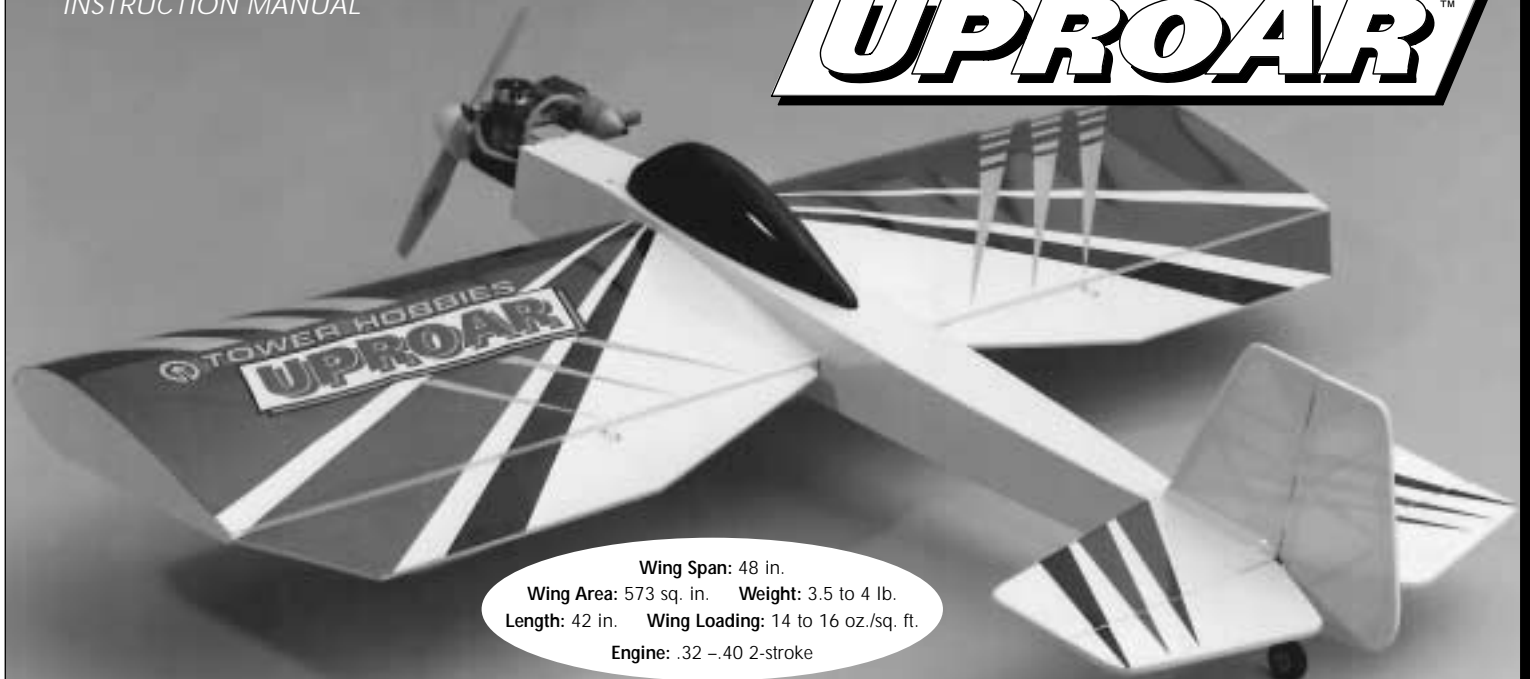


INSTRUCTION MANUAL

UPROAR™



Wing Span: 48 in.
 Wing Area: 573 sq. in. Weight: 3.5 to 4 lb.
 Length: 42 in. Wing Loading: 14 to 16 oz./sq. ft.
 Engine: .32 - .40 2-stroke

V 1.3 TUP4P02

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WARRANTY

Tower Hobbies guarantees this kit to be free from defects in both materials and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Tower's liability exceed the original cost of the purchased kit. Further, Tower reserves the right to change or modify this warranty without notice.

In that Tower 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 Tower Hobbies.

READ THROUGH THIS INSTRUCTION BOOK BEFORE BEGINNING CONSTRUCTION. THIS BOOKLET CONTAINS WARNINGS AND PRECAUTIONS REGARDING THE USE OF THIS PRODUCT.

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FOLLOW THIS IMPORTANT SAFETY PRECAUTION TO PROTECT YOUR MODEL, YOURSELF & OTHERS.

Your UPROAR is not a toy, but rather a sophisticated, working model that functions very much like an actual airplane.

Because of its realistic performance, the UPROAR, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage property.

To make your R/C modeling experience totally enjoyable, we recommend that you get experienced, knowledgeable help with assembly and during your first flights. You'll learn faster and avoid risking your model before you're truly ready to solo. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors.

You can also contact the national Academy of Model Aeronautics (AMA), which has more than 2,300 chartered clubs across the country. Through any one of them, instructor training programs and insured newcomer training are available.

Contact the AMA at the address or toll-free phone number below:

Academy of Model Aeronautics

5151 East Memorial Drive
Muncie, IN 47302-9252
TEL: (800) 435-9262
FAX: (317) 741-0057

Congratulations!

If you have been looking for a way to put the *FUN* back into your Sunday flying, you have just found it with the **Uproar**. The Uproar is a nimble little *hot-dogger* that assembles fast and is easy on the budget. The Uproar does not require any special building or flying skill – just traditional building methods and a little tail-dragger time.

With its oversized control surfaces it turns, loops and rolls in the blink of an eye. But the thick airfoil and light wing loading allow the plane to slow way down for gentle spot landings. If equipped with an engine like the Tower .40, it's possible to be airborne in a matter of feet, zip through three rolls, and loop back for a landing before most of your buddies are off the ground. What more can we say? The Uproar is the most flying fun you can buy regardless of the cost.

"ITEMS REQUIRED FOR COMPLETION"

HARDWARE: We recommend using Great Planes®, Hobbico® and Tower brand accessories for your modeling needs.

- 4 Channel radio with 5 servos and a Y-harness
- .32 - .40 2-Stroke / .40 - .48 4-Stroke
- Engine mount – GPMG1041
- (4) 4-40 x 1" Machine screws / blind nuts – GPMQ3544
- (4) Faslink Pushrod Connectors (optional) – GPMQ3820
- 4 - 8 oz. Fuel tank – GPMQ4101, 4102, 4103
- (2) 2-1/2" Wheels – GPMQ4223
- (4) 5/32" Wheel collars – GPMQ4306
- 1" Tail wheel – GPMQ4241
- (2) 3/32" Wheel collars – GPMQ4302
- 12" Medium fuel tubing – GPMQ4131
- (2) Rolls covering film – TowerKote Film
- (16) Hinges – GPMQ3950
- 24" Flexible pushrod cable and tube (throttle) – GPMQ3700
- (2) Screw-Lock Pushrod Connectors – GPMQ3870

