

# PuddleBug<sup>2.4</sup>

Micro RC Model for Spektrum / ParkZone 2.4 systems



Length 10.5 inches | Span 17.75 inches | Wing Area 71 inches<sup>2</sup> | Flying Weight 1.1 oz.

*Version 01/06/2010*



# Product Support

## WARRANTY

Stevens AeroModel guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Stevens AeroModel's liability exceed the original cost of the purchased kit. Further, Stevens AeroModel reserves the right to change or modify this warranty without notice.

## LIABILITY RELEASE

In that Stevens AeroModel has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

## **THIS PRODUCT IS NOT INTENDED FOR CHILDREN 12 YEARS OF AGE OR YOUNGER**

**WARNING:** This product may contain chemicals known to the State of California to cause cancer and or birth defects or other reproductive harm.

## PRODUCT SUPPORT

This product has been engineered to function properly and perform as advertised with the suggested power system and supporting electronics as outlined within this product manual. Product support cannot be provided nor can Stevens AeroModel assist in determining the suitability or use of electronics, hardware, or power systems not explicitly recommended by Stevens AeroModel.

For product assembly support, replacement parts, hardware, and electronics to complete this model please contact Stevens AeroModel on-line at [www.stevensaero.com](http://www.stevensaero.com).

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# Project Checklist

## Kit Contents

- Laser cut wood (6 Sheets - See inventory on following pages)
- Illustrated instruction manual - Available for Download ONLY
- Computer drawn 11x17 plan set (2 Pages)
  
- Taped to Back of Wood Brick
  - 2 - 12 in. Length of 0.015 in. dia. wire
  - 2 - 12 in. Length of 0.025 in. dia. wire
  
- Hardware Bag (4 x 6 in.)
  - 1 - 1/64 in. Plywood Grill (F10)
  - 1 - 1/32 in. Plywood Motor Mount Deck (F12)
  - 1 - 1-1/2 in. Length of 1/16 in. Heat Shrink Tubing
  - 1 - 3 in. Length of 1/16 in. Aluminum Tubing
  - 1 - #2 Trexler Balloon Wheel

## Required Electronics *(Available at StevensAero.com)*

- Spektrum compatible radio with servo reversing. We suggest the DX5e.
- ParkZone\* [PKZ3351] or Spektrum [AR6400] Ultra Micro Receiver/ESC/Servo System.
- ParkZone Motor and Gearbox [PKZ3624] (Same motor as used in the Sukhoi and UM P-51)
- ParkZone UM P-51 Propeller [PKZ3601] or E-Flite\* 4-Site Propeller [EFL9051]
- ParkZone [PKZ1035] or E-Flite [EFLB1201S] 110-120mAh 3.7V LiPo Battery

\*Recommended

### Required Building Supplies and Tools

- 1/2 oz. Medium CA Glue
- 1/2 oz. Thin CA Glue
- CA glue accelerator (kicker)
- Hobby Knife with ample supply of #11 blades
- Sanding block with 400 and 600 grit paper
- Covering Iron and Heat Gun
- Small Needle Nose Pliers
- Small Round "Rat-Tail" file.
- 1 in. x 2 in. length sticky back velcro
- 3/4 in. wide clear tape
- 1 Roll AeroLITE (solite)

### Suggested Building Supplies

- CA glue de-bonder
- Long sanding bar
- Low Tack Painters Masking Tape
- Dubro Servo Tape [DUB-634]

# General Assembly Instructions

Thank you, for purchasing this Stevens AeroModel PuddleBug™. An indoor micro RC model developed for the popular Spektrum and ParkZone 2.4ghz micro receiver/esc/servo “brick” or “puck” systems. This model has been developed and manufactured using state of the art CAD/CAM systems and features a unique interlocking construction process that, when compared to traditional methods found in other model aircraft kits, save countless hours of measuring, cutting, sanding, and fitting. We are certain that you'll find our kit to offer a truly exceptional build experience. At any time should you run across a term or technique that is foreign please don't hesitate to contact our staff with your questions.

## READ THIS

Please **READ** and **RE-READ** these instructions along with any other included documentation prior to starting your build and or contacting our staff for builder support.

## Pre-sanding

Do not skip this step. Prior to removing any parts from the laser cut sheet wood use a sanding block loaded with 250-400 grit paper and lightly sand the back side of each sheet of wood. This step removes any residue produced as a result of the laser cutting process and, as we have found that most stock wood sizes run several thousandths of an inch over sized, slightly reduces the thickness of each sheet.

