



Award Winning Model Designs™

# Cloud Ranger



Herr Engineering Corp. HRR508



## ASSEMBLY INSTRUCTIONS

Your kit contains the following parts. Please check your kit for any missing or damaged parts before starting construction.

### COMPLETE KIT PARTS LIST

#### Wood Bag:

1 LC-508-01	3/32x4x24 Laser Cut Balsa Sheet	1 LC-508-02	3/32x4x24 Laser Cut Balsa Sheet
1 LC-508-03	3/32x4x24 Laser Cut Balsa Sheet	1 LC-508-04	3/32x4x24 Laser Cut Balsa Sheet
1 LC-508-05	3/32x4x24 Laser Cut Balsa Sheet	1 LC-508-06	3/32x4x18 Laser Cut Balsa Sheet
1 LC-508-07	1/8x4x18 Laser Cut Balsa Sheet	1 LC-508-08	1/8x4x18 Laser Cut Balsa Sheet
1 LC-508-09	3mmx4x24 Laser Cut Poplar Ply Sheet	1 LC-508-10	1/16x4x5 Laser Cut Birch Ply Sheet
6 Leading Edge and Spars	1/4 sq.x24 Balsa Strip	4 Leading Edge Stringers	1/8 sq.x24 Balsa Strip
1 Wing Tips	3/4 Balsa Trianglex14	4 Trailing Edge	1/16x1x24 Balsa Sheet
4 Center Section Sheet	1/16x3x12 Balsa Sheet	1 Hatch Support & Servo Rails	1/4 sq.x12 Spruce
2 Control Surface Pushrod	1/16x18 Wire, Threaded One End	1 F-10 Braces	3/32x1/4x6 Balsa Strip
2 Ailerons	1/8x1x24 Balsa		

#### Misc. Parts Loose in Box:

1 Plan Sheet #1		1 Plan Sheet #2	
1 Instruction Book		2 Main Landing Gear 7 1/2	

#### Hardware Bag:

2 Control Horn	Small Nylon Control Horn	4 Horn Screw	2-56x3/8 Machine Screw
1 Elevator Joiner	1/8x3 Birch Dowel	5 Main Landing Gear and Hatch Screw	#2 Sheet Metal Screw
2 Nylon Clevis	Small Nylon Clevis	2 Wing Dowels	3/16x3 1/2 Dowels
1 Tail Wheel Wire	1/16 dia.x3 Music Wire		

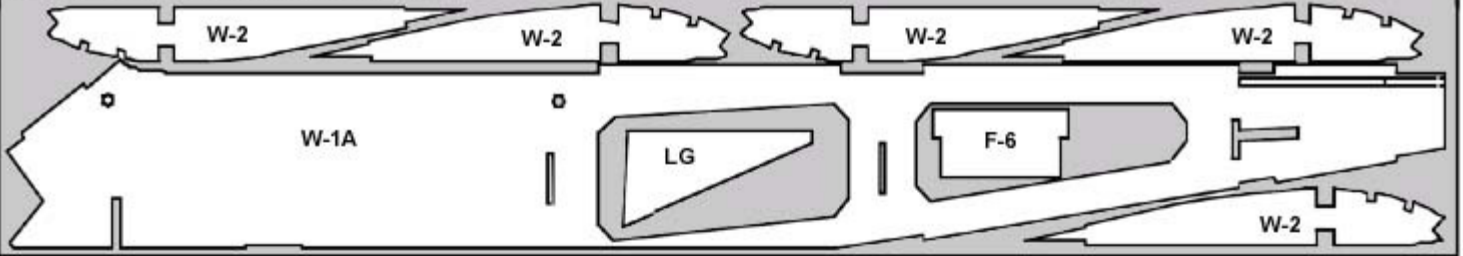
Note: If you are building your Cloud ranger with the optional ailerons, you will need to supply the control horns and pushrods.

The first thing that you need to do is to identify and mark the part numbers on the laser cut parts using the drawings on the following pages as a guide.

