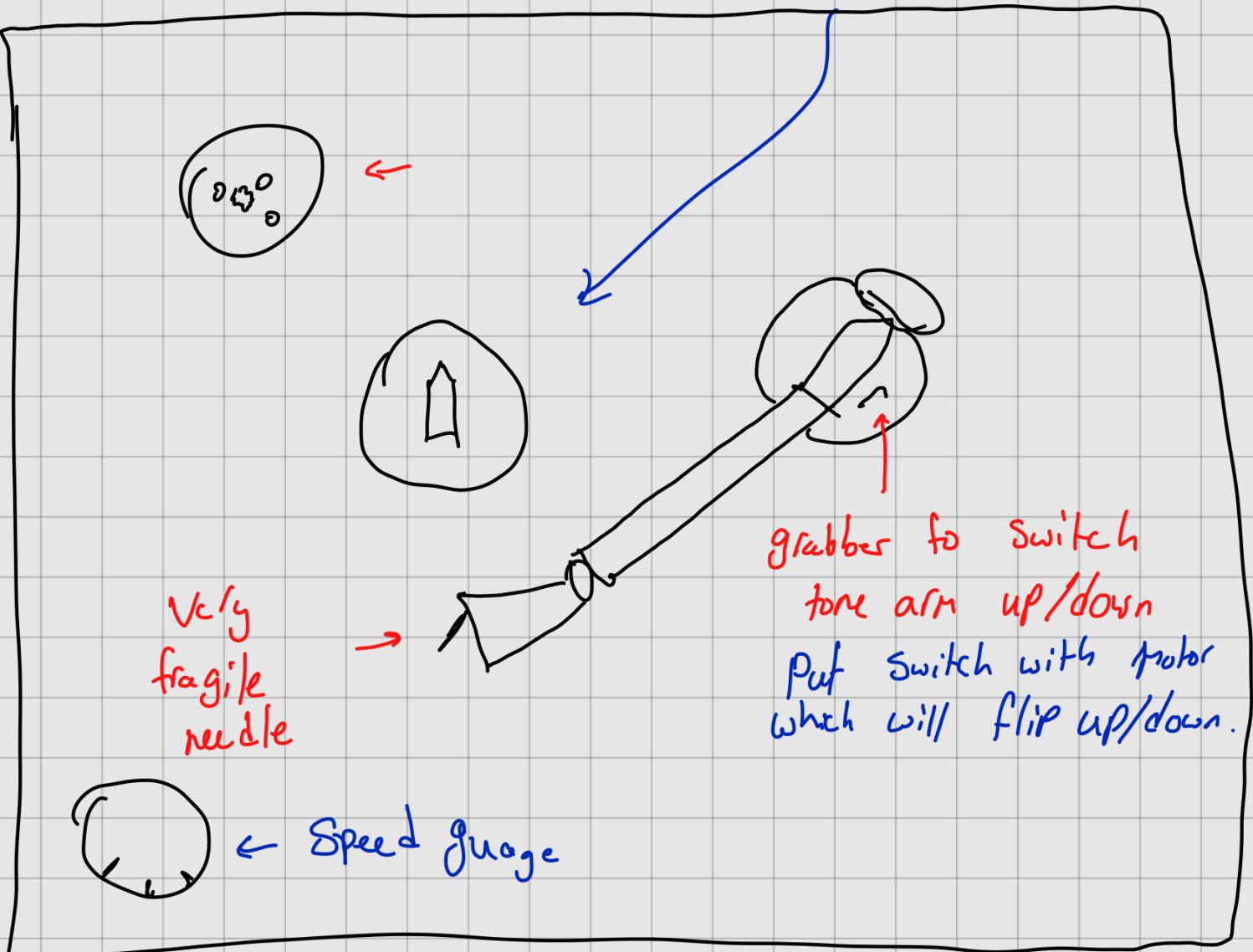


First group Meeting

- * Drafting Project
- * Initial Subsystems to be used to accomplish project
- * Seeing feasibility of Project
- * Searching different record Players for Project

