

## THE MINI KAOS

switch harness is a small Futaba\* unit. On the original, I used a Hitec Prism 7X TX and Williams Bros.\* smooth contour wheels, but Dave Brown\* Electra Lite wheels are much lighter. Finding a small fuel tank is a challenge: I chose a 1-ounce plastic contact-lens-cleaner bot-

tle. The plumbing is made of K&S\* 1/16-inch-outside-diameter metal tubes and thin silicone fuel line from Sig\* or Du-Bro\*.

I covered the Mini Kaos with MonoKote\*, bonding it completely to the wood. This ensures a tougher model with fewer wrinkles, and it helps the thin tail to resist warping. Wanting to keep things simple, I opted for a fixed nose gear; the huge rudder provides ample control for takeoff



steering and landing control. If you prefer, with little extra effort, you could make the nose gear steerable.

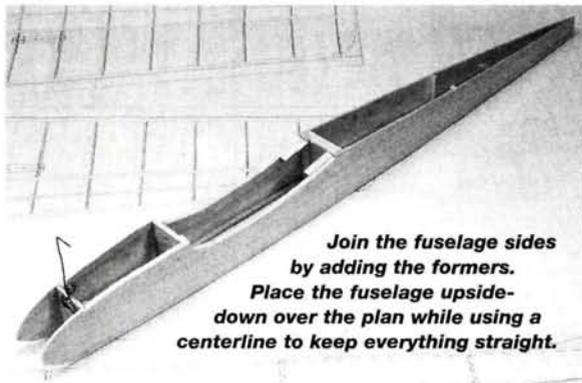
### CONSTRUCTION

Let's assume that you have a few kits under your belt and maybe even a plan-built model or two. I don't want to cop out on this phase but rather to pass on only the information that may be unique to one of my 1/2A designs.

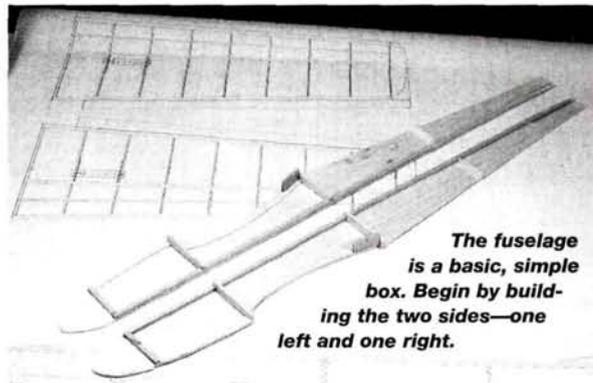
My prototype weighed 14 ounces all up; to achieve this weight, you must choose your materials and RC gear carefully. Make up a shopping list; note that you will need fairly light balsa throughout (except for the wing spars). By that, I mean wood that has a density of 6 to 8 pounds per cubic foot—a sheet of 3/32x3x36 inches weighing no more than 18 grams (3/4 ounce), for example.

You can make it through this project with a single bottle of medium CA; please leave the heavy epoxy on the shelf!

Before you start assembling, make a "kit" of parts to ensure that you have the crucial materials on hand; you'll also be able to check the parts fit before you make things permanent. Make pat-



**Join the fuselage sides by adding the formers. Place the fuselage upside-down over the plan while using a centerline to keep everything straight.**



**The fuselage is a basic, simple box. Begin by building the two sides—one left and one right.**

terns—copies of all the parts that need to be cut out—and use a glue stick to attach them temporarily to the wood (but do peel them off fairly soon after you've cut the parts). This method may also be applied to the wing ribs: use the glue stick to temporarily laminate two pieces of sheet under the pattern, and you'll be able to cut the ribs in half the time.

