

# Piper J-3 Cub

KIT # K-302

## *Assembly Instructions*



### WARRANTY

Alien Aircraft Corp. 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 Alien Aircraft Corp.'s liability exceed the original cost of the purchased kit. Further, Alien Aircraft Corp. reserves the right to change or modify this warranty without notice. The quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

In that Alien Aircraft Corp. 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.

### WARNING!!!

Failure to follow these safety precautions may result in severe injury to yourself and others.

Use safety glasses when running the motor. Do not run the motor in an area of loose gravel or sand; the propeller may throw such material in your face or eyes. Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you run the motor. Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop. Always remove the LiPo battery from the plane before charging. Always use a charger designed to charge LiPo batteries for charging the LiPo flight battery. Never leave the LiPo battery unattended while charging. If the battery becomes more than just warm, discontinue charging.



## Alien Aircraft Corp.

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# Notes about the laser cut parts

- 1...The first thing that you need to do is to identify and mark the part numbers on the laser cut parts using the drawings on the following pages as a guide.
- 2...It is possible that several of the laser cut parts may not be completely cut through. If this is the case you can free the part from the sheet quickly using an X-acto knife.
- 3...The slight discoloration on the edges of the laser cut parts may be removed by lightly sanding the edges with 400 grit sandpaper.

## Kit Contents:

Your kit contains the following parts. Please check your kit for any missing or damaged parts before starting construction.

### Wood Bag:

Qty.	Name	Description
1	LC-302-01	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-02	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-03	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-04	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-05	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-06	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-07	1/16" X 4" X 24" Laser Cut BALSA
1	LC-302-08	3/32" X 4" X 24" Laser Cut BALSA
1	LC-302-09	3/32" X 4" X 24" Laser Cut BALSA
1	LC-302-10	3/32" X 4" X 24" Laser Cut BALSA
1	LC-302-11	3mm X 3" X 12" Laser Cut POPLAR PLY
1	LC-302-12	3mm X 3" X 12" Laser Cut POPLAR PLY
1	LC-302-13	1/16" X 3" X 12" Laser Cut Birch Ply
1	LC-302-14	1/16" X 3" X 12" Laser Cut Birch Ply
4	Main Wing Spars	3/32" X 3/16" X 18" BALSA
1	Center Wing Spars	3/32" X 3/16" X 6" BALSA
2	Wing Leading Edges	1/4" sq. X 18" BALSA
6	Stringer Spars / Fuselage Stringers	3/32" X 3/32" X 18" BALSA
4	Wing Struts	3/32" X 1/4" X 12" BALSA ( Or 2 pieces 24" long)
2	Wing Center Section Sheet	1/16" X 3" X 12" BALSA

### Hardware Bag

Qty.	Name	Description
4	Blind Nuts	4-40 Blind Nuts
1	Main Landing Gear	1/16" X 12" MUSIC WIRE
2	Elevator Joiner & Wing Dowels	1/8" x 3" Birch Dowel
2	Wing Bolts	8-32 x 1" Nylon Screw
2	Blind Nuts	8-32 Blind Nuts
2	Former Brace	3/32" sq. x 2" Balsa
2	Wheel Retainer	1/16" Plastic Wheel Retainer
4	Control Horn	Control Horns
3	Sig EZ Hinge	Hinges
3	Cowl Blocks	3/8" Hardwood Blocks
3	Cowl Screws	#2 X 1/2" Sheet Metal Screws
1	Tail Wheel & Strut Wire	1/32" x 6" Music Wire
1	Tail Wheel	3/8" Plastic Tail Wheel & Retainer
1	Strut Tubes	1/32" x 3" Aluminum Tube

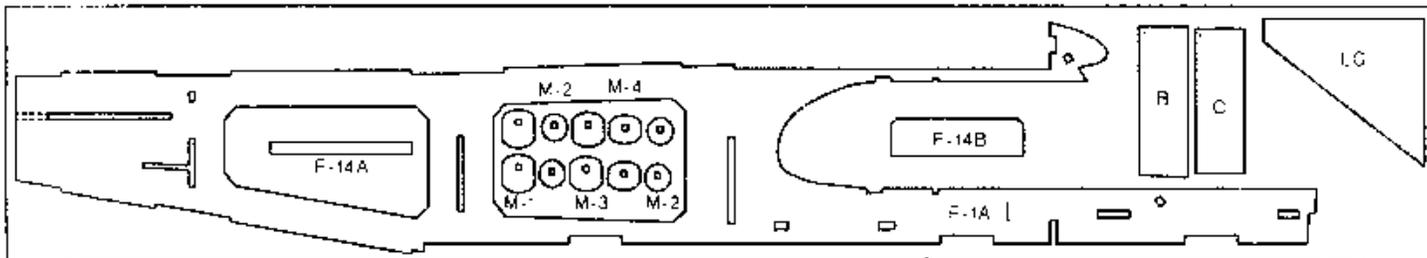
### Misc. Loose Parts

Qty.	Name	Description
1	K-302 PLAN A	
1	K-302 PLAN B	
1	K-302 Decal Sheet	
1	K-302 Plastic Cowl	
1	K-302 Windshield Plastic	

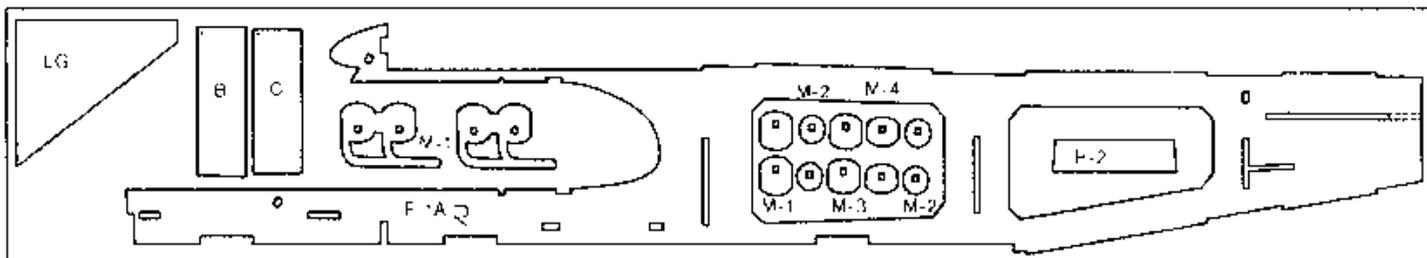
### Additional Items Required ( Not Included in Kit)

Note: These are parts that we have used and are familiar with. There are many other brands available and you may substitute other items that you are more comfortable with or have on hand.

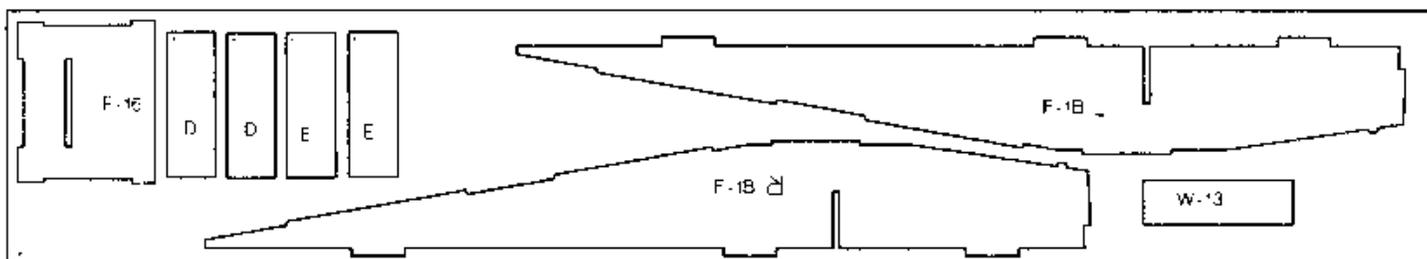
Qty.	Name	Description
1	Motor	Himax HC2808-1160 Brushless Motor ( Alien Aircraft P/N: AE-018)
1	Speed Control	Castle Creation Thunderbird-18 Electronic Speed Control ( Alien Aircraft P/N: AE-019) with connectors matching motor & battery
1	Battery Connector	Male Deans Ultra connector ( Alien Aircraft P/N: AE-027)
1	Heat Shrink Tube	3/16" Heat Shrink Tube ( Alien Aircraft P/N: AE-029)
2	Tail Pushrods	Dubro Micro Pushrod Set ( Alien Aircraft P/N: AH-001)
2	Aileron Pushrods	Alien Aircraft "2" x 10" Pushrod Set ( Alien Aircraft P/N: AH-003)
1	Propeller	APC 7X4 SF Propeller ( Alien Aircraft P/N: AE-023)
2	Wheels	DuBro 2" Super Lite Wheels (DuBro # 200SL) 1/16" Bushings Reqd.
1	Velcro	6" Velcro ( Alien Aircraft P/N: AE-012)
1	Motor Mount Hardware	2808 Motor Mount Hardware ( Alien Aircraft P/N: AE-022)
1	Battery	3 Cell 1250Mah Lipo Battery
1	Covering Material	1 Roll Light Weight Covering Material Plus Trim Colors
1	Radio	4 Channel Radio with 4 micro servos & Receiver with one "Y" connector



