Design Notebook

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Team Members:

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ECE 4871
Senior Design I
Fall 2021

Radha Changela

Team: Sweet Dreams

9/8/21

- Working on 'Project Ideas' assignment

- self defence weapond
- maybe interdisciplinary?

- class team is taking: IC Fabrications
  Robotics course
- missing: Mechanical courses/skill; maybe wait to see if other students joining have these skills
- ECE related courses: 3600
  Crypotograph
  Robotics intro
  Embeded system
  intro to Nanotech
- Project Overview
  - ~~shock~~ stun gun in wearable jewlary
  - w/ GPS
  - small / mirco ckt

9/13/21

turned in Resume
+ Project Prefrence Form
  choice 2: Solar Powered Drone
  choice 3: Digitally Controlled Power Supply

Rob Clyde

9/17

- Started Team Skills Matrix
  - ↳: Analog + Digital Design
    Mechanical Design
    Software coding (real-time)
    PCB design; assembly
    Project management
    technical writing
    team leadership

team has a OneDrive containing all working documents for this class

9/24/21

- look over final Team Skills Matrix
- make sure everone added their skill levels

- Find QFD templet
- user requirements: GPS, shocking, inexpensive, pretty looking, easy to use...
- engineering requirments: low power use, lightweight, cheap, insulated, stun gun accuracy, voltage ect. GPS accuracies
- Similar products: invisawear
  defender ring
  knockout? no currenty on market

10/1/21

- Finalize QFD in one drive
- turned in!!

Kate Lloyd

10/6

- 1st Meeting w/ Dr. Hasler

meeting Notes:

- went over project
- make biweekly ppt update with for Dr. Hasler
- need a better description of project
  - gets specifics down
- Start thinking about testing soon

10/15

- help katie w/ updat power point
- worked on Gant & Pert chart
  - ↳ are charts in drive
- start thinking about specific of idea/design

10/22

- Project Summary Draft due
- worked on w/ team
- Standard/Codes:
  - IEEE P360
  - IEC 60479
  - IEEE P1912 } doesn't really apply
  - IEEE 1451.5
  - IEEE C57.13.7?
  - IEEE 449:1990?
  - UL 69
  - IEC 60335-2
  - IEC 60601

focus on these 2

10/2

TRP Notes: See attached google doc

1. **What are the commercial applications of this technology?**
    a. Are there any existing products available?
        i. Taser Pulse
        ii. VIPERTEK VTS-989-1 Stun Gun
    b. Who makes them and how much do they cost?
        i. TASER; $400
        ii. VIPERTEK; $20
    c. List, explain, and summarize what is on the market. For example, you might find that there are security systems using acoustic sensors, general noise monitoring instruments, and military applications of acoustic sensors used for monitoring and tracking vehicles.
        i. There are multiple stun guns and tasers (Electronic weapons) in the market
        ii. Uses are for defence
        iii. "An electroshock weapon is a less-lethal weapon that utilizes an electric shock to incapacitate a target by either temporarily disrupting voluntary muscle control and/or through pain compliance."
2. **How does the underlying technology work?**
    a. For example, what are the frequency ranges of interest?
    b. What algorithms are out there?
    c. What are relevant measures of performance? (NOTE: You don't need to understand the algorithms or the technical details of how the technology works at this stage in the process. You just need to be able to find and briefly summarize the information.)
        i. Stun guns generate a high-voltage, low-amperage electrical charge
        ii. charge passes into the attacker's body. Since it has a fairly high voltage, the charge will pass through heavy clothing and skin. But at around 3 milliamps, the charge is not intense enough to damage the attacker's body unless it is applied for extended periods of time
        iii.
3. **What are the building blocks for implementing the technology?**
    a. Stun gun
        i. current may be generated with a pulse frequency
        ii. work on ordinary 9-volt batteries
        iii. circuitry includes multiple transformers, components that boost the voltage in the circuit, typically to between 20,000 and 150,000 volts, and reduce the amperage. It also includes a oscillator, a component that

fluctuates current to produce a specific pulse pattern of electricity. This current charges a capacitor.

b. Taser guns work the same basic way as ordinary stun guns, except the two charge electrodes aren't permanently joined to the housing. Instead, they are positioned at the ends of long conductive wires, attached to the gun's electrical circuit. Pulling the trigger breaks open a compressed gas cartridge inside the gun. The expanding gas builds pressure behind the electrodes, launching them through the air, the attached wires trailing behind.

https://www.amazon.com/dp/B01FHDZGGM/ref=as_li_ss_tl?ie=UTF8&linkCode=ll1&tag=safewicom-20&linkId=2902b2a4450f6f3a3a925b4cbaa2e708&language=en_US

https://taser.com/products/taser-pulse

Patent:
https://patents.google.com/patent/US20160327375A1/en?q=compact+stun+gun&oq=compact+stun+gun
https://patents.google.com/patent/USD822377S1/en?q=compact+stun+gun&oq=compact+stun+gun
https://patents.google.com/patent/USD750729S1/en?q=compact+stun+gun&oq=compact+stun+gun

Website:
https://electronics.howstuffworks.com/gadgets/other-gadgets/stun-gun2.htm Too Old
https://massgunownership.com/stun-gun-basics.html
https://www.homemade-circuits.com/diy-taser-gun-circuit/
https://electronics.stackexchange.com/questions/72667/electric-chewing-gum-prank-circuit-diagram
https://www.medscape.com/answers/770179-117850/what-is-the-role-of-conducted-electrical-devices-in-the-pathogenesis-of-electrical-injuries
https://drexel.edu/now/archive/2016/February/Taser-Study/
https://theweek.com/articles/445332/military-pain-rays-stun-guns-why-arent-being-used

