Design Challenge

Extraordinaire: The Superhero
**Design Project:** A Remote Control

About the Extraordinaire

Our Extraordinaire is strong and brave. She is here to protect the city and everyone in it using her spectacular powers and technical knowhow.
The Superhero uses her laser eye beams to make and fix extraordinary and high-tech gadgets which work with her powers. She knows and loves technology, but technology comes with risks.

Our Extraordinaire has two identities, her superhero identity and her civilian alter-ego. She has to protect and hide her double life, which can be difficult in this technological era. Identity is a big problem for The Superhero.

Design Solution: Auto Tweeter
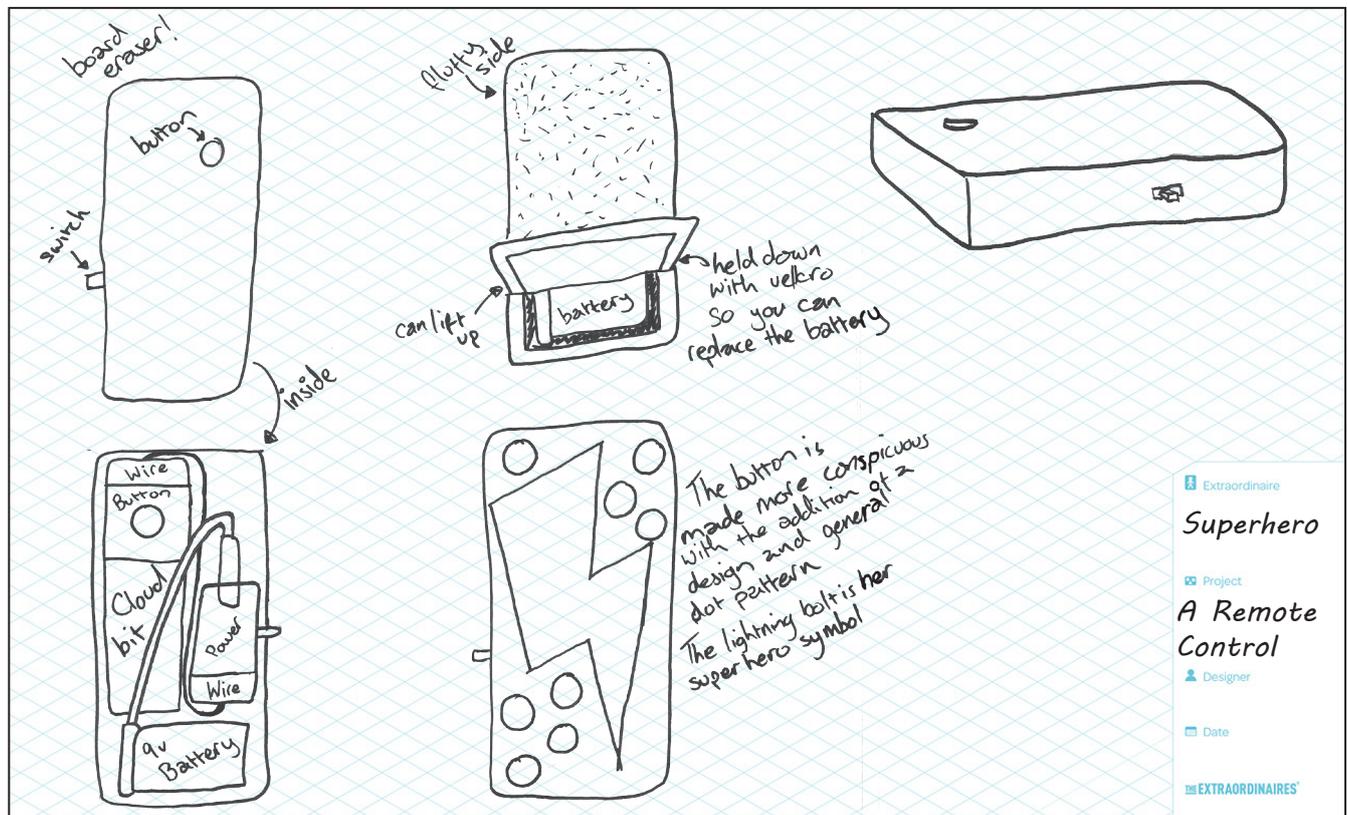
Materials

- Cardboard
- Scissors/craft knife
- Velcro
- An A4 piece of felt
- Black Paint
- A glue stick
- Masking tape
- Little Bits
    - Cloud bit
    - Battery Power bit
    - Button
    - Wire

Procedure

1. Start by cutting out some cardboard rectangles, one 2 ½ inch by 5 ½ inch piece, two 2 ½ inch by 7/8 inch pieces and two 5 ½ inch by 7/8 inch pieces. Tape them together to form a box.

Make sure you can easily get your box apart!

2. To make your Little Bits circuit, take your power bit and attach a wire bit to the end. The other end of the wire should connect to the button, which connects to the cloud bit. Arrange the circuit in your box face down.

The base of the box is the front of your eraser. The power should be on the right, the battery should be at the bottom and the button on the left. You can see how to arrange them in the design drawing above!

