

Success Series®

This kit features a complete and fully illustrated step-by-step construction manual - AND - full-size plans that ASSURE SUCCESS!

MIDWEST
Essence

Kit #185

The *Essence* of
Glider Flight

About This Construction Manual

This booklet divides the construction into sub-assemblies; wing, fuselage, etc. Read each section carefully and identify all of the parts before starting on a particular sub-assembly. There is a complete description of all kit parts under "Kit Contents", (Page #28). Please check to be sure that your kit is complete; that it is not missing any parts. If you do find that parts are missing, or you are having trouble identifying parts, see "Customer Service" (below). The instructions give the sizes of all the parts. Refer back to the "Kit contents" when selecting parts, to be sure that you are using the correct sizes.

This manual shows dimensions in inches and metric, the metric dimensions being given in parenthesis following the inch figures. Example: 3" (76mm) Since there is rarely a direct inch to metric conversion, in many cases a close approximation is quoted. The illustrations in this manual clarify and detail many of the assemblies shown on the plan, and the two should be used together during construction.

Customer Service

Should you experience a problem with this kit, we recommend you see your dealer first. If you are unable to solve the problem, feel free to call or write:

Customer Service Department
Midwest Products Co., Inc.
P.O. Box 564
Hobart, IN 46342
(219) 942-1134

 **MIDWEST**
PRODUCTS CO., INC.

400 S. Indiana St., P.O. Box 564, Hobart, IN 46342

This product is sold with exclusion of all warranty expressed or implied, statutory or otherwise. Buyer assumes all risk of use.



P-492

I.	About This Construction Manual Customer Service	Page No.
II.	Getting Started Tools and Materials You Will Need	2
III.	Additional Items You Will Need to Build an Operable R/C Model	3
IV.	Assembly Instructions Tail Surfaces	4-6
	Wing	7-14
	Fuselage	14-18
	Finishing Your Model	19-27
V.	Kit Contents	28-30
VI.	Acknowledgements	30
VII.	Product Evaluation Card/Catalog Offer	31

Getting Started

Tools and Materials You Will Need

- Instant Setting (thin CA) Cyanoacrylate (super-glue type) adhesive** - Used to instantly bond parts.
- Slow Setting (thick CA) Cyanoacrylate (super-glue type) adhesive** - used to glue parts that are to be moved for alignment.
- Note:** Cyanoacrylate adhesives are manufactured in many different formulations, some of which do not work well on models. Consult your local hobby dealer for the proper adhesive brands.
- Warning:** Cyanoacrylate adhesives cure (dry) very rapidly. Read all warnings and safety precautions on the label.
- Epoxy Glue and Finishing Resin** - 5 minute or 15-30 minute epoxy for special gluing applications.
- Accelerator** - Used to speed up the drying time of the cyanoacrylate adhesives.
- #80, #120 and #400 Grit Sandpaper**
- Hobby Knife and Extra Blades**
- Building Board** - This can be any flat, stiff material. You will need a building board that is at least 18" x 60" (457mm x 1524mm).
- Pencil and Pen**
- Straight Pins**
- Razor Saw**
- Small Square**
- Masking Tape**
- Sanding Blocks and T-Bar** - T-Bar should be at least 24" (610mm) long.
- 48" (1219mm) and 12" (305mm) Steel Straight Edge**
- Tack Rag**
- Electric Drill and Drill Bits** - 1/16" (1.5mm), 3/32" (2.3mm), 1/8" (3.2mm) and 1/4" (6.4mm).
- Paper Towel**
- Epoxy Brush**
- Scissors**
- Wax Paper**

Additional Items You Will Need to Build an Operable R/C Model

This is a list of the parts used on the prototype Essence. Consult your hobby dealer for these or similar items.

1 - Two - Three channel radio - "Channel" is a term that refers to the number of functions that a radio has. Typically, a sailplane radio's first two channels control the rudder and elevator. There are radios available that have more channels to incorporate options such as spoilers etc.

When buying a radio, bear in mind that there are many radio frequencies available. Not all of these frequencies can be used to operate model aircraft. Be sure to tell the dealer that you want a radio for use in a model "aircraft".

Warning: By Federal Communications Commission ruling, only a **select group** of these frequencies are designated for aircraft use. Under the law, it is your responsibility to use one of the proper frequencies for the type of model you are operating.

Caution: Before turning on a transmitter, be certain that there are no other models in the area that are operating on the same frequency. Most transmitters have a nominal line of sight range of three miles. If two transmitters on the same frequency are on at the same time, the radio signals will interfere with each other, resulting in loss of control of the model that is in the air and a crash which could cause injury or property damage. It is your responsibility to operate your radio in a safe manner. Follow the recommendations of the manufacturer, your hobby dealer and the club members in your area.

Finishing materials - We recommend that you finish your model with an iron-on covering. This material has a high gloss finish. If damaged, it can be repaired quickly and easily. You will need 2 six foot (1.8m) rolls of covering to cover your airplane, not including trim colors. There are other finishing materials available. Your hobby dealer will be glad to explain them to you.

NOTE: If you decide to finish your airplane with iron-on covering, you will also need a iron and heat gun. A light weight spackle is also handy to fill in small dents and smooth uneven edges.

1/4" x 7" x 11" (6.4mm x 178mm x 279mm) Foam rubber - This is used to protect the radio components. Du-Bro part #513 will work well for this application.

Hi-Start - This is a convenient method of launching your model. It consists of a length of surgical tubing that is staked into the ground and stretched. This "catapults" the model into the air and altitudes of 100 to 300 feet can be obtained with this method. Hobby Lobby's HIS002 or Dynafite's Upstart CAT # 5005-2m work well.

Decisions to make before you begin.

The Essence was designed to be a very versatile model which can be constructed in various configurations such as: a two piece wing option, a V-Tail option, and also equipped with spoilers. Each version requires special attention to construct correctly. Decide now which version you want to build.

Wing configuration: The wing can be built in either one or two pieces which is secured to the fuselage with rubber bands. Obviously, the two piece wing is easier to transport and store while both versions are easy to build.

Spoiler Option: Either wing configuration (one or two piece) can be built with or without spoilers. Spoilers act as airbrakes which "spoil" the airflow over the wing, thus allowing rapid controlled descents. Spoilers are recommended for experienced fliers. If you choose to install spoilers, you will need the following items not included in the kit:

1 piece 3/16" x 3/16" x 36" (4.7mm x 4.7mm x 914mm) Balsa
2 plastic tubes 1/8" O.D. x 36" (3.2mm x 914mm) Du-Bro # 500
4 yards of standard thread

1 piece 1/16" x 1/8" x 36" (1.5mm x 3.2mm x 914mm) Balsa
1 round toothpick

V-Tail Option: The empennage (tail feathers) of the Essence can be constructed with a conventional tail (vertical and horizontal stabilizer) or as a "V-Tail" version. The V-Tail produces less interference drag and therefore is more efficient. **Note:** You will need a computer radio in order to utilize mixing functions for the V-Tail option. The V-Tail is recommended for more experienced pilots. If you choose to incorporate the V-Tail, you will need the following items not included in the kit:

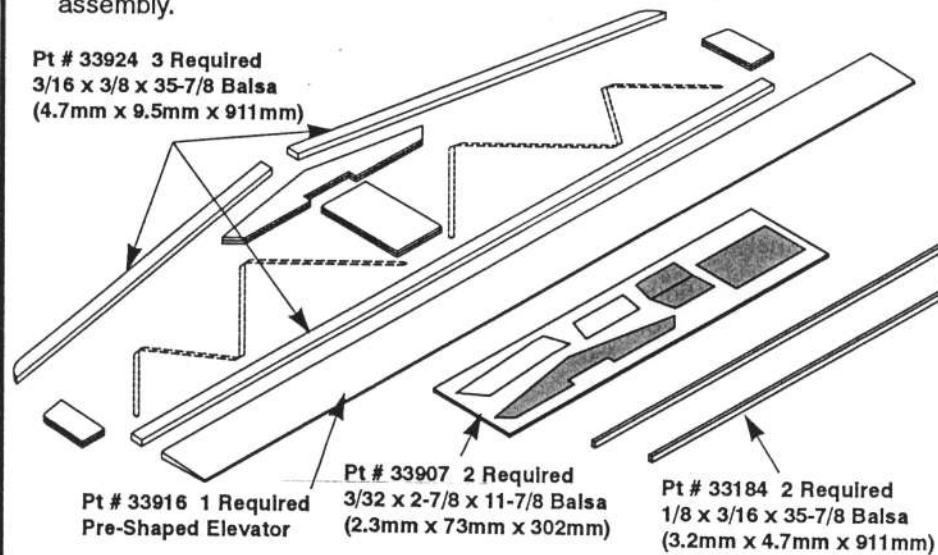
1 piece 3/16" x 3" x 36" (4.7mm x 76mm x 914mm) Balsa

TAIL SECTION

The Tail section consists of the Stabilizer, Elevator, Fin, and Rudder. These surfaces control the model's ability to climb, dive and turn. They must be assembled so that they are flat, with no twists or warps.

Stabilizer and Elevator

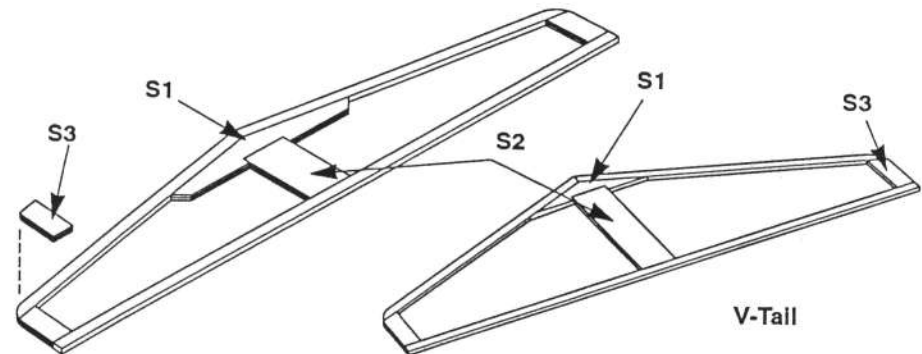
Before beginning the stabilizer, determine which version (conventional or V-tail) you want to build. Notice that the conventional tail is shaded and drawn with solid lines while the V-tail version is drawn with dashed lines. Construction of the conventional tail is illustrated below. You will need the parts illustrated below to complete this sub-assembly.



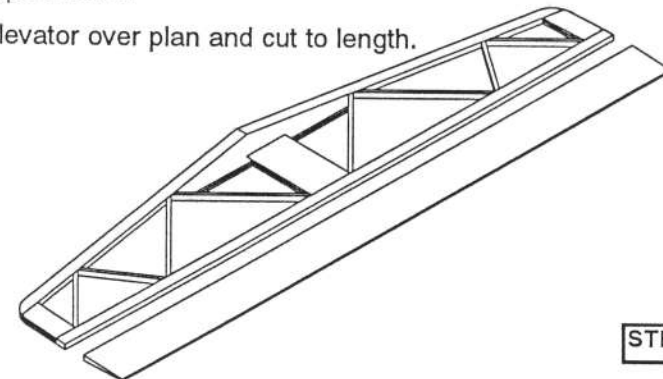
Note: Before beginning the stabilizer construction, select the strongest (hardest) strips of 3/16" x 3/8" (4.7mm x 9.5mm) balsa. Use these for the leading and trailing edges of the stabilizer.

1. Lay the fuselage plan on your building board and cover the drawing of the stabilizer with wax paper. Trim the 3/16" x 3/8" (4.7mm x 9.5mm) balsa stab leading and trailing edges to length and pin in place over the plan.
2. Using care, remove die-cut pieces S1, S2, and S3 from die-cut sheet. Using thick CA, glue together making them 3/16" (4.7mm) thick. Pin over plan and glue in place with CA. **Note:** If building the V-Tail, you will have to cut parts S1, S2, and S3 from the 3/16" x 3" x 36" (4.7mm x 76mm x 914mm) balsa sheet (not included).

STEPS 1-2



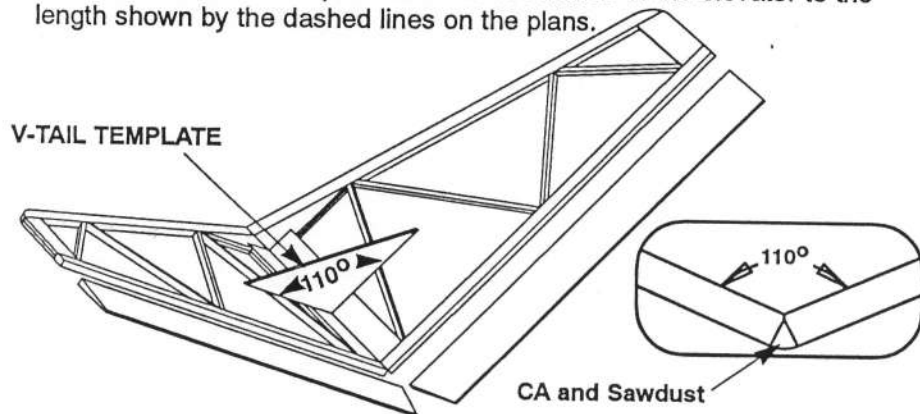
3. Cut the trussing from 1/8" x 3/16" x 36" (3.2mm x 4.7mm x 914mm) balsa and glue in place using thin CA. Lift the stab structure and block sand both sides smooth.
4. Place elevator over plan and cut to length.



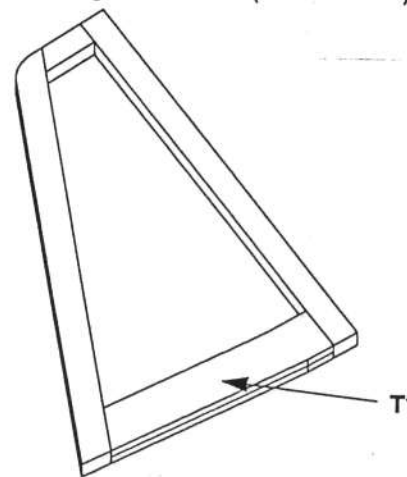
STEPS 3-4

If you are constructing the V-tail version cut out the template on the plans to set the angle of the "V" and paste it to a piece of scrap wood. The angle is important so pay careful attention to this step. Score the underside of the stabilizer about 3/4 of the way thru its thickness. Carefully "crack" the stabilizer along the score and set the angle using the template. Apply thick CA in the bottom of the crack and sprinkle micro-balloons or sawdust over the glue until the crack is completely filled to make a structural joint.

Place elevator over plans and cut two halves of the elevator to the length shown by the dashed lines on the plans.



- 5. Cover the drawing of the fin with wax paper. Trim the 3/16" x 3/8" (4.7mm x 9.5mm) balsa fin leading and trailing edges and top to length and pin in place over the plan and glue with CA.
- 6. Using care, remove die-cut pieces T1 from the die-cut sheet. Using thick CA, glue together, making them 3/16" (4.7mm thick). Sand, pin and glue in place.

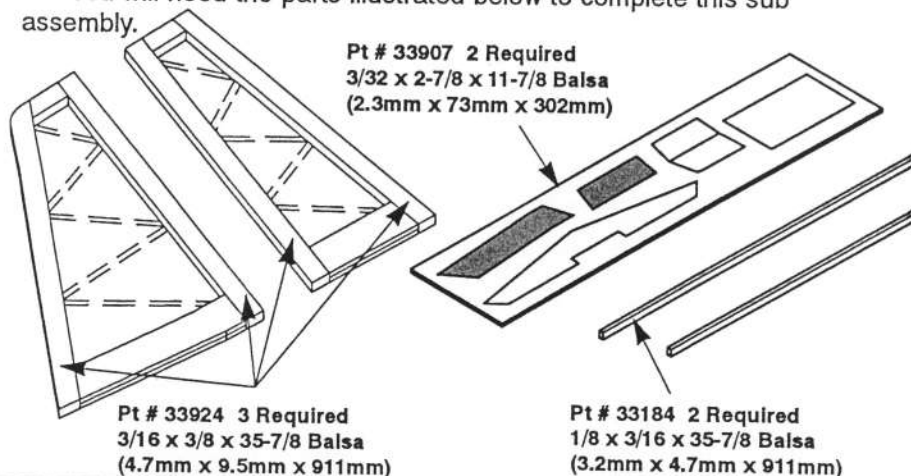


STEPS 5-6

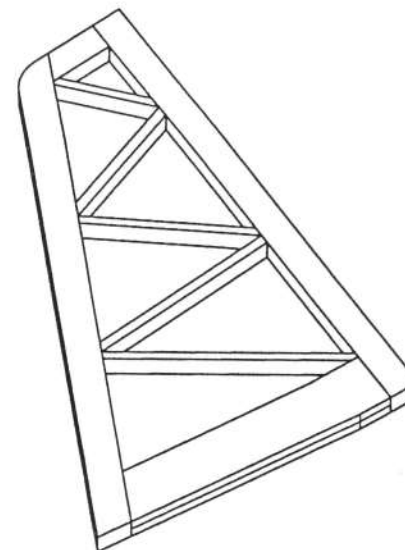
Eliminate steps 5 through 10 if you built the V-tail version.

Fin and Rudder

You will need the parts illustrated below to complete this sub assembly.

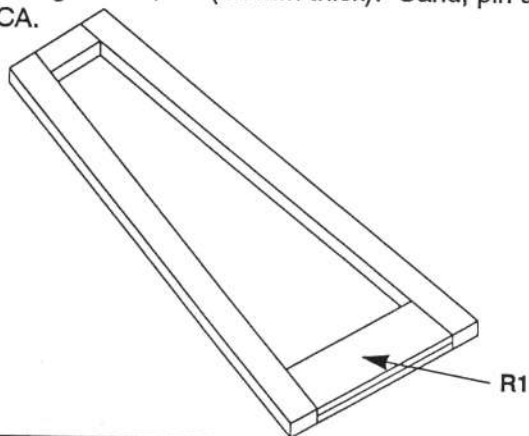


- 7. Cut the trussing from 1/8" x 3/16" (3.2mm x 4.7mm) balsa and glue in place using thin CA. Lift the fin structure and block sand both sides smooth.



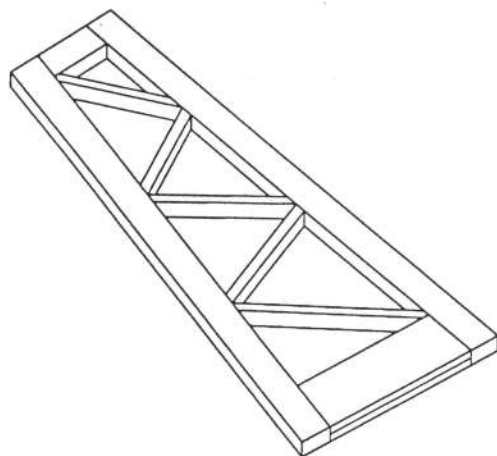
STEP 7

- ❑ 8. Trim the 3/16" x 3/8" (4.7mm x 9.5mm) balsa rudder leading and trailing edges and top to length. Pin and glue in place over the plan using thin CA.
- ❑ 9. Remove die-cut pieces R1 from the die-cut sheet. Using thick CA, glue them together, making them 3/16" (4.7mm thick). Sand, pin and glue in place using thin CA.



STEPS 8-9

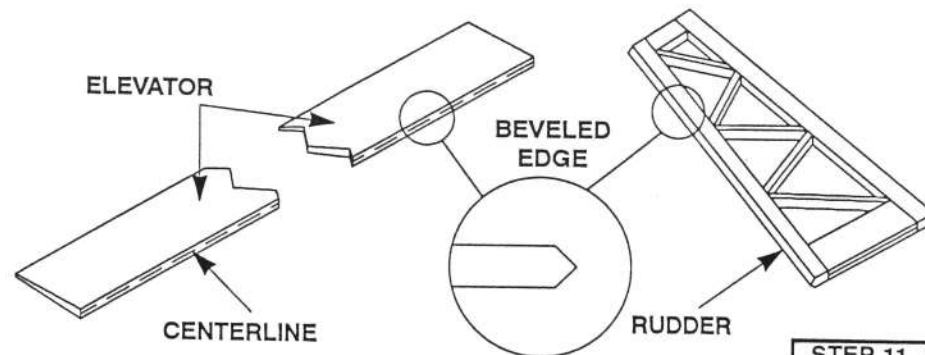
- ❑ 10. Cut the trussing from 1/8" x 3/16" (3.2mm x 4.7mm) balsa and glue in place using thin CA. Lift the rudder structure and block sand both sides smooth.



STEP 10

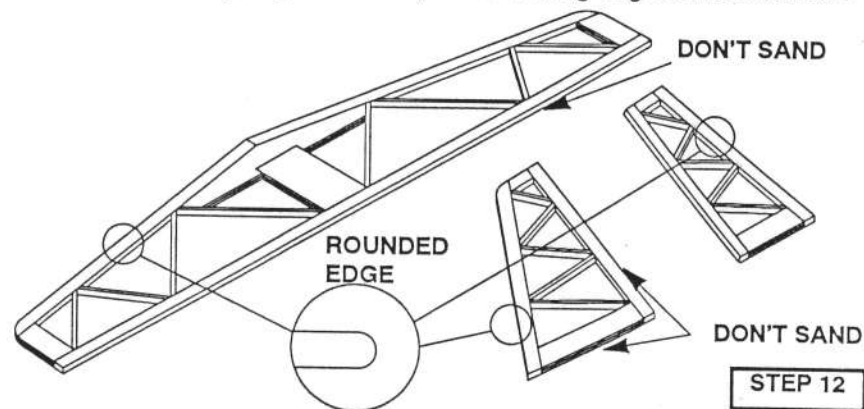
The following steps apply to either tail configuration.

- ❑ 11. Use a pencil to mark a centerline on the leading edge of the elevator(s) and/or rudder. Using a sanding block, sand a bevel onto the leading edge, as shown.



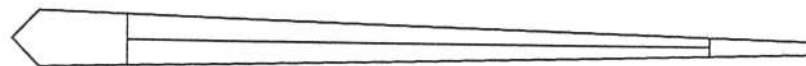
STEP 11

- ❑ 12. Using a sanding block, sand the outside edges of the stabilizer, (fin, and rudder if building a conventional tail), as shown. DO NOT sand the bottom or trailing edge of the fin, or the trailing edge of the stabilizer.



