

# Zagi-5C<sup>®</sup>

## Assembly Manual



<i>Airfoil</i>	<i>Zagi 101.3</i>
<i>Flying Weight</i>	<i>17.5 oz</i>
<i>Wing span</i>	<i>48"</i>
<i>Wing area</i>	<i>2.03 sq ft</i>
<i>Wing loading</i>	<i>8.5 oz sq ft</i>
<i>Radio</i>	<i>w/mixer</i>
<i>Servos</i>	<i>2 std</i>

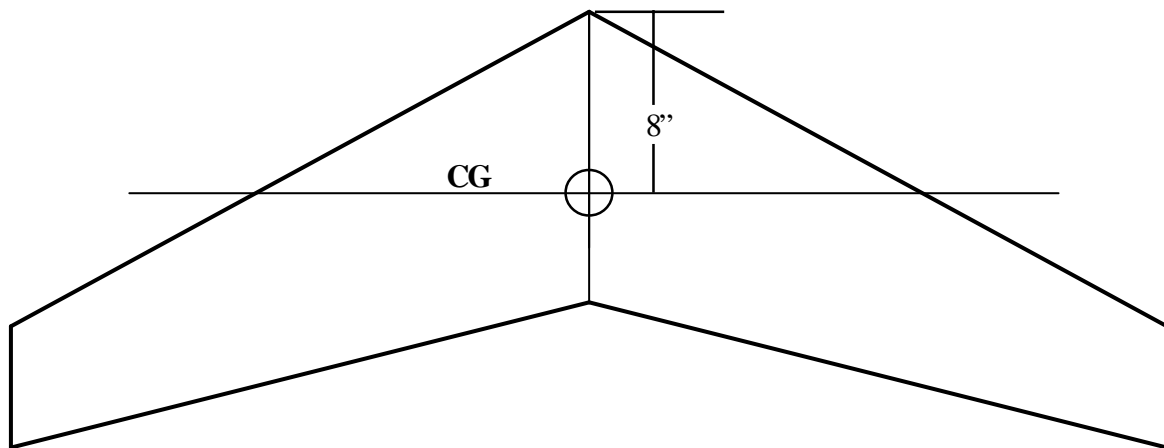
Visit: [www.Zagi.com](http://www.Zagi.com) Email: [Zod@Zagi.com](mailto:Zod@Zagi.com) Sales: (310) 301-1614 Tech (310) 827-2288 Fax: (310) 822-7695

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These instructions are updated with each new production run. Any mods or changes to the kit are included with each run.

3M Super 77 Spray Adhesive is the recommended adhesive for the assembly of the Zagi-5C. Since the Zagi-5C is all EPP the 77 Spray Adhesive will not damage the foam. Shoe Goo, Goop, or any of the other Goo or goop adhesives can be used with a weight penalty of one to three ounces.

**Balancing** The Zagi-5C balances at 8 inches back from the nose. This means that most of the outboard wing panels are behind center of gravity (CG). Adding weight behind CG means that more weight will be needed in the nose to achieve balance. So you pay a weight penalty twice or even more for adding the extra weight behind the CG.



**Wing Panels** The wing panels are die-cut for standard servos. The die-cut electronics bay will accept a receiver and a square AA size battery pack or Nicad batteries from 400 mAh to 1000 mAh. A small 220 mAh battery may be used for extra light conditions. The electronics bay will accommodate almost any receiver size. The die-cut servo bays can be glued back in place and re-cut if different size servos are preferred. Just push them out and spray them with the adhesive and replace them. Balsa shims can also be used to assure a snug fit. The wing is thick enough for the radio installation within the original contours of the airfoil. Radio gear should be invisible when it's covered.

## **The Zagi-5C Kit Contents:**

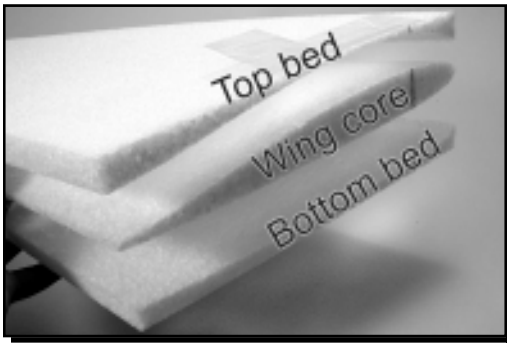
- 2 Expanded polypropylene (EPP) wing panels and beds
- 2 Pre-cut airfoil shaped balsa elevons
- 5 .03 X .31 X 24 Carbon fiber spars
- 1 Roll 2.2 mil color poly tape
- 2 Control horns with 2 screw plates and 4 screws
- 2 Threaded 2-56 control rods
- 2 Threaded 2-56 clevises
- 2 Die-cut clear plastic winglets
- 1 EPP foam block for repair and reinforcement
- 1 Roll of 2" wide fiber filament tape
- 1 2" x 5.5" Styrene electronics bay floor

## **Needed Components:**

- 1 Receiver (RX)
- 2 Standard servos (cutouts are for "standard" servos but minis may be used)
- 1 Battery A 600 mAh Nicad AA size battery will allow several hours of flying before recharging.

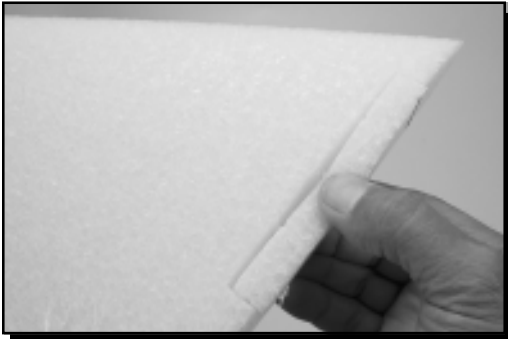
## **Tools and Materials Needed:**

- Small 90 degree square
- Sanding block
- #150 to #320 grit sandpaper
- X-acto knife with #11 blade
- Dremel (optional)
- Spray adhesive (3M Super 77)
- Lead weights for balancing (if needed)
- Additional roll 2.2 mil color poly tape in contrasting color (optional) - see text
- Round pencil or ball point pen
- Mixing (popsicle) sticks
- Clear food wrap
- Scissors
- Z-bend pliers (optional)



There are three parts to each wing panel. The wing core is shipped between the top and bottom beds. The beds are used as construction jigs so do not discard them. The top of the wing can be identified by its greater curvature. The right wing is the wing that would be on your right if you were in the cockpit. The right and left panels can be identified by the color mark at the root (the big end of the wing panel): Red on the right. Four important pre-cut features on the wing panels are illustrated below.

