

AICHI D3A1 VAL



In 1939 the Japanese needed a plane that was easy to produce and rugged so the Aichi Val was put into service. Powered by a Nakajima Kinsei 43 engine that put out 1,000 horsepower, the Val was capable of carrying two 60kg bombs (one under each wing) and a 250kg bomb underneath the fuselage.

It was mostly used to bomb mainland China but also played a big role in the bombing of Pearl Harbor. The Val led bombing attacks on Hickham Field, Ford Island and ships in Peal Harbor. Throughout the rest of the war it was the main dive bomber of the Japanese air force. It played major roles in attacks on Wake Island, Port Darwin, Guadalcanal and the Battle of the Coral Sea. The Val had great success against American and British warships but due to the lack of

power, was at a disadvantage against some Allied aircraft. Towards the end of the war, the Val was used mainly as a kamikaze aircraft and caused considerable damage to many ships that were attacked.



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Thank you for purchasing the Aichi Val from Skyshark R/C Corporation. For the first time, R/C enthusiasts have a choice in scale aircraft designs. Our goal, through computer technology and state-of-the-art production techniques, is to offer aircraft which in the past have not been modeled simply because they weren't popular enough to justify mass production. Our production techniques allow us to produce aircraft which, though not as popular and well known as P-51s and P-47s, still offer historical significance (good or bad!), Good looks and flying characteristics, and a uniqueness that is sure to turn heads wherever you take your airplane!

Your airplane has many unique features in its design:

CAD Design

CAD design allows strength to be built into the airplane without sacrificing weight. Accurate parts design and placement ensures a perfect fit.

CAD Drawn Plans

The plans in this kit are not copied from a master set! They are originals drawn directly from the CAD program where the airplane was designed. We do this because it allows us to use color, which helps you better visualize the various components of the airplane, and we can use better quality paper, which greatly reduces the possibility of shrinkage. Since you're going to build directly on the plans, they ought to be the proper size! Also, parts placement is guaranteed to be accurate, so you can build a better, straighter model.

Laser Cut Parts

The same program that generates the design and plans also drives the laser, so every part is reproduced exactly as it was designed. Laser cutting also allows us to fit more parts on each sheet of wood, reducing the waste, and lowering the cost to you. Since laser cutting does not have the

same limitations that mechanical cutters do, small and hard-to-produce parts are simply a computer file away, so you get a more accurate airplane.

Lightening Holes

Lightening holes are laser cut into all ribs and formers where possible. This allow us to keep the weight on each plane to a minimum without sacrificing strength.

Plastics and Fiberglass

The cowl is accurately reproduced high quality fiberglass. The canopy is accurately reproduced in clear heavy duty plastic. The wing fillets and other accessories are molded in plastic to ease the building and finishing chores!

A Word About the Building Options

Engine Options

Engine choices range from .46 to .61 2-strokes, or .56 to .91 4-strokes. Keep in mind the limited cowl area when choosing an engine. The Val will build light, so unless you live in very high elevations, you won't need to use an engine in the upper end of the spectrum. Our prototype model used an O.S. 50SX with an in cowl muffler. We needed 5 oz. of lead in the nose to balance the plane.

Flaps

The flaps can be made fully functional. All the servo reinforcements are included in the kit, as well as instructions of how to build and actuate the flaps.

Cockpit Detail

A fully detailed, fully researched laser cut and engraved cockpit is included in the kit. Keeping in mind that no complete, accurate, and intact Vals exist anywhere in the world, research data on the cockpit is not widely available. Several very respectable publications were used for reference, as well as commercially available plastic model kits; however, some of the references were in Japanese (!) So occasionally a WAG was used (WAG is an engineering term for Wild A\$\$ Guess) as well as basic common sense. Colors are estimates - RLM 83 Lichtgrun is the closest match I could find for interior green, but black is black, silver is silver, etc. Generally, it will be easier to paint individual parts before assembly, except where noted. Unlike our other kits, the cockpit is assembled and installed last.

General Building Information

The Val can be built by a person with average building skills. It is designed for someone who has built a trainer or low wing sport plane. No unusual building techniques are required, although more difficult areas are explained in detail where necessary. Certain steps in the building process must be followed as depicted, or you might find yourself digging back into the structure to redo something. These areas are outlined when necessary.

Occasionally hints will be included at certain building steps. These are not required for completion, rather they are tips intended to ease a particular process.

The laser does not cut through the wood, it burns its way through. As a result of this, occasionally there will be scorching on the surface of the wood. This is normal, and is only a surface discoloration, and does not affect the wood in any other way. Similarly, the laser settings are optimized for wood density averages, so occasionally, due to variations even in individual sheets, some areas might not cut through completely. This is apparent mainly with the plywood. Simply use care in removing the parts from the sheets; most of the time, the parts will literally fall out of the sheets!

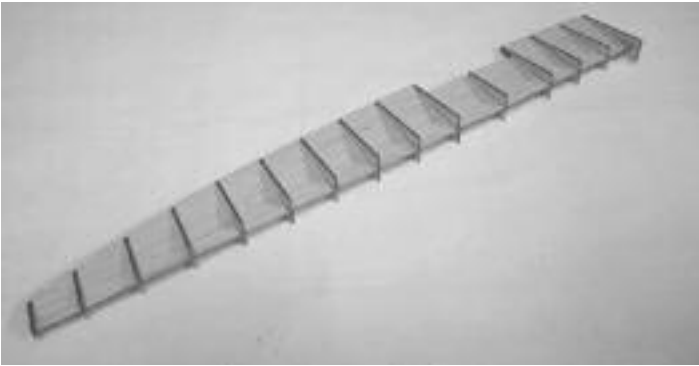
Hardware and a motor mount are not included in the kit. There are so many choices for quality hardware that these choices are left to the individual preferences of the builder, rather than include something in the kit that you'll probably throw away anyway. A vibration-dampening motor mount is recommended for use regardless of engine choice, so select a mount suited to your particular engine. The decals provided are not fuel-proof and will need to be clear-coated before coming in contact with fuel.

This aircraft is not a toy. It must be flown in a responsible manner according to the rules set forth by the Academy of Model Aeronautics. The builder assumes the responsibility for the proper assembly and operation of this product. Skyshark R/C Corporation shall have no liability whatsoever, implied or expressed, arising out of the intentional or unintentional neglect, misuse, abuse, or abnormal usage of this product. Skyshark R/C Corporation shall have no liability whatsoever arising from the improper or wrongful assembly of the product nor shall it have any liability due to the improper or wrongful use of the assembled product. Skyshark R/C Corporation shall have no liability for any and all additions, alterations, and modifications of this product.

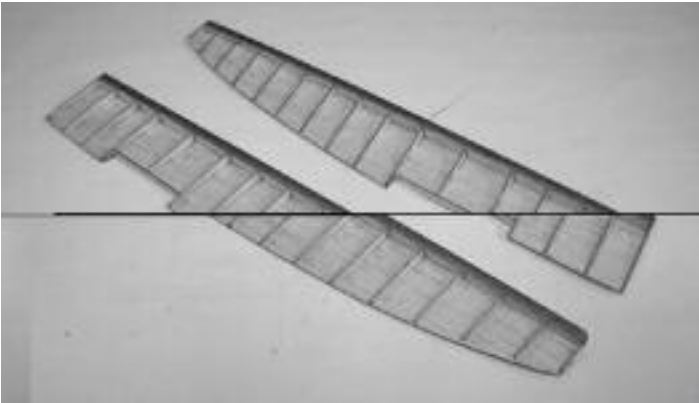
Having said that mouthful, turn the page and start building the best airplane on the market!

Notes:

Aileron Assembly



- 1. Align and glue A2 to inner slot on A1.
- 2. Slide A3 thru A15 into their respective slots in A1.
- 3. Glue A16 to outer edge of A1.

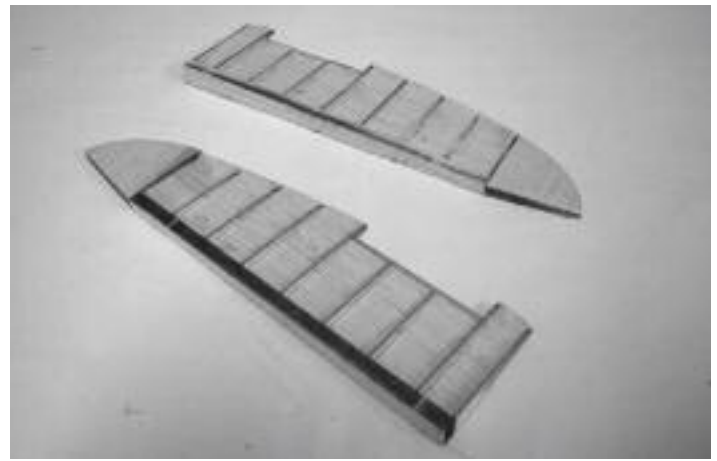


- 4. Align the A1/rib assembly with the A18 Aileron Spar and glue. Glue all ribs.
- 5. Glue A17 into slot in A1 to make a pocket for the trim tab. See Figure
- 6. Repeat for the opposite aileron. Set these assemblies aside.

Elevator Assembly

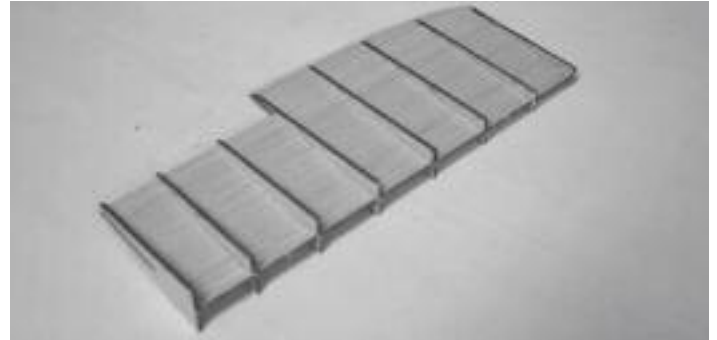


- 1. Align and glue E2 to inner slot in E1.
- 2. Align and glue E10 to outer slot in E1.
- 3. Slide ribs E3 thru E9 into their respective slots in E1.

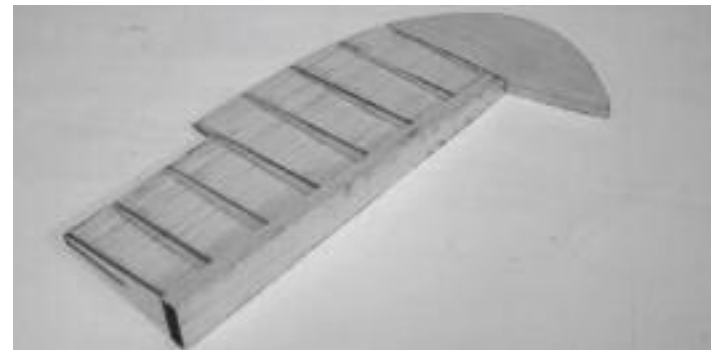


- 4. Align the E1/rib assembly to the E11 Elevator Spar and glue. Glue all ribs.
- 5. Align and glue E13 into the rear slot in E1 to make a pocket for the trim tab.
- 6. Glue E12 to the outer end of the elevator assembly.
- 7. Sand E12 to match the rib contour.
- 8. Repeat for the opposite elevator.

Rudder Assembly



- 1. Align and glue R2 into the bottom slot in R1.
- 2. Align and glue R9 into the upper slot in R1.
- 3. Slide R3 thru R8 into their respective slots in R1.



- 4. Align the R1/rib assembly with the R10 Rudder Spar and glue. Glue all ribs.
- 5. Glue R12 into the slot in R1 to form a pocket for the trim tab.
- 6. Glue 2 R11s together if necessary for correct fit. Otherwise just use one R11.
- 7. Glue R11 to the top of the rudder assembly.
- 8. Sand R11 to match the contour of the ribs. Do not sand R11 forward of the spar yet - you will do this when matching the rudder with the vertical stabilizer.

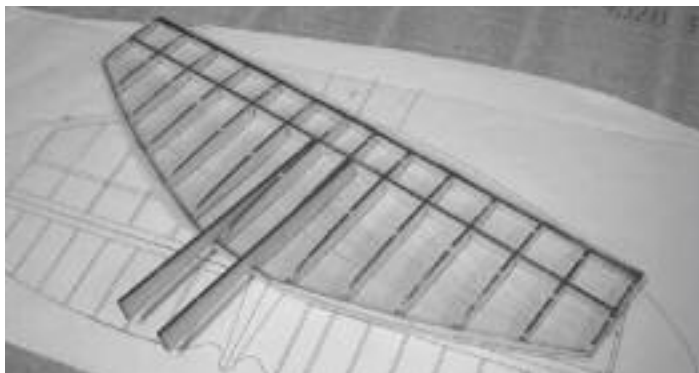
Horizontal Stabilizer Assembly



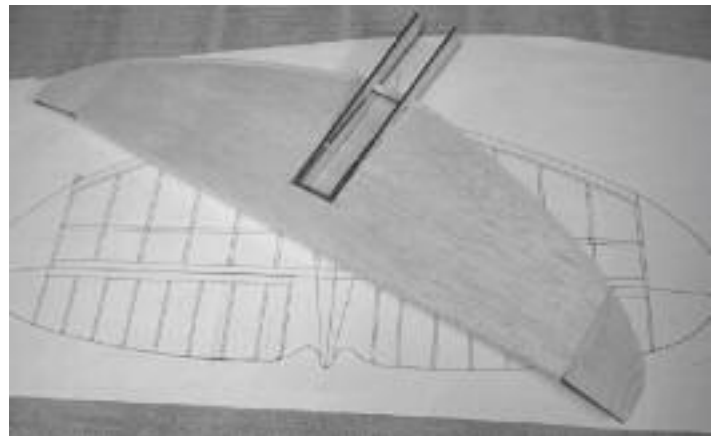
1. Fit S1 thru S7 ribs into the slots in S8 Ply Spar (it is easier to accomplish this by holding the parts vertically while aligning them, then laying the assembly down). Pin the assembly to the board.



