Spirit of St. Louis ARF

ELECTRIC PARKFLYER

INSTRUCTION MANUAL

WARRANTY

Great Planes® Model Manufacturing Co. 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 Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes 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 buyers are not prepared to accept the liability associated with the use of this product, they are advised to return this kit immediately in new and unused condition to the place of purchase.

READ THROUGH THIS INSTRUCTION MANUAL FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

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(217) 398-8970, Ext. 2
airsupport@greatplanes.com

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INTRODUCTION

Thank you for purchasing the Great Planes Spirit of St. Louis ARF. The Spirit of St. Louis ARF is a lightweight, slow-flying *Park Flyer* that can be flown just about anywhere there is an open area clear of obstacles. Since the Spirit of St. Louis ARF is constructed mostly of molded plastic foam, it is durable and does not require the application of film coverings used on wood models. And, the Spirit of St. Louis landing gear makes ROG (rise off ground) takeoffs from smooth surfaces a snap.

PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Although the Spirit of St. Louis is a slow-flying electric powered model, just the same as any R/C plane, it should still be flown with care. Even while gliding with the motor off the Spirit of St. Louis could possibly cause injury to yourself or spectators and damage property.

2. You must assemble the Spirit of St. Louis **according to the instructions**. Modifications may reduce performance. In cases where the instructions differ from the photos, the written instructions are correct.

3. You must use a R/C radio system that is reliable and in good condition. You must properly install all components so that the model operates correctly on the ground and in the air.

4. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound.

NOTE: We, as the kit manufacturer, provide you with a top quality kit and great instructions, but ultimately the quality 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.

Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.

Before starting to build, compare the parts in this kit with the Parts List, and note any missing parts. Also inspect all parts to make sure they are of acceptable quality. If any parts are missing, broken or defective, or if you have any questions about building or flying this airplane, please call us at (217) 398-8970, or e-mail us at:

productsupport@greatplanes.com.

If you are contacting us for replacement parts, please be sure to provide the full kit name (Great Planes Spirit of St. Louis ARF) and the part numbers as listed in the Parts List.

You can also check our web site for the latest Spirit of St. Louis ARF updates.

www.greatplanes.com

To make your R/C modeling experience totally enjoyable, if this is your first R/C model, we recommend that you get the assistance of an experienced pilot. If you're not currently a member of an R/C club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

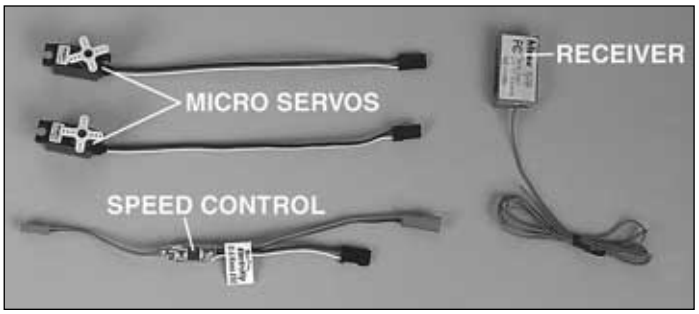
If you're not already an Academy of Model Aeronautics (AMA) member, we strongly urge you to join. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the address or toll-free phone number below:

AMA
SINCE 1936

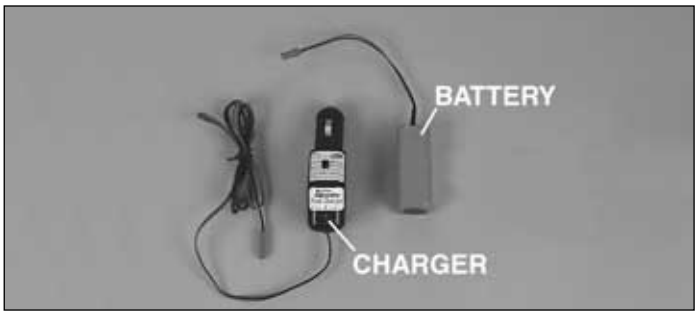
Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252
Tele. (800) 435-9262
Fax (765) 741-0057
Or via the Internet at: http://www.modelaircraft.org

ADDITIONAL ITEMS REQUIRED

Flight Equipment



The Spirit of St. Louis ARF requires a three-channel radio with two micro servos, a mini/micro receiver and a speed control. Hobbico® CS-5 *Nano™* servos (HCAM0090), the Great Planes *ElectriFly™* receiver (GPML0040 Hi Band, GPML0041 Low Band) and the Great Planes C-5 (GPMM2000) or C-10 (GPMM2010) speed control are recommended. The receiver comes without a crystal, which must be purchased separately. The order number for the crystal is FUTL63** (Hi Band) or FUTL62** (Low Band). Substitute the "**" with the channel number you require. For example, if the transmitter you plan to fly The Spirit of St. Louis ARF with is on channel 44, order receiver crystal FUTL6344. Hi Band receivers are tuned for channels 36 – 60. Low Band receivers are tuned for channels 11 – 35.



Additionally, an 8-cell (9.6 volt) 150 to 350 mAh battery pack (GPMP0050 – 150 mAh, shown in photo, GPMP0060 – 270 mAh, GPMP0070 – 350 mAh) is required. For charging the battery, the Great Planes ElectriFly Peak Charger (GPMM3000) is recommended.

Building Supplies

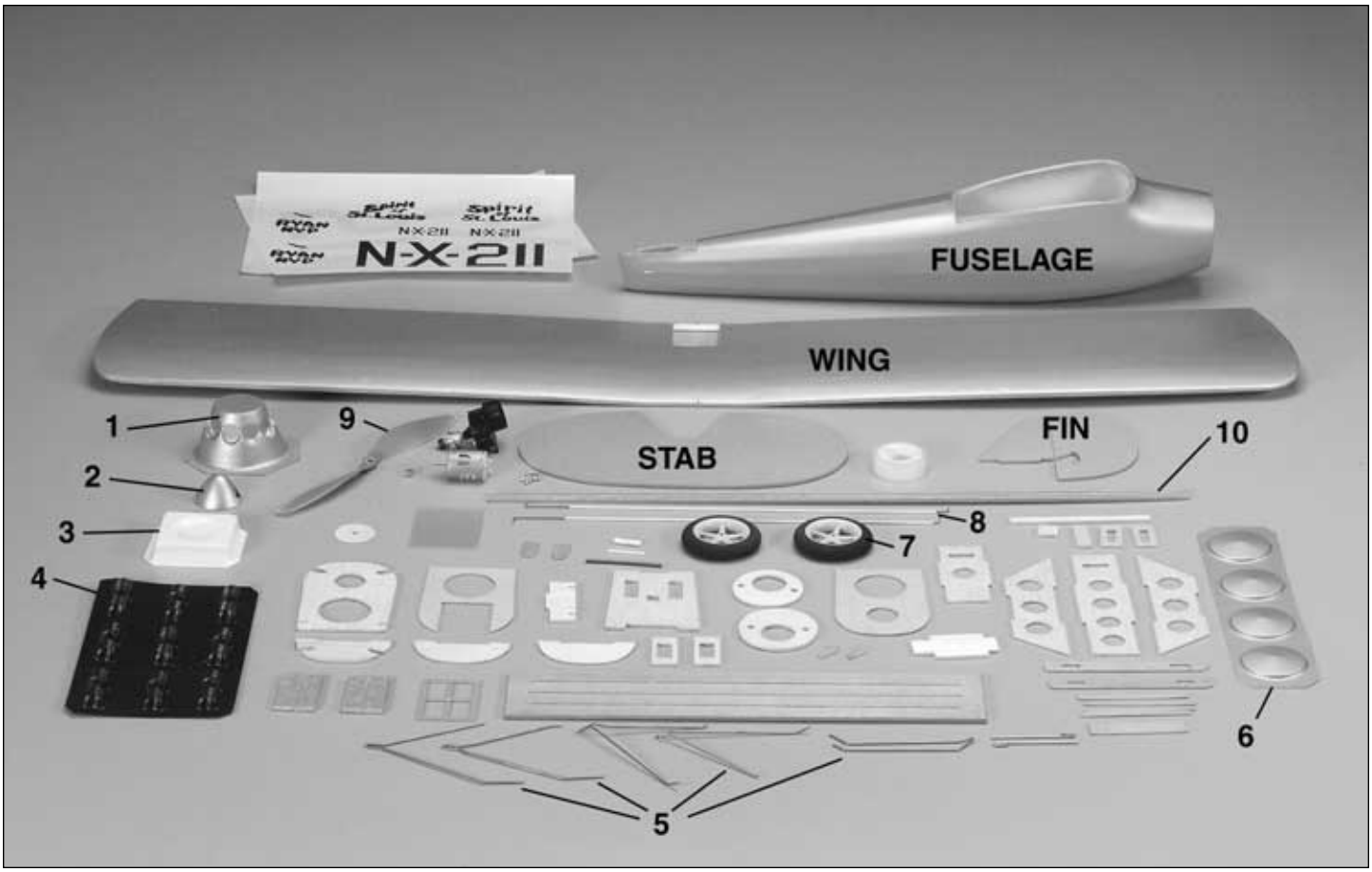
In addition to common household tools, here is the list of items used to build The Spirit of St. Louis ARF.

- ❏ 6-minute epoxy (GPMR6042)
- ❏ 1/2 oz. Medium CA+ (GPMR6007)
- ❏ Hobby knife (HCAR0105)
- ❏ #11 blades (HCAR0211)
- ❏ Builder's triangle (HCAR0480)
- ❏ Drill and 1/16" drill bit
- ❏ Double-sided foam tape (GPMQ4440) for mounting receiver and speed control
- ❏ Sandpaper and sanding block
- ❏ Small Phillips screwdriver (#1)
- ❏ Small T-pins (HCAR5100) or craft pins

Important Building Notes

- Since The Spirit of St. Louis ARF is made mostly of foam, and since CA adhesives commonly used to build R/C model airplanes dissolve foam, CA should not be used when gluing foam parts. Therefore, 6-minute epoxy, which is compatible with foam, is used for most of the construction. Unless otherwise specified in the instructions, 6-minute epoxy is to be used for gluing all parts of the model together. There are a few instances where CA may be used for gluing wood to wood. You can also use aliphatic resin glue instead of epoxy if desired.
- For the strongest bond apply epoxy to **both** parts being joined.
- Before beginning construction, refer to the parts drawings and use a ballpoint pen to write the part number on all the wood parts.

Parts Layout



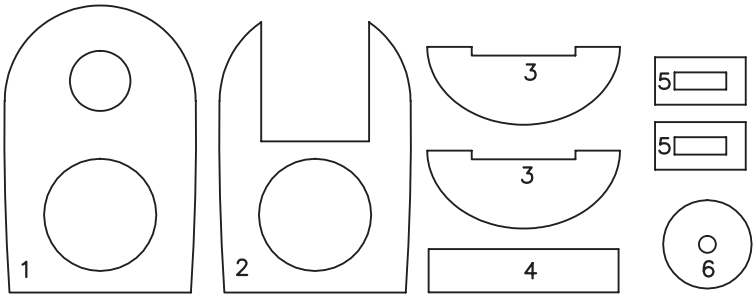
1. Cowl
2. Spinner
3. Spinner base
4. Cylinders
5. Landing gear wires
6. Wheel covers
7. Wheels
8. Pushrods
9. Motor, gearbox and propeller
10. Landing gear fairings

All other wood parts are identified on the following page.

PARTS DRAWINGS (not actual size)

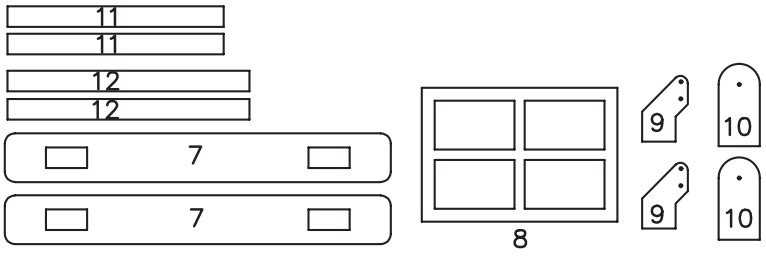
1/32" PLYWOOD PARTS

(1) 1 – FRONT FORMER DOUBLER, FRONT
(1) 2 – FRONT NOSE FORMER, REAR
(2) 3 – REAR LG FORMER DOUBLER
(1) 4 – BATTERY HOLDER TAB
(2) 5 – BATTERY HOLDER REINFORCEMENT
(1) 6 – SPINNER FORMER



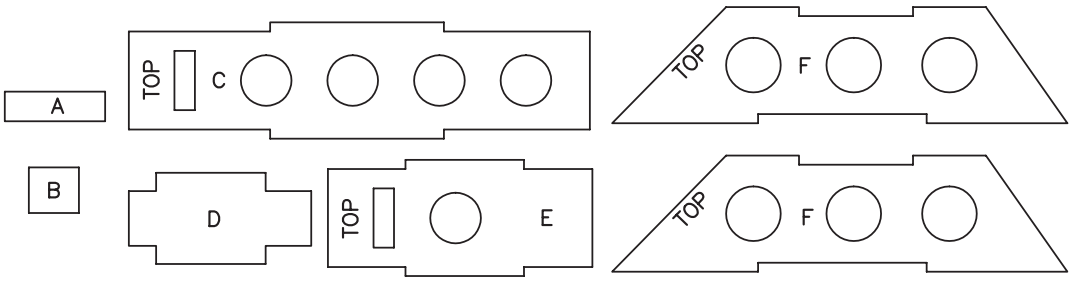
1/64" PLYWOOD PARTS

(2) 7 – WING STRUT MOUNTS
(1) 8 – WINDOW FRAME
(2) 9 – CONTROL HORN
(2) 10 – LANDING GEAR BRACE
(2) 11 – FRONT STAB MOUNT
(2) 12 – REAR STAB BRACE