SUPPLIES

- 2 oz. Thin CA – HCAR3600
- 2 oz. Medium CA – HCAR3650
- 2 oz. Thick CA – HCAR3670
- 6-minute epoxy – HCAR3300
- 30-minute epoxy – HCAR3350
- Balsa filler – HCAR3401
- Masking Tape
- Waxed paper
- Clothespins
- Isopropyl Rubbing Alcohol (70%)

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TOOLS

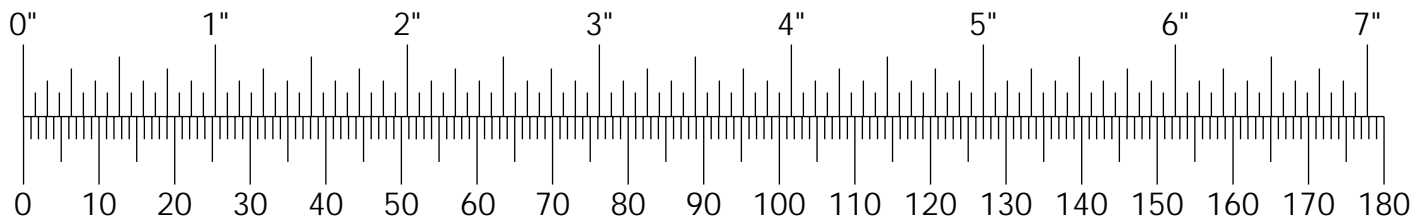
- Sanding block and paper – GPMR6170
- Hobby knife and #11 blades – HCAR0311
- Single edge razor blades – HCAR0312
- Razor saw (optional)
- Razor plane – MASR1510
- Electric drill
- Small Phillips and flat blade screwdrivers
- Pliers with wire cutter
- Sealing iron – TOWR3250
- Heat gun – TOWR3200
- T-Pins – HCAR5150
- Straightedge with scale
- Drill bits: ○ 1/16" ○ 3/16" ○ 5/32"
- 1/8" ○ 1/4"

IMPORTANT BUILDING NOTES

- Unroll the plan sheets, then reroll the plans inside-out to make them lie flat.
- Using a felt-tip or ballpoint pen, lightly write the part name or size on each piece as you remove it from the box. Refer to the parts list and plans for sizes and quantities. Use the die-cut

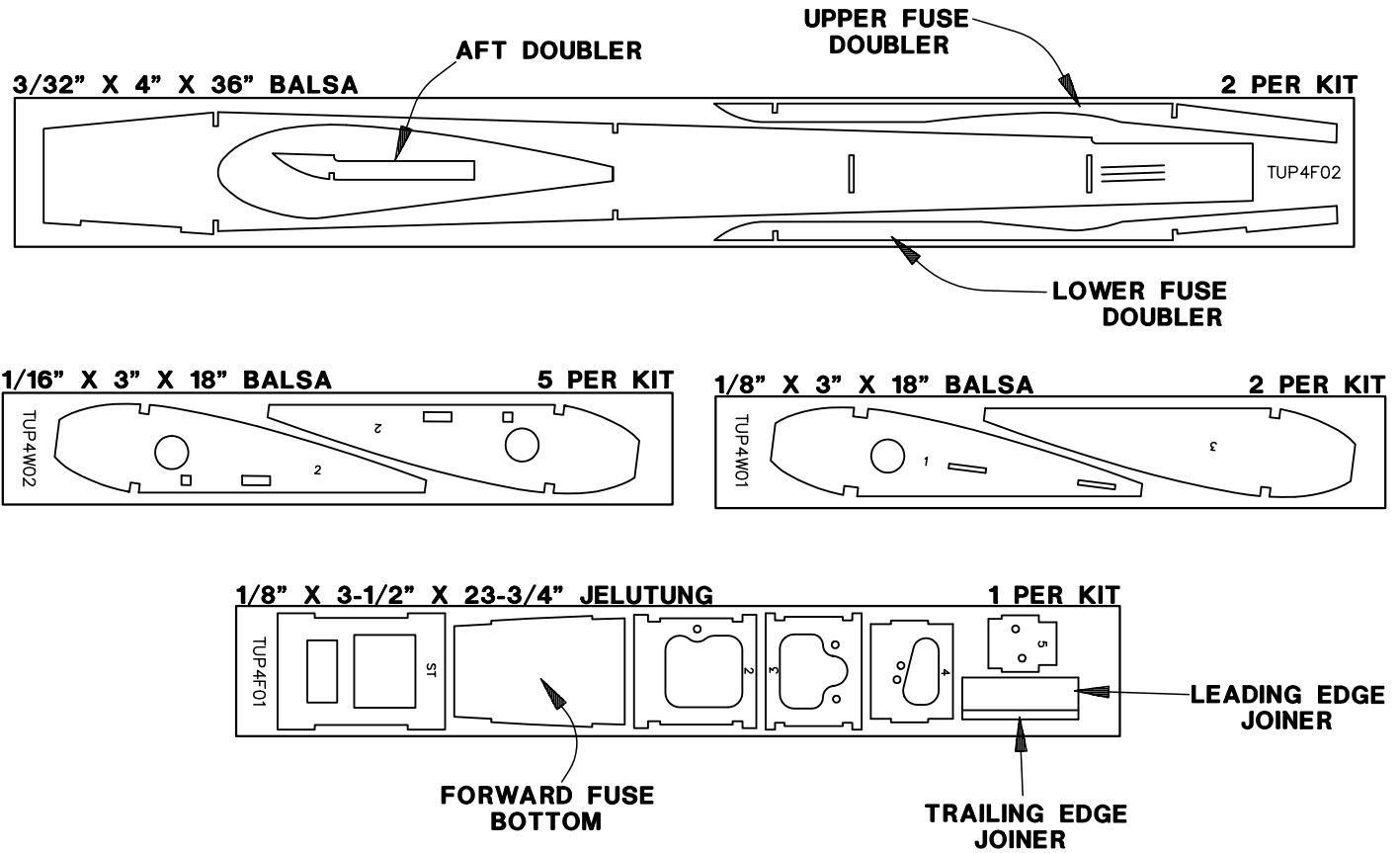
patterns shown on page 5 to identify the die-cut parts and mark them before removing them from the sheet. Save all scraps. If any of the die-cut parts are difficult to remove, **do not force them!** Instead, cut around the parts with a hobby knife or lightly sand the back of the sheet. After removing the die-cut parts, use your sanding block to lightly sand the edges to remove any die-cutting irregularities.

- Work on a flat surface over the plans. Cover the plans with waxed paper. There are notes on the plans that tell you what material to use to make each part.
- When instructed to **test fit parts**, this means DON'T USE GLUE until you are satisfied that everything fits properly – THEN glue the parts together if instructed to do so.
- The easiest way of cutting balsa sticks is with a razor saw. Position the stick over the plan, mark its size, then cut the part on a piece of scrap lumber. A modeling miter box works well for cutting square corners and 45 degree gussets.
- A single-edge razor blade also works well for cutting balsa sticks. Because the blades are both sharp and thin, they don't crush balsa as easily as #11 hobby blades.



