

sddec18-21: Multi-Effect Sound Pedal Sequencer for Performing Musicians

Week 7 Report

March 25 - March 31

Team MembersTyler McAnally — *Software Lead / Outreach*Karla Beas — *Facilitator / Hardware Engineer*Charles Rigsby — *Hardware Lead*Calyn Gimse — *Digital Lead / Test Engineer*Derrick Lawrence — *Report Manager / Hardware Engineer*Professor Randall Geiger — *Adviser / Client*Professor Joseph Zambreno — *Course Instructor***Summary of Progress this Report**

This week we focused on a few technical issues that are halting the initial prototype. Finishing touches were made on the digital effects that will be used, and we currently have 9 effects implemented. Effects have been programmed to be used in series, and functionality can allow for 3 effects, but can be modified to allow more. We have ordered parts to begin building a prototype with, including an ADC that fits the criteria we needed ($\geq 44\text{k}$ sample rate, -2V to $+2\text{V}$ reference, non-differential input, serial output), an adapter to use the surface mount package with a breadboard, and a few connectors that will be needed to get the instrument signal to the breadboard. We have researched the audio output system on board the raspberry pi hardware. We have also begun researching the bluetooth communication system.

Pending Issues

We need to better understand the PWM output that the raspberry pi 3 uses. We are unsure if this signal will be able to be fed directly into a speaker and/or amplifier. We need to do some review of embedded system topics in order to fully understand the clock signals and other digital I/Os we will need to feed into the ADCs we have ordered. Another issue we are facing is that bluetooth is most commonly used to transmit audio signals. We want to use it to simply transmit data from an android app to the raspberry pi, which may require a 3rd party interface.

Plans for Upcoming Reporting Period

Once the hardware parts we ordered come in, we will begin building a circuit to pull an analog signal from a guitar. We have a guitar, an artist to play it, and the required hardware to convert the output of the instrument to a digital signal. We are going to save that data and convert it to a WAV file to be replicated and allow for faster and easier testing in the future. Once the signal has been acquired, we will invest heavily in better understanding using bluetooth to send/receive data instead of audio signals. There may also be work to complete in regards to additional hardware needs as we get closer to a working prototype.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Tyler McAnally	Researched bluetooth compatibility and	4	27

	capabilities, home screen of application completed		
Karla Beas	Researched output stage of raspberry pi, contacted president of Audio Engineering Society to assist with questions	4	26
Charles Rigsby	Adc Research, UI Research, Parts Research(buttons, display, pedal, etc)	6.5	28.5
Calyn Gimse	Fixed some bugs in the code, completed implementing digital effects, added serial effect stacking	5	35
Derrick Lawrence	Verified operability of ADC and ordered input circuit hardware, researched negative voltage input to ADC	3	26