

The Gamma Ray

KIT # K-102



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.



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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-102-01	.1/16" X 4" X 24" Laser Cut BALS
1	LC-102-02	.1/16" X 4" X 24" Laser Cut BALS
2	LC-102-03	.1/16" X 4" X 24" Laser Cut BALS
1	LC-102-04	.3/32" X 4" X 24" Laser Cut BALS
1	LC-102-05	.3mm X 3" X 12" Laser Cut POPLAR PLY
1	LC-102-06	.1/16 X 3" X 6" Laser Cut BIRCH PLY
2	Laser Cut Elevons	.1/8" BALS
2	Laser Cut Wing Tips (W-8)	.3/32" BALS
5	Main Wing Spars / W-1 stiffeners	.3/32" X 3/16" X 18" BALS
2	Wing Trailing Edges	.1/16" X 3/4" X 18" BALS
3	Wing Leading Edges	.1/4" X 1/4" X 9" BALS
8	Stringer Spars	.3/32" X 3/32" X 18" BALS
1	Landing Gear Wire	.1/16" X 12" MUSIC WIRE

Hardware Bag

Qty.	Name	Description
4	Blind Nuts	4-40 Blind Nuts
2	.1/16" Wheel Retainer	Wheel Retainers
3	Control Horn	Control Horns
2	Sig EZ Hinge	Hinges

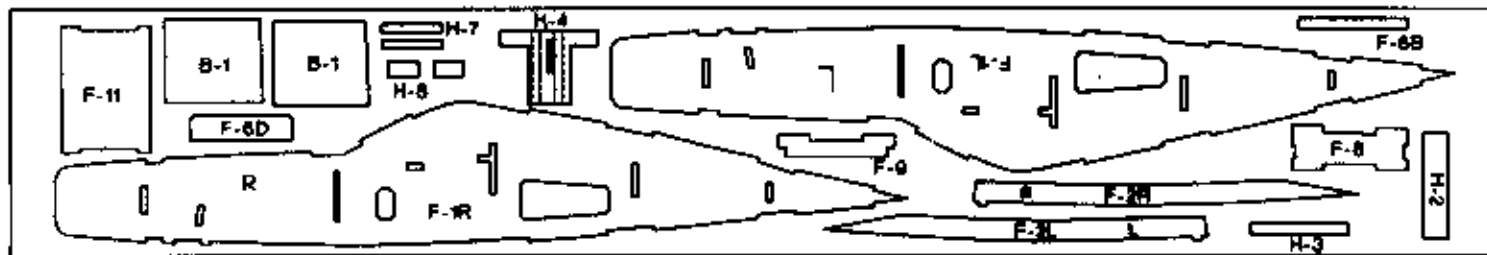
Misc. Loose Parts

Qty.	Name	Description
1	K-102 PLAN A	
1	K-102 PLAN B	

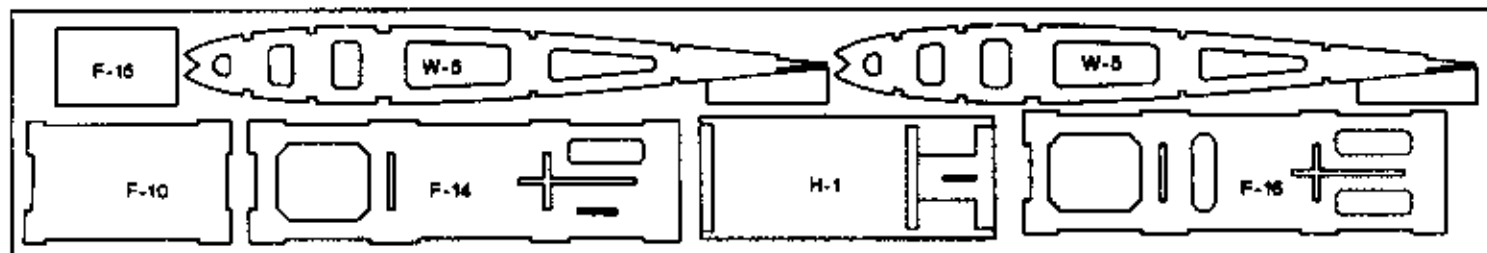
Additional Items Required (Not Included in Kit)

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.

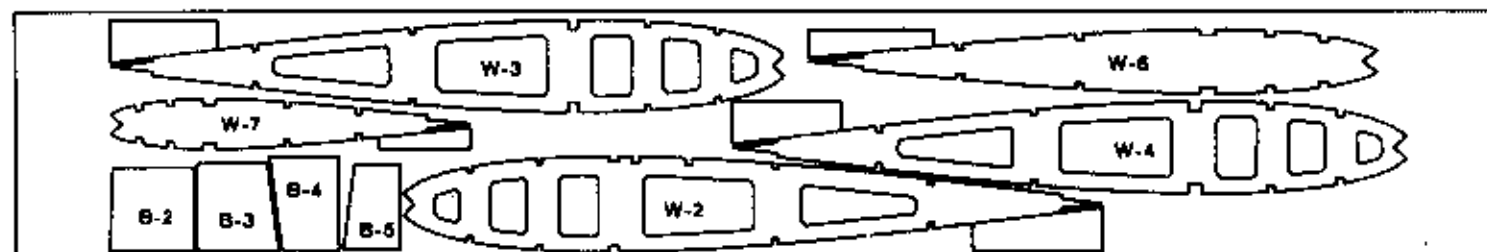
Qty.	Name	Description
1	Motor	Himax HC2212-1180 Brushless Motor (Alien Aircraft P/N: AE-003)
1	Speed Control	Castle Creation's Thunderbird-9 Electronic Speed Control (Alien Aircraft P/N: AE-004) with connectors matching motor & battery
1	.3 Pushrod set	K-102 "3" Pushrod Set (Alien Aircraft P/N: AH-002)
1	Propeller	.7 x 6 Propeller (Alien Aircraft P/N: AE-008)
2	Wheels	.145" Aluminum Bushing Wheels(Alien Aircraft P/N: AH-008)
3	Velcro	.6" Velcro (Alien Aircraft P/N: AE-012)
1	Motor Mount Set	Complete 2212 Motor Mount Assy. (Alien Aircraft P/N: AE-005)
4	wing hold down Rubber bands	#32 rubber bands
1	Battery	.2 or 3 Cell 640- 900Mah Lipo Battery (1.7" X 1.1" X 3.2" Max Battery Size)
1	Covering Material	.1 Roll Light Weight Covering Material Plus Trim Colors
1	Radio	.3 or 4 Channel Radio with 3 micro servos & Receiver (elevon mixing reqd.)



