

## Instruction Manual for the PteroWorks 3D Guppy

Thank you for purchasing this 3D Guppy kit. It can be built in a day or two, or a few evenings. If you have built and covered a wood model before you should have no trouble here, but please read the instructions thoroughly. Take your time, be careful and have fun with the build. You will need thin and medium CA glue, 15 minute epoxy or aliphatic wood glue, and sandpaper to assemble the airframe, and small spring clamps or clothespins will also be helpful. This manual can be downloaded from the website (PteroWorks.com) as a PDF, and the pictures enlarged on your computer for greater clarity.

The 3D Guppy is easy to fly with the control surfaces at low rates - it is very docile, but it is not a high-wing trainer and requires some flying experience. At high rates the 3D Guppy is capable of many 3D maneuvers. The wing loading is very low, and if set up properly there should be no surprises.

### Specs:

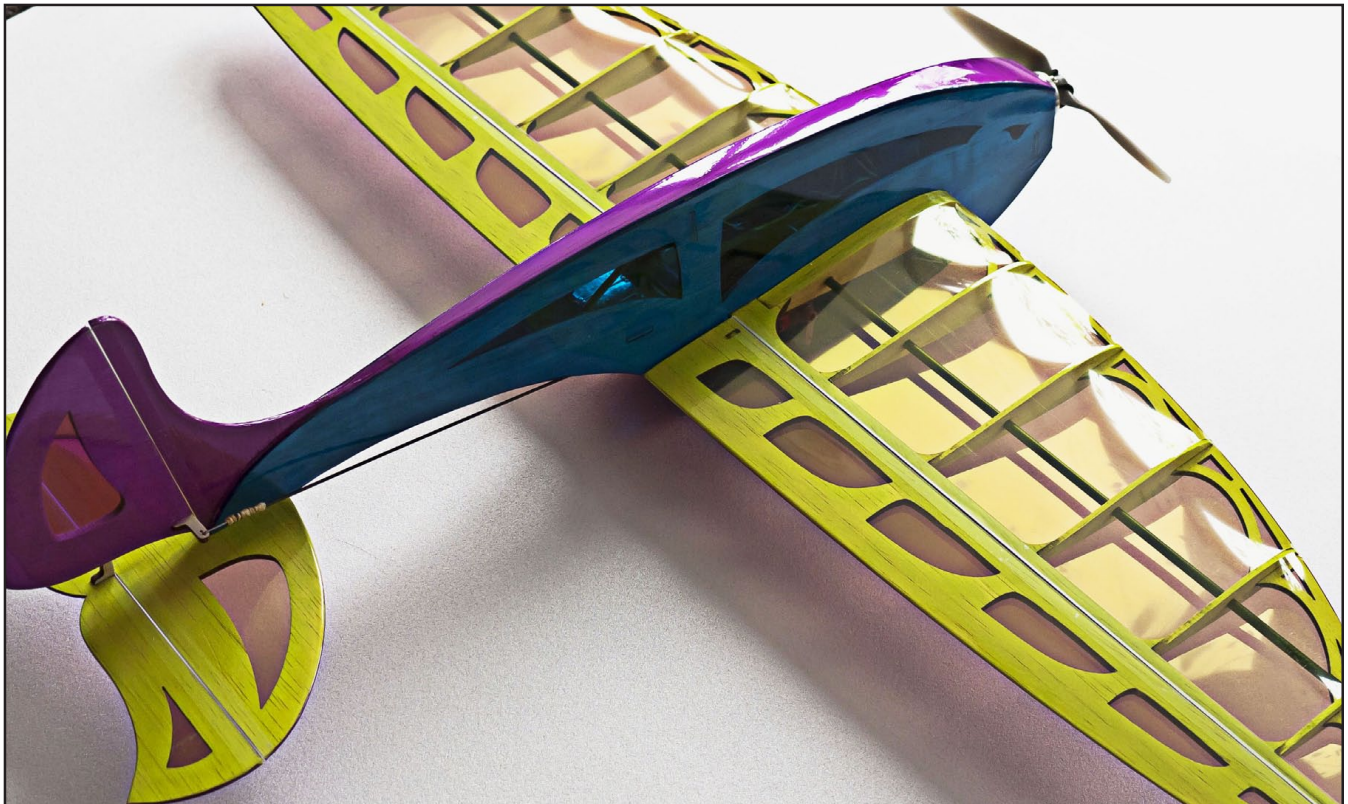
- wingspan: 28"
- length: 21"
- wing area: 140 square inches (0.97 ft<sup>2</sup>)
- weight RTF: 7-8 oz. (with a 2s-3s 600 mah LiPoly battery)
- wing loading: 8 oz/ft<sup>2</sup>

