



# SIDE POCKET

**A .40 sized aircraft that fills the gap between low wing planes with trainer type wings and pattern planes.**

**By John Miller**

**Y**our initial impression of the Side Pocket may be that it's just another .40 sized sport pattern ship. Not So. The Side Pocket is what should be considered a "Basic Performance" aircraft, i.e., a ship capable of all of the existing pattern maneuvers **plus** the ability to land and handle, at low air speed, much like a trainer. To attest to this low speed stability, my prototypes are capable of hovering (right side up **and** inverted!) in a 15-20 mph breeze. The overall performance characteristics are attributed to the wing design which incorporates proven features of existing notable pattern aircraft designs (the late Jim Kirkland's "Intruder" and Rhett Miller's (no relation "Compensator"), plus my own personal touch of designing aircraft over the past eight years.

My design criteria for this .40 sized ship was as follows:

(1) A .40 sized aircraft exhibiting

stable low speed flight characteristics, i.e., easy to land.

(2) Capable of full pattern performance — smooth rolling, predictable stall turns, predictable inverted characteristics, etc. This requires a double taper wing planform.

(3) Easy to build — not requiring exotic fixtures. The wing and fuselage are built true on a flat work table.

(4) Comfortable sized engine, fuel tank and radio compartment. Side Pocket is capable of accepting (easily) a 12 oz. Slim Line style tank.

(5) Ample room for retracts.

(6) Pleasing lines.

(7) Capable of performing with a non-Schnuerle ported .40.

The prototype uses a K & B .40 and can climb nearly vertical after rotation.

Side Pocket has surpassed all these criteria and my expectations. This is further exemplified by the four ships currently flying in our club, including

a retract version. All four aircraft demonstrate excellent low speed stability and high speed performance attributed to the basic design.

Before beginning construction, you will need to cut all the parts to shape. I make my part patterns from sheets of poster board as follows: Lay the plans, face up, over the poster board with carbon paper in between. Pin to the work table. Trace directly on the plans using a ballpoint pen. Remove from the work table. Cut the patterns and lay directly on the wood. Trace the outline with the ballpoint pen. Cut the part out and use a sanding block to smooth any rough edges.

**Final Note:** The C.G. location is critical in order to obtain nose-high flared landings. Side Pocket has flown with C.G. forward of plan location resulting in "no spins" and a tendency for the nose to sink, objectionably, on landing. The prototype pictured in this article is MonoKoted and required approximately 1½ ounces of

lead in the tail! Other Side Pockets flying have also required tail weight.

### CONSTRUCTION

#### Wing:

Both wing halves can be built simultaneously on a flat warp-free table. They do not have to be built over the plans. Halves are built "right side up."

1. Pin the bottom 1/16" T.E. sheets over the plans and mark the location of all the ribs. Use the R.H. Rib Spacing for marking the location of the right hand wing ribs.

2. If not building over the plans, re-pin the 1/16" T.E. sheet to your work table. Glue the 1/4" T.E. flush with the edge of the 1/16" sheet. Pin to table while the glue dries.

3. Using the dihedral template, align and glue rib #1 to the T.E. and T.E. sheet.

4. Glue rib #10 perpendicular to the T.E. and T.E. sheet.

5. Mark the locations of ribs on the bottom spar. Place, do not glue, the bottom spar under ribs #1 and #10. Support the spar, as shown on the plans, with 1/8", 3/16", 1/4", and 5/16" balsa pieces.

6. Glue the remaining ribs to the T.E. sheet and T.E. Align all ribs at locations marked on the bottom spar.

7. Pin the spar to the table at spar support locations. Now, glue all the ribs to the bottom spar.

8. Glue the top 1/16" T.E. sheet to the ribs and T.E. Pin the trailing edge to the table while the glue dries.

9. Glue the top spar in place. If necessary, re-pin the bottom spar so the pins can be removed before the wing is removed from the work table.

