Final Assignment

Machine Design 12/17/2022

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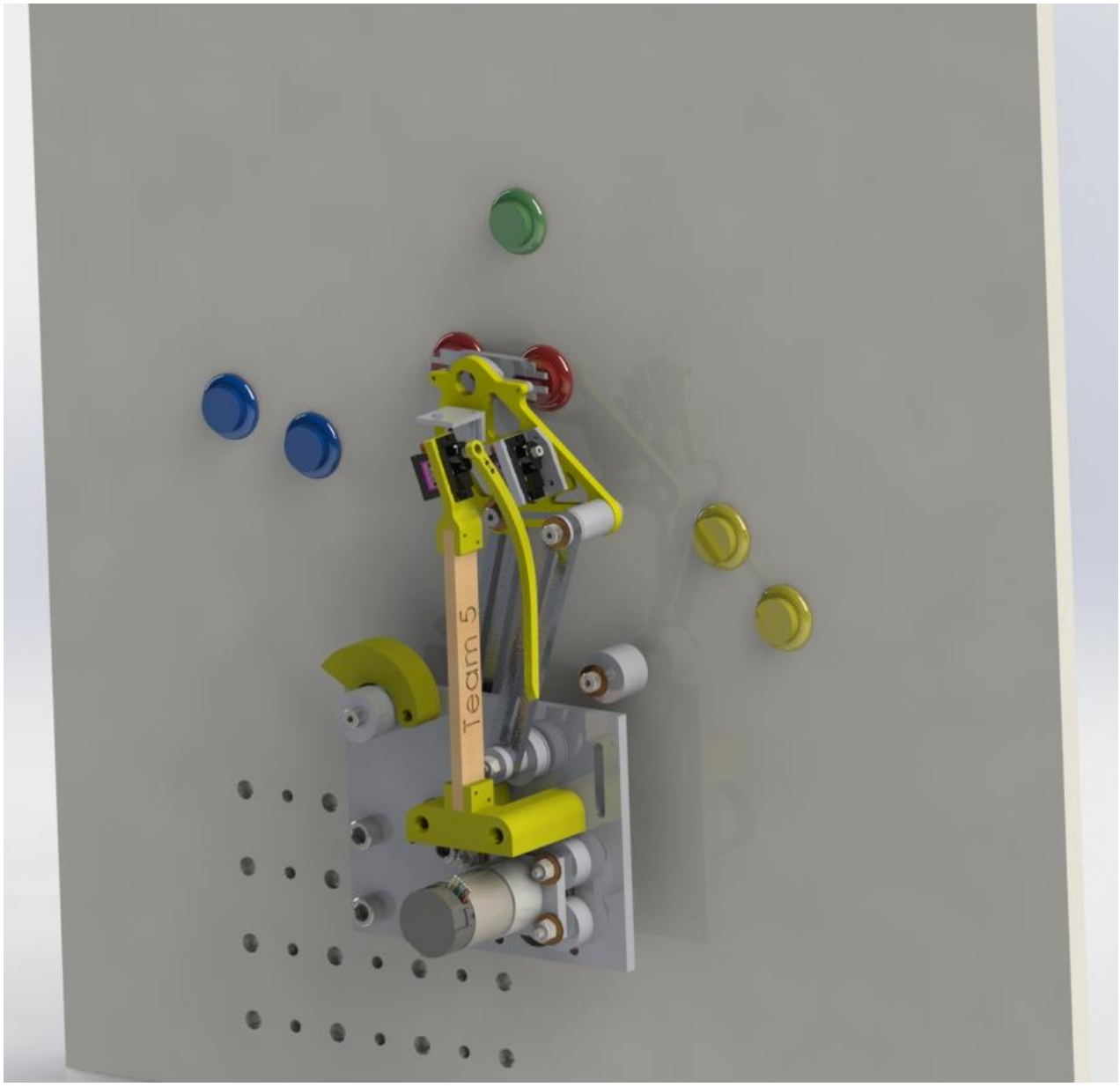
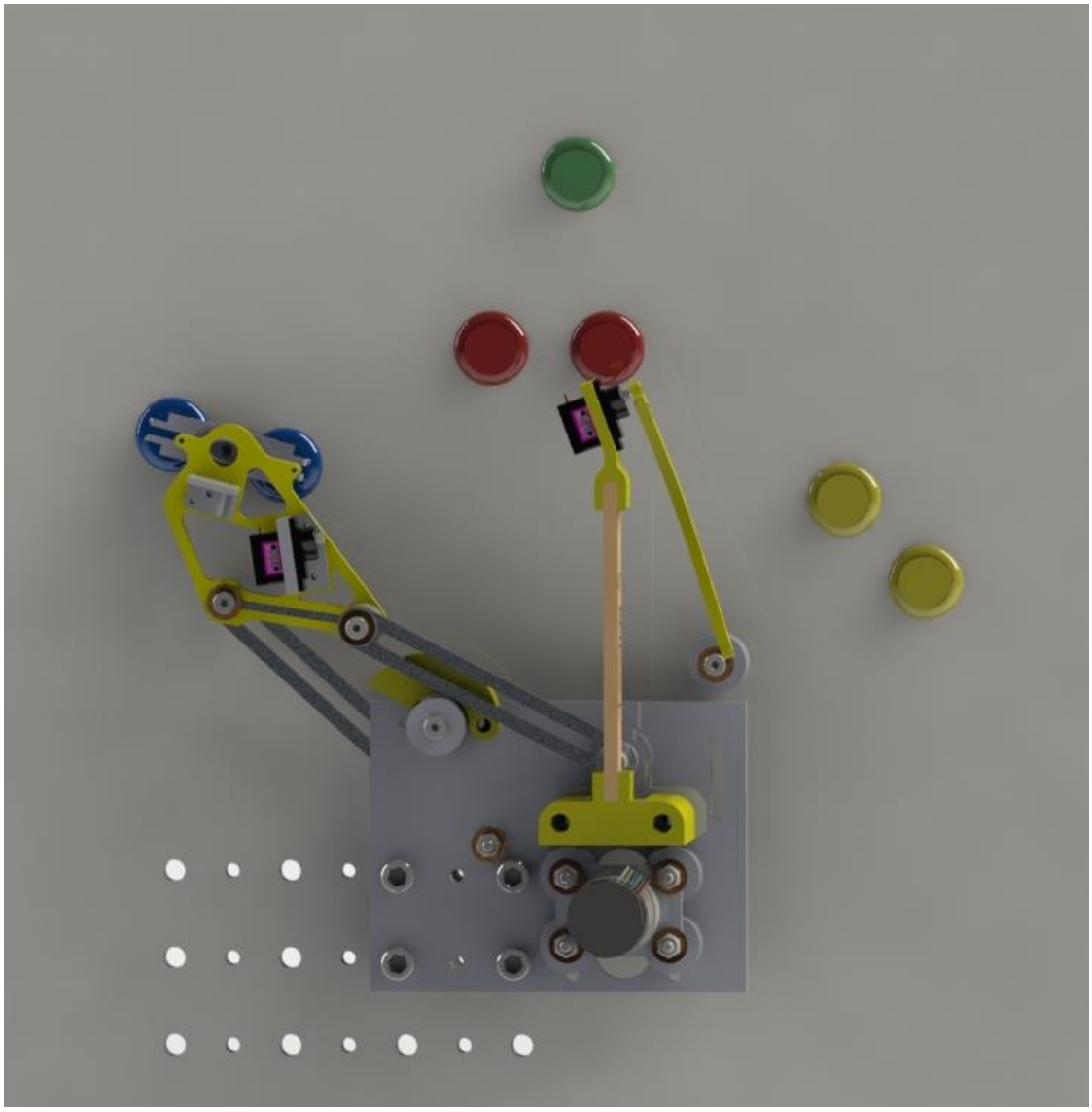
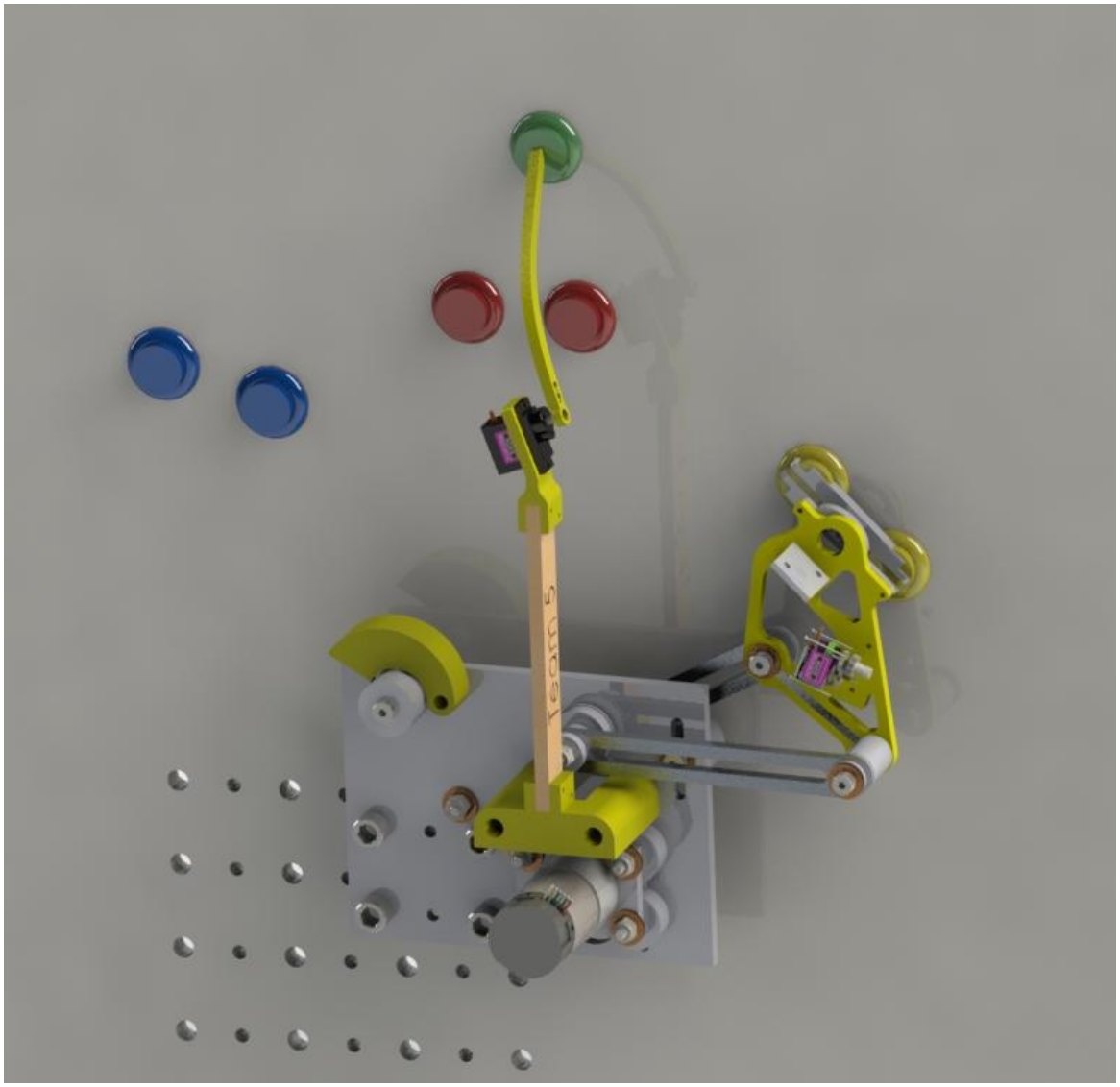
