eHopper

By Stevens AeroModel

Span 33.5 inches | Length 21.5 inches | Wing Area 235 inches^2 | Flying Weight 4.5 - 5.5 oz.

Version 02/02//2010

STEVENS AeroModel

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.

Stevens AeroModel
PO Box 15347 - Colorado Springs, CO 80935 - USA
719-387-4187 - www.stevensaero.com

Project Checklist

Kit Contents

- ☐ Laser cut wood (6 Sheets - See inventory on following pages)
- ☐ Photo illustrated instruction manual
- ☐ Rolled computer drawn plan set
- ☐ 1 - 12 in. length of 0.025 in. dia. music wire
- ☐ 1 - 18 in. length of 1/32 in. dia. music wire
- ☐ 1 - 18 in. length of 0.045 in. dia. music wire
- ☐ 1 - 19-3/4 in. length of 1/16 in. dia. carbon rod
- ☐ 2 - 24 in. length of carbon fiber flat stock (0.034 x 0.121 in.)
- ☐ 2 - 19-3/4 in. length of 1.5 mm square carbon tube

- ☐ Large Hardware Bag (4 x 6 in.)
  - 1 - 1 in. Foam Wheel [DUB-100MW]
  - 1 - 6 in. length of 1/16 in. heat-shrink tube
  - 1 - 1 in. length of 3/32 in. heat-shrink tube
  - 1 - 2 in. length of 1/8 in. dia. hardwood dowel
  - 1 - 6 ft. length 0.012 Stainless Wire
  - 2 - 1-1/2 in. Foam Wheel [DUB-150MW]

- ☐ Small Hardware Bag (2 x 3 in.)
  - 1 - 4-40 x 1 in. Nylon Bolt
  - 1 - 4-40 Blind Nut
  - 1 - Line Connector [SIGSH445]
  - 1 - Laser Cut Basswood Elevator Joiner
  - 2 - Micro II E/Z Links for 0.045 in. wire [DUB920 / BULK27805]
  - 4 - Micro Control Horn (Single Post) [DUB848 / BULK26305]
  - 6 - Micro E/Z Links for 0.032 in. wire [DUB849 / BULK26310]
  - 6 - Mini Rubber Bands (Black)
  - 12 - 1/16 in. x 1/4 in. Alum. Crimp Tubes

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
- ☐ Heat Gun and Covering Iron
- ☐ Soldering Iron & Solder
- ☐ Small Needle Nose Pliers/Wire Cutter
- ☐ Small Round Nose Jewelers Pliers
- ☐ Small Forceps
- ☐ Scissors
- ☐ Electrical Wire Cutter/Stripper
- ☐ Straight Edge Ruler
- ☐ 0.025, 1/32, 0.045, and 1/8 in. Drill Bits
- ☐ 2.5mm Allen Head Wrench
- ☐ Razor Saw
- ☐ Hot Glue Gun
- ☐ 3/4 in. Clear Tape
- ☐ 1 in. x 2 in. length sticky back velcro
- ☐ 3/4 in. wide clear tape
- ☐ 1 Roll AeroFILM or AeroLITE covering film

Suggested Building Supplies

- ☐ CA glue de-bonder
- ☐ Long sanding bar
- ☐ Razor Plane
- ☐ Low Tack Painters Masking Tape

Required Electronics *(Available at StevensAero.com)*

- [ ] 3 Channel radio and micro receiver. We suggest the Spektrum DX6i or DX7 Computer radio and AR6400* "Puck". However, a conventional receiver and two (2) JR S185 servos* may be used instead of the Spektrum gear.

Brushed Power System (Recommended)*:
- [ ] GWS IPS-S2 motor [GW/IPS-DX2BB-2XCS]
- [ ] Castle Creations Pixie-7P ESC
- [ ] GWS 7x6 Slow Fly Propellor
- [ ] 7.4V Hyperion 120mAh CX G3 LiPo

Brushless Power System*:
- [ ] E-Flite Park 250 [EFLM1130]
- [ ] Motor Mount Tube [EFLM1960]
- [ ] Castle Creations thunderbird 6 ESC
- [ ] GWS 7x3.5 Propellor
- [ ] 7.4V Hyperion 240mAh CX G3 LiPo

*Substituting electronics other than specified is not suggested.

General Assembly Instructions

Thank you, for purchasing this Stevens AeroModel **eHopper**™. A design inspired by Bill Stevens' full size Weedhopper. 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. As this kit is recommended for the advanced model builder and intermediate "pilot"; we invite absolute beginners to correspond with us, or to seek the help of another seasoned builder. At any time should one 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.

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.

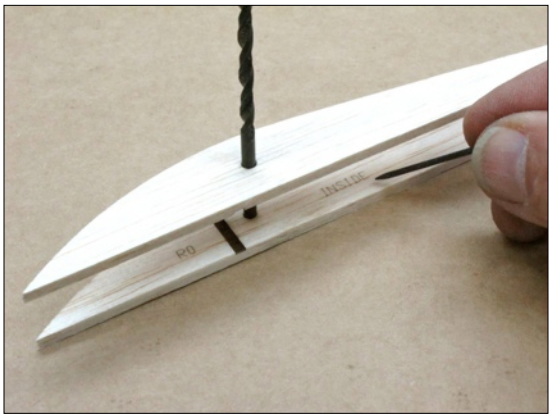
Unless otherwise noted in the instructions, always use medium CA glue for bonding parts.

Never force the fit!

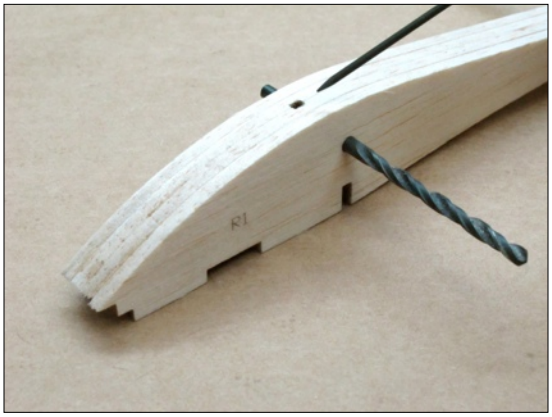
Remember this is a precision cut kit our machines cut to within 1 thousandth of an inch in accuracy. Yet the wood stock supplied by the mill may vary in thickness by up to 20 thousandths. This variance in the wood stock can cause some tabs/notches to fit very tight. Hey, dad always said it was easier 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

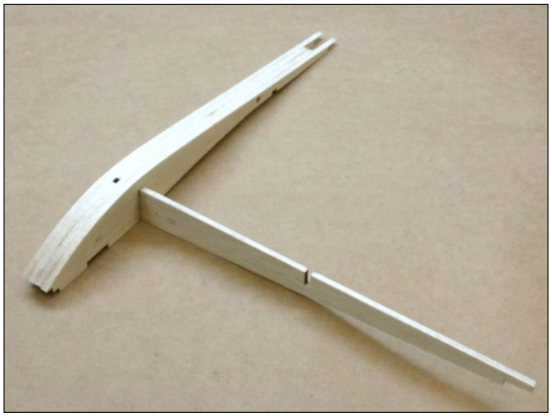
☐ Laminate center ribs R0 together, using 1/8 in. drill bits to align ribs. Remove drills before glue sets! *Ensure that sides etched "INSIDE are glued face to face. The etched notches will form the hole for the wing mount bolt.*



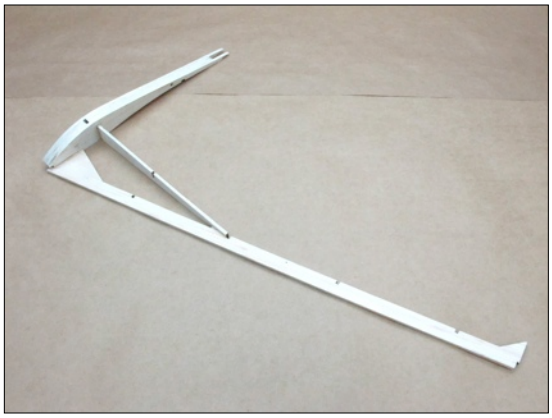
☐ Laminate ribs R1 on each side of the R0 assembly, again using 1/8 in. drill bits to align.



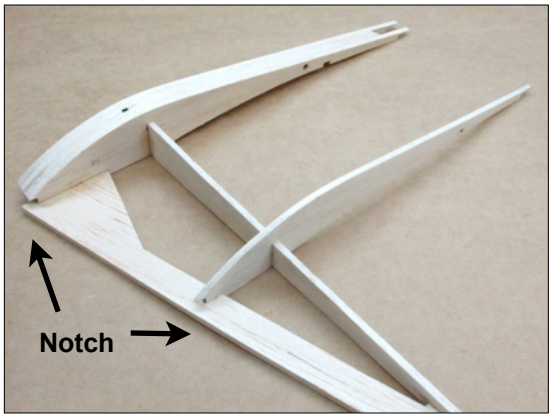
☐☐ Start with left wing. Fit spar S1 to center rib assembly. Ensure that spar seats snug against R1. Tack glue with thin CA.



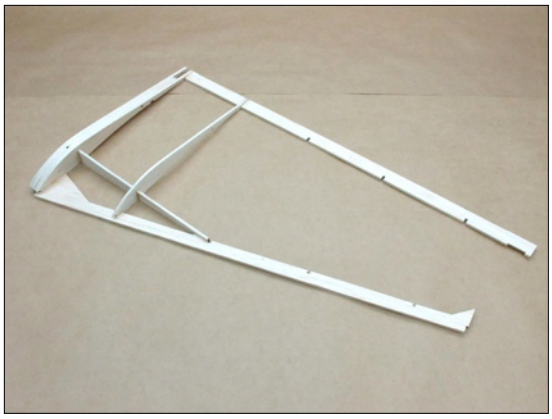
☐☐ With rib/spar assembly flat on the table, fit leading edge W1 to R1 and spar S1. Tack glue with medium CA.



☐☐ Fit rib R2 to leading edge and spar. Note All ribs are stepped at the leading edge producing a 1/8 in. notch above W1that will receive the W4 leading edge doubler.

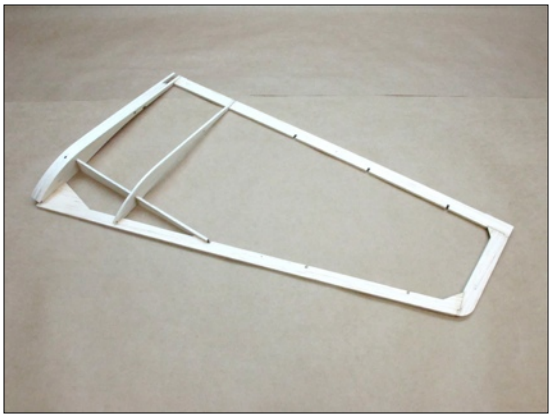


☐☐ Fit trailing edge W2 to ribs R1 and R2.



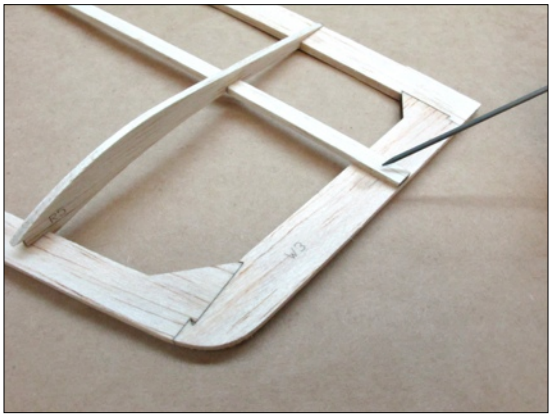
Wing Construction Cont.

☐☐ Fit wing tip W3 to leading edge W1 and trailing edge W2. Square wing on a flat table and bond all joints with medium CA.

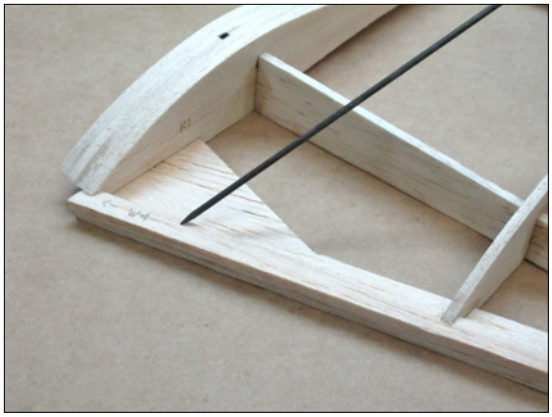


☐☐ Fit and bond ribs R3, R4 and R5 to wing assembly.

☐☐ Fit rear spar S2 to ribs. Square wing on table and bond. NOTE - tip of spar rests ON TOP of wing tip.



☐☐ Fit Leading Edge W4 and bond to W1 and ribs. "Arrow" on leading edge indicates position at wing center.

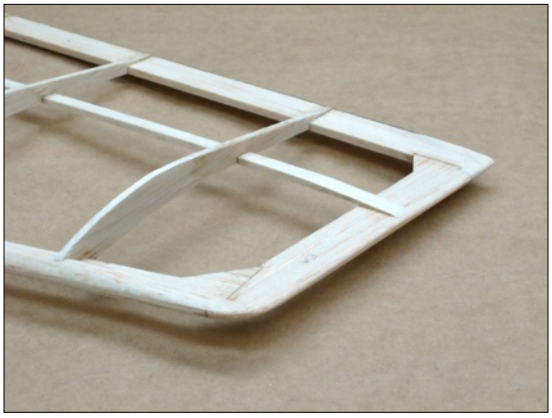


☐☐ Cut 1/8 in. carbon strip to length and bond to trailing edge with medium CA.

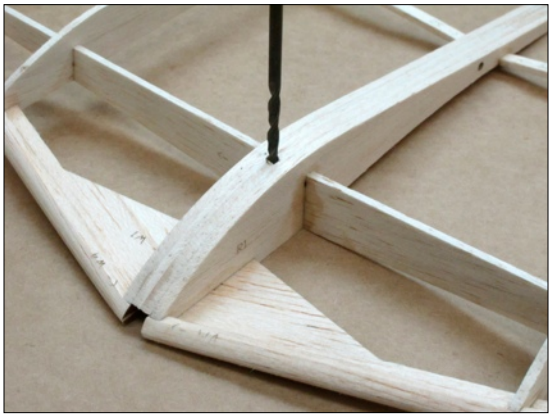
☐ Repeat preceding ☐☐ steps and assemble right wing to center rib/left wing assembly.