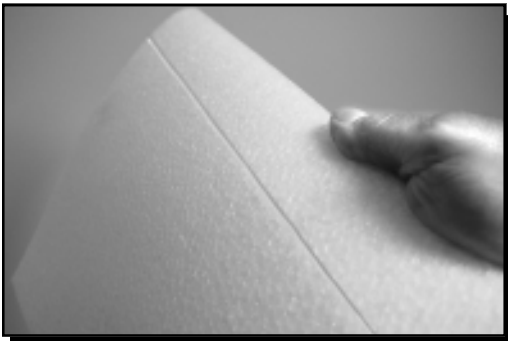
**DO NOT REMOVE ANY PRE-CUT PARTS AT THIS TIME!**



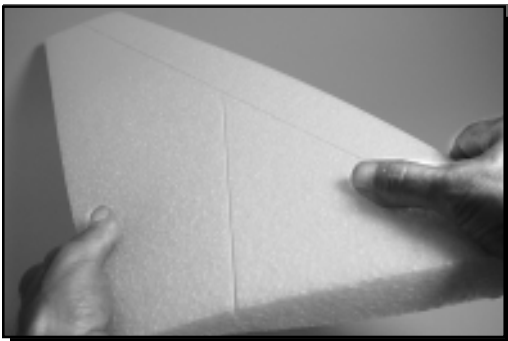
The electronics bay is die-cut. The receiver and battery will be installed in the electronics bay. Do not remove the assembly until the wing panels are joined.



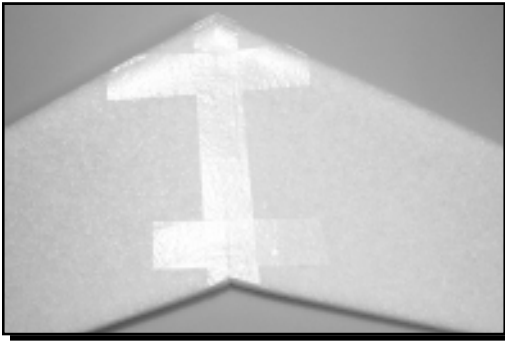
The servo bays are also die-cut. They are hard to see. An easy way to find them is to rub the surface just ahead of the carbon spar channel.



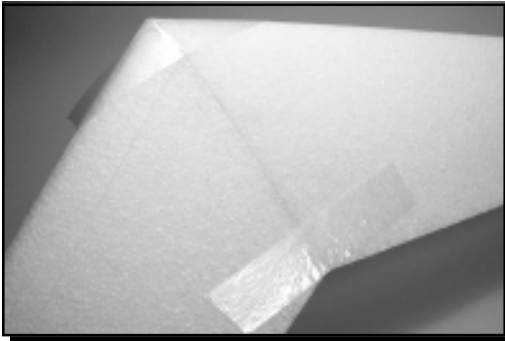
The four carbon fiber spar channels extend the full length of both wing panels on both sides.



The center spar channels will become one continuous 18" spar channel when the wings are joined



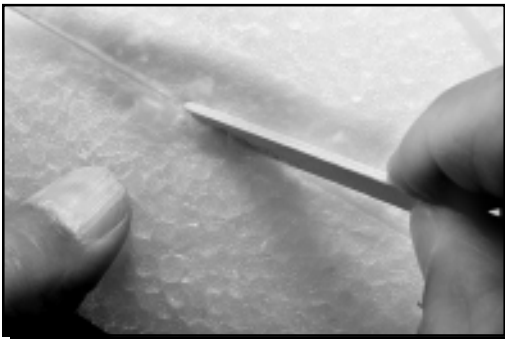
Tape the top beds together with fiber filament tape. Then tape the bottom beds together. Remove the hairs and zigzags from the wing cores and beds by rubbing them with EPP foam block. Lay the bottom beds on a flat surface. Set the wing cores on the beds top side up and lightly block sand the wing panels (cores) with #150 or #320 sandpaper. Blocksand the leading edge (LE) to round the flat spot. Place the wings in the top beds and repeat the procedure on the wing bottom.



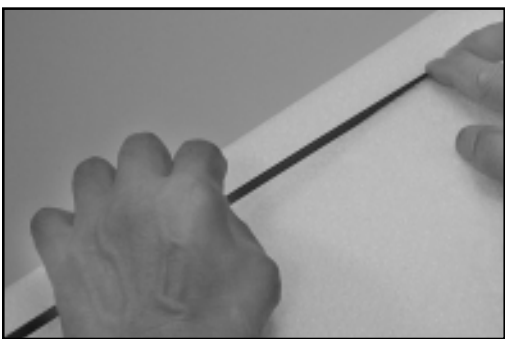
Spray the root (wide end) of the wing panels with 3M Super 77 Spray Adhesive. Hold the spray head 1 inch from the root. Spray a long bead along the root edge. Spread the bead with a small brush, a mixing popsicle stick, or foam block. Let the adhesive dry until it will not come off on your finger (approx. 20 min.) Join the wing panels together making sure that the center spar channels on the bottom side of the wing are aligned. Put two pieces of fiber tape across the seam to hold the wing panels together while the glue dries.



Glue the carbon fiber spars in the top side first. Lay the bottom beds on a flat surface. Put the wing panels in the bottom bed top side up. Hold the spray head 2 inches from the spar slot. Spray one long puddle of spray adhesive the length of the two spar slots.



Use the popsicle stick as a trowel to direct the adhesive into the spar slot. Repeat this until the entire inside of the groove is wet with adhesive.

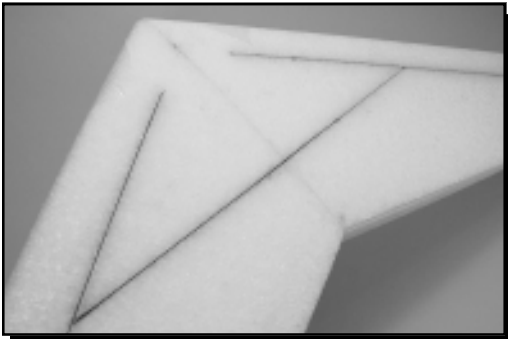


Lay two flat carbon spars on a piece of newspaper and spray them with adhesive. Starting two inches from the center line, push the spars into the channel. Make sure that the entire spar is below the wing surface.

