

Lightnin' Bug



Instructions

Warning

A radio-controlled airplane is not a toy. It is capable of causing serious bodily injury and property damage. It is the buyer's responsibility to build this kit correctly and install the motor, radio, and other equipment. The first test flights should be made only with the assistance of an experienced R/C flyer. The model must always be operated and flown in accordance with the safety standards of the Academy of Model Aeronautics.

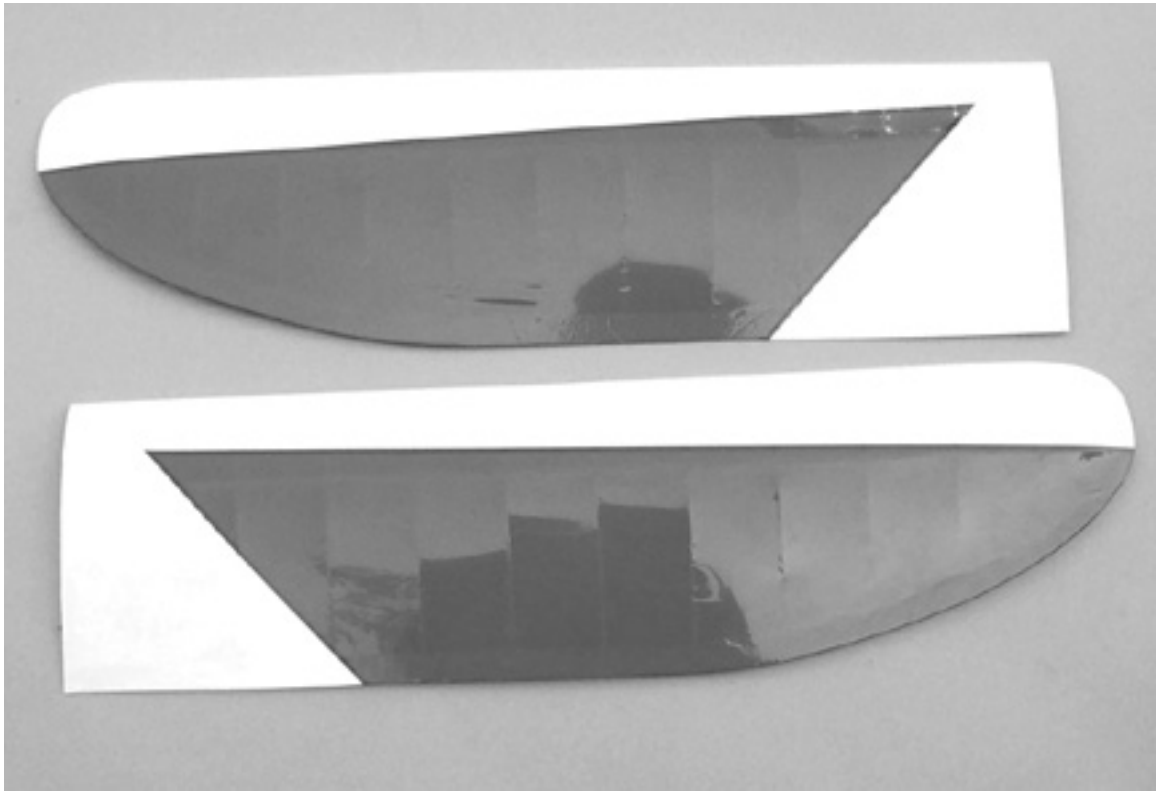
Per The Federal Communications Commission, you are required to use only those radio frequencies specified "for Model Aircraft".

