

# Hummingbird (100)



**By Stevens AeroModel**

Length 17.5 inches | Span 27 inches | Area: 100 inches<sup>2</sup> | Flying Weight 2.3 oz.

Version 1.0

### **WARRANTY**

Stevens AeroModel guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Stevens AeroModel's liability exceed the original cost of the purchased kit. Further, Stevens AeroModel reserves the right to change or modify this warranty without notice.

### **LIABILITY RELEASE**

In that Stevens AeroModel has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

### **THIS PRODUCT IS NOT INTENDED FOR CHILDREN 12 YEARS OF AGE OR YOUNGER**

**WARNING:** This product may contain chemicals known to the State of California to cause cancer and or birth defects or other reproductive harm.

### **PRODUCT SUPPORT**

This product has been engineered to function properly and perform as advertised with the suggested power system and supporting electronics as outlined within this product manual. Product support cannot be provided nor can Stevens AeroModel assist in determining the suitability or use of electronics, hardware, or power systems not explicitly recommended by Stevens AeroModel.

For product assembly support, replacement parts, hardware, and electronics to complete this model please contact Stevens AeroModel on-line at [www.stevensaero.com](http://www.stevensaero.com).

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## Project Checklist

### Kit Contents

- Laser cut wood (8 Sheets)
- Build Instructions
- Black and White Photo Supplement (Color Download Available from StevensAero.com)
- Computer drawn plan set (2 Pages)

Taped to back of wood brick:

- 1 - 1/32 in. x 12 in. wire
- 2 - 0.015 in. x 18 in. wire
- Hardware Bag
  - 1 - Elevator Joiner "E6" [\*]
  - 1 - Acetate Windshield [\*]
  - 1 - 1-1/2 in. length of 1/16 in. Heat Shrink Tube [2020]
  - 1 - 2 in. length of 1/8 in. dia. Hardwood Dowel [1017]
  - 1 - Pair 1-1/2 in. Micro Lite Wheels [DUB150ML]
  - 2 - 1/8 in. dia. x 1/16 in. Ring Magnets [4013]
  - 2 - 3/16 in. dia. x 1/16 in. Disc Magnets [4014]
  - 2 - #1 x 3/16 in. Screws [SMPP0103B]
  - 4 - 1/16 in. dia. x 1/4 in. length Aluminum Tube [2010]

Suggested Electronics (Available at StevensAero.com)

- Spektrum DSM2 2.4ghz transmitter with at least 3 channels
- Parkzone or Spektrum ultra micro receiver/esc/servo "brick" [PKZ3351], [PKZUA1151] or [SPMAR6400]\*
- Parkzone motor and gearbox [PKZ3624]
- 130mm x 70mm Propeller [EFL9051]
- 3.7V 160 - 200mAh LiPo compatible with Parkzone / Spektrum "brick" [HP-LG325-0160-1S-UM]

\*SPMAR6400 requires computer radio capable of channel mixing.

### Required Building Supplies and Tools

- 1/2 oz. Medium CA Glue
- 1/2 oz. Thin CA Glue
- CA glue applicator tips
- CA glue accelerator (kicker)
- Balsa filler
- Hobby Knife with ample supply of #11 blades
- Sanding block with 400 and 600 grit paper
- Heat Gun and Covering Iron
- Small Needle Nose Pliers
- 1/2 in. wide clear tape
- Servo mounting tape
- Soldering Iron

### Optional Building Supplies and Tools

- 1/2 oz. Thick CA Glue
- Modeling Clay for Ballast
- CA glue de-bonder
- Long sanding bar
- Masking Tape (Low tack painters tape)

## General Assembly Instructions

Thank you, for purchasing this Stevens **Hummingbird™** (100). A micro indoor scale model of the De Havilland DH53 Hummingbird. This product has been developed and manufactured using state of the art CAD/CAM systems and features a unique interlocking construction process that, when compared to traditional methods found in other model aircraft kits, save countless hours of measuring, cutting, sanding, and fitting. We are certain that you'll find our kit to offer a truly exceptional build experience. As this kit is recommended for the novice model builder and pilot; we invite beginners who have purchased this kit to seek the help of a seasoned builder and pilot. At any time should one run across a term or technique that is foreign please don't hesitate to contact our staff with your questions.

### READ THIS!

Please **READ** and **RE-READ** these instructions along with any other included documentation prior to starting your build and/or contacting our staff for builder support.

### Pre-sanding

Do not skip this step. Prior to removing any parts from the laser cut sheet wood use a sanding block loaded with 250-400 grit paper and lightly sand the back side of each sheet of wood. This step removes any residue produced as a result of the laser cutting process and, as we have found that most stock wood sizes run several thousandths of an inch over sized, slightly reduces the thickness of each sheet.

Leave your pre-sanded parts in the sheet until required in the assembly process.

### Protecting your worktable

Use the poly tube that this kit was shipped in as a non-stick barrier between your worktable and the product assembly. Promptly clean up any epoxy spills with rubbing alcohol and a disposable towel.

