BATTLE OF THE BANDS

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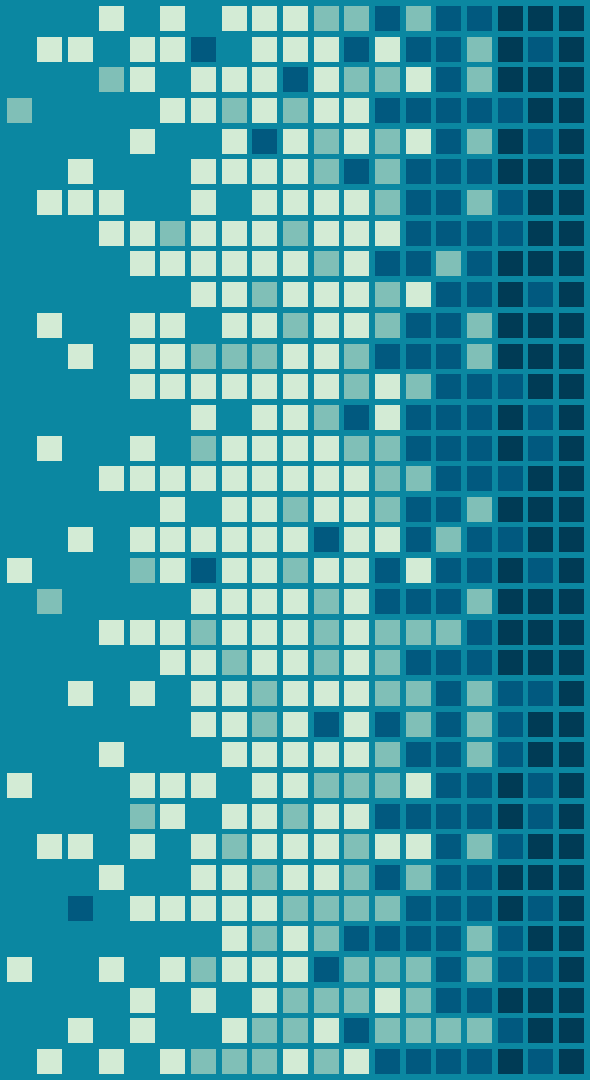
Electrical Engineering – SS 2019 – Duke TIP



ENTRY RULES

Entry Rules

- Every band must comprise of two members.
- You must have a name and a logo.
- Each band will be given one minute to perform.
- You must build at least 3 instruments.

