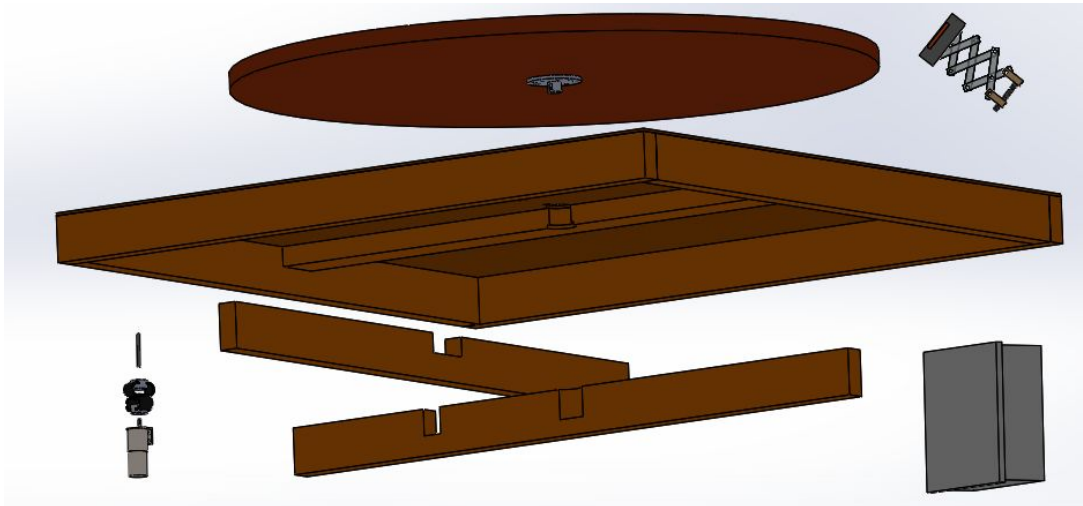


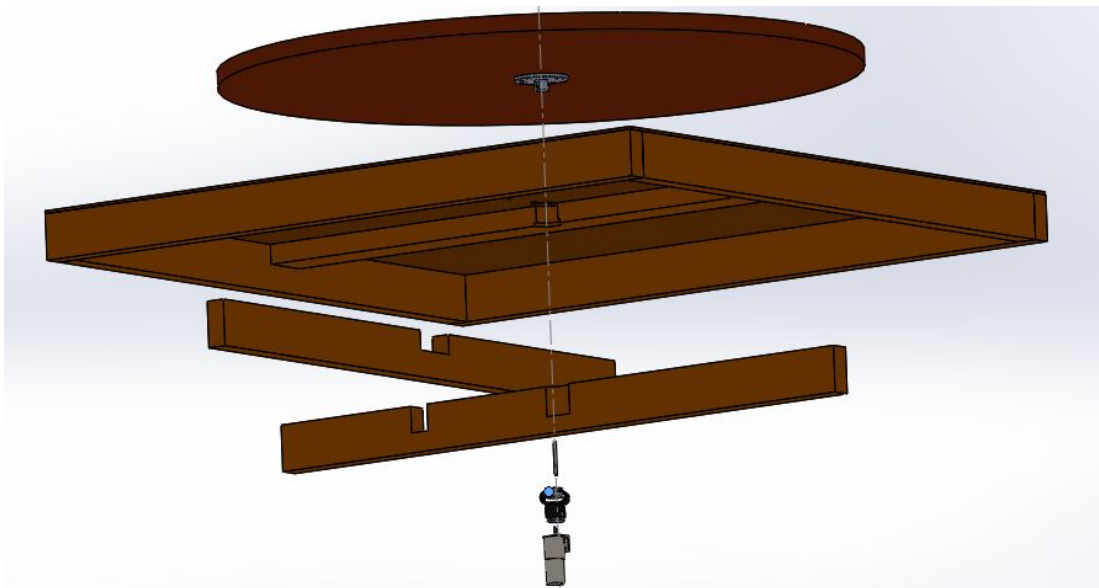
Table:

- Mechanical Work (Finishing Building Table)

