

Wollondilly Roobots 10911 – Texas Instrument Challenge

Deconstructing a Lightsaber

The Wollondilly Roobots have chosen to look at the insides of a **Lightsaber** (see photo 2). The reason we picked a Lightsaber is because this is our first thing that we have ever pulled apart to investigate what is inside. We wanted something simple that we could learn from rather than blowing our minds with too much information. The Lightsaber has lights and sound so hopefully it has a number of components for us to look at.

We dismantled our Lightsaber in less than 10 minutes (see photos 3 and 4). We found 1 main part with 3 smaller sections attached (see photo 6). From our knowledge of the Lightsaber we knew that 2 of the three smaller parts were switches. Part 2 is a push button switch that controls the lights on the integrated circuit board (Part 1) and Part 4 is a slide switch that controls the speaker (Part 3).

The speaker was really interesting, it had a magnet in it, which could hold all the screws from the Lightsaber (see photo 7 and 8). When we tried to pull apart the speaker we found a copper coil. From this information we researched how speakers worked and found that the metal coil makes an electromagnet which attracts and repels the other magnet we found. This attracting and repelling cause vibrations which forms the sound we hear. We are planning to investigate an electromagnet and hopefully build a speaker.

We tried to research Part 1 (see photo 9 and 10) and found that it was very difficult. The letters and numbers on the circuit didn't help and as this is our first electronic device we have tried to pull apart we had no idea. We decided to take it into Morton Bros – Jaycar in Goulburn and they were excellent. They explained each part and how they go together. On the circuit board they explained that the large black dot is the processor. The processor doesn't look anything like the ones we saw on the internet. We learnt that some processors cannot be replaced and others can. The man told us that the processor could be a timer like the 555 timer and he showed us a TI 555 timer.

We left Morton Bros – Jaycar with a lot more knowledge about circuits as well as a short circuit project so we can construct an electronic device. This one makes your voice sound like a dalek, so hopefully we can learn about processors as well as speakers. Next year we are going to try something more complicated and try to find out more about each part. Can't wait to pull apart a phone or remote control car!!!!

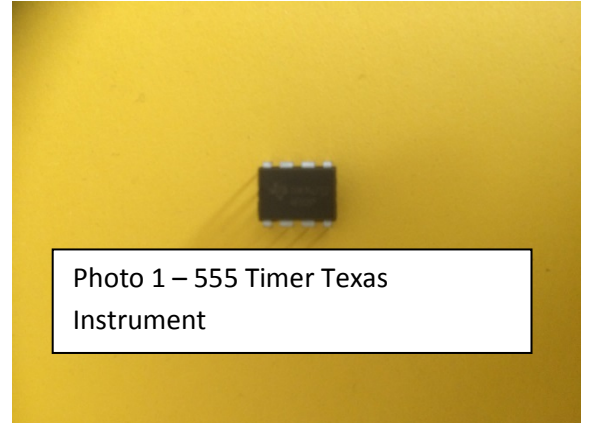


Photo 1 – 555 Timer Texas Instrument

Parts of a Lightsaber

Part		Origin	What it does	Photo
Integrated circuit board	Processor	China	The processor has the programming for the electronic device. With the VEX Robot we write code to tell the robot what to do. The processor tells the device what to do. It does this based on the way it is built.	10
	5 x LED drivers (transistor)	China	They help control the amount of current that flows through and electronic device.	10
	Crystal	China	Helps with the timing for the LED lights	9
	Capacitor	China	Protects the circuit and lights from electrical surges. They can store electrical energy	9
Series of Lights	28 x LED	China	The lights are the exciting part of the toy.	5
Wires	9 wires	China	Allow the circuit components to become one system.	6
Speaker	Magnet	China	The two magnets attract and repel each other to vibrate and make sound	7, 8
	Copper coil	China		
Push button		China	Closes and opens the circuit to let the lights work	6
Slide switch		China	Closes and opens the circuit to let the sound work	6

Reference list

Morton Bros – Jaycar Goulburn Australia 10/01/17.

