

# FREDe 1.5X

A ToonSCALE™ Park Flyer by Stevens AeroModel



Length 35 inches | Span 41 inches | Wing Area 580 inches<sup>2</sup> | Flying Weight 31 oz.

*Last Revised 12/31/2010*



# 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).

*Stevens AeroModel*  
*PO Box 15347 - Colorado Springs, CO 80935 - USA*  
*719-387-4187 - [www.stevensaero.com](http://www.stevensaero.com)*

# Project Checklist

## Kit Contents

### Major Components

- Laser cut wood (23 Sheets - See inventory on following pages)
- Illustrated instruction manual
- Pre-Cut Color Pilot (Left and Right) and Instrument Panel Sheets
- 1 - Pre-bent landing gear (1/8 in. dia. Wire)

### Strip Wood

- 1 - 3/8 in. square x 36 in. balsa stock (Leading Edge)
- 2 - 1/4 in. square x 36 in. balsa stock (Main Spar Cap Strips)
- 3 - 3/16 in. square x 36 in. balsa stock (Turbulator Spars)
- 2 - 3/32 in. x 3/16 in. x 36 in. balsa stock (Sub Spars)

### Long Hardware

- 1 - 12 in. Length 0.047 Wire
- 2 - 18 in. Lengths 1/32 in. Wire
- 2 - 14 in. Lengths 0.090 OD Nylon Tubing [27830]
- 4 - Basswood Wing Struts (Vertical)
- 2 - Basswood Wing Struts (Diagonal)

### 4x6 Hardware Bag

- 1 - 2-3/8 in. Length Hardwood Landing Gear Block [SIGSH655]
- 1 - Pair Micro Razor Control Horns [DUB936]
- 1 - Pair Mini E/Z connector [DUB845]
- 1 - Pkg. (4) 1/8 in. Wheel Collars [DUB139]
- 1 - 4-1/2 in. Length of 3/16 in. dia. hardwood dowel
- 1 - 6 in. Length 3/32 in. OD Aluminum Tube
- 1 - 6 in. Length 1/8 in. OD Aluminum Tube
- 2 - Micro EZ-Link [26310]
- 2 - 3-1/4 in. length 0.075 in. dia. wire.
- 6 - #32 Rubber Bands
- 8 - CA Hinges

### 3x3 Hardware Bag

- 1 - 3/4 in. dia. tail wheel.
- 1 - 1 in. length of silicone fuel tubing (EZ-Link Keepers)
- 2 - Rubber Retainers (Wing Pin)
- 4 - #8 Nylon Bushing
- 4 - 3/16 in. dia. Neo. Magnets
- 4 - 4-40 Blind Nuts
- 4 - 4-40 x 3/8 in. Bolts

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

- 3+ Channel radio and micro receiver. We suggest the Spektrum DX6i and AR500 receiver.
- 2 - Hitec HS-81/82 class servos [HRC32082S]
- SA Sport BL.10 Motor [SUPA2814-8] and APC 12 x 6SF Propeller [APC12060SF]
- SA Sport - 30 Amp ESC [SUP30AESC]
- Hyperion G3 7.4V 2100mAh 2 cell LiPo Battery [HP-LG325-2100-2s]

## Project Checklist Continued

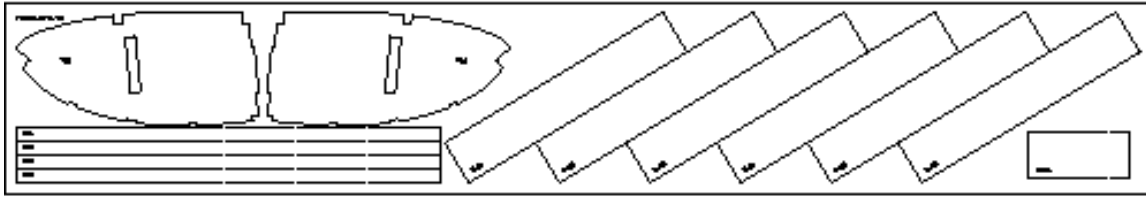
### Building Supplies and Tools

- |  |   |
|--|---|
| <input type="checkbox"/> 1 oz. Medium CA Glue                        | <input type="checkbox"/> ZONA 4 in 1 Saw Set [ZON35251]             |
| <input type="checkbox"/> 1 oz. Thick CA Glue                         | <input type="checkbox"/> DUBRO Hinge Slotter Kit [DUB660]           |
| <input type="checkbox"/> 1 oz. Thin CA Glue                          | <input type="checkbox"/> 24 in. Straight Edge                       |
| <input type="checkbox"/> CA glue accelerator (kicker)                | <input type="checkbox"/> Selection of Small Drills and Screwdrivers |
| <input type="checkbox"/> CA glue de-bonder                           | <input type="checkbox"/> Two 1/8 in drill bits.                     |
| <input type="checkbox"/> 30 min. Epoxy                               | <input type="checkbox"/> 1 in. x 12 in. length sticky back velcro   |
| <input type="checkbox"/> Rubbing Alcohol (Epoxy Clean-up)            | <input type="checkbox"/> 3/4 in. wide clear tape                    |
| <input type="checkbox"/> Balsa filler                                | <input type="checkbox"/> 3 Rolls AeroFilm Covering                  |
| <input type="checkbox"/> Hobby Knife with ample supply of #11 blades | <input type="checkbox"/> 1 Roll AeroTRIM Self-Adhesive Trim         |
| <input type="checkbox"/> Sanding block with 400 and 600 grit paper   | <input type="checkbox"/> 1 Trexler Inflating Pump                   |
| <input type="checkbox"/> Heat Gun and Covering Iron                  | <input type="checkbox"/> Paper Towels                               |
| <input type="checkbox"/> Small Needle Nose Pliers                    | <input type="checkbox"/> Enamel Paint Marker - Black [TES2547C]     |
| <input type="checkbox"/> Wire Cutters                                | <input type="checkbox"/> Long sanding bar                           |
| <input type="checkbox"/> Small Round "Rat-Tail" file                 | <input type="checkbox"/> Razor Plane                                |
| <input type="checkbox"/> 2.5mm Hex Head Wrench                       | <input type="checkbox"/> Small Spring Loaded Clamps                 |
| <input type="checkbox"/> Small Hammer                                | <input type="checkbox"/> Low Tack Painters Masking Tape             |
| <input type="checkbox"/> Scissors                                    | <input type="checkbox"/> 3M 77 or Glue Stick for Profile Pilot      |
|  | <input type="checkbox"/> DEFT Clear Lacquer Spray                   |



# Laser Cut Parts Inventory

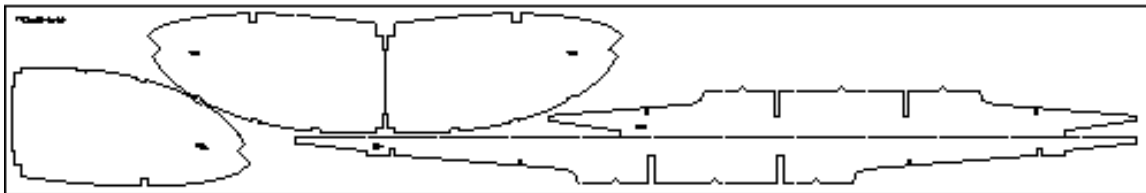
1/16" Balsa (AB-H)



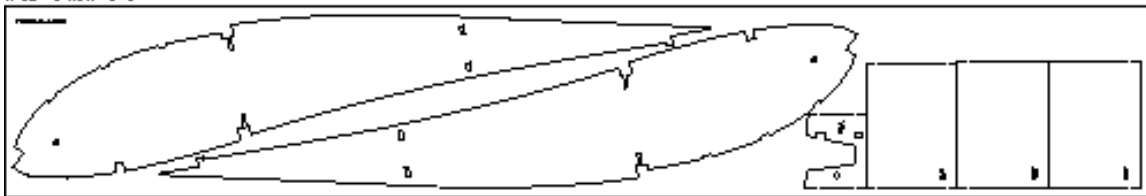
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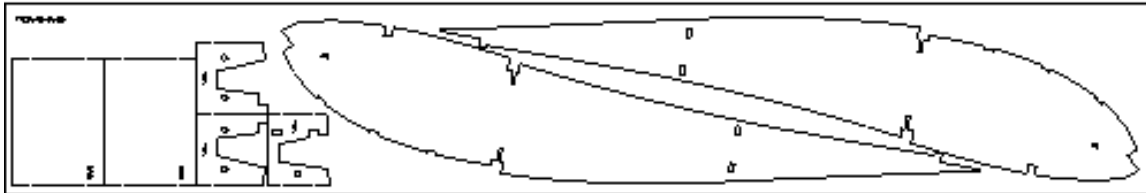
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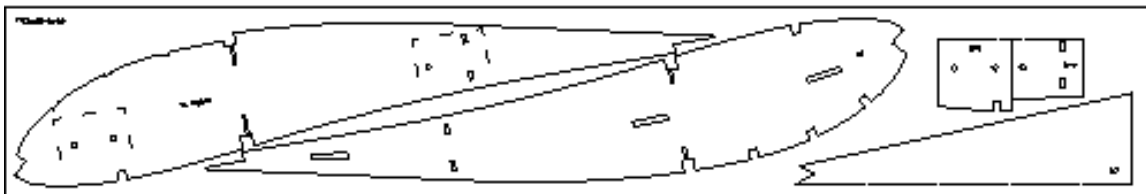
3/32" Balsa (BAC-M)



3/32" Balsa (BAC-M)

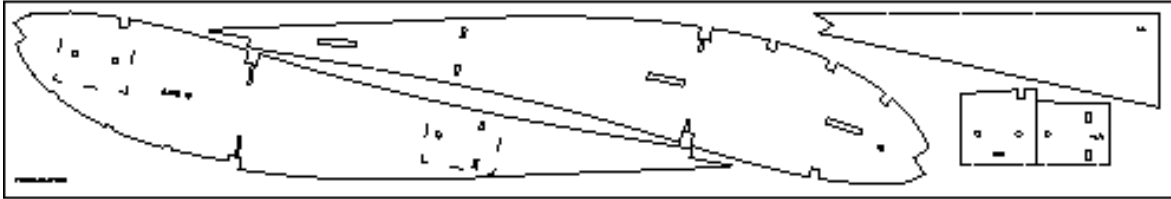


1/8" Balsa (ABC-K)

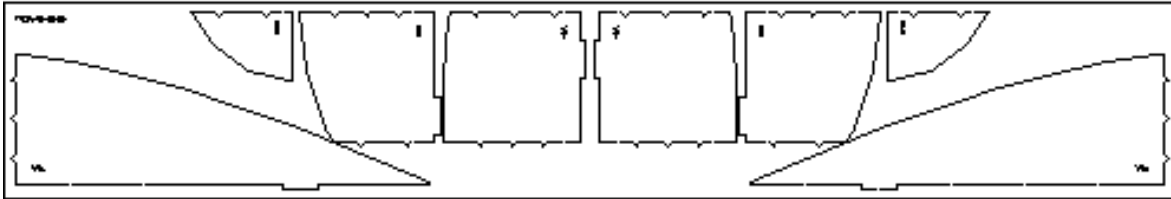


# Laser Cut Parts Inventory

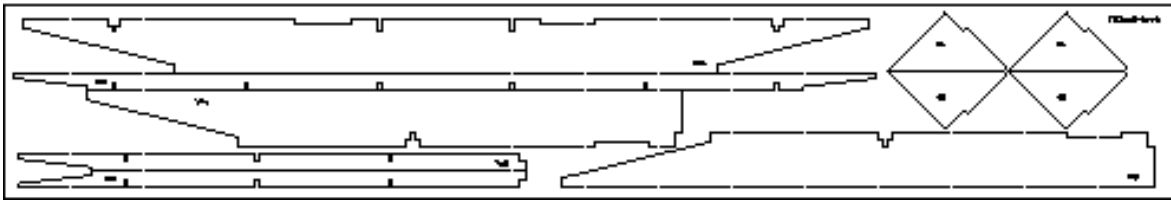
1/8" Balsa (ABC-N)



1/8" Balsa (AB-M)

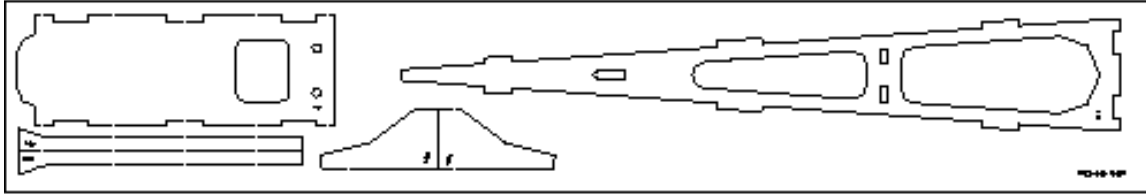


3/16" Balsa (BC-N)

