Drone Frame Documentation

We are using the F450 Drone Frame Kit. It comes with four arms connected by a top and bottom base plate. The bottom base plate acts as a power distribution bus. It takes in power from the Relay output (NOT the battery directly) and distributes it to each ESC. The battery sits on this base plate to keep the mass close to the center. The battery is currently secured in place by a Velcro loop. The upper base plate serves only a structural purpose, not an electrical purpose. The RPI sits on the upper base plate, secured by sicky pads.

*Note: the screw holes on the top baseplate are slightly misaligned, so you’ll probably have to widen them slightly with a drill in order to put the frame together.*

To make the wiring secure, we use an RPI Proto Hat V2, which is secured on top of the RPI and provides a solder-able breadboard-like grid on which to build many of our circuits. This is where we solder the IMU, ADC, and voltage divider, as well as the connections to the buck converter, relay, and ESCs. Those last three are too big to go on the proto hat, so the buck converter and relay are sticky-padded as close to the center as possible, and the ESCs are zip tied to the arms of the drone.

Each arm of the drone is marked on the bottom with a number and the intended direction of rotation for the propeller. The ”front” of the drone is the arm marked 1, which is also the direction the RPI’s USB ports are pointed (this is important for the IMU to be correctly oriented and for the motors to act appropriately). Opposite propellers must spin together. So 1 and 3 spin CCW (silver screw) and 2 and 4 spin CW (black screw).