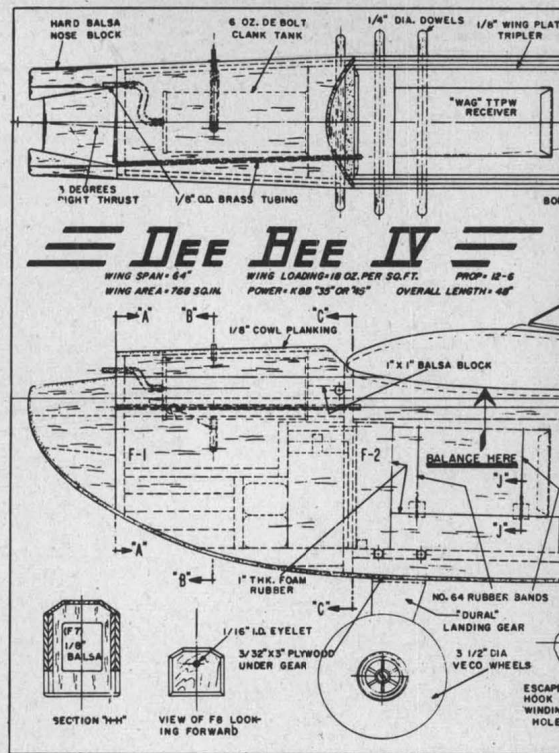


Don Brown, left, and "Chic" Magee



**Best Multi-Class Radio Plane in the East**  
*was opinion of top R/C talent attending DC/RC Symposium ... object of their attention was this Don Brown-designed*  
**Dee Bee IV**  
*Its exceptional performance at Nationals won D.B. a place on America's 1962 Team!*

**Editor's Note:** After three earlier planes and thousands of flights, Don Brown considers this craft ideal for the TTPW-CAR control system. Freely admitting it isn't a "beautiful" plane, he points out it is truly functional. No wild bomb in the air, the Dee Bee IV is smooth as silk, will do any maneuver you desire—and won't give you ulcers while you are at it!

The model was demonstrated to a critical, expert, enthusiastic audience at the recent DC/RC 2-day Symposium in Maryland. It emerged from that affair with the designation of "sharpest Multi contest plane in the East!"

■ TTPW proportional control, less complex than other multi-control systems, in my opinion is easier and more satisfying to fly. The proportional pilot needs only one stick to control his craft and has an infinite number of control surface positions, all simultaneous.

The main drawback has been the lack of ready-made actuators and an airplane with the proper characteristics to bring out the best in the control system.

The airplane cannot be a modified reed type configuration because the requirements are vastly different. The actuator must be specially designed with low current drain and a practical centering system, not a warmed-over reed type actuator.

The Dee Bee IV is the end product of a development program aimed at getting the most out of our favorite control system—TTPW—CAR. Particular attention has been given to matching an airplane to the ad-

vantages offered by dual proportional control and steering clear of a couple of shortcomings inherent in the system.

In our opinion, we have really "arrived" with this airplane. It flies fast, clean, and in a groove. Dee Bee IV will perform the precision pattern comfortably upright or inverted and any specialty stunt with ease. She has no "cranky" characteristics whatever.

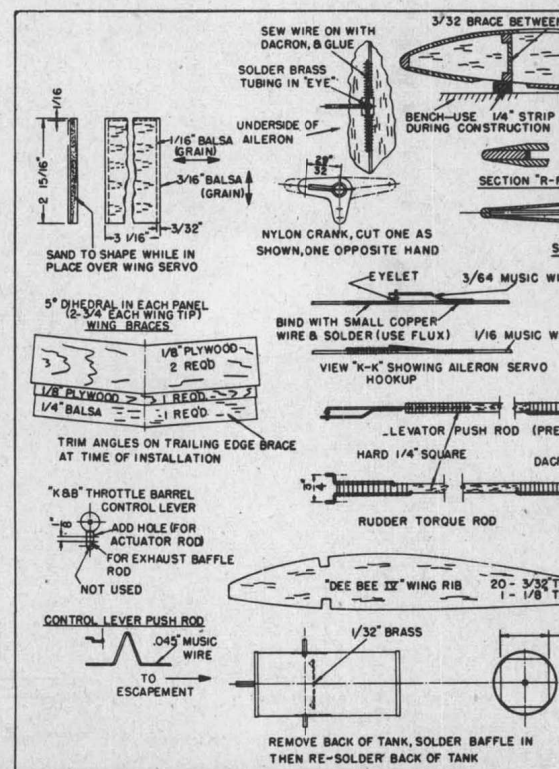
The first problem encountered in pulse control of a fair size, fast airplane has been the lack of servo power available to move large surfaces on a short coupled airplane. However, in studying Walt Good's research on hinge moments and servo power, we found what is needed. By careful design, the control surfaces of Dee Bee IV are high aspect ratio in keeping with Walt's findings. At the same time, our tail and aileron moments are long. This makes for good leverage and smooth, effective control. The high flying speed of the ship is also used to advantage by keeping control surface movement to a minimum while obtaining necessary action for any maneuver.