2. Slide S9 Balsa Rear Spar into the rear slots in the ribs.
3. Glue all spars and ribs in place.
4. Center S11 in the front slots in the S1 ribs and glue.
5. Fit S10 into the front slots and against S11 and glue. Repeat for the other side.
6. Carefully remove the tops of the rib cradles aft of S9 and forward of S10 and S11. This will make the sheeting process easier. Lightly sand the stabilizer assembly to remove any high spots.

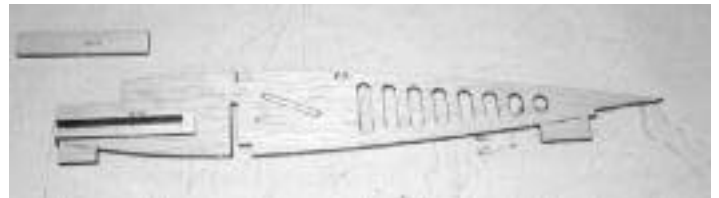


7. Cut two 17" pieces from 1/16"x4"x36" balsa sheet and edge glue.
8. Sheet the stabilizer top.
9. Remove the stab assembly from the board. Trim the sheeting at the stab edges.
10. Test fit S13 Ply Alignment Spar to the outside of rib S1 on each side of the stab. Trim as necessary for a tight fit.
11. Epoxy S13 on the outside against S1. Repeat for the other side.

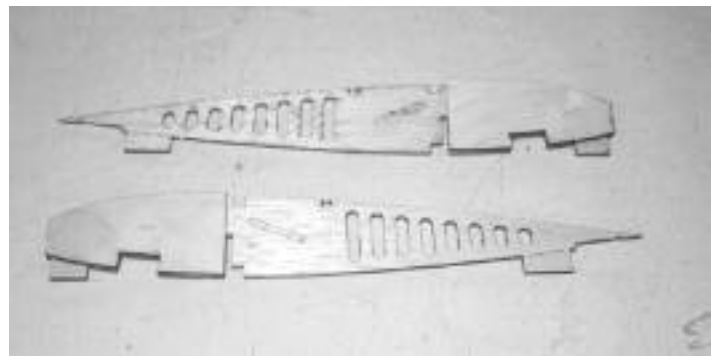


12. Cut two 17" pieces from 1/16"x4"x36" balsa sheet and edge glue.
13. Measure the area between the S13s and cut from the sheet. Test fit the bottom stab sheeting and glue in place.
14. Trim and sand the sheeting and stab assembly.
15. Cut and glue 1/4"x3/8" balsa leading edges to the stab, including the area between the S13s. Trim and sand the leading edges.
16. Glue 2 S12s together and glue to the stab ends. Repeat for the other side. Sand the S12s to match the stab.

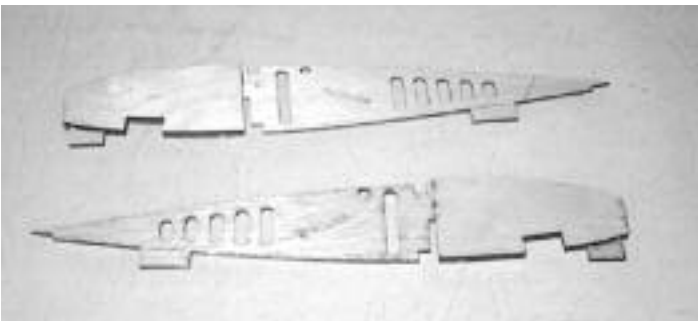
Center Wing Assembly (without flaps)



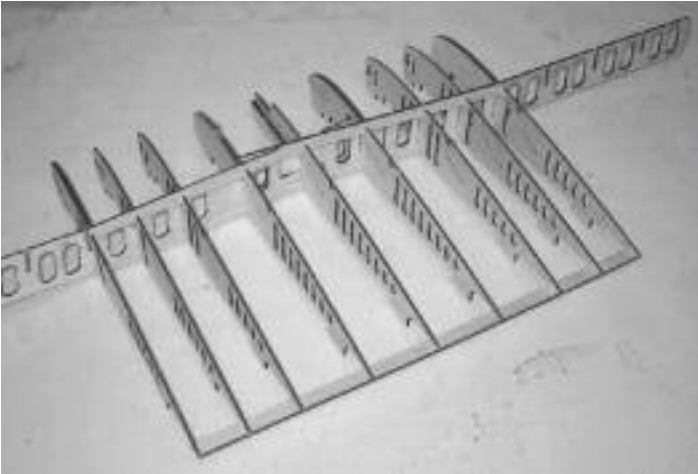
1. Align the slot in W1A to the slot in W1 and glue.
2. Glue W1B on top of W1A.
3. Turn W1 over and repeat for the other side. This will create the pocket for the wing dowel.



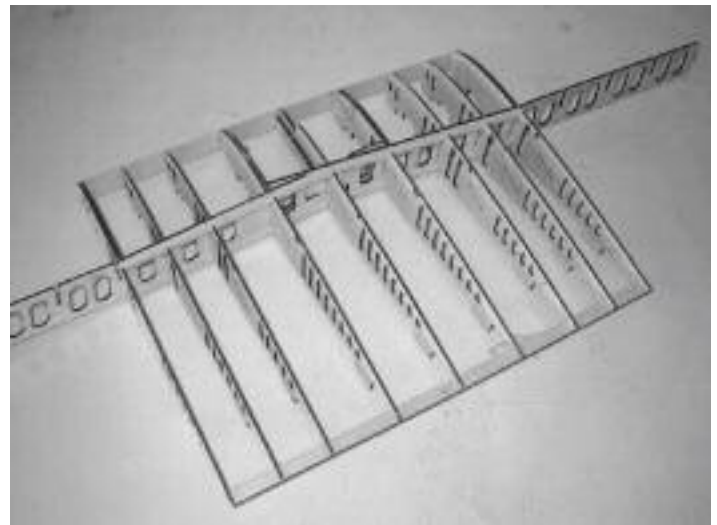
4. Epoxy W2A Ply Dabler to W2. Make a left and a right side as shown.



5. Epoxy W5B Ply Doubler to W5. Make a left and right side as shown.



6. Align W16 and W17 Ply Spars with the plans.
 7. Slide W1 over the spars. Do not glue yet.
 8. Slide both W2s over the spars and lock the spar tabs into the slots in W2. The Ply Doubler will face outboard. Do not glue yet.
 9. Slide W3s, W4s, and W5s into the spar slots. The W5 Ply Doubler will face inboard.
 10. Align each rib with the plans, align the spars and pin to the board. Slide a scrap piece of 3/32" balsa in the spar slots outboard of W5 for proper alignment of W5 (this will make room for W5A when building the outer wing panels). Glue the ribs to the spars.
 11. Cut a left and right 1/4"x1/4" balsa spar and glue in the slots in the ribs.
 12. Glue W18 Trailing Edge into the slots in the ribs.



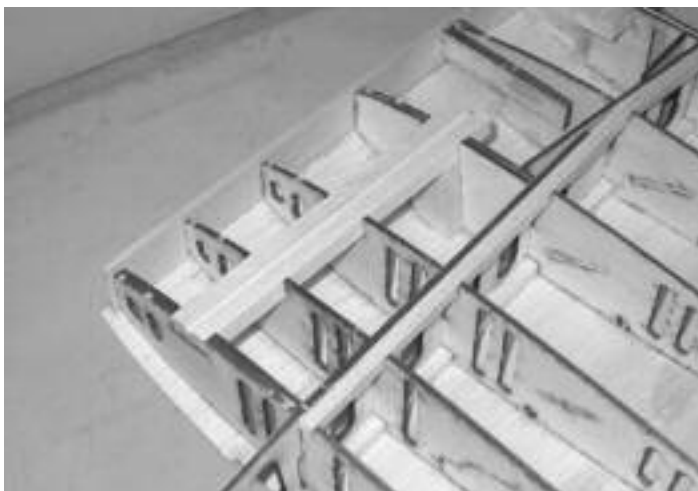
13. Cut the short 3/8"x1" balsa leading edge to 15-1/2". Soak the leading edge using a water or water/ammonia mix and carefully bend to match the leading edge curvature.
 14. When dry, glue the leading edge to the ribs, leaving a 1/16" lip top and bottom. This will allow the sheeting to butt against the leading edge.



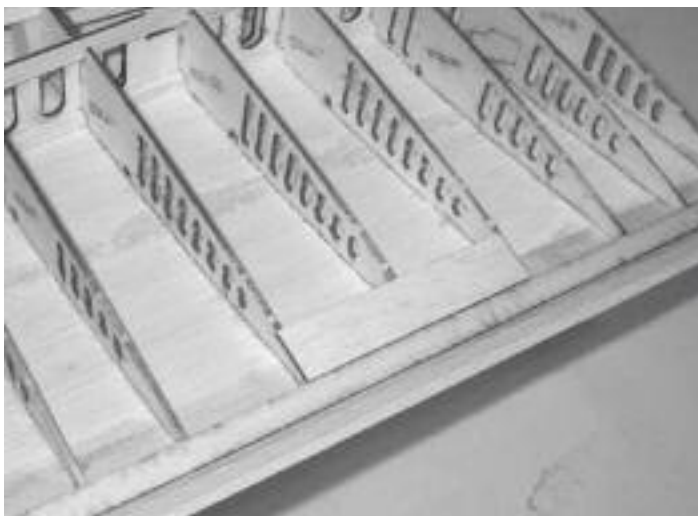
15. Cut four 15-1/2" pieces from 1/16"x4"x48" balsa sheet. Edge glue these sheets to make the top center section sheeting.

Hint: Sanding the joints smooth prior to gluing the sheet to the wing will allow for a much smoother wing surface.

16. Trim the sheeting to match the leading edge, and sheet the center wing section.
 17. Pull the wing off the board. Measure .6 (6/10ths) inches aft of W18 and cut the excess sheeting.



- 18. Sand the trailing edge sheeting to a taper to match the bottom rib camber.
- 19. Sand off the small alignment tab on the bottom of the Ply Spars at W5.
- 20. Cut a left and right 1/4"x1/4" balsa spar and glue into the slots in the ribs.
- 21. Epoxy the gear blocks and gear block anchors in place. The slot in the gear block anchor will face W2A.
- 22. Drill a 3/16" hole through the gear block to match the slot in the gear block anchor. Use care to not drill through the upper wing sheeting!

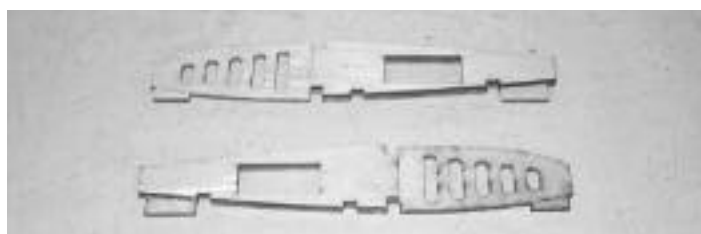


- 23. Make alignment marks on the leading edge to correspond with the hole for the wing dowel. You should drill the hole for the dowel at this time, though permanent installation of the dowel is not necessary. Shaping the leading edge is much easier without the dowel in the way.
- 24. Glue W20 Ply Wing Holddown Plate into the slots in W1 and W2 and against W18.
- 25. Since the aileron servos are in the outer wing panels, at this time install a Y-harness and servo lead extensions in the center wing section.
- 26. Lightly sand the bottom of the wing to remove any high spots.

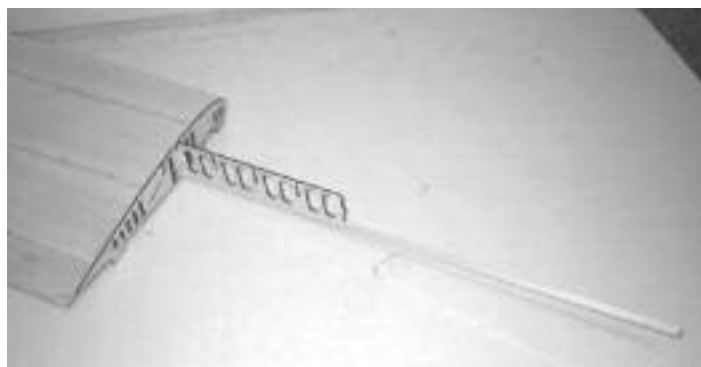


- 27. Using the same procedure as with the top sheeting, cut four 15-1/2" sheets from 1/16"x4"x48" balsa, edge glue, and sheet the bottom of the center wing section.
- 28. Trim and sand the wing sheeting flush with W5. Sand the trailing edge to match the upper and lower sheeting edges. Sand the leading edge to a preliminary shape that matches the upper and lower camber. Final sanding of the leading edge should be after the outer wing panels have been built.
- 29. Trim the gear wire slots.

