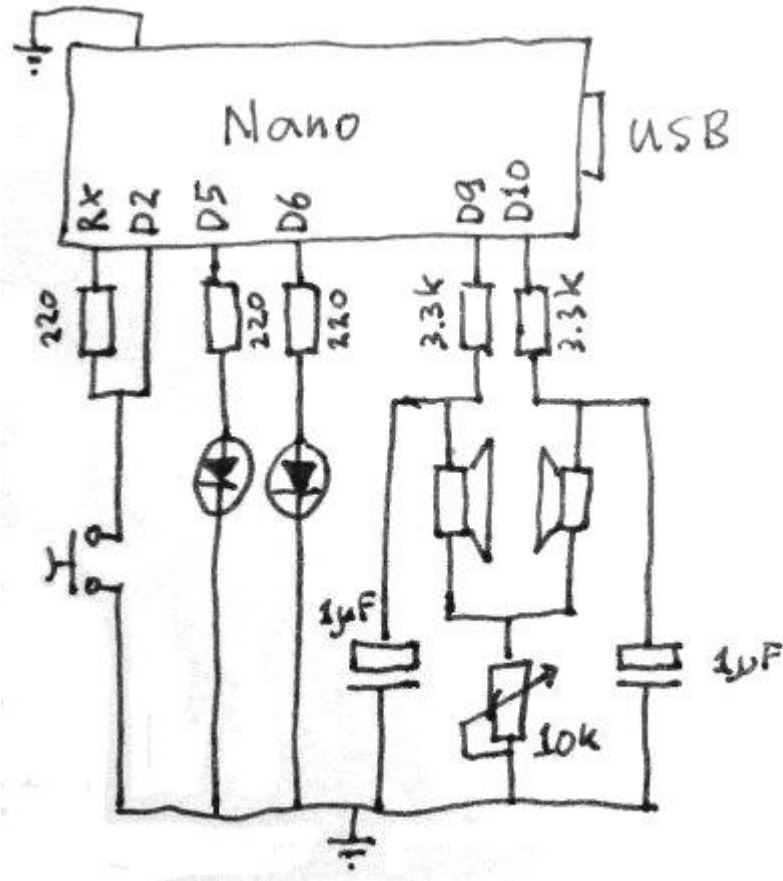


Brain Machine

From

A friend of mine wanted to have a brain machine like the one offered by Ada Fruit, but when it turned out that the international shipping costs were rather high, I decided to build one myself from parts. I started with the design by Chris Sparnicht and took some ideas from the brain machine from Ada Fruit with respect to the schematics of the headphone. I also decided to use a single potmeter to control the volume by putting it between the 'ground' of the earphones and the ground. I am aware that this could cause some crosstalk when the volume is reduced, but I hope it is not going to be a big problem. I arrived at the principal schema as displayed below based on a cheap Arduino Nano clone

Project: Brain Machine	
360x360px	
Name	Brain Machine
Initiator	FFAA5E
Status	Finished, kind of
Skills	soldering, Arduino
Summary	Creating a Brain Machine after an idea by Mitch Altman



