Presentation to present our idea, record flipper that is able to flip a record when it is done playing, it will then move the tonearm to the positon of the record.

Tonearm needs enough space for the movement

Must also know when tonearm in position

machine shop says that this is a very hefty project will need to reduce a component

decided on not doing the tonearm movement and to just do the record flipping

Accepted project

Using Hall effect sensor as the way to tell if tonearm is in position or not, no ultra sensor

Spoke with machine shop, and they told us a couple of ideas for the project, two ideas will be for the flipper it would be two servo motors and 1 stepper motor
The function would be the two servo motors would do the picking up and flipping while the stepper motor would be the motor that engages the record

Other would be all three servo motors that will be able to to do the whole functionality which is just engaging to the record, flipping the record, and also putting it back in place

Machine shop said that the 3 servo motor option is better as we have total control over the project,
Disadvantage is just a more complex code and state machine for the project

Machine shop can also do the stepper and 2 servo option but that the range is limited by the stepper motor, also stepper motors are expensive

Need record,

Got it from wallmart with mohammed

$35

Task fro this week is working on pcb

Job is researching microcontroller still unsure which to use

Researched on servo motors and stepper motors and how they work, big thing is that servos are able to move by using PWM wave signals and msot importantly being controlled by the wdith, steppers also need pwm signals but more for doing pulses to control it

Links to vids i watched

https://www.youtube.com/watch?v=1WnGv-DPexc
https://www.youtube.com/watch?v=_Cc_vKu7rfY

Microcontroller looks like it should be the ATMega328p, very simple cheap and is able to control properly

Started building breadboard,

Circuit is being done rn, hall effect sensor has the effect where signal will stay on until a signal of neg polarity is near it, keep in mind for programming

Fix for hall effect sensor is making a circuit that will be able to power off and power on the hall effect sensor to do a sort of restart, still dont know how to do this yet but will think later

No devboard for the circuit yet, simulated motor movement using the signal generator

Modulate, Am off, Square, duty cycle 50%,

Motors work well,

Machine shop lent us power servos,

Decide to do the 3 servo motor design for the project as the full control over the movement suited the project better

Demo went well, but no devboard to program yet, will order a new devboard, everyone using ESP32 so that will be the one

NO MORE ATMega328P, pwm pins for the atmega are the same pins needed to program the microcontroller, no good for us, need to switch

ESP32 is good shout, course web site has schematic and also pin layout has the pwm signals that we needed

