

HUMMER

HUMMER



 SIGRC50

BUILDING AND FLYING INSTRUCTIONS

The Hummer is designed as a 2-channel sport model and also makes a good I/2A racer. Although the Hummer is not recommended for the beginner, anyone with some R/C experience should have no problem flying it. Using a Cox Black Widow or similar reed valve engine, the Hummer is an easy flying model. With a Cox Tee-Dee .051 it really turns on the speed and is perfect for sport racing.

Radio Equipment

The Hummer requires only aileron and elevator control so any radio with 2 or more channels may be used. Special micro-size radios are not required. The prototypes used 2 functions of 4 and 6 channel radios. The radio compartment is large enough for standard size battery packs and servos.

Recommended Glues

The framework may be glued together using Sig-Bond resin glue, Sig Kwik-Set epoxy and cyanoacrylate "super" glues. With an airplane of this size it is important to keep the weight down so go easy on the glue and paint. Be sure to use epoxy glue when joining the firewall pieces F-1A and F-1B and when gluing the firewall and other formers in place.

Some Rules To Follow

Cut all long pieces of balsa first, followed by medium lengths before cutting up any full-length strips into short pieces. Remove die-cut pieces from the sheets carefully. If difficulty is encountered, do not force the part from the sheet. Use a modeling knife to cut it free. Leave parts in the sheets until needed in construction.

A piece of Celotex-type wallboard makes a handy building board, into which pins can easily be pushed. Lay the building board on a table with a flat and untwisted top. Pins can be pushed through all pieces in the kit without any lasting damage. Don't be afraid to use plenty of pins when planking. The holes will fill up during sanding and doping.

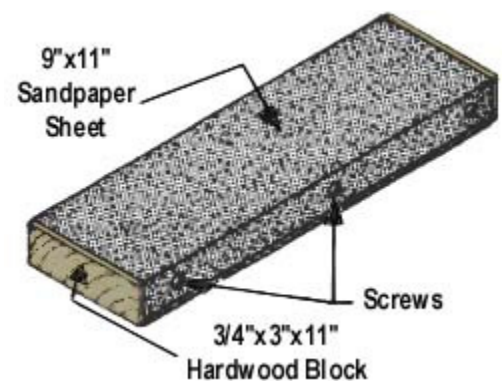
Wax paper should be used to protect the plan during building when the glue used is epoxy or an aliphatic resin glue such as Sig-Bond.

The plan paper can shrink and expand with temperature and humidity changes, as much as 1/4" the long way. This can cause minor mismatching but will not seriously affect fit of the parts, patterns for which were taken from the original ink drawings. The finished assembly need not match the printed plan perfectly to a fraction of an inch. Small variations will not affect the model's flying characteristics in any way. Be careful where you use a ball point pen for making marks. If not sanded off, these marks will bleed through many coats of dope and show on the finished model.

You Can't Get Along Without a Good Sanding Block

An indispensable tool for proper construction is a large sanding block sized to take a full sheet of sandpaper. Use several wood screws along one edge to hold the sheet in place. Use the block to bring all parts and sticks to final, exact fit. We recommend 80-grit garnet paper for use on the block during general construction. You can switch to 100-grit, followed by 220 silicone paper for final finish just before covering.

In addition to the large block, there are places where a smaller one is handy. Also, a sandpaper "file" can be made by gluing sandpaper to a flat spruce stick for working tight-places. We have an especially handy extra long sanding block made from a 40 inch piece of aluminum channel with sandpaper glued to it that is particularly useful for jobs like truing up the leading edge and trailing edge of the wing core.



Cutting Out Printed Parts

A jig saw is best for this job. Cut just outside the lines, leaving all of the black line on the part. When fitting the part into place in the model, use the sanding block to bring the edges to an exact fit. If a modeling knife is used to cut out the parts, don't cut too close to the lines - leave some extra wood outside the line. True up and finish the edge with the sanding block.

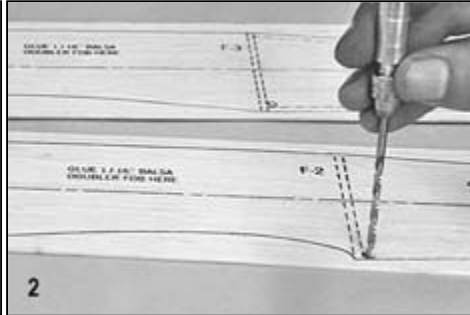
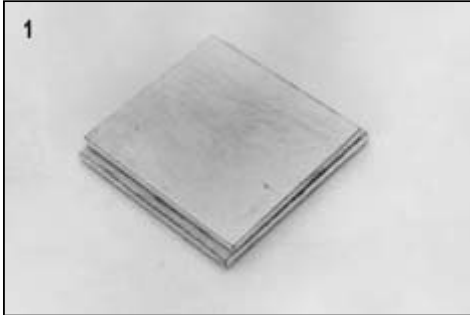
About The Building Sequence

The quickest and most efficient way to complete a model is to work on several pieces at the same time. While the glue is drying on one section you can start on or proceed with another part. Work can even go forward on several sections of the same assembly at the same time, such as the front and rear of the fuselage. We occasionally get suggestions that our instruction books should be in exact step-by-step building sequence. But this would result in many sentences starting, "While the glue is drying on the fuselage, move to the wing ... etc." and a lot of jumping back and forth between assemblies with no consistent pictorial progression. Also, a pre-selected building sequence by our choice might not suit your workshop space and time allotments. Therefore, we feel the present system of covering main assemblies in a unit works out best for the majority of kit builders. So keep in mind that the numbering sequence used in this book was chosen as the best way of explaining the building of each major assembly and is not intended to be followed in exact one-two-three fashion. Start on the fuselage at No.1 and after performing a step or two, flip over to the next main heading of "WING CONSTRUCTION" and do a step or two there, then back to "FUSELAGE CONSTRUCTION" and so forth. You will, of course, arrive at points where you can go no farther until another component is available. The way to understand these relationships is to read the instructions completely and study the full size plan before beginning to work.

Any reference to right or left refers to right or left as if seated in the cockpit.

FUSELAGE CONSTRUCTION

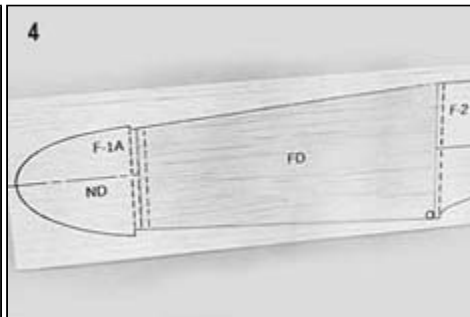
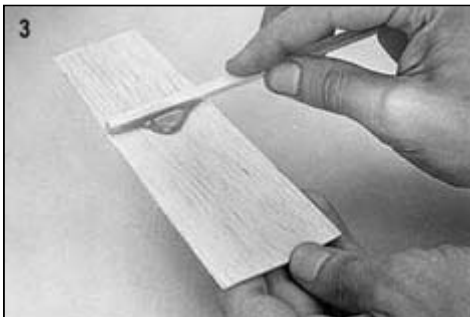
1.
 - a. Smooth and even F-1A and F-1B with a sanding block.
 - b. Glue them together using epoxy glue. Notice that there is a 1/16" gap on both sides. This is to allow space for the fuselage sides. It is a good idea to mark the location of the engine mount at this time.
2. Drill or cut out the 1/8" dowel holes in the fuselage sides. This will locate the holes after the balsa doublers have been glued in place.



Balsa Doubler Gluing Notes

Do not use Sig Bond, Tite Bond, Elmer's or other water based glues to glue the balsa doubler to the fuselage side. The water will cause the fuselage side and the doubler to curl unless they are heavily weighted with very secure weights and left to completely dry.