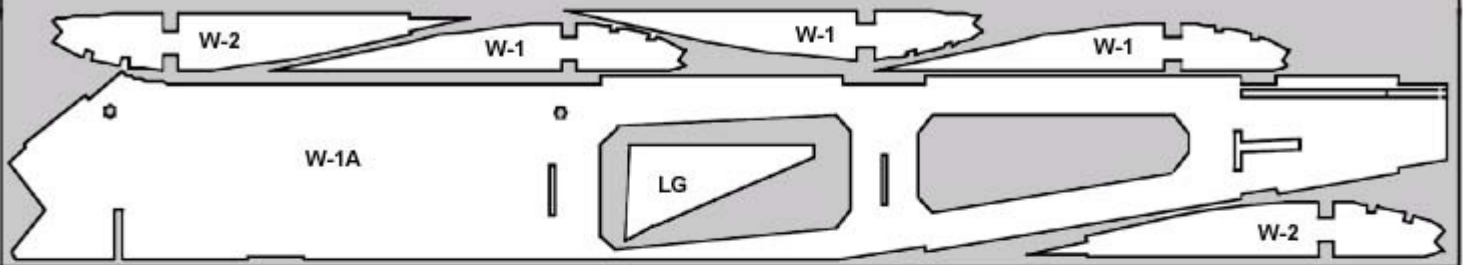
It is possible that several of the laser cut parts may not be completely cut through. If this is the case you can free the part from the sheet quickly using an X-acto knife.

NOTE: The slight discoloration on the edges of the laser cut parts may be removed by lightly sanding the edges with 400 grit sandpaper.

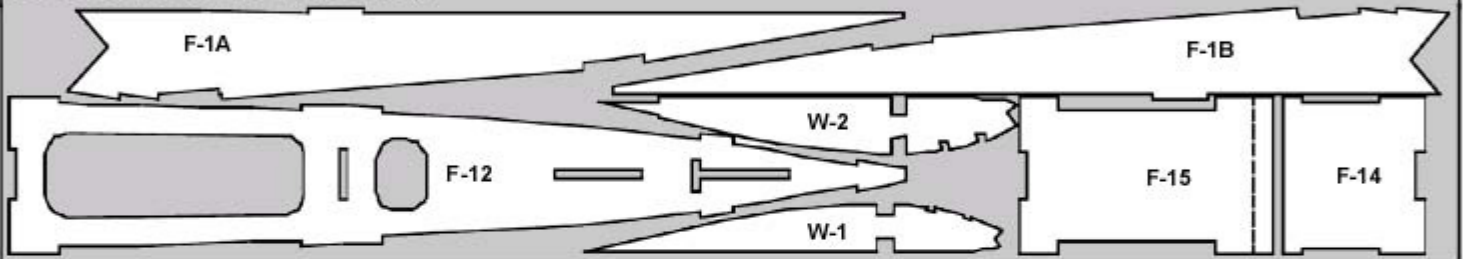
LC-508-01 3/32"x4"x24" Balsa 1 Req.



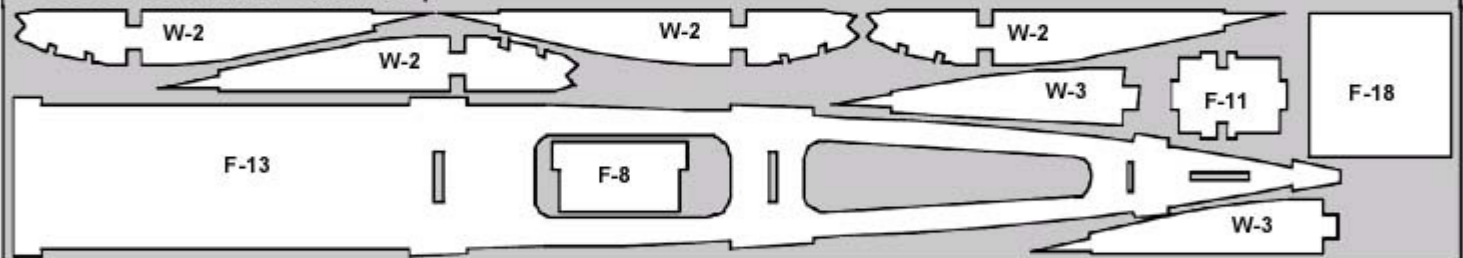
LC-508-02 3/32"x4"x24" Balsa 1 Req.



