

QUICK TRICK

1/2A pylon racing is an inexpensive, fun to fly event that can be held at virtually any open field. Build this "Quick Trick" including radio for under 100 dollars.

By Bob Wallace

Radio control modelers who favor painted finishes on their aircraft and, consequently, find themselves faced with a drying time void, will occasionally venture forth from their workshops. While on these rare sabbaticals, some modelers will, in order to pass the time, engage in a card game called Bridge. For these modelers the term "Quick Trick" needs no explanation.

However, for those modelers who are devotees of the film cover finishing technique and, thereby, never have reason to emerge from their workshops except for their usual vocations, refreshment, sleep, or to fly their creations, we would explain that in Bridge the term "quick trick" refers to a virtual sure winner. An ace or king/queen combination in any suit.

1/2A pylon racing, experiencing a rapid growth in the New England States, now features a full season of well run sanctioned contests which are centered in the eastern Massachusetts area. The New England area 1/2A pylon racing rules are the AMA provisional rules with one exception; that being the minimum fuselage cross section requirement, which was eliminated. It was the consensus of most flyers that this rule, as worded, was ambiguous.

1/2A pylon racing is an inexpensive, fun to fly event that can be held at virtually any open field. Since hand launching is used, the field doesn't even have to be closely mowed.

A highly competitive 1/2A racing aircraft, including radio system and engine, can be built for under 100 dollars! 1/2A pylon racing is without any doubt the least expensive form of racing within the world of R/C.

The "Quick Trick" is designed for use with the Cox/Sanwa #8020 two channel radio system, although any other system with relatively small servos may be used. The Cox/Sanwa #8020 system was our choice because it is one of the least

expensive two channel digital proportional radio system available. The servos are very compact, although the receiver is somewhat large for a two channel system. We substituted an Ace 100 mah ni-cd battery pack for the standard Cox/Sanwa airborne dry battery pack. Don't let the low price of this radio system fool you. It is a remarkably fine performing system: surprisingly so when one considers its low purchase price.

If you presently own an older radio system with larger servos and battery pack, the purchase of two of the smaller servos that are now offered by many manufacturers (in either kit or assembled form) and a smaller ni-cd battery pack (100 or 225 mah) would be well worth your consideration, since the use of the larger components would necessitate increasing the depth and width of the fuselage. We have not had any problems in flying 5 heats using a 100 mah battery pack, without recharging. Tests with a Flite Life indicate that approximately 1/2 of the battery pack's capacity is used in flying 5 heats, providing that the airborne system is turned off promptly after each heat.

If you are an R/C'er with an interest in racing, but have in the past shied away from it due to the high cost, then 1/2A racing is made to order!