Wing Construction Cont.

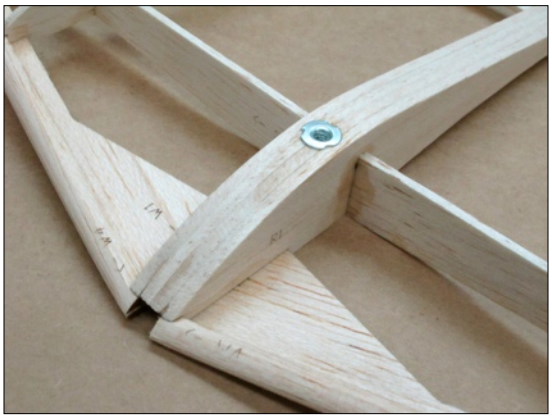
☐ Lightly sand wing frame, rounding leading edge and tip. Taper top surface of rear spar and leading edge smoothly into wing tip.



☐ Open slots in R0 with a 1/8 in. drill to form hole for wing mount bolt.



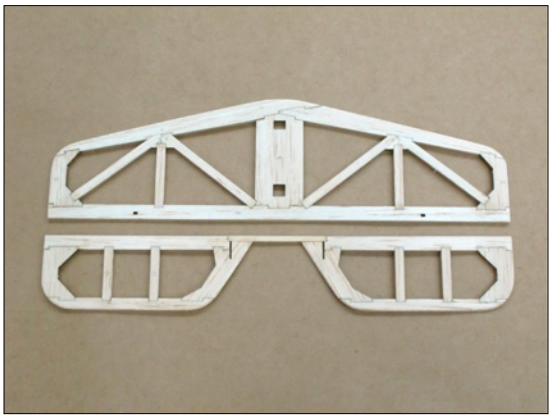
☐ Install 4-40 blind nut through hole from the top of the rib. Nut may be recessed slightly to facilitate smooth covering. Secure blind nut with thin CA around edges of flange.



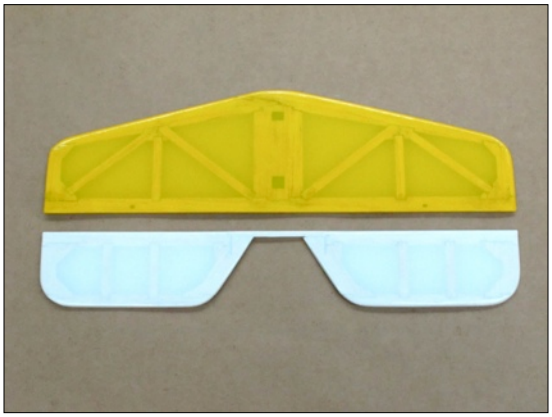
☐ Cover wing with a high quality, user friendly covering film such as Stevens AeroModel AeroFILM or AeroLITE.

Tail Feathers

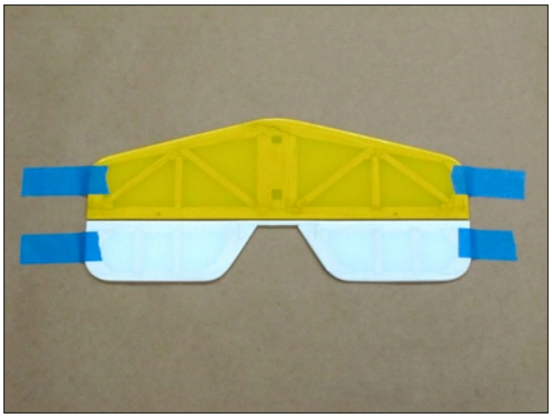
☐ Assemble horizontal stabilizer and elevator per plan. Use sanding instructions on plan set to prepare surfaces for covering.



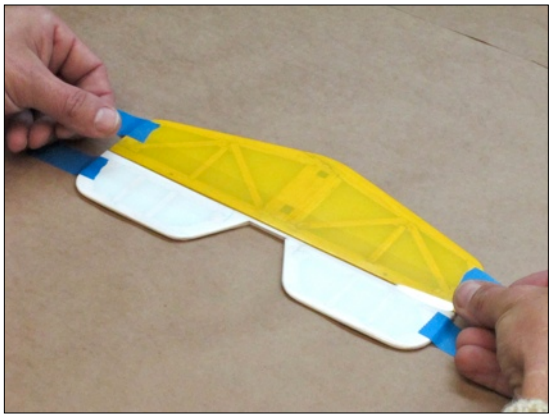
☐ Cover horizontal stabilizer and elevator.



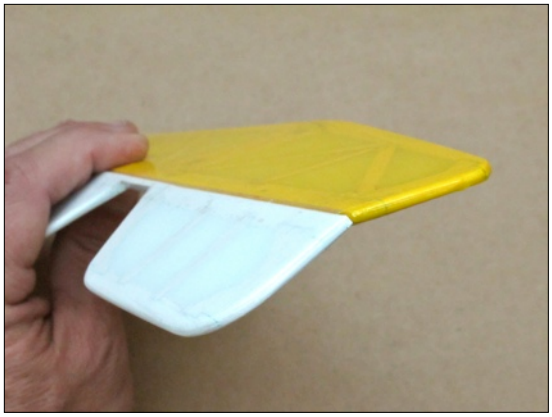
☐ With low-tack masking tape, secure stabilizer and elevator to table as shown. Leave approximately 1/32 in. gap between surfaces.



☐ Apply 3/4 in. clear tape over gap to form elevator hinge.



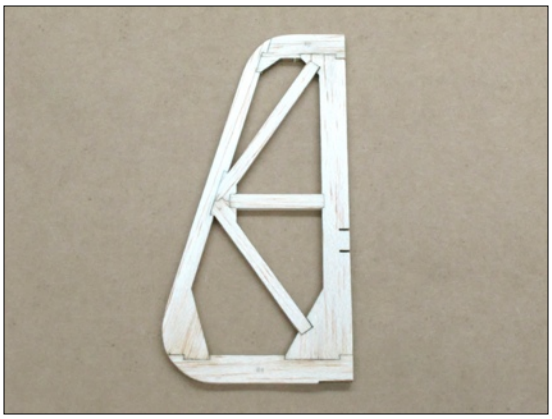
☐ Ensure there is adequate “down” travel. If not, remove tape, increase gap between surfaces slightly, and re-tape.



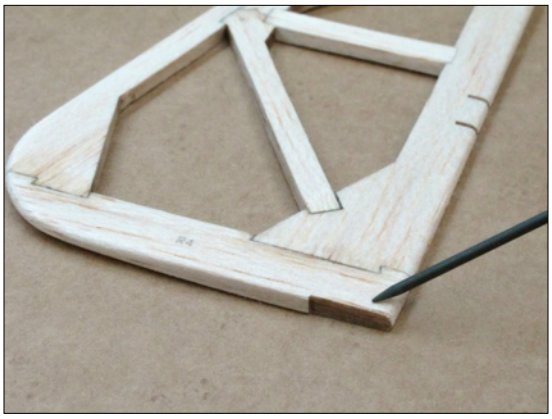
☐ Open slot for the elevator control horn on the lower side of the right elevator. Fit control horn E6, ensuring that it is perpendicular to elevator. Secure with thin and medium CA.

Tail Feathers Cont.

☐ Assemble rudder frame per plan. **Do not install ply hinges or horn at this time.**



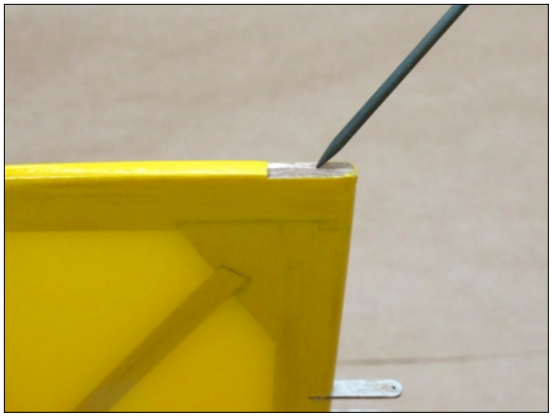
☐ Follow instruction on plan set to lightly sand rudder in preparation for covering. *Do not round off rudder horn mount area.*



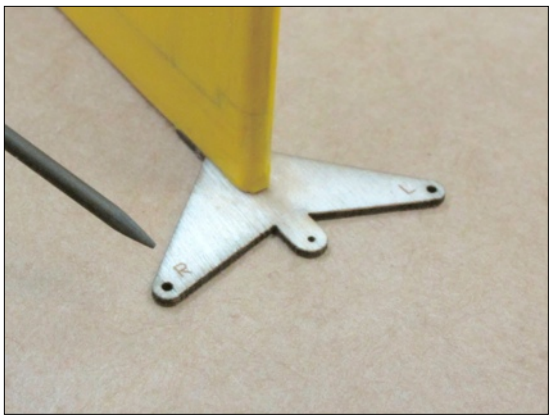
☐ Cover rudder with AeroLITE or AeroFILM. Open slots for hinges with hobby knife or razor blade.

☐ Fit ply hinge pieces R5 in slots. **Do not glue at this time.**

☐ Remove covering from control horn mount at base of rudder.



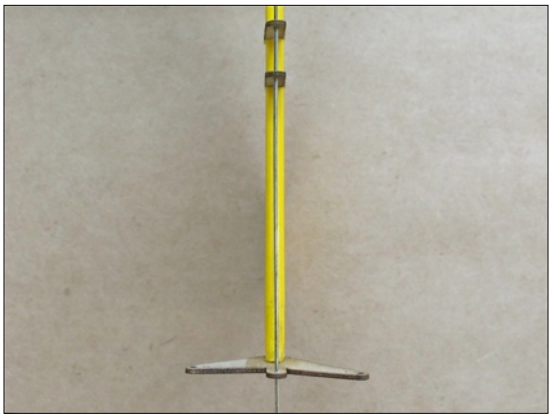
☐ Fit control horn R6 to rudder. Note that short arm of horn is marked “R” and extends on the right side of rudder. *Ensure that control horn is square and perpendicular to rudder.* Tack with thin CA.



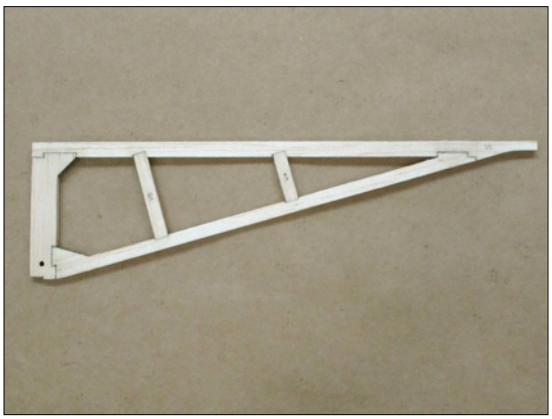
Tail Feathers Cont.

☐ Slip a length of .025 wire through the holes in control horn and ply hinge pieces.

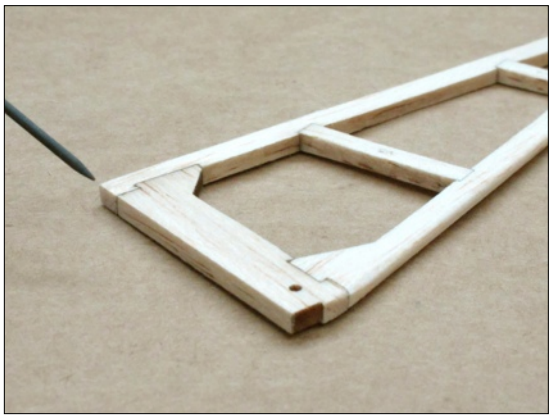
☐ Carefully align wire/hinge line with centerline of rudder, and parallel with rudder leading edge. Bond hinges and control horn to rudder with medium CA. Remove wire.



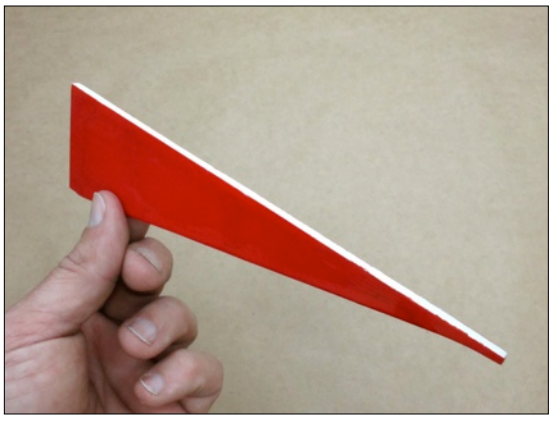
☐ Assemble vertical stabilizer per plan.



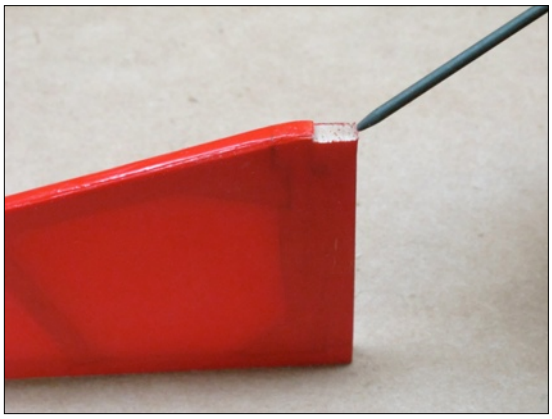
☐ Lightly sand vertical sub-fin, rounding lower edge. Leave upper edge and trailing edge square.



☐ Cover vertical stabilizer. Remove covering from top edge of stabilizer to allow wood to wood bond with fuselage.