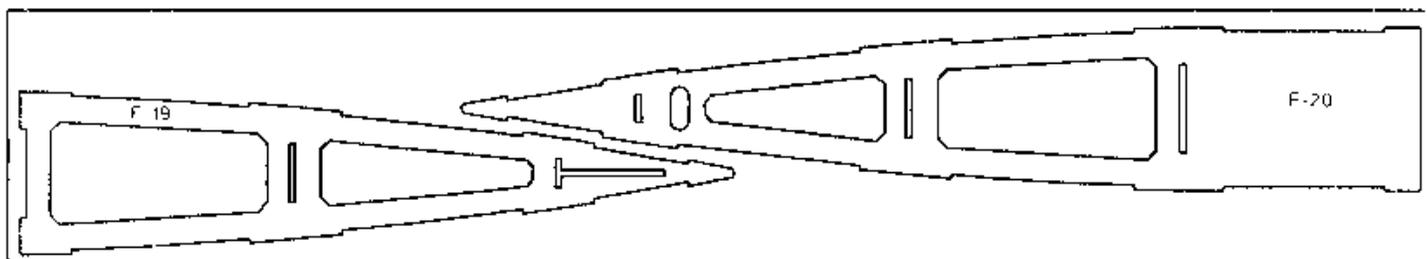
LC-302-01 1/16" X 4" X 24" BALSA 1 REOD



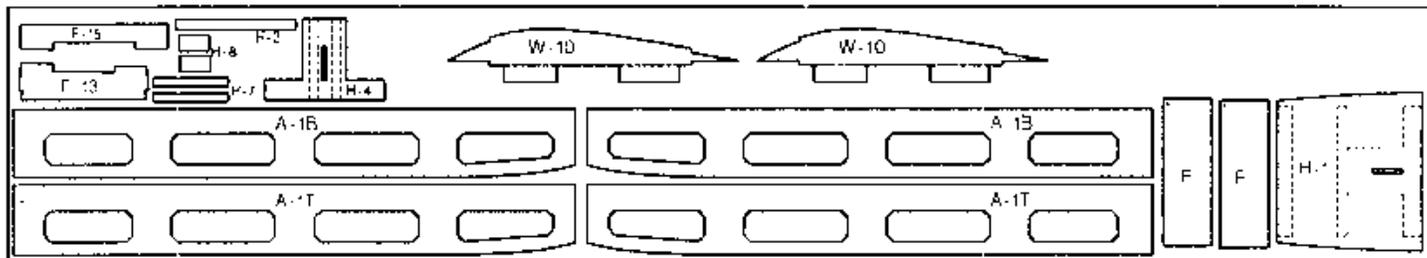
LC-302-02 1/16" X 4" X 24" BALSA 1 REOD



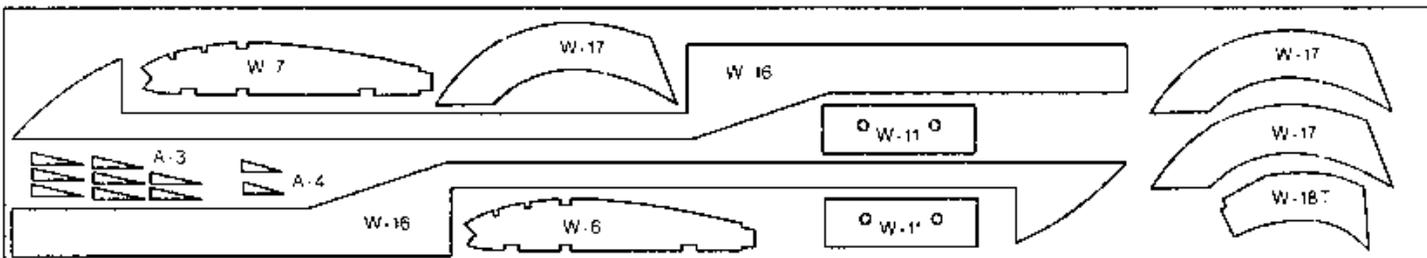
LC-302-03 1/16" X 4" X 24" BALSA 1 REOD



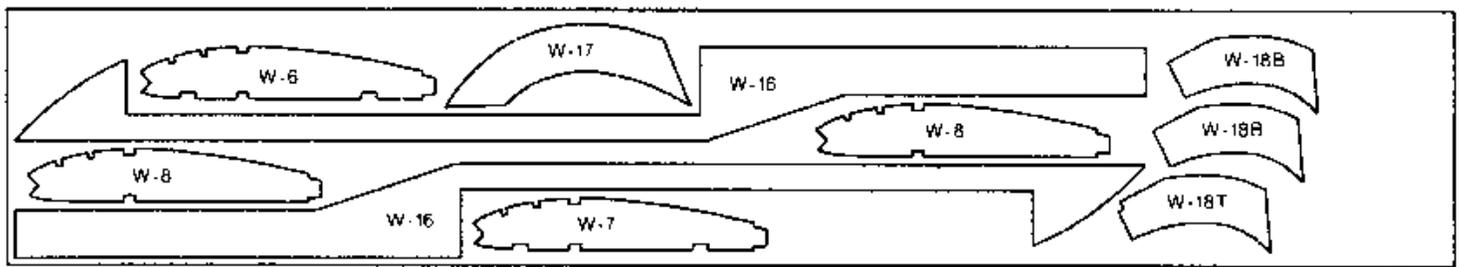
LC-302-04 1/16" X 4" X 24" BALSA 1 REOD



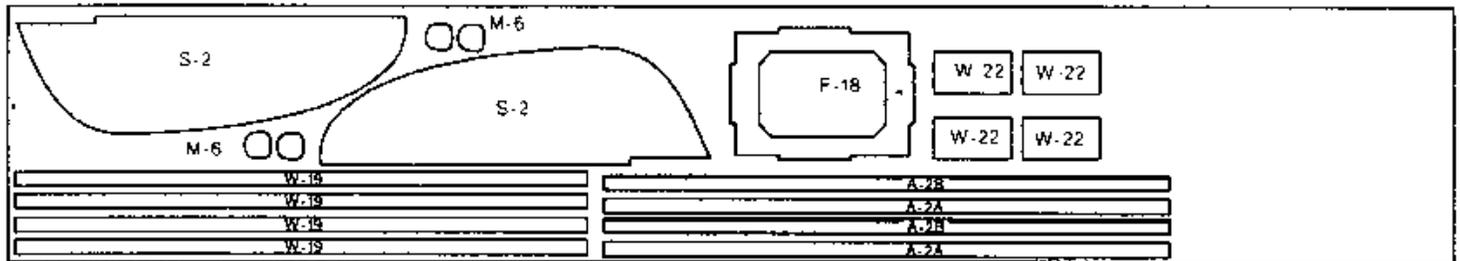
LC-302-05 1/16" X 4" X 24" BALSA 1 REOD



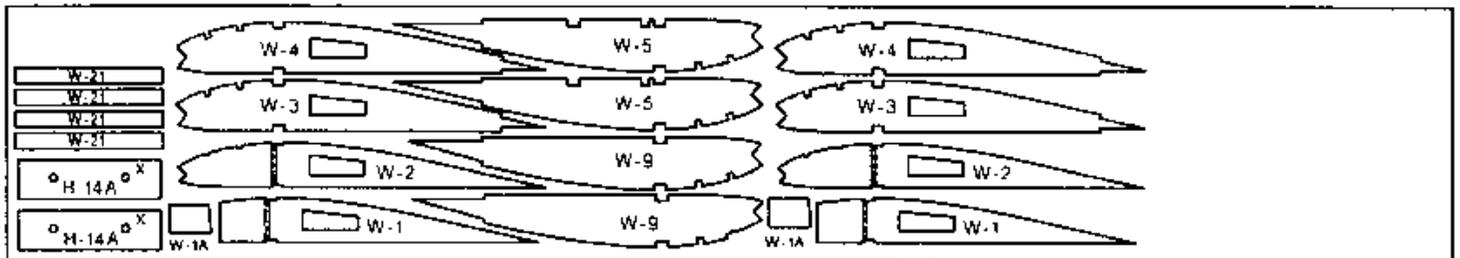
LC-302-06 1/16" X 4" X 24" BALSA 1 REOD



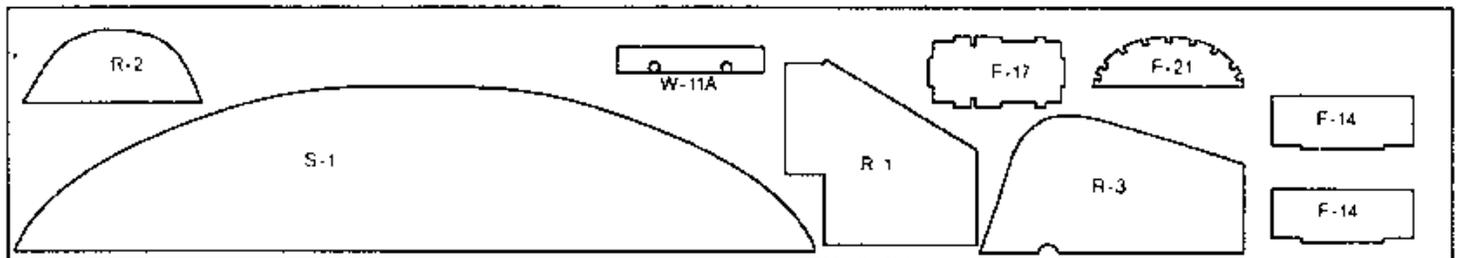
LC-302-07 1/16" X 4" X 24" Balsa 1 REQD.



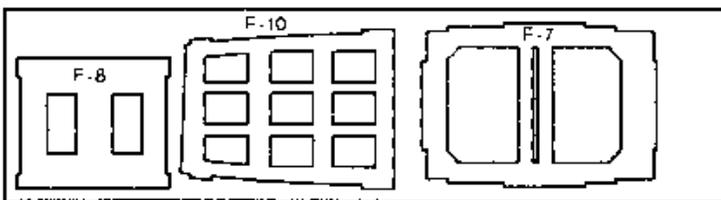
LC-302-08 3/32" X 4" X 24" Balsa 1 REQD.