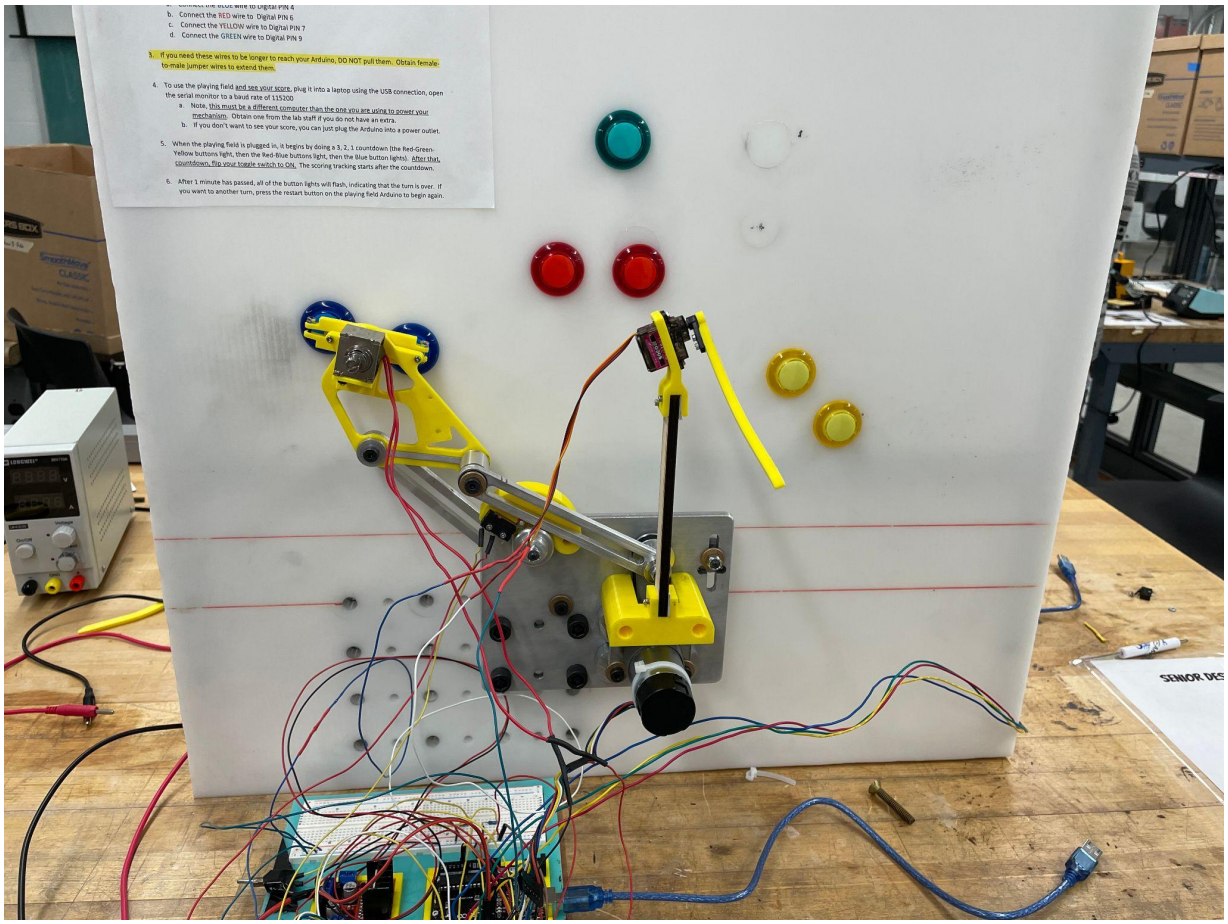
Fully Rendered CAD of final design in all three positions:

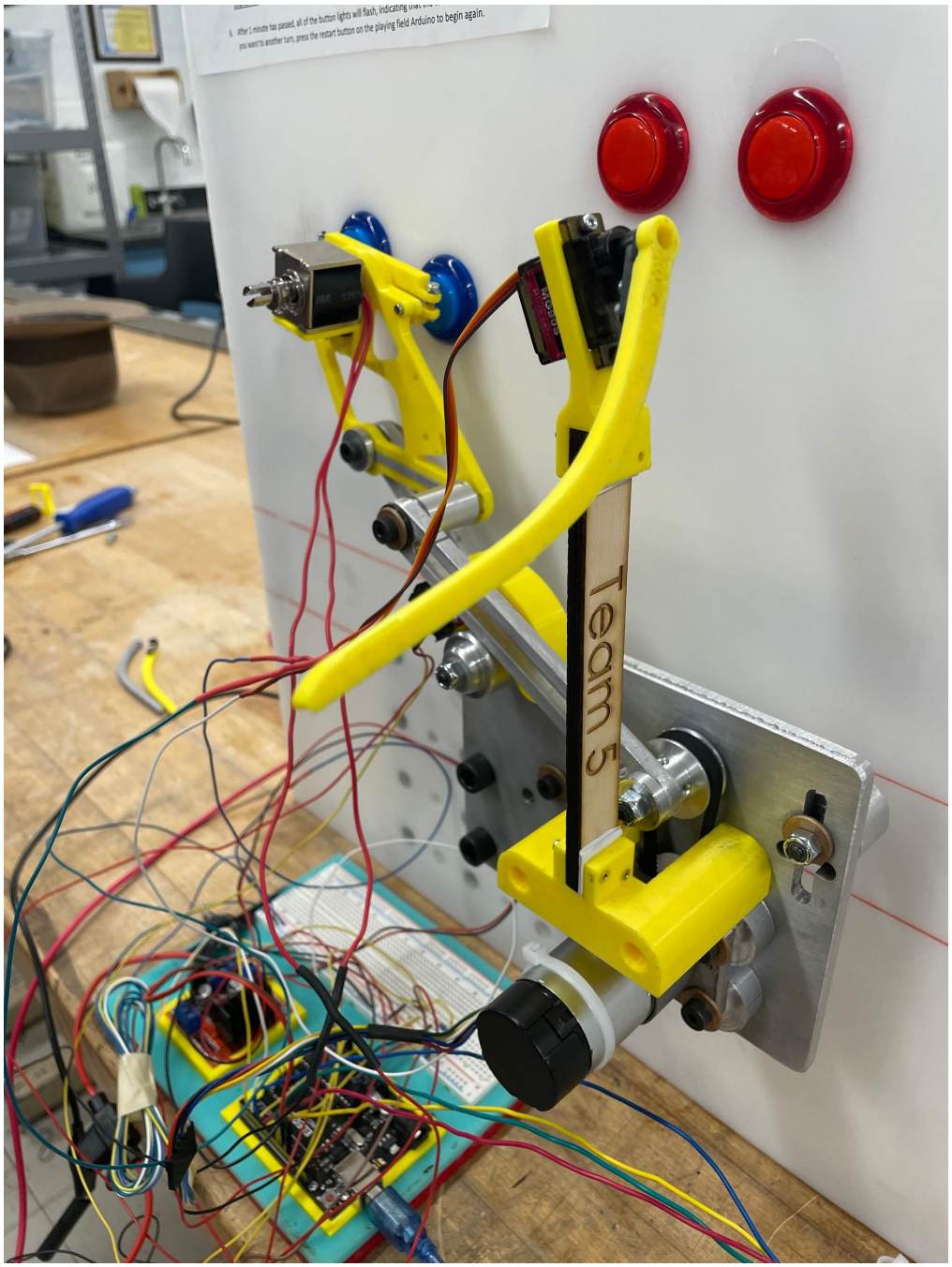


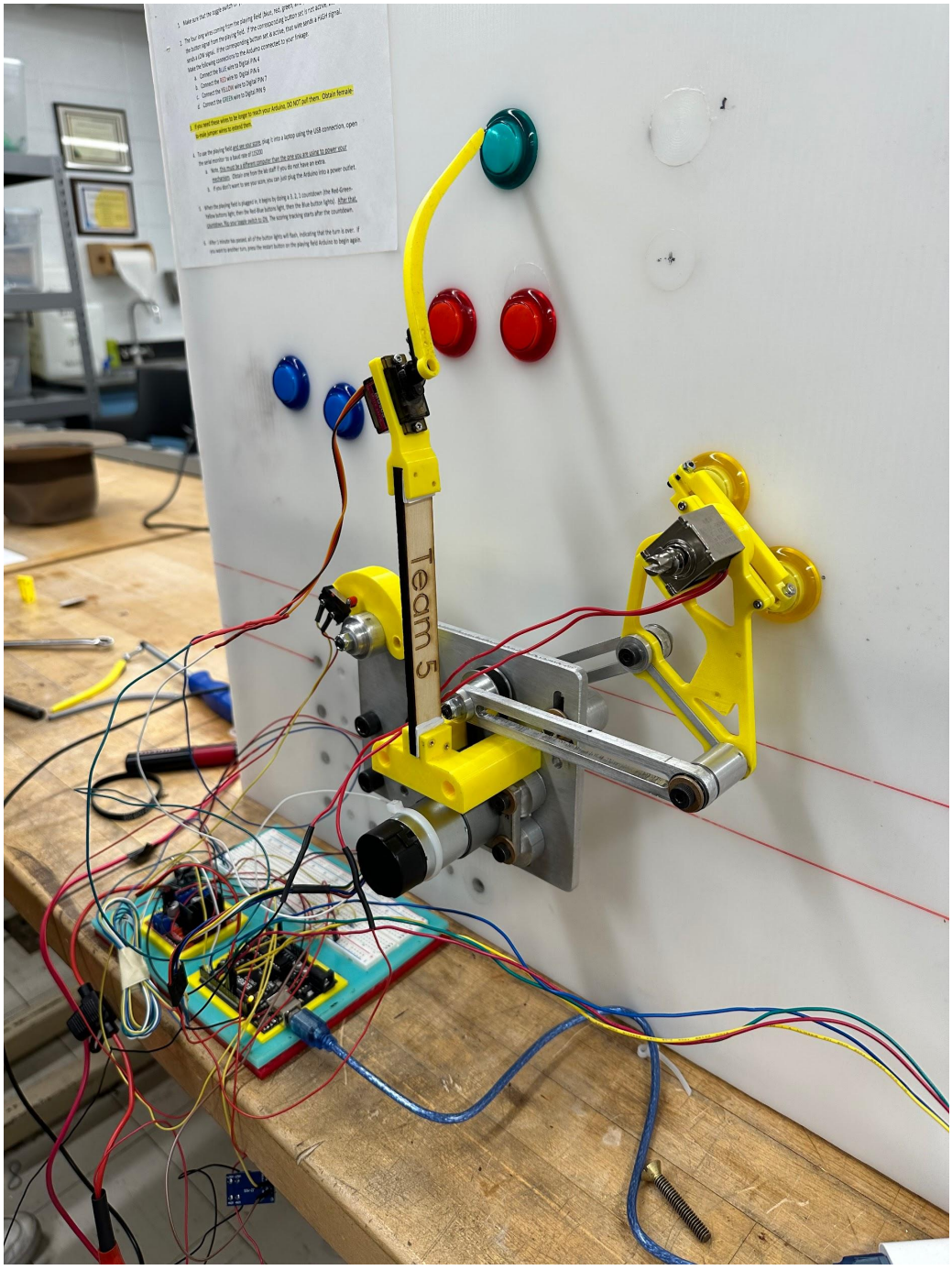


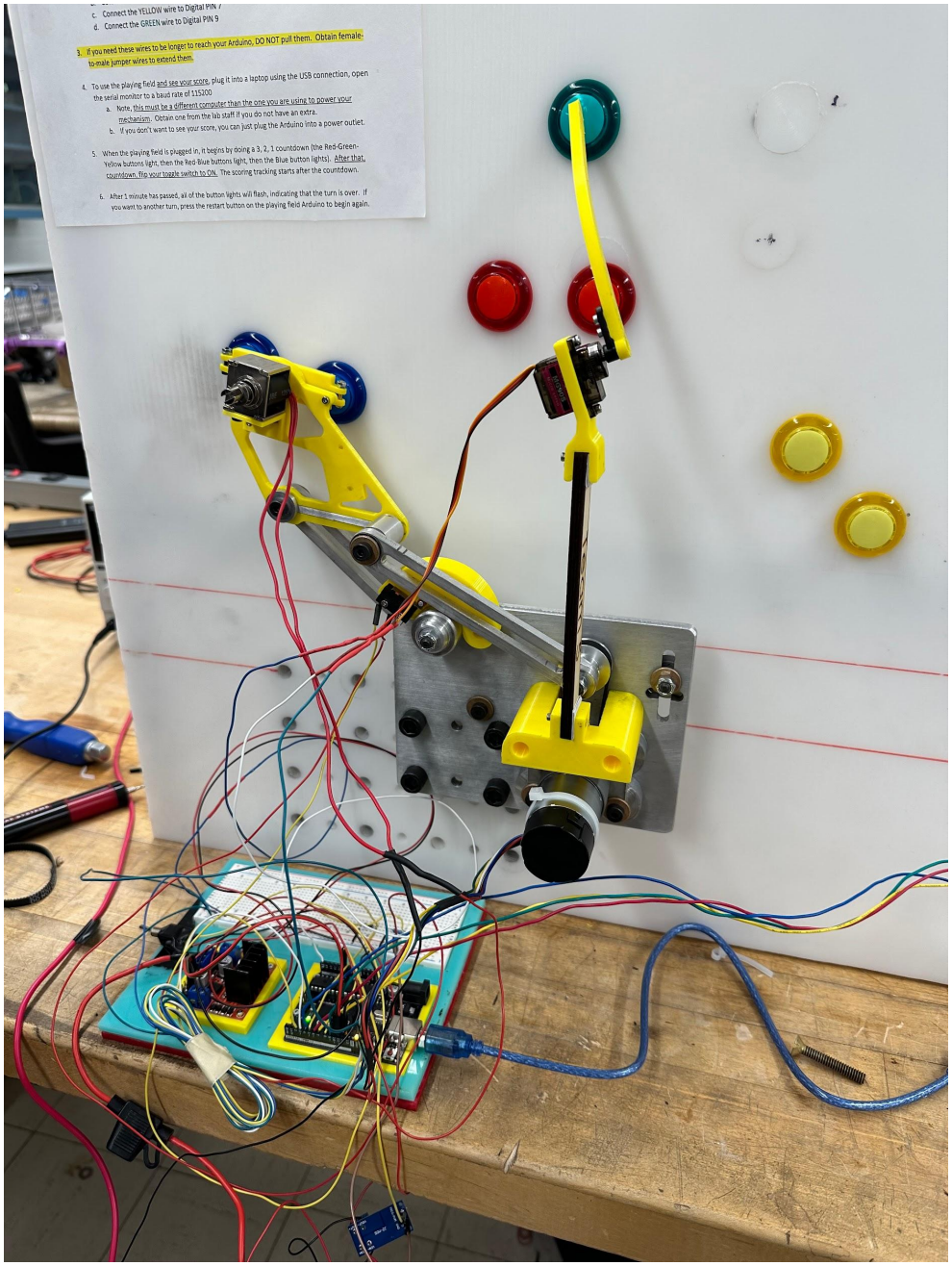

Team 5

Final setup:


b. Connect the RED wire to Digital PIN 6
c. Connect the YELLOW wire to Digital PIN 7
d. Connect the GREEN wire to Digital PIN 9
3. If you need these wires to be longer to reach your Arduino, DO NOT pull them. Obtain female-to-male jumper wires to extend them.
4. To use the playing field and see your score, plug it into a laptop using the USB connection, open the serial monitor to a baud rate of 115200
a. Note, this must be a different computer than the one you are using to power your mechanism. Obtain one from the lab staff if you do not have an extra.
b. If you don't want to see your score, you can just plug the Arduino into a power outlet.
5. When the playing field is plugged in, it begins by doing a 3, 2, 1 countdown (the Red-Green-Yellow buttons light, then the Red-Blue buttons light, then the Blue button lights). After that, countdown, flip your toggle switch to ON. The scoring tracking starts after the countdown.
6. After 1 minute has passed, all of the button lights will flash, indicating that the turn is over. If you want to another turn, press the restart button on the playing field Arduino to begin again.