Machine

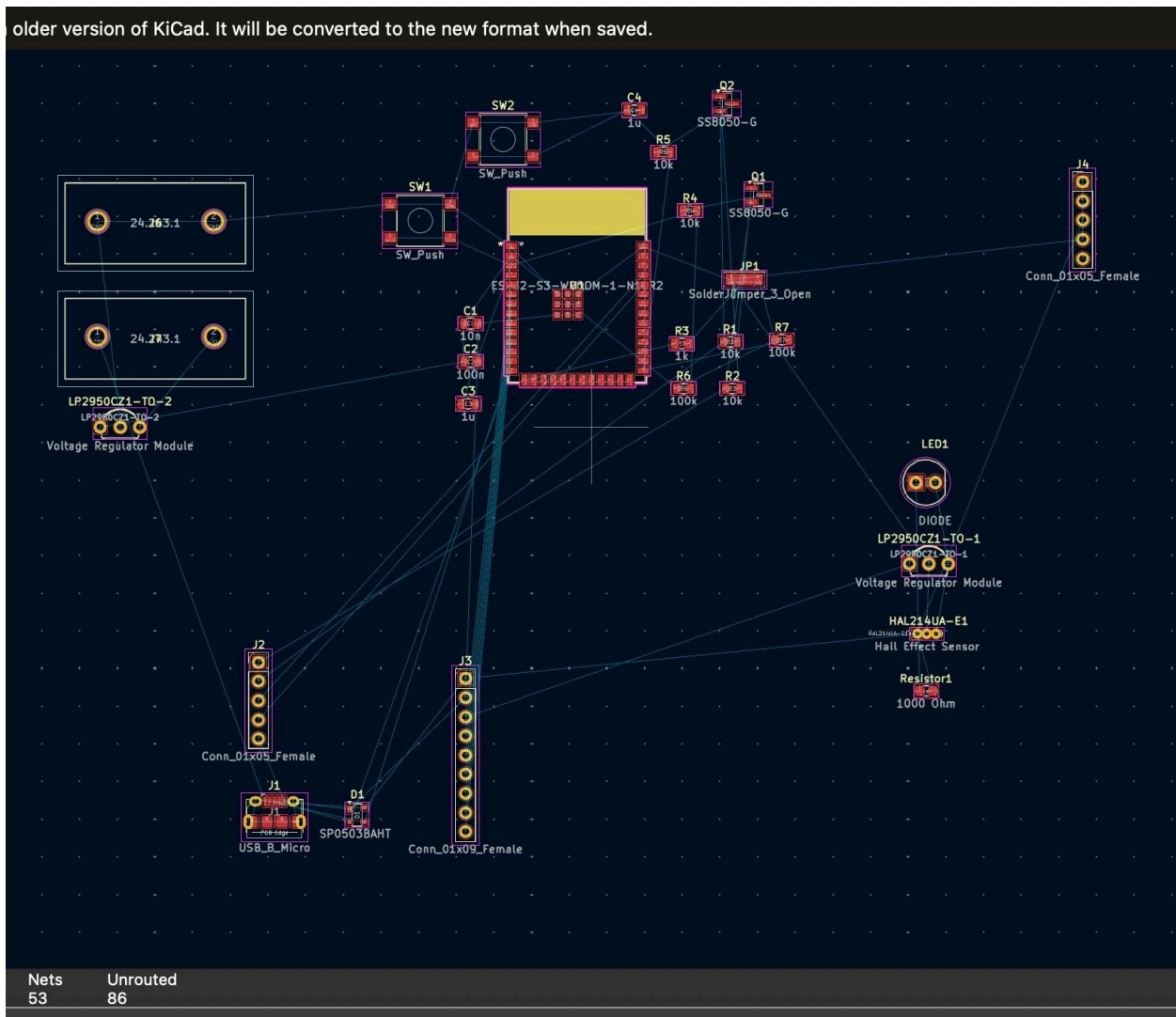20 ^{Kg}

ⓢ DSSERVO™ AD5318
ROBOT DIGITAL SERVO

Shop

Ordered jumper cables and also 2 esp32 devboards,

Late arrival, came march 25th, also dont know if needed but got a logic shifter incase the vpp of the microcontroller is too low, since esp32 can only output 3.3 VPP PWM signals

Research on pcb schematic

Decided on doing a simple pcb in order to get points for demo, still no third round pcb order
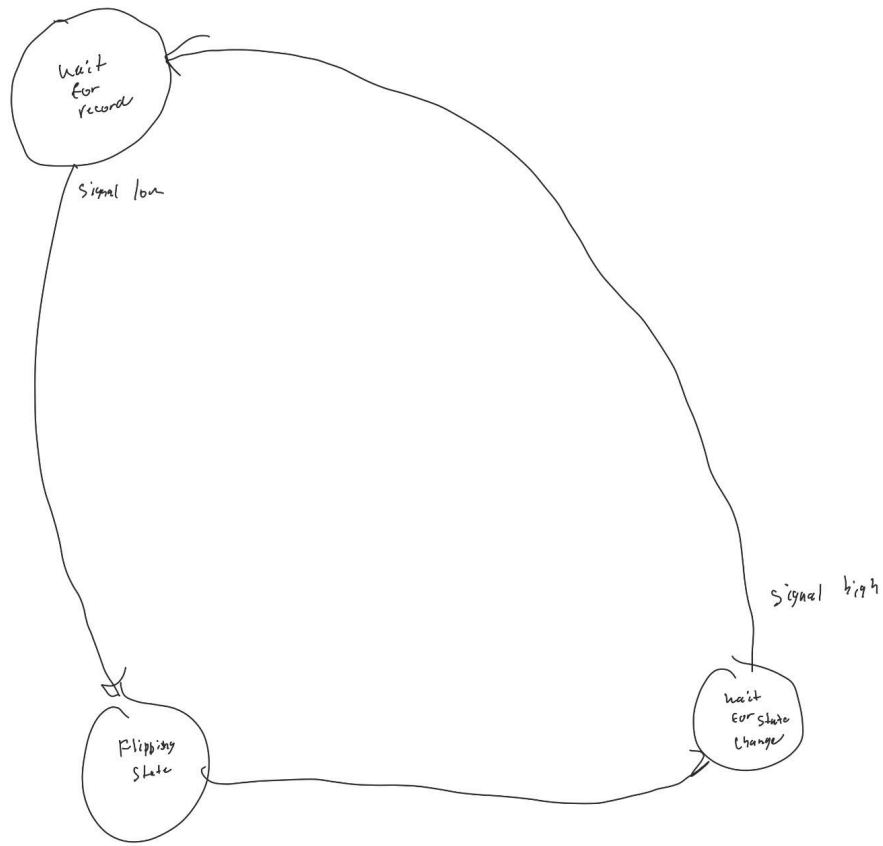
Working on the 4th round, needed to add capacitors for the linear regulators

