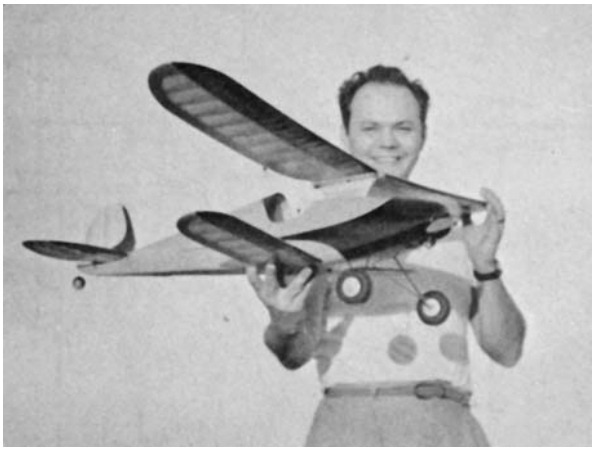
DUET

by Ted Strader



Latest in trends is the increase in bipe R/C ships. Here's one that has been in popular demand. Author Strader beams happily over this ship, a real pride and joy to fly.

Below: The original was flown on 27.255 mc. and was operated on a single channel pulser. This provided proportional rudder. Tail waggers (pulsers) have the added advantage of eliminating the nasty old rubber band—often run down.

Some want high wings, mid-wings, low wings. This one is for fans who prefer two wings and R/C single-channel rigs.

• If such a thing is cricket we'd like to dedicate this plane to the many modelers around the world who liked the pictures enough to inquire about plans. One or two letters along this line is not unusual, but it began to look like a lobby had been formed for the Duet.

Our only hope is that the model fulfills your expectations.

The Duet was designed primarily because we happen to be one of the countless who genuinely like bipes. But, we wanted a stable model. A bipe doesn't always fill these requirements.

A close inspection of the plans and dimensions will reveal a layout more for a high wing monoplane than a biplane, and yet we feel the individuality of the biplane has been retained.

The chord is average for a plane of this size if the top wing was average length as compared to fuselage length. But the top wing is about 6" longer than what we consider average which gave us the stability we were seeking.

The model can be sustained in flight by the top wing alone which means that the bottom wing lift is gravy.

All in all, we arrived at the goal set. A biplane that looks like a real ship with the stability of a high wing.

And, stable it is. On the first flight it was tail heavy. Instead of rolling over or trying to loop it flew (mushed) out the entire flight with its tail dragging. With this remedied, we settled down to the serious business of enjoying the sight of a bipe in controlled flight.

CONSTRUCTION: Very little scaling is necessary to build the Duet. A couple of pieces of tracing paper, a straight edge, sharp pencil and a ruler should do the trick.

Both wings will require only a

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minimum of effort to affect a working plan. One half of the stabilizer outline is included in the full-size drawings to aid in this department. The grids on the rudder make short work of this, so all we have to worry about is the fuselage side outline. And, this should take very little time

By laying the 3/32" sheet doublers in their relative positions, along either the seam line of two 3" sheets, or a reference line drawn on 6" stock, and allowing for the corresponding bulkhead thickness, the forward section is about completed. The only other critical measurements are the distance to the -stabilizer leading edge and its attitude.

With the bottom half of the fuselage correct, and by using the tops of the fuselage bulkheads as guides, the top half arrives at its own conclusion

FUSELAGE: Using either 6" stock, or two sheets of 3" medium-hard 3/32" balsa, for the fuselage sides, cement the doublers in place as outlined above and according to plan. This gives you a basic front half. Plot the locations of the rest of the bulkheads, the distance to the stabilizer leading edge. With the aid of the "typical stabilizer section," shown full size, plot the stabilizer rest outline, allowing for the 1/16" sheet when cutting.

Once the bulkheads have been cut, you are ready to put shape into the ship. To aid in alignment, mark the horizontal dashed lines on each bulkhead. With these lined up to the reference line on each fuselage side, your alignment problems are eliminated

Until all bulkheads are installed, cement them only from the reference line to the fuselage bottom.

Cement bulkheads 1 and 3 in place in this manner. Before either are completely dry, cement bulkhead 2 in the notch of doubler 3. Temporarily install the plywood top wing pylon core to further check alignment. Cement the firewall in place and then bulkheads 4 and 5. A scrap balsa block at the tail completes this phase of construction. Check both fuselage sides for equal bend

Once the lower half is dry we can begin to draw the top into shape. Here a little hot water and a sponge will prove helpful. Draw the top turtle deck sides into place, using rubber bands and cementing as you go. After the turtle deck top has been sanded straight from the cockpit to the stabilizer leading edge, and flush with the tops of bulkheads 3, 4, and 5, the crown can be cemented in place. Cut this from soft 3/8" sheet, allowing a little extra on each side. When it's in position, run a line of pins along each side to bring fuselage side into a straight line.

