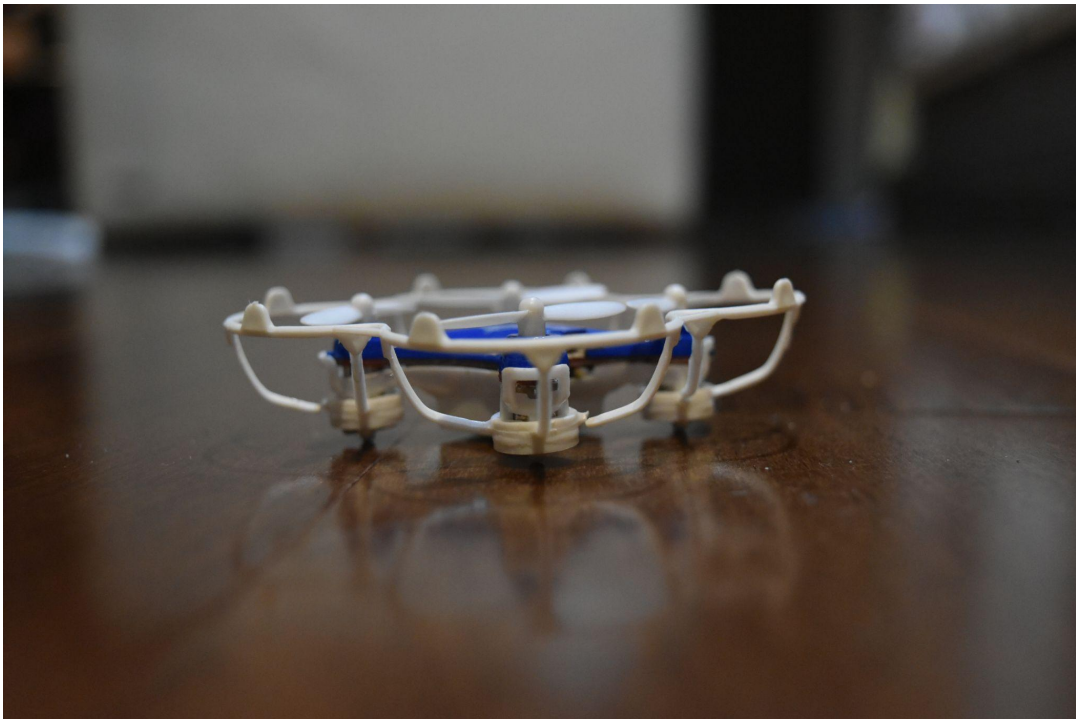


VRC Middle School - Reverse Engineering Online Challenge sponsored by
Texas Instruments

Drone Disassembly

Created by 10012W

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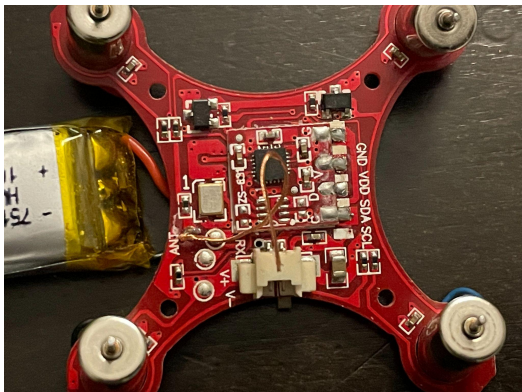


Hello, this is Sean Chan-Sato, Lucan Chugani and Kobe Sam. We have chosen to reverse engineer a mini drone (10 cm x 10 cm). We decided to take apart a drone as it is a new piece of recent technology and is used for many jobs including entertainment, photography or in the workplace. The way it can communicate with the controller and have the ability to hover and fly controllably mid-air fascinates me. For such a small piece of technology, we were intrigued into seeing the complex mechanisms inside.

By unscrewing 4 tiny screws off the bottom of the drone, we were able to take off the protective plastic piece under the drone. Removing this piece exposed many components. We can see that all of the components are connected to the circuit board. The battery which can be seen on the left of the image is a 7 volt battery. The 4 motors on each of the corners of the drone are high speed motors with low torque and can be stopped by a finger. In the center of the drone we can see the CPU. This component provides instructions and controls the drone. Near the top of the image we can see the switch. This controls when the circuit is powered on and off.



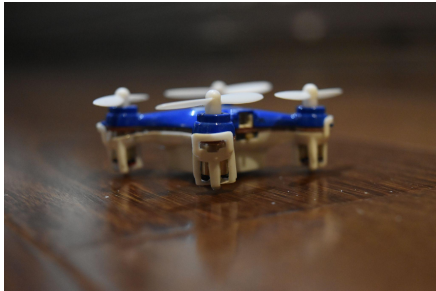
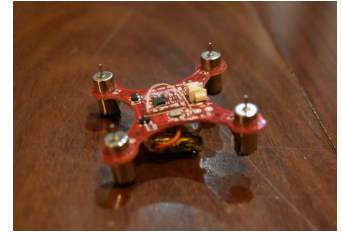
Bottom Side of Drone



Top Side of Drone

By taking the propellers off we were able to take off the top protective layer. This exposed more of the circuit board and also exposed the charging port. At the top of the drone we can see little black rectangles and those are the resistors. The job of the resistors is to resist the flow of current ensuring that your components won't get too much electricity and get damaged. Furthermore we can see another circuit board on top of the other. The top layer is used as the component surface, and the bottom layer is used as the component soldering surface.

While taking this apart, we noticed that the design focuses on low weight. This is essential as to make an object fly or hover, it must be incredibly lightweight or have incredibly powerful motors. The entire drone only had 4 screws and 2 pieces of plastic surrounding the lightweight circuit board. By having a lighter base it allows the drone to have less powerful motors.



Taking apart this drone has given us a greater understanding of drones and how they work. We've realized that by reverse engineering, we can come up with ideas to engineer something else. Throughout this project it was fascinating to see how engineers have been able to design something so small yet so complex.