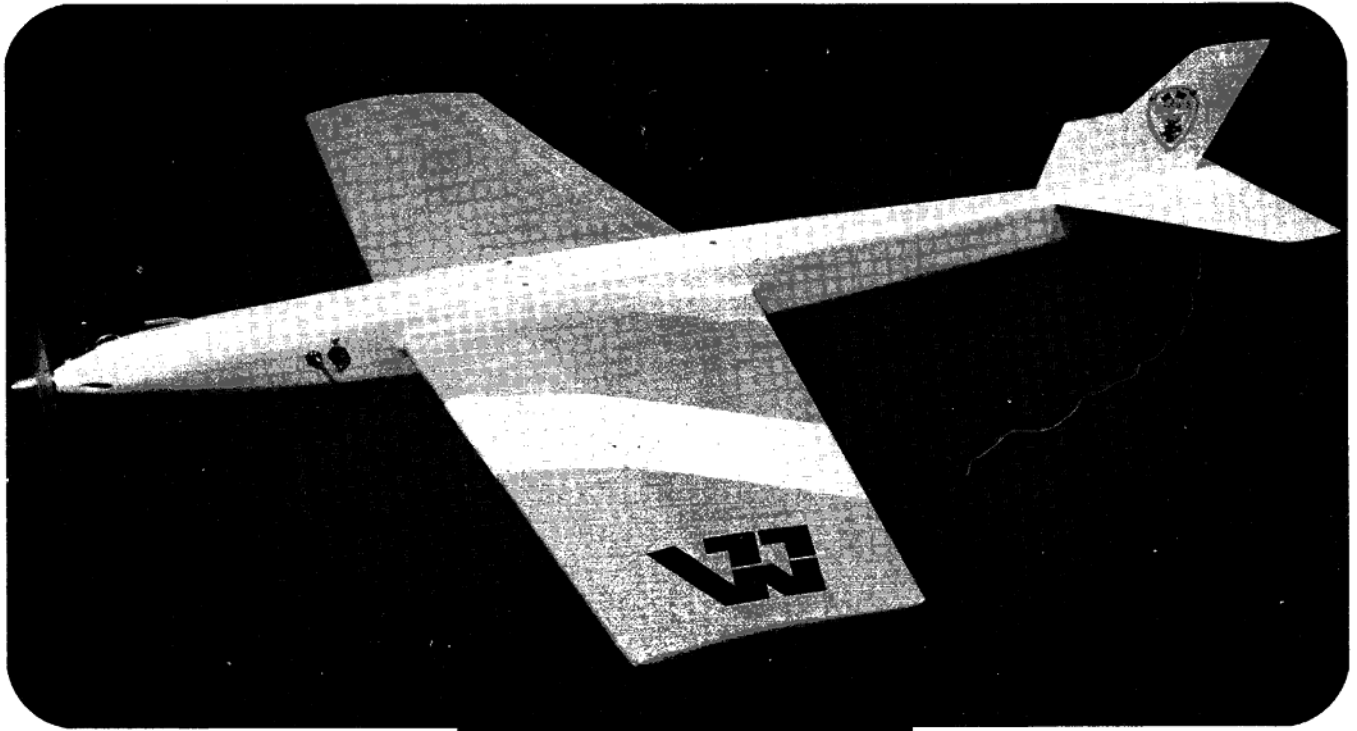
The "Quick Trick" is a very clean aircraft that is designed strictly for racing. It flies extremely steady and groovy and it is fast. There are no "squirrely" tendencies. The second "Quick Trick" that was built, and the subject of this article, utilized two EMS Bantam Midget servos.

CONSTRUCTION

Wing:

The wing is constructed by the use of alignment "tabs" or "legs" which are attached to each wing rib. Start by cutting out the twelve wing ribs from 1/16" sheet balsa and the notched 1/8" sheet wing spar. Position the wing ribs onto the spar and pin in place over the wing plan on a flat building





board. The top surface of the wing should be perfectly flat with the bottom tapered according to the descending width of each wing rib. Pin the 1/8" x 3/16" strips to the butt ends of the wing ribs. After checking for proper alignment of this assembly, glue it together using a cyanoacrylate adhesive. (We used Custom Model Products "Fast Bond" glue for all construction except for the firewall installation, which was done with epoxy. Aliphatic resin glue may be used in lieu of cyanoacrylate, however, the use of epoxy for construction phases other than the firewall installation, is not recommended due to the resultant weight build-up.)

Using a long sanding block, lightly sand the top of the wing structure to the proper contour at the front and trailing edge. Pin and glue the top 1/16" sheeting pieces and 1/16" x 3/16" capstrips in place. Remove the wing from the building board and trim the alignment "legs" off of the wing ribs and, after sanding the bottom to the proper contour, pin and glue the bottom sheeting and capstrips in place. The aileron and trailing edge (of the left wing) are made from 1/16" sheet. Pin and glue the 1/8" x 3/16" strip in place and, using a long sanding block, bevel the strip and trailing edge of the bottom 1/16" sheeting to accept the top 1/16" sheeting. Pin and glue the 1/16" top sheet in place. The left wing trailing edge assembly is glued permanently in place. The right wing portion is tack glued in place temporarily, sanded to the proper contour, and then removed. The aileron is cut out and the center section segment is grooved to accept the aileron torque rod assembly. A filler block is inserted into the aileron core where the torque rod end enters the aileron. The other end of the aileron and the fixed portions of the right wing trailing edge are capped with 1/16" sheet. Install the torque rod assembly