Used the my.ece in order to get parts

Made order for the smd components

Amazon order and digikey orders came quick

Programming scheme would be a sort of FSM, needs to have three states, the first state would be when the record player is done playing, assume that the record is playing while our circuit is turned on, next state would be the flipping state and this state would be when the record is flipping, this state would automatically be put into the wait for change state, this state is for when our record flipper is waiting for the tonearm to move back to playing the record, this state will be so our flipper doesnt auttomactically do the operation again when th record is near

wait
for
record

Signal low

Signal high

wait
for state
change

Flipping
State

Power Supply

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

I/O

5V Power
GND

GPIO5   1
GPIO6   2
GPIO7   3
GPIO15   4 J3
GPIO16   5 Conn_01x09_Female
GPIO17   6
GPIO18   7
         8
         9

RTS   1
DTR   2
TX   3 J2
RX   4 Conn_01x05_Female
      5

GND

J1
USB_B_Micro
VBUS
D+   1
D-   2
ID   3
Shield   4 D1
GND   5 SP0503BAHT
          6

5V Power
D+
D-

GND   GND

+5V

5V Power 1
          2 J5
             24.243.1

Voltage Regulator Module
LP2950CZ1-TO-2

VI VO   3V3
GND

GND

GND   1
      2 J4
         24.243.1

GND

Power to Motors

5V Power 1
GND   2
          3 J6
          4 Conn_01x05_Female
5V Power 5
GND

Hall Effect Sensor

5V Power

Resistor1
1000 Ohm

LED1
DIODDE

HAL214UA-E1
Hall Effect Sensor
GND VCC
VOUT 3

VI VO   GPIO5
GND

Voltage Regulator Module
LP2950CZ1-TO-1

GND

ESP32-S3 Module

U1
ESP32-S3-WROOM-1-N16R2

3V3

C1   C2
10n   100n

GND

GND   1   GND   GND 49   GND
CHIP_PU   2   3V3   GND 48
           3   EN   GND 47
VBAT_SENSE 4   IO4   GND 46
GPIO5   5   IO5   GND 45
GPIO6   6   IO7   GND 44
GPIO7   7   IO7   GND 43
GPIO15   8   IO15   GND 42
GPIO16   9   IO16   GND 41
GPIO17   10   IO17   GND 40
GPIO18   11   IO18   IO1 39   LM_2
M1_FAULT 12   IO8   IO2 38   LM_1
          13   D-   TXD0 37   TX
          14   D+   RXD0 36   RX
GPIO3_STRAPPING 15 IO20   IO42 35   MTMS
GPIO46_STRAPPING 16 IO46 IO41 34   MTDI
M1_EN   17   IO17   IO40 33   MTDO
M1_PWM   18   IO10   IO39 32   MTCK
M1_DIR   19   IO11   IO38 31   CAMERA_SCL
M2_FAULT 20   IO12   IO37 30   CAMERA_SDA
M2_EN   21   IO13   IO36 29   CAMERA_SCK
M2_PWM   22   IO14   IO35 28   CAMERA_MISO
M2_DIR   23   IO21   IO0 27   GPIO0_STRAPPING
CAMERA_CS 24   IO47   IO45 26   GPIO45_STRAPPING
                          IO48 25   CAMERA_MOSI