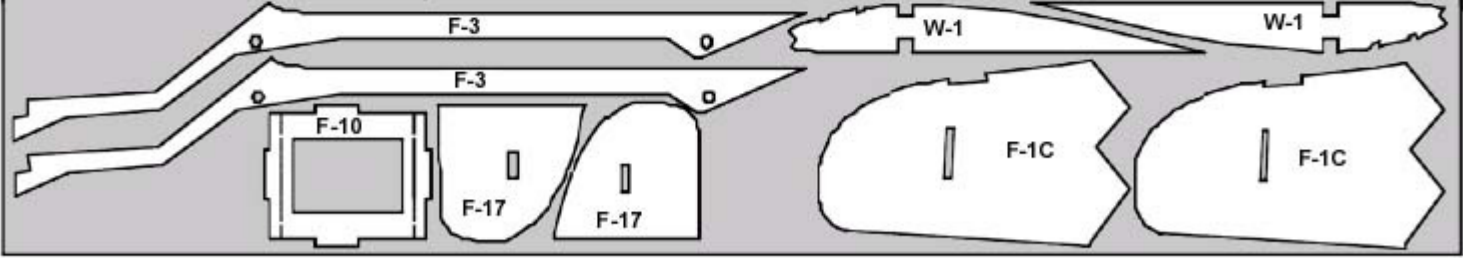
LC-508-03 3/32"x4"x24" Balsa 1 Req.



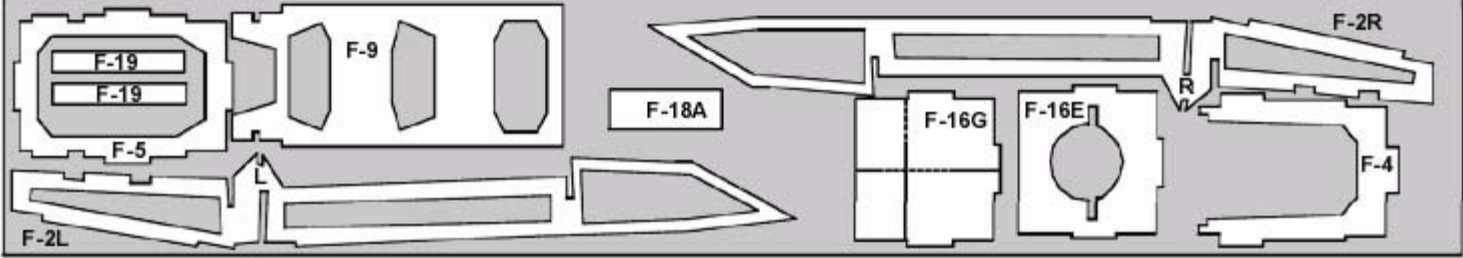
LC-508-04 3/32"x4"x24" Balsa 1 Req.