QUICK TRICK
Designed By: Bob Wallace
TYPE AIRCRAFT
 1/2A Pylon Racer
WINGSPAN
 31 1/4 Inches
WING CHORD
 6 1/2" (Avg.)
TOTAL WING AREA
 203 Sq. In.
WING LOCATION
 Mid-Wing
AIRFOIL
 Symmetrical
WING PLANFORM
 Double Taper
DIHEDRAL EACH TIP
 5/16 Inch
O.A. FUSELAGE LENGTH
 26 5/8 Inches
RADIO COMPARTMENT AREA
 (L) 6" x (W) 2" x (H) 1-7/16"
 * Vary to accommodate servos used
STABILIZER SPAN
 10 Inches
STABILIZER CHORD (incl. Elev.)
 3 1/2" (Avg.)
STABILIZER AREA
 35 Sq. In.
STAB. AIRFOIL SECTION
 Flat
STABILIZER LOCATION
 Top of Fuselage
VERTICAL FIN HEIGHT
 3-1/16 Inches
VERTICAL FIN WIDTH (incl. rudder)
 3 1/8" (Avg.)
REC. ENGINE SIZE
 .049-.051 Cu. In.
FUEL TANK SIZE
 1.3 Oz.
LANDING GEAR
 None
REC. NO. OF CHANNELS
 2
CONTROL FUNCTIONS
 Elevator and Aileron

BASIC MATERIALS USED IN CONSTRUCTION
 Fuselage Balsa & Ply
 Wing Balsa
 Empennage Balsa & Ply
 Wt. Ready To Fly 20 Oz.
 Wing Loading 14.2 Oz./Sq. Ft.

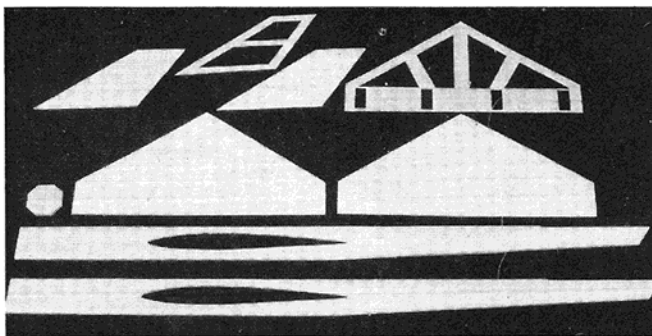
and glue it and the fixed center section (right wing portion) in place. Glue the 1/8" sheet wing tip caps in place. Cut the aileron hinge slots and fit the aileron in place, but do not glue it in place at this time. Glue the 3/16" x 1/4" leading edge in place and sand the wing assembly to its indicated contour.

Tail Surfaces:

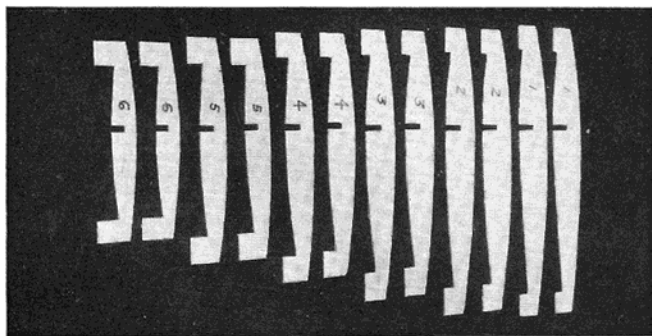
The tail surfaces are constructed from 1/64" plywood and 1/16" sheet. The use of 1/64" plywood as a center core is a little extra work but results in stronger more streamlined surfaces. Start by cutting out the 1/64" plywood center pieces. They should be cored as shown on the plan. Cut the 1/16" sheet pieces out. It is easier to laminate the elevator/stabilizer in one piece and, after sanding it to the indicated contour, cut the elevator portion off. The cored center section now has the hinge slots in place. Install the hinges, and glue in place. The use of solid polypropylene hinges is recommended since a much tighter hinge gap line can be easily obtained. Cut a recess for the elevator control horn base into the bottom of the elevator, and glue the horn in place. Be sure to "rough up" the control horn base with sandpaper before gluing it securely in place. Fine sand the tail surfaces and set aside for now.