Leave your pre-sanded parts in the sheet until required in the assembly process.

## Protecting your worktable

Use the poly tube that this kit was shipped in as a non-stick barrier between your worktable and the product assembly. Promptly clean up any epoxy spills with rubbing alcohol and a disposable towel.

## Bonding the assembly

As this product tabs, notches, and otherwise interlocks like a 3D puzzle we suggest that when fitting parts you dry fit (use no glue) the parts together first. It's advised to work 1-2 steps ahead in the instructions using this dry-fit technique which allows ample opportunity to inspect the fit and location of assembled components and realizes a benefit as each successive part contributes to pulling the entire assembly square. Once you arrive at the end of a major assembly step(s) square your work on top of a flat building table and revisit the dry fit joints with glue. Using the dry-fit process you'll be able to recover from a minor build mistake and will ultimately end up with a more square and true assembly.

Unless otherwise noted in the instructions, always use medium CA glue for bonding parts.

## Never force the fit!

Remember this is a precision cut kit our machines cut to within 1 thousandth of an inch in accuracy. Yet the wood stock supplied by the mill may vary in thickness by up to 20 thousandths. This variance in the wood stock can cause some tabs/notches to fit very tight. Hey, dad always said it was easier to take away material than add it back. With this in mind, should you find a joint or two to fit rather snug consider lightly sanding a tight fitting tab rather than crushing and forcing your parts together. You'll break fewer parts in assembly and will end up with a more square and true assembly.

## Wing Construction

- Locate and join together over plan sheet parts W1a and W1b to create the wing center section sheeting.



Next, locate parts W2a and W2b. Join together so that the etching on the frame is on the same side. Build a right and left frame.



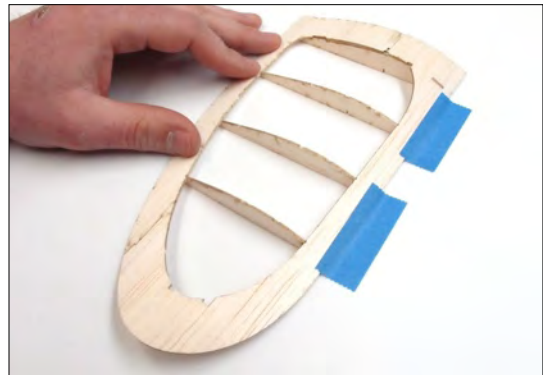
- Begin building by laying the wing frame flat atop your work table (**text/etch marks up**). The ribs will be inverted when assembled to the wing frame. Locate and install R2 to the wing panel by aligning a front most tab and notch. Glue.



- Install ribs R3, R4, and R5 aligning first at notch point and etch lines in leading edge of wing frame. Glue ribs at leading edge.



- Lay the wing down atop a flat surface with the portion of the wing forward of the spar taped flat against the surface. Wrap the wing panel aft into position at trailing edge tab and notch points. Align ribs to etch lines and glue.

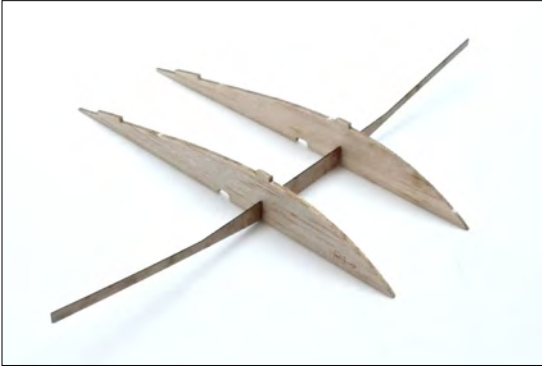


- Install S2 and S3 spars to right and left wing panels within notches at wing frame and ribs R2, R3, R4, and R5.