Lay the top beds on a flat surface and cover them with clear food wrap to prevent the wings from sticking to the beds. Put the wing panels in the top bed bottom side up. Repeat the carbon fiber gluing procedure on the bottom side.



Cut the remaining 24" carbon spar to 18". Wire cutters work well.



With the wings in the top beds on a flat surface, spray the center spar channel with adhesive. Repeat the carbon fiber gluing procedure. Push it into the center spar channel. Make sure that the spar is flush at the center of the wing. Align the wing in the beds. Use weights (not included) to hold the panels in place while the glue dries.

Weights are very important to maintain alignment and wing geometry. Let the wing assembly dry and go on to the next step. It's a good idea at this point to let the glue dry overnight or at least a few hours.



The Zagi 5C servo bay was designed to fit standard servos. Standard servos are cheap and rugged with more than adequate torque. The servo bay may be expanded or shimmed to fit a different size servo. Since the servos are mounted so close to the center of gravity (CG), different size servos may be used without effecting the balance. Find the straight control arm with two tabs in the parts bag supplied with the servo.



Cut one of the tabs off the control arm leaving only one tab.

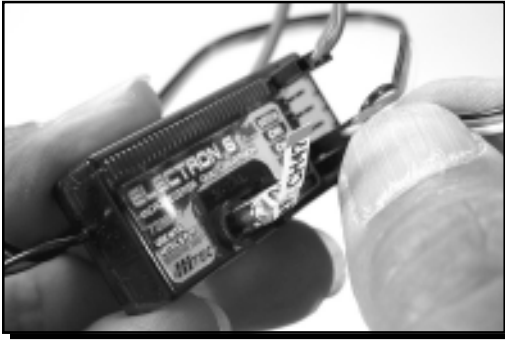
If the servo is supplied with a four tab (+) shaped control arm, remove three of the tabs leaving only one.



Replace the round servo control arm with the modified arm. Avoid stressing the gears by holding the control arm to limit travel when removing and replacing. Do not over-tighten tie screw. Snug is tight enough. To maximize servo life, avoid moving the servo control arm with the radio off.

**DO NOT INSTALL THE SERVOS AT THIS TIME.**

The servos must be centered with the radio powered up before they can be installed.



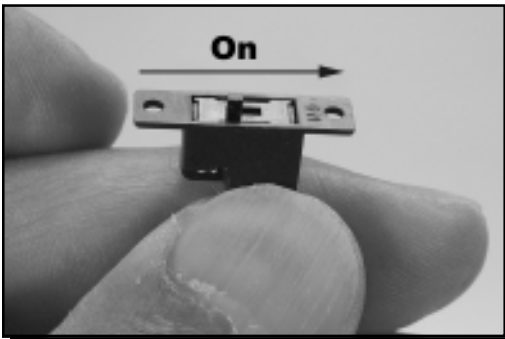
Computer radios have settings for elevon mixing. Check the radio manual for flying wing, elevon or delta-wing mix setting. V-tail settings will not work. Set the transmitter for elevons and determine the appropriate receiver slot for the controls. Position the servos the way they will be in the wings, with the control arms facing outboard. Plug the right and left servos into the receiver. Check to see that the switch is off. Plug the switch into the battery slot of the receiver. Plug the battery into the other side of the switch.



The trim levers are located on all transmitters to the left and below the control stick. Some trim controls are electronic and others are mechanical. Trim levers are provided to adjust the zero position of the servos. Center the trim levers to the zero position. For details on electronic zero centering, refer to radio owner's manual.



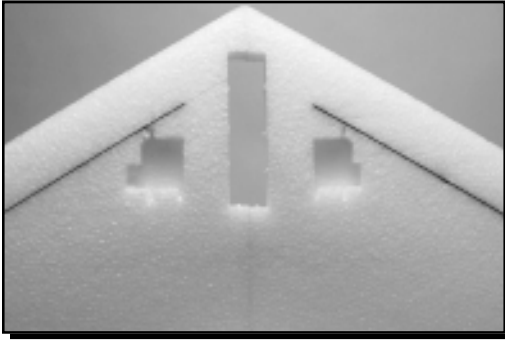
Power up the transmitter. Always turn the transmitter switch to the on position before powering up the receiver. Check the battery condition indicator on the transmitter to make sure that the battery is charged.



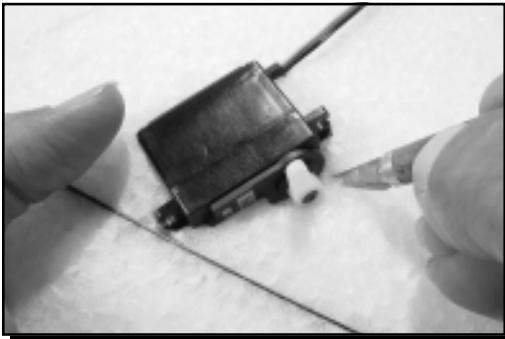
Power up the receiver



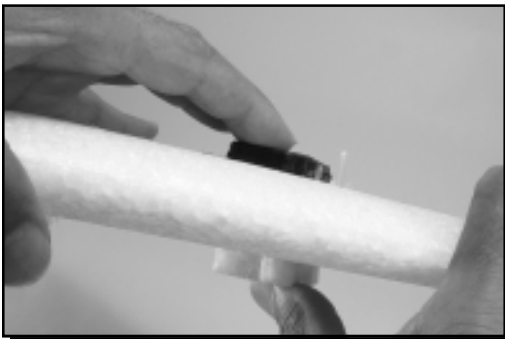
With the transmitter and receiver powered up, the servos should be 90 degrees to the servo case in the hands-off neutral stick position. If they are not, remove the control arm and replace it at 90 degrees to the servo case. Use the trim lever to make micro adjustments to the alignment of the control arm. When the elevon control stick is pulled back (the opposite direction to antenna) the servo control arms should both move forward. When the stick is moved to the right, the right servo control arm should move forward and the left servo control arm moves back.



