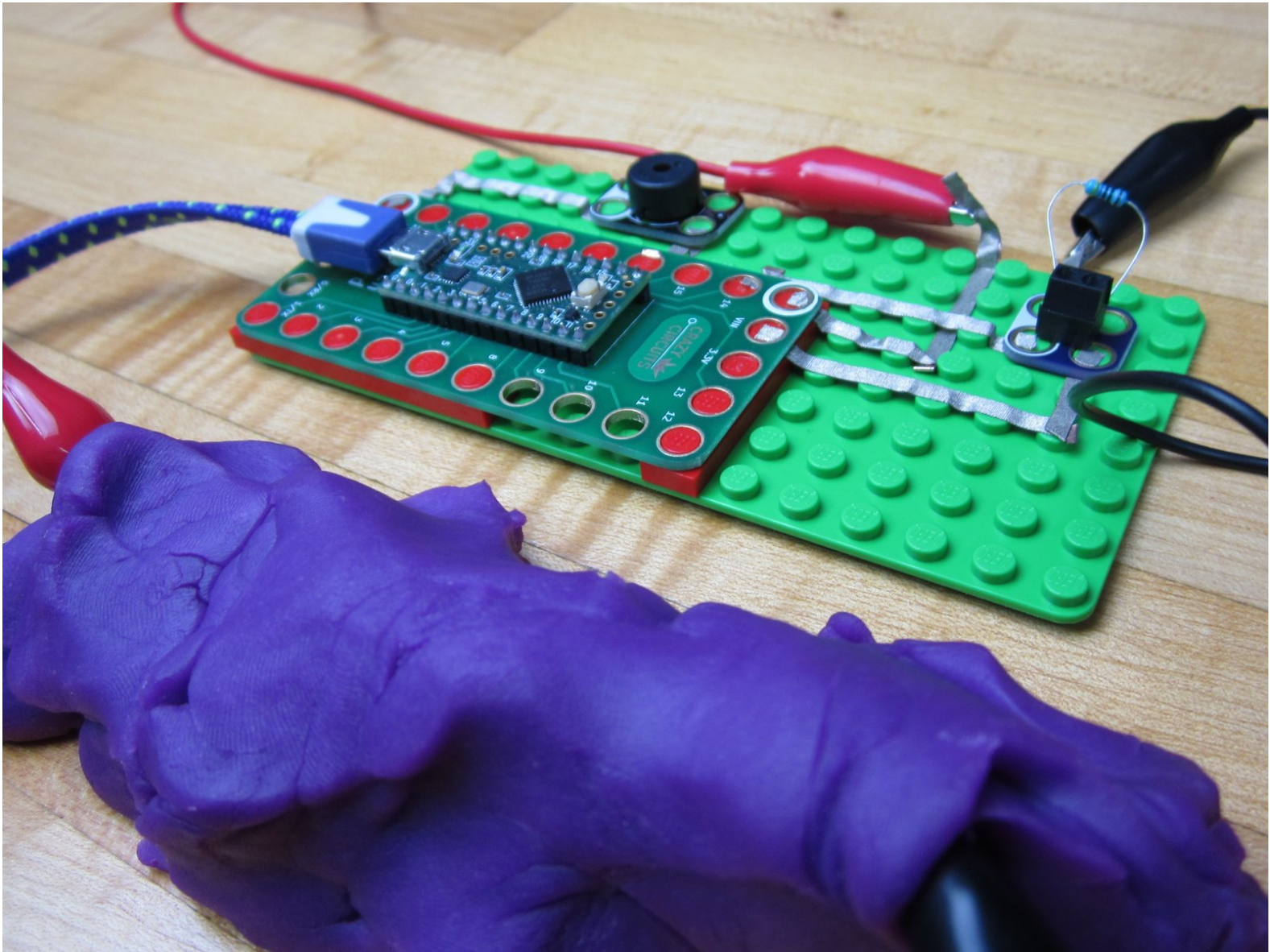




Written By: Joshua



INTRODUCTION

Conductive Dough is extremely fun to use in place of a Potentiometer (variable resistor) in projects and you can use it to control all sorts of things. In this activity we'll be using dough to control the sound being produced by a Piezo Speaker hooked up to one of our Invention Boards.

If you have a Robotics Board you can also do this project, you'll just have to change a couple of pin numbers in the code.