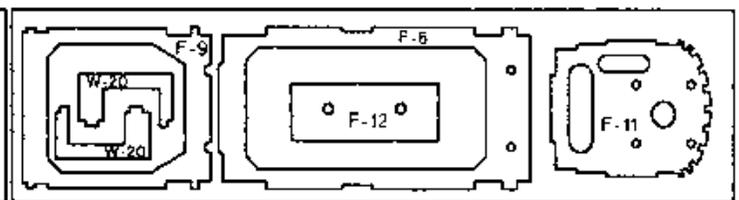
LC-302-09 3/32" X 4" X 24" Balsa 1 REQD.



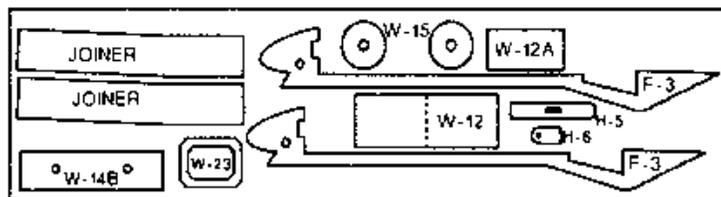
LC-302-10 3/32" X 4" X 24" Balsa 1 REQD.



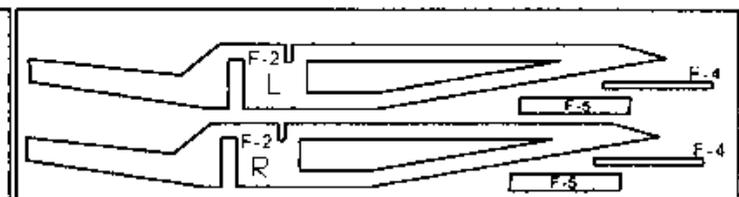
LC-302-11 3mm x 3" X 12" Poplar Ply 1 REQD.



LC-302-12 3mm X 3" X 12" Poplar Ply 1 REQD.



LC-302-13 1/16" X 3" X 12" Birch Ply 1 REQD.



LC-302-14 1/16" X 3" X 12" Birch Ply 1 REQD.

## Building Instructions:

General Note: Cover the plans with wax paper before assembling your model to prevent the parts from sticking to the plan.

### **Building the Tail Surfaces:**

1... Glue R-2 and R-3 together. Bevel the front edge of R-3 as shown on the plan, and sand the other edges round. Bend and test fit the tail wheel wire. Do not glue the wire in place at this time.

Mark the hinge locations and cut the hinge slots in R-1 and R-3. Temporarily install the hinges without glue. Sand the outside front edge round of R-1 round. Leave the other edges square.



2...Sand the 1/8"x 3" dowel to 3/32" diameter. Join the elevators (S-2) using this dowel. Use the stabilizer as a guide. Trim the dowel if required to achieve the proper length.

Bevel the front edge of the S-2's as shown on the plan, and sand the other edges round.

Sand the front and ends of the stabilizer round. Leave the back edge square.

Mark the hinge locations and cut the hinge slots. Temporarily install the hinges without glue.



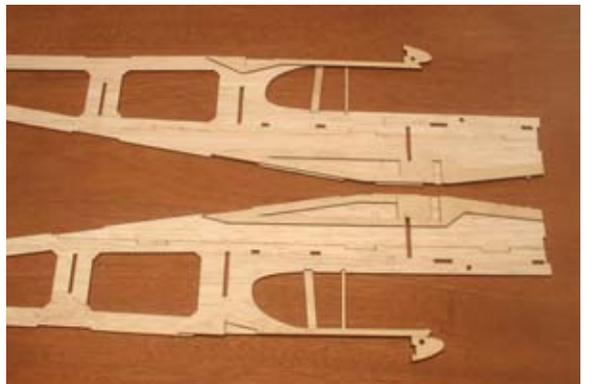
### **Building the Fuselage:**

3...Glue parts F-1A-L and F-1B-L together. Glue parts F-1A-R and F-1B-R together. Be sure to make a right hand and a left hand side.

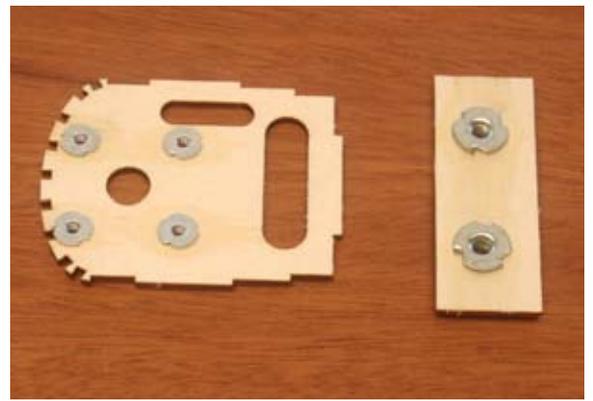


4...Glue the F-2 and F-3 doublers to the inside of the F-1R & F-1L fuselage sides. Be sure to make a right hand and a left hand side.

Glue parts F-3 and F-4 into the slots in the fuselage sides.



5...Press the four 4-40 blind nuts into the back of the firewall (F-11). Use a small drop of thin C/A to secure them in place.



Press the two 8-32 blind nuts into the back of F-12. Use a small drop of thin C/A to secure them in place.

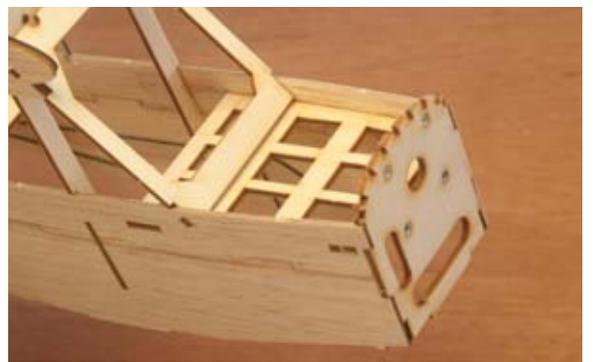
6...Lightly tack glue formers F-6 , F-7 , F-9 and servo tray F-8 into position on the right fuselage side. Use a small square to position these parts 90 degrees to the fuselage side.



7...Place the left fuselage side into position and square up the fuselage. Glue the left fuselage to the formers. Make sure that the fuselage is square and completely glue the formers to the fuselage sides.



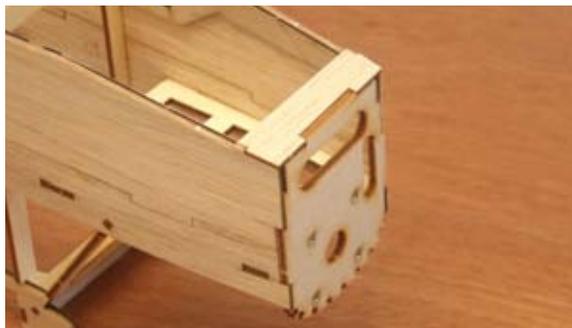
8...Place part F-10 into position in the fuselage but do not glue at this time. Glue the firewall (F-11) into position making sure the front of the fuselage is not twisted. Now glue F-10 into position.



9...Place F-12 into position. The blind nuts are a little closer to the front edge. Glue securely into position.



10...Glue F-13 into position on the bottom front of the fuselage.



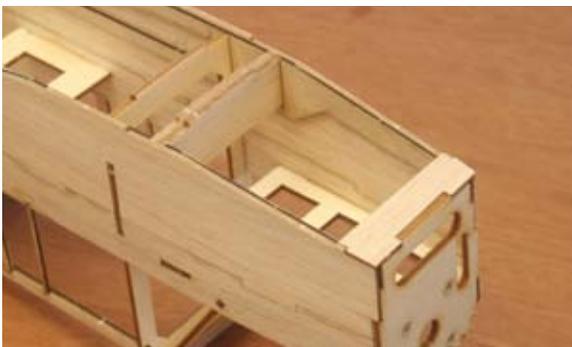
11...Glue F-14A to the front of one F-14.



12...Glue the other F-14 in place. Use a small scrap of 1/16" balsa to space the F-14's apart at the open end. Do not glue the spacer.



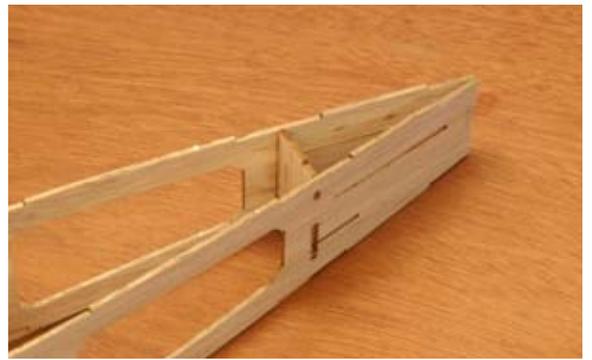
13...Slide the F-14 assembly into position in the slots in the fuselage doublers and glue into position.



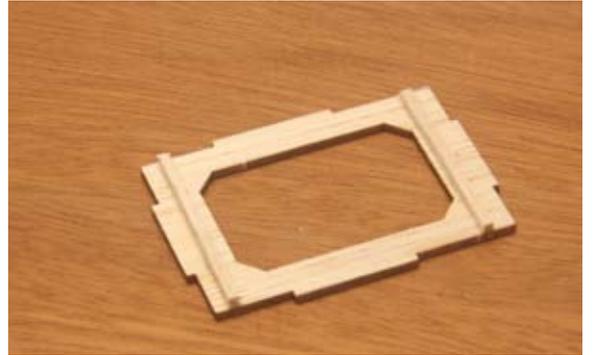
14...Glue F-15 and F-16 into position on the bottom of the fuselage.



