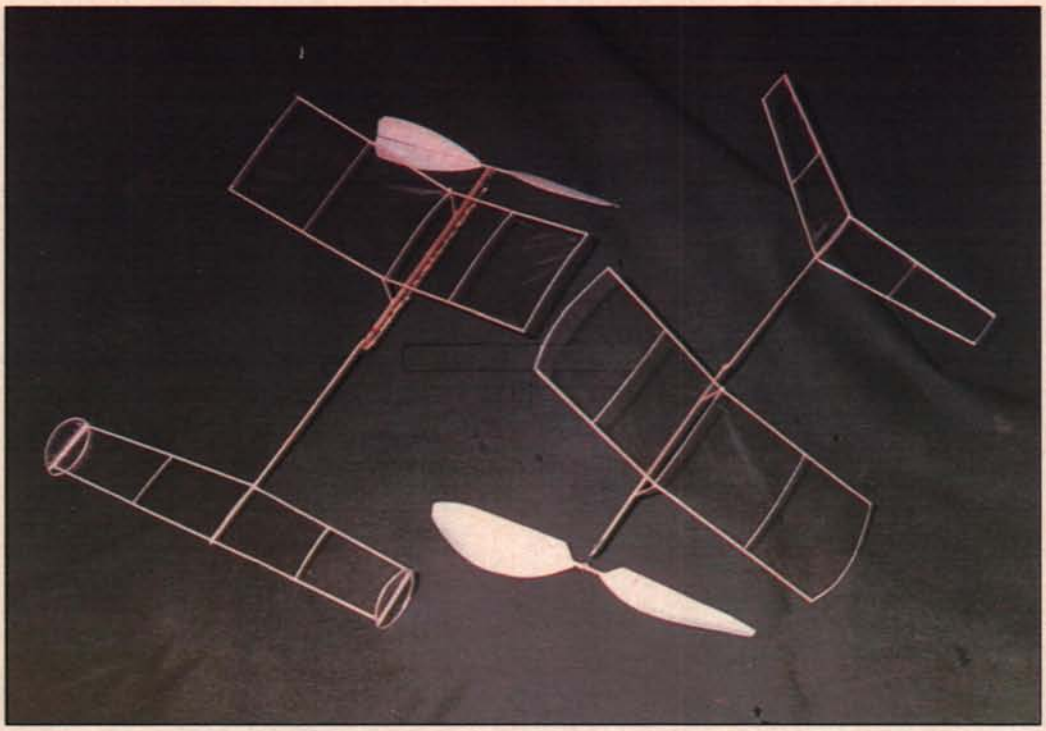
AN INTRO TO 'MINI STICK'

A primer on one of the fastest-growing new indoor events, complete with full-size plans and detailed instructions for building the author's "Tutail Mini Stick."

BY KEN JOHNSON



Ken Johnson's Mini Stick indoor models, showing both the twin-fin and V-tail versions. Both are detailed on the plans.

Every so often an indoor event comes along that catches almost everyone's interest. Some years ago it happened with Easy B. At almost every contest I attended across the country, entries were high in Easy B. Beginners and experts could enjoy these models equally, and beginners became experts in a rather short time.

Again it happened with Peanut Scale. Many old-timers were drawn back into modeling by seeing the Peanuts fly. They remember the dime kits from years past, and are now reliving those times with Peanut Scale.

Now in 1992, a new star is rising in indoor modeling. It's called Mini Stick—a duration event for stick-fuselage models of 7-inch wingspan. This event is the brainchild of Tom Vallee and Pete Stachling, who originated it as a partial solution to the flying site problem. These little planes can be flown seriously in almost any room. Mini Stick is becoming a big hit around the U.S. as well as in Europe and the Far East.

The first contest was held in Tom Vallee's living room. The high time was about three minutes. Tom says that the Parlor Mite models by Bud Tenny and the Matchbox models by Bill Bigge were the inspiration for Mini Stick. They are great for an after-the-business-ends event at club meetings.

