

Electronics

- MCU
- Actuators
 - Two options:
 1. BLDC
 2. Actuator
 - a. [Steadywin GIM8108](#)
 - b. [GIM8108-8](#)
- PCB
 - Battery input
 - 4s-6s LiPo
 - fusing, power distribution
 - DC-DC rails(jetson, logic, sensors)
 - CAN/UART/USB hubbing between Jetson and drivers
 - IMU + headers for encoders/limit switches
 - [Unitree 4d Lidar?](#)
 - E-stop and brownout protection

Initial plan

1. Leg
 - a. Simulation
 - i. Isaac sim + ROS 2 -- test physics of single leg, to make sure it works
 1. Goal:
 - a. Validate link lengths, joint limits, workspace, and stability.
 - b. Verify that your chosen servos' torque specs actually cover the loads (use your estimated masses).
 - c. Test gaits (crawl, trot) without frying hardware.
 - b. Buy one legs worth of actuators(3 units)
 - i. Purchase list
 1. 1 x 100 kg(hip pitch)
 2. 2 x 62 kg(knee + abduction)
 3. 4 S battery
 4. microcontroller([teensy 4.1](#))
 5. 3d printer(purchase on craigslist borrow from parents)
 - ii. Bench leg test
 1. Run PWM control from micro-controller plus 4S battery
 2. Make sure walking simulation can run 2-3 minutes under ~60 C

Pupper Links

1. Stanford pupper research paper: [2110.00736](#)
2. [Pupper Docs](#)
3. [Pupper Model](#)

Build Notes

1. Leg

- a. Overall notes
 - i. 0.35 mm chamfer on all bolt/screw holes
- b. GIM8115-9
 - i. [Diagram](#)
 - ii. Housing Mounting: 8 holes, M4 thread, depth 3.5 mm
 - 1. Connecting plate to actuator: 0.5mm
 - 2. Through standoff between hip and knee pitch actuator: M5 screw = 5mm + 0.5mm
 - iii. Output Plate Mounting: 3 × M4 screws and 3 × Ø4H7 dowel pin holes for alignment
- c. GIM8108-8
 - i. [Diagram](#)
- d. Script for leg torque