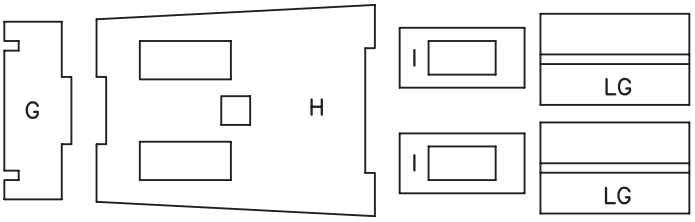
1/8" BALSA
BATTERY HOLDER PARTS

(1) A – COVER SPACER
(1) B – TAB MOUNT
(1) C – REAR
(1) D – COVER BASE
(1) E – FRONT
(2) F – SIDE



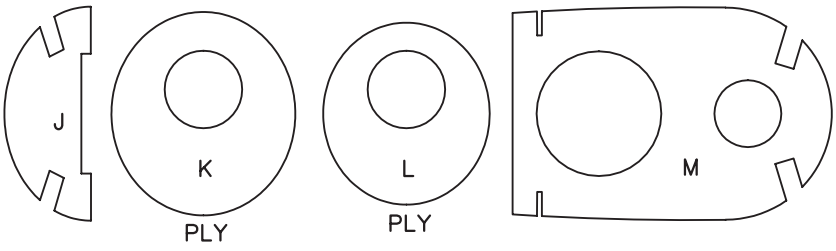
1/8" BALSA
SERVO TRAY PARTS

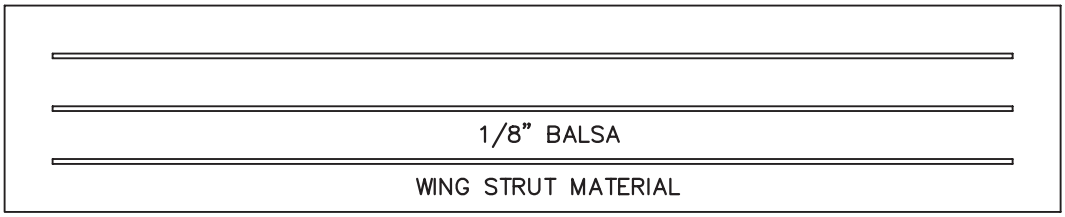
(1) G – PUSHROD BRACE
(1) H – SERVO TRAY
(2) I – SERVO MOUNT
(2) LG – LANDING GEAR SHOCK ABSORBER



1/8" BALSA AND PLY
FORMER PARTS

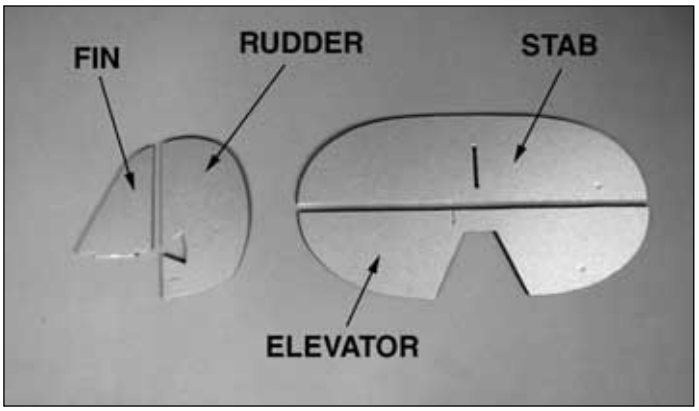
(1) J – REAR LG FORMER
(1) K – FRONT NOSE FORMER
(1) L – REAR NOSE FORMER
(1) M – FRONT FORMER



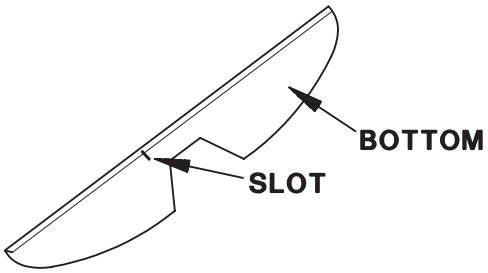


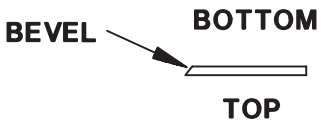
ASSEMBLY

Assemble the Tail Surfaces

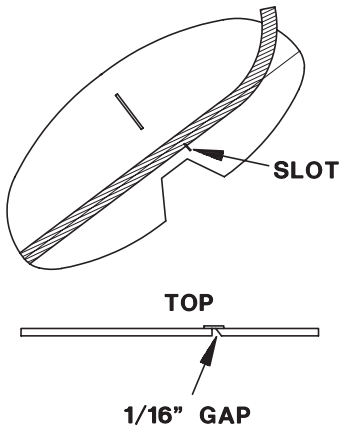


❑ 1. Using the precut lines as a guide, use a sharp hobby knife to cut the **rudder** from the **fin** and the **elevator** from the **stabilizer (stab)**.





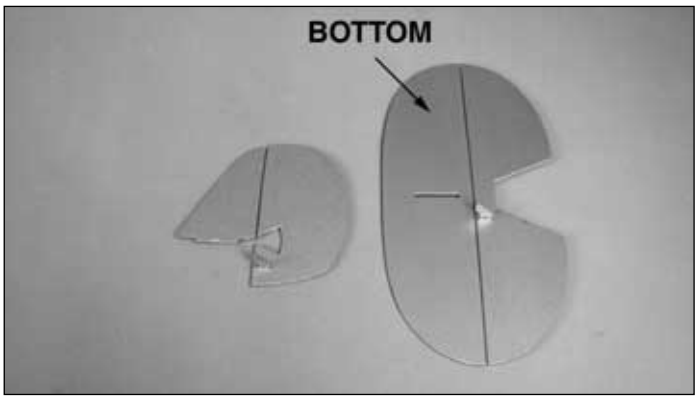
❑ 2. Sand a bevel to the **bottom** of the leading edge of the elevator. The elevator is upside-down when the slot for the control horn is on the **left** side.

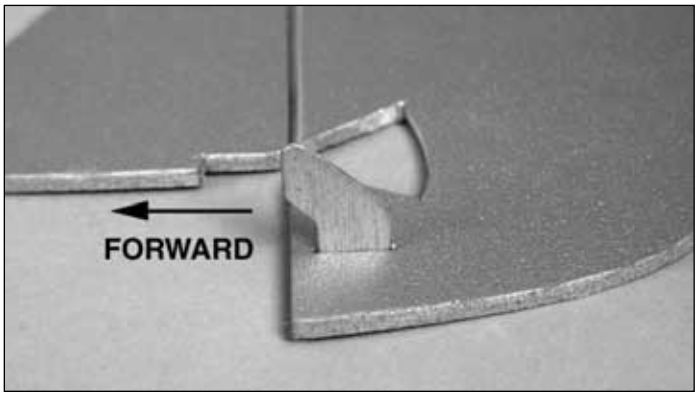


❑ 3. Lay the stab and elevator on your workbench with the slot in the elevator on the right side. Be certain there is a 1/32" gap between the elevator and the stab. Use one piece of cellophane tape on the top to join the elevator to the stab.

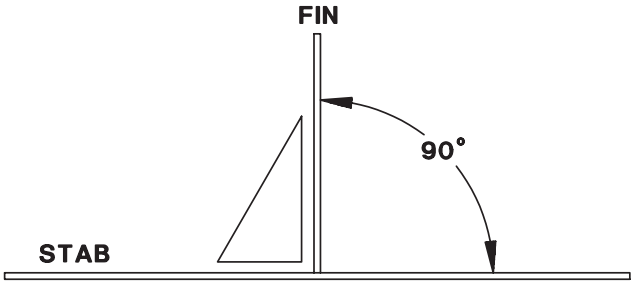
❑ 4. Sand a bevel to one side of the rudder (it doesn't matter which side), then use cellophane tape to join the rudder to the fin just the same as you joined the elevator to the stab.

❑ 5. Use a hobby knife to carefully widen the slot in the rudder and the elevator for the 1/64" plywood **control horns (9)**. Only a small sliver of foam is to be removed.



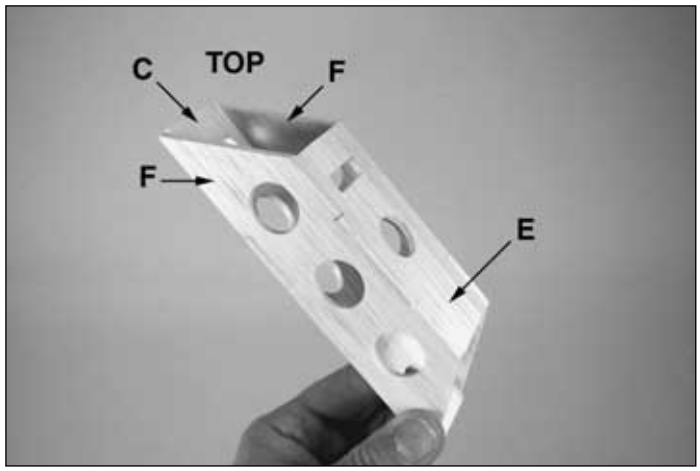


❑ 6. Enlarge the holes in the control horn for the pushrod wire with a T-pin. Glue the control horns into the slots. Be certain the elevator control horn is on the **bottom** and the rudder control horn is on the **left** (the stab and elevator are shown upside-down in the photo). Also be certain the control horns are facing forward.

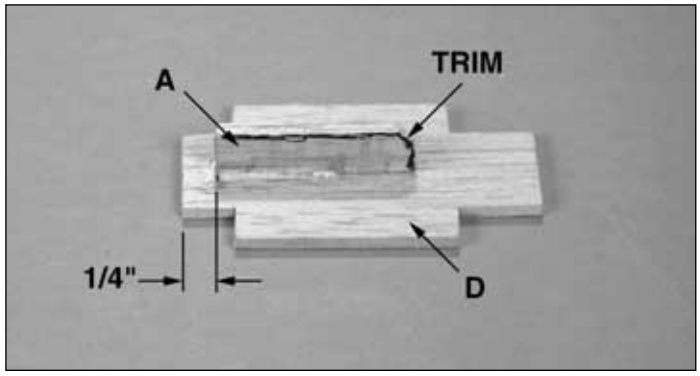


❑ 7. Use epoxy to glue the fin to the stab. Use a small builder's square to get the fin perpendicular to the stab, then use tape or small T-pins to hold them together until the epoxy hardens.

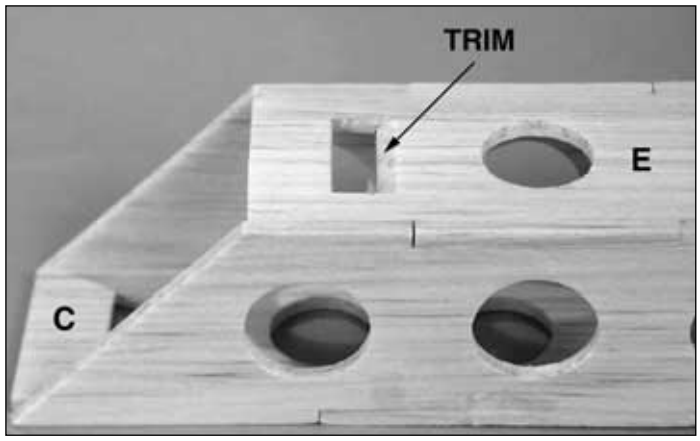
Assemble the Battery Holder



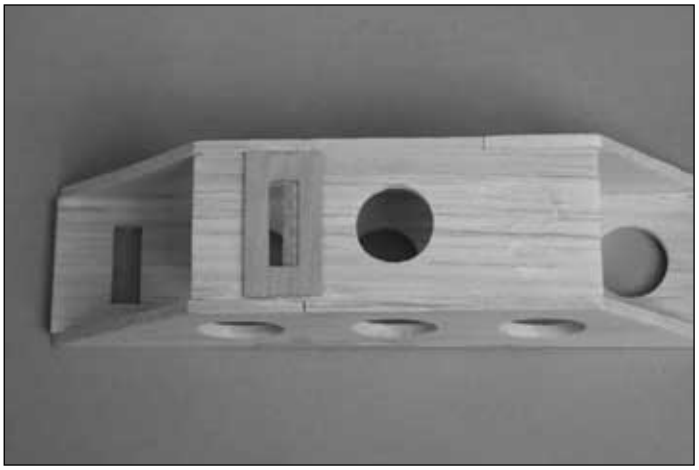
❑ 1. Without using any glue, assemble the 1/8" balsa parts of the **battery holder (C, E, F, F)** as shown in the photo. Once all the parts are joined, use medium CA to permanently hold them together. Be sure the parts are square to each other, not twisted.
Note: The cutouts in C and E are at the top. Parts F are oriented with the end that has the steeper slope at the top.



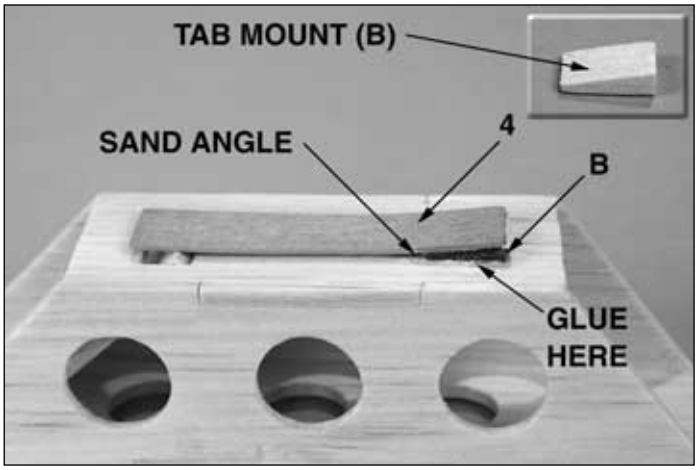
❑ 2. Build the **battery holder cover** from parts **A** and **D**. Glue A ¼" from the end of D as shown in the photo. Note: You may need to trim the end of A to get it to fit into the battery holder properly.



❑ 3. The cutouts in C and E may need to be trimmed at an angle to allow the battery holder cover to fit properly in the battery holder.



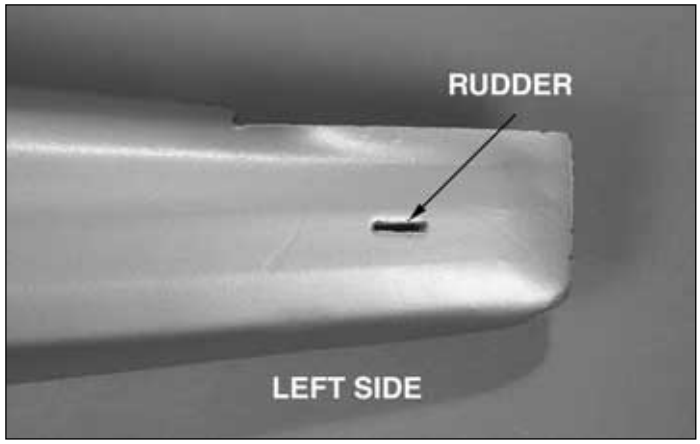
❑ 4. Glue the two 1/32" x 11/16 x 1-3/8" [1 x 18 x 34mm] ply **battery holder reinforcement (5)** around the cutouts in parts C and E as shown in the photo.

