

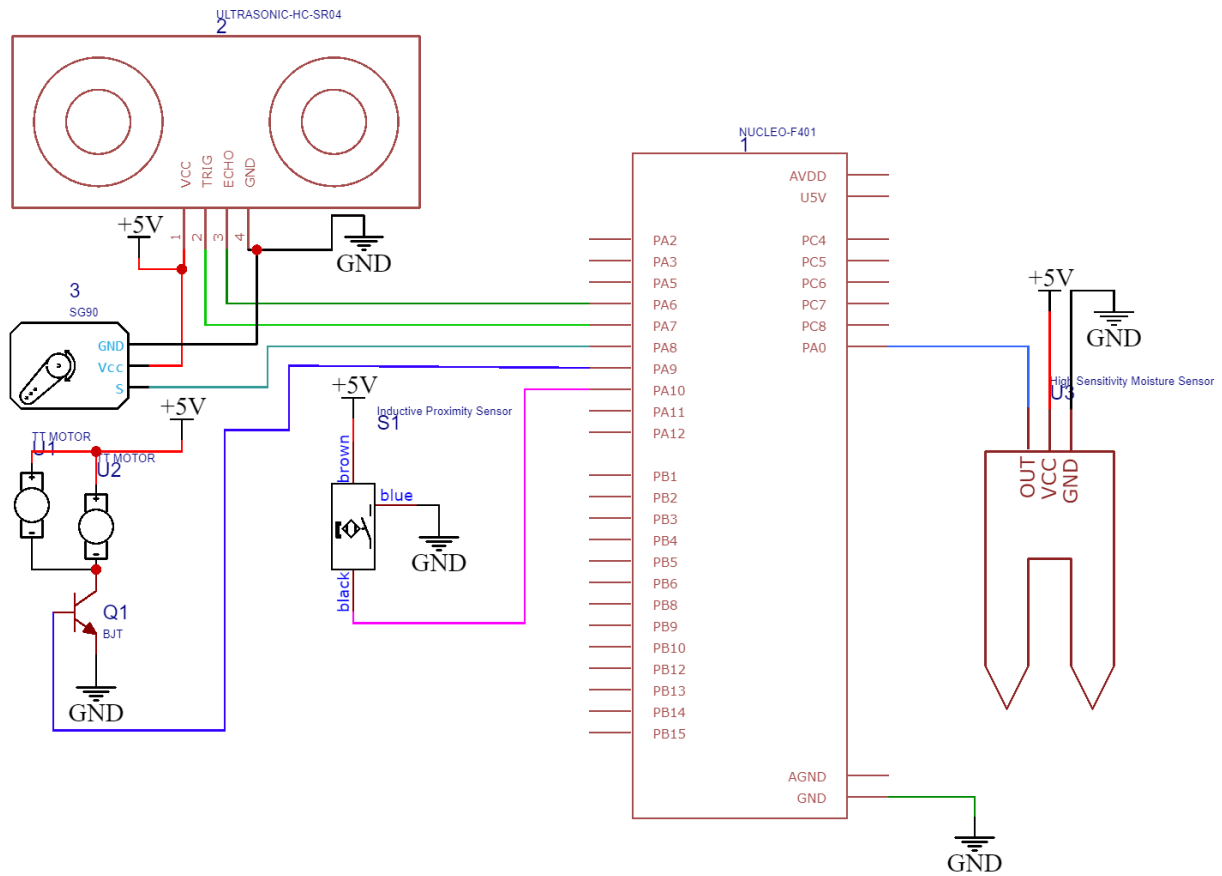
Design Process Review

Documented Revisions of Waste Sorter Project

Gavin Lusby & Jaydan Law

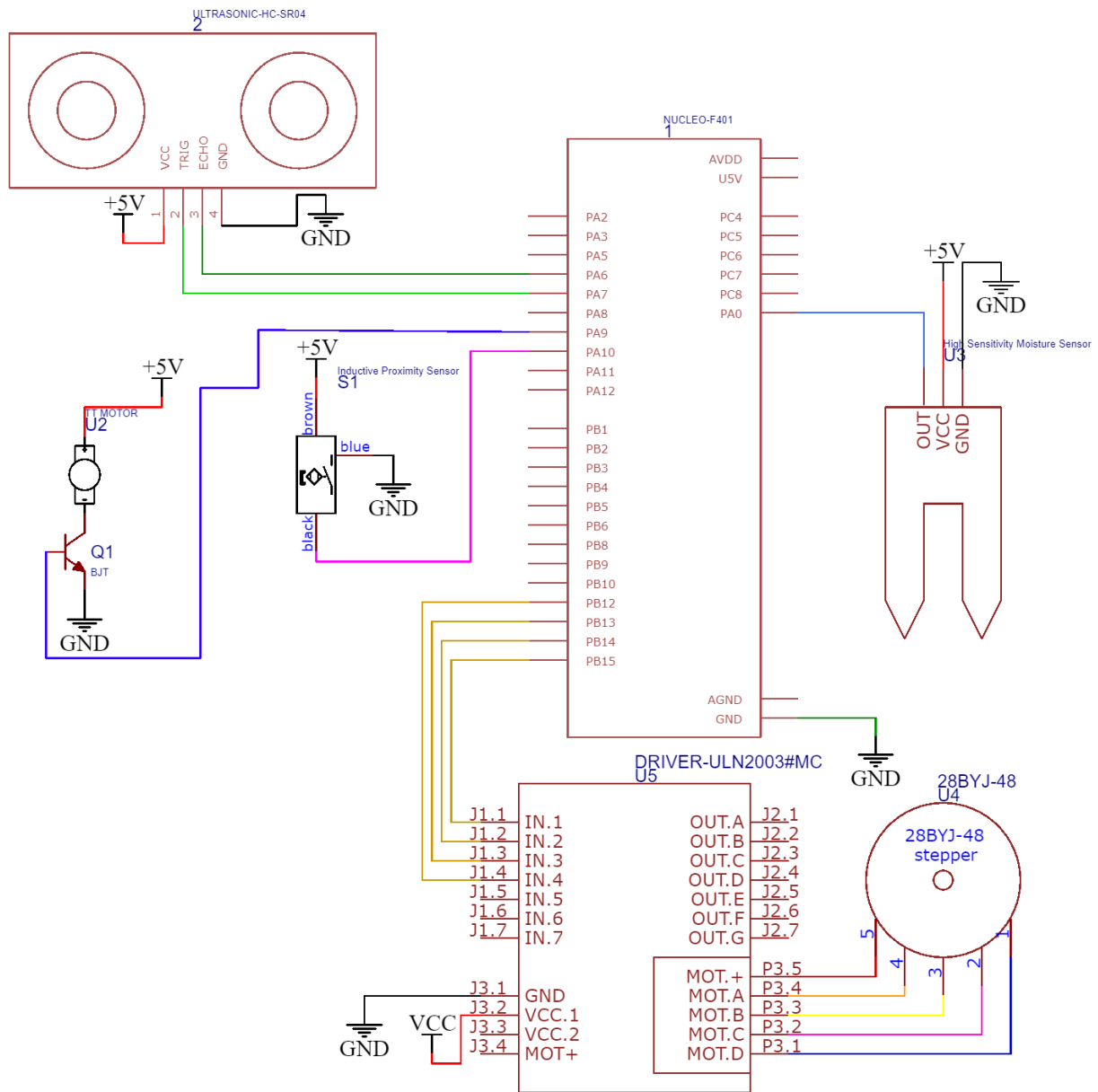
Schematic Diagram Revisions

Initial Version



Original Design: Schematic Diagram Revision 0, 10/31/2022

Revision A: Second Iteration



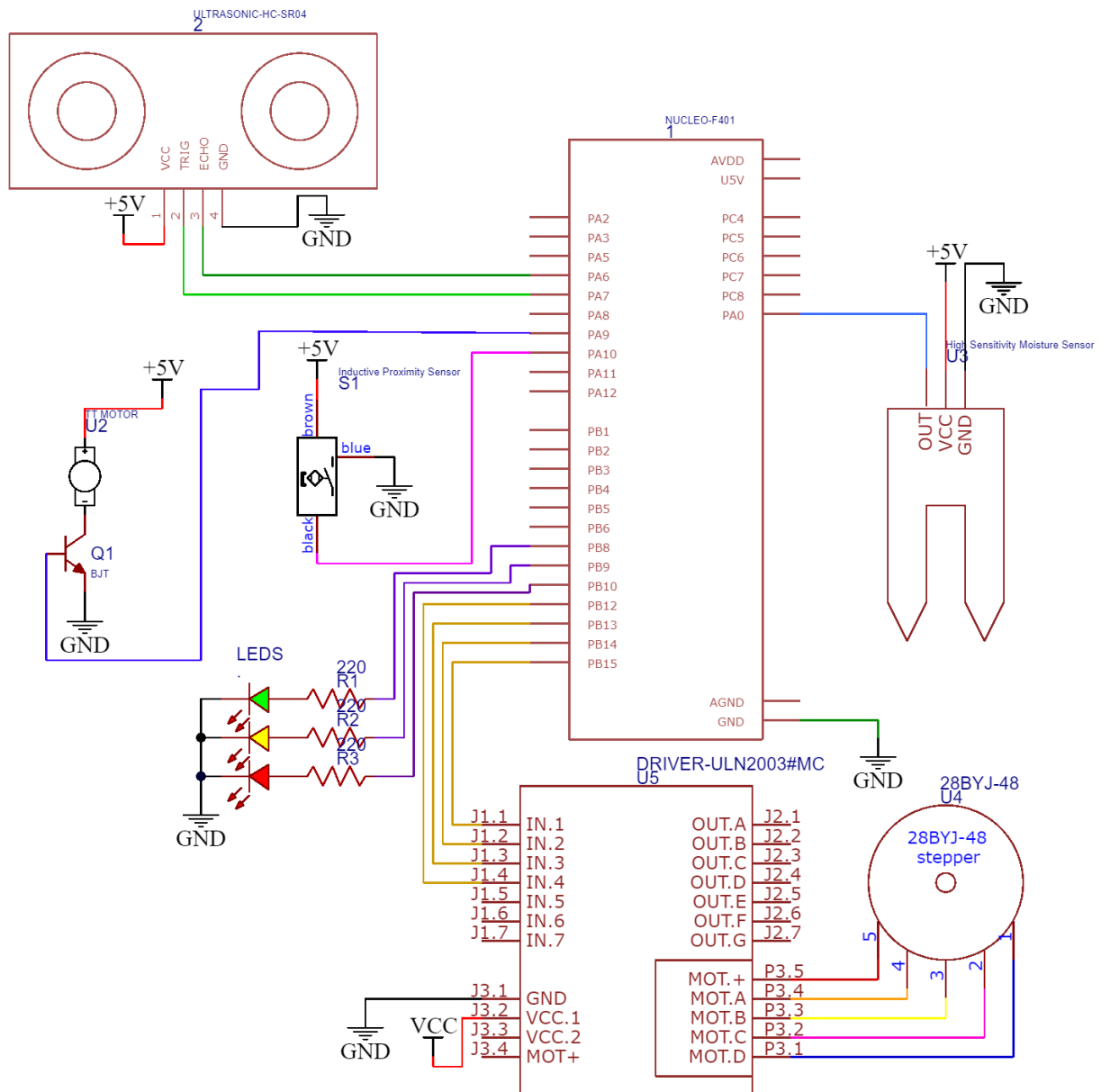
Schematic Diagram Revision 1, 11/10/2022

This change had two purposes:

- 1) Remove one TT Motor from Schematic Diagram to be consistent with mechanical drawings
- 2) Replace Servo Motor controlling collection plate with Stepper Motor. We realized our original design required a servo motor encoder in order to detect rotation, position, distance, which we realized we did not possess. Without this, we would only be able to apply a certain amount of torque without knowing how much it rotates the motor(eg. If

the plate fills up, it weighs more, so now when you apply a certain amount of torque it doesn't rotate as much). We opted to switch for a stepper motor with a ULN2003 Motor Driver because we were able to find those materials, and also, we could easily tell the position of a stepper motor and assign each sorting compartment it's own rotational coordinate(eg. Rotate 90deg to get from compartment A to compartment B, rotate -90deg to get from compartment C to compartment B).