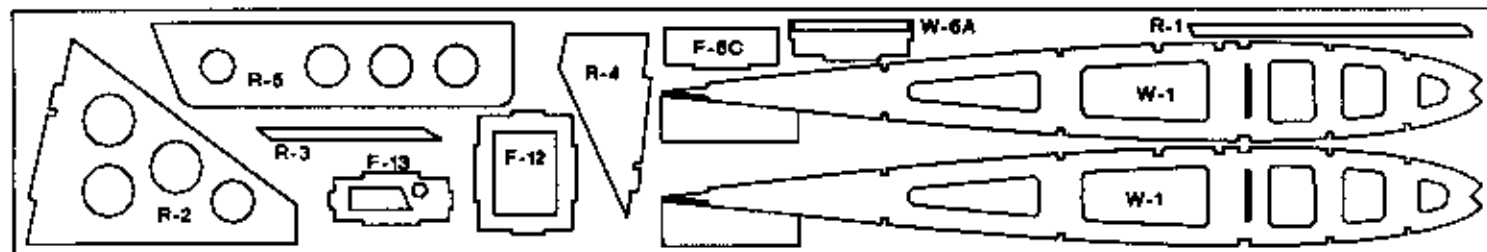
LC-102-01 1/16" X 4" X 24" Balsa 1 REQD.



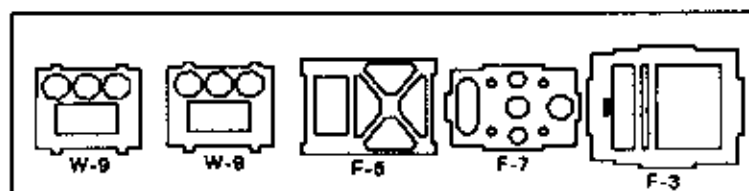
LC-102-02 1/16" X 4" X 24" Balsa 1 REQD.



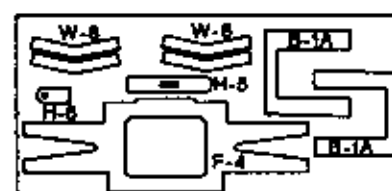
LC-102-03 1/16" X 4" X 24" Balsa 2 REQD.



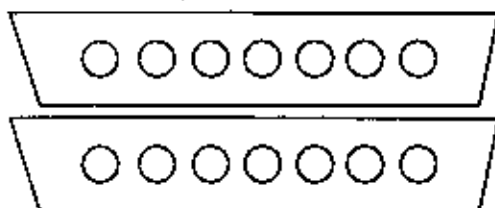
LC-102-04 3/32" X 4" X 24" Balsa 1 REQD.



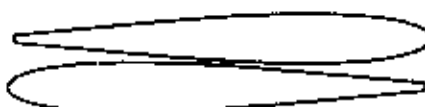
LC-102-05 3mm X 3" X 12" LITE PLY 1 REQD.



LC-102-08 1/16" X 3" X 6" Birch Ply 1 REQD.



ELEVONS
2 REQD.



WING TIPS
2 REQD.

Building Instructions:

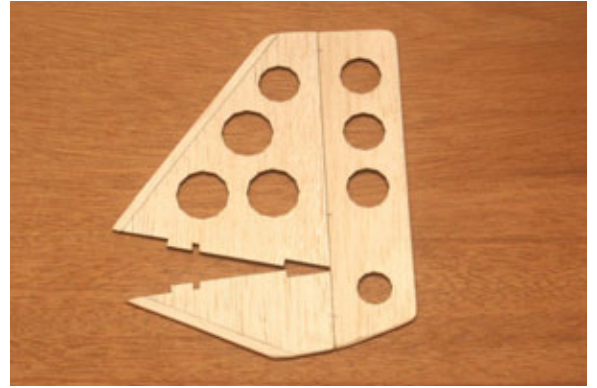
General Note: Cover the plans with wax paper before assembling your model to prevent the parts from sticking to the plan.

Building the Rudder:

1...Glue R-1 to R-2. Glue R-3 to R-4. Sand the front and top edges of R-1/R-2 round. Leave the back and bottom edges square. Sand the front and bottom edges of R-3/R-4 round. Leave the back and top edges square.

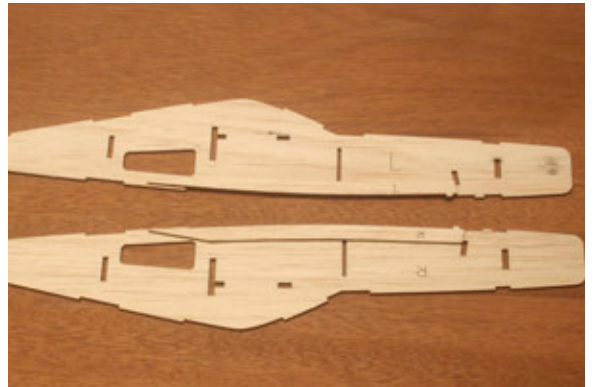
Bevel the front edge of R-5 as shown on the plan, and sand the other edges round.

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

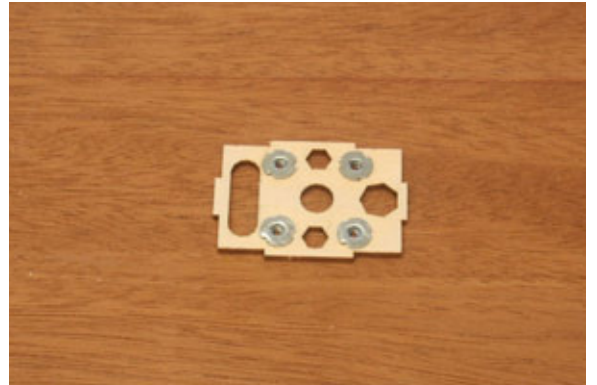


Building the Fuselage:

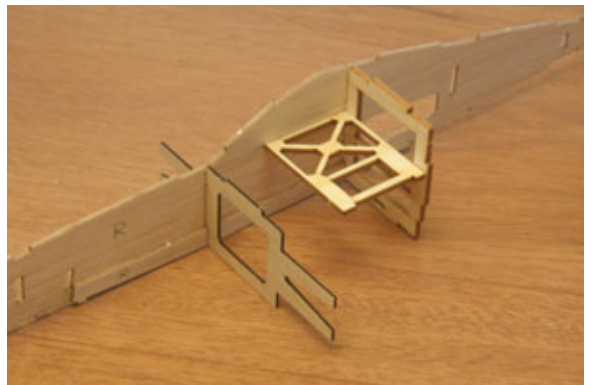
2...Glue the F-2R & F-2L doublers to the inside of the F-1R & F-1L fuselage sides. Be sure to make a right hand and a left hand side.