Mike Coling, of England, held a postal contest for these tiny models from January 1 to March 31, 1992. There were 117 entries from eleven countries for the one event. This has to be one of the largest and most successful indoor contests ever. The three winning times were: 1st, G. Hunter with 430 seconds; 2nd, Tom Vallee with 390 seconds; and 3rd, J. O'Donnell with 336 seconds.

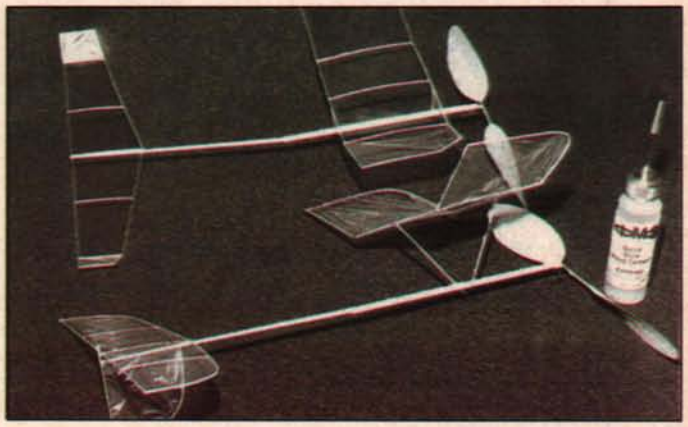
At the USIC indoor meet at Johnson City, Tennessee earlier this year, there were 62 entrants in Mini Stick. First place was won by Joe Krush with a flight of 10:20.

BUILDING THE "TUTAIL MINI STICK"

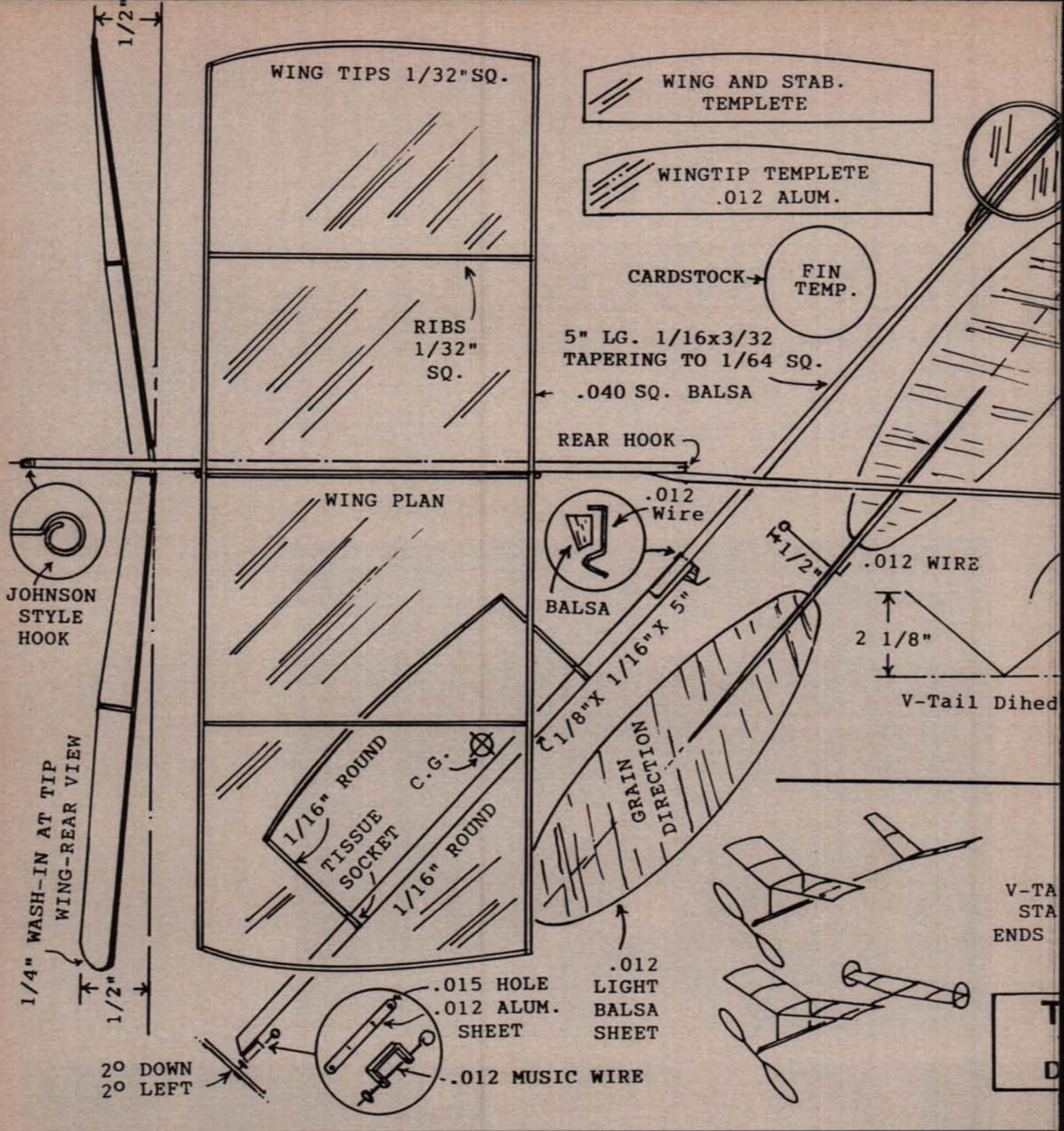
Begin by selecting 4- to 6-pound balsa. Trim the motor