3. Before you mark out the hole for the button, deconstruct your box. Take the base (the 2 ½ inches by 5 ½ inches rectangle) and mark out the center of your power button. The center of the power button is 21/32 inches from the long edge, and 1 7/16 from the short edge. The diameter of the button is 7/16 inches. Draw a circle where your button will be and cut it out.

This circle is really important to get right; you're looking for a tight fit. If you make the hole too big your button might move too much. Don't forget that you can always make the hole a little bit bigger, but making it smaller is difficult. To start off the hole, use a pair of scissors or a craft knife to cut along the diameter.

4. Time to mark out the hole for your power switch on one of your long rectangles (5 ½ inches by 7/8 inches). The side of the hole is 3 1/8 inches from the short side and ¼ inch tall. From the long side measure 3/8 to mark out the top of the hole, which is 1/8 wide. Once the rectangular hole is marked, cut it out.

5. Now put the box back together. Place your base piece down, with the hole for the button in the top left. Tape the rectangle with the hole for the power switch to the right side of the base. The hole should be towards the bottom of your box. Once these pieces are in place, re-attach the other walls for you box.

I used masking tape to stick my box together, but you can use glue if you want!
Remember; if you are using a water based glue, make sure this doesn't spill onto your Little Bits.
When working with electronics it's important that they are secure, otherwise they could get damaged.

6. Place your circuit back in the box. You now want to increase the wall thickness of certain sections of your box. Either side of the battery, where the short sides of the battery don't quite touch the walls of the box, glue or tape squares of cardboard to the inside of the box.

7. Cut out a rectangle of cardboard roughly 1 inch by 2 inches. This rectangle needs to sit on top of the walls of your box covering your button and wire bits. Glue/tape it in place.

This piece of cardboard is designed to help make sure your button can be easily pressed. If you think you need it, add another strip of cardboard to the structure to help reinforce it, or to lessen the gap between the feet of the bit and the next available surface.

8. The power bit needs to be kept at the same height, as well as making sure it doesn't move backwards and forwards or sideways. The wire for the battery keeps one side of the power bit raised to the right height, but it should be level. Fold a strip of cardboard and tape it together to fit under the feet of the power and wire bits. Secure this with tape or glue.

9. Between the Cloud and power bits, add a square of cardboard pressed up against the side of the power and wire bits. Glue or tape this to the base of the box.

10. Make two long strips of cardboard no wider than ¼ inch and lay them across the top of your box, from long edge to long edge so that they cover the feet of your power and wire bits but not the battery. Glue or tape them in place, and then secure the square from step 9 to the cardboard strip.

The last step I chose to do for this was to use some masking tape to keep the wire for the battery in place, but don't do this yet!

11. Take all of your Little Bits out of the case. Cover the outside of your box in one smooth consistent layer of masking tape and paint it.

12. While the paint is drying, there's time to set up your Cloud bit! Go to the Little Bits website and create an account. Click on "Cloud Control" and follow the instructions to set up a new cloud bit.

13. Once your cloud bit is set up, follow the link in the automate tab to go to the If This Then That website. It should take you directly to a Little Bits page. Once it loads, click connect and register an account. You can now try programming your Cloud Bit!

14. Click on "My Applets" and then "Create a new Applet". You should see the phrase "if this then that".

The phrase "if {this} then {that}" is simply asking a yes/no question, then adding actions to those answers. If something happens; a {this}, it will cause something else to happen; a {that}.

15. Select "this", select Little Bits and select "Turned On". Provided your If This Then That and Little Bits accounts are connected you should be able to choose your Cloud Bit from a drop down menu and "Create trigger".

You have just told your cloud bit that when you press the button in your circuit, when you turn on your Cloud bit, you want the bit to do something.

16. Now you can assign your "that". Select Twitter, and link the account you want to use. Choose "Post a tweet" and write a tweet to send out. Finish the Applet and make sure it's turned on!

17. There is a print out at the end of these instructions – which is the pattern I used for the front of my Auto Tweeter. Don't worry about the size of the blue area, just cut it down to whatever size you need. There is a white ring to cut out for the button. Cut out the pattern and glue it on the face of your box.

18. Put your circuit back into your box, making sure the button and power switch are sitting correctly, so they can be used easily. You won't have to take the circuit out again unless you want to use your bits for other projects so make sure they all sit snuggly.

19. Cut out a rectangular piece of cardboard roughly 5 ¾ inches by 2 ¾ inches. Place that on top of your felt, and cut around the rectangle, leaving a ¼ inch gap between the cardboard and where you're cutting. Glue this piece of felt to the cardboard.

This is the eraser part of the project. You want to make sure you leave that over hang on the felt unglued – it's going to cover the Velcro we add later.

20. Cut diagonally into the corners of the excess felt around your cardboard. This will allow you to cleanly fold up the sides. Don't glue the rest of this felt down.

21. Take your Velcro and stick down one side to the top of the walls of your box. The other side of the Velcro should be attached to the cardboard to be placed on top. Use the overhang of felt to cover the Velcro, trimming it if it's too long.

Finished!