Right Wing Panel (without flap)

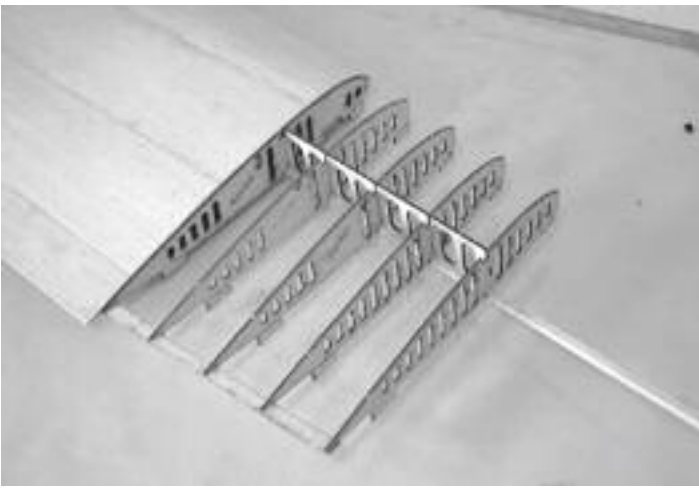


- 1. Epoxy W10A Ply Doubler to W10. Make a left and right side as shown.

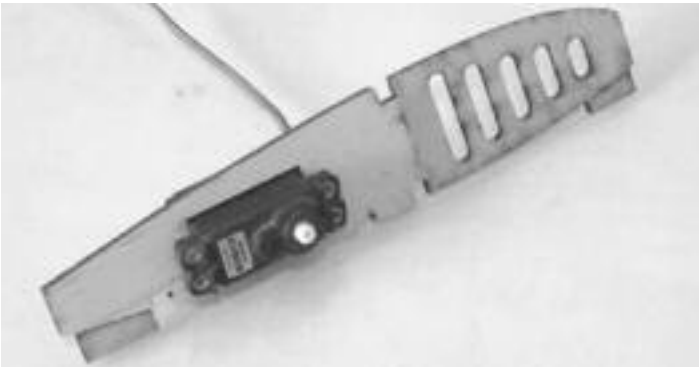


- 2. Align and glue W5A to W5.
- 3. Cut a 1/4"x1/4" balsa spar to length and glue into the slot in W5A and to the bottom of the Ply Spar. Align and pin the wing to the board.

Hint: Place a scrap block of wood or something similar under the center wing section to support the wing while building the outer wing panels.



- 4. Slide W6, W7, W8 and W9 into the slots in the spar and glue in place.
- 5. Glue W19 to the rib trailing edges.



- 6. Install the aileron servo to the W10 rib. The Ply Doubler will face outboard.

Hint: Provisions for an access hatch will be made for the servo. This servo mounting system usually will outlast the airplane, but to make servo removal easier if necessary, mount the servo with hex-head screws. It will be much easier to fit an allen wrench in the access hatch than a screwdriver.



- 7. Glue W10 in place, with the servo head and Ply Doubler facing outboard. Connect the servo leads.
- 8. Align and glue W11, W12, W13, W14, and W15 in place.
- 9. Cut and glue a 1/4"x1/4" balsa spar in place.
- 10. Glue W27 Aileron Spar to W9 and the rib trailing edges.

- 11. Bend a 3/8"x1" balsa leading edge to match the leading edge contour. Depending on the density of the balsa, some leading edge stock will not make the bend at W14 and W15. If this is the case, cut slots about 3/4" apart and halfway through the leading edge in the area of W14 and W15. This should allow the balsa to bend to this final curve. Sand the inner edge to match the dihedral angle of the center wing section and glue in place.



- 12. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets. Cut one piece of 10" x 2" balsa and edge glue.
- 13. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 14. Sheet the upper wing section, taking care that the wing structure stays pinned to the board. This will "lock in" the built-in washout in the wing.
- 15. Remove the wing from the board. Measure .6 inches aft of W19 and trim the trailing edge sheeting.
- 16. Trim and sand the sheeting at the aileron bay and wingtip.
- 17. Cut shear webs from 1/16" balsa sheet and glue to the front of the spars from W9 outboard.



- 18. Cut and glue pieces of 1/4"x1/8" balsa into the slots in W10 and W11 as supports for the aileron servo hatch.
- 19. Sand the trailing edge sheeting to a taper that matches the bottom rib contour. Lightly sand the wing structure to remove any high spots.

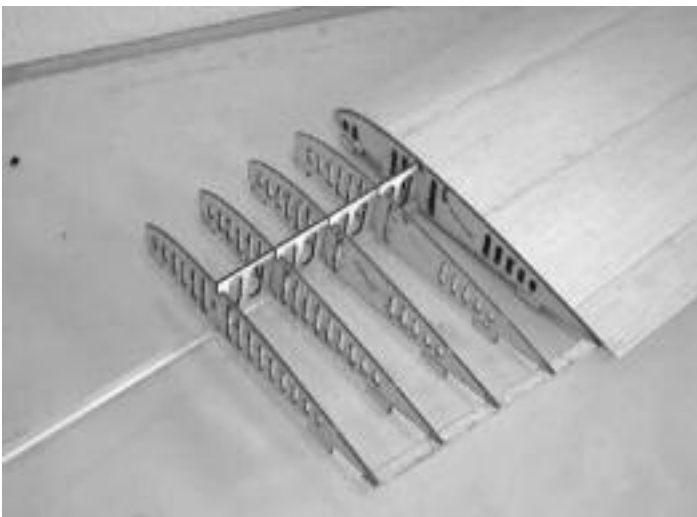
20. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets. Cut one piece of 10" x 2" balsa and edge glue.
21. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
22. Sheet the bottom of the outer wing section.
23. Trim and sand the sheeting at the tip, aileron bay and trailing edge. Cut out the sheeting for the servo access hatch.
24. Sand the leading edge to match the upper and lower rib camber.
25. Glue the wingtip in place and sand to match the wing contour. Sand at the trailing edge of the tip by the aileron bay being careful not to sand too much off.

Left Wing Panel (without flap)



1. Align and glue W5A to W5.
2. Cut a 1/4"x1/4" balsa spar to length and glue into the slot in W5A and to the bottom of the Ply Spar. Align and pin the wing to the board.

Hint: Place a scrap block of wood or something similar under the center wing section to support the wing while building the outer wing panels.

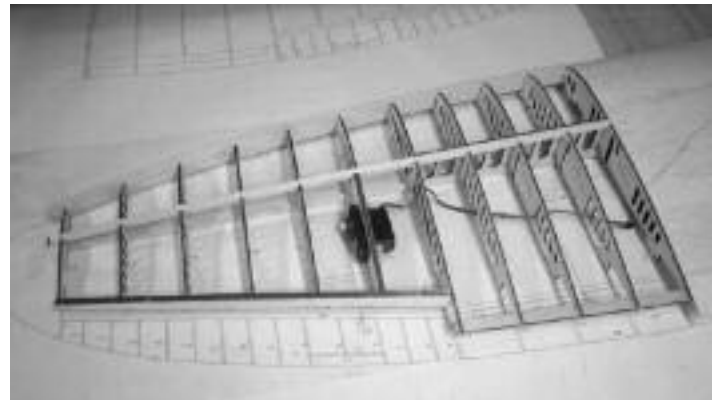


3. Slide W6, W7, W8 and W9 into the slots in the spar and glue in place.
4. Glue W19 to the rib trailing edges.



5. Install the aileron servo to the W10 rib. The Ply Doubler will face outboard.

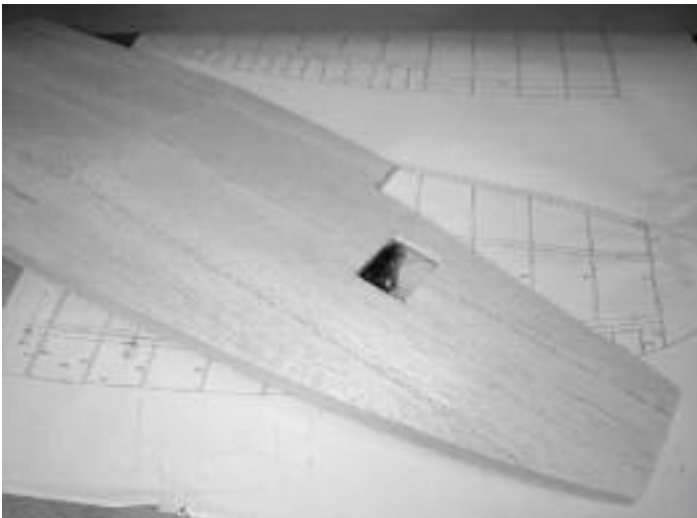
Hint: Provisions for an access hatch will be made for the servo. This servo mounting system usually will outlast the airplane, but to make servo removal easier if necessary, mount the servo with hex-head screws. It will be much easier to fit an allen wrench in the access hatch than a screwdriver.



6. Glue W10 in place, with the servo head and Ply Doubler facing outboard. Connect the servo leads.
7. Align and glue W11, W12, W13, W14, and W15 in place.
8. Cut and glue a 1/4"x1/4" balsa spar in place.
9. Glue W27 Aileron Spar to W9 and the rib trailing edges.
10. Bend a 3/8"x1" balsa leading edge to match the leading edge contour. Depending on the density of the balsa, some leading edge stock will not make the bend at W14 and W15. If this is the case, cut slots about 3/4" apart and halfway through the leading edge in the area of W14 and W15. This should allow the balsa to bend to this final curve. Sand the inner edge to match the dihedral angle of the center wing section and glue in place.



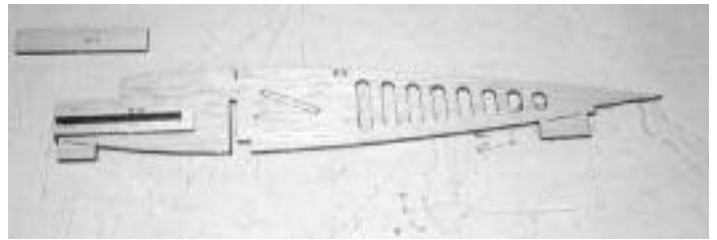
- 11. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets. Cut one piece of 10" x 2" balsa and edge glue.
- 12. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 13. Sheet the upper wing section, taking care that the wing structure stays pinned to the board. This will "lock in" the built-in washout in the wing.
- 14. Remove the wing from the board. Measure .6 inches aft of W19 and trim the trailing edge sheeting.
- 15. Trim and sand the sheeting at the aileron bay and wingtip.
- 16. Cut shear webs from 1/16" balsa sheet and glue to the front of the spars from W9 outboard.



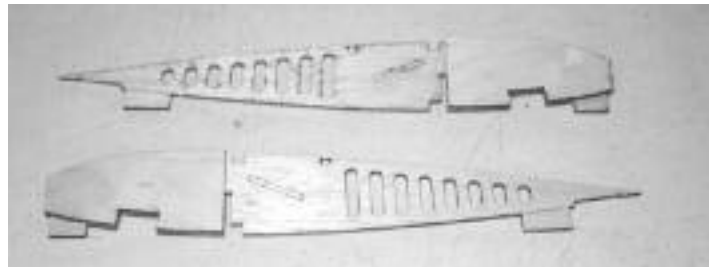
- 17. Cut and glue pieces of 1/4"x1/8" balsa into the slots in W10 and W11 as supports for the aileron servo hatch.
- 18. Sand the trailing edge sheeting to a taper that matches the bottom rib contour. Lightly sand the wing structure to remove any high spots.
- 19. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets. Cut one piece of 10" x 2" balsa and edge glue.
- 20. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 21. Sheet the bottom of the outer wing section.
- 22. Trim and sand the sheeting at the tip, aileron bay and trailing edge. Cut out the sheeting for the servo access hatch.

- 23. Sand the leading edge to match the upper and lower rib camber.
- 24. Glue the wingtip in place and sand to match the wing contour. Sand at the trailing edge of the tip by the aileron bay being careful not to sand too much off.
- 25. Final sand the entire leading edge to a rounded contour matching the airfoil section shown on the plans.

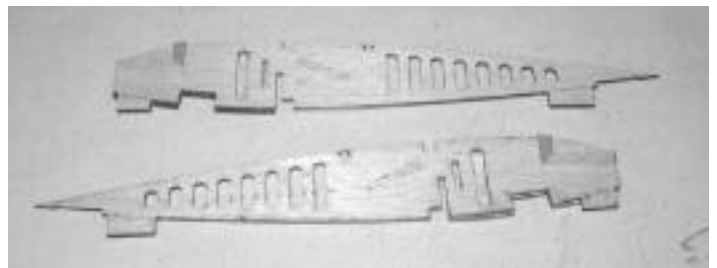
Center Wing Assembly (with flaps)



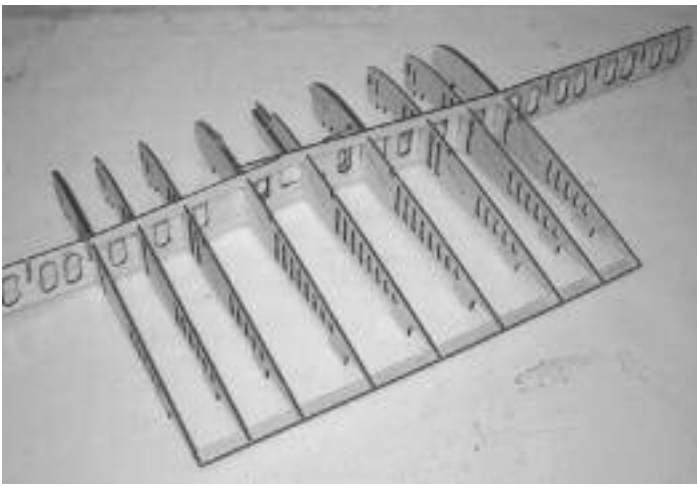
- 1. Align the slot in W1A to the slot in W1 and glue.
- 2. Glue W1B on top of W1A.
- 3. Turn W1 over and repeat for the other side. This will create the pocket for the wing dowel.