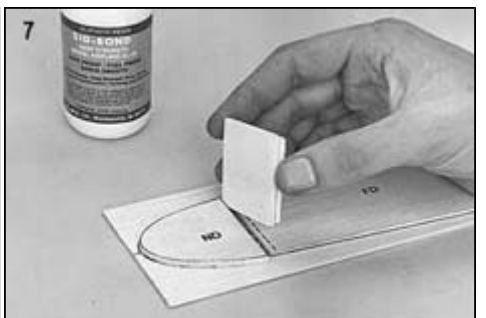
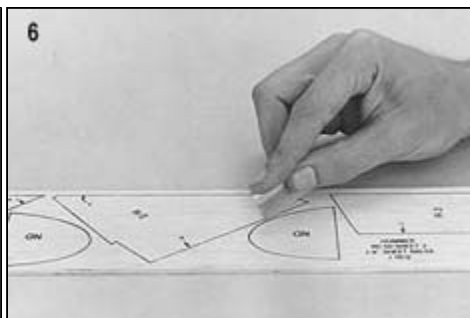
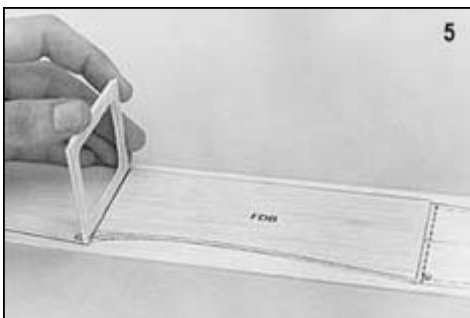
3. Using a paddle, spread a thin coat of epoxy on the die-cut 1/16" balsa doubler FD. Don't use a large amount of epoxy as this will add unnecessary weight.
4. Glue doubler FD in place.



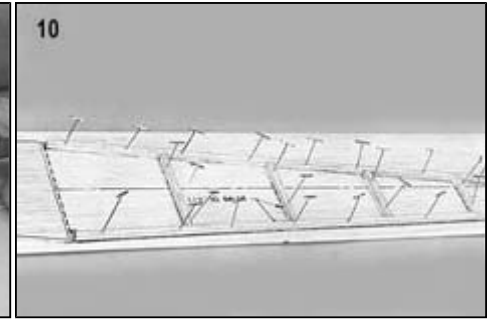
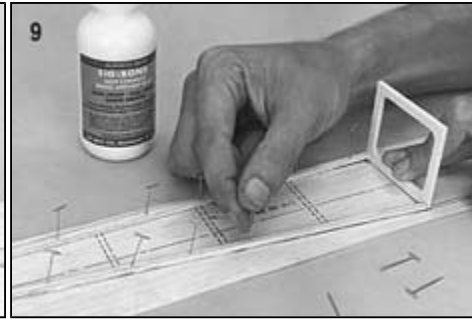
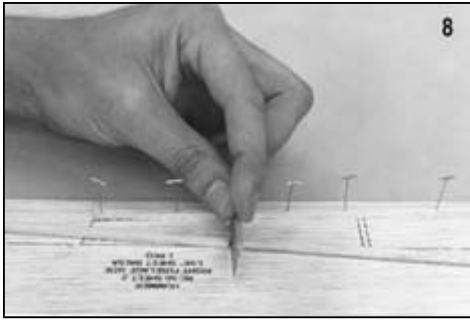
Some builders like to use contact cement for doublers. With this method, the doubler and the fuselage side are each coated with the glue and after drying are pressed together. If this is done, remember that once they touch each other they are permanently joined, so have some pins in place to guide the doubler into exact position as it is lowered. Also, a piece of wax paper between the two parts will keep them from sticking together until you are sure they are accurately positioned, then the paper can be slipped out and the parts pressed together.

5. Repeat the same process for doubler FDB. Use plywood former F-2 to space the two doublers. Do not glue F-2 in place.
6. Cut the nose doubler ND out of the 1/8" printed balsa sheet. Be sure to cut outside of the lines and then sand down to the line.
7. Glue ND in place using the firewall as a spacer. Do not glue the firewall in place.

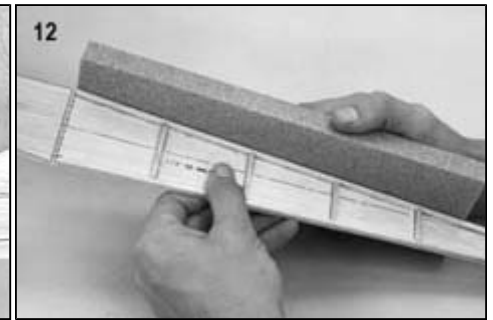
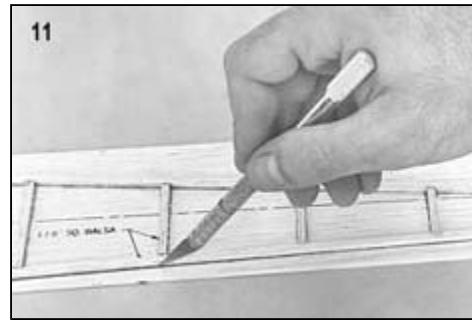
The doubler on the prototype Hummer was glued on with Sig Kwik-Set 5-minute epoxy and this is the method we recommend.



8. Cut pieces of 1/8" square balsa as indicated on the printed fuselage side.
9. Using F-3 as a spacer, glue and pin the pieces in place. Do not glue F-3 in place.
10. Glue on the cross-pieces of 1/8" square balsa as indicated. It helps to cut the pieces slightly oversize, then bring to exact fit with a sanding block.



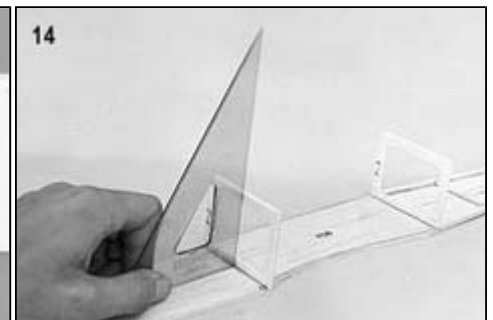
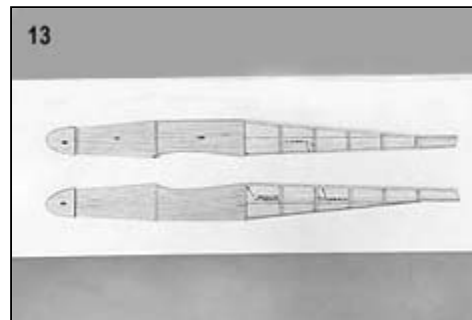
11. Cut out the fuselage sides with a knife. Cut just outside of the line. Save the excess wood for sheeting the center section of the wing.



12. Sand down to the final size.

13. Fuselage sides now ready for joining.

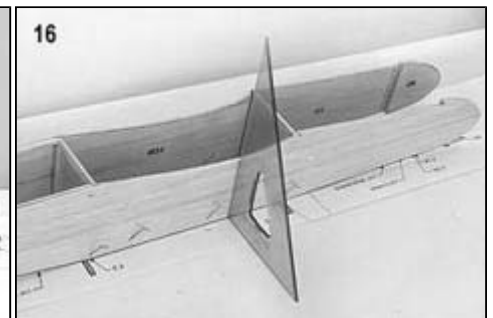
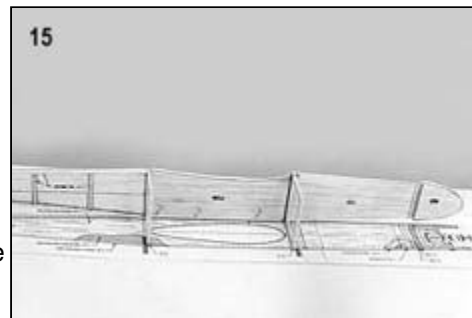
14. Epoxy plywood formers F-2 and F-3 in place. Use a square to be sure the formers are perpendicular to the fuselage side.