Left: Lifting Mini Sticks from the box can be tedious! Best part is that two complete models can be carried in a small cardboard box, as seen here. Above: The author winding his V-tail Mini Stick at the Burbank Jr. High gym in Burbank, California. Photo by Sweeny Hayashi. Right: Two Mini Sticks built from the Indoor Model Supply kit. This company also sells a complete line of indoor supplies. Photo courtesy Lew Gitlow.

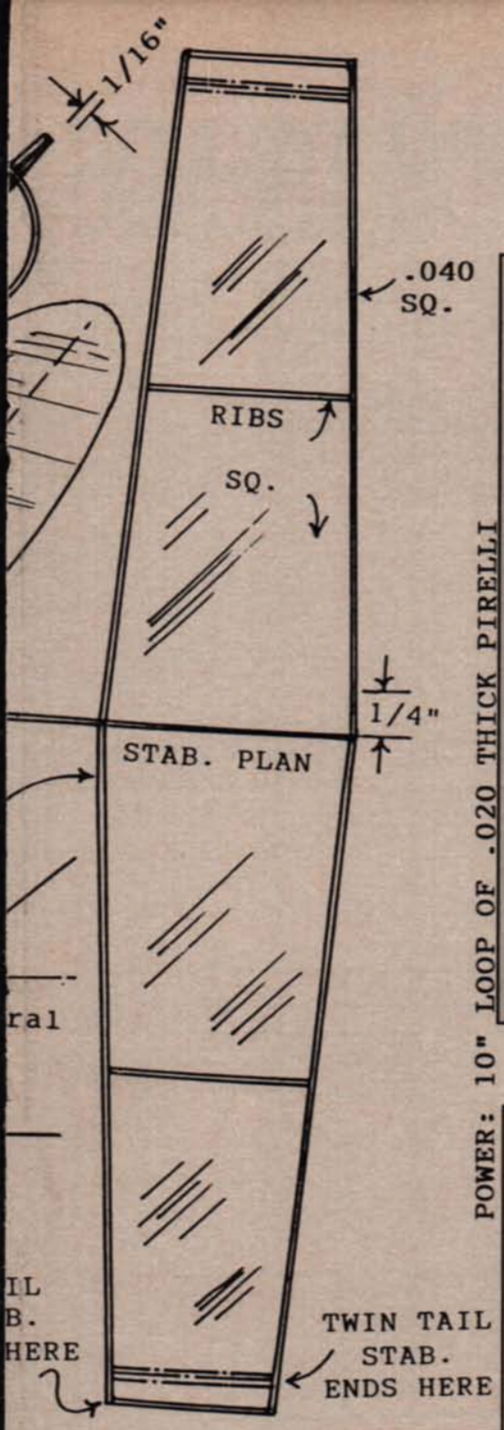


stick and tail boom to the sizes specified. The tail boom is cemented alongside the rear of the motor stick with a 3/8-inch overlap. Elevate the back of the tail boom 1/16-inch and angle it to the left 1/4-inch (looking down from above).

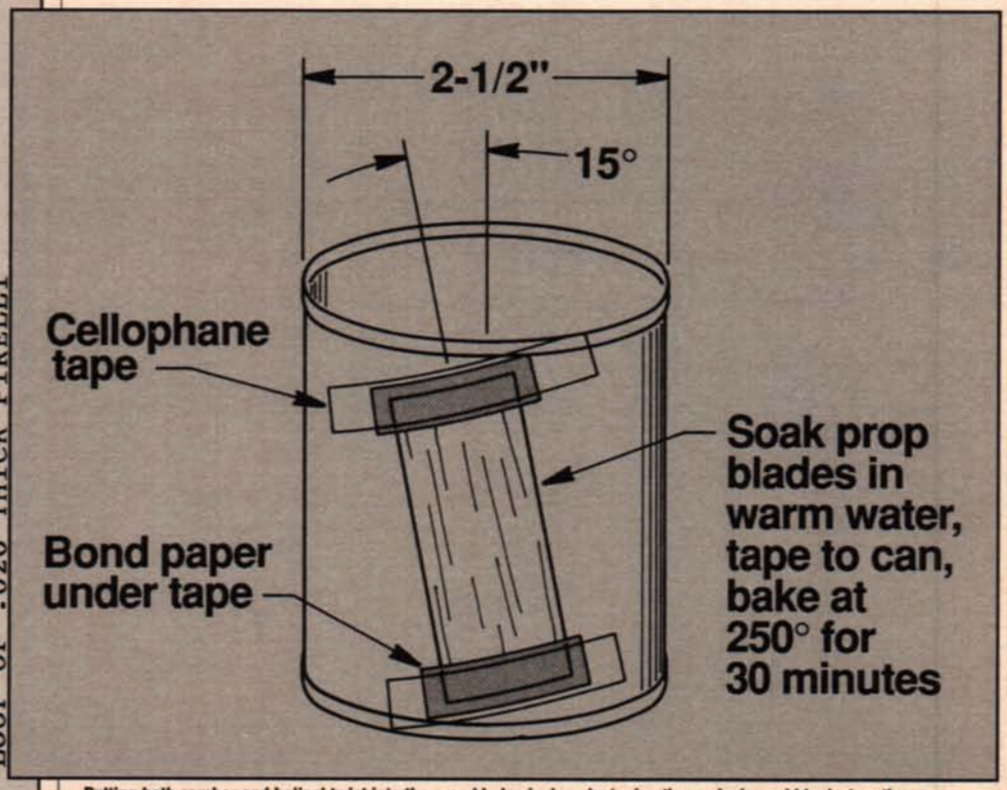
The thrust bearing (which I prefer to call the shaft hanger) is made from .012 aluminum. Cut a strip measuring 3/8x1/16 inch, drill a 1/64-inch or #78 hole 1/32-inch from each end, and bend the hanger as shown. If you choose, a thrust bearing can be obtained from one of the suppliers listed at the end of this article.

The rear rubber hook is fashioned from .010 or .012 music wire. Most indoor builders have their own style of hook; the one pictured on the plan is mine. The hook should actually be cemented in place before the tail boom is attached to the motor stick. When cementing the shaft hanger to the underside of the stick, bind the hanger to the stick with thin monofilament thread. Cement and trim the thread neatly. I suggest building 2° down and left thrust into the shaft hanger.

