sdmay19-11: MIDI Zeusaphone (Singing Tesla Coil)

Week Report 13

Winter Break, January 14 - January 24

Client/Advisor

Joseph Zambreno

Team Members

Gunnar Andrews — *Webmaster*
Leo Freier — *Interrupter and Micro Controller Lead*
Luke Heilman — *Technical Architect*
William Brandt — *Pulse Width Modulation Expert*
Greg Harmon — *Tesla Coil Construction Expert*
Jacob Feddersen — *Communications Specialist*

Summary of Progress this Report

- Built and tested proof-of-concept miniature, low power tesla coil
- Construction of oneTesla Musical Tesla Coil Kit
- Hardware design for custom tesla coil
- Configured PI as an access point on its own network
- Created beginning web API with a fully functioning backend
- Added functionality to driver

Past Period Accomplishments

- Completed Basic Functionality of Web API - Leo, Gunnar, Jake
    - Configured PI to be a stand-alone access point on its own network
    - Set up basic apache server on the PI
    - Wrote HTML page for a front end, and some basic php scripts to gain a basic functionality and connection to the backend
    - A user can now log into the PI, then select a song to play. That song will then play
- Worked with Homemade Coil - Jake, Leo
    - Played around with Jake's homemade coil to learn more about building and configuring the coil.
    - Not a long-term prototype, but working with it was helpful for practice.
    - Proof of concept, demonstrating the operating properties of a tesla coil
- Construct and Test OneTesla Interrupter Circuit - Jake
    - Build and solder oneTesla Interrupter according to specs and instructions given
    - Test board logic and construction using provided steps
- Construct and Test OneTesla Main Board Logic and Power Circuits - Jake, Luke, Greg
    - Build and solder the main board per instructions
    - Test Logic circuit and connection with the interrupter
- Research and select driver design for our own tesla coil - Jake
    - Most designs based on schematics originally from Steve Ward
    - Selected Mini SSTC 5 as base design, for its simplicity, similarity to oneTesla, with which we are familiar, and common implementation, indicating that it is a reliable design to construct
    - Modified the diagram to modularize the circuit for construction and testing and enable music

Pending Issues

- Need to find good location for consistent testing of the coil
    - Need space away from people and electronics, indoors

Plans for Upcoming Reporting Period

- Finish and Test OneTesla coil and interrupter
- Finish parts list for own coil implementation
- Improve web API
    - Add the functionality for a user to add a midi file to the list of songs to play
    - Also add the functionality for the list of songs on the API to update dynamically based on the locally saved songs (possibly uploaded by the user)
    - Start experimenting with bootstrap to improve aesthetic of the webpage
- Research keyboard and specifications for the Pi we will use
- Make plan for prototyping and testing tesla coil circuit modules safely

---

Individual Contributions

Team Member	Contribution	Reporting Period Hours	Total Hours
Gunnar Andrews	● Updating and setting configuration files on PI(w/Leo) ● Setting up PI as an access point on its own network(w/Leo) ● Loaded apache server on PI(w/Leo) ● Created beginning html page for web api(w/Leo) ● Created backend for web api and set up communications from user to backend processes (w/Leo)	12	83
Leo Freier	● Working with Jake's homemade coil for practice (w/Jake) ● Helped set up Pi as an access point (w/Gunnar) ● Completed basic functionality for web API (w/Gunnar)	13	82
Luke Heilman	● Helped review soldering the interrupter (w/Jake) ● Learned to solder with practice kit ● Soldered part of the main board of the OneTesla (w/Jake and Greg) ● Researched parts for group's own implementation of coil (w/Jake)	18.25	95.25

William Brandt	● Assisted with construction of tesla coil ● Looked over designs for our own coil	8	74
Greg Harmon	● Soldered main logic board of OneTesla ● Gathered materials to insulate the secondary coil of OneTesla ● Review final designs ● Look at part list	12	88
Jacob Feddersen	● Research, order components, and build miniature tesla coil ● Construct oneTesla interrupter circuit ● Assist with oneTesla coil construction ● Research and select our own tesla coil design ● Transmitter/receiver circuit design ● Parts list for tesla coil ● Web API and Raspberry Pi interface	39	122.5

Gitlab Activity Summary

commit c69f9f51b9628b730843106a8fb42c6a58723516 (origin/pi_generate_wave)
Author: Leo Freier <lmfreier@iastate.edu>
Date: Mon Jan 21 16:52:22 2019 -0600

updated scripts/client