



DOOM SYNTH



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Abstract

The idea for the DOOM Synth project comes from the desire to create a self-contained instrument that is able to reproduce the sound and style of Mick Gordon's guitar pedal array that was created for the soundtrack for the video game DOOM 2016. Rather than create the same system of jury-rigged pedals and mixers that was originally used, a device designed specifically to create a unique and similarly distorted sound that the guitar pedal array did is what we hope to achieve.

Needs and Problems

The biggest problem currently with making a system that accomplishes this sort of distortion effect is that they are expensive.

- Guitar Pedalboard: \$2000
- Digital Audio Workstation: \$200-600 (low-end)
- Analog Workstations: >\$2000

Additionally, the original was designed with a CPU/instrument input to be used as the main musical instrument of the array. It had no musical capabilities of its own, requiring an external device to take advantages of its effects.

Design Concept

The goal is to create a modular system that has a similar functionality to Mick Gordon's guitar pedal array, but as its own musical instrument with functionality similar to a keyboard synthesizer. All effects are toggleable, and they can be mixed and matched as the user desires.

Design Concept (cont.)



(potential/mock design)

The keys themselves would not range across that of a full piano, and we are instead opting for the smaller range of the C1~C3 octaves for a deeper tone to match the heavier, grungy, and unique sounds that the modulation and distortion effects create when combined together with the whole array of effects.

Components

An incomplete list of components consists of:

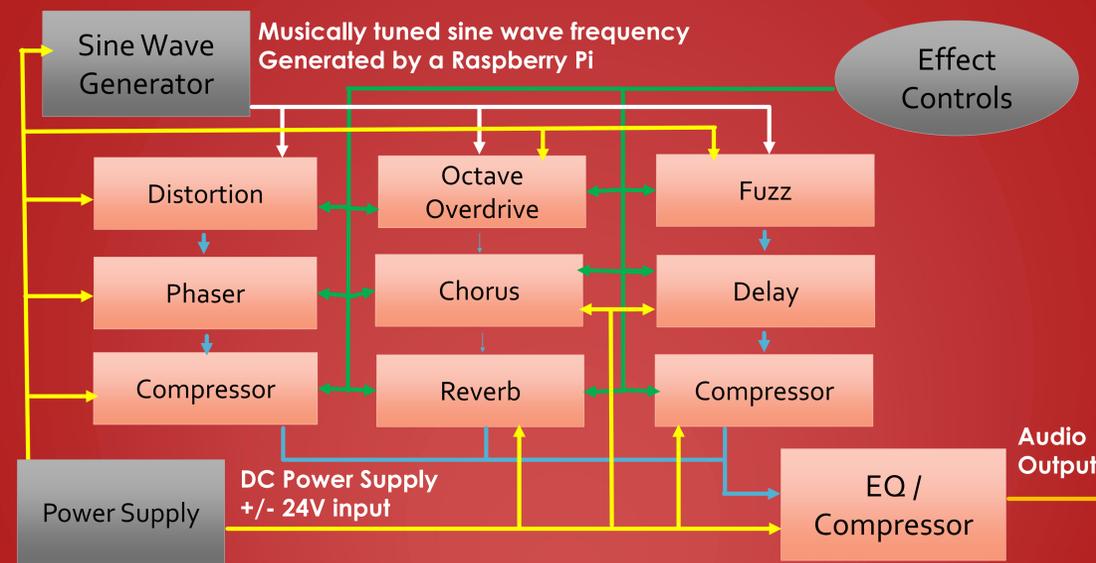
- Raspberry Pi - To generate the notes
- Bucket Brigade Devices - For effects
- Quarter-inch Audio Jacks - For audio out

Work to be Done

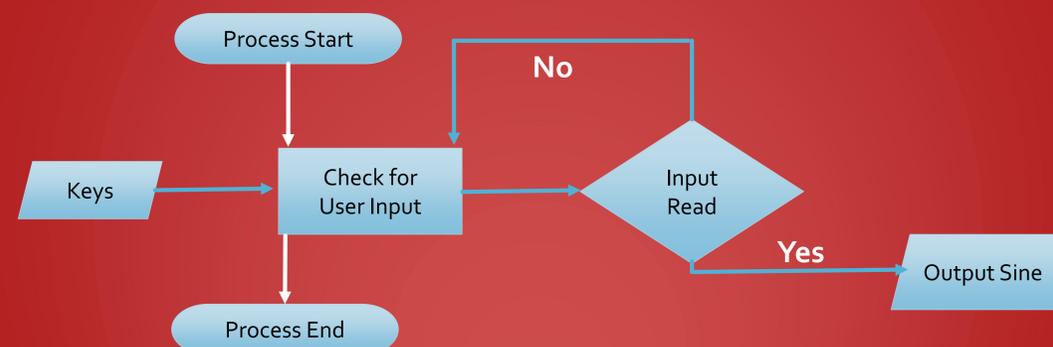
The general plan for the project is as such:

- (3-4 weeks) - Assemble designed circuits.
- (2-4 weeks) - Testing the effects, individually and in combination
- (4-8 weeks) - Fixing issues/finalizing project

Functional Design Diagram



Software Design Diagram



Glossary

- **Synthesizer** - An instrument that generates audio signals by user input, usually with piano like inputs.
- **Workstations** - Station to mix audio and sound, be it through analog machines, or with specialized software on a computer.
- **Guitar Pedal** - A device that modulates/distorts an input audio signal
- **Bucket Brigade Device** - Stores analog signal along a series of capacitors,

Acknowledgements

The Doom Synth team would like to give a special thanks to Dr. Jonathan Votion, Mick Gordon, and id software.

We would also like to recognize the UTSA Makerspace, Student Success Center and UTSA ECE department faculty and staff for providing the resources, instruction and support related to this project.