GPIO3_STRAPPING   10k   GND

3V3
100k
R6

CHIP_PU
SW1
SW_Push
C3
1u

GND

10k   CHIP_PU
Q1
SS8050-G

DTR   10k

3V3
100k
R7

GPIO0_STRAPPING
SW2
SW_Push
C4
1u

GND

RTS   10k
Q2
SS8050-G
10k   GPIO0_STRAPPING

3170.0157 mils
H4   H3
J4
J5
LP2950CZ1-TO-2
Team 20
276k.0460 mils
2755.0000 mils
R1 Q1 R4
R2 Q2 R5
R6
C1 C2
LED1
J3
U1
C3
SW1
R3
SW2
Resistor1
R7
C4
HAL214UA-E1
LP2950CZ1-TO-1
D1
J1   J6
H1   H2
3170.0000 mils

Plan for this week is to plan on breadboard demo, with the new designs and also all new components

Equipment is a little buggy, tested out oscilloscope, not reading signals properly, also the multimeters for one of the benches do not work

Used scopy to make sure the signals were being routed properly

How to use oscilloscope, use the pen to place wherever you're signal is coming from, pen also has a connector to use to connect to ground,
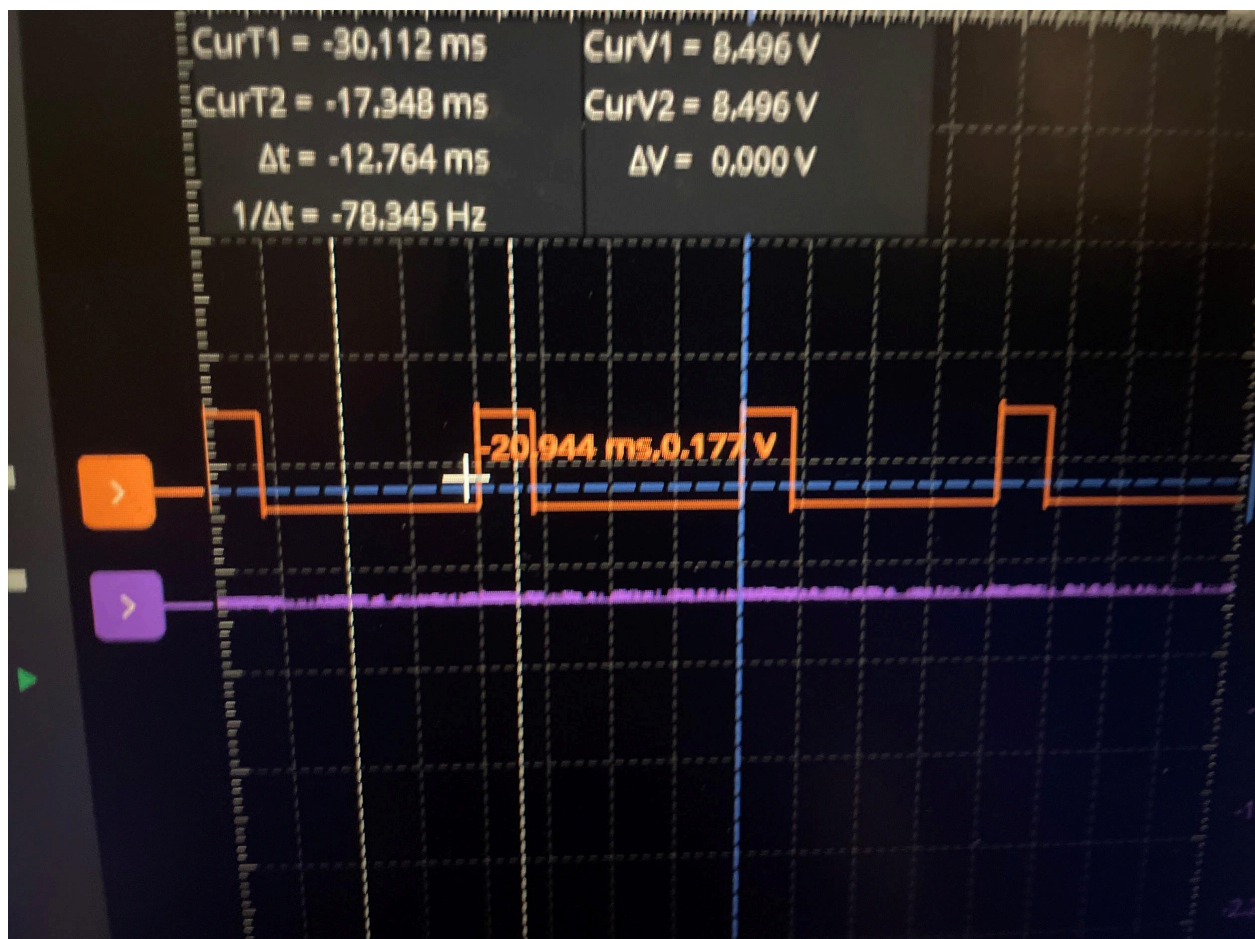
Circuit is being built

