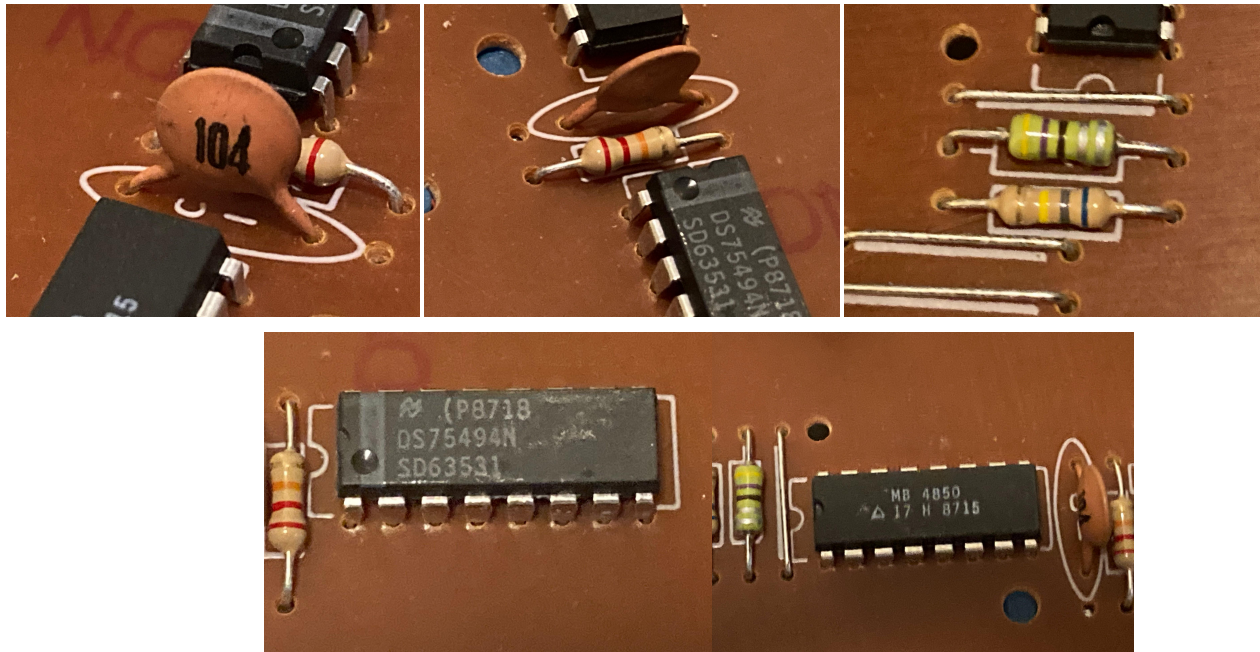
After discovering this, I was very interested in what both batteries were used for. First, I carefully took out the batteries and disposed of them. Then I helped clean the inside of the battery compartment, with some help from my parents to make sure I didn’t touch the corroded parts.



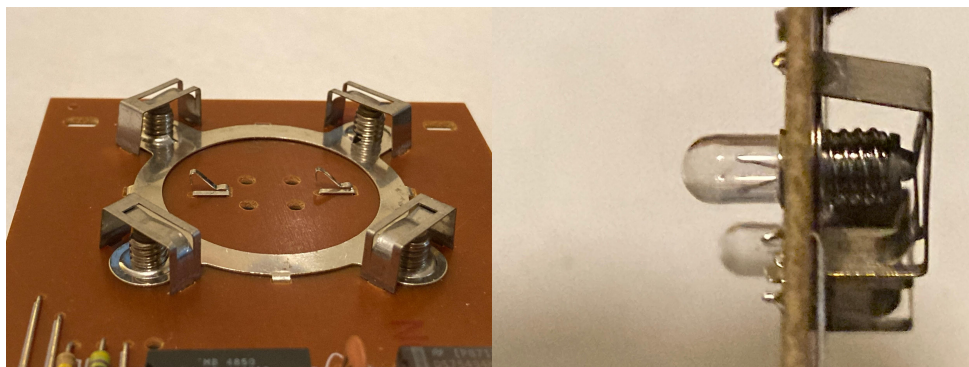
After taking out the screws, it revealed a piece of plastic that made the buttons spring up after you pressed them. I also found the buttons on the circuit board that coordinate with the big buttons from the front.