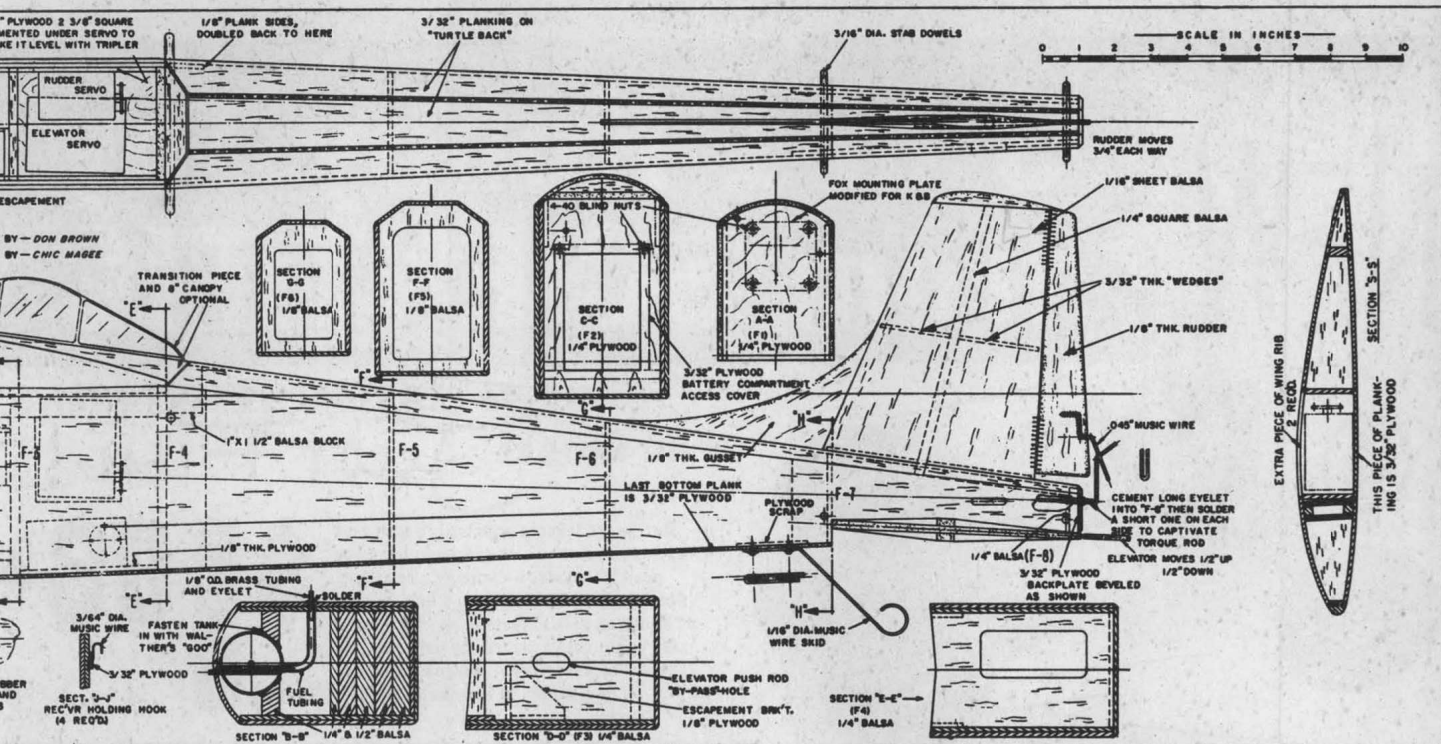
Incidentally, one of the most frequent pitfalls observed in proportional control flying is trying to get a duplication of reed type control response. This makes for unsteady control, particularly on the elevators. Settle for as little control as must be used to get the job done, and flying will smooth out amazingly. Dee Bee IV is capable and comfortable in inverted passes at 3 to 4 feet altitude. When coming across the field it gives the impression of being on a "wire."