* Very Precise to refit Vinyl to Screw



Sketch of modern Vinyl players



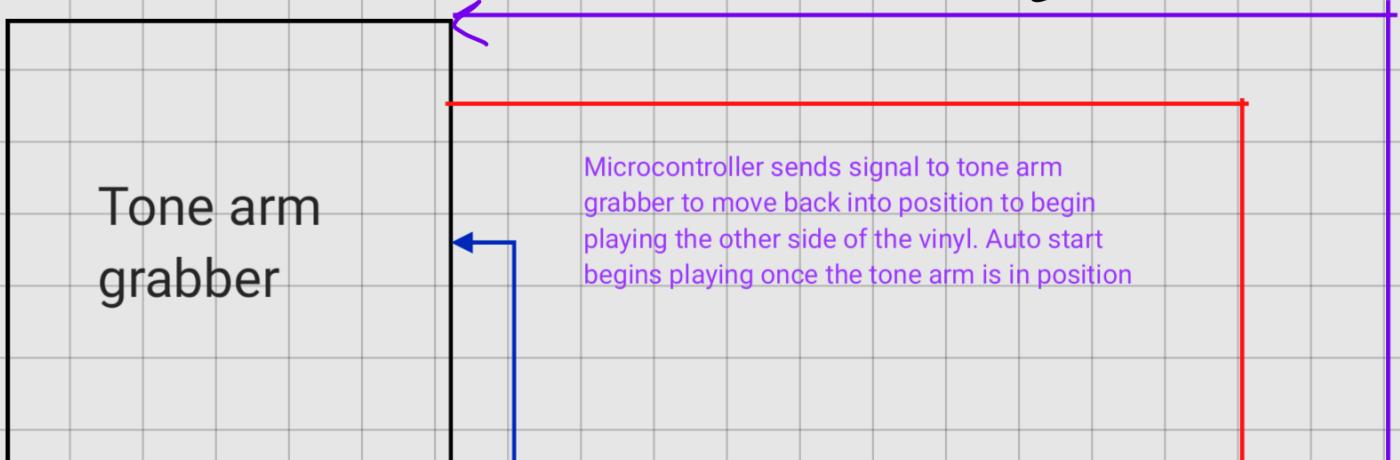
Pictures of proposed Vinyl player
used for project



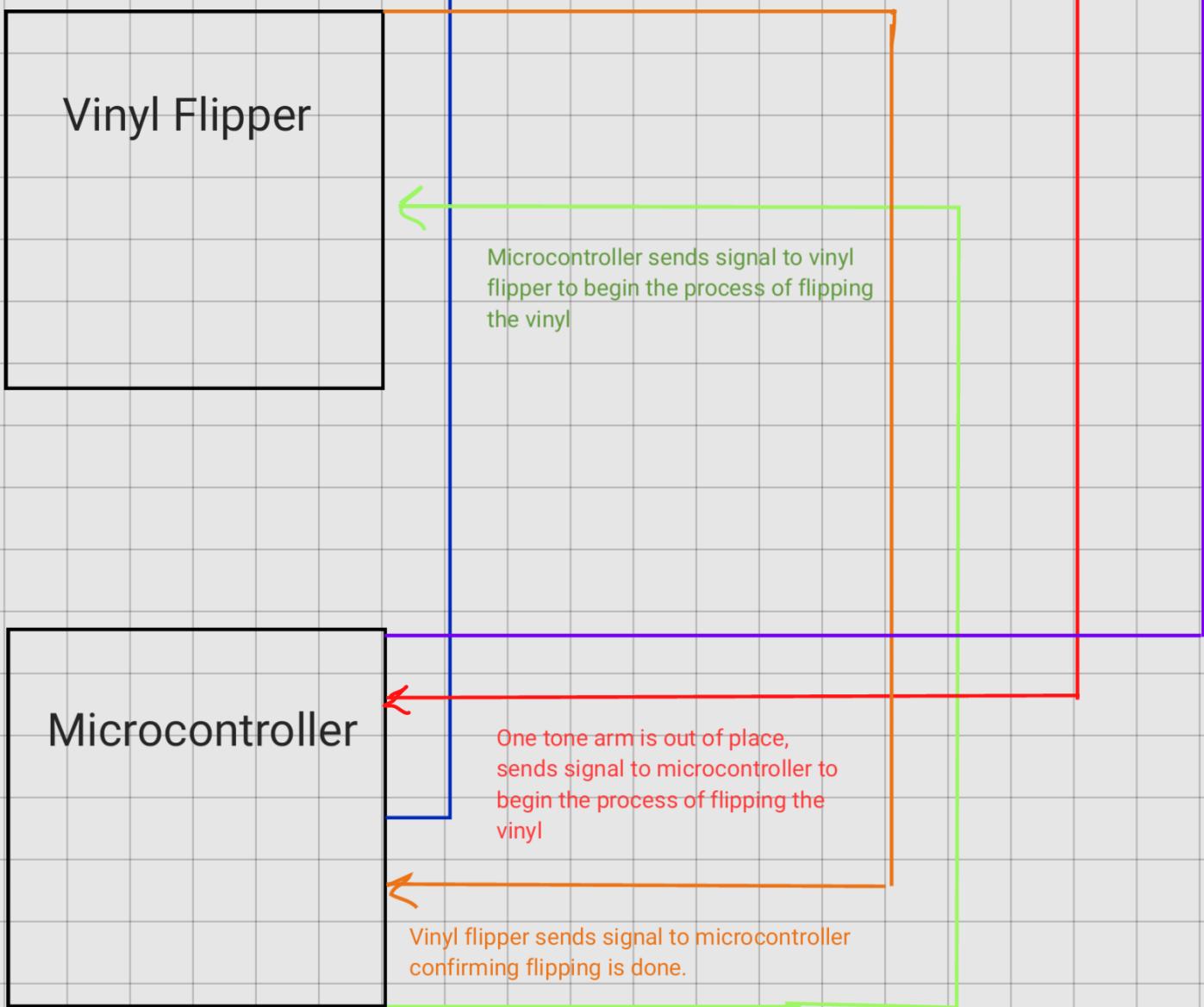


[Discarded for a cheaper simpler
alternative]

Rough Sketch for overall System design



Steps



IR Vs Hall-Effect Sensors for Projects:

Uses light

Needs to be carefully installed

More costly

Less room for error

May be falsely triggered

Uses magnetic field for signal.