15. Pin one side over the top view of the plans.

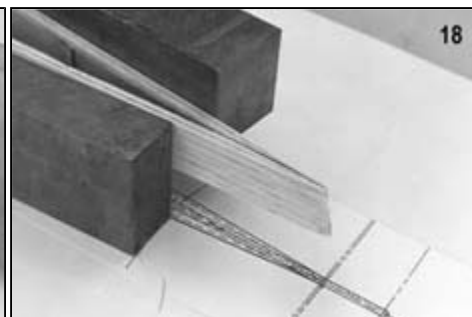
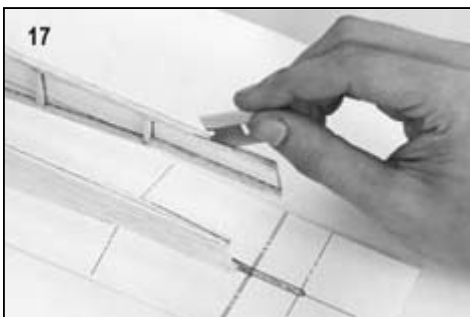
16. Epoxy glue the other side to F-2 and F-3 over the plans. Check with a square before the glue sets up.

17. Trim the 1/8" square balsa to a bevel at the rear of the fuselage so that the two side will join together as indicated on the plans.

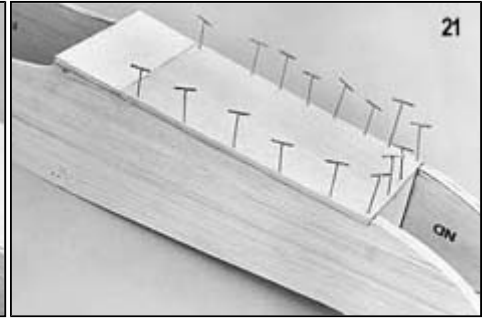
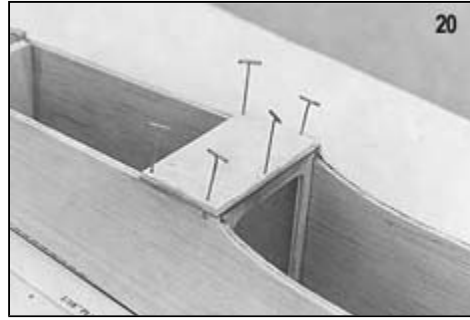


18. Pull the sides together using square weights (pieces of scrap iron shown here) and glue together.

19. Put epoxy on both sides of the firewall and glue in place over the plans. Use the weights to pull the sides together.

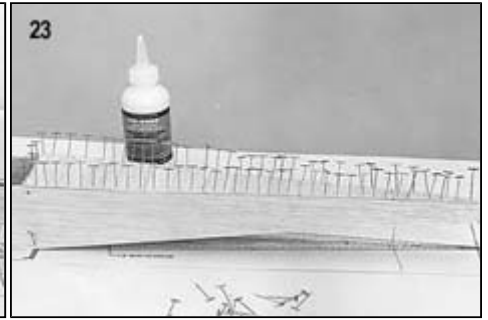
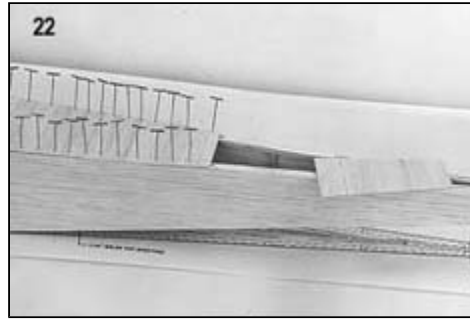


20. Remove the 1/8" Lite-Ply landing gear plate from the die-cut sheet and epoxy glue in place on the bottom of the fuselage and F-2.



21. Glue and pin the forward fuselage bottom. This is cut, as indicated, from the 1/8" balsa printed sheet.

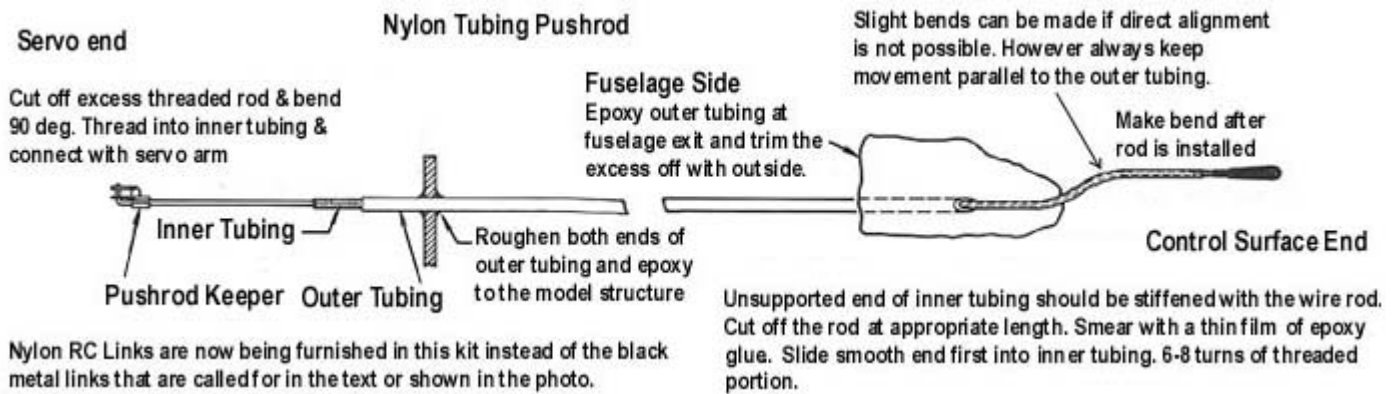
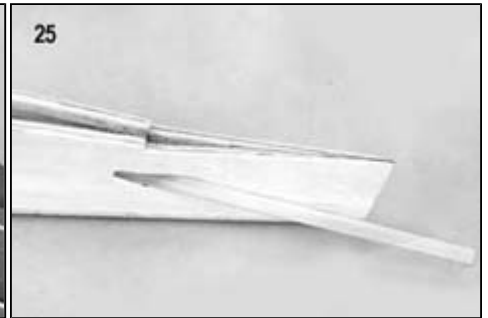
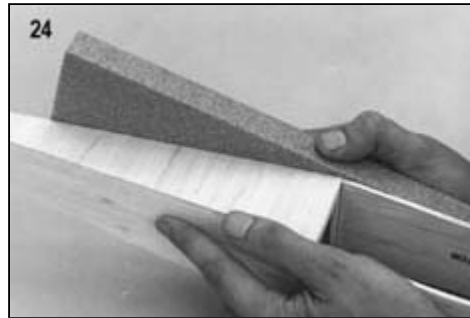
22. Cut cross-grain pieces of 1/16" balsa sheeting for the fuselage bottom.



23. Bottom sheeting completed.

24. Sand the rough edges.

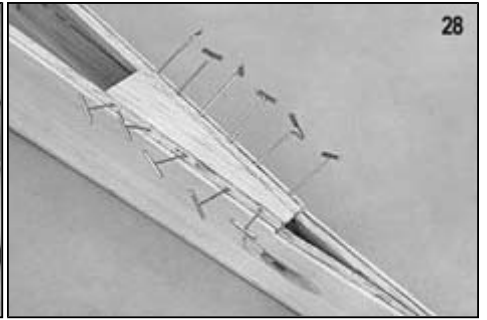
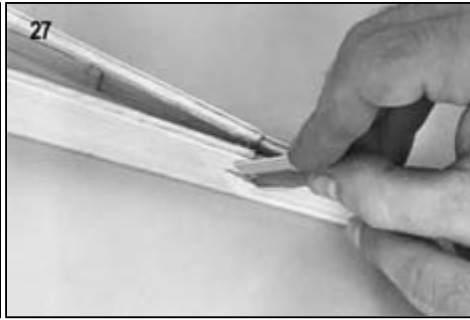
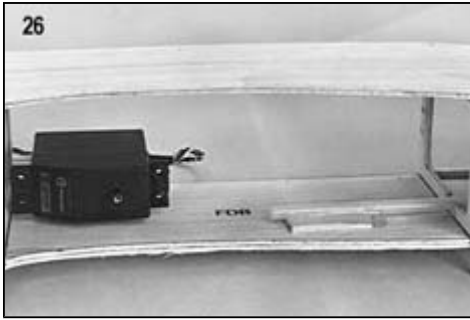
25. Cut an exit hole for the nylon tubing push rod as indicated on the plans. Insert the tubing but do not glue in place.