Lecture Notes:
https://indico.phys.hawaii.edu/event/934/contributions/3282/attachments/2503/3009/Stungun.pdf

Other:
https://ieeexplore.ieee.org/document/8037289

10/29/21

- break down list of standard/codes from last time
- my focus on standard UL 69
- 2 IEEE papers testest stun gun safety to this standar
- UL 69 ment for Electric Fence controllers
- will use to verify the amount of voltage output for our device

- start thinking about Budget Proposal (due soon)

~~10/15~~

11/19

- already submited Budget & costing
  - in One Drive
- Broke up project proposal
- I worked on Market Analysis
- focus on Invisawear & Defender Ring as competitors
- help proff read/edit rest of proposal
- added customer reqs as preliminary concept selection & justification

- Meet w/ Dr. Hasler
  - talked about testing
  - find out design to work w/
  - Dr. Hasler understand & can help w/ out asspect.

Rob Lloyd

12/2

Meeting w/ Dr. Hacker

Notes:

- no need to go into more details for standards/code
- some slides wordy
  - add more pictures
- make sure user does not get in trouble from/with device
  - think about insulation & charge output
- explain software slide
  - add picture, flow chart, ect.
  - draw what it means
- Focus on concept 1st!!! (over cost analysis) ↓ cannot do w/out actual/final design
- will it look like a bracket or a fitbit?
- Use fitbit or 'clone' w/ open source code to hack it into what we want
  - much easier then doing embed system from scratch
- expaind shock test plan
  - more details needed
  - do test soon (by 1st week of Jan)
  - need this for rest of project
  - need data/measurments
- Conceptual design
  - how will ring be attached to fitbit?
  - how will it look?
  - make sure it does not get caught in anything
  - half glove / artist glove idea
  - materials & insulation

* Think about question we do not have answers to *

Rob Clyde

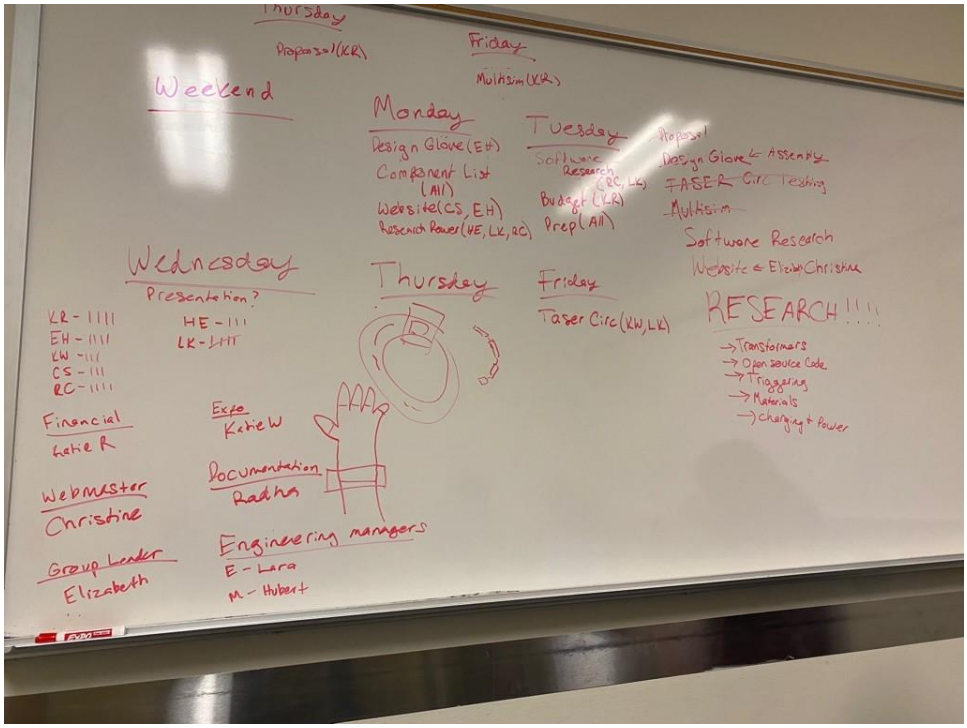
1/12/2022

Time:
12:30 PM – 2:30 PM

Attendance

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

- First team meeting of the semester
- Talking about pivoting from bracket + ring to glove
    - More accomplishable
    - New concept finalized
- Taking out heart detection
    - Not doing what we wanted
- Decided on a time/day for oral presentation
    - Only wednesdays work for us
- Finalized leadership roles
    - Will be documentation leader
    - Will be doing meeting minutes and weekly reports
- Research gps tracker open source codes and battery recharger
- Work on proposal slides and get more images



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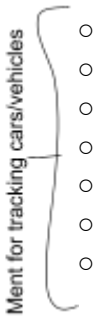
To Do:

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

1/15/2022

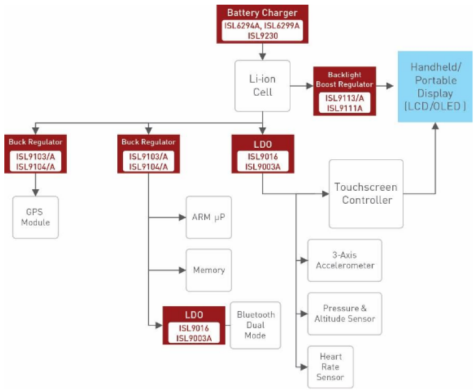
- GPS tracking open source code
    - Traccar
        - It can send push, web, SMS, and email notifications!!
        - has mobile applications for Android and iOS platforms
    - OpenGTS
    - Trackit by Flespi
    - Track My Ride
    - Navit
    - GPS Trace
    - Trackme
    - All from: https://www.goodfirms.co/blog/best-free-open-source-gps-tracking-software



- GPS Cell phone tracker: https://github.com/nickfox/GpsTracker
    - available as a Wordpress plugin and Android client
    - Works with google maps
    - 4 clients, iOS, Android, Windows Phone and Java ME
- https://github.com/darrylburke/heltec_esp32_lora_bluetooth_gps_tracker
    - Locations can be displayed in Android via a bluetooth connection
    - Dog tracker
- https://github.com/Nicolanz/pet_tracker
    - Pet tracker - Web application
    - A web application for tracking the real time location of a pet using a Collar with GPS

Rechargeable power source

- https://www.instructables.com/The-Simplest-Rechargeable-Battery-Circuit-and-sav/
- https://www.homemade-circuits.com/designing-customized-battery-charger/
- https://hackaday.io/project/171723-2020-make-every-3v3-device-rechargeable
    - design to charge a 3.7 V lipo battery
    - act as a power supply, in both cases the the output voltage is 3.3 V
    - With Eagle file
- Fitbits use rechargeable lithium-ion battery
- Wearable tech break down



-
    - https://www.powerelectronicsnews.com/powering-wearables-battery-types-current-challenges-and-energy-harvesting/

1/18/2022

Time: 9:00 PM – 9:35 PM

Attendance

Katie Roberts
Radha Changela
Hubert Elly
Lara Kassabian
Christine Saw

- Finalized oral presentation slides to send to dr hassler
- Everyone went around and gave update on their weeks tasks
    - 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
- Send out weekly update tomorrow
- Add to budget/parts list

To Do:

1. Weekly update email |1/19/2022| Radha
2. Finalize Budget and Materials needed I1/18/2022I everyone
3. Oral Presentation Slides |1/19/2022| everyone

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

- Working on adding parts to budget and finished it getting a final budget
- Updated proposal slides
    - Added break down on budget by major parts
    - Currency at around $500
- Next week's task, look at open source code, get a pseudo code
- Gannt chart has been updated

To do:

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

1/22/2022

- Decided to use https://github.com/mcore1976/gpstracker
    - Kaite R found
    - Isn't much to do now, once we get parts we can update code with our APN, USERNAME and PASSWORD of GPRS access from your Mobile Network Operator
- Found new battery recharger
    - https://www.sparkfun.com/products/10217#reviews
    - With this we won't need to make our own pcb
    - Will save space and time
    - Still used a 3.7v lipo battery
- Incorporated dr. Hassler's feedback and updated proposal slides

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

- Went through proposal slides and discussed Dr hasler's comments and new changes
- Removed transformer slide
    - Will no longer need to make our own
- Added more pictures
    - Added example text alert
- Divided up slides for presentation

To do:

1. Practice Proposal All by Wednesday
2. Continue/finish assigned tasks from previous meeting All by Wednesday

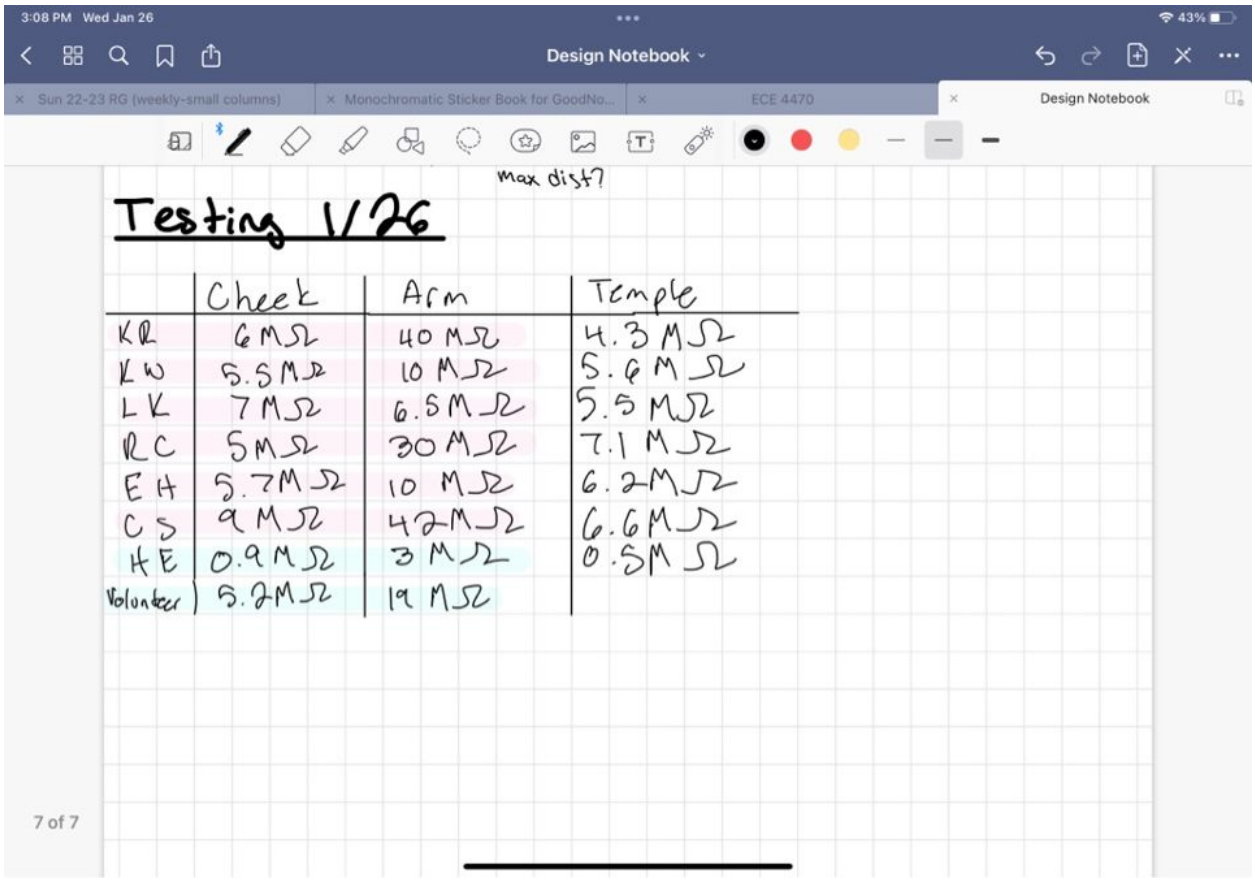
1/26/2022

Time: 12:30 PM – 2:20 PM

Attendance

Katie Roberts
Katie Weatherwax
Radha Changela
Lara Kassabian
Christine Saw
Elizabeth Herrejon (joined at 1:30)
Hubert Elly (joined at 1:30)

- Incorporated (hopefully) last of dr hasler's feedback
- Presented to the group new battery recharger
    - Decided that will be best
- Edited Proposal with feedback from Dr. Hasler
- Decided to use lipo battery charger form sparkfun instead of assembling our own PCB
- Edited slide 7
- Break into 2 as per Dr. Hasler's suggestion
- Decide to have switch to turn stun gun on and off
- Push button and pressure sensor will trigger SMS message
- Recorded resistances of our bodies



- Decide to have switch to turn stun gun on and off
    - Push button and pressure sensor will trigger SMS message

To do:

1. Practice Proposal |2/2/2022| All
2. Schedule Proposal date/time and logo design |1/28/2022| Elizabeth
3. Finalize Stun Gun Circuit |2/2/2022| Katie R.
4. Software Pseudocode |2/2/2022| Christine and Radha
5. Design PCBs |2/23/2022| Lara
6. “Question Quarterback” and Finalize Proposal Slides |2/2/2022| Katie W.
7. Research Flexible PCB |2/2/2022| Katie W. and Hubert

2/1/2022
Time: 8:00 PM – 9:00 PM

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

- Elizabeth talked about her mood board
- Deceived on a product name
- Practiced presentation
    - Final presentation with dr hasler will be tomorrow
    - I go over user reqs
- Looked at sim chip used in gps tracker
    - SIM800L
        - 2G

To do:

1. Practice Proposal |2/2/2022| All
2. Finalize Stun Gun Circuit |2/9/2022| Katie R.
3. Software Pseudocode |2/9/2022| Christine and Radha
4. Design PCBs |2/23/2022| Lara
5. “Question Quarterback” prep |2/9/2022| Katie W.
6. Research Flexible PCB |2/9/2022| Katie W. and Hubert
7. Breakdown Animation |2/16/2022| Elizabeth

2/2/2022
Time:
12:30 PM – 1:00 PM

Attendance

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

- Went through a practice run again and presented to hasler and 2 other teams

To Do:

1. Finalize Stun Gun Circuit |2/9/2022| Katie R.
2. Software Pseudocode |2/9/2022| Christine and Radha
3. Design PCBs |2/23/2022| Lara
4. Research Flexible PCB |2/9/2022| Katie W. and Hubert
5. Breakdown Animation |2/16/2022| Elizabeth

2/6/2022

https://github.com/mcore1976/sim808gpstracker **Ignore the following, using the wrong mirco controller**

CONNECTIONS TO BE MADE (from SIM to ATMEGA micro controller :

Will need to adjust for ours!!

1. SIM808 board RXD (BK-SIM808 pin R) to ATMEGA328 TXD PIN #3,
2. SIM808 board TXD (BK-SIM808 pin T) to ATMEGA328 RXD PIN #2
3. SIM808 board DTR (BK-SIM808 pin S : SLEEP PIN) to ATMEGA328 PC5 PIN #28
4. SIM808 board GND (BK-SIM808 pin G) : to powerbank GND
5. SIM808 board VCC (BK-SIM808 pin V / PWRIN) : to powerbank +5V VCC
6. SIM808 board PWRKEY (BK-SIM808 pin K - left unused - it is internally bound to GND, however when breaking this connection it can be used to switch on/off whole SIM808 board)
7. OPTIONAL) SIM808 RI/RING if available (No such pin on BK-SIM808 board) - to ATMEGA328P INT0 pin #4, and then you may experiment with ATMEGA POWERDOWN mode by uncommenting appropriate portion of the source code. I didn't have such board so I couldn't check this option.