Problem #1 Servo motors are not moving even when microcontroller is outputting really good signals

Issue fixed, needed to connect the dev board to the ground of all the rest of the ground signals, it was left floating

Also need to make sure signals are being routed correctly

Do not program microcontroller while it is receiving power, always do those things separately

Also when programming when program is done press the enable pin button as this will help the,icrocontroller to be ready to program after loading in the program.

Got the record flipper from jordan the machine shop, looks really nice

need to make improvements to the circuit as the Hall effect sensor was routed imporoperly

3.3V
1.7V

Hall, effect sensor was not sending out signals properly

Hall effect does not drop down the voltage entirely, it only goes to half

Weird behavior with motors is that sometimes they would move sporadically

The behavior was very random maybe breadboard wrong?

Changes that were made, put capacitors in the input and outputs of our Hall effect sensor

No more weird behaviors or anything

Also needed to go to machine shop to have them switch our servo motor,
This is because the direction of travel is the opposite of what we want, neede jordan to flip it
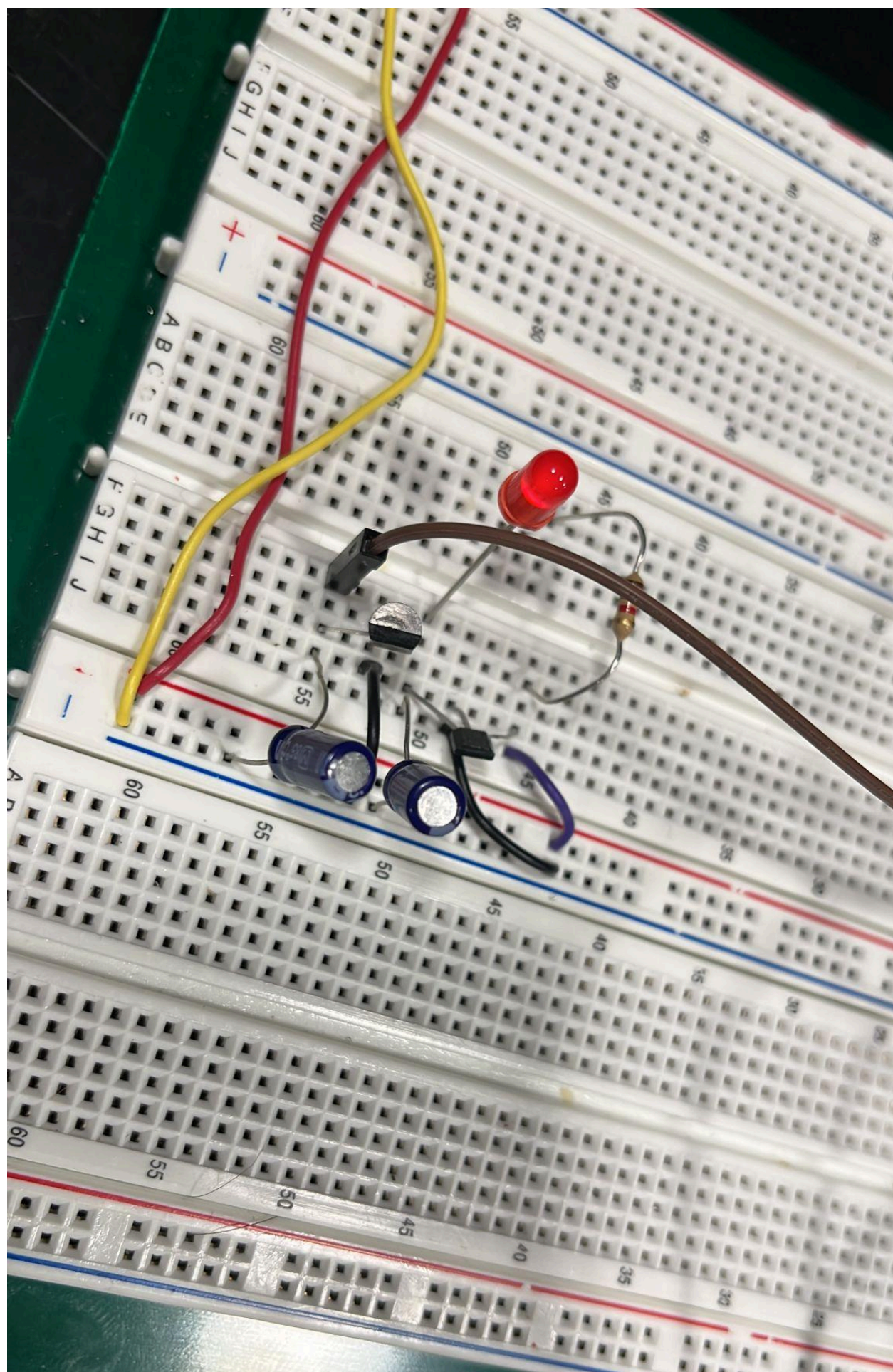
We have breadboard working now it's focusing on pcb

