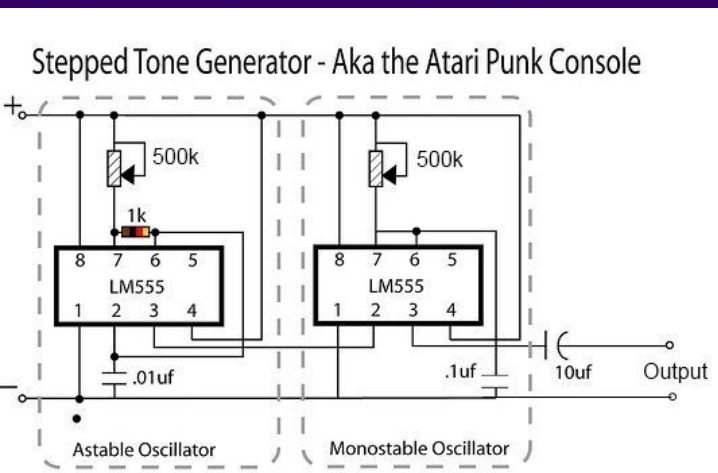
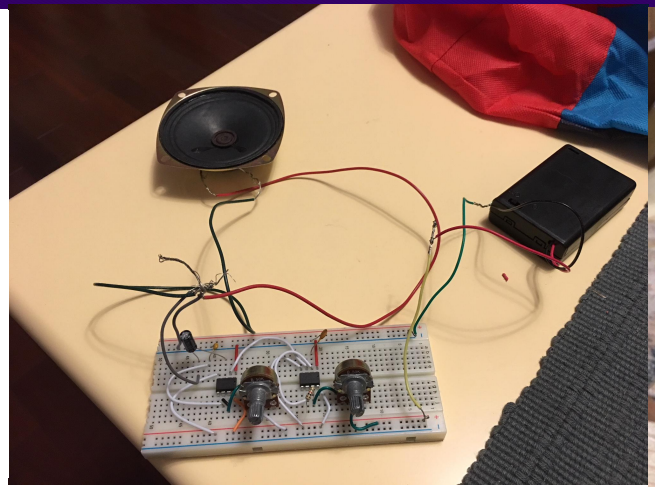

Synthesizer Capstone
Epifanio Rios

Brief

Throughout the year my capstone has been dedicated to learning about and creating synthesizers. A subject that I have been interested in exploring in the past few years and found a reason to pursue it through the capstone process that occurs throughout the senior year. During this process I've created a series of synthesizers that align with the goals I have set up for the project, and I have reached several personal goals in the process. The entire process can be broken up into a couple of phases.