8. Capacitor 1000uF between +5V and GND of powerbank (optional, most of them already has some huge capacitors)

9. put 3x 1N40007 diodes IN SERIAL between 5V VCC and ATMEGA328P VCC PIN #7 (only for BK808 board and others that use 3.3V TTL logic) - ATMEGA must be powered from ~3.3V to adopt TTL logic levels of outputs TXD/RXD of BK-SIM808 board
    a. 3x 1N4007 (1 USD) - to convert 5V from powerbank to 3.3V for ATMEGA328P VCC
    b. May not need since our battery is 3.7v

10. put 100nF capacitor between ATMEGA328P VCC pin #7 and ATMEGA328P GND pin #8 & PIN#22

11. connect GPS passive antenna and GSM antenna to appropriate IPEX / U.FL connectors of BK-SIM808 board. Probably it can work with active GPS antenna (but you would need to add another resistor for pullup antenna input to VCC - decribed here https://www.raviyp.com/embedded/205-sim808-gps-active-antenna-unable-to-acquire-fix-solution)

12. The AND-GLOBAL BK-SIM808 board I have used has TO SMALL electrolytic capacitor (mine had only 100uF). You have to solder/add another big capacitor (I have used 2200uF/10V, but it can be 1000uF/10V) in parallel to make this board work correctly. Otherwise it will continuously restart itself while trying to register to the 2G network.

13. Connect crystal 8MHz (XTAL 8 MHz quartz crystal) between pins 9 & 10 of ATMEGA 328p and add blocking capacitors 22pF between crystal pins and GND line. If you want to use crystal pleas modify "compileatmegaX" file by putting appropriate l-fuse value to avrdude command.
    a. Will we need it?

2/9/2022

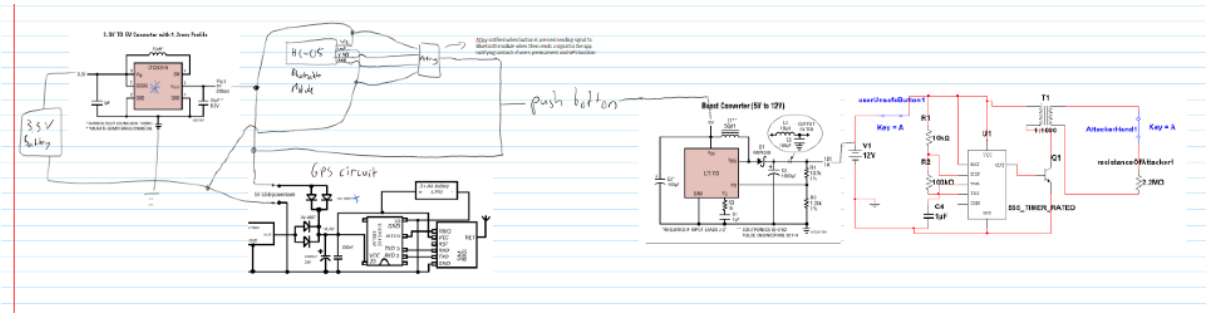
Time:

12:30 PM – 1:30 PM

Attendance

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

- Software
  - Christine broke down pseudo code into sections
  - Radha looked into connecting sim chip to microcontroller
- Flexible PCB
  - Katie W. found a company that's makes them
  - They must approve our time, but it will take about 21 days of ordering
  - OSH park website
  - Hubert looked up flexible breadboard as another option
    - Will buy for testing
- Website and App integration
  - Elizabeth made flow diagram for app (user side)
  - Look up fitbit open source to get hoe glove will integrate with app
- PCBs
  - Lara designed PCB, and it about 1sq inch for stun gun circuit
  - Also made a block diagram for electrical system
- Katie R.
-



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To do:

1. PCBs Design layout (Meet with Katies) |2/16/2022| Lara
2. Continue working on app and animation |2/16/2022| Elizabeth

3. Pseudocode |2/16/2022| Christine
4. Fitbit open-source code research |2/16/2022| Radha and Hubert
5. SIM Chip research |2/16/2022| Radha
6. Final Report Outline and app research |2/16/2022| Katie W.
7. Bluetooth research and finalizes circuits |2/16/2022| Katie R.

2/14
https://github.com/mcore1976/gpstracker
https://lastminuteengineers.com/sim800l-gsm-module-arduino-tutorial/ :Sim CHIP

NET is a pin where you can solder Helical Antenna provided along with the module.

VCC supplies power for the module. This can be anywhere from 3.4V to 4.4 volts. Remember connecting it to 5V pin will likely destroy your module! It doesn't even run on 3.3 V! An external power source like Li-Po battery or DC-DC buck converters rated 3.7V 2A would work.

RST (Reset) is a hard reset pin. If you absolutely got the module in a bad space, pull this pin low for 100ms to perform a hard reset.

RxD (Receiver) pin is used for serial communication.

TxD (Transmitter) pin is used for serial communication.

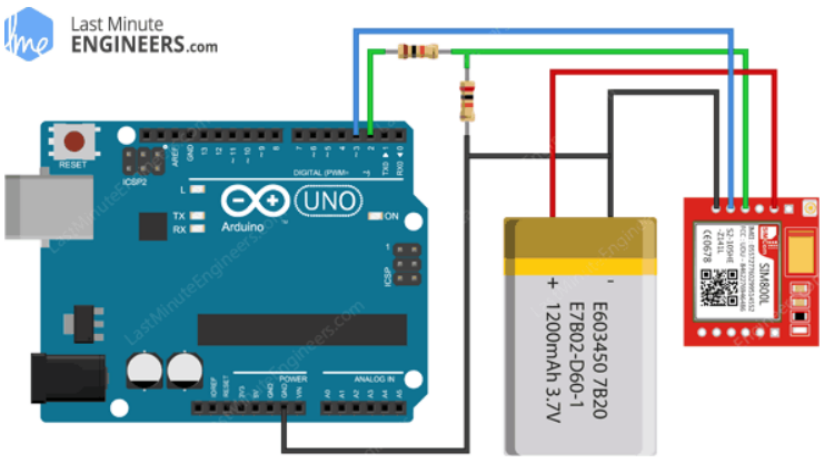
GND is the Ground Pin and needs to be connected to GND pin on the Arduino.