### Included in this kit:

5 sheets of laser cut wood (all wood required), 28" x 36" rolled plans, 0.156" carbon wing spars, 2" steel wing joiner, instructions.

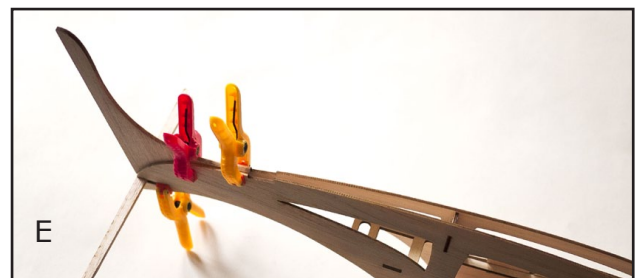
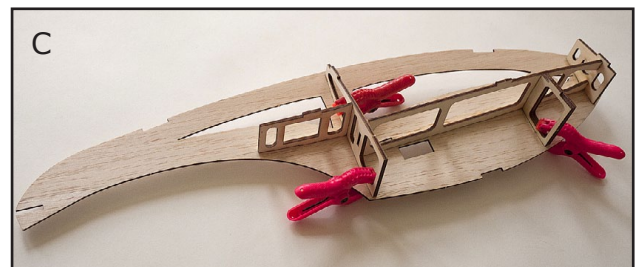
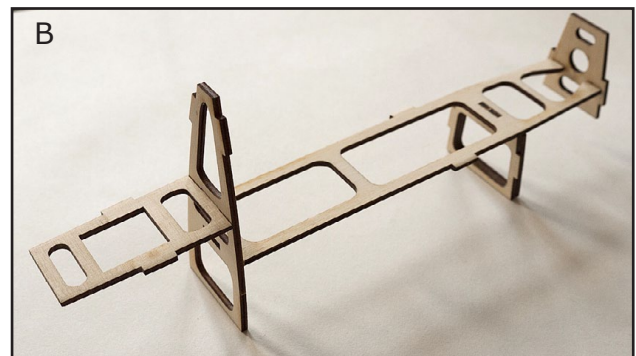
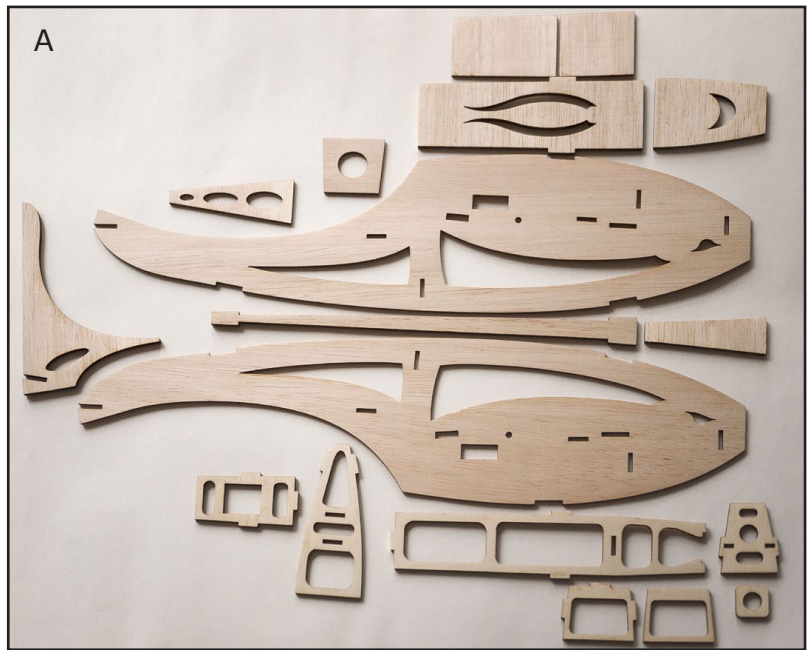
Additional gear required: 24 mm 100 watt brushless motor with a kVa of around 1,500 rpm/v, 6 x 4 prop, 10 A ESC, four micro servos (HS-45HB or equal), 6 channel receiver, and a 400-800 mah 2s-3s LiPoly battery.