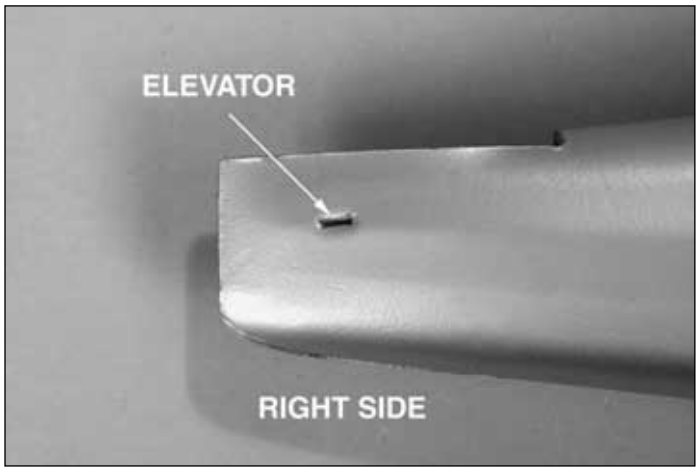


❑ 5. Fit the battery holder cover into the battery holder. Glue the **tab (4)** and the **tab mount (B)** to the holder as shown. The tab will hold the cover in position, until removal or installation of the battery is required. Note: Sanding the tab mount at an angle as shown in the photo will increase the pressure on the cover.

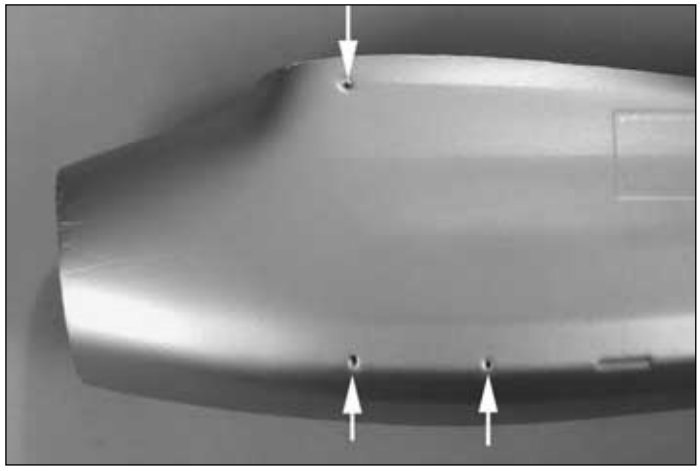
Assemble the Fuselage

Due to the manufacturing process, there may be some small surface stress marks on the fuselage and wing. This is normal.

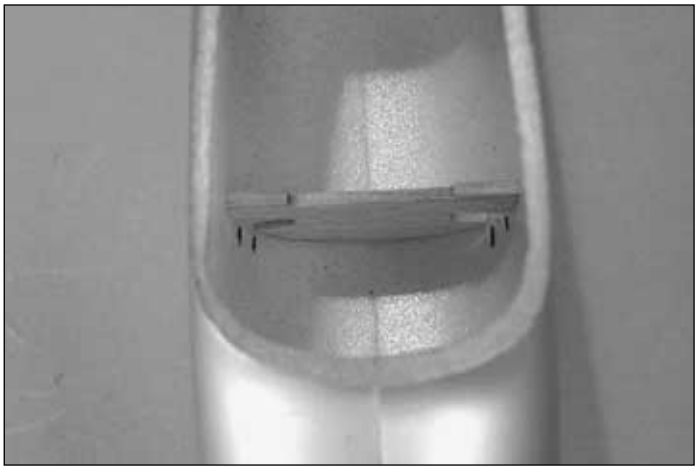




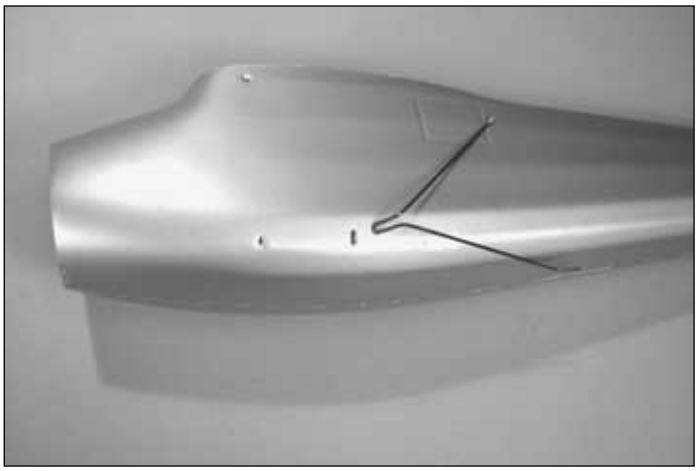
❏ 1. Using the indentations in the aft end of the fuselage as a guide, cut the slots for the elevator and rudder pushrods. **Do not** cut the slots for the stab braces until instructed to do so.



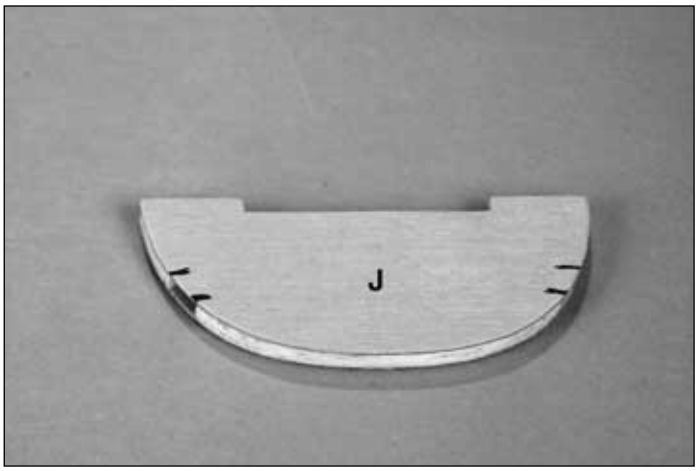
❏ 2. Use one of the landing gear wires to punch a hole at the three marked locations for the landing gear on each side of the fuselage. These holes will be used to align the formers that will be installed in the fuselage. The left fuselage side is shown in the above photo.



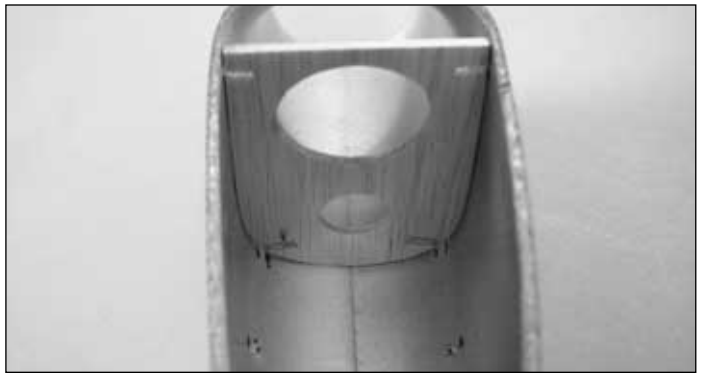
❏ 3. Temporarily fit the 1/8" balsa **rear landing gear former (J)** into the fuselage. Be certain it is centered on the rear two holes you punched in the fuselage sides. Use a fine-point felt-tip pen to mark the inside of the fuselage for the landing gear wires on both sides of the slot in the landing gear former.



❏ 4. Remove the landing gear former. Cut a slot in the fuselage from the inside, centered in the groove, from one mark to the other. Use one of the aft landing gear wires as a guide for cutting the width and height of the slot.

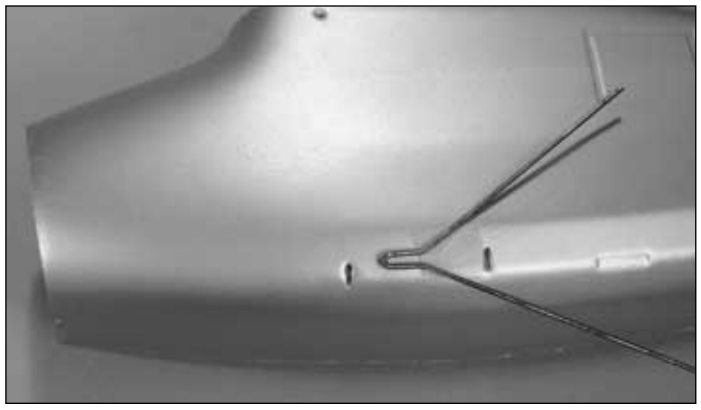


❏ 5. Use medium CA to glue both 1/32" plywood **doublers (3)** to both sides of former J. Mark the ply doublers at the location of the slots in former J.

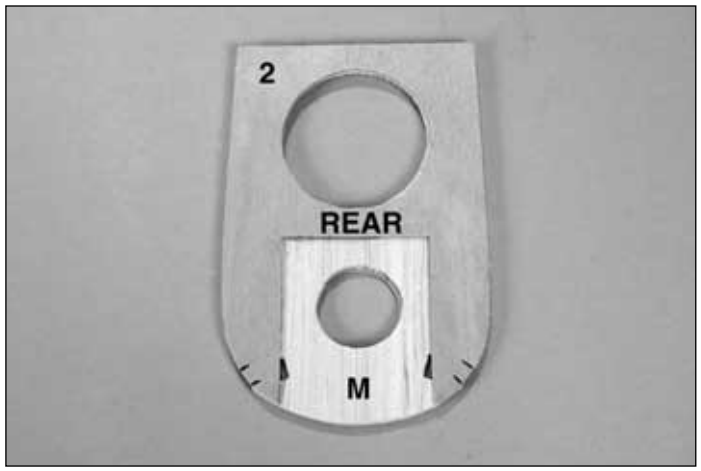


❑ 6. Temporarily fit the 1/8" balsa **front former (M)** into the fuselage. Be certain it is centered on the four forward holes you punched in the fuselage sides. Use a fine-point felt-tip pen to mark the inside of the fuselage on both sides of the slot in the former for the landing gear wires.

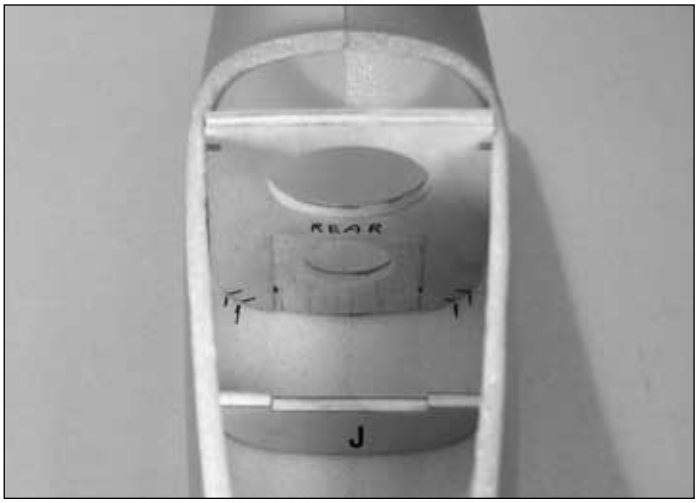
Note: The molding process for the type of foam used in the fuselage allows some variation in thickness. If former M protrudes above the top of the fuselage, sand the BOTTOM of the former until the top of the former aligns with the top of the fuselage. Be careful not to change the curvature of the former.



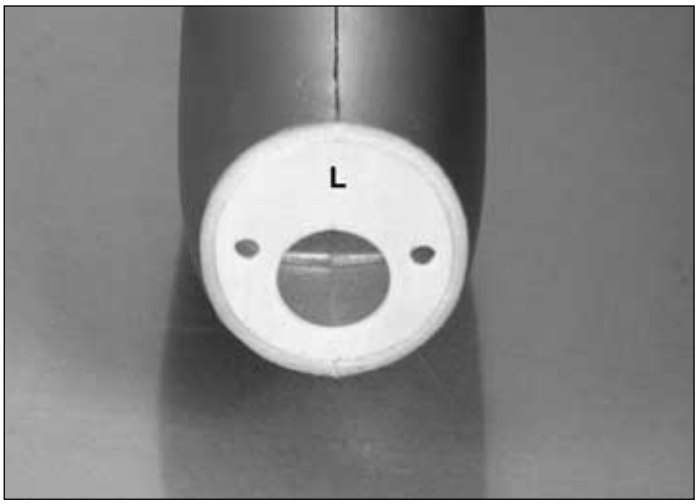
❑ 7. Remove the landing gear former. Cut a slot in the fuselage from the inside, centered in the groove, from one mark to the other. Use one of the forward landing gear wires as a guide for cutting the width and height of the slot.



❑ 8. Use medium CA to glue both 1/32" plywood **doublers (1,2)** to the front and back of former M. Mark the ply doublers at the location of the slots in former M. Mark the side of the former shown in the above photo "REAR".

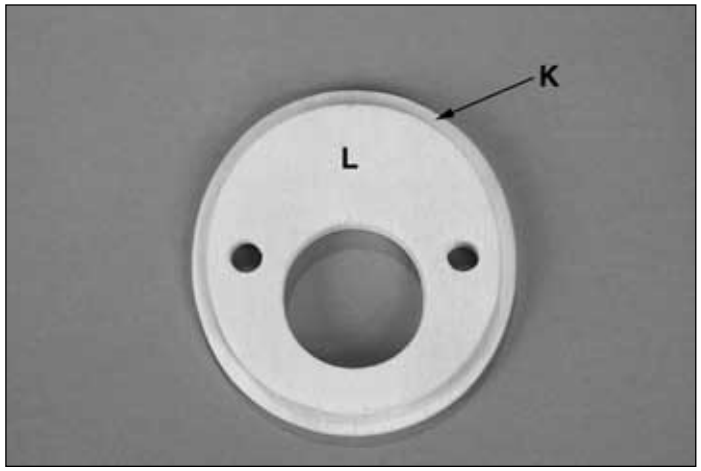


❑ 9. Glue front former M and rear former J into position using 6-minute epoxy. Make sure the formers are aligned with the marks you made earlier. Use the landing gear wires to insure that the formers are aligned over the slots in the sides of the fuselage. Remove the wires before the epoxy hardens.