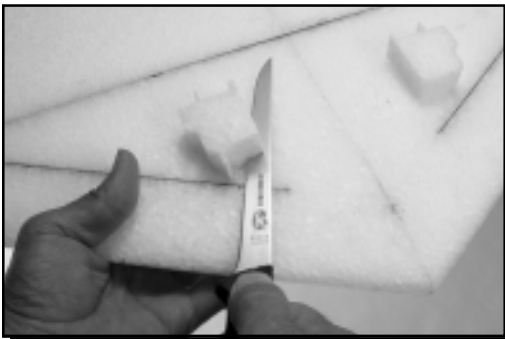
Remove the pre-cut electronics bay cookie from the center of the wing. Save the cookie, it will be used later. The servo bays are cookie cutouts in the shape of a servos. The cutouts are not easy to see. Poking a finger from the bottom while inspecting the top helps. Locate the cutout and push the cookie about halfway through into the bottom of the wing.



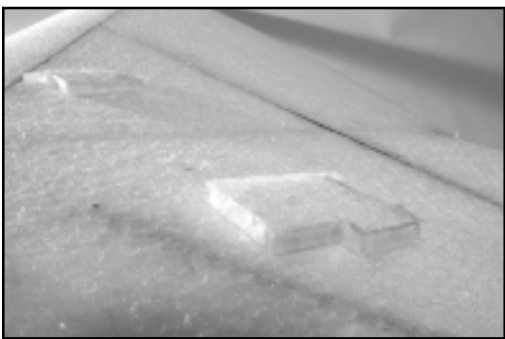
The shape of the cutout indicates the orientation of the servo. Push the servo into the cutout forcing the cookie through to the bottom side of the wing. Cut away any foam that prevents the insertion of the servo.



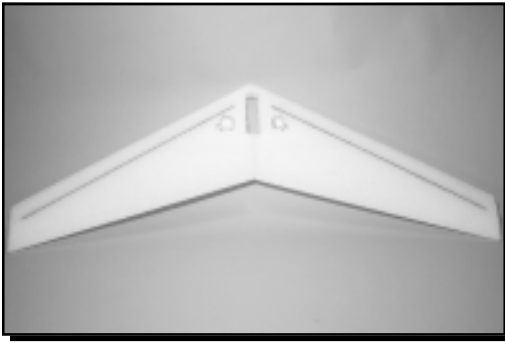
Use the servo to push the cookie out to the bottom side of the wing. Align the servo so that it is flush with the top of the wing while pressing the cookie from the bottom.



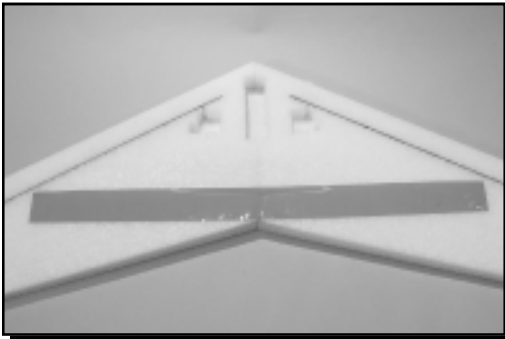
Use a sharp kitchen knife to cut the cookie flush with the bottom of the wing. Another method is to mark the perimeter of the cookie with a pencil, remove the cookie and make the cut.



Push the cookie from top to bottom of the wing about 1/4 inch. Spray a small amount of adhesive on the edges of the cookie and push it back in place.

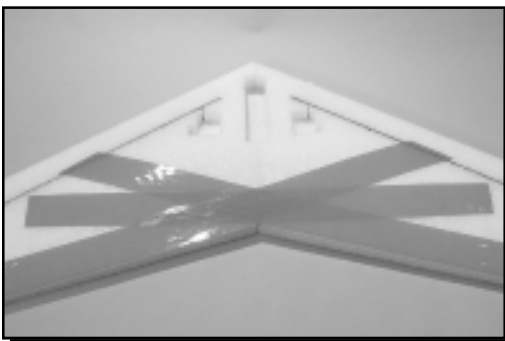


Lay the wing in the bottom beds. Spray a medium mist coat of adhesive on the top side of the wing. Make sure that the walls of the electronics bay are covered. Let the adhesive dry for 15 minutes before taping.

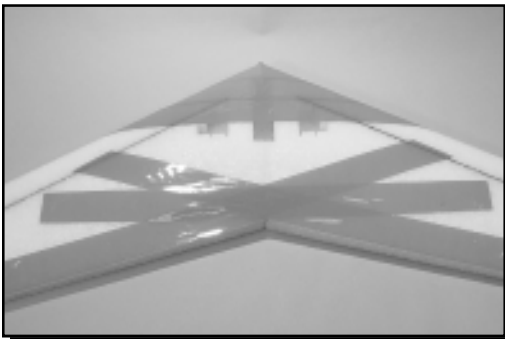


*The fiber tape will not appear as dark as pictured here. Darker tape was used in these pictures to enhance contrast visibility.*

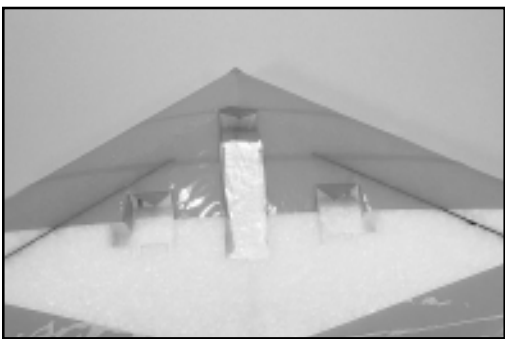
Apply a piece of fiber filament tape straight across center section of the wing between the carbon spars.



Apply a strip of fiber filament tape to the trailing edge (TE). Start at the tip and cover across to the spar on the opposite wing.

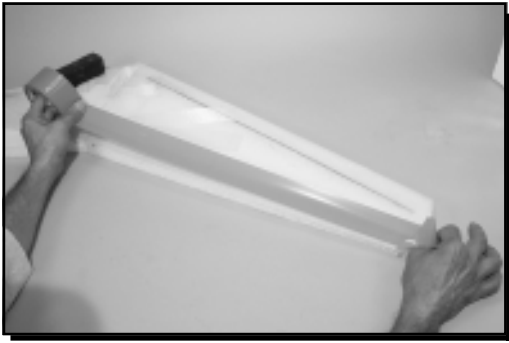


Apply two pieces of fiber filament tape across the nose. The tape will partially cover the battery bay. For extreme combat duty, apply a strip of fiber tape around the leading edge (LE).



Cut the corners of the tape so it can be folded into the electronics and servo bays.

Place the wing in the top beds and repeat the same procedures on the bottom side of the wing.



Spray another mist coat of adhesive on all top surfaces of the wing including the areas covered with fiber tape. Make sure to spray the tips and trailing edges. Spray 2 inches of the bottom of the wing at the TE. Let the adhesive dry for 20 minutes.

