

QUIRK-E

by Tom Binkley

Quirky is an adjective which means unusual, eccentric and whimsical. Quirk-e seems a fitting name for this distinctive little electric powered park flyer.

Inspired by Todd Long's Tiny-X and Carl Martin's Fast Freddy, from the days of brushed motors and nickel batteries, this design has come of age with lipoly batteries and a brushless motor.

Simplicity is key. With a flat bottom airfoil, stick fuselage and compact size it builds quickly. But it's light weight, low aspect ratio wing and short tail moment make it a great performer.

Start by getting the needed components and supplies. You'll need a small outrunner brushless motor like the 2204-14T. It weighs only 19g and features a built in prop saver and firewall mount. You'll need a light weight ESC like Castle Creation's Thunderbird 9, a light receiver and two 6g servos. A 2 cell 500-610 mAh lipoly battery supplies power. Light weight is important to the performance of this design. I used a GWS Pico Stik fuselage stick, but a light carbon fiber tube or 3/16" X 5/16" spruce stick will work too.

Cut all wing parts out of 3/32" balsa. Pin trailing edge and bottom spar to wax paper covered plans and glue ribs in place adding shear webs between ribs. A good fit is important. Add top spar and 1/8" hardwood dowel leading edge. If

leading edge dowel is slightly bowed, put bow forward (not up or down) to keep it from warping the wing. Add the turbulator spar and then the wingtips and wingtip braces. The center rear half ribs should be spaced to fit the width of the aileron servo. Add a spreader between those half ribs spaced to suit the length of the aileron servo. Add a spreader on the bottom between half ribs for the servo wire exit.

Assemble ailerons and stabilizer using 3/32" balsa. Rudder is made from 1/8" balsa. Quirk-e has a fixed rudder for simplicity and weight reduction.

Lightly sand all balsa parts, bevel hinge edges and cover with So-Lite. Choose a color scheme that is very different top and bottom to aid with orientation when flying. The Quirk-e logo works well to identify the top side. It can be cut out of Mono-Kote trim.

Remove covering from stab and rudder where they attach to fuselage and glue them in place. They need to be square to each other and square to the fuselage. Glue the 1/32" ply motor mount and brace in place.

Mark fuselage for wing location. Apply a packing tape reinforcement to the front center of the wing from the leading edge back about 3/4". Carefully remove a little covering from bottom of trailing edge and spar to provide a gluing surface.

Epoxy trailing edge and spar to fuselage being careful to align wing square with fuselage as viewed from above, and level with stab when viewed from behind. When epoxy is cured place a balsa shim between fuselage and leading edge.

The shim should be the width of fuselage and about 1/4" long, just thick enough to fill the gap between fuselage and leading edge. Tack shim in place with a drop of thin CA.

Next, bind the leading edge to the fuselage using sewing thread and a needle. Poke the needle through the tape reinforcement (and covering) and pull the thread around right side of the leading edge and under the fuselage, then around the left side of leading edge and back under fuselage, about 5 times. Soak thread with CA for a very strong joint. Trim any excess thread.

Hinge the elevator and ailerons in place with packing tape. Install aileron servo, horns and push rods. If the servo is a snug fit, a drop of 5 minute epoxy on each end will hold it in place nicely. Bend tail skid from .032 music wire and epoxy in place with 1/32" ply wedge.

I suggest you trim your motor to ESC wires to a minimum length and solder them (no connectors). Also, shorten the ESC battery lead to a minimum. Bend the landing gear from .062 music wire and attach the wheels. I recommend GWS Pico Stik 2 1/2" wheels because they are very light, are shock absorbing and they work well in short grass. Bind the landing gear to the fuselage with thread and CA or epoxy.

Let's trial fit our components to ensure proper balance and placement. First, screw the motor to the firewall and tape the ESC neatly to fuselage. Install prop. Now, using masking tape, temporarily attach the battery, receiver and elevator servo and a piece of push rod wire in their respective places. Move as needed until the model balances 3 inches back from the leading edge.