Can be situated near to arm for operation beginning

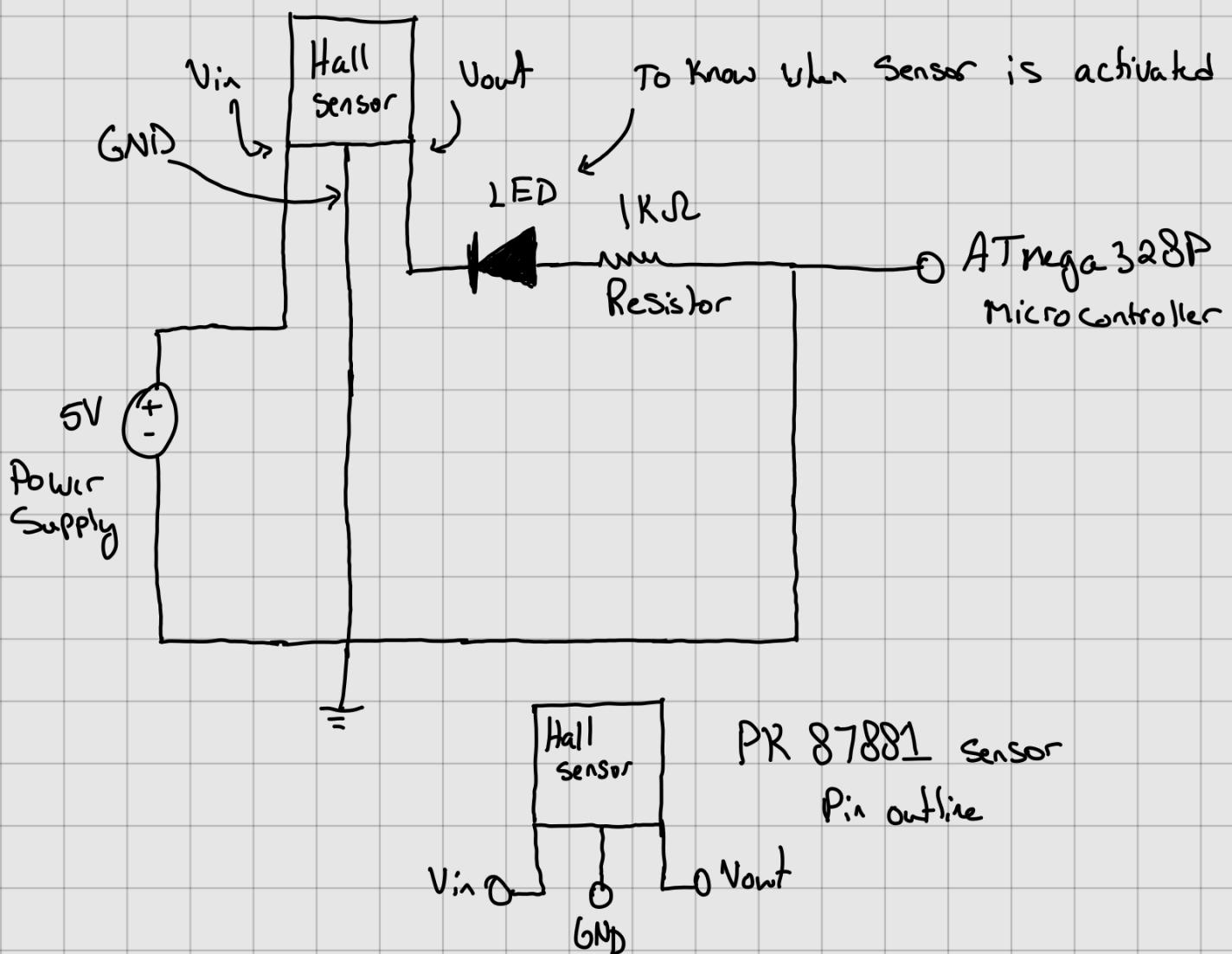
more room for error

cannot / very hard to false trigger

Hall-Effect Sensor is better,



Simple Hall-Effect Sensor Circuit

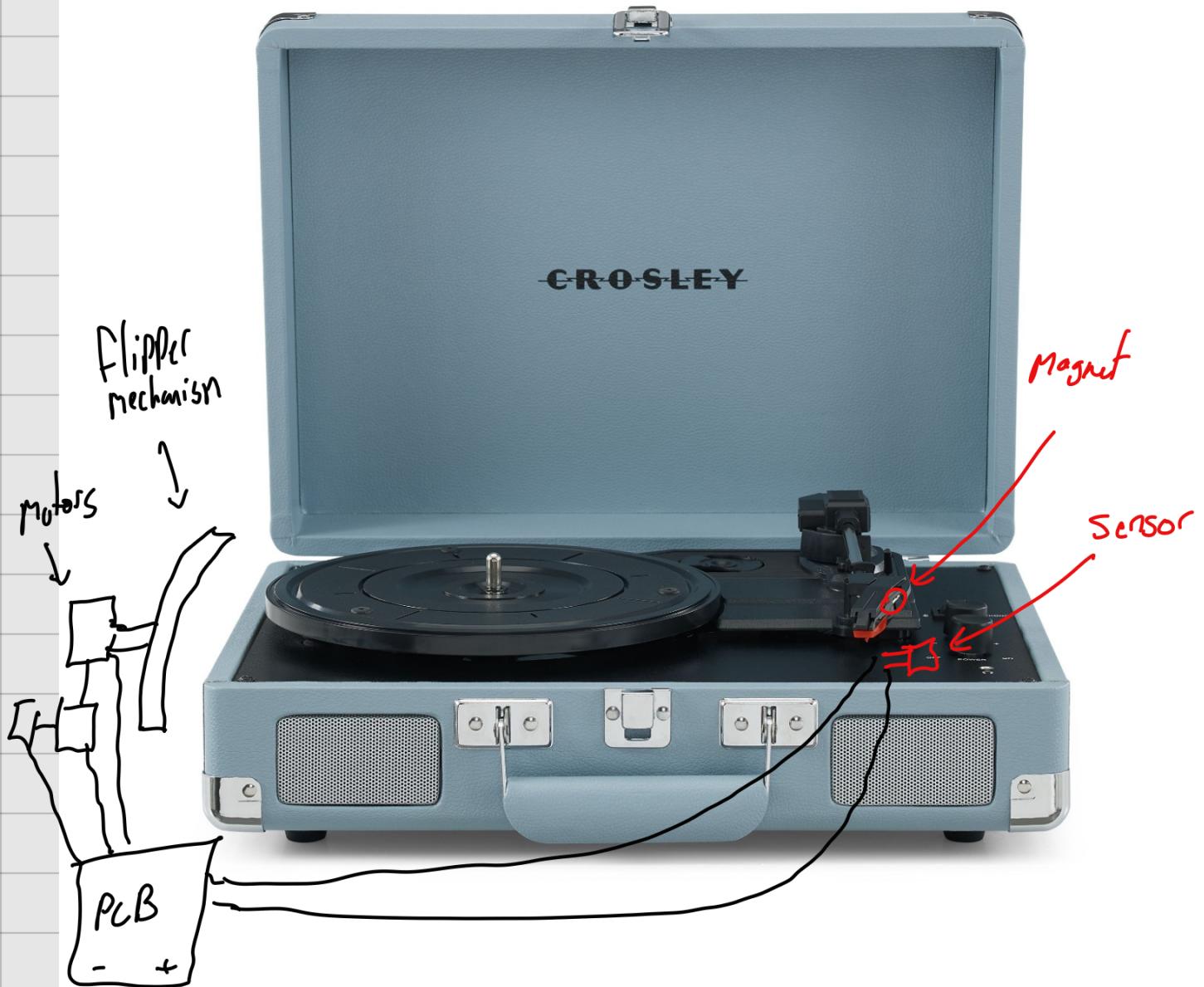


Simple circuit where Jicde is 5V then

(when sensor is triggered it goes

to 0V, High \rightarrow Low Signal

operation. Viable for our project.



Crosley Vinyl Player chosen for Project

cheap, \$35 fits project budget

Small, allows for better implementation of Flipping mechanism

Tone arm is not automatic, so it's assumed it will be automatic

PK 8788 Sensor vs HAL - 21h

Latch Signal

[stays on after one

Trigger Signal

acts as desired

magnetic field signal &

in context of
project

does not go off after signal

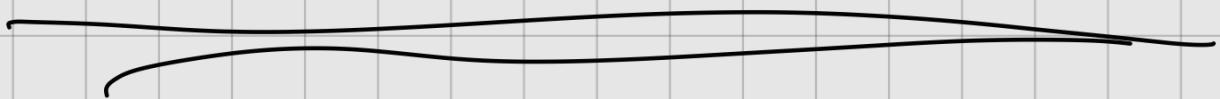
is gone]

Needs de-latch circuit

Only sensor is
needed to implement.

extra work to implement

HAL - 21h Sensor is better.



ATT Mega Microcontroller cannot be used,
So ESP32 is chosen.

ESP32 only takes 3.3V, so Voltage regulator
is needed.