Phase One: Synth's first steps

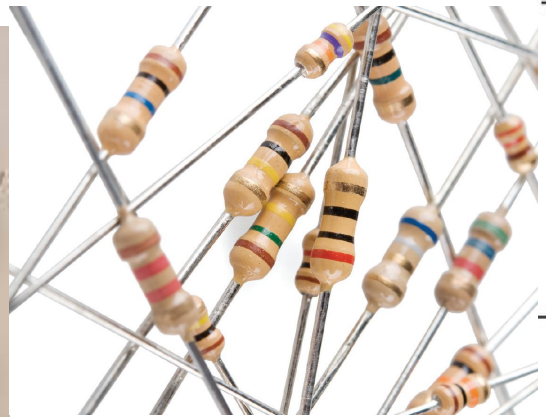


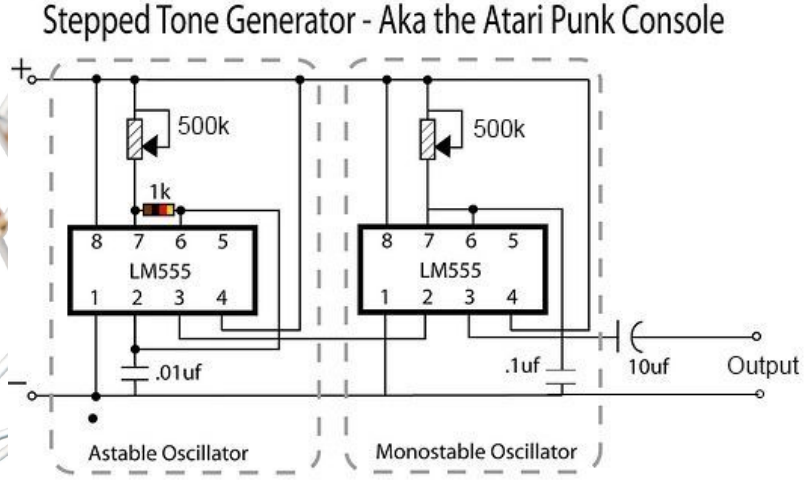


The Atari Punk Console - OG Synth

Phase One: Learning Curve

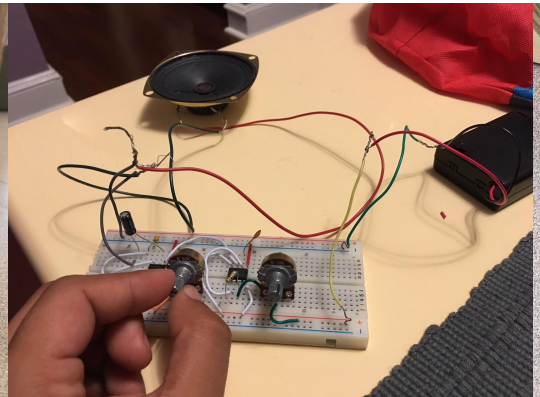
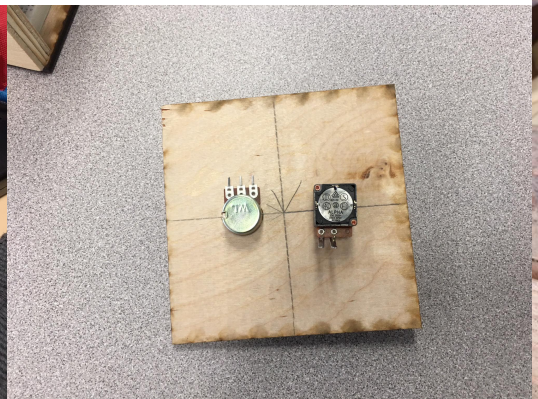
The first phase was filled with tons of learning about things I have had little experience in and had no idea what to do with. A large part of it was learning how to read schematics and learning what each component in it was responsible for. Resistors Capacitors and jumper wires were just a few of the new friends had to make in this first phase.





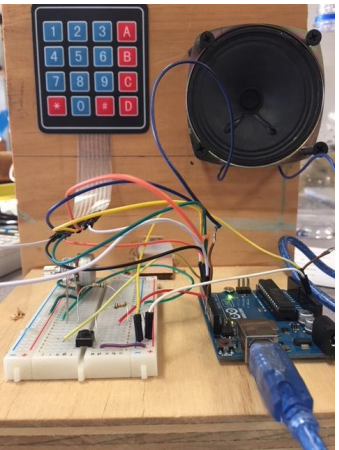
Phase One: Construction

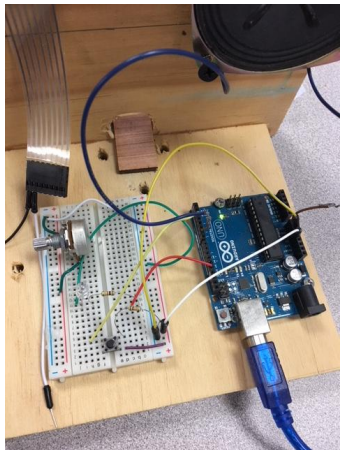
The amalgamation of all the work and the learning done throughout this first phase amounted to the first fully functioning synthesizer that I have ever created. It was the first steps in accomplishing my goals and moving forward into understanding and fabricating synthesizers. Overall this part is always the most fun when it comes to this process.

