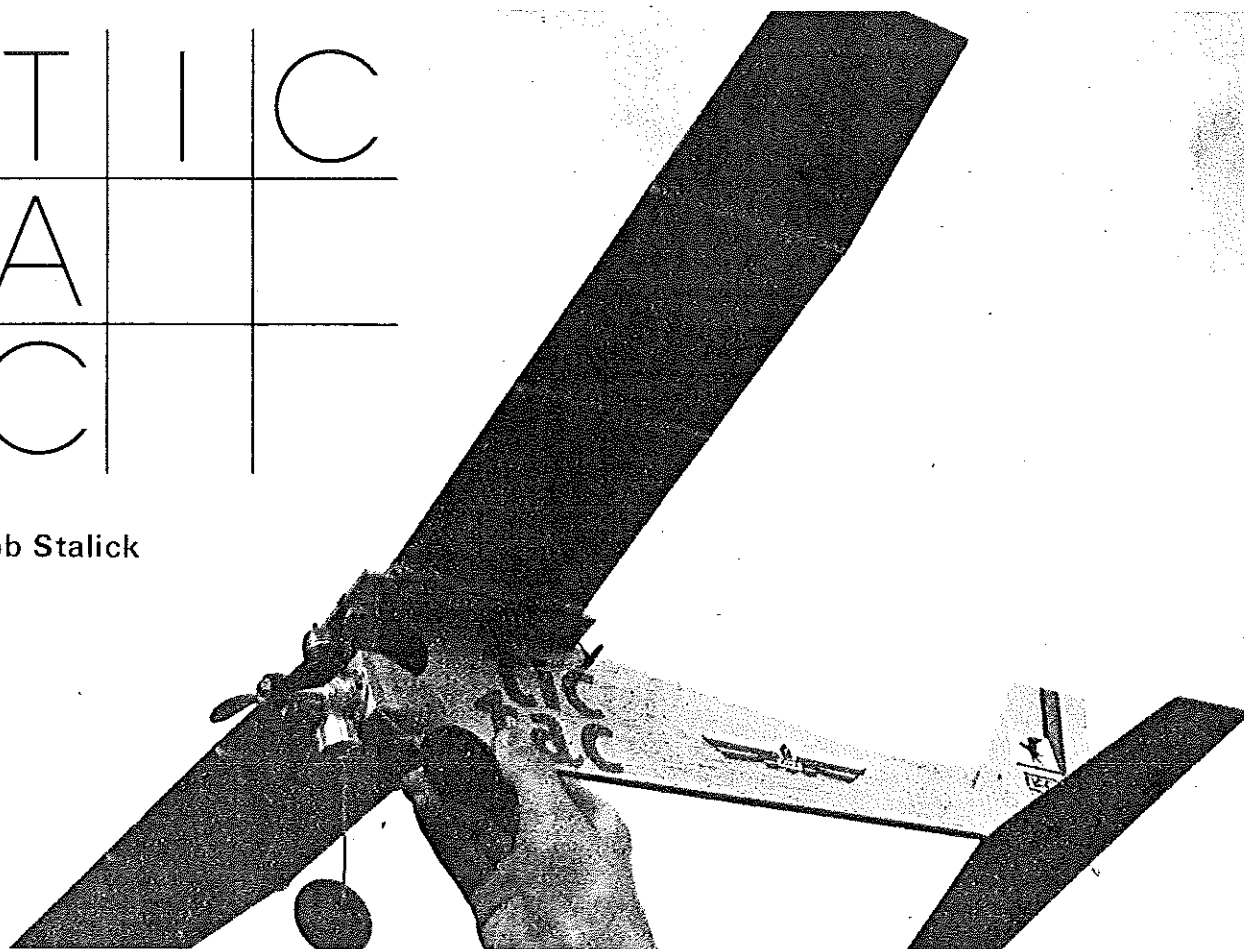


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Bob Stalick



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Sturdy and simple to build this little .02-powered free flight is ideal for fun flying.

PUT A TIC-TAC in the air and get a bang out of flight—it's a clean, fresh explosion of fun. Designed to use that Pec Wee .020 from a worn out ready-to-fly plastic model, it can be built for around \$3.00 and some odds and ends from your scrap box. Does it fly? You bet! In fact, you'll need to watch the engine run or you'll put it out of sight. Quick to build, you can put it together in two or three evenings, making it the closest thing to A.R.F. (almost-ready-to fly) free flight that you can find nowadays.

