SECOND GENERATION BICYCLE CHARGING STATION FINAL DESIGN

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OUTLINE

- Research
  - Generator- purchased V.S. custom
  - Power requirements of electronic devices
  - Chipset
  - Programming
  - Display- touch V.S. non touch
  - Power Logger
- Testing
- Design
  - Creating the circuit
    - Soldering
    - Capacitors
    - Voltage limiter

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RESEARCH

- Generator- Purchased V.S. custom

- Power Requirements of electronic devices

- Chipset

- Programming

- Display- touch V.S. non touch
  - Buttons

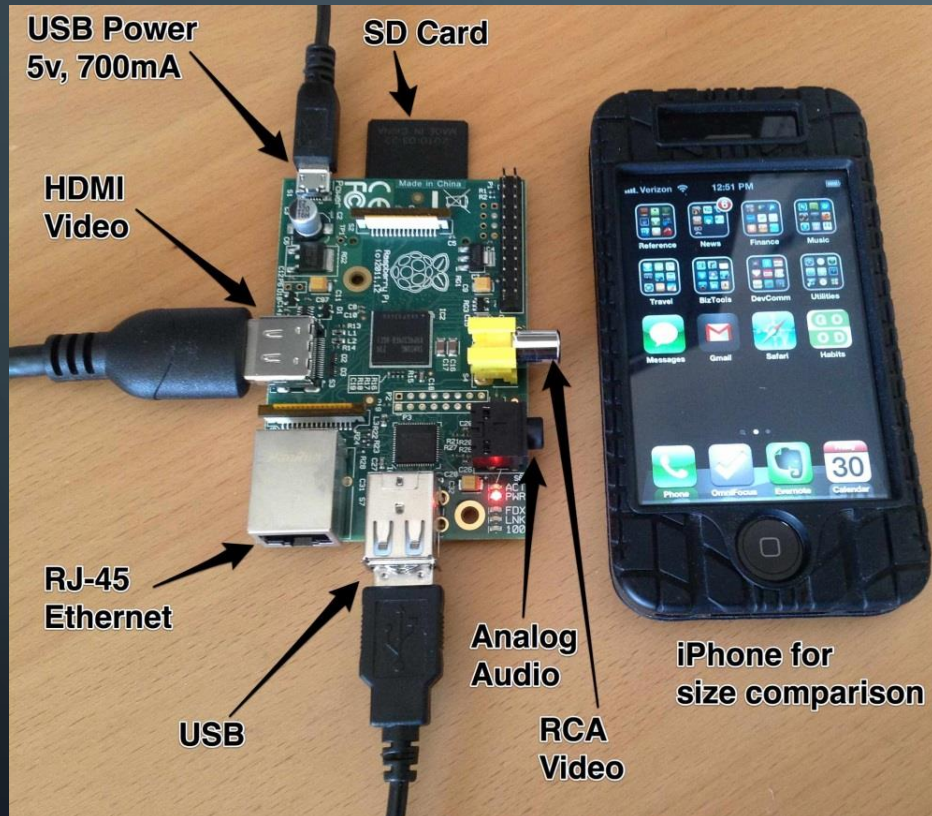Rashed Alharbi

GENERATOR – 300W/DC
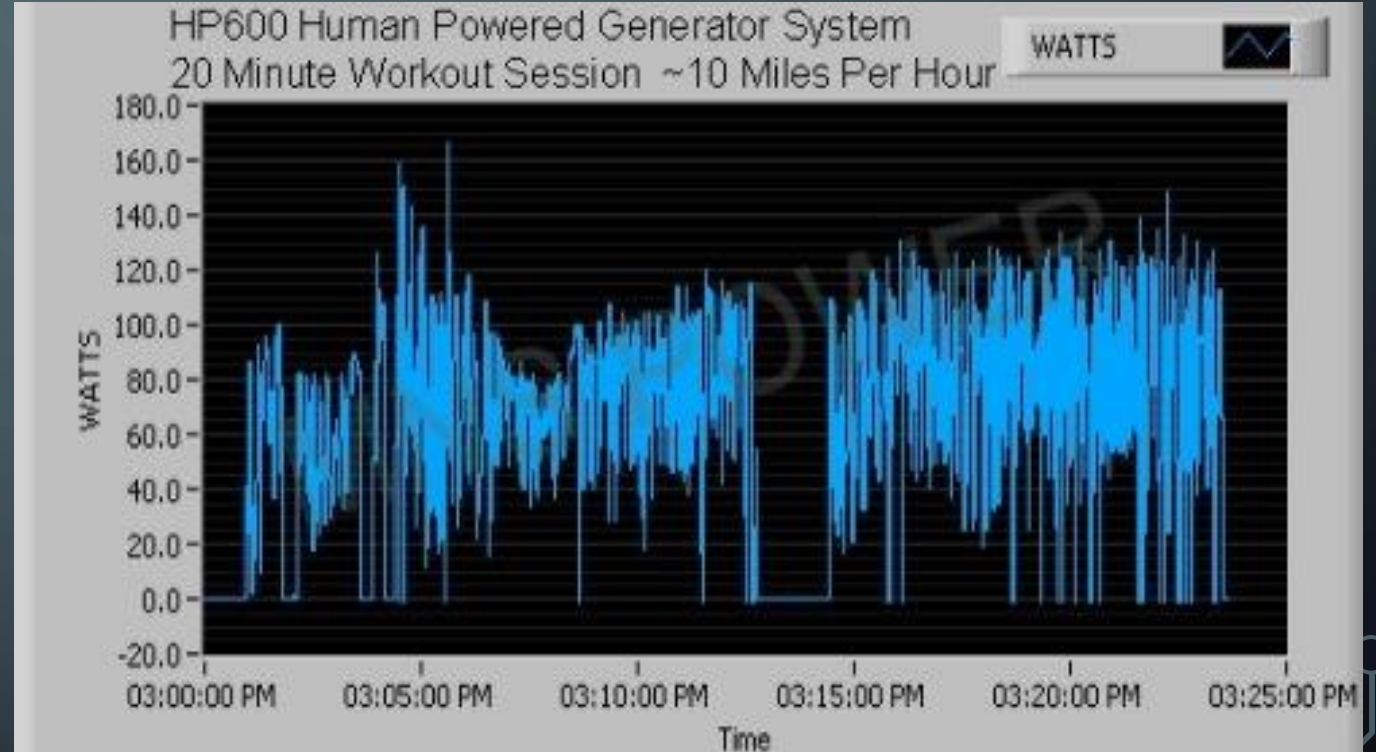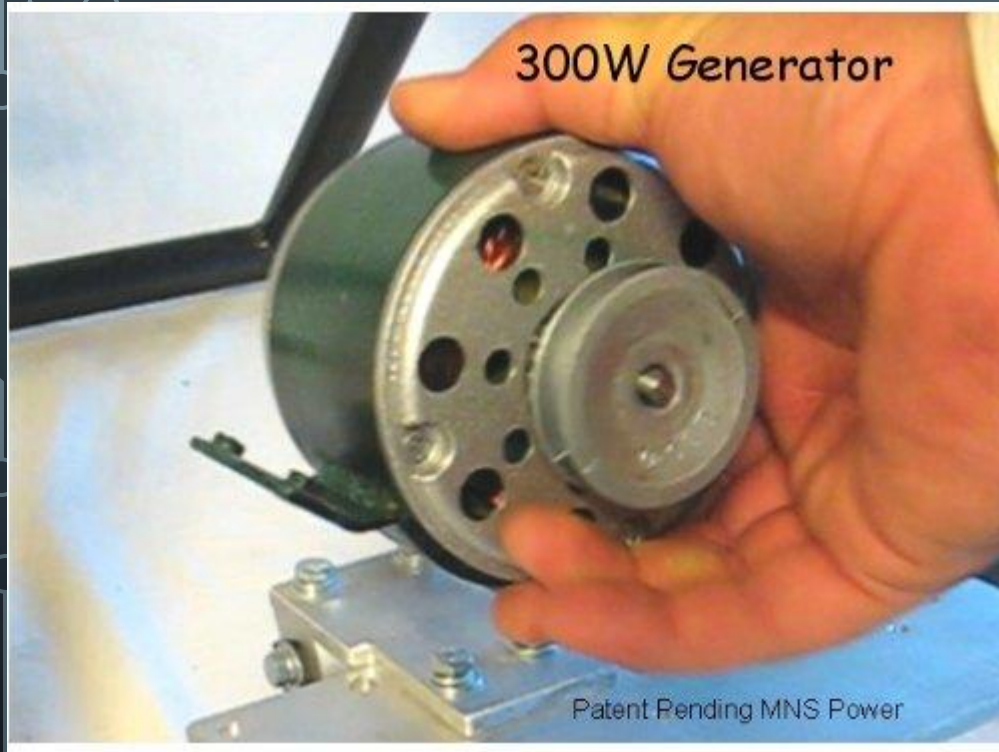
http://www.amazon.com/Bicycle-Generator-Power-Pulley-Dynamo/dp/B001WB3TZ4/ref=sr_1_5?ie=UTF8&qid=1390607126&sr=8-5&keywords=dc+generators+100+watts#productDetails