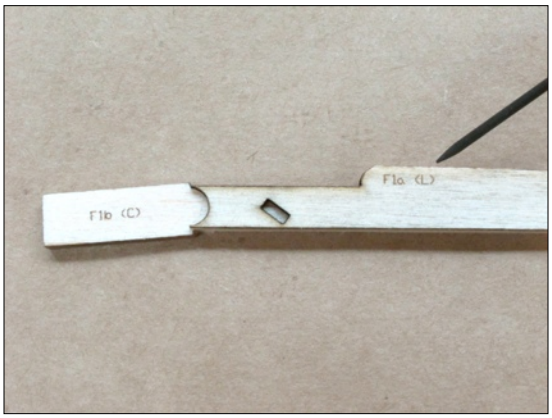


☐ Remove covering from hinge mount area at base of stabilizer. **Do not install hinge at this time.**

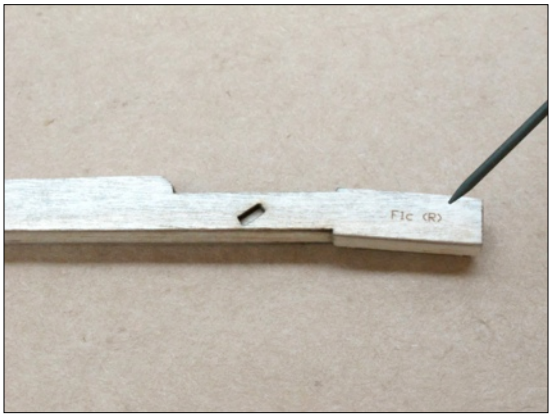


Fuselage Construction

☐ **Main Fuselage Boom:** On a flat work surface, align ply F1a on top of balsa F1b. *Ensure that the etching on both parts faces up.* Bond with medium CA.



☐ Align ply F1c on the other side of F1b. Bond with medium CA.

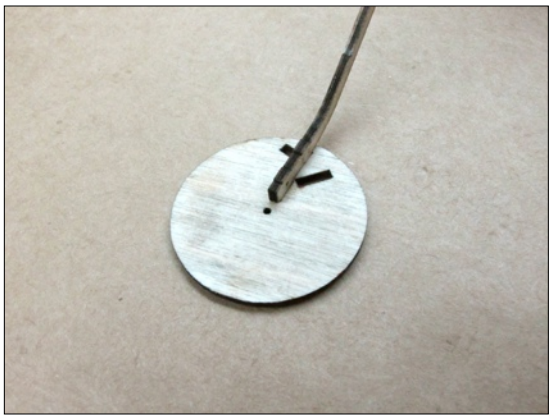


☐ Using guide slots in F1b, drill 1/8 in. hole for wing mount.

☐ Seal boom with at least 2 coats of Deft lacquer or similar clear lacquer spray.

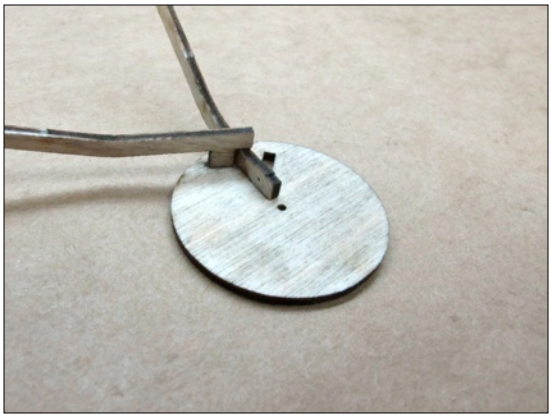
☐ If desired, paint boom black at this time with Design Master lacquer spray or Paint Marker.

☐☐ **Left Strut Assembly:** With etching on hub F5 (L) facing DOWN, carefully fit middle strut F3. Tack glue with thin CA.



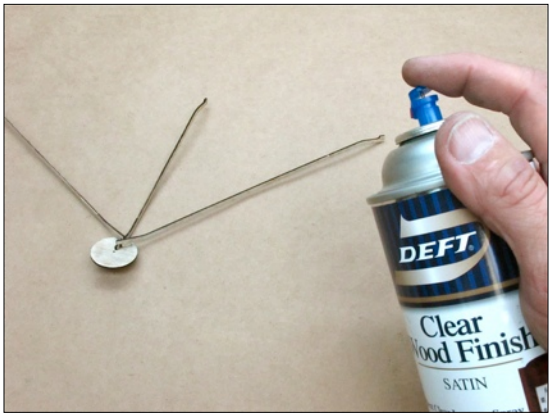
Fuselage Construction Cont.

☐☐ Fit rear strut F4 to hub, trapping F3. Tack glue with thin CA.

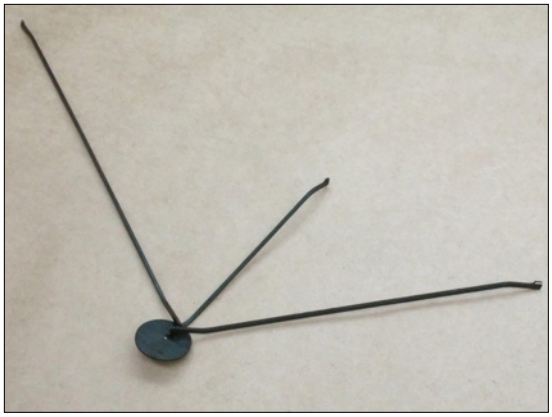


☐☐ Fit forward strut F2 to hub, trapping F3. Tack glue with thin CA.

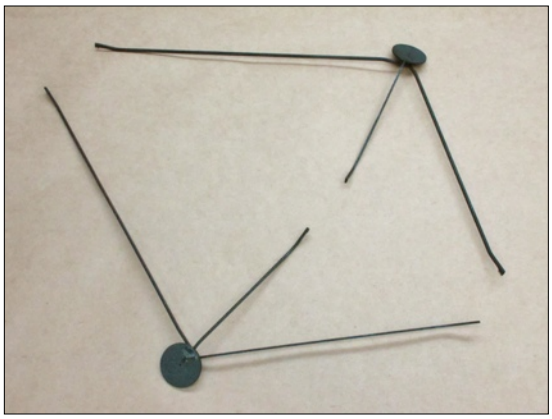
☐ Seal strut assembly with two coats of Deft. **DO NOT SKIP THIS STEP.** If not sealed, the ply struts may absorb moisture and warp.



☐ Paint strut assembly black and repeat sealing process.



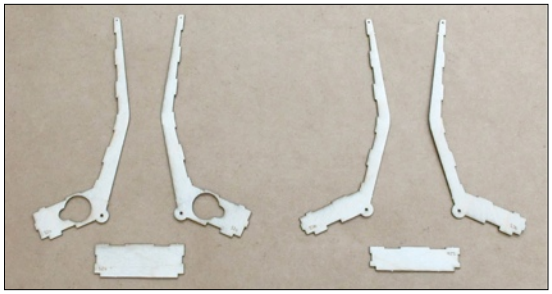
☐ Repeat previous ☐ ☐ steps to assemble **Right Strut Assembly**, ensuring that you are creating a mirror image of the Left Assembly.



Fuselage Construction Cont.

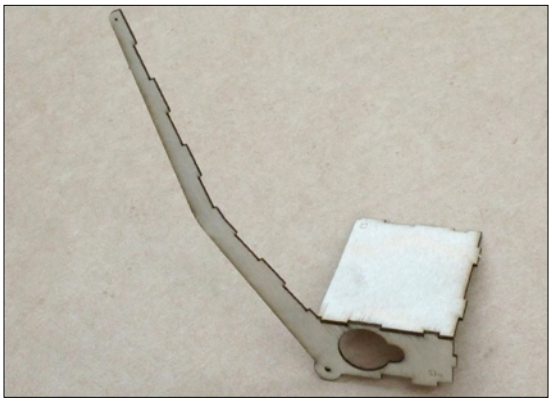
Pilot's Seat. Please read this entire topic before beginning assembly of this part.

☐ Choose the set of ply seat parts appropriate to the radio gear you intend to use. The deeper seat sides S1a/S2a will accommodate JR S185 micro servos. The thinner sides S1b/S2b are used with the Spektrum AR6400.

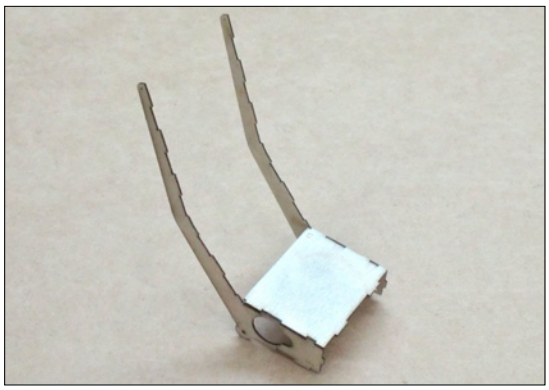


Instruction Given For JR S185 Micro Servos

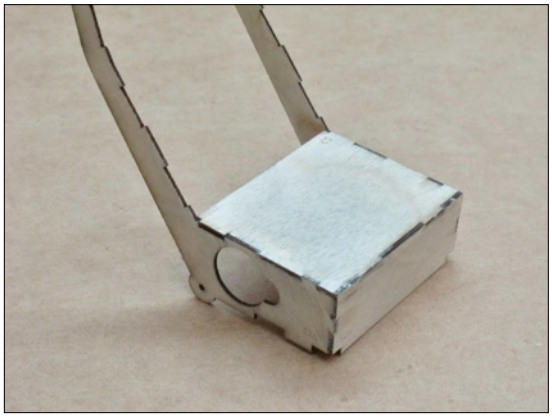
☐ ★ Fit seat side S1a (S1b if building for AR6400) to seat bottom S3. tack glue with thin CA.



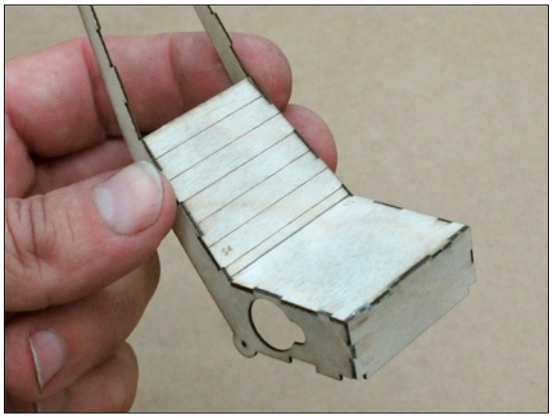
☐ Fit the other side S1a to seat bottom. Tack glue in place.



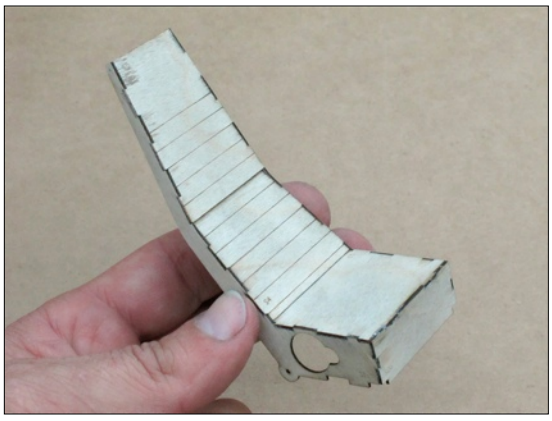
☐ ★ Fit seat front S2a (S2b if building for AR6400) to assembly. Tack glue.



☐ Gently pinch sides together and fit lower back rest S4. *Ensure etching faces forward.* Tack with thin CA.



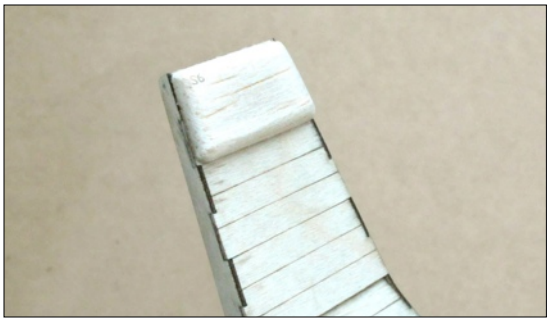
☐ Fit upper back rest S5 between sides, ensuring etching faces forward, and tack in place.



Fuselage Construction Cont.

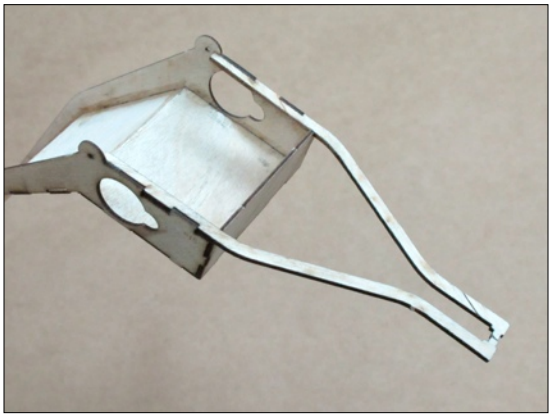
Pilot's Seat Continued.

☐ Round off front edges of balsa headrest S6.



☐ Check alignment of seat. Gently twist assembly or re-fit pieces as necessary. Bond all joints with medium CA.

☐ Fit seat struts F7 to side and front as shown. *Ensure struts are in the same plane as the base of the seat.* Bond with medium CA.

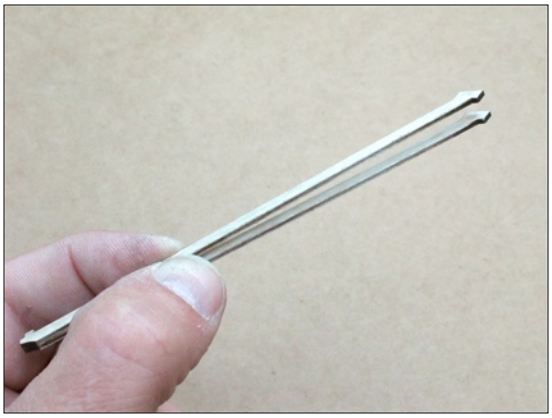


☐ Seal seat assembly with two light coats of Deft and paint desired color.