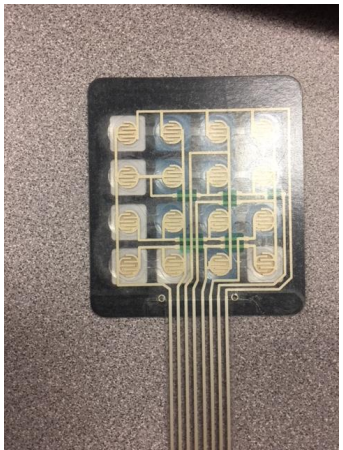





Phase Two: What's Next?

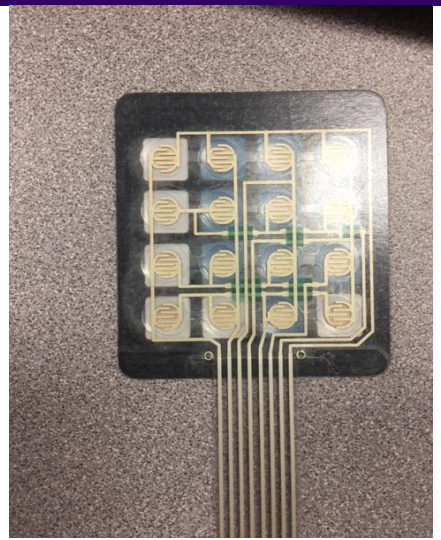
After the first phase figuring out what to do next was the hard part. How do I move on into something bigger something even more trying? That led me to the second phase of my synthesizer, which was moving into digital synthesizers, with the help of arduinos, programmable microcontrollers. Which is a different from the analog style of synthesizers I had previously built.