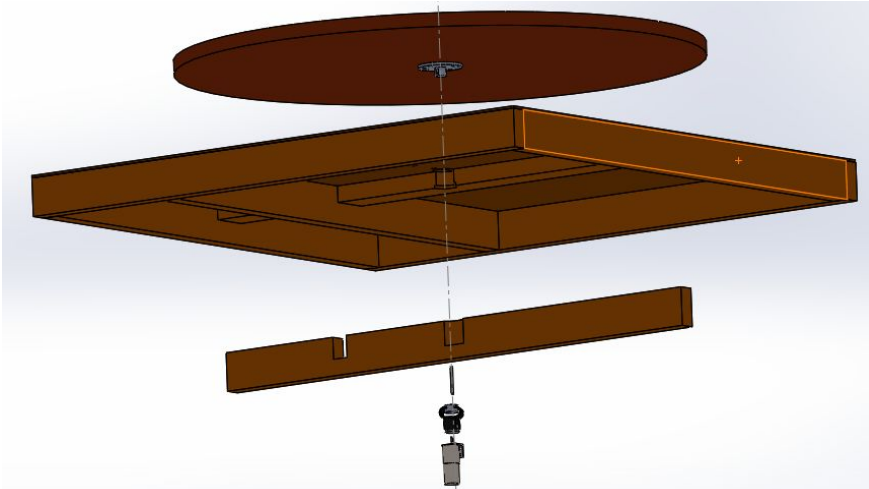


Roughly what currently exists. There is also a bunch of lumber, a motor, and other electrical stuff not included in this pic.

- 1) The cross pieces may need to finish being notched. Was doing this before spring break and the coronavirus dilemma, and am not sure exactly where it was left off.

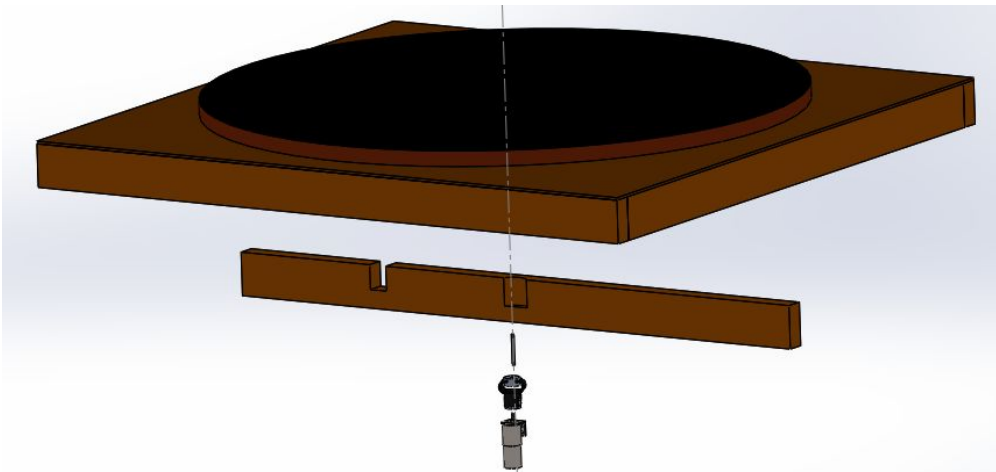


- 2) The first crossing support should be placed along the internal seam of the plywood, and both pieces of plywood should be screwed to it.