10. Glue the 3/8" balsa L.E. to the front of the ribs.

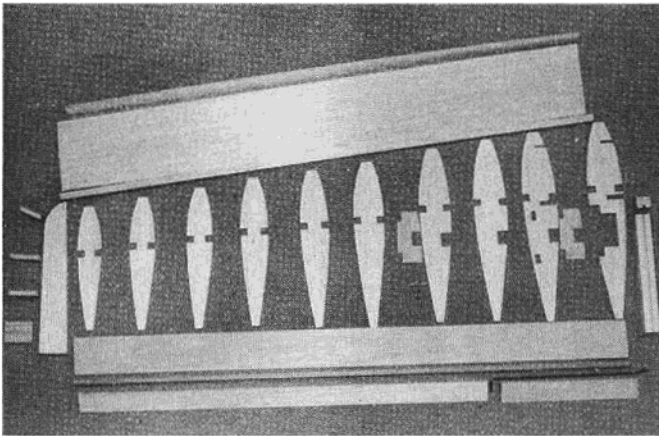
11. Trim the 1/16" top L.E. sheet to shape. Apply a sandable glue to the L.E., top spar and ribs. Pin the L.E. sheet in place. A simple way to achieve a good L.E. and spar joint is to pin 4" or 6" lengths of 3/8" square balsa on top of the 1/16" sheet along the entire joint length. These lengths evenly distribute the compression forces of the pins for a smooth even joint.

12. When the glue is thoroughly dry, remove all the pins. Remove the wing panel from the table. Trial fit the landing gear blocks and 1/16" ply plates to the ribs. Epoxy the landing gear blocks and ply plates in place simultaneously. Use clothespins to hold the ply plates to the ribs. When cured, fit and epoxy the pine blocking pieces in place. When cured, drill a 5/32" hole through the blocking and landing gear block.

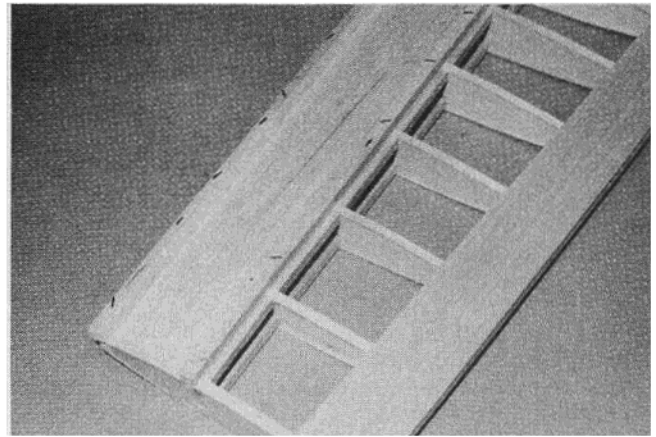
13. Re-pin the wing halves to your work table. Trim, fit and glue the top 1/16" center sheeting to the ribs per the plans. Cut and glue the top capstrips to the tops of the ribs. When dry, sand end of rib #1 flush.