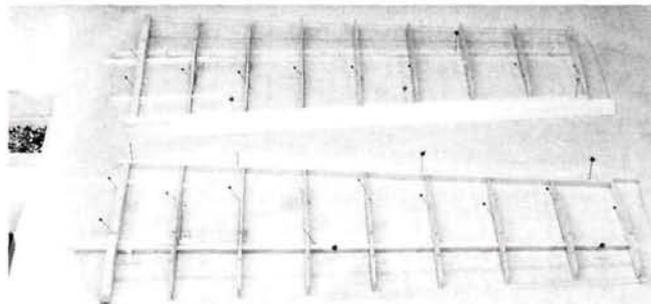
On the tail, just cut the parts out and sand them smooth; see the bevel on the hinge line? This is important to smooth control. Install the elevator joiner, and set

these parts aside.

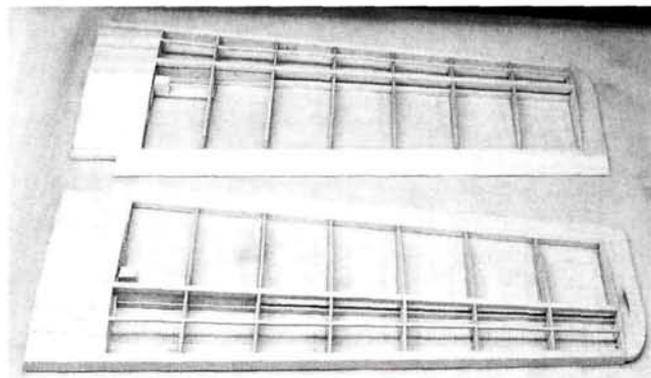
The fuselage is basically two joined side assemblies; refer to the plan to get all the parts in the right places. Work over the top view and install the two center bulkheads and then the firewall (the nose gear should be on the firewall now), and pull the tail panels together. Plank the top and bottom, and you've nearly finished. Finally, take the carving knife and sanding block and trim the corners to a nice rounded shape. The fillets are very much a part of this design, so shame on you if you leave them off!

They not only improve the appearance, but they also enhance flight performance.

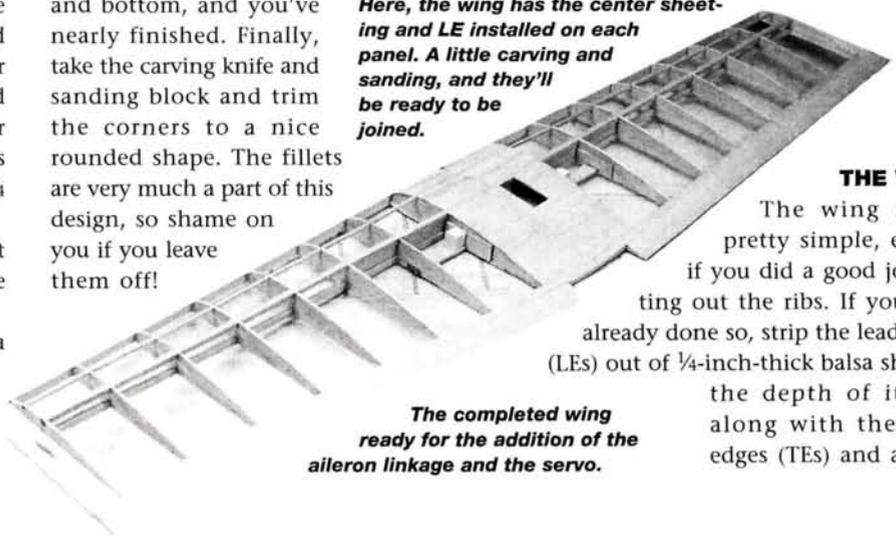
Either hunt down a formed-plastic canopy, or shape a balsa block as I did (yes, I hollowed it out).



**Build the wing panels by first pinning down the TEs and the bottom main spars, and then add the ribs as shown.**



**Here, the wing has the center sheeting and LE installed on each panel. A little carving and sanding, and they'll be ready to be joined.**



**The completed wing ready for the addition of the aileron linkage and the servo.**

### THE WING

The wing really is pretty simple, especially if you did a good job of cutting out the ribs. If you haven't already done so, strip the leading edges (LEs) out of 1/4-inch-thick balsa sheet (note the depth of its taper) along with the trailing edges (TEs) and ailerons. I

# THE MINI KAOS

used little spots of glue to hold the ailerons to the TE strips and then carved and sanded them to shape as a unit. Protect the plan with wax paper while you assemble the wing's halves. I pinned the bottom spar and the TE to the surface, and then I glued in the ribs and the spar webbing. Now glue on the LE and the top spars.