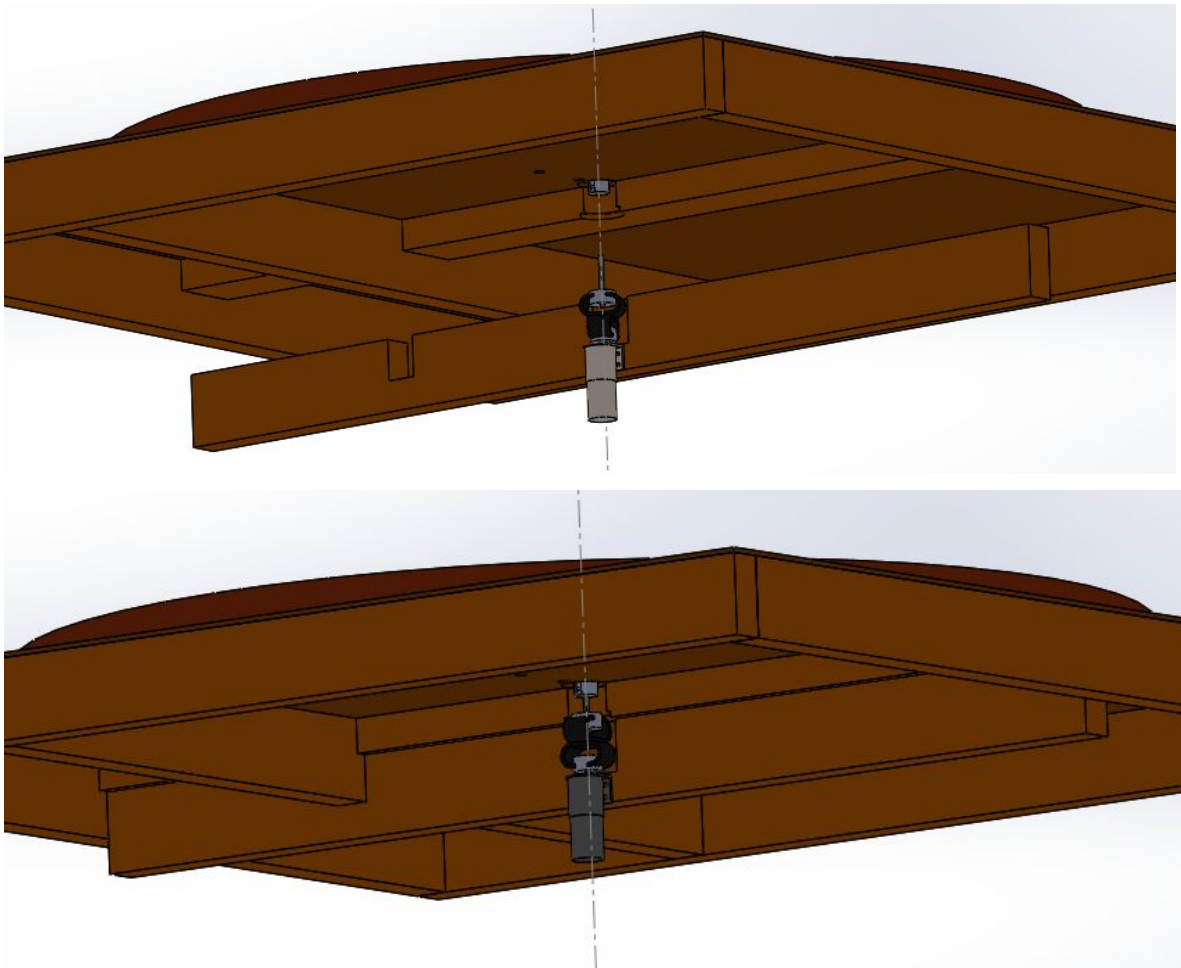


- 3) Next the rotation table needs centered on the table bearing. We were doing this by placing the table on the bearing and holding a scale/ruler (tape measure) on the square table under the rotating table. Then we slowly spun the rotating table and adjusted the table until all 360 degrees gave the same measure. Then there are holes in the bottom of the plywood to screw through in order to reach the table bearing screw hole locations (rotate/find screw holes, put 2 screws in, rotate to next screw location, etc.). We used the medium and large (I think) screw holes to put a total of 8 screws into the table.

Note: The rotating table will need to be removed to put the final support in, so don't bother with all 8 screws until after the support is in place.