4

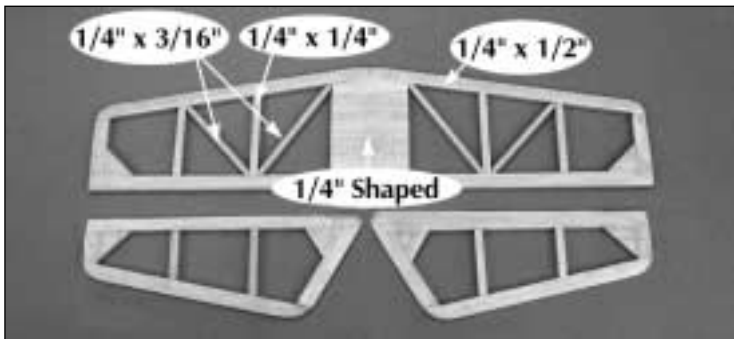
"Die-Cut Page"



5

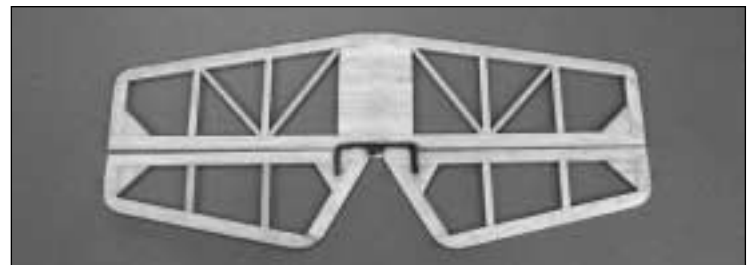
"BUILD THE TAIL SURFACES"

STAB AND ELEVATORS



(Refer to this photo for the following 3 steps.)

- 1. Pin the shaped 1/4" balsa stab center section over its location on the plans. Use 1/4" x 1/2" x 30" balsa to build the outer framework of the stabilizer and both elevators, gluing each piece in position as you proceed.
- 2. Cut and install four corner gussets and two elevator joiner wire gussets from 1/4" x 1" x 24" balsa.
- 3. Cut and install the 1/4" x 1/4" and 1/4" x 3/16" internal bracing as shown on the plans.



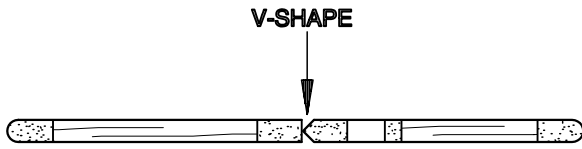
○ 4. Attach the elevators to the stabilizer with masking tape, making sure the outer edges are flush. Position the 1/8" elevator joiner wire over the elevators as shown on the plans. Mark the location of the joiner wire torque rods.

○ 5. While the parts are taped together, round off all outside edges around the perimeter of the assembly



○ 6. Remove the elevators. Drill a 5/32" hole (7/8" deep) through the center of each elevator's leading edge at the locations you marked in step #4. Cut a groove from the hole you drilled to the root end of each elevator. The groove will allow the joiner wire to fit flush with the elevator's leading edge.

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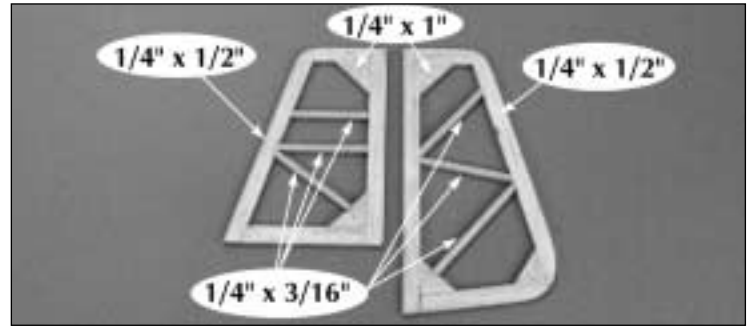


SAND THE LE OF EACH CONTROL SURFACE TO A V-SHAPE AS SHOWN

- 7. Draw a centerline on the leading edge of both elevators. Refer to the cross section on the plan, then sand the elevator's leading edge to a "V" shape.
- 8. Test fit the joiner wire into both elevators. Make sure that both elevators are flat on the work surface and that the tips of the elevators align with the tips of the stab. If necessary, remove the joiner wire, then make adjustments by bending the torque arms.
- 9. Roughen the torque arms with coarse sandpaper. Pack 30-minute epoxy into the elevator's holes with a toothpick, then permanently install the joiner wire. Be sure the elevators are flat on the work surface and that the leading edge is perfectly straight.

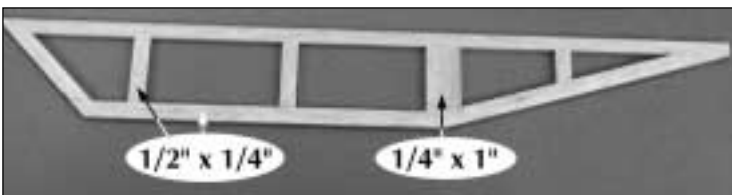
7

FIN AND RUDDER



- 1. Working over the plans covered with waxed paper, assemble the outside framework of the fin and rudder using 1/4" x 1/2" x 30" balsa.
- 2. Add the corner gussets cut from 1/4" x 1" balsa.
- 3. Add the 1/4" x 3/16" balsa internal bracing.
- 4. Using the plans for reference, mark and drill a 1/8" hole (3/4" deep) into the lower leading edge of the rudder to accept the tail gear torque arm. Cut a groove from the hole to the bottom of the rudder to allow clearance for the tail gear bearing.
- 5. Refer to the cross section on the plans, then round off the leading and top edge of the fin and the trailing and top edge of the rudder with sandpaper. Shape only the leading edge of the rudder to a "V" along the hinge line.

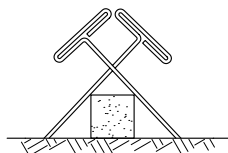
**"BUILD THE WING"
AILERONS**



- 1. Working over the plans covered with waxed paper, build the ailerons frames from 1/4" x 1/2" balsa.
- 2. Add the 1/4" x 1/2" internal bracing. Carefully cut and install the aileron control horn brace using the 1/4" x 1" balsa.
- 3. Draw a centerline on the leading edge of both ailerons. Sand the leading edge of the ailerons to a "V" shape as shown on the plans.
- 4. Don't round off the trailing edge of the ailerons. Just *knock off* the corners.

WING PANELS

- 1. Trim the length of the four 1/4" x 1/4" x 30" basswood wing spars to 24". Save the remaining 6" pieces for later use.



**TWO WARPED SPARS INSTALLED
THIS WAY WILL RESULT IN A
STRAIGHT WING**



- ○ 2. Cover the wing plans with waxed paper. Use cross-pinning (see illustration) to hold a wing spar in position where shown on plans. The spar should be even with the wing's centerline and tip.
- ○ 3. Cut the four 1/16" x 1-1/8" x 30" balsa trailing edge sheets down to 24". Pin one sheet over the plans flush with the trailing edge of the wing. **NOTE:** These sheets extend past the rear end of the ribs by 1/4".