Put the wing top side up in the bottom beds. Put a weight on the left panel to hold it steady while taping. Start taping at the TE and work forward.



*Covering the top and bottom of the wing in contrasting colors enhances visual orientation. Use the darker color on the bottom surface. An optional roll of color tape will be required.*

Wrap the first strip of tape around the TE from top to the bottom being careful to follow the shape.



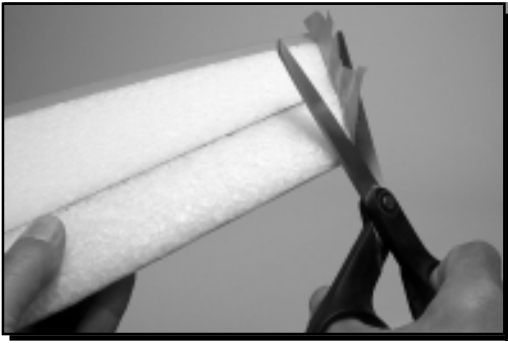
Apply strips of tape working forward from the TE. Overlap each strip of tape a quarter of an inch. Extend the tape two inches beyond the center line of the wing. Extend the tape two inches beyond the tips.



Continue overlapping the strips of tape until the entire top right wing panel is covered.



Trim the tape that extends beyond the LE.

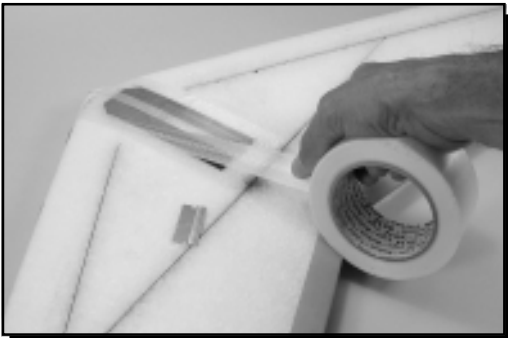


Fold the tape around the tip and cut it to the contour of the bottom surface. Trim and fold the tape into the battery, servo and receiver bays.

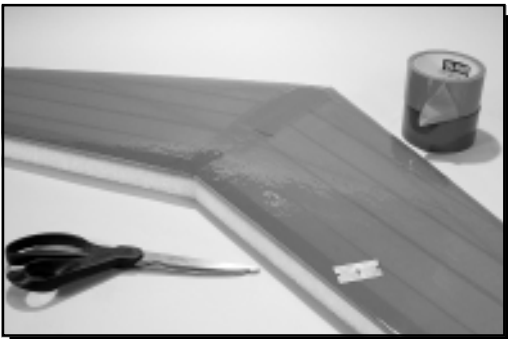
Cover and trim the top left wing panel. Repeat the same taping procedure as on the right panel.



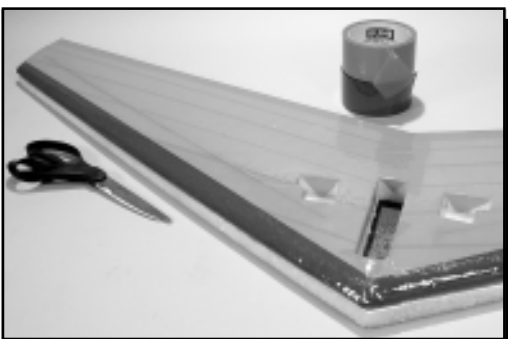
Cut out the electronics bay floor. Lay the part on a piece of newspaper. Spray the part with adhesive. Center the floor over the electronics bay and press it in place.



Spray a mist coat of adhesive to the bottom side of the part. Apply two strips of fiber tape cordwise (parallel to the center line) over the part.



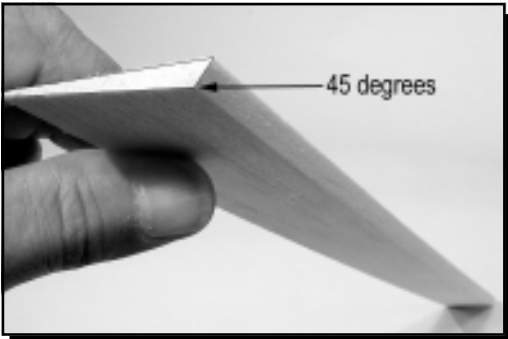
Spray another mist coat of adhesive on all bottom surfaces of the wing including the areas covered with fiber tape. Complete the color tape covering on the bottom of the wing.



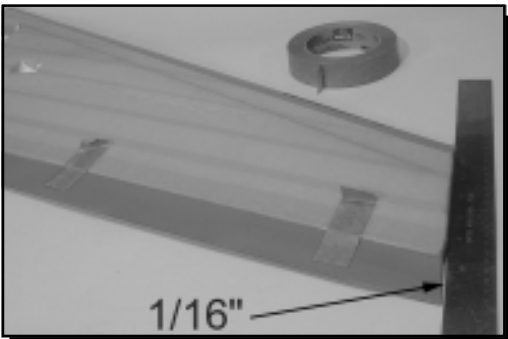
When the entire top and bottom are covered, wrap a spanwise strip of color tape around the leading edge.



Position the elevon against the TE. Position a straight-edge parallel to the center line at the inboard edge of the servo bay. Make a cut line on the elevon. Position the straight-edge to match the angle of the wing tip. Make a cut line on the elevon to match the wing tip. Trim the ends off the elevons at the cut lines.



Sand a 45 degree angle into the front of the elevon. Sand the elevons and smooth all the surfaces.

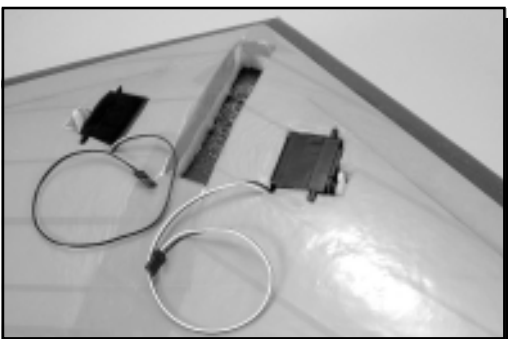


Spray the elevons with a mist coat of adhesive. Apply color tape to cover the entire surface.