26. a. Place the elevator servo to be used in position.
b. Insert the inner tubing into outer tubing and use this to align the outer tubing with the servo. Glue the outer tubing in place with epoxy.

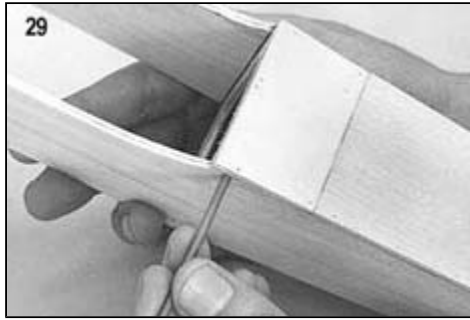
27. Use a razor blade to cut the outer tubing off flush with the fuselage side.

28. Use scrap 1/16" balsa for the fill-in piece. The fill-in piece is glued in between the two fuselage sides and is flush with the top.



29. Using a 1/8" bit or round file (as shown here), drill out the 1/8" holes through the balsa doublers.

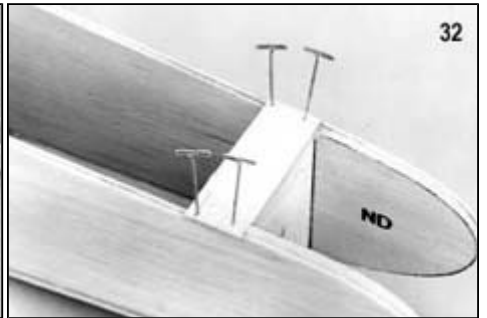
NOTE: Some builders prefer to leave off protrusions until after the model is covered. This is especially true of those using plastic film coverings. You may choose to leave the dowels out until after covering if you prefer.



30. Glue the front and rear hold-down dowels in place.

31. Glue the 1/16" cross grain top sheeting in place as was done previously with the bottom sheeting.

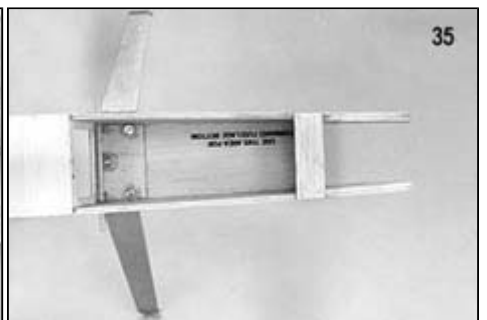
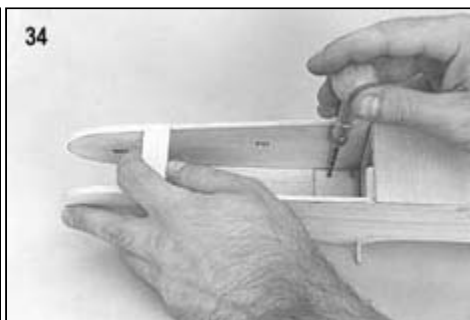
32. Glue the piece of 1/16" front top sheeting in place on top of the fuselage and firewall.



33. Place the landing gear over the plywood landing gear plate and drill the holes with a 3/32" drill bit.

34. Recess the hole from the inside with a 7/64" drill bit. This allows the stud of the blind nut to fit into the hole.

35. Being careful not to get epoxy on the threads, glue the 2-56 blind nuts in using epoxy glue. Bolt the landing gear in place to pull the blind nuts into the wood.

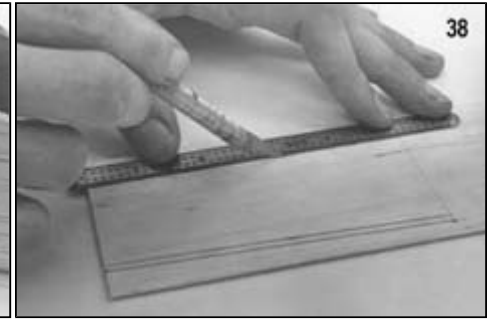
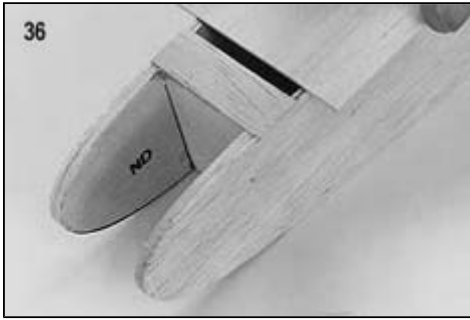


HATCH CONSTRUCTION

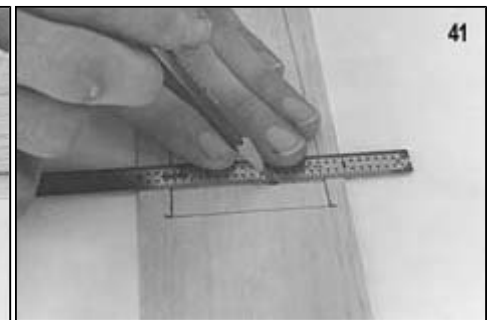
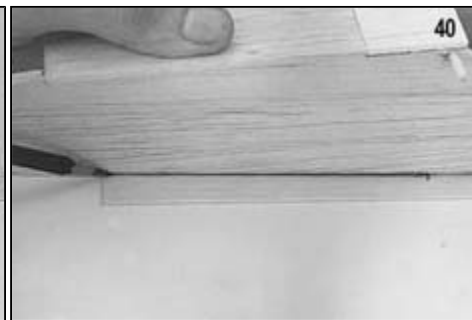
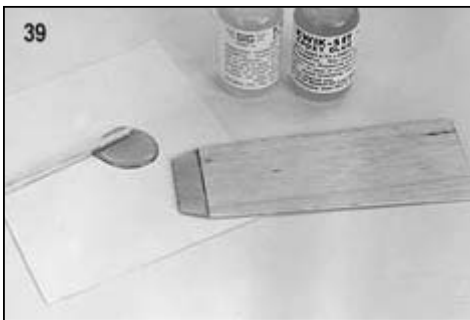
36. a. Place a piece of 1/16"x3" balsa on the top of the fuselage.
b. Mark on the fuselage a gap of 3/16" between this piece and the top front fuselage sheeting that was previously glued on in picture 32.

37. Turn the fuselage over and with the hatch in the same position as in 36, mark the outline of the hatch on the 1/16" balsa.

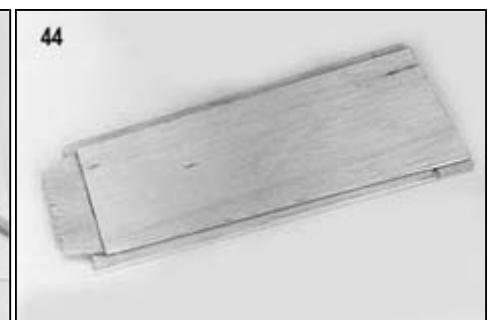
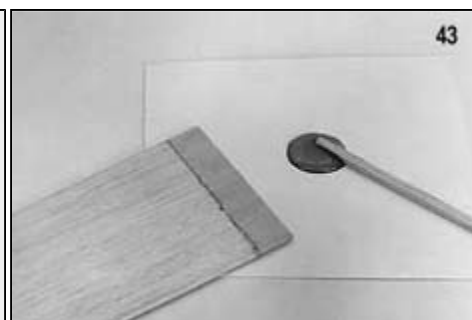
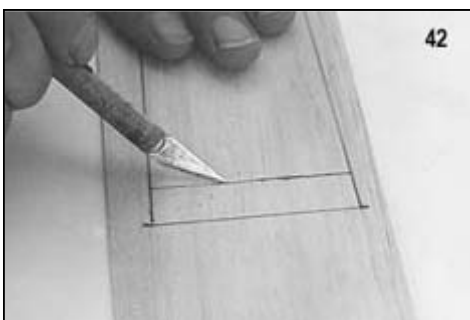
38. Mark in 1/8" from the outside line. Cut this piece out of the sheet using the inside lines just drawn. This will be the hatch doubler.