TOOLS:

- [Scissors](#) (1)
- [Slotted Screwdriver](#) (1)



PARTS:

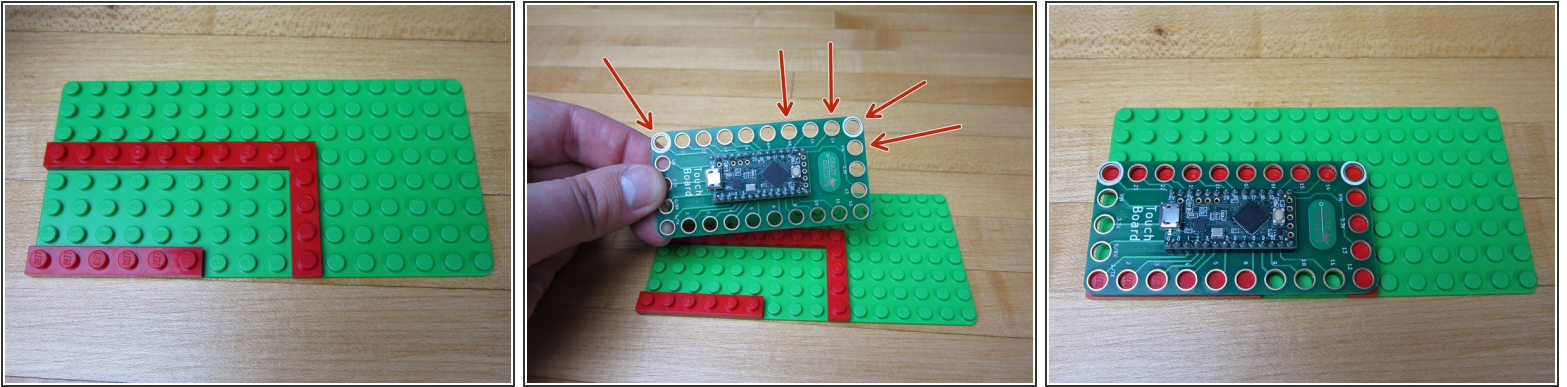
- [Crazy Circuits Invention Board](#) (1)
- [Crazy Circuits Piezo Speaker Chip](#) (1)
- [Crazy Circuits Screw Terminal Chip](#) (1)
- [Squishy Circuits Conductive Dough](#) (1)

Step 1 — Screw in the Resistor



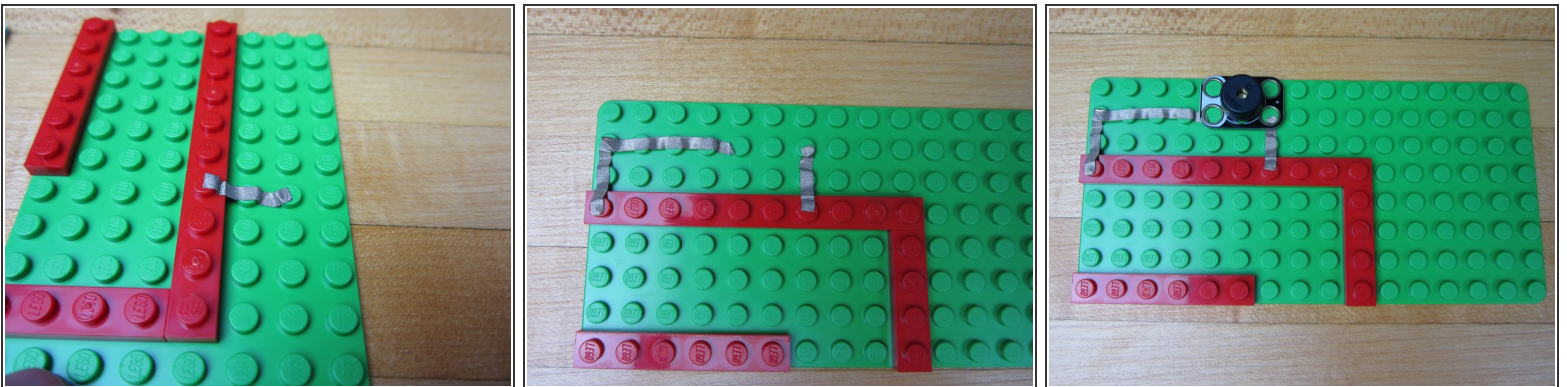
- Grab a Resistor and screw it into the Screw Terminal Chip.
- ⓘ We're using a 460 ohm resistor, however a resistor of near or similar value will work.
- ⓘ If you don't have a Screw Terminal Chip around you can always just use Maker Tape to hold the Resistor down. We attached a small diagram of what that would look like at the end of this write up.