Team 5


Team 5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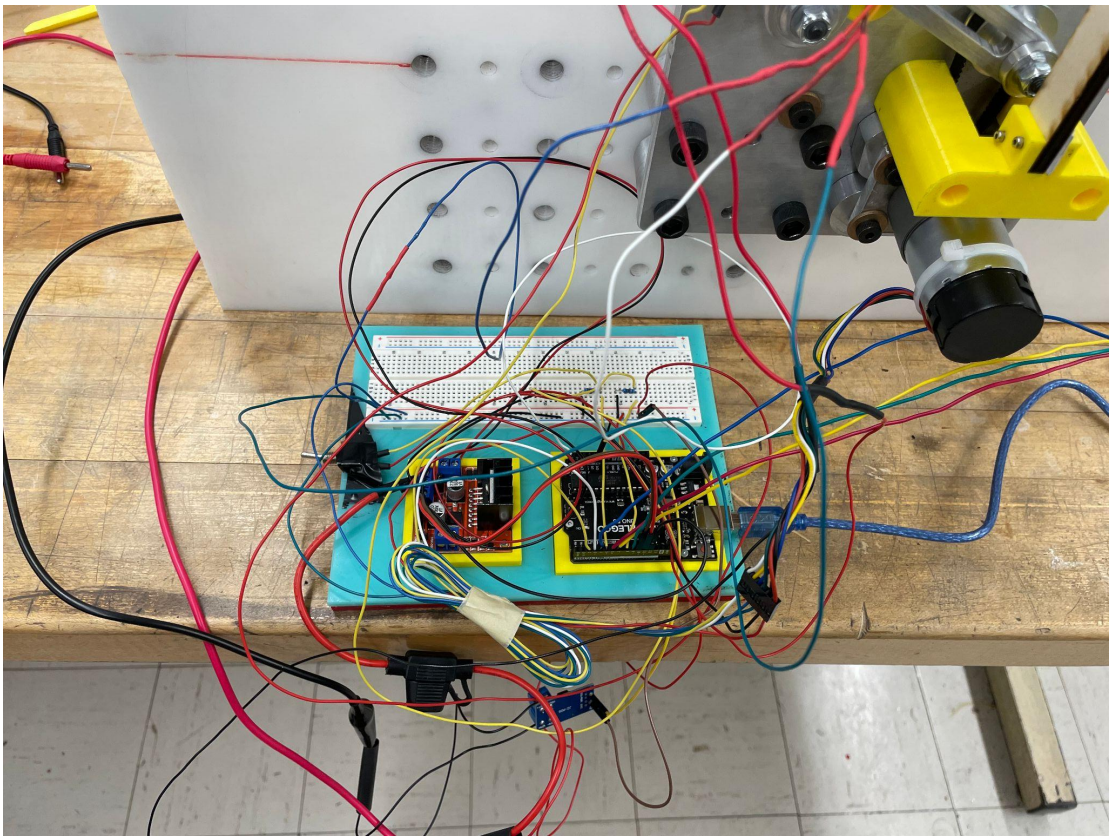