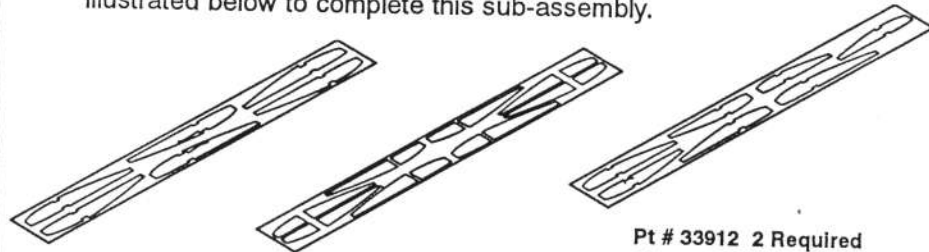
STEP 12

Note: For increased performance, using a sanding block, sand the trailing edge of the rudder (if building a conventional tail) to a taper as shown. This will reduce drag.



Wing

Before beginning the wing, determine which version (one or two piece wing with or without spoilers) you want to build. You will need the parts illustrated below to complete this sub-assembly.

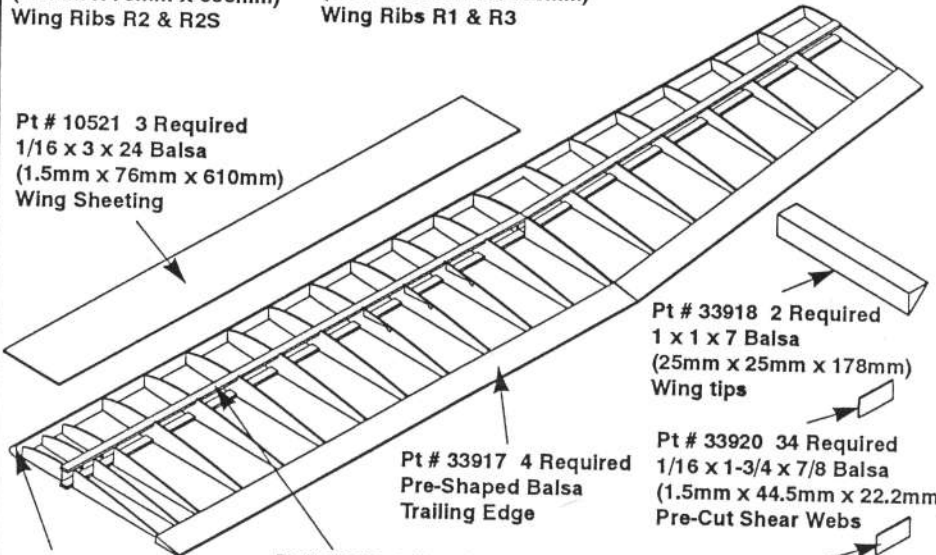


Pt # 33910 3 Required
1/16 x 2-7/8 x 23-7/8 Balsa
(1.5mm x 73mm x 606mm)
Wing Ribs R2 & R2S

Pt # 33911 1 Required
3/32 x 2-7/8 x 23-7/8 Balsa
(2.3mm x 73mm x 606mm)
Wing Ribs R1 & R3

Pt # 33912 2 Required
1/16 x 2-7/8 x 23-7/8 Balsa
(1.5mm x 73mm x 606mm)
Wing Ribs R4 - R10

Pt # 10521 3 Required
1/16 x 3 x 24 Balsa
(1.5mm x 76mm x 610mm)
Wing Sheeting



Pt # 33918 2 Required
1 x 1 x 7 Balsa
(25mm x 25mm x 178mm)
Wing tips

Pt # 33920 34 Required
1/16 x 1-3/4 x 7/8 Balsa
(1.5mm x 44.5mm x 22.2mm)
Pre-Cut Shear Webs

Pt # 33913 2 Required
Pre-Shaped Balsa
Leading Edge

Pt # 33919 8 Required
1/8 x 3/8 x 23-7/8 Spruce
(3.2mm x 9.5mm x 606mm)
Wing Spars

Pt # 33922 1 Required
1/32 x 1 x 2 Ply
(.8mm x 25.4mm x 51mm)
Wing Protectors

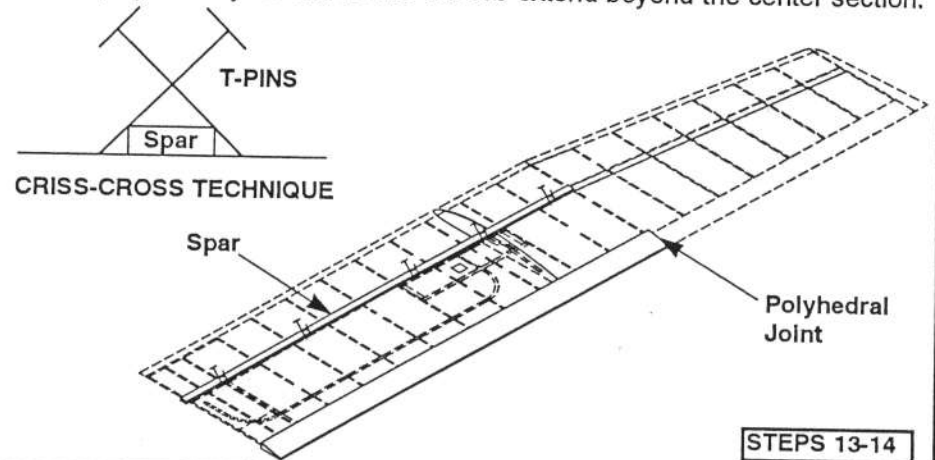
Pt # 33915 1 Required
3/8" (9.5mm) Ply
Pre-Cut Dihedral Brace

Pt # 33908 1 Required
3mm x 2-7/8 x 11-7/8
Lite Ply Dihedral Brace Box

Pt # 33909 1 Required
1/32 x 2-7/8 x 11-7/8 Ply
(.8mm x 73mm x 302mm)
Polyhedral Braces

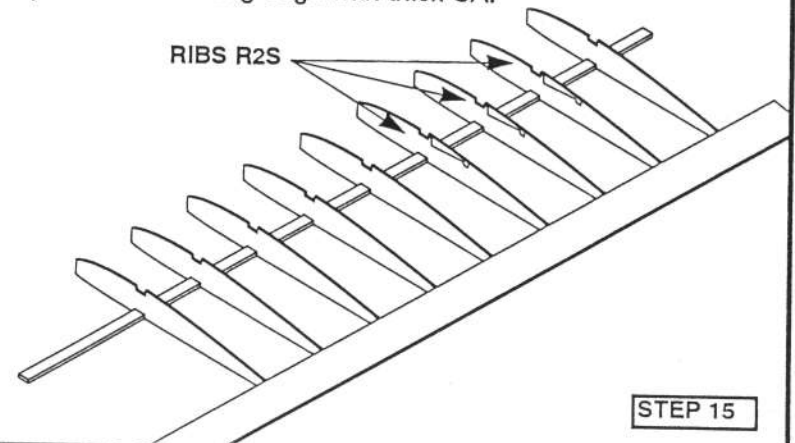
Lay the wing plan on your building board and cover the drawing of the right wing panel with wax paper.

- 13. Position the pre-shaped inner panel trailing edge flush with the polyhedral joint and let the excess extend beyond the center section. Pin in place.
- 14. Using a criss-cross technique, pin the 1/8" x 3/8" x 23-7/8" (3.2mm x 9.5mm x 606mm) spruce spar in place. Place one end flush with the polyhedral joint and let the excess extend beyond the center section.



STEPS 13-14

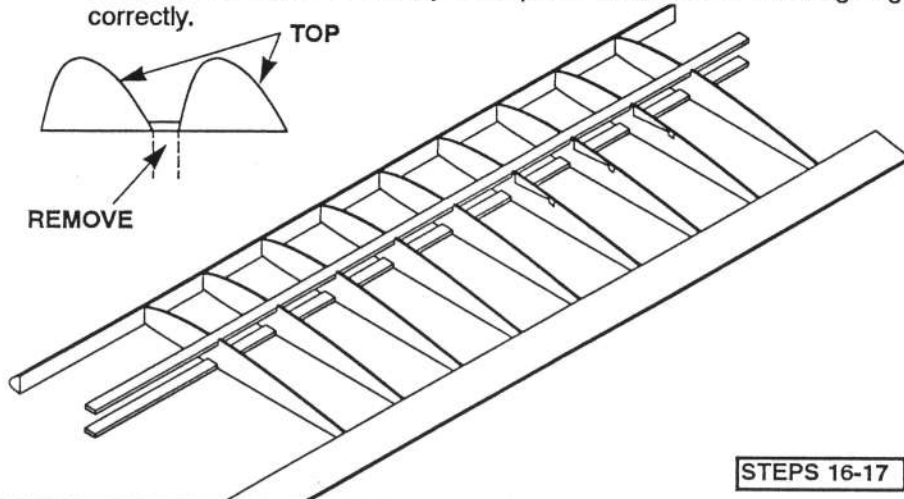
- 15. Place the six (6) R2 ribs and the three (3) R2S ribs in position. Make sure to place the R2S ribs in the correct location. The R2S ribs are identified by the wedge shaped impression marks as shown. Use a square to set the proper rib angle at 90 degrees. Glue in place to the main spar and the trailing edge with thick CA.



STEP 15

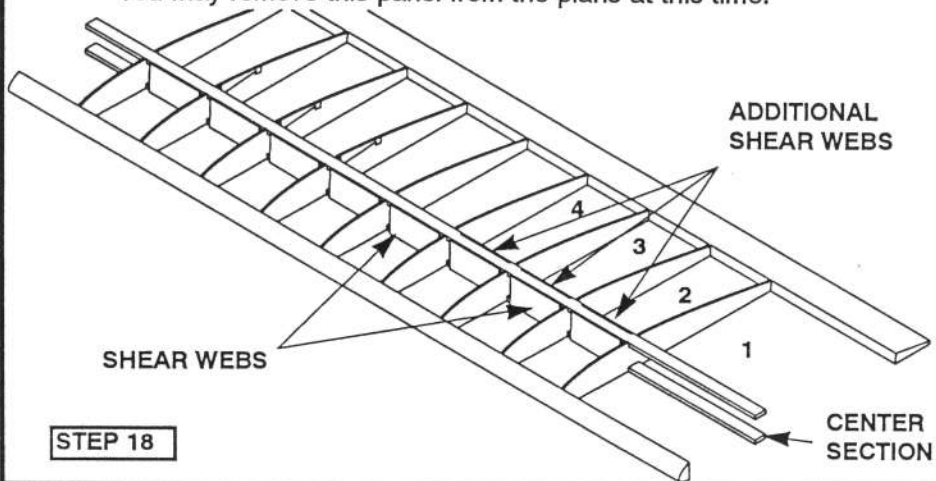
□□ 16. Position the top spar in the notches in the ribs and glue in place with thick CA; again, flush with the polyhedral joint. Be careful to keep the ribs square.

□□ 17. Separate the leading edges. Position and glue the pre-shaped leading edge in place, keeping the bottom edge flush with the bottom of the ribs. Be careful to identify the top and bottom of the leading edge correctly.



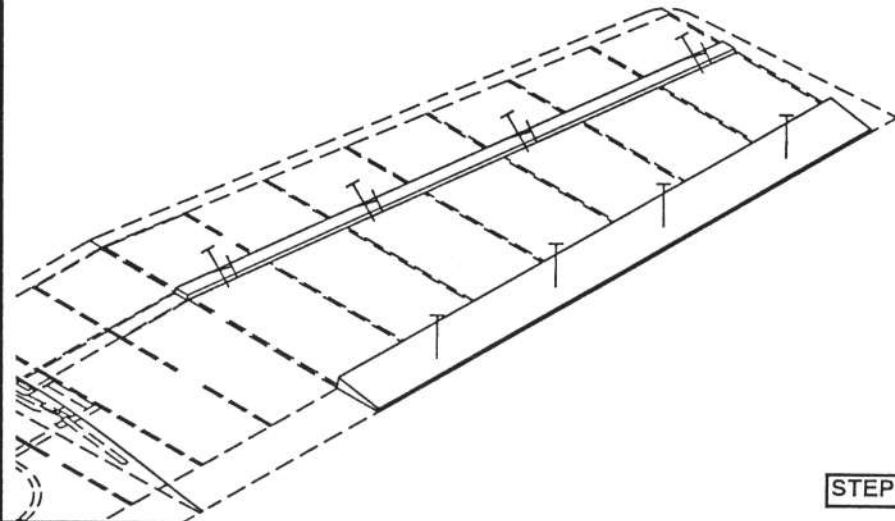
STEPS 16-17

□□ 18. Using thick CA, glue the 1/16" x 1-3/4" x 7/8" (1.5mm x 44.5mm x 22.2mm) balsa shear webs to the front of the spars. The shear webs should be centered on the spars and between the ribs. Three webs are also installed on the back of the spar in the 2nd, 3rd, and 4th rib bays, as shown. There are no shear webs at either end of the panel. You may remove this panel from the plans at this time.



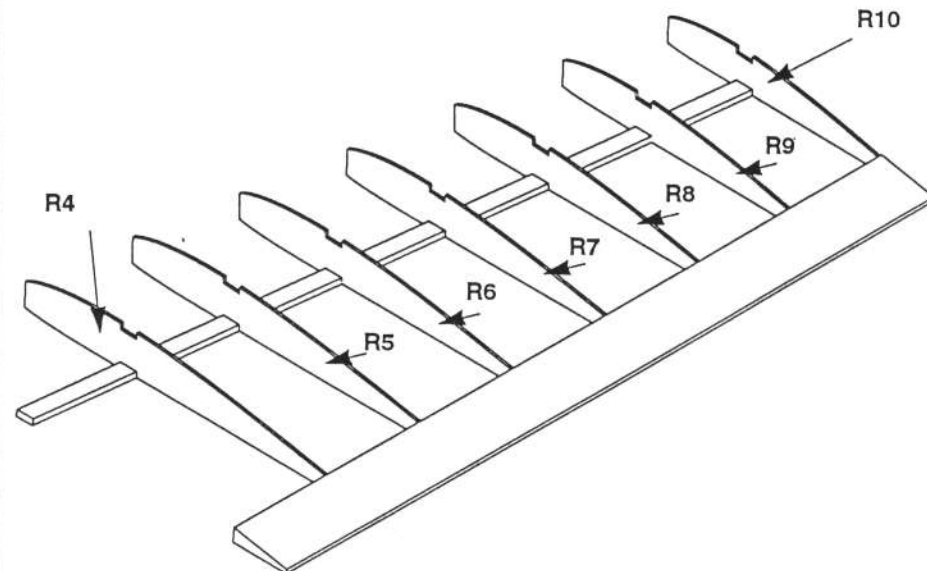
STEP 18

□□ 19. Cut the outer panel trailing edge to length and pin in place. Cut the outer panel 1/8" x 3/8" (3.2mm x 9.5mm) spruce spar to length and pin in place using a criss-cross technique.



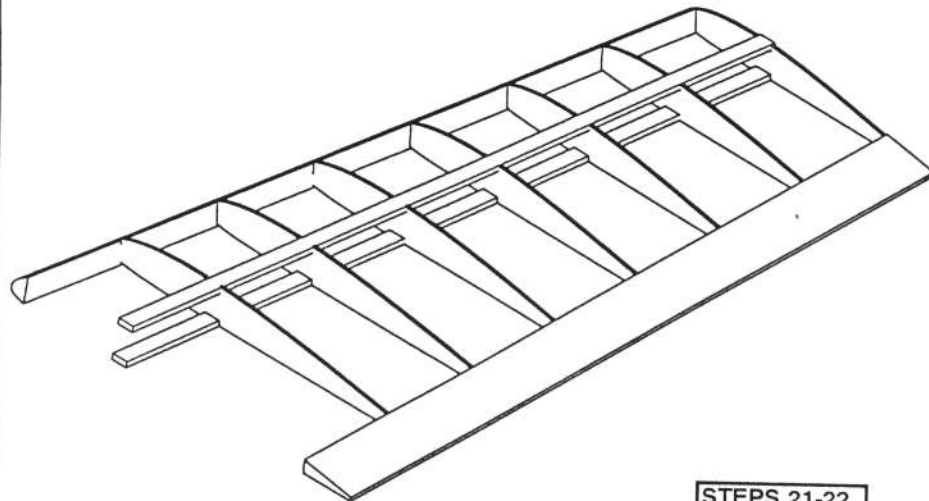
STEP 19

□□ 20. Position ribs R4 thru R10 in place. Use a square to set the rib at 90 degrees to the bench. Glue in place to the main spar and the trailing edge using thick CA.



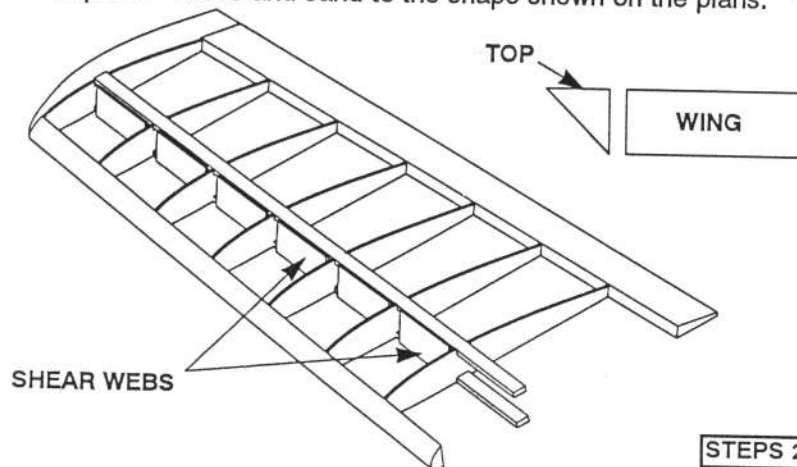
STEP 20

- 21. Using thick CA, position and glue the top spar in place.
- 22. Using CA, position and glue the pre-shaped leading edge in place, keeping the bottom edge flush with the bottom of the ribs.



STEPS 21-22

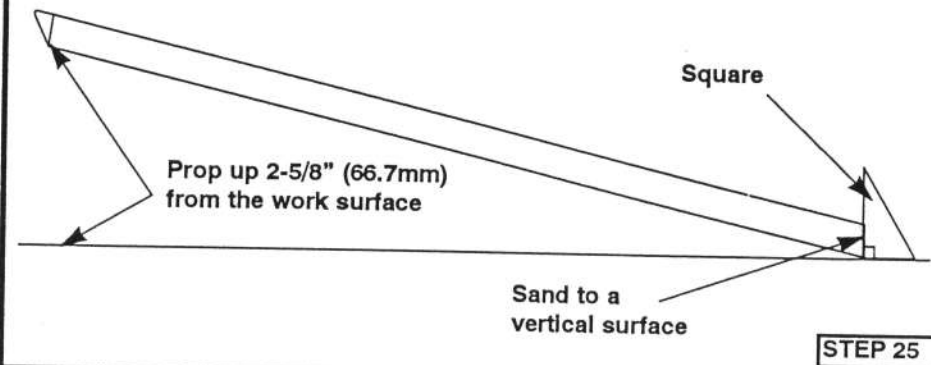
- 23. Using thick CA, glue the 1/16" x 1-3/4" x 7/8" (1.5mm x 44.5mm x 22.2mm) balsa shear webs to the front of the spars. The shear webs should be centered on the spars and between the ribs. They may need to be trimmed to fit flush with the top of the spars.
- 24. Remove the wing panel from plan; sand the leading edge, trailing edge, and spars flush with R10. Position and glue the balsa wing tip in place. Carve and sand to the shape shown on the plans.



SHEAR WEBS

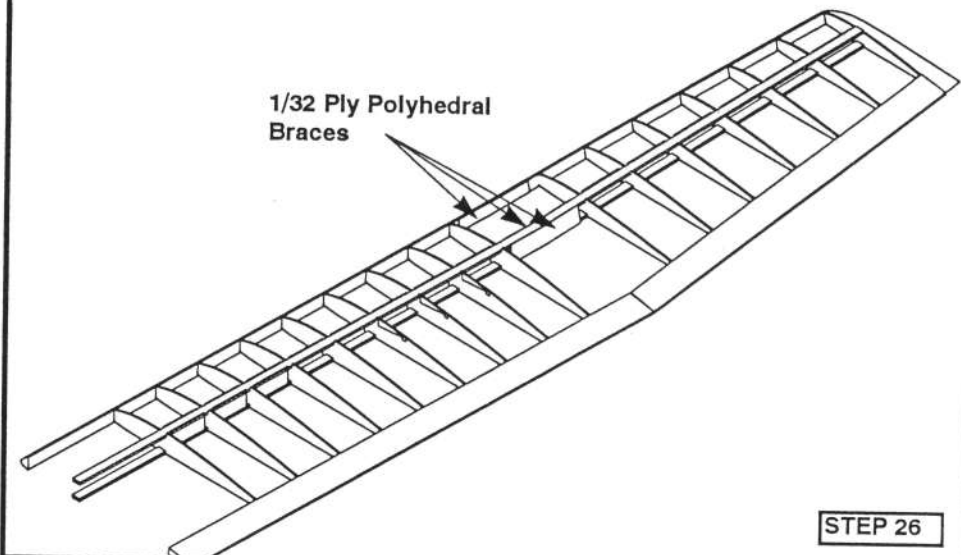
STEPS 23-24

- 25. Position the outer panel over the plan. Prop up 2-5/8" (66.7mm) from the work surface to the bottom of R10. Sand the leading edge, trailing edge, and spars to achieve vertical surfaces on each. Be careful not to sand any sweep (forward or backward) into the wing panel.