Your Instruments

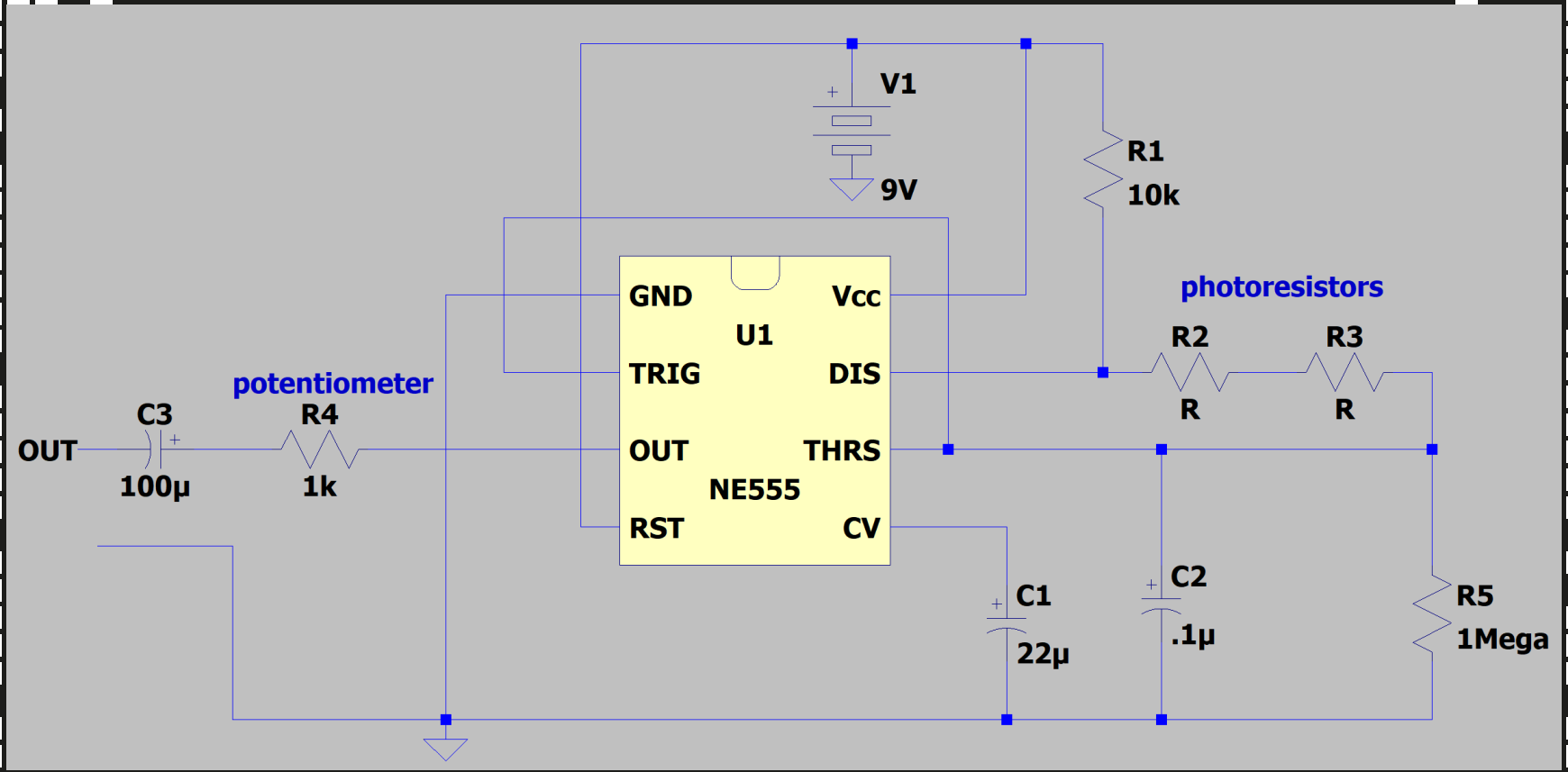
- Theremin
  - https://youtu.be/nE_sAnSkW-Q
- Atari Punk Console
  - https://youtu.be/Oi3dmSMpjsU?t=240
- Toy Organ
- Warble Sound Effects Generator

THEREMIN

Theremin

- Uses photoresistors to detect light to change the frequency of the RC circuit.
- How wide of a resistance range do you get?
- How many different frequencies can you get?
- Could you use other types of resistive components?
- Pressure sensors? Thermistors?