At this point, I lifted my wing panels off the board and added the center sheeting. Take a good look at the wing cross-sections and maybe make templates that will help you carve the LE to the correct taper. Compare the two halves closely to verify that they



**I use a simple, fixed nose-wheel assembly; you can easily add the hardware if you want one that steers.**

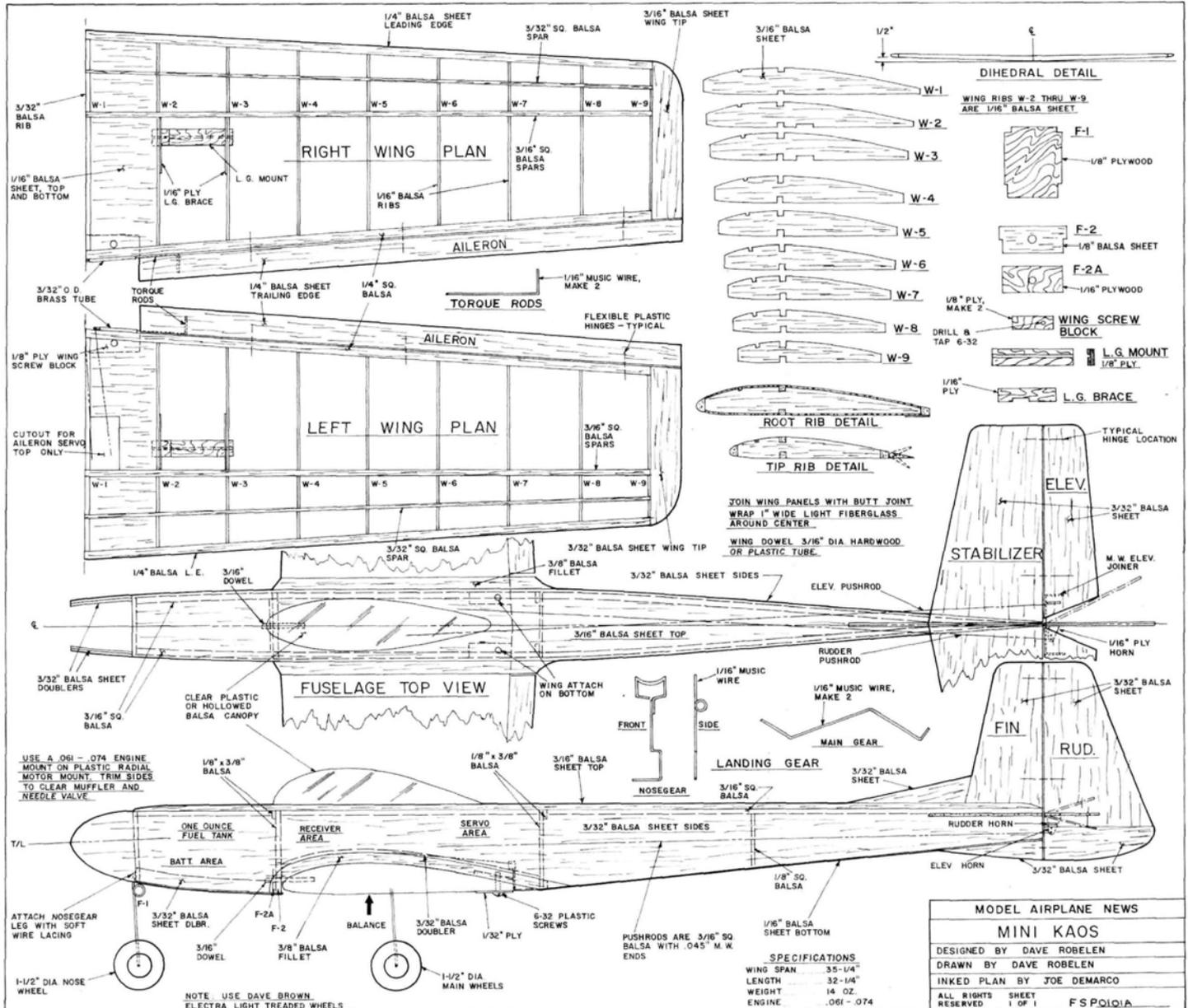
match. Sand a tiny angle into the ends of the wing roots where they join, and make sure they make full contact. Glue the two halves together as a butt joint, adding slight dihedral, and do what's necessary to avoid twisting the wing. Decide whether you want to add the fiberglass band around the center (I left it off), and then make the aileron-servo cutout.

