

CHIBICOPTER!



charles z. guan 22 march 2012

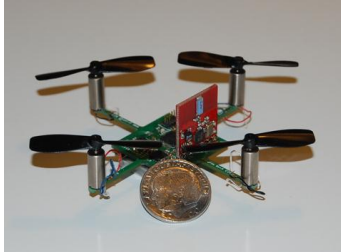
Original Design Intent

- Explore the smallest quadrotor design space using only common, inexpensive R/C model parts
- Better aesthetics via 3D printed monocoque airframes instead of bare PCBs or carbon rods
- Intermediate level between scratch-build and full kits – maximizing use of digital fabrication (3DP, PCB printing) intermixed with premade modules.



Accomplishments

- 36 gram all-up weight... 3rd-best-in-class?
- Inexpensive brushless motors
 - Others are coreless brush DC, \$\$\$
- R/C indoor-model component based
 - Not a custom all-in-one PCB with discretized sensors, microcontrollers
- Doesn't look like a board. Has landing legs and low-turbulence arms



Crazy Flie
20g, 2" props



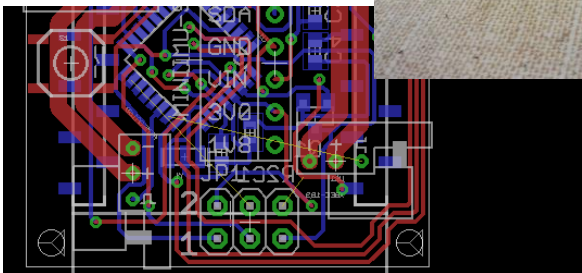
NC-ONE
24g, 2" props



Chibicopter
36.6g, 2.5" props

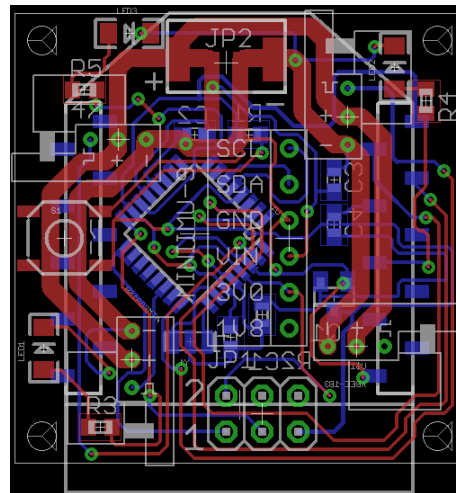
Some Engineering Lessons

- Things aren't as small as they seem – get your parts first, to be certain
- Ordering parts that are dependent on the dimensions of unknown components = risky
- ~~Double triple~~ quadruple check routed boards for correctness before ordering multiples...



Some Product Design Lessons

- “Old Tektronix Scope Syndrome”... hard-to-reach reset button, power connector.
- XBEE programming only – requires some knowledge of TTL serial hardware protocol to remotely program. Could be shutting out own target market?



Work to Come

- Near Term / appropriate for the class
 - Reliable flight with current hardware
 - Resolve the board bugs, not adding any new features
- Outside of class / independently
 - Revise airframe design for more rigidity and flexible motor options
 - Compromise on size of PCB for easier assembly

