Cover Page

Wednesday, December 1, 2021 9:19 PM

Lara Kassabian's Notebook
Sweet Dreams

Team members:
Radha Changela | rchangela3@gatech.edu
Hubert Elly | helly3@gatech.edu
Elizabeth Herrejon | eherrejon3@gatech.edu
Lara Kassabian | lkassabian@gatech.edu
Katie Roberts | kroberts73@gatech.edu
Christine Saw | csaw3@gatech.edu
Katie Weatherwax | katie.weatherwax@gatech.edu

Team Meeting 09/17/2021

Friday, September 17, 2021

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Christine Saw
Radha Changela
Hubert Elly
Lara Kassabian

Agenda Items

1. Introductions
2. Team Name decision
    a. Sweet Dreams
3. Need to get an advisor (does anyone know anyone?)
4. Team Skill Matrix (due 9/24/2021)
5. LettuceMeet for availability

Action Items

1. Fill out availability I everyone I 9/18/2021
2. Skill Matrix I everyone I 9/22/2021
3. Review Skill Matrix I everyone I 9/23/2021
4. Submit Skill Matrix I Katie Roberts I 9/24/2021
5. Make a list of availability I Elizabeth I 9/20/2021

Other Notes

General discussion of product and expectations for this semester.
Already planning subteams based on availability.

Team Skills Matrix Notes

Friday, September 17, 2021

Skills?

Analog design: 3043 -- 1
Digital design: 2031? -- 1
Real time coding: I don't know what that is -- 0
Mechanical design: robotics, internship etc. -- 3
PCB: internships -- 2
Project management: in class projects, internship gantt -- 3
Team leadership: robotics team lead -- 3
Technical writing: class reports (not really technical) -- 0

Team Meeting 09/24/2021

Friday, September 24, 2021

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Christine Saw
Radha Changela
Hubert Elly
Lara Kassabian

Agenda Items

1. Team skill matrix review
2. Advisor Decisions
    1. Emailed professor
3. QFD

Action Items

1. QFD | everyone | 10/01/2021
    1. Research
2. Gantt chart | Lara
3. Form Teams channel I Katie I 9/24/2021
4. Send email to professor about advisors I Elizabeth I 9/24/2021

Other Notes

1. Team Skill: reviewing sub teams (deciding leaders, project managers, etc)
2. Advisor: waiting for response from
3. Wanting a Teams channel for communicaiton and have all our files in one place
4. QFD: Elizabeth made the chart
    - General discussion of engineering and customer reuqirements
    - Potential Competitors:
        - https://hypebae.com/2020/12/personal-safety-self-defense-jewelry-rings-knockout-brand-kate-davis-founder-interview
        - https://www.defenderring.com/
        - https://www.invisawear.com/

Gantt Chart

Monday, September 27, 2021

- https://www.getapp.com/project-management-planning-software/gantt-chart/w/microsoft-teams/
- https://memory.ai/timely-blog/7-simple-project-management-tools
- https://www.wrike.com/
- https://www.fool.com/the-blueprint/slack-project-management/

Trello --> issues with teams integration

Decided on Teams for OneNote usage and OneDrive
Groupme for quick communication

Want Kanban and Gantt combination:
ClickUp

Team meeting 10/06/2021

Wednesday, October 06, 2021

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Dr. Jennifer Hasler
Radha Changela
Hubert Elly
Lara Kassabian

Agenda Items

1. Introductions I Elizabeth and Dr. Hasler
    1. Project Introduction
    2. Member Introduction
2. Project Discussion I everyone
    1. Goals
    2. Application
    3. Testing

Action Items

1. Biweekly PowerPoint for Dr. Hasler I everyone I 10/22/2021
2. Discussions I everyone I 10/20/2021
    1. What is our project? What does it do?
    2. Flush out ideas
    3. How are we going to test it?
3. Write down explorations/design notebooks I everyone I 10/20/2021
    1. Get all ideas and drafts down

Other Notes

- Christine Saw could not make the meeting due to a class conflict.
- Project ideas: simple circuits
- Research: microprocessors, how we are dealing with charge and clothing resistance
- Dr. Hasler: really liked the project idea but thinks we need a better description and better thought ideas
    - Flush out specific subsystems
    - Start working on technical aspects this semester
    - Do not leave coding till the end
    - Keep a PowerPoint of the design up to date: Use images and tables to show the design and the design updates etc.
        - Will help with the writing of the final proposal
    - Start thinking about how you are going to test it
        - Demo Videos
        - Reach out to ROTC trainees and ask for volunteers for product testing
    - Have shocking circuit trigger when it connects with a body (i.e. punch) and when it reaches a certain acceleration
        - Accelerometer