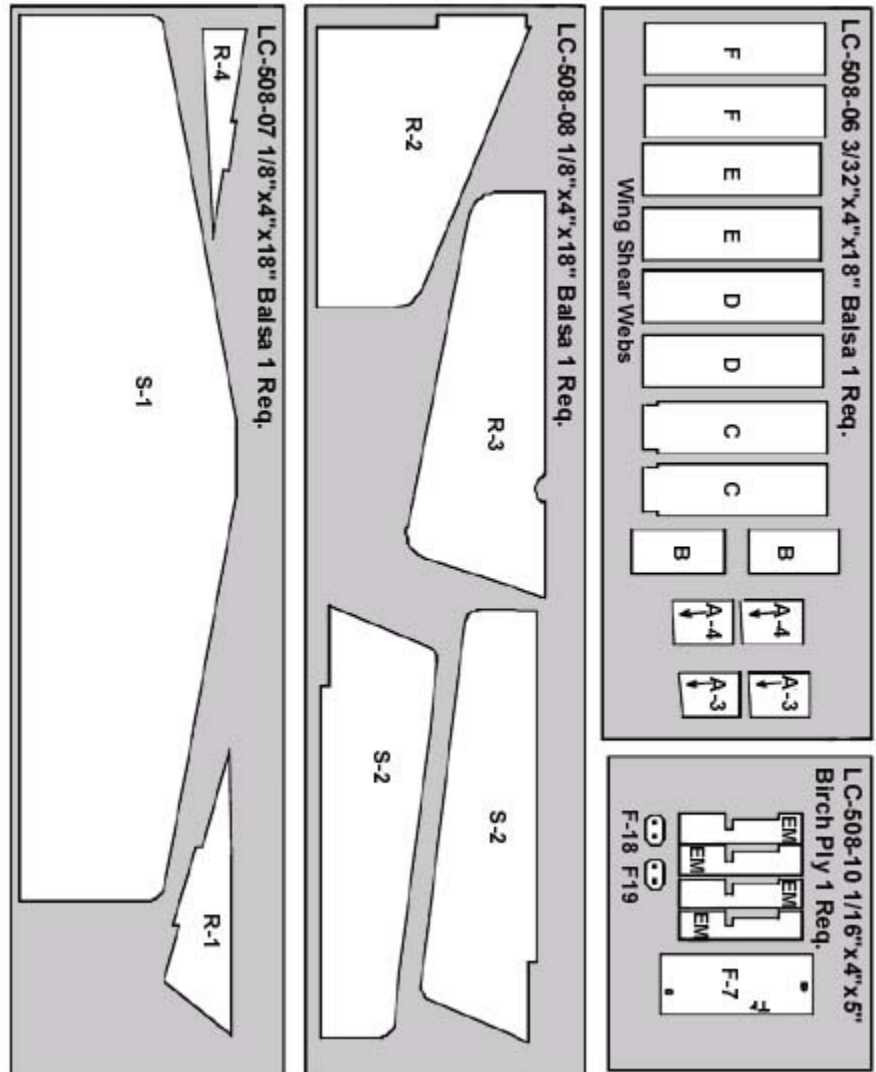
LC-508-05 3/32"x4"x24" Balsa 1 Req.



LC-508-09 3mmx4"x24" Lite Ply 1 Req.



<b>Additional Items Required (Not Included in Kit)</b>		
Note: These are parts that we have used and are familiar with. There are many other brands available and you may substitute other items that you are more comfortable with or have on hand.		
1	Engine	.049 to .061 Engine with throttle or Speed 400 Electric Power system
1	Radio	3 or 4 Channel Radio with Mini servos (ailerons require 2 servos)
3	Hinges	Sig Easy Hinges #SH-710 or Du-Bro Kwik Hinge #537
2	Yellow Covering Material	2 Rolls Iron on covering material
2	3/32 Wheel Collars	Sig #SH-585 or Du-Bro #138
1	1/16 Wheel Collar	Sig #SH-584 or Du-Bro #137
2	Main Wheels	2 1/4 Du-Bro #225T
1	Tail Wheel	3/4 Sullivan #351 T1 Tail Wheel
2	Wheel Bushings	Make from K&S Brass Tube #127
For Glow Power you will also need the following items:		
1	Throttle Pushrod Assembly	Sig #SH-559 or Du-Bro #165
1	Motor Mount	Dave Brown #0506
4	Motor Mount Screws	4-40 x 3/4 Machine Screws and Blind Nuts Sig #SH-111 or Du-Bro #129
1	Fuel Tank	Sullivan 2oz. #SS-2
1	1/2-A Fuel Line	Sig #SH-288 or Du-Bro #221
1	Propeller	Grish Tornado 6-3 Nylon Propeller #GRIQ1050



We offer a complete Speed 400 electric power system that is factory matched to this airplane. See the enclosed flyer or contact us at the factory for further information.