Fuselage:

The fuselage is built around the assembled wing. Start by cutting out the two 1/8" fuselage sides and the 1/8" plywood firewall. Slide the fuselage sides into place over the wing, using the fuselage top view on the plan sheet, as a guide. Glue the sides in place. The firewall is now glued in place after making sure that it is properly aligned and square to the 0°-0° thrust line. Install the 3/8" triangle stock inside the fuselage except for one piece (this will be added after the fuel tank is installed). Mount the Fourmost engine mount to the firewall with



Complete fuselage and tail group parts kit cut before starting assembly.



Wing ribs cut with tabs to insure a perfect aligned wing. Can be built flat on plans.

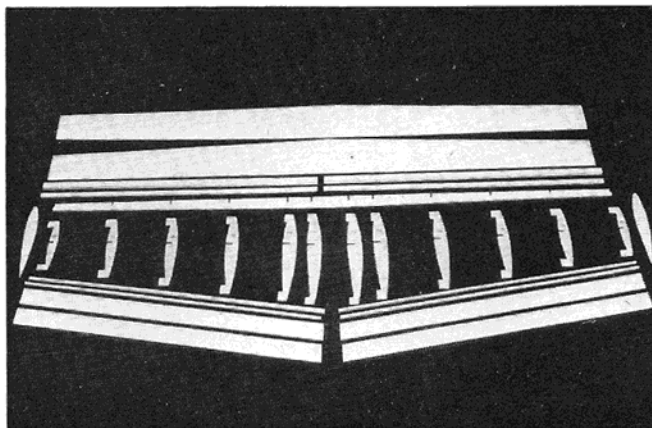
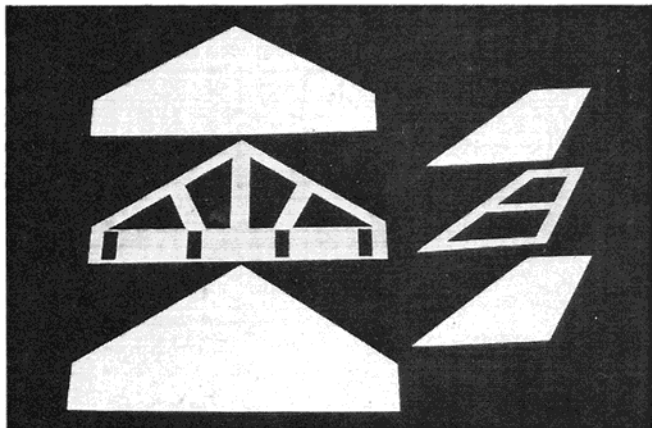
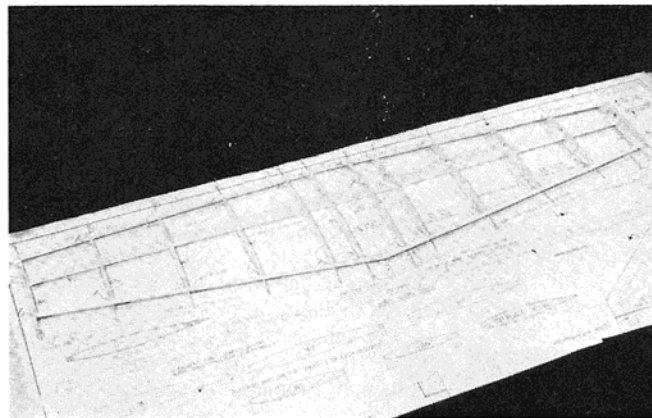