3...Press the four 4-40 blind nuts into the back of the firewall (F-7). Use a small drop of thin C/A to secure them in place.



4...Lightly tack glue formers F-3, F-4 and the servo tray (F-5) into position on the right fuselage side. Use a small square to position these parts 90 degrees to the fuselage side. The servo opening in F-5 should be on the left side.



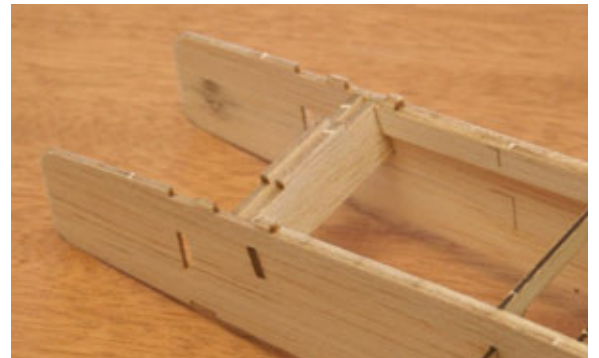
5...Place the left fuselage side into position and square up the fuselage. Glue the left fuselage to the formers.



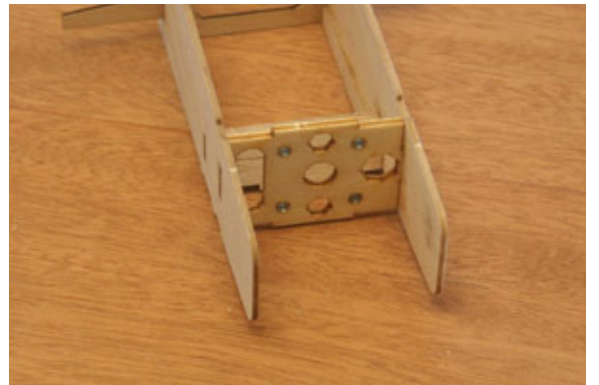
6...Glue F-6B and F-6C to the front of F-6A as shown on the plan.



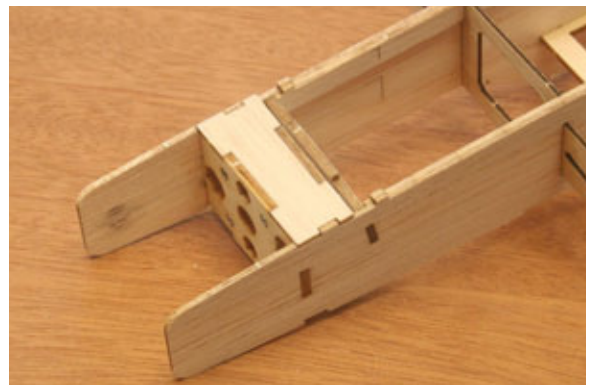
7...Gently spread the fuselage sides apart and slide F-6 into position from the front. When fully seated, glue into position.



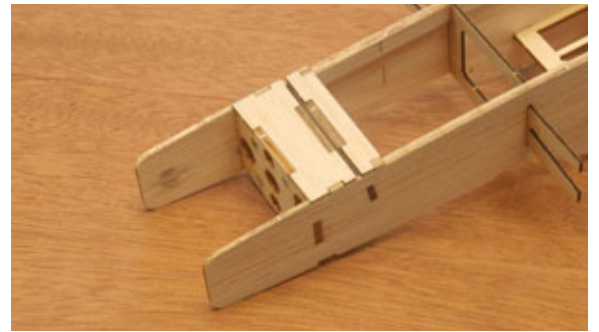
8...Tack glue the firewall (F-7) into position making sure the front of the fuselage is not twisted.



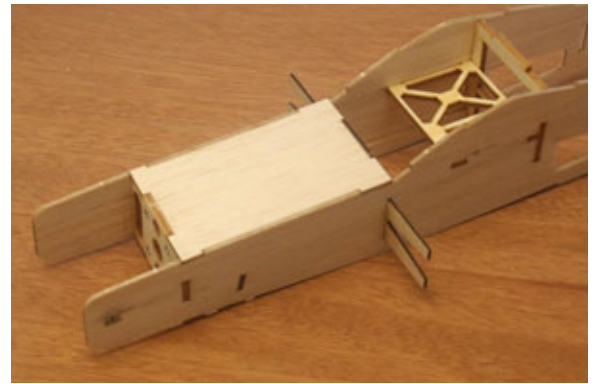
9...Glue F-8 into position on the bottom front of the fuselage.



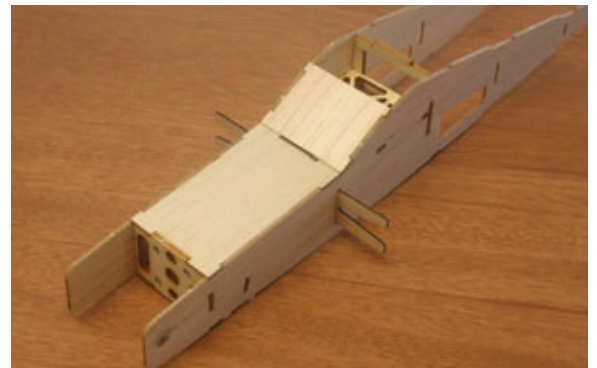
10...Glue F-9 into position on the bottom front of the fuselage.



11...Glue F-10 into position on the top front of the fuselage.



12...Glue F-11 into position on the top front of the fuselage.



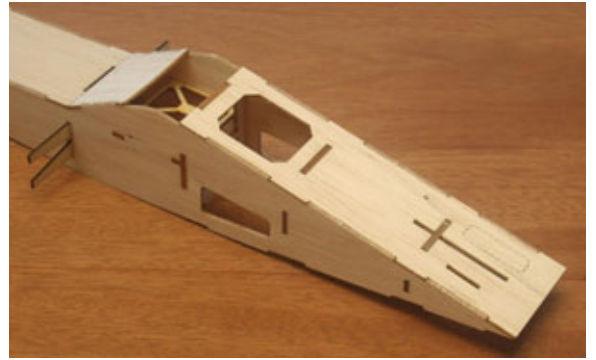
13...Place former F-12 into position and glue into place.