LP2950 CZI module is chosen

* From self-service [Free]

Converts 5V signal to 3.3V, good for ESP32

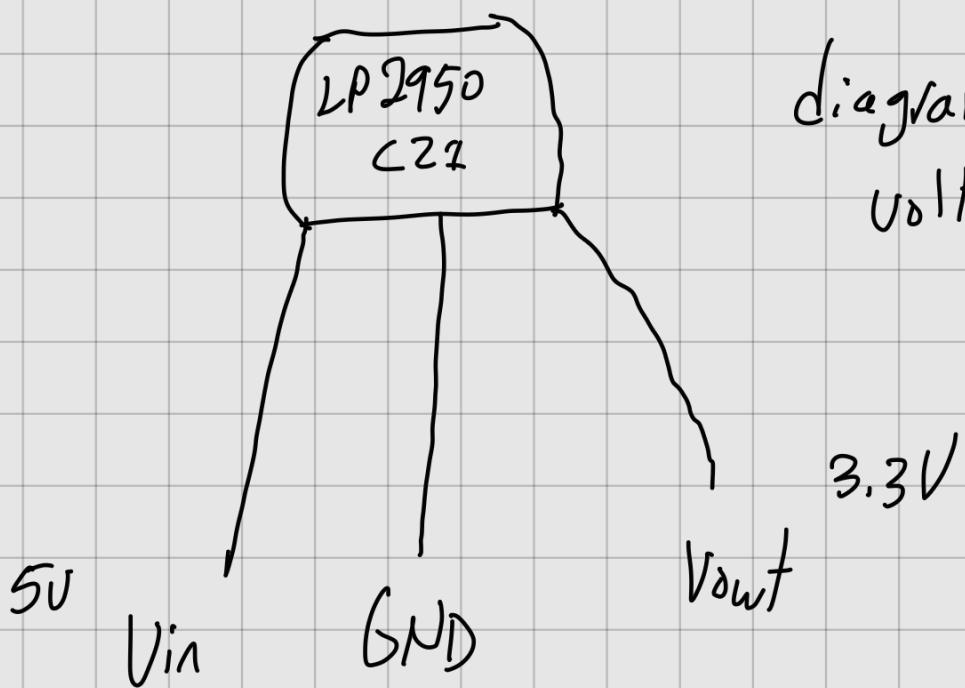


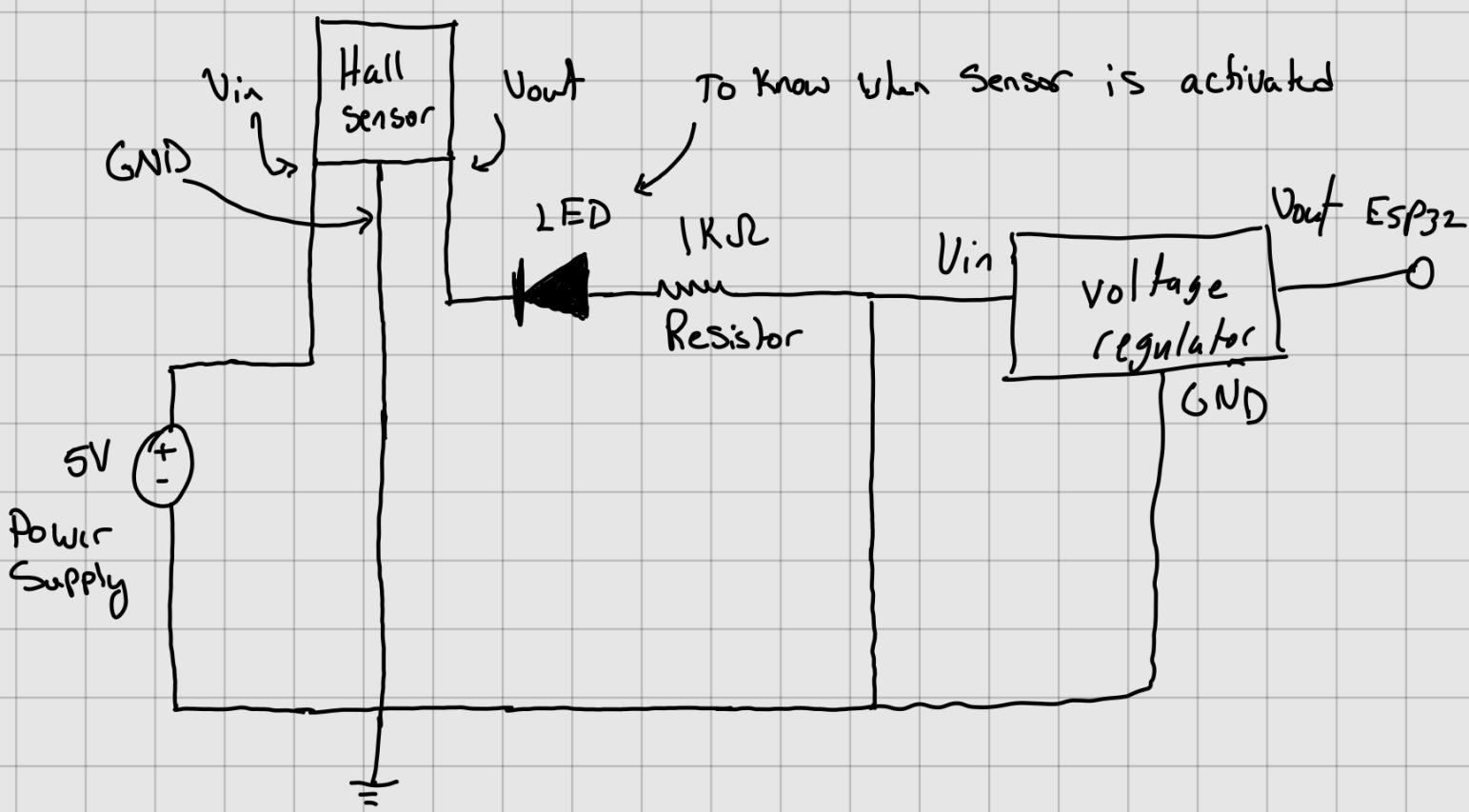
diagram of
voltage regulator
module.

