

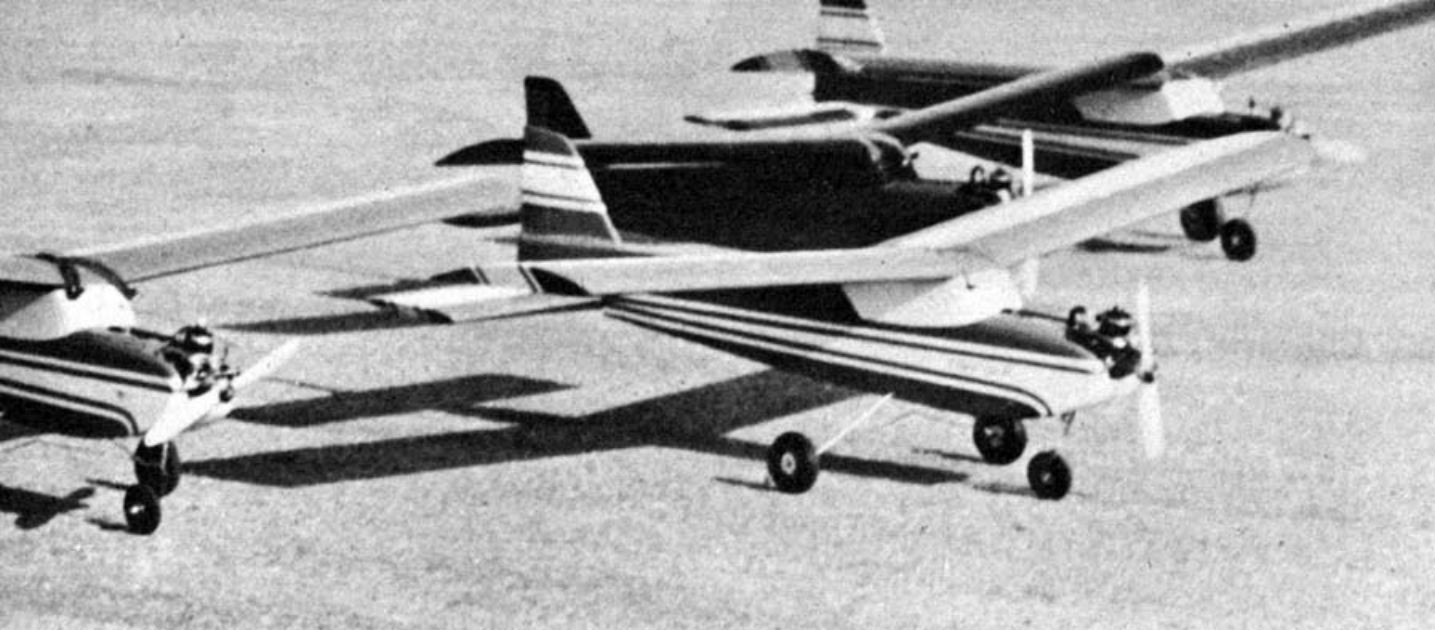
AMERICA'S TOP RADIO CONTROLLED PLANE



Milt Boone's
CHARGER
Flown by BARKS
Dominates
"Rudder-Only"
R/C Championships



Designer Milt Boone (above) holds Charles Hayes' winning "rudder-only" entry at 1959 National Competition. Shown here are 5 Chargers flown by Bakersfield Radio Kontrol Society members. Full size drawings appear on Hobby Helpers Group Plan #160.



■ A radio controlled, rudder-only airplane developed for sport or competition flying, the Charger is the end result of many months of building and flying R/C rudder craft. I feel that in the hands of the average flyer, it is capable of performing all the maneuvers required of "rudder only" types. It will loop, roll, Cuban eight, do simplified proto take offs, touch and go.

The best part about the design is you don't have to be an expert to put this little craft through its paces. The Charger is a rugged plane that can take a spin-in without exploding. Its contest abilities are well proven—so build and trim it as the plans show and you are in for many hours of fun. I like to build the surfaces first so let's get started.

Pick your wood carefully with an eye to weight. Keep it light.