## SIDE POCKET BILL OF MATERIALS

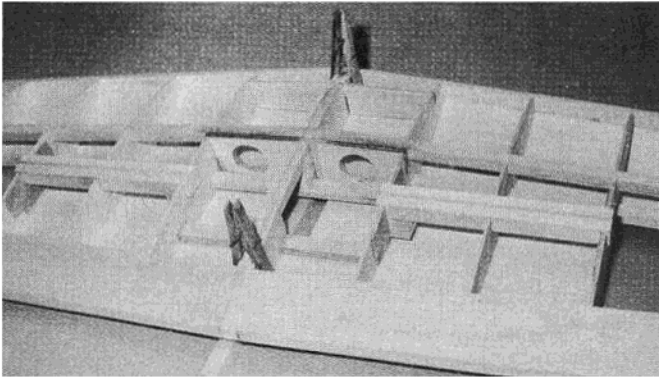
Quantity	Item	Usage
	<b>PLYWOOD</b>	
1	1/32" x 6" x 36"	Fuselage Doublers
1	1/16" x 6" x 12"	F-1, Tank Floor Land Gear Block Plates.
1	1/8" x 6" x 12"	F-4, Wing Plate, Dowel Webs, Dihedral Brace.
1	1/4" x 6" x 12"	F-2, F3, Wing Bolt Plate, Dihedral Brace.
	<b>BALSA</b>	
11	1/16" x 4" x 36"	Stab Sheeting, Wing Sheeting, Cap strips.
2	3/32" x 3" x 36"	Ribs #4 through #10.
2	3/32" x 4" x 36"	Ribs #2 & 3, Bottom Fuselage Sheeting, Spar Webs, Stab Ribs.
2	1/8" x 4" x 42"	Fuselage Sides, Stab Doublers, Wing Front & Rear Fairing End Pieces.
4	1/4" x 1/4" x 36"	Fuselage Top & Bottom Stringers, Fuselage Balsa Supports.
1	1/4" Triangle x 36"	F-1 and Wing Bolt Hold Down Plate Reinforcers.
2	1/4" x 3" x 36"	Vertical Fin (5 pieces), Wing Tips, Tip Braces, Wing Trailing Edge, Stab Trailing Edge.
2	1/4" x 4" x 36"	Rudder, Rib #1 (2), Wing Front & Rear Fairing Side Pieces, Stab Rib S1, Tank Compartment Top Block.
5	3/8" x 3/8" x 36"	Fuselage Top, Bottom Fin, Wing Spars, Stab Leading Edges.
1	3/8" Triangle x 36"	F-2 Support
1	3/8" x 3" x 36"	Wing Leading Edges
1	1/2" or 5/8" Triangle x 36"	Chin Block Triangle Supports
1	1/2" x 4" x 36"	Chin Block, Bottom Block, Wing Center T.E. Sections, Stab Blocks.
3	3/8" x 1 1/2" x 36" Aileron Stock	Elevators, Ailerons (Glue 1/8" scrap strip to leading edge and trim trailing edge to achieve suitable shape and thickness), Tail block.
1	3/4" x 2" x 12"	Stab Tips
	<b>MISC. WOOD</b>	
1	1/4" Dowel	Wing Dowels
1	1/4" x 1/2" x 36" Spruce	Servo Rails
2	5/8" x 3/4" x 7" Pine	Landing Gear Blocks and Blocking Pieces.
	<b>HARDWARE</b>	
1	3/32" x 36" Music Wire	Aileron and Elevator Linkage.
2	5/32" x 36" Music Wire	Landing Gear Struts
1	1/8" O.D. Brass Tubing	Aileron and Elevator Linkage.
1	2-56 x 12" Threaded Rod	
1	Wing Sport Canopy	
1	1/4"-20 x 2" Nylon Wing Bolt	
1	Set Landing Gear Straps	
	<b>Quantity</b>	
1	Item	
1	2 1/4" Spinner	
1	10 x 6 Propeller of Choice	
1	36" Length NyRod Set	
1	Goldberg or Equal 5/32" Steering Arm	
1	#6 Flat Washer	
1	Goldberg or Equal Long Control Horn (Elevator)	
1	Goldberg or Equal Short Control Horn (Rudder)	
1	Pair Klett Short Pushrod Exit Guides	
1	Dave Brown or Kraft 40 Engine Mount	
1	4-40 Engine Mount Bolt Set	
1	Kraft or Equal 8 oz. "Slim Line" Fuel Tank	
1	12" Length Silicone Fuel Tubing	
1	Strip Aileron Linkage Set	
7	5/32" Wheel Collars	
3	2 1/4" Wheels	
8	Nylon or Steel Clevis	
15	Klett Small Hinges	
4	Solder Links	