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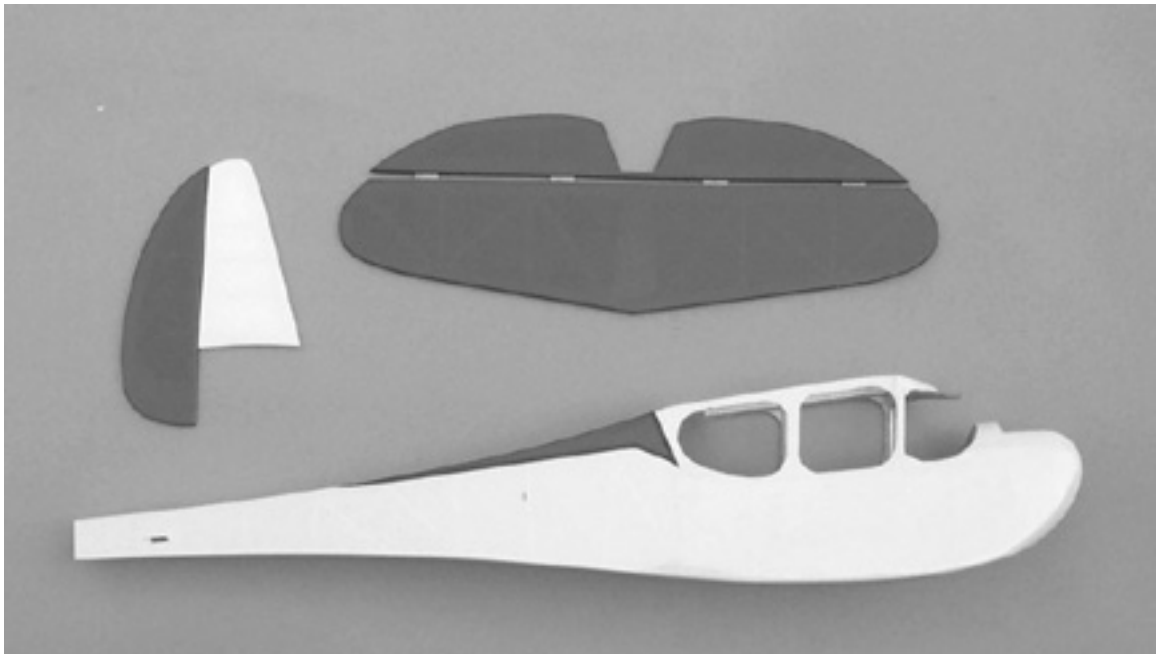
CARL GOLDBERG PRODUCTS, LTD.