Infospace Holdings “How Stuff Works” 10/01/17

<http://computer.howstuffworks.com/microprocessor.htm>

Photo 2 – The Lightsaber



Photo 3 – Pulling apart the Lightsaber

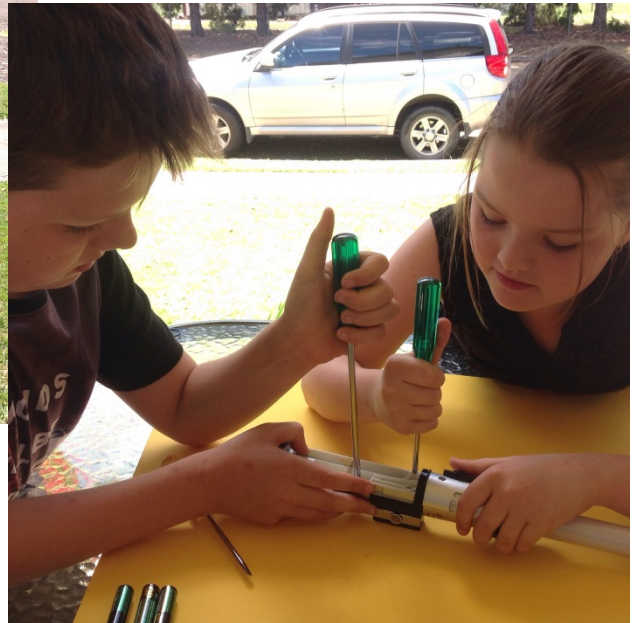


Photo 4 – The insides of the Lightsaber

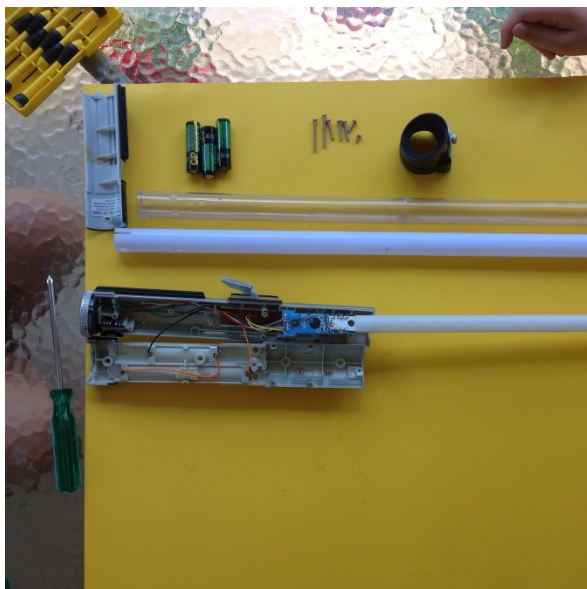


Photo 5 – The LED Lights