Requires covering material (Ultracote or Oracover Lite recommended).



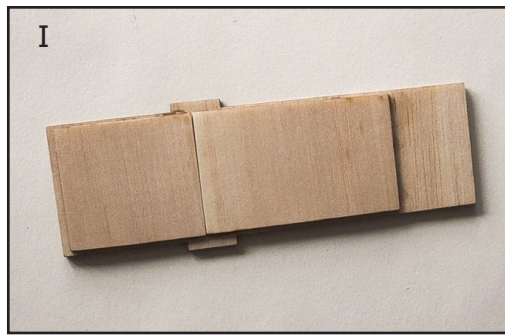
## Body

1. Collect all parts for the body (fig. A).
2. Assemble and glue inner frame skeleton out of six ply pieces. Note doubler piece at front-bottom. Check fit of tabs and sand if necessary before gluing (fig. B).
3. Check fit of skeleton frame with left body side, ensuring all tabs fit into their proper slots, and glue in place (fig. C).
4. Check fit of right body side and glue in place (fig. D).
5. Check fit then glue rudder post to rear body sides. Note rudder post is sandwiched in-between body sides. Be sure body is square and straight before gluing. Small clamps can help to set alignment before gluing, and a scrap of 1/8" balsa can be used to align stabilizer slots (fig. E).
6. Slide "backbone" into open top of body, check fit, sand if necessary and glue in place. Small clamps can help ensure a solid bond (fig. F).
7. Check fit then glue top head piece. Sand if necessary for a good fit (fig. G).
8. Check fit then glue lower tail stiffener pieces. Sand if necessary for a good fit (fig. H).





9. Glue two belly plate doubler pieces to inside of belly plate (fig. I).



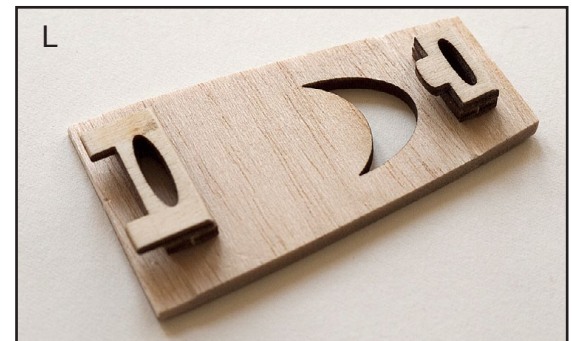
10. Check fit then glue belly plate to bottom of body assembly (fig. J).



11. Assemble lower battery hatch parts, checking position and fit of latch pieces before gluing (figs. K, L).



12. Sand body until pretty!

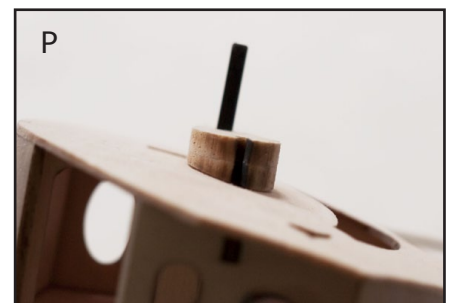
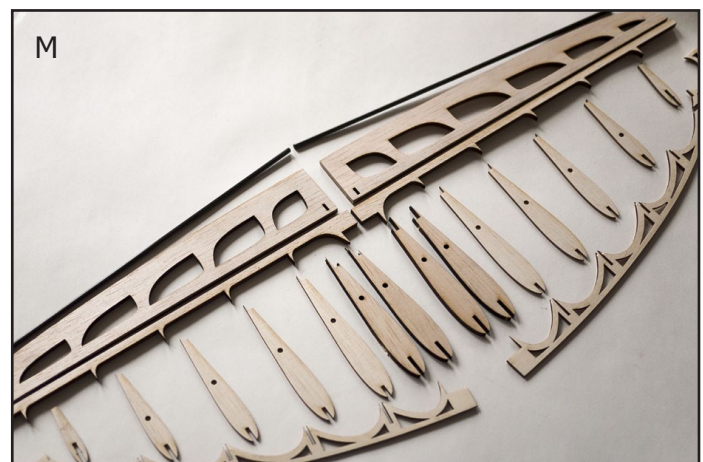