Horizontal Stabilizer: Make two rib templates of aluminum. Stack fourteen pieces of medium balsa between templates then carve and sand to shape. Notch $\frac{1}{4}$ " leading edge $\frac{1}{16}$ " deep for each rib. Pin leading edge down on a flat surface with notches up and glue

ribs in place, sighting down trailing edges to make sure they are in line. Next take two pieces of $\frac{1}{16}$ " x $1\frac{1}{4}$ " taper, sand one edge of each and glue together to make trailing edge. After this dries, glue to ribs. Remove pins from leading edge and pin stabilizer down flat on trailing edge. Glue vertical grain webbing between each rib as shown. Next sheet and web leading edge, making sure stabilizer is flat and true. With razor blade, cut three center ribs down $\frac{1}{16}$ " top and bottom, and sheet center section. Glue tip blocks on and shape. After sanding, stabilizer is ready for silk covering.

Vertical Stabilizer and Rudder: Make from $\frac{3}{16}$ " medium quarter grain sheet as shown. Be sure tube hinges are straight and free. Cover and silk.

Wing: Make in two halves. One right and one left panel. Make templates as per horizontal stabilizer. Carve and sand wing ribs. Twenty-six $\frac{1}{16}$ " and two $\frac{3}{16}$ " ribs are needed. Notch leading and trailing edges as shown. Pin down trailing edges and glue in ribs. The two $\frac{3}{16}$ " ribs go at the center section of each panel. Next glue to front of ribs the notched top leading edge. After this dries, pick up wing panels and glue in bottom spars. Pin panels back down as soon as possible.

Cut and glue in webbing with grain running vertical. Glue in top spars. The

webbing is very important to the strength of the wing. After the wing panels are thoroughly dry, remove from building board and glue bottom leading edge on. Cut down two center ribs on each panel $\frac{1}{16}$ " to receive center sheeting and sheet bottom of each wing panel between spars. Tip blocks may now be glued on, carved, and sanded to shape. Shape leading edge as shown.

The two panels are now ready to be joined. Set up a table saw for a 5 degree angle to cut the dihedral angle off the two $\frac{3}{16}$ " center ribs. Then glue the two wing halves together with white glue. Use clothespins for clamps. This works and the wing will be stronger at this joint than at any other place. If no saw is available, the angle may be sanded into the two center ribs. After the wing panels are joined the top center section should be sheeted. The wing is now ready for finish sanding and covering.

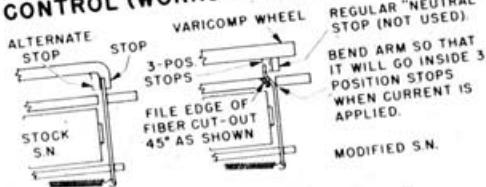
Fuselage: The fuselage is made in two halves, right and left. Glue three pieces of $\frac{1}{16}$ " x 3" x 36" together to make one sheet nine inches wide. The fuselage sides may be cut from these. Laminate the nose section ahead of bulkhead #1 with $\frac{1}{32}$ " plywood. Use white glue.

Next laminate the cabin area between bulkheads #1 and #2 with $\frac{1}{32}$ " sheet balsa, cross grained. Glue $\frac{1}{32}$ " plywood stabilizer, and wing dowel reinforcements to fuselage sides. Truss the fuselage sides from the rear of bulkhead #2 to the stabilizer with $\frac{1}{16}$ " x $\frac{1}{4}$ " firm balsa.