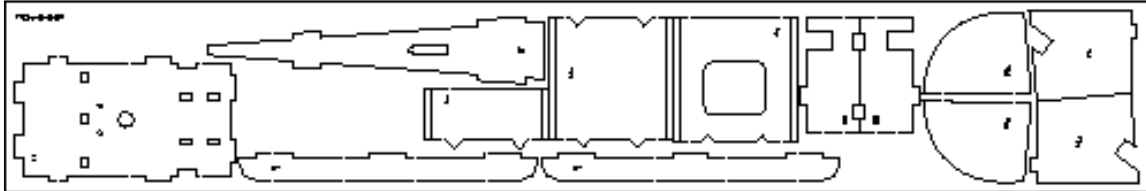


# Laser Cut Parts Inventory

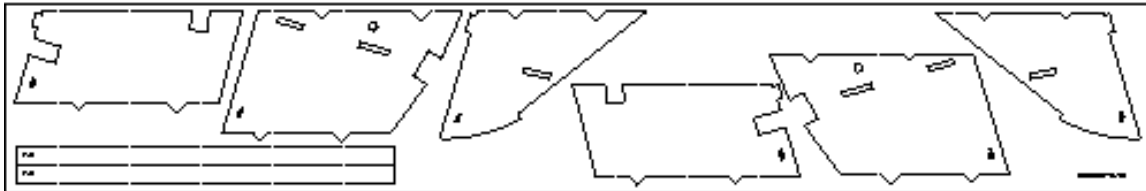
3/32" Balsa, CAB-M0



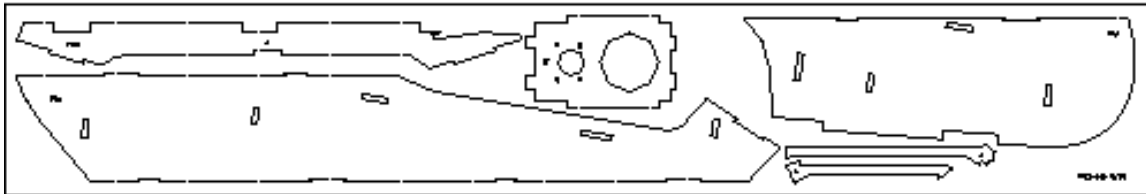
1/8" Balsa, CAB-M0



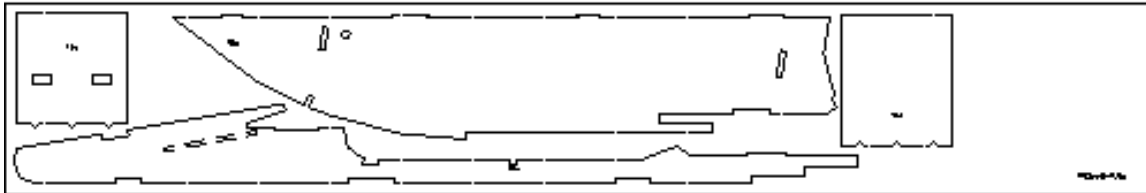
1/8" Balsa, CAB-M0



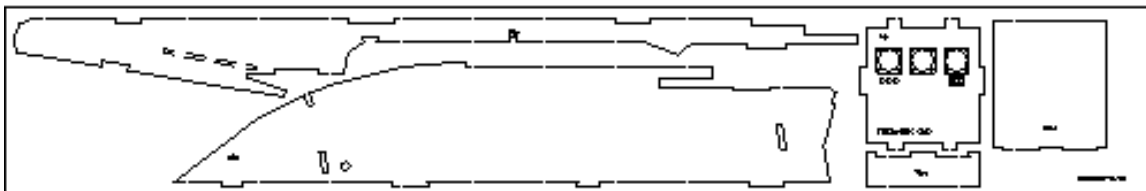
1/8" Balsa, CAB-M0



1/8" Balsa, CAB-M0

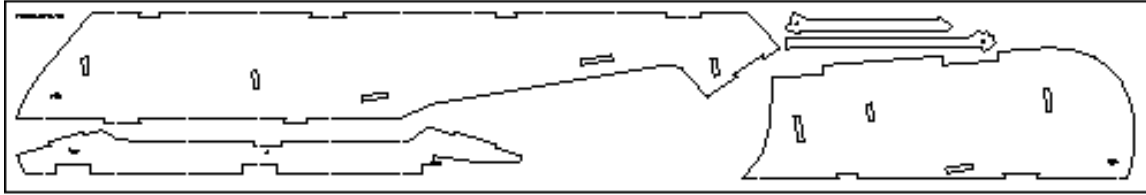


1/8" Balsa, CAB-M0

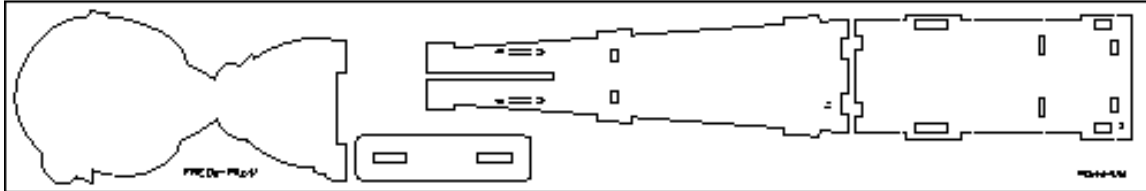


# Laser Cut Parts Inventory

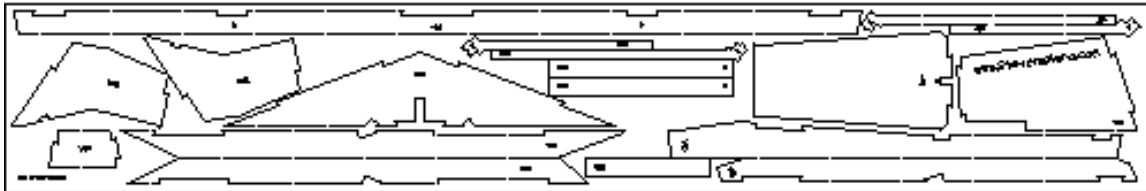
1/8" Balsa (AB-PD)



3/16" Balsa (ABC-SM)



3/16" Balsa (ABC-H)



3/16" Balsa (ABC-H)



1/32" Ply

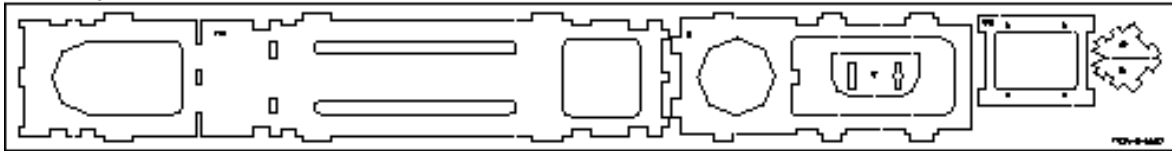


1/16" Ply

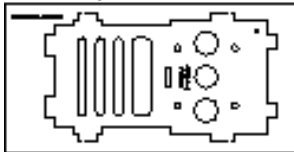


# Laser Cut Parts Inventory

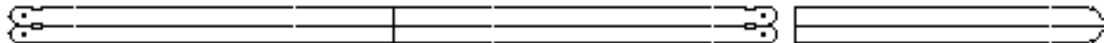
1/8" Lite Ply



1/8" Lite Ply



3/16" Balsa Wood (Bulk in Bag 4 Vertical / 2 Diagonal)



# General Assembly Instructions

Thank you, for purchasing this Stevens AeroModel FREDe1.5X, a design inspired by the joy of flying. 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, saves 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 intermediate model builder and "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. 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.

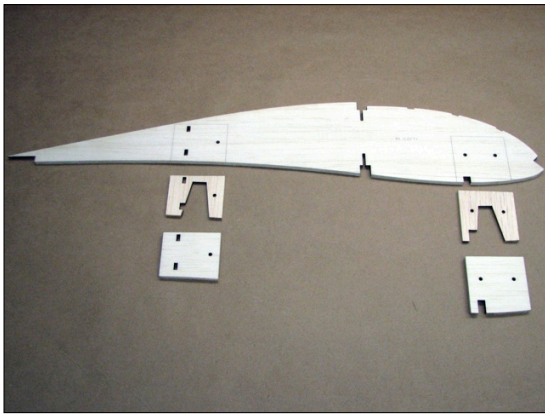
Unless otherwise noted in the instructions, always use medium CA glue for bonding parts.

## Never force the fit!

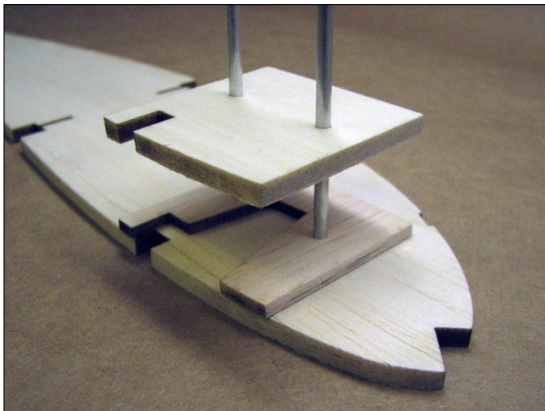
Remember this is a precision cut kit our machines cut to within 1 thousandth of an inch in accuracy. Yet the wood stock supplied by the mill may vary in thickness by up to 20 thousandths. This variance in the wood stock can cause some tabs/notches to fit very tight. Hey, dad always said it was easier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

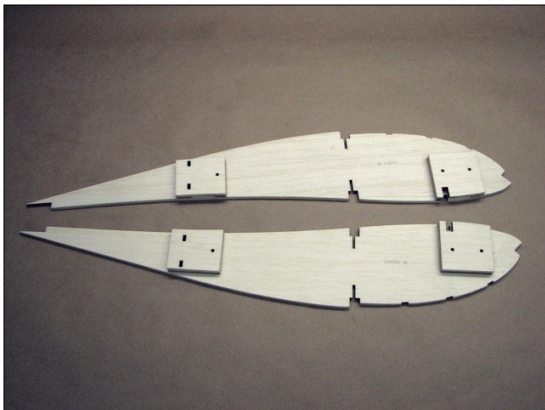
- Assemble center ribs from parts R1 (RIGHT) and R1 (LEFT), W8a, W8b, W9a, and W9b.



- Using 1/8 in. drill bits as alignment guides, sandwich W8a between W8b and R1 (LEFT). Align notches on all three parts. *Ensure that the etching on R1 (LEFT) faces up.* Bond with medium CA. Repeat for W9a and W9b, creating front and rear strut sockets.



- Repeat for R1 (RIGHT), *ensuring that etching on R1 faces up during assembly*, creating mirrored right and left center ribs.



- Using a straight edge as a guide, assemble lower spar jig W2 from parts W2a, W2b and W2c. Bond with medium CA.

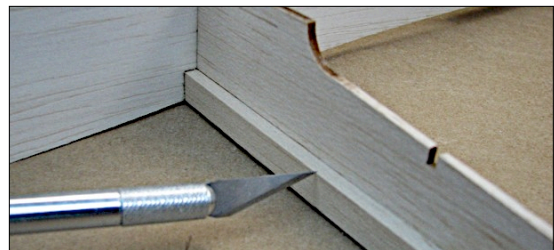


- Install ribs R1 (*sockets must face the wing center as illustrated*) at center notched positions of lower spar jig W2. When fitting W2 to wing ribs place one length of 1/4 in. square balsa stock centered to W2 to forming the lower spar cap strip. Tack glue parts at corners where ribs interface spar to retain.

Note: Due to under camber in airfoil it will be required to locate the spar to the ribs with the forward portion of the ribs hanging off the edge of your work table.



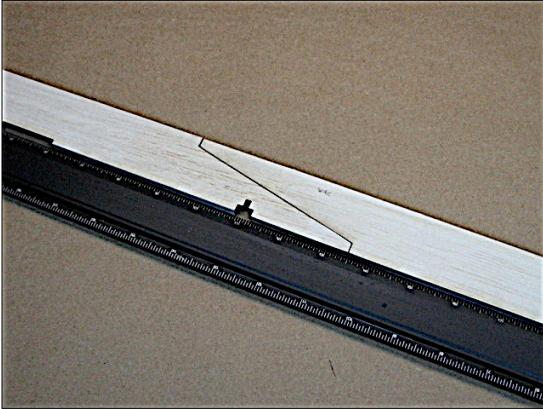
*1/4 in. sq. balsa stock forms lower spar cap.*





## Wing Construction Cont.

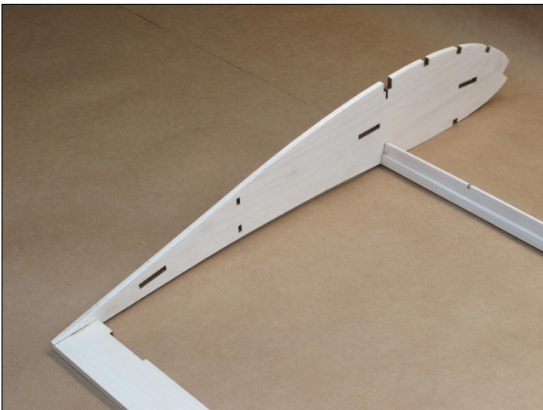
- Using a straight edge as a guide, assemble W4 trailing edge from parts W4a, W4b, and W4c. Bond with medium CA.



- Bond two each W6 gussets to square trailing edge to ribs R1.



- Tack glue ribs R4 to outside notches at trailing edge and W2 lower spar jig.



- Bond two each W6 gussets to square trailing edge to ribs R4.



- Fill in remaining ribs R2 and R3 and tack glue at corners where rib interfaces lower spar and trailing edge.



- Using a straight edge, assemble upper spar jig W1 from parts W1a, W1b, and W1c. Bond with medium CA.