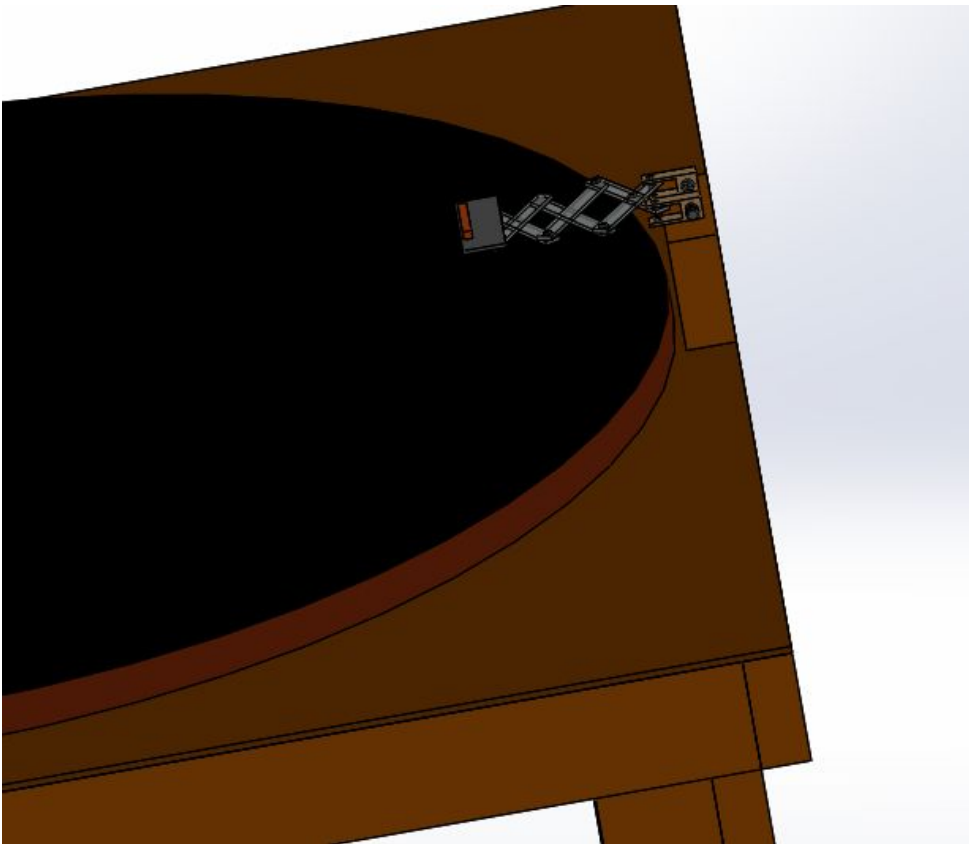
- 4) The next step involves multiple things all coming together. The motor and shaft should be concentric with the table and bearing, this will determine the location of the support. The coupling may dictate the height of the motor on the support (may just be easier to remove some extra material from the 'flat' cross support to give clearance for the motor/coupling to be higher). This height dictates the length the shaft needs to be cut to (though it has a lot of wiggle room on both the coupling side and the table flange side). We planned to line up then attach the motor to the support first. Then to line up the shaft and put the support in place.
- Note: This should be attached from the sides and top (want an inch (or more) in the 2x4 so use 3in screws from top). This means the rotating table will need to be taken back off though it should be easier to center with the shaft at the center (can put all 8 screws in the bearing this time)



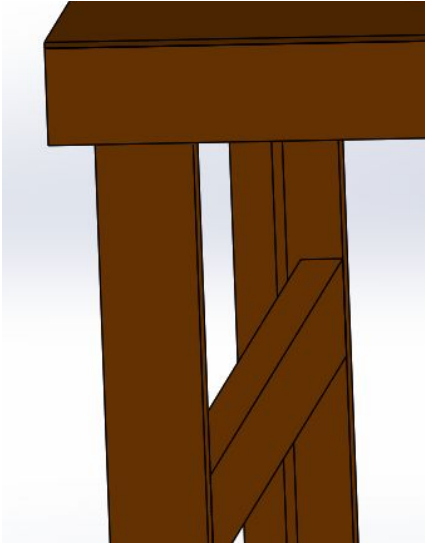
- 5) Build and attach legs. We had found 'feet' to use, but they may be beyond repair and you may need to find/order some.