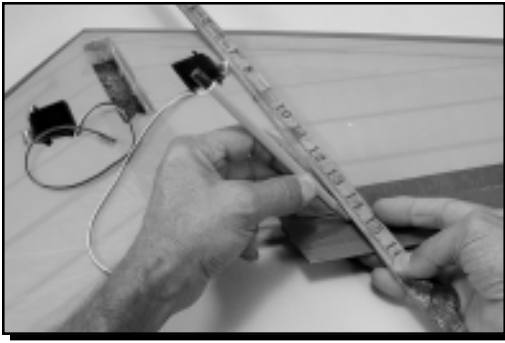
Position the elevon on the trailing edge of the wing. Align a straight-edge with the wing tip. Leave a 1/16" space between the end of the elevon and the straight-edge. Use small pieces of masking tape to hold the elevon in position temporarily. Best to leave a corner of the tape turned up for easy removal.



Color tape may be used to make a hinge. Holding the end of the tape over the seam press the color tape in place while peeling it back. Remove the small pieces of masking tape ahead of the color tape. Press the tape down along the length of the elevon with a squeegee.



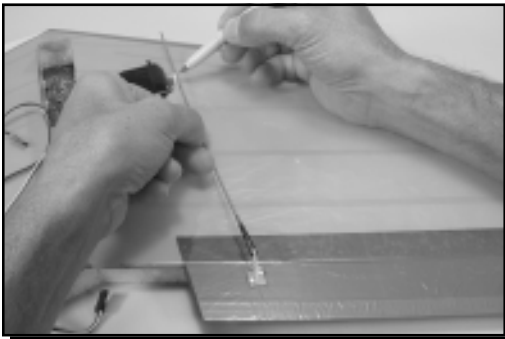
Press the servos in place with the control arms centered at 90 degrees to the servo case. The servo case should be flush with the surface of the wing and the control arms sticking straight up above the wing surface.



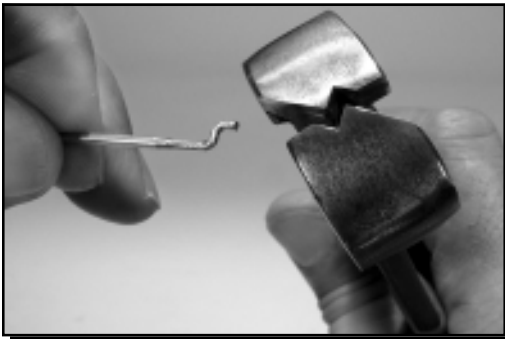
Align a straight-edge from the outboard side of the servo control arm to the elevon parallel to the center line. Make a line on the elevon.



Align the control horn to the line on the elevon in line with the servo control arm. Use a punch or any pointed tool to mark the position of the holes in the control horn foot. Drill two holes big enough for the 2 x 56 self tapping machine screws. Thread the machine screws through the elevon into the nylon locking pad. Snug the screws to make a slight impression in the balsa wood. Do not over tighten!

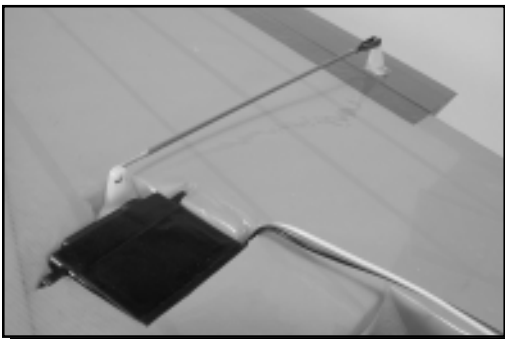


Screw the threaded clevis onto the control rod so that equal threads are showing on both sides of the clevis. Hold the elevon in the neutral position and make a mark where the control rod matches the top hole in the control arm.

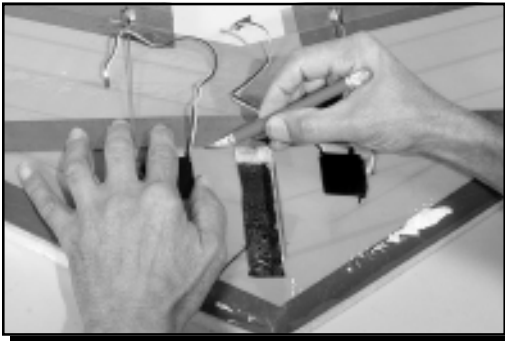


*The diameter of the control rod may be reduced with a file or belt sander to fit better into the control arm. The control arm hole may be enlarged with a drill or by spinning an X-Acto blade in the hole.*

Attach control rods to the servo control arms with a Z-bend. (NOTE: Z-bend pliers may be purchased from your local hobby dealer to make this operation easier.) Long nose pliers will also work to make a Z-bend.

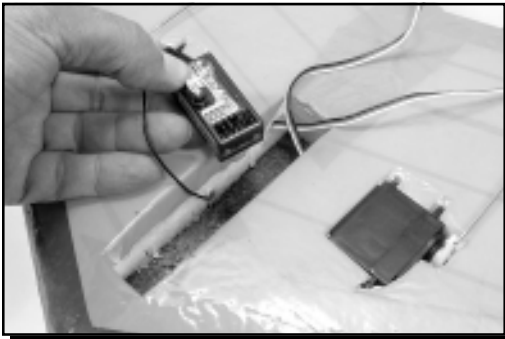


Mechanical centering of the elevon can be achieved by removing the clevis from the control horn and screwing it in or out.

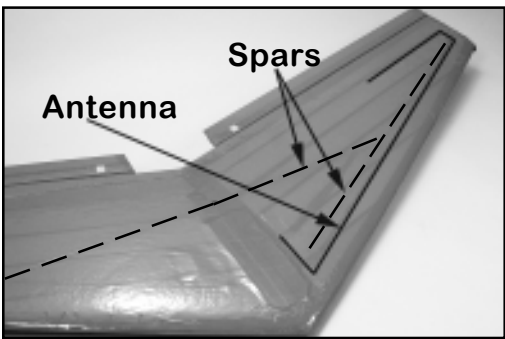


Using a straight-edge as a guide, make a half-inch deep cut for the servo wire channels. The channels go between the servo wires, where they exit the servos, to the middle of the electronics bay. Push the servo wires into the channels with a flat blade screwdriver. Apply a piece of color tape over the channels.