## Wing

13. Collect all wing parts and lightly sand any laser burn off all parts (fig. M).

14. Cut two main carbon wing spars (0.156" diameter) to 12.5" length each.

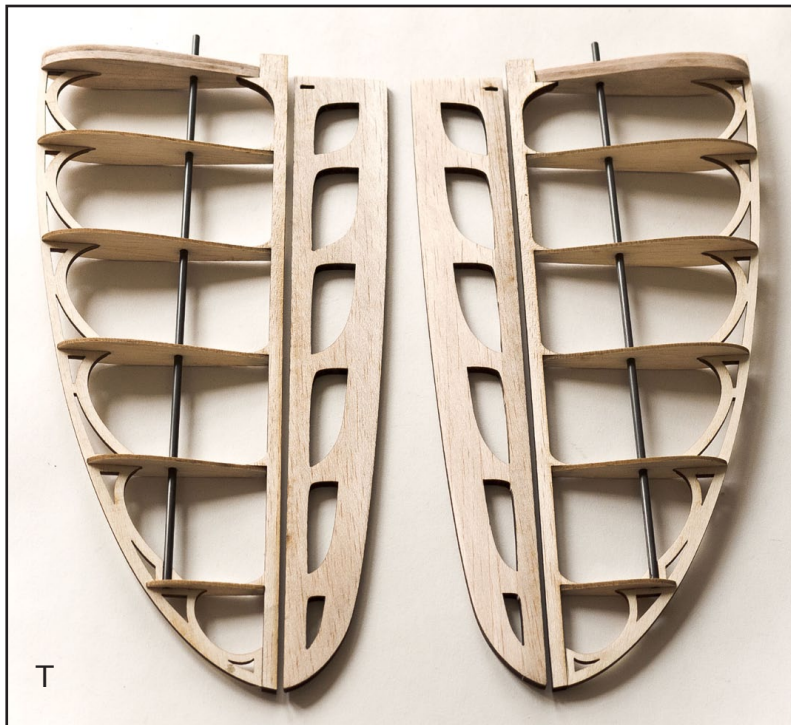
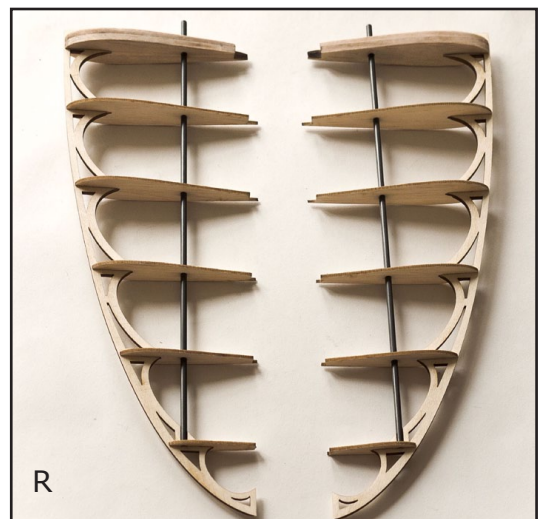
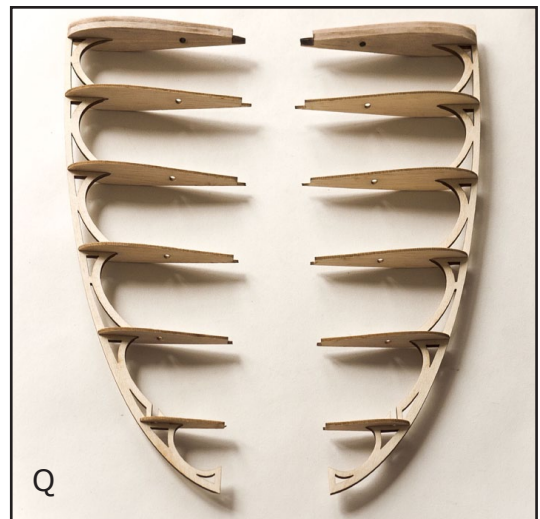
15. Glue two sets of identical inner (root) ribs (the 3/16" balsa ones) together, and sand an angle into inner side surface (where it will mate with the body) to match body angle. Note orientation of ribs - the extension tab at the trailing edge is on