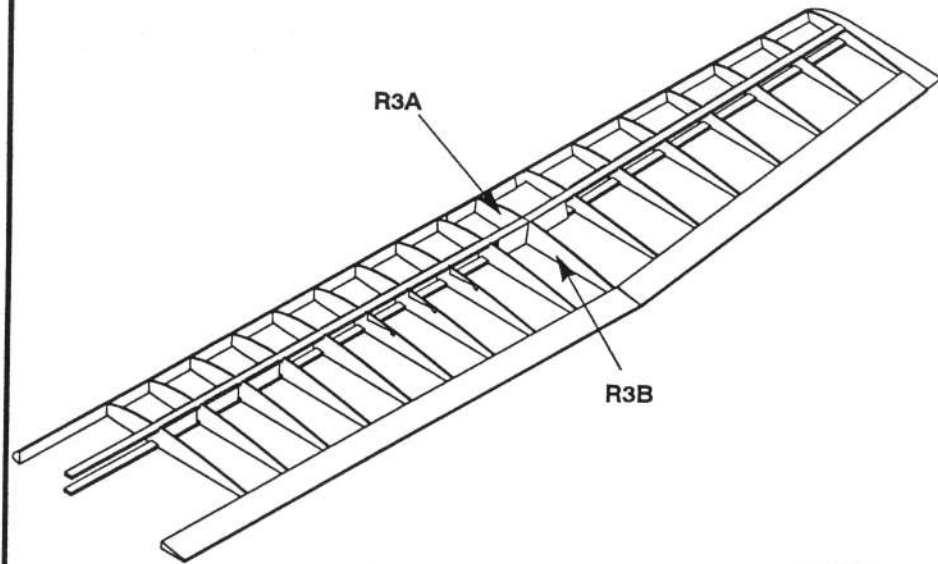
STEP 25

- 26. Place the inner panel over the plan; using thick CA, tack glue the leading edges, trailing edges and main spars of the two panels together at the polyhedral joint. Using 5 minute epoxy, glue the three 1/32" (.8mm) ply polyhedral braces, two (2) to the spars and one (1) to the leading edge and clamp until the epoxy has cured.



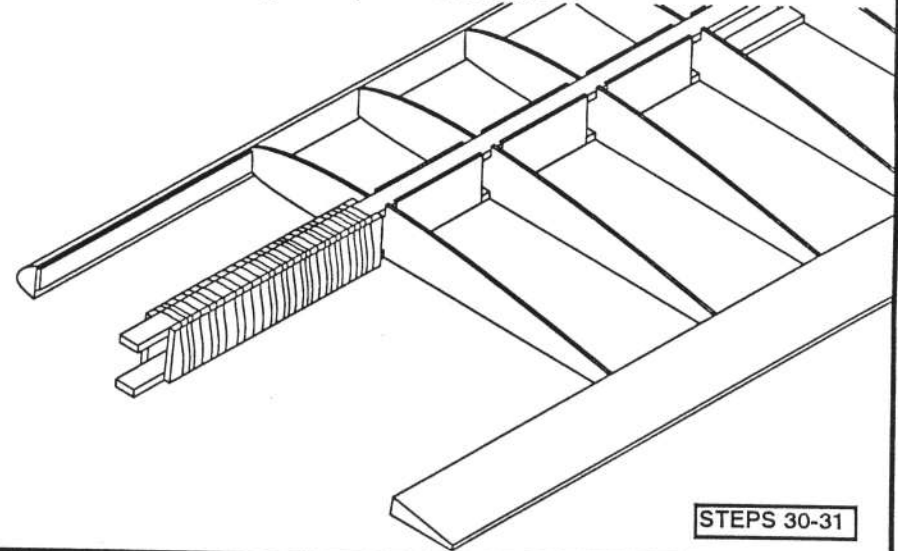
STEP 26

- 27. Position ribs R3A and R3B and glue in place. They may need to be sanded slightly to achieve a good fit.



STEP 27

- 31. Wrap each dihedral brace box half tightly with thread (not included) about 20 turns and glue in place with thin CA.

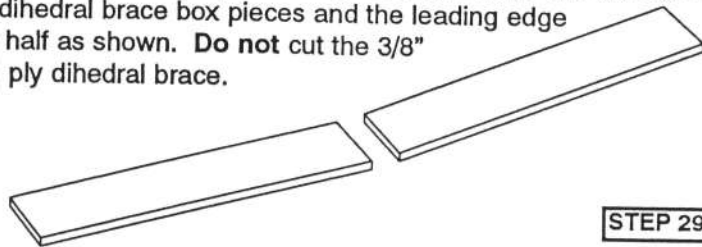


STEPS 30-31

- 28. Repeat steps 13 thru 27 for the left wing half.

If you are building the one piece wing version, skip ahead to step number 32.

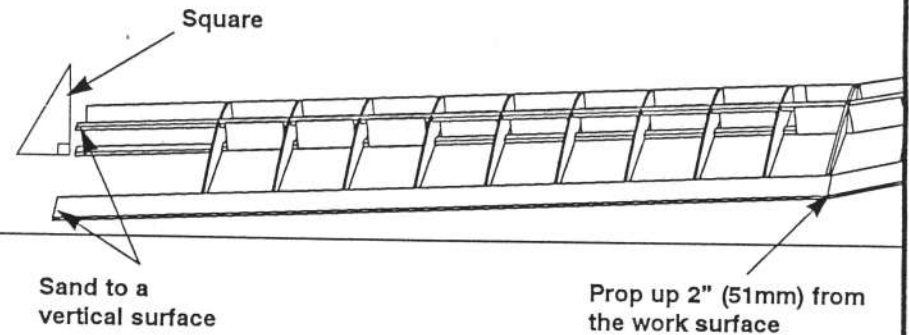
- 29. If you are building the two piece wing version, cut the two die-cut 3mm Lite Ply dihedral brace box pieces and the leading edge brace in half as shown. **Do not** cut the 3/8" (9.5mm) ply dihedral brace.



STEP 29

- 32. Prop up one wing panel 2" (51mm) from the work surface to the bottom of R3, and sand the leading edge, trailing edge and spars to a vertical surface. Do the same for the opposite wing panel.

- 33. Test fit the two inner panels together by pinning one wing panel flat and propping up the other wing panel 4" (102mm) from the work surface to the bottom of R3. Be sure that each spar, etc. is flush with the opposite spar, etc. If necessary, sand until a correct fit is obtained. When the fit is correct, tack glue the leading edges, trailing edges and main spars of the two panels together using thick CA.

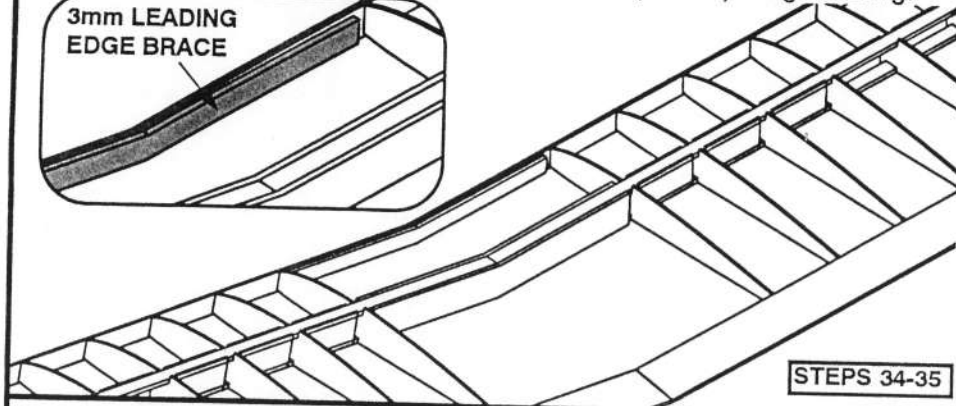
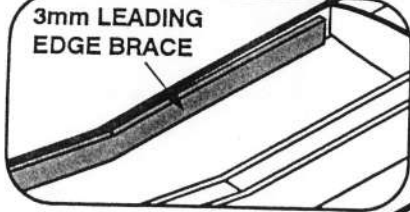


STEPS 32-33

- 30. Using epoxy, glue these pieces on both sides of the spars in the center section. Make sure the end you just cut faces towards the center of the wing, with the slant angled up; while the other end is butted against the first R2 rib. Be careful that the epoxy does not flow into the area between the spars, as the dihedral brace must slide into this area. Using thick CA, glue each half of the leading edge brace in place centered on the leading edge and against the first R2 rib.

Steps 34 and 35 are for the one piece wing version only.

- 34. Apply 30 minute epoxy to the 3/8" (9.5mm) ply dihedral brace and position between the spars. Apply epoxy to the two die-cut dihedral brace box pieces and clamp in place.
- 35. Epoxy the die-cut 3mm lite-ply leading edge brace in place. Center the brace on the leading edge to clear the 1/16" (1.5mm) wing sheeting.



STEPS 34-35

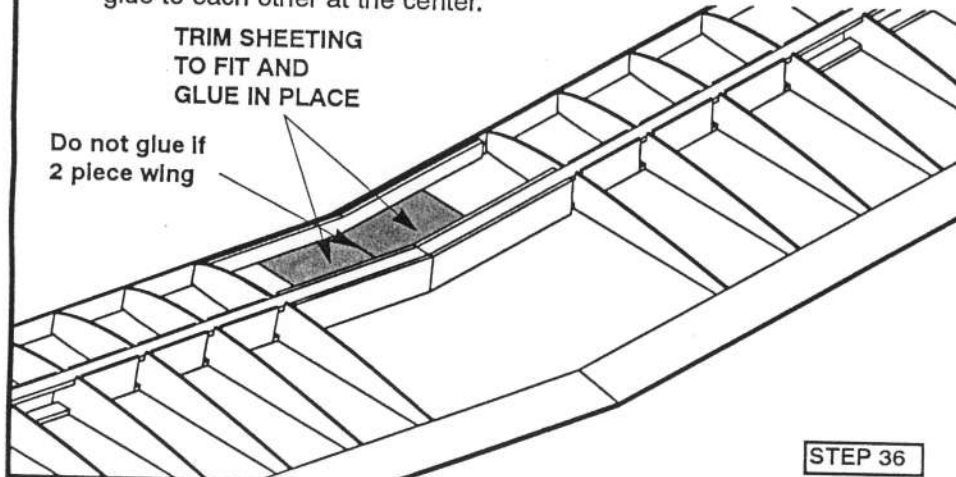
Steps 36 thru 42 apply to all wing configurations.

If building a two piece wing, slide the ply dihedral brace into place and slide the wing halves together.

- 36. From a 1/16" x 3" x 23-7/8" (1.5mm x 76mm x 606mm) balsa sheet, cut six pieces 2-3/8" (60mm) long. Place one of the sheets flush with the bottom of the leading edge and trim it to the front of the dihedral brace box. Glue in place with thin CA. If building a two piece wing, do not glue to each other at the center.

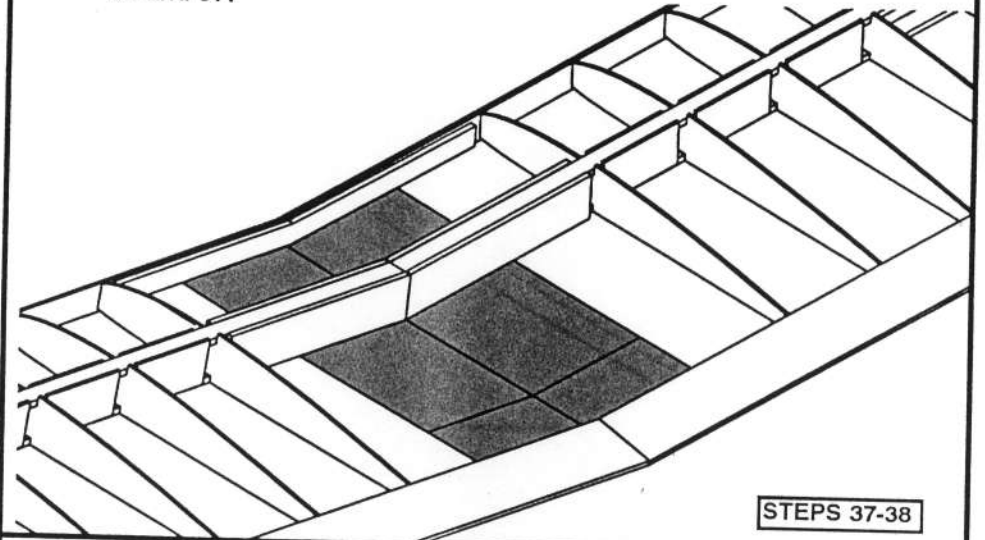
TRIM SHEETING
TO FIT AND
GLUE IN PLACE

Do not glue if
2 piece wing



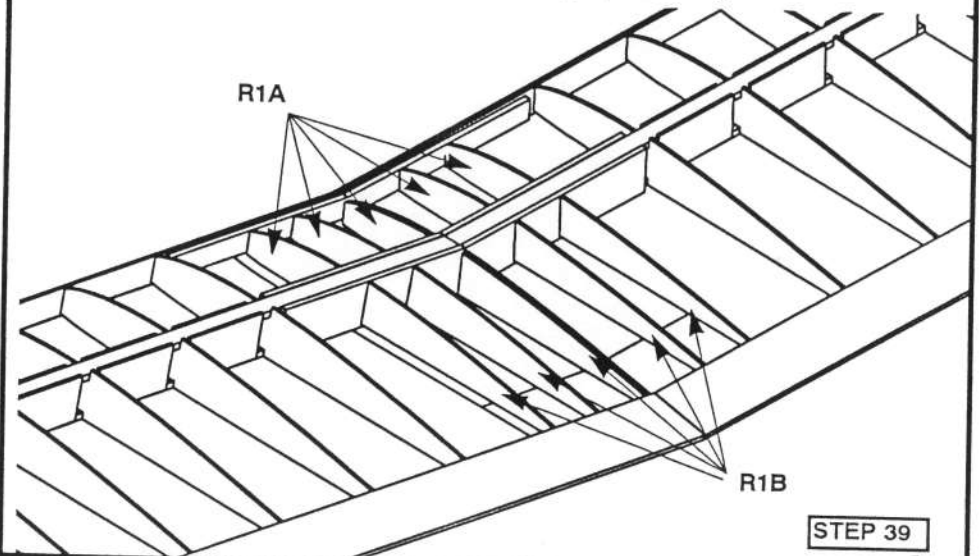
STEP 36

- 37. Glue another piece to the rear of the dihedral brace box and trim a third piece to fit from the second to the trailing edge, glue in place with CA. If building a two piece wing, do not glue to each other at the center.
- 38. Remove pins, pin the other wing panel flat on the board. Repeat steps 36 and 37.



STEPS 37-38

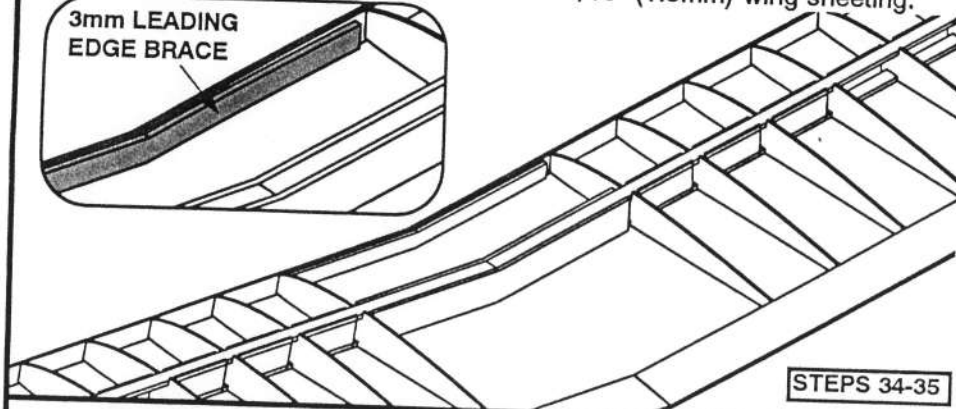
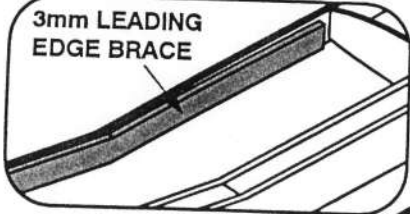
- 39. Test fit ribs R1A and R1B in position. If necessary, sand to fit properly. Using thick CA, glue these ribs in position. The center two ribs are glued together in the one piece wing option only.



STEP 39

Steps 34 and 35 are for the one piece wing version only.

- 34. Apply 30 minute epoxy to the 3/8" (9.5mm) ply dihedral brace and position between the spars. Apply epoxy to the two die-cut dihedral brace box pieces and clamp in place.
- 35. Epoxy the die-cut 3mm lite-ply leading edge brace in place. Center the brace on the leading edge to clear the 1/16" (1.5mm) wing sheeting.



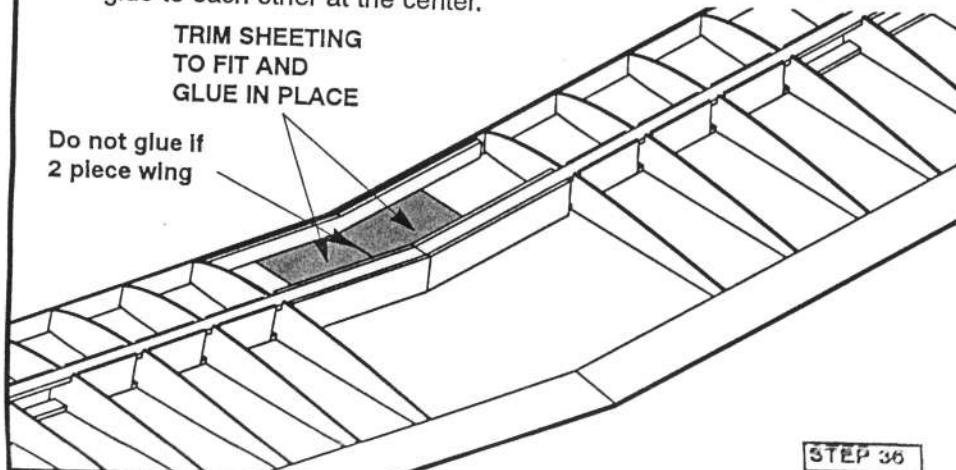
Steps 36 thru 42 apply to all wing configurations.

If building a two piece wing, slide the ply dihedral brace into place and slide the wing halves together.

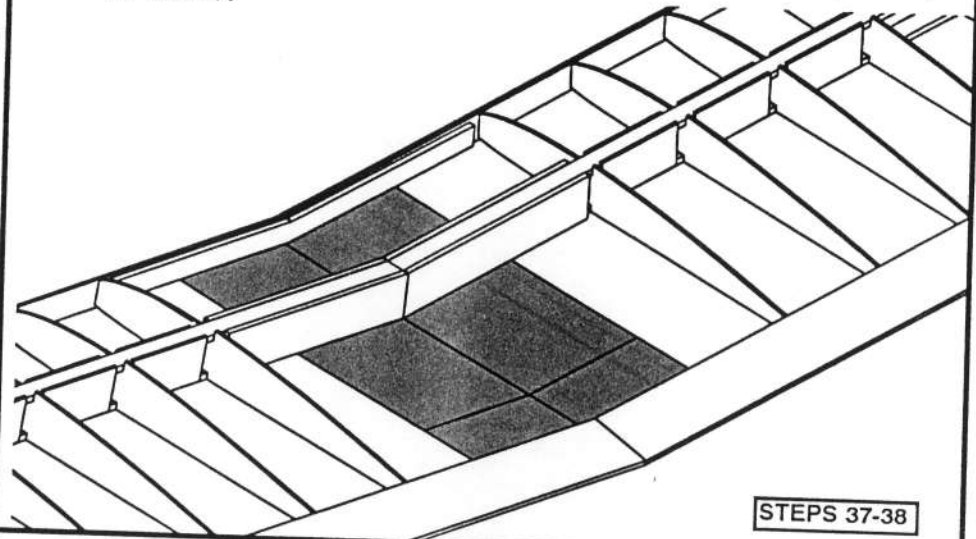
- 36. From a 1/16" x 3" x 23-7/8" (1.5mm x 76mm x 606mm) balsa sheet, cut six pieces 2-3/8" (60mm) long. Place one of the sheets flush with the bottom of the leading edge and trim it to the front of the dihedral brace box. Glue in place with thin CA. If building a two piece wing, do not glue to each other at the center.

TRIM SHEETING TO FIT AND GLUE IN PLACE

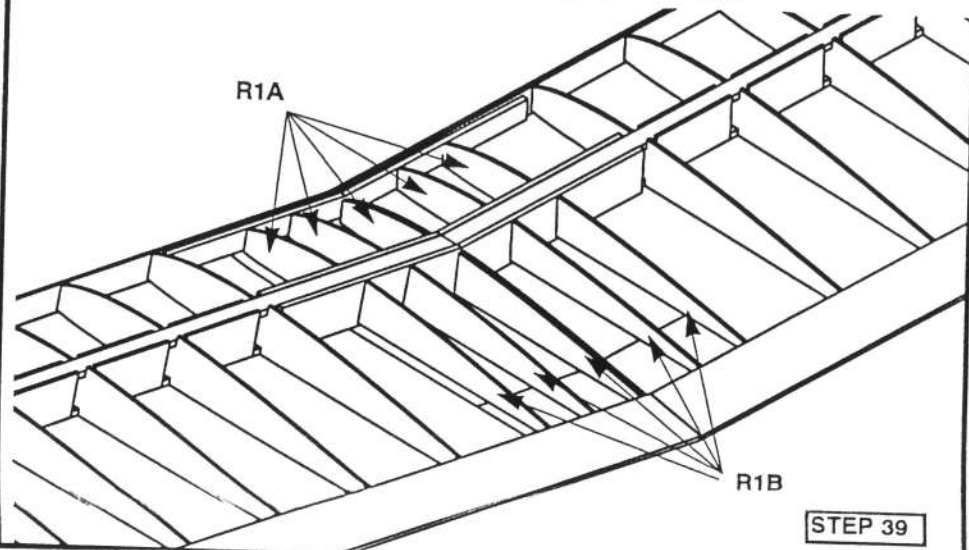
Do not glue if 2 piece wing



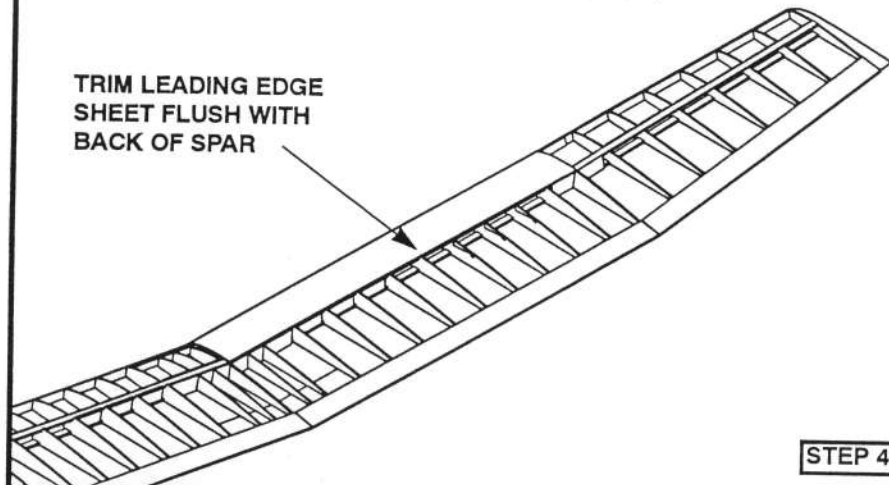
- 37. Glue another piece to the rear of the dihedral brace box and trim a third piece to fit from the second to the trailing edge, glue in place with CA. If building a two piece wing, do not glue to each other at the center.
- 38. Remove pins, pin the other wing panel flat on the board. Repeat steps 36 and 37.