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POWER REQUIREMENTS

- Generator max input: 2750 RPM at 24V

- Inverter power output range: 12V-16V

- Electrical devices charge at a rate of 5W

- Laptops charge at a rate of 90W-100W

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CHIPSET – RASPBERRY PI

USB Power 5v, 700mA
SD Card
HDMI Video
RJ-45 Ethernet
USB
Analog Audio
RCA Video
iPhone for size comparison

- Extendable Memory
  Can store very large amounts of data

- Built in Linux operating system
  Programs can run on top of existing architecture

- Multiple Expansion ports
  Can keep track of multiple sensors at once

rayhightower.com

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PROGRAMMING - PYTHON

```python
import RPi.GPIO as GPIO ## Import GPIO library
import time ## Import 'time' library. Allows us to use 'sleep'

GPIO.setmode(GPIO.BOARD) ## Use board pin numbering
GPIO.setup(7, GPIO.OUT) ## Setup GPIO Pin 7 to OUT

##Define a function named Blink()
def Blink(numTimes,speed):
    for i in range(0,numTimes):## Run loop numTimes
        print "Iteration " + str(i+1)## Print current loop
        GPIO.output(7,True)## Switch on pin 7
        time.sleep(speed)## Wait
        GPIO.output(7,False)## Switch off pin 7
        time.sleep(speed)## Wait
    print "Done" ## When loop is complete, print "Done"
    GPIO.cleanup()

## Ask user for total number of blinks and length of each blink
iterations = raw_input("Enter total number of times to blink:
")
speed = raw_input("Enter length of each blink(seconds): ")

## Start Blink() function. Convert user input from strings to
numeric data types and pass to Blink() as parameters
Blink(int(iterations),float(speed))
```
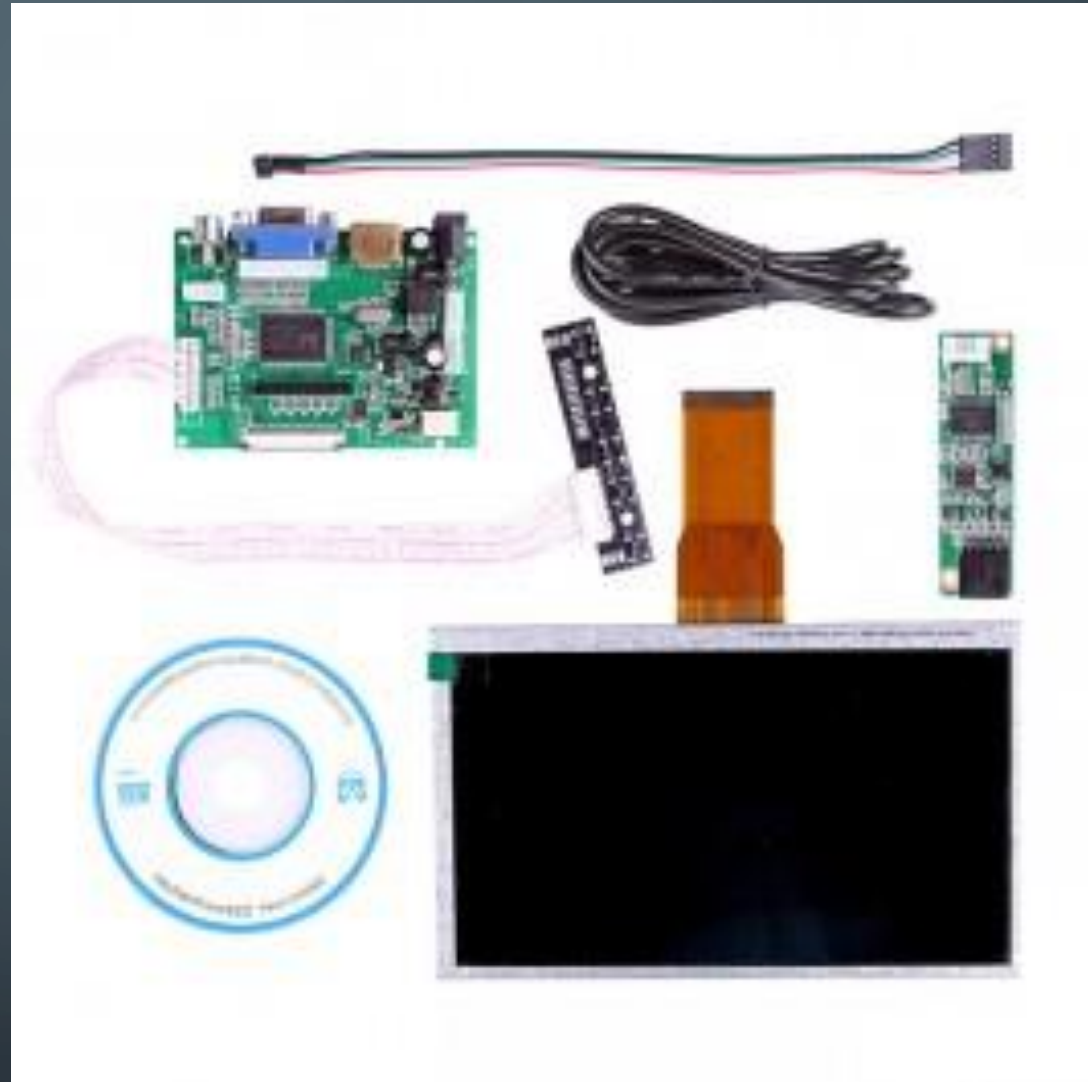
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DISPLAY TOUCH V.S NON- TOUCH