The flying surfaces are best built with the aid of cardboard templates. The template is pinned down over the plan, then the wood strips are placed alongside and pinned against the template. *Never pin through indoor strip wood!* Place the straight pin alongside the wood or cross pin over the wood.



TUTAIL MINISTICK
7 Inch Duration Model
Designed By Ken Johnson



Putting both camber and helical twist into the prop blades is done by taping the soaked wood blanks to a tin can as shown and baking in an oven for the specified time.

Mini Stick Rules

Model Type	Monoplane.
Maximum Span (projected)	7 inches.
Maximum Wing Chord	2.5 inches.
Maximum Motor Stick Length	5 inches.
Maximum Model Length	10 inches (less the propeller).
Maximum Stab Area	50% of the wing area.
Covering	Plastic/paper. No microfilm.
Propeller	Wood only.
Minimum Weight	.015 oz. or .43 grams.

Flying

Steering	four 10-second steers.
Attempt	15 seconds or more.*

**Special flying rules for very small (living) rooms.*

The wing and stab ribs and wingtips are made from light 1/32-inch quarter-grain balsa. Make templates for these from .012 sheet aluminum. Dress the edges with a fine file so that the knife blade will pass smoothly along it.

The balsa for the ribs should be about 1/4-inch longer than needed. Place the wood and template on a sheet of art illustration board so that the cuts will be cleaner and sharper. With the airfoil template at the top of the balsa sheet, make a cut along the edge, then move the template down the wood 1/32-inch and make another cut. Continue the rib cutting process until you have all you need plus a few extra.

After pinning down the leading and trailing edge spars (along the cardboard template), cement each rib in position. The front of each rib is attached first. When dry, the rear of the rib is trimmed to length and cemented in place. The wingtip shape is made the same as the ribs, but uses a higher arch curve.

There are two different stabilizers shown on the plan. One uses twin rudders, the other is the V-tail type. Pick whichever you like best. The round twin fins on the former are bent around a 1-1/16 inch diameter template and baked (while on the template) in a 250° oven for 20 minutes. The fins are cemented to the stab tips after covering.

Before cutting out the prop blades, the blade blanks must be cambered. Refer to the illustration for details. The blanks are first soaked in warm water for 15 to 20 minutes, then placed between two layers of paper towel to absorb the excess water, then taped to a metal can as shown and baked in an oven for a half-hour or so. Let it cool, then go ahead and cut the blades to shape as shown on the plan.

Make a prop jig from a balsa block and three balsa triangles, as shown in the sketch. The center triangle holds the prop shaft vertical, while the two outer triangles determine the proper blade pitch.

The hub spar of the propeller is made from 1/16-inch square medium-hard balsa. Sand a 3-1/2 inch length to a round cross-section by spinning it back and forth in a folded piece of medium-grit sandpaper. Hold the paper between the thumb and forefinger of one hand while spinning the wood with the other hand. From the center, taper each half smaller toward the outer tip, down to 1/64-inch round at the tip. When both are the same, drill a .015 or #78 hole through the center of the spar. Bend a short length of .010-.015 music wire with a round loop at one end—a 1/16-inch diameter loop is about correct. Then pass the straight end of the wire through the hole in the prop spar.