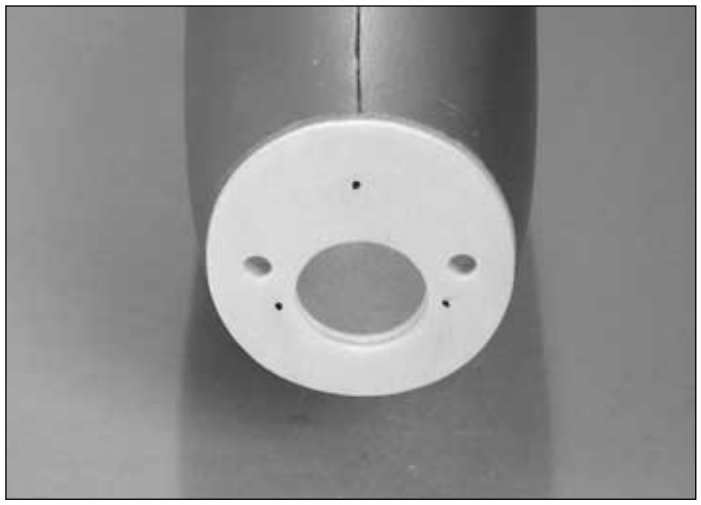


❑ 10. Test fit the 1/8" ply **rear nose former (L)** into the nose of the fuselage. The former should be a slightly firm fit in the fuselage. The large hole in the former is closest to the bottom of the fuselage. Former L is the smaller of the two ply nose formers.

Note: If the former is too large, do not sand it as the former is the proper size for mounting the cowl. Instead, use a dowel or pencil to compress the foam on the inside of the nose until the former fits properly.

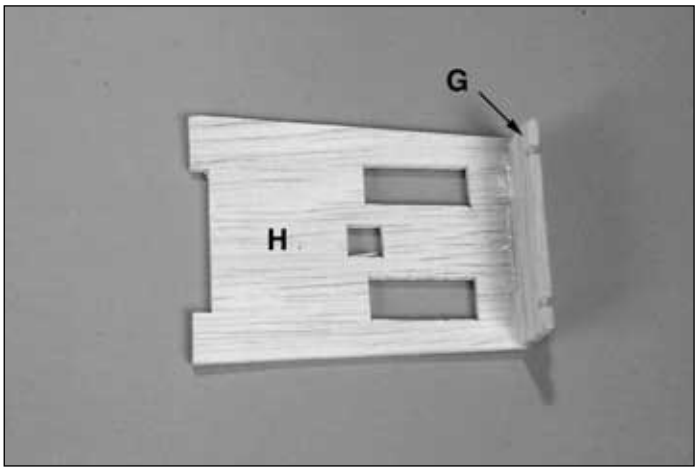


❏ 11. Glue the rear nose former to the 1/8" ply **front nose former (K)** with medium CA, being careful to align all three holes in both parts as shown in the photo. Be sure the three punch marks in K face out.

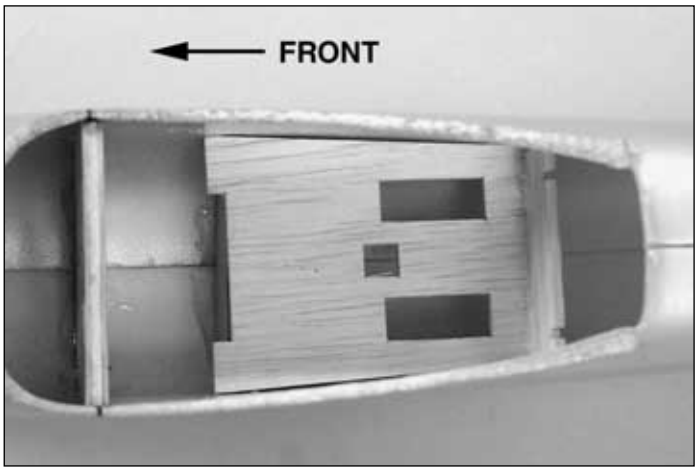


❏ 12. Trial fit the nose former assembly into the nose of the fuselage. If the front nose former extends beyond the sides of the fuselage, remove the assembly and sand it until it is even with the sides. Do not sand it while it is fitted into the nose as you can easily damage the foam fuselage. Once you are satisfied with the fit, glue the assembly into place with 6-minute epoxy. Remove any excess epoxy using a paper towel dampened with denatured alcohol.

Install the Servos



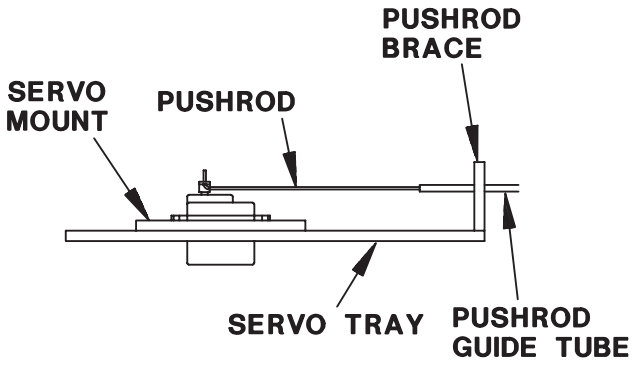
❏ 1. Glue the 1/8" balsa **pushrod brace (G)** perpendicular to the 1/8" balsa **servo tray (H)** with medium CA.

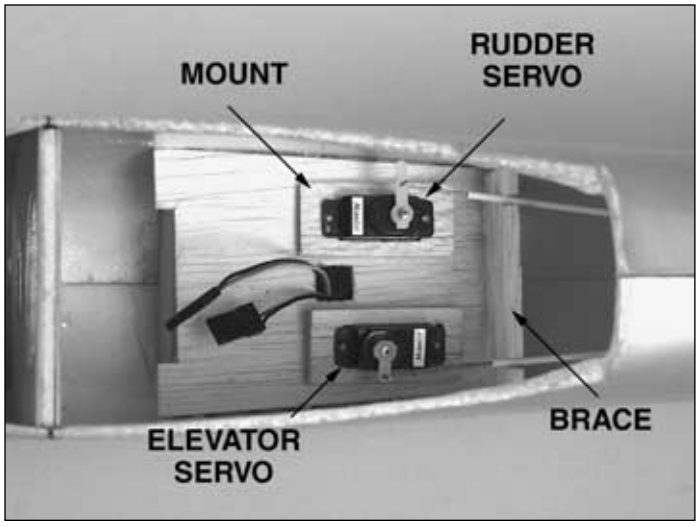


❏ 2. Glue the servo tray assembly into the fuselage with 6-minute epoxy. The cutout in the front of the tray should align with the front of the rear LG former.

❏ 3. Install the **pushrods** and **guide tubes** into the fuselage by inserting them in the holes you made in the rear of the fuselage. **Do not** glue the pushrods into position until instructed to do so. The pushrods cross inside the fuselage. The elevator pushrod, which exits from the right side of the fuselage, has the ends bent at 90 degrees to each other.

Refer to this sketch and the photograph for the following two steps.

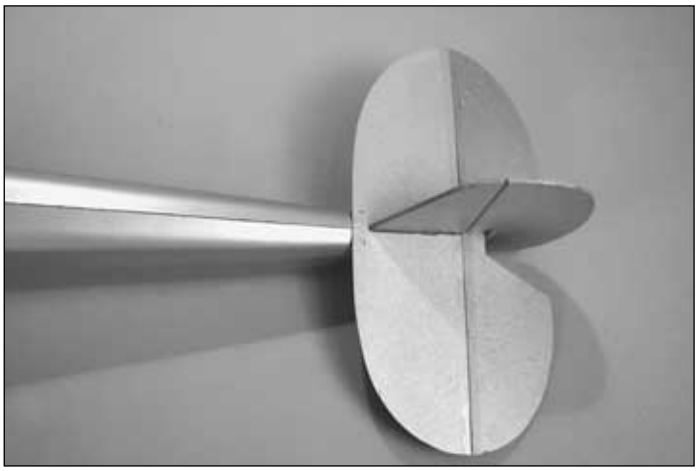


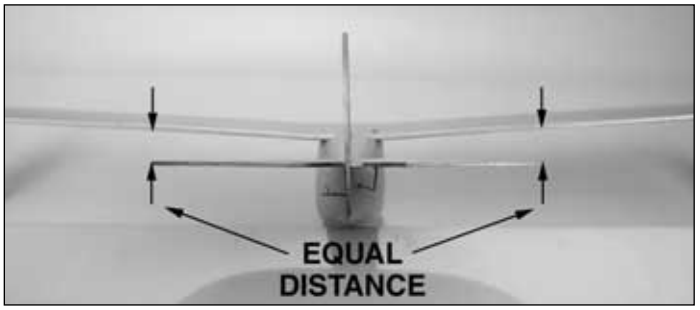


❏ 4. Fit the servos into the 1/8" balsa **servo mounts (I)**. Drill 1/16" holes through the servo mounts, then mount the servos to the servo mounts with the screws that came with the servos.

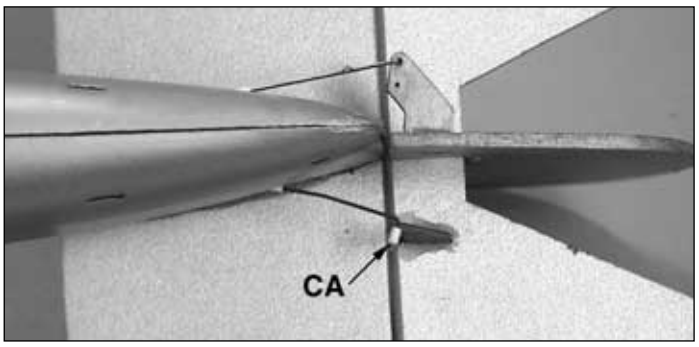
❏ 5. Fit the servo mounts with the servos into the servo tray. **Do not** glue the servo mounts to the servo tray until instructed to do so. Connect the pushrods to the servos by inserting them into the servo arm from the bottom. The pushrods will be secured to the servo arm later. If the pushrods do not align with the servos, cut slots in the pushrod brace that will allow the pushrods to align as shown in the photo and in the sketch. Use a long servo arm for the rudder servo and a short arm for the elevator servo.

Hook Up the Controls

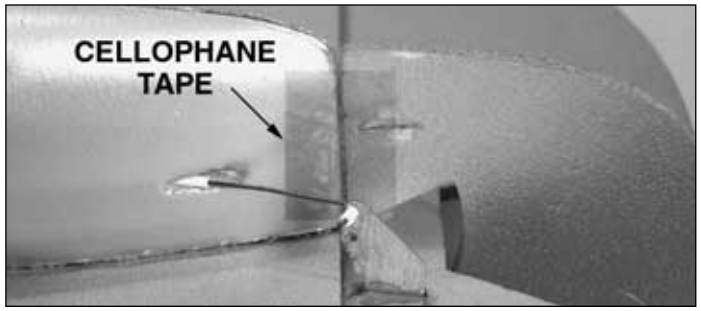




❏ 1. Glue the stab and fin to the fuselage with 6-minute epoxy. Make sure the fin is centered on the molded-in seam on the top of the fuselage and that it is parallel with the centerline of the fuselage. Before the epoxy hardens, position the wing on the fuselage and view the wing and stab from behind. If necessary, raise or lower one side of the stab until it is parallel with the wing. Use pins to hold the stab into position until the epoxy has fully hardened. Fill any gaps between the fuse and the bottom of the stab sparingly with additional epoxy.

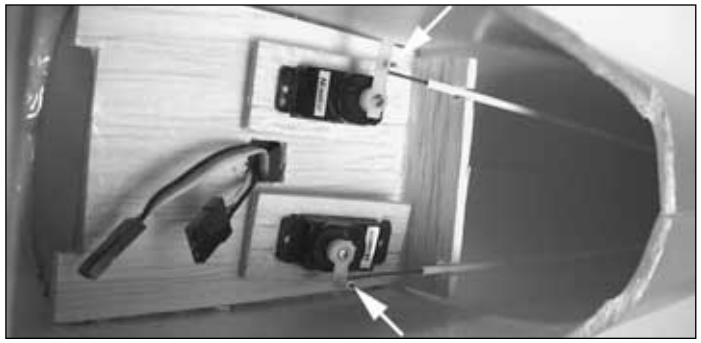


❏ 2. Connect the aft end of the pushrods to the control horns on the elevator and rudder by inserting them into the outermost hole. If necessary, make small bends in the pushrods to get them to align with the holes in the horns. Be certain there is a small amount of sideways tension in the rods so they remain connected to the horns. Cut two 1/8" [3mm] long pieces from the small white plastic tube. Place one piece on the end of both pushrods to hold them onto the control horns. Place a small drop of CA on each piece to hold it in place.



❏ 3. Use a piece of cellophane tape on both sides of the rudder to hold it to the rear of the fuselage.

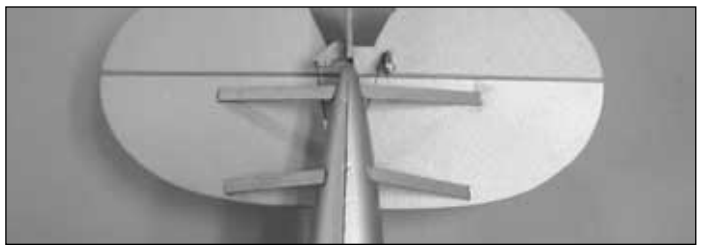
❏ 4. Temporarily connect the speed control and servos to the receiver. Turn on the transmitter, then center the trims. Connect the charged battery to the speed control. If the servo arms are not centered, remove the arms from the servos and center the arms.



❏ 5. Cut two 1/8" [3mm] long pieces from the small white plastic tube. Place one piece on the end of both pushrods to hold them onto the servo arms. Place a small drop of CA on each piece to hold it in place.

❏ 6. With the pushrods connected to the servos and the control surfaces, position the servo trays so the elevator and rudder are neutral. Carefully glue the servo mounts to the servo tray with medium CA.

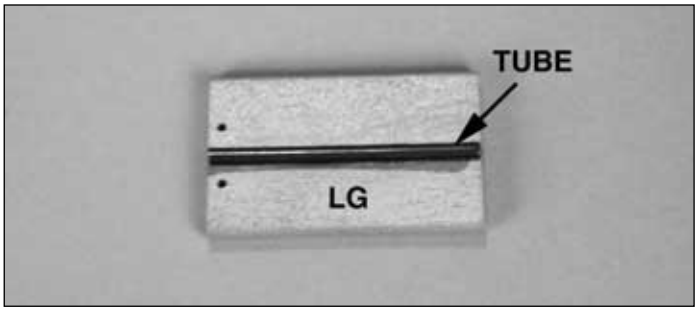
❏ 7. Now that the servos have been positioned and the controls are centered, use 6-minute epoxy to glue the ends of the pushrod guide tubes to the slots in the fuselage and the slots in the pushrod brace. Be careful not to get any epoxy into the ends of the pushrods.