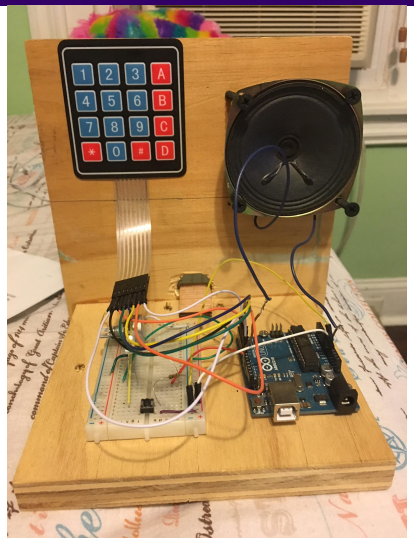






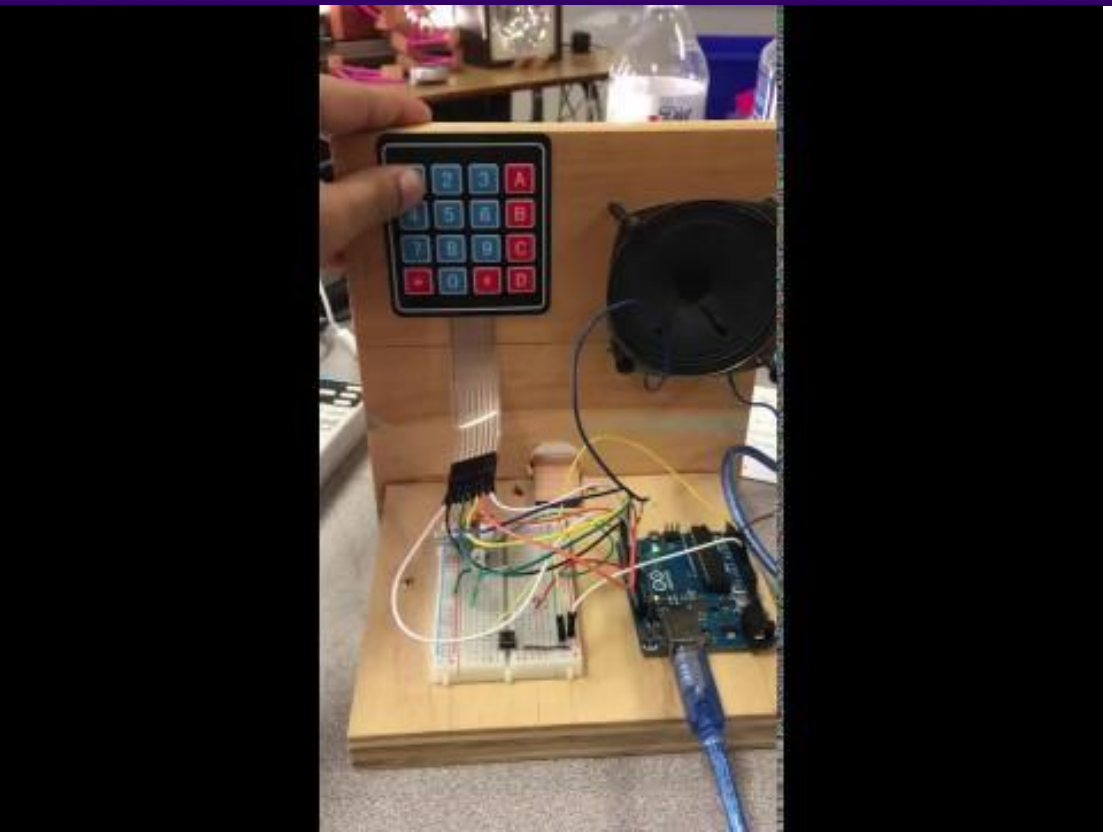
Phase Two: Programming





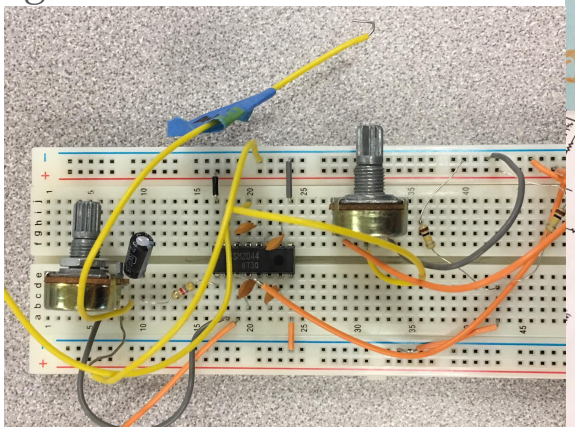
With the introduction of a digital front I had to further develop skills and understandings surrounding programming and programming languages. To have an arduino synth function I had to program the tones it played into an array that is programmed into a keypad.