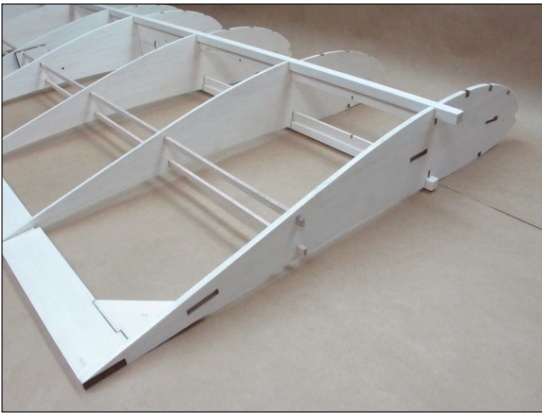


## Wing Construction Cont.

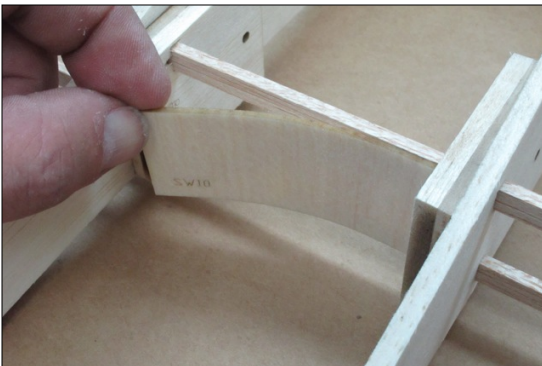
- Fit upper spar jig W1 to span ribs. When fitting W1 to span wing ribs, place one length of 1/4 in. square balsa stock on top of and centered to W1, forming the upper spar cap strip. Tack glue parts at corners where ribs interface spar to retain.



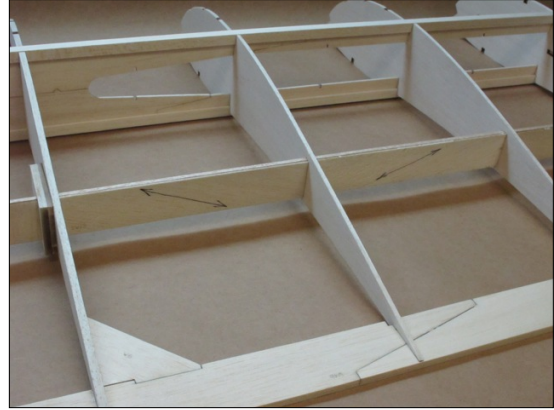
- Install 3/32 in x 3/16 in. balsa spars through holes in ribs aft of main spar. Allow ends of sub spar to overhang assembly at R4, do not trim and do not glue to retain at this time.



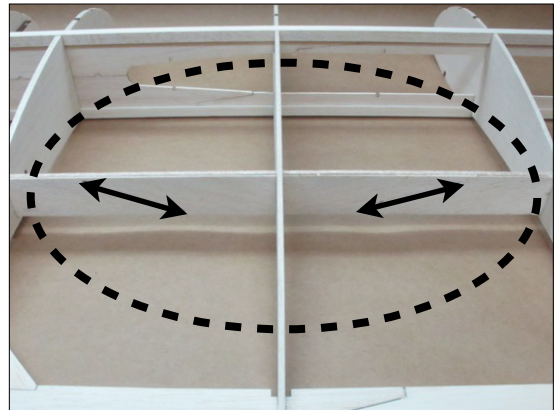
- With wing assembly held flat to work surface. Fit and bond center sub-spar shear web SW10 between center ribs R1 to aft side of balsa sub-spars.



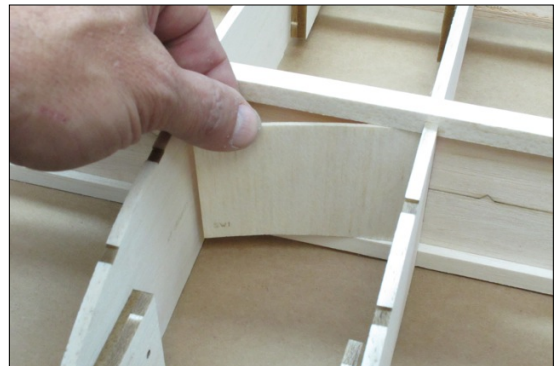
- Install remaining sub-spar shear webs SW11, SW12, and SW13 to aft side of sub spars between rib pairs R1/R2, R2/R3, and R3/R4 respectively.



Note the grain direction of SW11, SW12, and SW13 runs at 45 degrees, alternate grain direction of parts as illustrated.

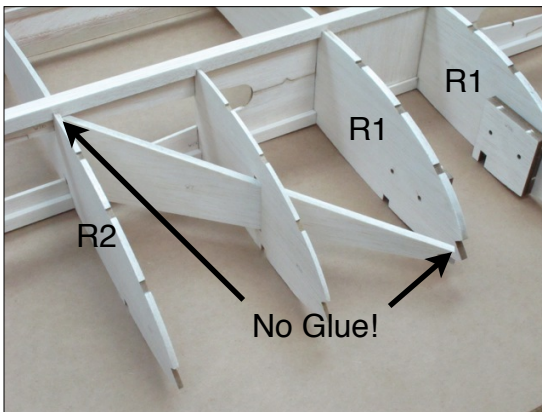
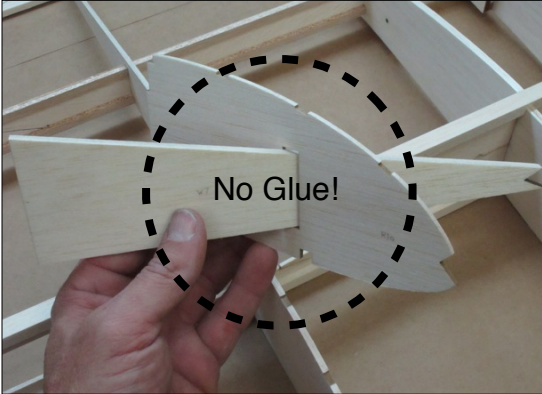


- Bond vertical grain shear webbing SW1 between spar caps and against forward surface of W1/W2 spar jig at wing center.

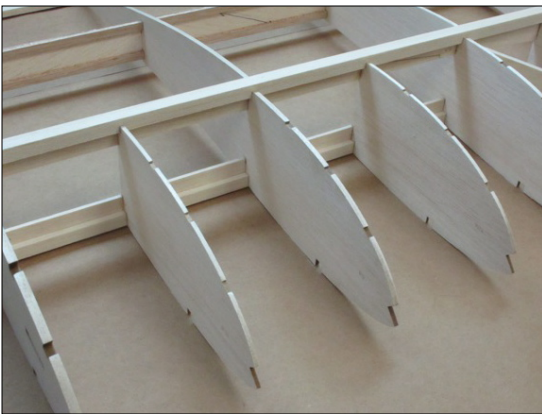


## Wing Construction Cont.

- Dry-fit W7 through slot in center of sub-rib R1a - **DO NOT BOND ANY PORTION OF W7 TO WING SPAR OR SUB RIB AT THIS TIME.** Tack glue the dry-fit assembly of W7/R1a to wing at notches in W1/W2 spar jig where R1a sub rib interfaces.



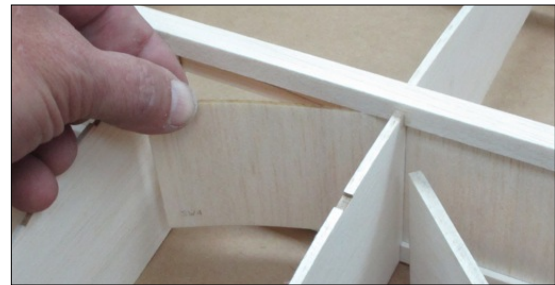
- Tack glue remaining sub-ribs R2a and R3a to the wing assembly.



- With wing held flat on top of work surface, fit and bond the remaining vertical grain shear webbing in the following order SW2, SW3, SW4, SW5, SW6, and SW7 against forward surface of W1/W2 spar jig.

Begin with SW2 and bond between rib R1 and R1a sub-rib. Next SW3 between R1a and R2. Continue in this manner to complete installation with SW7 being installed between R3a and R4.

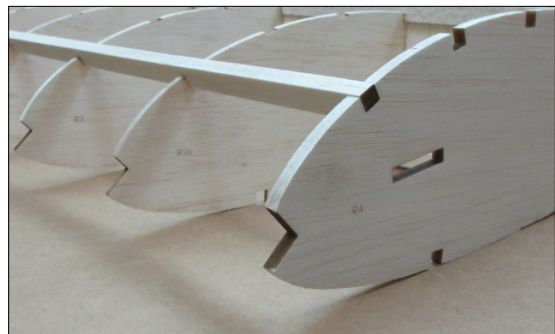
Again, do not bond W7 (from previous assembly step) to any portion of the wing assembly at this time.



- Using a straight edge as a guide, assemble the W3 jugged turbulator spar from parts W3a, W3b, and W3c. Bond with medium CA.



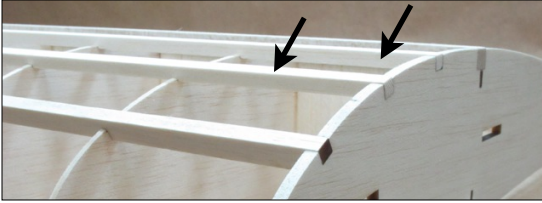
- Fit and bond jugged turbulator spar to forward notch in ribs and sub ribs. Turbulator should fit flush with ribs at wing tips and sit 1/8 in. proud of the top surface of all interior ribs.



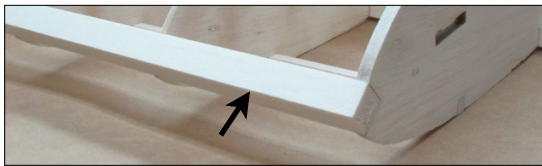


## Wing Construction Cont.

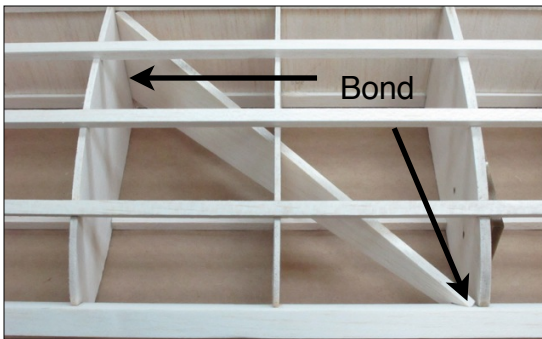
- Fit and bond remaining top and bottom turbulator spars using 3/16 in. square balsa stock. Again, turbulator spars will fit flush with ribs at wing tips and 1/8 in. proud of the top surface of all interior ribs.



- Fit and bond 3/8 in. square balsa stock to notch at leading edge of ribs and sub ribs.



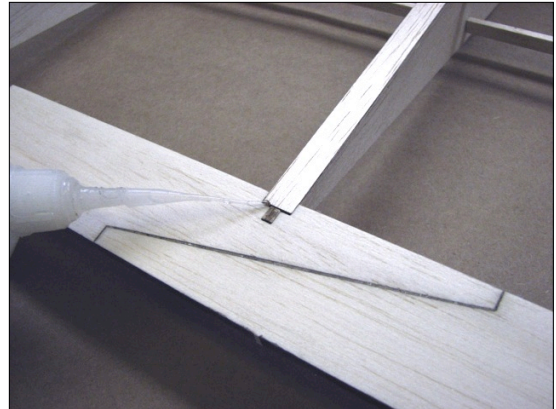
When installing leading edge, W7 is captured diagonally between R1 and leading edge and R2 and spar as illustrated. With wing held flat on top of your work surface bond W7 where it contacts leading edge and spar.



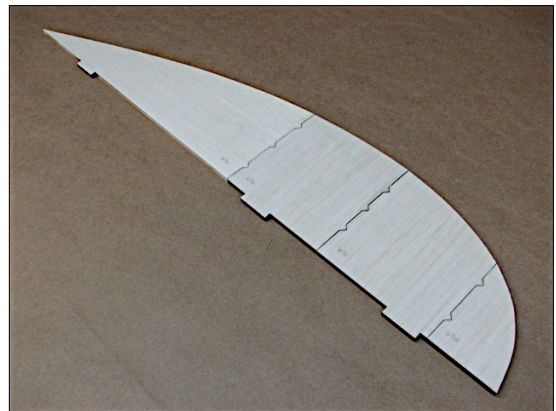
- Trim leading edge, turbulators, spar caps, and sub-spar stock flush with outside edge of R4.



- Invert wing then fit and bond rib cap strips W10 to trailing edge at ribs R2 and R3.



- Assemble two W5 wing tips from parts W5a, W5b, W5c, and W5d. Bond with medium CA.



- Bond W5 wing tips into slots at rib R4, aligning front with center of L.E.



## Wing Construction Cont.

- With wing held flat on top of your work surface re-visit all tack glued wing joints with medium CA.



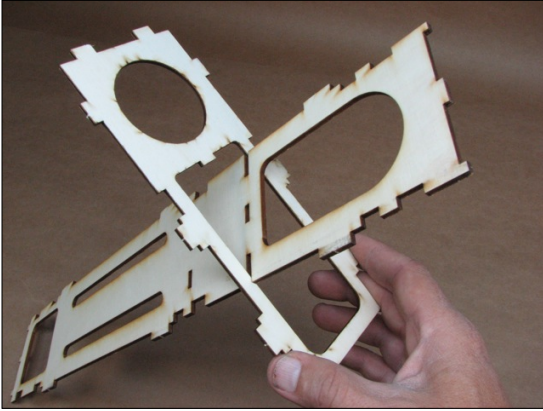
- With a razor plane and sanding bar, shape L.E. to match profile on plan. Sand contour smooth on wing tips and round off edges. Leave trailing edge square.