- ○ 4. Position the die-cut R1 (see note) through R3 wing ribs on the spar at the locations shown. Be sure the flat portion of the

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airfoil is toward the building board and the ribs are fully seated on the spar. Use a small drafting triangle to hold each rib vertical while you glue it in position. **NOTE:** The main spar is **centered** in the spar notch in the R1 rib to allow room for the spar joiners to fit on both sides of the spars.



○ ○ 5. Cut two 24" trailing edge sticks from 1/4" x 3/8" x 30" balsa. Glue the trailing edge (3/8" dimension is vertical) to the ribs and bottom trailing edge sheeting. Sand the top of the trailing edge (with a long sanding block) flush with the top of the ribs at an angle that matches the slope of the airfoil.



○ ○ 6. Cut two 24" sub leading edges from the 1/16" x 1" x 30" balsa sheets. Center the sub leading edge vertically on the front

of the ribs (and flush with the wing's centerline), then glue it in position. Sand the top edge flush with the top of the airfoil.

○ ○ 7. Cut two 5/16" x 1-3/16" x 30" balsa leading edges to 24". Vertically center, then glue, a leading edge to the sub leading edge of the wing panel.



○ ○ 8. Glue the 1/4" x 1/4" x 24" top basswood spar in position. Use a drafting triangle to be sure the root end is even with the bottom spar.

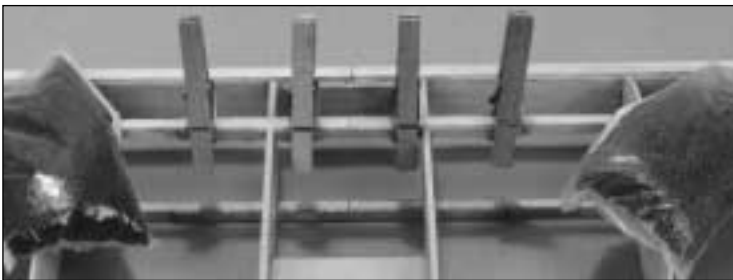
○ ○ 9. Use the leftover 1/4" basswood spar material to make two aileron servo rails 1-5/8" long. Insert two of the rails into the notches between the closely spaced R2 ribs. Use a servo of your choice to set the correct spacing between the rails, then glue the rails securely in position.

○ ○ 10. Follow steps 2 - 9 to build the second wing panel using the extra pieces you cut previously. Be sure to build a left and right wing panel.

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JOIN THE WING PANELS

○ 1. **Test fit** the die-cut 1/8" ply leading and trailing edge joiners and the four 1/16" x 1/4" x 6-1/2" ply main spar joiners in the wing. **Test fit** the die-cut plywood servo tray between the R1 ribs. Use a metal straightedge to make sure the spars, leading edge and trailing edge are aligned and straight. When everything fits well, glue the servo tray to **both** R1 ribs, then remove the joiner pieces in preparation for gluing.



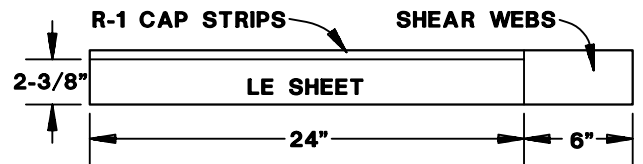
○ 2. Be sure the wing is right-side up and flat on the workbench, then use 30-minute epoxy to glue the leading and trailing edge joiners in position. Next, install the top and bottom main spar joiners, also using 30-minute epoxy. Double check that there is no twisting or bowing and that everything is straight before the epoxy cures.

★★★★ **Pro Tip:** Clothespins or spring-clips can be used to clamp the pieces together and phone books or magazines can be used to hold the wing flat.

ADD WING SHEETING

Be sure the wing is pinned flat on your work surface from the spar to the trailing edge before you begin sheeting.

○ 1. Glue a 1/16" x 1-1/8" x 24" trailing edge sheet to the top of both wing panels.



○ 2. Trim the four 1/16" x 3" x 30" balsa leading edge sheets to 24". *Save the leftover 6" pieces for use later during construction.* Cut the 3" x 24" pieces down to 2-1/2" x 24". Save the 1/2" x 24" sticks to make the R1 capstrips.

○ ○ 3. Align a leading edge sheet with a wing tip, then hold it tightly against the leading edge while using thin CA to glue it to the sub leading edge. (See photo at step 5.)

○ ○ 4. Carefully lift up the leading edge sheet, away from the ribs. Working quickly, apply a bead of medium or thick CA to each rib, then roll the sheet into contact. Hold the sheet until the CA cures. Wick some thin CA between the sheet and the spar to secure the aft edge of the sheet to the spar.



○ ○ 5. Glue a scrap piece of 1/16" x 1/2" x 2" balsa to the bottom edge of the leading edge sheet at the root end to reinforce the joint between the leading edge sheets. Sheet the other top leading edge by repeating steps 3 and 4.



○ ○ 6. Cut and install cap strips for the top of each R2 and R3 rib from 1/16" x 5/16" x 30" balsa sticks. Use the 1/16" x 1/2" x 24" balsa left over from the leading edge sheeting to make the R1 capstrips. Refer to the photo and plans for the correct position of the root and tip cap strips.

○ ○ 7. Use the leftover 1/16" x 3" x 6" leading edge sheeting to cut and install shear webs on the aft edge of the spars as shown on the plans.

○ ○ 8. Remove the wing from your work surface. Pin it back to your building board, upside-down, making sure that it's straight without any twists.

○ 9. Repeat steps 3 - 8 to sheet the bottom of the wing.

○ 10. Use leftover cap strip balsa to frame the servo openings on the bottom of the wing as detailed on the plans.



○ 11. Use a razor plane or carving blade and coarse sandpaper to shape the leading edge. Cut the template from the plan, glue it to scrap cardboard, and then use it to test the accuracy of your work as you proceed.

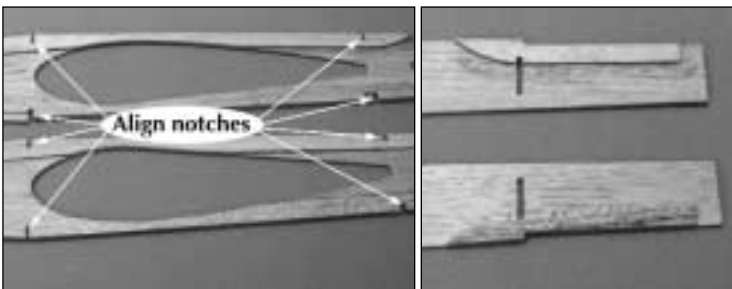
○ 12. Cut two 4-1/4" x 11" strips from an 8-1/2" x 11" sheet of paper. Roll the strips lengthwise into tubes, then insert them through the holes in the wing ribs between the servo bay and W1. Apply a couple of drops of medium CA to secure them in position. These tubes make it easy to *fish* your servo wires into the fuse.