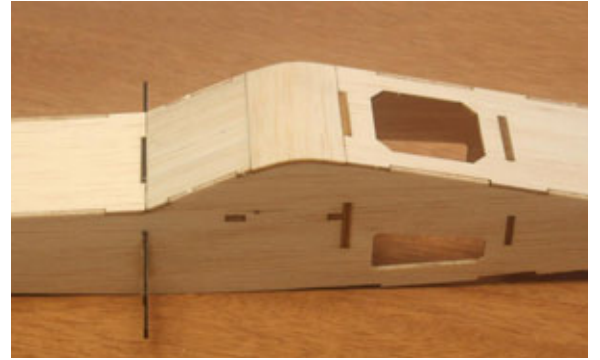
14...Place former F-13 into position and glue into place. The round hole should be on the left side.



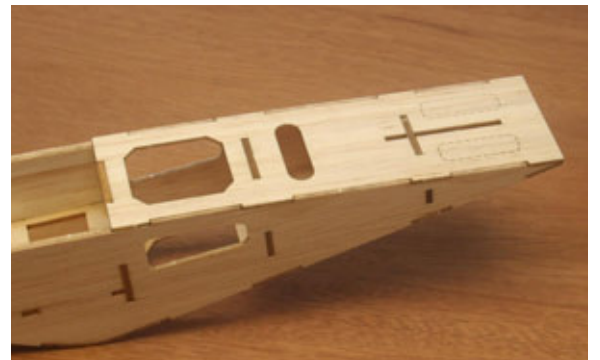
15...Glue F-14 into position on the top rear of the fuselage. The pushrod exit at the rear should be on the left side.



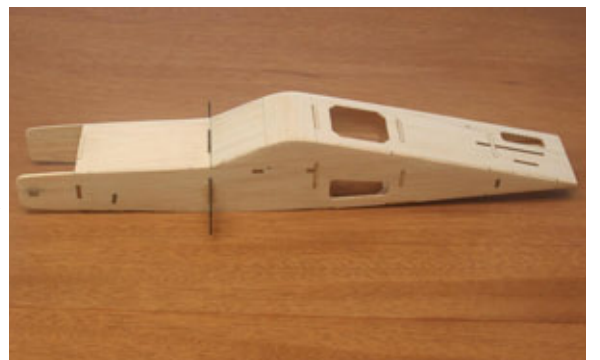
16...Glue F-15 into position on the top of the fuselage between F-11 and F-14. Slightly moisten the top surface to allow the wood to bend to match the curve of the fuselage easier. Trim one end if required to allow a tight fit.



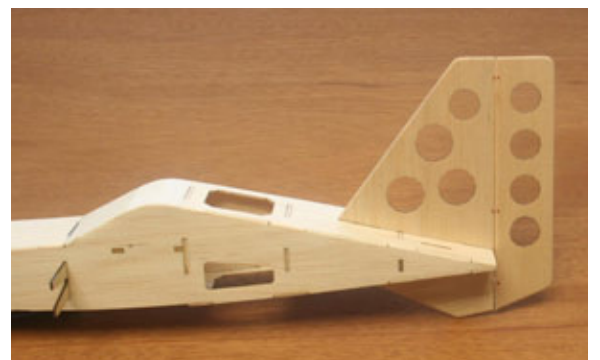
17...Glue F-16 into position on the bottom rear of the fuselage.



18...Cut out the lightning holes in the rear of the fuselage as marked by the laser cut dashed lines. Use a sanding block to sand all of the fuselage surfaces smooth and flat. Now lightly sand the edges of the fuselage round on the top from the nose to the tail. Round the bottom edges of the fuselage from the nose back to the front of the hatch opening. Leave the bottom edges of the fuselage square from the hatch opening back to the tail.



19...Test fit the fins and rudder to the fuselage. Sand or trim as required to achieve a good fit.



Building the Wing:

20...Cover the right wing plan with wax paper to prevent the parts from sticking to the plan. Note: The wings are built upside down so although we are building the right wing on the plan view, it will become the left wing on the finished model.

21...Cut one of the 3/32" x 3/16" x 18" main spars in half to make two 9" pieces. Cut, fit and pin the inboard 3/32" x 3/16" lower main spar to the plan. Align the inboard end with the inboard edge of rib W-1. angle the inboard end of the remaining 9" piece of main spar and pin into position on the plan. The outboard end will extend past the last wing rib.

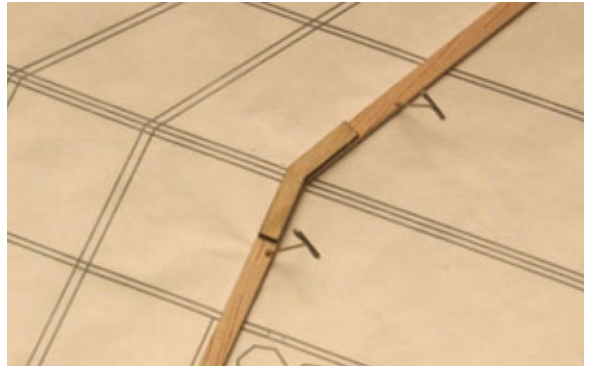
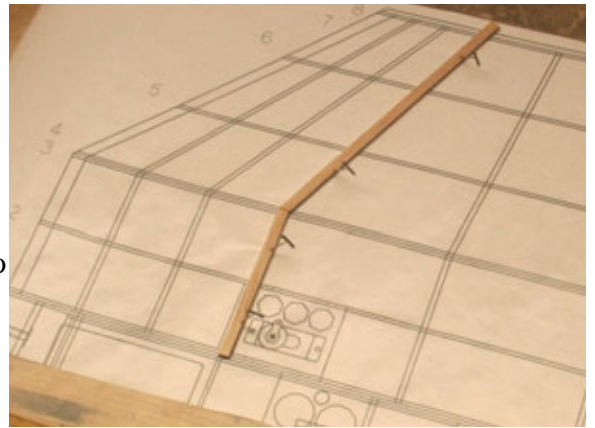
22...Glue the plywood spar joiner (W-8) into position as shown.

23...Glue wing ribs W-1 through W-7 into position on the spar. The ribs should be 90 degrees to the building board..