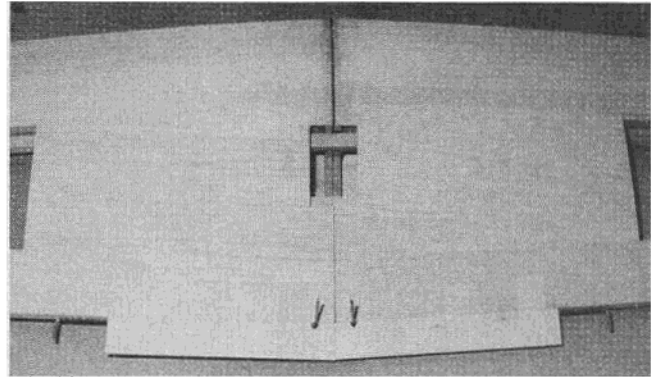
*Basic component pieces of wing half.*



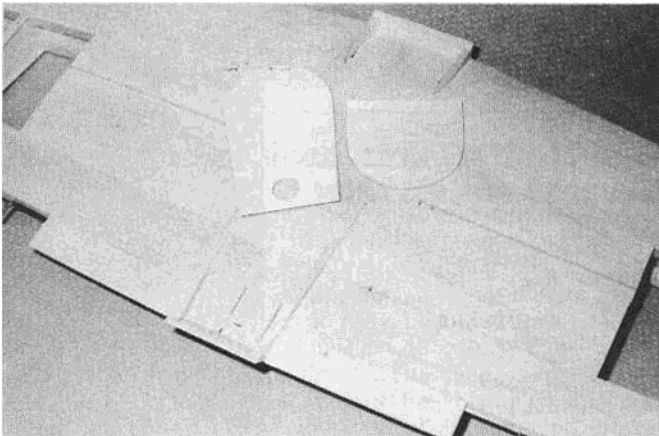
*3/8" sq. balsa strips used to hold leading edge sheeting tight while drying. (See Step #11 in wing construction.)*



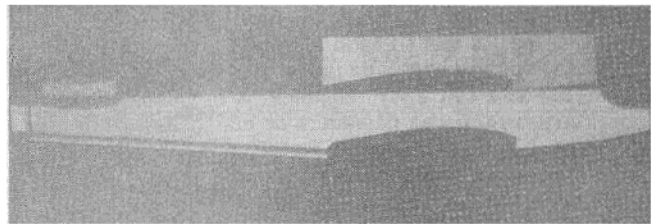
*Clothespins clamp ribs together while epoxy cures. 3/8" sq. under center with tips touching table provide proper dihedral.*



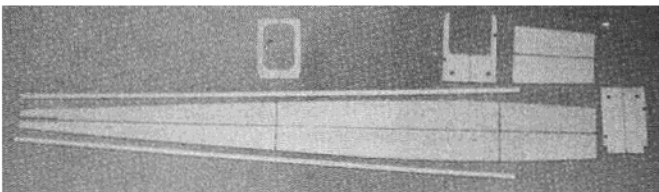
*Masking tape used on trailing edge while epoxy cures. Servo rails are designed into construction and will accept KPS 15 size or smaller servos.*



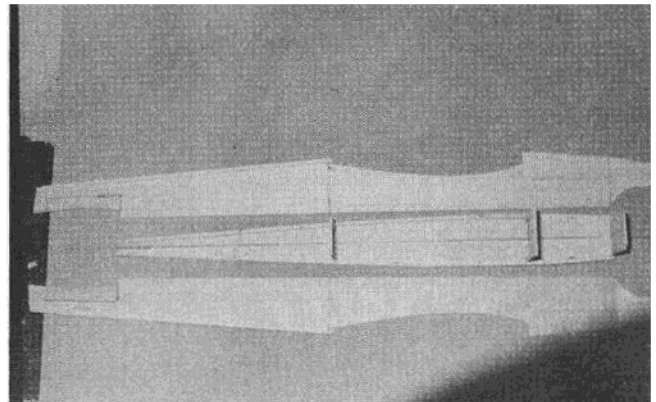
*Wing fairing ready for final assembly. Note hefty wing bolt hold-down plate.*