It won't win any contests for you. It's not supposed to. If your idea of free flight fun doesn't extend to the competitive arena, or if you're just getting started in free flight—or if you would like to get out of the rut, the Tic Tac is for you. Docile and forgiving, but yet a good performer, it'll teach you some of the rudiments of trimming so that the next step you might want to take will be easier. So, let's get to building, so that we can go flying this weekend.

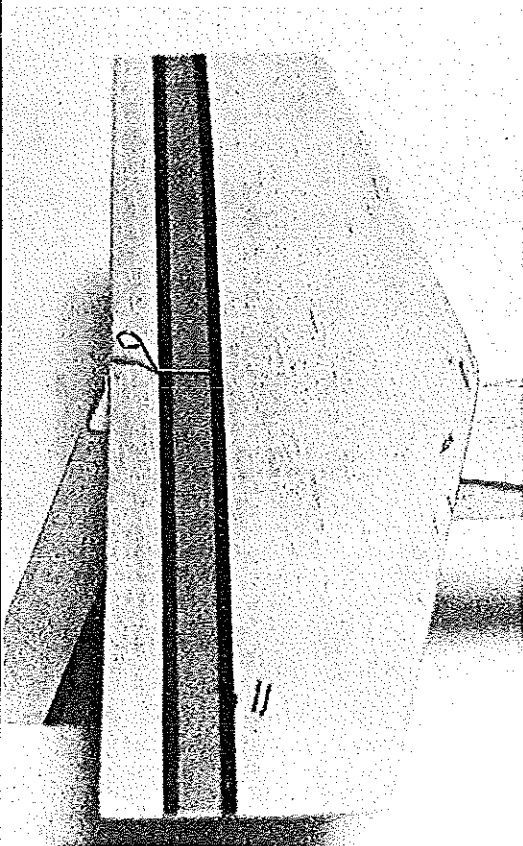
### Construction

Go to the local hobby shop and pick up a sheet of  $4 \times 36 \times 1/16$  in. medium to hard balsa (should weigh about 1 oz.) and a sheet of  $3 \times 36 \times 3/16$  in. medium balsa (should weigh about  $2\frac{1}{2}$  ozs.) The wing, stabilizer and wing center-section bottom are built from the  $1/16$ -in. sheet, and the fuselage is cut from the  $3/16$ -in. sheet. The wing platform and the wing ribs also can be constructed from this sheet—as can the balsa cheeks behind the firewall. You'll also need some  $1/16$  in. plywood for the firewall, some  $3/48$  bolts and blind-nuts to mount the engine, a 10-in. length of  $1/16$ -in. music wire for the landing gear, and some other odds and ends, like gauze, paper clips, and a pair of old wheels (from that old plastic model). Epoxy and Titebond or Elmer's Glue will stick it all together.

Let's build. Trace the fuselage outline from the plan directly onto the  $3/16$ -in. sheet. Cut out carefully. Sand the edges square. Note that the bottom of the fuselage is flat except for the front 2 in.

From that  $3/16$  in. sheet that's left over or from scrap  $1/8$  in. sheet, cut out six wing ribs—cut them accurately. Take the sheet of  $1/16$ -in. balsa you bought and trace the wing outline on it. Cut out the entire wing.

The sheet-balsa tail surfaces are easily glued to the fuselage. Leave the aft bottom of the fuselage flat for a good stabilizer seating.



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Left: The single-surface wing construction is here shown clearly. Note that the inboard ribs ride alongside the wing-mounting platform and thus serve to keep the wing aligned in flight.

Pin the ribs onto the plan—pin through the tabs on the front and rear of each rib. For now, omit the two center ribs. Cut the wing along the lines marked "dihedral joints." You should have two identical panels and a 2-in. wing center section. Using Titebond or Elmer's, put a generous amount of glue on each rib and pin the wing halves in place. When dry, remove from the plan.