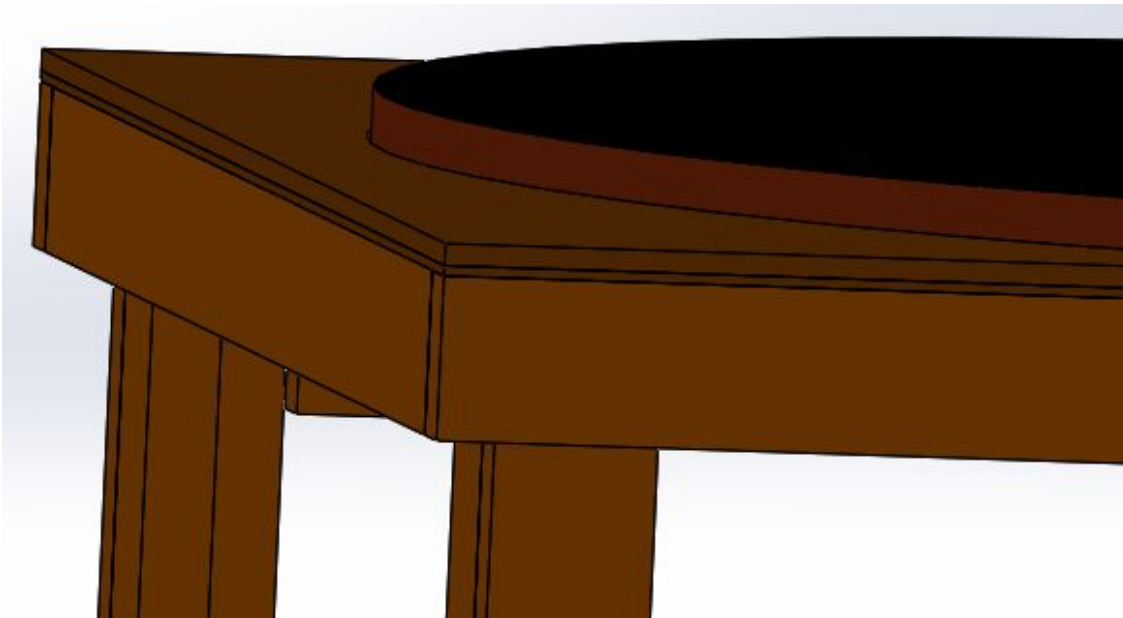
- 6) Build support/stand for mechanical arm. Current idea is basically a 2x4 cut to width or with a slot to width. Attach mechanical arm subsystem.



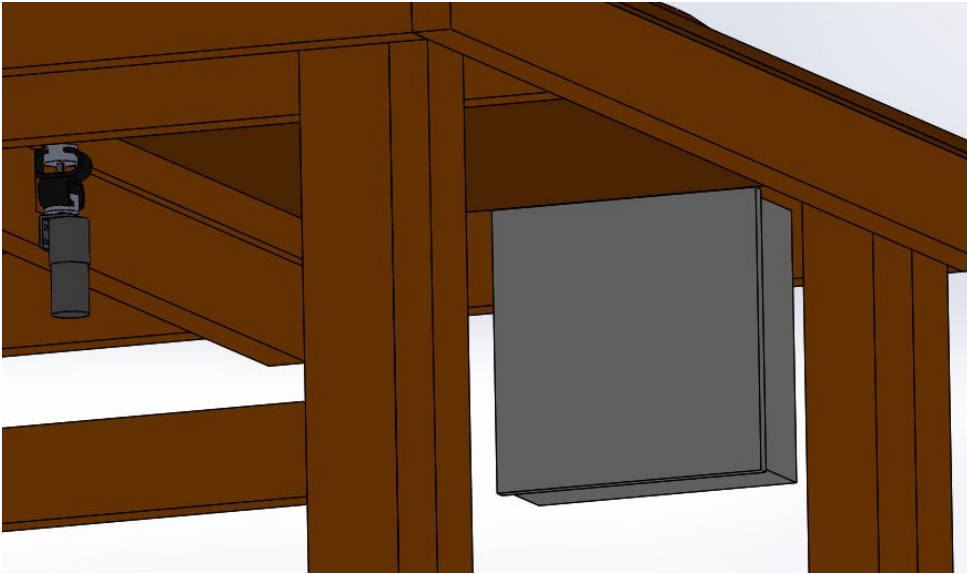
- 7) Cut and attach the table connector pieces. May be easier to attach if you put plywood behind the connector pieces.