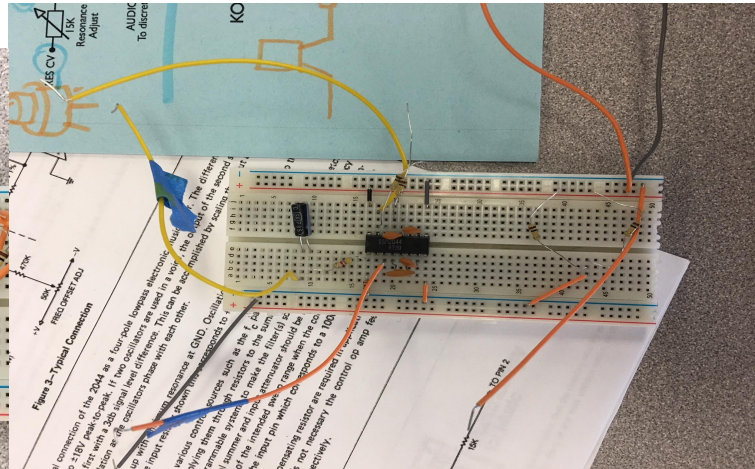
Phase Two: Testing



Phase Three: Dazed and Confused

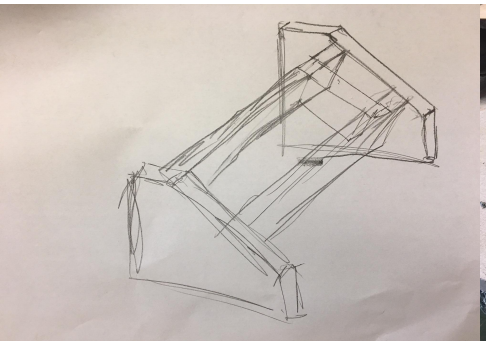
To even further up the ante of the previous phase, now became the time to work on other synth components and more complex systems. One of these components included a filter which removes portions of a the waves being generated by the synth or more specifically the sound generator in order to get a more clear sound. Though this did not turn out to be as successful as desired as we managed to intercept very specific radio signals through it.

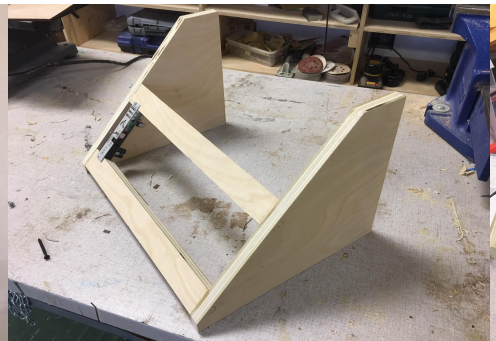


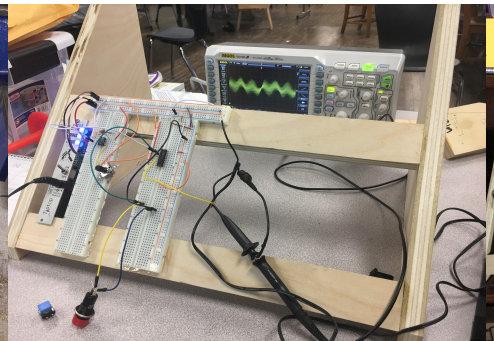


Phase Three: Modular more like Tubular

After the long affair with the filter, it came time to move on and back into sound generators. The next step came clear as to come closer to my dream of creation a large modular synth was being realized. The modular synth is meant to be able to house multiple modules along the sound generator, such user interface systems, filters, sequencers, voltage controlled amplifiers, and many more. Much of this was an exercise in designing a synth housing and further understanding analog synth systems.







Phase Four: The Final Stretch

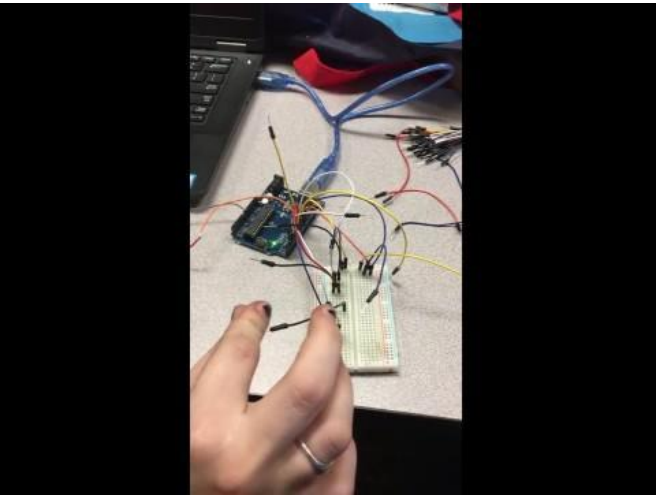
To appropriately end the year and the project off, the next synthesizer had to be a step up from the modular synthesizer. It had to have a functioning keyboard and have that keyboard actually be a keyboard. So I was on track to creating manufacturing and designing a press activated system, when an idea struck to make a keyboard with a little less pressure on it. So came a wonderful idea and addition to my synth family.