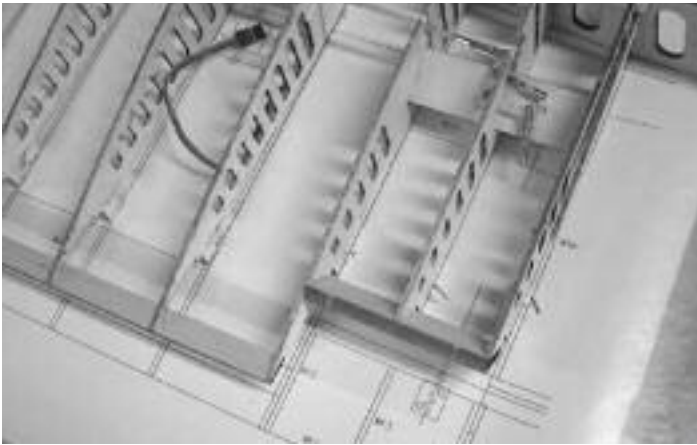
- 4. Epoxy W2A Ply Doubler to W2. Make a left and a right side as shown.



- 5. Epoxy W5B Ply Doubler to W5. Make a left and right side as shown.
- 6. Cut the trailing edge off of ribs W4 and W5 at the engraved line.

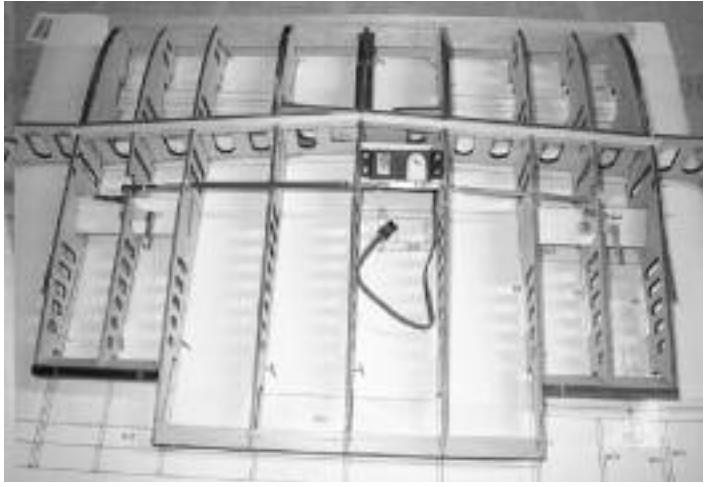


- 6. Align W16 and W17 Ply Spars with the plans.
- 7. Slide W1 over the spars. Do not glue yet.
- 8. Slide both W2s over the spars and lock the spar tabs into the slots in W2. The Ply Doubler will face outboard. Do not glue yet. Slide W22 Ply Servo Tray into the slots in W1 and W2.
- 9. Slide W3s into the spar slots.
- 10. Cut the trailing edges off the W4 and W5 ribs at the engraved line. Lightly sand.
- 11. Slide W4s and W5s into their respective slots in the spar. The W5 Ply Doubler will face inboard.
- 12. Using the plans as a guide, locate and drill a hole in the W23 Ply Bellcrank Support and install the bellcranks. Slide W23s into the slots in W3, W4, and W5.
- 13. Align each rib with the plans, align the spars and pin to the board. Slide a scrap piece of 3/32" balsa in the spar slots outboard of W5 for proper alignment of W5 (this will make room for W5A when building the outer wing panels). Glue the ribs to the spars. Glue W22 and W23s in place.
- 14. Cut a left and right 1/4"x1/4" balsa spar and glue in the slots in the ribs.



- 15. Glue W21 Trailing Edge into the slots in ribs W1, W2 and W3.
- 16. Glue W25 Flap Spars to the back edges of W4 and W5 and against W3. Locate W25 so the bottom edge is aligned with the bottom of the ribs, with a portion of W25 protruding above the tops of the ribs. Note too that W25 has a slight taper, thus an inboard and outboard edge.

- 17. Cut the short 3/8"x1" balsa leading edge to 15-1/2". Soak the leading edge using a water or water/ammonia mix and carefully bend to match the leading edge curvature.
- 18. When dry, glue the leading edge to the ribs, leaving a 1/16" lip top and bottom. This will allow the sheeting to butt against the leading edge.



- 19. Fit the flap servo in place in W22. Make up pushrods to connect the servo to the bellcrank. Adjust so that the bellcranks when at 90 degrees as shown are in the middle of the servo travel range and the bellcranks are parallel.

Hint: The flap pushrods will be in the way during the rest of the wing assembly if you permanently install them. Using clevises for the pushrod attachment at the bellcrank to the flap will be easier because the pushrods can be removed and re-installed during construction.

- 20. Sand the top of the W25s to match the rib contour. Lightly sand the wing top surface to remove any high spots.



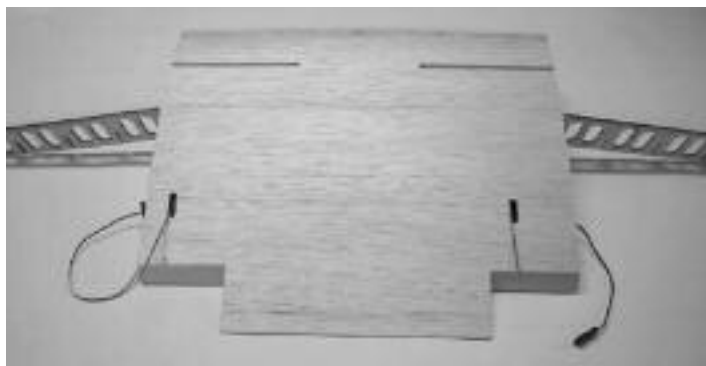
- 21. Cut four 15-1/2" pieces from 1/16"x4"x48" balsa sheet. Edge glue these sheets to make the top center section sheeting.

Hint: Sanding the joints smooth prior to gluing the sheet to the wing will allow for a much smoother wing surface.

- 22. Trim the sheeting to match the leading edge, and sheet the center wing section.
- 23. Pull the wing off the board. Measure .6 (6/10ths) inches aft of W21 and cut the excess sheeting.
- 24. Trim the sheeting at the flap cutouts.
- 25. Glue W20 Ply Wing Holddown Bolt Plate into the slots in W1 and W2.
- 26. Sand the trailing edge sheeting to a taper to match the bottom rib camber.
- 27. Sand off the small alignment tab on the bottom of the Ply Spars at W5.
- 28. Cut a left and right 1/4"x1/4" balsa bottom spar and glue into the slots in the ribs.
- 29. Since the aileron servos are in the outer wing panels, at this time install a Y-harness and servo lead extensions in the center wing section.
- 30. Temporarily install the flap pushrods to the bellcranks. Mark the location of the point where the pushrod will exit the bottom wing sheeting so the slot can be cut after sheeting. Remove the pushrods.



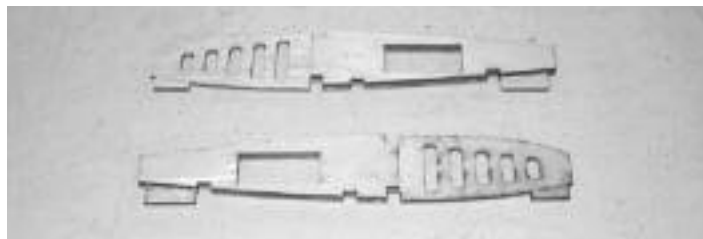
- 31. Epoxy the gear blocks and gear block anchors in place. The slot in the gear block anchor will face W2A.
- 32. Drill a 3/16" hole through the gear block to match the slot in the gear block anchor. Use care to not drill through the upper wing sheeting!



- 33. Make alignment marks on the leading edge to correspond with the hole for the wing dowel. You should drill the hole for the dowel at this time, though permanent installation of the dowel is not necessary. Shaping the leading edge is much easier without the dowel in the way.
- 34. Lightly sand the bottom of the wing to remove any high spots.

- 35. Using the same procedure as with the top sheeting, cut four 15-1/2" sheets from 1/16"x4"x48" balsa, edge glue, and sheet the bottom of the center wing section.
- 36. Trim and sand the wing sheeting flush with W5. Sand the trailing edge to match the upper and lower sheeting edges. Sand the leading edge to a preliminary shape that matches the upper and lower camber. Final sanding of the leading edge should be after the outer wing panels have been built.
- 37. Trim the gear wire slots.
- 38. Align the marks you made for the flap pushrod exit location and cut the slots in the wing sheeting. Install the pushrods and check for fit. Remove the pushrods and set them aside.

Right Wing Panel (with flaps)

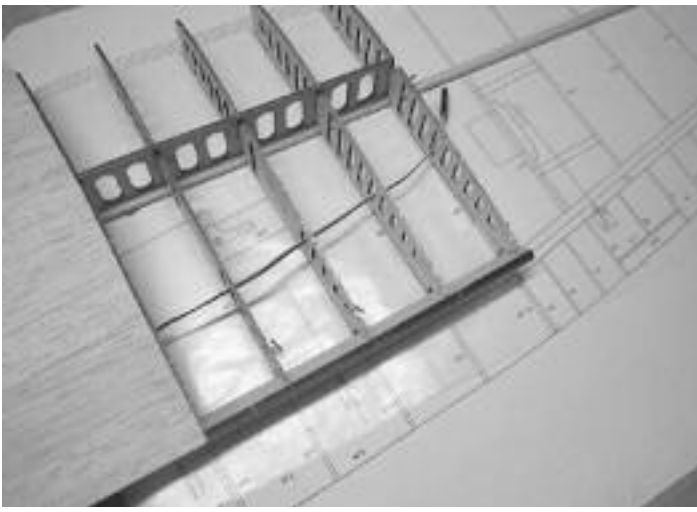


- 1. Epoxy W10A Ply Doubler to W10. Make a left and right side as shown.

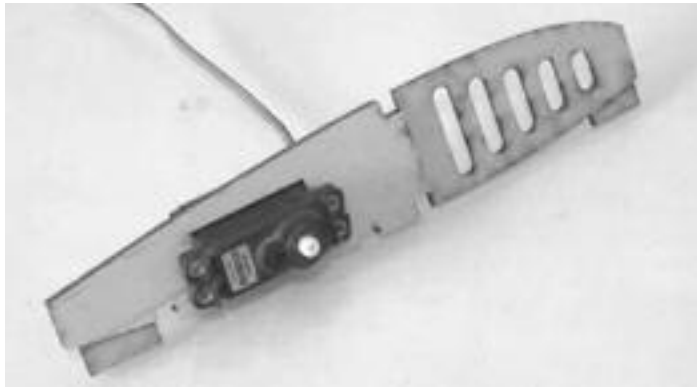


- 2. Cut the trailing edge from W5A at the engraved line.
- 3. Align and glue W5A to W5.
- 4. Cut a 1/4"x1/4" balsa spar to length and glue into the slot in W5A and to the bottom of the Ply Spar. Align and pin the wing to the board.

Hint: Place a scrap block of wood or something similar under the center wing section to support the wing while building the outer wing panels.

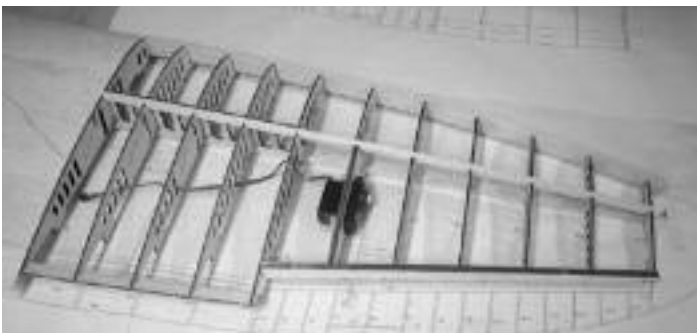


- 5. Cut the trailing edges from W6, W7, W8, and W9 at the engraved line.
- 6. Slide W6, W7, W8 and W9 into the slots in the spar and glue in place.
- 7. Glue W26 Flap Spar to the trailing edges of the ribs and against the center wing assembly. Align W26 so that the bottom edge is even with the bottom edges of the ribs. Note that W26 is tapered - fit the larger end to the inside against the center wing section.



- 8. Install the aileron servo to the W10 rib. The Ply Doubler will face outboard.

Hint: Provisions for an access hatch will be made for the servo. This servo mounting system usually will outlast the airplane, but to make servo removal easier if necessary, mount the servo with hex-head screws. It will be much easier to fit an allen wrench in the access hatch than a screwdriver.



- 9. Glue W10 in place, with the servo head and Ply Doubler facing outboard. Connect the servo leads.