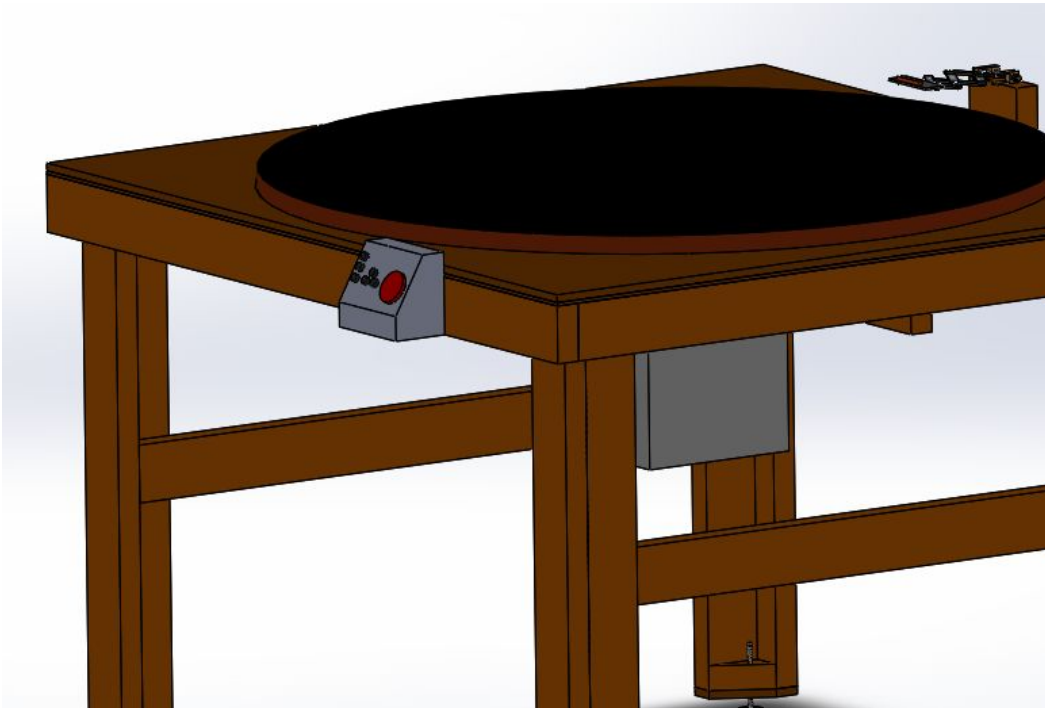
- 8) Build and attach the plywood safeguard. Note: To be effective, the plywood safeguard would need to be half inch plywood (or double layered of the quarter inch, but we don't believe there is enough) which would need to be purchased. This was an extra goal and could be done at the end or not at all.