TRP Notes

Friday, October 08, 2021

What are the commercial applications of this technology?
- Are there any existing products available?
  - Fitbit charge HR cs-fht100sl - cameron sino -$15
  - apple watch battery
  - panasonic CG-320A
  - CPH3225A -seiko instruments
  - FYL0H473ZF - KEMET - $2.88
  - CPX3225A752D - Seiko -
  - XH414HG - seiko
- Who makes them?
  - Fitbit battery - Cameron Sino
- How much do they cost?
  - Fitbit battery - $15

How does the underlying technology work?
- Ex: What are the frequency ranges of interest?
- What algorithms are out there?
- What are relevant measures of performance?

What are the building blocks for implementing the technology?
- Are both hardware and software required?
- Is any special hardware available?
- What about embedded processor platforms?
- Wireless networks?
- Power considerations?

- li-ion batteries vs supercapacitors
- super capacitors don't store high voltage - but can use a transformer
- diy supercapacitor taser
- diy high voltage transformer for stun gun
- seiko micro battery catalogue
- Latest Advances in the Manufacturing of 3D rechargeable lithium microbatteries
- History, Evolution, and Future Status of Energy Storage
- https://maxwell.com/wp-content/uploads/2021/08/3003112-EN.1_3V-150F-Datasheet.pdf
- https://www.lithium-polymer-battery.net/ultra-thin-lithium-polymer-battery/
- https://www.lipolbattery.com/Ultra-Thin-LiPo-Battery.html
- Thin-film batteries ranging from 1 to 10mm^3 have power from 10nW to 1mW.
- https://web.archive.org/web/20110531014449/http://www.cartage.org.lb/en/themes/Sciences/Chemistry/Electrochemis/Electrochemical/ElectricalDouble/ElectricalDouble.htm
-

Team Meeting 10/15/2021

Wednesday, December 1, 2021 11:05 PM

Attendance

Elizabeth Herrejon (left at 1:30) (returned at 2)
Katie Weatherwax (left at 3)
Katie Roberts
Radha Changela
Hubert Elly (left at 1:30)
Lara Kassabian (left at 1:30)

Agenda Items

1. Gant and Pert chart
2. Breaking into subteams and deciding on schedule

Action Items

1. Biweekly PowerPoint for Dr. Hasler I everyone I 10/22/2021
2. Discussions I everyone I 10/22/2021
    1. What is our project? What does it do?
    2. Flush out ideas
    3. How are we going to test it?
3. Write down explorations/design notebooks I everyone I 10/22/2021
    1. Get all ideas and drafts down

Other Notes

- Use this semester for research and brainstorming. Start prototyping and testing next semester

Team Meeting 10/29/2021

Friday, October 29, 2021

Attendance

Elizabeth Herrejon (joined at 1 pm)
Katie Weatherwax
Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian

Agenda Items

1. Standards and Codes

Action Items

1. Discussions I asap I everyone
    1. What is our project? What does it do?
    2. Flush out ideas
    3. How are we going to test it?
2. Budget Proposal I 11/12/2021 everyone

Other Notes

Just worked on the assignment

Team Meeting 11/19/2021

Friday, November 19, 2021

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw (left at 1)

Agenda Items

1. Project Proposal
    1. Discussing Demonstrations
    2. Deciding on final ideas
    3. Clarifying roles
    4. Finalizing budgets
2. Discussing topics, we want to bring up to advisor

Action Items

1. Project Proposal I11/22/2021 I everyone
2. Meeting with Advisor I 11/19/2021 I everyone
3. Final Summary I 11/22/2021 I everyone

Other Notes

Just worked on the assignment

Team Meeting 11/19/2021

Friday, November 19, 2021 Afternoon

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian
Dr. Jennifer Hasler
Christine Saw

Agenda Items

1. Discussion
    1. Discussing Demonstrations
        1. How to go about in testing
    2. Deciding on final ideas
        1. Specifically stun gun circuity