39. a. Trim one of the 1/16"x1/2"x2-1/4" plywood pieces to fit the front of the hatch doubler.
b. Butt glue this to the front of the doubler with epoxy.
c. Trim the hatch doubler so it will be able to fit inside the fuselage sides.
40. Place the fuselage on top of a piece of 1/16"x3" balsa. The balsa piece should fit up against the top front fuselage sheeting. Mark the outline of the hatch on the balsa sheet.
41. Measure 1/2" back from the rear end of the hatch top and mark a line at this point.



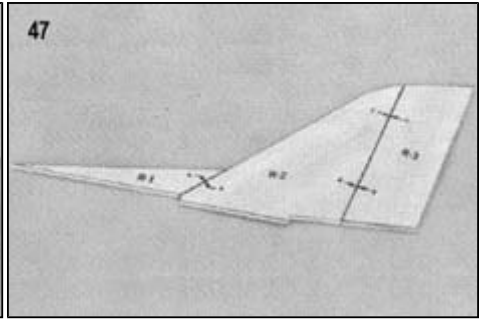
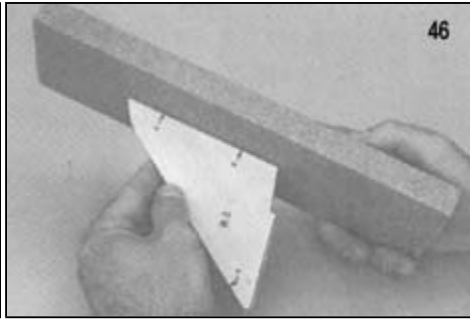
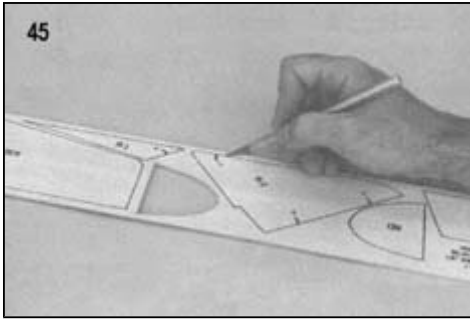
42. Cut out the hatch top.
43. Glue the other piece of 1/16"x1/2"x2-1/4" plywood to the rear of the hatch top (a butt joint).
44. Glue the hatch doubler to the hatch top. Pictured is the completed hatch as viewed from the bottom.



TAIL ASSEMBLY

45. Cut out R-1, R-2, R-3, and the stabilizer from the 1/8" balsa printed sheet. Be sure to cut outside of the lines.
46. Sand down to the lines.
47. Glue R-1, R-2, and R-3 together. Use the marks A, B, and C for a good line-up.

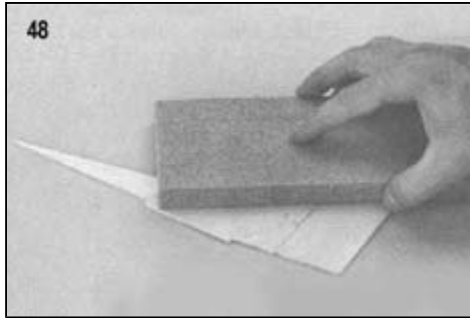
In any conflict between the plan and these instructions, follow the instructions as they are revised more frequently than the plan.



48. Sand off the ink lines and smooth both sides of the fin.

49. Mark a center line on top of the fuselage where the fin will go.

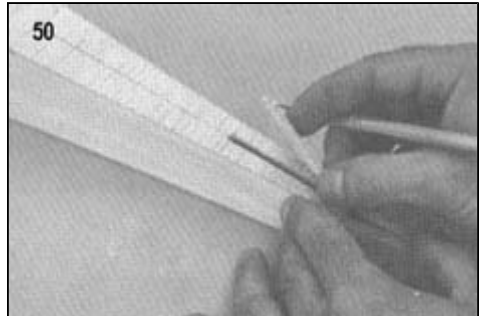
50. Cut out the slot in the top of the fuselage where the fin tab will go. This cut out should be 2-1/2" long.



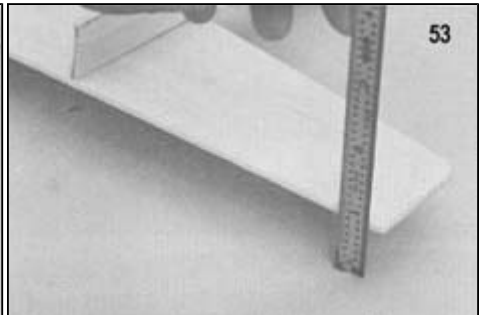
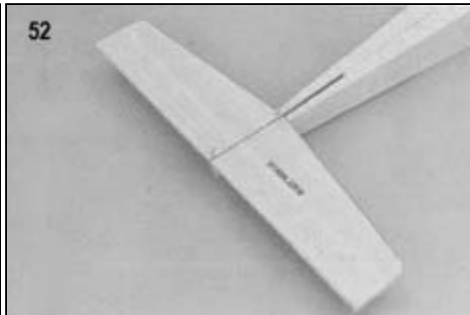
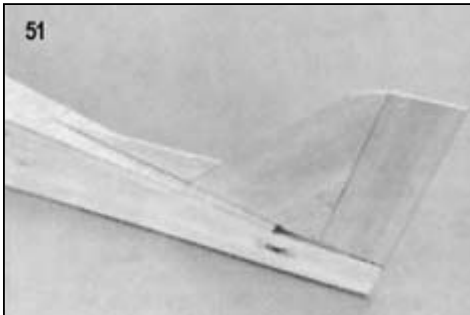
51. Trial fit the fin into the fuselage but don't glue it in place until later.

52. Pin the stabilizer in place.

53. a. Turn the fuselage over and measure to be sure the stabilizer is level. All measurements from the leading edge and trailing edge should be the same. If they aren't, trim the fuselage until the stabilizer is level.
 b. Cut slots in the stabilizer and elevator (1/8"x1"x12" balsa) for the hinges as indicated on the plans. Do not glue these in until after covering.



NOTE: Some builders prefer to finish the tail pieces separately then glue on to the finished airplane. If you wish to do so do not glue the tail on until after covering. Be sure to leave bare wood exposed where the parts will be glued for a good bond.

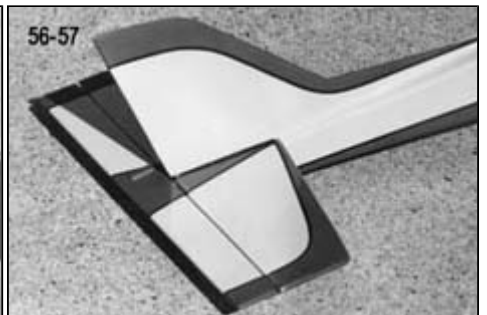
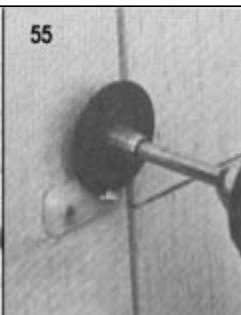
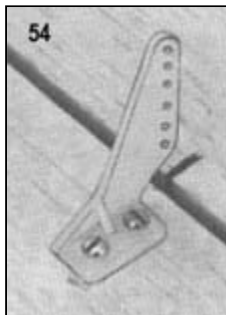