PO Box 818 4462 Oakwood Rd Oakwood, GA 30566 Phone 678-450-0085

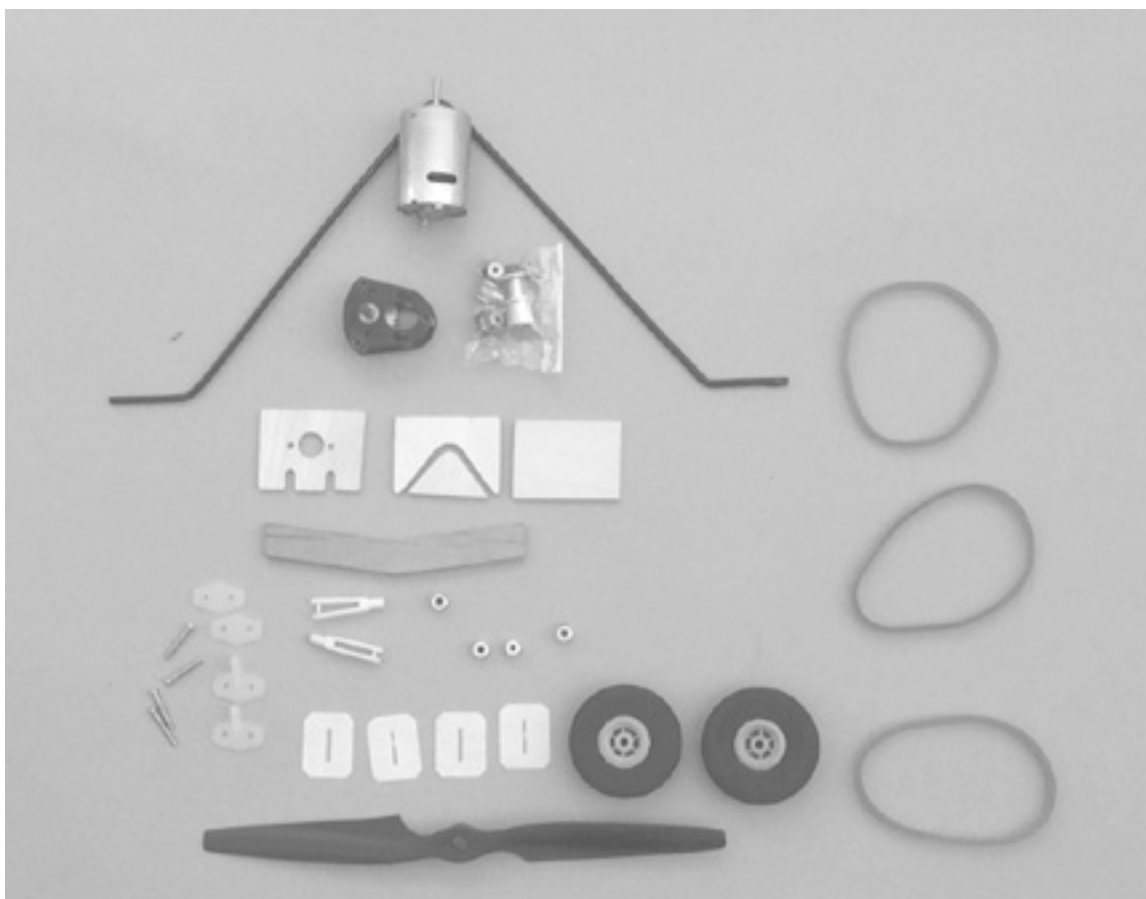
Parts Identification



Wing Panels



Fuselage, Stabilizer/elevators, & Fin/rudder



Included Hardware (Wire pushrods not shown).

Material List

Speed 400 motor
 Gearbox with 3 gear ratios
 Propeller
 Prop adapter
 Main Wheels (2)
 Wire Landing Gear
 Wire pushrods (2)
 Nylon Clevis (2)
 Nylon Control Horns (2)
 CA Hinges
 Wheel Collars (4)
 Nylon EZ Clips (2)
 #64 Rubber Bands
 Wing Panels
 Fuselage Assembly
 Horizontal Stabilizer and elevators
 Vertical Fin and rudder

Front Clear plastic windshield
 Clear Side windows, 2 left and right
 Hardwood dihedral brace
 Wire tailskid

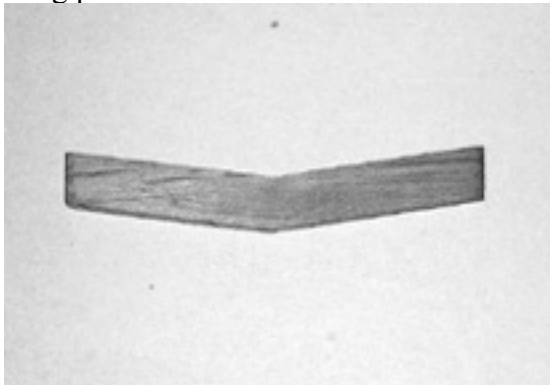
Additional Items Required

5-minute epoxy
 30-minute epoxy
 Medium CA glue
 Thin CA glue
 Canopy glue
 Xacto knife with #11 blade
 Masking tape
 Small square
 15-amp speed control
 Radio Equipment

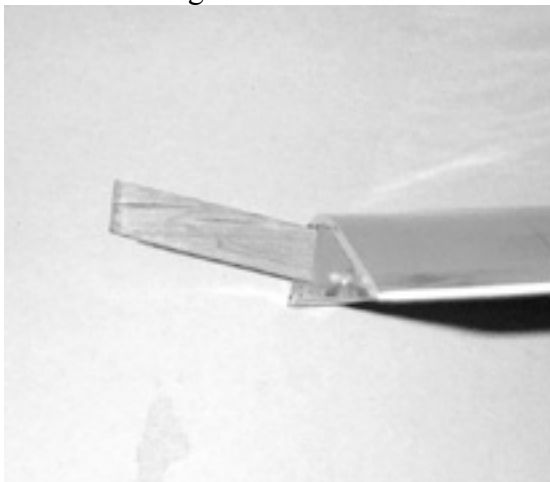
Wing Construction

We begin construction with the wing. Before starting construction, it is a good idea to place wax paper on the building surface to prevent gluing the wing to the building board.

Locate the two wing halves and the $\frac{1}{4}$ " dihedral brace taped to one wing panel.



Trial fit the dihedral brace in one of the wing halves.



Now slide the other wing panel onto the dihedral brace until it meets the other wing root. Check for alignment. If necessary, slightly sand the corners of the dihedral brace for proper fit.



When you are satisfied with the fit, remove the wing panels from the dihedral brace. Mix about one ounce of 30-minute epoxy and coat the inside of the slot in each wing panel, the dihedral brace, and the root rib of each wing.

Now slide the dihedral brace into one wing panel. Wipe away any excess epoxy that may have oozed out from inside the slot. Slide the other wing panel onto the brace, wiping away any excess epoxy with a paper towel wet with alcohol. Tape in place with masking tape until the epoxy has cured.