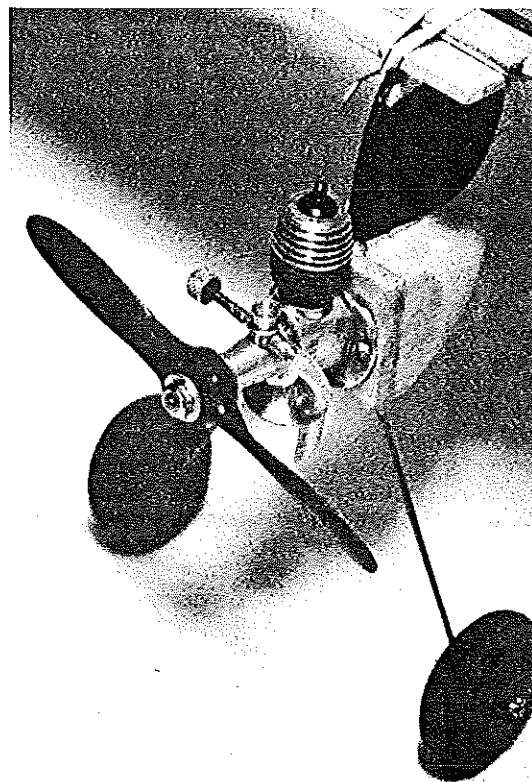
Next, pin down the two center ribs and glue on the 2-in. center section (leave about half of each rib uncovered by the center-section sheet.) When dry, leave pinned in place on the plan. Fit the two completed wing halves in place—you will need to sand a very slight radius into the butt of each wing half to get a good joint (just like sanding a hand-launch glider wing). Block up each tip 1-5/8 in. and, using epoxy glue liberally applied, pin the halves in place over the exposed portions of the center wing ribs. Let cure.

When done, remove the completed wing from the plan and trim off the tabs at the front and back of each wing rib. Glue a piece of 1/16-in. sheet balsa, 4 in. long, between the center ribs on the bottom. Cut the stab from 1/16-in. sheet. Using a pen, mark the center line, then sand all edges to round them off. Cut the fin from another piece of 1/16-in. balsa, sand all edges round.

Cut three identical pieces of 1/16-in. plywood to shape and size shown on the plan. Cut one piece through as indicated to

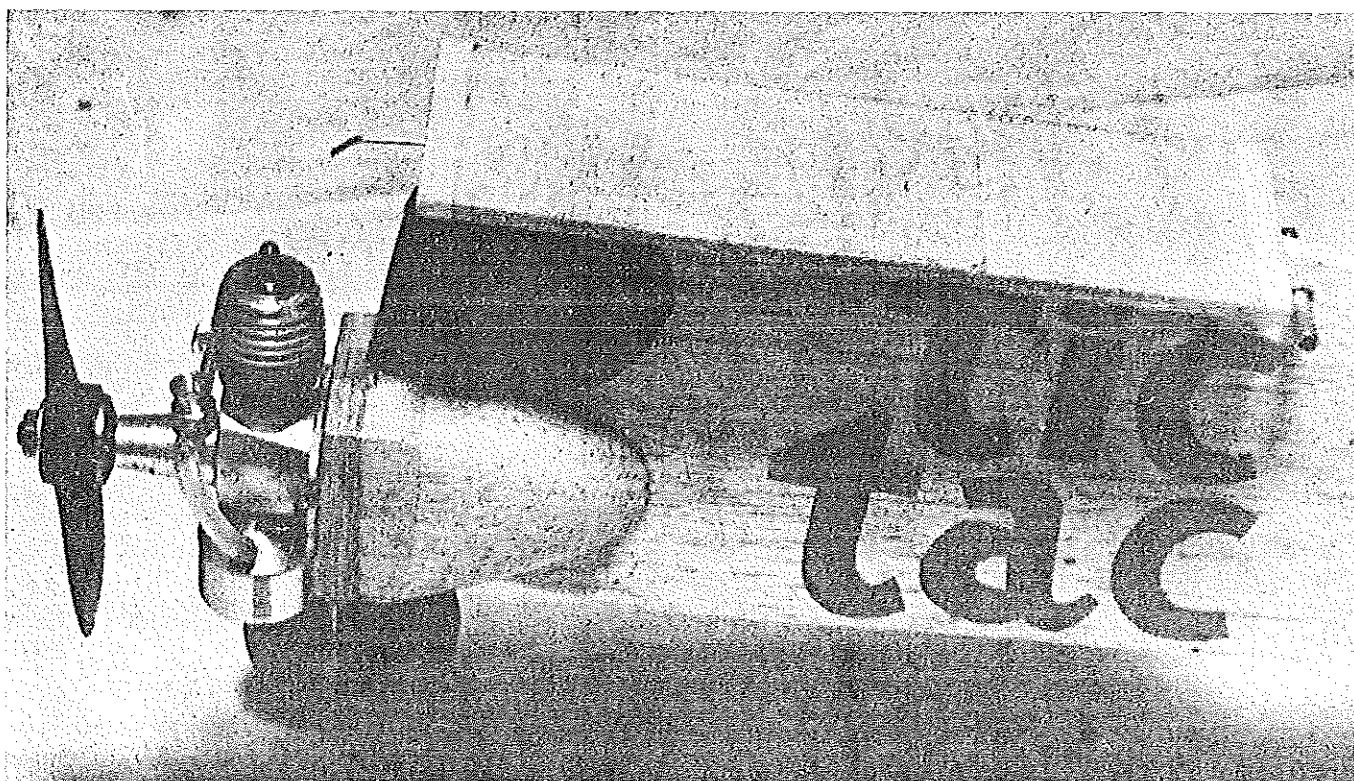
accept the landing gear wire. Bend wire to shape. Using epoxy, apply glue to one side of one plywood firewall; fit the top part of the plywood you've cut through, slide in the landing gear wire as shown, then slide the bottom part of the plywood against the wire. Apply more epoxy to one side of the remaining plywood firewall and place it on top of the other two pieces. Clamp this whole plywood and wire sandwich together, using a vise or clothespins. Try to keep it square. When cured, sand the edges and, using the engine of your choice, place it on the firewall and mark, using a sharp pencil, the mounting lug hole locations on the plywood. Be sure that you don't mark directly over the landing gear wire. Drill 1/8-in. diameter holes and epoxy the 3-48 blind nuts in place. When cured remove the engine. Attach the firewall where shown onto the front of the fuselage and epoxy in place. Be certain there is no side- or up-thrust (slight down-thrust is OK.) After the epoxy has cured, laminate some of the remaining 3/16 in. and cut to shape, then epoxy in place behind the firewall, as shown. Wrap gauze or nylon around this firewall/balsa cheek joint and glue or epoxy the reinforcement in place. The stab is glued directly onto the bottom of the fuselage as shown. The fin is centered on top of the fuselage and glued into place.