- Resistive touch screen

- Calibration

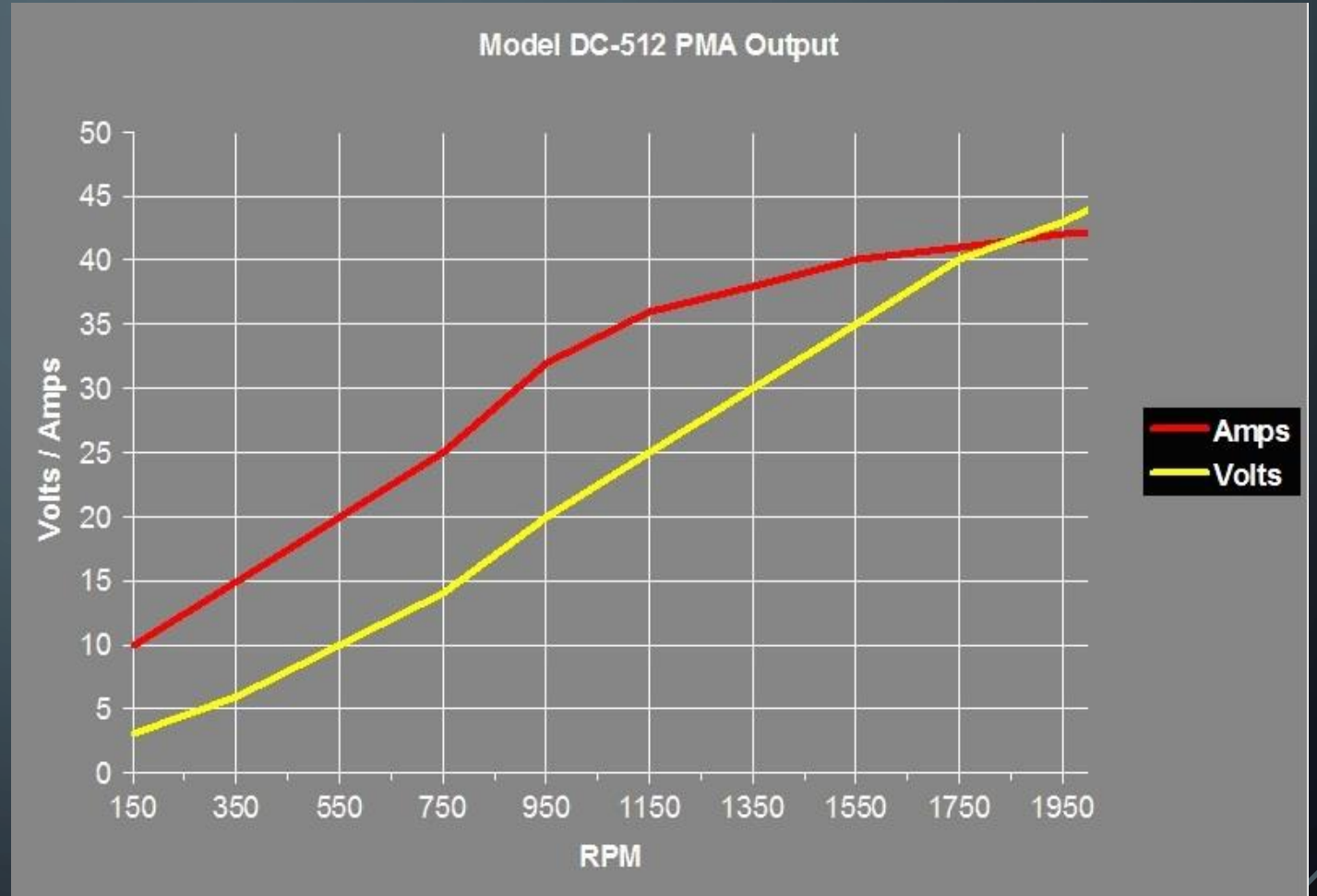- Integrated buttons

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DISPLAY USES

- Raspberry Pi

- Programming

- Frames

- Resistive Touchscreen
  - Buttons instead

Display Kit

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TESTING