A similar method is used to form the forward upper portion of the fuselage.

First, draw in and cement the portion between bulkheads 1 and 2 and then the rest of the upper portion of the nose section

"J" bolt the 1/8" steel landing gear in place, cement the 1/16" plywood floor between bulkhead 1 and the bottom wing leading edge in place, and then, lace and cement the 3/32" steel wire landing gear reinforcement to this floor. Bend it forward and solder to the main gear.

The original model had a battery hatch on the fuselage bottom between the firewall and bulkhead 1. If a top hatch is preferred, an opening could be made from about a 1/2" back from the firewall to just before the pylon

Rough cut the pieces to be cemented on both top and bottom. The only care necessary at this point is a good butt joint between pieces for appearance sake. When dry, cut down to size with course grit sandpaper. When close to actual shape, finish with finer paper and then the finest grade for pre-dope smoothness Cement a block on front and shape it in a similar manner. Cut out to accommodate engine used.

Dowels are now cemented in slots provided in plywood pylon core. The outer pieces of 1/4" sheet balsa are cemented in place and sanded to shape. Cement plywood platform on top and then cement 1/4" x 1/16" in place.

Check the linkages to the rudder (and elevator, if used) When satisfied all is in readiness, add the bottom 1/16" sheeting to the bottom. Add the tail-wheel wire and then close up the tail with the 1/16" sheet stabilizer rest.

WINGS: Construction of the

wings is straightforward. The most important thing is the selection of wood. It should be a good hard grade throughout. A hardwood spar could be substituted and the leading edge could be capped if desired without adding too much weight

T-l and T-3 are recessed to allow the two piece trailing edges to fair together at the tip. The bottom wing is built in three pieces and then joined. We reinforced both bottom and top wing breaks with cloth strips.

TAIL: The stabilizer is constructed first and then sanded to airfoil section. Slight alterations will be necessary if a workable elevator is desired. The fin and rudder are simply scaled up from the grid drawing and cut from hard 3/32" sheet Cloth hinges complete the basic structure.

FINISH: The original model was sanded down with fine sandpaper and covered with two coats of dope. Yellow silk was applied to the entire frame. Three coats of heavy dope were applied to the fuselage. Three coats of thinned dope were applied to the wings and stabilizer and then one coat of rather heavy dope to finish. When dry, we masked off the areas to be trimmed and attacked this with black.

The dowels are now cemented in place and the wheels installed Use a liberal amount of cement on the dowels and recoat the area to make sure that they hold securely.

We haven't ignored the radio installation on purpose but feel that this is a problem peculiar to your own circumstances. We might add that bulkhead 2 was used to mount all switches, pots, plugs, etc.

With the radio gear installed and motor mounted we are ready to balance the model for initial glides and then powered flight.

The balance paint as shown on the plans. Check for any warps. If the model balances a bit ahead of the spot on the plans you have no need for concern. It will fly a little faster and be a bit easier to control. Too far forward will begin to cost money for broken props Hand launching a tail heavy ship can be tragic!

Pick a calm day for your test glides, a breeze can cover up erratic tendencies which may occur when such lift increasing aids are not present

When you get a gentle glide without too much effort you're ready.

Our Duet used a Cub .149 for power set at 5° down thrust and no side thrust Since this model had its day the K&B 09 has hit the scene and would make a good mill for strictly sport. The original also flew its entire lifetime on pulse, and therefore you may see the need for a bit of right thrust on escapement flying when using the .15-size engines.

BILL OF MATERIALS (Balsa unless otherwise specified)

5—3/32" x 3" x 36"	Fuselage sides, doublers bulkheads, rudder
6—1/16" x 3" x 36"	Fuselage bottom, ribs, trailing edges, cap sheeting
1—1/4" x 3" x 36"	Leading edges, stabilizer spar, pylon
1—3/16" x 3" x 36"	Wing spars
1—3/8" x 3" x 36"	Fuselage turtle deck top, nose bottom
1—1/2" x 3" x 36"	Stabilizer, wing tips fuselage nose

.09 to .15 glow, or .075 to .09 diesel, engine; radio gear; silk; tank; 1/16" plywood; 3/32" plywood; 1/8" plywood; 1/8" steel wire; 3/32" steel wire; 1-3/4" tail wheel; 2-2-1/2" wheels; "J" bolts; cement; dope; dowels.