With proportional ailerons, inverted flight is quite easy, as only the elevator stick movement is reversed. Rudder coupling is via a separate servo and through a "soft" torque rod, allowing considerable "blow-back" at high speed. This cleans up aileron maneuvers that would normally be upset by an "out-of-phase" rudder. The rudder linkage at the tail of the airplane will "lock-up" at the extremes, when needed, to stop the plane from blowing out of spins. If full rudder is pulled in at the top of a stall, it will reach its extreme position easily, due to low pressure on the control surfaces and will stay locked even in the most violent of spins.

To aid our relatively small ailerons in roll maneuvers, the shoulder wing configuration with fairly low empennage was chosen. This allows the rudder to effectively assist in rolls.

Throughout the current flying season, various guesses were made among our group as to the flying speed of the IV. One





day a light plane pilot who showed up at the field offered to fly parallel to our model and report its air speed. He was able to fly level at 85 mph and the Deee Bee IV passed him! A fair estimate of "flat-out" speed would appear to be 100 mph.

The original model flew "right off the board." Only one change was made, at a later date. The design called for one degree of decalage and the plane was flown this way all one season. In an effort to obtain more snap in the down-elevator position, for inverted pull-ups, we reduced this to zero degrees. Results were gratifying; the flight path is now "trajectory." No trouble whatever is encountered in pull-outs or recovery; inverted flight is practically a hands-off proposition. In inverted, the down-thrust becomes up-thrust and makes up for the wing being less than fully symmetrical. This still leaves a respectable amount of lift in upright flight and allows slow three point landings, plus all around good handling near the ground in the glide.

Begin construction by gluing up sides and their doublers. Four foot long wood is nice if available. The original was spliced as shown. Doublers can be glued with regular or contact cement. Set up fuselage sides with bulkheads F2 and F4 in position, let dry thoroughly. Add F1, F5, F6, and F7. F3 is fitted last as it must be tailored to the "bowing" condition that is bound to occur when nose and tail are pulled in.

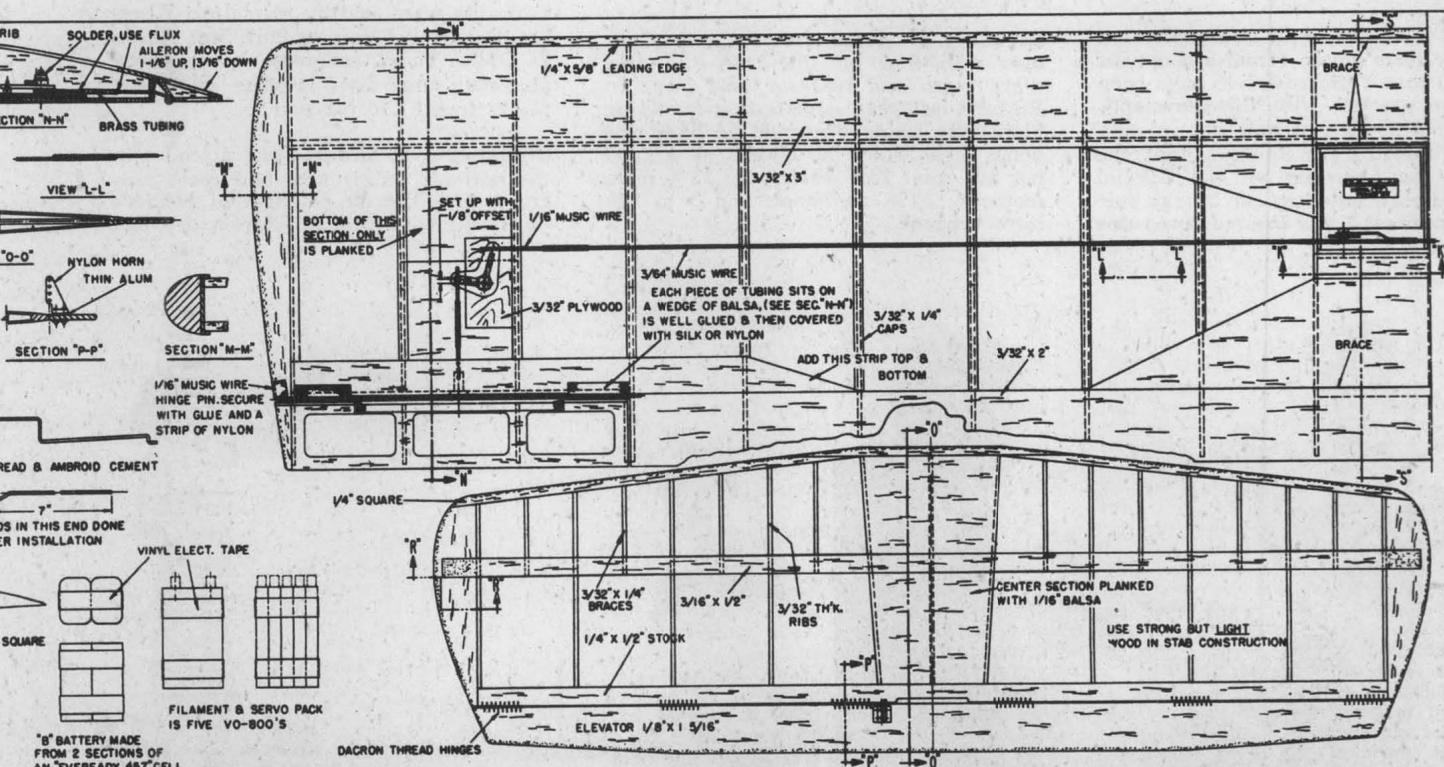
Before installing fuel tank, it is a good idea to add the baffle shown. This will prevent fuel feed pipe from vibrating loose at its support and will stop the plane from running away from its fuel in violent aerobatics.