Step 2 — Make a Platform for the Invention Board



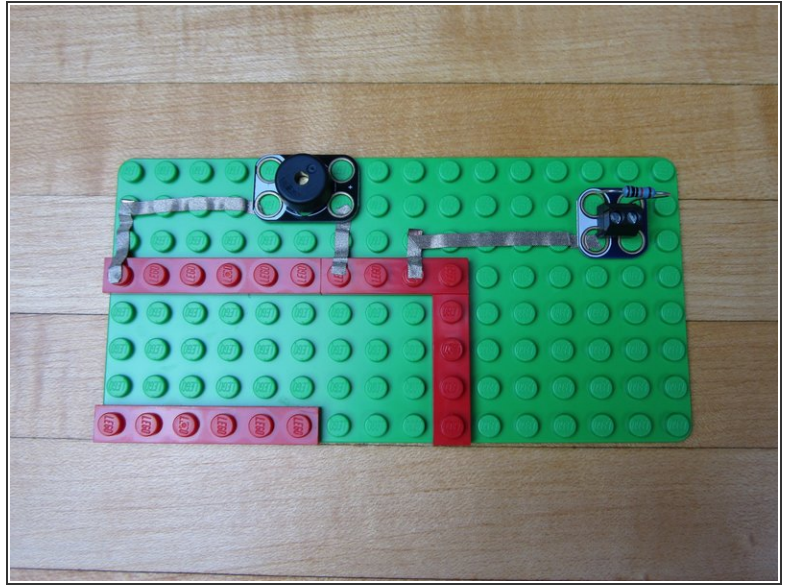
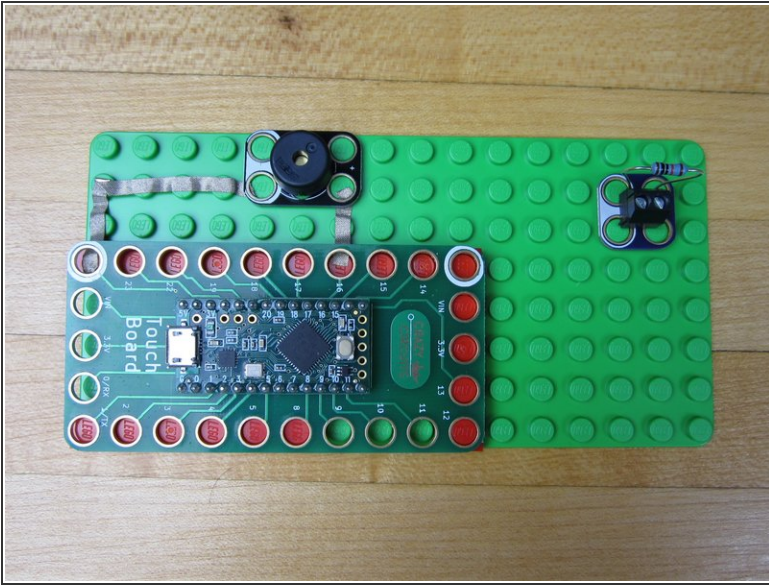
- The Invention Board won't lay flat onto our 8x16 base plate, so we'll need to make a platform for it. We're using several thin plates to create the platform.
- ⓘ You NEED to have bricks below the pins that you're using, otherwise the tape won't make a connection. We're using both Grounds, Pins 14 and 16, and the VIN on the right side.