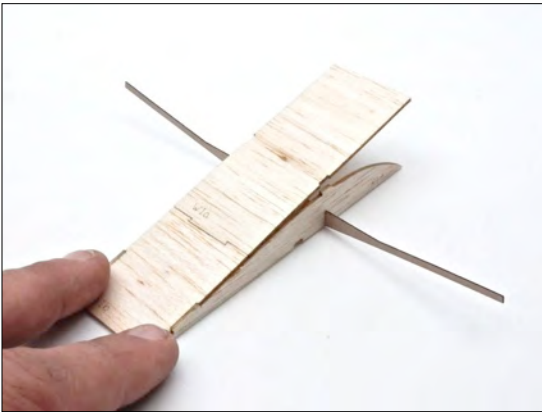


## Wing Construction Continued

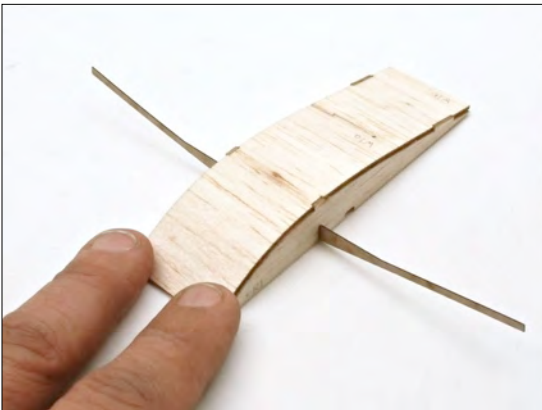
- Build the wing center section from W1 sheeting (previous assembly of W1a/W1b), ribs R1, and ply spar S1. Key ribs R1 to the spar S1 using the notches in the spar as a reference for spacing. Glue.



Next, aligning with the tabs on ribs R1, wrap center section sheeting W1 assembly over R1 ribs and glue in place.



Edge of W1 follows centerline of ribs R1.



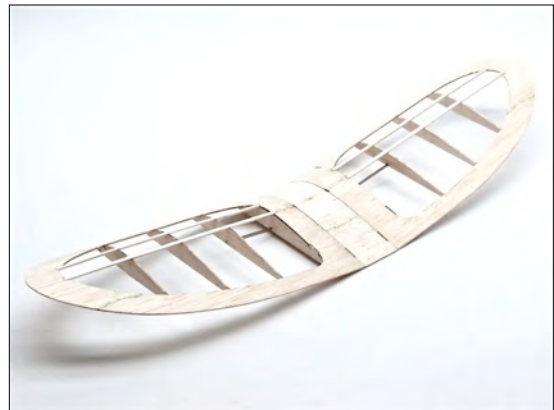
- Join completed right and left wing panel to completed wing center section.



Fit the spar S1 to the notch in the bottom of ribs R2 and R3.



Wing root edge should align with tabs in ribs R2 and fit flush with edge of center section sheeting. Once satisfied with alignment, glue.



## Wing Construction Continued.

- Check wing for twist. Sight along the bottom portion of ribs *forward of the spar S1*. Straight wings will have each rib bottom parallel to the next. Warped wings will show deviation from rib to rib. To correct a warped wing: mist wing panel with glass cleaner, then pin to a flat building surface. Once completely dry, the wing will assume the shape of the surface it has been pinned to.
  
- Final sand wing. Then using a clear lacquer or polyurethane based spray, apply a light coat to seal the wood. We suggest "Deft" brand "Clear Wood Finish".
  
- Use the covering guide on plan sheet 1 of 2 to cut the covering for your wing panels and apply according to the directions provided by your covering film manufacture. We suggest AeroLITE covering film, available at StevensAero.com

**Cover only the top surface of the wing.**

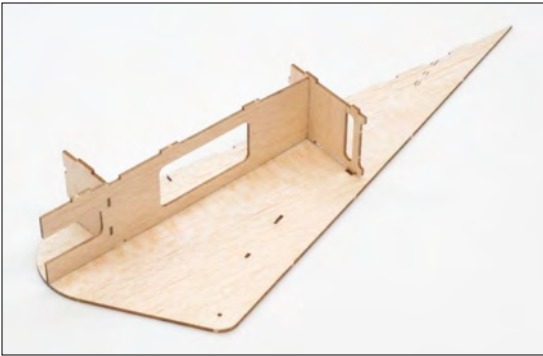


## Fuselage Construction

- Build the central crutch. Locate parts F1, F2, and F3 then dry fit (use no glue) these components together in the order illustrated on the plan sheet.