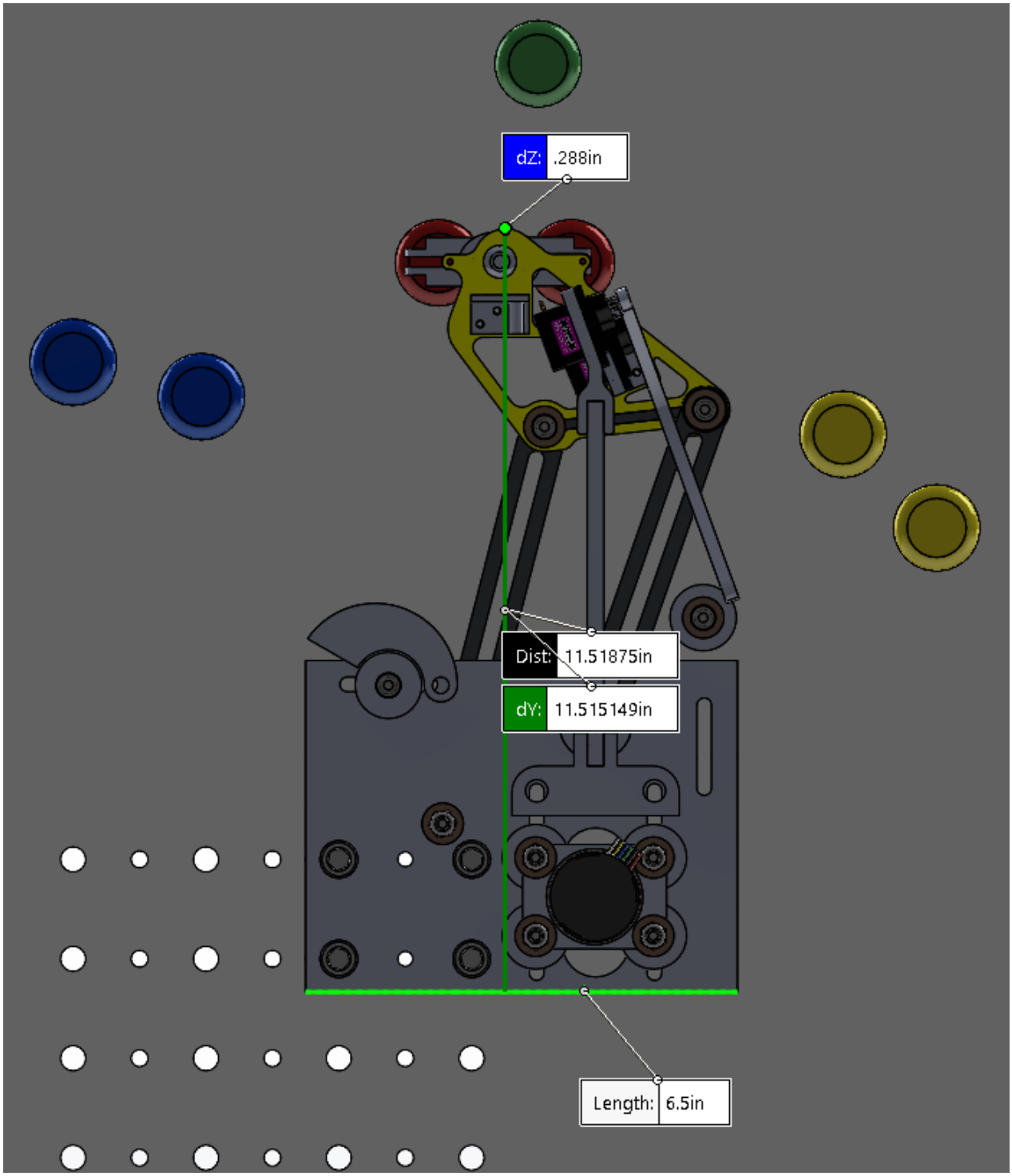
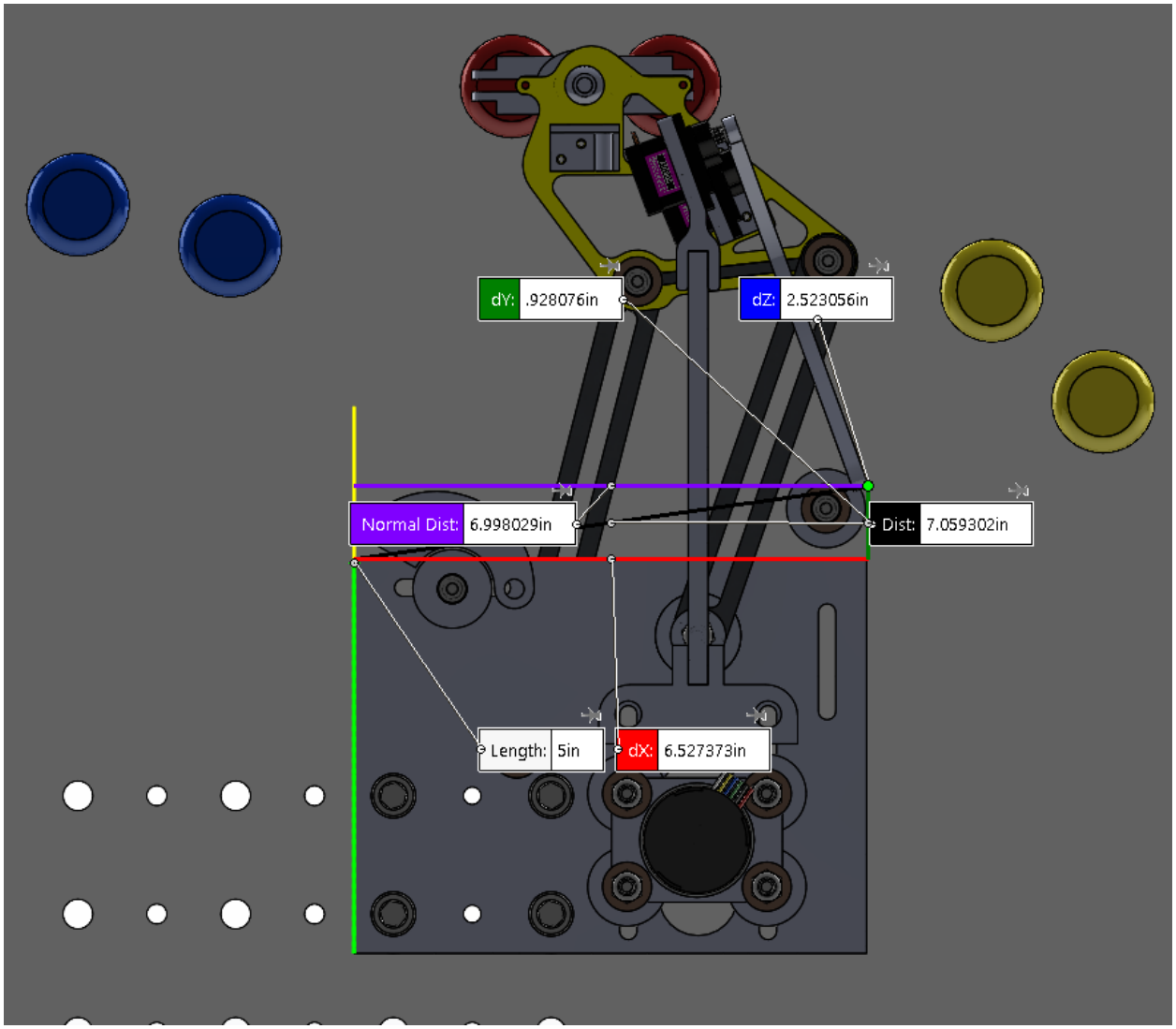
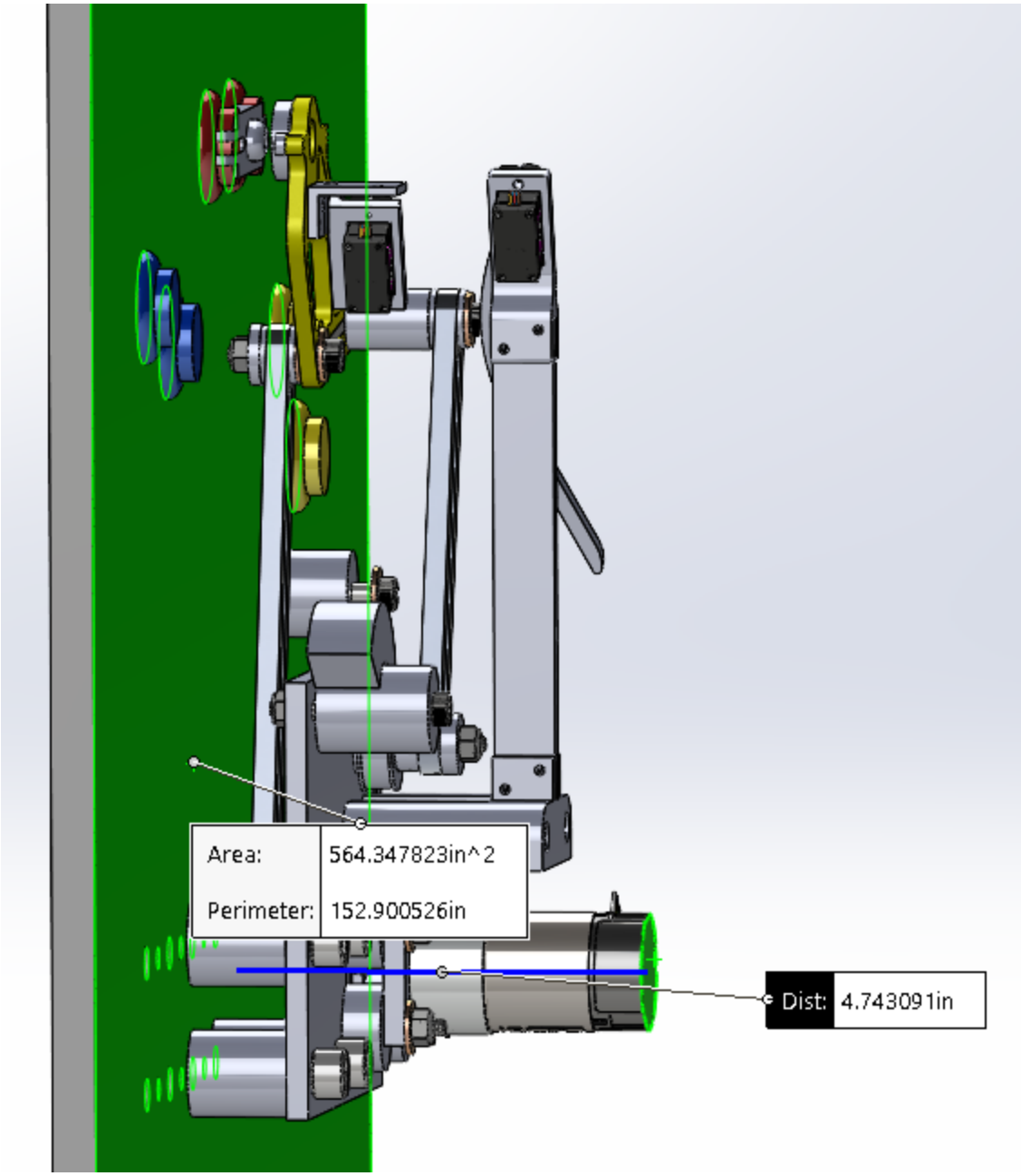