Revision B: Third Iteration

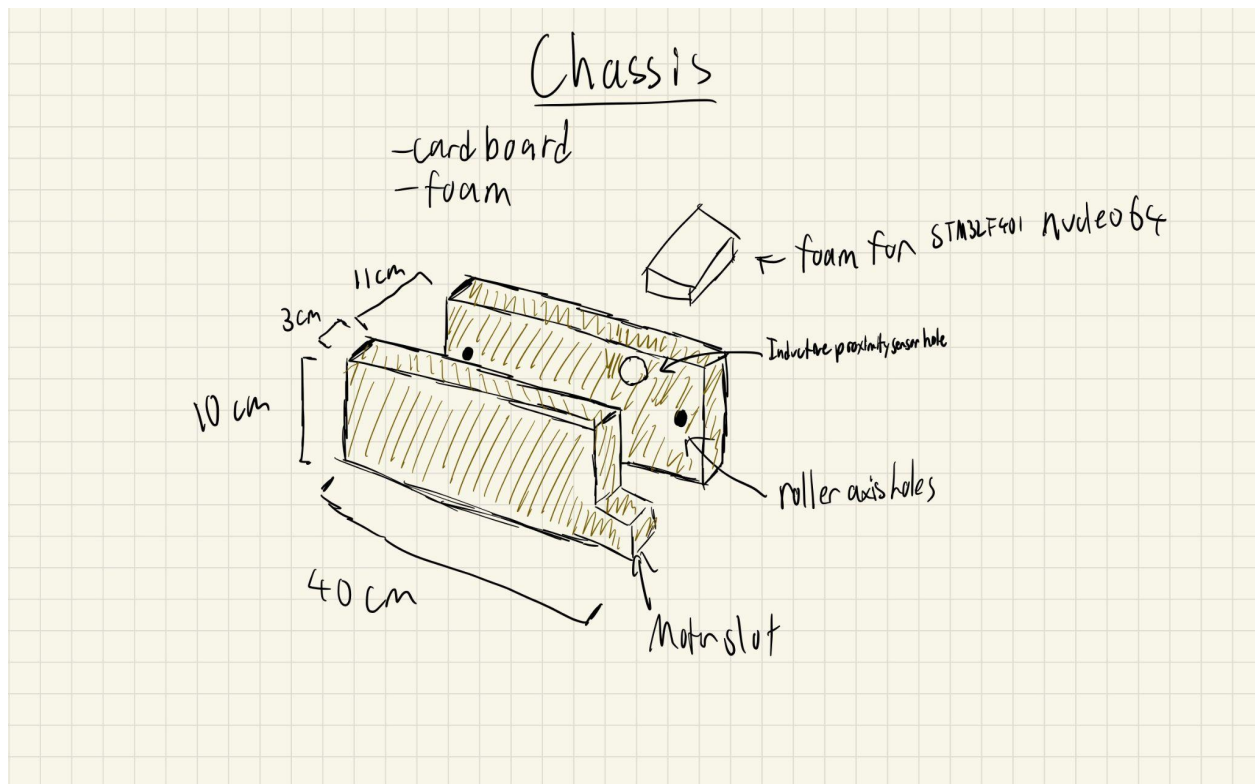


Schematic Diagram Revision 2, 11/16/2022

The purpose of this change was simple. We wanted visual indicators to show which section the trash is being sorted into. The addition we made was hooking up 3 LEDs, one for each type of disposable item (metals, organics, and other). We will hook up these 3 LEDs to GPIO pins and the corresponding LED will turn on for two seconds after the item falls in the basket to indicate what type of waste it would be sorted as.