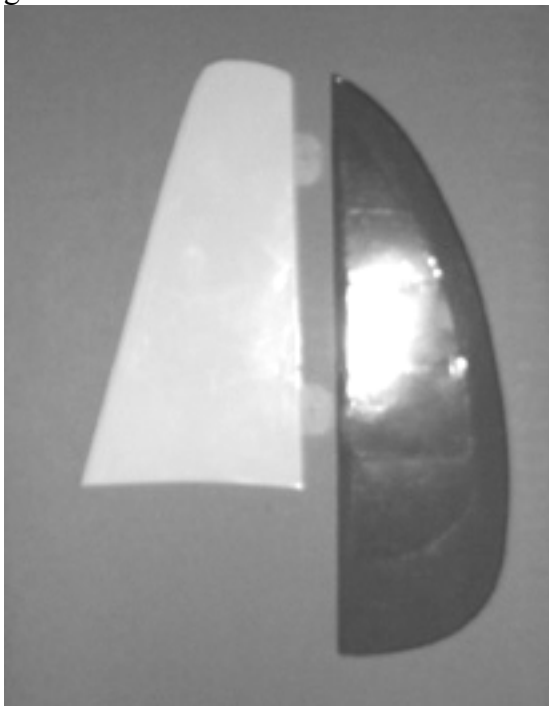


When the epoxy has cured, remove the masking tape and set the

wing aside. The wing assembly is now completed.

Tail Construction

Locate the horizontal stabilizer, elevator, fin & rudder. Notice that the hinges are installed but *not* glued.



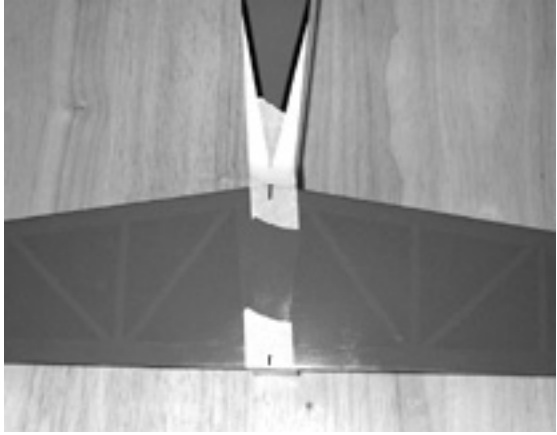
Remove the rudder from the fin. At the rear bottom edge of the fin, it is necessary to remove the corner with a razor blade to allow clearance for the elevator. $\frac{1}{4}$ inch in and $\frac{1}{4}$ inch up is enough.



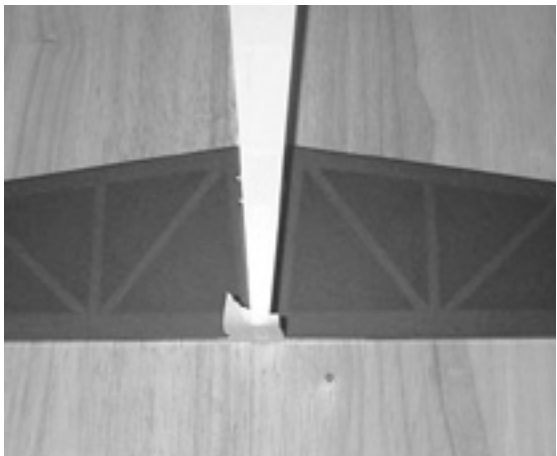
Next, with a sharp #11 Xacto Blade, remove the covering from the bottom of the fin.



Locate the fuselage and the stabilizer. Use masking tape on top of the stab and measure from each tip to locate the centerline of the stab. Place the stab on top of the fuselage and center it using the marks on the masking tape as a guide. Check the alignment, and temporarily tape it in place with masking tape. **The trailing edge of the stab should be inset $\frac{1}{4}$ " from the rear of the fuselage.**



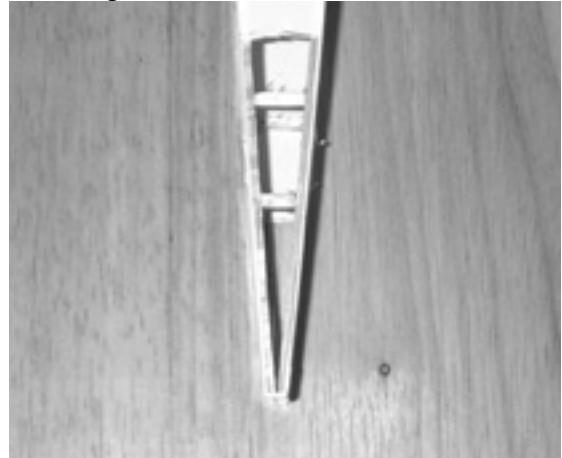
Mark the top of the fuselage where the leading edge of the stab is located. Now turn the fuselage over and mark the stab along the fuselage sides.