*Fuselage side components.*



*Fuselage top block and formers with centerlines and locations marked.*



*Fuselage ready for final assembly. Designer uses centerline on top block, formers and work table for accuracy. Servo rail and fuel tank supports already in place.*

### **Joining Wing Halves:**

1. Turn the wing panels upside down and support rib #1 with a length of 3/8" sq. balsa. Sand, as required, for a smooth fit between wing halves. Insert, do not glue, the servo rails into

one wing half. Apply epoxy to ribs #1 and join together. The tips should touch the table and the center is supported by the 3/8" sq. balsa.

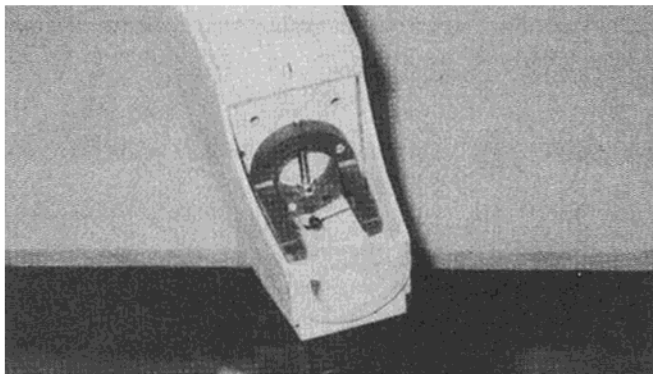
2. Fit and epoxy in place both dihedral braces, 1/8" ply webs and

servo rails. Insure the braces are flush with the top of the ribs.

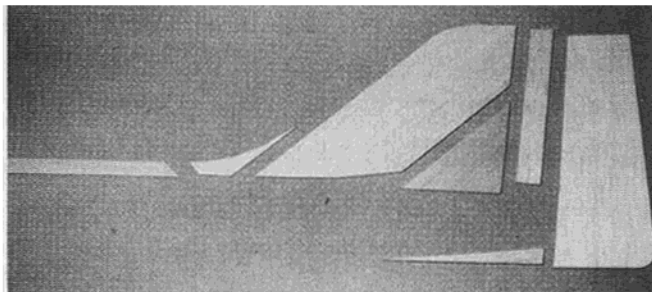
### **Finishing the Wing:**

1. Trim, fit, and glue the 3/32" spar webs in place as shown on the plans.

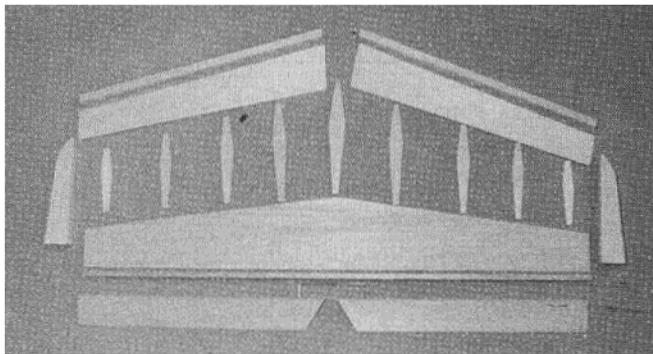
2. Trim and glue the bottom 1/16"



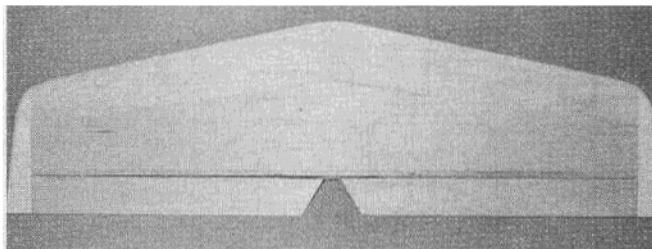
Engine compartment with nose gear. Final shaping line on chin block and triangle pieces.