- 10. Align and glue W11, W12, W13, W14, and W15 in place.
- 11. Cut and glue a 1/4"x1/4" balsa spar in place.
- 12. Glue W27 Aileron Spar to W9 and the rib trailing edges.
- 13. Sand W26 and W27 to match the rib camber.
- 14. Bend a 3/8"x1" balsa leading edge to match the leading edge contour. Depending on the density of the balsa, some leading edge stock will not make the bend at W14 and W15. If this is the case, cut slots about 3/4" apart and halfway through the leading edge in the area of W14 and W15. This should allow the balsa to bend to this final curve. Sand the inner edge to match the dihedral angle of the center wing section and glue in place.



- 15. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets.
- 16. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 17. Sheet the upper wing section, taking care that the wing structure stays pinned to the board. This will "lock in" the built-in washout in the wing.
- 18. Remove the wing from the board.
- 19. Trim and sand the sheeting at the aileron bay, the flap bay and wingtip.
- 20. Cut shear webs from 1/16" balsa sheet and glue to the front of the spars from W9 outboard.



- 21. Cut and glue pieces of 1/4" x1/8" balsa into the slots in W10 and W11 as supports for the aileron servo hatch.
- 22. Sand W26 and W27 to match the rib camber. Lightly sand the wing structure to remove any high spots.
- 23. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets.

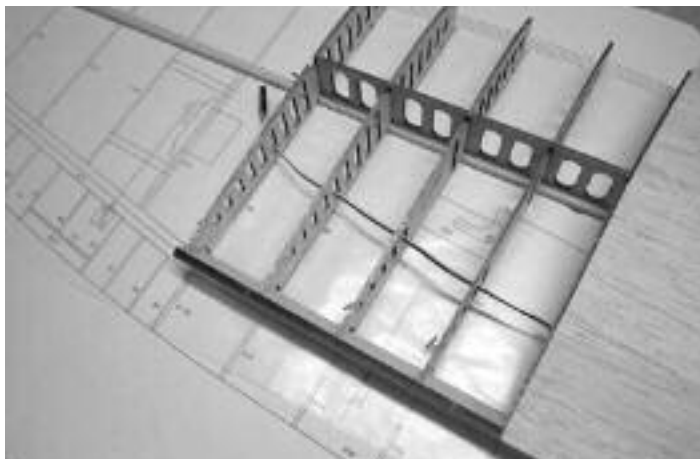
- 24. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 25. Sheet the bottom of the outer wing section.
- 26. Trim and sand the sheeting at the tip, aileron bay and flap bay. Cut out the sheeting for the servo access hatch.
- 27. Sand the leading edge to match the upper and lower rib camber.
- 28. Glue the wingtip in place and sand to match the wing contour. Sand at the trailing edge of the tip by the aileron bay being careful not to sand too much off.

Left Wing Panel (with flaps)



- 1. Cut the trailing edge from W5A at the engraved line.
- 2. Align and glue W5A to W5.
- 3. Cut a 1/4"x1/4" balsa spar to length and glue into the slot in W5A and to the bottom of the Ply Spar. Align and pin the wing to the board.

Hint: Place a scrap block of wood or something similar under the center wing section to support the wing while building the outer wing panels.



- 4. Cut the trailing edges from W6, W7, W8, and W9 at the engraved line.
- 5. Slide W6, W7, W8 and W9 into the slots in the spar and glue in place.
- 6. Glue W26 Flap Spar to the trailing edges of the ribs and against the center wing assembly. Align W26 so that the bottom edge is even with the bottom edges of the ribs. Note that W26 is tapered - fit the larger end to the inside against the center wing section.



- 7. Install the aileron servo to the W10 rib. The Ply Doubler will face outboard.

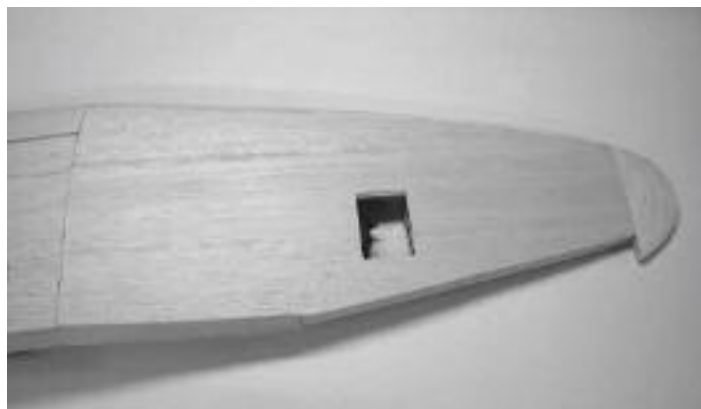
Hint: Provisions for an access hatch will be made for the servo. This servo mounting system usually will outlast the airplane, but to make servo removal easier if necessary, mount the servo with hex-head screws. It will be much easier to fit an allen wrench in the access hatch than a screwdriver.



- 8. Glue W10 in place, with the servo head and Ply Doubler facing outboard. Connect the servo leads.
- 9. Align and glue W11, W12, W13, W14, and W15 in place.
- 10. Cut and glue a 1/4"x1/4" balsa spar in place.
- 11. Glue W27 Aileron Spar to W9 and the rib trailing edges.
- 12. Sand W26 and W27 to match the rib camber.
- 13. Bend a 3/8"x1" balsa leading edge to match the leading edge contour. Depending on the density of the balsa, some leading edge stock will not make the bend at W14 and W15. If this is the case, cut slots about 3/4" apart and halfway through the leading edge in the area of W14 and W15. This should allow the balsa to bend to this final curve. Sand the inner edge to match the dihedral angle of the center wing section and glue in place.

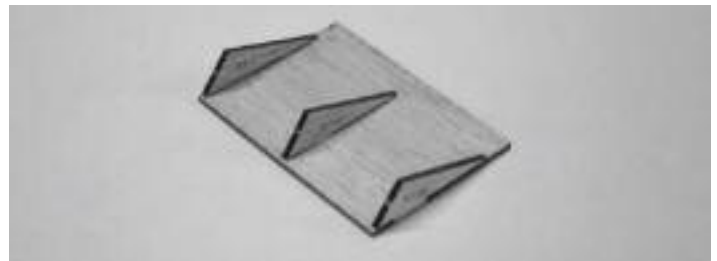


- 14. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets.
- 15. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 16. Sheet the upper wing section, taking care that the wing structure stays pinned to the board. This will "lock in" the built-in washout in the wing.
- 17. Remove the wing from the board.
- 18. Trim and sand the sheeting at the aileron bay, the flap bay and wingtip.
- 19. Cut shear webs from 1/16" balsa sheet and glue to the front of the spars from W9 outboard.

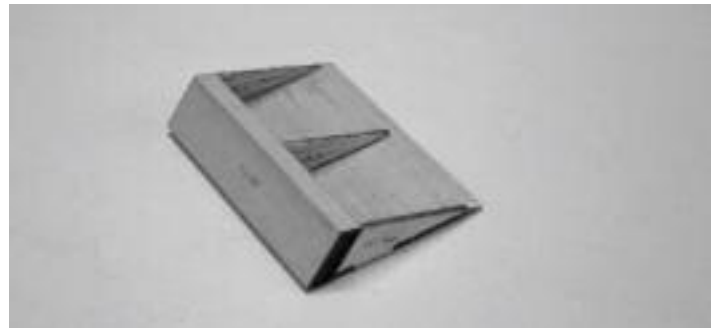


- 20. Cut and glue pieces of 1/4x/18 balsa into the slots in W10 and W11 as supports for the aileron servo hatch.
- 21. Sand W26 and W27 to match the rib camber. Lightly sand the wing structure to remove any high spots.
- 22. Cut three 22" pieces of balsa sheet from 1/16"x4"x48" balsa. Edge glue these sheets.
- 23. Trim the sheeting to match the leading edge contour and the contour at the center wing section.
- 24. Sheet the bottom of the outer wing section.
- 25. Trim and sand the sheeting at the tip, aileron bay and flap bay. Cut out the sheeting for the servo access hatch.
- 26. Sand the leading edge to match the upper and lower rib camber.
- 27. Glue the wingtip in place and sand to match the wing contour. Sand at the trailing edge of the tip by the aileron bay being careful not to sand too much off.
- 28. Final sand the entire leading edge to a rounded contour matching the airfoil section shown on the plans.

Flap Assembly



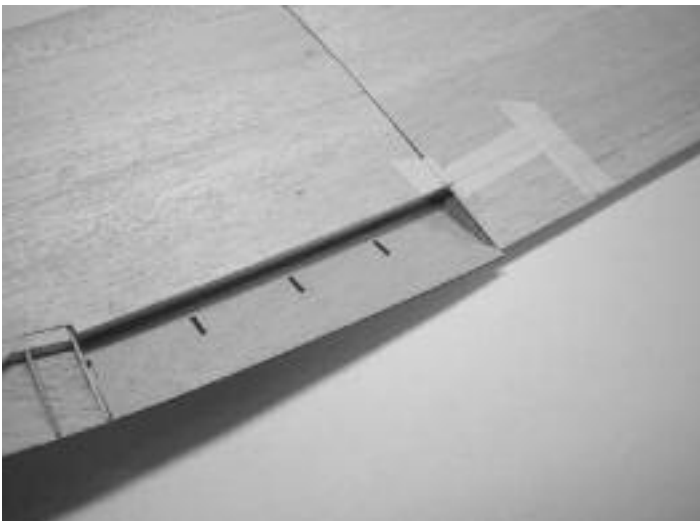
- 1. Lay out the parts WF1, WF2, WF3, and WF4 for both left and right inner flap sections. Test fit WF1 to the bottom of the inner flap bay on the wing to determine the proper positioning. It is less confusing if you work on one flap at a time, so set one parts set aside for now.
- 2. Glue WF2, WF3 and WF4 into the slots in WF1.



- 3. Sand the front lip of WF1 to a bevel to match the angle of the ribs.
- 4. Glue WF11 to the front of the flap assembly. The upper edge of Wf11 will be flush with the top of the ribs.
- 5. Sand WF11 flush with the bottom of the flap. Sand the top of WF11 flush with the ribs, and sand the trailing edge of WF1 to a taper to match the ribs.



- 6. Test fit the flap to the wing to determine the location for WF13 Ply Re-reinforcement. This piece will give the control arm support and will locate inside the flap in either the inner or outer cavity - align it with the pushrod hole in the wing. Glue WF13 inside the flap.
- 7. Sheet the top of the flap section with 1/16" balsa sheet.
- 8. Trim and sand the sheeting, then test fit the flap section to the wing. Sand as necessary for a good fit
- 9. Tape the flap section to the wing. Locate and tape the aileron in position on the wing.

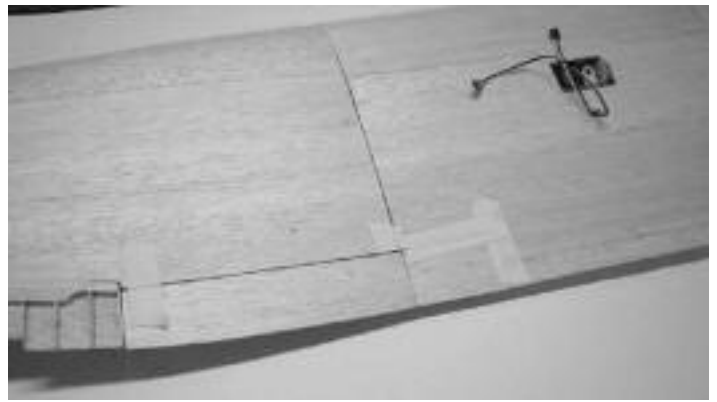


Note: The flap spars on the inner and outer wing section will not necessarily be straight to each other, but the outer flap spar might bow slightly on its own during the course of wing construction. If this is the case, the flap spar should be sanded flat.

10. Test fit WF5 to the flap bay. Remember that WF5 will have a 1/4" balsa front edge, so locate it in position with this in mind. Sand the inner and outer edges of WF5 to fit snugly against the inner flap section while leaving about 1/16" gap at the aileron.
11. Re-cut the slots in WF5 if necessary for the ribs, and tape WF5 in position to the flap and aileron. Position is not critical now, this step is to set the rib at the proper angle only.
12. With WF5 in position, tack glue WF6 to WF5 matching the angle of the inner flap edge.



13. Remove WF5 from the wing. Glue WF6 permanently to WF5. Glue WF7, WF8, WF9 and WF10 to WF5.
14. Bevel the leading edge of WF5 to match the ribs.
15. Glue WF12 to the front of the flap section. The upper edge of WF12 will be flush with the top of the ribs.
16. Sand the bottom of WF12 flush with WF5. Sand the top of WF12 flush with the ribs, and sand the trailing edge of WF5 to a taper matching the ribs.
17. Sheet the top of the flap with 1/16" balsa.

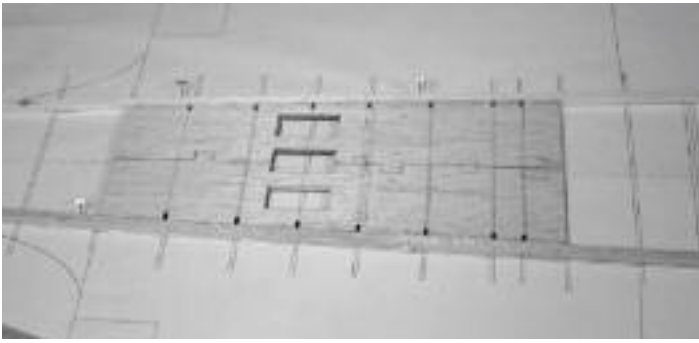


18. Trim and sand the sheeting with the flap. Test fit the flap section to the wing and sand as necessary for a good fit.
19. Epoxy the outer flap section to the inner section. Before the glue sets, tape the outer flap section in place to the wing and to the inner section. The end result will be a one piece flap with a bend in the middle.
20. Remove the tape and test fit the flap to the wing. Trim as necessary for a good fit.