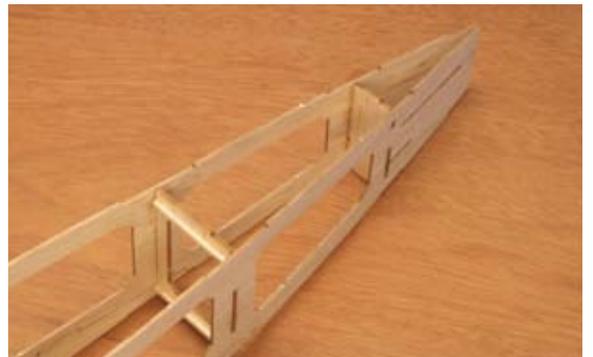
15...Place former F-17 into position and pull the rear of the fuselage sides together. Adjust the back end until the fuselage is straight and square. Glue the fuselage sides together and glue the former in place.



16...Glue the 3/32" sq. reinforcements to the top and bottom of F-18 as shown on the plan.



17...Place former F-18 into position and glue in place.



18...Glue F-19 into position on the top rear of the fuselage.



19...Glue F-20 into position on the bottom of the fuselage.

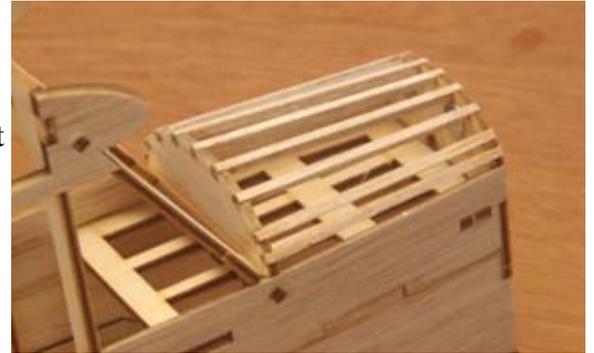
Now completely glue the formers to the fuselage sides.



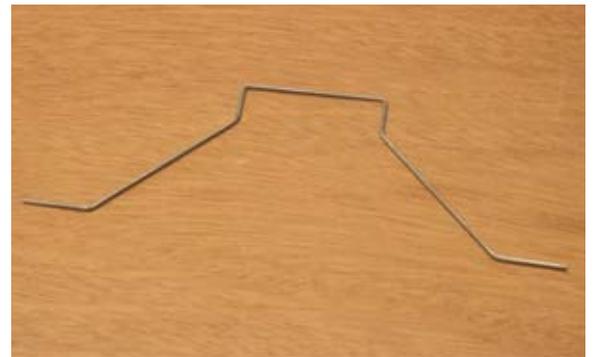
20...Glue former F-21 into position on the top front of the fuselage. It should be centered left and right, be 90 degrees to the top of the fuselage and be touching former F-9.



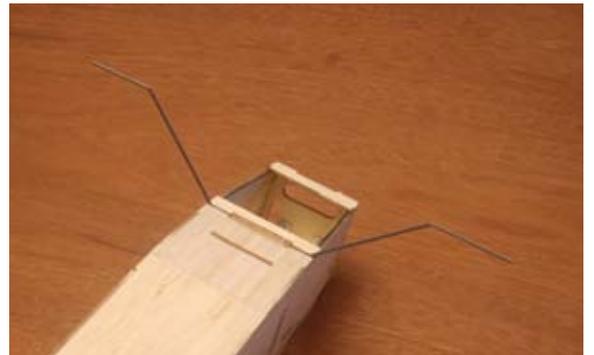
21...Using the 3/32" sq. X 18" strips, glue the stringers to the top front fuselage between F-11 and F-21. Trim the stringers flush with the formers.



22...Bend the main landing gear wire to shape using the pattern on the plan. Leave the axles long until you mount the wheels.

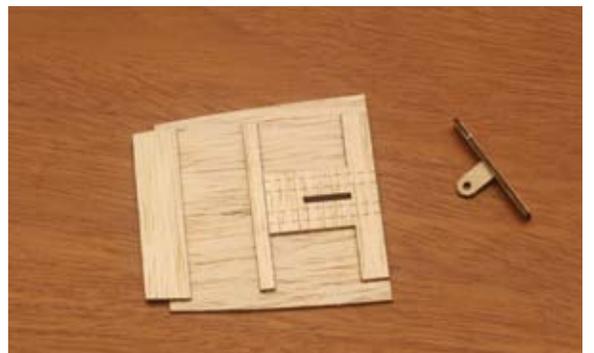


Test fit the landing gear into the slot in the bottom of the fuselage. Do not glue in place at this time.



### **Building the Hatch:**

23...Glue parts H-2, H-3 and H-4 into position on the hatch (H-1) using the laser marking as a guide. Glue parts H-5 and H-6 together. Make sure that they are 90 degrees to each other.



24...Place parts H-7 into position on the hatch. Insert H-5/6 into position to establish the proper spacing for the H-7's. Use the tip of a straight pin to apply a tiny amount of glue to the outside edges of the H-7's. Use extreme care to make sure that you DO NOT glue the H-5/6 slider into position!!!



25...With the H-5/6 slider in position, carefully glue the two H-8 pieces into position. Use the tip of a straight pin to apply a tiny amount of glue to the outside edges of the H-8's. Use extreme care to make sure that you DO NOT glue the H-5/6 slider into position!!!



26...Glue a small scrap of 1/16" sheet about 1/2" square for filler to the inside of F-15. The front end should be trimmed off flush with the front of F-15.



27...Test fit the hatch to the bottom of the fuselage. The front tab (H-2) slides under part F-13. Slide the hatch slider forward and press the back end of the hatch down on the fuselage. Move the slider back to secure the hatch. Trim the 1/16" spacer as required to allow the slider to move to the rear. You can trim the outside edges of H-2 to center the front of the hatch if required.



28...Use a sanding block to sand all of the fuselage surfaces smooth all over. Now lightly sand the corners of the fuselage round. Leave the wing opening square.



29...Cut away the wood from the stabilizer slot between the dashed lines.



30...Test fit the tail surfaces on the fuselage. Trim and sand if needed to achieve the proper fit. Cut the bottom rudder hinge slot in the end of the fuselage.

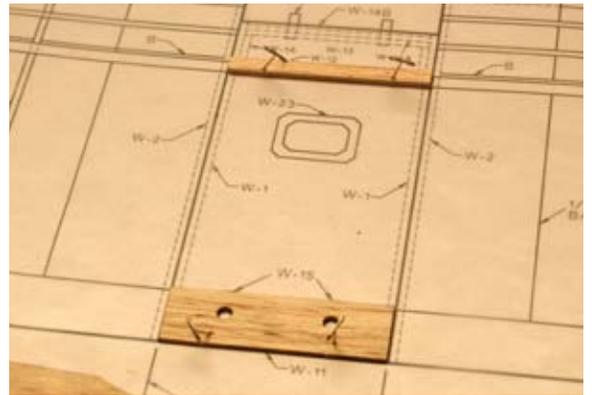


### **Building the Wing:**

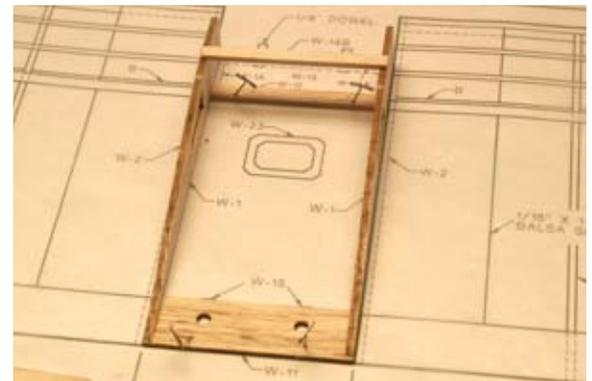
31...Cover the center section wing plan with wax paper to prevent the parts from sticking to the plan.

### **Building the Center Section:**

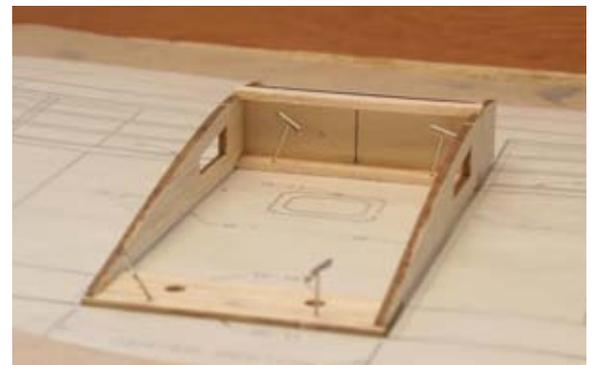
32...Pin the lower  $3/32'' \times 3/16''$  lower main spar to the plan. Cut it from the 6'' long strip. Align the ends with the ends of the center section. Pin part W-11A to the building board.