Theremin

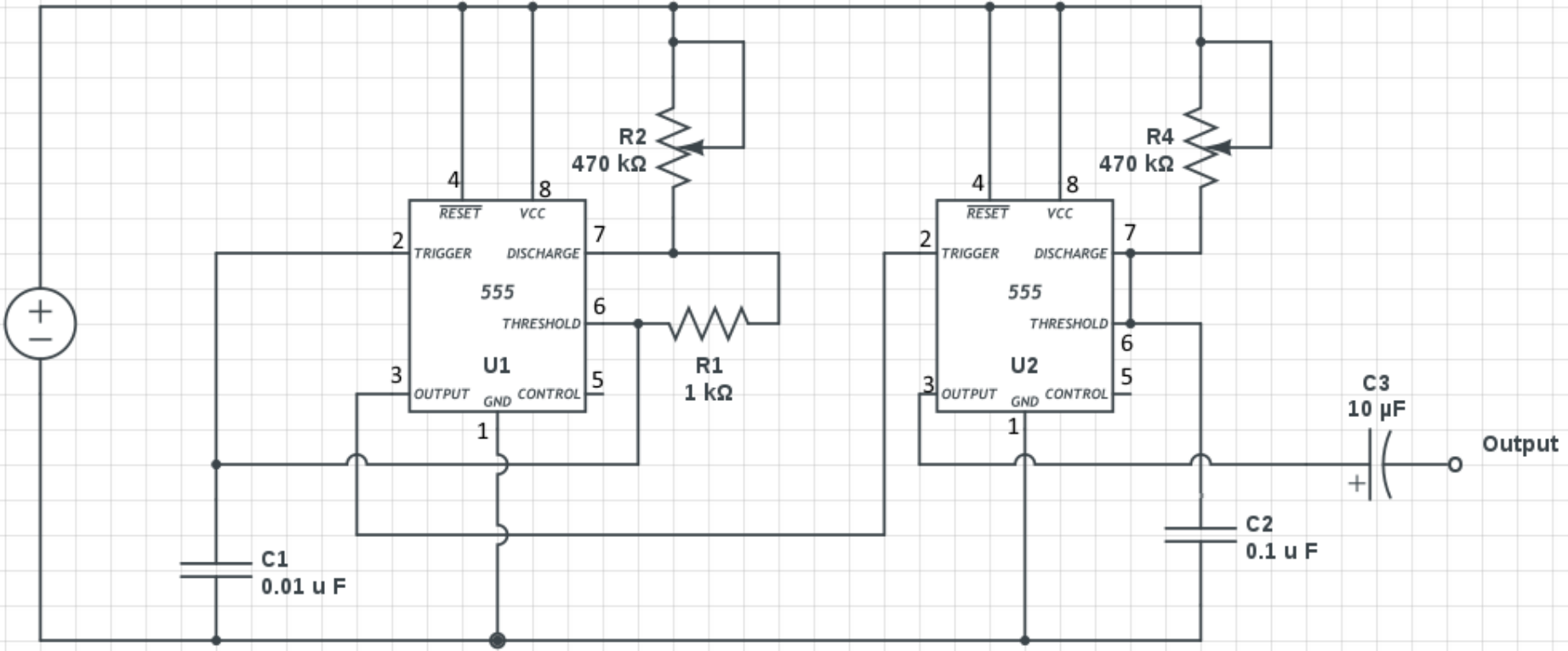

V1
9V
R1
10k
GND
Vcc
U1
TRIG
DIS
OUT
THRS
NE555
RST
CV
photoresistors
R2
R
R3
R
potentiometer
C3
100µ
R4
1k
OUT
C1
22µ
C2
.1µ
R5
1Mega

ATARI PUNK CONSOLE

Atari Punk Console

- Atari Punk console is an astable square wave oscillator driving a monostable oscillator that creates a single (square) pulse.
- Uses two 555 timers to generate these wave forms!
- There are two controls, one for the frequency of the oscillator and one to control the volume.
- The controls are usually potentiometers (can also be controlled by light, pressure, or temperature).
- Try it out!