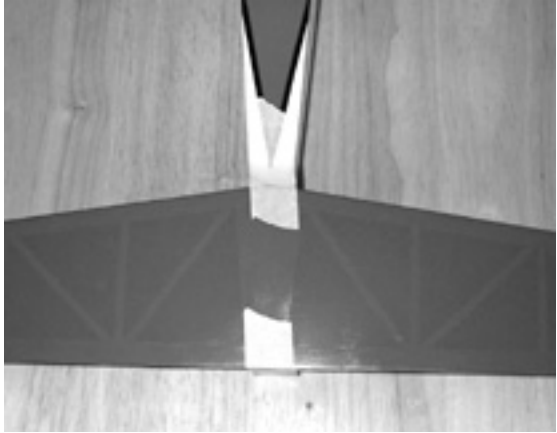
Remove the stab from the fuselage and very carefully with a #11 Xacto blade remove the covering between the lines. By removing the covering you are gluing to the wood and not the covering, giving you a much stronger joint. Cut about 1/16" inside the lines. Be careful not to cut the wood.



Now carefully remove the covering at the rear of the fuselage. Be careful not to remove the covering too far in front of the stab.



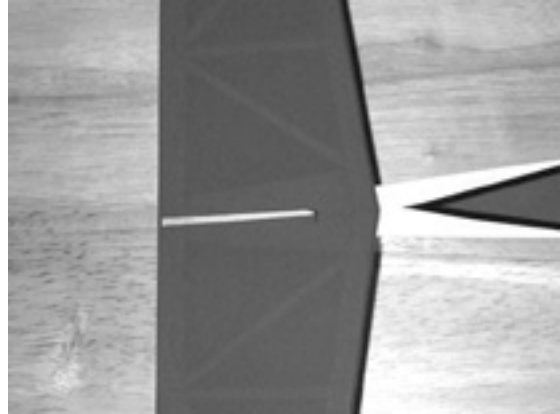
Mix a small amount of 30 - minute epoxy and spread a thin coat on the exposed area of the stabilizer. Carefully place the stab on the fuselage and again tape in place. Make sure it is square with the fuselage and level with the wing saddle. Set aside until the epoxy is dry.



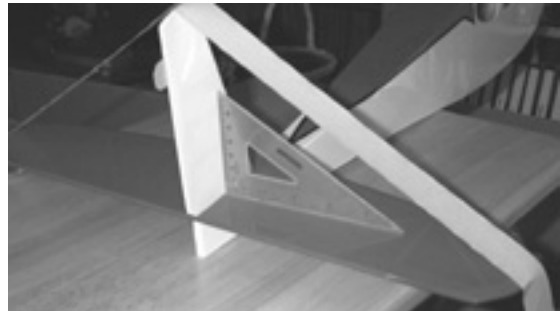
Using the fin as a guide, mark the top of the stabilizer so you will know where the front edge of the fin stops. (Notice that the notch you cut earlier is flush with the trailing edge of the stab, which is $\frac{1}{4}$ " in from the rear of the fuselage.)



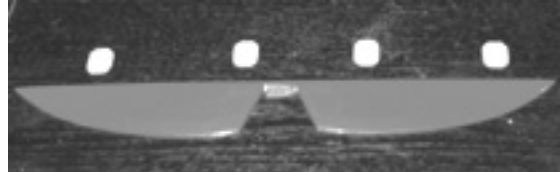
Using a straight edge, draw a line down the center of the stab from the mark you just made to the trailing edge of the stab. Remove the covering $\frac{1}{16}$ " out on each side of the centerline. Be careful not to remove the covering forward of the front of the fin.



Mix a small amount of 5-minute epoxy and spread a thin coat on the stab where you removed the covering. Using a square, set the fin in place and hold with masking tape until dry. The front of the notch in the fin you cut earlier should be even with the rear of the stab.



Locate the elevator and four (4) hinges.



Install the hinges in the pre-cut slots in the elevator and slide them into the slots in the stab trailing edge. Leave about a $\frac{1}{32}$ " gap (a matchbook cover makes an ideal gauge). Apply 2-3 drops of thin CA glue to both the elevator and stab side of all the hinges. When the CA is dry, flex the elevator back & forth to loosen it up.



Next, install the rudder using the method described above. Make sure the elevator does not bind on the rudder before you glue the hinges.