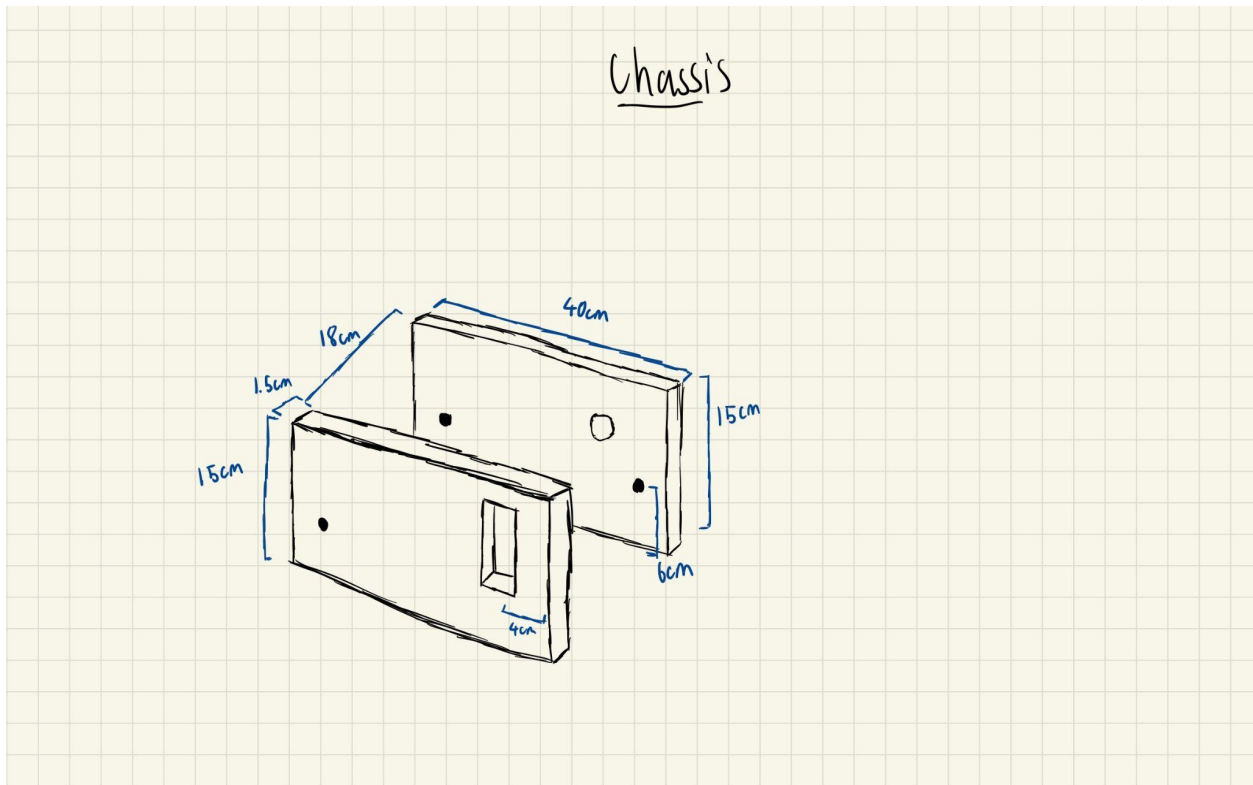
System Architecture Drawing Revisions

Initial Version



Original Design: Main Chassis Revision 0, 10/31/2022

Revision C: Second Iteration