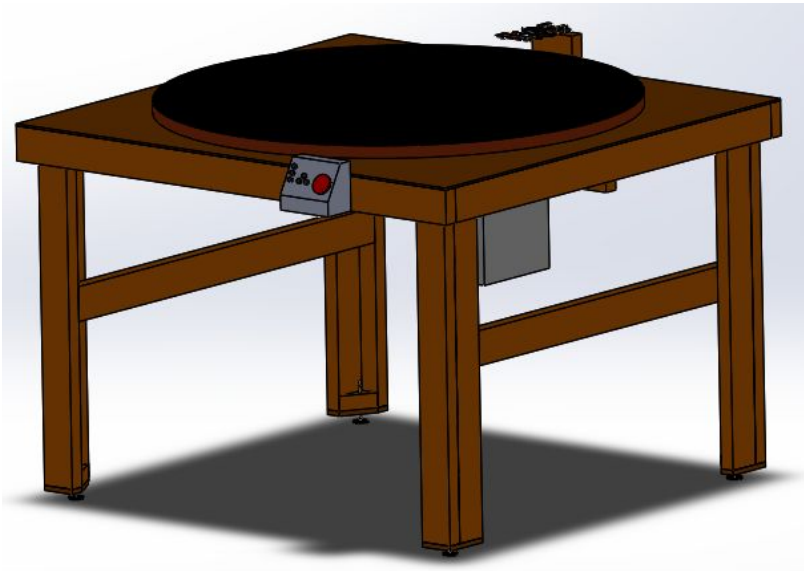
9) Attach the electrical box



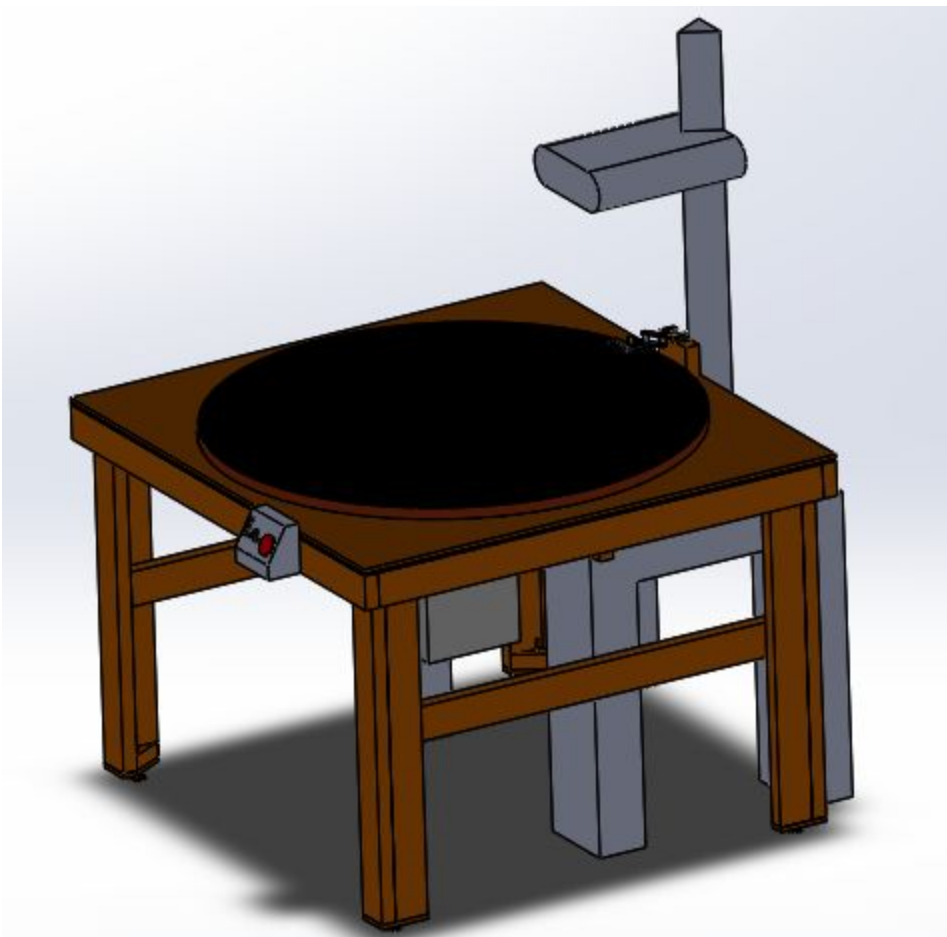
10) Build and attach the control panel



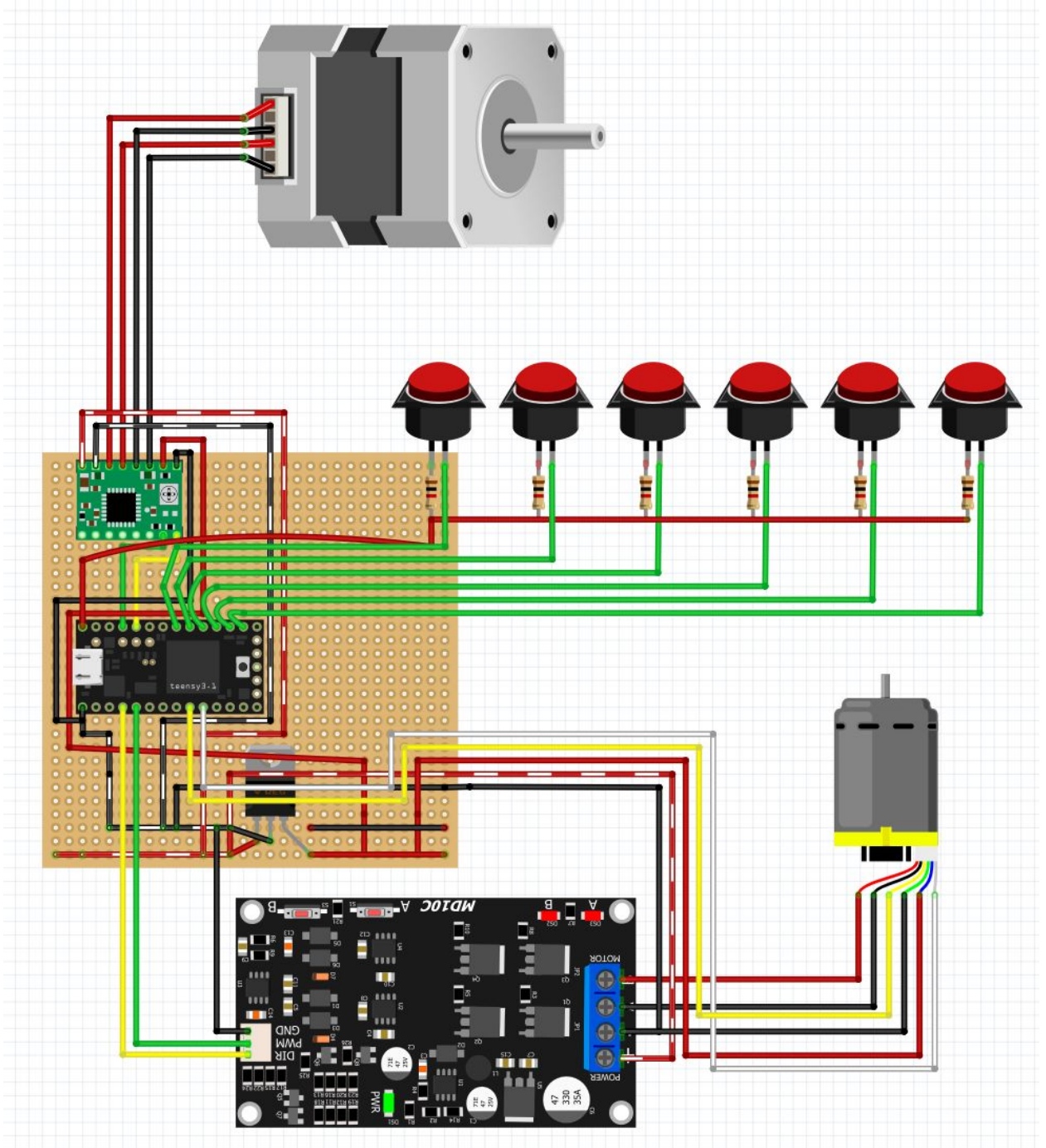
11) Finishing touches. Sanding, paint/finish?, etc. Also, quick tests to make sure everything is good.