54. Install the horns.

55. Cut or file off the ends of the horn screws.

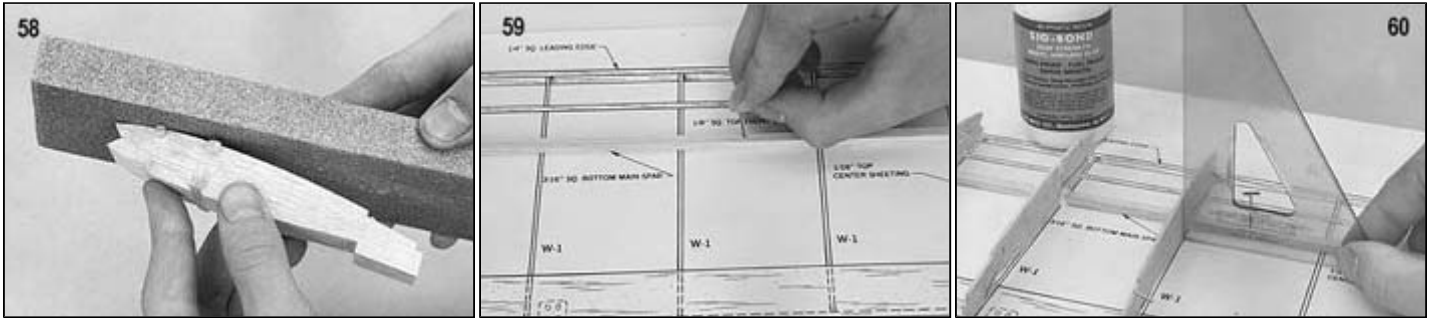
56. Glue the stabilizer in place. Be sure it is level.

57. Glue the fin into its slot.

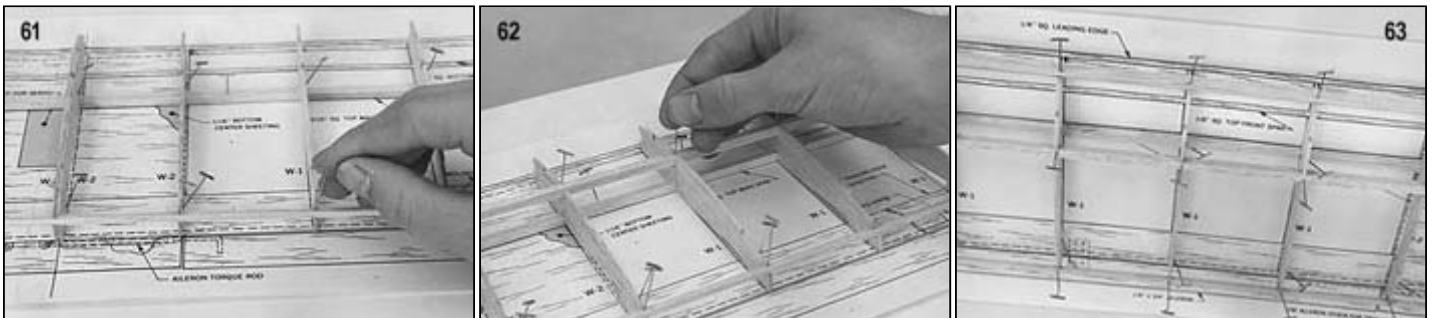


WING CONSTRUCTION

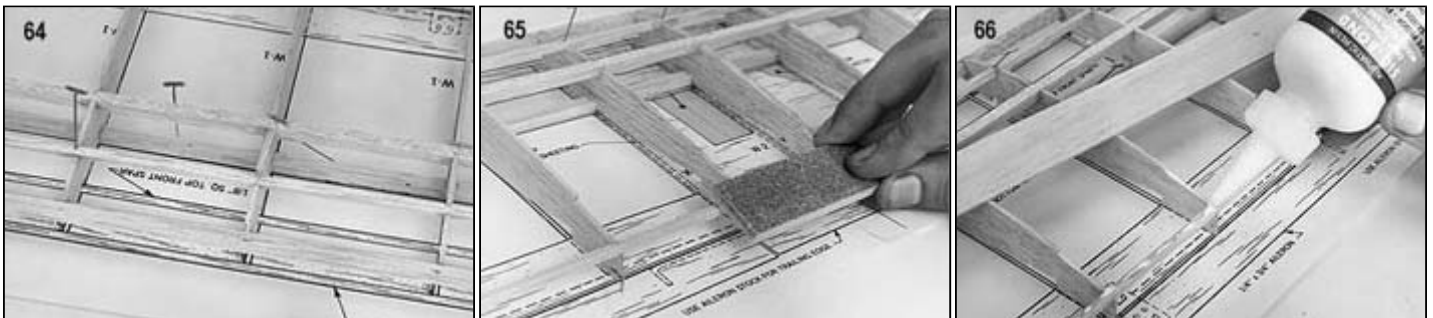
58. Remove the ribs from the die-cut sheets. Stack the W-1 ribs together in one stack, and the W-2 ribs together in another stack. Use a sanding block to sand the ribs even. Do not oversand.
59. Pin the 3/16" square balsa bottom main spar in place over the plans.
60. Glue and pin the W-1 and W-2 ribs in place on the balsa bottom main spar. Use a triangle to square the ribs.



61. Glue and pin the 1/8" square balsa rear spar in place on the back of the ribs. Glue only to the back of the rib, not to the jig tab which will be removed later.
62. Glue and pin the 3/16" square balsa top main spar in the rib notches.
63. Glue and pin the 1/4" square balsa leading edge in place on the fronts of the ribs.

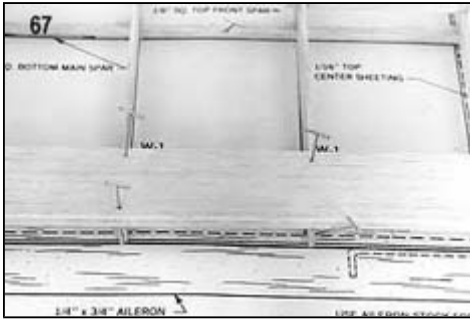


64. Glue and pin 1/8" square balsa top front spar into the rib notches.
65. Bevel the 1/8" square rear spar at an angle even with the top line of the ribs.
66. Spread a coat of glue on the 1/8" square rear spar and on the areas of the ribs that are to accept the trailing edge top sheeting.



67. Pin down the 1/16" x 1" trailing edge top sheeting.
68. Remove the wing from the plan, turn it over and glue and pin the 1/8" square bottom front spar in the rib notches.

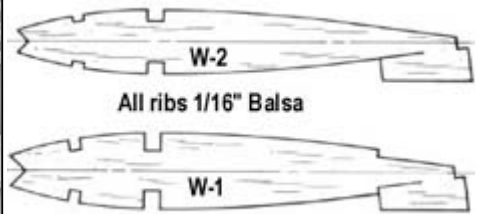
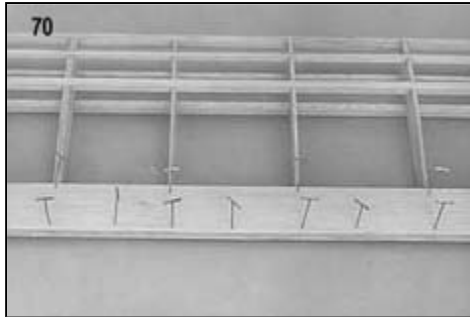
69. Cut the jib tab off the bottom of the ribs.



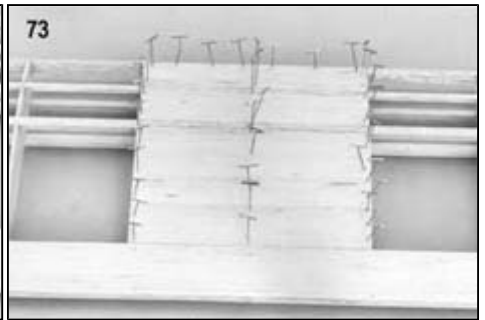
70. Glue and pin the 1/16"x1" trailing edge bottom sheeting in place.

71. Cut pieces of 1/16" sheeting (excess from the fuselage sides) for the wing center section and spread glue over the ribs and along the spars.