- 39. Test fit ribs R1A and R1B in position. If necessary, sand to fit properly. Using thick CA, glue these ribs in position. **The center two ribs are glued together in the one piece wing option only.**

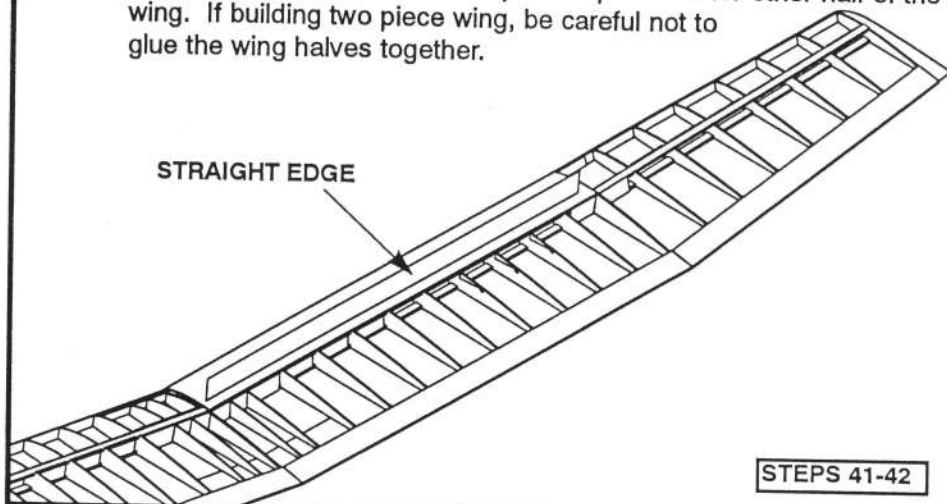


- 40. Trim a 1/16" x 3" x 23-7/8" (1.5mm x 76mm x 606mm) balsa leading edge sheet to cover rib R3A and flush with center rib R1A. Tape in position on the leading edge with masking tape. Press the sheeting in place and trim flush with the back of the spar.



STEP 40

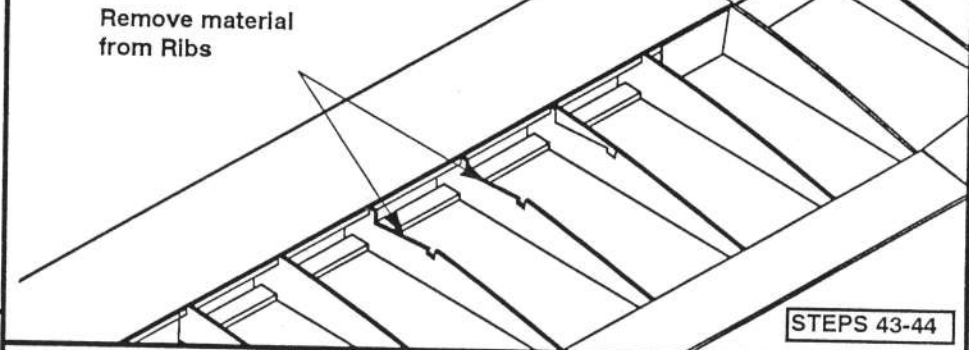
- 41. Place a bead of thick CA to the top of the spar and press the leading edge sheet into position. A straight edge will help hold the sheeting down evenly. Also, apply glue between the strips of tape on the leading edge.
- 42. Flip the wing over and glue the sheeting to the ribs using thin CA. Use a pin to poke holes in the center sheeting over ribs R1A and apply thin CA in each hole. Repeat steps 40-42 for other half of the wing. If building two piece wing, be careful not to glue the wing halves together.



STEPS 41-42

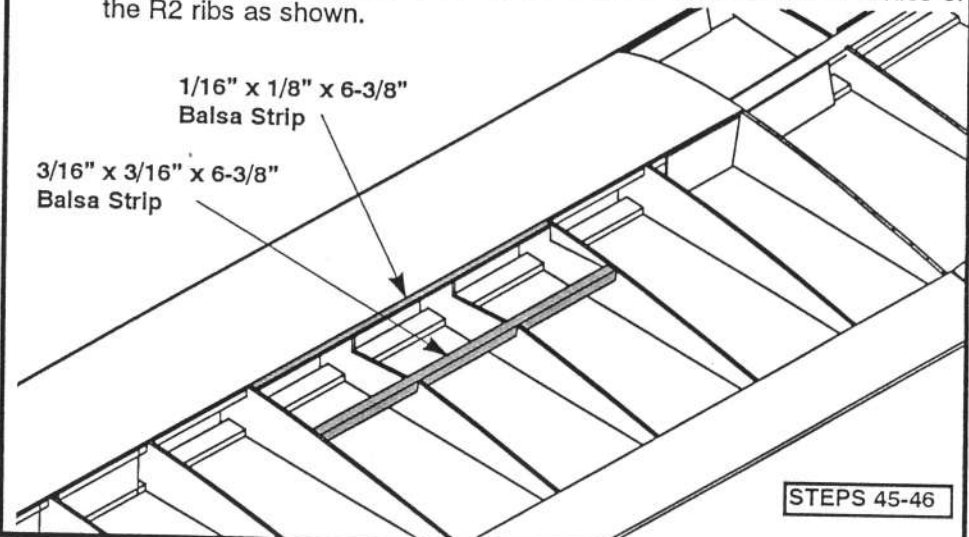
Steps 43 - 49 are for installing spoilers in either the one or two piece wing. **If you are not installing spoilers, skip ahead to step 50.**

- 43. Cut one 6-3/8" (162mm) long spoiler from the scrap end of each outer panel trailing edge.
- 44. Remove the material from the impression marks from the two R2S ribs where the spoiler will be, as shown on the plan.



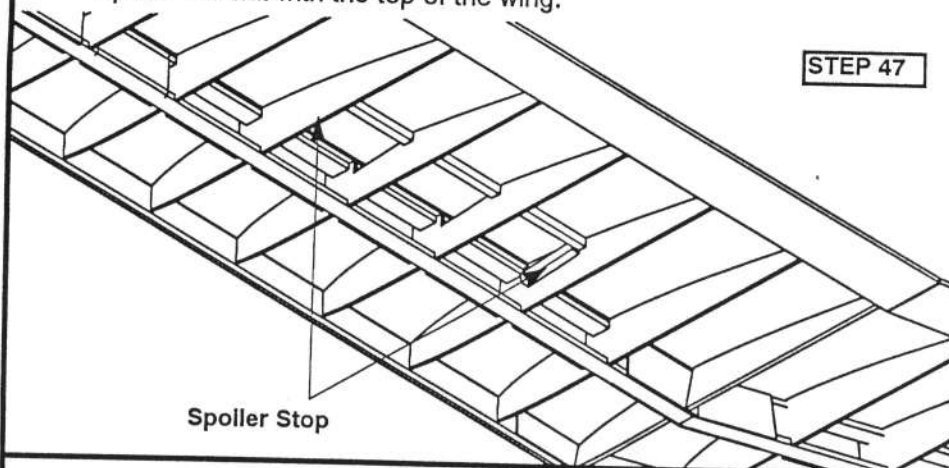
STEPS 43-44

- 45. Using CA, glue a 1/16" x 1/8" x 6-3/8" (1.5mm x 3.2mm x 162mm) balsa strip (not supplied) to the back edge of the leading edge sheet between the R2 ribs as shown.
- 46. Using CA, glue the 3/16" x 3/16" x 6-3/8" (4.7mm x 4.7mm x 162mm) balsa strip (not supplied) in the notches of the R2S ribs and the sides of the R2 ribs as shown.

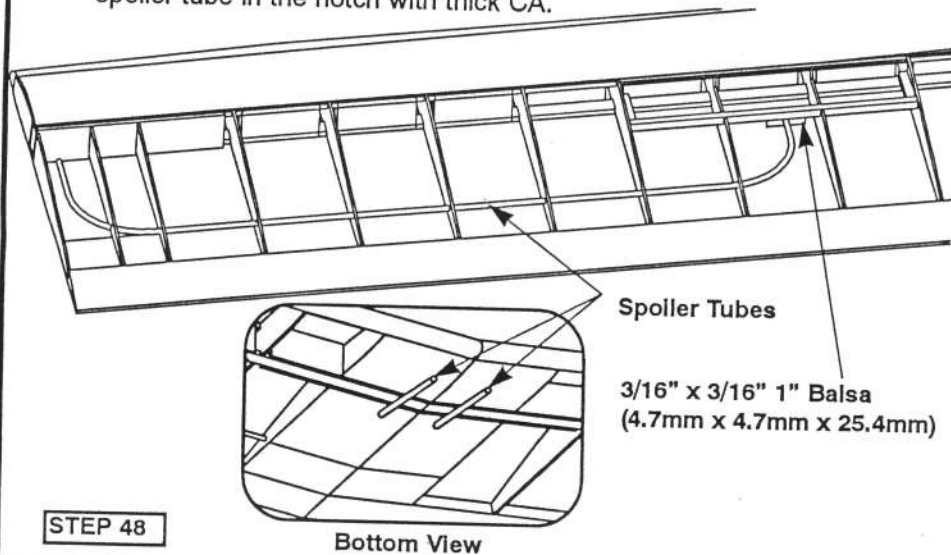


STEPS 45-46

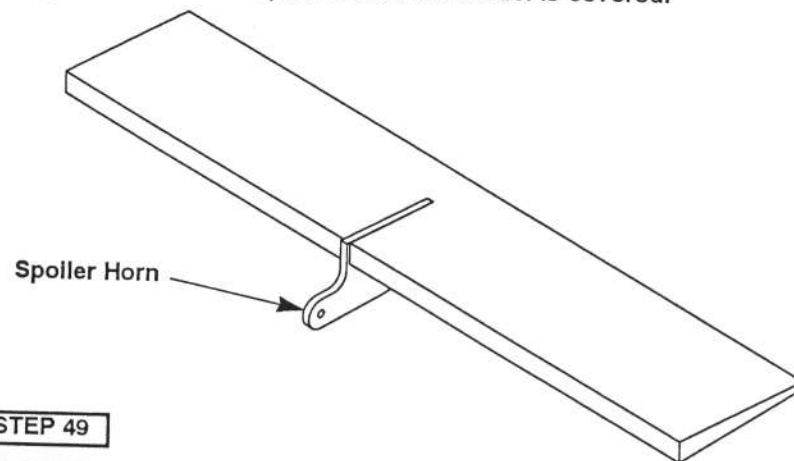
- 47. Position the spoiler and sand if necessary to achieve a $1/32"$ (.8mm) gap around the sides and the trailing edge. Temporarily tape the spoiler in place and flip the wing over. Carefully glue the $3/16" \times 3/16" \times 1-1/4"$ (4.7mm x 4.7mm x 32mm) balsa spoiler stops (not supplied) in place on ribs R2 (one at each end of spoiler) as shown. Make sure the spoiler sits flat with the top of the wing.



- 48. Drill a $1/8"$ (3.2mm) hole in the ribs at the locations shown on the plans to run the spoiler tubing thru. Exit the tubing just to the rear of the dihedral brace box. Notch a $3/16" \times 3/16" \times 1"$ (4.7mm x 4.7mm x 25.4mm) piece of balsa (not included) and glue it to the bottom of the $3/16" \times 3/16" \times 6-3/8"$ (4.7mm x 4.7mm x 162mm) balsa with thick CA; glue the spoiler tube in the notch with thick CA.

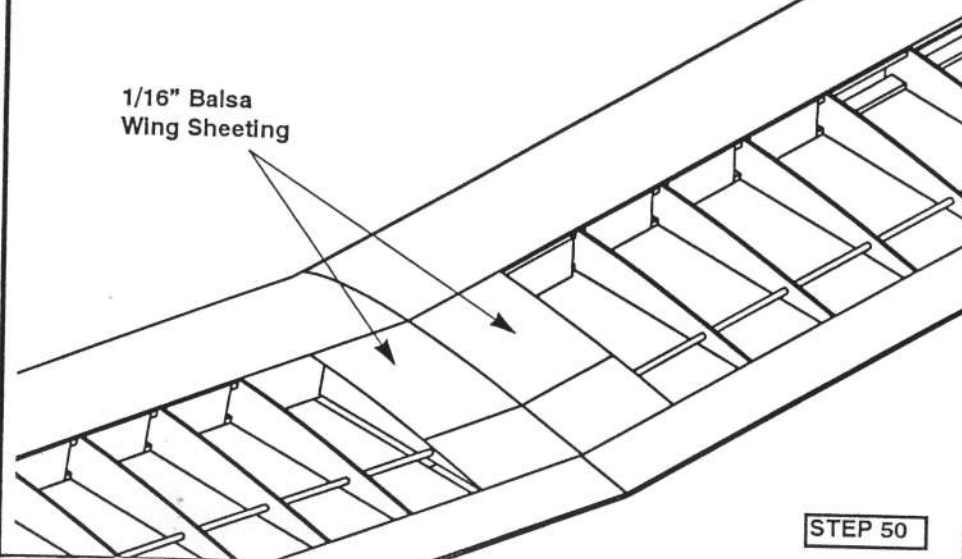


- 49. Using the template on the plans, make two spoiler control horns from $1/16"$ (1.5mm) ply. Cut a $1/16"$ (1.5mm) wide slot in the spoiler at the location shown on the plans for the control horn and glue in place. The spoilers will be completed after the model is covered.

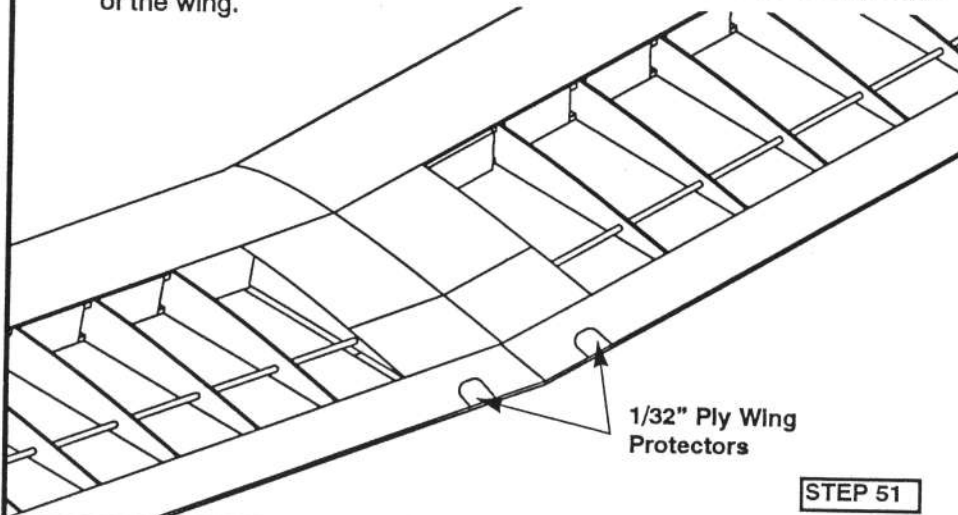


The following steps apply to all wing configurations.

- 50. Using the remaining piece of $1/16"$ (1.5mm) balsa sheeting, sheet the top inboard center section out past rib R1B as shown. Using thick CA, glue a piece to the rear of the spar. Next, trim a piece to fit between the first piece and the trailing edge. If building a two piece wing, do not glue to each other at the center.



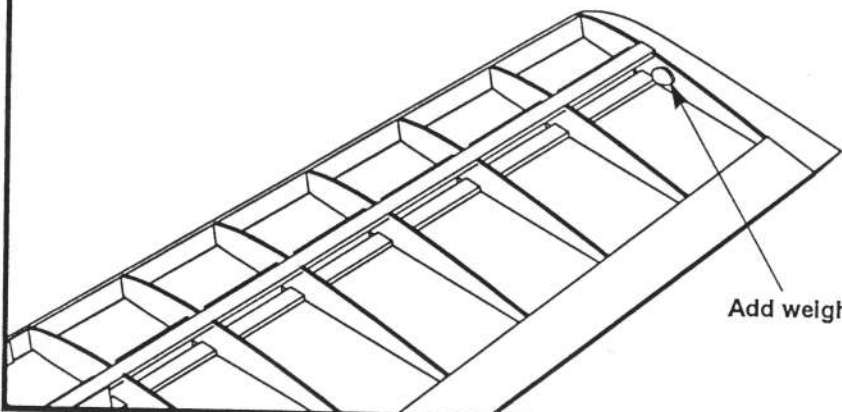
- 51. Cut the 1/32" x 1" x 2" (.8mm x 25.4mm x 51mm) ply wing protector in two. Each piece should be 1" x 1" (25.4mm x 25.4mm). Sand three of the edges to a taper and glue to the top of the wing as shown on the plan. Place the unsanded edge flush with the back of the trailing edge of the wing.



Balance the wing laterally by placing the wing on a flat level surface and notice which wing panel drops. Add a small amount of weight such as a penny to the high (lighter) wing tip and secure in place with thick CA.

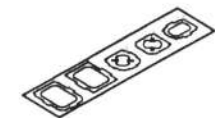
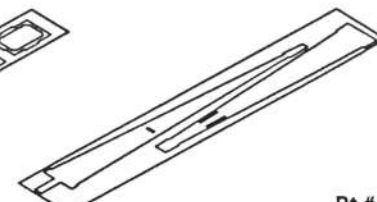
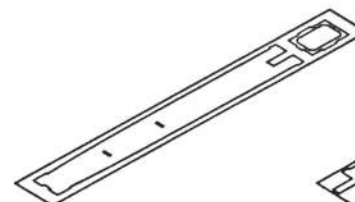
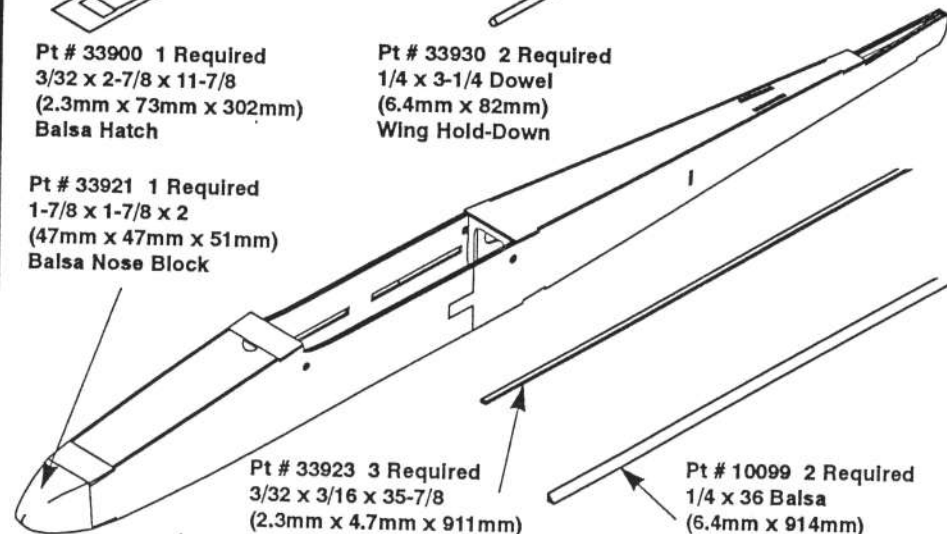
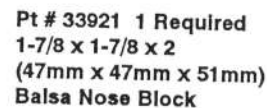
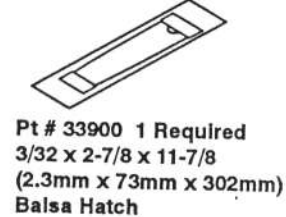
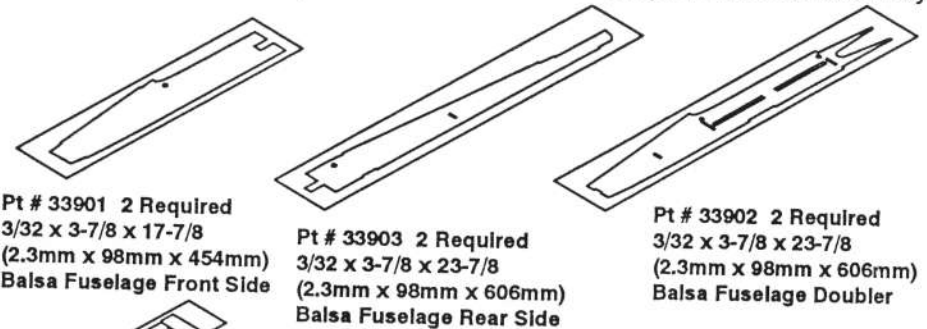


Wing panels should balance equally

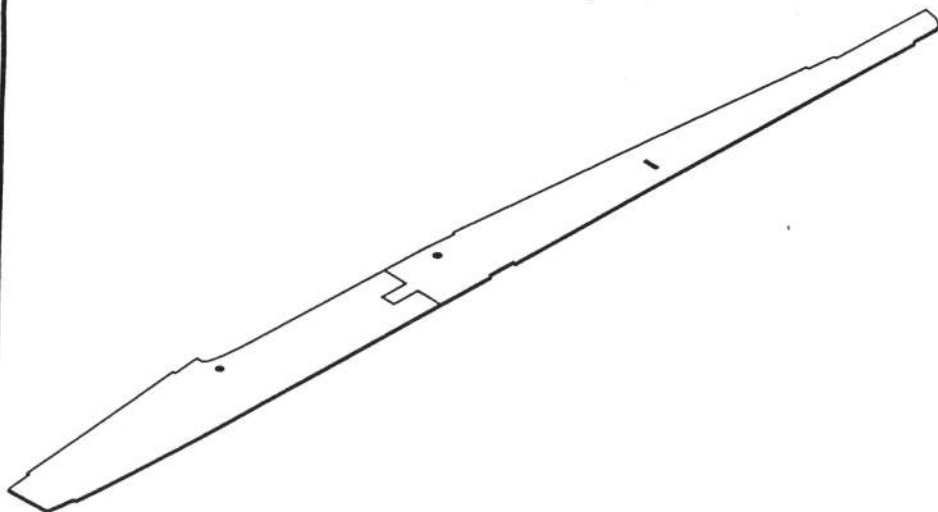


Fuselage

You will need the parts illustrated below to complete this sub-assembly.