RING pin acts as a Ring Indicator. It is basically the 'interrupt' out pin from the module. It is by default high and will pulse low for 120ms when a call is received. It can also be configured to pulse when an SMS is received.

DTR pin activates/deactivates sleep mode. Pulling it HIGH will put module in sleep mode, disabling serial communication. Pulling it LOW will wake the module up.

MIC± is a differential microphone input. The two microphone pins can be connected directly to these pins.

SPK± is a differential speaker interface. The two pins of a speaker can be tied directly to these two pins.



Wiring SIM800L GSM GPRS Module with Arduino UNO

A 10K resistor between SIM800L Rx and Arduino D2, and 20K between SIM800L Rx and GND would work fine.

- Wearable tech open source
  - https://makecademy.com/open-source-wearable-platforms-review
    - Many use the same microcontroller as us
  - 53 Open Source Fitbit Software Projects
    - https://opensourcelibs.com/libs/fitbit
  - https://github.com/Fitbit/ossapps

2/16
Time: 12:30 PM – 2:00 PM

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

- 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

To Do:

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

2/20

- https://makecademy.com/open-source-wearable-platforms-review
    - Want more of a code skeleton

- https://opensource.com/life/16/9/fitness-apps-android
    - RunnerUp
        - Uses bluetooth
        - “The app can connect to Bluetooth SMART (BLE), Zephyr, Polar WearLink, and ANT+ Bluetooth-based heart rate monitors. There are 15 different options for connection to social sites, ranging from Facebook to specialize running sites like MapMyRun”

- https://studio.fitbit.com/
    - Need to have a fitbit and its apps
    - Hard to build new app off of this

2/23
Time:
12:30 PM – 1:30 PM

Attendance

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

- 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

To Do:

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

2/24
Found this for setting up bluetooth:
https://developer.android.com/guide/topics/connectivity/bluetooth/setup

- Android platform includes support for the Bluetooth network stack
- app framework provides access to the Bluetooth functionality through Bluetooth APIs

app can perform the following with Bluetooth APIs:

- Scan for other Bluetooth devices.
- Query the local Bluetooth adapter for paired Bluetooth devices.
- Establish RFCOMM channels.
- Connect to other devices through service discovery.
- Transfer data to and from other devices.
- Manage multiple connections.

2/27

More bluetooth research

Set up Bluetooth:

https://developer.android.com/guide/topics/connectivity/bluetooth/setup

- Will also need to: “Find Bluetooth devices” and “Connect Bluetooth devices”
- List code used for Kotlin and Java

Bluetooth permissions:

https://developer.android.com/guide/topics/connectivity/bluetooth/permissions

- Which do we need?
  - Depends on android version we are using
  - Can have bluetooth link to physical location?

3/2
Time: 12:30 PM – 1:30 PM
Location: PG 2217
Attendance:
Katie Roberts
Katie Weatherwax
Radha Changela
Lara Kassabian
Christine Saw
Hubert Elly
Elizabeth Herrejon (virtual)

- Updates:
    - Christine and Hubert meet to talk about the micro controller
        - How to program it and connect it to bluetooth
            - Heavy research this week, will begin testing next
    - Radha found how to set up Bluetooth with an app
        - We can use Android Studio to build an app
        - Will send stuff to Elizabeth
    - Lara finished PCB board layouts
        - Will send it to Elizabeth next week
        - Will finalize boast converter for stun gun circuit
    - Lara and Katie W. took apart the stun gun to see and understand circuit
    - Katie W. looking into getting a locker at the Hive

To do:

1. Finalize boast converter layout and submit stun gun PCB |3/9/2022| Lara
2. Continue working on app |3/9/2022| Elizabeth
3. Micro controller set up research |3/9/2022| Christine and Hubert
4. Research sending GPS location via text to multiple people |3/9/2022| Radha
5. Look into surface mount on breadboard |3/9/2022| Katie W. And Lara
6. Order through hole parts |3/9/2022| Katie R.

3/5

Sending text via app

Sending text SMS:

https://www.tutorialspoint.com/android/android_sending_sms.htm

- Uses internal SMS app
- Uses the app users phone number and therefore their network/ data
- Has step to create app in Android Studio IDE

https://www.androidauthority.com/how-to-create-an-sms-app-721438/

- Java
- We need:
    - “The basics”
    - “Fun with permissions”
    - “Sending messages”

3/9

Location: PG 2217

Time: **12:30 PM – 1:10 PM**

Attendance:

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

- Updates:
  - Elizabeth recruited test subjects and finished a new power point templet
  - Katie W. coordinating with testing time, and made a skeleton timeline on expo requirements
  - Lara looked into redesigned stun gun circuit with a capacitor bank
    - Based on a lot of DIY stun guns online
  - Radha looked into multiple phone numbers for sending text alter to, will continue and build off code to do so
    - Will be working with Elizabeth
  - Christine researched attiny set up

To do:

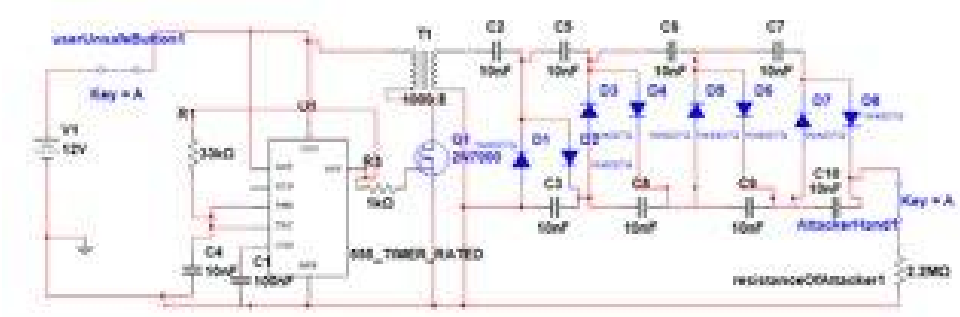
- Email Dr. Hasler and get test subjects to sign waivers |3/16/2022| Elizabeth
2. Testing attiny |3/16/2022| Christine and Hubert
3. Adding multiple phone numbers to text alert code |3/16/2022| Radha
4. Work on schematic and look for parts for redesign |3/16/2022| Katie R. And Lara
5. Order new parts |3/16/2022| Katie R.
6. Pickup studs, testing them and possible slide updates |3/16/2022| Katie W.

3/16
Location: Hive
Time: 12:30-1:30
Attendance:
Katie Roberts
Katie Weatherwax
Radha Changela
Lara Kassabian
Christine Saw
Hubert Elly

- Updates:
    - Katie R. ordered all new parts
        - Building on flexible pcbs so we need through hole parts not mounted ones
    - Katie W. ordered metal studs and is looking ahead through at deadlines
        - Has a list of what is needed for expo
    - Elizabeth worked on app and will continue to work on it
    - Lara, built new prototype stun gun crk
        - Needs to update it with the correct part
- Software team started to set up Attiny
- Hardware team started to test prototype of new crk with metal studs

TO do:

1. Working on app |3/30/2022| Elizabeth
2. Software and attiny testing |3/30/2022| Hubert
3. Adding multiple phone numbers to text alert code |3/30/2022| Radha
4. Get breakout boards ready to test |3/20/2022| Lara
5. Testing breakout boards during spring break |3/30/2022| Katie R.
6. Start expo PowerPoint and poster |3/30/2022| Katie W.



3/ 23
Spring break no team meeting

More app research:
Trigger:
https://developer.android.com/guide/topics/connectivity/bluetooth/transfer-data

- Java
- Edit example on website:
    - Remove public void write
        - We don't need to send data to the glove
        - public void run() to wait for trigger sent by glove/microcontroller

Time of Trigger:
https://developer.android.com/reference/java/util/Date

- getTime()
    - Returns the number of milliseconds since January 1, 1970, 00:00:00 GMT represented by this Date object.

Device Location:
https://developer.android.com/reference/android/location/Location

- Possible use:
    - public double getLatitude ()
    - public double getLongitude ()

https://support.google.com/maps/answer/7326816?hl=en&co=GENIE.Platform%3DAndroid

- Real time location with google maps
- I think this would be best as it updates location more frequently (live location)

Sample Text message:
"SOS! Your friend, *contactsName* is in trouble! They have activated their protected glove at *triggerTime* at *getLatitude()*, *getLongitude()*. To track their live location, click the following link: *googleMapsLink*"

Intentionally Left Blank

3/30
Location: Hive
Time: 12:30-2:00
Attendance:
Katie Weatherwax
Radha Changela
Christine Saw
Hubert Elly
Elizabeth Herrejon

- Updates:
    - Christine finished setting up Attiny
    - Hubert looked into Attiny gps/bluetooth connection
    - Radha created word doc with individual parts for needed for app (ex how to set up bluetooth, how to read trigger, how to sent sms)
    - Katie W. started documentation for final documentation
    - Elizabeth worked on app
        - Can send text from app to phone
        - On simulation on android studio
- Software team started to set up Attiny
- Hardware team started to test prototype crk with stunds
- Video should be done the Friday the week before expo
    - Poster and powerpoint needs to be done before
- Have to find new fabric from walmart to order
    - Ece shop can't buy the one we want from amazon or etsy

To do:

1. Working on app |4/6/2022| Elizabeth and Radha
2. Software and attiny testing |4/6/2022| Hubert and Christine
3. Testing breakout boards |4/6/2022| Katie R. And Lara
4. Break down parts for poster and PowerPoint |4/6/2022| Katie W.

4/4

More app research

Making sure we can send text to multiple phones

https://www.c-sharpcorner.com/article/create-sms-android-app-using-android-studio/

- Step by step instructions using android studio to create app that sends text messages

https://google-developer-training.github.io/android-developer-phone-sms-course/Lesson%202/2_p_sending_sms_messages.html

- More example code

Check for and request permission for SMS

4/6
Location: HIve
Time: 12:30-2:00
Attendance:
Katie Weatherwax
Kaite Roberts
Radha Changela
Christine Saw
Hubert Elly
Elizabeth Herrejon
Lara Kassabian

- Updates:
  - Hubert looked into bluetooth connection with our temporary Bluetooth
  - Radha researched app sending text messages
  - Katie W. started documentation for final documentation
    - Poster, power point, due dates
    - Will ask for specific specs from other sub teams
  - Elizabeth worked animation video of glove
- Software team set up Attiny, and tried to connect bluetooth to it
- Hardware team tested and updated stun gun ckt
- Video should be done by 22th the week before expo
- Have to fabric for glove, still needs to sew glove

To do:

1. Working on app (Texting) |4/13/2022| Elizabeth and Radha
2. Software and attiny testing |4/13/2022| Hubert and Christine
3. Testing breakout boards |4/13/2022| Katie R. And Lara
4. Working on poster and PowerPoint |4/13/2022| Katie W. and Radha

4/11

Worked on document into
Objective section :

Value Statement - benefits to user(s) and other stakeholders.