General Note: Cover the plans with wax paper before assembling your model to prevent the parts from sticking to the plan.

## Building the Tail Surfaces

1. Join R-1 and R-2 together over the plan. Temporarily hinge the rudder (R-3) to the fin. Do not glue the hinges at this time. Bend the tail wheel wire to shape and glue it into position into the bottom of the rudder.
2. Join the elevators using the 1/8" dowel. Use the plan and the stabilizer as a guide. Trim the dowel as required to achieve the proper length.
3. Temporarily hinge the elevators to the stabilizer. Do not glue the hinges at this time.
4. Sand the tail surfaces smooth and round all of the edges except the bottom edge of the fin.

## Building the Fuselage

5. Assemble the left fuselage side (F-1). Glue parts F-1A, F-1B, F-1C, F-2 and F-3 together as shown on the plan. Parts F-2 and F-3 are glued on the inside of the fuselage. Parts F-2 are marked with an L or R for the left and right side. Be sure to make a left and a right side.

6. Place the right fuselage side on the building board and place formers F-4, F-5 and F-6 into position. These formers should be 90 degrees to the Fuselage side. Glue the formers to the fuselage side.
7. If you are building the model for electric power you should glue parts F-8 and part F-9 into position as shown on the plan. If you will be using a glow motor you will not be using these pieces.
8. Glue the left fuselage side into position on the formers. The formers should also be 90 degrees to this fuselage side.
9. Glue the plywood landing gear support F-7 into position with the markings TF at the front and facing the inside of the fuselage.
10. Glue two strips of 3/32" x 1/4" balsa strip across the front of former F-10 to brace it as shown on the plan.
11. Gently squeeze the aft end of the fuselage sides together and hold with two clothes pins. Place the formers F-10 and F-11 into position and glue them to the fuselage sides. Glue the aft end of the fuselage sides together making sure that the joint is straight and not leaning to the left or right.
12. Place part F-12 into position and glue it to the center of formers F-5, F-10 and F-11. Working from the front to the rear, gently pinch the fuselage sides into contact with F-12 and glue together.
13. Place part F-13 into position and glue it to the center of formers F-5, F-10 and F-11.
14. Working from the front to the rear, gently pinch the fuselage sides into contact with F-13 and glue together. The front end should rest on and be glued to F-7.
15. Fit part F-14 to the fuselage and glue into position.
16. Fit part F-15 to the fuselage and glue into position. Cut or crack F-15 slightly so that the rear end will lay flat on part F-7.
17. If you are building your model for glow power, glue F-16G into position on the front of the fuselage. If you are building your model for electric power, glue F-16E into position on the front of the fuselage.
18. Glue parts F-17 into position on the inside of the fuselage sides at the nose of the model.
19. Glue part F-18A to the bottom rear of F-18 to make the removable hatch.
20. Cut a piece of 1/4 sq. spruce long enough to fit between the fuselage sides and glue to the rear face of F-16. The top of the spruce should be 3/32" below the top edge of F-16. Now fit the hatch into position and drill a 1/32" hole in the forward end for the hatch hold down screw.
21. If you are building your model for electric power you should cut the bottom of the fuselage (F-13) out from between the insides of parts F-2 on the sides and between parts F-7 at the front and F-8 at the rear. This is now the opening for the battery compartment. Do not do this if you are building your model with glow power.