Step 3 — Add the Piezo Speaker



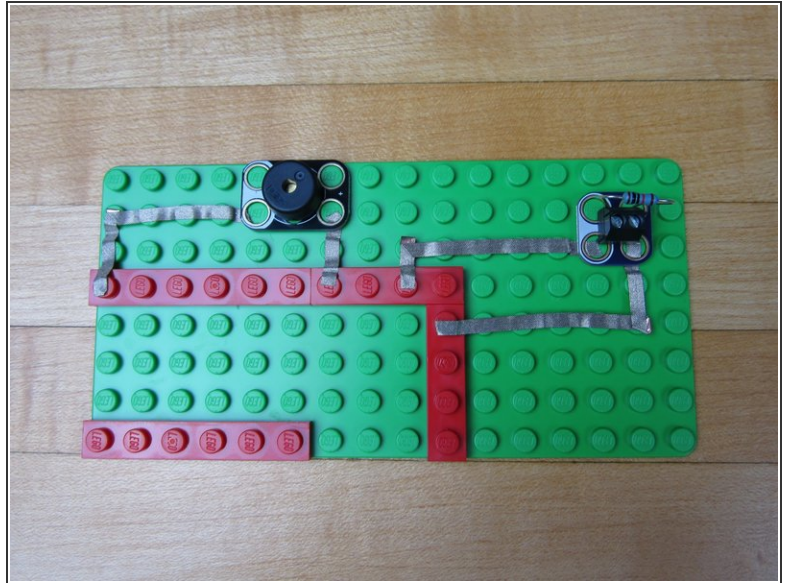
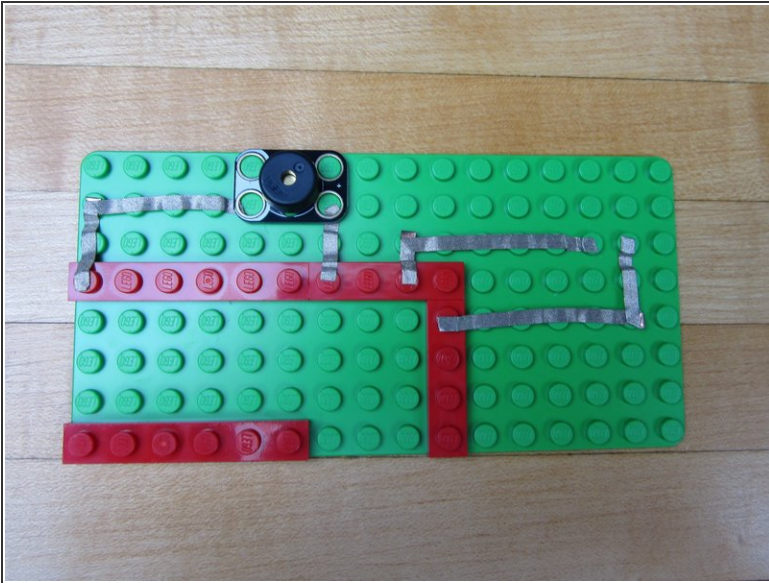
- Run Maker Tape from Pin 16 to where you want your Piezo Speaker. Cut excess tape and press down with your fingernail or the Piezo Speaker.
- Run Maker Tape from the left side Ground Pin (white circle) to the Piezo Speaker.
- Press your Piezo Speaker into place.

Step 4 — Connect Pin 14 to the Screw Terminal



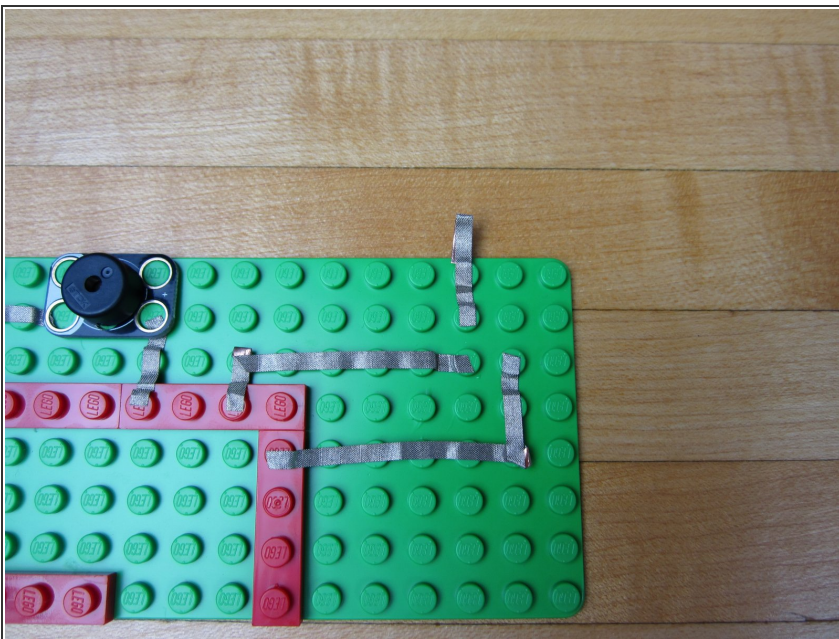
- Place your Screw Terminal near the top right corner for placement.
- Run a line of Maker Tape from Pin 14 to the white side of the Screw terminal.
- Cut excess tape and press to fit.