- Generator testing
  - Electronic devices
  - Inverter use
  - Power requirements
  - Trial and error - coupler

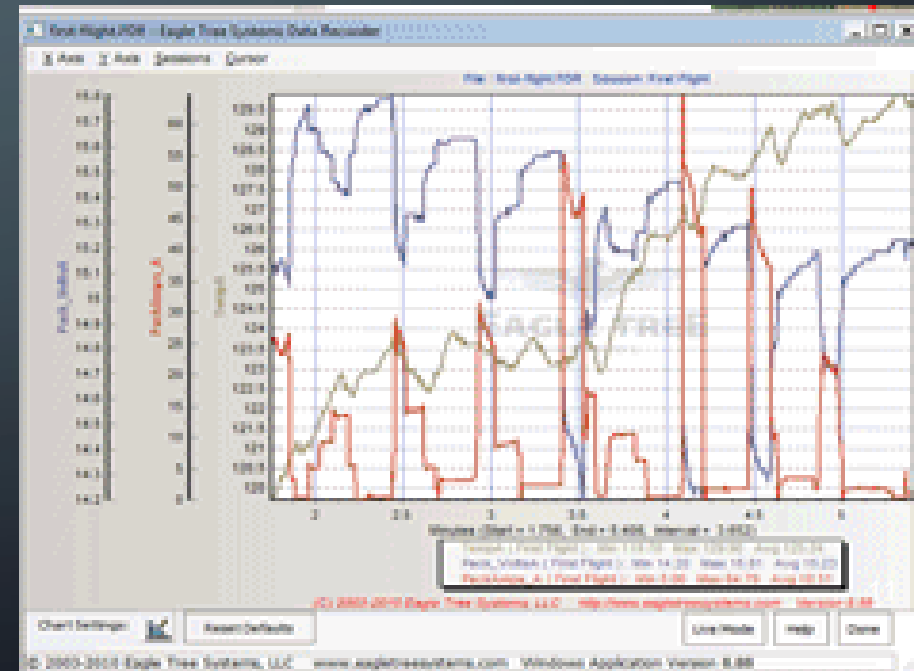Model DC-512 PMA Output

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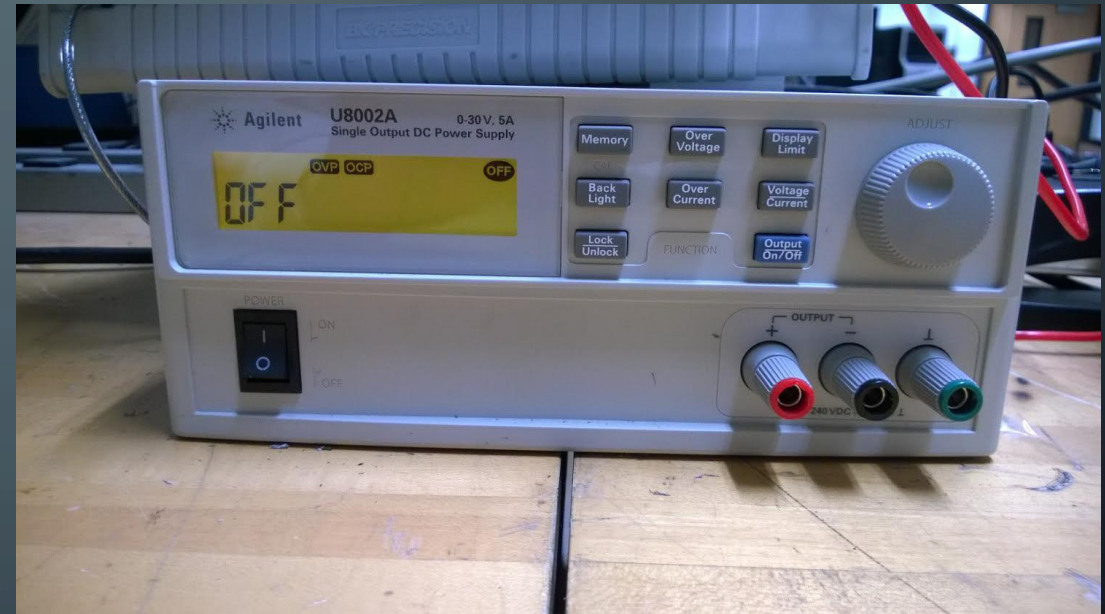# PROGRAM TESTING