Volume of our mechanism:

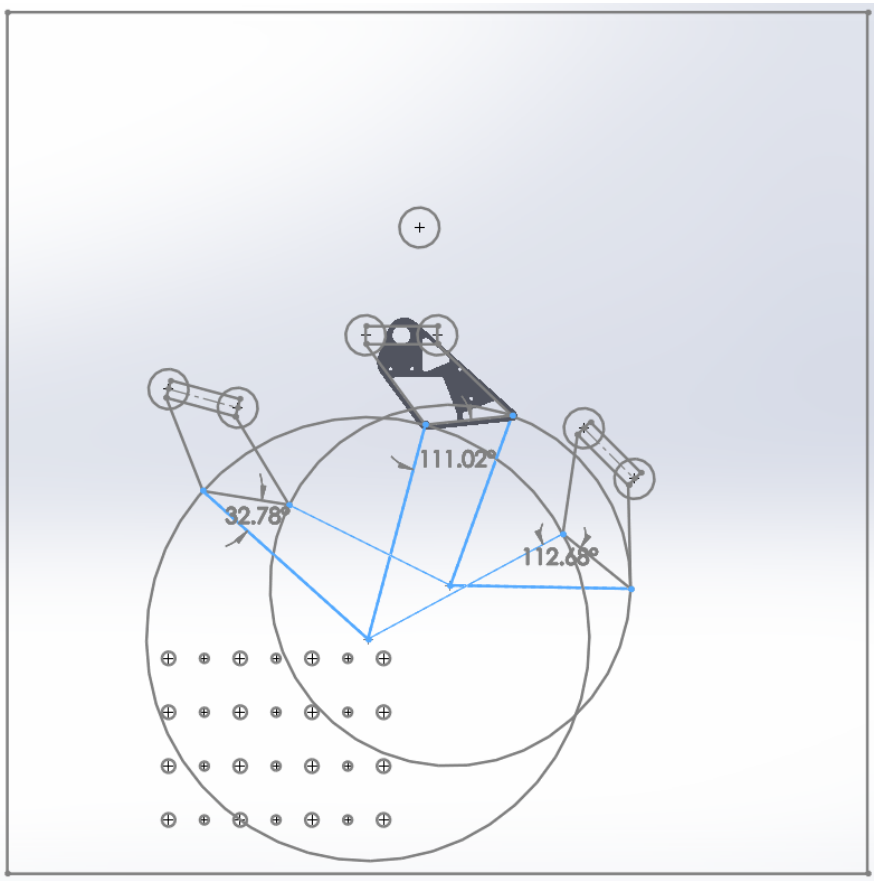



dY: .928076in
dZ: 2.523056in
Normal Dist: 6.998029in
Dist: 7.059302in
Length: 5in
dX: 6.527373in



Volume: dz*dx*dy = (4.743”)(6.52737”)(11.51515”) = **301.88481 in^3**

Transmission Angle Deviation



Largest Transmission Angle Deviation: 90 - 32.78 = 57.22
Transmission Angle Deviation Left: 90 - 32.78 = 57.22
Transmission Angle Deviation Right: 180 - 112.68 = 67.32

Left and Right Button Locations are Worst Transmission Angles

Cost Analysis:

All 3D printed parts: $2.41

20 N Solenoid: $9.99

Servo: $3.33

Timing Belt and Pulley: $11.89

Total: $27.62