the **bottom** of the wing. Test fit the rib assembly to the body with a carbon wing spar (fig. N, O, P).

16. Fit all ribs to the leading edge piece. Sand ribs if necessary for a good fit of the tabs into the slots. Do not glue yet (fig. Q).
17. Carefully run carbon wing spar through holes in ribs and into notch on leading edge piece. Do not glue yet (fig. R, S).
18. Fit and glue trailing edge pieces to rib ends, and the leading edge piece at the tip (fig. T).
19. Place wing assemblies on a flat surface and ensure there is no twist or warp in wing and glue all joints. Note: wing design will favor a slight amount of wash-out at the wing tips to increase stability of wing. Note again orientation of ribs - the extension tab at the trailing edge is on the **bottom** of the wing.
20. Carefully sand trailing edge to match the profile of the ribs.



21. Carefully sand ailerons to match wing ribs and taper down toward their trailing edges.

### Tail

22. Carefully sand rudder and horizontal stabilizer/elevator pieces for a nice aerodynamic shape. Do not glue in control horns yet (fig. U). **Note: shorter control horns are meant for the tail surfaces (elevator and rudder).**



## Covering and Assembly

23. Cover all parts before final assembly. Ultracote/Oracover Lite is recommended, but any good lightweight covering will work. When covering the wing halves ensure there is no twist or warp. Use a heat gun or covering iron to carefully remove any twist or warp after covering (fig. V, W).
24. Tape the control surfaces (ailerons, rudder and elevator) to the wing halves and stabilizers with 1/2" clear tape. Glue control horns into slots. Aileron horns should be on bottom side and elevator horn should be on top. Rudder horn should be on side opposite elevator horn. Use short horns for elevator/rudder.
25. Glue the horizontal stab to the body, ensuring it is square to the vertical rudder and wing. Sand if necessary to ensure a good fit.
26. Install the motor, ensuring there is clearance with the body sides and lower battery hatch. Wires should run through the vent hole in the firewall, and speed control will need to be attached to wires on inside of body.
27. Install the elevator and rudder servos into the rear of the body, and aileron servos into rectangle holes in body. Note orientation in picture. Glue in place with CA or use screws (fig. X).
28. Glue 2" steel wing joiner half way into one side of the wing spar. Sand steel first to get a good bond with CA (fig. Y).
29. The wing can be left un-glued if you wish it to be removable, but for increased strength the wings should be glued to the body.
30. Install receiver in main hatch area above wing and test fit the battery, which should lay on the belly plate doubler. Use a 2S-3S LiPoly 400 - 800 mah.
31. Attach control rods to servo horns and control surfaces. Use Z-bend .040 piano wire for ailerons and .050 carbon rods with .040 piano wire glued to each end (fig. Z).
32. Check Center of Gravity against the plans and ensure you are within 1/8". Position the battery to adjust the C/G, and mark the battery's position. Use velcro to hold the battery in place.
33. Program radio and adjust control surface throws. High rates: Elevator should be about 5/8" up and down; ailerons should be 3/4" up and 3/4" down. Rudder throw should be about 1" left and right. Low rates should be 60%-70% of high rates. Exponential is recommended.
34. Always perform a radio check before flying the 3D Guppy. **Use low rated for first flight!** The Guppy is designed to take off with a gentle toss of your hand and belly land on grass. Spoilerons (raised ailerons) can be programmed for shorter landings. Experiment at a safe height!
35. **Have fun!**