- Power logger

   Originally Windows and Macintosh Based OS

- Modified to work the raspberry pi's Linux OS

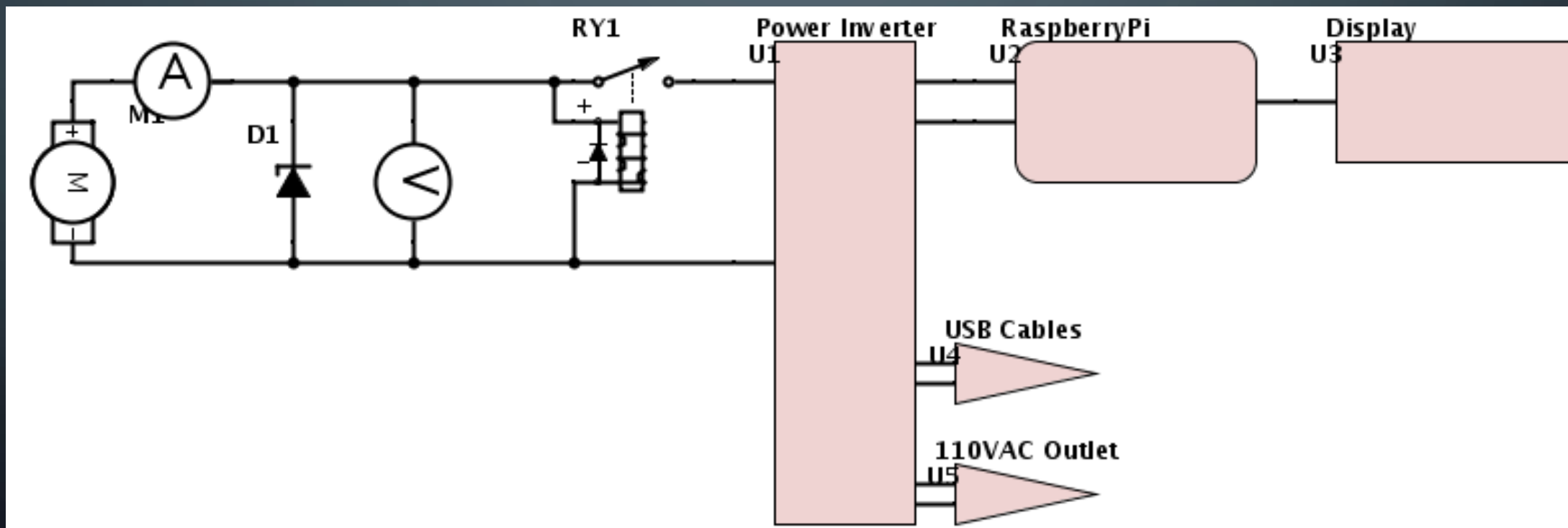Alex Devine

DISPLAY TESTING

- Making a power cable
  - Display power off the raspberry pi

- Display power and voltage regulator
  - Power supply
  - Determining voltage requirements
    - Inverter
    - Display

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DESIGN

- Creating the circuit
  - Soldering
  - Capacitors
  - Voltage Limiter

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CIRCUIT DIAGRAM

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CONCLUSION

- The second generation charging bicycle station provides users knowledge and educational experience.

- By the use of pedaling a bicycle
  - Understanding how generator works
  - Powering electronic devices through the generator
  - Powering the display to present visual effects

Alex Devine

Questions