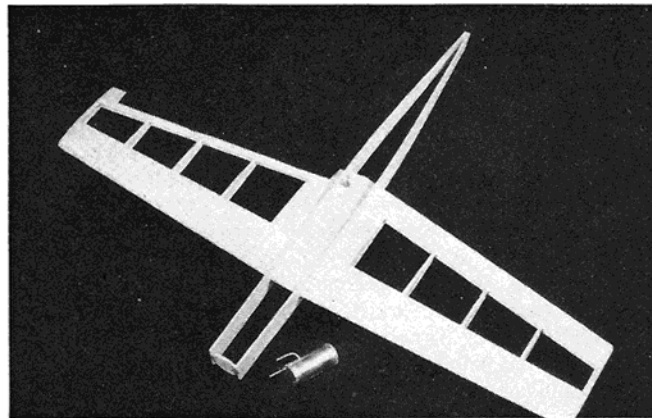
Photo shows complete wing kit cut before assembly starts.



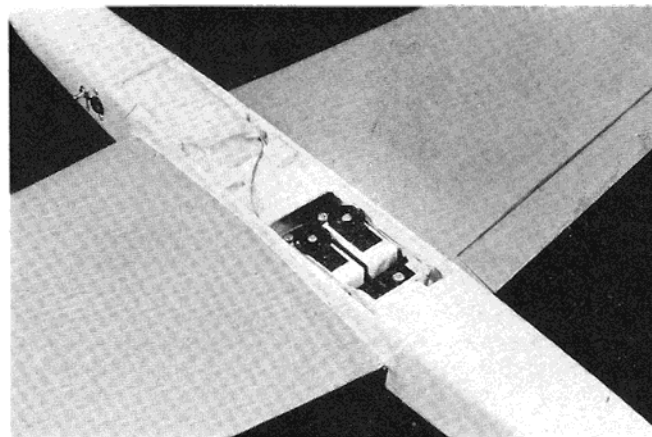
Perfect warp-free tail assembly can be built using this sandwich method. 1/64" ply center with 1/16" sheet balsa top and bottom.



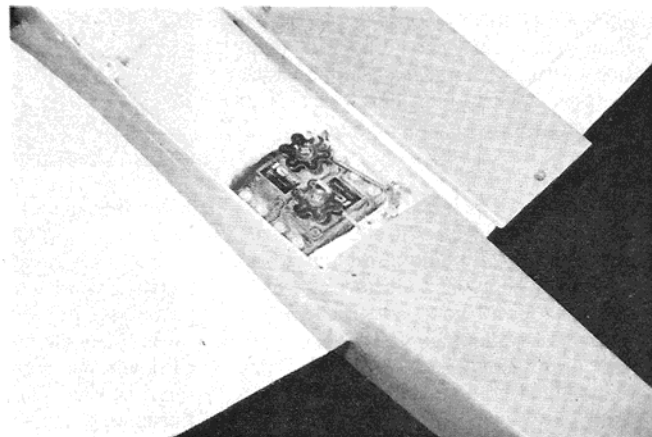
Using a pre-cut notched spar, wing builds very fast.



After wing is complete, the rest builds around the wing. Very sturdy little racer.



Good access to complete airborne package when hatch is removed.



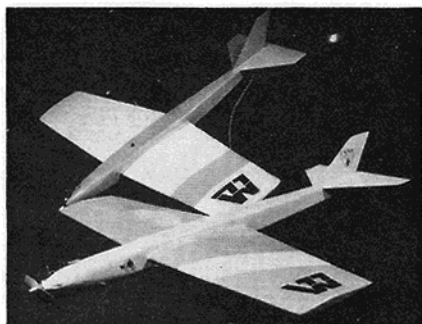
Small Cox/Sanwa micro servos mounted cross-wise and in tandem.

4-40 machine screws and locknuts. Fit the beveled spacer piece in place at the tail end of the fuselage and draw the fuselage sides together and glue (using the plan sheet top view as a guide) to obtain the proper fuselage curvatures. Glue the 3/32" and 1/8" bottom sheeting in place, cross grained.