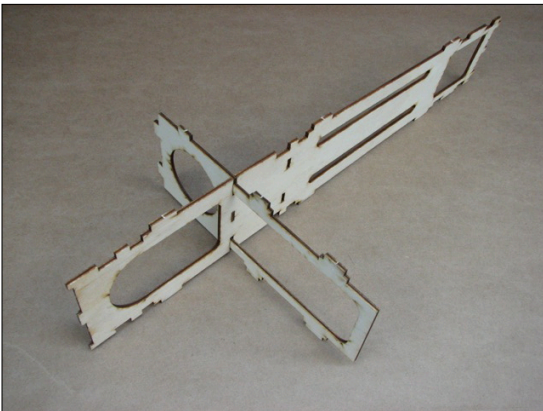


## Fuselage Construction

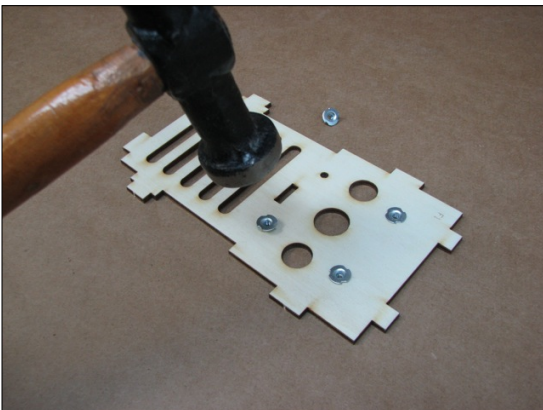
- Assemble fuselage crutch. Begin by inserting ply F00 crutch through ply former F2, fitting F2 into slots in F00 as illustrated.



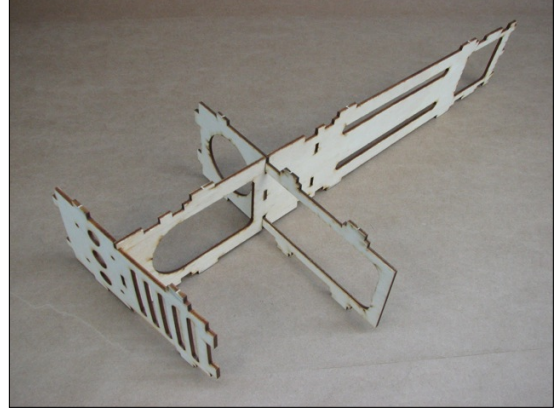
- Square F2 to F00 and tack with medium CA.



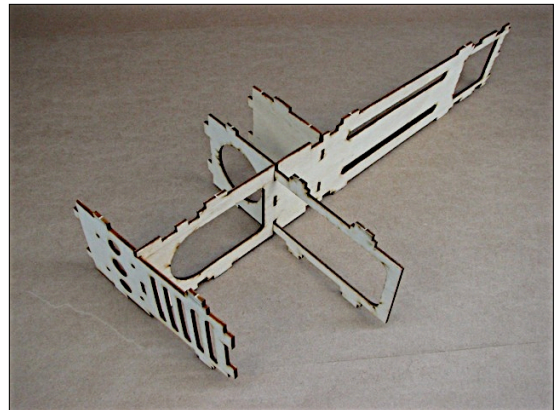
- Locate 4-40 blind nuts to holes in ply firewall F1. With a hammer, seat nuts firmly in F1. Secure with medium CA around edge of nuts.



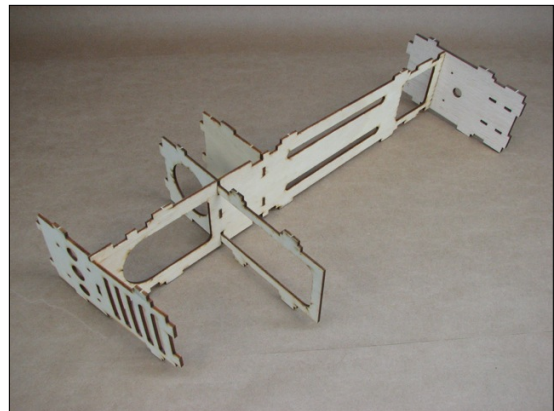
- Dry fit F1 to tab on F00, orienting as shown.. *Ensure that blind nuts are on the back of F1.*  
**DO NOT GLUE F1 TO ASSEMBLY!**



- Fit balsa former F3 to top of F00 as shown, with etching facing rearward. Square and tack with medium CA.



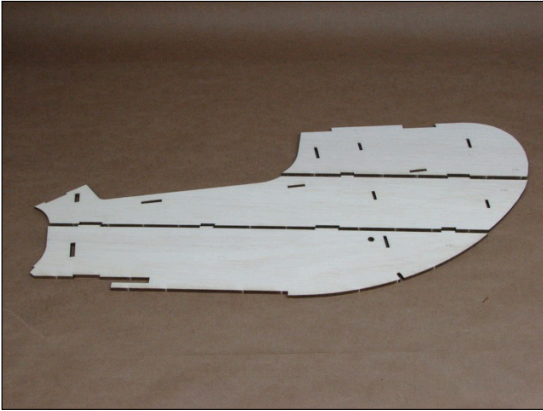
- Fit former F4 to F00 as shown. Square and tack with medium CA.



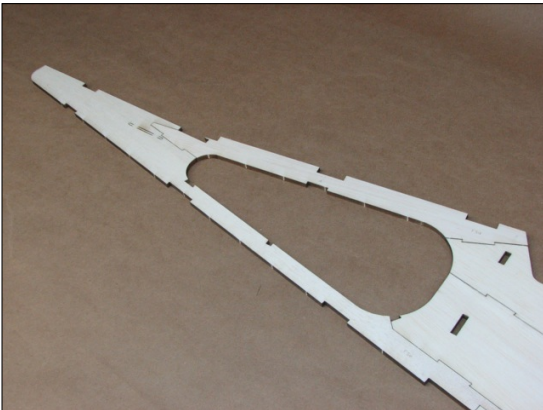
## Fuselage Construction Cont.

- Make right and left fuselage sides.

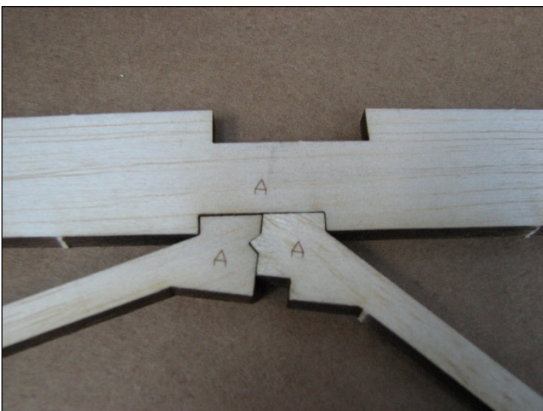
On a flat building surface, bond forward fuselage sides from parts FSa, FSb, and FSd.



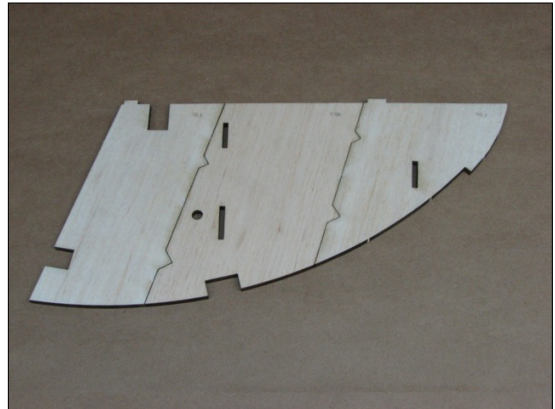
Bond FSd and FSe to forward assembly.



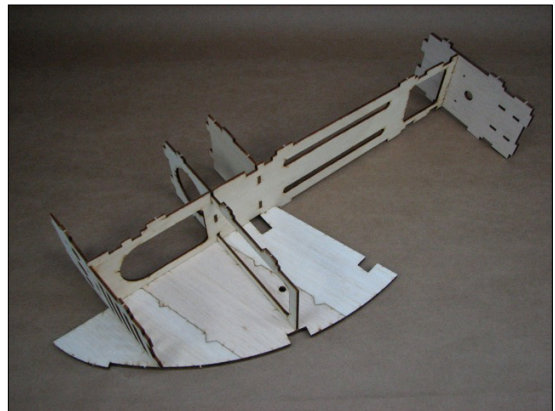
Bond truss parts to fuselage side assembly. match tabs A with slots A.



- Bond right and left fuselage doublers from parts F0a, F0b, and F0c.



- Fit one fuselage doubler to crutch assembly and tack glue with thin CA.



NOTE - when properly installed, tabs on F1 and F2 will protrude through fuselage doubler.





## Fuselage Construction Cont.

- Fit fuselage side to crutch/doubler assembly. Tack glue at tabs with thin CA.



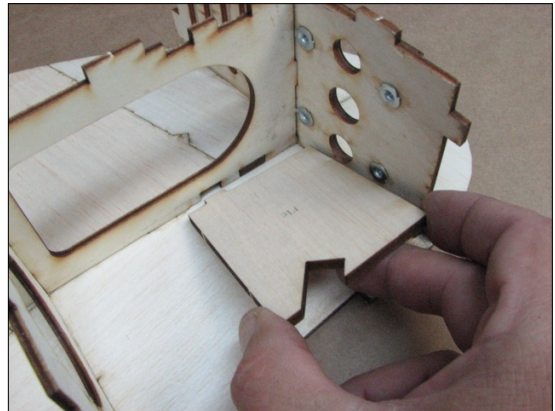
- Fit and bond cross grain doubler F1a to inside of fuselage forward of F1b plywood doubler.



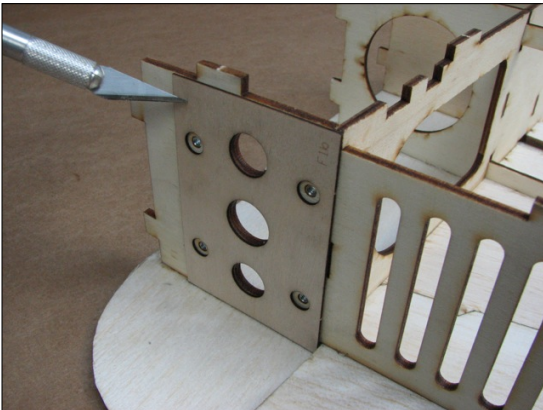
- Fit and bond F4a through slots in F4 and fuselage doubler.



- Fit F1c behind F1 and above F00. Bond with medium CA.



- Fit and bond ply F1b firewall doubler to front of F1, aligning holes over blind nuts. Do not allow glue to contact threads in blind nuts.



- Fit SR1 below F00 and in front of F4. Bond with medium CA.

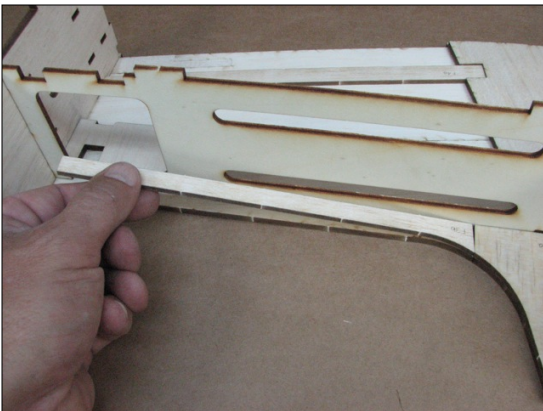


## Fuselage Construction Cont.

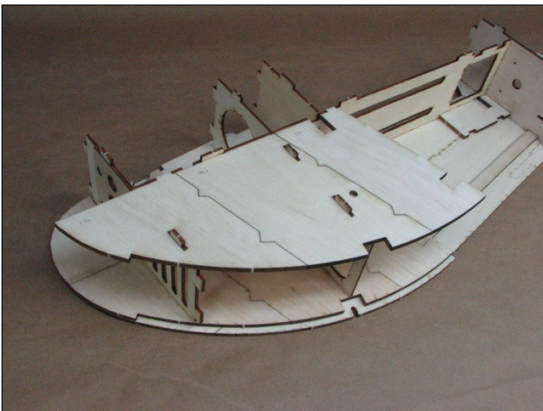
- Fit and bond cross grain doubler F3a to fuselage side above F00 and in front of F3.



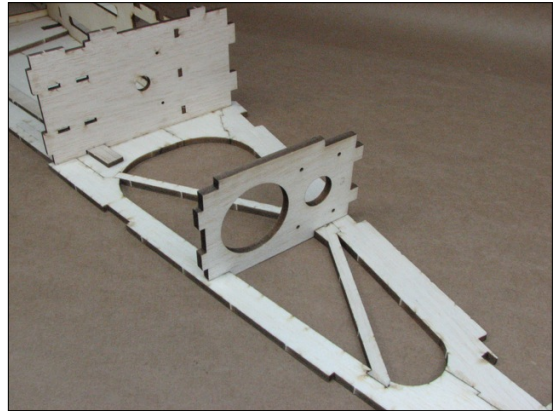
- Fit and bond F3b to fuselage side above F00 using medium CA glue.



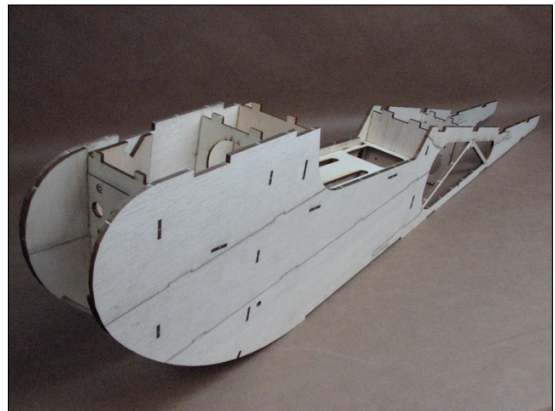
- Fit remaining fuselage doubler to crutch assembly. Tack with thin CA.



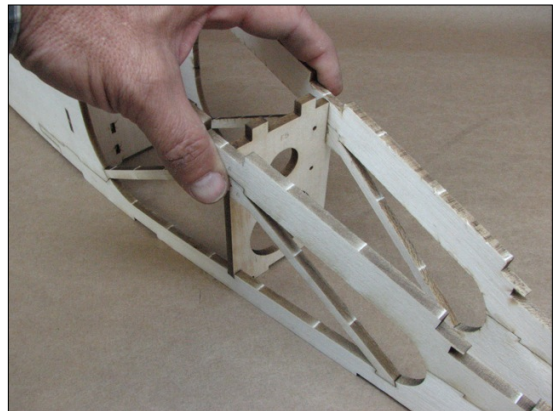
- Dry fit F5 to fuselage side. Do not glue.