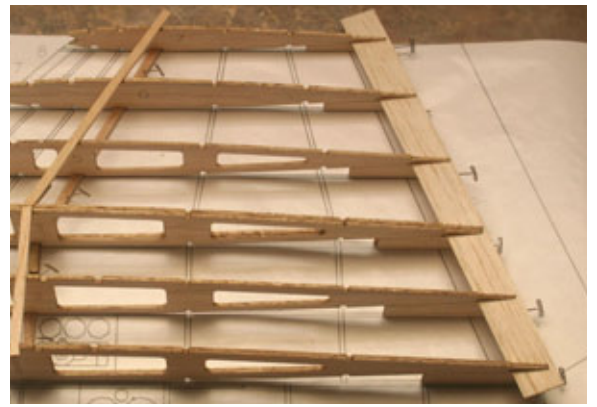
24...Place one of the remaining W-8 spar joiners on the edge of your work bench. Center the middle of the W-8 on the edge of your work-bench and press down slightly to crack the W-8 to put a small angle in it.

Place the W-8 into position on ribs W-3 / 4. Cut the inboard main spar to length and glue to the ribs and W-8.

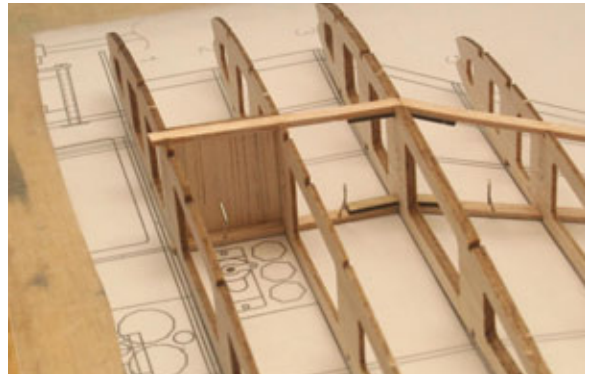
25...Fit and glue the outboard main spar into position. Squeeze W-8 and the spar into full contact as required.



26...Cut one of the 1/16" x 3/4" x 18" trailing edge sheets in half and slide into position into the slots in the back edge of the ribs. Be careful not to glue the trailing edge to the temporary support tabs.



27...Glue the shear web (B-1) into position on the front faces of the main spars between ribs W-1 and W-2.



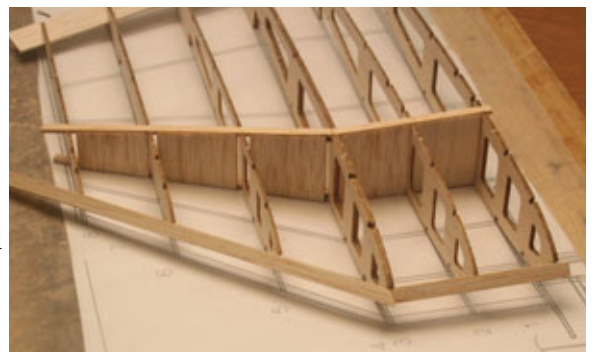
28...Place part B-1A into position between the spars between W-1 and W-2. The parallel leg should be at the bottom near the plan and the tapered leg should be at the top. It should be forward in full contact with B-1. Glue into position around the outside edges only.



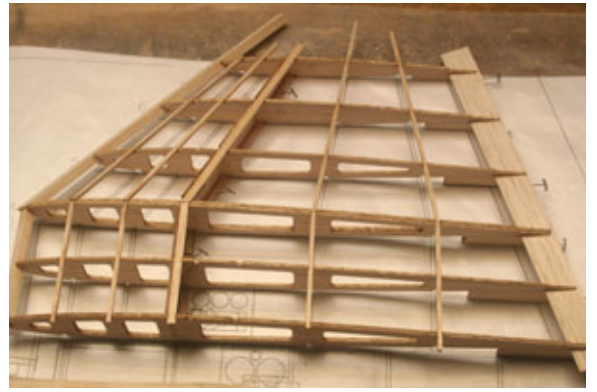
29...Glue the remaining shear webs B2 thru B-5 into position on the front face of the spars.



30...Cut one of the 1/4" sq. x 9" leading edges in half to make two 4 1/2" pieces. Use one of the pieces to make the inboard leading edge and glue in place. Use a full 9" piece of 1/4" sq. to make the outboard leading edge. Cut the proper angle in the end and glue into position.



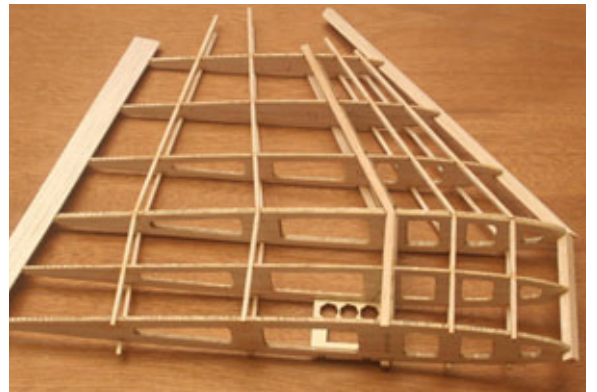
31...Glue the four 3/32" sq. stringer spars into position.



32...Glue the W-9 servo mount into position.



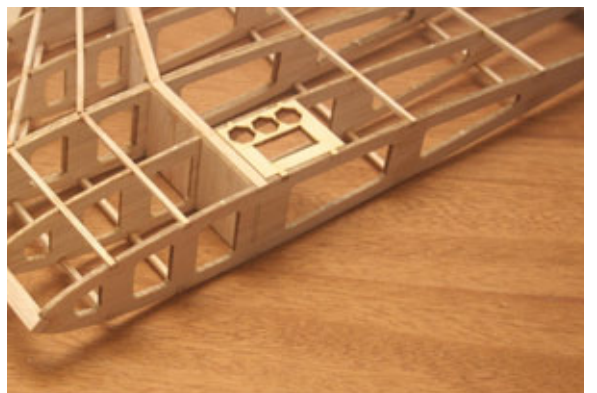
33...Remove the wing from the plan. Remove the temporary support tabs from the trailing edge of the wing ribs. Install the 3/32" stringer spars into position on the other side of the wing.



34...Press the trailing edge flat against your building board and glue the top 1/16" x 3/4" x 9" trailing edge into position.