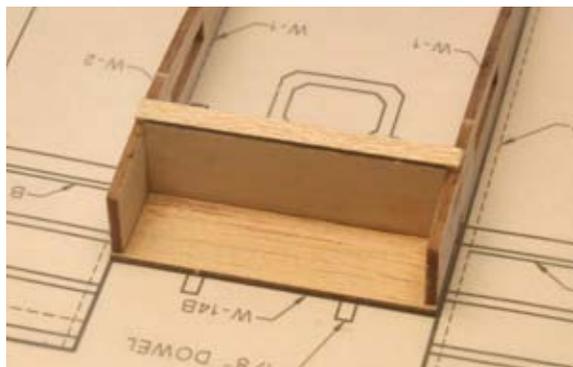
33...Glue ribs W-1 into position 90 degrees to the building board. Cut and glue the upper  $3/32'' \times 3/16''$  main spar into place. Make sure the ribs maintain 90 degrees to the building board.



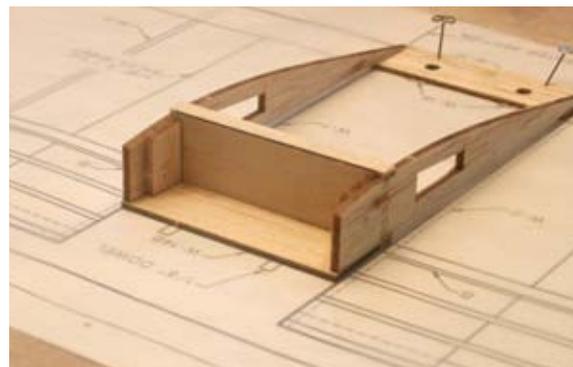
34...Draw the centerline on the back of W-12. Position W-12 on the front of the top and bottom spars and glue into place.



35...Slide part W-13 under the front of the W-1 ribs. It should be tight against the front of W-12 and centered left and right. Glue it to W-12 and the W-1 ribs.



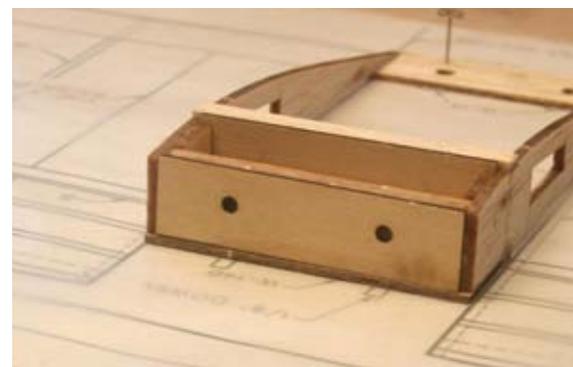
36...Glue pieces W-1A into position.



37...Position one W-14A into position on top of W-13 and against the front of the W-1A's. The holes are offset from the center and should be closer to the top than the bottom. Glue in place.



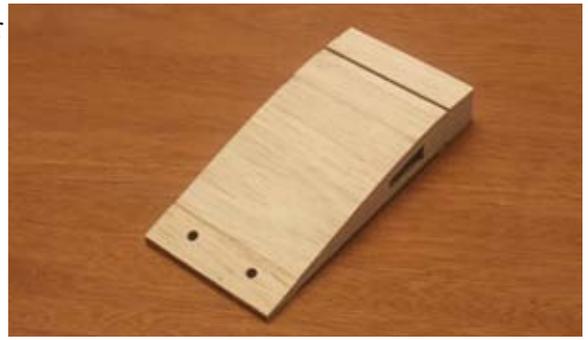
38...Glue the second W-14A into position on the front of the previous one. Now glue W-14B into position on front of the W-14A's.



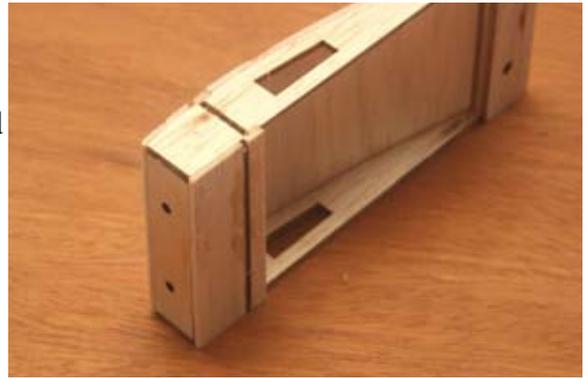
39...Glue the top W-11A into position and then slide the W-11B between the two W-11's and glue in place.



40...Use the 1/16" x 3" x 12" balsa sheet to sheet the top of the center section. Cut the sheet so the grain runs left to right. The sheet should but up against and be flush with W-11 and the spar. The front piece rests on top of the F-14's.



41...Cut open the 1/16" wide slots in the W-1 ribs between the dashed lines.



42...Slide the short end of the two joiners into the slots in the W-1 ribs. The outboard ends of the joiners should angle up. The inboard ends should meet at the centerline on W-12. Glue the joiners to W-12 and the top and bottom spar.



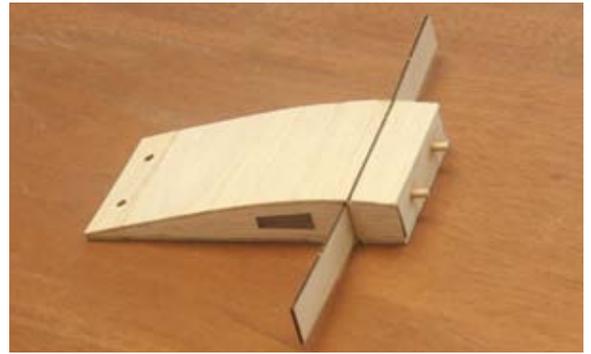
43...Center W-12A on the back of the joiners and glue into position.



44...Sheet the bottom of the center section with the 1/16" sheet as you did the top.



45...Cut two pieces from the 1/8" dowel approximately 3/4" long. Insert them into the holes in the front of W-14B. They should stick out just over 1/4". Securely glue them into position.



46...Test fit the wing center section onto the fuselage. You can adjust the holes in F-6 if required for a good fit. Sand the back end if required to fit tightly down into the step in the fuselage.



47...Place the W-15 discs onto the nylon screws and thread them into place. Glue the W-15's to the top of the center section.



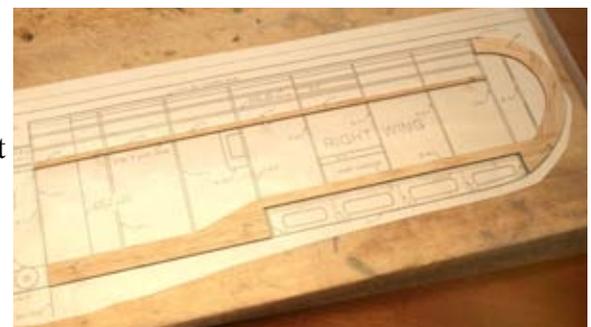
48...Glue W-23 into position on the sheet on the bottom of the center section. Cut away the sheet from the center when the glue dries.



### **Building the Right Wing:**

49...Cover the right wing plan with wax paper to prevent the parts from sticking to the plan.

50...Pin the lower 3/32" x 3/16" lower main spar to the plan. Align the inboard end with the wing center line. Trim the outboard end so it ends at the W-9 rib. Pin W-16, W-17 and W-18B into position and glue together.



51...Glue rib W-3 into position 90 degrees to the building board. Glue shear web "B" into position against the front face of the lower spar and rib W-3 as shown on the plan. Glue to the trailing edge as well as the spar.

The small "X" on the shear web marks the top outboard corners of the shear webs.



52...Glue rib W-2 into position. The top of the rib should angle slightly toward the wing tip.



53...Glue ribs W-4 thru W-9 into position. They should be 90 degrees to the building board. Do not glue W-9 to W-18 at this time.



54...Pin the W-10 rib into position on the plan. The standoffs should be placed on the hatched areas on the plan.



55...Glue the 3/32" x 3/16" top spar into position. The spar stops at the W-9 rib. Glue the 1/4" sq. leading edge into position in the notches in the front of the ribs. The leading edge stops at rib W-9. Be careful to not allow glue to run down onto W-18.



56...Glue two W-19's together. Put into position and glue to the ribs and the trailing edge.



57...Glue the remaining shear webs ( C thru F ) into position. Trim the ends to get the proper fit if needed.



58...Glue the 3/32" sq. stringer spars into position. They should stop at W-9.



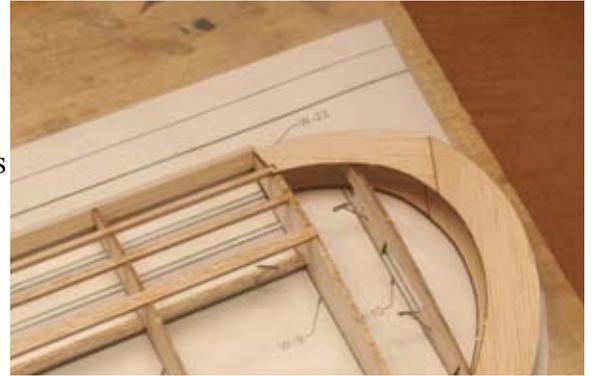
59...Glue the top trailing edge / wing tip parts W-16, W-17 and W-18T together.



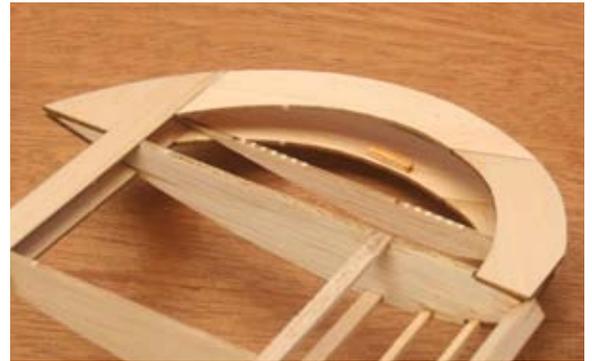
60...Glue the top trailing edge / wing tip into position, Glue it to ribs W-1 thru W-9 and the back of W-10.