This is the point at which I cut the ailerons free and added the linkage to the TE. Remember to sand the bevel on the aileron hinge line! Fit the wing to the fuselage,

then drill and tap the hold-down blocks for the hold-down screws and install the dowel in the LE. Remember to leave the planking off the nose bottom so that you'll be able to drill through the hole in the former and in the wing to position the hold-down dowel. I keep writing "dowel," but I actually used a length of plastic tubing from one of those telescopic pushrods. Don't glue this in yet. The covering job goes more easily if you cover first and then glue in the tube/dowel afterward.

## FINAL ASSEMBLY

Cover all the parts with the material of your choice. Go ahead and hinge all of the controls except for the rudder. I use Mylar drafting film cut into 1/4-inch-wide strips and fasten it with CA. The torque rods *must* go on the ailerons before they're hinged. The bearings should also be fitted and glued in while you add the hinges.





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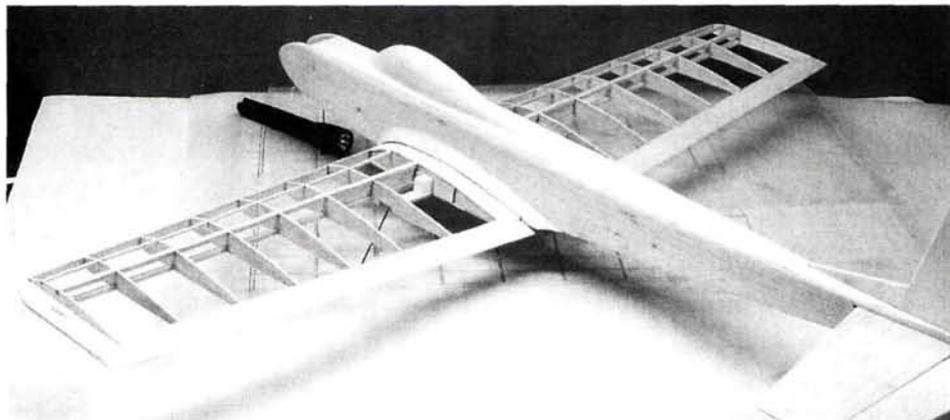
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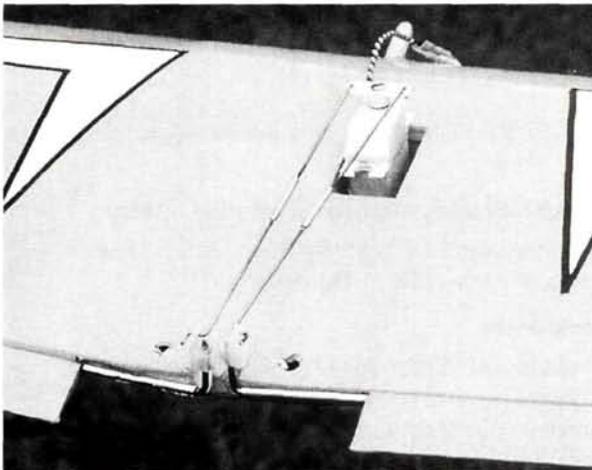
## THE MINI KAOS



The Mini Kaos ready to cover.

Mount the wing on the fuselage, and use the wing as a reference point for aligning the tail. If you misalign them, your Mini Kaos will look silly, fly crooked and bring shame to your entire household! Do what's required to get the tail on straight, and then hinge the rudder.