## **Building the Left Wing**

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22. Pin the lower 1/4" sq. spar and the lower trailing edge sheet to the left wing plan. The inboard ends should be aligned with the wing centerline (C/L) and the outboard end will extend out past the last W-2 rib.
23. Cut the lower 1/16" sheet for the lower inboard end of the wing and glue in place between the trailing edge and the spar.
24. Glue the second W-1 rib into position. This ribs should be 90 degrees to the building board.
25. Glue the shear web A into position against the rib and the spar. Use A-3 if you are building the model with 3 channels and use A-4 if building the model with 4 channels. The arrow on the shear web points toward the wing center line and should be on the side of the part closest to the plan.
26. Glue the first W-1 rib into position. This rib should be tight against shear web A and will be leaning slightly toward the wing tip.

27. Glue shear web B into position and glue the third W-1 rib into position.
28. Now glue ribs W-2 and the remaining shear webs (C, D, E, and F) into position. These ribs are all 90 degrees to the building board.
29. If you are building the 4 channel version, fit rib W-3 into position inboard of the second W-2 rib as shown on the plan. The spacing between W-3 and the W-2 should be 1/16" wider than your servo. Glue W-3 into position.
30. Glue the top 1/4" sq. spar into position. The inboard end of the spar should end flush with the face of the W-1 rib. The outboard end will stick out past the last W-2 rib. Be sure to glue it to the shear webs as well as the ribs.
31. Glue the 1/4" sq. leading edge, the 3/32" sq. strips and the top trailing edge sheet to the wing.  
Note: If you are using ailerons on your model you should now cut holes about 1/2" behind the main spars in the ribs inboard of the aileron servo to run the aileron servo wire through. These holes should be just slightly larger than the connector on your servo. You should run a thread through these holes now and secure the ends with tape. This thread will be used to feed the servo wire through the wing during final assembly.
32. Add the 1/16" sheet to the inboard end of the wing between the spar and the trailing edge. Use three pieces of 1/16" sheet to sheet the inboard top of the wing from the spar to the leading edge. These pieces go between the 3/32" sq. strips and not on top of them.
33. Remove the wing from the plan and add the lower 1/16" sheet to the inboard end between the spar and the leading edge.
34. Trim and sand the spars, leading edge and the trailing edge flush with the last W-2 rib.

## **Building the Right Wing**

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35. Pin the lower 1/4" sq. spar and the lower trailing edge sheet to the left wing plan. The inboard ends should be aligned with the wing centerline (C/L) and the outboard end will extend out past the last W-2 rib.
36. Cut the lower 1/16" sheet for the lower inboard end of the wing and glue in place between the trailing edge and the spar.
37. Glue the second W-1 rib into position. This ribs should be 90 degrees to the building board.
38. Glue the shear web A into position against the rib and the spar. Use A-3 if you are building the model with 3 channels and use A-4 if building the model with 4 channels.
39. Glue the first W-1 rib into position. This rib should be tight against shear web A and will be leaning slightly toward the wing tip.
40. Glue shear web B into position and glue the third W-1 rib into position.
41. Now glue ribs W-2 and the remaining shear webs (C, D, E, and F) into position. These ribs are all 90 degrees to the building board.
42. Glue the top 1/4" sq. spar into position. The inboard end of the spar should end flush with the face of the W-1 rib. The outboard end will stick out past the last W-2 rib. Be sure to glue it to the shear webs as well as the ribs.
43. Glue the 1/4" sq. leading edge, the 3/32" sq. strips and the top trailing edge sheet to the wing.
44. Add the 1/16" sheet to the inboard end of the wing between the spar and the trailing edge. Use three pieces of 1/16" sheet to sheet the inboard top of the wing from the spar to the leading edge. These pieces go between the 3/32" sq. strips and not on top of them.
45. Remove the wing from the plan and add the lower 1/16" sheet to the inboard end between the spar and the leading edge.
46. Trim and sand the spars, leading edge and the trailing edge flush with the last W-2 rib.