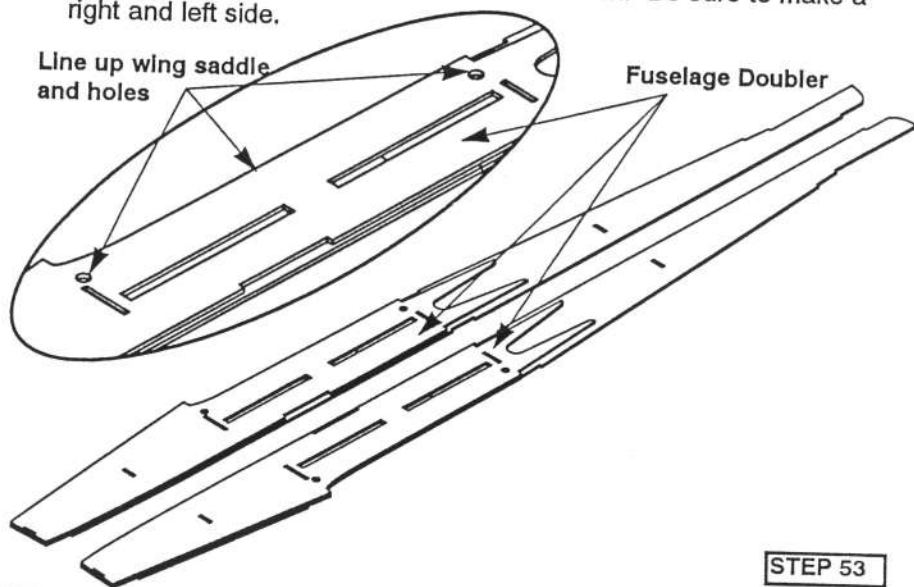


- 52. Cover the fuselage plan with wax paper and lay a 3/32" (2.3mm) balsa front and rear fuselage side together over the plan. Line up the edges of the parts with the plan and glue them together with CA. Make the other fuselage side using the other set of parts.



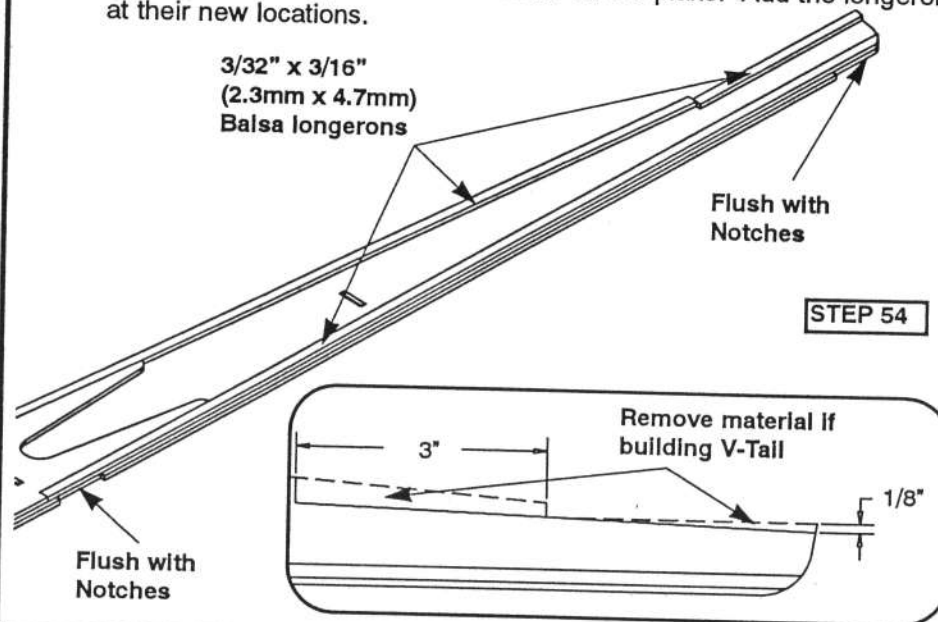
STEP 52

- 53. Using thick CA, glue the die-cut balsa fuselage doubler in place. Line-up the wing saddles, holes and front as shown. Be sure to make a right and left side.



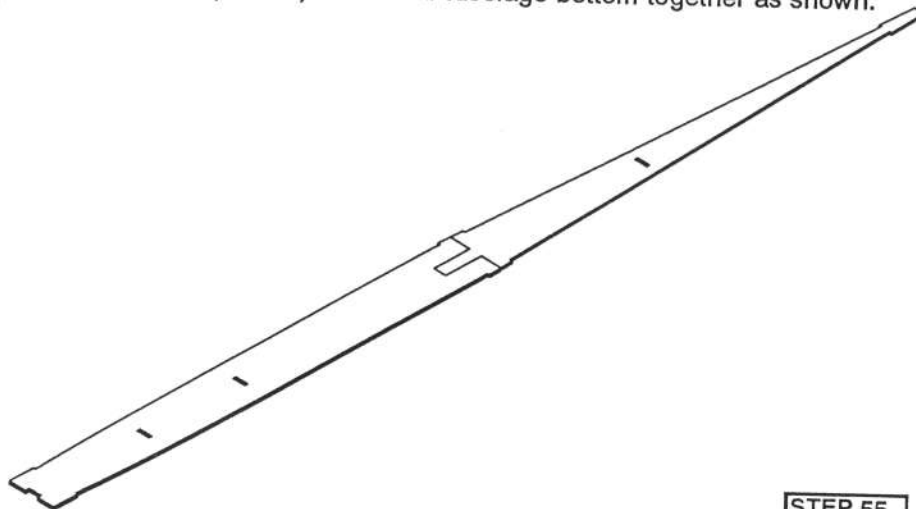
STEP 53

- 54. Cut the 3/32" x 3/16" (2.3mm x 4.7mm) balsa longerons to length and glue in place with thin CA. Position the longerons flush with the bottom of the notches as shown. Note: Cut all the long longerons first. If building the V-Tail, trim the stabilizer platform 1/8" (3.2mm) down at the rear and 3" (76mm) forward as shown on the plans. Add the longerons at their new locations.



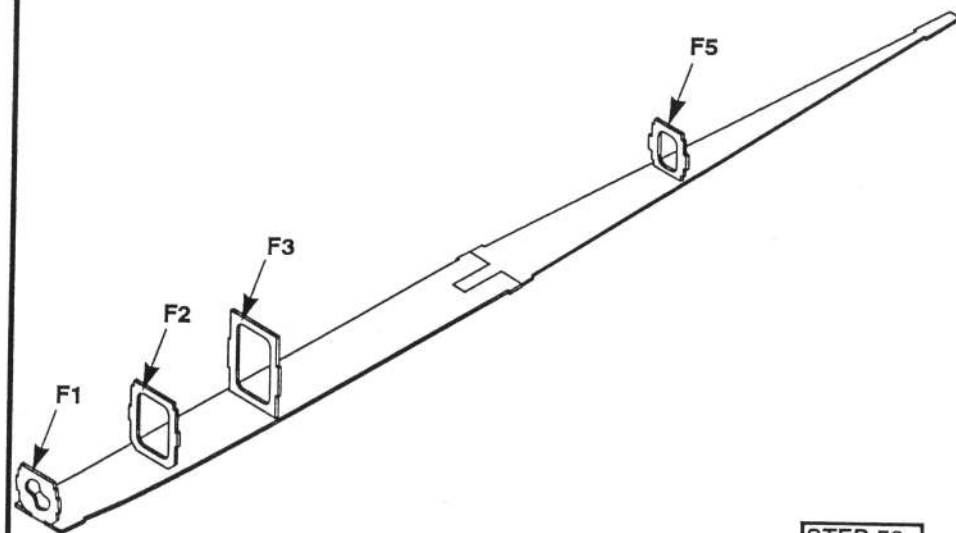
STEP 54

- 55. Using thick CA, glue the die-cut 3mm lite ply front fuselage bottom and the 3/32" (2.3mm) balsa rear fuselage bottom together as shown.



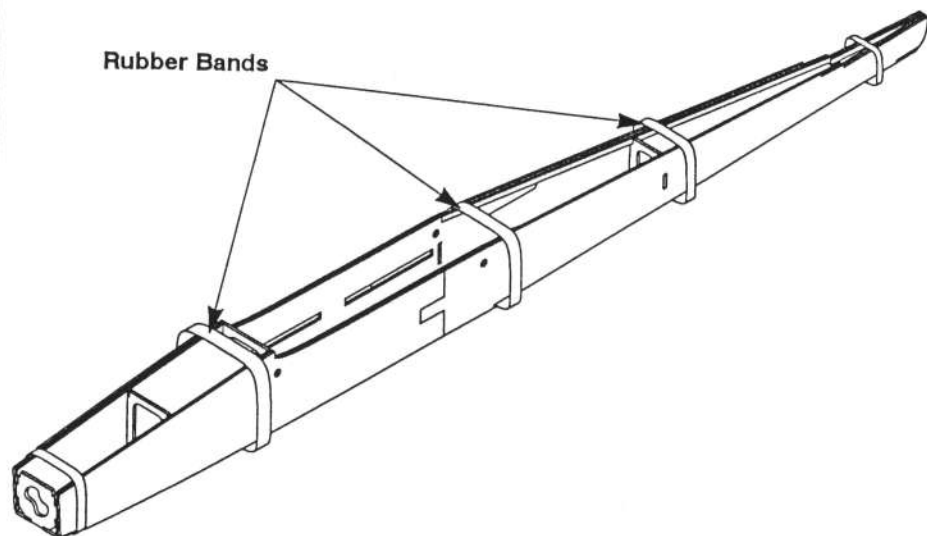
STEP 55

- 56. Position all the fuselage formers except F4 on the fuselage bottom as shown. Do not glue at this time.



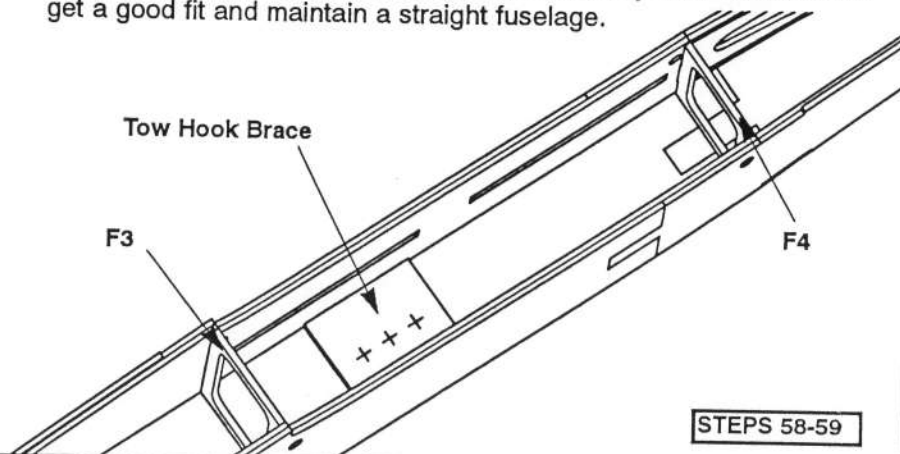
STEP 56

- 57. Place the fuselage sides over the fuselage bottom making sure the tabs of the formers "lock" into their respective slots. Use rubber bands to secure the fuselage together.



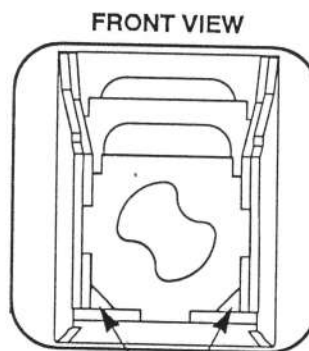
STEP 57

- 58. Position F4 in place. Check the fit of the Die-Cut 3mm Lite-Ply tow hook brace in its slot between the fuselage doublers. Make sure the three impression marks face towards the top. Glue to the fuselage bottom with thick CA.
- 59. Check to be sure the fuselage is straight and free from twists. When satisfied with the alignment, apply thick CA to all joints. Be careful to get a good fit and maintain a straight fuselage.

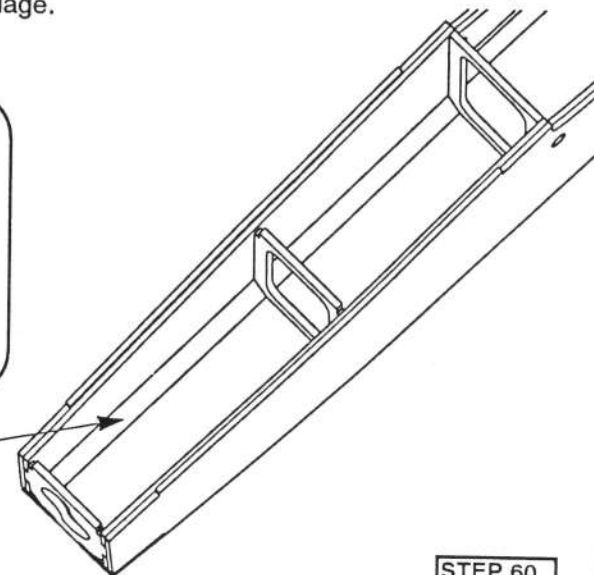


STEPS 58-59

- 60. Slide a piece of 1/4" (6.4mm) balsa triangle stock in the front of the fuselage bottom past F1 and F2 and against the front of F3. Trim the triangle stock to length, flush with F1, and glue with thin CA. Repeat for other side of the fuselage.



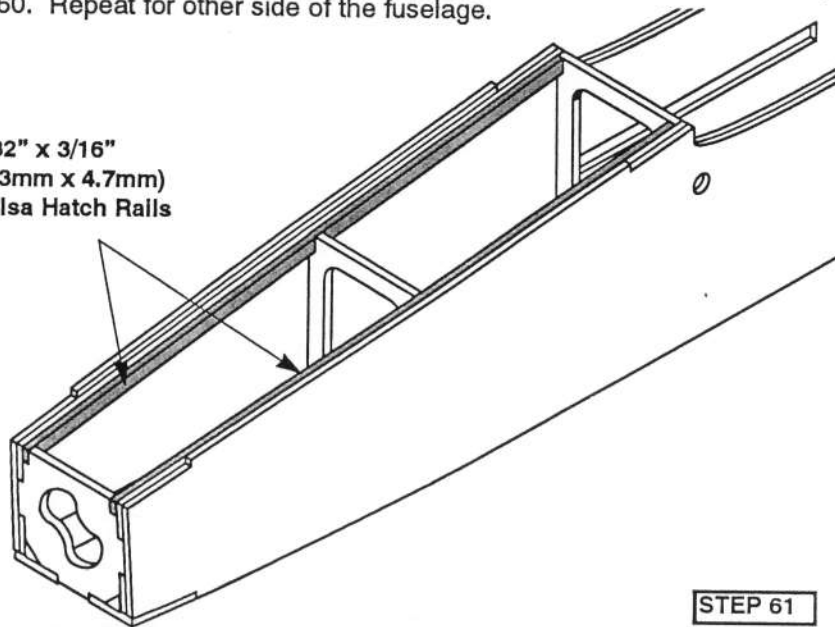
1/4" (6.4mm) Balsa Triangle Stock



STEP 60

- 61. Using thick CA, glue the upper $3/32"$ x $3/16"$ (2.3mm x 4.7) balsa hatch rails to the upper front of the fuselage and trim flush with F1 as in step 60. Repeat for other side of the fuselage.

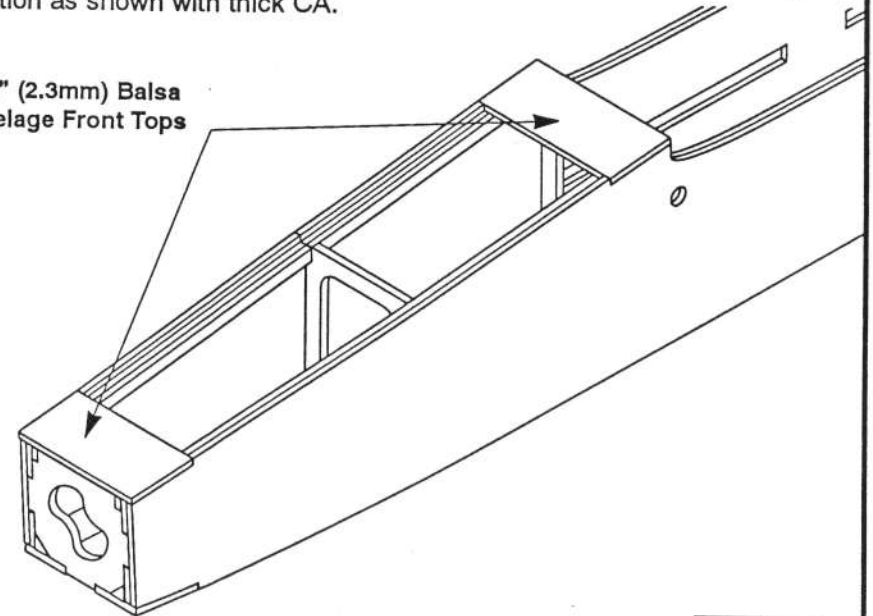
$3/32"$ x $3/16"$
(2.3mm x 4.7mm)
Balsa Hatch Rails



STEP 61

- 63. Glue the $3/32"$ (2.3mm) Die-Cut balsa fuselage front top pieces in position as shown with thick CA.

$3/32"$ (2.3mm) Balsa
Fuselage Front Tops



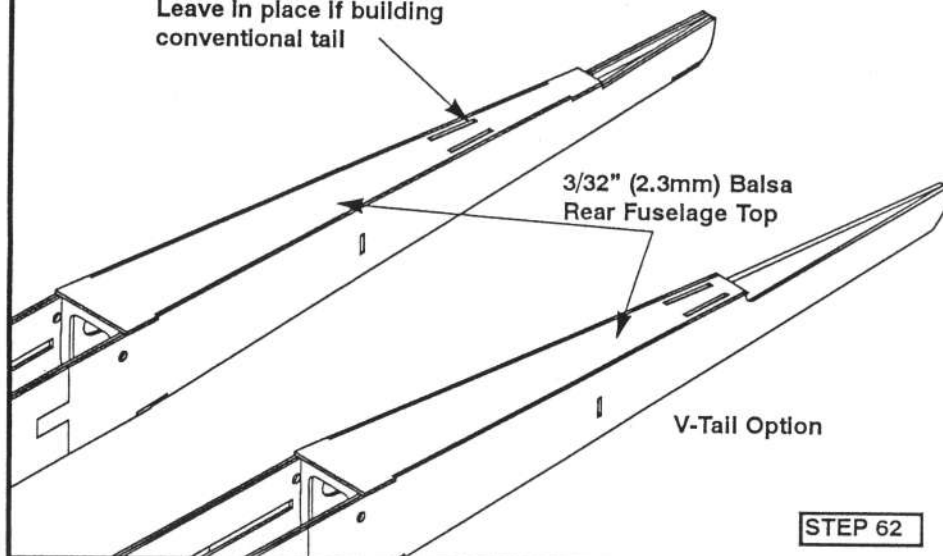
STEP 63

- 62. Using thick CA, glue the die-cut $3/32"$ (2.3mm) balsa rear fuselage top in place. Note: If building the V-Tail, remove material from the fuselage top for the pushrods and trim the top to length.

Leave in place if building
conventional tail

$3/32"$ (2.3mm) Balsa
Rear Fuselage Top

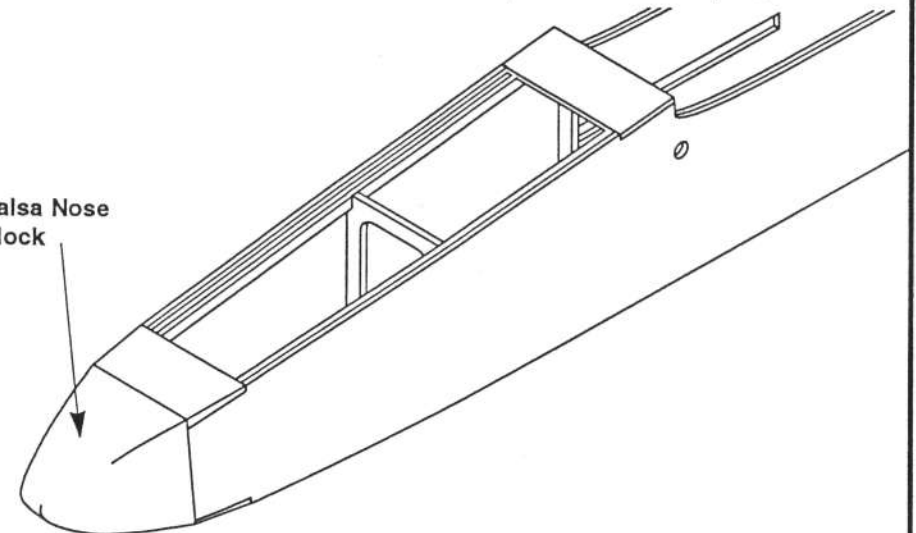
V-Tail Option



STEP 62

- 64. Glue the $1-7/8"$ x $1-7/8"$ x $2"$ (47.6mm x 47.6mm x 51mm) balsa nose block in place. Carve and sand to shape shown on the plan.