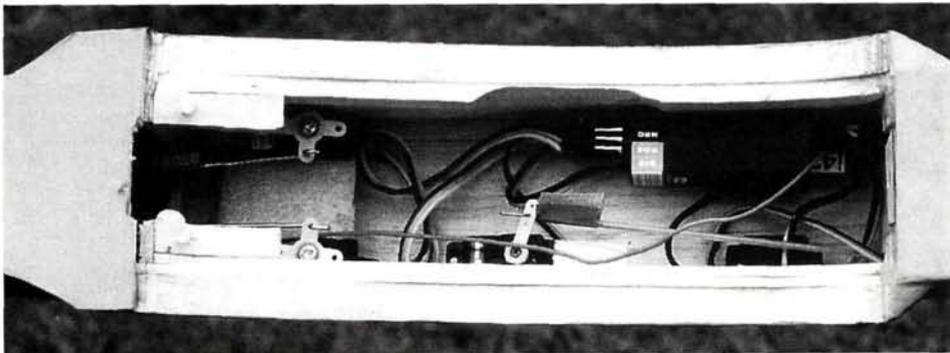
doesn't suit you, cut some brass tubes, flatten their ends for the pushrod holes and solder them into place. The linkage is a couple of pieces of 1/32-inch wire. Install the engine, aligning the thrust line as shown, and make the cutouts required for the parts that stick out.



Here, the aileron servo and linkage have been installed—simple and effective.

Cut a couple of control horns out of thin plywood and attach them to the tail surfaces. I made my strip aileron connectors by chopping them out of plastic bell-cranks and drilling the necessary holes; they are press-fit onto the rods. If that

the pushrods carefully, and you won't have to bend them. The throttle drive in my bird is a length of 0.020-inch wire between the servo and carb. Do what's needed to get your switch harness mounted, and check all of the controls for

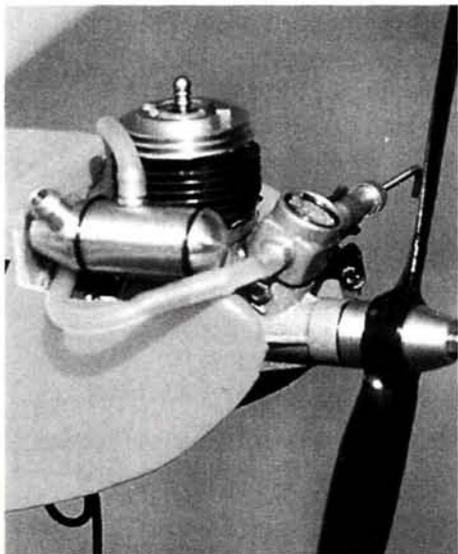


Any of today's mini RC systems will fit the Mini Kaos nicely. The small area trimmed off the fuselage doubler allows the offset wing-mounted aileron servo to fit perfectly.

proper throw and smoothness of movement. Have a buddy drop by and critically admire your latest creation; see whether he notices anything that needs attention.

### FLYING

Break in your new engine on a test stand. Follow its manufacturer's instructions, and forget about flying until it will hold a steady peaked setting on the ground. I use the Norvel BigMig .061 with great results,



I used a Norvel BigMig 1/2A engine for power.

but it does require a proper break-in. (This is especially true of the newer versions that have a ceramic cylinder coating.) It may be the fault of my fuel (K&B\* 500), but I have found that the stock glow plug runs much too cold in all my engines. The idle and transition are messy, and the needle valve becomes fussy. Cox\* glow heads may be threaded directly into the BigMig cylinder; I use the head from a Cox Black Widow, and my engine runs like a charm!

Do all your range checks with and without the engine running. If you can, plan to launch from the ground; otherwise, just take the engine up to top revs and give the Mini Kaos a forward shove. Let it climb and then check the trims and responses; do a slow pass at altitude to get the feel of things, and then enjoy!

Let me know how you make out, and I will be glad to answer any questions.

\*Addresses are listed alphabetically in "Featured Manufacturers" on page 198. ✦

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