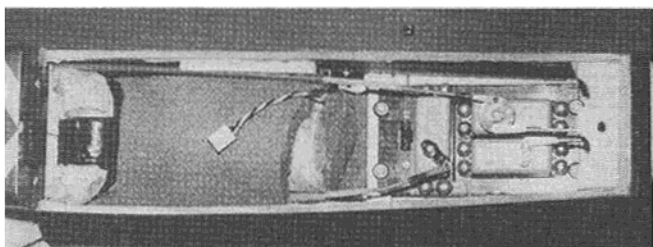
Complete pieces for vertical fin and rudder.



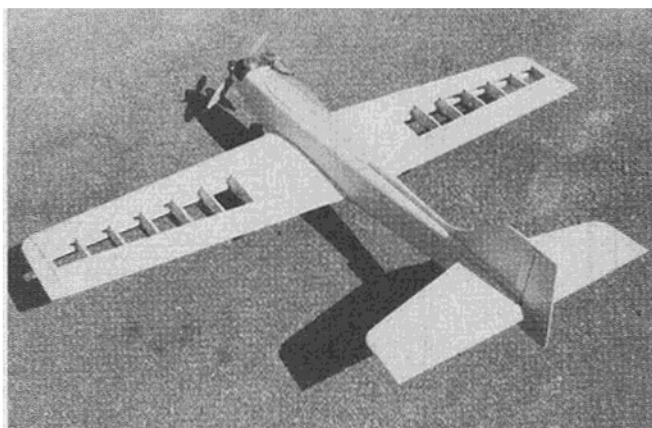
Basic components for stab and elevator.



Completed stab and elevator.



Very neat radio installation. Receiver under all that foam padding.



Side Pocket ready for final covering and finishing.

L.E. sheet in place.

3. Trim, fit, and glue the bottom center sheeting and bottom capstrips

in place.

4. Glue the 1/4" wing tips, braces, and blocks to ribs #10 per the plans.

5. Epoxy the center trailing edge to the wing with aileron torque rods in place. Be careful not to get epoxy

### SIDE POCKET

Designed By:  
John P. Miller, Jr.  
**TYPE AIRCRAFT**  
Basic Performance (See Text)  
**WINGSPAN**  
57 Inches  
**WING CHORD**  
10 1/4 In. (Avg.)  
**TOTAL WING AREA**  
584 Sq. In.  
**WING LOCATION**  
Low Wing  
**AIRFOIL**  
Semi Symmetrical  
**WING PLANFORM**  
Double Taper  
**DIHEDRAL EACH TIP**  
13/16" or 3/8" under center  
rib with wing inverted

**O.A. FUSELAGE LENGTH**  
47 7/8"  
**RADIO COMPARTMENT SIZE**  
(L) 12-1/16" X (W) 2 3/4" X (H) 2 1/2"  
**STABILIZER SPAN**  
25 Inches  
**STABILIZER CHORD (incl. elev.)**  
6-11/16" (Avg.)  
**STABILIZER AREA**  
167 Sq. In.  
**STAB. AIRFOIL SECTION**  
Symmetrical  
**STABILIZER LOCATION**  
Mid Fuselage  
**VERTICAL FIN HEIGHT**  
4 3/4 Inches  
**VERTICAL FIN WIDTH (incl. rud.)**  
8 7/8" (Avg.)  
**REC. ENGINE SIZE**  
40 Cu. In.

**FUEL TANK SIZE**  
8 Oz.  
**LANDING GEAR**  
Tricycle  
**REC. NO. OF CHANNELS**  
4 (5 for retracts)  
**CONTROL FUNCTIONS**  
Rud., Elev., Ail., Throt. (Retracts)

**BASIC MATERIALS USED IN CONSTRUCTION**  
Fuselage ..... Balsa & Ply  
Wing ..... Balsa, Ply, Pine  
Empennage ..... Balsa  
Wt. Ready To Fly ..... 72-96 Oz  
Wing Loading ..... 17.75-23.67 Oz./Sq. Ft.

between the brass tubing and music wire.