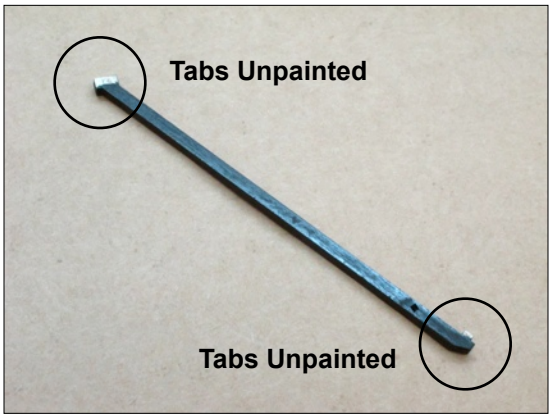
For Spektrum AR6400 receiver/servos: Use instruction given for previous assembly steps substituting seat side S1b and seat front S2b. at steps with ☐ ★

Fuselage Construction Cont.

☐ **Nose Wheel / Strut Assembly:** Laminate two ply strut parts F6. Align carefully and bond with medium CA.

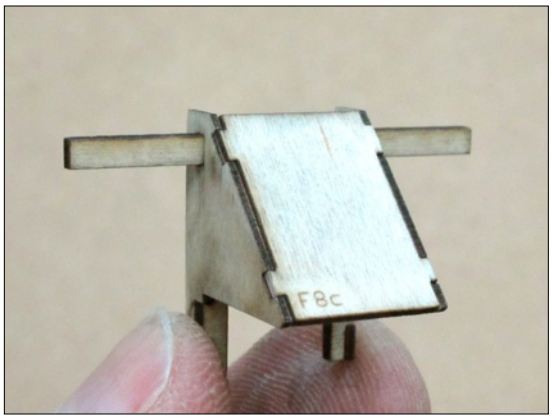


☐ Seal strut and paint black at this time. Leave tabs unpainted, to provide a good wood to wood bond with the fuselage boom.

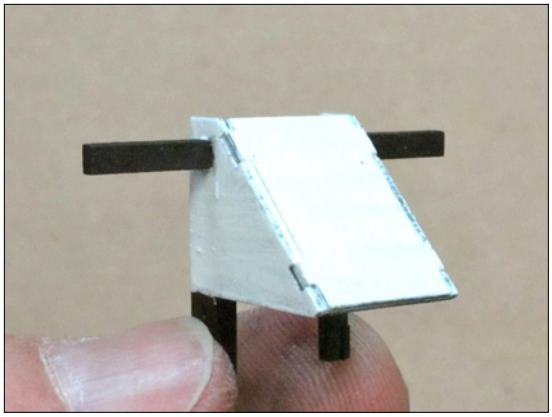


☐ Fit two ply sides F8b to ply wheel fork F8a and tack with thin CA.

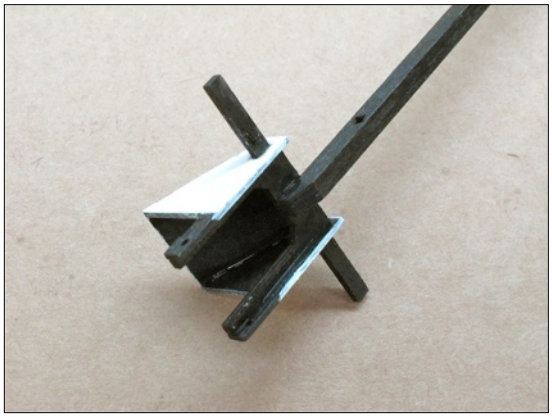
☐ Fit fender front F8c to fork/side assembly. Bond entire assembly with medium CA.



☐ Seal strut/nose wheel assembly with two coats of Deft and paint desired color.



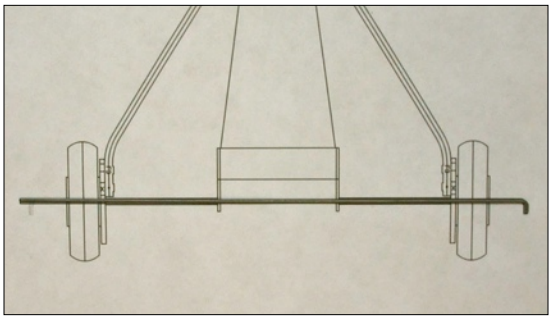
☐ Fit fender assembly to nose wheel strut. Align carefully and bond with medium CA.



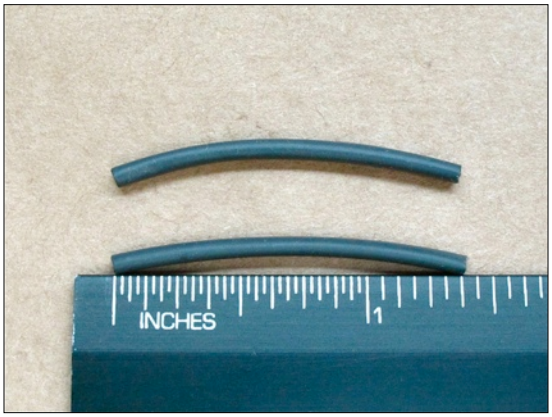
Fuselage Construction Cont.

☐ Fit left and right strut assemblies to slots in main fuselage boom as shown. Tack with medium CA glue.

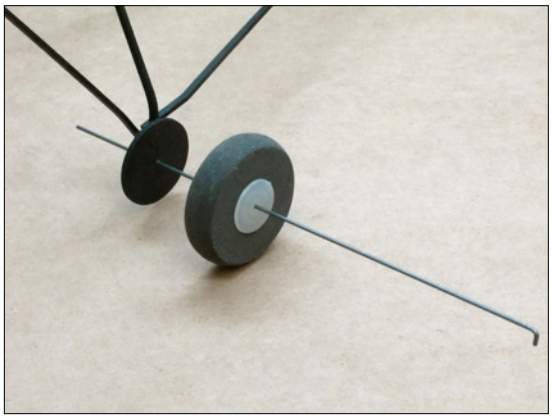
☐ Using a length of 0.045 in. wire, make a 90 degree bend 1/8 in. from one end. Cut wire to length indicated on landing gear plan.
Do not bend other end at this point.



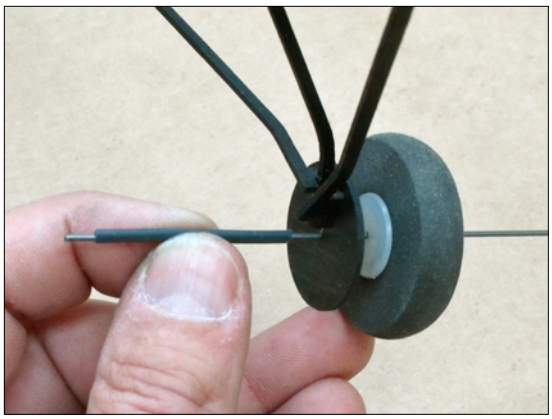
☐ Cut two lengths of 1/16 in. heat shrink tubing 1-3/8 in. long to make axle spacers.



☐ Install axle and seat in this order: Slide axle through one wheel, then through left hub/strut assembly.



Now, slide one spacer onto axle.



Next, slide seat onto axle. ***Ensure seat is facing forward!***

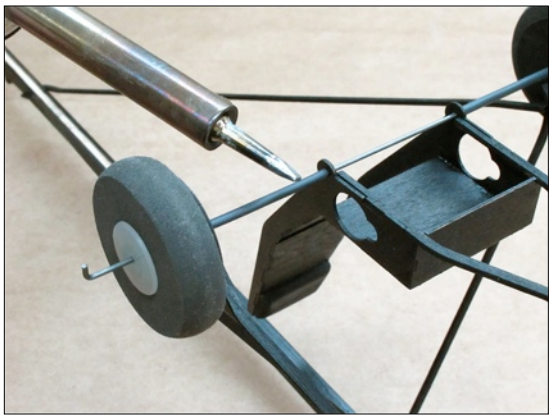
Fuselage Construction Cont.

Now, slide remaining spacer onto axle and extend axle through the right hub.

Finally, slide remaining wheel onto axle and make another 90 degree bend 1/8 in. from end. ***Ensure bends at each end of the axle are in the same direction.***

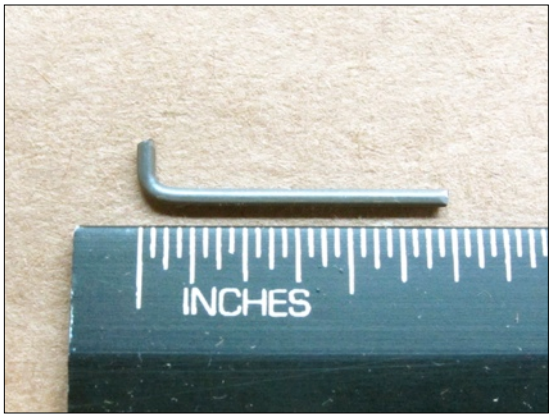
☐ Center axle in seat assembly. Bond axle to hubs with medium CA. *Ensure bends at axle ends point* ***down*** *as indicated on landing gear plan*. **Do not bond seat to axle at this time**.

☐ Shrink axle spacers using a fine tip soldering iron in close proximity.



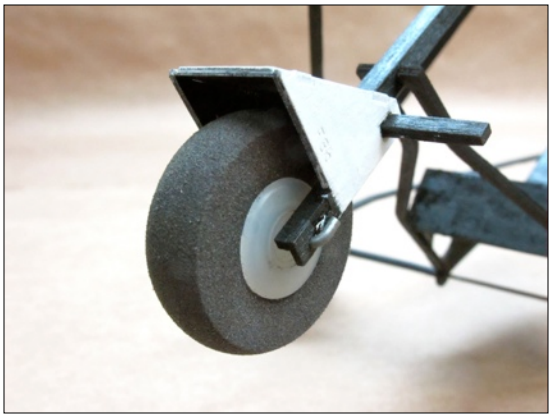
☐ Fit nose wheel strut to F1 and seat struts. Tack with thin CA glue.

☐ **Nose Wheel:** Using a length of 0.045 wire, make a 90 degree bend 1/8 in. from one end. Trim wire to 3/4 in. length to form front axle.



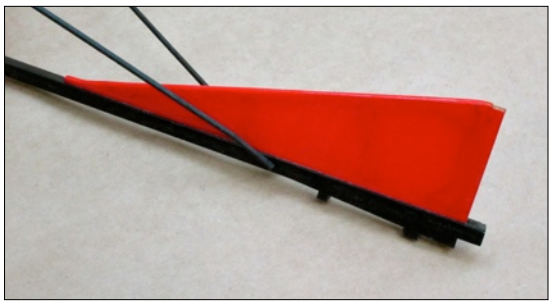
Fuselage Construction Cont.

☐ Trap 1 in. wheel in fork assembly with wire axle. Retain axle with a drop of medium CA. *Ensure that wheel is not bonded to axle.*

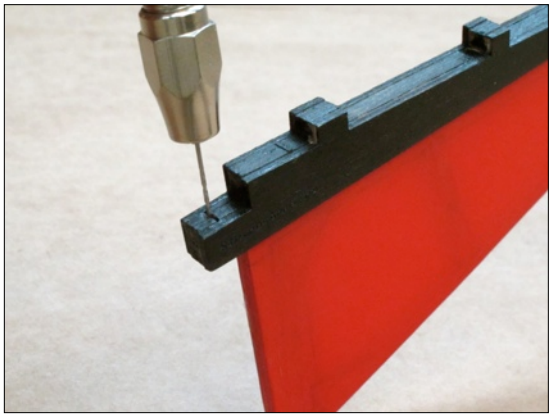


☐ Carefully check alignment of fuselage and correct any errors. When satisfied, bond all joints with medium CA.

☐ Fit vertical stabilizer to slot on bottom of fuselage boom. *Ensure stabilizer is aligned with the vertical centerline of fuselage and bond with Medium CA.*

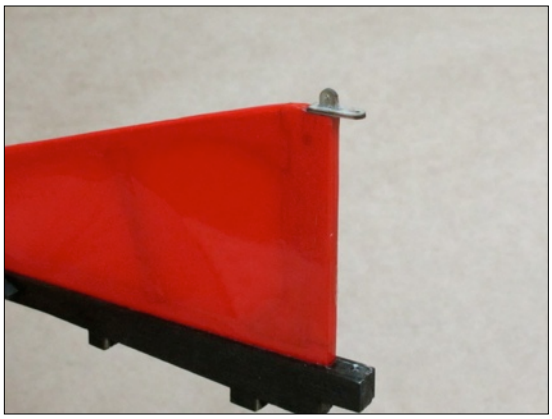


☐ Using a 0.025 drill, open hole for rudder hinge in center of notch at end of boom.



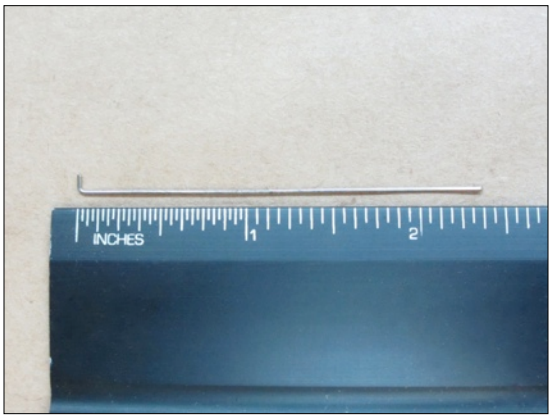
☐ Fit ply rigging tab F10 in slot in ply hinge F9.

☐ Tack glue rudder hinge assembly to base of vertical stabilizer.

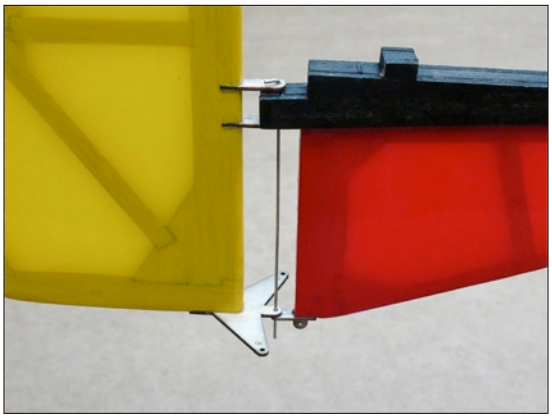


Fuselage Construction Cont.