Action Items

1. Project Proposal I11/22/2021 I everyone
2. Final Summary I 11/22/2021 I everyone

Other Notes

- For stun gun circuit:
    - Instead of focusing on discharge current focus on charge and voltage
    - What should the voltage be (probably around 100 V)
    - Add a clearer circuit
    - Research what capacitor rating we will need
    - Desired current range: 1- 3 mA
- Testing
    - Start with lab bench testing
    - Then find volunteer to test on (military, Elizabeth's dad?)
- Things to consider
    - Resistance of the human body
        - Sweaty vs dry
        - Fat vs skinny
        - Skin vs clothing

Team Meeting 01/12/2022

Wednesday, January 12, 2022 1:39 PM

Location: **CULC**
Date: **1/12/2022**
Time: **12:30 PM – 2:30 PM**

Attendance

Elizabeth Herrejon
Katie Weatherwax
Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw

Agenda Items

1. Discussion
    1. Introducing new design idea
        1. Glove only
    2. Deciding on final ideas
    3. Timeline
    4. Oral Presentation

Action Items

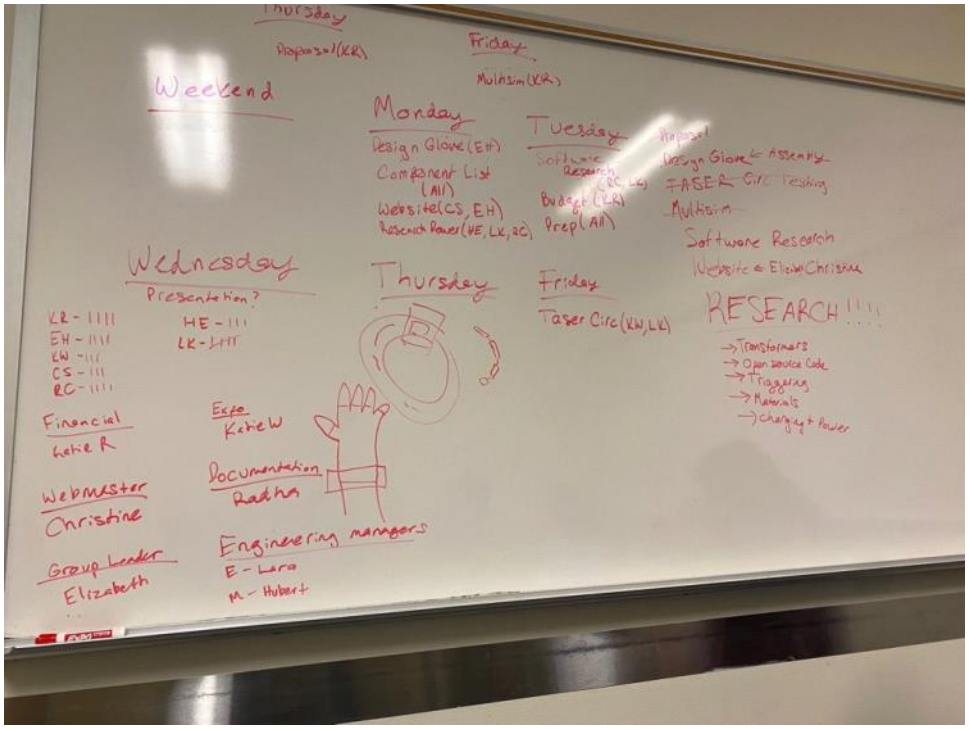
2. Oral presentation availability email |1/12/2022| Elizabeth
3. Weekly update email |1/13/2022| Radha
4. Student continuation form |1/12/2022| Radha
5. Proposal resubmit I1/13/2022I Katie W.
6. Budget I1/18/2022I everyone
7. Research |1/17/2022| everyone *see image below for research topic division
8. Oral Presenation|1/19/2022| everyone

Group Notes

- Finalized leadership role *See image on last page
- Finalized design
    - Glove design
    - Ring backup, Elizabeth looking into only ring design by 1/17
- GET MORE IMAGES for proposal

Individual Notes

<u>To-Do:</u>
Software research - due Tuesday 01/18 (with KW)
Open source code
Look on course website (groupme)
Taser Circuitry - due Friday 01/21 (with KW)
Power research - due Monday 01/17 (with HE, RC)
Component list - due Monday 01/17 (w everyone)
Prepare for oral presentation - due Tuesday (01/18)
Oral Presentation - due Wednesday (01/19)
Room Booker 8D


