sdmay19-11: MIDI Zeusaphone (Singing Tesla Coil)

Week Report 17
February 21 - February 28

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

- Finished Web API design
- Completed initial PCB layouts
- Refactored PCB architecture
- Build and test power provider circuit

Past Period Accomplishments

- Drafted simple sketch of tesla coil case in SolidWorks - Luke
    - Using some ideas taken from the OneTesla:
        - Hold the PCB and case components together with standoffs
        - Use side panels on the case mostly for aesthetics, but will also hold power input
- Put power provider circuit on perfboard - Jake and Luke
    - Could then test the transformer and regulators taking power from 120V mains
    - Discovered the transformer operates differently than expected
        - Doesn’t output constant voltage - it depends on the current draw
        - The output was also higher than expected
        - Transformer reconfigured to output 10V instead of 20V
        - The actual rectified output voltage was closer to 16V
        - Tested circuit with the rest of mini-tesla coil, and it worked
- Web API design - Gunnar Andrews
    - First did draw.io XML design
    - Then implemented design into html
- Completed first drafts of all PCB layouts - Leo
    - Three main circuits have an initial draft layout
    - Primary circuit layed out in diagram form
- Changed overall PCB architecture
    - Changed to two PCBs for the coil
    - One with input logic and power provider, the other with only the bridge
    - Combined IL and PP onto one layout in Ultiboard

Pending Issues

Nothing to report

Plans for Upcoming Reporting Period

- William-Design safety document, work elsewhere as needed.
- Speak with Lee Harker to look over our current PCB designs
- Design bridge circuit PCB layout
- Integrate Web API design into live deployment on PI
- Once keyboard arrives start testing and working on pitch modulation
- Continue perfboading the circuit so we can test our own secondary coil on it eventually
- Order elements - bridge circuit, secondary coil, Raspberry Pi

Individual Contributions

Team Member	Contribution	Reporting Period Hours	Total Hours
Gunnar Andrews	● Completed API design in XML and HTML ● Selected and ordered keyboard ● Updated website ● Finalized api design and function with team	8	123
Leo Freier	● Completed first drafts of all PCB layouts ● Changed how each board is designed ● Initial draft of combined board ● Somewhat helped with power provider testing	8	123
Luke Heilman	● Researched materials/processes for making the case ● Brushed up on SolidWorks skills ● Drafted rough designs for tesla coil case ● Tested perfboard power provider circuit with Jake	12.75	156.75
William Brandt	● Talked with Leo about PCB design ● Began gathering information for safety document	6	113
Greg Harmon	● Heatsinks ● Sourcing PCB’s from OSH Park ● Discussed PCB layout with Leo	8	135
Jacob Feddersen	● Visited Lowe’s to check on available hardware for building secondary ● Perfboarded and debugged transformer circuit	7	178.75

Gitlab Activity Summary

None to report