- Fit remaining fuselage side to crutch/doubler assembly. Square assembly on flat surface and bond all joints forward of former F4.



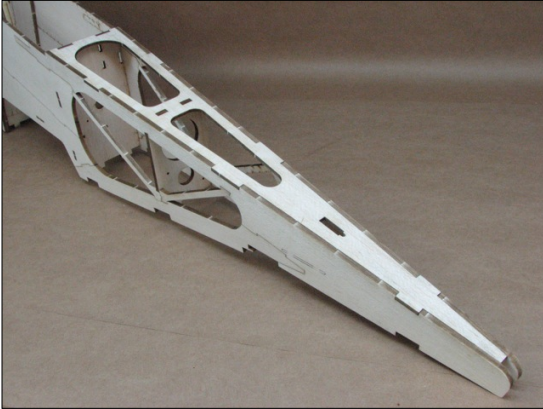
- Pull fuselage sides together at F5 and tack with thin CA.



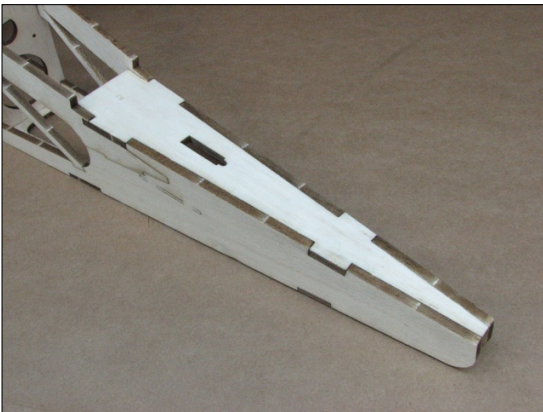


## Fuselage Construction Cont.

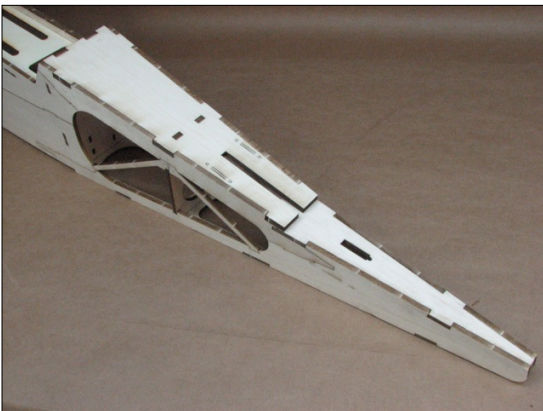
- Fit F11 to bottom of fuselage assembly. Tack with thin CA.



- Fit F8 to top of fuselage assembly. Tack with thin CA.



- Fit F7 to top of fuselage assembly. Tack with thin CA. Square assembly on a flat surface and bond all joints in rear fuselage with medium CA.

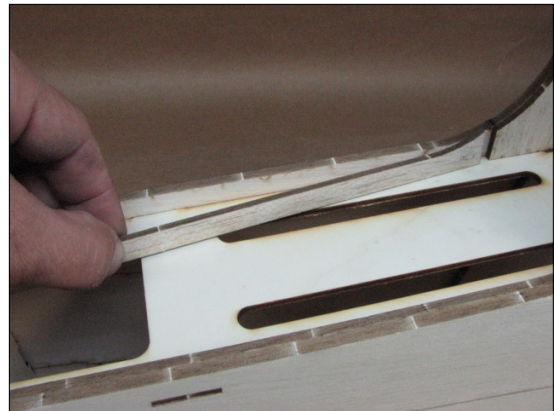


- Fit remaining doubler parts.

Bond F3a with medium CA glue.



Bond F3b with medium CA glue.



- Fit and bond F4a through slots in F4 and fuselage doubler. Also, fit SR1 below F00 and in front of F4. Bond with medium CA.

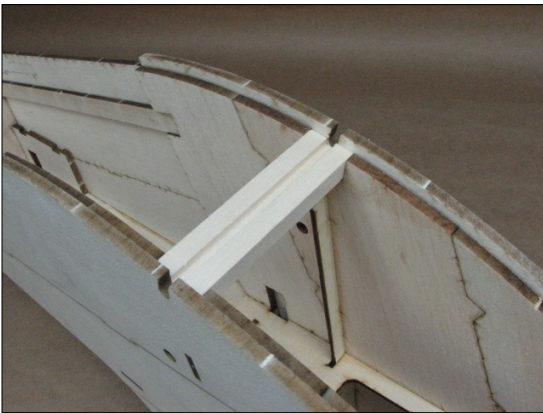


## Fuselage Construction Cont.

- Fit remaining cross grain doubler F1a to inside of nose. Bond with medium CA.



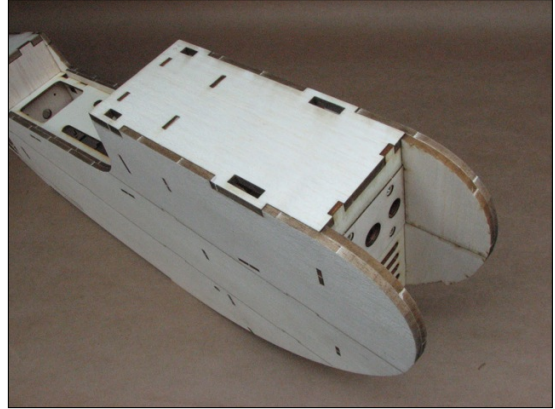
- Install pre-cut landing gear block within slots of fuselage doublers, aligning slot in block to outside of fuselage and with slots in fuselage sides. Bond with medium CA.



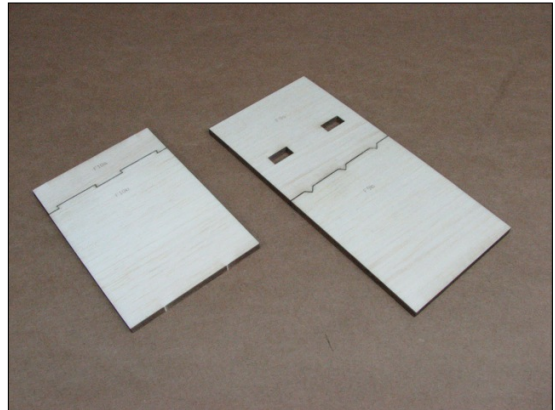
- Fit SR2 servo tray to slots in SR1's. Bond with medium CA.



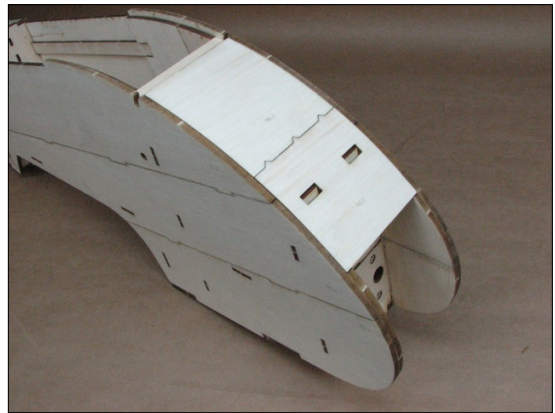
- Fit F6 to top of fuselage. Bond with thick CA to allow ample working time to align part.



- Assemble F9 and F10 fuselage sheeting from parts F9a/F9b and F10a/F10b. Bond with med. CA.



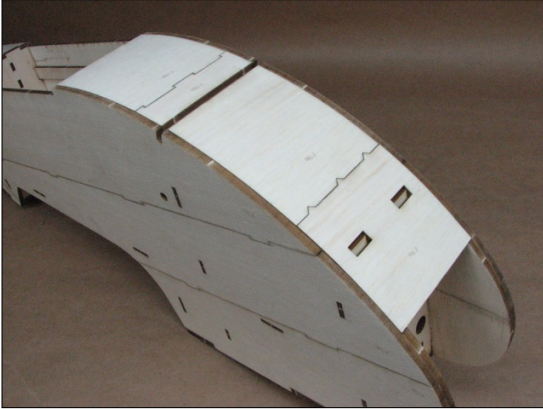
- Bond F9 assembly to fuselage forward of the landing gear slot in gear block. Bond with thick CA to allow working time to locate part.



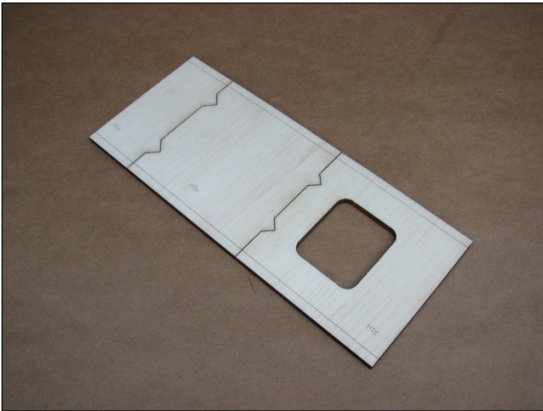


## Fuselage Construction Cont.

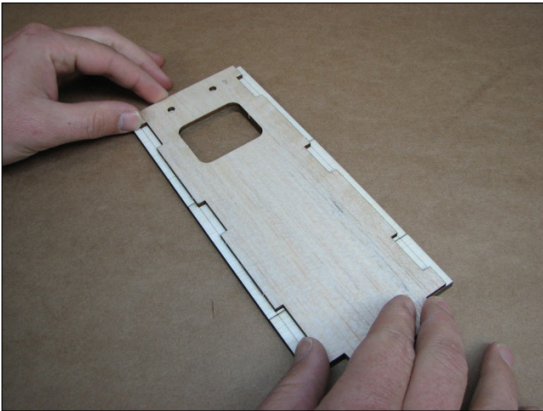
- Bond F10 assembly to bottom of fuselage, aft of slot in landing gear block with thick CA.



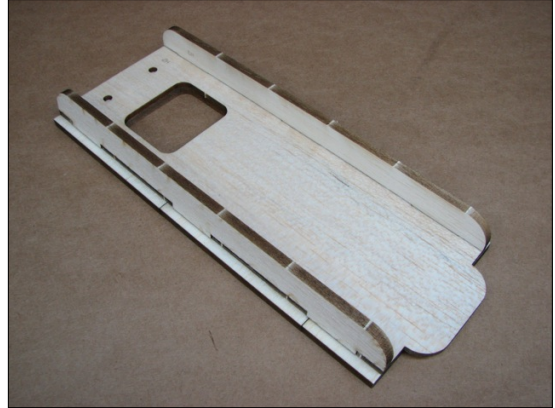
- Assemble H1 from parts H1a, H1b, and H1c. With etching located on same side of all parts, bond with medium CA.



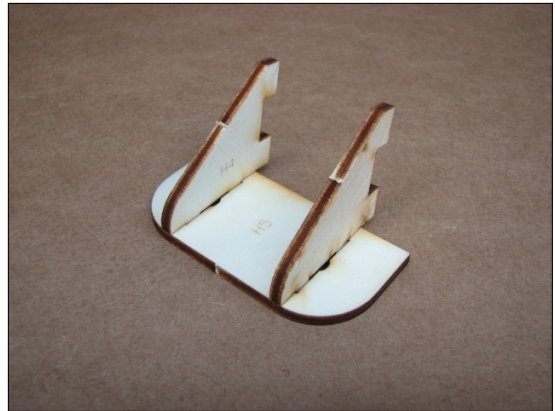
- Align H2 with etch marks in H1 assembly, with ends flush with H1 ends. Bond with thick CA.



- Fit H3 rails to notches in hatch assembly. Square on a flat surface and bond with medium CA.



- Create hatch catch. Fit parts H4 to H5. Bond with medium CA.



- Bond H4/H5 catch assembly to F4 with medium CA glue.

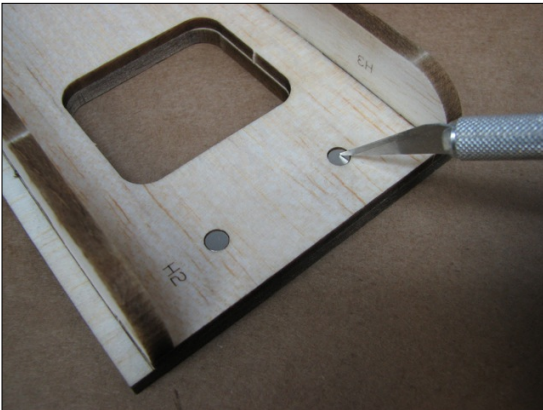


## Fuselage Construction Cont.

- Install neo. magnets in slots of H4/H5 catch assembly. Bond with medium CA.



- Match polarity of magnets so that magnets installed within hatch will attract to those installed to H4/H5 catch. Once satisfied that magnets will not be installed so as to repel each other, bond with medium CA.



- With battery hatch installed lightly sand entire fuselage with 400 grit sanding block in preparation for covering.



## Tail Feather Assembly

- Assemble vertical stabilizer, rudder, horizontal stabilizer, and elevator. Using the detail sheets as a guide, assemble each component beginning with the outer framework and finishing with the internal truss. Refer to detail sheets for sanding and hinging instruction.

Horizontal Stabilizer and Elevator.



- Vertical Stabilizer and Rudder.