Thursday
Proposal (KR)
Friday
Multisim (KR)
Weekend
Monday
Design Glove (EH)
Component List (All)
Website (CS, EH)
Research Power (VE, LK, ZC)
Tuesday
Software Research (ZC, LK)
Budget (LR)
Prep (All)
Proposal
Design Glove & Assembly
FASER Circ Testing
Multisim
Software Research
Website & Elena Christine
RESEARCH!!!!
→ Transformers
→ Open source Code
→ Triggering
→ Materials
→ Charging + Power
Wednesday
Presentation?
KR - IIII
EH - IIII
KW - III
CS - III
ZC - IIII
HE - III
LK - IIII
Thursday
Friday
Taser Circ (KW, LK)
Financial
Katie R
Webmaster
Christine
Group Leader
Elizabeth
Expo
Katie W
Documentation
Radha
Engineering managers
E - Lara
M - Hubert

Software Research

Thursday, January 13, 2022 3:02 PM

Microcontrollers:

Name	Cost $/unit	Area cm^2	Features	Links
~~ATWINC3400-MR210xA~~ Stricken for being too excessive for our needs	~~14.01~~	~~3.30~~	~~Power Amplifier (PA), Low-Noise Amplifier (LNA), Transmit/Receive (T/R) switch (for Wi-Fi® and Bluetooth) and Power Management Unit (PMU)~~	-
ATtiny20	0.51	0.02	In-system programmable, 2K bytes of in-system programmable flash program memory, 0.128 kb sram	digikey
PSoC 4000 –none in stock	1.78	0.02	Up to 16 KB of flash with Read Accelerator, Up to 2 KB of SRAM, i²c	datasheet
KL03 - none in stock	3.17	0.03	32kb flash, 2kb sram,	digikey
Microchip PIC12LF1552	0.86	0.05	Self-Programmable under Software Control,	digikey
~~TinyZero~~ expensive	~~19.95~~	~~4~~	~~Like a small arduino~~	~~tinycircuits~~

Attiny comparison chart

What does the chip need to be able to do?

- What is input voltage? - depends on what battery we get
- Memory
    - Do we need SRAM? -- maybe to save SMS contacts?
- Communication
    - Serial
        - What type
    - How to send alert to emergency contacts?
        - Through phone? Bluetooth?
- Peripherals
    - Do we need an ADC? - if we pick only digital sensors- no
    - No need for encoders/PWM
- Power
    - Low power consumption

Open-source code (let's use C):

- GPS tracker for mini drones (10g weight)
    - Using ATtiny84A
    - Looks too big
- Sending SMS Text Message using PIC Microcontroller – Flowcode
- Implementation of Microcontroller Based Vehicle Location Tracker Using GSM and GPS
    - They used an arduino to send GPS info by SMS
- Security alarm using SMS messages.
    - Using AVR atmel
- Find a C compiler for attiny?

From <https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fgtvault-my.sharepoint.com%2Fpersonal%2Feherrejon3_gatech_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F7fc207f047f84fc997af96079f3265e8&wdenableroaming=1&mscc=1&wdodb=1&hid=A75A23A0-50AC-1000-6CDA-E84D9482D5D0&wdorigin=ItemsView&wdhostclicktime=1645567910392&jsapi=1&jsapiver=v1&newsession=1&corrid=6d18eab6-f2e0-4b1a-ad54-c3620d086982&usid=6d18eab6-f2e0-4b1a-ad54-c3620d086982&sftc=1&mtf=1&sfp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Medium&ctp=LeastProtected>

Team Meeting 01/18/2022

Tuesday, January 18, 2022 9:20 PM

Location: **Virtual**
Date: **1/18/2022**
Time: **9:00 PM – 9:35 PM**

Attendance

Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw

Agenda Items

1. Discussion
    1. Oral Presentation slides
        1. Send it to Dr. Hasler soon so we can set a date for the presentation
        2. Decided who is presenting what slide
    2. Overview of research done since last meeting
        1. Finalize parts and design
    3. Timeline

Group Notes

- Lara researched software and finalized microcontroller
- Lara and Katie W. will meet Thursday to build 'shock' circuit
- Hubert researched transformers and found one that conserves space
- Katie R. created simulation of 'shock' circuit
- Katie R. updated project proposal and submitted to Dr. Hasler
- Elizabeth designed glove layout/look and created the personal website
- Radha researched battery recharging and found a circuit
- Christine built the base of proposal power point and will talk to Elizabeth about website (updating)
- Katie W. researched and chose presser sensors and worked on the power point