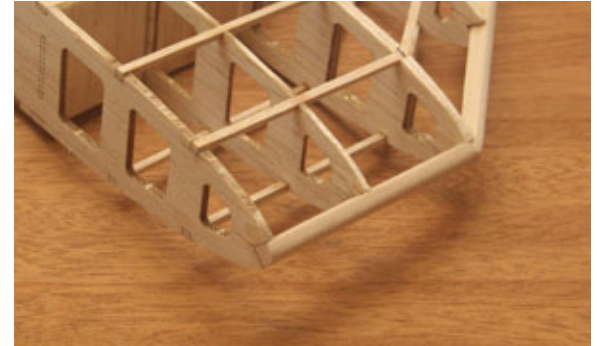
35...Trim the spars, leading edge and trailing edges flush with both ends of the wing.



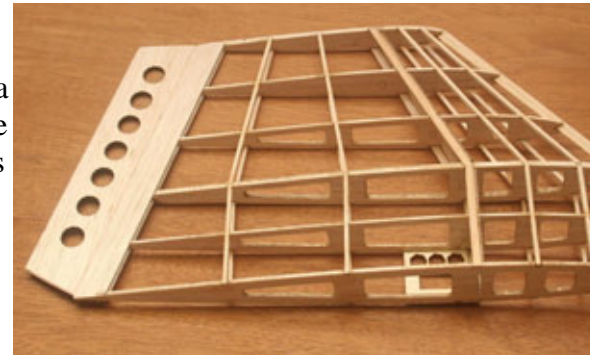
36...Glue the 1/8" laser cut wing tip to the end of the wing.



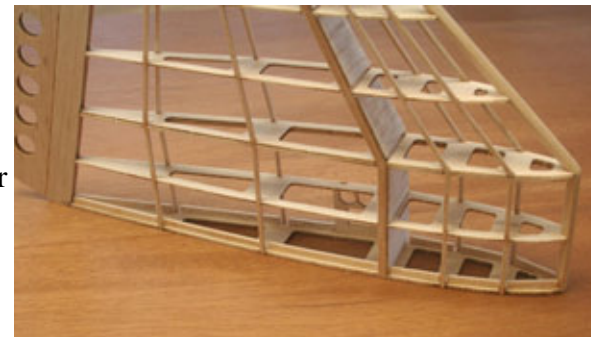
37...Sand the leading edge round to match the profile shown on the plan.



38...Sand the ends and back edge of one of the elevons round. Sand a bevel on the front edge as shown on the plan. Mark and cut the hinge slots in the elevon and trailing edge of the wing and test fit the hinges and elevon to the wing without gluing. Cut the slot in W-1 for the wing joiner tabs on former F-4. This slot is partially cut with dashed lines on rib W-1.



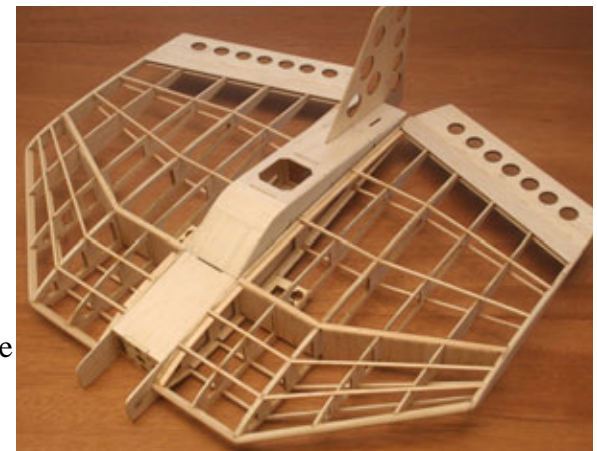
39...Use the 3/32" x 3/16" x 18" balsa strips to make the stiffeners for rib W-1 as shown on the plan. Hold the rib tightly against a flat surface while gluing the stiffeners into position to ensure that the rib is straight and flat.



Now sand the wing smooth all over.

40...Now repeat steps 20 thru 39 to build the opposite wing.

41...Test fit the wings to the fuselage. The servo mounts are on the bottom of the wings. The bottom of the wing should be flush with the bottom of the fuselage from the rear of the hatch opening to the rear of the fuselage.



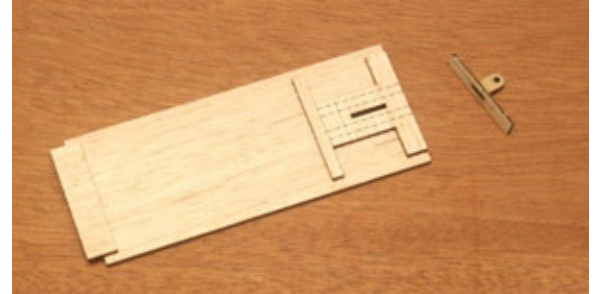
Covering:

42...Sand all parts smooth with 400 grit sandpaper. Cover the model with a light weight iron on covering material. Only cover the bottom of the hatch H-1 (side without laser markings) Be careful not to warp the hatch as you shrink the covering.

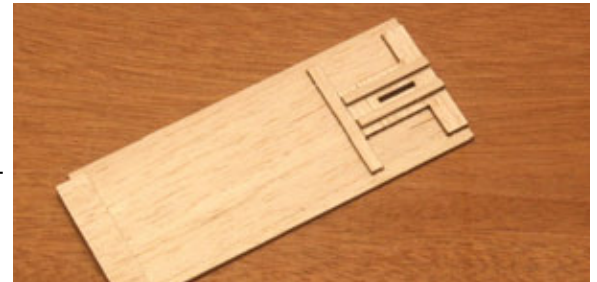
Note: After the model is covered you must check the tail, control surfaces, hatch and wing for warps or twists. If there are any they can be removed by twisting the parts straight and heating the covering.

Final Assembly:

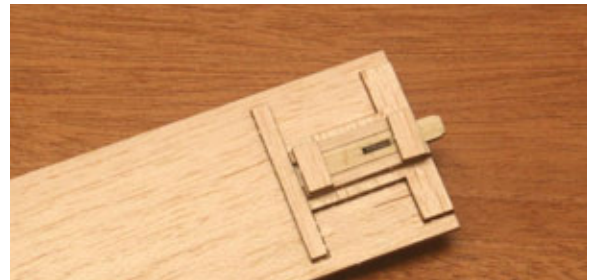
43...Glue parts H-2, H-4 and H-4 into position on the hatch (H-1) using the laser marking as a guide. Glue parts H-5 and H-6 together. Make sure that they are 90 degrees to each other.