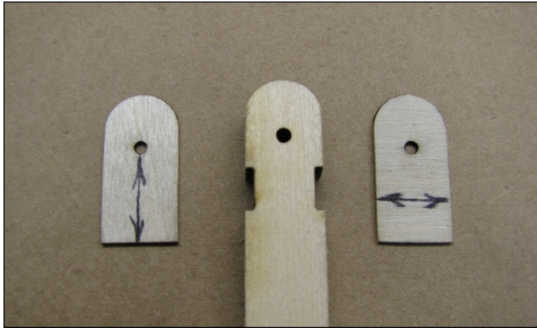




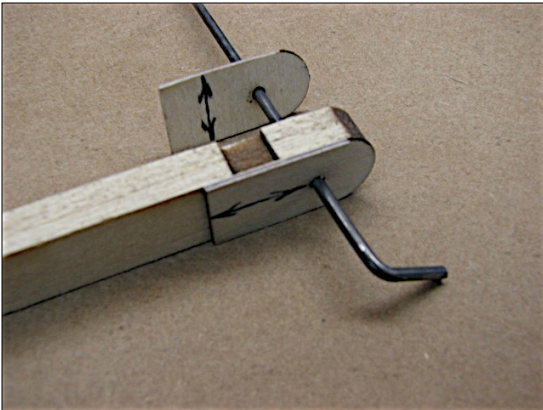
## Strut Assembly

**Struts are not installed until final assembly.**

- Make two each rear vertical struts from 3/16 in. basswood ST1 and 1/32 in. ply gussets G1a and G1b.

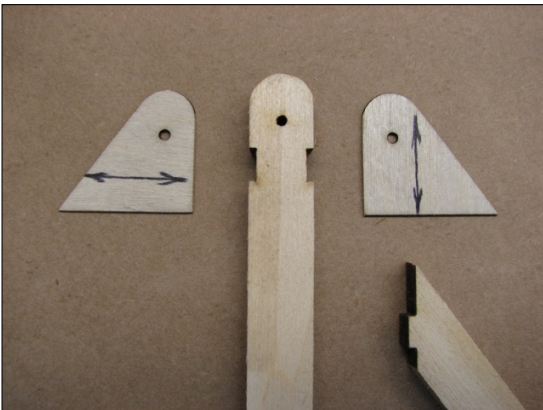


Using a length of .075 in. dia. wire as a guide, bond cross grained G1a and G1b to strut with thick CA. Remove wire before glue sets.

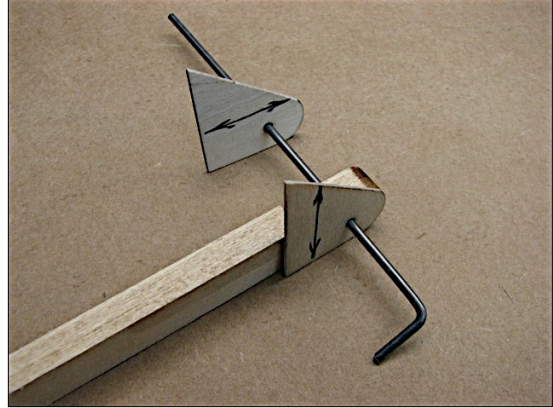


- Make two each forward struts.

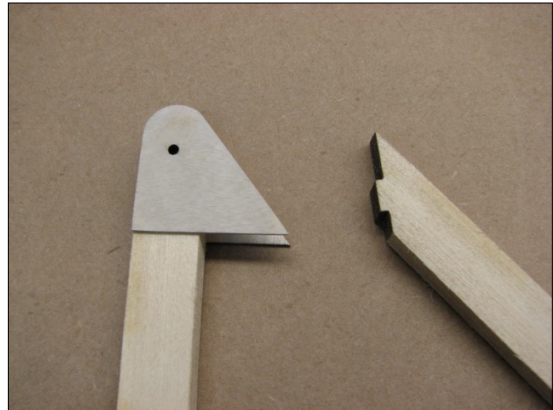
Install cross grain gussets G2a and G2b to remaining pair of S1 vertical struts.



- Again use .075 in. dia. wire as a guide and bond G2a and G2b gussets to vertical strut with thick CA. Remove wire before glue sets.

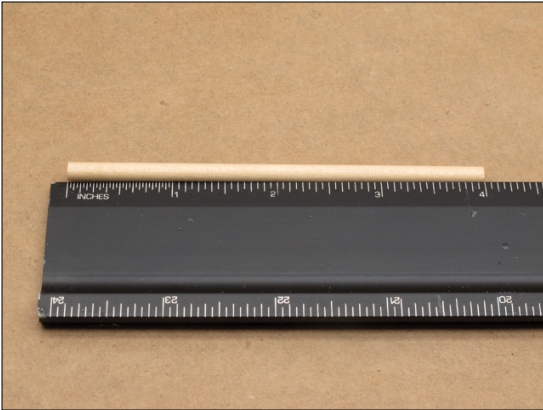


- Do not bond ST2 diagonals to verticals at this time.** Keep matched pairs together and set aside until final assembly.

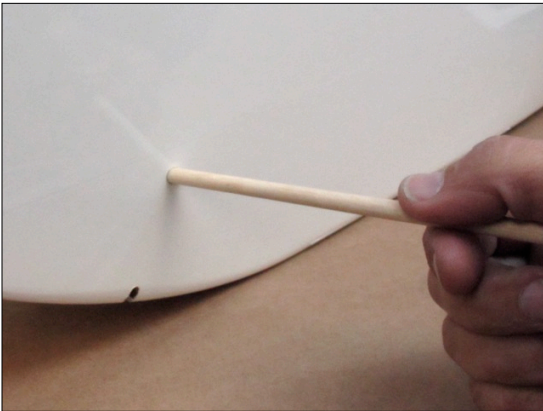


## Final Assembly

- Install pushrod guide tubes through formers F4, F5 and fuselage sides. Extend tubes 1/4 in. into electronics compartment, and trim flush at the aft exit points.
- Cover fuselage, wing, and tail feather components with a high quality user friendly covering film such as Stevens AeroModel AeroFILM.
- Cut 1/4 in. dia. dowel to 4 in. length.

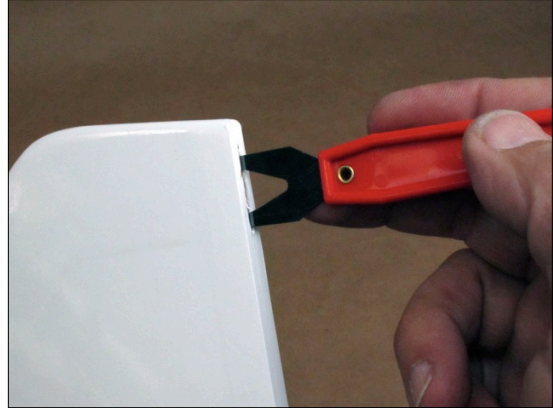


- Open holes for landing gear dowel through covering with a hot, fine point soldering iron. Center dowel in fuselage with approximately 1 in. extending from both sides. Secure with thin CA.

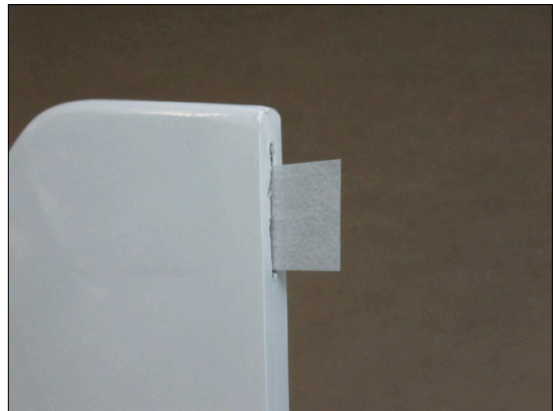


## Tail Feathers

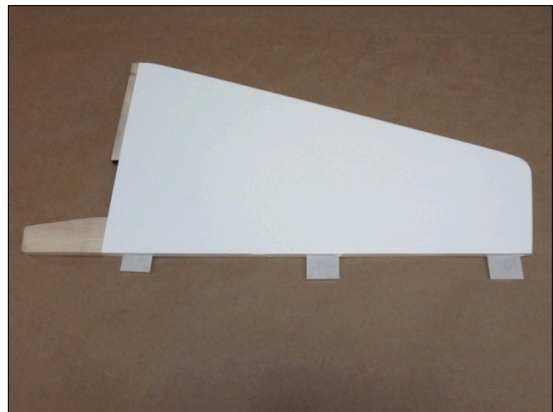
- Using a DUBRO Hinge Slotter Kit [DUB-660] open slots for hinges in tail feathers where indicated on detail sheets.



- Check fit of hinge material to slot.



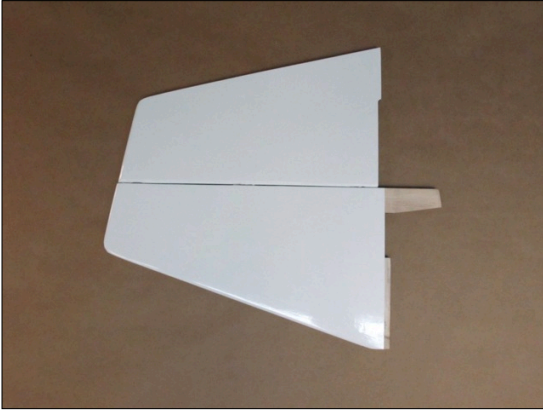
- Bond all hinges to one surface only. When all hinges are secure, fit and bond into adjoining surface.



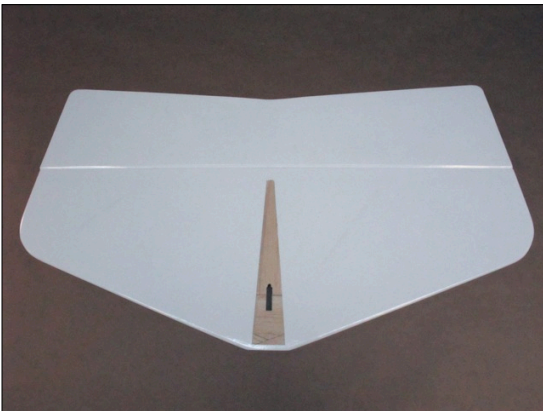


## Final Assembly Cont.

- Flex control surfaces after glue has set to ensure free movement.



- Remove a small patch of covering from the underside of stabilizer to provide for a secure, wood to wood bond with fuselage. Bond with thick CA, ensuring that stab is perpendicular to fuselage.

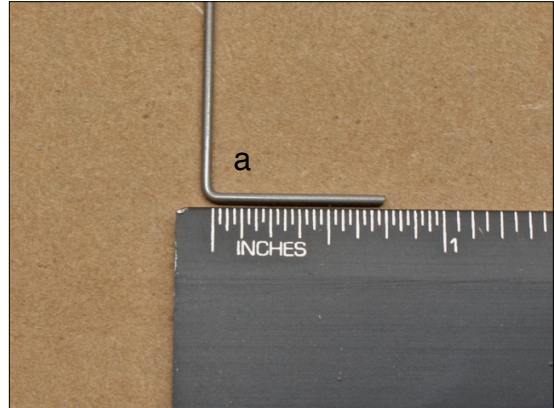


TIP! - Rudder may be temporarily inserted through stabilizer and fuselage to aid in alignment.

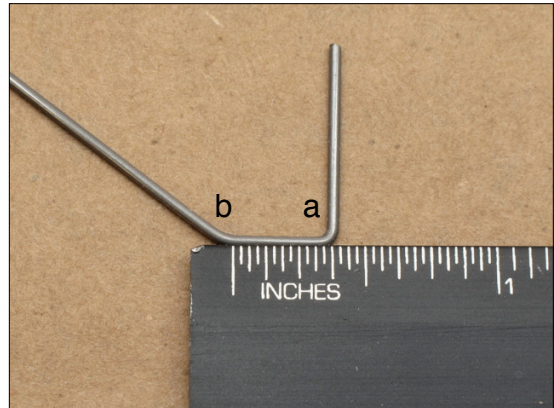
- Open slots in stabilizer and fuselage for rudder/tailwheel using a hot, fine tipped soldering iron.

## Tail Wheel

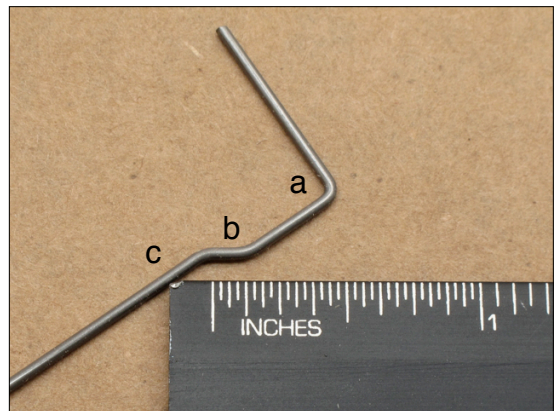
- Refer to drawing for tail wheel bend orientation. Using 6 in. length of .047 in. wire, make a 90 degree bend 3/4 in. from the end.



- Make a 45 degree bend 3/8 in. from the first bend.

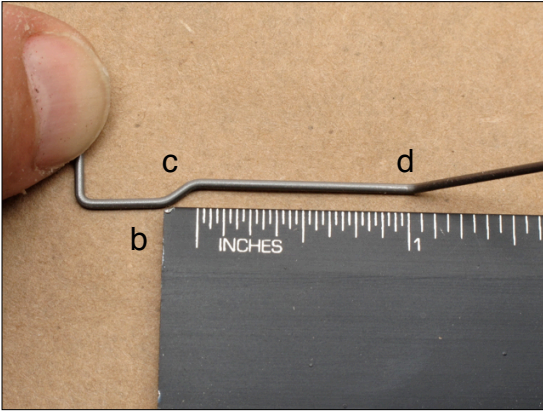


- Make another 45 degree bend in the opposite direction, 1/8 in. from last bend.