Individual Notes

Discussing what people worked on since last week
Assigning slides to people

- Gantt chart
- Microcontroller

Team Meeting 01/19/2022

Wednesday, January 19, 2022 1:12 PM

Location: **PG Library**
Date: **1/19/2022**
Time: **12:30 PM – 1:50 PM**

Attendance

Katie Roberts
Katie Weatherwax
Elizabeth Herrejon (virtual)
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw

Agenda Items

1. Discussion
    1. Oral Presentation slides
        1. Finalize Slides
        2. Send it to Dr. Hasler soon so we can set a date for the presentation
    2. Finalize Budget
    3. Timeline

Action Items

2. Weekly update email |1/19/2022| Radha
3. Build Shock Circuit |1/21/2022| Lara and Katie W.
4. Practice Oral Presentation |1/26/2022| everyone
5. Research how to build a transformer |1/26/2022| Hubert
6. Pseudocode |1/26/2022| Radha and Christine
7. Research Bluetooth and GPS Circuit |1/26/2022| Katie R.
8. Researching Pressure Sensor connecting to circuit |1/26/2022| Katie R.
9. Glove Layout |1/26/2022| Elizabeth

Group Notes

- Finished up budget and made budget summary
- Updated Gant Chart
- Finalized Proposal Slides

Individual Notes

- [ ] Finishing presentation slides
- [ ] Updating tasks and assigning tasks on Gantt chart

Stun Gun Circuit Breadboarding

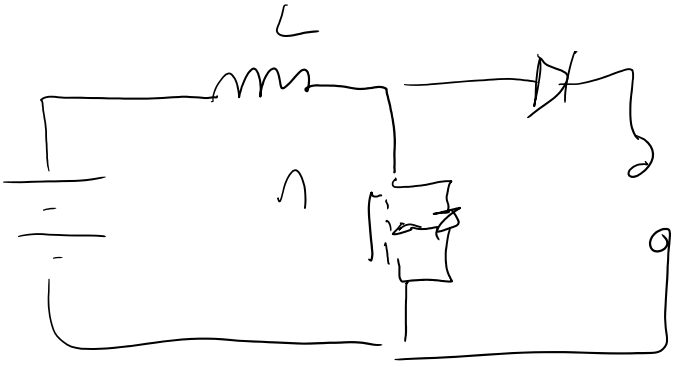
Thursday, January 20, 2022 11:15 AM

low voltage high current

meeting 01/21 ⇒

redesign circuit

$$V_o = \frac{V_{in}}{1-D}$$



$$\frac{3}{1-0.99} = \frac{3}{0.01}$$

$$= 300$$

Team Meeting 01/24/2022

Monday, January 24, 2022 6:09 PM

Location: **Virtual (Teams)**
Date: **1/24/2022**
Time: **6:00 PM – 7:15 PM**

Attendance

Katie Roberts
Katie Weatherwax
Elizabeth Herrejon
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw

Agenda Items

1. Discussion
    1. Finalize Proposal Slides
    2. Practice Presentation

Action Items

2. Practice Proposal
3. Continue/finish assigned tasks from previous meeting

Group Notes

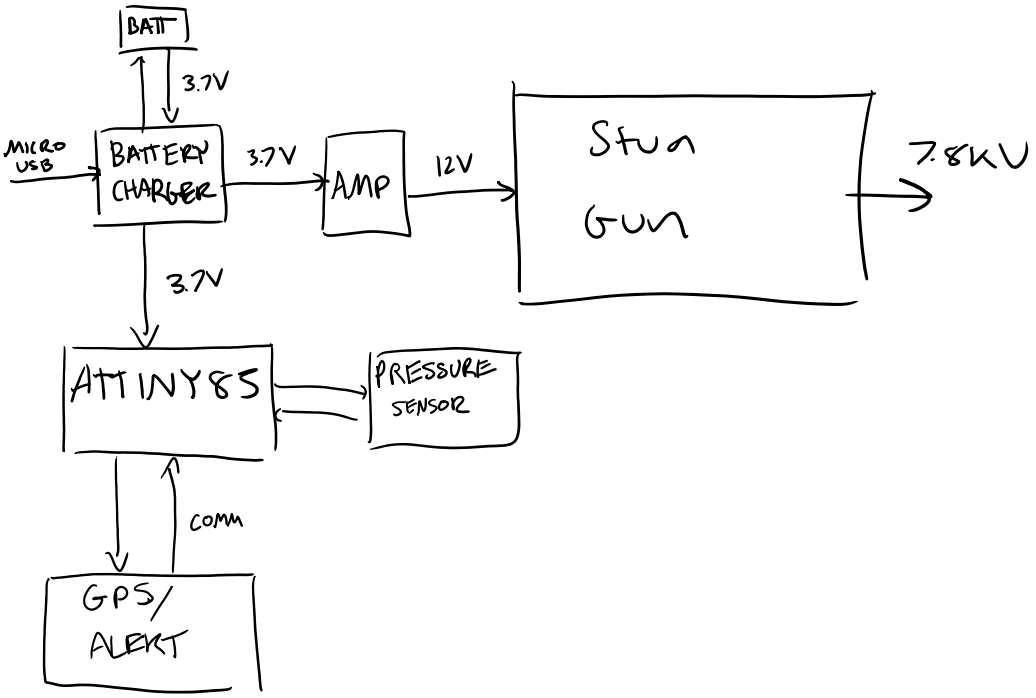
- Went through proposal slides and discussed comments
- Removed transformer slide
    - Will be using new turns ratio that exist
    - We will not have to make our own
- Break up design requirements slide into 2
- Update text Alert picture
    - Fix typo and add link/ mention live tracking location
- Divided up slides
- Lara and Katie W. gave update with testing
    - Took resistor mesasurement

Individual Notes

- [x] Change design requirements slide - too wordy (before next meeting)
- [x] Technical approach - microcontroller (my slide) (before next meeting)

Electronics Block Diagram

Tuesday, February 1, 2022 7:07 PM



Electronics Meeting 02/11/2022

Friday, February 11, 2022 11:20 AM

Attendance

Katie Roberts
Katie Weatherwax

Notes

- [ ] Finish layout for stun gun (tomorrow)
- [ ] Start boost 5-12 v converter

Next meeting:

- [x] Clean up BOM
- [x] Measure everyone's hands surface area

Team Meeting 02/16/2022

Wednesday, February 16, 2022 12:50 PM

Location: **PG Library**
Date: **2/16/2022**
Time: **12:30 PM – 2:00 PM**

Attendance

Katie Roberts
Katie Weatherwax
Radha Changela
Lara Kassabian
Christine Saw
Elizabeth Herrejon (virtual)
Hubert Elly

Agenda Items

1. Discussion
    1. Task Updates
    2. Parts Ordered

Action Items

2. PCBs Design layout |2/23/2022| Lara
3. Continue working on app and update website |2/23/2022| Elizabeth
4. Pseudocode block diagram |2/23/2022| Christine
5. Fitbit open-source code research |2/23/2022| Radha and Hubert
6. Research Brain stuff and PCB coverings |2/23/2022| Katie W.
7. Bluetooth research |2/23/2022| Katie R.

Other Notes

- Updates:
    - Katie W.
        - Need to do more research on voltage to brain (brain damage)
        - Sent app research to Elizabeth
    - Lara
        - Continue layouts
    - Battery Charger is here
    - Design notebooks due on 25th (first round)
    - Email Hasler about update presentation and notebook submission
    - Radha
        - Has layout of SIM chip hook up
        - Still doing research on fitbit opensource code
    - Hubert
        - Still doing research on fitbit opensource code
    - Elizabeth
        - Writing update email to Hasler
        - App design and integration/layout
    - Chrstine
        - Needs parts to continue pseudocode
    - Katie R.
        - Finalized circuit schematic
        - Order more parts

Individual Notes

Team updates:

- Katie W: will we cause brain damage when shocked
- Got the batteries and battery charger
- Hubert: open source for fitbit

- Radha: open source too, wearable device to app
- Christine: code block diagram
- To do:
  - [x] Edit BOM

Team Meeting 02/23/2022

Wednesday, February 23, 2022 12:48 PM

Location: **Culc 317**
Date: **2/23/2022**
Time: **12:30 PM – 1:30 PM**

Attendance

Katie Roberts
Katie Weatherwax
Radha Changela
Lara Kassabian
Christine Saw
Hubert Elly

Agenda Items

1. Discussion
    1. Task Updates
    2. Parts Ordered

Action Items

2. PCBs Design layout |3/2/2022| Lara
3. Continue working on app and update website |3/2/2022| Elizabeth
4. Setting up micro controller |3/2/2022| Christine
5. Research Bluetooth data to app |3/2/2022| Radha
6. Research Mirco controller to Bluetooth |3/2/2022| Hubert
7. Taking apart stun gun circuit |3/2/2022| Katie W.
8. Layouts with Lara |3/2/2022| Katie R.