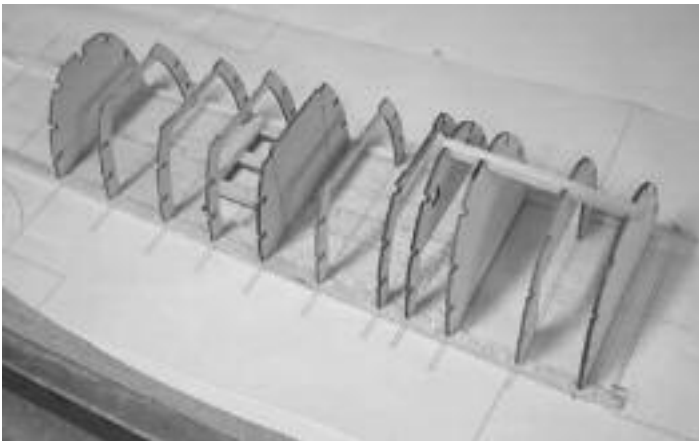


21. Measure a point 0.15" up from the front inner bottom edge of the flap and make a mark there. Do the same for the front outer bottom edge and make a mark. With a straightedge draw a line connecting the two points. This will be the hinge line and will not follow the bend of the flap.
22. Sand a bevel from the bottom of the flap to the hinge line. The bevel should be approximately 90 degrees to the bottom of the flap. A constant angle is the goal here. Test fit to the wing and move the flap through some up and down motion. Sand as necessary for proper movement.
23. Repeat for the other flap. When complete, remove the ailerons and set them and the flaps aside until final assembly.

Fuselage Assembly



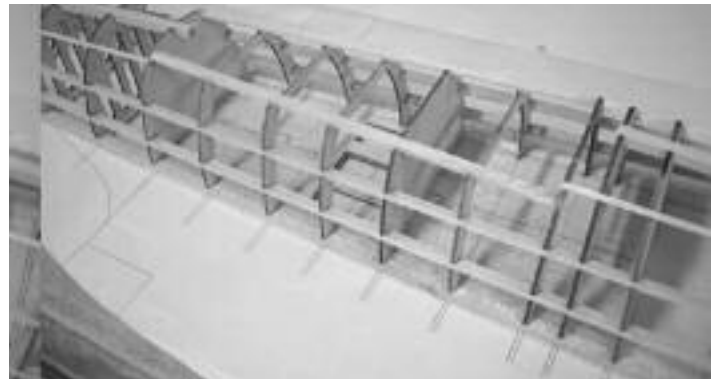
1. Lay out two 1/4"x1/4" balsa sticks to act as the fuselage crutch. These pieces will not extend past F18A but will extend about 1/2" past F1A. Pin to the board.
2. Glue C1 and C2 together to make the cockpit floor.
3. Lay several pieces of scrap 1/8"x1/4" balsa on the board under the cockpit floor. This will properly space the floor in reference to the crutch. The cockpit floor will locate between bulkhead F3A and F11A. Glue the floor in place. See Figure



4. Glue F1A Ply Firewall in place. The firewall has 1 degree right thrust - this is accounted for on the plans, and is 90 degrees to the crutch.
5. Glue F2A and F3A in place.
6. Glue F4A in place by sliding the legs through the slots in the cockpit floor.
7. Glue F5A thru F10A in place. Do not remove the horizontal connectors (the rivet detail on F7A faces forward).
8. Glue F11A in place.
9. The forward upper keel is laminated 1/8x1/4 balsa. Cut a piece and glue to F1A, F2A, F3A, and F4A. Repeat with the second piece on top of the first. See Figure



10. Glue F12A thru F18A in place.
11. Cut and glue a 1/4"x1/4" balsa upper keel between F11A and F18A.
12. Slide 1/8x1/4 balsa stringers into the slots in the bulkheads, starting with the lowest slots working upward. The top stringer runs from F1A to F5A, then from F11A to F18A.
13. Sand the top stringers flush with F5A and F11A. See Figure



14. Cut two 1/8"x1/4" balsa stringers to fit between F5A and F11A, lying flat on top of the bulkheads. Align the stringer with the inside top edges of the bulkheads. Sand the stringers at F5A and F11A to match the bulkhead contour. See Figure



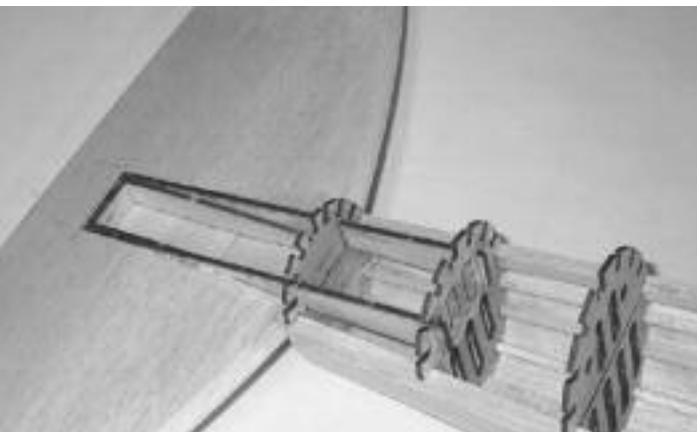
15. Place scrap 1/8"x1/4" balsa flat against the sides of the crutch at two or three locations. This will elevate the fuse sheeting by 1/8" on the crutch (this gives the lower fuse sheeting a solid adhering surface).
16. Sheet the fuse using 1/16"x4"x36" balsa. Match the balsa sheet density as closely as possible to prevent warping (a hard sheet on one side and a soft on the other will definitely do this!). Glue both sheets on either side of the crutch and work the sheeting up the fuse sides together. Start relieving the sheeting at the cockpit area as you work up, and add filler pieces to the forward section and at F11A.
17. Remove the horizontal bridge sections of F5A, F6A, F8A, F9A, and F10A. See Figure



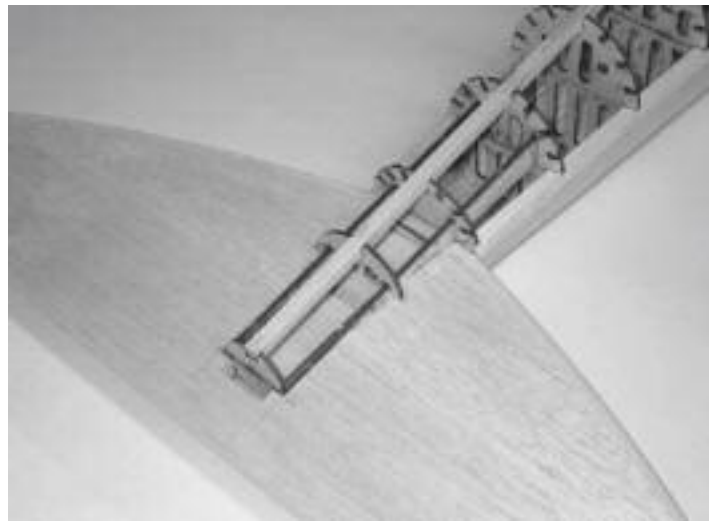
- 18. Remove the upper fuse from the board. Sand the sheeting flush with F18A, but leave approximately 1/2" extending past F1A.
- 19. Epoxy C40 Ply Servo Tray to the cockpit floor.
- 20. Align F1B with F1A and glue in place. Epoxy F19 to the front of the F1s (F19 will install easier by sliding it in place from the bottom).
- 21. Glue F2B thru F11B in place (note there is no F8B).
- 22. Fit F21 Ply Wing Saddle in place. Start gluing at the center bulkheads, then gently bend F21 to fit to F2B and F11B. See Figure



- 23. Bevel the slots in F21 to allow the F22 Ply Wing Holddown Plate to slide into place.
- 24. Epoxy F22 in place. When dry, sand the ends of F22 flush with F21.
- 25. Align and glue F12B, F13B, F14B, F15B, and F16B in place.



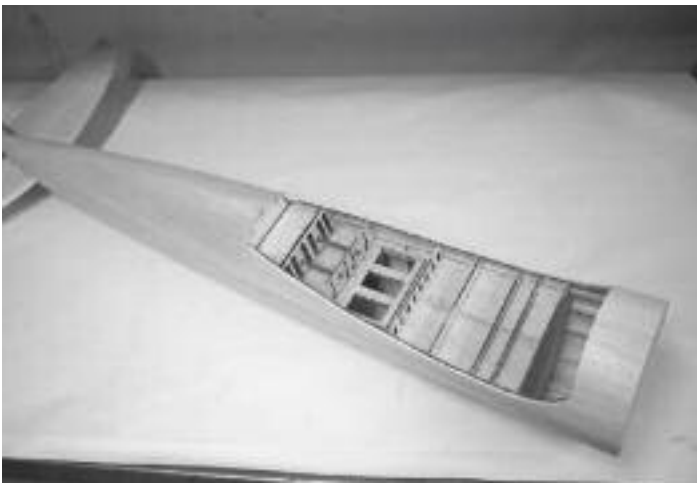
- 26. Test fit the stab to the rear of the fuselage assembly, and test fit F17B and F18B. Epoxy the stab in place.
- 27. Epoxy F17B and F18B in place.



- 28. Cut out a section of sheeting on the stab behind and flush with the stab spar.
- 29. Glue F25 to the stab, flush with the aft edge of the stab spar and centered to the fuselage structure.
- 30. Glue a 1/4"x1/4" balsa keel into the slots in the bulkheads from F11B to F25.
- 31. Slide F24 under the keel and in place on the stab and glue in place.
- 32. Route the elevator and rudder pushrods.
- 33. Glue two 1/8" x 1/4" stringers from F9B to F18B.
- 34. Fit and glue the other 1/8" x 1/4" stringers from F11B to F18B.



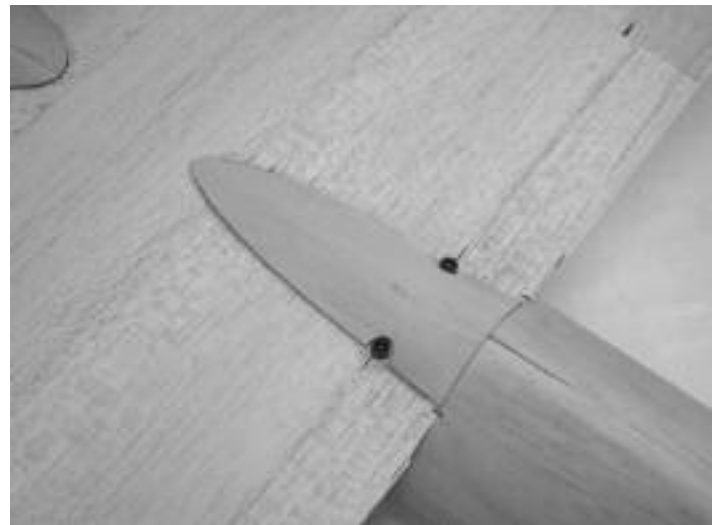
- 33. Glue 1/4"x1/8" balsa stringers to the F1B and F2B bulkheads. Do not add the 1/4"x1/4" keel yet.
- 34. Mount the wing in place on the fuselage. Align the wing with the fuselage.
- 35. Slide F20 over the wing dowel and glue to F2B. Remove the wing.
- 36. Glue a 1/4"x1/4" balsa keel to F1B and F2B.



- 37. Test fit F34 to the fuse structure at the stab and sand for a good fit. F34 should be even with the fuse sheeting. Glue in place to F18, F24, F25 and the stab.
- 38. Align a 1/16"x4"x36" balsa sheet to the side of the fuselage and sand the edge to fit against the top sheeting. Glue sheets to both sides of the fuselage.
- 39. Sheet the lower fuselage by starting at the wing saddle and working forward and up, then relieve the sheets at the wing saddle and work aft and up, trimming the sheets along the way. Wet the sheeting as necessary to help it conform with the curvature of the lower fuse. Cut the sheet as necessary to allow for the pushrods. A small filler piece will be needed at the forward section.



- 40. Trim and sand the sheeting at the firewall, the wing saddle, and at F25.
- 41. Mount the wing to the fuselage. Align the wing and drill holes through the wing holddown plate and F22 for the holddown bolts.
- 42. With the wing still attached, trim F27 to fit to the wing leading edge. F27 should match the fit with F2B, not the sheeting. Glue F27 to the leading edge. Draw a centerline on the wing and on the fuse sheeting to help locate the f28s in the next step.
- 43. Glue F28s together. Bevel the aft edges of the assembly and test fit to F27 and the wing. Glue in place

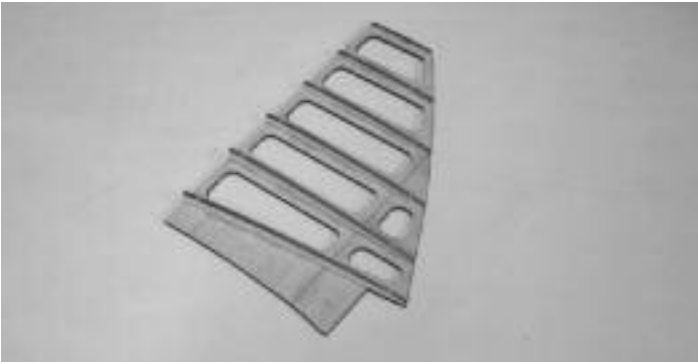


- 44. Fit F29 to the trailing edge of the wing and sand for a fit like you did at the leading edge with F27.
- 45. Cut a 1/4"x1/4" balsa stick 4 3/4" long. Sand the end to a long taper and test fit to the wing and F29. Glue in place on the wing centerline.
- 46. Test fit F30 to the wing and F29. Make cutouts in F30 for the wing bolts, and glue F30 in place.
- 47. Remove the wing.