Wing construction requires no jigs. Lay trailing edge lower sheet on plans, pin in position. Forward lower spar must be jacked-up 1/4" off plans. Add ribs and even up their leading edges with straight-edge. Add top spar, top trailing edge sheet. Double-glue leading edge to ribs. When dry, remove structure from plans; install lower leading

edge sheeting. Make sure no warps developed. Wing halves are joined before leading edge top sheet is added. Plank center section on bottom, install aileron servo. Planking under servo is 3/32" plywood.

Choose light stringy wood for stabilizer. Build 1/4" thick frame on plans, add 3/16" x 1/2" spar and wedges between spar and leading edge. Add wedges between spar and trailing edge to form triangular section shown. Allow full drying time before removing from plans. Add spar and wedges similarly to opposite side.

Our TTPW receiver is equipped with R.B.M. relays. While rather heavy, they are very reliable, especially when two servos are used in parallel as with our rudder/aileron setup. Receiver should mount with component boards standing on edge. This does away with vibration problems and "G" effects on unbalanced armatures during violent pull outs. Use contact cement to fasten 1/4" escapement rubber on wing



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**Citizen-Ship**

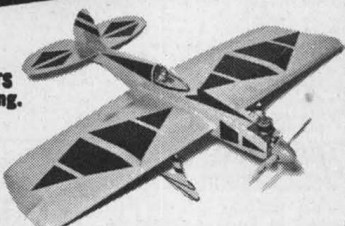
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## Dee Bee

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Radio and servo wiring is per Walt Good's diagram in his original American Modeler article or as supplied with the Ace kits. Just add aileron servo in parallel with rudder servo in proper phase. Connection to aileron servo is an RCA Phono Plug and a Switchcraft Jack #3501SP. Mount jack on bulkhead behind radio so in a crash the plug will pull out of the jack.

Pay particular attention to keeping tail of airplane light in weight. Sand rear of fuselage well, use lightest model silk for covering and not too much color dope. Original has 5 coats of clear Aero-Gloss, 2 coats of color.

Both K&B 35 and 45 engines have been used. Due to clean design, the flat-out speed is not noticeably different when using an 11-6 prop on the 35 or a 12-6 on the 45. However, the 45's pulling power shows up in consecutive violent maneuvers; it is the recommended power plant.

Test gliding, impractical due to the flying speed of Dee Bee IV, is hazardous at best. If all surfaces are free of warps and control movement is as shown, the first flight should be very close to final trim. ROG if possible, with engine at almost full throttle. Ground handling characteristics are excellent. Once enough speed is obtained to lift the tail skid, the ship can be steered with ease, with no bad effect from aileron coupling. In a mild breeze, cross or down wind takeoffs are common practice. With the zero degree decalage, the ship must be pulled off the ground. Do not try to hold the nose high. As the speed increases so will the stability.

The author expresses to "Chic" Magee sincere appreciation for his behind-the-scenes efforts in engineering and developing the Dee Bee IV. His ability as a design engineer made possible many improvements in the aircraft and associated equipment.

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