Contents

- 1 Parts
- 2 Soldering PCB

- 3 Wiring
- 4 Glasses
- 5 Programming

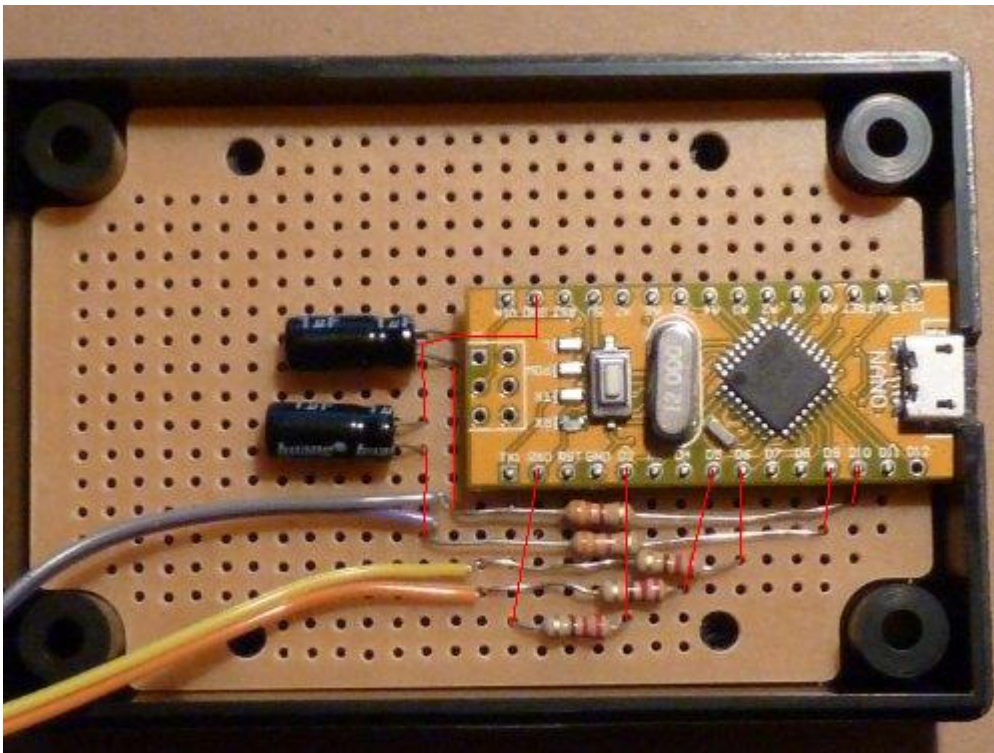
Parts

I bought the following parts from STORES for the brain machine:

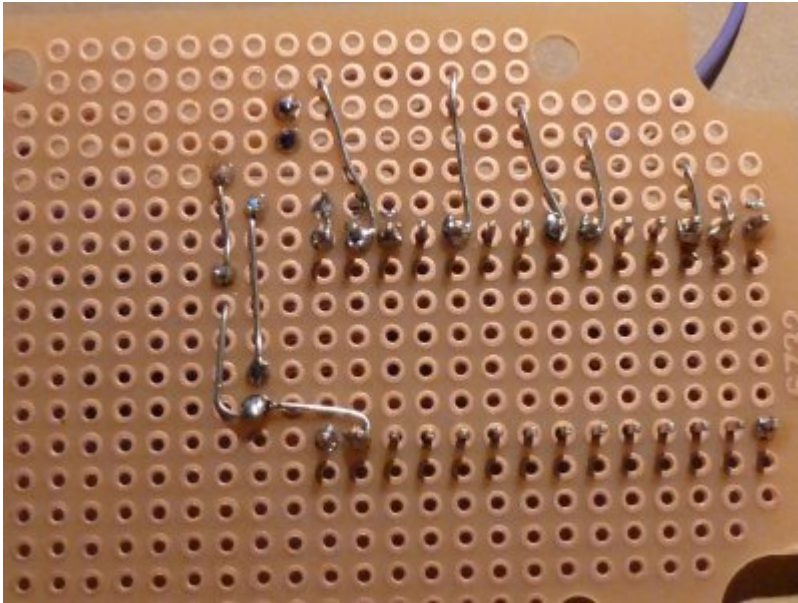
- 10K potmeter with nob
- 2m 3.5 jack extention cord
- Two 3.5 female jacks
- Three 220 Ω resistors
- Two 3.3K Ω resistors
- Two 1 μ F elco condenstators
- Two red 5mm LEDs
- Small box including PCB

Soldering PCB

I spend about four hours working at assembling the brain machine. I spend some time removing some material from the PCB of the Arduino Nano near the USB connector with a file, to make it fit in the box. Next I spend some time putting the components on the PCB. I also attached some wires (not all) that will connect to the jacks, the potmeter and the reset button on the top part of the box. Below a picture of the PCB in the box, where I added some red lines to indicate how the components are connected on the back.