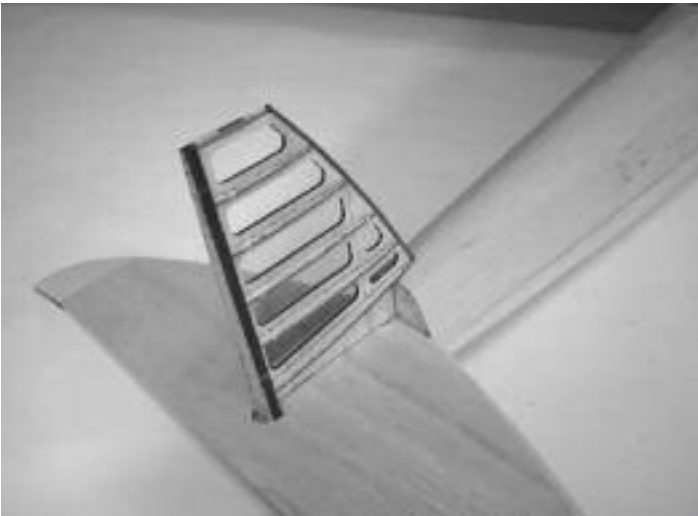


- 48. Cut segments from the 1/2"x1/2" balsa stick trim and sand these segments to fit around the front of the firewall.
- 49. Sand the firewall lip to match the fuse. Round the front edge of the lip.

Vertical Stabilizer Assembly



- 1. Glue V1 and V2 together.
- 2. Align the ribs V3 thru V7 to the engraved lines on V1 and glue in place.
- 3. Turn the assembly over and glue ribs V3 thru V7 in place, aligning with the opposite side.
- 4. Glue V8 to top of the assembly.



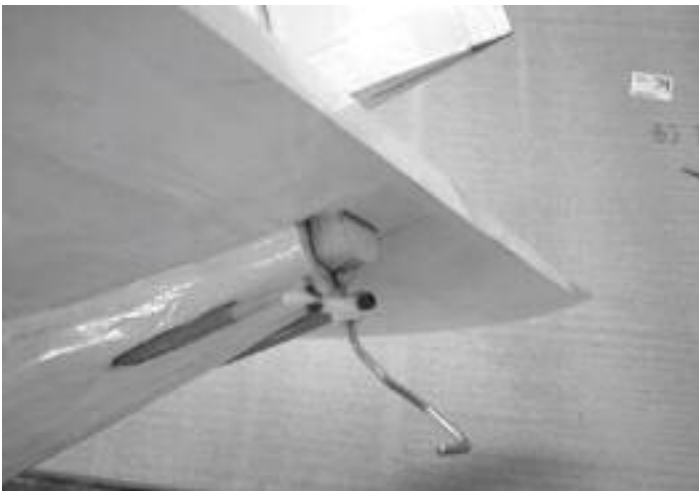
- 5. Align and glue V9 Vertical Spar to the back edge of the stabilizer.
- 6. Test fit the stab to the fuselage assembly. Cut a small access hole in the horizontal stab sheeting at the rear of the stab spar (the tailwheel wire will exit through this hole). Check that the aft edge of the vertical stab aligns with the edge of the horizontal stab spar. Trim the vertical to fit.
- 7. Align the vertical stab with the fuselage and the horizontal stab and glue in place.



- 8. Glue V10 to the leading edge of the stab structure.
- 9. Lightly sand the structure to remove any high spots.
- 10. Using 1/16" balsa sheet, sheet the vertical stabilizer.
- 11. Trim and sand the stab at the leading edge, trailing edge, and at the top.
- 12. Glue a 3/8"x1/4" balsa stick to the leading edge. Sand to match the stab camber, but do not round the leading edge yet.
- 13. Glue two V11s together and glue to the top of the stab. Sand to match the stab contour.
- 14. Align and glue the dorsal fin in place.
- 15. Final sand the stab leading edge and dorsal fin.



- 16. Trim F32 to match the shape of F18 and glue to the back of F18, leaving room for sheeting.
- 17. Glue F33 to F32 and the horizontal and vertical stabilizers.
- 18. Repeat for the other side.



- 19. Trim the opening in the stab bottom to allow insertion of the tailwheel block. Trim the tailwheel block so the tail cone can clear. Slide the tailwheel wire through to opening to check for any interference.
- 20. There are two methods for mounting the tailwheel block and wire. One is to slide brass tubing over the wire and epoxy the tubing to the tailwheel block, the other is to coat the wire with oil or grease and epoxy it in the groove in the tailwheel block when gluing the block to the fuse. Either method is acceptable. Align the tailwheel wire and block with the rear fuselage and rudder centerline and epoxy in place.
- 21. Slide a steering arm and wheel collar on the tailwheel wire and slide the wire in place. Using the rudder as a guide, bend the wire 90 degrees where it enters the rudder.
- 22. Test fit the rudder/tailwheel linkage.

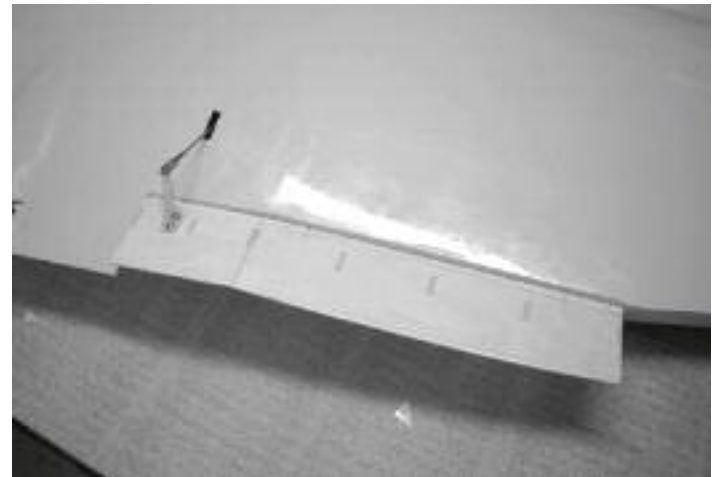


- 3. Sand the trim tabs (R12 for the rudder, E14 for the elevators) to fit in the tab bays. Glue the trim tabs in place. Glue scrap balsa in the bays where the tailwheel wire, elevator joiner wire, and control horn will mount. Sand to match the ribs.
- 4. Hinge and mount the rudder.
- 5. Test fit the elevators and elevator joiner wire. Hinge and mount to the stab.
- 6. Test fit the tail cone to the fuselage and trim as necessary. Mount the tail cone to the fuse by either epoxying, or the tail cone may be attached with screws by adding mounting blocks.

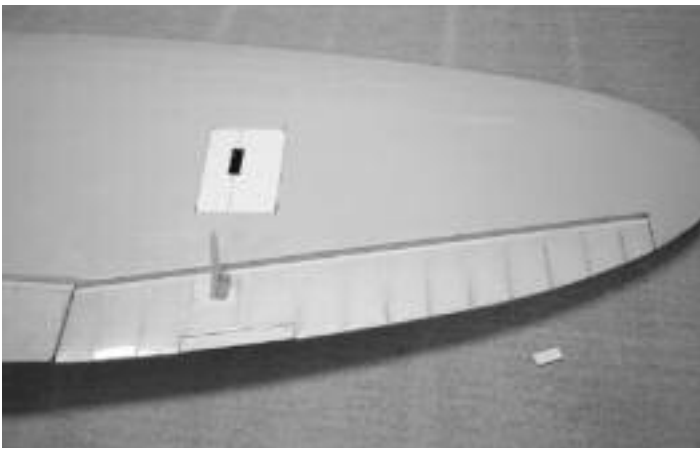
Control Surfaces



- Note: control surface mounting is usually easier after the covering or other aircraft finish is applied. It is assumed that the covering method has been accomplished prior to completing this section.
- 1. Cut and trim the tail cone halves to fit. To best do this, tape the rudder and elevators in place and trim the bottom half to fit first. Tape it in place, then trim the top half to fit the bottom half.



- 7. Measure the inside leading edge of the flap from the top edge to the hinge line. Transfer this measurement to the wing. Measure the outside leading edge of the flap from the top edge to the hinge line and transfer this measurement to the wing. Connect the two lines on the wing - this is the hinge line on the wing. Test fit the flap to the wing and check the hinge line for accuracy.
- 8. Hinge the flap and attach to the wing.
- 9. Replace the flap pushrod. Align a control horn with the pushrod and mark and drill holes approximately 1/2" back of the leading edge of the flap to attach the control horn to the flap (remember there is a 1/8" ply plate to support the control horn in this location).
- 10. Repeat for the other flap.



- 11. Sand the A19 Trim Tab to fit in the bay in the aileron. Glue the trim tab in place.
- 12. Test fit the aileron to the wing and locate the control horn on the aileron. Add scrap balsa to the aileron and sand to match the ribs.
- 13. Hinge and mount the aileron.
- 14. Mount the control horn.
- 15. Cut and fit covers for the aileron servo bay (an excellent material to use is leftover plastic from the wheel pants!).
- 16. Add the pushrod.
- 17. Repeat for the other aileron.



- Paint the back of the panel interior green.
- 5. Test fit the instrument panel to the cockpit, and remove portions of F5A and the surrounding stringers as necessary. Glue the instrument panel in place.
- 6. Paint the C11 Pipe silver. The arm is the locator for the C12 Trim Wheel and can be painted black, along with the trim wheel. Glue C12 to C11, and glue the assembly to the left side cockpit floor.

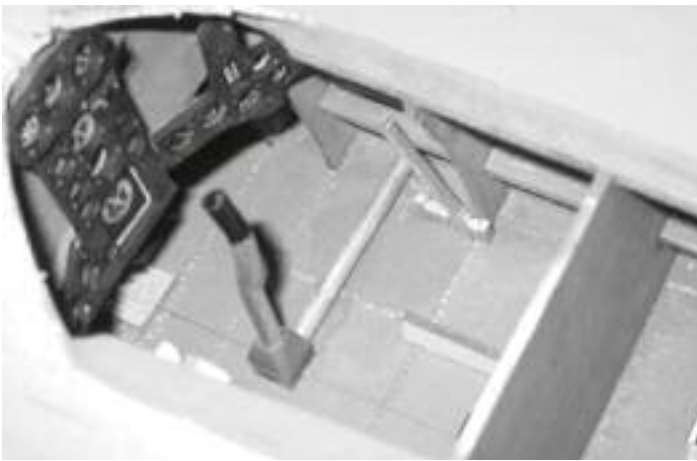
Cockpit Assembly



- 1. Paint the C23 instrument panel black with silver screw heads.
- 2. Cut out and glue the instrument panel backing to the panel.
- 3. Carefully score the panel on the engraved lines (between the center panel and the two "wings"). Gently angle the panels so that and glue C22 to the lower back portion of the instrument panel.
- 4. Glue C21 to the upper back portion of the panel.



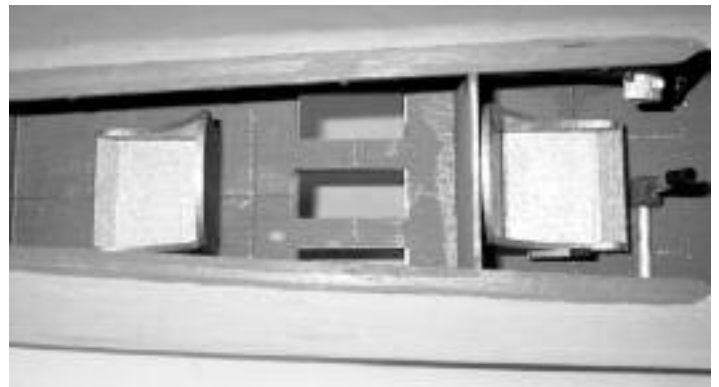
- 7. Paint the C13 Radio Panel black with white buttons and silver screw heads. Paint the C14 Mixture Lever silver with a red knob. Glue to C13 with knob aft.
- 8. Paint the C15 Throttle silver with a white knob. Glue to C14 with knob forward.
- 9. Paint the C16 Quadrant Cover silver. Glue to C15.
- 10. Glue the Radio Panel to the left side cockpit wall, behind the F6 bulkhead and under the ledge.
- 11. Paint the C20 Fuel Panel black. Cut out and glue the instrument backing to C20. Glue C20 to the left side cockpit floor.



- 12. Paint the C17 Hydraulic Lever silver and glue to the right side cockpit floor.
- 13. Glue C5 Control Stick Base to the cockpit floor on the engraved marks.
- 14. Sand the C6 Control Stick Boot to simulate a leather boot, and paint brown.
- 15. Shape a control stick as depicted in the plans. Glue the boot to the bottom of the stick and glue the stick to C5. A torque tube may be added to the right side of the floor as shown.
- 16. Glue C7 and C8 Pilot Seat Mounts to the cockpit floor.
- 17. Glue C9 and C10 Gunner's Seat Mounts to the aft cockpit floor.



