

The "OFFSPRING" . . . A/1 NORDIC

By RON ROBERTI . . . Your best chance of winning is with a clean, functional design, such as this one. Even if you don't decide to build it, the wing construction method is worth close study.

● After seeing the results of my Pink Lady A-2 Nordic, I wondered if a smaller version of the same airplane would work as well. So to the drawing board I went and thus was born the "Offspring." An excellent all sheet covered version of my A-2, although heavier than the minimum weight required, its performance is excellent, especially on the towline where many A-1 gliders have most of their trouble. It's a real good contest airplane, easy to build and fly. Try it, you'll like it!

Before you start, read the text carefully. By doing so, you'll save yourself some trouble, as you will see.

Wood selection is most important to keep the weight down as much as possible.

Start the fuselage by cutting the main center piece of 1/4 inch plywood, from the template on the plans. This will be the main strength, timer mount, wing mount, tow hook mount, and mount for the ballast box. Cut out two sides of 3/8 medium hard sheet and glue one on each side of the plywood. Do not cut lower notch on side pieces, as the tow hook will fit in the slot and mount to the plywood center piece. Now cut two sides of 1/4 inch sheet medium hard, eliminating both top and bottom notches. Glue these two pieces, one on each side and let dry. I suggest using Titebond cement for strength. After this is dry, insert the fiberglass fishing rod, making sure that the top is parallel with the center line. Plans show this. This is to make sure that when the stab mounts are put on, you do not build in any incidence setting.

At this time, we can drill the holes for the wing-mount wires. This must be done on a flat surface, using a drill press for accuracy. The main support wire is 1/8 O.D., so you will have to drill a hole to accommodate a piece of 1/8 I.D. brass tubing. The forward wire is 3/32, so you will have to drill a hole

to accommodate a piece of 3/32 I.D. brass tubing. Before drilling, mark the holes by using the wing rib template. Lay it flat on the side of the fuselage and set it so you have 3° of positive incidence in the wing. Locate the center of the rib, and mark where the holes are to be drilled. The side view of the fuselage plans show this. This is a most important step, so please take care in doing it as it will save problems when you insert the wings.

After the holes are drilled, insert the brass tubing, making sure you leave approximately 3/32 of an inch overlap on each side, as this is where you will mount the 1/16 ply butt ribs. As shown on the plans, you should now have a fuselage with a 1/4 inch slot on the bottom for the adjustable tow hook, and a slot at the top for the D.T. timer. The timer and tow hook I used came from F.A.I. Model Supply, in Phoenix, Arizona.

Now make the stab platforms and epoxy in place, making sure they are aligned properly. Drill the holes for the D.T. and auto-rudder lines, as shown. Using a needle file, file to a bevel so that the lines run smoothly through the holes. The auto-rudder adjusting screw mechanism can be made with a strip of .032 sheet aluminum, 1/8 inch wide and bent to a 'U' shape. Drill and tap, using a 00-80 tap. Install 00-80 screws. The tap and screws are model railroad supplies, not hard to get at a good hobby shop. File a small notch in the tail boom and epoxy mechanism in place. See top view of plans for location.

The rudder is made of light 3/32 sheet, sanded to airfoil shape and tissue covered. Hinges are made of 1/16 O.D. aluminum tubing and glued with epoxy or Hot Stuff. After this is completed, insert .032 wire hinge pin. Make sure the hinge holes are clean and rudder swings free. Make the wire spring holders for the auto-rudder and epoxy to rudder

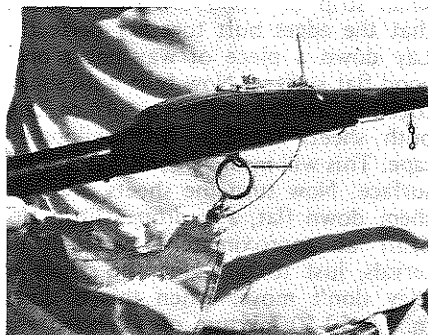
as shown. Paper clips can be used for this. When entire rudder assembly is completed, glue with epoxy to the fuselage, making sure it's straight. The sub-rudder is also 3/32 sheet.

We will now set the fuselage aside to be completed after the wings are made.

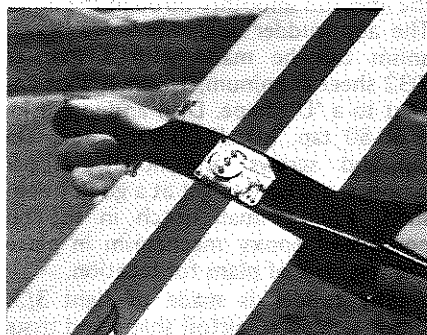
The best way to make the wings and make them right is to build a simple jig which also can be used for other models in the future.