61...Roll the front of the wing tip forward and glue to W-9 and W-10. The very end of the wing tip should be level with ( the same height ) as the main spar at rib W-9.



62...Remove the wing from the plan. Break the tabs from the bottom of W-8. Glue a 3/8" long piece of 3/32" sq. balsa to the top inside of the wing tip at the location shown on the plan. Glue to the top only.



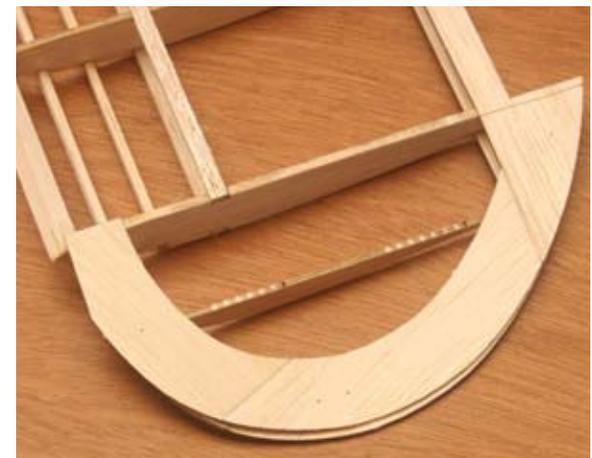
63...Cut part way thru the bottom of W-16 at the outside edge of W-9.



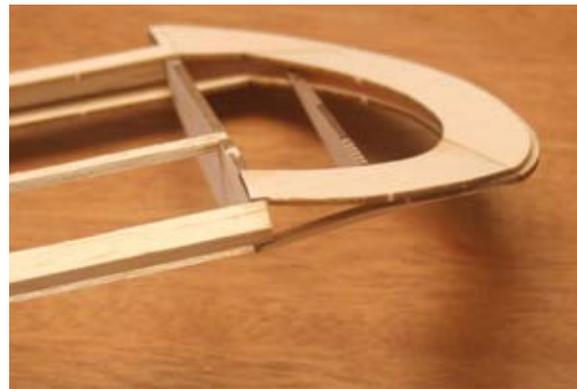
64...Lay the wing upside down on your building board. Hold it so it is level front to back and the top spar is in contact with the building board.

Press the lower wing tip sheet into contact with the top sheet and press both into contact with the building board. The bottom will be a little short but that is OK.

Put a drop of glue at the very end of the wing tip to glue the bottom to the top. Then, working from the center to the rear glue the bottom wing tip to the top.



65...Working from the center to the front, glue the bottom wing tip to the top. Stop about 1 3/8" from the 1/4" sq. leading edge leaving a triangular opening in the front. Glue to W-9.



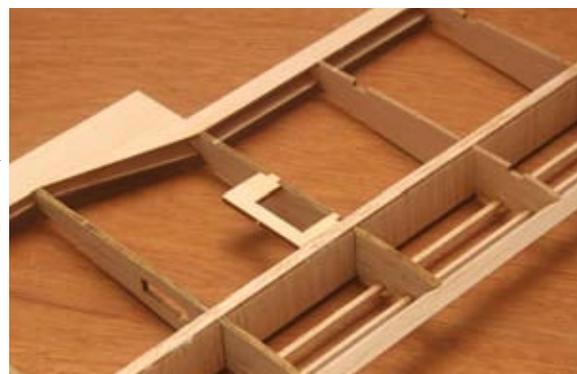
66...Trim the front of W-18B back so it even with W-18T.



67...Glue two W-22's into position against the top and bottom sheet and the 1/4" sq. leading edge.



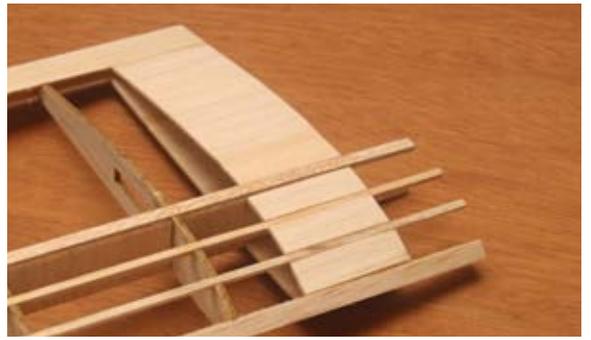
68...Glue the aileron servo tray (W-20) into position on rib W-5. Glue to the rib as well as the main spar. The front edge should be flush with the spar.



69...Glue the two W-21 pieces into position in the notches in ribs W-6 and W-7.



70...Cut four pieces 1 1/2" wide from the 1/16" x 3" x 12" balsa sheet. Use them to sheet the top and bottom center of the wing. The sheet should be cut to fit between the spars as shown on the plan.



71...Trim the spars, leading edge and trailing edge flush with the end of the wing.



72...Sand the leading edge of the wing round to match the profile shown on the plan. Sand the trailing edge and wing tip round. Leave the edges of the aileron cutout square. Now sand the wing smooth all over.



Repeat steps 49 thru 72 to build the left wing.

### **Building the ailerons:**

Build the right aileron.

73...Glue A-2R on top of A-2A. The line on the A-2R should be on top as shown on the photo.



74...Trim an angle on the top of the A-2's from the top front corner of A-2A to the line marked on A-2R.



75...Glue the A-2 onto and flush with the front of A-1B. The taper on A-2 should be on the top and angle toward the rear



76...Glue the A-3's and A-4 into position.



77...Glue A-1T onto the top of the aileron. Sand the ends, front, top and rear of the aileron flush.



78...Draw a line on the front of the aileron 1/8" down from the top. Draw a line 1/8" back from the leading edge on the top and bottom of the aileron.



79...Use these lines as a guide to trim or sand the proper angles on the front of the aileron as shown on the plan.



80...Mark a line on the back of the aileron spar (W-19) 1/8" down from the top. Mark the hinge locations and cut slots for the hinges. Temporarily install the hinges and check the aileron for proper fit on the wing. Do not glue the hinges at this time.

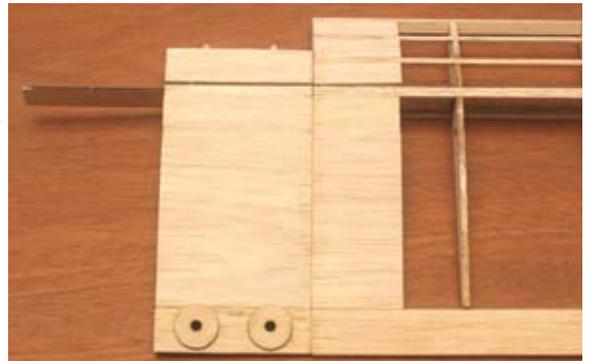


81...Repeat steps 73 thru 80 to build the left aileron.

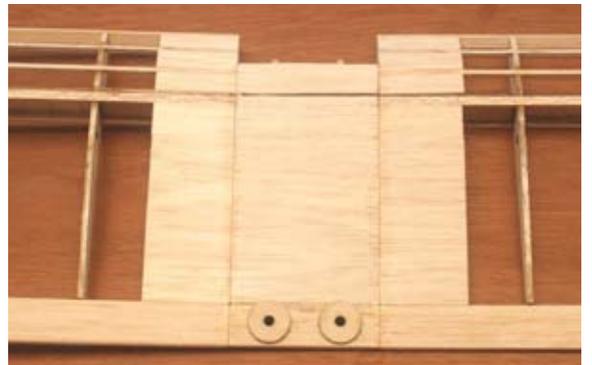
82...Cut slots in both W-1 ribs at the dashed lines to accept the wing joiner as shown on the plan.



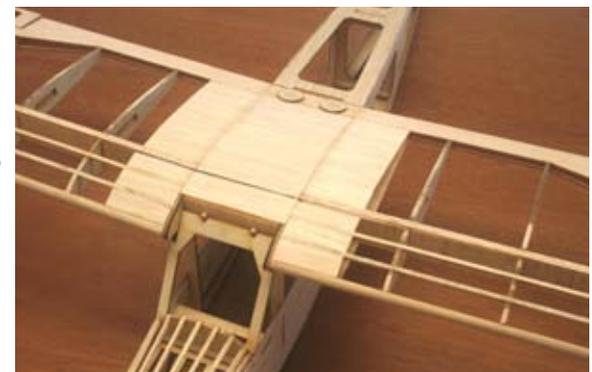
83...Slide the wing joiner on the center section into position in the right wing. Position it tightly between the spars and forward against the shear web and glue the right wing to the center section.



84...Slide the wing joiner on the center section into position in the left wing. Position it tightly between the spars and forward against the shear web and glue the left wing to the center section.



85...Test fit the wing onto the fuselage and sand the wing as required to produce a good fit if needed.



### **Covering:**

86...Sand all parts smooth with 400 grit sandpaper. Sand the back edge and top edge of parts "LG" round. Leave the front square. Feed strings from the aileron servo mounts to the center section. You will use these strings to pull the servo wires thru the wing after the model is covered. Cover the model with a light weight iron on covering material.

**Note:** After the model is covered you must check the tail surfaces and wings for warps or twists. If there are any they can be removed by twisting the parts straight and heating the covering.