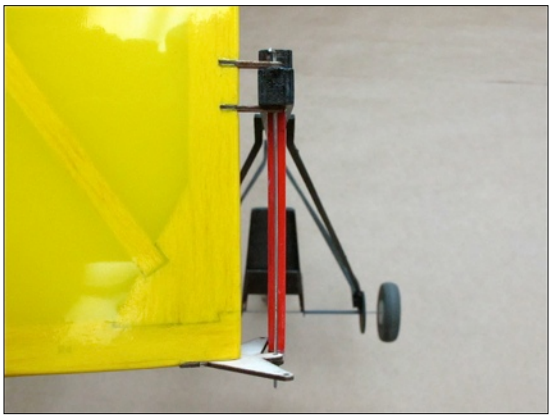
☐ Using 0.025 wire, make a 90 degree bend 1/8 in. from one end. Trim wire to 2-3/8 in. to form rudder hinge pin.



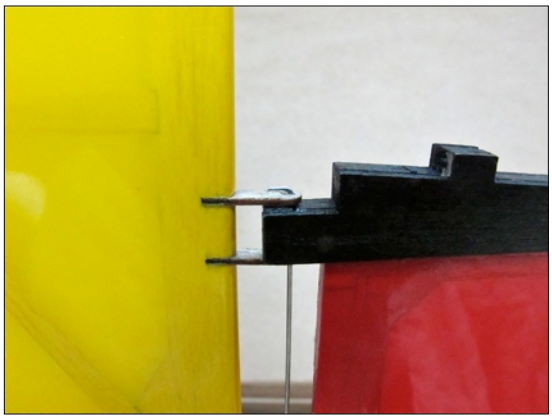
☐ Insert hinge pin through rudder hinge tabs trapping boom. Pass wire through hinge tabs at bottom of rudder and vertical stabilizer.



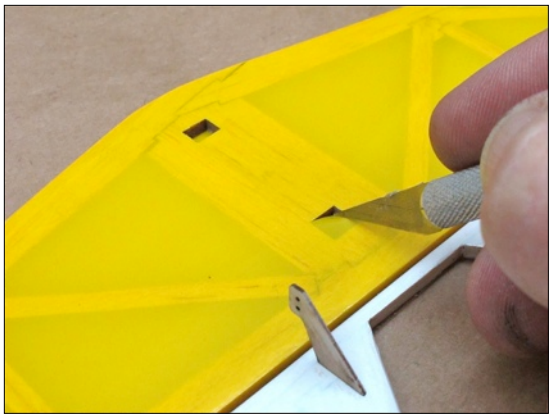
☐ Align hinge pin with center line of vertical stabilizer. Bond hinge tab at vertical fin with medium CA.



☐ Hinge pin may be left to float free, or may be secure by CAREFULLY placing a drop of medium CA at top. *Ensure CA does not bind in hinge fittings!*



☐ Open mount holes in bottom of horizontal stabilizer with a hobby knife or razor blade.

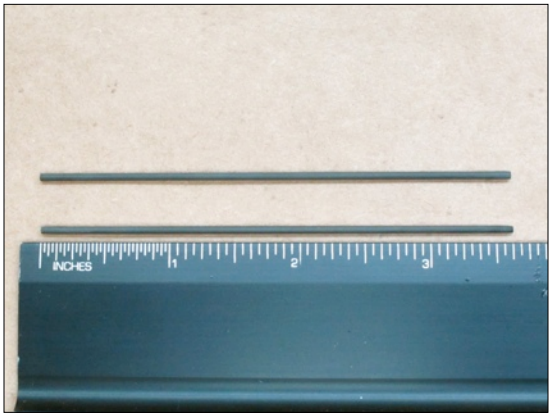


☐ Fit horizontal stabilizer to tabs on F1. *Ensure that stabilizer is horizontal and perpendicular to rudder.* Bond with medium CA.

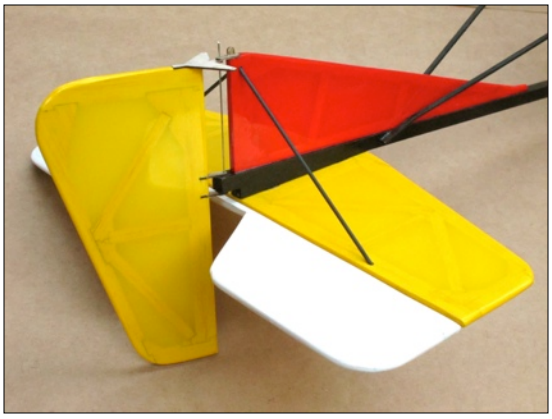
Fuselage Construction Cont.

☐ **Stabilizer Struts:** Open strut holes in vertical stabilizer and bottom of horizontal stabilizer with a fine point soldering iron.

☐ Cut two 3-5/8 in. lengths of carbon rod to make stabilizer struts.

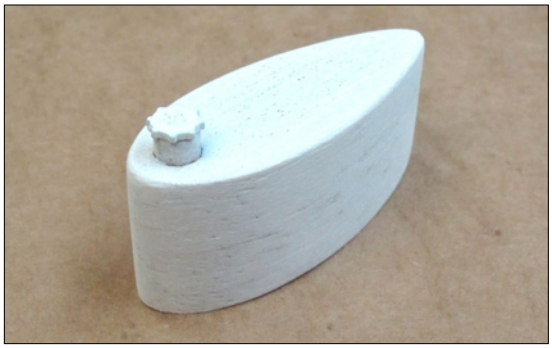


☐ Fit struts in holes in stabilizers. Trim to fit if necessary. *Ensure vertical and horizontal stabilizers remain perpendicular to each other.* Bond with medium CA.

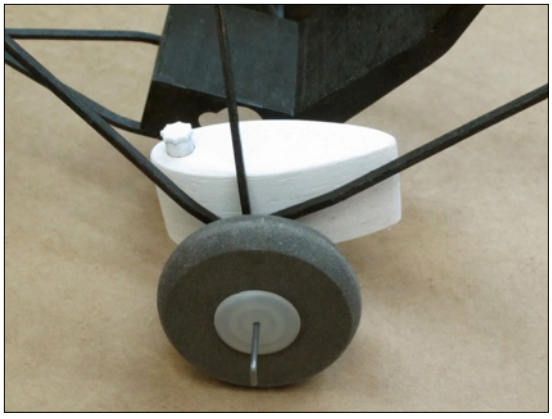


☐ **Fuel Tank:** Assemble fuel tank by stacking parts in this order, bottom to top: five T1's, one top T2, fuel cap body T3, fuel cap top W. Bond with medium CA.

☐ Sand tank smooth, round edges, seal with Deft and paint white.

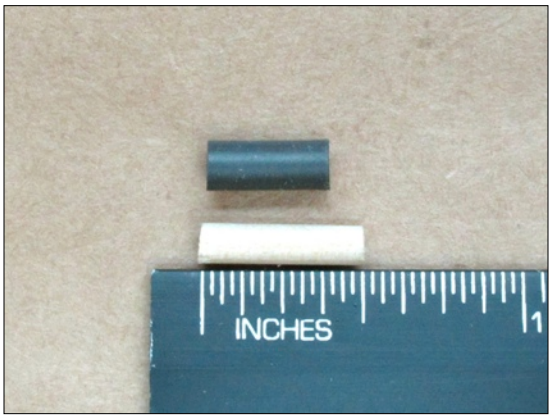


☐ Mount tank on left axle as shown. Tank is tipped forward slightly on full size aircraft. Bond tank to axle and strut assembly with medium CA.



Fuselage Construction Cont.

☐ **Control Stick:** Cut 1/8 in. dowel to 1/2 in. to make control stick. Cut 1/8 in heat shrink tubing to 3/8 in. for grip.

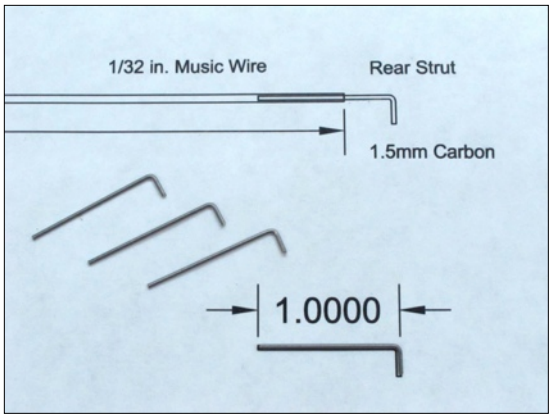


☐ Slide tube onto dowel and secure with thin CA.

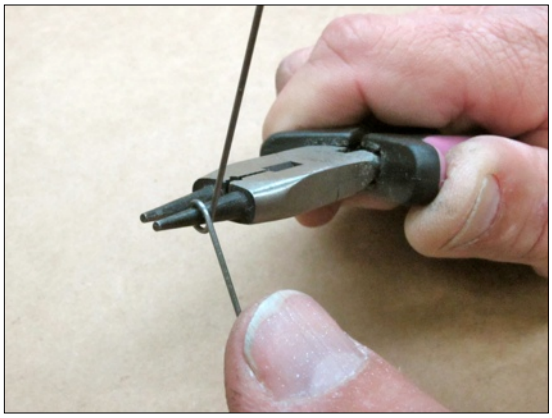
☐ Mount control stick centered on right axle, tilted forward about 30 degrees.

Strut Assebly

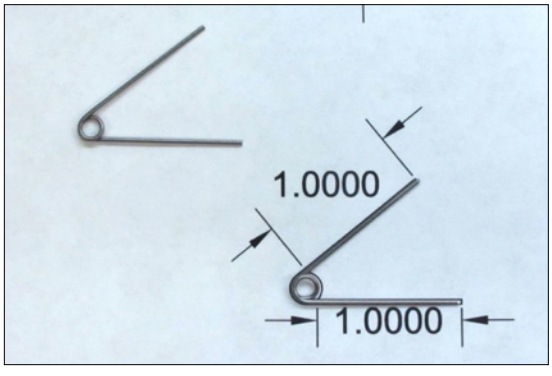
☐ **Strut Wire Fittings:** Refer to Strut Assembly on plan. Using 1/32 wire, make a 90 degree bend 3/16 in. from one end. Trim wire to 1 in. length. Repeat to make four fittings.



☐ Using 1/32 in. wire and round nose pliers, form a loop about 1/8 in. diameter 1-1/2 in. from one end

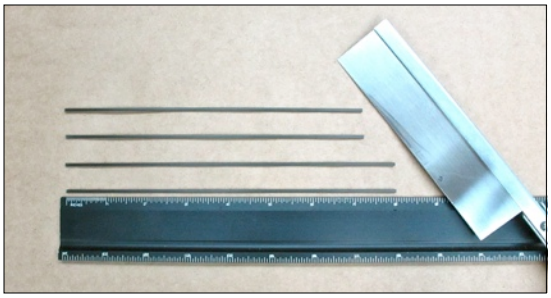


☐ Ends of wire should diverge about 45 degrees. Refer to plan for proper angle. Trim straight portions to 1 in. length.

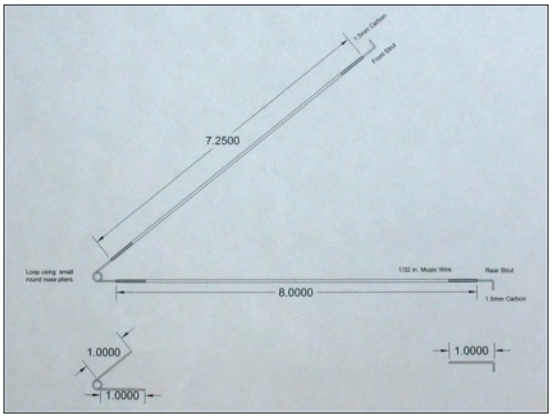


Fuselage Construction Cont.
Strut Assembly Cont.

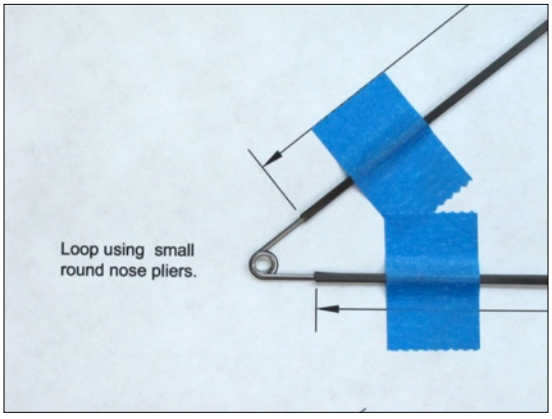
☐ **Struts:** Cut two lengths of 1.5 mm square carbon tube to 7-1/4 in. long, and two lengths 8 in. long.



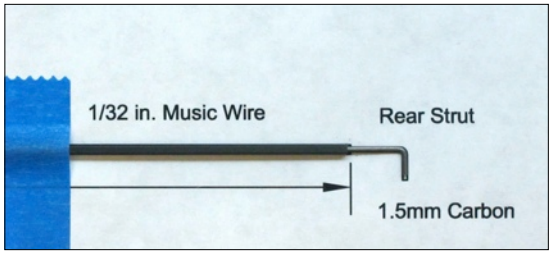
☐ Assemble struts over drawing on plans. **Note: Finished strut length is critical to proper wing angle. Check and double-check assembly before final gluing.**



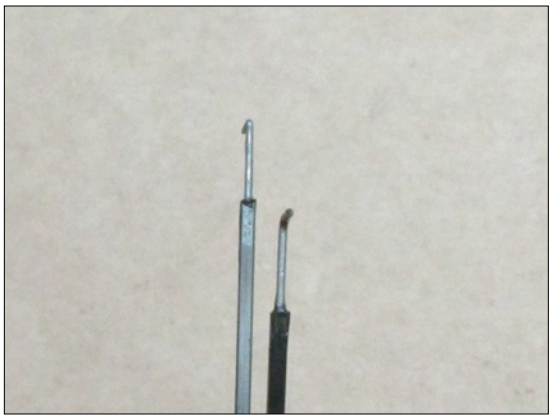
☐☐ Insert 'V' shaped fitting into one long and one short carbon tube. DO NOT GLUE. Tape assembly to drawing on plan.