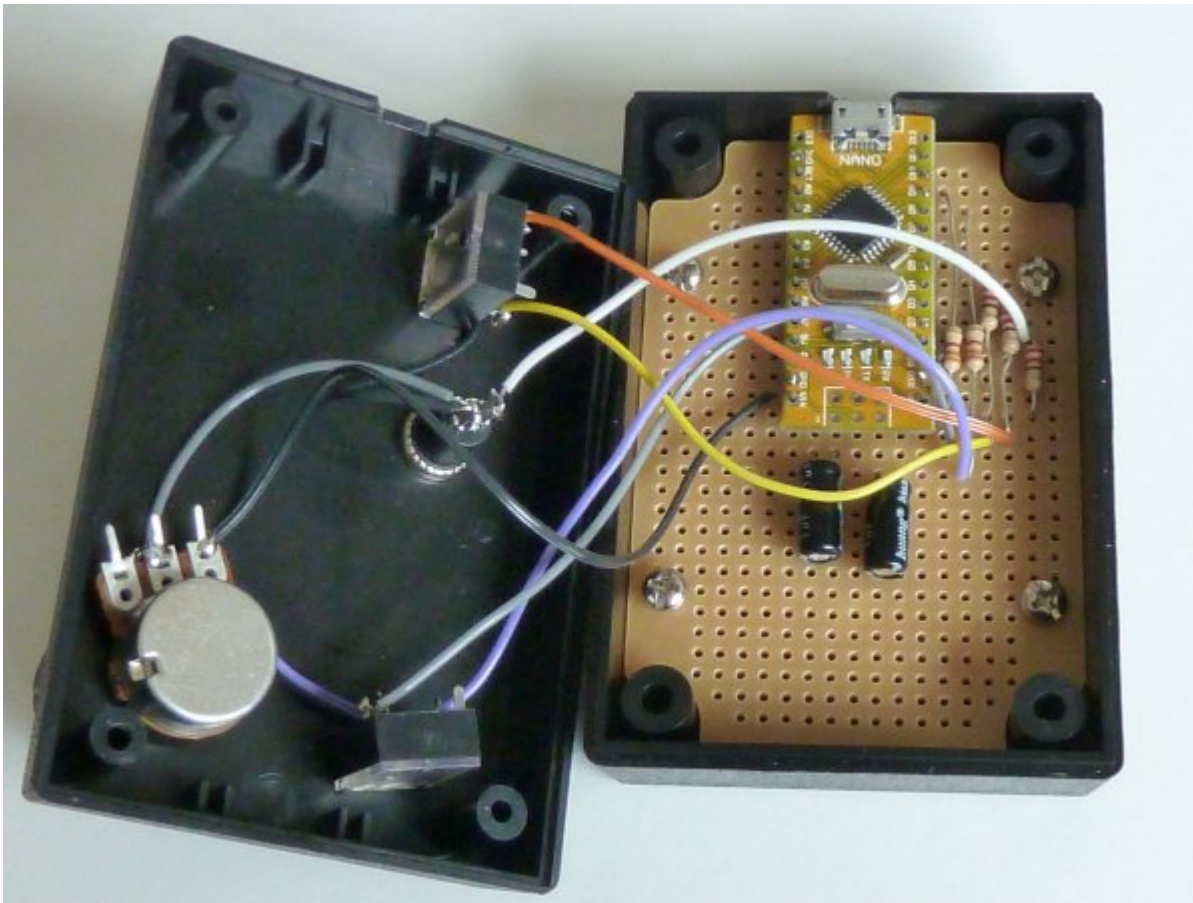


A picture of the back of the PCB:



Wiring

I drilled holes in the box for the jacks, the potmeter and the reset button. Finished the wiring between the PCB and these parts. The result can be seen in the picture below.



Glasses

Next, I made the glasses with the LEDs. Bellow a picture of the finished box with the glasses and some headphones



Programming

After I downloaded the code (`Arduino_Brain_Machine.pde`) from Chris Sparnicht, I noticed that the LEDs where left switched on after the whole sequence had finished I discovered that the schematics had the LEDs connected to the positive voltage, where I had connected them to the ground. I asked someone about whether this was a problem and I understood that connecting the LEDs to positive voltage may make them brighter. I also modified the sequence of blinking frequencies, removing the gamma waves that interleaved the delta was in the middle.

I also noticed that the reset button did not work, but that it was only used to restart the sequence after it had completed after it had started on power-up. I changed it in such a way that the sequence does not start on power-up, but that the button has to be used to start the sequence and that the button can also be used to stop the sequence once it is running. This resulted in the following `BrainMachine.ino`.

I already had reasoned that the volume control might not going to work as designed and that I might have to add two diodes to fix that. And indeed the volume control did not work, but it did influence the quality of the sound, and I decided to keep it as it is for the time being.

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