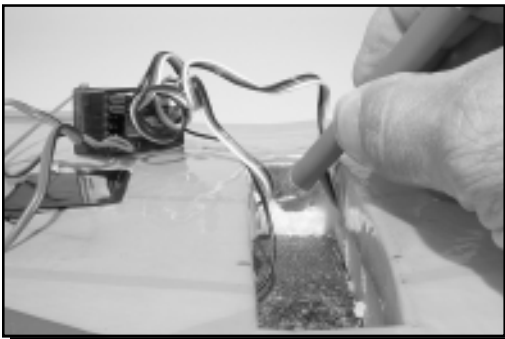
Alternate method: Drill a hole between the servo bays and the electronics bay. Make the holes big enough to push the servo plugs through.



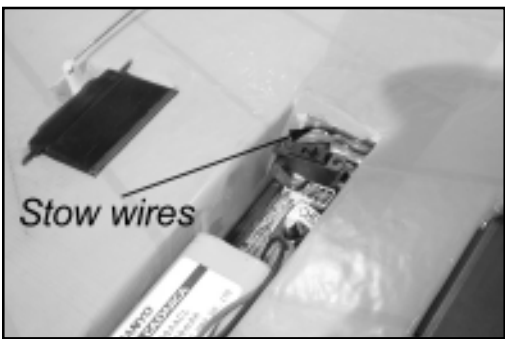
Drill a hole in the wall of the electronics bay at an angle to miss the floor plate. Make the hole big enough for the antenna wire to fit through to the bottom side of the wing. Push the wire through the wing leaving a couple of inches of antenna in the electronics bay for positioning.



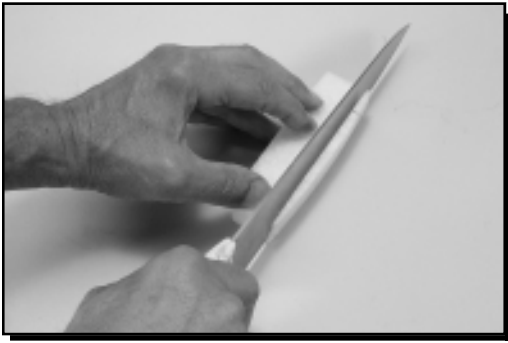
Using a straight-edge as a guide, make a quarter-inch deep cut for an antenna wire channel on the bottom of the wing. Begin with a cut toward the nose 1/2 inch past the spar. Then cut the channel the length of the wing panel parallel to the spar. The antenna may hang off the wing tip or may be circled back on the wing behind the spar. Push the antenna wire into the channel with a flat blade screwdriver. Apply a piece of color tape over the channel.  
**DO NOT CUT OFF ANY OF THE ANTENNA!**



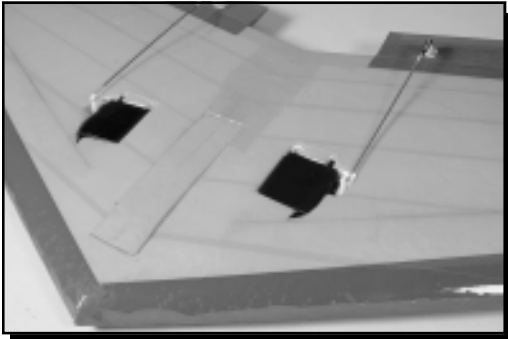
Hollow out a space in the wing behind the receiver between the top and bottom skin. Make the cavity big enough to stow the extra servo wire. The extra switch wire will also be stuffed in.



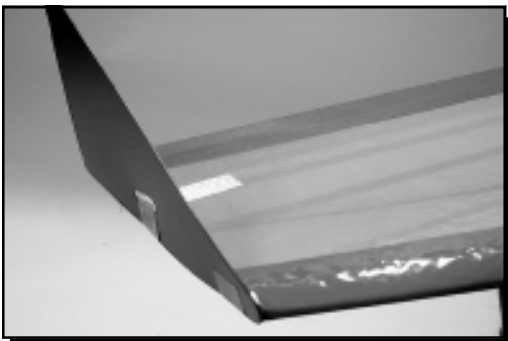
Install the receiver, battery and switch. Assemble the components the way they were assembled on page 7. Power the transmitter and the receiver. Check the movement of the elevons. When the elevon control stick is pulled back (the opposite direction to antenna) the elevons should both move up. When the stick is moved to the right, the right elevon should move up and the left elevon moves down.



Use the cookie that was removed from the electronics bay to make a hatch cover. Use the curved side to match the curvature of the wing. Spray and tape the cover.

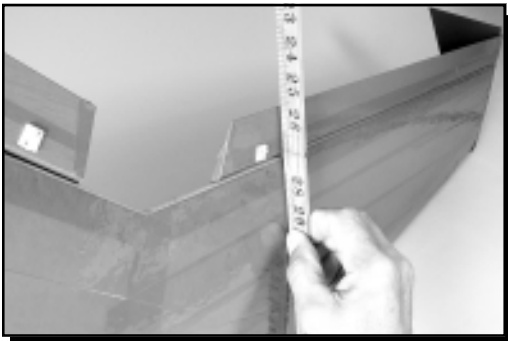


Fit the hatch cover to the electronics bay to make sure that it fits. Do not tape it in place until the wing is balanced.

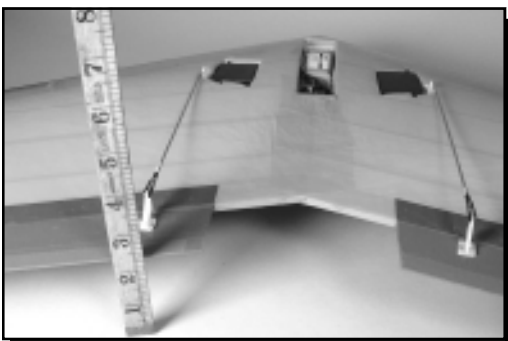


Put a piece of fiber filament tape through the slot in the winglet to the top of the wing and wrap it around to the bottom of the wing. Add two more pieces of tape to secure the winglet in place. Make sure the elevons will not bind against the winglets as they move.

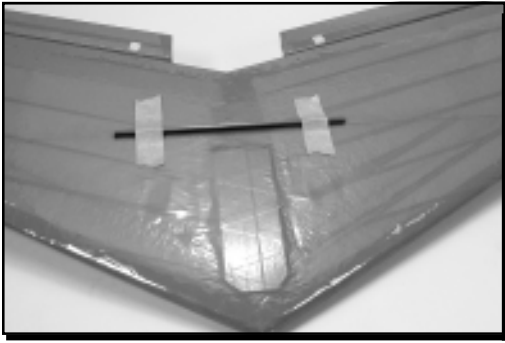
*The winglets are at the very back of the airframe where excess weight is a real balance factor. The tape method of fastening is both light and strong. If a different winglet fastening system is preferred, keep the weight down to the weight of two short strips of tape.*



Turn the transmitter on and then the receiver. The initial trim settings should be adjusted holding a straight-edge against the bottom of the wing at the TE. The straight-edge should be flush with the bottom of the wing and the elevon for the last three inches. Use the threaded clevis to adjust them to the proper position, do not use the trim levers on the transmitter.