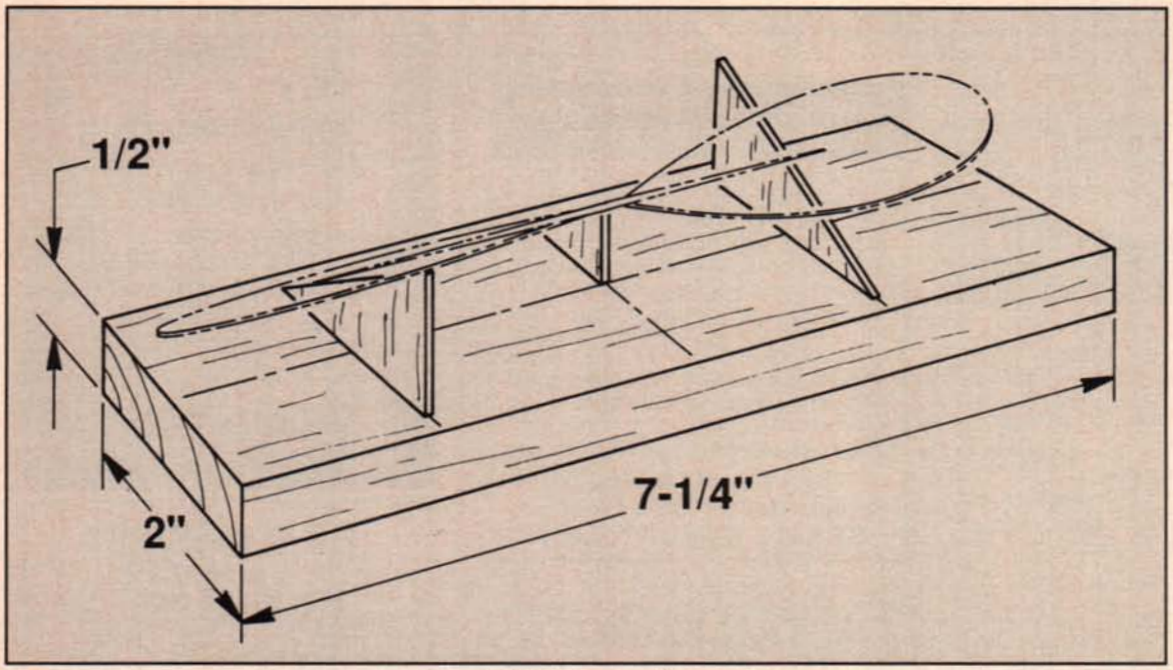
Make a right-angle bend in the shaft wire. Cut off the excess wire, leaving a 3/16-inch piece past the bend. Glue the wire to the prop hub, making sure the shaft is at a 90° angle. Cement the wire shaft to the vertical

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face of the center triangle on the prop jig. Draw a thin centerline lengthwise along the back of each prop blade and cement the prop spar to each blade along this line. The outboard portion of the blade should extend 1-11/16 inches beyond the end of the spar. Make sure each prop blade is resting its leading and trailing edges on the triangle on each side of the fixture. When dry, the prop shaft can be cut away from the center triangle.

The prop is now ready to be joined to the motor stick. Cut the prop shaft loose from the hub. Straighten the wire and thread it back through the hub. Run the shaft through the two holes in the prop hanger. Place a small Teflon washer onto the shaft just ahead of the prop hanger, then slide the shaft back through the hole in the prop spar. Re-bend the shaft and cement it to the hub as before. Finally, check to make sure the prop is balanced and tracking true.



The propeller blades are glued to the prop spar using this simple fixture to keep everything properly aligned.

COVERING THE MODEL

The model is covered with a thin plastic called Ultra Film, available from several indoor specialty sources. Tape a 12x16-inch piece of the film to a sheet of smooth artboard with a small strip of Scotch tape at each corner of the film—not drum tight and not sloppy loose. Paint the topside of the wing framework with Ultra Film cement and allow it to dry.

Place the wing topside down on the film. Using a fine brush dipped in thinner, apply thinner to the coated frame. Hold the frame down with weights or your hand to steady it while applying the thinner. The thinner will soften the cement coating and make it adhere to the film. Run the wetted brush along the ribs on top also.

After the film is completely attached to the wing, trim it away on the outside with a hot wire cutter (micro cautery tool) or a new, sharp blade. The hot wire cutter and disposal scalpels can be ordered from Dr. Vernon Hacker, 25599 Breckenridge Dr., Euclid, OH 44177. Several blades and the hot wire tool will cost you

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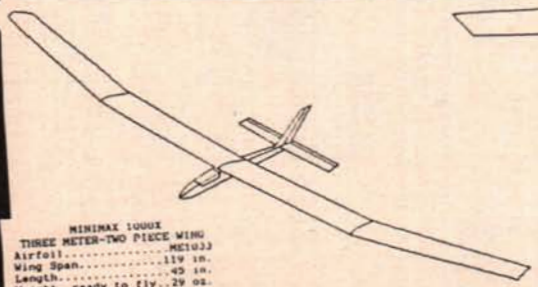
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$10.00. It's well worth the money.