### **Final Assembly:**

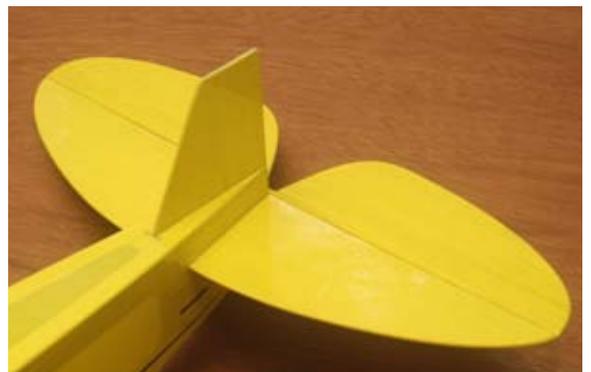
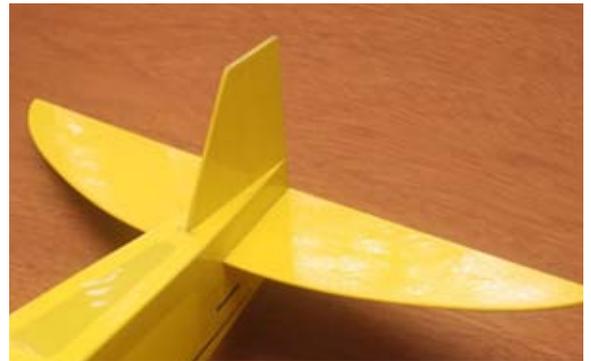
87...Cut the covering away from the stabilizer in the area that makes contact with the fuselage. Cut the covering away from the stabilizer slot in the fuselage.

Place the stabilizer into position in the fuselage. Make sure that it is straight and square and then glue it into position.

88...Carefully cut the covering away from areas on the fin that will make contact with the fuselage. Place the fin into position and make sure that it is straight and square. Glue the fin into position.

89...Attach the elevators with the hinges and glue in place.

90...Securely glue the tail wheel wire into place on the rudder. Attach the tail wheel with the push on retainer..



91...Attach the rudder with the hinges and glue in place.



92...Glue the rudder and elevator control horns into position. Drill 1/16" holes for the pins to pass thru. When the glue is dry, cut off the excess pins flush.

Insert the pushrod housings into the exit slots in the back of the fuselage. They should extend out about 2 1/4" from the fuselage top.



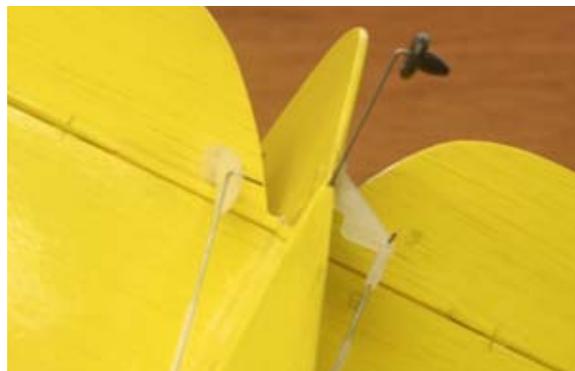
The front ends should pass thru the slot in former F-7. Glue the housings to the rear exits. Do not glue the front ends to the former at this time.



93...Screw the servos to the servo tray.



94...Install the pushrods into the housings. Secure the rear of the pushrods with Mini E/Z Links.



The front ends of the pushrods are attached to the servos with Mini E/Z Connectors. Glue the pushrod housings to the former.



NOTE: By sanding the covering material lightly with 400 grit sandpaper you can use thin C/A glue to attach the windows to the covering material and achieve a good bond. You may also cut the covering material away and glue the windows to the wood.

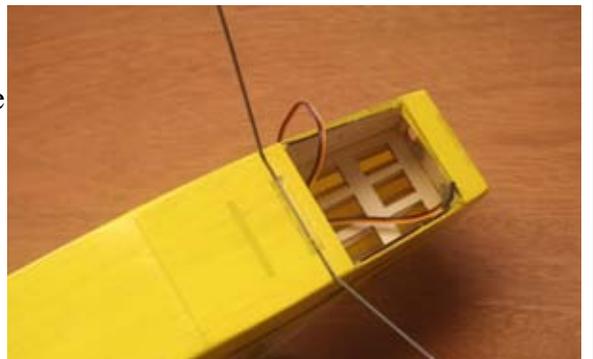
95...Cut the side windows from the plastic sheet. They should be about 1/16" oversize. Glue them into position on the outside of the model.



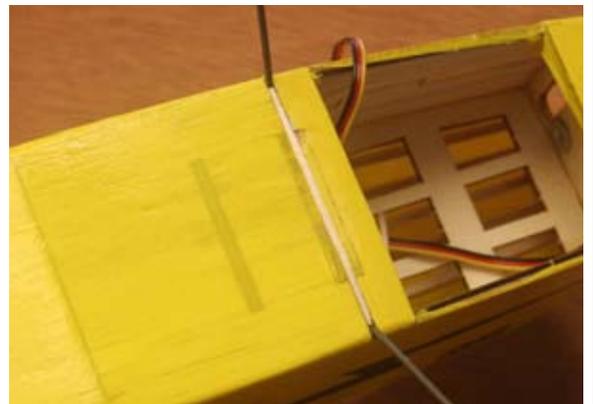
Cut the windshield to the pattern on the plan. Tape it down at the top of F-6. Wrap it around and tape the lower rear corners to the fuselage sides. Mark and trim as required. Now glue the windshield to the model with thin C/A. Start at the top. When this is dry work your way slowly around the rest of the windshield.



96...Insert the landing gear wire into the slot in the fuselage. Make sure it is completely seated. Squirt two drops of thin C/A into the slot and let dry completely.



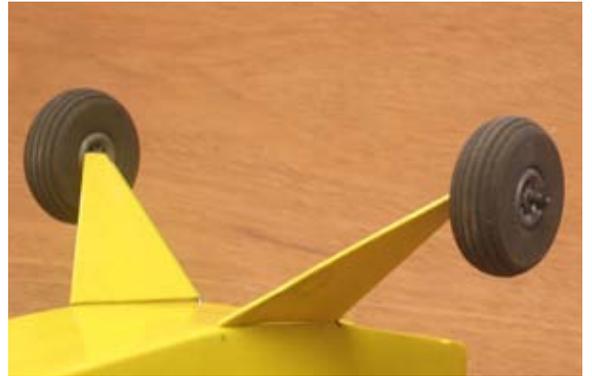
97...Insert F-14C into the slot and glue into position. Trim off any excess flush with the bottom of the fuselage. Iron on a 1/4" strip of covering material to cover the bare balsa.



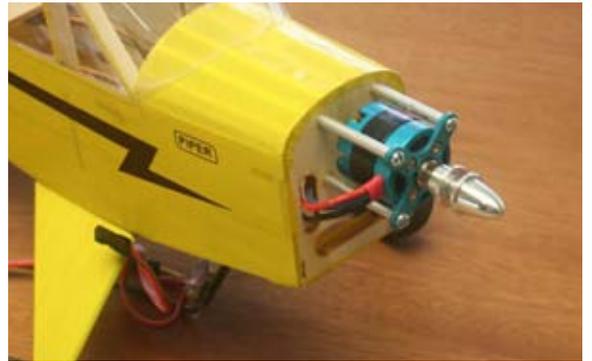
98...Attach parts LG to the back of the landing gear wires with a small amount of C/A. Wrap a 1/2" wide strip of covering material around the front of the landing gear wire and iron into position to secure parts LG to the landing gear wire.



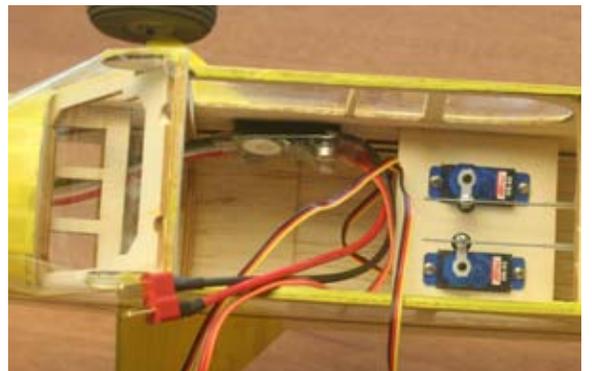
99...Put the wheels on the model and press the wheel retainers into position. With the retainers in place, cut off the excess wire axle flush with the retainer.



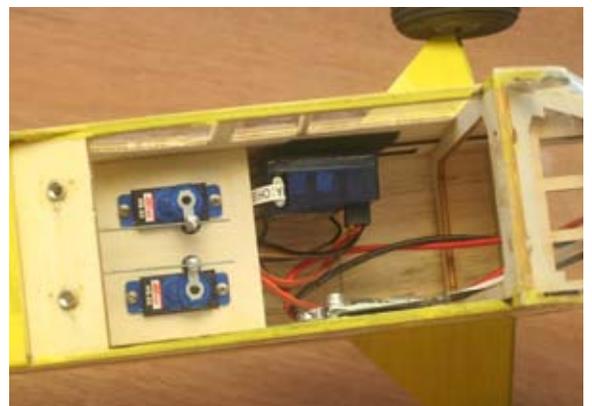
100...Secure the motor mount to the front of the motor with the four flat head screws. Now bolt the motor to the firewall with 4-40 screws and aluminum tube spacers.



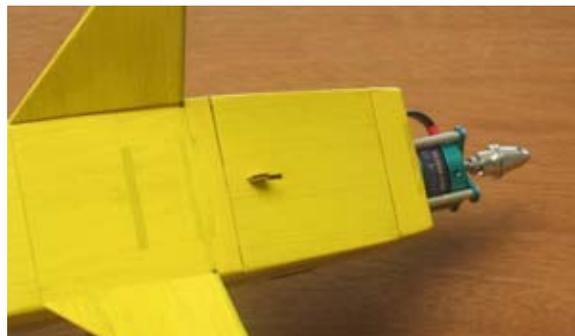
101...Secure the speed controller to the fuselage with velcro. Plug the motor into the speed controller.