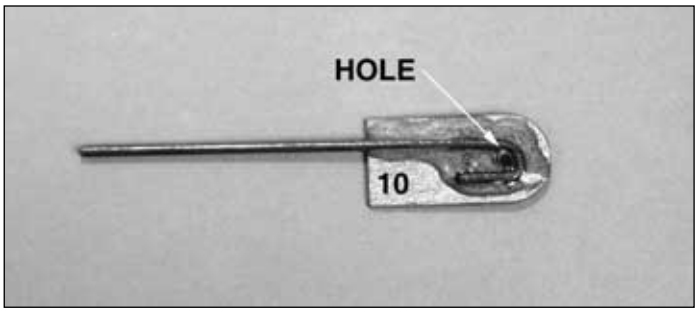
❏ 8. Mount the plywood **tail braces (11, 12)** to the bottom of the stab and the fuse. Cut small slots in the bottom of the fuse at the indentations to accommodate the ends of the struts, but do not cut slots in the stab. Bevel ends at stabilizer for a better fit and more gluing surface. Glue the struts into position with epoxy.

Assemble the Landing Gear

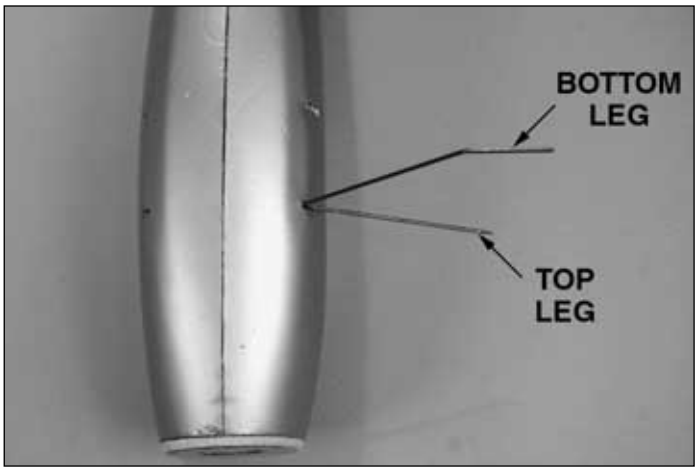
The landing gear looks delicate and difficult to install, but they are actually very strong and quite easy to assemble. We will start with the right landing gear assembly.



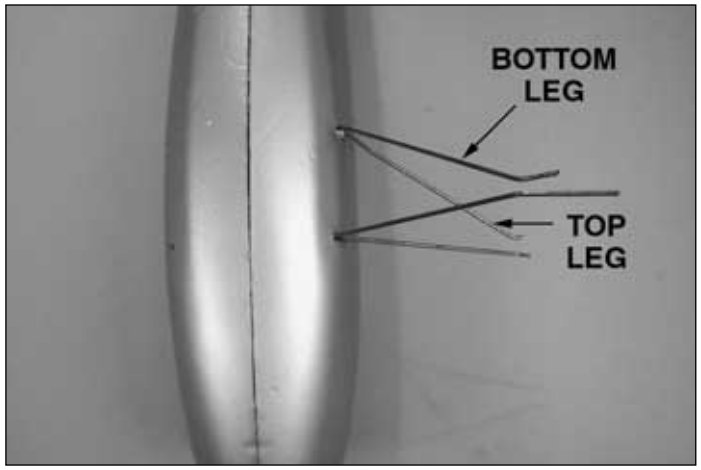
❏ ❏ 1. Cut a piece from the small dark tube to the length of the groove in the 1/8" [3.2mm] balsa part **LG**. Using epoxy, glue the tube into the groove in LG. Drill two 1/16" [1.6mm] holes where shown in the photo. This assembly will now be referred to as the "shock absorber assembly".



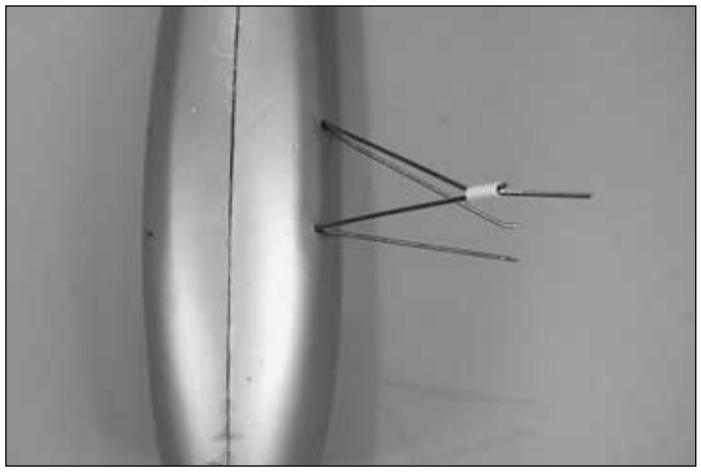
❏ ❏ 2. Glue the 1/16" [1.6mm] wire landing gear part shown in the photo to the 1/32" [0.8mm] ply part **10** with 6-minute epoxy. Be sure to align the wire part with the hole marked on the ply part. When the epoxy has hardened, enlarge the hole with a 1/16" [1.6mm] drill. This assembly will now be referred to as the "bottom brace wire assembly".



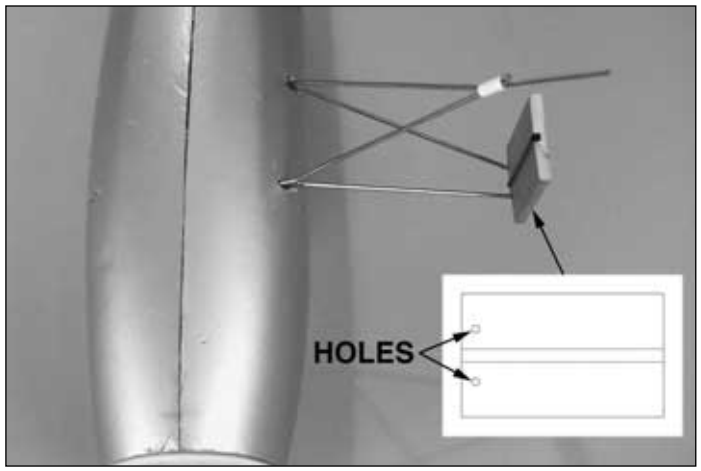
❏ ❏ 3. Without using any glue, insert the forward landing gear wire into the front slot in the fuselage. Both forward landing gear wires are the same. The photo shows the bottom of the fuselage viewed from the firewall.



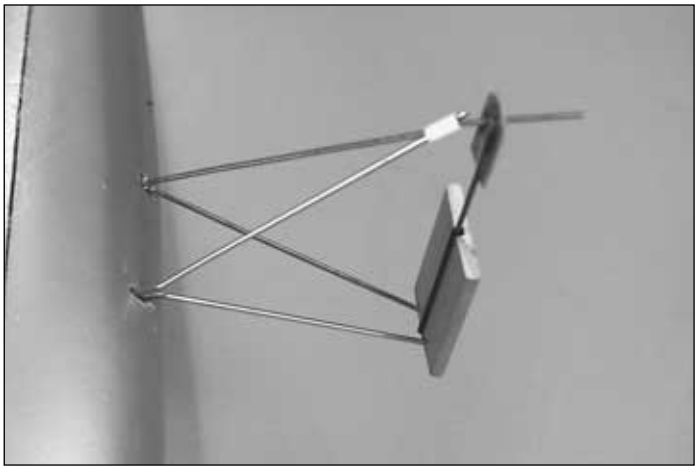
❏ ❏ 4. Next, insert the rear wire. There is a left and right rear wire so make sure you are using the correct wire. The longer end should be oriented as shown in the photo above.



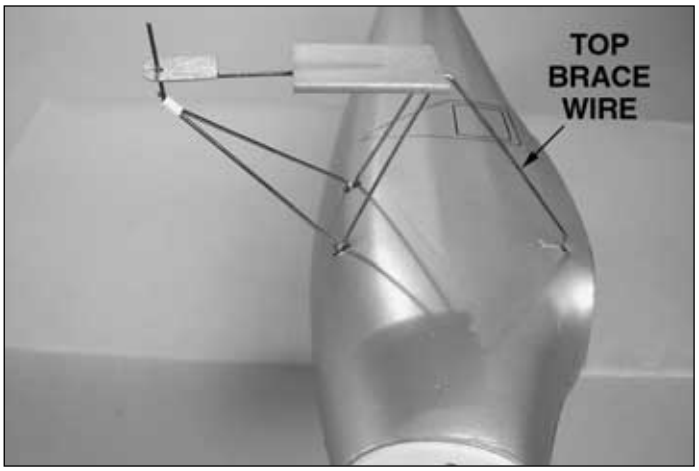
❏ ❏ 5. From the large white plastic tube cut two pieces 3/8" [9.5mm] long. Use one to hold the bottom of the wires together. Note: You may need to "tweak" the wires a bit to get them to fit properly.



❏ ❏ 6. Insert the ends of the top of the wires into the two holes in the shock absorber assembly you made earlier.



❏ ❏ 7. Insert the bottom brace wire assembly you made earlier into the tube in the shock absorber assembly, then insert the main landing gear wire into the hole in the wire assembly as shown in the above photo.



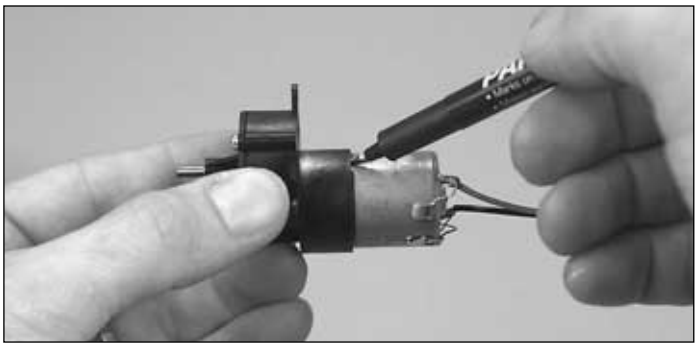
❏ ❏ 8. Insert the top brace wire into the tube in the top of the shock absorber assembly and the top hole in the fuselage. You may need to "tweak" the bends in the wires to get the assembled landing gear system to fit properly.

❏ ❏ 9. Time to glue the landing wires into the fuselage. Remove the top brace wire and then carefully remove the remainder of the landing gear assembly as a unit. Mix some 6-minute epoxy and put some into the three holes in the fuselage. Insert the landing gear assembly and the top brace wire back into the fuselage holes. After the epoxy has hardened, mix a small amount of epoxy and fill the holes in the fuselage. Be careful not to use an excessive amount of epoxy as it could run inside the fuselage and add excess weight to the model.

❏ 10. Return to step 1 and install the landing gear to the left side of the fuselage.

Mount the Motor

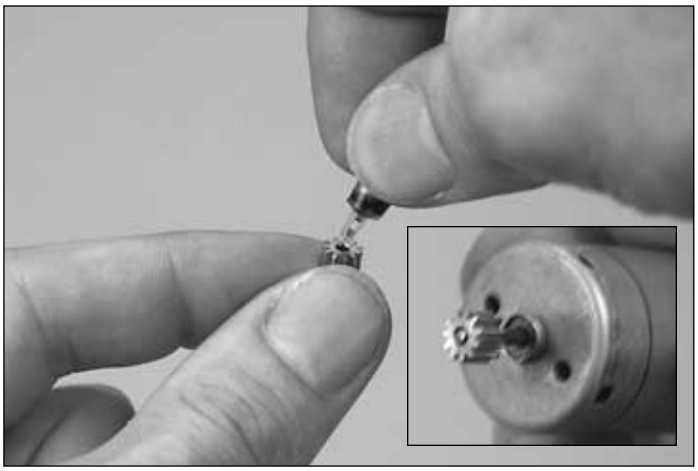
❏ 1. Use denatured alcohol or other solvent to clean the motor shaft on the motor that you will use. Roughen the shaft with 320-grit sandpaper so glue will adhere.



❏ 2. Without using tools, use your fingers to press the motor all the way into the gearbox. Spin the shaft on the gearbox. If there is resistance and the shaft does not spin freely, back the motor out of the gearbox **just enough** to allow the shaft to spin freely. Use a fine-point felt-tip pen to mark the motor. This is how far the motor is to be installed after the pinion gear is mounted.

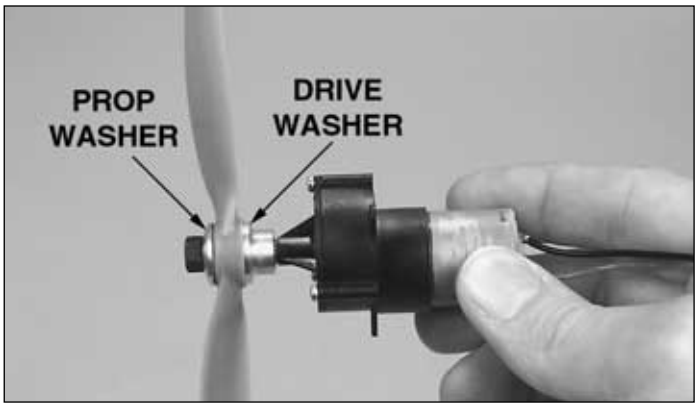
❏ 3. Remove the motor from the gearbox.

❏ 4. The pinion gear fits onto the motor shaft easier one way than it does the other. Using only your fingers (no tools), determine which way is the easiest by test-fitting the gear onto the shaft. The "easy way" is the way the gear goes on and is to be permanently installed.



❏ 5. Remove the pinion gear from the motor. Add a small drop of the cement included with this kit to the hole in the end of the gear that fits onto the shaft. Install the gear onto the shaft. The end of the gear should be even with the end of the motor shaft.

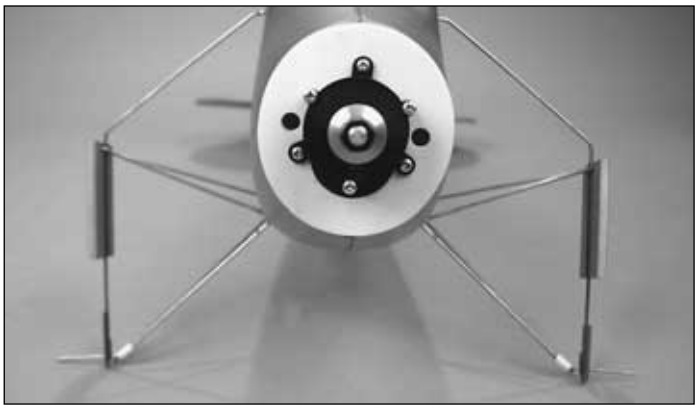
❏ 6. Use a toothpick to apply a **small** dab of lubricating oil to both ends of the motor shaft where it exits the motor. **Do not** apply oil directly from the container because you may apply too much.