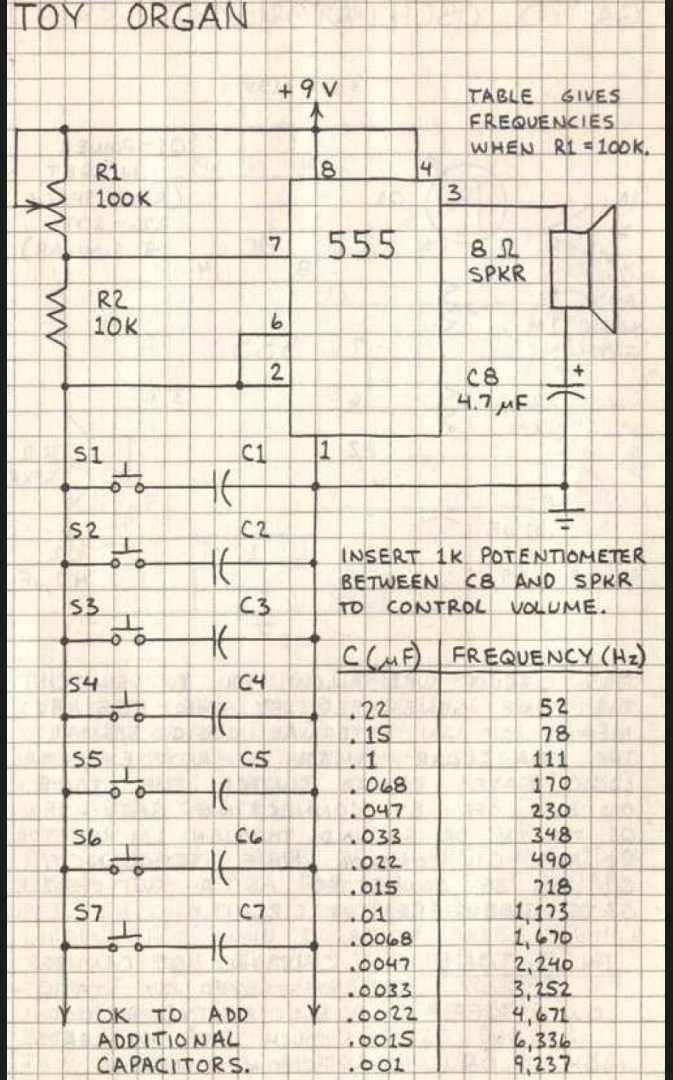
Atari Punk Console



ORGAN

Toy Organ

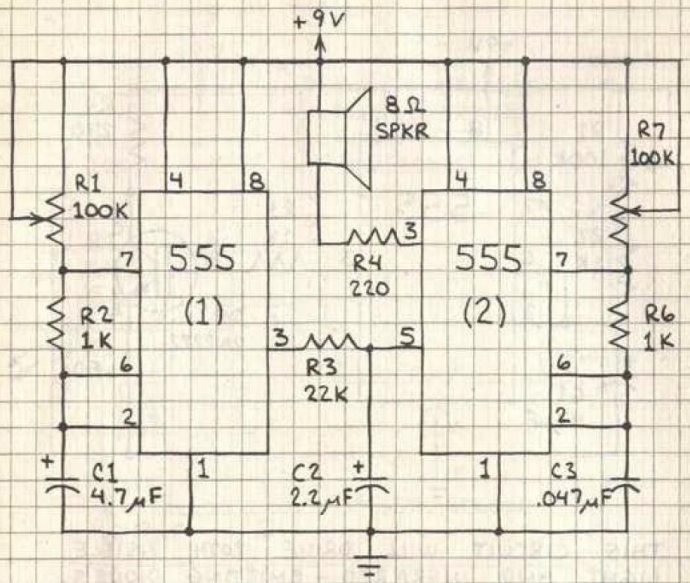
- Has different switches to change the RC values and therefore the frequency of the tone.
- Can you calculate the frequencies?
- How many different frequencies are there?



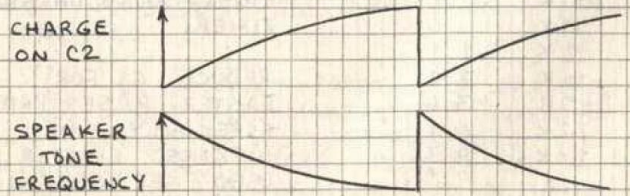
Could you have resistors for each switch instead?

WARBLE SOUND EFFECTS GENERTOR

SOUND EFFECTS GENERATOR



THE FIRST 555 OSCILLATES AT A FREQUENCY DETERMINED BY R1 AND C1. ITS OUTPUT CHARGES C2 THROUGH R3. THE SECOND 555 OSCILLATES AT A FREQUENCY DETERMINED BY R7, C3 AND THE VOLTAGE AT PIN 5 (i.e. THE CHARGE ON C2). EXPERIMENT WITH THE SETTINGS OF R1 AND R7 AND THE VALUES OF R3 AND C2 TO OBTAIN WARBLE EFFECTS.



ADDITIONAL NOTES

Tweak them!

- Use photoresistors or thermistors in place of potentiometers or vice versa!
- Change the frequencies by modifying the time constant (changing R/C values).

Criteria for winning battle of the band

- We will work together to determine the criteria.
- Every team will vote to determine the winner.