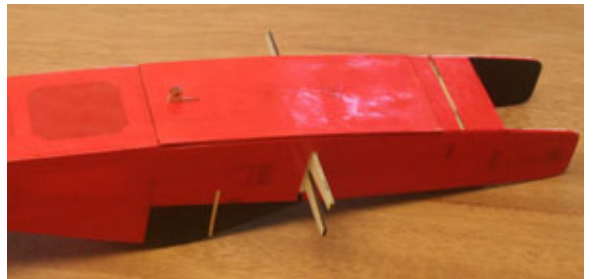
44...Place parts H-7 into position on the hatch. Insert H-5/6 position to establish the proper spacing for the H-7's. Use the tip of a straight pin to apply a tiny amount of glue to the outside edges of the H-7's. Use extreme care to make sure that you DO NOT glue the H-5/6 slider into position!!!



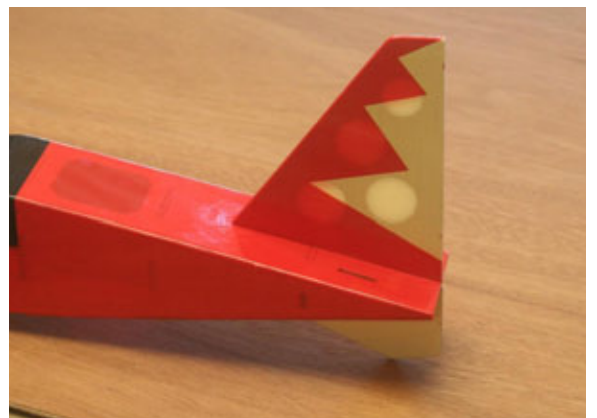
45...With the H-5/6 slider in position, carefully glue the two H-8 pieces into position. Use the tip of a straight pin to apply a tiny amount of glue to the outside edges of the H-8's. Use extreme care to make sure that you DO NOT glue the H-5/6 slider into position!!!



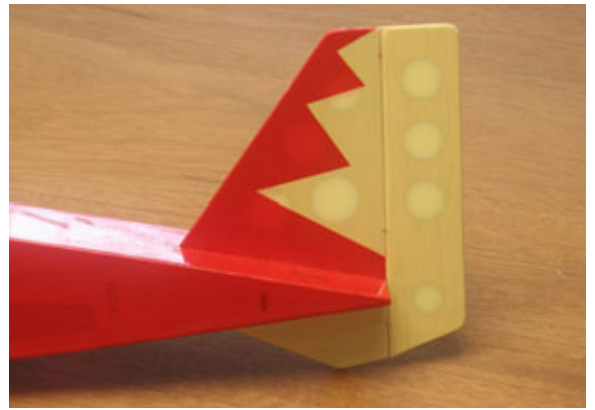
46...Test fit the hatch to the bottom of the fuselage. The front tab (H-2) slides under part F-9. Slide the hatch slider forward and press the back end of the hatch down on the fuselage. Move the slider back to insert it into the slot in former F-3. You can trim the outside edges of H-2 to center the front of the hatch if required.



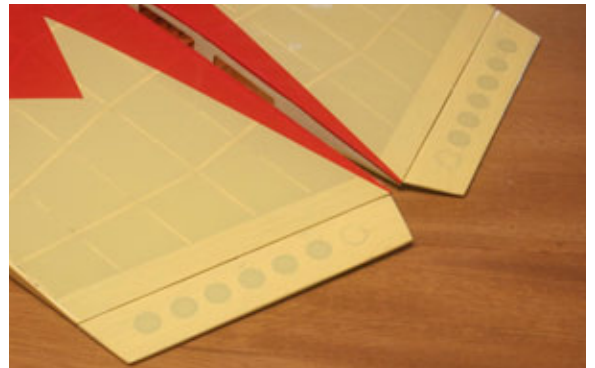
47...Cut the covering away from the areas on the top and bottom of the fuselage where the fins will make contact. Place the top and bottom fins into position. Make sure that they are straight and square and glue into place.



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



49...Attach the elevons with the hinges and glue in place on the wings.

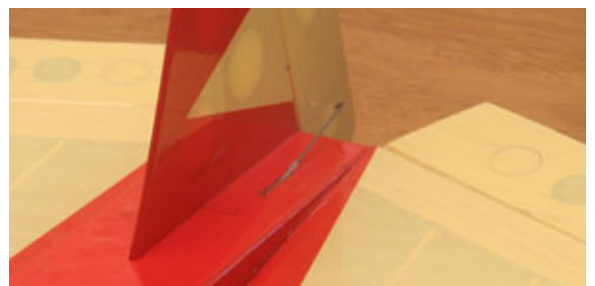


50...Place the right wing into position on the fuselage. Mark the fuselage around the wing where the W-1 rib makes contact with the fuselage side. Remove the wing and carefully remove the covering from the fuselage side where the wing makes contact. Glue the wing to the fuselage and former F-4. The wing should be tight against the fuselage side and the bottom of the wing should be flush with the bottom of the fuselage from the rear of the hatch opening to the rear of the fuselage. When the glue is dry, glue the opposite wing in place.

51...Screw the servos into the servo mounts in the wing and fuselage.



52...Insert the rudder pushrod housing into the exit slot in the back of the fuselage. The housing should extend out about 3/4" from the fuselage top.



The front end should pass thru the slot in former F-3. Glue the housings to the rear exit. Do not glue the front ends to the former at this time.



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



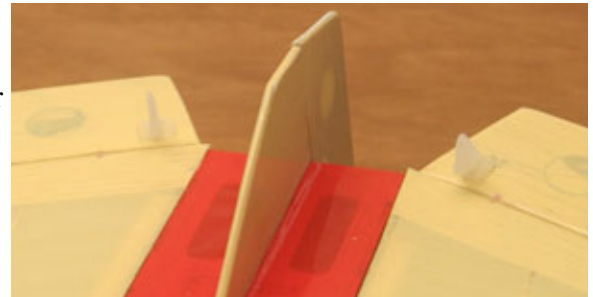
54...Install the pushrod into the housing. Secure the rear of the pushrod with a Mini E/Z Link.



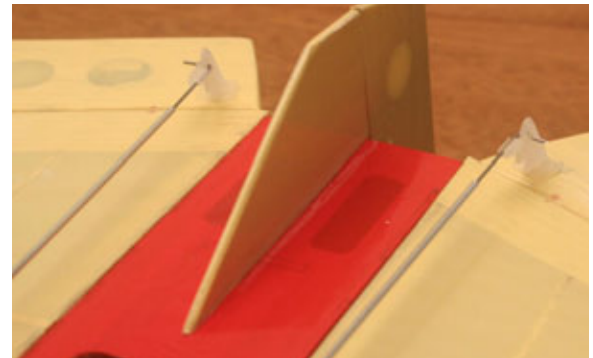
The front end is attached to the servos with a Mini E/Z Connector. Glue the pushrod housing to the former.