102...Plug the speed control and servos into the receiver and attach the receiver to the fuselage side with velcro. Pass the receiver antenna back and out through the rear of the fuselage.



103...Secure the hatch into position.



104...Attach the ailerons to the wings with the hinges and glue in place.



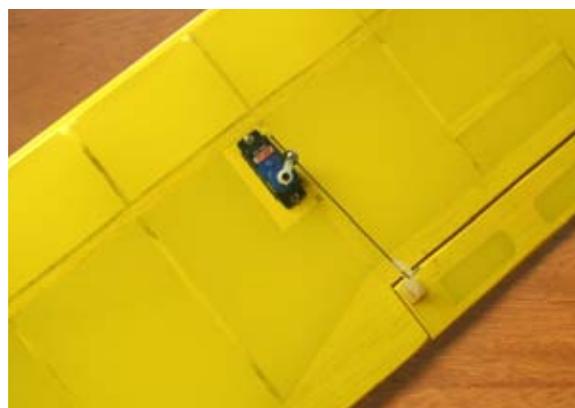
105...Screw the servos into position on the bottom of the wing.



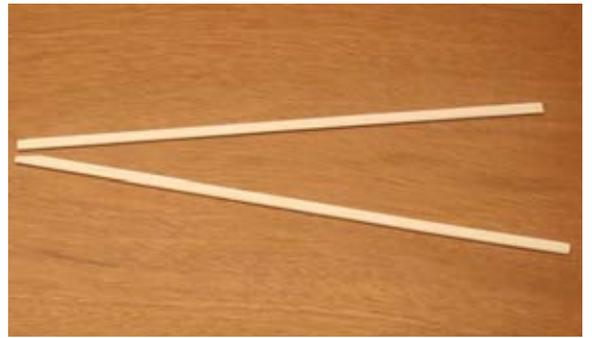
106...Glue the aileron control horns into position on the bottom of the ailerons. Drill 1/16" holes for the pins to fit into.



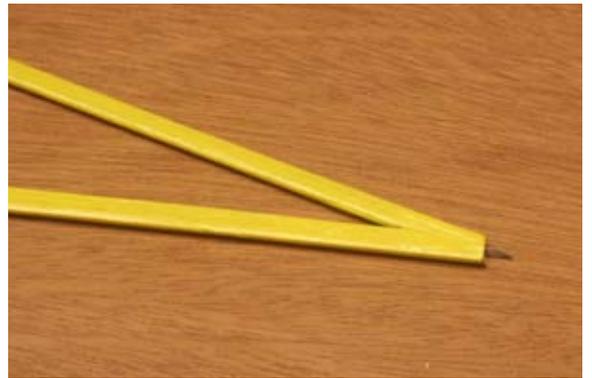
107...Install the pushrods. Attach the rear of the pushrods to the horns with Mini E/Z Links. The front ends are attached to the servos with Mini E/Z Connectors. When the servos are in neutral the servo arm should be 30 degrees forward as shown.



108...Using the plan as a guide, use the 3/32" x 1/4" strips to make the wing struts.



109...Cover the wing struts. Glue the attach wires into the ends of the struts.



110...Drill a 1/16" hole in the fuselage sides and carefully glue a 1/2" piece of the aluminum tube in place, flush with the fuselage side.



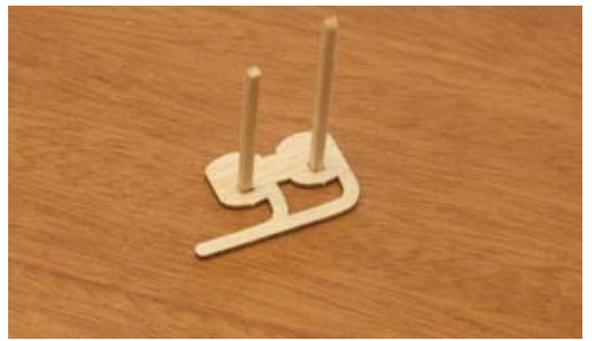
111...Insert the bottom end of the strut in the tube in the fuselage side. Adjust the bend in the wire to establish the proper angle.



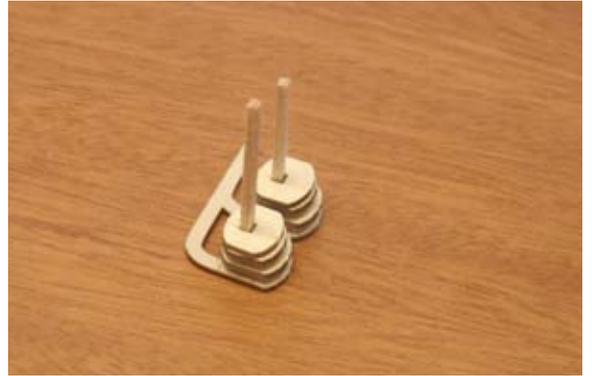
112...Place 1/2" pieces of aluminum tube over the wires at the outboard ends of the wing struts. Place the ends of the struts on the bottom of the wing over the W-21's. Adjust the bends on each end of the struts so the tubes lay flat on the bottom of the wing. Mark the location of the tubes on the wing. Remove the struts and glue the tubes to the bottom of the wing. Reinstall the struts to check the fit.



113...Glue two 1" long pieces of 3/32" sq. balsa into the holes in M-1. They should be 90 degrees to M-1.



114...Glue the motor pieces into position using the exploded view on the plan as a guide.



115...Trim the 3/32" sq. strip off flush.



116...Glue part M-6 on top of each stack. When the glue is dry, paint the dummy motor.



117...Glue the 3/8" blocks to the front of F-11. They should be flush with the outside of the fuselage. Trim the top block to provide clearance for the motor.



118...Place the cowl in place. Drill 1/16" holes thru the cowl and mounting blocks. Secure the cowl to the model with the #2 X 1/2" sheet metal screws.



119...Cut the paper cooling shrouds from the plan. Paint them black. Bend them to shape and glue to the cowl and parts M-6.



120...WITH THE PROPELLER REMOVED...Turn the transmitter on. Place the throttle stick in the low position. Plug the battery into the speed controller. Check the motor for proper operation and direction of rotation. Follow the instructions with the speed controller to make any adjustments.

121...Check the servos for proper operation and direction. Adjust the control throws to the values shown on the plan. Now disconnect the battery and then turn off the transmitter.

122...Place the battery in the nose of the model. Attach the propeller. Attach the wing onto the fuselage.

123...Check the balance of the model. It should balance at the position shown on the plan. Move the battery forward or aft to achieve the proper balance. Use velcro to secure the battery in the model in this position. Note: If moving the battery will not achieve the proper balance, you will have to add weight to the nose or tail. Glue any weight securely to the model.

124...Your model is now ready to fly. Fully charge the transmitter and airborne battery before attempting to fly the model. Always range check and do a thorough pre-flight of the model before every flight. Always follow established safety guidelines while operating the motor, radio and flying your model.

You must read the:

**LIPO BATTERY SAFETY ALERT**

On the next page.

## LIPO BATTERY SAFETY ALERT

### Lithium Battery Fires

Lithium batteries are becoming very popular for powering the control and power systems in our models. This is true because of their very high energy density (amp-hrs/wt. ratio) compared to NiCd's or other batteries. With high energy comes increased risk in their use. The principal risk is FIRE which can result from improper charging, crash damage, or shorting the batteries. All vendors of these batteries warn their customers of this danger and recommend extreme caution in their use. In spite of this, many fires have occurred as a result of the use of Lithium Polymer batteries resulting in loss of models, automobiles, and other property. Homes and garages and workshops have also burned. A lithium battery fire is very hot (several thousand degrees) and is an excellent initiator for ancillary (resulting) fires. Fire occurs due to contact between Lithium and oxygen in the air. It does not need any other source of ignition, or fuel to start, and burns almost explosively. These batteries must be used in a manner that precludes ancillary fire. The following is recommended:

1. Store, and charge, in a fireproof container; never in your model.
2. Charge in a protected area devoid of combustibles. Always stand watch over the charging process. Never leave the charging process unattended
3. In the event of damage from crashes, etc, carefully remove to a safe place for at least a half hour to observe. Physically damaged cells could erupt into flame and after sufficient time to ensure safety, should be discarded in accordance with the instructions which came with the batteries. Never attempt to charge a cell with physical damage, regardless of how slight.
4. Always use chargers designed for the specific purpose, preferably having a fixed setting for your particular pack. Many fires occur in using selectable/adjustable chargers improperly set. Never attempt to charge Lithium cells with a charger which is not specifically designed for charging Lithium cells. Never use chargers designed for Nickel Cadmium batteries.
5. Use charging systems that monitor and control the charge state of each cell in the pack. Unbalanced cells can lead to disaster if it permits overcharge of a single cell in the pack. If the batteries show any sign of swelling, discontinue charging and remove them to a safe place outside as they could erupt into flames.
6. Most important: NEVER PLUG IN A BATTERY AND LEAVE IT TO CHARGE UNATTENDED OVERNIGHT. Serious fires have resulted from this practice.
7. Do not attempt to make your own battery packs from individual cells.

These batteries CANNOT be handled and charged casually such as has been the practice for years with other types of batteries. The consequence of this practice can be very serious resulting in major property damage and/or personal harm.