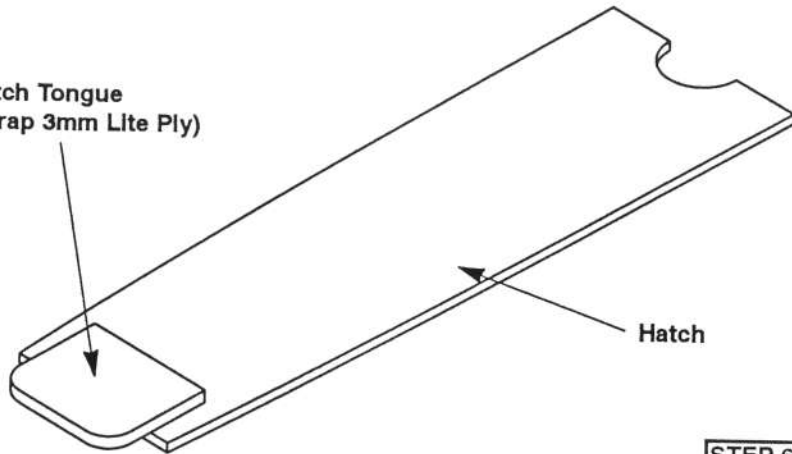
Balsa Nose
Block



STEP 64

- 65. Using thick CA, glue hatch tongue in place from scrap 3mm Lite Ply as shown.

Hatch Tongue
(scrap 3mm Lite Ply)

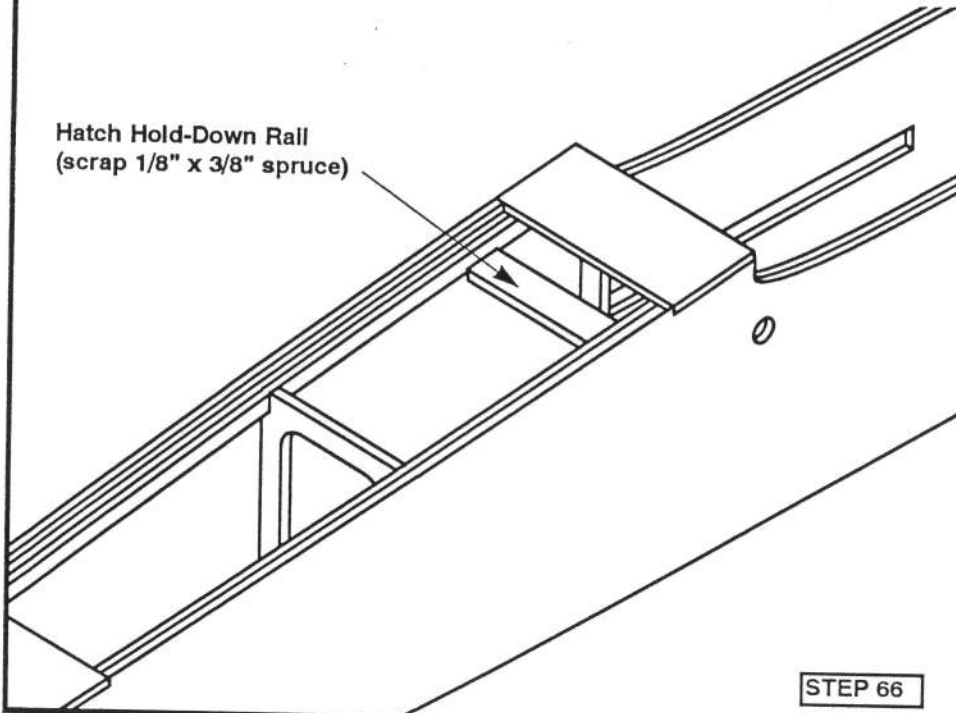


Hatch

STEP 65

- 66. Trim a scrap piece of 1/8" x 3/8" (3.2mm x 9.5mm) spruce to length for the hatch hold-down rail. Using thick CA, glue the hatch hold down rail about 1/8" (3.2mm) below the surface of the hatch as shown on the plans. This allows clearance for the hook and loop material.

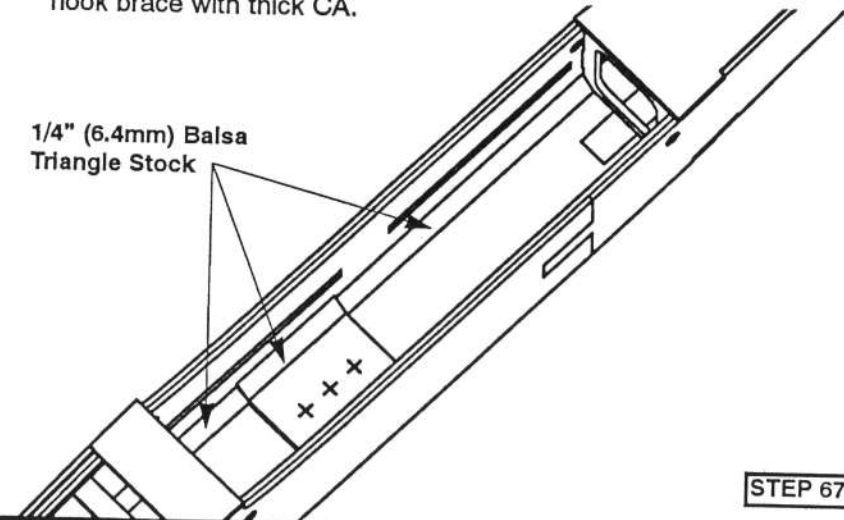
Hatch Hold-Down Rail
(scrap 1/8" x 3/8" spruce)



STEP 66

- 67. Cut the 1/4" (6.4mm) balsa triangle stock into six pieces. Make two each of the following lengths: 1-7/8" (47.6mm), 2" (51mm), and 5-1/8" (130mm). Glue the two pieces of 1-7/8" (47.6mm) between F3 and the tow hook brace, glue the 2" (51mm) pieces over the tow hook brace, and finally glue the 5-1/8" (130mm) pieces between F4 and the tow hook brace with thick CA.

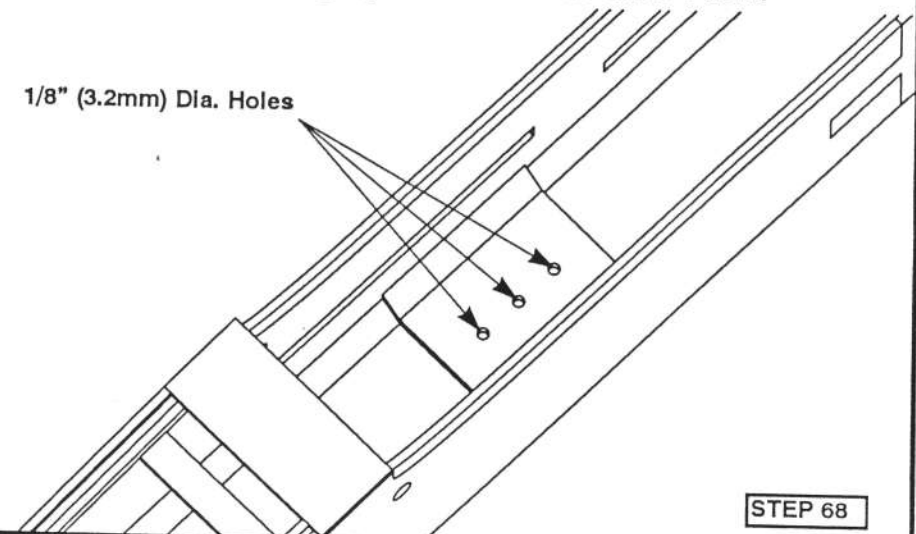
1/4" (6.4mm) Balsa
Triangle Stock



STEP 67

- 68. With a 1/8" (3.2mm) bit, drill the holes for the tow hook in the tow hook brace at the impression marks from the inside of the fuselage and through the bottom of the fuselage. Carefully tap the three 4-40 T-Nuts in place from the inside and apply thick CA around each to secure in place. Be sure not to get glue on the threads of the T-Nuts.

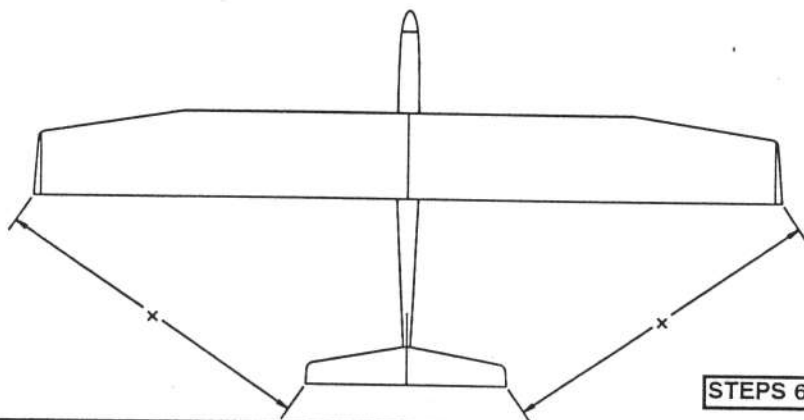
1/8" (3.2mm) Dia. Holes



STEP 68

Mounting the Tail

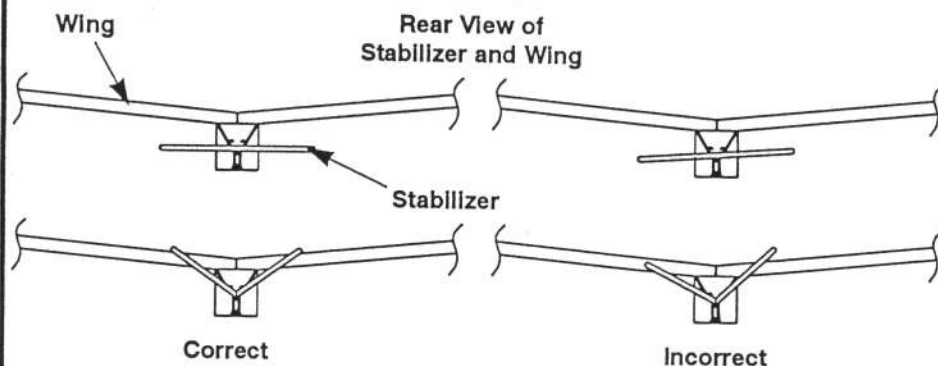
- 69. Temporarily slide the 1/4" x 3-1/4" (6.4mm x 82mm) wing hold down dowels in position. **Do not glue yet.** Rubber band the wing in position and be sure that it is centered and square with the fuselage.
- 70. Position the stabilizer on the fuselage. Align the centerline of the stabilizer with the center of the fuselage; also make sure the tips of the stabilizer are the same distance to the tips of the wing, as shown.



STEPS 69-70

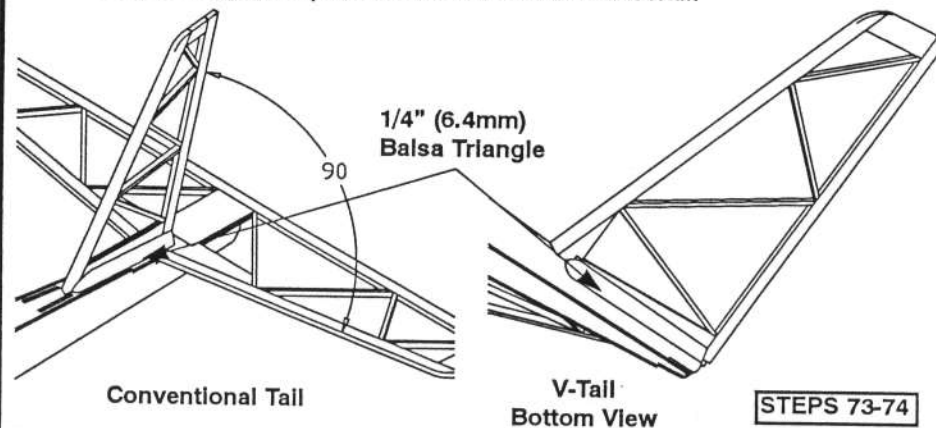
- 71. Check the fit of the stabilizer with the fuselage, making sure that it is properly aligned and square with the fuselage and wing. Sight from the rear to align the stabilizer with the wing. Slightly sand the stabilizer platform on the fuselage, if necessary, to make adjustments to assure the stabilizer is straight and level.

- 72. Using thick CA, liberally glue the stabilizer in place.



STEPS 71-72

- 73. Apply 5 minute epoxy to the bottom edge of the fin. Position the fin in place centered on top of the stabilizer. Sight the model from the front and rear to assure that the fin is perpendicular to the stabilizer. When you are satisfied with the alignment, allow the epoxy to cure.
- 74. Using the 1/4" (6.4mm) balsa triangle stock, cut two pieces 4" (102mm) long. Using thick CA, glue in place on both sides of the fin. If you built the V-Tail version, cut the triangle stock to a length of 6-1/4" (159mm). Sand and glue in place to the bottom of each half.



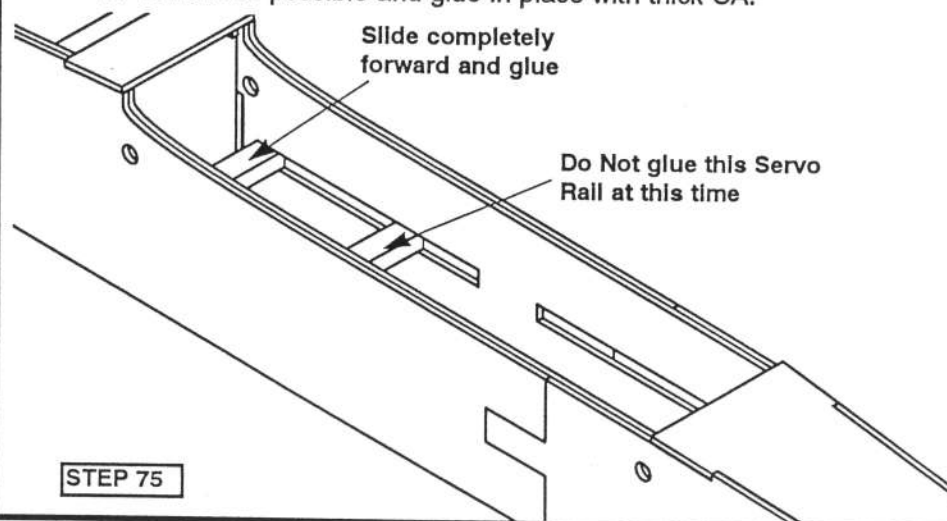
Conventional Tail

V-Tail
Bottom View

STEPS 73-74

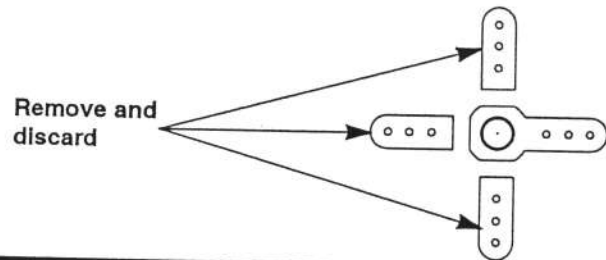
Radio Installation

- 75. Install the 1/4" x 3/8" x 2-1/16" (6.4mm x 9.5mm x 52mm) bass servo rails in their slots in the fuselage doublers. Slide the front servo rail as far forward as possible and glue in place with thick CA.



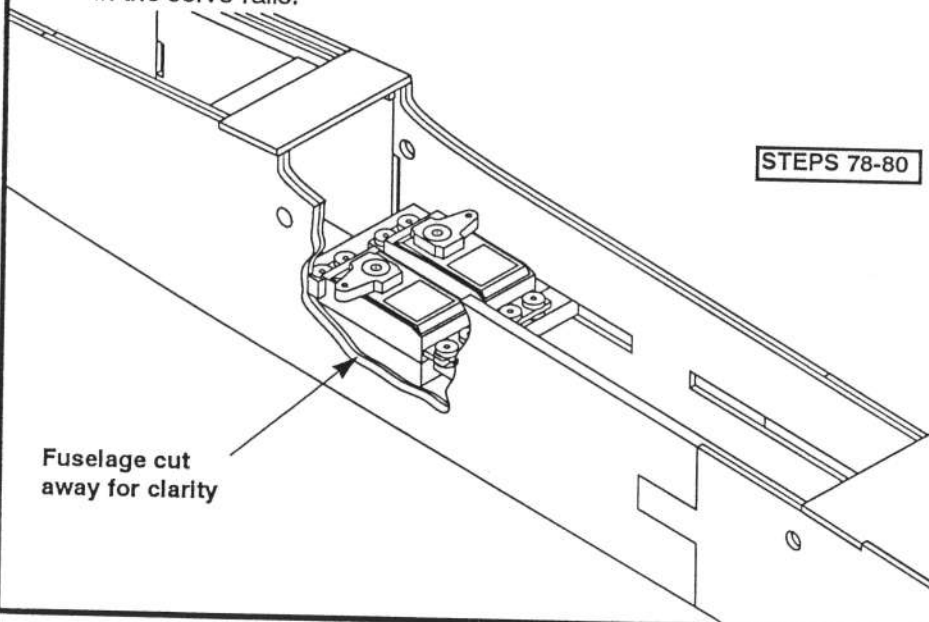
STEP 75

- 76. Install the rubber grommets and brass eyelets in your servos mounting holes per the manufacturers instructions.
- 77. Cut three arms off of two of the "X" type servo arms, temporarily install the servo arms in position.



STEPS 76-77

- 78. Position the two servos in between the servo rails leaving an even space between each servo and the sides of the fuselage. Using a sharpened pencil, mark the location through every mounting hole of each servo. Using thick CA, carefully glue the second servo rail in position leaving enough space to get the servos in and out.
- 79. Remove the servos and drill through the servo rails at each mark with a 1/16" (1.5mm) drill bit.
- 80. Using the mounting screws supplied with your radio, mount each servo in the servo rails.

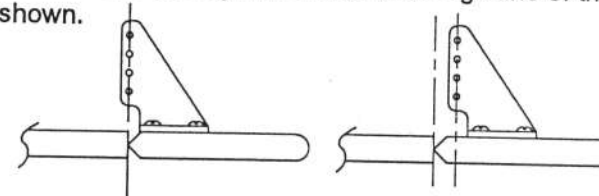


STEPS 78-80

Control Horns

- 81. Temporarily tape the rudder to the fin and the elevator to the stabilizer. Position a control horn on the rudder and on the elevator at the locations shown on the plan (rudder on the left side, elevator centered on the bottom). Mark the locations of the mounting holes on the rudder and elevator with a sharp pencil.

Note: When positioning the control horns, be sure the pushrod attachment holes are directly in line with the hinge line of the control surface as shown.

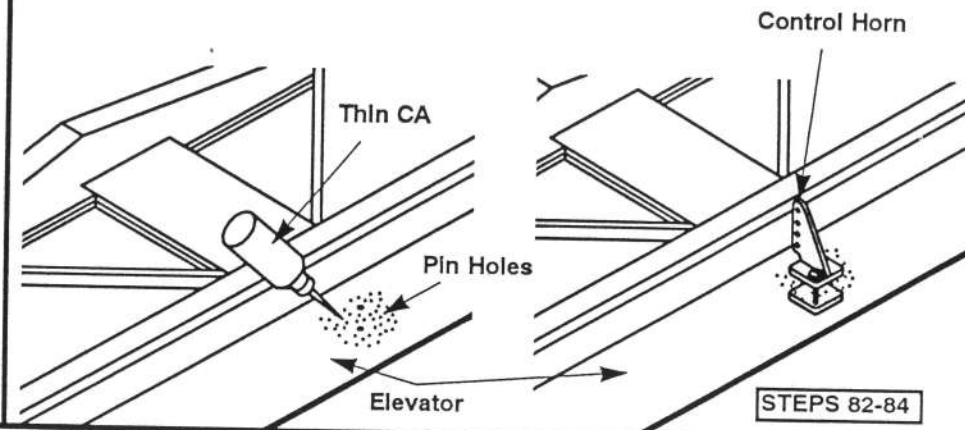


CORRECT

INCORRECT

STEP 81

- 82. Remove the control horns and drill holes through the surfaces at the marked locations with a 3/32" (2.3mm) drill bit.
- 83. Punch pin holes half way through both sides of the surface in the area of the drilled holes. Flow thin CA onto the areas that have the pin holes in them. Allow the CA to soak into the drilled and pin holes. The CA will harden the wood and prevent the control horns from crushing into it when the screws are tightened.
- 84. After the CA has cured, install control horns and screw in place with the 2-56 x 1/2" (2-56 x 12.7mm) bolts.

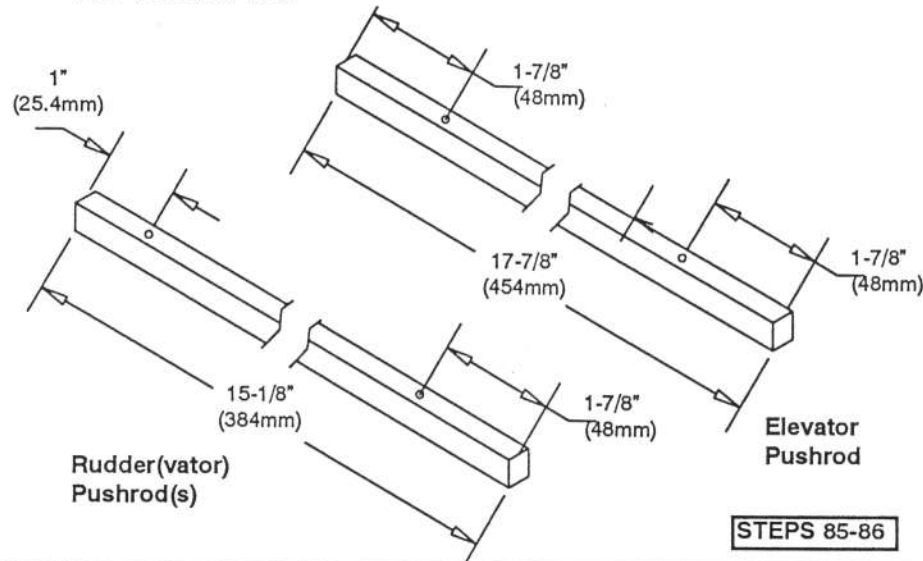


STEPS 82-84

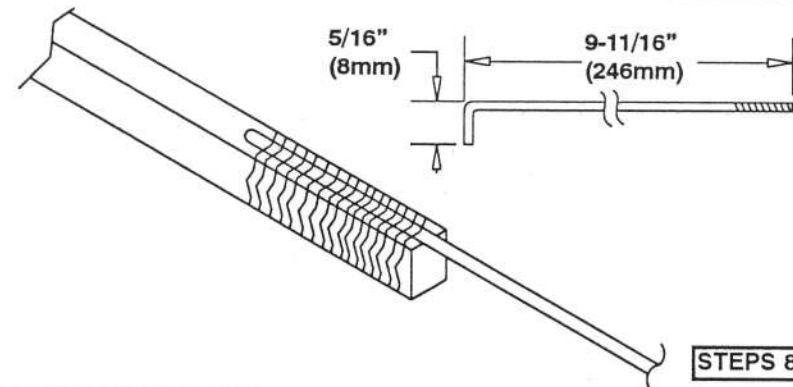
Elevator and Rudder Pushrods

Note: The pushrods for the conventional tail and the V-tail are different. If you built the conventional tail, the elevator pushrod exits the fuselage at the rear and the rudder pushrod exits the fuselage on the top side. If you built the V-Tail version, both pushrods exit the top of the fuselage.