72. Pin the sheeting in place. The sheeting will be flush with the tops of the spars.



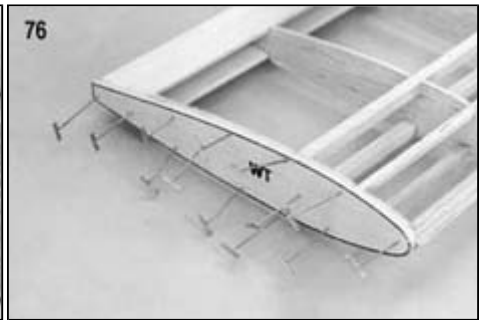
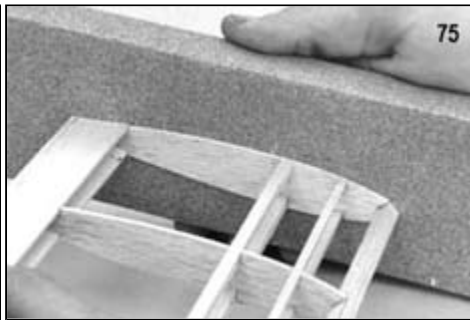
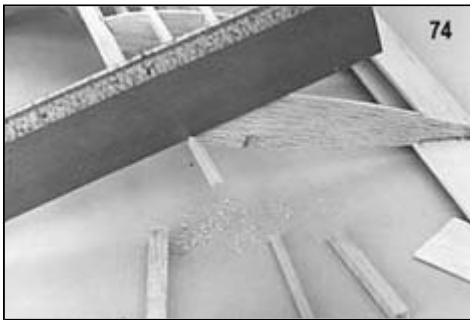
73. Finish sheeting the center section in the same manner.



74. Trim the spars and trailing edge sheeting flush with the rib at each wing tip.

75. Use a sanding block to finish the wing tip rib.

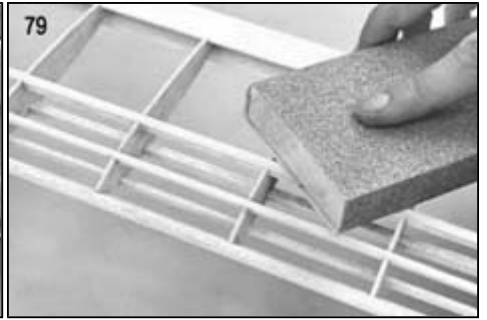
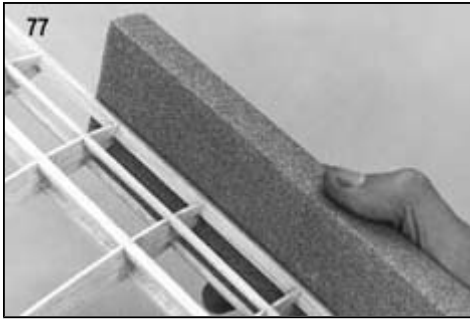
76. Cut the wing tips WT from the 1/8" balsa printed sheet. Glue and pin in place.



77. Use a sanding block to round the leading edge to airfoil shape.

78. Sand the center section sheeting so that the sheeting is flush with the tops of the spars.

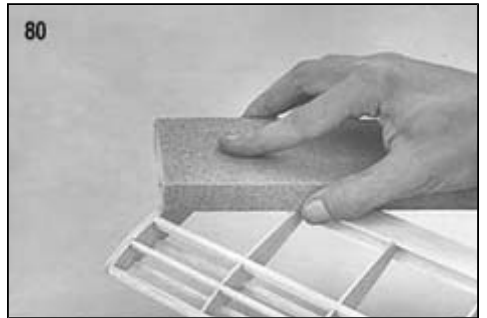
79. Sand the rest of the wing lightly to smooth out any irregularities.



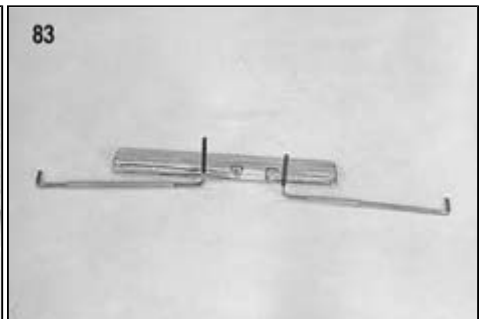
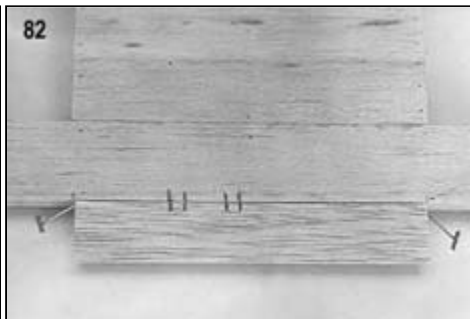
80. Sand the wing tip flush with the end rib.

81. Cut the ailerons and center section trailing edge out of the shaped 1/4"x3/4" aileron stock.
NOTE: The aileron horns are offset from the wing center line to allow extra radio room in the fuselage.

82. Mark the location of the aileron horns on the trailing edge as indicated on the plans.

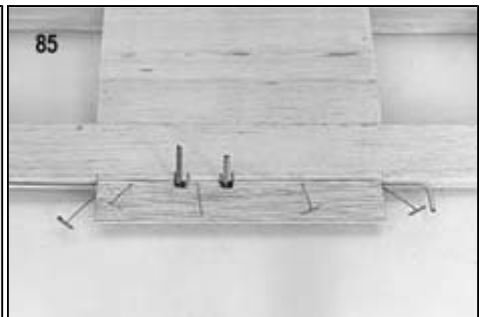
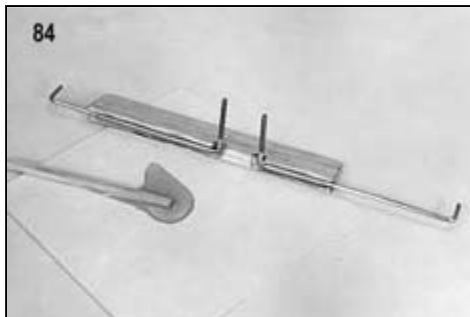


83. Hollow out the trailing edge piece where the aileron horns will fit. Note that one of the aileron horn bearings must be shortened. Cut through the plastic tube with a modeling knife.



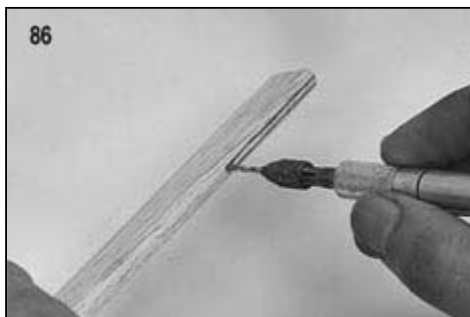
84. Roughen the plastic tube of the aileron horns with a piece of sandpaper. Epoxy glue the aileron horns into place. Be sure that they are flush with the front of the piece and that there is no binding or friction caused by glue leakage into the bearing.

85. Epoxy the assembly into place on the wing.

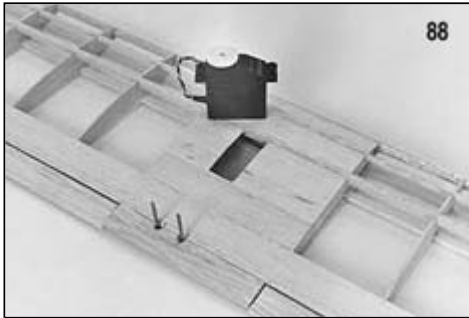


86. Drill a hole into the aileron to accept the aileron horn.

87. Groove the aileron to take the aileron horn wire, then check the fit. Use the instructions at right to hinge both the ailerons and the elevator with Easy Hinges. For best results, cover the model before hinging. Be sure to epoxy the aileron torque rods in the ailerons as you are performing the second step in the hinging instructions.



88. Cut out the sheeting from the center section for the aileron servo. The exact size of the opening will depend on the particular brand of servo and the method of mounting.