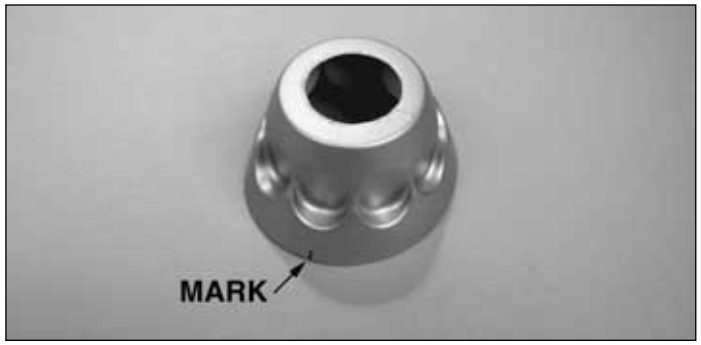
❏ 7. Reinstall the motor into the gearbox up to the line you marked. If the motor does not fit tightly in the gearbox, use a drop of CA to hold it in position. Fit the prop adapter to the gearbox. Insert the appropriate nylon spacer ring into the prop, then test fit the prop to the gearbox (be certain to use the prop washer). If necessary, use a hobby knife to enlarge the hole in the nylon spacer ring so it will fit onto the prop adapter.

❏ 8. Tighten the prop nut with an 8mm wrench. If necessary, use a pliers to hold the drive washer while tightening the prop nut. Wrap the drive washer with a cloth to keep the pliers from marring it.

❏ 9. Spin the propeller by hand. It should spin somewhat freely, but due to the resistance of the motor and gear drive, the propeller should not "coast" or freewheel indefinitely. If there is much resistance, back the motor out of the gearbox until the propeller spins as it should.



❏ 10. Remove the propeller from the gearbox. Position the motor and gearbox on the firewall. Using the holes in the mounting tabs on the gearbox as a guide, drill three 1/16" holes through the firewall for the mounting screws. Mount the gearbox to the firewall with three wood screws.

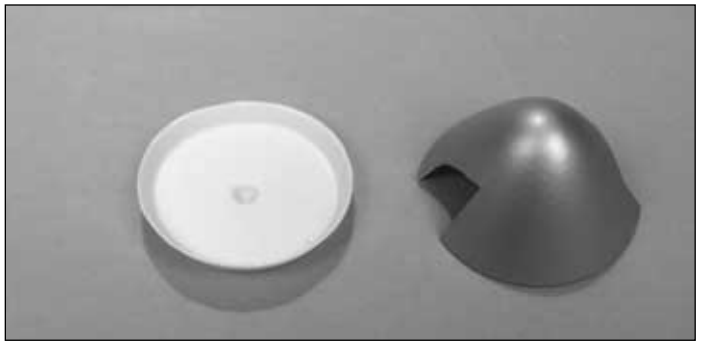


❏ 11. Put a mark at the top of the molded plastic **cowl**. The center section of the cowl has a line which points to the top. Note that this is aligned with the indentation for the top cylinder. Trim the excess material from the aft edge of the cowl. Cut a hole in the front of the cowl for the gearbox.

❏ 12. Carefully cut the molded **cylinder heads** from the plastic sheet. Lightly sand the edges flat and smooth with some 120-grit sandpaper placed flat on your worktable. Glue two of the cylinder heads together to form a cylinder head assembly. This is easiest to do if you hold the assembly as shown in the photo while gluing the center section together first with CA. After the CA has cured, hold the assembly in the center and glue the rippled ends together.

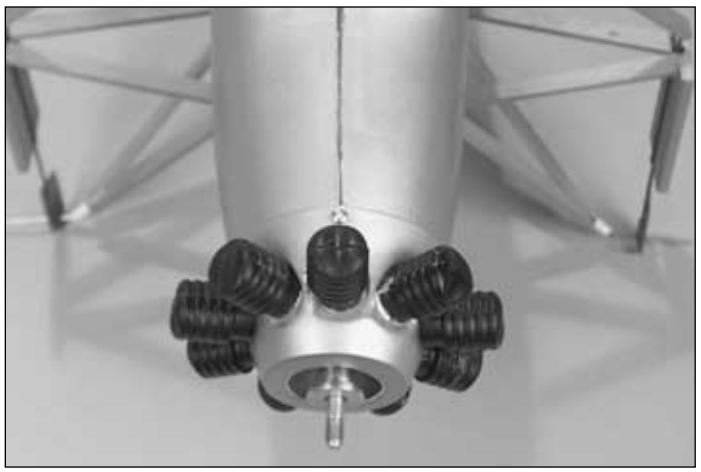
❏ 13. Carefully cut this assembly in half to obtain two cylinders. Do this for the remaining cylinder heads to obtain nine complete cylinders.

❏ 14. Glue all nine cylinders to the cowl with medium CA.

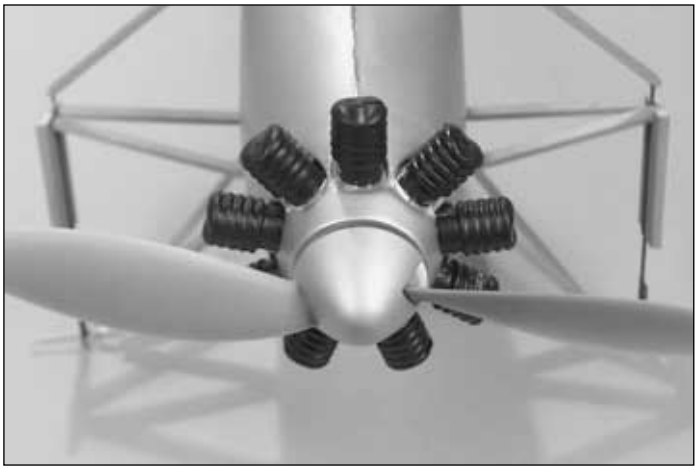


❏ 15. Carefully cut the molded plastic **spinner** and **spinner base** from the plastic sheets. Make the cutouts for the prop in the spinner. Do this a bit at a time, until the propeller fits nicely into the spinner.

❏ 16. Glue the 1/32" ply **spinner former (6)** inside the plastic spinner base with medium CA. Using the dimple in the molded plastic spinner as a guide, carefully drill a 7/32" [5.6mm] hole in the center of the assembly.



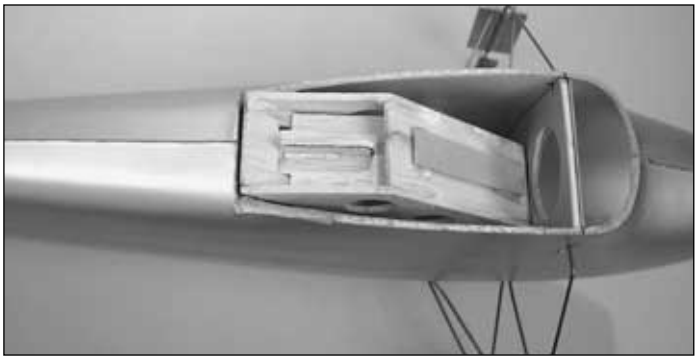
❏ 17. Center the cowl on the prop shaft adapter. Drill a 1/16" [1.6mm] hole through the cowl into the balsa nose formers for each screw. Mount the cowl to the fuselage with three wood screws. This photo shows the finished cowl mounted to the completed model. Refer also to the photo at step 18.



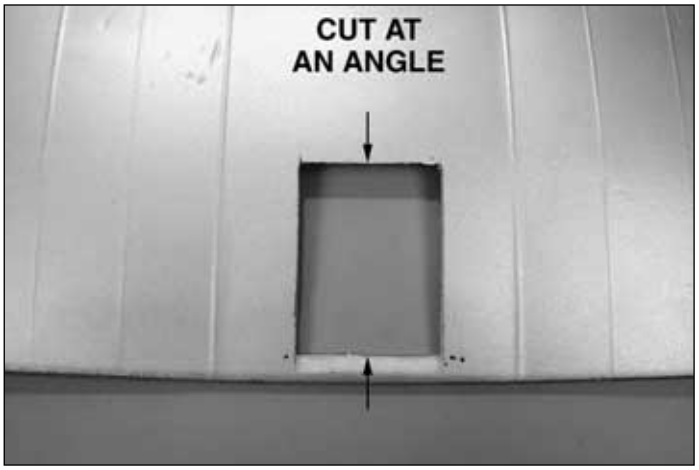
❏ 18. Install the spinner base assembly on the gearbox adapter prop shaft, then mount the prop, prop washer and prop nut. Position the adapter so that there is 1/16" [1.6mm] between the spinner base and cowl. Tighten the prop nut securely. Install the spinner on the spinner base and secure it with medium CA. Use only a very small drop of CA on each side of the spinner so that it can be easily removed if you need to change the prop.

Assemble the Wing

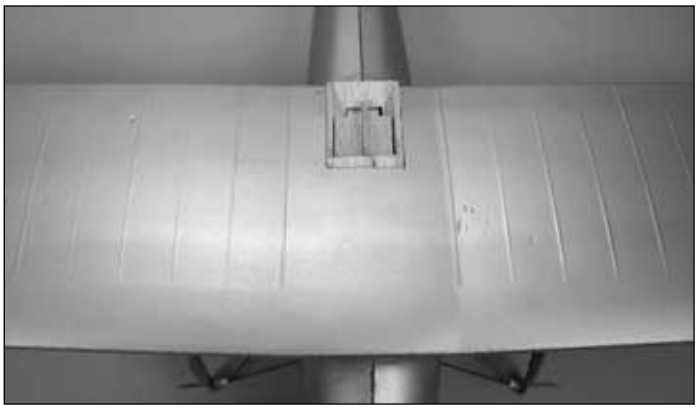
❏ 1. Glue the 1/64" plywood **wing braces (7)** into the indentations on the bottom of the wing.



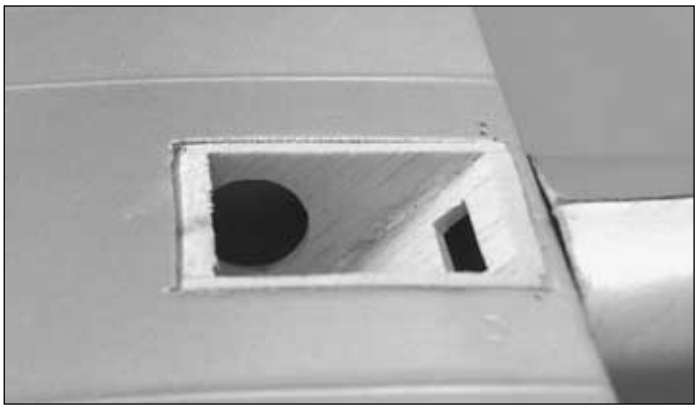
❏ 2. Position the battery holder in the fuselage and notice the position and angle that it will be in when installed. DO NOT glue into place until later.



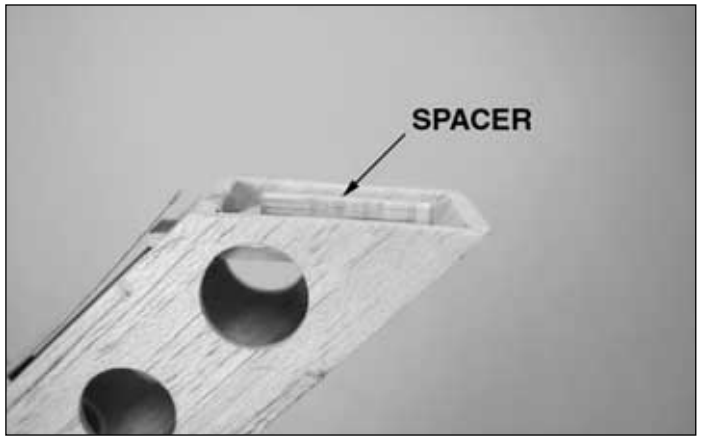
❏ 3. Cut an opening in the top of the wing for the battery holder. Use the mold lines as a guide. Cut the front and rear of the opening at an angle to match the angle of the battery holder when it is mounted in the fuselage. Trial fit the battery holder in the opening.



❏ 4. With the battery holder in position in the fuselage, trial fit the wing to the fuselage, centered on the fuselage. Trim the opening in the wing as needed to fit the battery holder. Press the wing firmly onto the fuselage, making sure it is firmly resting on the top of the fuselage. (Look from below the wing to be sure). Mark the top of the battery holder where it meets the wing.

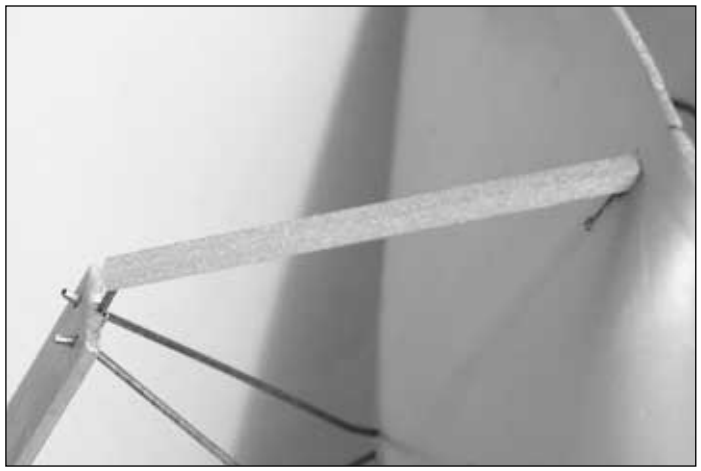


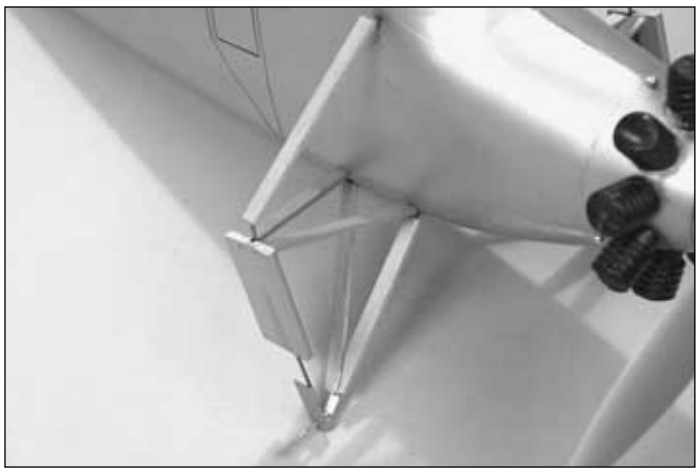
❏ 5. Remove the wing and battery holder from the fuselage. Remove the battery holder cover, then trim the battery holder at the marks you made. Reinstall the battery holder and wing on the fuselage and insure that the battery holder is flush with the top of the wing. Make any adjustments needed.