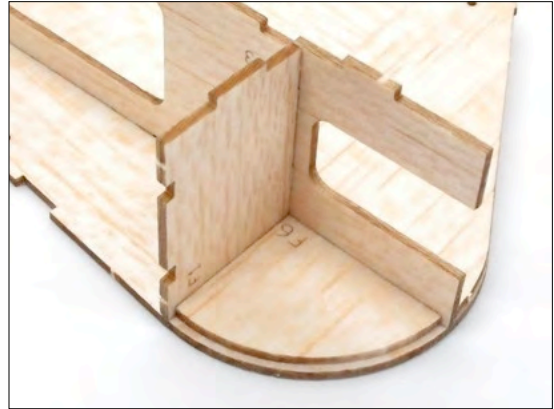
- Locate central crutch assembly to the notches in the *right* fuselage side then glue.



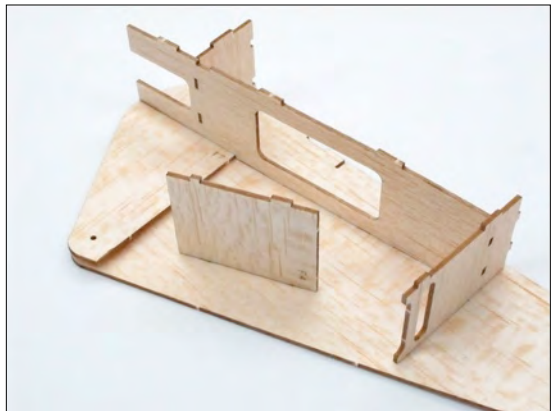
- Fit tab of F7 to notch in F3, align holes for axle at fuselage side, then bond to inside surface of fuselage as illustrate on plan.



- Bond one F6 part to inside surface of *right* fuselage side as illustrated on plan.



- Key former F4 to tabs provided in *right* fuselage side.



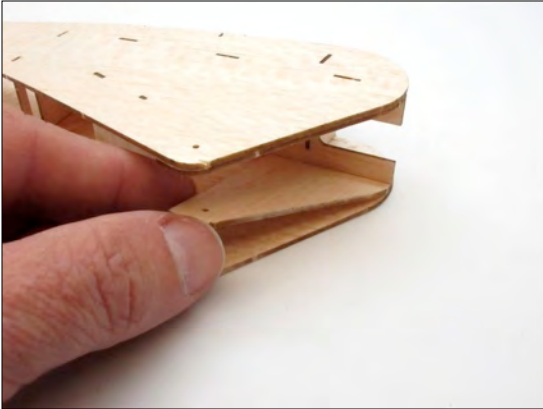
- Fit *left* fuselage side to assembly. Square structure on work table then glue at all contact points.





## Fuselage Construction

- Repeat process for installing F7 and F6 within fuselage assembly, bond within fuselage against *left* fuselage side.



- Install F5 to the top of the fuselage assembly then glue.



- Bond ply grill F10 to front of parts F7, flush with fuselage sides.



- Bond ply fender F11 to F10 above wheel opening as indicated on plan sheet.

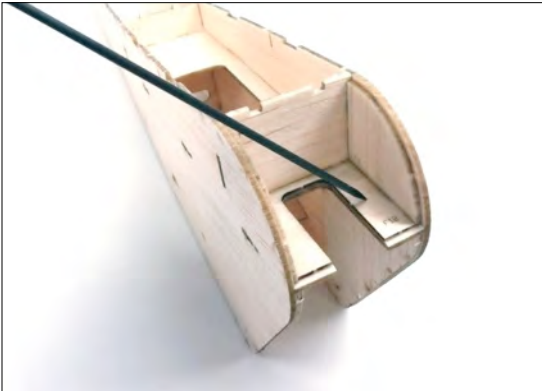


## Fuselage Construction

- Using a *sharp* #11 blade, complete cutting of notch that runs through former F5. This will allow passage of strut wire through fuselage. Now, harden the balsa wood at slot on fuselage sides where strut wire will pass through.



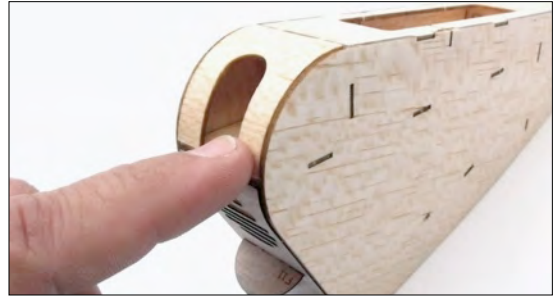
- Bond ply motor mount doubler F12 on top of F3 between parts F6.