The wing jig is made in four parts . . . the base, ribs, top sheet, and music wire. Cut a piece of 3/4 inch thick plywood as shown on the plans, making sure it is not warped. You can buy this as scrap in any lumber yard. Cut out the rib/formers, using the template shown on the plans, and glue in place 1 inch apart. I used Hot Stuff for speed. When all the ribs are secure, coat the top of each rib with two coats of Weldwood contact cement and let dry. Cut a piece of 1/32 sheet plywood the same length and width as the base, and pencil in rib location lines. Put two coats of Weldwood contact cement along each rib location line and let dry. When dry, install the 1/32 plywood sheet on top of the ribs, making sure ribs and plywood make good contact. A soft sponge is good for working the plywood to the ribs. When this is completed and you have a nice, evenly curved surface, install the .020 music wire in place as shown. This will be a sanding guide for the trailing edge of the lower sheet of the wing. It works very well. Now that the jig is built, the wing is simple.

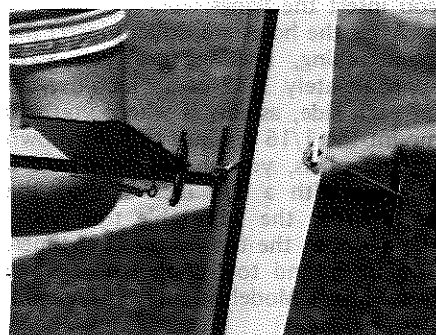
The first step in building the wing is picking the proper sheet stock. The wing sheets should not weigh more than 10 grams each. You need a total of four sheets . . . two for each wing upper and lower surfaces. The sheets must be butt-joined together, using 1/16 by 3 and 1/16 by 2, 4 to 6 pound stock. Good wood with no warps is a must here, so



Wire from tow-line releases DT timer when glider is released. Auto-rudder link at right.



Cigar tube nose holds ballast, 1/4 inch ply core in fuselage carries all loads. 'Glass tail-boom.



Auto-rudder and DT stab rigging. Both are very simple and fool-proof.

pick it carefully. Joining sheets together is no problem, if you take the time to do a few simple steps.

Using a good straight-edge, cut a small strip of wood off each sheet so that the edges butt together perfectly. Lay down a piece of wax paper on a good flat surface. Now butt both sheets together, and on the outer surface, tape both sheets together with cellophane tape. This will insure a good flat bottom surface. Now turn the sheets over, lay them down flat, and drop a little Hot Stuff at approximately two-inch intervals, just to tack-glue the sheets so they don't move. When this is done, mix a 50-50 mixture of Titebond and water. With a small brush, brush the glue into the seam. When the glue is almost dry, repeat this gluing step again. When all four wing panels are complete and dry, they can be cut to the size and shape shown on the plans. Make sure when you cut the sheet for the top surface, that you leave about a 1/4 inch overlap to take up the top curve of the airfoil, as the wood used for the upper surface will be slightly wider than the bottom.

When the sheets are cut to size, lay the sheets on the plans and mark the rib locations with a felt pen. When all rib locations are marked on both top and bottom sheets of one complete wing side, set this aside and cut the ribs.

The rib requirements are as follows: Use quarter-grain, medium-light wood for ribs. Cut 24 ribs 1/8 thick, 2 ribs 3/16 thick, and 8 ribs of 1/16 plywood. Make a template as shown on the plans, using .032 aluminum to insure rib accuracy. Plywood ribs will have to be cut with a jigsaw. When plywood ribs are cut, align them with the wing wire holes on the fuselage, making sure you have at least 3° of positive incidence. Mark and drill the holes in the ribs the same as you did with the fuselage. Double-check the ribs and make sure that they are in perfect alignment with the holes in the fuselage. Once the ribs are glued in place and sheeted, if the tubing does not align, it's too late.

Take the bottom sheet for the wing center panel first and, using masking tape, tape it to the wing jig between the rib location markings, and glue the ribs in place. I use Hot Stuff for speed. Acetate or Titebond will do, but will just take longer. Install the 1/8 x 1/4 spruce spar and cement in place. If the spar interferes with the wing wire tubing, cut some of the spar away to fit. This will not affect the strength of the wing, as the plywood ribs will take most of it under windy towing. Epoxy tubing in place.