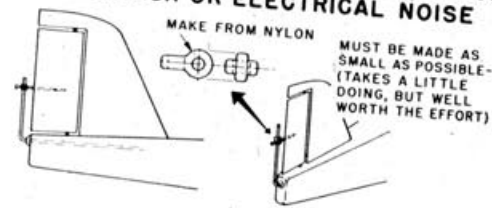
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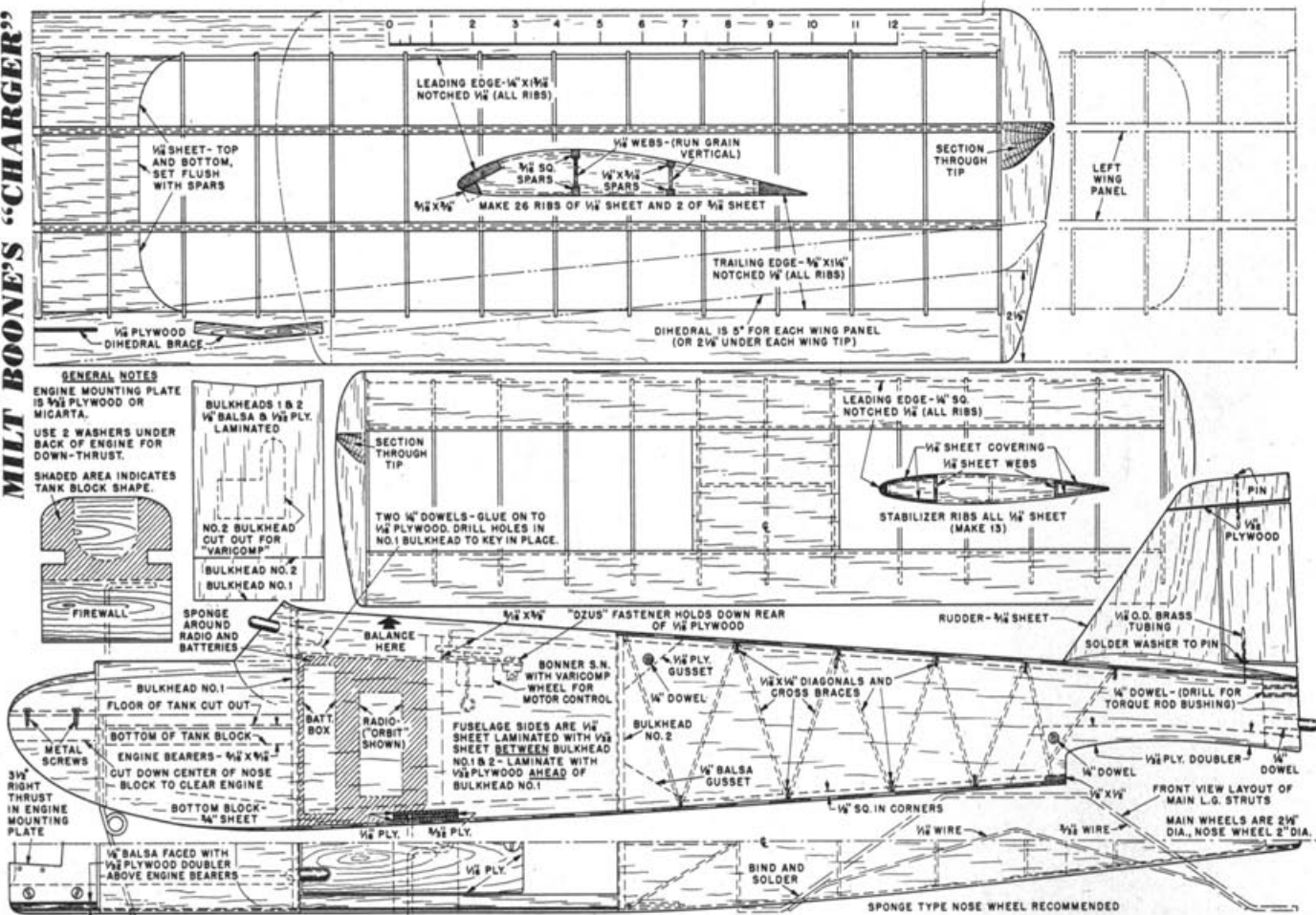
METHOD OF ADAPTING STANDARD BONNER S.N. FOR 3-POSITION MOTOR CONTROL (WORKS ONLY ON QUICK BLIP)



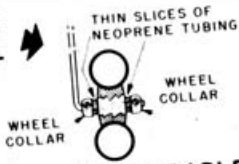
TORQUE ROD-TO-RUDDER CONNECTOR- NO BACKLASH OR ELECTRICAL NOISE



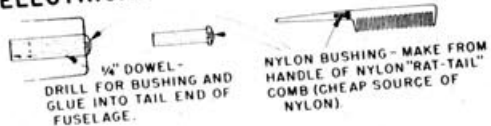
MILT BOONE'S "CHARGER"