Step 5 — Connect VIN to the Screw Terminal



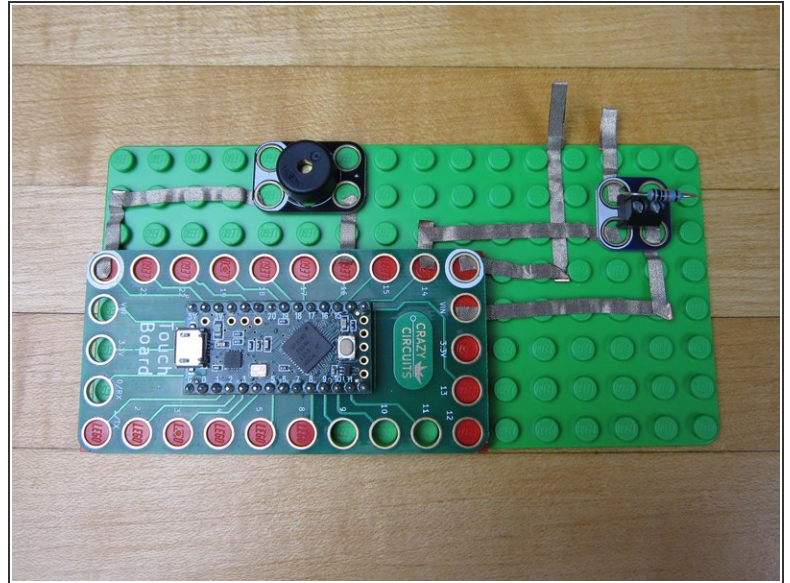
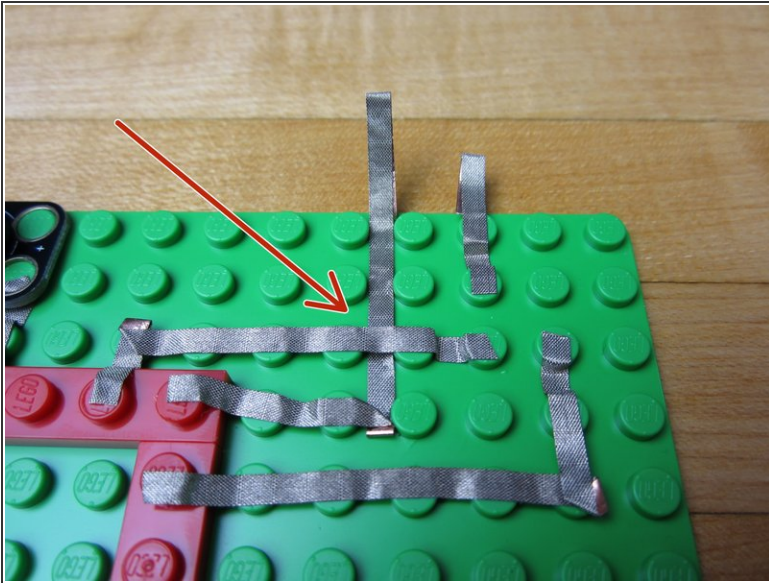
- Run a line of Maker Tape from the VIN pin to the blue side of the Screw Terminal.
- Cut excess tape and press to fit.

Step 6 — Add an Alligator Connection Strip



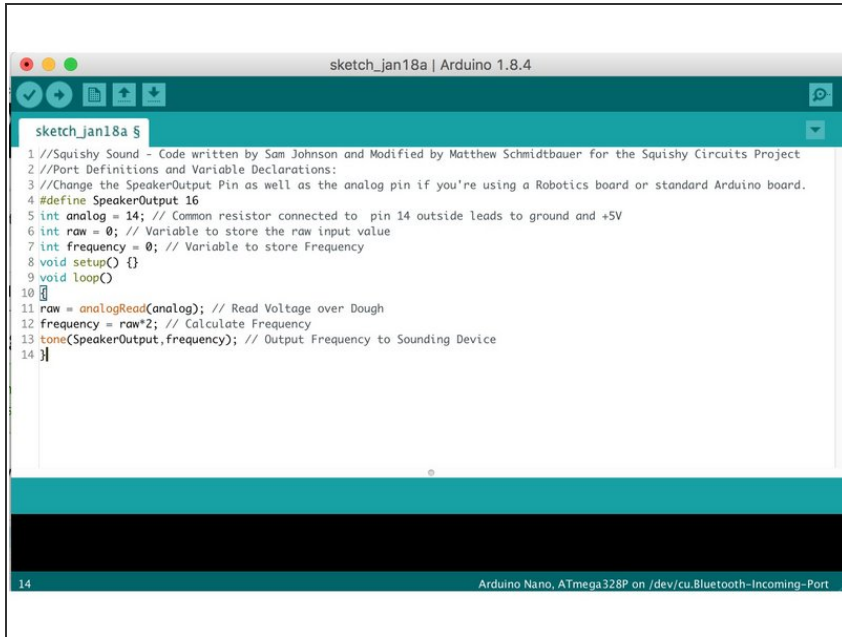
- Use a piece of Maker Tape and go from the second hole on the Screw Terminal off the side of your building surface.
- Fold over the tape onto itself so it's conductive on both sides. You can also just run it to the bottom side of the base plate as well.