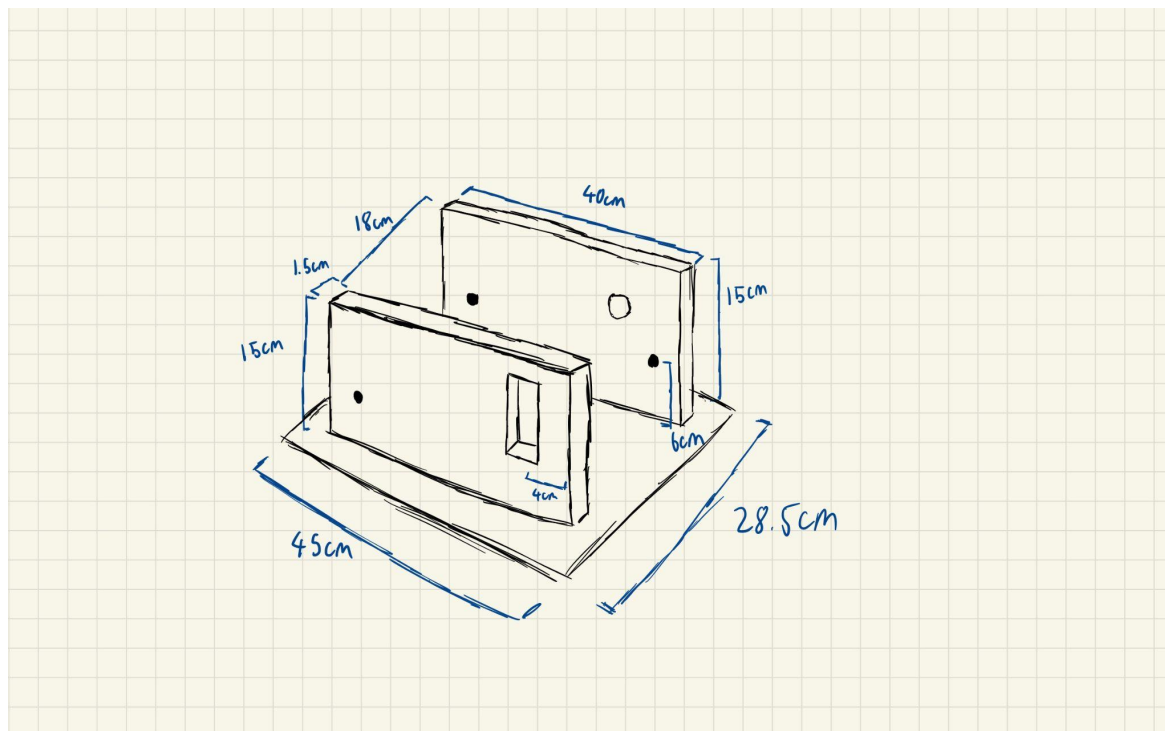
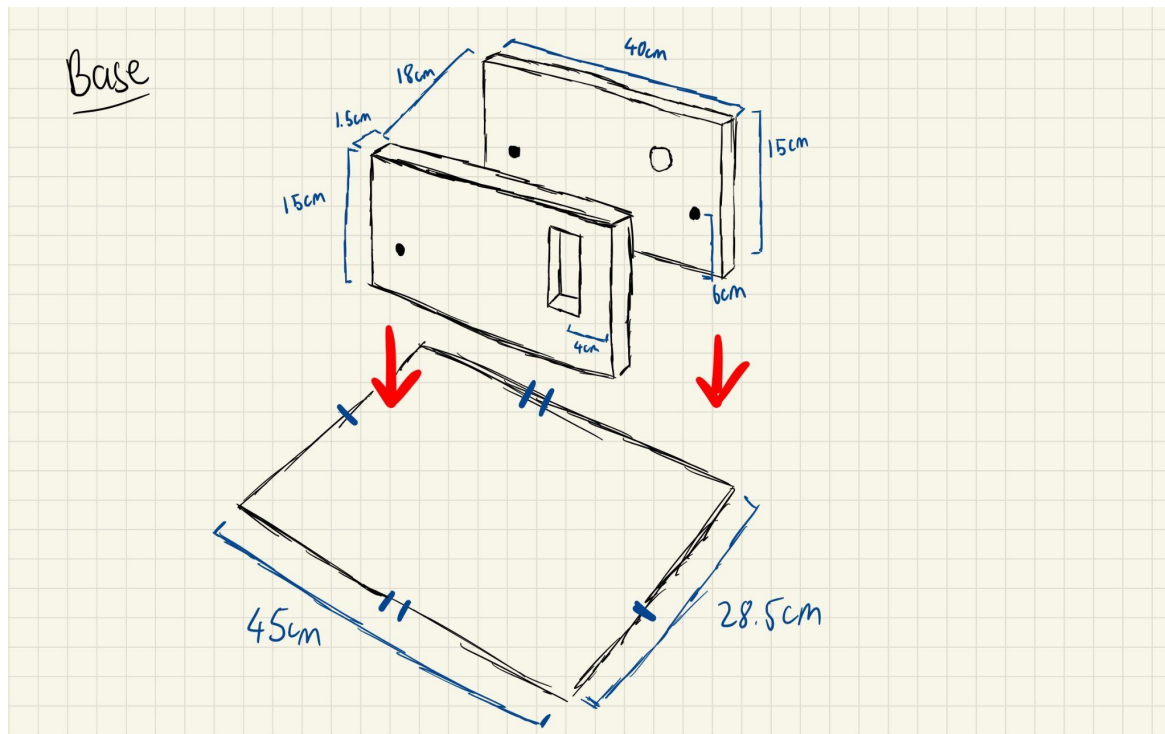


Main Chassis Revision 1, 11/10/2022

This revision includes multiple changes.