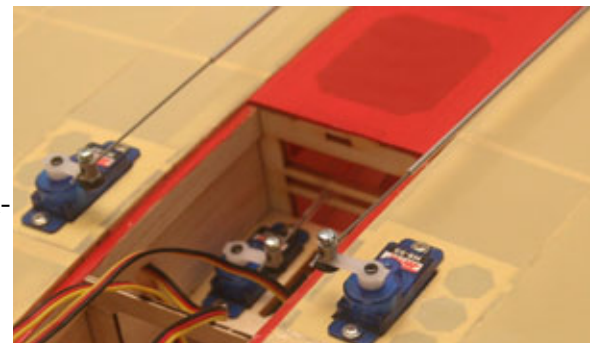
55...Glue the elevon control horn into positions. Drill 1/16" holes for the pins to pass thru. When the glue is dry, cut off the excess pins flush.



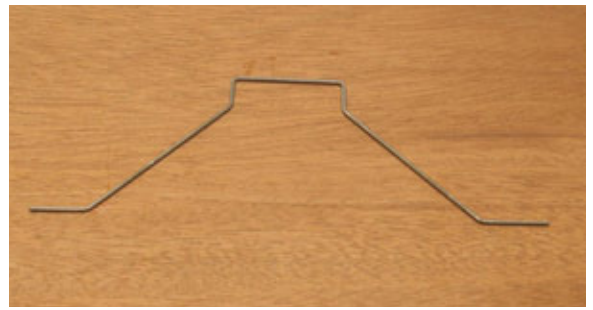
56...Slide the 1/32 I.D. aluminum tubes over the elevon pushrods. Install the pushrods. Secure the rear of the pushrod with Mini E/Z Links.



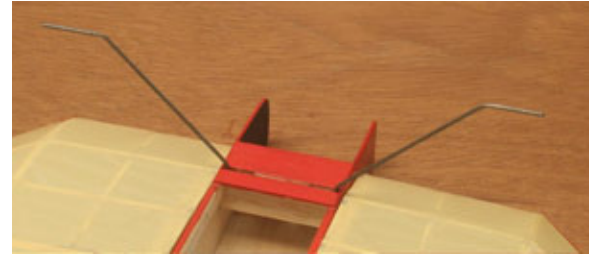
The front end is attached to the servos with Mini E/Z Connector. Center the aluminum tube on the pushrods and secure with a small drop of thin C/A at each end of the tube.



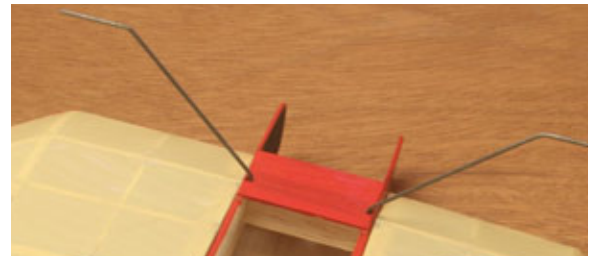
57...Bend the main landing gear wire to shape using the pattern on the plan. Leave the axles long until you mount the wheels.



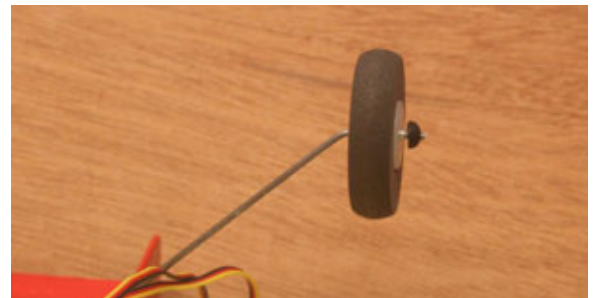
58...Insert the landing gear wire into the slot in the fuselage. Make sure it is completely seated. Squirt two drops of thin C/A into the slot and let dry completely.



59...Insert F-6D into the slot and glue into position. Trim off any excess from F-6D flush with the bottom of the fuselage. Iron on a 1/4" strip of covering material to cover the bare balsa.



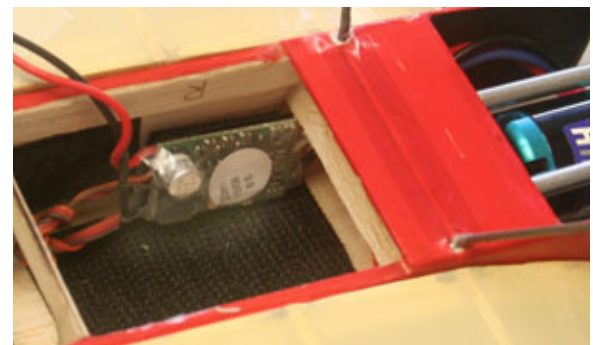
60...Put the wheels on the model and press the wheel retainers into position. With the retainers in place, cut off the excess wire axle flush with the retainer.



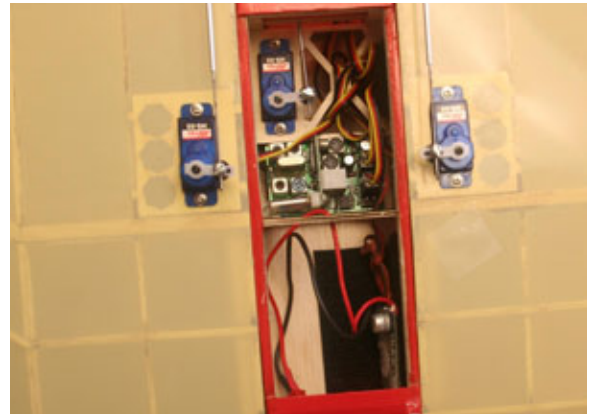
61...Secure the motor mount to the front of the motor with the four flat head screws. Now bolt the motor to the firewall with 4-40 screws and aluminum tube spacers. Note: Because the wires on the motor are short, pass the wires from the speed controller thru the firewall and attach to the motor before mounting the motor to the firewall.



62...Secure the speed controller to the fuselage with velcro.



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



64...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.

65...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.

66...Place the battery in the nose of the model. Attach the propeller. Attach the hatch onto the fuselage.

67...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.

68...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.

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.