Photo 6 – The electronics

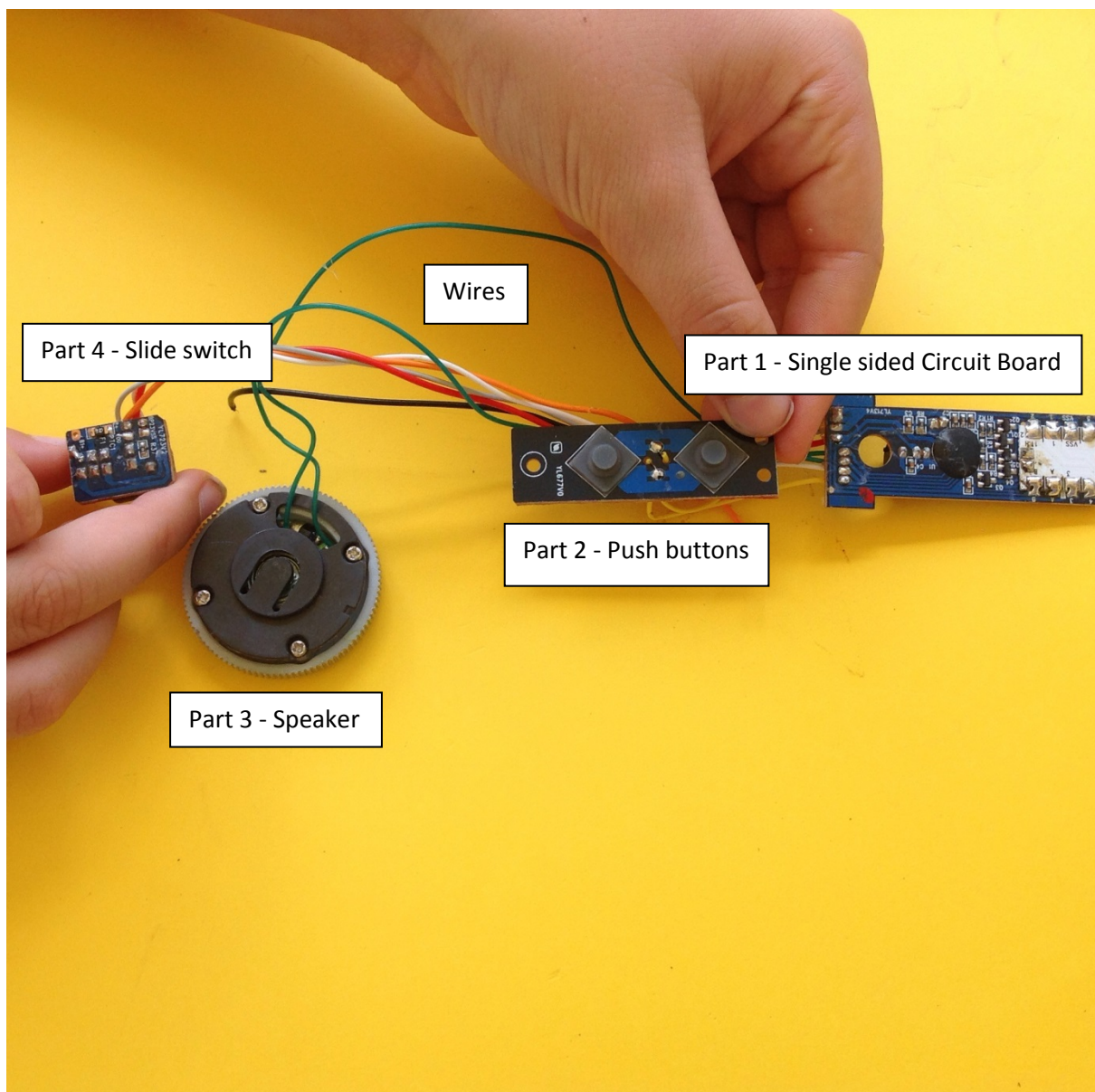


Photo 7 – The speaker in focus, Parts 3 and 4

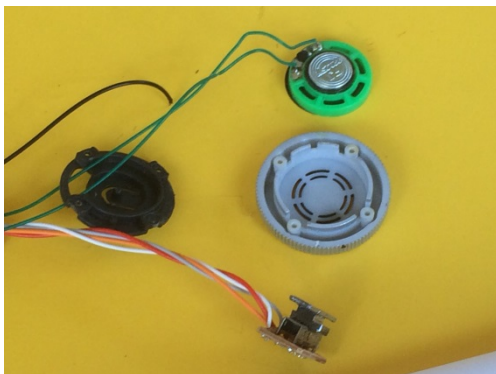


Photo 8 – A magnetic speaker

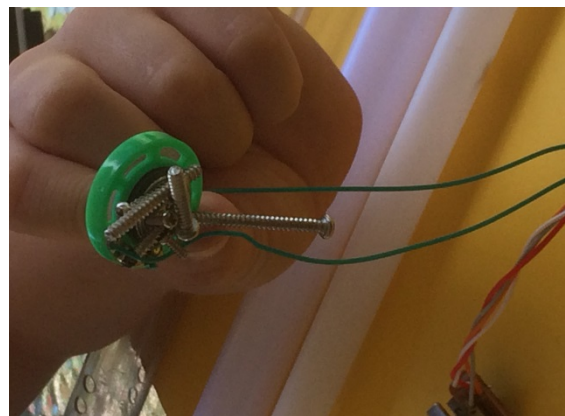


Photo 9 - back of circuit board

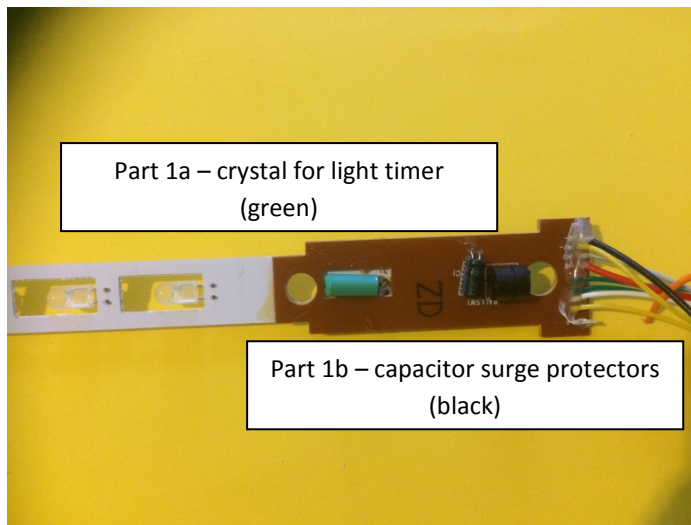


Photo 10 – front of circuit board