- 1) The holes for the conveyor roller supports were moved farther apart, as the conveyor belt was not wound tightly enough around the wheels (Moved 1 cm further apart)
- 2) The holes for the conveyor belt were moved up (1 cm) as the conveyor belt was dragging on the ground
- 3) The motor driving the conveyor belt was shifted 4 cm inward. This allows us to secure it into the cardboard on four sides rather than just two as originally intended. This will help with the stability of the conveyor belt
- 4) The height of the walls of the chassis were increased by 5 cm to allow for more space to accommodate for the conveyor belt and sensors that will be installed
- 5) The thickness of the walls was decreased by 1.5 cm to eliminate unnecessary bulk and size
- 6) The spacing between the walls was increased by 3 cm to allow for less contact of the belt with the walls which was causing unnecessary friction

Revision D: Third Iteration



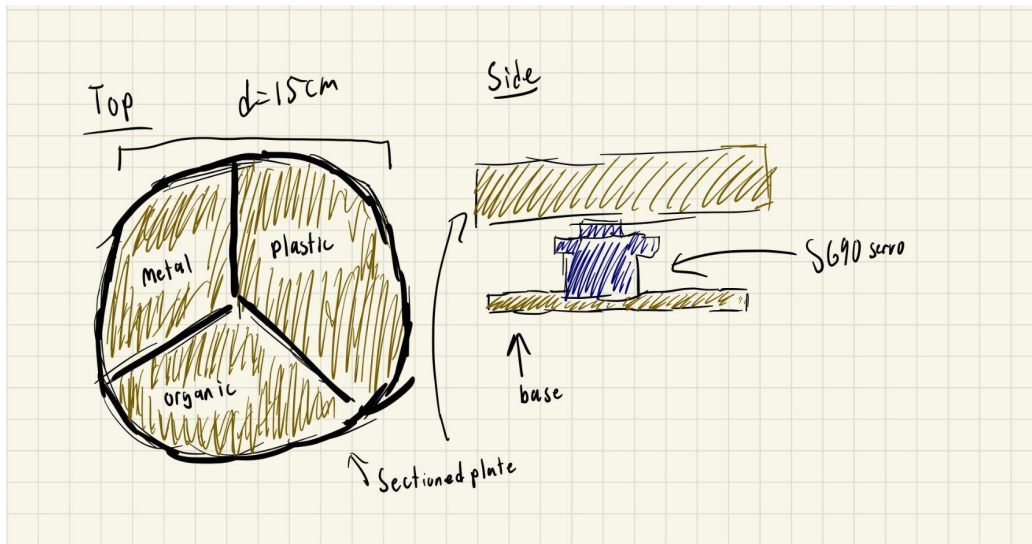
Main Chassis Revision 2, 11/16/2022

This iteration introduced the new addition of a base plate. The purpose of the base plate is to add stability to the machine, as the conveyor belt would cause movements in the entire

machine. By adding the base plate, this distributes the weight evenly and adds weight to the bottom, anchoring our machine and counteracting the movements of the conveyor belt.