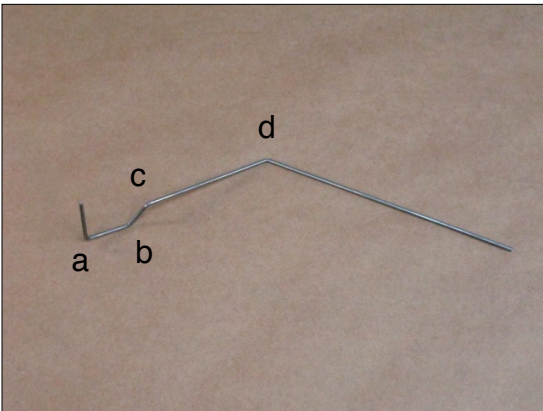


## Final Assembly Cont.

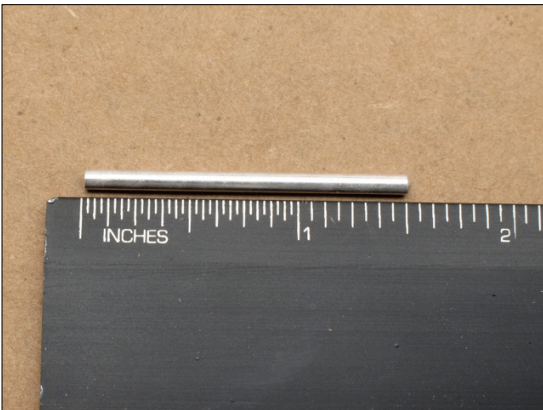
- Lay wire flat on the table. Make a 45 degree bend 1 in. from first bend, and 90 degrees from the plane of the first set of bends.



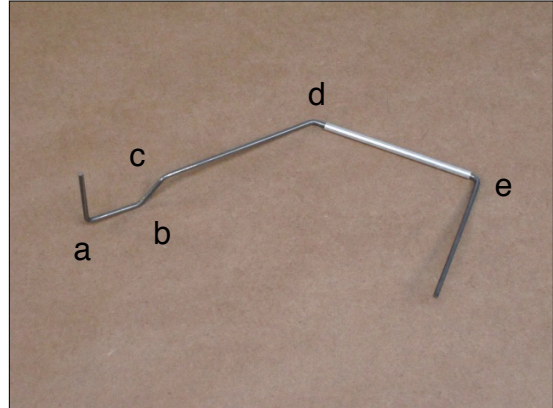
- Tail Wheel wire should appear as below at this step.



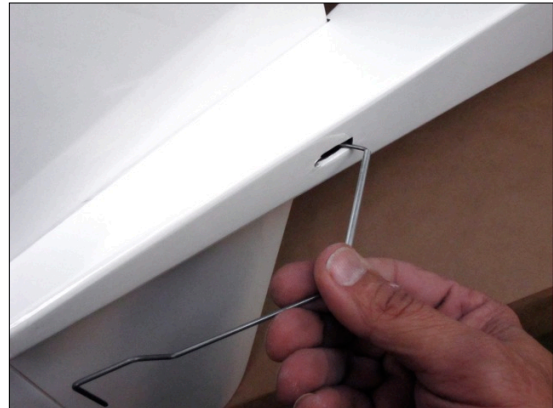
- Cut 3/32 in. O.D. aluminum tube to 1-1/2 in to form tail gear bearing tube.



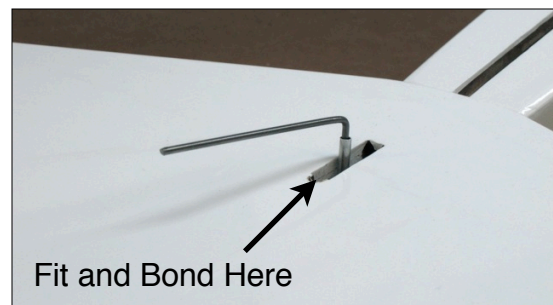
- Slide bearing tube onto wire and make a 90 degree bend 2 in. from last bend, trapping tail gear bearing tube on wire.



- Insert wire with tail gear bearing tube installed up through slot in bottom of fuselage.



- Fit tail gear bearing tube in round recess at rear of slot in fuselage and horizontal stabilizer. Tube should extend approximately 1/16 in above stabilizer, and 1/8 in. below fuselage. Bond with medium CA being careful to not get glue within the aluminum tail gear bearing tube.

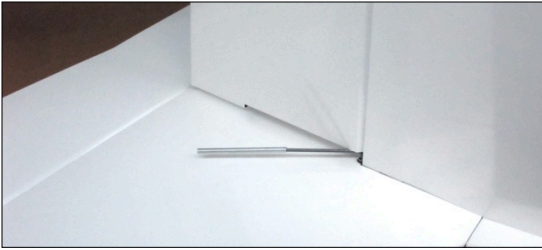




## Final Assembly Cont.

- First, bond vertical stabilizer/rudder assembly to slots in stab and fuselage. Ensure that assembly is seated properly and rudder does not bind on horizontal stabilizer. Secure with med. CA.

Next, cut 2 in. length of 3/32 in. O.D. aluminum tube to form tail gear steering tube and slip over gear wire.



- Center wire in slot in rudder. Secure with thick CA and tape.

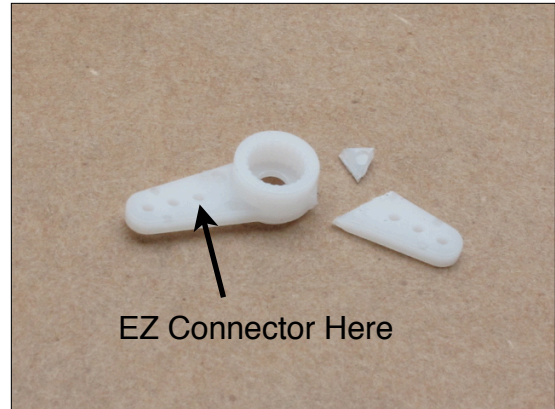


- Secure 3/4 in. tailwheel with a 90 degree bend in tail gear wire as shown below.



## Control Installation

- Trim one arm from servo control horns. Install an E/Z Connector in the inner hole of each control horn.



- Install two standard servos (HS-82MG) in SR2 servo tray, using mounting hardware provided with the servos.



- Insert pushrods into guide tubes (with "L" bend at control surface end). Open holes for mounting posts using a hot soldering iron.



## Final Assembly Cont.

- Install control horns and secure with medium CA glue.



Install control horn keeper then trim excess post material. Tip: Use a hot iron to melt post creating a rivet that secures mounting plate.



- Center servos, and insert pushrods through E/Z Connectors. Do not tighten screws at this time.



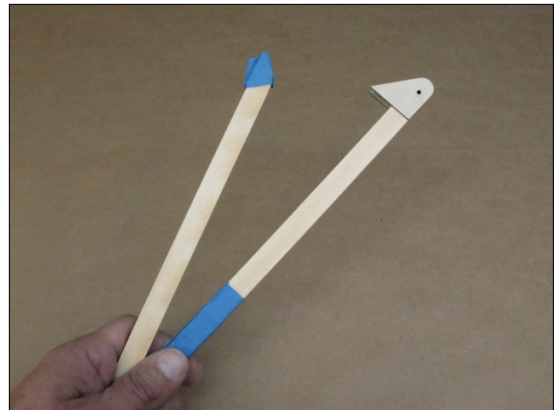
- Secure end of pushrod in control horn with an E/Z Link. Safety the E/Z Link with a 1/8 in. length of fuel tubing slipped over it. Center the control surface and tighten screw on E/Z Connector.



- Install radio receiver and make electrical connections per your transmitter and receiver instruction manual.

## Strut Installation

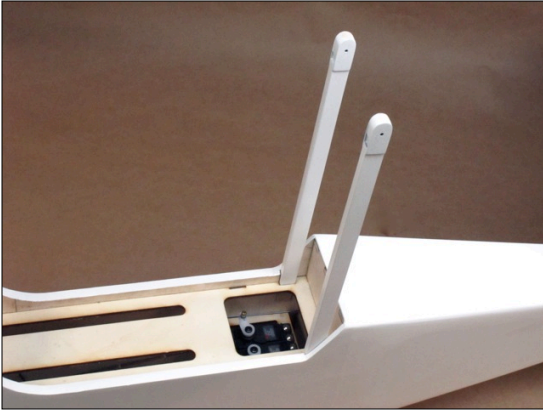
- Optional, mask off areas of the struts where glue will be applied, and paint struts desired color.



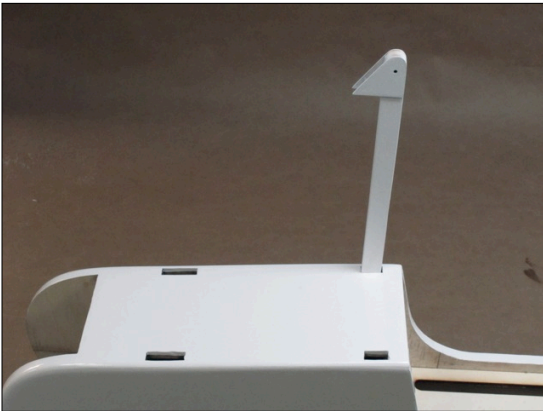


## Final Assembly Cont.

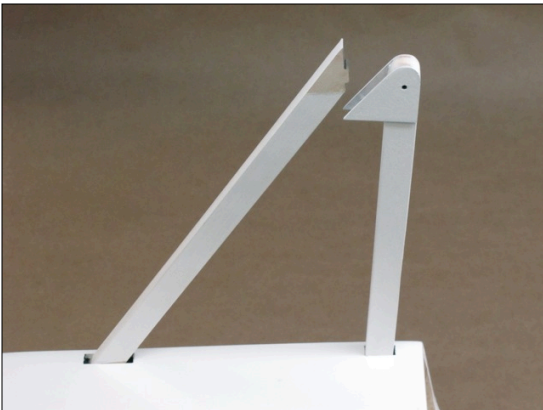
- Install rear struts in pockets with thick CA. *Ensure that struts are perpendicular to the cockpit deck and parallel to each other.*



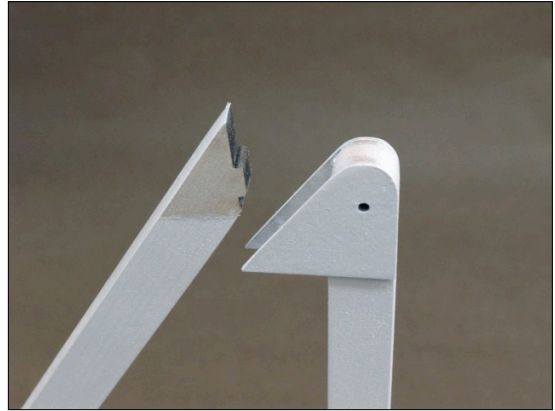
- Fit and bond front vertical struts with thick CA. *Ensure that gussets face forward, and struts are parallel to each other and rear struts.*



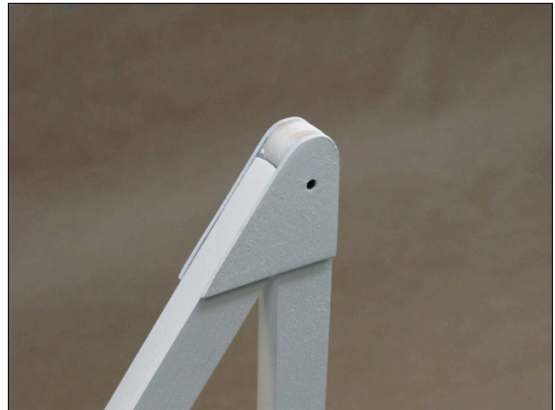
- Fit matching diagonal strut in socket. **Do not glue at this time.**



- Coat mating surfaces with thick CA and fit struts together.

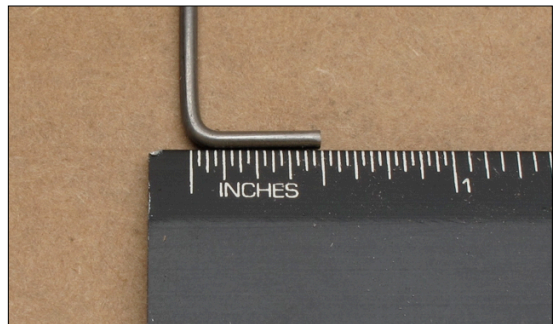


Fill any gaps in joints with thick CA. **Clamp gussets while glue cures.** Then, secure base of diagonal strut at this time with medium CA.



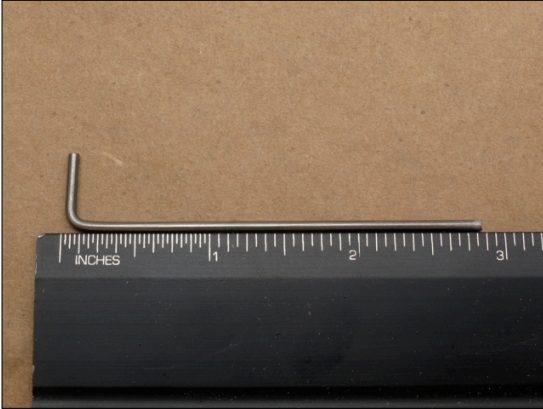
## Wing Pin Assembly

- Form *Wing Pins* from 3-1/4 in. length of .075 in. wire, make a 90 degree bend 1/2 in. from one end.