Step 7 — Connect Ground to Alligator Clip



- Use a longer line of tape and go from the Ground pin off the side of the board.
- Start by threading a long piece of tape UNDER the pin 14 line of tape.
- Connect one end to the Ground pin. Let the other end hang off the edge, and fold it over like you did before.
- Use a pencil, screw driver, or paper clip to push down the tape so that the Ground line isn't touching the Pin 14 line.

Step 8 — Upload Code

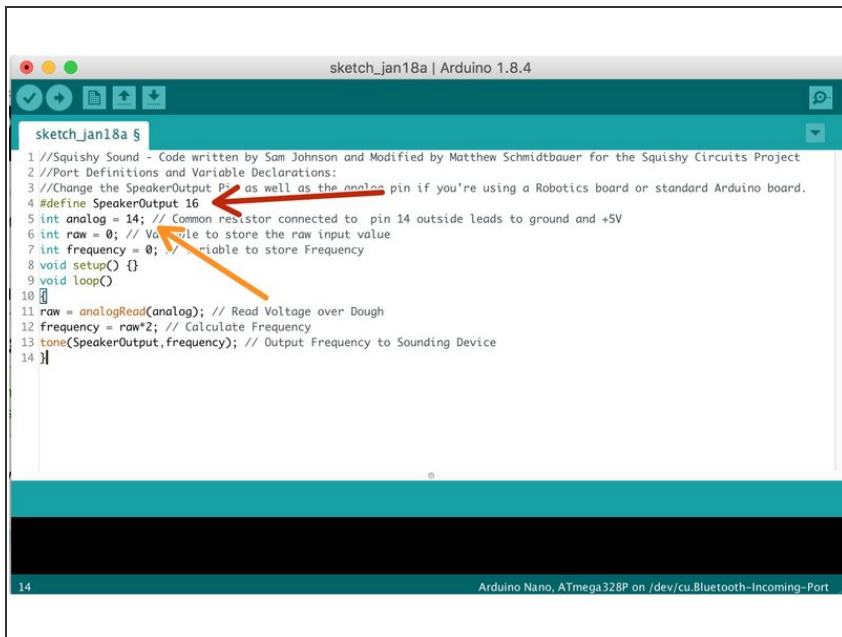


```
sketch_jan18a | Arduino 1.8.4

1 //Squishy Sound - Code written by Sam Johnson and Modified by Matthew Schmidbauer for the Squishy Circuits Project
2 //Port Definitions and Variable Declarations:
3 //Change the SpeakerOutput Pin as well as the analog pin if you're using a Robotics board or standard Arduino board.
4 #define SpeakerOutput 16
5 int analog = 14; // Common resistor connected to pin 14 outside leads to ground and +5V
6 int raw = 0; // Variable to store the raw input value
7 int frequency = 0; // Variable to store Frequency
8 void setup() {}
9 void loop()
10 {
11   raw = analogRead(analog); // Read Voltage over Dough
12   frequency = raw*2; // Calculate Frequency
13   tone(SpeakerOutput,frequency); // Output Frequency to Sounding Device
14 }
```

- i** If you've never used your Invention Board before, review the [Invention Board User Guide](#).
- Plug your Invention Board into your computer and open up the Arduino Software.
- Follow [this link](#) and choose either the ConstantTone or StepTone code. Copy and paste the code into a new project window in the Arduino Software.
- Upload the Code.