Next, the dihedral must be added. Make a cut halfway through the center of the leading and trailing edges of the wing. Press upward on either side of the cut. Prop up one side of the wing to obtain the one-inch dihedral and cement the joint. The left wing panel should have 1/4-inch of wash-in at the tip—that is, the trailing edge of the wing is 1/4-inch lower than the leading edge at the tip.

Use these same techniques to cover the tail surfaces, and you're ready for final assembly.

(An alternate method of covering is to use the spray cement technique. The topside of the wing and tail framework is *lightly* sprayed from about 20 inches with 3M Super 77 adhesive. The wing frame is then pressed topside down on the covering film. Light pressure along the outline will assure good adhesion. Trim away the excess film with a blade or hot wire.)

Mount the wing on 1/32-inch round or square posts. Glue the tail surfaces to the tail boom. Attach the rubber motor to the front and rear hooks. Holding one finger just under the motor stick, balance the fuselage until it's horizontal. Mark this spot with a pen. Measure 3/8-inch to the rear and mark this spot; this will be the center of gravity. Mount the wing posts so that the center of the wing chord is over this spot. Add approximately 1/16-inch positive incidence to the wing, meaning that the leading edge of the wing is slightly higher than the trailing edge.

FLIGHT TESTING THE MINI STICK

Using a .020x10-inch rubber motor, test the model to see what the flight pattern is like. It should turn to the left in 10-foot circles and should climb gently. The wings should be near horizontal. If the plane spins in to the left, add wash-in to the left wingtip. If it does not turn tight enough, add stab tilt (left side higher than the right). You can do this by gently twisting the tail boom while breathing on it.

Fly your Mini Stick in dead air only—no open doors or windows and no air conditioners running. Good flying!

SOURCES FOR INDOOR SUPPLIES

Indoor Model Supply, Box 5211, Salem, OR 97304; handles a complete array of indoor supplies, including thrust bearings, Teflon washers, rubber and even a Mini Stick kit. An 18-page catalog is $1.00.

Micro-X, Box 1063, Lorain, OH 44055; complete indoor supplies, catalog is $1.50.

Raymond B. Harlan, 15 Happy Hollow Rd., Wayland, MA 01778; various indoor supplies including covering materials, thrust bearings and a really great rubber stripper.

Wayne Trivin, 7408 West Hanna Ave., Tampa, FL 33615; very lightweight indoor covering material. ***MB***

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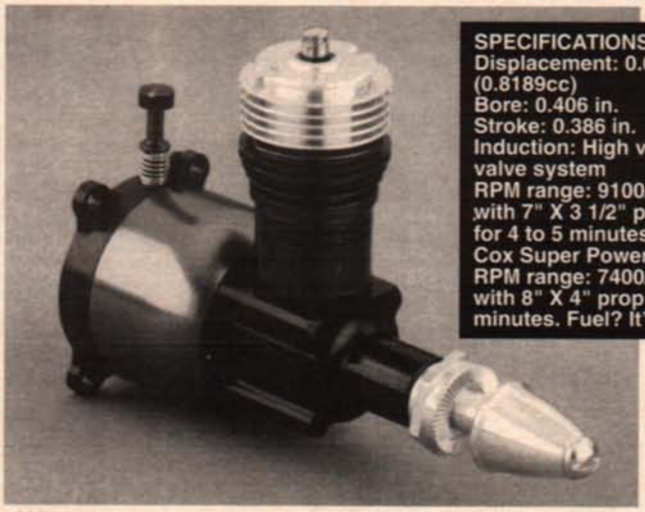


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