Other Notes

- Updates:
    - Huber and Radha went over open-source app
        - Broke it up into two parts for Bluetooth to
    - Lara designed PCB for boost converter, <1sq inch
    - More parts came in!
    - Katie W. looked up brain damage at high voltage
        - We are fine!
    - Katie R. ordered more parts
        - Will be working with Lara
    - Christine finalized pseudocodes and block diagram

Individual Notes

- [x] This week: set up a time w katie W
- [x] Work on 5-12V Boost design
- [x] Send list of parts to Katie R

5-12V Boost Converter

Wednesday, February 23, 2022 2:47 PM

- What inductor to use? Given one is too big
  - Need to know input/output current to determine inductance
    - Will it be different from LT1170?
    - LT1170 Pout = 20W, LT1172 Pout = 5W out
    - LT1172 Iout = 5W/12V = 0.41A ??

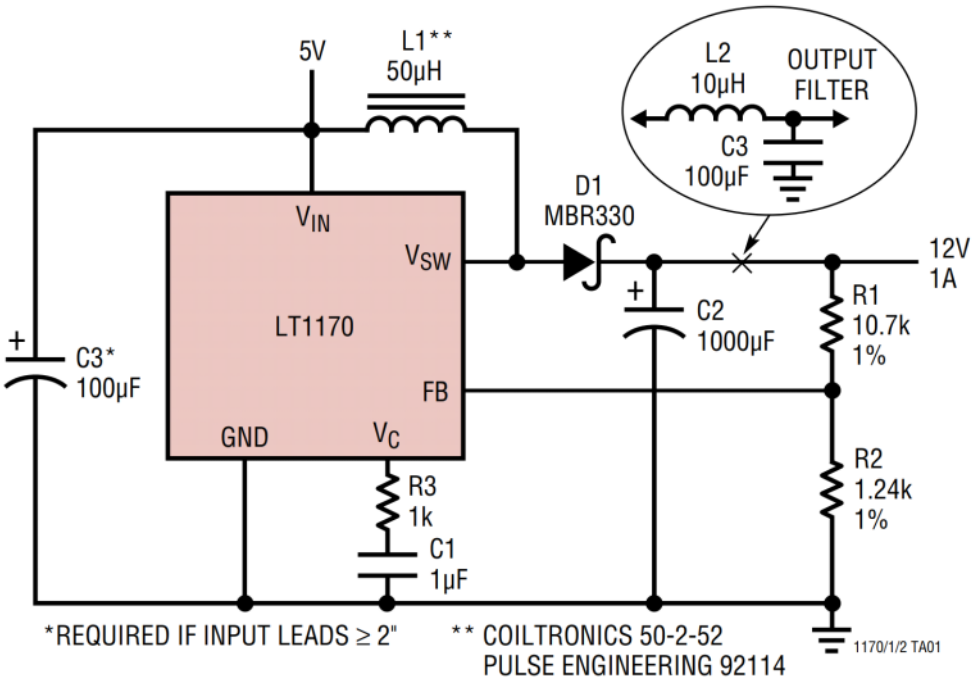
In a typical example, using a boost converter to generate 12V at 0.12A from a 5V input, duty cycle is approximately 60%, and switch current is about 0.65A, yielding:

$$I_{IN} = 6mA + 0.65(0.004 + DC/40) = 18mA$$

$$P_{SW} = (0.65)^2 \bullet (1\Omega)(0.6) = 0.25W$$

$$P_{D(TOT)} = (5V)(0.018A) + 0.25 = 0.34W$$

Boost Converter (5V to 12V)