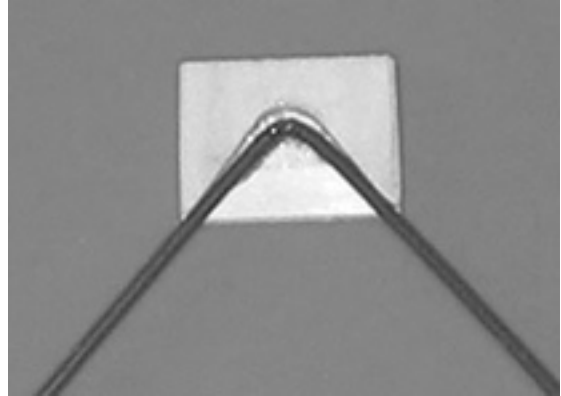
Remove a $\frac{1}{4}$ " triangle from the rear of the stab platform, just like you did the bottom of the fin.



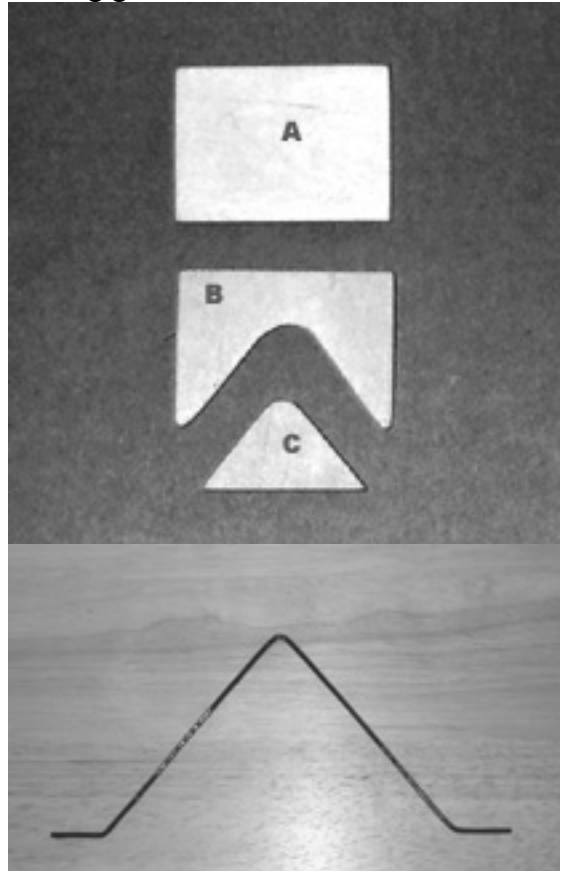
Now CA the rudder hinges on both sides. The tail section is now finished.

Fuselage Construction

(Note, your kit may differ slightly from the prototype from which this manual was written. Your pieces may already be assembled, in which case you only need to glue the gear to the pre-assembled plate and epoxy it to the firewall.)



Locate the wood landing gear mounting pieces and the wire landing gear.



Trial fit the gear mounting plate in the nose of the fuselage. It should be flush with the bottom of the fuselage and snug with the former. You may have to sand the edges slightly for a good fit.

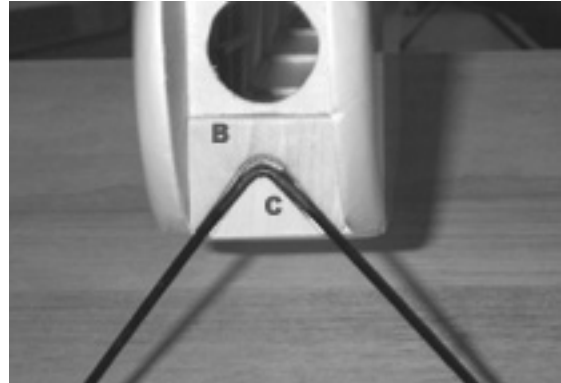


When you are satisfied with the fit, epoxy in place with 5-minute epoxy.

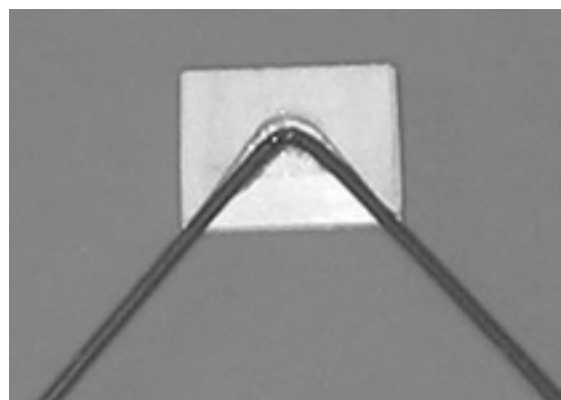
When the epoxy is dry, tack the landing gear in place with medium CA glue.