6. Sand the wing L.E., T.E., wing tips and ailerons to shape per the plans. **Note: L.E. is a constant radius from root to tip and is important in achieving the outstanding flying characteristics of the Side Pocket.** Cut the servo opening in the top of the wing.

#### Fuselage Construction:

1. Prepare an R.H. and L.H. side by marking the locations of the 1/32 ply and 1/8" balsa doublers on the fuselage sides. Using a **non-water** based contact cement, cement the doublers to the sides. Cut the elevator and rudder pushrod exit slots per the plans. Glue, to one side only, the balsa tail block. Mark the locations of F-2, F-3, and F-4. Mark and glue in place the 1/4" balsa fuel tank floor and servo rail supports. Using sandable glue, glue the 1/4" sq. bottom balsa stringers in place.

2. Glue the 1/4" tank compartment top to the 1/4" fuselage top block, using a sandable glue.

3. When dry, place top block over plans and mark longitudinal centerline and locations of F-3 and F-4.

4. Mark a long centerline on your work table. Pin the top block to the table with centerlines aligned. Mark centerlines on F-2, F-3, and F-4. Epoxy these formers to the top block aligning centerlines and insuring formers are perpendicular to the top block.

5. Using a sandable glue, glue and pin the 1/4" top stringers to the top block per the plans. Glue the 3/8" triangle piece to F-2 and top block.

6. Trial fit the fuselage sides to the top block and formers. Due to the airfoil shape of the fuselage, the sides are glued to the top using a two step method. **First Step:** Apply a uniform thin amount of 5-minute epoxy to F-2, F-3, and the top of the fuselage sides between F-2 and F-3. Both sides should be done simultaneously. Apply a slow drying sandable glue to the top of the fuselage half the distance from F-3 to F-4. Assemble both sides to the top aligning F-2 and F-3 with the marks on the fuselage sides. Hold or clamp until the epoxy cures. **Second Step:** Apply slow drying sandable glue to the exposed top of the 1/4" stringers. Apply 5-minute epoxy to the sides of F-4. Draw both sides towards F-4 and the top block. Pin the sides to the top block. Hold or clamp the sides to F-4 until the epoxy cures. Pull the tail of the fuselage together aligning over the table centerline and glue the tail block to the remaining fuselage side.

7. Fit and glue 1/4" triangle pieces

to F-2. Glue the throttle pushrod to F-2 and F-3. Glue the tank floor to the supports. Glue the nose gear steering pushrod to F-2 and F-3.

8. Epoxy the 1/4" ply wing bolt plate and the 1/4" triangle pieces in place. Glue the 1/8" balsa piece to F-4.

9. Remove pins from F-4 to the rear of the top block. Cut, fit and glue (cross grain) the 3/32" sheet to the fuselage bottom using sandable glue.

#### Fitting Wing To Fuselage:

1. The fuselage must now be positioned and pinned to the work table so the table is under the wing tips with the wing in place in the fuselage.

2. Measure and mark the centerline of the fuselage on the 1/8" balsa piece at F-4. Cut and sand the center L.E. of the wing so the wing fits with the fuselage. Seat the wing so wing and fuselage centerlines align. Measure from the table to the wing trailing edge at wing tip. Compare both tip measurements. Carefully sand the wing saddle with the "highest" wing tip until both tips are equidistant from the table.

3. Insert a 15/64" drill through F-3 and drill, by hand, through the balsa L.E. and start the hole in the 1/8" ply web. Do this for both dowels. Remove the wing and drill the holes through the webs and dihedral brace.

4. Insert, do not glue, wing dowels into the wing. Fit the wing to the fuselage with dowels into F-3. Insure for a "snug" fit of the dowels in F-3. Pin or weight down the trailing edge of the wing. Recheck the wing tip measurements and sand the saddle(s) as required.