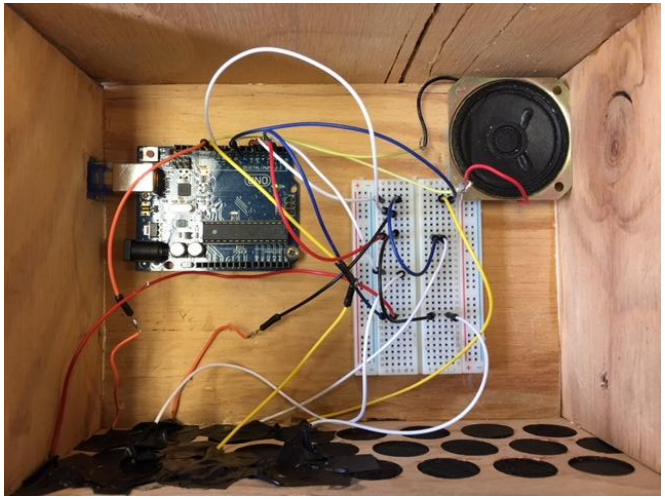
Phase Four: Damn Does 3D Printing Suck

So the idea was to create a touch sensitive keyboard that uses the resistance generated by your skin. Once you simply touched the button, without the need of a single press, a tone is activated. This required tons of everyones favorite thing, 3D printing and dealing with the 3D printer. With the 3D printer, I had used conductive PLA which was able to run current through to be able to have the touch sensitive buttons.

Phase Four: Close but actual Cigar

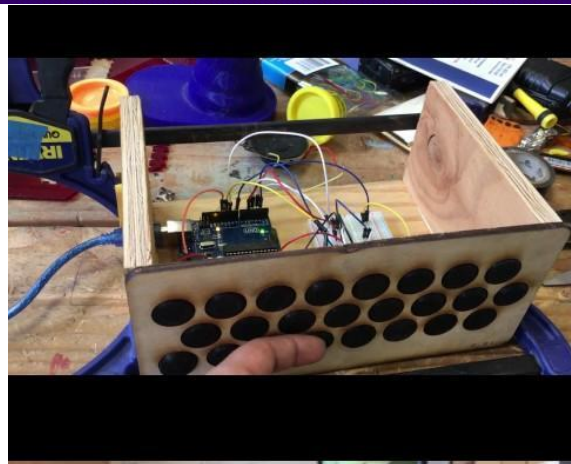
For this synthesizer I had returned back to using the digital method of using an arduino and some good old C and C++. So back to the totally not frustrating world of programming I went and was able to set up the code necessary to make this final synth happen. And well it turned out pretty alright if you ask me.

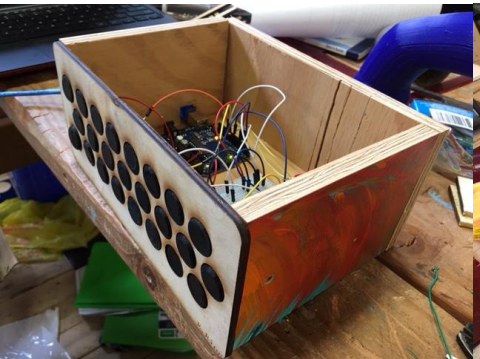


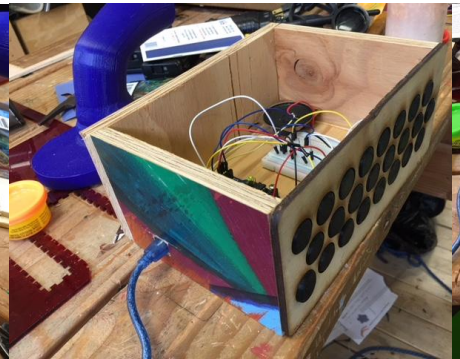


Phase Four: Not Quite a Magnum Opus But...

So now it all came down to completing and building the housing necessary for the arduino, the speaker, the pins, the breadboard, and connecting the pins to the keyboard. I mave have overcompensated on the button department.







THE END

OR IS IT?