Step 9 — Robotics Board Changes

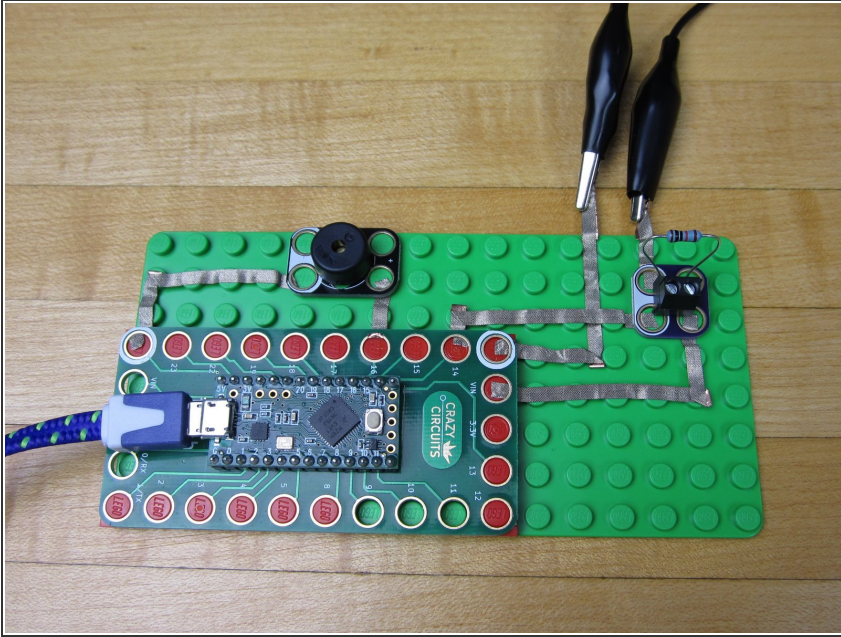


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sketch_jan18a | Arduino 1.8.4

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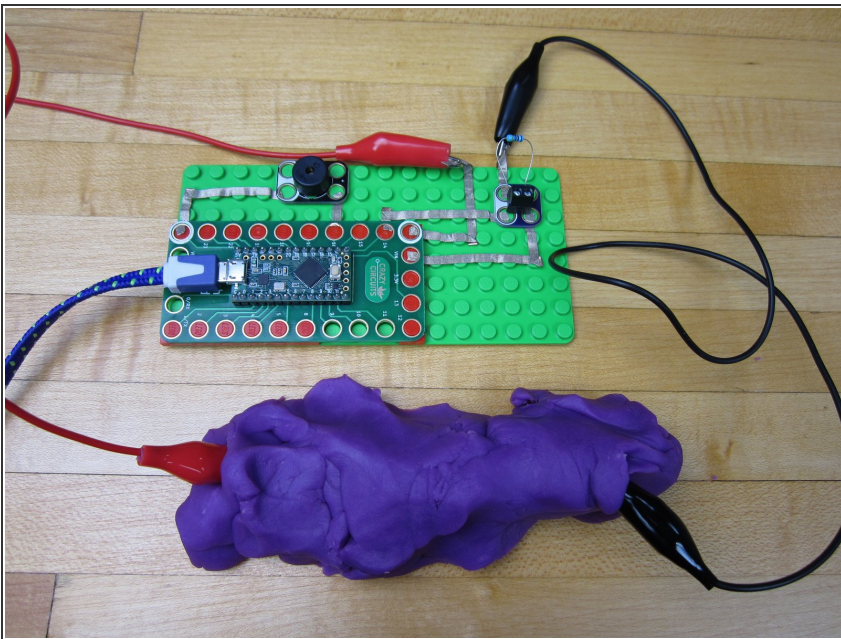
- i** If you're using a Robotics board you'll need to change a couple of lines.
- Change the Speaker Output Pin to 3.
- Change the Input (Analog Input) to A5.
- i** At the end of this write up is a diagram for how we suggest you hook up your Robotics Board, however the pins you use are entirely up to you.

Step 10 — Test Everything... Again



- Leave your Invention Board plugged into your computer.
- Use an Alligator Clip to connect your two Alligator Connection Points together.
- No matter which code you're using, you should hear something come out of your speaker.

Step 11 — Connect Your Dough



- Connect the second Alligator Clip.
 - Plug both Alligator Clips into the dough.
 - Stretch the dough, change shapes, and do all silly manner of things. The sounds coming out of the Piezo Speaker will change.
- i** Add a second batch of dough to the mix and make a reaaaaaaallllllllly lone line.