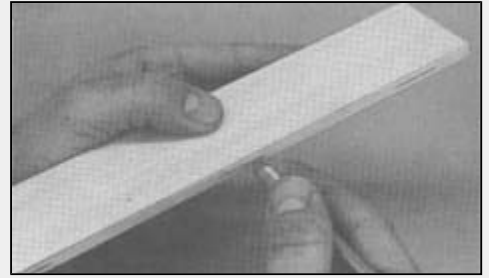


89. Place the wing into the fuselage wing saddle and check the fit. Use Sig wing cushion tape SIGSH545 to seal the interior from oil and dirt. The wing, tail and engine are at 0 degrees incidence.

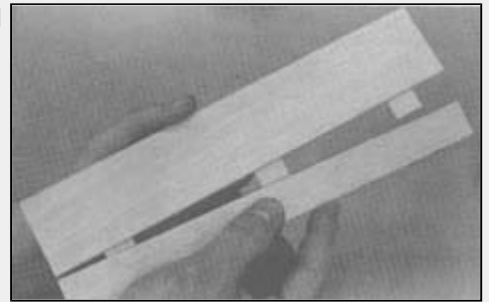


INSTALLING EASY HINGES

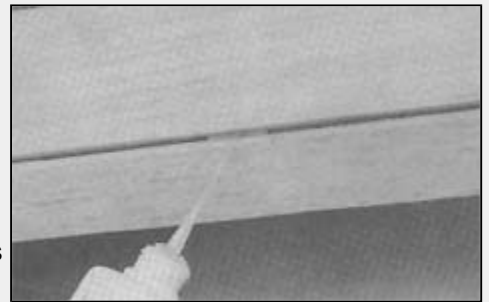
Using a No.11 X-Acto blade (or similar) cut a slot approximately 1/2" in depth and slightly wider than the hinge. After all slots have been cut, insert an Easy Hinge halfway into each slot in one of the pieces to be hinged. Then carefully slide the matching model part onto the other half of the hinges. You'll find it easiest to slide the part onto the hinges at an angle, one hinge at a time.



At this point the surface to be hinged is attached but not glued. Align the two surfaces and adjust the gap between them as required. For best control response, the gap should be as small as possible but big enough to allow the control surface to move to the maximum deflection that you will require.



Place three or four drops of any brand of cyanoacrylate adhesive (thinnest variety) directly onto the Easy Hinge in the gap. You will notice that the glue is quickly wicked into the slot as it penetrates both the wood and the hinge. Continue this process, gluing the same side of all of the hinges. Then turn the surfaces over and repeat the gluing process on the other side of each hinge.



After the glue has cured, approximately three minutes, the joint can be flexed. You may notice a slight stiffness in the joint. This can be eliminated by flexing the surface to full deflection each direction a couple of dozen times. Don't worry about shortening the life of the hinge as they are almost indestructible.

COVERING AND FINISHING

It is important to put some type of fuel-proof finish on your airplane. With an airplane of this size it is very important to keep the weight down. The plastic iron-on coverings are a good material for this model because of their light weight and no-warp. The manufacturer's directions for applying iron-on coverings are packed with the material. Follow these closely, for different types of covering have different iron temperatures and techniques of application.



Attaching The Canopy

- Trim around the canopy, leaving a 1/16" flange.
- Position the canopy on the fuselage and cut away the covering material which will be in contact with the canopy flange.
- Glue the canopy on to the fuselage, using either Sig-Ment or "Super" cyanoacrylate glue. The joint may be covered with a piece of striping tape.

Tank Installation

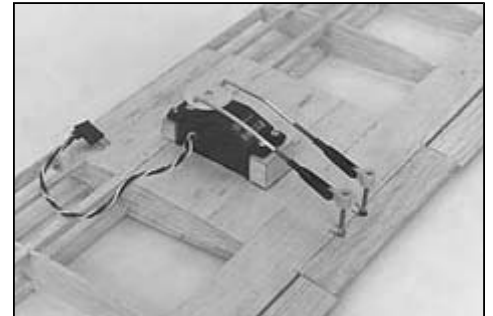
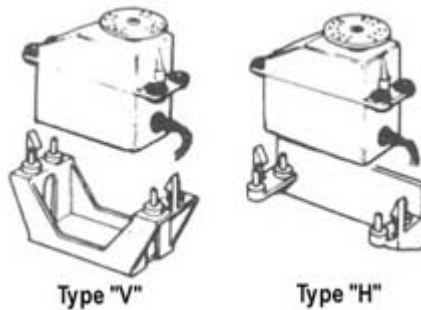
NOTE: Engines such as the Cox Black Widow have the tank built as an integral part of the engine. If an engine such as this is used there is no need for a plastic clunk type fuel tank.

The Hummer's engine is not fully enclosed so only one vent line is needed in the fuel tank. With a single vent set-up, fill the tank by disconnecting the fuel feed tube from the carburetor and pumping fuel into the tank through it. When fuel runs out the vent tube, the tank is full.

A 1 or 2 ounce plastic clunk-type fuel tank (such as the Sullivan 5S-1 or SS-2) fits best in the Hummer. The tank is mounted by drilling two small holes to allow the brass tubing to stick through the firewall. The fuel tubing is then slipped over the brass tubing outside the fuselage. Stuff foam rubber under and around the tank to keep it in position.

Radio Installation

It is best to follow the manufacturer's recommendations when installing your radio. Most radio's come with some type of plastic tray such as these two Futaba servo trays (shown below). The type H tray works well for the elevator servo, and the type V is used for the aileron servo.



If plastic trays are not available, you may use hardwood rails to mount the servos. Using a #2 wood screw and a washer, tighten the screws down against the grommets until the washer is just resting against the grommet without compressing it. Do not overtighten as the vibration of the model will be transferred to the servo.

The receiver battery pack should be wrapped in foam rubber sheet, held on with rubber bands and placed as far forward as possible, under the tank. It is a good idea to put the package in a small plastic bag, taped shut around the battery cable to protect the battery from accidental fuel leakage. The receiver should be similarly wrapped in foam to protect it from engine vibrations. Cover it with a plastic bag also. The switch may be mounted wherever convenient on the side of the model. The elevator and ailerons should move 3/16" up and down.

Pre-Flight

Be certain to carefully range check your radio equipment and see how it operates with the engine running before attempting test flights. A lot of problems can be avoided if the engine has been well broken-in and the needle valve adjustment perfected on a test block or in another airplane before installation in the model.

The Balance Point position is shown on the side view drawing of the plans. Do not balance any further back than this point even if lead must be added to the nose. Trying to fly with the Balance Point too far back is much more dangerous than the slight increase in wing loading caused by adding . nose weight. Balance with an empty fuel tank. When slightly nose heavy the model will be a great deal more stable and less likely to stall or snap roll. The reaction to control movements is also less sensitive with a forward Balance Point so it is not so easy to overcontrol. Some aerobatic ability may be sacrificed with a forward Balance Point so you may wish after test and familiarizations flights, to adjust the balance slightly to suit your own preferences and conditions. Do this gradually and check results and control response in the air. In case all of this talk makes you somewhat uncertain, rest assured that the Balance Point shown in the side view has been thoroughly proven by test flying several prototype models.

A properly balanced and aligned model with a reliable engine and radio is more assured of successful flights.

Flying

As mentioned in the opening paragraph of these instructions, the Hummer is not intended for use as an R/C trainer. If you are a newcomer to RC model flying, we strongly recommend that you not attempt flying without the assistance of an experienced RC flyer. Contact your local model club or ask your hobby dealer for the names of good flyers in your area and a suitable location for flying. Many hours of work are involved in the construction of a model and it can all be lost in a moment of beginner's indecision. A skilled flier can help you get past the first critical test flights without damaging the model and give needed instruction in proper control.

If you have any technical questions or comments about this kit, or any other SIG product, please call us.

SIG MODELER'S HOTLINE
1-800-524-7805
Weekdays, 7:00am - 4.30pm Central

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