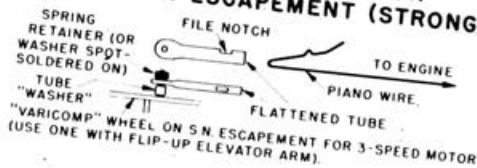
FRICION DEVICE FOR NOSE WHEEL



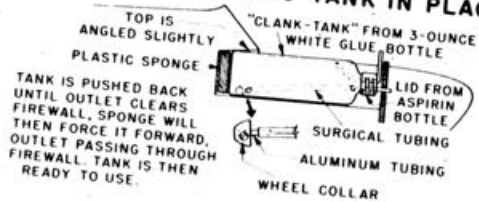
NYLON REAR TORQUE ROD BUSHING- NO ELECTRICAL NOISE- VERY DURABLE



QUICK CONNECTOR FOR MOTOR CONTROL AT ESCAPEMENT (STRONG!)



METHOD OF HOLDING TANK IN PLACE



"DZUS" HOLD-DOWN FOR RADIO AND BATTERY COVER BOARD



Charger

(Continued from page 15)

Cut out bracing to receive $\frac{1}{8}$ " square corners, top and bottom and glue corners in. Glue motor mounts to fuselage sides. Pin one fuselage side flat to building board. Make bulkheads #1 and #2 as shown. Cut out bulkhead #2 for actuator. Glue bulkheads #1 and #2 to fuselage sides, making sure they are at right angles.

Now glue the other fuselage side to the bulkheads. Make gas tank block and glue to fuselage sides and bulkhead #1. After this is thoroughly dry, remove partially completed fuselage from building board. Bend the main landing gear and nose gear and laminate between plywood. Glue nose gear and main gear in place. Glue in nose block and bottom block. Next glue the two fuselage sides together at the rear. Glue $\frac{1}{16}$ " x $\frac{1}{4}$ " cross braces both top and bottom. Glue cabin reinforcements, top and bottom of fuselage with $\frac{1}{16}$ " balsa with grain running lengthwise. Cut gas tank block down in front of bulkhead #1 and glue in windshield block. Shape windshield and gas tank block and finish sanding entire fuselage. It is strongly recommended the fuselage be covered with either silk or nylon to gain strength.

After painting the airplane to suit your taste, the radio, torque rod, and batteries are installed. There are many fine engines, but a three speed throttle control is essential to fly this airplane. Since the OS Max 15 was the only 15 cubic inch engine available with a combination throttle arrangement, it is the engine I use. The balance of the equipment can be of the builders' own choice.

After the equipment is installed and tested the plane is ready for flight. Check this list first. (1) Is receiver tuned properly and range checked? (2) Are batteries up? (3) Make sure torque rod is not binding and rudder is free to move easily. (4) Does plane balance at point shown on plan? Don't be afraid to add weight to nose if necessary to balance as shown. (5) Are down thrust washers installed as shown? (6) Are wing and stabilizer warp free and flat?

If the above check okay then it is ready to fly. If at all possible, choose a place to R.O.G. More radio planes are damaged trying to hand launch them on their maiden flight than any other way. Roll the plane on the ground and adjust gear until it rolls straight. Crank up the engine, turn on the receiver and transmitter and let her go. If you have to correct either right or left during the take off run, make the pulse short. If properly adjusted, it should leave the ground after about 50 to 75 feet and haul out at about a 30 degree angle on high speed. It should fly level on intermediate speed and descend at low speed for those touch and go and spot landings. In moderately strong winds, put a $\frac{1}{8}$ " plywood shim between rear of fuselage and stabilizer for better wind penetration.

Equipment used: Engine, OS Max 15 RC; Gas tank, Home made clunk from 30oz. Wilhold glue bottle; Radio, Orbit Single; Actuator, Bonner Varicomp; Throttle control, Bonner S. N., modified as shown in sketch.