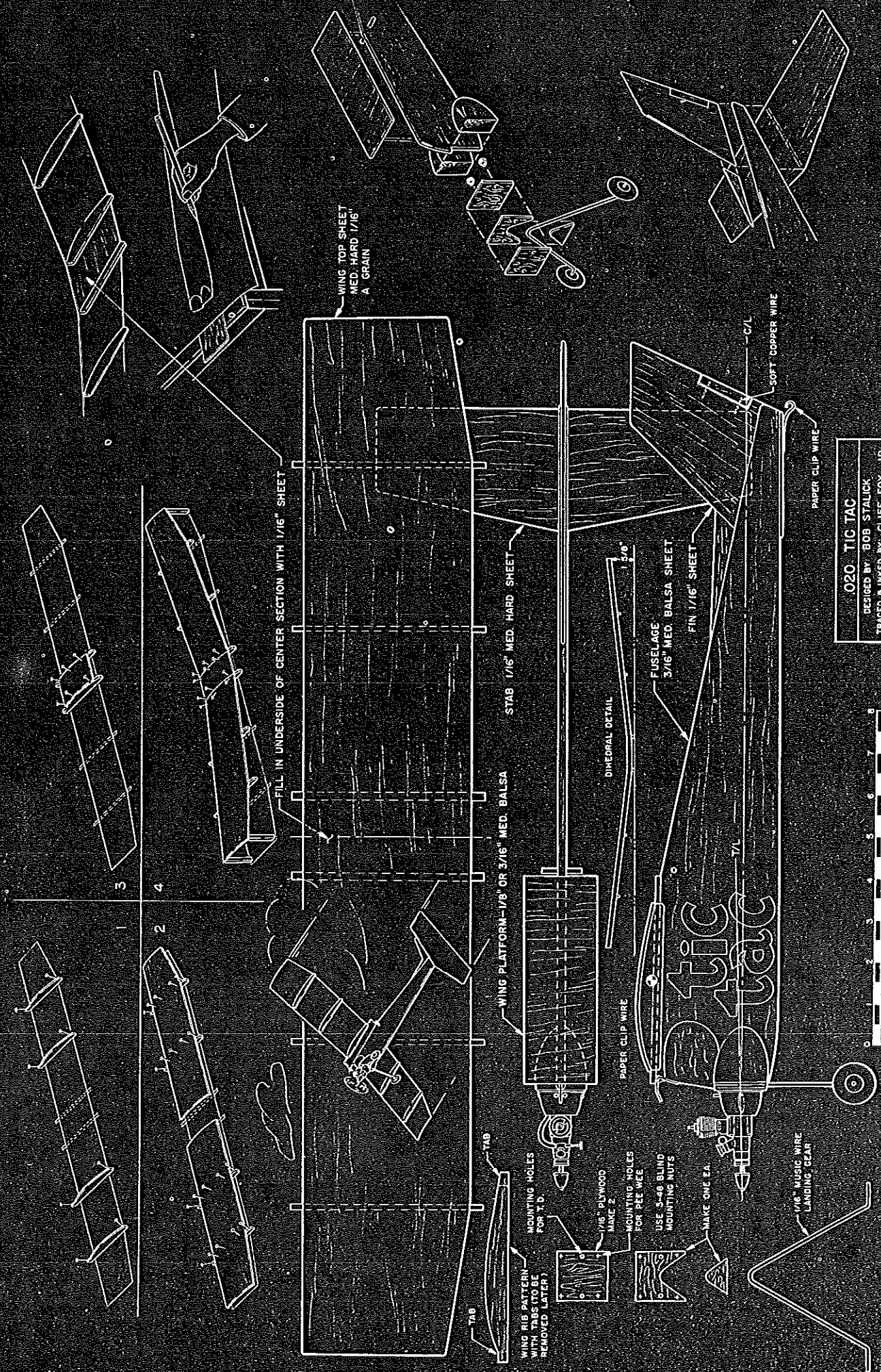
The wing platform is constructed from remaining 3/16-in. balsa or 1/8-in. scrap. It should be wide enough to just fit between the two center ribs of the wing. Glue in place on top of the fuselage. Drill through the fuselage where shown and add the 1/8-in. dowel. Add wing hold-down wire where shown, and the tail skid. Shape all balsa parts and sand lightly. (turn page)