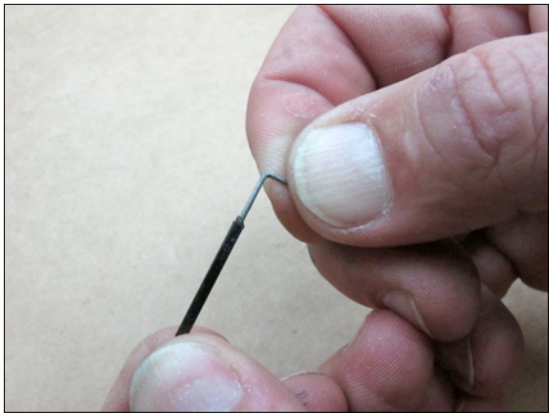
☐☐ Insert long end of bent wires into tubes. Carefully check finished length of struts. Adjust tubes and wires as necessary. Tack glue with thin CA.



☐☐ Remove strut assembly from plan and check alignment of fittings. When satisfied, permanently bond wire to carbon with medium CA.



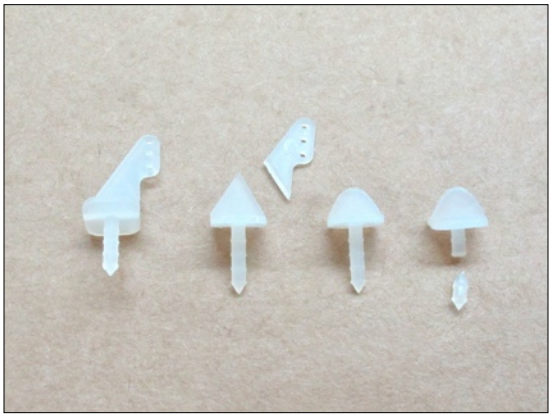
☐☐ Test by pulling on the fittings with moderate pressure. If any fitting pulls free, coat shaft of wire with medium CA and insert back to original depth.



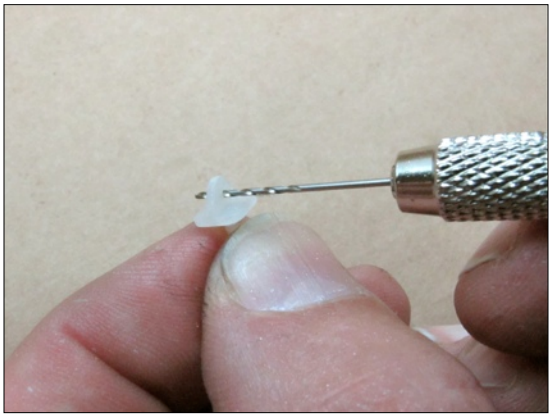
Fuselage Construction Cont.
Strut Assembly Cont.

☐ Repeat previous steps marked ☐☐ to build second strut.

☐ Trim four Du-Bro RC Micro Control Horns (DUB848) as shown on plan set, to create strut mount fittings. Round off point and trim stem to 1/8 in.



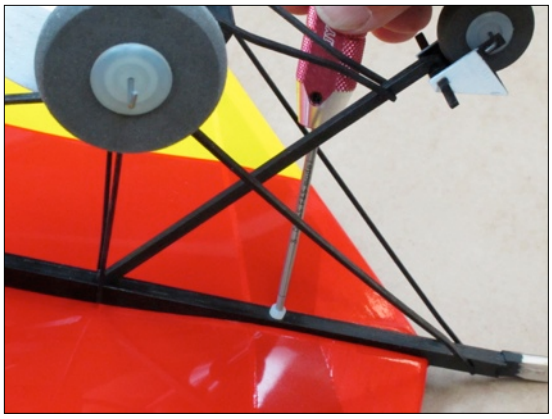
☐ Drill a 1/32 in. hole in each fitting as shown.



☐ Open holes for fittings in wing using a fine point soldering iron.

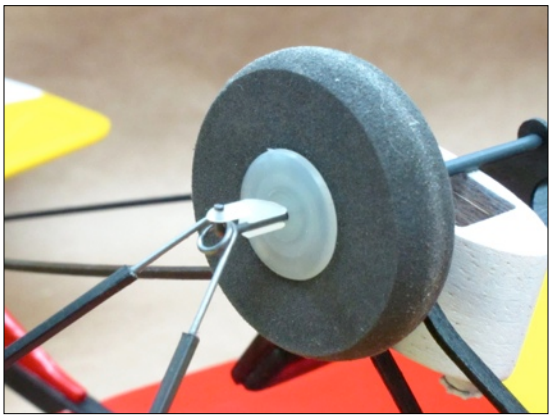
☐ Insert nylon fittings into holes in wing. **Do not glue at this time.**

☐ Mount wing to fuselage using supplied 1 in. nylon bolt and make certain wing is completely seated to fuselage boom.

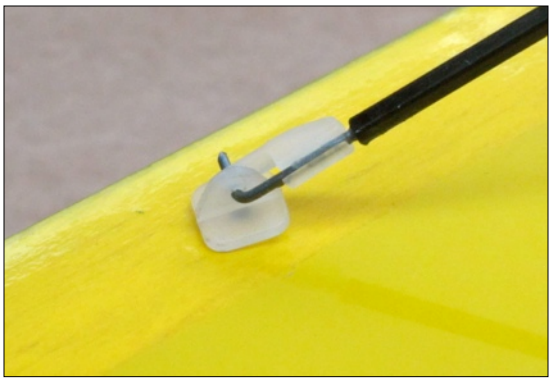


Fuselage Construction Cont.

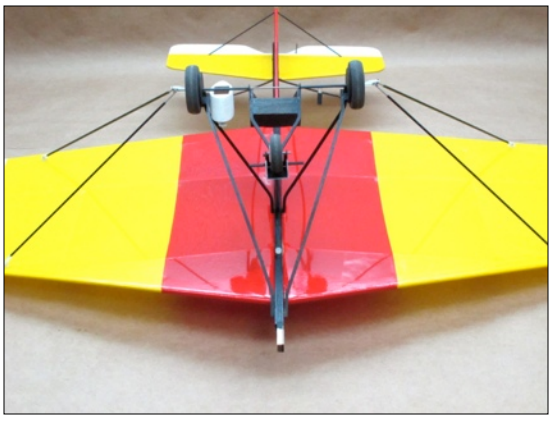
☐ Temporarily attach one strut to axle with Du-Bro RC **Micro II E/Z Link** [DUB920]. *Ensure front/rear strut orientation is correct - short strut goes in front.*



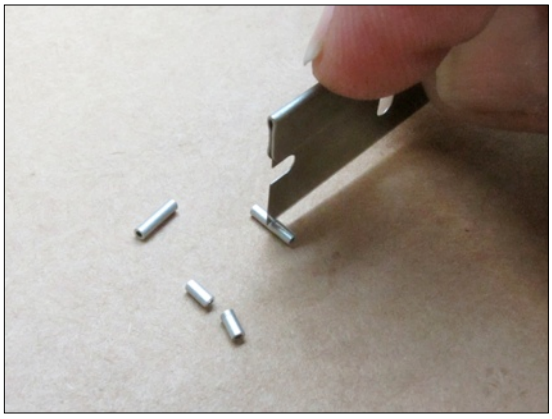
☐ Insert strut into fitting and secure with a Du-Bro RC **Micro E/Z Link**. Align nylon fitting with strut end. Bond fitting with medium CA.



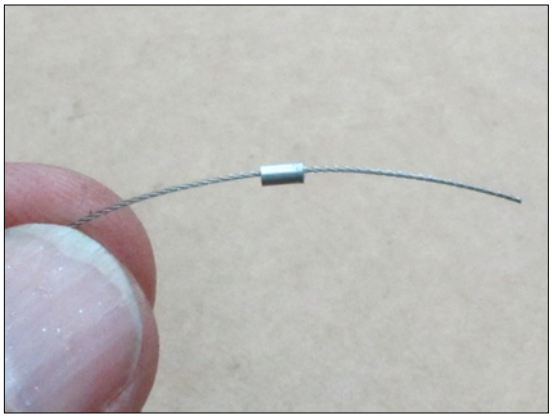
☐ Repeat process with opposite wing. <u>Remove wing and struts when finished.</u>



☐ **Tail Rigging:** Optional - Cut 1/16 dia. x 1/4 in. aluminum tube in half to form rigging crimps. Plenty have been provided should you wish not to reduce this part's size.



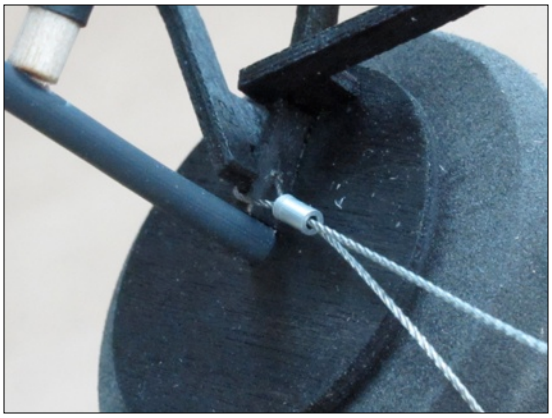
☐ Cut a 30 in. length of supplied stainless rigging wire. Slide one crimp onto wire.



☐ Pass wire through hole in middle strut F3 near main axle.

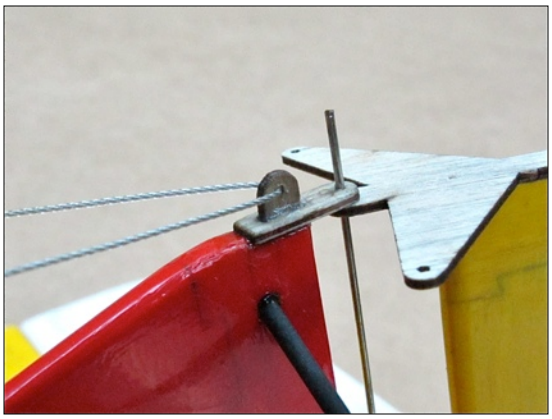
Fuselage Construction Cont.

☐ Pass wire back around strut. Slide crimp down trapping end of wire.

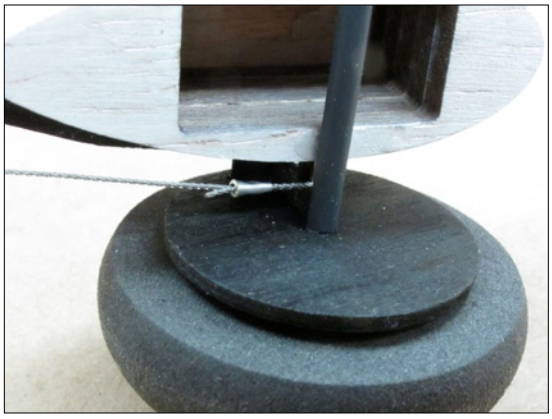


☐ Close close crimp with round nose jewelers pliers. Squeeze crimp in two places, and secure with a small drop of medium CA. Trim off excess wire.

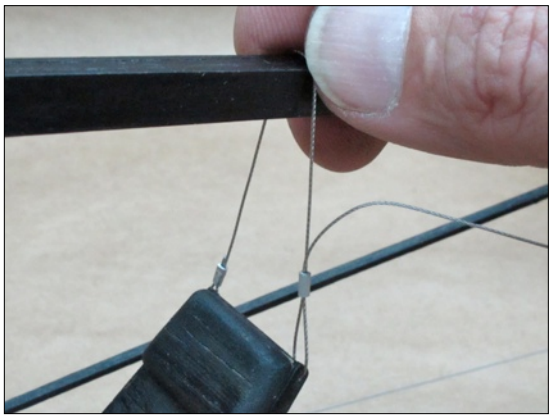
☐ Pass wire through hole in rigging tab at base of vertical stabilizer. **Do not bond to tab.**



☐ Slide on another crimp, and secure wire to other end of strut as before. **Note:** Do not pull tail rigging too tight, as this will pull the tail surfaces out of alignment.



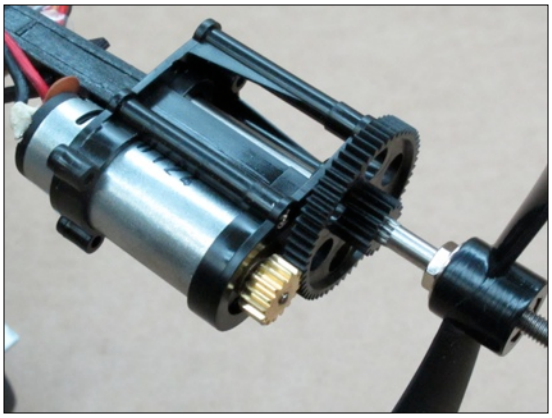
☐ Rig seat to fuselage boom in the same manner. Pass wire over boom and pinch with fingers to shape close to boom. Again, do not pull rigging too tight, as this may break the seat.



☐ With seat rigging installed we find it helpful to file a small notch where rigging crosses top of fuselage boom to prevent the rigging wire from causing binding when fitting the wing to the fuselage.

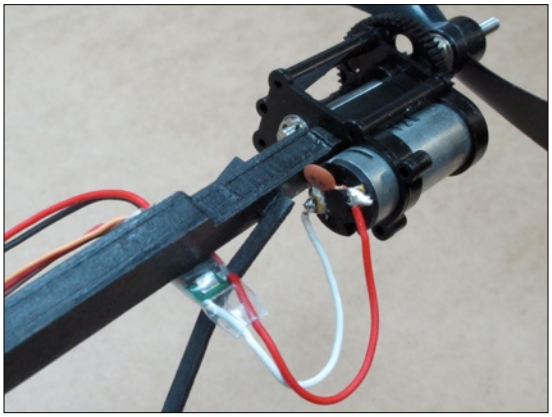
Radio and Control Rigging

☐ **Power System:** Install GWS motor and 3.5:1 gearbox [GW/IPS-DX2BB-2XCS] with a GWS 7x6 Slowflyer propellor. Motor should be positioned so that the gear box is on the left side of the aircraft; The cut out in F1a clears the snap ring on the propellor shaft.