With the trailing edge of the bottom sheet butted against the wire guide on the jig, sand the trailing edge to a 1/4 inch bevel as shown on the plans and, while maintaining the shape of the rib, sand the trailing edge bevel to the

thickness of the wire. Sanding down to the wire will make a good straight uniform edge. Now install the top sheet as follows:

Put two coats of Weldwood contact cement on top of each rib and on the trailing edge. Using the rib location lines we drew previously on the top sheet, put two coats of contact cement along the rib lines and trailing edges and let dry. Now remove the masking tape from the jig.

Start at the leading edge and align the top sheet on both ends. Then press the sheet onto the ribs, making sure that there is good contact on all ribs. Use a soft sponge or rag to do this. Work slowly and evenly, and a good straight wing will result. Make doubly sure you are very careful when cementing the trailing edge to insure that it comes straight. Remove the wing from the jig and trim the trailing edge as needed.

Sand the leading edge with a sanding block until it's good and straight, and add 1/4 sq. leading edge. Trim and sand to airfoil shape. Brush on two or three coats of nitrate dope... sand smooth.

The wing outer panels are made on the wing jig the exact same way as the center panels, except cut the ribs to fit the bevel shape shown on the plans and sand to airfoil shape. If this is done carefully, a nice tapered tip will result. *(We'd suggest relocating the trailing edge guide wire to suit the taper. This way, the leading edge remains parallel to the building form, and anti-tip stalling wash-out will be built in. Wire will have to be relocated twice, once for left tip and once for right tip. wcn)* Follow the plan text and use 1/8 x 1/4 balsa spar. When both panels are completed, sand dihedral on both butt ribs so that 4-1/2 inch tip dihedral is obtained, and cement with Titebond. Reinforce dihedral break with silk and tissue cover with your favorite colors. My Baby Doll is covered with pretty pink tissue, just like her mother, and trimmed with white and black. It wasn't necessary to draw both wing panels on the plans, as the wing is built on a jig. Just rotate the rib locations to make the opposite wing. When both wing panels are complete, we can now finish the fuselage.

Cut two rectangles of 1/16 plywood, slightly larger than the wing airfoil. Using the wing itself as the guide, align and drill the holes for the wing-mount wires through the two pieces of plywood, one for each side. Now insert the 1/8 and 3/32 music wire through the fuselage. Install the two plywood rectangles and then the wings. Trace the airfoil shape of the wings onto the plywood, cut with a saw, and glue the two plywood pieces to the fuselage. Now file the tubing flush.

Shape the fuselage as shown on the plans. The nose is made from an alum-

inum cigar wrapping tube. Any tobacco shop has them. Cut the nose to the length shown on the plans. Shape the fuselage to conform to the ballast tube up front. When this is completed, brush on two coats of fiberglass resin and sand smooth between coats.

Install all aluminum tubing for auto-rudder, D.T., and timer on-off release. Install timer before drilling on-off release hole. On-off arm of the timer has to line up with the hole in the fuselage. A little care here will be worth the effort. The timer is released by a small piece of control line cable attached to the tow line. This starts the timer and trips the auto-rudder when the model is released from the towline. Make sure the hole is drilled at the angle shown on the plans to insure a smooth release. When this is complete, paint the fuselage and install the adjustable tow hook. Using 50 lb. test braided nylon line, install all D.T. and auto-rudder lines and hardware.

The stabilizer is built just as the wing, except it does not have a spar, and 1/32 sheet is used. Pick your wood carefully, as the completed stab should weigh about 7 to 10 grams and no more, and that's in the fully completed stage.

Put the model together and add lead to the ballast tube until the C.G. is located at the position shown on the plans. Pennies can be used for fine ballast adjustments. Secure the nose plug with two small wood screws. Double-check all operations of D.T., auto-rudder and timer-release. When all is satisfactory, let's take it out to the field and get to flying this thing!

Test glide the model. If it dives, add shims, 1/32 at a time, to the rear stab mount as needed to obtain a good, flat glide. If the model stalls, add the shims to the forward stab mount until a smooth glide is obtained. Set the auto-rudder straight for towing, and a slight right turn on release. Set the tow-hook about 1/2 inch in front of the C.G. Test flying should be done in a slight breeze. Start with about a 75 ft. towline, and about 10 to 15 seconds timer setting, to see how the model acts under tow. The only adjustment I had to make was in the glide turn setting. The model should tow straight up overhead. If it climbs too steeply, move the tow hook forward just a little and try it again. If the model doesn't seem to climb, move the tow hook aft slightly. My model came out to about 7-1/2 oz., which is heavy compared to the minimum weight rule for A-1, but being the maximum size of 276 sq. in., you'll be more than satisfied with its performance. You'll enjoy building and flying the "Offspring". Good luck in the contest season.

MODEL BUILDER

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