47. When the right wing is finished, sand both wing panels smooth and sand the leading edge round.
48. Test fit the right and left wing panels together. With one wing panel on your building board you should have approximately 4 1/2" to 4 3/4" dihedral for the three channel wing and approximately 4 1/2" to 4 3/4" dihedral for the four channel wing. Now glue the two wing panels together.
49. Use thin C/A glue to attach the 1" nylon tape to the joint between the wing panels. Glue one end at the top trailing edge with a small amount of glue. Now stretch the tape around the wing tightly and glue the tape completely into position. When the glue is dry you can trim away any excess and then lightly sand the tape smooth.
50. Cut the 3/4" triangle for the wing tips in half and glue to the ends of the wing. The front of the tip block should be flush with the leading edge, and the bottom should be flush with the bottom of the W-2 rib. Glue a scrap piece of 3/32" sheet on top of the wing tip to bring the middle part up to the height of the W-2 rib. Sand the tip blocks to match the airfoil section of the ribs and then sand them smooth.
51. If you are installing ailerons, cut 1/4" square notches in the ribs on either side of the aileron servo and mount 1/4" spruce servo rails as shown on the plan. Trim the ailerons to the shape shown and temporarily hinge them to the wing.

## Pre-Cover Assembly

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52. Sand the entire fuselage smooth and lightly round the corners.
53. Install the main landing gear wires into the fuselage and secure with the landing gear straps (F-19) and #2 sheet metal screws.
54. Fit and glue the servo rails into position. Adjust the spacing of the rails to fit the servos that you are using. The servo rails are made from 1/4" sq. spruce. The servo rails extend completely across the fuselage and rest on top of the F-2 s. Now mount the servos on the rails. Mount three servos if you are building the glow powered version and only two servos if you are building the electric powered version.
55. Trim the wood from the rear of the stabilizer slot. Glue the stabilizer, fin and R-4 to the aft end of the fuselage. Make sure they are straight and square before gluing.
56. Temporarily hinge (do not glue) the elevators to the stabilizer.
57. Cut the lower hinge slot in the rudder and the fuselage and then temporarily hinge (do not glue) the rudder to the model.
58. Attach the control horns to the elevator and rudder with 2-56 screws. Install the rudder and elevator pushrods with clevises at the horns and servo connectors at the servos.

## Electric Powered Version

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**If you are building the Glow Powered Version, Skip ahead to step #67.**

59. Laminate two pairs of parts EM to make two motor mount rails. Now securely glue these rails to the front of the model. The parts EM interlock with F-16E and the tabs fit into the slots in parts F-17.
60. Assemble the gear box onto the front of the motor. Use the middle size pinion so that you have a 2.5:1 gear ratio. You should apply blue Loctite to all screws and they should be securely tightened.  
Note: Insert a 1/4" wide strip of typing paper between the gears while installing the gear box. This will provide the proper amount of backlash in the gears when it is removed. You must apply a small amount of grease to the gears. Also, you should check all components of the electric drive system for tightness before every flight and as the gears wear it may be necessary to adjust the gear box to maintain the proper mesh between the gears.
61. Attach the electronic speed controller to the motor and solder connectors to the speed controller to match the battery that you are using.
62. Lay one of the motor mounts on the EM rails. Feed the wiring from the motor through the hole in F-16E and then rest it on the motor mount. Place the top half of the motor mount into position and press down to hold the motor into position.

63. While holding the motor you should adjust the thrust line so that the prop shaft is pointing straight ahead or with a slight amount of right thrust. When the mounts are properly positioned, drill through the mount and parts EM with a 1/32" drill bit.
64. Remove the motor and mounts and install 2-56 blind nuts on the bottom of parts EM. Reinstall the motor and mounts using 2-56 screws.
65. WITHOUT THE PROPELLER ATTACHED, hook up the radio and power system and test the motor for proper operation. Do Not install the propeller until after you have again tested the power system after the model is covered and is completely ready for flight.
66. Now jump ahead in the instructions to the covering section.

## **Glow Powered Version**

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67. Mark and drill 1/16" holes on F-16G for the motor mount. Attach the motor mount to the firewall with 4-40 screws and nuts. Now install the motor on the mount. Trim the top front corner of the fuselage side to allow for needle valve access and clearance.
68. Mark and drill 3/16" holes in the firewall for the throttle pushrod, fuel and vent lines.
69. Glue the F-19 fuel tank supports into position.
70. Assemble the fuel tank and install into the model.
71. Bend and install the throttle pushrod. Attach the pushrod to the servo with a servo connector.