- Install F9. Find edge opposite "U" shape cut in F9 and position this edge flat against leading edge of F5 atop F6. First, glue F9 where it contacts F5.



Then, wrap/bond F9 down along top edge of F6 spanning fuselage sides.



- Locate two cross-grained parts F8 (F8a and F8b) to inside of parts F7 behind grill - see "Wheel / Axle Detail". Use the 1/16 in. aluminum tube axle as alignment guide. Tack glue parts F8 with med. CA glue. **DO NOT GLUE AXLE IN PLACE.** Remove axle tube and permanently glue F8 with thin CA.



- Using a sharp #11 blade shape inside surface of F8 to match radius/relief in grill for tire.



## Final Assembly

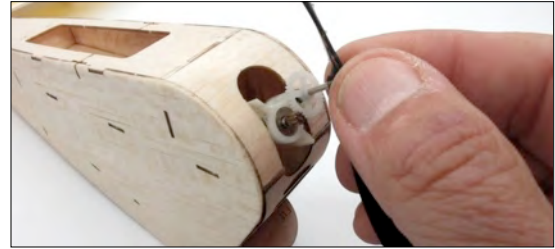
- Follow plan on sheet 1 and assemble Horizontal Stabilizer as illustrated.



- Using a clear lacquer or polyurethane based spray, apply a thin coat to seal the fuselage and tail surfaces. We suggest "Def" brand "Clear Wood Finish"
- Use the covering guide on the plan sheet to cut the covering for your Horizontal Stabilizer and apply according to the directions provided by your covering film maker. We suggest AeroLITE covering film, available at StevensAero.com
- Completed Horizontal Stabilizer assembly keys to tabs atop aft end of fuselage assembly. Square horizontal Stab to fuselage sides, and glue.
- Locate parts V3 Strakes to underside of H4 in Horizontal Stabilizer and glue.
- Trim mounting post from motor gear box [PKZ3624] prior to installation.



Now, install gearbox through opening in F9 and glue to ply motor mount doubler. Ensure that there is no side thrust before gluing with medium CA glue.



- Sand bevel, then hinge elevator and rudder to horizontal and vertical stabilizers with clear tape using the reference on plan sheet 2 of 2 as a guide.
- Install Micro receiver brick on bottom of F4 with double sided servo tape [DUB634]
- Glue rudder control horn to *left* side of rudder.

Glue elevator control horn to *lower right* side of elevator.

Follow the detail on plan sheet 2 of 2 for creating and installing servo linkage.

- Bend 0.015 in. dia. wire strut using template on plan sheet 2 of 2 as a guide.



## Final Assembly Continued

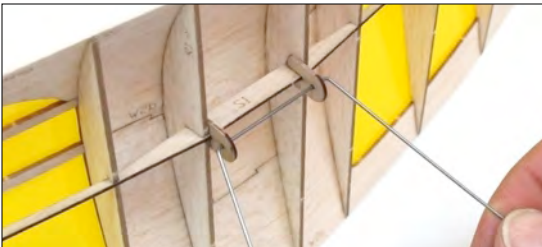
- Fit and glue one S2 ply tab to *inside* of one rib R1 straddling ply spar.



Insert strut wire through tab.



Slide remaining S2 tab onto wire and glue tab inside opposite rib R1.



- Using a Trexler inflating pump [TRX-HP] or SIG syringe [SIGSH627], carefully fill you tire with air. Do not inflate the tire using your mouth. Moisture from your breath will permanently damage the inflation tube. Do not overfill tire as this will bulge or otherwise deform the tire.

Twist inflation tube three times.

Wrap inflation tube around hub once then tuck remaining tube neatly between tire and hub.

- Mount tire in base of fuselage with 1/16 in. dia. aluminum tube axle. **DO NOT GLUE AXLE IN PLACE** as this will allow removal of Trexler tire for inflation/deflation before and after flying sessions.

- Extend the battery lead from your receiver if necessary, and route through opening in F5 and under slot in rib R1 of right wing.

- Mount wing by sliding tabs S2 into slots in F5, guiding strut wire through slot in fuselage sides.



Slide end of struts into ends of axle tube to secure wing.

- Stack the round balsa parts "a" - "j" atop one another and glue to form fax glow head. Paint black and fit/glue to the opening in F9.

- Balance model at ply wing spar S1. Mount the battery under the right wing outboard of rib R1 with Velcro. Locate the battery fore/aft to achieve proper balance.