The fuel tank, which is constructed from "tin can" stock (or sheet brass), and 3/32" brass tubing is now installed. A commercially available one ounce tank such as the Sullivan round type may be used instead of the tank shown on the plans. The 1/2A racing rules call for a 90 second starting time. When using a one ounce tank, the chances of completing 10 laps after running for 60 to 90 seconds on the ground becomes rather risky. The extra 3/10 of an ounce of fuel that the scratch-built tank contains is a good insurance factor that is, in my opinion, well worth the extra work. A fixed pick-up or fuel line pinch-off is required. The tank shown on the plans utilizes a fixed pick-up which requires rolling the plane inverted to shut the engine down. A pinch-off could also be used and activated by applying full down elevator. Either method will work well. The fuel tank should be installed with a layer of thin foam wrapped around it, to minimize vibration induced foaming within the tank.

Add the final piece of 3/8" triangular stock to the fuselage. Glue the tail surfaces in place after making sure that they are properly aligned. Cut the elevator pushrod exit hole in the rear of the fuselage and install the pushrod.

The radio antenna may be routed through the fuselage. I used plastic drinking straws for this purpose. They weigh very little and provide an easy means of routing the antenna out of the aircraft. Glue the fuselage top sheeting in place and cut the radio access hatch to size. Install the radio system components and carefully check that the



servo linkages and arms have sufficient clearance with the hatch in place.

Remove the radio system components and then carve and sand the fuselage to the proper shape. Fillet the wing and tail surfaces into the fuselage using either epoxy and micro-balloons or Sig Epoxolite. Fine sand the entire aircraft in preparation for finishing.

Finishing:

I used Solarfilm on the wing and K & B Superpoxy primer and enamel on the fuselage and tail surfaces. It is easier to cover the aileron and the aileron recess surface separately and then install the aileron. The remainder of the wing can then be covered. Film type covering can be used on the fuselage and tail surfaces, if desired. I simply prefer an epoxy type painted finish on the fuselage and tail as it seals better against fuel and oil seepage and is, I believe, better looking and more durable.

The completed aircraft less fuel, weighed in at 16 ounces (4 ounces under the legal minimum 20 ounce limit). The advantage of building a racing aircraft and having it come out under weight is that you can add then necessary weight "where you want it" and still have the aircraft at just the minimum legal limit. All other things being equal, the lighter aircraft will fly better and faster than the heavier one every time!

Up to this point the engine choice has not been mentioned. The rules specify any stock engine up to .051 cubic inches of displacement. While there are several satisfactory engines to select from, the Cox T.D. .051 or .049 is by far the best choice. In my opinion it is the only choice if you expect to be competitive in 1/2A racing. The best prop, which also must be stock, seems to be the Cox 5" diameter — 3" pitch, black or grey. While the standard Cox needle valve assembly performs satisfactorily, the Kustom Kraftsmanship needle valve assembly is an accessory to be considered as it allows a much finer fuel/air mixture to be obtained. It won't make you go any faster but it will add a measure of consistency which, as any veteran racer will tell you, is a must for success in pylon racing of any type.

How to go faster is a subject in itself and also one on which even the experts (which I am not) often disagree. My suggestion would be to experiment with the different glow heads that are available, the number of head shims, different props, etc.

Finding the combination that produces "just that little bit of extra speed" is one of the most rewarding aspects of racing.

Flying:

The "Quick Trick" is a delight to fly as it will go exactly where it is pointed. The recommended control surface travel limits are as follows: Aileron 3/16" up and down; Elevator 1/8" up and down. Be sure the C.G. is as shown on the plans. Our first prototype "Quick Trick" was tail heavy when first flown, and a tail heavy aircraft that flies fast is guaranteed to "hold your attention in a wide eyed way"! We added weight to the nose, reduced the elevator travel a bit, and the second flight was an absolute joy — a completely different aircraft. Smooth and stable, yet responsive without being jumpy. With the engine shut down the "Quick Trick" is stable and easy

to land.

Why not give pylon racing a try? As mentioned, it is inexpensive, relatively easy, and exciting. More important — it is just plain fun! □

**Editing By Hlsat.
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