- Safety, Reliability/Quantity, Inclusiveness, longevity, Integrity b. Sweet Dreams prioritizes safelysafety for all with Nemi, our reliable, self-defense glove created to last.

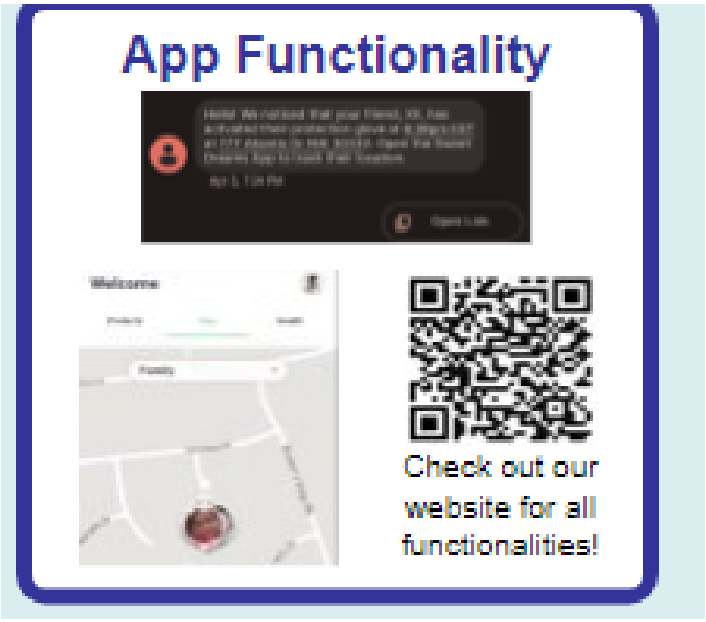
Discuss technical issues, challenges, and opportunities. Include any regulatory, code, and standards issues, if applicable.

4/13
Location: Hive
Time: 12:30-2:00
Attendance:
Katie Weatherwax
Kaite Roberts
Radha Changela
Christine Saw
Hubert Elly
Lara Kassabian

- Updates:
    - Radha worked on the document
    - Christine and Hubert got Bluetooth to work!
        - Will need to wait for Elizabeth to incorporate it into the app
    - Material for glove prototype is here
        - Katie R.'s hand will be the model
- Elizabeth has the app working! It can sent text message from one phone to another with one tap on the app
- Katie W. worked on poster (mostly done, needs into and images from other subteams)

To do:

1. Working on app (Bluetooth signal) |4/20/2022| Elizabeth and Radha
2. Test Bluetooth with app code and package subcircuit |4/20/2022| Hubert and Christine
3. Finalizing breakout boards |4/20/2022| Katie R. And Lara
4. Finish poster and PowerPoint |4/20/2022| Katie W. and Radha
5. Start sewing glove |4/20/2022| Katie W.



4/18

Write conclusion section for poster/ powerpoint

Glove is connected to app through Bluetooth
Trigger from glove's use sends alert text message
40kV and 3-5 mA are discharged from stun gun circuit

Future Considerations for our product include:

- Placing stun gun circuit on polished PCB
- Registering a SMS Short Code to send alert messages instead of users' phone number
- Registering a Google Map API to utilize additional features (ideal for private services)
- Adding a GPS to the glove
- Making app more interactive with self-defense tips, guides, and video tutorials

4/20
Location: VL Senior Design Lab
Time: 12:30-2:30
Attendance:
Katie Weatherwax
Kaite Roberts
Radha Changela
Christine Saw
Hubert Elly
Lara Kassabian

- Updates:
    - Katie W. gave expo updates
    - What time our set up is
    - We are outside in the tent so no access to power
    - Will need to be there all day
- Our stun gun circuit discharged a very high voltage (40kV based on simulation, but voltmeter in lab cannot measure it)
- Updates need to be made to poster and will need to be reprinted
- Stared putting everything on final glove
- Everyone added parts to the power point

- I worked on final document
    - Updated standards
    - Discuss the stakeholders. added Stakeholder “2x2” Chart.
    - Updated some Technical Specifications

To do:
Prepare for Expo |4/26/2022| All
Record Video |4/22/2022| All
Finish Glove prototype |1/21/2022| All

4/25

Worked on document

Proofed what we have so far to make sure it in all past tense (or present in some cases)

List of what still need to be written/ updated:

-2-3 sentence intro (pg 4)

-Project Description, customer requirements and goals: write part c, rearrange/organized section.

- update technical specs

- design concept, ideation, constraints, alterations and trade-offs: update/add stuff that is highlighted (pg 11)

- project demonstration: update (pg 16)

- market analysis: updates and add to (pg 17)

- cost analysis: updated and add to (pg 18)

- conclusion and current status: write (pg 21)

4/26 Expo Day:

Expo was cool. We did great. Yay us!!!