NOTE: This motor/gearbox/propellor combination is specific to the power requirements of the eHopper. Other IPS systems with different gear ratios are not suitable.

☐ Install Castle Creations Pixie-7P speed control under the fuselage boom at the junction of the forward struts as shown.

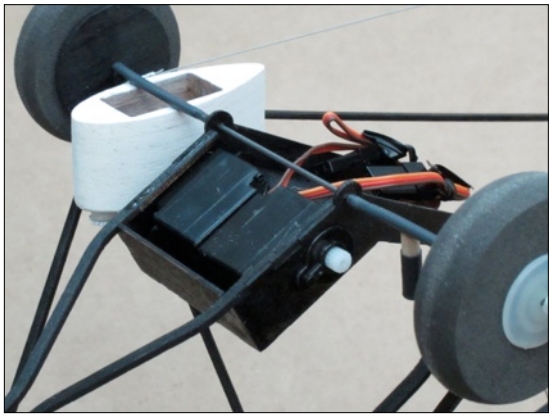


☐ **Note:** We recommend removing the connectors from the motor and speed control, reducing the length of wire, and directly soldering both components together.

Installation of receiver, servos, ESC, and final rigging of control surfaces, will differ slightly according to the type of radio gear/seat assembly you chose in the Fuselage Construction section. Each installation will be covered in separate sections below.

Conventional Gear (JR S185 Servos):

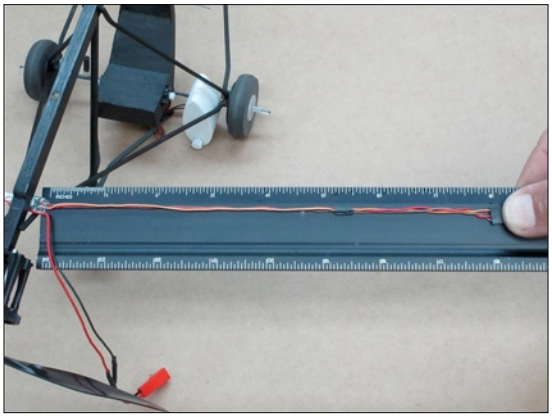
☐ Install two JR S185 micro servos in base of seat as shown. Secure servos with a small amount of hot glue.



☐ Mount Spektrum AR6100e or AR6110e receiver behind seat with small amount of hot glue or double sided tape.

Radio and Control Rigging Cont.

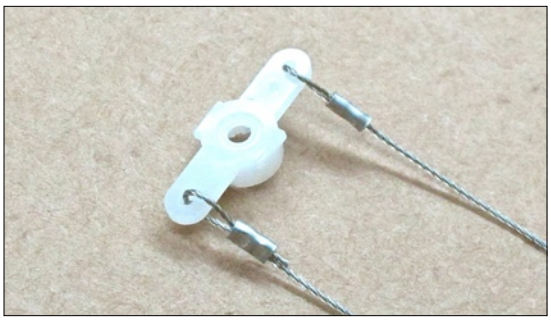
☐ Remove connector from radio lead and female connector from a 3” extension [EFLREX3L]. Trim wires to total length of 8 in. and solder.



☐ Route lead down the left forward strut. This simulates the fuel line routing on the full size aircraft. Retain with hot glue.

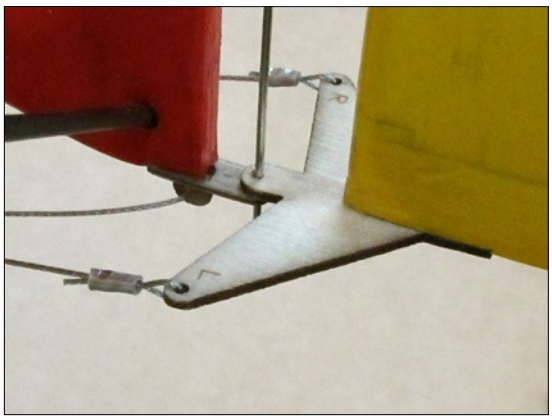
☐ **Rudder Rigging:** Trim a control horn as shown for the rudder servo.

☐ Cut two 18 in lengths of rigging wire and attach to control horn in the same manner as done previously with the rigging wires.



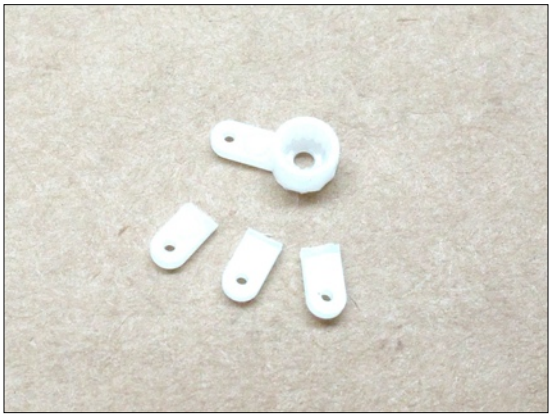
☐ Electronically center rudder servo and mount horn as shown.

☐ Route control wires above tail rigging and through rudder horn. Upper cable goes to the left horn, lower to the right. Center rudder, draw wire snug and crimp and trim excess. Secure all crimps with a drop of medium CA.

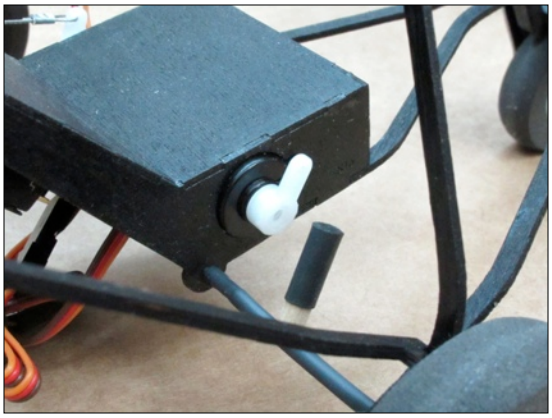


Radio and Control Rigging Cont.

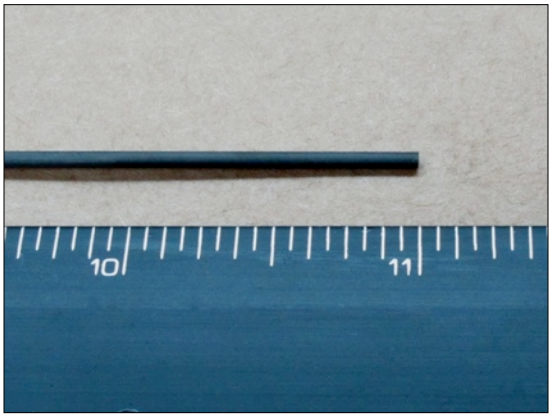
☐ **Elevator Pushrod:** Trim a control horn as shown for the elevator servo.



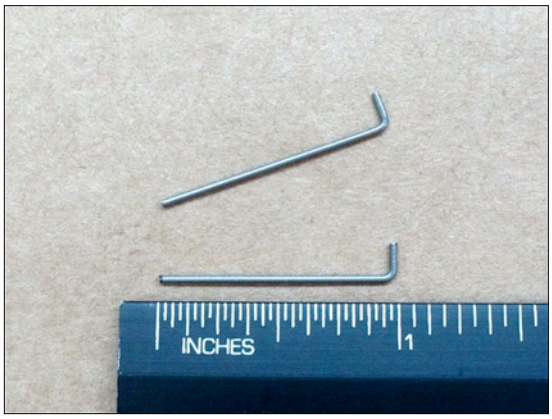
☐ Electronically center elevator servo and mount horn as shown.



☐ Cut a length of 1/16 in. dia. carbon rod 11 in. long to make elevator pushrod.



☐ Using 1/32 in. wire, make a 90 degree bend 1/8 from one end. Trim fitting to 1 in. Make two pushrod fittings.



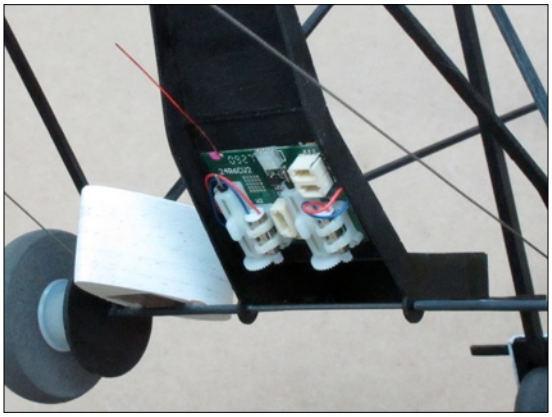
☐ Join fittings to pushrod with a 1/2 in. length of 1/16 in. heat-shrink tube. Shrink tube using a fine tip soldering iron. DO NOT GLUE.

☐ Install pushrod with Du-Bro RC Micro E/Z Links [DUB849]. Center servo, and adjust pushrod length by sliding metal fitting in/out of heat-shrink sleeve.

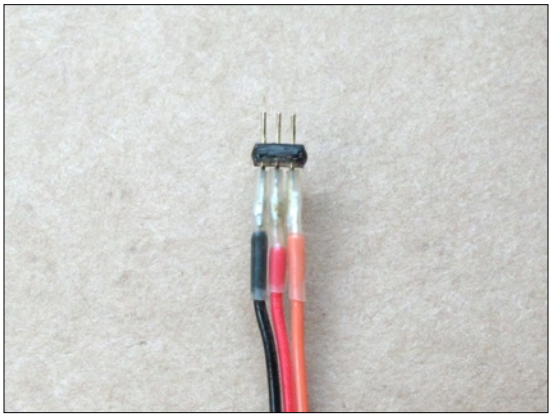
Radio and Control Rigging Cont.

AR6400/AR6400L “Puck”:

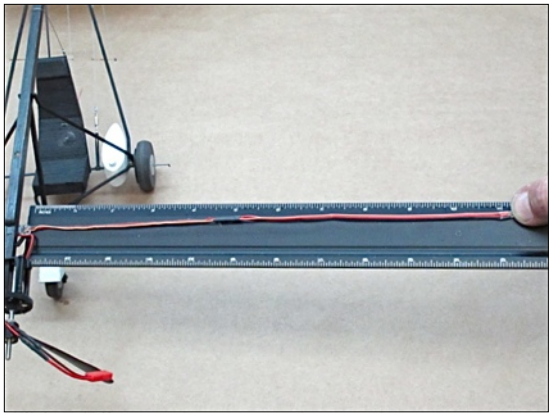
☐ Remove battery lead from AR6400 puck. Power will be provided through the Pixie 7-P speed control. Install the puck oriented as shown, with the servo gears facing down. Secure with hot glue or double sided tape.



☐ Make an extension for the speed control by soldering 6 in. wire leads to a 3-pin connector available from StevensAero. Configure color coded wires as shown.

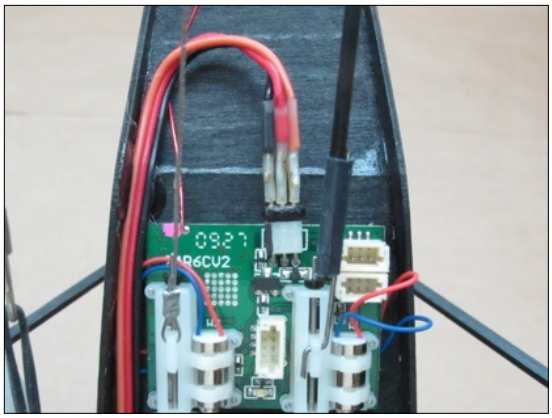


☐ Remove connector from speed control. Trim wires for a finished length of 11 in. and solder on extension. *Ensure colored wires match.*



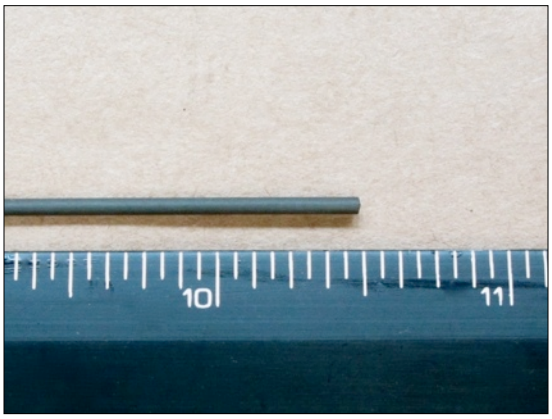
☐ Route lead down the left forward strut. This simulates the fuel line routing on the full size aircraft. Retain with hot glue.

☐ Plug lead into receiver. *Ensure connector is oriented so black/ground wire is plugged into black/ground socket on receiver.*

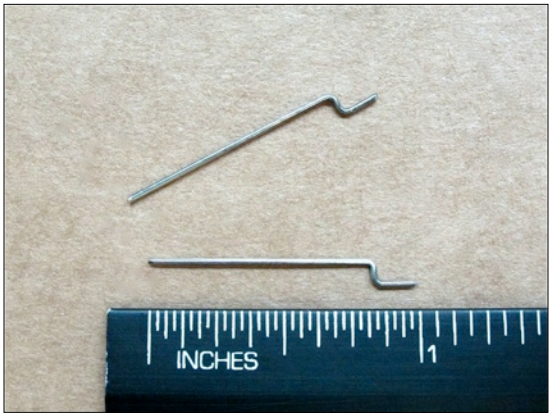


Radio and Control Rigging Cont.

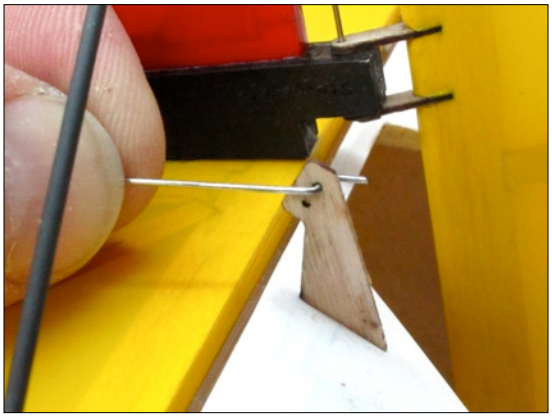
☐ **Elevator Pushrod:** Cut a length of 1/16 in. dia. carbon rod 10-1/2 in. long.