5. Epoxy the 1/8" wing bolt plate to the wing T.E. per the plans. Mark the location of the bolt hole on the 1/8" ply plate. Drill through the plate, wing and wing bolt hold-down plate using a #7 drill. Tap the wing bolt hold-down plate with a 1/4-20 tap. Enlarge the hole in the wing for a snug fit of the bolt.

6. Remove the wing, epoxy the dowels into the wing, and rebolt the wing to the fuselage while the epoxy cures, being careful not to get epoxy on the wing L.E. or dowels that extend into F-3.

#### Wing Fairings:

Using a straightedge against the fuselage sides, mark the extension of the sides onto the wing at the front and rear fairing locations. Trim, fit, and glue the front and rear fairing side pieces in place, per the plans. Trim, fit, and glue the 3/32" sheet in place. Cut the access hole for wing bolt.

#### Stab Construction:

1. Pin the bottom 1/16" T.E. sheet over the plans and mark the location

of all the ribs. Pin, do not glue, the 1/4" T.E. flush with the rear of the 1/16" T.E. sheet. Glue all ribs in place. When dry, glue and pin the top 1/16" T.E. sheet to the ribs.

2. Glue and pin the top 1/16" L.E. sheets in place. When dry, turn the stab over and glue the bottom 1/16" L.E. sheets in place.

3. Using a long sanding block, gently sand the leading and trailing edges so the ribs are flush with the sheeting. Be careful not to sand too much.

4. Using a sandable glue, glue the leading and trailing edges in place. Wrap masking tape around the edges to hold in place while the glue dries.

5. Sand the sheeting flush with rib S5 and glue the stab tips in place. Sand entire stab to shape.

6. Drill the elevator halves for connecting link. Insure that the L.E. of the link is flush with the L.E. of the elevators and epoxy to the elevators.

#### Final Assembly:

1. Trial fit the engine mount & nose gear to the fuselage. Make and trial fit the steering pushrod to the steering arm insuring freedom of movement.

2. Glue the 1/2" fuselage bottom block in place.

3. Glue, with sandable glue, the 1/2" or 5/8" triangle pieces to the chin block per the plans. When dry, fit to the fuselage. Cut/trim the rear of the left triangle for the steering arm. When satisfied with the fit, glue with sandable glue, to the fuselage.

4. Sand the front of the nose flush and epoxy F-1 in place. Glue the 1/4" triangle pieces to F-1 per the plans.

5. Bolt the wing to the fuselage. Position the plane right side up. Support the plane so the wing tips are equidistant from the table top and the top of the fuselage is parallel to the table.

6. Place and fit the stab so stab tips are equidistant from the table top. The stab and top fuselage centerlines should coincide. When satisfied with the fit and alignment, epoxy in place.

7. Glue the three "rear" pieces of the vertical fin together on a flat table. When dry, lightly sand the seams smooth. Fit to the stab and fuselage and epoxy in place. Fit and glue the two balsa stab blocks in place.

8. Glue the remaining top and bottom fin pieces in place.

9. Fit the canopy to the fuselage. If your plane is to be MonoKoted, I suggest MonoKoting the top of the fuselage first, then cut/trim the MonoKote as required and epoxy the canopy to the fuselage. The canopy could then be sanded of any excess epoxy and then painted to suit.

10. Sand the fuselage, wing, and control surfaces to final shape per the plans. Finish sanding and paint or MonoKote per your method.

11. If you MonoKote, I suggest epoxy coating the engine compartment and wing bolt area for protection from the fuel.

12. Install the fuel tank, engine, radio, pushrods, etc. Be sure to balance per the plans for optimum performance and flying enjoyment.

#### **Control Surface Movements**

(As used on prototypes)

**Rudder:** Approximately 25° right and left.

**Ailerons:** Approximately 1/4" up and 3/16" down.

**Elevator:** Approximately 1/4" up and down.

**From  
RCModeler  
Oct. 1983**