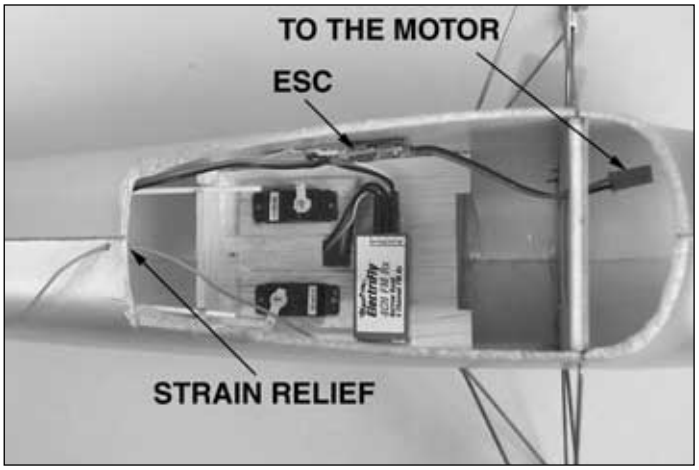
❏ 6. Remove the wing and battery holder and install the battery holder cover on the battery holder. Trim the spacer on the cover so that it is flush with the top of the battery holder.

Before the wing can be glued into place the receiver and speed controller must be installed. In addition, you should glue the fairings to the landing gear at this time.

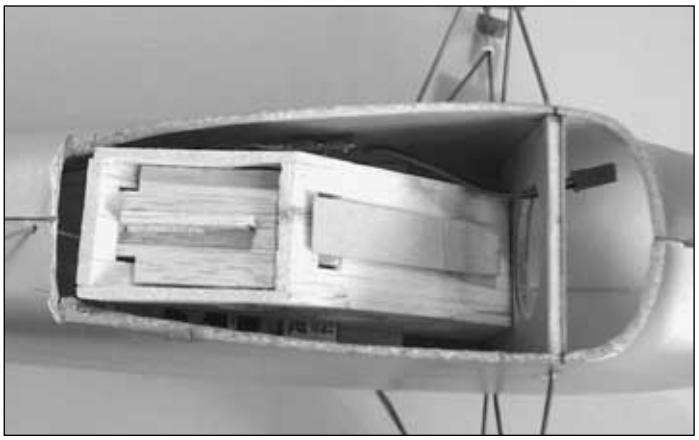




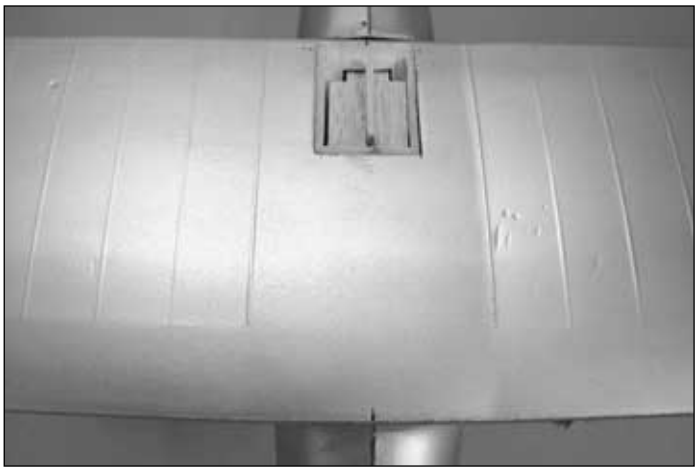
❏ 7. Using the patterns on page 24 as a guide, cut the landing gear fairings from the grooved 1/8" x 1/4" [3.2 x 6.4mm] balsa stick. Cut one end of each fairing strip to the angle on the pattern, but verify that the length is correct before cutting the strip to length. Glue the fairing strips to the landing gear wires with medium CA being careful not to let any CA to drip onto the fuselage. Note that we used a panel line pen to outline the door and window.



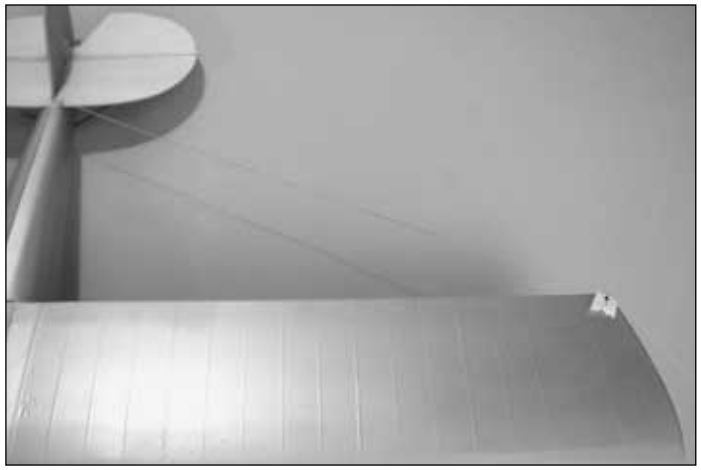
❏ 8. Plug the servos and ESC into the receiver and install it in the model. Double sided tape works well to hold the receiver in place. Use double sided tape to also hold the ESC to the fuselage side. Plug the motor into the ESC. Drill a hole in the top of the fuselage aft of the wing and route the receiver antenna through the hole. Use a cut off servo arm to make a strain relief for where the antenna exits the fuselage.



❏ 9. Position the battery holder in the fuselage. Glue it in place with some medium CA. Do not glue it too solidly in place as you will have to remove it if you need to access the receiver or servos later.



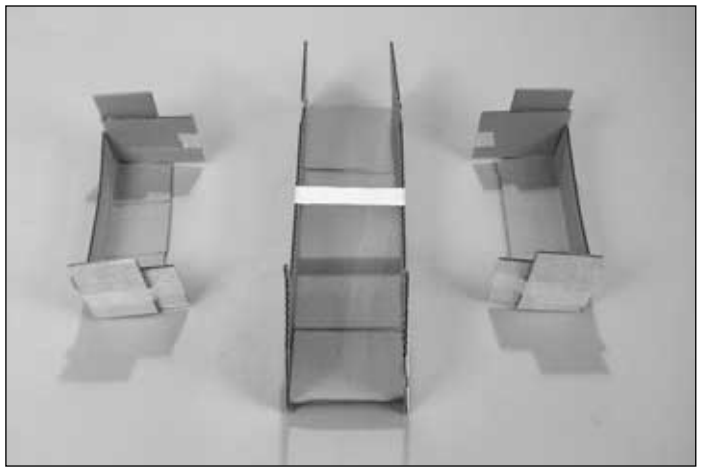
❏ 10. Measure and mark the center of the wing at the leading and trailing edges. Position the wing on the fuselage using the marks to center the wing.



❏ 11. Push a pin into the stab in front of the fin. Use a tape measure or string to measure from the pin to one wing tip, then check the distance from the pin to the other wing tip. Adjust the wing as needed until both distances are equal.

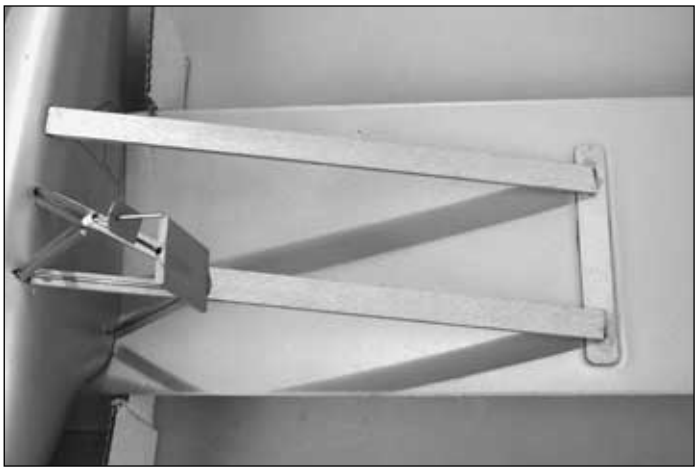
❏ 12. While holding the wing to the fuselage in this position view the model from the front. Make sure that the wing is aligned parallel with the stab. If it is not, lightly sand the high side of the fuselage until the wing and stab are parallel.

❏ 13. Glue the wing to the fuselage with 6-minute epoxy. Hold the wing firmly in place until the epoxy has hardened.



❏ 14. Use tape to assemble the die-cut cardboard jigs supplied with the model. These jigs are used to establish the correct dihedral and washout angles for the wing. There is a small square marking the wing leading edge of each jig that is not visible in the photo.

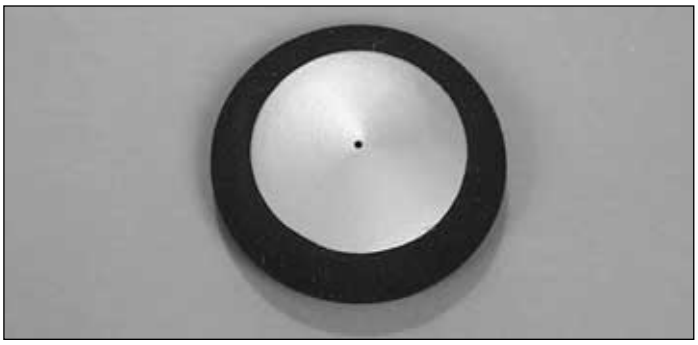
❏ 15. Place the model upside down in the jigs. Make sure that the leading edges of the jigs are at the leading edge of the wing.



❏ 16. Cut the wing struts from the 1/8" balsa **wing strut** material. Make sure the model is firmly resting on the jigs as you measure and cut each strut. Cut slots in the fuselage for the rear struts at the molded marks. Use 6-minute epoxy to glue the struts in place.

FINAL ASSEMBLY

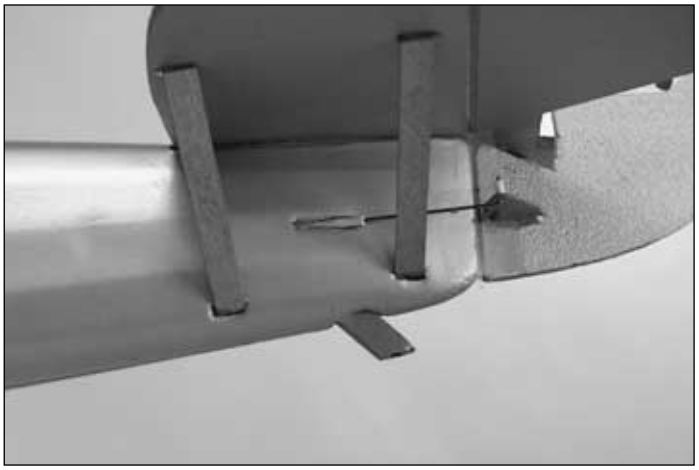
❑ 1. Paint the inside of the battery holder black where it is visible on the top of the wing. Glue the clear plastic window to the inside of the 1/64" [0.4] battery hatch **window frame**. Glue the window frame to the spacer on the top of the battery hatch. Roughen the plastic for a better bond.



❑ 2. Carefully cut the wheel **hub caps** from the plastic sheet. Glue one hub to the wheel. Drill a 1/16" [1.6mm] hole through the wheel axle hole into the hub cap. Glue another hub cap to the other side of the wheel. Drill a hole through this hub cap as well. Make the second wheel in the same manner.

❑ 3. Cut two 1/8" [3.2mm] long **retainers** from the small white plastic tube. Mount the wheels to the landing gear with a retainer. Using care not to get any glue on the wheels, secure the retainers to the landing gear with a very small drop of medium CA.

❑ 4. Cut the self stick decals from the sheet and apply them to the model. Use the above photo and the box cover as a guide.



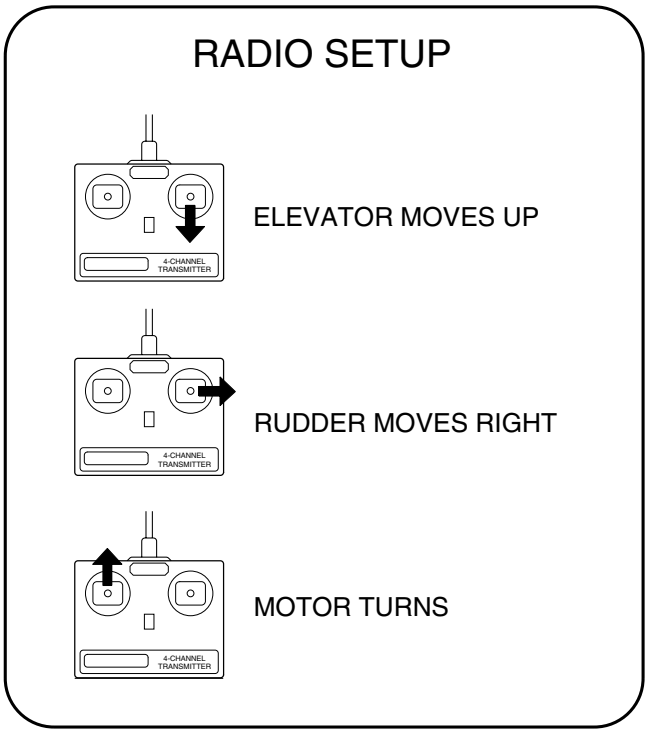
❑ 5. Cut the 1/8" x 5/16" x 4-3/8" [3.2 x 8 x 111mm] balsa stick to a length of 3" [76.2mm] to make a **tailskid**. Cut a slot in the bottom rear of the fuselage as shown and glue the tailskid in place with epoxy. Put some epoxy on the end of the tailskid that is inserted into the fuselage so that it will be glued to the top of the fuselage as well.

PREPARE FOR FLYING

Set the Control Throws

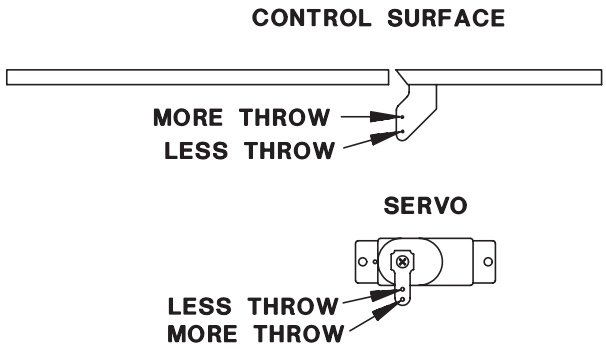
NOTE: Unless you are specifically checking the operation of the motor, for safety remove the propeller from the model while setting it up on your workbench.

IMPORTANT: Whenever connecting the battery always hold onto the fuselage in case the motor accidentally comes on and the propeller turns.