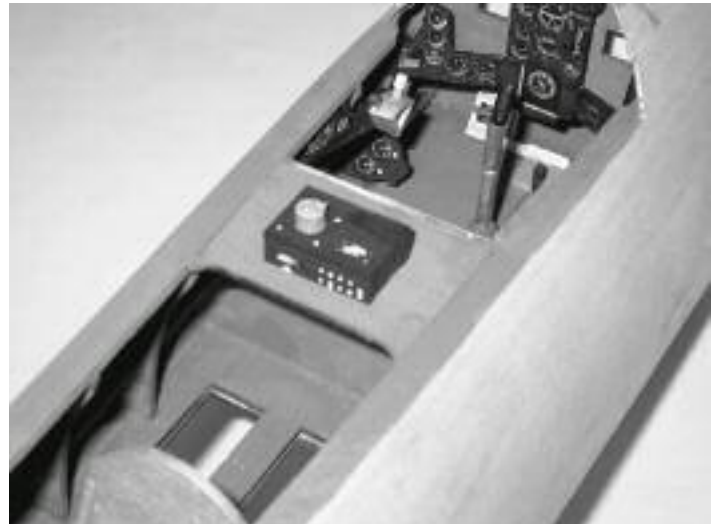
- Note: during flight with the aft canopies closed, the gunner usually faced forward.
- 18. Build the seats by gluing C25 seat back to C24 bottom. Next glue 2 C27 sides in place. Glue C26 lip to the forward edge of the seat assembly.
- 19. Glue the C28 seat adjuster to the pilot's seat only. Paint the seats silver.



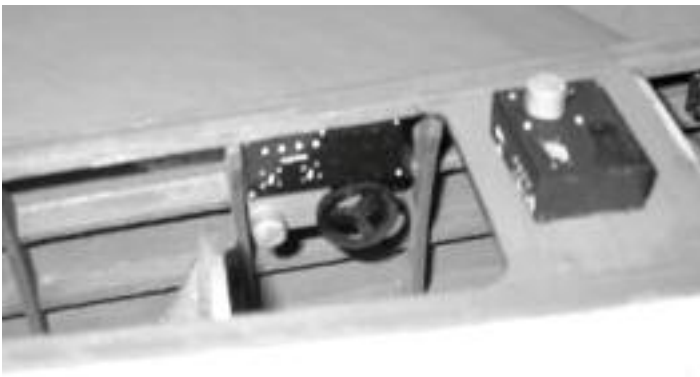
- 20. Glue the pilot's and gunner's seat to the seat supports.



- 21. Glue C19 Canopy Handle to the C18 Track. Paint silver with black handle. Glue to the right rear edge of the front cockpit.



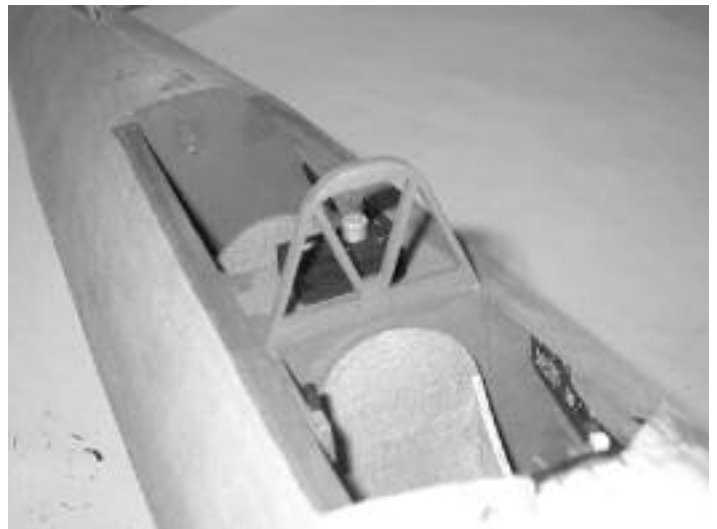
- 22. Glue C31 Radio Shelf to the back edge of F7A even with the cockpit ledge. Paint interior green.
- 23. Glue C39 to the edge of C38, then use scrap 1/8x1/4" balsa to build a box out of C38. Paint black with white details and glue to C31 Radio Shelf.
- 24. Cut a 1/4" piece of 1/4" dowel, paint silver, and glue to the big circle on top of C38.



- 25. Paint C32 interior green. Paint C33 black with white details. Glue C33 to C32. Paint C34 wheel black and glue to C32.
- 26. Cut a 1/4" piece of 1/4" dowel, paint silver and glue to C32.
- 27. Glue C32 to underside of cockpit ledge aft of the radio shelf.
- 28. Paint C37 black. Cut out and glue the instrument backing to C37.
- 29. Glue C37 to the right side of F8A just under the radio shelf.



- 30. Paint C36 Ammo Drums black and position on the both the right and left sides of the cockpit aft of the gunner's seat.
- 31. Paint C35 silver and glue to the right side next to the gunner's seat.
- 32. Cut two 1 1/2" pieces of scrap 1/4"x3/8" balsa. Paint black. Paint C29 and C30 silver with a red knob and glue to the balsa pieces. Make a left and right side. These are the gun butts.
- 33. Slide the gun butts into the slots (handles face out-board) in F4 and glue the ends against F3.



- 34. Paint the pilot's Rollover Bulkhead interior green and glue in place to F7A.



- 35. Trim the canopy to fit and glue in place.

Final Assembly



- 1. Mount the wing to the fuselage. Fit F31 to the lower fuse and wing, and glue F31 to the fuse.



2. With the wing still in position, trim the fit the wing fillet in place and glue to the fuselage.



3. Draw a line around the bottom of each wheel pant and cut along the line.



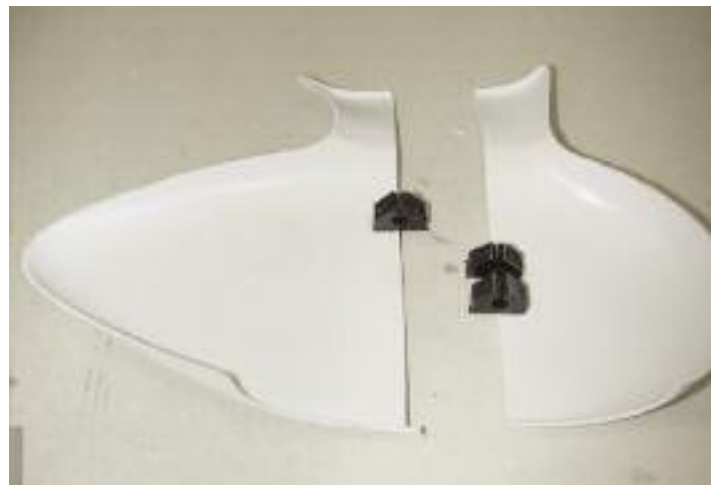
4. Trial fit the wheel pants together. Trim and sand for a good fit. Do not glue at this time.



5. Cut an opening in the bottom of wheel pant assembly so that the wheel will fit without binding. Also cut the top of the wheel pant so the gear wire will have room to move.



6. For removable wheel pants cut one side of each pant as show in the photo. For non-removable wheel pants go to step 9.



7. Attach the gear anchors with medium CA to each side of the wheel pant, making sure each anchor is centered on the cut as shown in the photo.



8. Press the landing gear in the gear anchor slots. This will hold the 2 pieces of the wheel pant together. Attach the wheel using a 3/16" wheel collar.



9. For non-removable wheel pants, do not cut the wheel pant in half. Center the landing gear wire and use medium CA to glue the gear anchors in place as shown in the photo.



10. Glue the two wheel pant halves together making sure that all sides are even.

The remainder of the construction consists of attaching the rest of the components to the airplane. Most of this is builder's choice, and individual tastes, styles, and component selection, so any detailed descriptions would be impossible. The remainder of assembly is described in general terms only.

Engine Installation:

The engine centerline is marked on F15. Locate and drill the holes for your motor mount. Install the motor mount and engine of your choice.

Fuel Tank and Throttle Cable:

After deciding which direction the engine will point (up, down, or sideways) drill holes for and install the throttle cable. Mount the fuel tank of your choice, and connect the lines.

Servo and receiver installation:

3/8" maple blocks are provided for servo rails.. Mount these as shown on the plans and mount the servos. Mount the receiver and connect the components. The battery pack may be located anywhere in the fuselage for balance purposes.

Covering:

Cover the airplane with the covering of your choice. The covering choices are too numerous to mention, but the airplane shown on the box was covered with film, painted, and clear-coated. It is recommended that the airplane and control surfaces be covered separately.

Control surfaces:

Locate the control horn positions. Final sand the control surfaces. Locate the hinge points (hinges and other hardware are not provided in the kit because everyone has his own preferences. Rather than put in stuff that most of you will throw away, we left it out to keep the kit price down) and install the hinges and control surfaces. Use at least three hinges per control surface for best results. Connect and adjust the pushrods.

Landing Gear (Fixed):

Insert the main gear wire legs into the slots in the wings, secure with straps, and mount the wheels of your choice. Landing gear (Retracts): Bend the gear wire to match the angle shown on the plans, and install the gear legs and wheels. Install the remainder of the retract components per the retract instructions.

Control Throws:

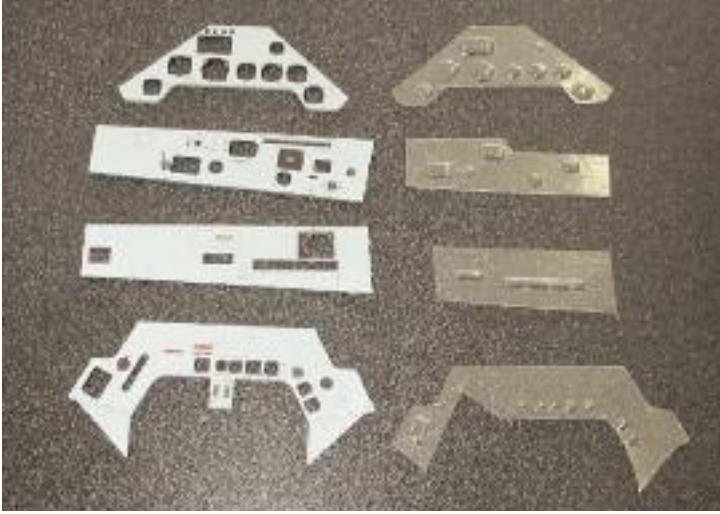
Ailerons: 1/2" up & down
 Elevator: 3/8" up & down
 Rudder: 3/4" left & right
 Flaps: 3/4" down

The rest is up to you! Fly and enjoy!

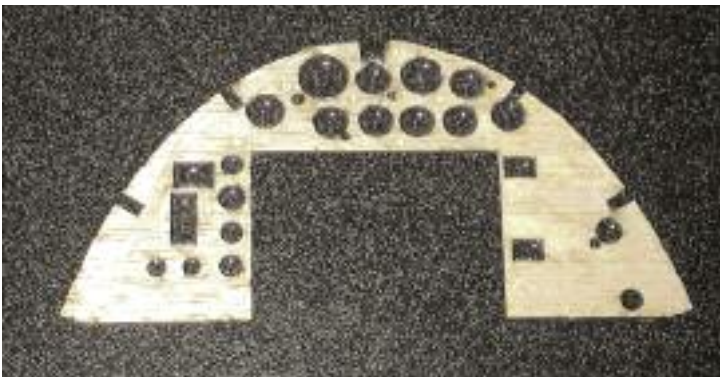
Skyshark R/C

Gauge Face Assembly Instructions

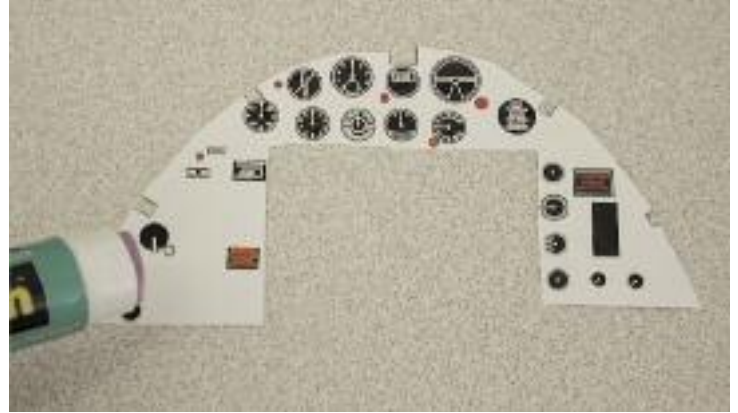
Paper gauge faces are located on the 3-view drawing that are included with the instruction manual.



1. After painting the laser-cut cockpit parts, cut the clear plastic gauge inserts to size. Be sure to cut away any areas where stringers will attach or notches where levers will be inserted.



2. Using a small amount of medium CA, attach the clear gauge insert to the back of the panel so the protruding lenses fit into the laser cut holes.



3. Color any necessary parts of the paper gauge panel and apply glue to the front of the paper. **DO NOT USE CA** for this step (the fumes from the CA will cloud the gauges). We use a Scotch glue stick for our prototypes.



4. Apply the paper to the back of the panel so the gauges line up with the laser-cut holes and allow to dry.