## **Covering**

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72. Remove the motor, motor mount, control surfaces, landing gear and other items. Sand the entire model smooth with 320 grit sandpaper. Remove the hatch from the model and cover it separately.
73. Cover the model with your choice of iron on covering materials.
74. Cut the windows to shape using the patterns on the plan and apply to the model. An ultra fine Sharpie Marker can be used to draw panel lines and other details. Paint the wing hold down dowels and the F-19 landing gear retainers.

## **Final Assembly**

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75. Install the elevators and then the rudder to the model and glue the hinges in place. Install the ailerons on the model the same way if you are using them.
76. Install the servos in the model. If you are using ailerons, cut two 1/2" dia. holes in the lower wing sheet aft of the main spars and just outboard if the nylon tape at the center of the wing. Use the thread to feed the servo wires through the wing. (Control horns and aileron pushrods are not provided in the kit)
77. Install the pushrods and control horns and connect the pushrods to the servos.
78. Glue the wing hold down dowels into position. Paint or cover the ends.
79. Install the landing gear. Cover parts LG. Attach to the wire strut with a strip of covering material. Apply a small amount of silicone rubber to attach them to the fuselage side.

## **Electric Powered Version**

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**If you are building the Glow Powered Version, Skip ahead to step #84.**

80. Install the power system back in the model.
81. Securely glue two Velcro straps to the bottom of part F-9 to hold the battery into your model.

82. Install the receiver and battery pack so that the model balances at the point shown on the plan. Wrap the receiver with foam rubber. If necessary, add weight to the nose or tail until the model balances at the point shown on the plan with the fuel tank empty. Mount the switch in the left fuselage side. Run the receiver antenna through the rear fuselage and out a small hole in the fuselage side just behind F-11 and below the stabilizer.
83. WITHOUT THE PROPELLER ATTACHED, hook up the radio and power system and test the motor for proper operation.

### **Glow Powered Version**

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84. Install the engine mount to the firewall and bolt the engine to the mount.
85. Install the throttle pushrod and nose gear steering pushrod.
86. Install the fuel tank and run the fuel and vent lines to the tank.
87. Install the receiver and battery pack so that the model balances at the point shown on the plan. Wrap the battery and receiver with foam rubber. If necessary, add weight to the nose or tail until the model balances at the point shown on the plan with the fuel tank empty. Mount the switch in the left fuselage side. Run the receiver antenna through the rear fuselage and out a small hole in the fuselage side just behind F-11 and below the stabilizer.
88. Attach the wing to the model with a minimum of 4 rubber bands on each side. Set the control throws to the measurements shown on the plan.

### **Both Versions**

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89. Verify that the model balances at the point shown on the plan before flying. Verify that the control throws are set and that the controls move in the proper direction.
90. Always pre-flight your model thoroughly before each flight. It is your responsibility to verify that your model is airworthy. Always follow established safety guidelines while starting and operating the engine, radio and while flying the model.

<b>WARRANTY</b>
<p>Herr Engineering Corp. guarantees this kit to be free from defects in both materials and workmanship at the time of purchase. This warranty does not cover any component damaged by use or modification. In no case shall Herr Engineering Corporation's liability exceed the original cost of the purchased kit. Further Herr Engineering Corp. reserves the right to change or modify this warranty without notice.</p> <p>In that Herr Engineering Corporation has no control over the assembly or use, no liability shall be assumed or accepted for any damage resulting from the use by the user during construction of the kit or the use of the final user assembled product. By the act of building this kit and/or using the final user assembled product, the user accepts all liability.</p> <p>If the buyer and/or user is not prepared to accept all of the liability associated with this product, he is advised to immediately return this kit in new and unused condition to the place of purchase for a full refund.</p>

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