Power will be supplied by course

Provided Power Supply.

- * No need for assembling new Power delivery mechanism.
- * Provides 5V 2.5A, each motor has ~2A stall current, so each motor will work separately for successful operation.
- * Banana jacks used to plug it into PCB.

Updated Hall-Effect Sensor circuit with Voltage Regulator



This will be the final circuit for sensor
in PCB.

ESP 32

VS

ATmega

allows for higher level
implementation

Simple function
only

GPIO pins separate
from Power

[GPIO pins attached]
to Power

meaning it can't be
implemented.

The microcontroller needs to send a

specific number of PWM waves to

Motors for correct angle of flipping

at record

Third Round of PCB errors

No decoupling Capacitors for ESP 32

Certain wiring incorrect with Sensor

Fourth round will address these issues.

And ensure PCB functions as intended like the breadboard.

Minimum magnetic field required by sensor

to activate ~ 50 Gauss, recommended ~ 150 Gauss

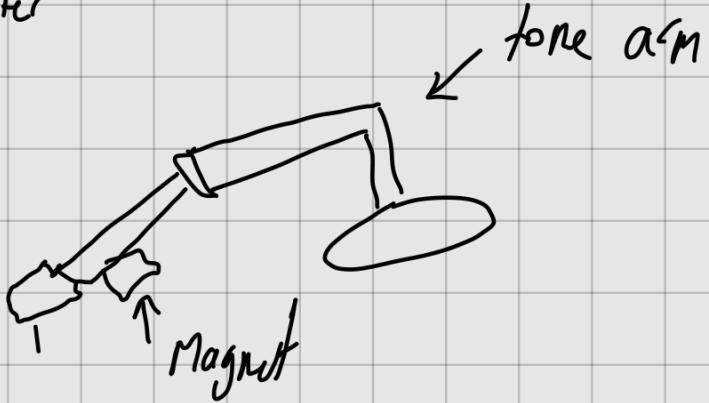
from data sheet

A Simple N52 neodyme magnet will do the

job, dimensions must give strong enough signal

and be small enough to fit tone arm without

hindering performance.