Although the model was flown with a Cox .02 engine the author threw a curve by showing this "mystery" engine. It's the K&B Infant, an .02 which was the first of the engines which later became designated as Half A. And probably had about half the power of the later-day Cox .02.

Two cheek blocks glued to fuselage sides support the plywood firewall. On plans plywood is shown notched into fuselage—since Cox has a tank mount, it is located farther forward to maintain proper CG position. Model can be constructed in two or three evenings.





020 TIC TAC  
DESIGNED BY: BOB STALCK  
TRACED & INKED BY: CLIFF FOX, JR.



## Tic Tac

Give the entire model two coats of thinned fuel-proof clear dope and sand lightly. Apply any tissue trim and complete by adding two or three more coats of clear dope. Add wheels, using Goldberg wheel retainers or solder. Put your name and AMA number on the model. Bolt your engine in place—you're ready to do some testing.

**Preflight Checks:** Rubberband the wing in place. Slide it fore and aft on the wing mount until you achieve the indicated balance point,  $2\frac{1}{4}$  in. from the leading edge of the wing. You may cut back the wing mount to accommodate this balance point if you wish—it was not done on the original.

**Hand-glide the model.** It should glide straight ahead or turn slightly, with no tendency to dive or stall. Try several tosses into the wind. If it stalls drastically, move the wing back a bit ( $\frac{1}{4}$  in. or so) until the stall is nearly gone. If it dives, move the wing forward until the model begins to stall. Mark this location on the wing mount and line up the wing on this line each time. Once the proper wing location is determined, glue a strip of hard  $1/16$  in. sq. to the wing platform in front and back of the wing. These serve to keep the wing from sliding and changing position.

**Flying:** Now, fuel it up and start the engine (if you insist in using the T.D. .020, mount the prop on backwards to reduce thrust). Time the engine run on a full tank until all the fuel is gone. Fuel it up and start again—time the run again and when there are about 10 seconds of fuel left, launch the model gently into the wind. It should climb slowly in a loose shallow spiral, either to the right or left (the original climbed to the left). If it tries to loop, add one washer on one side between the



engine and the firewall to give the engine side thrust. Recommendation: add the washer under the right mounting lug—looking down from the top of the model—this gives left thrust.

Increase flight time by allowing longer motor runs. You can increase climb angle slightly by bending up the trailing edge of the stab ala hand-launch glider, or reduce climb angle by bending the trailing edge down. Adjust glide turn by offsetting the rudder tab (the original had about  $3/32$  in. right tab for right glide). Do not overpower this model—it will climb and glide either left or right, but if overpowered, it can

spiral in. Use a mild fuel and as long of an engine run as your field permits. If you have a nice, smooth runway area—like a plywood panel—Tic Tac will take off from the ground, with just a couple of feet of runway used. Since it has no dethermalizer system, it is best to trim the glide so that it is a bit nose-down (very slight dive) to minimize fly-aways. At  $3\frac{1}{2}$  ounces, the Tic Tac will thermal glide, and you can lose it if you're not careful. (That's why you wrote your name on it.)

If it does fly away, the second Tic Tac is even easier and quicker to build. Happy thermals.



Top: The author with his many-times flown Tic Tac. Note that the tabs on the wing ribs—an aid to construction—are cut away after the wing is completed. Adjacent: This rear-quarter view brings out the perky look of this knock-about sport model, AMA decal numbers always add to realism—and are good publicity