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"BUILD THE FUSELAGE"

○ 1. Cover the fuselage top view on the plans with waxed paper. Designate a right and left die-cut balsa fuselage side. If you look at the rear end of the fuse sides you will see three die-cut lines. These lines designate the pushrod exits. Use a hobby knife to cut between the top and middle lines on the right fuse side to open an exit slot 1-1/4" long for the elevator pushrod. Do the same between the middle and bottom lines on the left fuse side for the rudder pushrod exit.

★★★★ **Pro Tip:** If you have chosen the colors for your trim scheme, cut the film for the two fuselage sides using the die-cut side pieces as your pattern. Cut the outside edges about 1" oversize but cut the wing opening to the exact size. Be sure to cut a left and right side. Save these pieces for use during final covering.



○ 2. Align and glue the top, bottom and aft die-cut balsa doublers to the die-cut balsa **right** fuse side as shown. Be sure the

notches on the doublers match the fuse sides perfectly. Repeat this operation for the **left** fuse side but be sure to check your work before using any glue so that you **don't make two right sides!** The doublers must face toward the inside of the model.



○ 3. Drill a 3/16" pushrod hole through each of the punch marks on die-cut ply formers, F2 through F5. Without using any glue, insert the formers into the notches in the fuse sides with the **die-stamped numbers facing the front of the model** and all of the 3/16" pushrod holes toward the bottom of the fuselage. Use masking tape to hold the assembly together.



○ 4. Position F2 over its location on the plans, then pin the fuse sides to the building surface. Carefully align the length of the fuse

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over the plan, squaring up the formers and pinning the assembly in place as you proceed. Be sure the front and rear ends are aligned and that the fuse is not twisted.

○ 5. Once satisfied that the fuse is trued up, wick some thin CA into all of the fuse side and former joints.

○ 6. Glue the shaped balsa tail post between the fuse sides, flush with the rear end of the fuse sides. Check that the tail post is vertical with a drafting triangle before the glue cures.



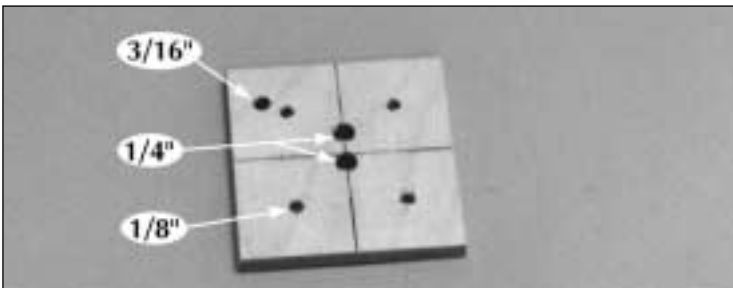
○ 7. Cut and install 3/32" x 3" cross-grain sheeting to the top of the fuse from F2 to the stab saddle. After sanding the sheeting flush with the top edge of the fuse, remove the fuse from the building surface, then realign and pin it back over the plans, upside down.



○ 8. Cut two 18" pieces from the 36" outer pushrod tube. Sand the outside of the tubes to create a better surface for gluing, then



○ 12. Sheet the fuse bottom from the front edge of F3 to the tail post with 3/32" cross-grain sheeting. The sheeting from F2 to the hatch rail will be completed **after** the wing is installed.

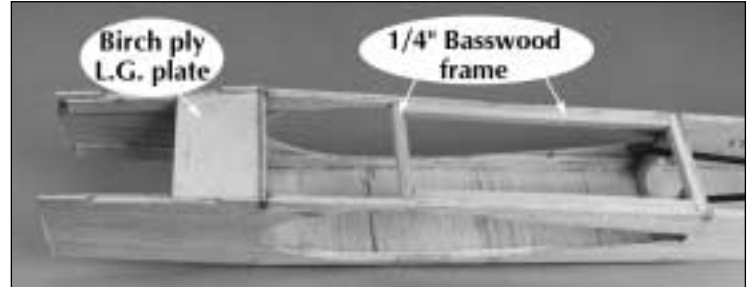


○ 13. Use the firewall cross section on the plan to draw two center lines on the 1/4" birch ply firewall. Center your engine mount on these lines and mark the location of the mounting holes. Drill 1/8" holes through these marks and install 4-40 blind nuts (not included) on the back side of the firewall. Now would also be a good time to drill 1/4" holes for your fuel and vent lines and a 3/16" hole for the pushrod.

○ 14. Use **6-minute** epoxy to glue the firewall between the fuse sides and to the fuse bottom. Secure the firewall with tape, clamps or rubber bands until the epoxy has **fully** cured.

slide the tubes through the holes in the formers and out through the pushrod exits at the rear of the fuse. Glue the tubes to the formers and exit slots with medium CA.

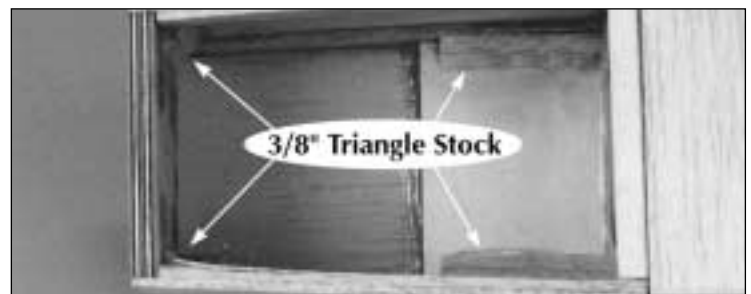
○ 9. Cut the rear hatch rail from 1/4" x 1/4" basswood leftover from a main spar. Glue it in position into the notches in the fuse doubler at F3. Cut two side hatch rails from 1/4" x 1/4" x 7-1/8" from an 18" basswood stick. Glue them in position to the inside of the fuse. Cut the front hatch rail (to match the plans) from 1/4" x 1/4" basswood leftover from a main spar. Glue it in position.



○ 10. Use 6-minute epoxy to glue the 1/8" birch ply landing gear plate into the notches ahead of F2 and to the forward edge of F2. Wipe off any excess epoxy before it cures with a paper towel and rubbing alcohol.

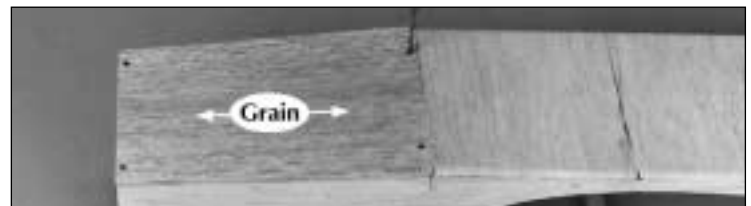
○ 11. Use CA to glue the die-cut 1/8" ply forward fuse bottom in position. Hold the fuse sides in tight contact while the CA cures.

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○ 15. Use **6-min epoxy** for both of the following operations. Cut and glue two pieces of 3/8" triangular balsa to the fuse sides and the firewall between the fuse doublers. Cut and glue two pieces of triangular balsa to the landing gear plate and the fuse doublers.

○ 16. Cut and glue a 1/4" x 1/4" basswood hatch rail to fit between the fuse sides in front of F2. Sand the top of the rail to match the tapered angle of the fuse.