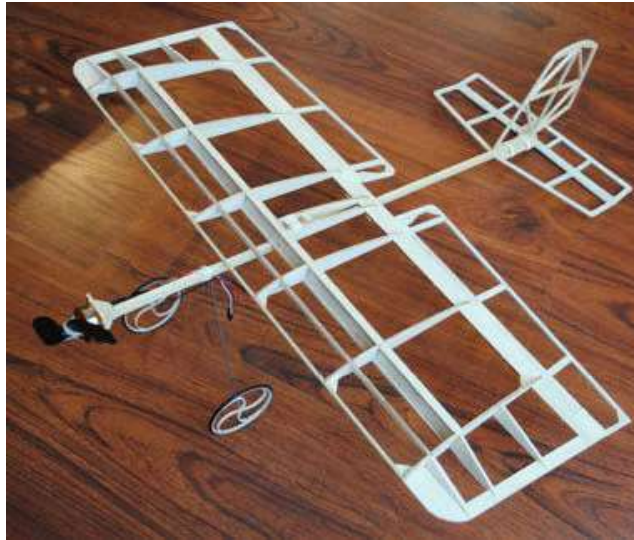
After noting their position, remove parts. Then glue the 3/4" X 5" X 1/32" ply plate in place accordingly. I attached my elevator servo with a dab of 5 minute epoxy. (If needed, it can be removed without damage using a knife) Attach receiver and battery with hook and loop fastener. Make and install an .050 carbon fiber push rod and ply control horn for the elevator.

Program your transmitter with some expo and on low rates adjust aileron travel to 1/2" each direction (measured at the aileron's widest point) and elevator travel to 5/16" each direction. Confirm that there are no warps and control directions are right. Quirk-e will ROG in a few feet at half throttle.

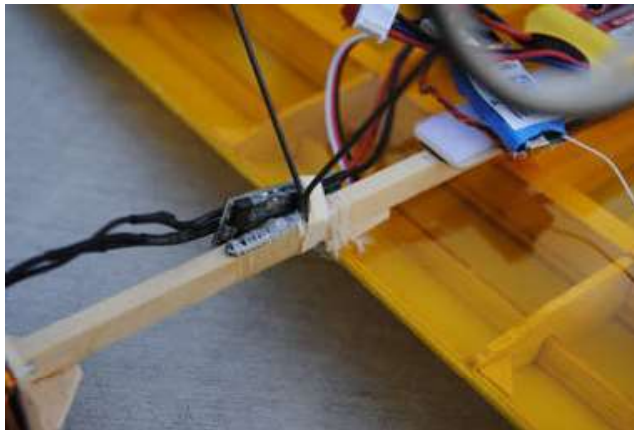
This is where the fun begins. At part throttle and low rates Quirk-e is actually docile and relaxing to fly. Still on low rates, but with more throttle, Quirk-e performs aerobatics, including outside loops, easily and predictably. Inverted flight is effortless with just a touch of down elevator and no tendency to roll out. The flat bottom airfoil adds stability without detracting from inverted flight. It even does nice touch and go's on school yard grass. Experiment with higher rates for some wild fun.

Quirk-e can do all kinds of crazy gyrations without being twitchy or stressful to fly.

A little Quirk-e, a lot of fun!



Quirk-e framed and taped together for photo. Rear half ribs spaced to fit servo.



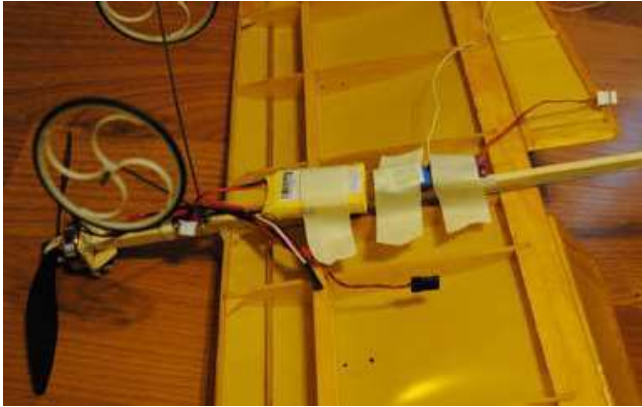
Thread attaches landing gear and wing leading edge to fuselage stick. ESC with shortened wires taped to fuselage.



Aileron pushrods are two pieces overlapping in heatshrink tubing.



Wire end on .050 carbon fiber push rod held with heat shrink tubing and a drop of CA. Won't slip, but can be adjusted. Ply and wire tail skid.



Temporarily taping gear in place to determine correct location avoids adding weight to balance.



Quirk-e is perfect for a lazy day at the park.



Quirk-e gliding gently, lazily, inverted. Arm your ESC's brake for best glide.



Mono-Kote Trim Quirk-e logo helps visual orientation in flight.



Or, a fast paced airshow!



Transparent yellow shows off simple structure, contrasts with bright yellow and logo on top of wing.