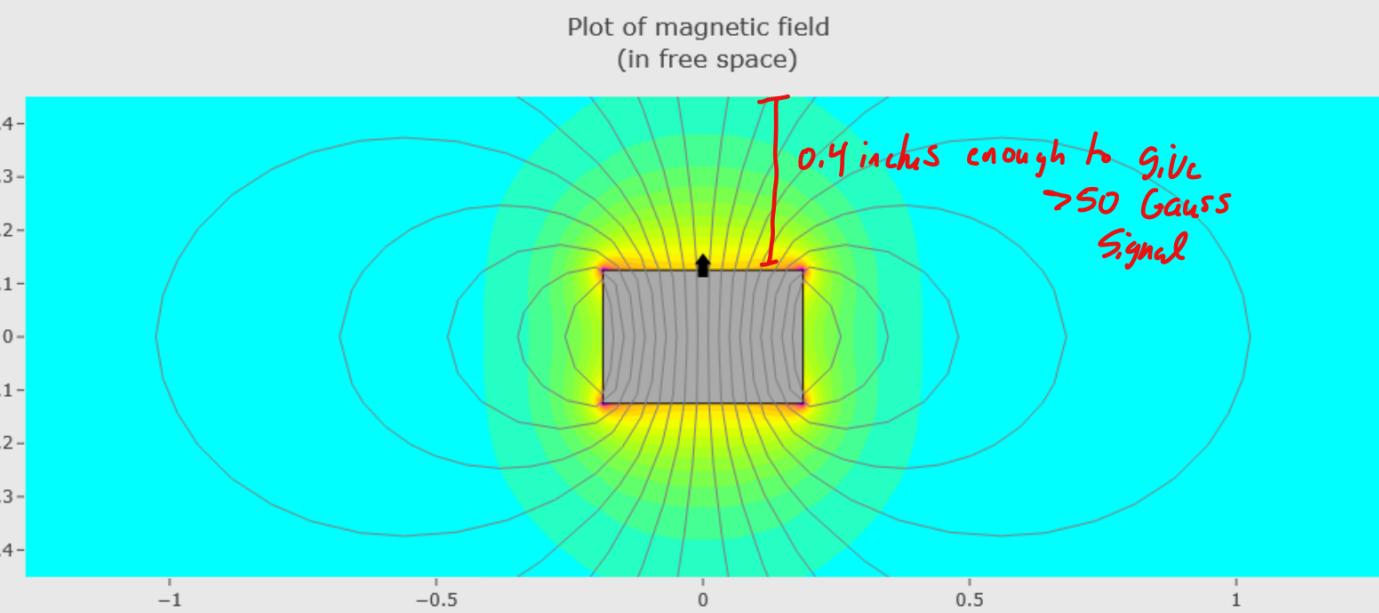


Magnetic field of Magnet graph

With Specified dimensions and Strength

Taken from calculator Link:

<https://www.kjmagnetics.com/magnetic-field-calculator.asp>



It can be seen that the magnet gives off
a strong enough signal at about ~ 0.6 inches
away from sensor.

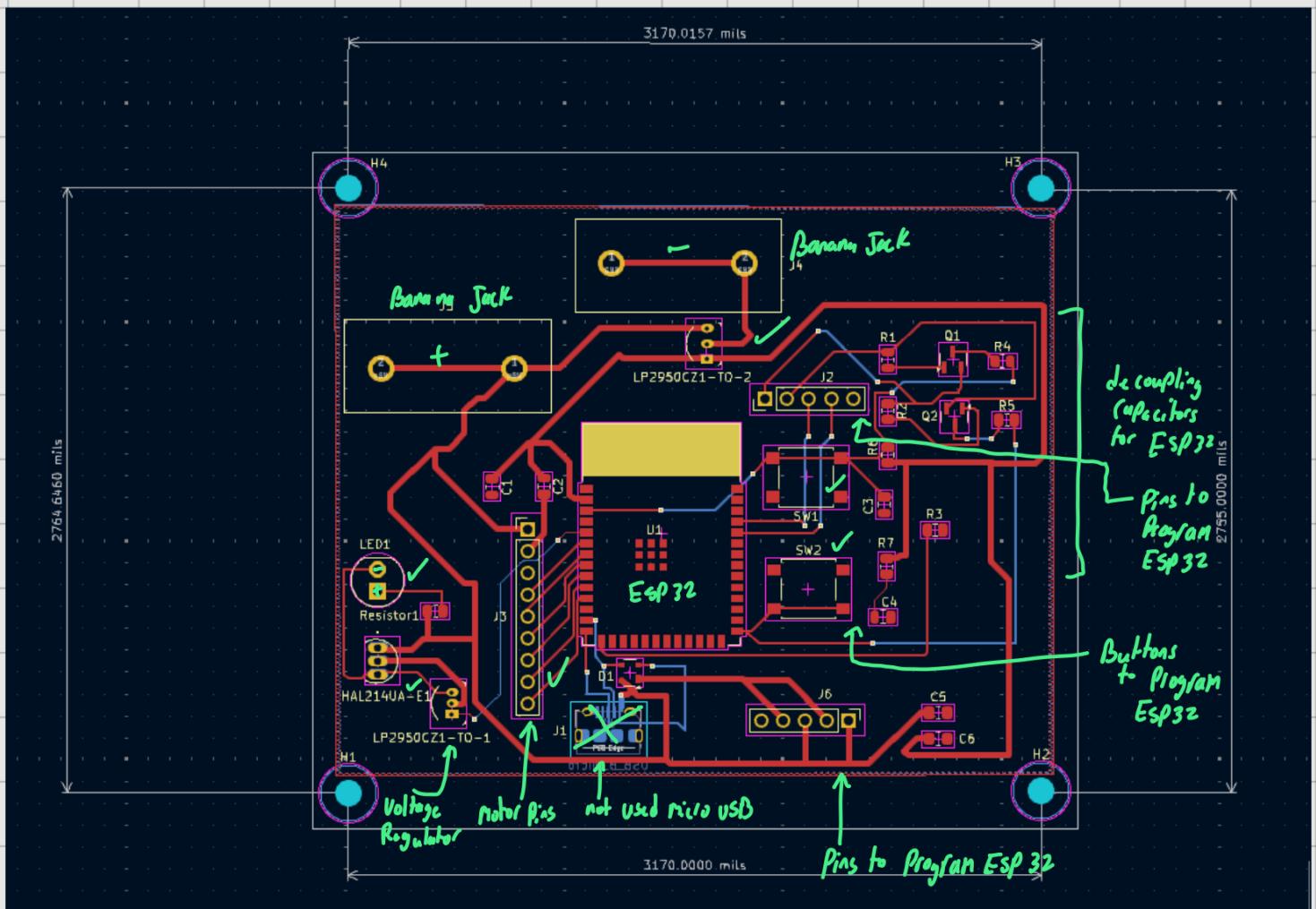
No accidental triggering check

- * Sensor needs ~ 50 Gauss to trigger.
- * Whole system has max 2.5A from lab given Power Supply.
- * Sensor is away from PCB, right next to tone arm to receive signal, it is wired to PCB 100A needed to achieve ~ 50 Gauss to accidentally trigger Sensor, System can't do that.
- * No other magnets in record player, tone arm reads record electronically, so no accidental triggering.