Next trial fit the filler plate. Again slight sanding may be needed for a snug fit. When you are satisfied with the fit, epoxy in place with 5-minute epoxy.



Next trial fit the cover plate. A little sanding of the edges may be needed for a good fit. Epoxy in place with 5-minute epoxy, using the epoxy to fill in any gaps between the landing gear and the mounting plates. Set the assembly aside until it is dry.



Next locate the two main wheels and four wheel collars. Install the wheels onto the main gear, using

two wheel collars on each side.
Make sure the wheels turn freely.

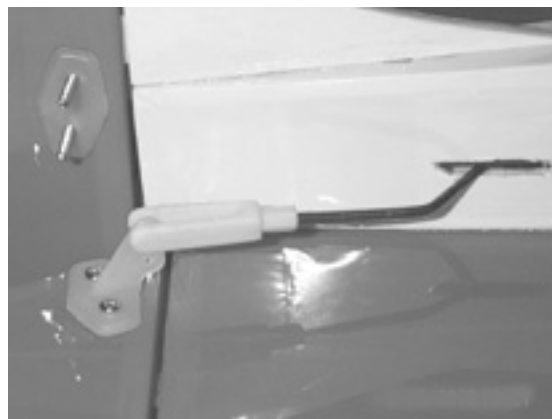


Next, at the rear of the fuselage under the stab, you need to cut away the covering for the pushrod slots, one on each side.



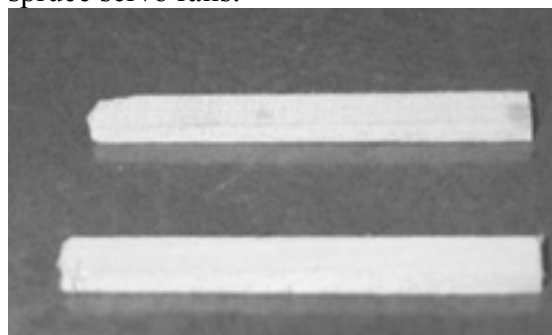
Locate the two wire pushrods and the nylon clevis. Install a clevis halfway onto the threaded end of each pushrod. Slide the pushrod into the openings and use them as a guide

to locate the elevator and rudder control horns. Mount the control horns with the two #2 screws and nylon backing plate from the parts pack.



(Note: It may be necessary to put a slight "Z" bend in the pushrod like shown above to make it operate smoothly.

Now it is time to install the servos. We used the Maxx Products MX-50 servos in the prototype. Locate the two $\frac{1}{8}$ x $\frac{1}{4}$ x $2\frac{1}{4}$ spruce servo rails.



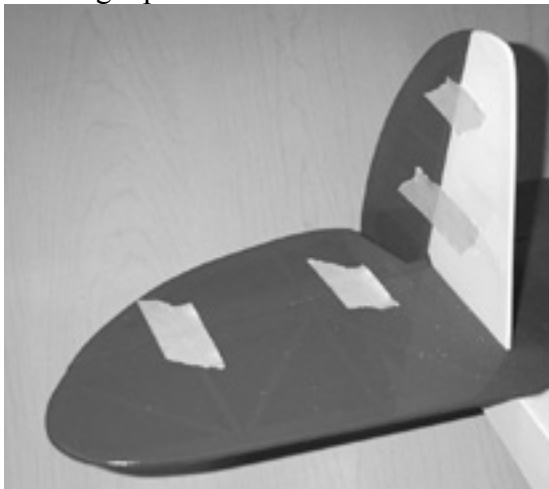
Use your servo as a spacer and glue in the two servo rails using 5-minute epoxy.



Next, using the hardware supplied with the servos, mount them to the servo rails.



Next, center the elevator and rudder and secure them with masking tape.



Center the servo arms and make a 90° bend in the rod. It may be necessary to cut off some of the excess rod. Using two keepers from the hardware pack, attach the pushrods to the servo arms.



Motor Installation

Prior to installing the motor, it is necessary to hook up the speed control. We used the Maxx Products # MX-9115. Follow the instructions supplied with your speed control prior to installing the motor in the airplane.