On the circuit board, I found 2 microchips, 3 resistors, and 1 capacitor. The first microchip was labeled “MB 4850”. I researched the chip and found that it was specifically designed and only found in this Pocket Simon game. Although this was not a Texas Instruments microchip, I found that in earlier versions, the normal Simon game used a “TI” chip to control the game. The other microchip was labeled “DS75494N”. When I researched it, I found that it was from the company “National Semiconductor Corporation”, and that it is a common microchip used to interface between LED’s or light bulbs to other microchips.

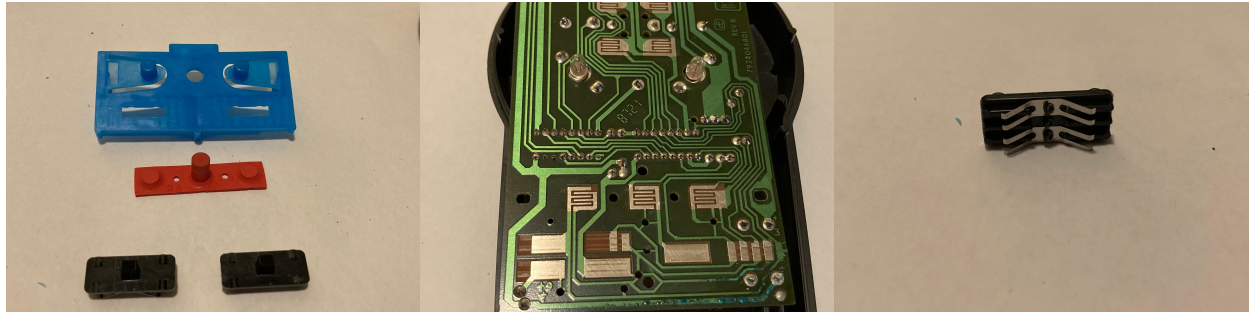


I also learned that the circuit board used tiny light bulbs instead of using LEDs.

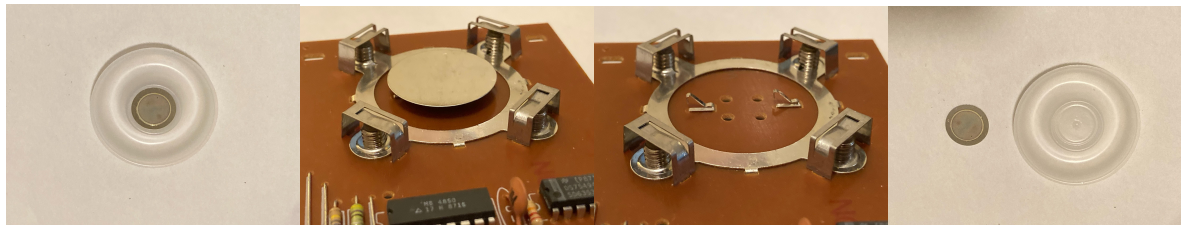


Later, I discovered that the sliding switches weren't premade and soldered on. The switch itself didn't move or have any moving parts in it, but instead metal contacts that stuck out from the bottom that touched the circuit board.

When you moved the switch, the contacts would complete different circuits.



The buzzer used in this game was just a small piece of metal, sitting in a plastic holder. When put together, 2 contacts of metal from the circuit board touched the piece of metal sitting in the plastic holder. The plastic holder also turned out to be a light diffuser.



Also, when I researched the microchips, I found that the 2 AA batteries were used for the lights and circuit, while the 9-volt was used for the buzzer.

In all, I have concluded that taking things apart can be surprising! When I first thought of taking this apart, I thought, "Well, this won't be exciting to deconstruct..." However, I was wrong. From different battery types to sliding switches that go directly to the circuit board, this was a very fun and educational experience for my friends and I.

Works Cited:

<https://www.digchip.com/datasheets/parts/datasheet/321/DS75494N.php>

<https://www.microchipdirect.com/product/DSC1001DL2-001.4850?productLoaded=true>