12) Deliver the table to the museum, and attach the tables. All final testing.



- Electrical work



- - Holes in electrical enclosure need to be adjusted for a better fit for the power supply and the polycarbonate rectangle that the protoboard and table motor controller will be sitting on
  - Protoboard and table motor controller will need to be mounted to polycarbonate rectangle
  - Once everything is mounted in the electrical enclosure, wiring will need to be run from the enclosure to table motor, mechanical arm, and push buttons and the power supply cable will need to be run to an outlet



- Once wiring is laid out, and finalized, use the zip-tie mounting pads to make the wire paths neat and secured to bottom of table
- Final location of buttons is still up in the air, follow on team can pick final location at their discretion
- It is suggested that follow on team looks into a way to mitigate risk of electrical enclosure becoming electrified if power supply cable breaks
- The Schematic Drawing is not accurate. Had to redesign midway for better wiring clearance, and could not get access to modified PCB so drawing is an attempt to see changes

#### Mechanical Arm:

- Mechanical Work
  - Need to complete color bar holder
    - Take a thin strip of some metal and mill to slots in of equal length and the same distance from the center of the strip along its long axis. These slots can then be attached to the end of the scissor lift portion of the mechanical arm with nuts and bolts. These will allow the mechanical arm to move back and forth while having a rigid platform for the color bar.
  - Attach color bar to color bar holder. Does not need to have a very strong mode of adhesive to the holder, but the color bar will need to remain in a consistent position as the arm moves from position to position. One idea for implementing this is slotting an indent in the holder that is the dimensions of the color bar, which can remain inside and resist any motion on it. Another is using an adhesive substance, provided by Elizabeth, to attach the color bar to the holder in a non-permanent way.
- Electrical work
  - The electrical work is functional, and just needs some tuning. The number of steps required to go forward is lower than the number of steps required to move backwards the same distance, so that will need to be accounted for. Also, we have the Teensy break a few times. We're still not entirely sure what caused this, but be very careful to make sure everything is grounded properly before connecting it to the power supply and the computer.

#### Software:

- Autocrop script:
  - Code still requires additional testing to verify continued reliability in addition to the improved performance time. Attention should be directed at the cropping of the color bar out of the image, leaving just the artifact. Currently, the raycast is only being performed at the center of each side perpendicular to the corresponding side in order to locate the artifact edges. After this initial crop, additional raycasts can be performed starting in each corner in order to find the gap between the color bar and the artifact. This can be used to crop the color bar from the artifact.  
Also, code still needs to be integrated with the Applescript for multithreaded performance.
- Teensy code:
  - Placeholder values are currently in place for both the stepper motor driving the mechanical arm and the DC servo motor driving the rotating table. These values should be adjusted accordingly in integration testing. Also, the buffer for the buttons should be tested to verify the OnButtonDown, OnButtonUp, etc code works as desired.