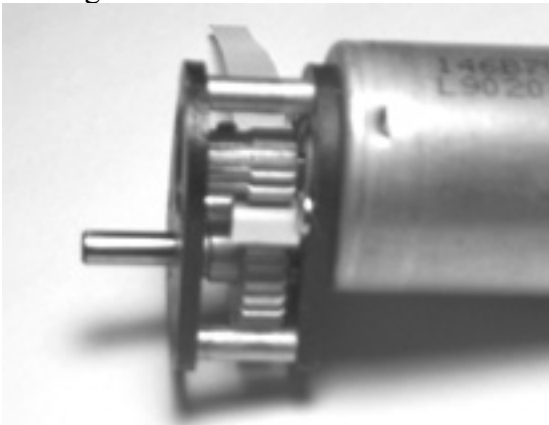
Locate the motor and gearbox. There are three gear ratios. We used the middle gear (2.5 to 1), but you can experiment to get the performance you prefer.



Slide the gear on the motor shaft and secure with the set screw. Use the gearbox as a guide to set the proper location on the shaft.



Next, attach the motor to the gearbox using two of the supplied screws. Cut a 1/4" wide strip of magazine page to use as a gauge for the gear spacing. The gears should be snug but not bind.



Next, mount the motor to the firewall. You may have to enlarge the center hole slightly for the prop adapter to clear.



(Note: Trial fit the prop on the adapter and ensure that the prop clears the nose. If it doesn't, break the firewall loose, shim it out for proper prop clearance and re-glue.)

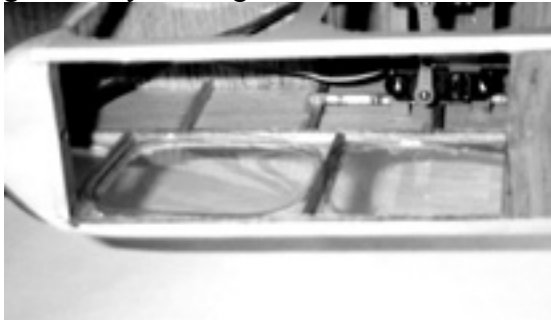
Install the prop on the adapter and tighten.



Locate the front windshield and trial fit. It may be necessary to trim it slightly for a good fit. Apply a thin bead of RC56 Canopy Glue® along the edge of the windshield and tape in place with masking tape overnight to dry.



Next install the side windows. They have been pre-cut but slight trimming may be necessary. When you are satisfied with the fit, apply a thin bead of RC56 Canopy Glue® around the edge of the window frames and insert the windows. Tape in place if necessary and allow the glue to dry overnight.



Finishing The Model

Now all that's left is to install the receiver and battery pack. We used an eight-cell 1100ma square pack (Maxx Products #8KR-1100AAU) wrapped in foam rubber directly behind the motor, with the receiver and speed control just to the rear of the battery.

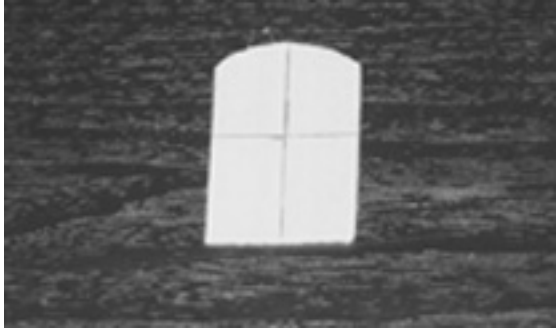


With All radio gear and battery pack installed, the model should balance 2- 3/8" behind the leading edge of the wing measured at the fuselage, or just slightly behind the wing spar.

Follow your radio manufacturer's instructions for setting up your radio. Set the elevator throw for up/down 3/8" and the rudder throw left/right 3/4" for the initial flights. You may wish to adjust the throws further after the first few flights. Be sure to use a minimum of 4, preferably 6 #64 rubber bands to secure the wing on the fuselage.

1/2A Conversion

For those of you who wish to fly the *Lightnin' Bug* with one of the fine 1/2A glow motors, we have included a firewall for mounting the motor. It is a laser cut piece of 1/8" lite plywood. The vertical center line and thrust line are marked.



Mount your 1/2A motor on the firewall, using the laser-etched lines as a guide. You will need 4 #2 x 3/8" wood screws (not supplied).

Remove the motor from the firewall and epoxy the firewall to the front bulkhead using 5-minute epoxy.

When the 5-minute epoxy has cured, coat the entire engine compartment with 30 minute epoxy to fuel proof the bare wood.

Now re-mount the motor to the firewall and make sure the prop will clear the nose of the airplane.