

## B.6 Assembly Instructions

This section outlines the general steps for assembling the pickleball throwing machine once all components have been printed, wired, and prepared.

*Note: For visual reference, please refer to the CAD models and exploded views in the GitHub repository (<https://github.com/jc2889/OpenPickleballMachine>).*

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### Step 1: Mount Motors to Motor Brackets

- Insert each **775 DC motor** into the **motor bracket.STL**.
  - Secure the motors using **M4 bolts and nuts**.
  - Ensure the motor shafts are aligned and facing the launching direction.
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### Step 2: Assemble the Launcher Wheel System

- Attach **TPU launcher wheel.STL** to each motor shaft.
  - Align the wheels within the **roller frame.STL** to ensure the pickleball fits snugly between them.
  - Mount the entire roller frame to the wooden base using screws or bolts.
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### Step 3: Mount Servo and Ring Gear System

- Attach the **continuous rotation servo** to its designated bracket.
  - Connect the **custom servo gear.STL** to the servo shaft.
  - Engage the servo gear with the **ring gear.STL** to enable rotation of the launcher assembly for directional control.
  - Ensure smooth rotation and secure mounting to prevent gear skipping.
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#### Step 4: Install Feeding Mechanism

- Mount the **ball disc.STL** and **ball\_mover.STL** to guide balls into the launcher wheels.
  - Attach the second servo to drive the feeding disc using **custom motor gear.STL**.
  - Position the **tube.STL** to direct balls from the feeder into the launcher gap.
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#### Step 5: Mount Control Electronics

- Secure the **electrical box.STL** to the frame or underside of the launcher.
  - Mount the **Raspberry Pi**, **PCA9685**, and **motor drivers** inside the electrical box using M2 screws or double-sided tape.
  - Route wires carefully and use **Wago or spade connectors** for clean and safe connections.
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### Step 6: Secure Battery and Display

- Mount the **battery** to the base using the **battery strap.STL** or zip ties.
  - Mount the **touchscreen display** using the **screen mount.STL** and orient it for easy user access.
  - Connect the display via HDMI and USB to the Raspberry Pi.
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### Step 7: Final Assembly and Testing

- Perform a final wiring check. Ensure:
  - No loose connections
  - Battery polarity is correct
  - Step-down voltage is properly regulated
- Power on the system and test each component individually:
  - Motors
  - Servos
  - UI responsiveness
- Once verified, test a full launch cycle with a pickleball.