Simple pcb could not work because there is no uart bridge connectors where it needed to be connected to the txd and the rxd

Make sure oven needs to be opened and closed in order to properly, groups were having trouble with it but this is good tip

PCB WORKS

Picture of video of pcb working first try

Date: May 1st **Course:** ECE 445 **Team Name:** Vinyl Records

Just In Time Workshop Feedback Form

Great job on your presentation! The following feedback is intended to help you polish your presentation. Please consider filling out a feedback survey on your experience. Scan the QR code up above!

Slide Design

- Reduce the amount of text on your slides
- Re-order your slides to tell a clear story
- Change the font style and/or size to be legible and consistent
- Consider using UIUC approved slides
- Add slide numbers and/or an agenda slide

Additional notes:

✷ Great demo video → should it be later?

✷ Nice slides, consider enlarging the text and cutting down full sentences to short bulletpoints

Collaboration and Cohesion

- Add verbal transitions between speakers (e.g., "Now, I'll pass it to Anna.")
- Physically position yourselves to stand on the sides of the screen in an even and balanced way
- Consider actively listening to your fellow teammates while they speak to look engaged
- Practice with your teammates to find a common rate and pitch of presenting

Additional notes:

✷ take a breath before intro, start more confidently!

✷ Nice transitions and "in conclusion"

Delivery

- Stand strong with your feet shoulder width apart, your spine straight, and your shoulders back
- Identify and use one resting hand gesture that is not crossing your arms or putting your hands in your pockets
- Make eye contact with the audience at least 50-70% of your speaking time
- Practice without your notes so you can adopt an extemporaneous style of speaking

Additional notes:

✷ Careful of "uh" and "um"

• plant feet firmly, be mindful of swaying

• Nice eye contact!

• make hand gestures casual, I would use whole hand and not just pointer finger

Notes for speaking

No looking on floor

Smiles to the audience

No pointing so intensely, making it more natural

Fix slides and make sure we arre all in sync'

Mishap happened, servo motors were very wonky and we needed to come in and fix it

The orientation of the servo motors were off, would miss the record and also sometimes pick it up

Very unreliable and very finicky

Do not press reset for the microcontroller as this will cause the system to panic and just behave very erratically

 Be near power supply in case any weird and dangerous behavior

Needed to do the adjustments as there was no time to go to the machine shop

Fixed all issues, orientation is all aligned and can do all the requirements

Final presentation went well professor liked project

THANK YOU CHI FOR A GREAT SEMESTER!!!