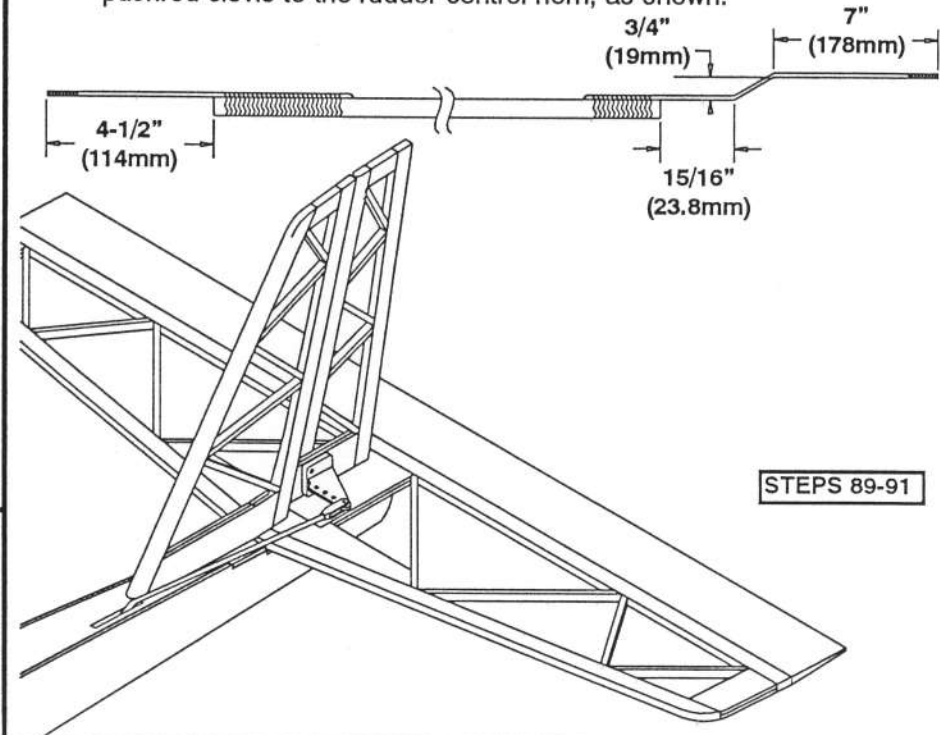
- ❑ 85. If you built the conventional tail version, each pushrod will be a different length. Cut one $3/16" \times 3/16" \times 17-7/8"$ ($4.7\text{mm} \times 4.7\text{mm} \times 454\text{mm}$) balsa to a length of $15-1/8"$ (384mm) for the rudder. The elevator pushrod does not need to be cut.
- ❑ 86. For the conventional tail, drill a $1/16"$ (1.5mm) hole $1-7/8"$ (48mm) in from both ends of the elevator pushrod. For the rudder pushrod, drill the $1/16"$ (1.5mm) hole $1-7/8"$ (48mm) in from one end and $1"$ (25.4mm) in from the other end. Note: If you built the V-Tail version, drill the $1/16"$ (1.5mm) hole $1-7/8"$ (48mm) in from one end and $1"$ (25.4mm) in from the other end.



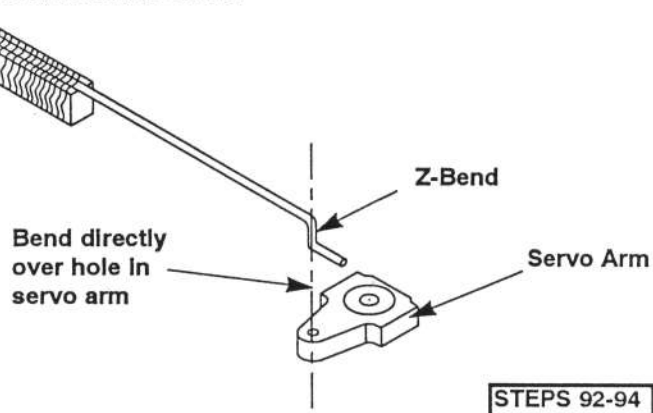
- ❑ 87. Bend the $1/16"$ (1.5mm) threaded pushrod wires as shown.
- ❑ 88. Insert the pieces of wire into each pushrod and tack glue with thick CA. Wrap each end of the pushrods with thread and saturate with thick CA as shown on the plan.



- ❑ 89. Bend the long end of the rudder(vator) pushrod(s) as shown.
- ❑ 90. Insert the pushrods into the fuselage from the wing saddle and pass each pushrod through its respective exit. Screw a nylon clevis onto each of the threaded ends at the control surfaces.
- ❑ 91. Replace the rudder and elevator and tape in place as in step # 81. Attach the elevator pushrod to the elevator control horn, and rudder pushrod clevis to the rudder control horn, as shown.



- ❑ 92. With the control surfaces neutral, make a small mark with a felt tip marker where the pushrod crosses the hole in the servo arm.
- ❑ 93. Remove the pushrod and using a pair of pliers, make two 90 degree bends in the pushrods to make a Z-shaped bend (Z-Bend). Make the Z-bends so that they are centered over the holes in the servo arms.
- ❑ 94. Remove the servo arms and insert the Z-bend through the innermost hole; replace the arm on the servo.



V-Tail Set-up

The V-Tail option offers an advantage over the conventional tail by reducing drag and making the Essence more streamlined. This option requires the use of a control "mixer" as the control surfaces on the tail, or ruddervators (rudder and elevators) function both in the same direction as elevators and differentially as a rudder. To make this option functional, a computer radio with some basic mixing functions is necessary. Any of the following mixing functions can be used to make the V-tail work:

Elevon mixing

Flapperon mixing

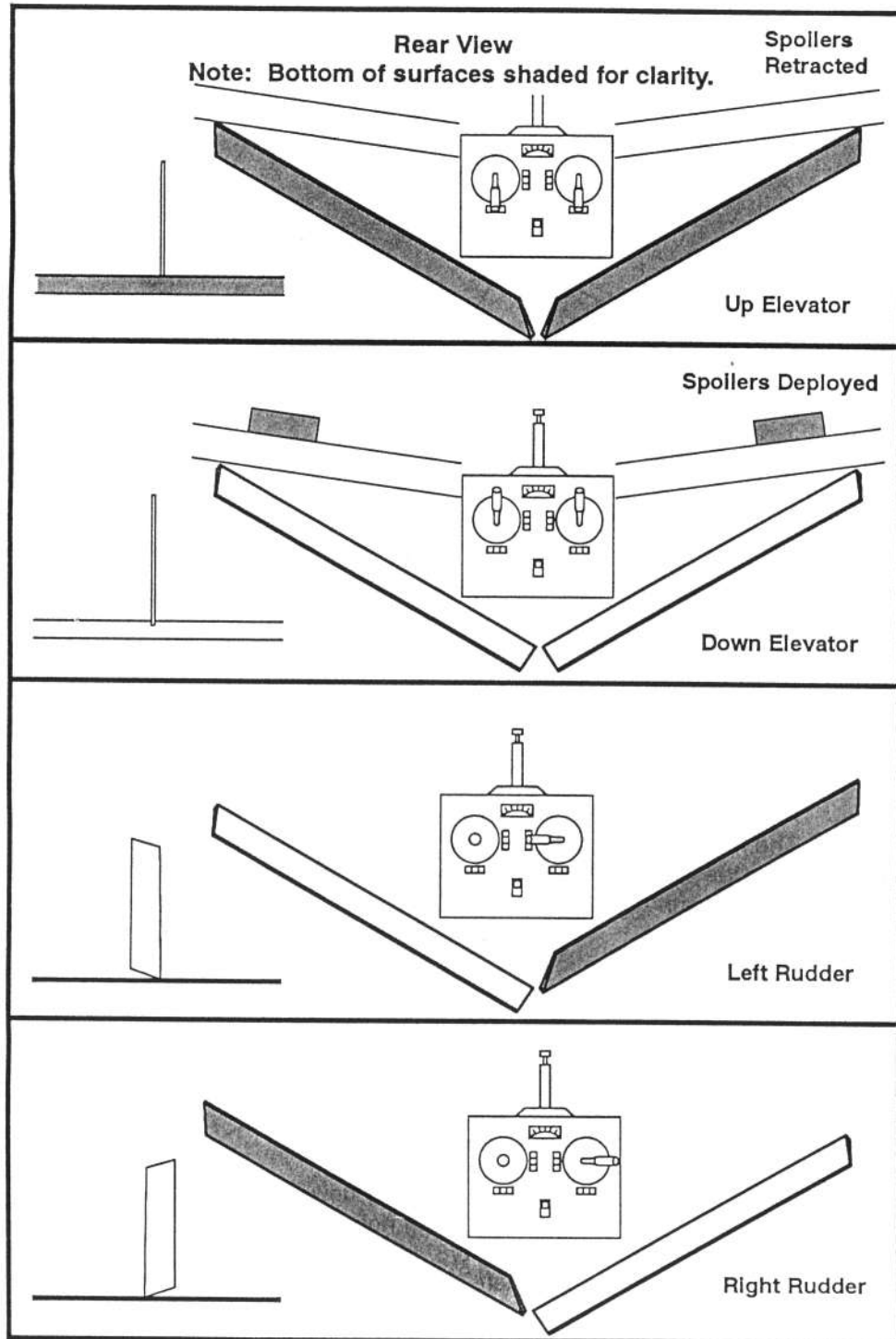
Programmable mixing

Because radio brands and models vary in the specific steps to take to use these mixing functions, the following is a general description of the use of each.

Elevon mixing- Use this method if your radio has elevon mixing capabilities, as this is the easiest method. Plug one servo into the aileron channel and one servo into the elevator channel of the receiver. In the elevon programming screen on the transmitter, make the elevon mixing function active. Then change the direction of each servos movement in the elevon mixing screen to obtain the correct direction of movement of the ruddervators, as shown.

Flapperon mixing- Plug one servo into the aileron channel, and one servo into the flap channel of the receiver. In the programming on the transmitter, make the coupled elevator/flap mixing active. Then make the flapperon mixing active, and change the direction of each servos movement in the flapperon mixing screen to obtain the correct direction of movement of the ruddervators, as shown. By using this method, the elevator trim will be controlled by the flap dial control instead of the normal elevator trim lever on the transmitter. Also the switch that would normally be used to turn on and off the coupled flap function will now turn off the elevators if it is flipped. Use great care not to accidentally flip this switch.

Programmable mixing- Plug one servo into the aileron channel and one servo into the elevator channel of the receiver. On the first programmable mixing screen (P-mix1) make the aileron channel the master and the elevator channel the slave and turn on the "include trim" function on this screen. On the second programmable mixing screen (P-mix2), make elevator channel the master and the aileron channel the slave and turn on the "include trim" function on this screen. Change the direction of each servos movement in each P-mix screen to obtain the correct direction of movement of the ruddervators, as shown. Note: some radios do not have an "include trim" function as part of the P-mixing functions. If your radio does not, then only one ruddervator will be effected by the aileron trim and only the other by the elevator trim. If this is the case, this method of mixing is not recommended.



Finishing Your Model

We recommend using one of the many iron on coverings currently available. These are by far the easiest and most economical way to achieve an attractive finish, and are also faster to repair. Read and follow the instructions included with the covering. Our model was covered with White, Pink and Purple Ultracote™. The following are some helpful hints for finishing a model with most iron on coverings. Prior to covering you will want to final sand the entire model and fill any gaps with a light weight spackle. Cut the covering approximately 1" (25.4mm) oversize around all sides of the part to be covered.

First iron on small pieces on the ends of parts such as the ends of the rudder, and in corners where the fuselage meets the stabilizer and fin. Then cover the major elements. Cover the model from the bottom up and from back to front. This keeps the seams in the covering toward the bottom and out of sight

When applying the covering to the major components, tack it at one end, pull it fairly tight and tack it along the opposite end. Then tack it while pulling tight along the remaining edges. The covering should look fairly tight before applying heat to the center of the part. This will help to achieve a wrinkle free smooth finish.

Important

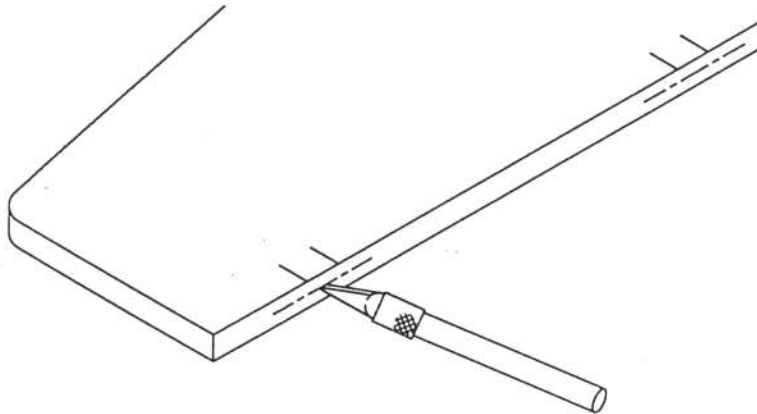
Because of the shrinking that occurs when covering is heated, it is possible that it can twist or warp the wing even though it was built straight. After the wing is covered, check each panel for straightness. To fix, simply hold the wing at the center and tip and twist it in the direction opposite of the warp. When this is done the covering will wrinkle. While holding the twist, apply heat to the covering to remove the wrinkles. Recheck the wing for straightness and repeat until straight again. Repeat this procedure on the opposite wing panel.

Hinge Installation

The control surfaces of the airplane pivot on hinges. The following general procedures are provided to show how to install the hinges. Once the model has been finished and completely covered, you can use the following steps to secure the hinges to the plane.

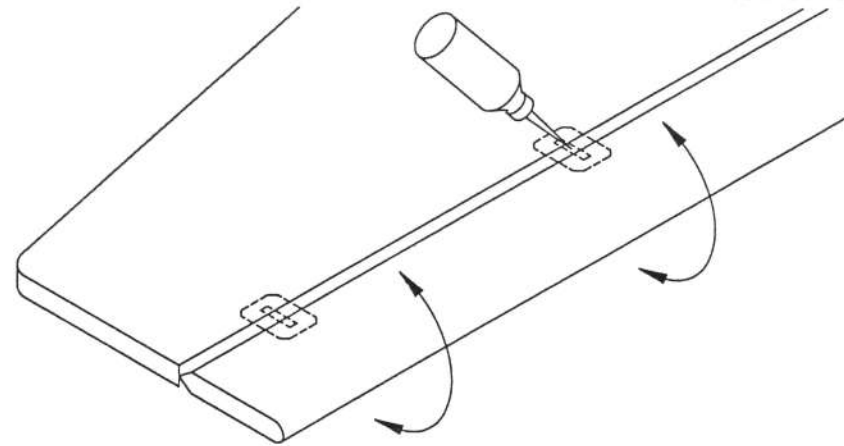
Place the elevator and rudder on the plan and mark the locations of the hinges. Lay the parts in the appropriate position and transfer the marks to the stabilizer and fin.

WARNING: You will need to be extremely careful when cutting the hinge slots with your knife blade. It is a good idea to wear some type of protective glove, such as leather, when doing these steps.



Once you have marked the positions of the hinges, you will need to mark centerlines on the parts, where the hinge slots will be cut. Follow the steps below for cutting the hinge slots with your knife blade.

1. First, cut a shallow slit along the centerline of the hinge location. This initial cut is to establish your cut in the proper location. Concentrate on the centerline and don't cut too deep.
2. Make a few more cuts in the same location, getting slightly deeper each time. As you make these cuts, be sure that the blade goes straight into the wood. Repeat this step until the slot is deep enough for the hinge.
3. Test fit each hinge in the slots. If the hinge doesn't want to go all the way into the slot, you may need to slide the knife blade into the slot a few more times to open it up.

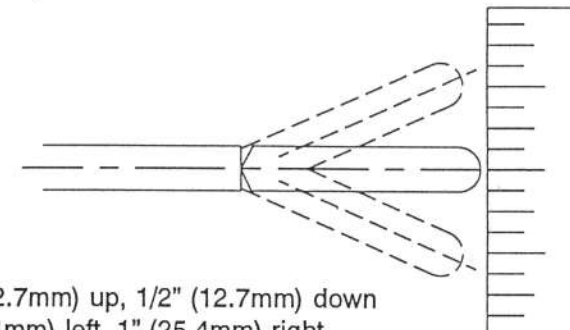


1. Insert the hinges in the rudder. Connect the rudder to the fin, making sure that it is positioned properly, as shown on the plan.
2. Move the rudder to make sure that it will turn without binding.
3. Following the manufactures instructions, glue the hinges in place.
4. After the glue has cured the rudder may seem a bit stiff. Working it back and forth will loosen it up.

Repeat these steps to secure the elevator to the stabilizer.

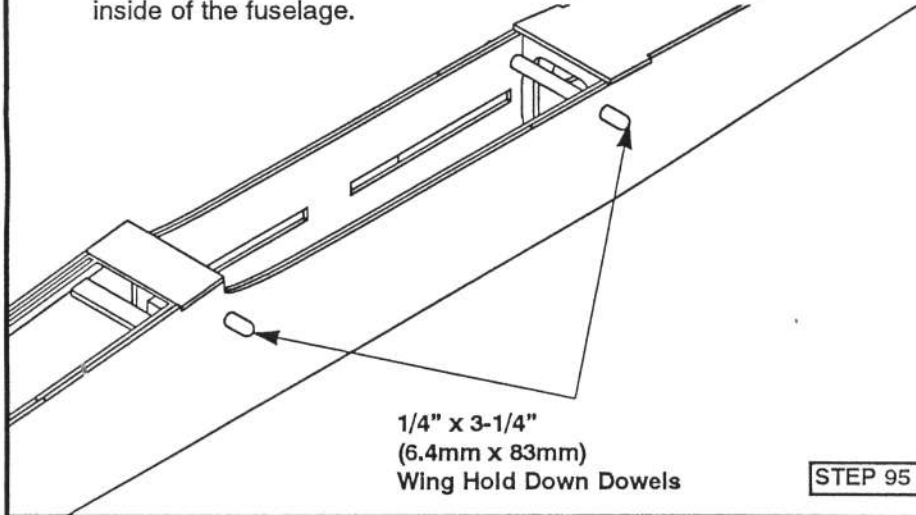
Control Throws

The following control throws are recommended starting points. Measure the control throws with a ruler held near the trailing edge of each control surface, as shown



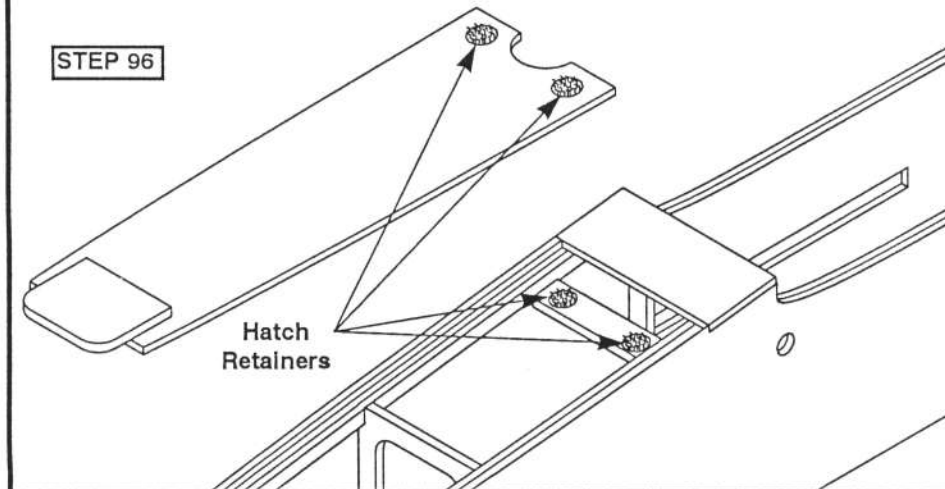
- Elevator - 1/2" (12.7mm) up, 1/2" (12.7mm) down
Rudder - 1" (25.4mm) left, 1" (25.4mm) right
Ruddervators - 5/8" (15.9mm) up, 5/8" (15.9mm) down
 - 5/8" (15.9mm) left, 5/8" (15.9mm) right

95. Using thick CA, glue the 1/4" dowel wing hold downs in place from the inside of the fuselage.



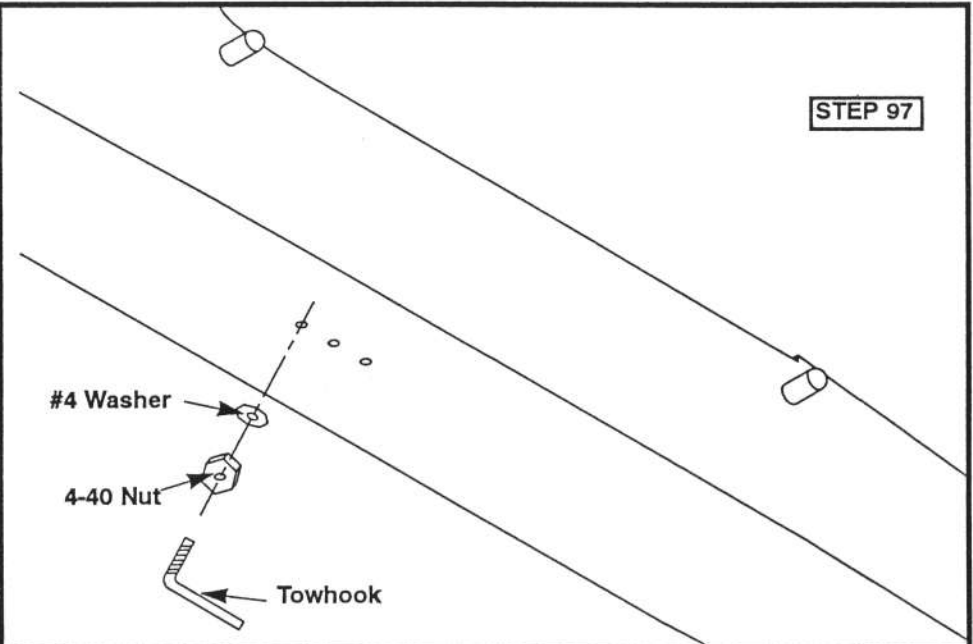
STEP 95

96. Using thick CA, glue the hook and loop hatch retainers in place.



STEP 96

97. Secure the 4-40 threaded Towhook to the bottom of the fuselage by threading a 4-40 nut and a #4 washer in place. Screw the towhook almost all the way into the forwardmost hole for the first few flights. With the towhook facing straight back, tighten the nut against the bottom of the fuselage. After the first few flights, you can move the towhook back for higher launches; be careful, as this setup is more apt to cause an early release from the towline.