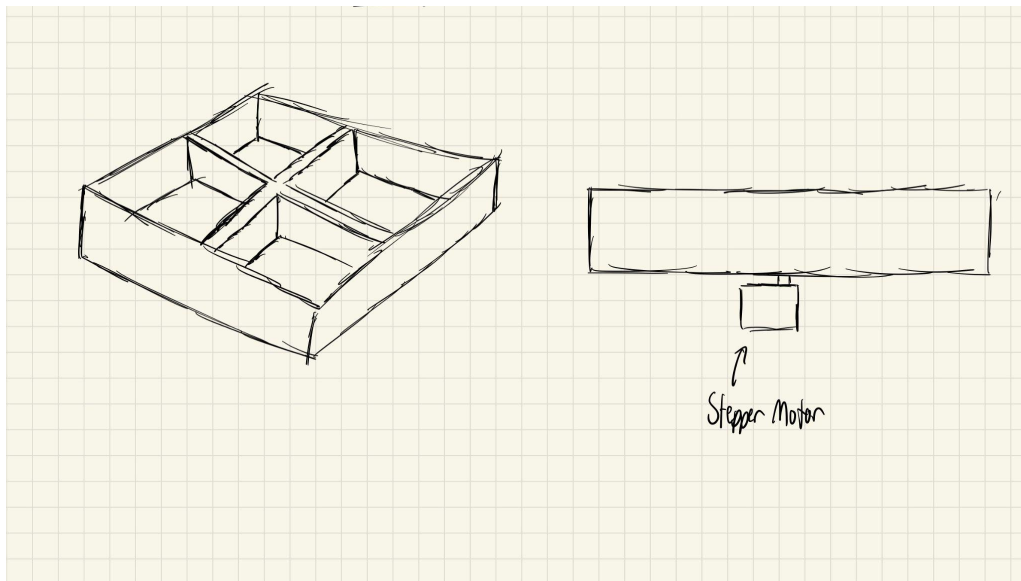
Mechanical Drawing Revisions

Initial Version



Original Design: Collection/Rotating Plate Revision 0, 10/31/2022

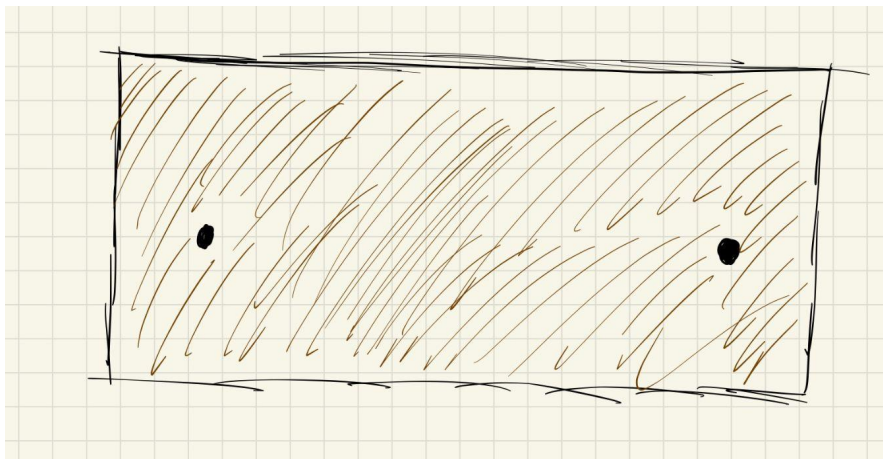
Revision E: Second Iteration



Collection/Rotating Plate Revision 1, 11/10/2022

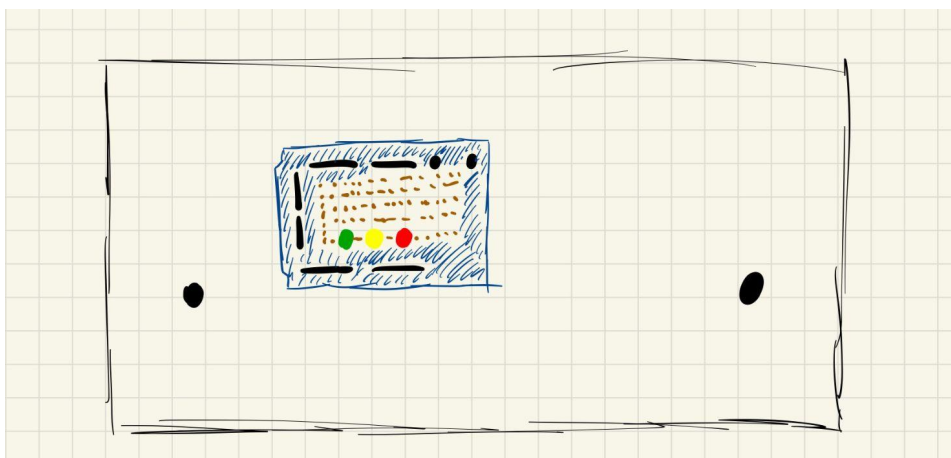
Two changes were made in this revision. The first one is the shape of the plate itself, which was initially a circle with 3 sections but is now a square with 4 sections. The reason for this was ease of manufacturing, a circular design is more complicated to produce compared to the square. As well, the sections were increased but only 3 are still actually in use, the fourth section is only there for balancing purposes. The second change was the change in motor, going from a Servo SG90 to a Stepper Motor. We realized our original design required a servo motor encoder in order to detect rotation, position, distance, which we realized we did not possess. Without this, we would only be able to apply a certain amount of torque without knowing how much it rotates the motor(eg. If the plate fills up, it weighs more, so now when you apply a certain amount of torque it doesn't rotate as much).

Initial Version



Original Design: Side Wall Revision 0, 10/31/2022

Revision F: Second Iteration



Side Wall Revision 1, 11/10/2022

The changes made in this iteration were the addition of the proto-board to the side of the outer wall as well as indicator LEDs. The protoboard is simply for connections, and the LEDs are there to visually indicate what category a piece of garbage is sorted into when passing through the machine and sensors.