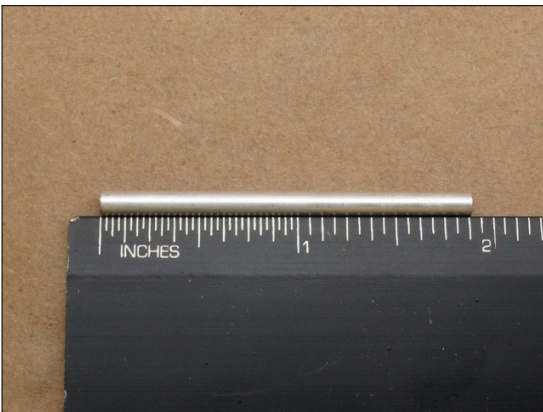


## Final Assembly Cont.

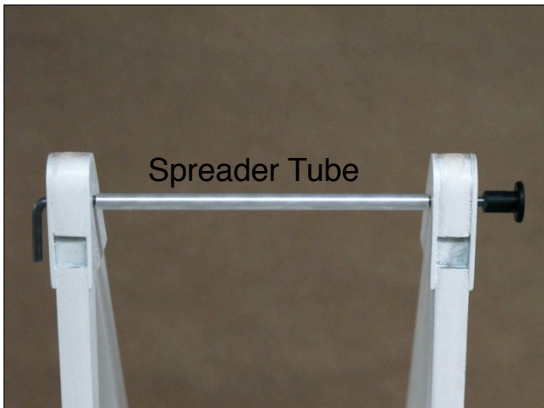
- Cut wire to a total length of 2-7/8 in. sand or file ends smooth.



- Make **Spreader Tube** from a length of 1/8 O.D. aluminum tube cut to 1-7/8 in.



- Wing Pin Assembly will be installed through struts as shown. Secure pin with rubber retainer.



- Align edges and holes in parts WMa and WMb and laminate parts together using medium CA glue to create 3/32 in. thick wing mounting tab. Make a total of 4 wing mount tabs from provided cut parts.



- Open holes for wing tabs on underside of wing. Insert previously laminated tabs and check for proper fit. Mix up 1/2 oz. of 30 minute Epoxy. Coat tabs with epoxy, and put a small amount in slots in the wing.



- There should be enough epoxy that some excess oozes out of the slot when the tab is inserted.





## Final Assembly Cont.

- Before the Epoxy cures, the excess can be easily cleaned up with a little rubbing alcohol and a paper towel.



- When the Epoxy is completely cured, the wing may be mounted and retained with Wing Pin Assembly.

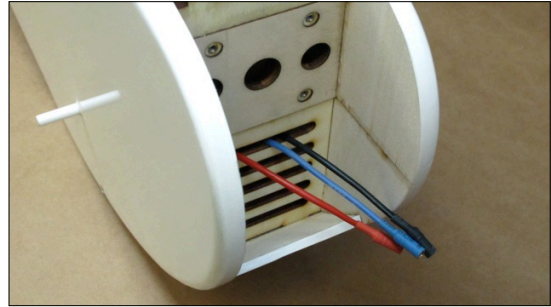


## Motor Installation

- Install a strip of Velcro (not provided) the full length of the underside of the battery tray.



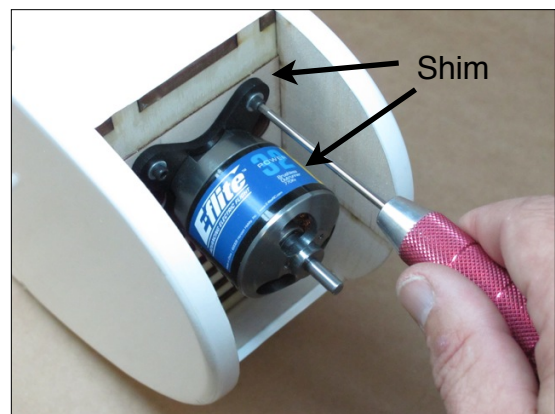
- Extend ESC cables through upper cooling slot in firewall.



- Connect motor and slide cables back through firewall...

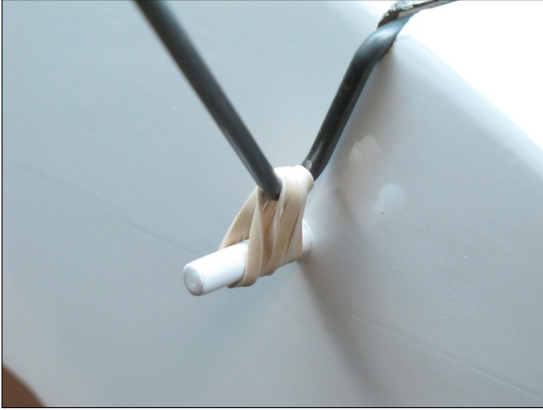


...and mount the motor. Down thrust has been built in to the FREDe's firewall, but right thrust must be set by the builder. We suggest stacking two washers #8 Nylon under each of the left mounting bolts.

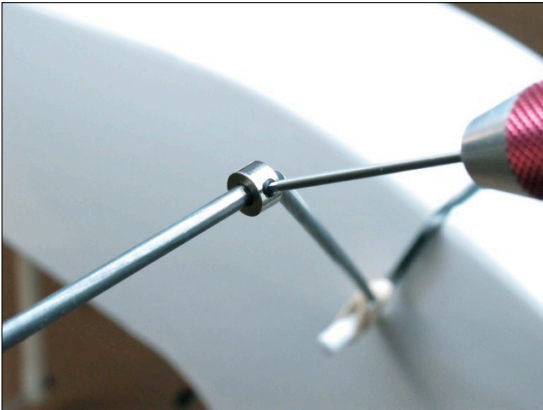


## Final Assembly Cont.

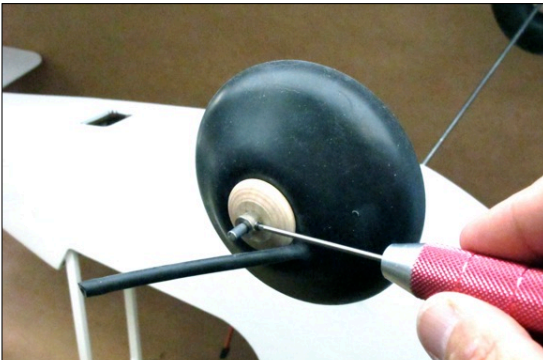
- Retain landing gear in its slot with two size 32 rubber bands on each side. Wrap each band at least 3 times around wire and landing ear lug dowel.



- Install a Dubro wheel collar [DUB-139] to prevent the wheel from jamming on the bend in the wire.



- Install main wheels (not included: We suggest a #10 Trexler wheel) and retain with another wheel collar.



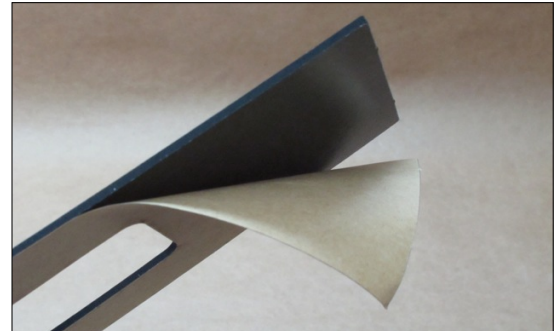
## Pilot and Cockpit Finishing

- Fit color instrument panel to front of cockpit. Trim as necessary. Apply a light coat of 3M 77 to the back of the color instrument panel and press firmly in place.



- Note:** Adhesive on neoprene material is very effective. Do not press neoprene in place until you are satisfied with the placement of the part.

Test fit then remove backing from the neoprene cockpit lining.



Carefully fit lining and press firmly in place.



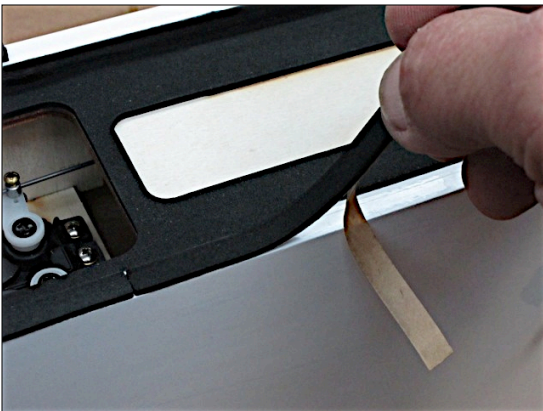


## Pilot and Cockpit Finishing Cont.

- If you have ordered the optional coaming kit. Test fit front and rear coaming to fuselage. Then, remove the backing from the neoprene cockpit coaming.



Carefully position cockpit coaming. *Ensure that notches in rear coaming fit around rear struts.* When satisfied with coaming position press firmly in place.



- Install neoprene “backrest” against back wall of cockpit.



- Fit and glue 2 piece pilot profile with medium CA. Do not attach to base at this time.



- Carefully remove one profile “Fred” from the color sheet. Make sure the color profile matches the side of the balsa profile that is facing up.



- Apply a light coat of 3M Super 77 adhesive to balsa profile.

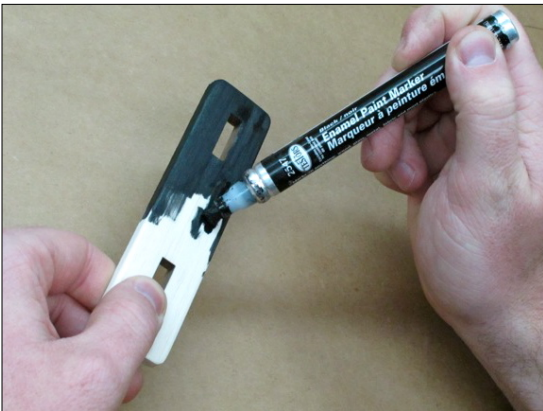
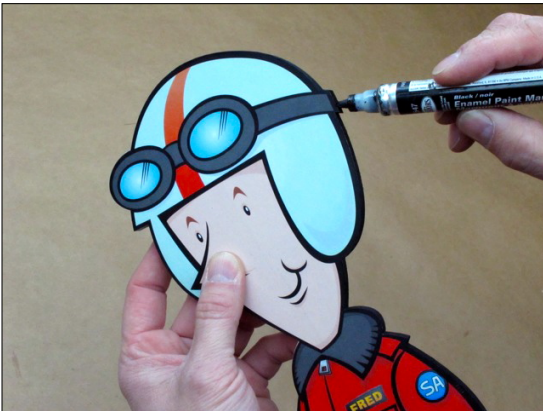


## Cockpit and Pilot Finishing Cont.

- Carefully position color profile and press firmly in place. Repeat for other side.



- Finish edges of Fred, and color the base with a black Testors Enamel Paint Marker.



- Fit Fred to his base and secure with medium CA. Give Fred two light coats of a clear lacquer sealant such as Deft.



- Position Fred in opening in neoprene lining and secure with medium CA.



- Congratulations!** Your **FREDe 1.5X** is now complete. Invite the neighbors over and show it off!





## Flight Control Setup and Balance

- First, mechanically and electronically center all control surfaces and servos; zero any trim settings in radio.
- Balance **FREDe1.5X** 4 in. from leading edge of wing. CG range will extend back to 5 in. from leading edge. Move CG back gradually as you become comfortable with flight performance.

Control Surface Travel *given is degrees and set with a protractor gauge:*

### Rudder

Low Rate +/- 20 degrees 30% expo  
High Rate +/- 30 degrees 50% expo

### Elevator

Low Rate +/- 20 degrees 30% expo  
High Rate +/- 30 degrees 50% expo

## 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 in avoiding disaster.

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

- Weight and Balance** - Refer to the Flight Control Setup section for balancing your model correctly. Ensure that the **FREDe1.5X's** C.G. is in the appropriate location for your experience level.
- Check Weather** - **FREDe1.5X's** first flight should be in zero wind conditions. **FREDe1.5X** is capable of flying in winds up to 15 mph so long as the pilot is capable.
- Inspect Airframe** for warps and obvious signs of wear and damage. Do not fly a damaged or warped model.
- Inspect Control Surfaces** for center, proper direction of travel, proper throw, secure pushrod connections, hinges, and control hardware.
- Inspect Motor** for proper direction of rotation, secure mounts and propellor. Check wiring, ESC, Receiver and Battery for secure mounting.
- Inspect Battery** for full charge. Never begin a flight with a partially charged battery.
- Check Landing Gear** - Repair or replace worn or rotten landing gear retention rubber band. Check that tires are in good condition.
- Clear Area** - Ensure that any spectators are well clear of the flight line. Have an assistant handy to keep people back and warn you of any impending danger (animals, unwary individuals, small children, etc.).

## 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 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.
- Go Flying!** - Enjoy **FREDe**'s smooth and docile flight characteristics. You will notice that **FREDe1.5X** is a very stable airplane. When built straight, and trimmed for level flight, **FREDe1.5X** should always return to wings level from any attitude. We've found **FREDe1.5X** to capture the imagination of prospective pilots both young and old. With an experienced instructor and a buddy-box system, we've found **FREDe1.5X** to be a very capable three channel trainer.

If your first flight was a bit more exciting than you'd have liked, and you're having problems with erratic flight performance; please inspect your equipment and airframe for damage, improper installation, and/or twists and warps. The most common mistakes are to try and fly with a warped or twisted wing. With such a fat chord and short moments, a small warp can cause big in-flight problems. Make certain that your wing is straight before you fly.

**FREDe1.5X** is capable of most common Rudder / Elevator/ Throttle aerobatics including Snaps, Spins, Stalls, Wing-Overs, Stall Turns, Chandelles, Barrel Rolls, Lazy-8's and Loops.

You'll find that **FREDe1.5X** really doesn't like inverted flight and will rapidly seek a wheels down attitude each and every time you try to coax it into an "outside" maneuver.

- Have fun learning the ins and outs of FREDe1.5X'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](mailto:support@stevensaero.com)

**RCGroups.com** - Forum Build Threads

**Facebook.com** - Search for Stevens AeroModel

**Phone** - 719-387-4187 M-F 10A-5P MST