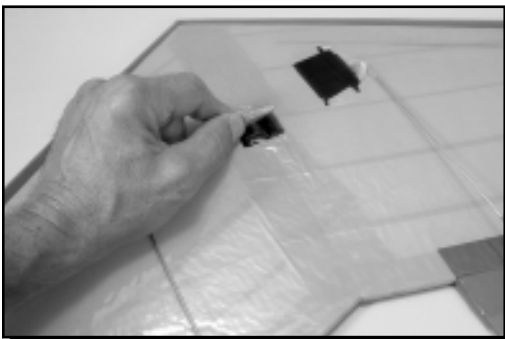
Turn the transmitter on and then the receiver. Set the wing on a couple rolls of tape or anything that will let the elevons move freely. Hold a ruler near the elevon. Pull the elevator stick back to the full 'up' position without any right or left movement. The throw should be 1/2". The full down throw should be the same. Now push the stick to the full right position. The right elevon should move up and the left move down. The throw should be 1/2". Less throw can be adjusted by moving the control rod to the next hole down on the servo control arm.



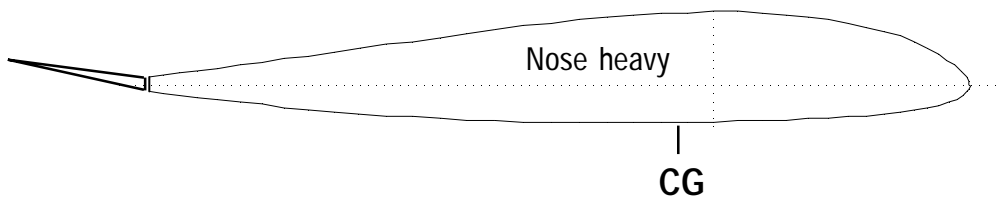
Lay the wing bottom-side-up. Tape a 1/4" dowel 8 inches back from the nose (over the center spar). A round pencil or ball-point pen can be used. Place the wing right-side-up on a flat surface. Balance is achieved when the wing balances momentarily on the dowel. Do not add nose weight. Move the battery forward or aft to balance.



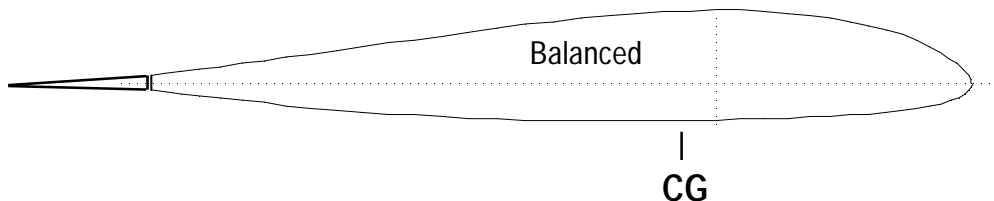
Cut a piece of foam the size of the space between the battery and the front of the electronics bay to maintain battery position.



Tape the hatch cover over the electronics bay. Leave the last inch without tape to provide access to the switch.



If the Zagi 5C requires reflex (up elevator) for level flight it is nose heavy. The weight in the nose pushes the nose down. The elevons compensate in the 'up' elevator position creating drag.



The Zagi 5C will balance with the elevons in a neutral position. No reflex is necessary for washout or other stability reasons. The suggested starting point for balance is 8 inches back from the nose. The best way to find the balance point is to keep moving the battery back between flights in 1/8" increments until it is almost unflyable (too elevator sensitive). Remember, the elevator travel volume can compensate for pitch sensitivity.

## Preflight check and glide test

Do a preflight check before every flight. Always turn the transmitter power on before the receiver. Make sure that the controls are working properly. Check the trim levers on the transmitter. Pull the elevator control stick back and observe that both elevons move upward. Push the control stick to the right and observe the right elevon moves up and the left elevon moves down. Hold the wing securely by the nose. The first glide test should be done on flat land in a light breeze. The wing should be held by the nose with your palm up and your thumb wrapped around to the top. Hold the wing over your head with the nose pointed straight ahead. Run slowly into the wind. Give it a gentle push STRAIGHT AHEAD. Do not point the nose upward. Correct the flight path with the radio control stick. The test is successful when the wing flies straight ahead with a slow sink rate to a sliding landing. Trim levers on the transmitter can be used to adjust the glide path. If the wing turns in either direction after the launch, compensate by adding 2 or 3 clicks of trim in the opposite direction. If the wing pitches up and immediately dives, add 2 or 3 clicks of down trim. Repeat the glide test until the Zagi 5C flies straight ahead with a slow sink rate to a sliding landing. Increase the launch speed each time to provide longer control flights.

## First flight

Check the frequencies (channel number) of all pilots within visual range before turning on your transmitter. Turning on your transmitter with the same channel number as someone who is flying will certainly cause his plane to crash.

The Zagi 5C is capable of high speed. Flights at a high rate of speed can cause considerable damage to someone or something if a collision occurs. Please exercise caution while flying. **It is recommended that you join the Academy of Model Aeronautics (AMA) (1-800-435-9262) to provide insurance, awareness of safe flying practices, and knowledge of what's going on in the modeling field. At some flying sites it is mandatory that you be a member of the AMA.**

Hold the wing by the nose with your palm up over your head and your thumb wrapped around to the top. Take a step or two forward and give the wing a good strong throw into the wind. A follow through with a little finger tip will increase the launch speed.

Good luck,  
JT

Trick R/C guarantees this kit to be free from defects in both workmanship and material at the date of purchase. This does not cover any components or parts damaged by use, misuse or modification. In no case shall Trick R/C's liability exceed the original price of the purchased kit.

Since Trick R/C has no control over the final assembly, no liability shall be assumed for any damage resulting from the use by the user of the final user-assembled product. By the act of using the final user-assembled product, the user accepts all resulting liability.

**Zagj-5C<sup>®</sup>**