☐ Using .025 in. wire, make a Z bend at one end - refer to plan for size of bend. Trim wire to 1 in. to form pushrod end. Make two.

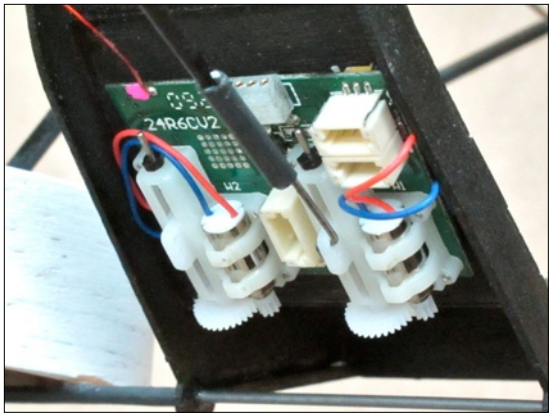


☐ Install metal pushrod ends <u>first</u> to control horn and servo. Use outer most hole at control horn.



☐ Join fittings to pushrod with a 1/2 in. length of heat-shrink tube. Shrink tube using a fine tip soldering iron.

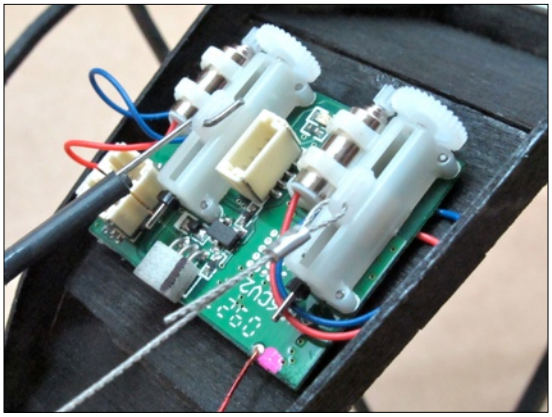
☐ Pushrod connects to the <u>right-hand</u> servo on the AR6400 puck.



☐ Center elevator both electronically and mechanically. Then retain position with a drop of medium CA glue where push-rod, metal, connector, and heat-shrink tube meet.

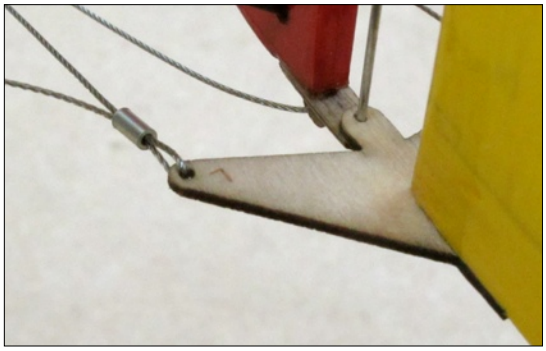
Radio and Control Rigging Cont.

☐ **Rudder Rigging:** Cut two 18 in lengths of rigging wire. Crimp end of one wire to the left-hand servo in the same manner as done previously with the tail/seat rigging.

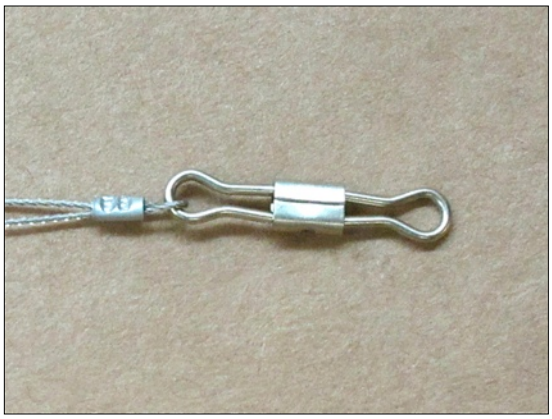


☐ Route control wire above tail rigging and through right side of rudder horn. Center rudder and snug wire. Do not crimp yet.

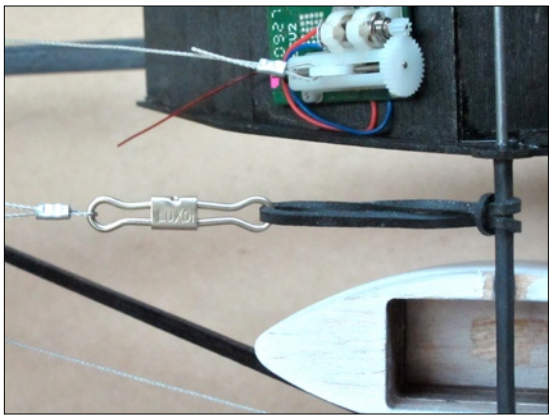
☐ Attach second wire to left side of control horn. Snug wire but do not crimp.



☐ Attach control wire to supplied connector [SIGSH445], snug up and crimp.



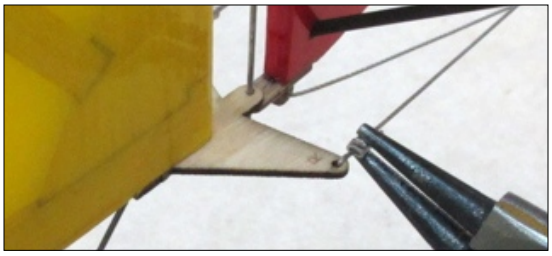
☐ Loop one rubber band around left axle as shown. Attach connector to rubber band.



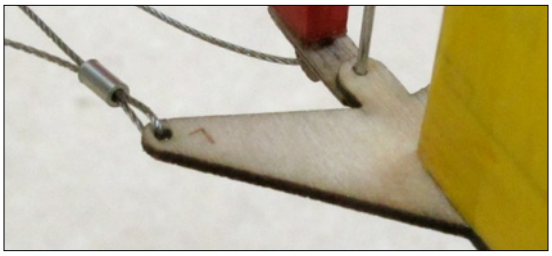
☐ Fix rudder in center position by trapping between two sticks taped together.

Radio and Control Rigging Cont.

☐ Center servo electronically. Adjust control wire at right horn, removing slack, and crimp to final length.

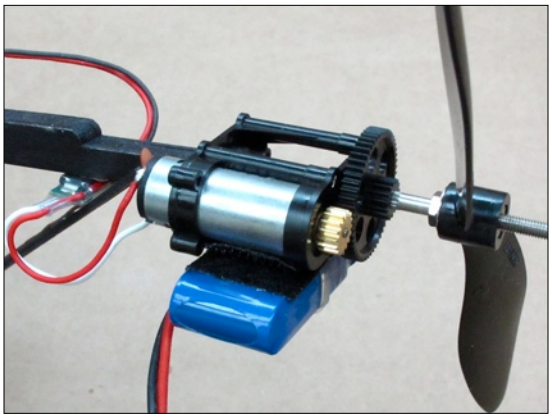


☐ Adjust control wire at left horn. Snug wire until rubber band is just under tension.

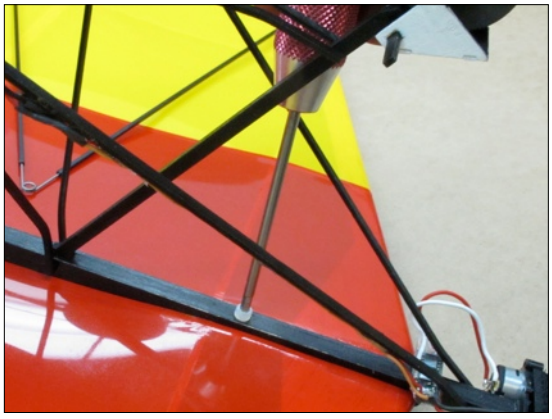


☐ Turn on radio and test rudder movement. Rubber band should have just enough tension to return rudder to full left position reliably. **Do not over tension rubber band, as this may stress the servo.** When satisfied that rubber band has proper tension, crimp wire to final length.

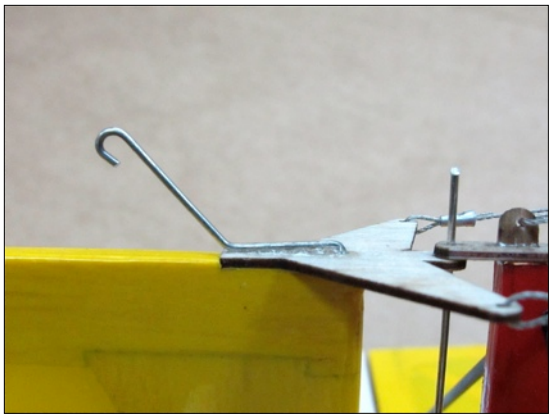
☐ Mount 7.4V two cell 120mAh battery [HP-LG325-0120-2s] below the gear box with sticky Velcro (not provided).



☐ Mount wing with provided nylon bolt and secure struts.



☐ Bend tail skid per plan, fit to hole in rudder horn, and bond with medium CA.



Congratulations your **eHopper™** is finished!

Flight Control Set-up

☐ Inspect wing for any warps that may have worked their way in when covering your model, or while model was in storage, and remove prior to flight. **Do not attempt flight if wing is warped.** Lack of aileron control on this model will make contending with a warped wing very difficult. **FIX THE WARP.**

☐ Center control surfaces, then set direction, rate of travel, and dampening (expo).

Rudder servo should be controlled by the aileron channel of your radio as rudder on this model also controls roll of the aircraft. Rudder should follow aileron stick travel i.e. moving aileron stick to the right should move rudder to right of aircraft. Likewise, left aileron stick input will move rudder left.

Elevator servo will be controlled by elevator channel of your radio. Pulling back on the elevator stick should result in the elevator moving UP! Likewise, forward stick results in the elevator moving DOWN!

Rudder Travel (rudder is VERY effective)
Travel +/- 15 degrees 30% expo

Elevator Travel
Travel +/- 10 degrees 30% expo

AR6400 Special Requirements:

When using the Spektrum AR6400 "Puck" you will need a computer radio (DX6i, DX7, etc.). In order to control the rudder with the aileron channel of your computer radio generate a custom mix of: **Aileron to Rudder +100%**

Pre-Flight to First Flight

☐ Have an experienced pilot assist you with pre-flighting your new model. Just like having someone proof-read something you've written, having a second fresh set of eyes to inspect your final product is often helpful at avoiding disaster.

While not an exhaustive pre-flight check, these are some of the major items that you should consider when developing your own pre-flight checklist. Get in the habit of always pre-flighting your models before each and every flight.

☐ **Weight and Balance -** Check **eHopper's** CG before each flight. The correct cg is VERY CRITICAL to **eHopper's** flight performance. The model should balance just forward of the strut junction above the seat, at the mark etched on the fuselage sides. This is essentially 4 in. behind the wing leading edge at rib R1.

Using a Phillips head screwdriver or similar tool, support the model by the boom under the mark etched on the sides. Site from profile of aircraft against horizon. If the fuselage boom appears to hang level with horizon line, then **eHopper**™ is properly balanced for flight.

☐ **Check Weather - eHopper's**™ first flight should be in zero wind conditions. **eHopper**™ is capable of flying in winds up to 8 mph so long as the pilot is capable.

☐ **Inspect airframe** for warps and obvious signs of wear or damage. Do not fly a damaged or warped model.

☐ **Inspect control surface** for center, proper direction of travel, rate of throw, secure pushrod connections, hinges, and servo mounting.

☐ **Check wing attach points** for damage and/ or wear.

☐ **Check landing gear and struts.** Repair damaged struts or landing gear attach points.

☐ **Inspect battery for full charge.** Never begin a flight with a partially charged battery.

Pre-flight Cont.

- ☐ **Clear Prop!** Before applying power to the model, clear and keep clear of the prop arc. As electric motors are capable of inflicting severe damage (more so than their internal combustion counterparts) and may turn on unexpectedly anytime power power is applied to the system. respect the business end of the model (the prop and prop arc) treating every electric model and propellor as if it were a loaded gun.

- ☐ **Range Check Radio -** Follow the radio manufacturers guidelines for performing a proper range check.

- ☐ **Check for Traffic -** Proceed to the flight line (with your mentor or instructor if you are a novice pilot) and observe other RC traffic. If the runway is clear, and no one is in the pattern to land, loudly announce your intentions to take off. remember all aircraft on ground must yield the runway to those landing.

- ☐ **Go Flying!** Point model into wind (if present) and steadily advance throttle to full. Use rudder to correct track while on ground roll. Within several feet the model should be airborne. Fly model to comfortable 1-2 mistake high altitude, reduce throttle to stop climb, then trim model for straight and level flight at a comfortable cruise speed.

- ☐ **Setup for Landing -** Clearly announce your intention to land. Make landings into the wind. With rudder/elevator control and no ailerons, setting up landings in crosswinds should be avoided until you are comfortable with the model's in flight behavior. Reduce throttle during approach, and cut power just before rounding out for landing. **eHopper™** will float in ground effect briefly and settle to the ground on the mains.

  DO NOT ATTEMPT 3 POINT LANDINGS

  Just like the full-size craft. The **eHopper™** should be brought in only on the main gear with nose wheel elevated at landing. While in ground effect hold the nose wheel high until the model settles in and touches down.

Congratulations!

You've completed your first flight(s). **eHopper™** should have only required a click or two of trim to obtain level flight and should perform smoothy in both pitch and roll.

By now you will have noticed that **eHopper™** is a very stable airplane. When built straight and trimmed for level flight, **eHopper™** should always return to wings level from any attitude.

If your first flight was a bit more exciting than you'd have liked and are having problems with erratic flight performance; please inspect your airframe for damage, improper installation, and/or twists and warps. The most common mistake is to try and fly with a warped or twisted wing or incorrect balance point (CG).

Have fun learning the ins and outs of **eHopper's™** in-flight performance and feel free to share your thoughts and experiences with our staff. We are committed to improving your build and flying experience and are constantly refining our processes, designs, and manuals to reflect customer feedback. You may correspond with Stevens AeroModel staff using any of the following methods:

E-Mail - support@stevensaero.com

RCGroups.com - Forum Build threads

Facebook.com - Search for Stevens AeroModel

Phone - 719-387-4187 M-F 10am - 5pm MST