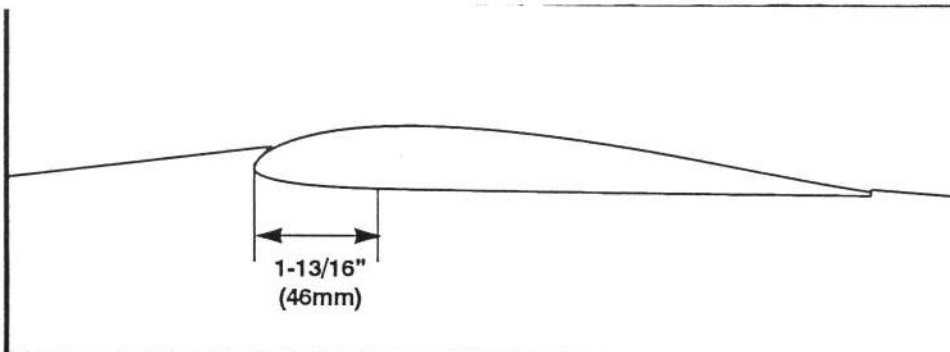
STEP 97

Balance

Important: The following instructions will show you how to properly balance your model. Follow them carefully and do exactly as instructed. In order for an airplane, even a small model airplane, to fly properly, it must be balanced. Otherwise, the elevator and rudder will not be able to control the model and it will crash.

To balance your airplane, all of the parts and components must be installed in their correct positions on the model. For example: the battery pack and receiver must be in their proper locations in the fuselage; all pushrods must be installed and connected, etc. At this time, double-check to be certain that all parts and components are installed, that they are installed properly and in the right locations.

98. Attach the wing to the fuselage using rubber bands. Using a ruler, measure back from the leading edge of the wing 1-13/16" (46mm). Make a pencil mark at this point on the bottom of the wing, next to the fuselage, as shown. Then, make the same measurement and mark on the opposite wing. These pencil marks are the locations of the center of gravity.

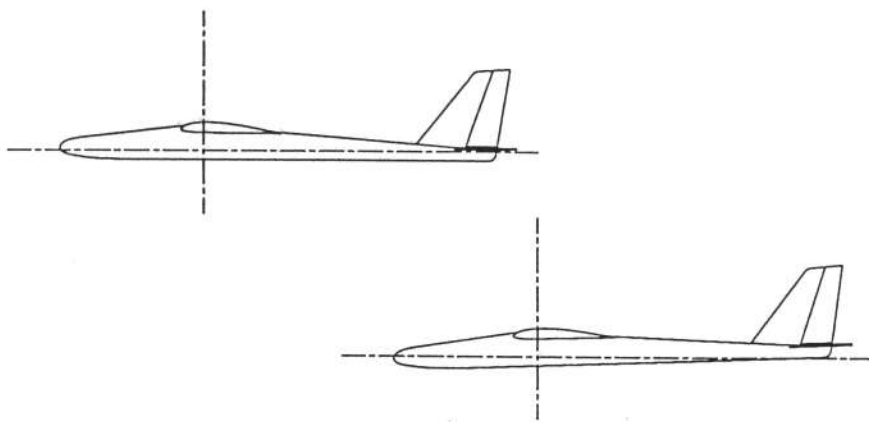


STEP 98

99. Place a fingertip on each pencil mark and lift the model. If it is in proper balance, it will sit on your fingertips in a level or slightly nose down attitude, as shown. If this is the case with your model, it is properly balanced and you can ignore the following instructions.

Note: Due to slight weight differences among different types of components, it's possible that your model will not be in balance. If this is the case with your model, continue with these instructions.

100. If your airplane sits on your fingertips in an extremely nose down attitude it is nose heavy and weight will have to be added to the tail. Do not attempt to fly your model if it is nose heavy. This is an unsafe and dangerous condition.



STEPS 99-101

Note: If possible, move the battery pack further back in the fuselage. This change may be enough to bring the model into balance. If not, you can purchase lead weights from your hobby dealer that have an adhesive backing. They should be placed on the bottom of the stabilizer, next to the fuselage. Add weight at this location until the model is balanced.

101. If your airplane sits on you fingertips with the tail low do not attempt to fly it. This is what is known as a tail heavy condition and is very dangerous and unsafe. Weight will have to be added to the nose of the model to bring it into balance.

Note: In the case of a tail heavy model, lead weights can be positioned inside the fuselage in the space immediately behind the noseblock. When enough weight has been added to bring the model into balance, the weights should be permanently secured with epoxy.

At this point, your airplane should be properly balanced.

Flying

Although it is possible to learn to fly an R/C model without any help, the odds of success are greatly improved if you seek the help of an experienced pilot. The Essence is very easy to fly, however an experienced pilot can save you a lot of time and possible disappointment by helping you fly your Essence for the first flights.

Trimming the Essence

Before attempting to launch the Essence on a hi-start, it should be trimmed from a hand launch. With the radio transmitter and receiver turned on, grip the Essence under the wing near the center of gravity. With the wings level and nose pointed very slightly downward and **directly into the wind**, gently launch the Essence with a forward push. With a slight downward push, the Essence will accelerate until it gains enough air speed, then it will level off and fly forward. Repeat this process and adjust the trims on the transmitter until the Essence glides straight forward in a smooth glide path.

Hi-Start Launch

Find a big open field for a hi-start launch. A hi-start is the simplest and most popular way to launch the Essence. A hi-start is essentially a large, gentle slingshot. It consists of 30 to 100 feet of rubber surgical tubing tied to 200 to 400 feet of string with a metal ring and a small parachute or streamer at the end. The end of the rubber tubing is staked into the ground, directly upwind of the launch point. There are different sizes of hi-starts available. The size of hi-start needed depends on the size of the glider to be launched. The Essence is a 2-meter size glider and will typically use a Standard hi-start. There are also shorter hi-starts available, which do not achieve as much altitude on the launch, but can be used in smaller fields.

With your transmitter and receiver turned on, hook the metal ring of the hi-start to the tow hook on your Essence. Stretch the hi-start directly downwind approximately twice the distance that the rubber is long. You want about 8 lbs. of tension for your first flights. A fishing scale is helpful for this. More tension can be used for later flights. Grip the plane as you did for the trim launches, except point the nose upward at approximately 45 degrees. Give the Essence a strong push forward, **directly into the wind**. The Essence will climb and fly similar to a kite. Use the rudder to steer and keep the Essence tracking straight. As the Essence flies over the stake, the rubber will relax and it will fly off of the tow line. The parachute will carry the hi-start line back toward you.

Once off the tow line, make gentle "S" turns into the wind and get the feel of the Essence. Remember that a radio controlled airplane responds to control inputs as if you were sitting in the cockpit. When you move the rudder stick to the left, the rudder moves to the airplane's left. So when the airplane is flying toward you, it may seem like the the rudder control is reversed. When you give left rudder the airplane turns to your right, which is the airplanes left. Keep this in mind. Over time you will get use to staying oriented with the airplane, and the correct input will become second nature to you.

Adjust the trims so that the Essence flies straight and level with no control inputs from the sticks. Do not let the Essence fly very far downwind, as returning upwind is difficult. Simply make gentle "S" turns until it is low to the ground, then fly straight and level avoiding any obstacles such as trees, until it lands.

Thermals

Simply put, thermals are swirling pockets of rising warm air that occur in nature. They are formed by uneven heating of the earth's surface. Darker colored surfaces such as asphalt, buildings, and plowed fields absorb heat faster than lighter colored areas and are good places to look for "lift" or thermals. These thermals are what keeps a glider aloft for extended periods of time. As long as there are thermals of sufficient strength, a glider can stay aloft indefinitely, riding one thermal after another. As you gain experience you will become better at recognizing and riding thermals.

Spoilers

Spoilers are used to "spoil" the lift of the wing and cause the glider to descend more rapidly. They can be very helpful in controlling the decent rate on a landing approach to help you land where you want to. The best method of using the spoilers is to deploy them until the glider descends to the desired altitude and then retract them. Play the spoilers in and out as necessary to maintain the desired decent path.

Occasionally you may get into a giant thermal from which you cannot escape and the Essence will continue to climb. Although rather infrequent, if this should occur, deploy the spoilers and leave deployed until the Essence has descended to a low altitude.

Ballasting

In windy conditions, it can be advantageous to add ballast to the Essence. This will increase its wing loading, which will increase its ability to penetrate into the wind. When adding ballast, place it as near the center of gravity as possible. Adding 6 to 8 oz. should make a noticeable difference.

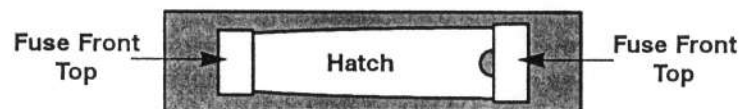
Happy Thermaling!

Note: All wood parts are Balsa unless noted.

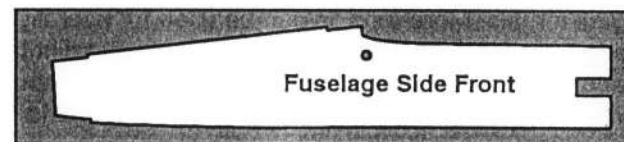
Fuselage

PART NO.	QTY.	DIMENSIONS	METRIC (mm)	DESCRIPTION
10099	2	1/4" x 36" Tri stock	6.4 x 914 Tri stock	Misc. fuselage
33921	1	1-7/8" x 1-7/8" x 2"	48 x 48 x 51	Nose Block
33923	3	3/32" x 3/16" x 35-7/8"	2.3 x 4.7 x 911	Longerons
33929	2	1/4" x 3/8" x 2-1/16"	6.4 x 9.5 x 52	Bass Servo Rails
33930	2	1/4" x 3-1/4" Dowel	6.4 x 83	Wing Hold Downs
F-213	1	# 4 Washer		Towhook Assembly
F-231	1	4-40 Hex Nut		Towhook Assembly
F-250	3	4-40 Blind Nuts		Towhook Assembly
M-623	2	1/2" Hook		Hatch Retainers
M-624	2	1/2" Loop		Hatch Retainers
M-625	1	Pre-bent metal		Towhook

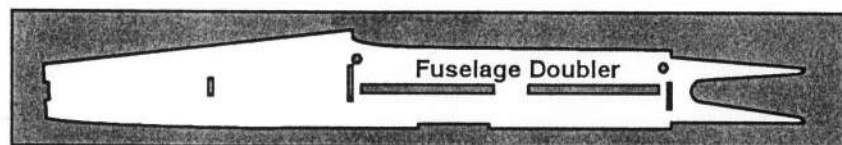
Fuselage Die-Cut Parts



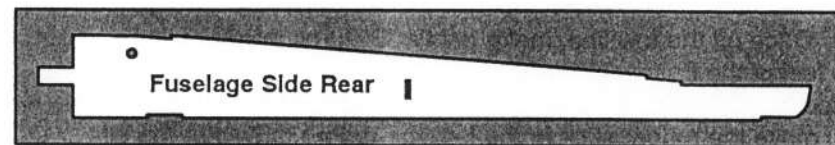
Pt # 33900 - 1 Required - 3/32" x 2-7/8" x 11-7/8"
(2.3mm x 73mm x 302mm) Balsa



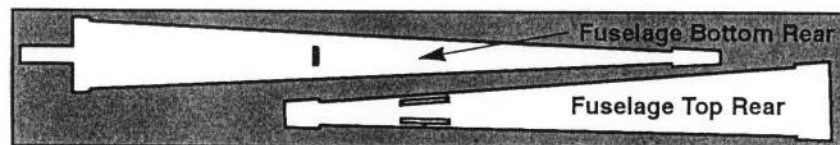
Pt # 33901 - 2 Required - 3/32" x 3-7/8" x 17-7/8"
(2.3mm x 98mm x 454mm) Balsa



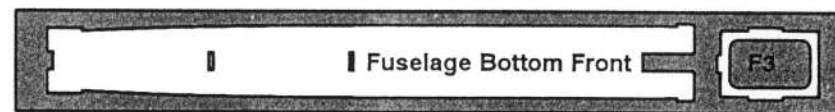
Pt # 33902 - 2 Required - 3/32" x 3-7/8" x 23-7/8"
(2.3mm x 98mm x 606mm) Balsa



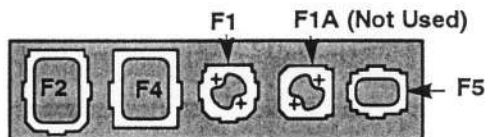
Pt # 33903 - 2 Required - 3/32" x 3-7/8" x 23-7/8"
(2.3mm x 98mm x 606mm) Balsa



Pt # 33904 - 1 Required - 3/32" x 3-7/8" x 23-7/8"
(2.3mm x 98mm x 606mm) Balsa



Pt # 33905 - 1 Required - 3mm x 2-7/8" x 23-7/8"
(3mm x 73mm x 606mm) Micro- Lite Plywood



Pt # 33906 - 1 Required - 3mm x 2-7/8" x 11-7/8"
(3mm x 73mm x 302mm) Micro- Lite Plywood

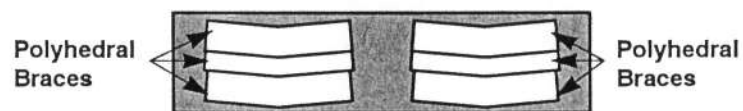
Wing

PART NO.	QTY.	DIMENSIONS	METRIC (mm)	DESCRIPTION
10521	3	1/16" x 3" x 24"	1.5 x 76 x 607	Wing Sheeting
33913	2	1/2" x 1-3/8" x 23-7/8"	12.7 x 35 x 606	Pre-shaped Leading Edge
33915	1	3/8" x 5/8" x 8-15/32"	9.5 x 15.9 x 215	Ply Dihedral Brace
33917	4	5/16" x 1-1/4" x 23-7/8"	8 x 32 x 606	Pre-shaped Trailing Edge
33918	2	1" x 1" x 7" Tri stock	25.4 x 25.4 x 178 Tri stock	Wing tips
33919	8	1/8" x 3/8" x 23-7/8"	3.2 x 9.5 x 606	Spruce spars
33920	34	1/16" x 1-3/4" x 7/8"	1.5 x 44 x 22.2	Shear webs
33922	1	1/32" x 1" x 2"	.8 x 25.4 x 51	Ply Wing Hard Points

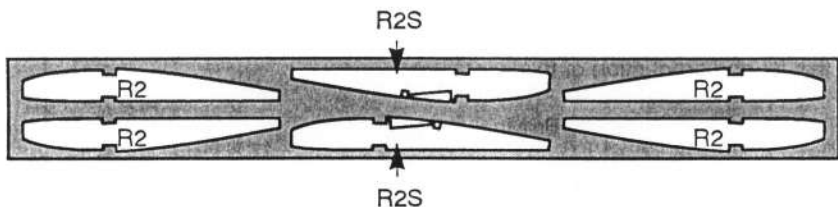
Wing Die-Cut Parts



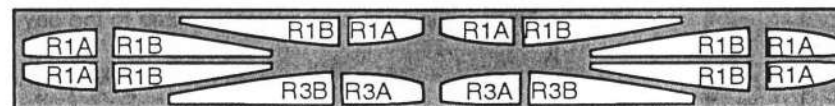
Pt # 33908 - 1 Required - 3mm x 2-7/8" x 11-7/8"
(3mm x 73mm x 302mm) Micro- Lite Plywood



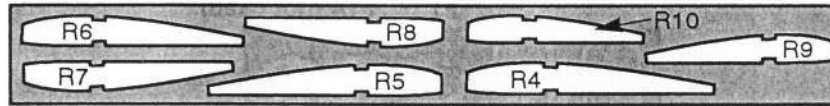
Pt # 33909 - 1 Required - 1/32" x 2-7/8" x 11-7/8"
(.8mm x 73mm x 302mm) Plywood



Pt # 33910 - 3 Required - 1/16" x 2-7/8" x 23-7/8"
(1.5mm x 73mm x 606mm) Balsa



Pt # 33911 - 1 Required - 3/32" x 2-7/8" x 23-7/8"
(2.3mm x 73mm x 606mm) Balsa

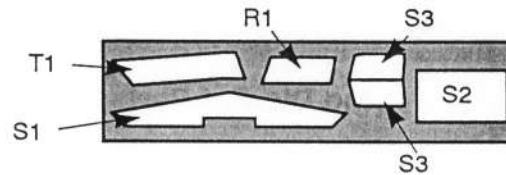


Pt # 33912 - 2 Required - 1/16" x 2-7/8" x 23-7/8"
 (1.5mm x 73mm x 606mm) Balsa

Control Surfaces

33184	2	1/8" x 3/16" x 35-7/8"	3.2 x 4.7 x 911	Tail structure
33914	2	3/16" x 3/16" x 17-7/8"	4.7 x 4.7 x 454	Pushrods
33916	1	3/16" x 1-1/2" x 23-7/8"	4.7 x 38 x 606	Pre-shaped Elevator
33924	3	3/16" x 3/8" x 35-7/8"	4.7 x 9.5 x 911	Tail structure
A-121	2	Molded nylon		Control Horns
M-419	2	Molded nylon		Small Clevis
M-210	4	1/16" Dia. x 10"	1.5 Dia. x 254	Threaded rods
F-106	4	2-56 x 1/2"	2-56 x 12.7	Control Horn Screws

Control Surface Die-Cut Parts



Pt # 33907 - 2 Required - 3/32" x 2-7/8" x 11-7/8"
 (2.3mm x 73mm x 302mm) Balsa

Miscellaneous

M-492	1	32 Pages		Instruction Manual
M-493	1	36" x 46"	914 x 1168	Plan
D-286	1	3" x 10-1/2"	76 x 267	Decal Sheet

Acknowledgements

The following individuals have contributed to the development of this kit and production of this construction manual:

Model designed by: Mike McConville

Illustrations by: A.J. Broviak

Model engineered by: A.J. Broviak

Manual Assembled by: A.J. Broviak

Manual written by: A.J. Broviak and Mike McConville

© 1995, Midwest Products Co., Inc.

Product Evaluation Card/Catalog Offer

What you tell us you like, and don't like, determines what model kits we make and how we make them. We would appreciate it if you would take a few minutes to answer the following questions about this kit and also, tell us a little about your interests. As our way of saying "thank you", we will send you a FREE COPY of our current Kit Catalog. Simply fold this form in thirds and tape it (PLEASE DO NOT STAPLE) so that our address faces out. Postage will be paid by Midwest.

1. Kit Name Midwest Essence 2. Kit Number 185

3. Where did you learn about this kit?
 Magazine Ads Friend
 Hobby Shop Other

4. What influenced you the most to buy this kit?
 Box Art Recommendation of Others
 Type of Model Price
 Magazine Ads Other _____

5. Did you have any trouble using the plans?
 Yes No
If yes, please explain. Be specific.

6. Did you have any difficulty understanding any of the written instructions on the plans, or in the construction manual?
 Yes No
If yes, please explain. Be specific.

7. Did you have any difficulty understanding any of the illustrations in the construction manual?
 Yes No
If yes, please explain. Be specific.

8. Did you have any difficulty identifying any of the parts?
 Yes No If yes, which parts?

9. If you answered yes to Question 8, which of the following answers best describes the problem?
Could not identify part(s) from:
 Plans Written description in manual
 Isometric views in manual Other _____

10. Were any of the kit parts:
 Missing Wrong Size
 Broken Wrong Shape

11. If you checked off an item in Question 10, please list those part(s) and tell us what was wrong with them.

12. Was any of the model's construction difficult for you?
 Yes No
If yes, please explain.

13. What did you like most about this kit?
 Plans Wood Parts
 Construction Manual

14. What did you like least about this kit?
 Plans Wood Parts
 Construction Manual Other
If other, please explain. Be specific.

15. Are you satisfied with the finished model?
 Yes No
If no, please explain. Be specific.

16. How does this kit compare to similar kits by other manufacturers?
 Better than As good Not as good

17. Is there anything else you would like to tell us about this kit?

Tell Us About Yourself

18. How long have you been building models?

19. What magazines do you regularly read?

20. Are most of your models built from:
 Plans Kits Scratch built using your own plans

21. What other subjects would you like to see us add to our Success Series R/C Airplane Kits (include engine size)

22. Kit was purchased from:
 Hobby Shop Mail Order Other _____

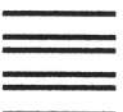
Name _____

Age _____ Annual Income _____

Address _____

City _____ State _____ Zip _____

Phone (Area Code) _____



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 93 HOBART IN

POSTAGE WILL BE PAID BY ADDRESSEE



PO BOX 564
HOBART IN 46342-9966

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