○ 17. Position a sheet of 3/32" x 4" wide balsa over the fuel tank compartment with an edge butted against the top sheeting at F2. The grain must run from front to rear. Trace the outline on the bottom surface, then cut and sand the hatch to fit. Drill four 1/16" pilot holes through the top of the hatch into the hatch rail and firewall at the locations shown for #2 sheet metal screws.

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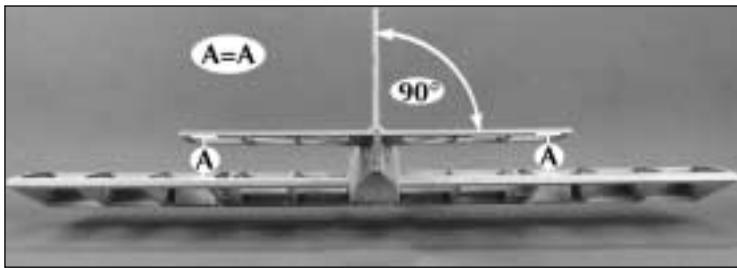
"FINAL ASSEMBLY"

IMPORTANT: The wing is designed to fit snugly into the fuse to provide a good glue joint between it and the fuse sides. Work slowly and carefully when sliding the wing into location to avoid damaging the cap strips or ribs. If too much resistance is felt, remove the wing, then sand the inside of the opening in the fuse to enlarge it slightly.



○ 1. With one wing tip on the floor, work the fuse down the wing from the opposite end. Due to the close fit, the fuse must be kept perpendicular to the wing or it will bind. You will probably need to *help* each cap strip through the fuse so take your time and work carefully.

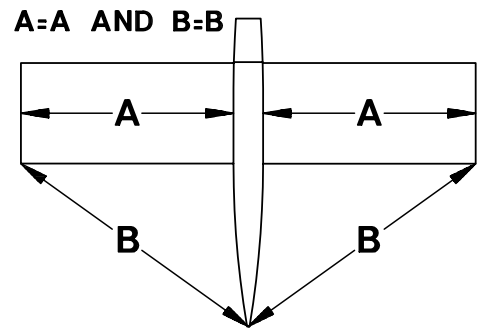
firewall to set the correct alignment. Draw a couple of reference marks on the stab and fuse sides once it is in position. Look at the rear of the model from several feet away. The stab must be parallel with the wing. *See photo at next step.* If not, **lightly** sand the **high side** of the stab saddle to correct the problem. Once fully aligned, use 30-minute epoxy to glue the stab in position. Hold it in position with masking tape and pins until the epoxy has cured.



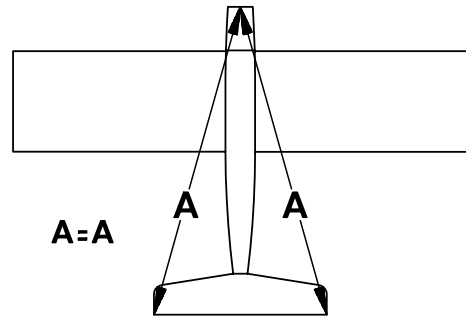
○ 4. Pin the fin on the centerline of the stab. Check its alignment with the centerline of the fuse with a long straightedge, then mark its aligned location. Glue the fin to the stab with 6-minute epoxy. Make sure the fin is square to the stab with a drafting triangle, then pin and tape the fin in position until the epoxy cures.

○ 5. Cut pieces of 3/8" triangular balsa to fit on both sides of the fin, as shown on the plans. Round off the front and rear ends for better appearance. Glue them securely in position to the stab and fin.

○ 6. Finish sheeting the bottom of the fuse with 3/32" x 4" balsa sheet from F2 to just past the front edge of the front bottom hatch rail.



○ 2. Once the wing is **centered** in the fuse, measure the distance from each wing tip to the tail post. Shift the wing until the measurements are equal. When wing alignment is correct, use medium CA to securely glue the circumference of the R1 ribs to the fuse. Fill any gaps with thick CA.



○ 3. Center the stabilizer on the stab saddle and temporarily pin it in position. Measure from each stab tip to the center of the

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○ 7. Cut the bottom hatch cover from 3/32" x 4" balsa. Fit the hatch, then drill 1/16" pilot holes through the hatch and hatch rails. **TIP:** Use leftover balsa to reinforce the hatch cover by applying two or three cross-grain strips to the inside surface.

"COVERING AND FINISHING"

We recommend using a lightweight film covering material such as **TowerKote™** film to finish your Uproar. For best results, apply the film following the manufacturer's instructions using the sequence we suggest on page 17.

Repairing surface dings

Many surface blemishes on a framed model are caused by bumps and balsa chips on the work surface. This type of ding is best repaired by applying a drop or two of window cleaner or tap water to the blemish, then running a **hot** sealing iron over the spot to expand the wood fibers. After the surface has dried, sand the *expanded* area smooth.

Final sanding

Fill any scuffs, dings and the forward end of the pushrod tube exit slots with balsa filler. After the filler has hardened, cut and sand the pushrod tubes flush with the fuse sides, then sand the entire structure with progressively finer grades of sandpaper, ending with 320-grit.

Fuelproofing

Fuelproof the firewall and fuel tank compartment by painting them with thinned 30-minute epoxy. Prevent the epoxy from clogging the blind nuts by first packing the holes with petroleum jelly applied with a toothpick. Be sure to **clean** off any "external" petroleum jelly "messes" with rubbing alcohol before fuelproofing.

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Balance the airplane laterally

SPECIAL NOTE: Do not confuse this procedure with "checking the C.G." or "balancing the airplane fore and aft." That very important step will be covered later in the manual.

- 1. Install the engine (with muffler) and landing gear to the fuselage.
- 2. With the wing level, lift the model by the engine propeller shaft and the fin (this may require two people). Do this several times.
- 3. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by gluing a weight to the **inside** of the other wing tip. **NOTE: An airplane that has been laterally balanced will track better in loops and other maneuvers.**

Cover the structure with TowerKote Film

The Uproar does not require any painting to obtain the scheme shown on the box, as all of the finish is done with **TowerKote Film**.

Make sure the structure is smoothly sanded with **320-grit** sandpaper. Remove all dust from the structure with a vacuum cleaner and **Top Flite® Tack Cloth** so the TowerKote film will stick well. Cover the aircraft with TowerKote film using the sequence that follows. Make sure the TowerKote film is thoroughly stuck to the structure and all of the edges are sealed. Use a **Top Flite Hot Sock™** on your covering iron to avoid scratching the finish.

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"FINAL HOOKUPS AND CHECKS"

- 1. Cut a slot in the aft of the fuse for the tail gear bearing. Coat the exposed wire with petroleum jelly. Work some 6-minute epoxy into the slot, then insert the bearing. Wipe off any epoxy before it cures with a paper towel moistened with alcohol.
- 2. Draw a centerline on the trailing edge of the fin, stabilizer and wing. Refer to the plans, then mark and cut hinge slots for all control surfaces. Mark and cut matching hinge slots on all control surfaces. If you are using laminated CA style hinges, a #11 blade in a hobby knife works well for cutting the slots.
- 3. Install the **elevators** and **ailerons** using your choice of hinges. Pack the tail gear torque rod hole in the **rudder** with 6-minute epoxy, then install the rudder with its hinges.