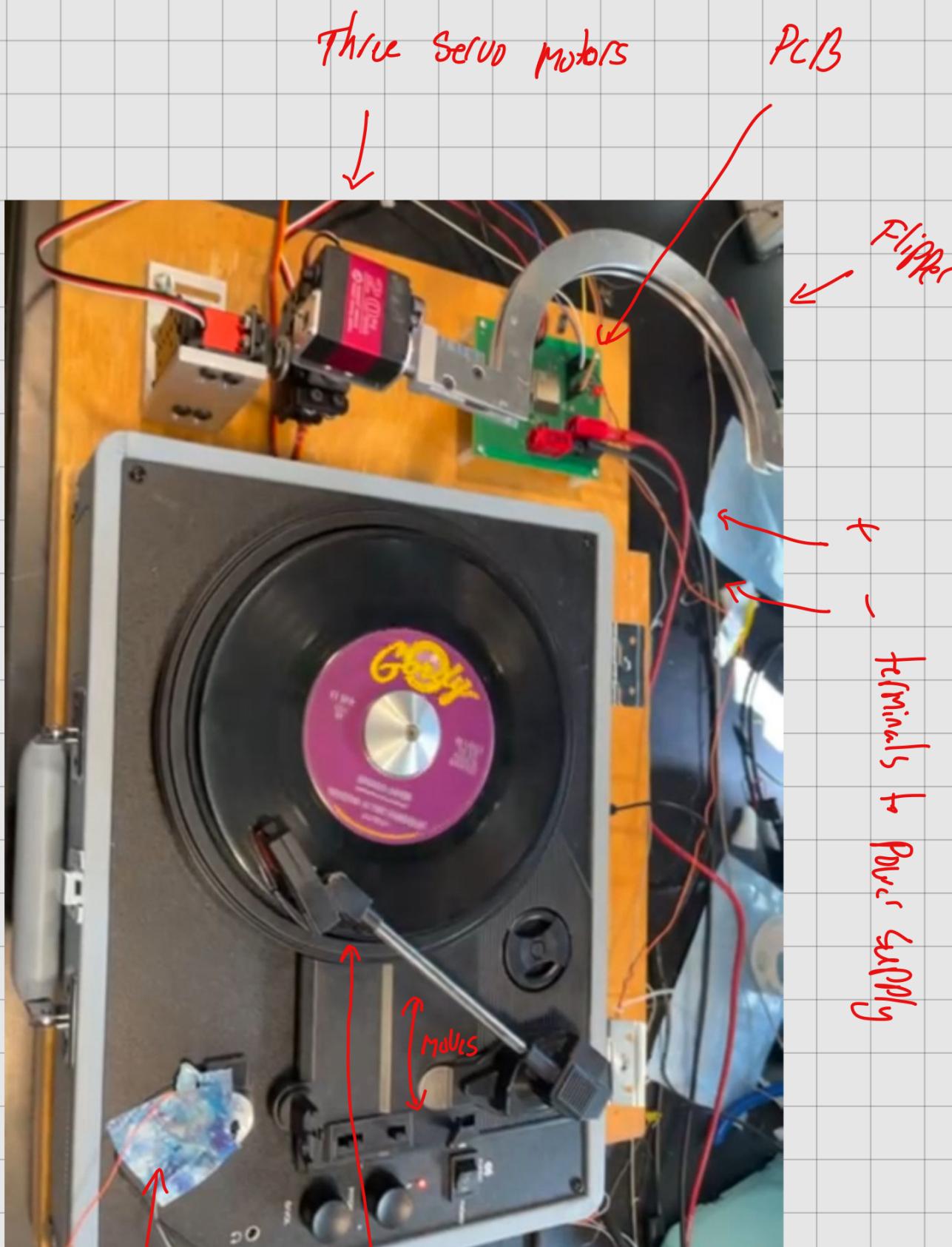
From these points we see Sensor will never be accidentally triggered.

PCB layout check

4th Round



Picture of assembled Project



Hall effect Sensor Magnet attached to tone arm to send signal

Improvements to project

- # ADD rubber fitting to record grabber for no damage to records
- # Test flipping mechanism with automated tone-arm
- # Try out 12 inch records, not just 7in and build new grabber.

Overall Project was successful