Testing Session

Friday, February 25, 2022 1:03 PM

Location: **Hive**
Date: **2/25/2022**
Time: **1pm-4pm**

Attendance

Katie Weatherwax
Lara Kassabian

Agenda Items

1. Disassemble stun gun

Action Items

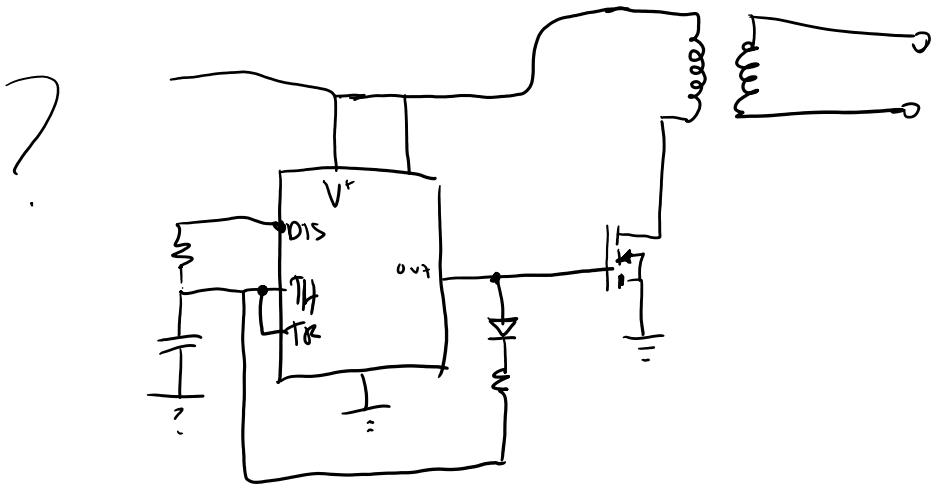
1. Order PCBs

Other Notes

- Figured out safety pin!
- Parts list on stun gun
    - Rectifier - MB6S https://www.onsemi.com/products/discrete-power-modules/rectifiers/mb6s
    - Capacitor - https://capacitorsfilm.com/product/high-quality-polypropylene-film-cbb22-capacitor-225j400v-metallization-capacitor/
    - Switch 3 pos
    - Button
    - Resistors, R1-R4
    - LEDs, L1, L2
    - Transformer?
    - Safety pin
    - Battery 4 pack
    - Flashlight

Stun Gun V2

Wednesday, March 9, 2022 11:28 AM



[Make Mini Stun Gun]

Team Meeting 03/16/2022

Wednesday, March 16, 2022 1:24 PM

Individual To-Do:

- [x] Solder breakout boards (before next meeting)
  - [x] ic reg boost
  - [x] Ic reg multi
  - [x] Transformer WE

Team Meeting 04/06/2022

Wednesday, April 6, 2022 12:42 PM

Meeting notes:

- Katie W. 2/3 of poster finished
- Update design specs after testing
- Video needs to be done by 22nd
- Presentation and poster is priority2

To-Do by 04/13:

- [ ] Update design specs from testing
- [x] Research amplifier circuit
  - https://www.digikey.com/en/articles/control-amplify-high-voltages-effectively-high-voltage-op-amp
- [x] Solder stun gun
- [x] Audio transformer okay?

Notes from testing:

- Output of four stage doubler (~100VAC)
- Output of 8 stage doubler (~200VAC)
  - Audio transformer makes clicking noise
  - Moved center tap pins, now whines?
  - https://audiokarma.org/forums/index.php?threads/noisy-transformer-buzz-and-hum.802211/
- Shocking hurts!
- https://kaizerpowerelectronics.dk/high-voltage/555-audio-modulated-flyback/
- Finished soldering 4 doubler stages

Team Meeting 04/13/2022

Wednesday, April 13, 2022 12:44 PM

Team Updates:

- Bluetooth works!
- Radha is doing documentation
- Poster and presentation is coming along

Individual To-Do:

- [x] Edit design specs (today)
- [x] Put rest of circuit on flex PCB (today)
- [x] Test circuit (before next meeting)
- [ ]

Team Meeting 04/20/2022

Wednesday, April 20, 2022 12:37 PM

Looking ahead:

- Expo setup from 1-2pm
- Expo starts 4:00pm
- Go through the presentation
- Design notebooks due 28th
- Final report and demonstration May 3rd

Individual To-Do before expo:

- [x] Work on final report
- [x] Hot glue voltage doubler
- [x] Bring double sided tape to expo
- [x] Stun gun testing