- 4. Cut eight 1/8" long pieces of inner pushrod tube from the 6-1/2" piece supplied. Cut 8" from the end of both of the 35" wire pushrods with threads on both ends. Slide four of the plastic bushings onto each 27" long pushrod wire, spaced as shown on the plans. If the plastic bushings will not slide on the wire, cut them shorter. Screw a nylon clevis fourteen revolutions on to each pushrod.

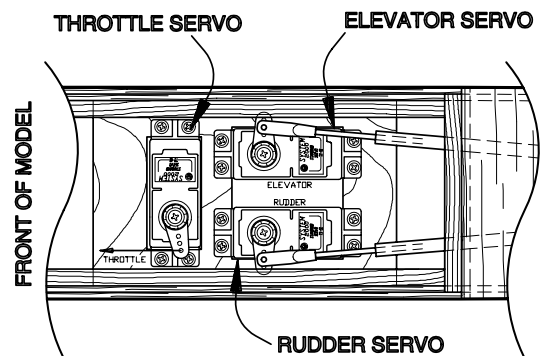
When covering areas that involve sharp junctions, like the tail section or around the root end of the wing, cut narrow strips (1/4" to 3/8") and apply them in the corners **before** covering the major surfaces. The larger pieces of TowerKote film will overlap and capture these smaller pieces. This technique also bypasses the need to cut the TowerKote film in these areas after it has been applied. **DO NOT, under any circumstances, attempt to cut the covering material after it has been applied to the fin and stab, except around the leading and trailing edges.**

Recommended Covering Sequence:

- 1. Tail junction strips as described above
- 2. Wing/fuse junction
- 3. TE surfaces of wing
- 4. Bottom of left wing panel
- 5. Bottom of right wing panel
- 6. Top of left wing panel
- 7. Top of right wing panel
- 8. Fuse bottom
- 9. Fuse sides (use your precut pieces)
- 10. Fuse top
- 11. Stab bottom
- 12. Stab top
- 13. Fin left and right side
- 14. Rudder left and right side
- 15. Bottom of elevators
- 16. Top of elevators
- 17. Ends of ailerons
- 18. Bottom of ailerons
- 19. Top of ailerons
- 20. Top and bottom hatch covers



- 5. Remove the backing plate from two nylon control horns, then snap a pushrod clevis on each of the horns. Slide the pushrods into the guide tubes at the rear of the fuse. Position the control horns on the elevator and rudder where shown on the plans, then mark and drill 5/64" holes through the control surfaces for the horn mounting screws. Mount the control horns with the 2-56 x 5/8" machine screws. Remove the pushrods but leave the control horns in position.



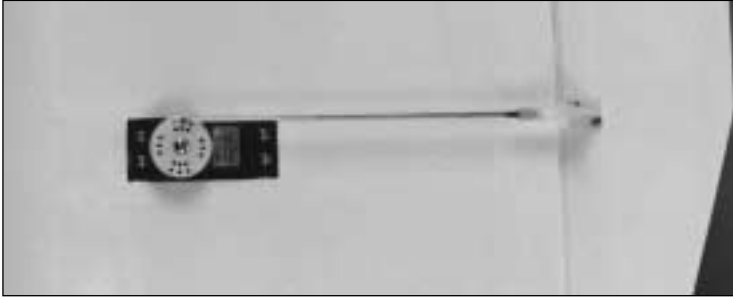
- 6. Install three servos in the fuse as shown in the sketch. **Note:** Sketch shows the bottom of the model looking through the hatch.

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○ 7. Reinstall the pushrods and attach them to the horns. With the rudder and elevator positioned at neutral, mark the pushrod where it aligns with the servo horn. Make Z-bends at the marks or use pushrod keepers to attach the pushrods to the servos.

○ 8. Install a throttle linkage pushrod (not included) using your preferred method.

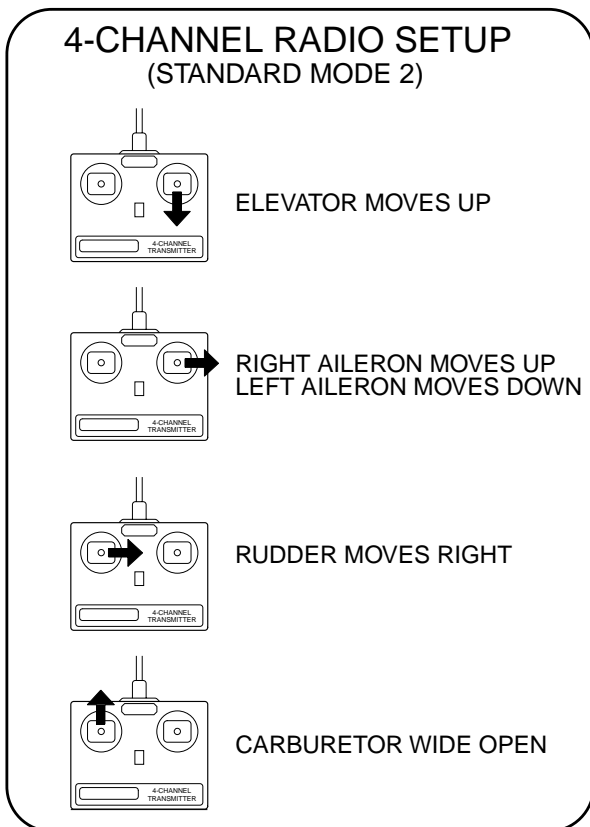
○ 9. Install the aileron servos in the wing, fishing the servo leads through the paper tubes as you proceed. Connect the servo leads to a Y-harness, then center the servo arms.



○ 10. Install the aileron control horns where shown on the plans. Attach clevises to the two 8" threaded pushrods (left over from the elevator and rudder), then install them using Z-bends or pushrod keepers.

○ 11. Hook up the radio and adjust the control throws. The control throws are suggested as a starting point and may be increased or decreased once you are familiar with the flight characteristics of your particular model.

○ 12. Make sure the control surfaces move in the proper direction as illustrated in the following sketch:



○ 13. Install the main landing gear wire using the four nylon straps and #2 x 3/8" screws. Install the 2-1/2" main wheels (not included).

CONTROL SURFACE THROWS

Control throw adjustment: By moving the position of the clevis at the control horn **toward the outermost hole**, you will **decrease** the amount of throw of that control surface. Moving it **toward the control surface** will **increase** the amount of throw. If these adjustments don't accomplish the job, you may need to work with a combination of adjustments by also repositioning the pushrod at the servo end. Moving the pushrod toward the splined shaft on the servo will decrease the control surface throw — outward will increase it.