❏ 1. Turn on the transmitter and connect the battery to the speed control in the model. Be certain the rudder, elevator and motor respond as shown in the chart. If required, use the reversing function in the transmitter to reverse any controls necessary so they respond correctly.

❏ 2. Use the ATV function in the transmitter or adjust the position of the pushrods on the servo arms or the control horns on the elevator and rudder to get the control surface throws shown in the chart that follows. The throws are measured at the widest part of the control surface.



❏ To **increase** the control surface throw, move the pushrod to the hole that is closer-in on the control horn on the control surface, or move the pushrod to the hole that is farther out on the servo arm. To decrease the control surface throw, do the opposite.

Set up the Spirit of St. Louis so it has the following control surface throws:

ELEVATOR:	5/8" up [15.9mm]	5/8" down [15.9mm]
RUDDER:	1-1/4" right [31.8mm]	1-1/4" left [31.8mm]

Second to the C.G., the control throws have the greatest effect on the way a model flies. Set the throws as close to these settings as possible. If you have too much control throw the model may respond too quickly. If you do not have enough throw you may not be able to maneuver the model or have enough control to land it when the motor is off.

Balance the Model (C.G.)

IMPORTANT: The C.G. (center of gravity), or balance point has the greatest effect on how a model flies. Do not overlook this important procedure. Modelers who do so often find that the airplane is difficult to control, or out of control after it is too late. Preserve your model and insure that the first flight won't be the last by balancing the model according to the following instructions.

The C.G. (center of gravity) must be checked when the model is ready to fly with the propeller and battery installed.

❏ 1. Use a felt-tip pen or narrow strips of tape to mark the balance point on the **bottom** of the wing 1-5/8" [41.3mm] rearward from the leading edge of the wing on both sides of the fuselage.

❏ 2. Lift the model right-side up at the balance point you marked on the bottom of the wing. If the nose drops the model is nose-heavy and you must add weight to the tail. If the tail drops the model is tail-heavy and you must add weight to the nose.

❏ 3. If additional weight is required to balanced the model, use small pieces of Great Planes stick-on weight (GPMQ4485). If weight is required in the nose, do not stick weight to the cowl. Remove the cowl and stick the weight to the firewall. If weight is required in the tail, it can be stuck to the top or bottom of the stab next to the fuselage.

❏ 4. After placing weight on the model where necessary, recheck the C.G. to confirm that it is correct.

Identify Your Model

No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 24 and place it on or inside your model.

Charge the Transmitter Batteries

Be certain the transmitter batteries are fully charged. Follow the battery charging instructions that came with your radio control system to charge the batteries or replace if using alkaline batteries.

Ground Inspection

Before you fly you should perform one last overall inspection to make sure the model is truly ready to fly and that you haven't overlooked anything. If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to perform the inspection. Check to see that you have the radio installed correctly and that all the controls are connected properly. The motor must also be checked by confirming that the prop is rotating in the correct direction and the motor sounds like it is reaching full power. Make certain the elevator and rudder are secure, the pushrods are connected, the controls respond in the correct direction, radio components are securely mounted, and the C.G. is correct.

Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the motor running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

Performance Tips

- Using multiple battery packs for successive flights may cause the motor to become excessively hot, thus causing damage. Allow the motor to cool for at least 10 minutes between flights.
- Keep epoxy use to the "useful minimum". Less weight will make for better flight performance.

Motor Safety Precautions

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

Get help from an experienced pilot when learning to operate motors.

Use safety glasses when running motors.

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 path of the propeller as you start and run the motor.

Keep items such as these away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects (pencils, screw drivers) that may fall out of shirt or jacket pockets into the prop.

The electric motor and motor battery used in The Spirit of St. Louis ARF are very powerful and the spinning propeller has a lot of momentum; therefore, if you touch the propeller while it is spinning it may inflict severe injury. Respect the motor and propeller for the damage they are capable of and take whatever precautions are necessary to avoid injury. Always disconnect and remove the motor battery until you are ready to fly again and always make sure the transmitter is turned on before connecting the battery.

AMA Safety Code (excerpts)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

GENERAL

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

RADIO CONTROL

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit, spectator and parking areas and I will not thereafter perform maneuvers, flights of any sort or landing approaches over a pit, spectator or parking area.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

FIND A SAFE PLACE TO FLY

Though The Spirit of St. Louis ARF is a "Park Flyer," the **best** place to fly **any** model is at an AMA chartered club field. Club fields are set up for R/C flying, making your outing safer and more enjoyable. We recommend that you join the AMA and a local club so you can have a safe place to fly and have insurance to cover you in case of a flying accident. The AMA address and telephone number are in the front of this manual.

If there is no club or R/C flying field in your area, find a suitable site that is clear of trees, telephone poles, buildings, towers, busy streets and other obstacles. Since you are not flying at a sanctioned AMA site, be aware that there may be others like yourself who could be flying nearby. If both of your models happen to be on the same frequency, interference will likely cause one or both of the models to crash. An acceptable minimum distance between flying models is five miles, so keep this in mind when searching for a flying site.

In addition to obstacles, it is important to be aware of people who may wander into the area once you begin flying. At AMA club flying sites it is a severe rule infraction to fly over others, and this is a good practice to follow if flying elsewhere. R/C models tend to attract onlookers whose numbers can soon multiply, forming small, uncontrolled crowds. Onlookers pose two main problems. First is the danger of actually crashing your model into a person, causing injury. Second is the distraction from those who ask you questions while you are trying to concentrate on flying. To minimize or avoid this problem, have an assistant standing by who can spot people who wander into your flying site (so you can avoid flying over them) and who can perform "crowd control" if people start to gather.

FLYING

IMPORTANT: If you are an inexperienced modeler we strongly urge you to seek the assistance of a competent, experienced R/C pilot to check your model for airworthiness AND to teach you how to fly. No matter how stable or "forgiving" The Spirit of St. Louis ARF is, attempting to learn to fly on your own is dangerous and may result in destruction of your model or even injury to yourself and others. Therefore, find an instructor and fly only under his or her guidance and supervision until you have acquired the skills necessary for safe and fully controlled operation of your model.

Takeoff

We recommend flying The Spirit of St. Louis ARF when the wind is no greater than five miles per hour. Less experienced flyers should fly only in calm (less than one mile per hour) conditions. Frequently, winds are calm in the early morning and early evening. Often these are the most enjoyable times to fly anyway!

Until you have The Spirit of St. Louis ARF properly trimmed for level flight, we recommend having an assistant hand-launch the model instead of taking off from the ground.

Turn on the transmitter and plug the battery into the speed control. Turn the receiver on by following the instructions that came with your speed control.

IMPORTANT: Confirm that the transmitter operates the controls by moving the sticks and watching the surfaces respond. Occasionally, electric models have been launched with the transmitter turned off or the battery disconnected from the speed control!

When ready to hand launch, the assistant should hold the bottom of the fuselage behind the main landing gear, then raise the model high above his head and point it **into the wind**. With the pilot *(that would be you!)* standing behind the plane, fully advance the throttle to start the motor. As soon as the motor is at full power, the hand launcher should gently toss the plane into the air at a **level** or **slightly nose-up** attitude. Be certain the model is being launched **into** the wind and be immediately ready to make corrections to keep the airplane flying straight, level and into the wind.

When the model has gained adequate flying speed under its own power, **gently** pull the elevator stick back until the airplane starts a gradual climb. Many beginners tend to pull too hard causing the model to stall, so be gentle on the elevator and don't panic. If you do pull too hard and you notice the model losing speed, release the elevator stick and allow the model to regain airspeed.

Continue a **gradual** climb and establish a gentle turn until the airplane reaches an altitude of 75 to 100 feet.

Flight

The main purpose of the first few flights is to learn how your model behaves and to adjust the trims for level flight. After the model has climbed to a safe altitude reduce the throttle slightly to slow the model, yet maintain altitude. The Spirit of St. Louis ARF should fly well and maintain adequate airspeed at about 1/2 to 3/4 throttle.

Adjust the elevator trim so the model flies level at the throttle setting you are using. Adjust the rudder trim to level the wings. It may take a few minutes to get the trims adjusted, but this should be your first priority once at a comfortable altitude. Continue to fly around, executing turns and making mental notes (or having your assistant take notes for you) of what additional adjustments or C.G. changes may be required to fine tune the model so it flies the way you like.

If The Spirit of St. Louis ARF reaches a high enough altitude, you may periodically cut off the motor power and glide. This may extend the flight time by several minutes, especially if you fly into a rising air current.

Landing

Because The Spirit of St. Louis ARF flies slowly, it requires little room to land. Begin the landing approach by flying downwind at an altitude of approximately 20 feet [6 meters]. When the airplane is approximately 50 to 100 feet [15 to 30 meters] past you, gradually reduce power and make the "final" 180-degree turn **into** the wind aligning the airplane with the runway or landing area. Do not dive the airplane, as it will pick up too much speed. Instead, allow the airplane to establish a gradual descent. Concentrate on keeping it heading into the wind toward the runway. When the plane settles to an altitude of about 4 feet [1 meter], gently apply a little "up elevator" to level the plane, but be careful as too much up elevator will cause it to stall. While holding a slight amount of up elevator the airplane will slow and descend as it loses flying speed and touch-down on the runway.

Until you are able to accurately judge how far The Spirit of St. Louis ARF can glide, it may be helpful to reserve some battery power to run the motor so the plane can be flown back to the runway. If needed, most BEC systems allow you to move the throttle to idle and then apply power to get a short burst of power.

After landing, allow the motor to cool for about 10 minutes before flying the model again. The battery should also be allowed to cool for at least 10 minutes before it is recharged.

ROG Takeoff

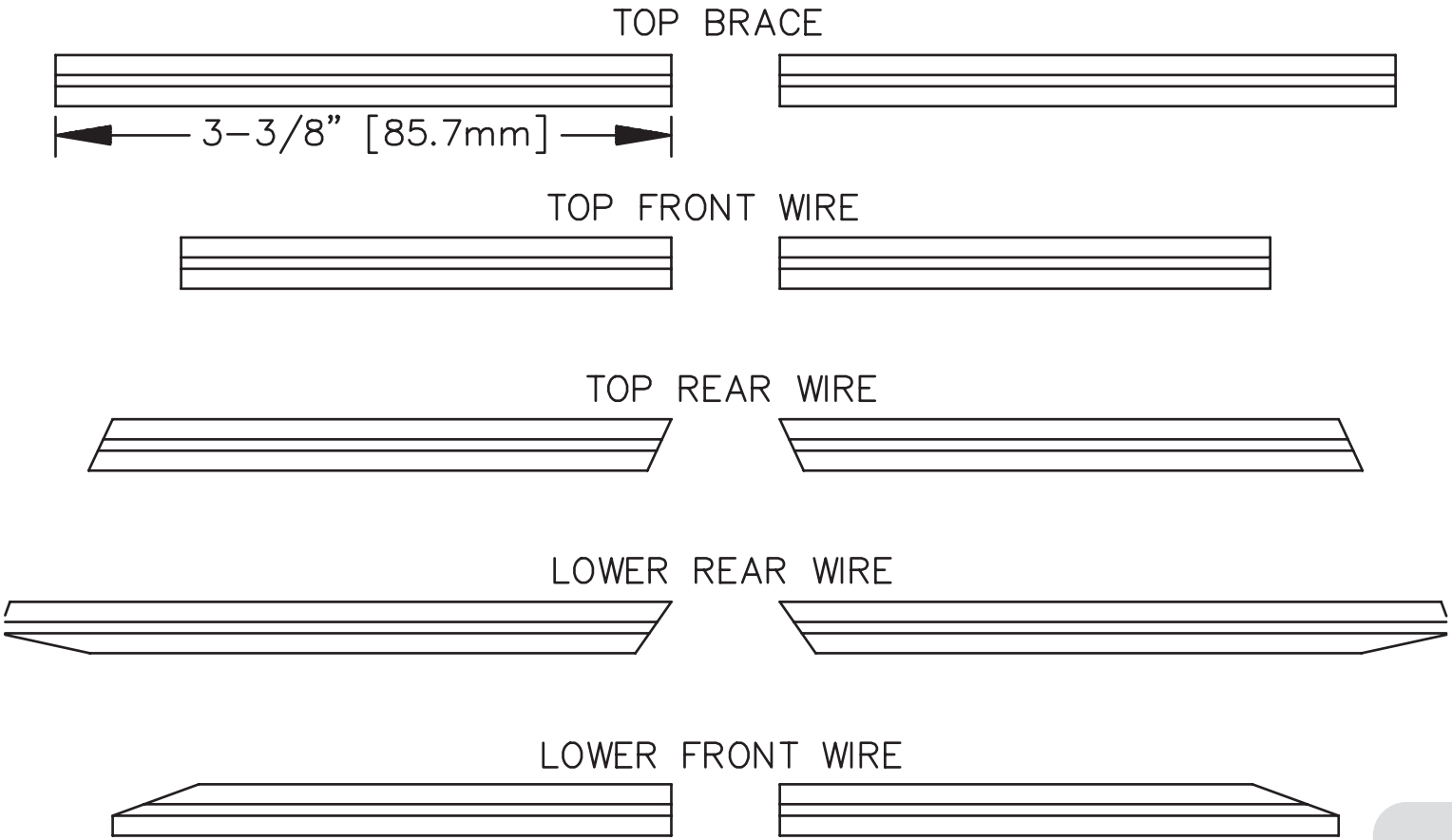
When speaking of small models, frequently a takeoff from the ground is called an "ROG" (*rise off ground*) takeoff. Landings on grass will be a little rough, but doing a ROG takeoff from grass will probably not be possible with The Spirit of St. Louis ARF. If planning an ROG takeoff, find a smooth, paved surface.

After you have trimmed The Spirit of St. Louis ARF for flight and have become familiar with its flight characteristics, you may try some ROG takeoffs. With the model on the runway and pointing directily into the wind, gently apply power. Initially, the plane may turn to the left or right because it has not gained enough speed for the controls to become effective. Do your best to get through this brief moment and maintain a straight heading down the runway and into the wind. Make corrections with the rudder to keep it rolling straight into the wind. If the model veers too far off, cut the throttle and try again. As the model begins to gain speed the controls will become effective.

After the airplane has gained adequate speed (this requires experience to gauge), gently pull back on the elevator stick allowing the airplane to become airborne. Release some of the up elevator control and establish a gentle climb the same as when you were hand-launching.

Best of luck and happy flying!

1/8" X 9/32" [3 X 7.1mm]
BALSA FAIRING PATTERNS



Identification Tag

Use this tag or photocopy it and use the copy. Please fill in the indicated information and place the tag in your model.

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number