We recommend these control surface throws as a **starting point**:

NOTE: Throws are measured at the **widest part** of the elevators, rudder, and ailerons. If your radio does not have dual rates, set the control throws halfway between the specified high and low rates.

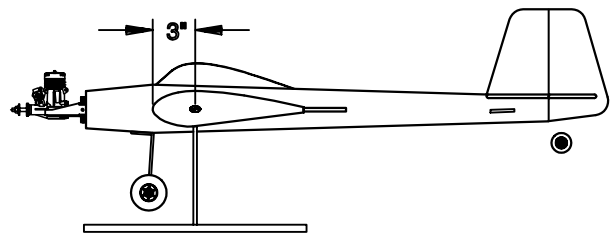
ELEVATOR:	High Rate 1/2" up [12.7mm] 1/2" down	Low Rate 3/8" up [9.5mm] 3/8" down
RUDDER:	1" right [25.4mm] 1" left	Same as high rates
AILERONS:	3/4" up [19mm] 3/4" down	3/8" up [9.5mm] 3/8" down

○ 14. Install the fuel tank, engine and muffler. Install the propeller and spinner.

○ 15. Trim the canopy to size. Hold it in position on the fuse, then draw around its perimeter with a felt-tip pen. Cut away a narrow strip of covering film, following the line you just drew. Glue the canopy in position with RC-56 canopy glue or thin CA.

BALANCE YOUR MODEL

NOTE: This section is **VERY** important and must **NOT** be omitted! A model that is not properly balanced will be unstable and possibly unflyable.



○ 1. Accurately mark the balance point on the **bottom** of the wing on both sides of the fuselage. The balance point is shown on the plan (CG), and is located **3" (76mm) behind the leading edge**. This is the balance point at which your model should balance for your first flights. Later, you may wish to experiment

by shifting the balance up to **1/4" forward or back** to change the flying characteristics. Moving the balance **forward** may improve the smoothness and arrow-like tracking, but it may then require more speed for takeoff and make it more difficult to slow down for landing. Moving the balance **aft** makes the model **more agile** with a lighter and snappier feel. In any case, **please start at the location we recommend and do not at any time balance your model outside the recommended range.**

○ 2. With all equipment installed (ready to fly) and an **empty** fuel tank, lift the model at the balance point. If the tail drops when you lift, the model is "tail heavy" and you must move weight toward the nose to balance. If the nose drops, it's "nose heavy" and you must move weight toward the tail to balance. Try to balance the model by changing the position of the **receiver battery** and **receiver**. If this is not enough, you may need to add stick-on weights to the tail or a heavy prop hub to the nose.

"PREFLIGHT"

Balance the prop

Balance your propellers carefully before flying. An unbalanced prop is the single most significant cause of damaging vibration. Not only will engine mounting screws and bolts vibrate out, possibly with disastrous effect, but vibration will also damage your radio receiver and battery.

Charge the batteries

Follow the battery charging procedures in your radio instruction manual. You should **always** charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

- Get help from an experienced pilot when learning to operate engines.
- Use safety glasses when starting or running engines.
- Do not run the engine in an area of loose gravel or sand, as the propeller may throw such material in your face or eyes.
- Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you start and run the engine.
- 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.
- Use a "chicken stick" device or electric starter; follow instructions supplied with the starter or stick. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.
- Make all engine adjustments from behind the rotating propeller.
- The engine gets hot! Do not touch it during or after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine causing a fire.
- To stop the engine, cut off the fuel supply by closing off the fuel line or follow the engine manufacturer's recommendations. Do not use hands, fingers or any body part to try to stop the engine. Do not throw anything into the prop of a running engine.

Ground check the model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to check if you have installed the radio correctly and that all the control surfaces move in the correct direction. The engine operation also must be checked and the engine "broken-in" on the ground. **Follow the engine manufacturer's recommendations for break-in.** Check to make sure all screws remain tight, that the hinges are secure and that the prop is on tight.

Range check your radio

Wherever you fly, you need to check the operation of the radio before the first flight of the day. This means with the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet [30.5 meters] away from the model and still have control. Have someone stand by your model and, while you work the controls, tell you what the various control surfaces are doing.

Repeat this test **with the engine running** at various speeds, with an assistant holding the model. If the control surfaces are not always acting correctly, **do not fly!** Find and correct the problem first.

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

- Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that the engine exhaust gives off a great deal of deadly carbon monoxide. Therefore do not run the engine in a closed room or garage.

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"FLYING"

The Tower Uproar is a great-flying sport airplane that flies smoothly and predictably, yet is highly maneuverable. It does not, however, have the self-recovery characteristics of a primary R/C trainer; therefore, **you must either have mastered the basics of R/C flying or obtained the assistance of a competent R/C pilot to help you with your first flights.**

Takeoff: If you have dual rates on your transmitter, set the switches to "high rate" for takeoff, especially when taking off in a crosswind. Although this model has excellent low speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out." When you first advance the throttle and the tail begins to lift, the plane will start to turn left (a characteristic of all "taildraggers"). Be ready for this, and correct by applying sufficient right rudder to hold it straight down the runway. The left-turning tendency will diminish as soon as the tail is up and the plane picks up speed. Be **sure** to allow the tail to come up. Don't hold the tail on the ground with too much up elevator, as the plane will become airborne prematurely and possibly stall. When the plane has sufficient flying speed, lift off by smoothly applying up elevator (don't "jerk" it off to a steep climb!), and climb out gradually.

Flight: We recommend that you take it easy with your Uproar for the first several flights, gradually "getting acquainted" with this responsive sport plane as your engine gets fully broken-in. Add and practice one maneuver at a time, learning how she behaves in each. For ultra-smooth flying and most normal maneuvers, we

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recommend using the "low rate" settings as listed on page 19. "High rates" should be used for tearing up the sky, low level loops, snaps and spins, and most quick response flying. Speed is the key to good knife-edge performance.

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice any unusual sounds, such as a low-pitched "buzz," this may be an indication of control surface "flutter." Because flutter can quickly destroy components of your airplane, any time you detect flutter you must **immediately** cut the throttle and land the airplane! Check all servo grommets for deterioration (this will indicate which surface fluttered), and make sure all pushrod linkages are slop-free. If it fluttered once, it probably will flutter again under similar circumstances unless you can eliminate the slop or flexing in the linkages. Here are some things which can result in flutter: excessive hinge gap; not mounting control horns solidly; sloppy fit of clevis pin in horn; elasticity present in flexible plastic pushrods; side-play of pushrod in guide tube caused by tight bends; sloppy fit of Z-bend in servo arm; insufficient glue used when gluing in the elevator joiner wire or aileron torque rod; excessive flexing of aileron, caused by using too soft balsa aileron; excessive "play" or "backlash" in servo gears; and insecure servo mounting.

Landing: When it's time to land, fly a normal landing pattern and make your final approach into the wind. For your first landings, plan to land slightly faster than stall speed and on all three

wheels, as this is the easiest way to land your Uproar. Later, with a little technique, you will find you can make slow landings on just the main gear, with the tail flyin' high.

We hope you enjoy your Uproar and have a blast wowing the guys at the field.