### Bonding the assembly

As this product tabs, notches, and otherwise interlocks like a 3D puzzle we suggest that when fitting parts you dry fit (use no glue) the parts together first. It's advised to work 1-2 steps ahead in the instructions using this dry-fit technique which allows ample opportunity to

inspect the fit and location of assembled components and realizes a benefit as each successive part contributes to pulling the entire assembly square. Once you arrive at the end of a major assembly sequence square your work on top of a flat building table and revisit the dry fit joints with glue. Using the dry-fit process you'll be able to recover from a minor build mistake and will ultimately end up with a more square and true assembly.

Unless otherwise noted in the instructions we find it easier to tack glue part (temporarily bonding parts in assembly using a small dot of glue) using medium CA glue applied with a fine-tip CA glue applicator tip. Tight fitting joints should be bonded using thin CA glue applied, sparingly, with a CA glue applicator tip.

### Never force the fit!

Remember this is a precision cut kit our machines cut to within 5 thousandth of an inch in accuracy. Yet the wood stock supplied by the mill may vary in thickness by up to 20 thousandths. This variance in the wood stock can cause some tabs/notches to fit very tight. With this in mind, consider lightly sanding, or lightly pinching, a tight fitting tab rather than crushing and forcing your parts together. You'll break fewer parts in assembly and will end up with a more square and true airframe.

### Manual Updates

Please check our web-site for updates to these instructions prior to commencing the build.

While not required for proper assembly of this model, full-color photos following the build sequence given in this instruction manual are available to download at [www.stevensaero.com](http://www.stevensaero.com)

To obtain downloads and updates relative to this model aircraft kit, please visit the corresponding product page at StevensAero.com

## Fuselage

Fuselage parts are designated with a "F" followed by a numeric. Parts have been numbered so that the fuselage assembly and required parts follows in numeric order from F1 to F30 (F30 set aside until final assembly).

The fuselage is of traditional sheet side with central crutch assembly. Many of the formers will need to be installed in a forward and top orientation. Unless otherwise specified, formers should be installed with the etched part number facing the front of the assembly and any top or bottom designations followed.

You will "fit" the majority of this fuselage assembly together "dry" only gluing at the final instructional steps or when instructed to "bond". When parts cannot easily be retained with friction, use a single tiny drop of medium CA glue applied sparingly through a CA glue applicator tip to "tack glue" the part in place. Should you commit an error in assembly it will be easier to recover from the mistake and remove or correct the part fit in error if you do not slather the assembly in glue after each step! Further this method of assembly will allow our interlocking design to do it's job as each successive part installed within the fuselage will help pull the entire structure square and true.

1. Assemble the center crutch. Locate center crutch F1 and dry fit to former F2.
2. Fit and bond fuselage uprights A, B and C to fuselage side F3. Orient uprights so that lettered end fits into matching lettered slot - A to A, B to B, C to C.
3. fit crutch assembly to fuselage side F3.
4. Fit former F4 to crutch F1 and fuselage side F3.
5. Fit ply battery mount F5 to F4 and fuselage side F3.
6. Fit ply landing gear brace F6 to F5 and fuselage side F3.
7. Assembly wing mount from balsa part F7, and ply parts F8 and F9. Bond assembly with medium CA.
8. Fit wing mount assembly to fuselage side F3. Part F8 should be on top and the tabs on F7 should point down.
9. Assemble and bond remaining fuselage side from parts F10 and uprights A,B, and C. Fit fuselage side F10 to crutch assembly. Square assembly on a flat surface and bond all mating surfaces between formers and fuselage sides with thin CA. **DO NOT bond rear portion of fuselage sides behind former F2 to fuselage crutch F1.**
10. Fit and bond former F11 to F1 just behind former F4.
11. Fit and bond former F12 to F1 immediately forward of former F2.
12. Fit former F13 to slots in F1 immediately behind F12. Bond F13 to F12 and F1 with thin CA.
13. Fit former F14 to crosspiece of F1 where indicated on plan. **DO NOT bond at his time.**
14. Fit former F15 to tabs at the end of F1. Tack glue with medium CA.
15. Bring fuselage side together, fitting to formers F14 and F15, and central crutch F1. Square assembly on a flat surface and bond all mating surfaces with medium CA.
16. Fit crosspiece F16b to fuselage bottom F16. Bond with thin CA.
17. Fit fuselage bottom F16 to fuselage sides and formers F14 and F15. Square assembly and bond with medium CA.
18. Fit and tack glue F1b to former F15.
19. Wrap first part F17 around F1b and rear portion of F16, tack gluing with medium CA.
20. Wrap remaining part F17 around the other side of F16 and F1b, bonding to F1b and F15 with medium CA.
21. Position part F18 over F1b so that edges match. remove F18 and coat F1b with medium CA in those area that F18 covers. Replace F18, ensuring that part is lined up correctly over F1b.
22. Repeat the procedure in Step 21 to position and bond F19 over F18.
23. Fit and bond formers F20 and F21 to central crutch F1.

24. Fit stringer F22 to notches in F13, F20, F21, and F15. Ensure that the arrow on part F22 points forward, toward former F13.
25. Fit ply part F23 over the back of F6 to create the landing gear pocket. The tab on the top of F23 will engage the slot in F5, and the lower side tabs will engage the recess in the fuselage side behind F6.
26. Position part F24 over F23 to complete the landing gear pocket, tabbing into F5 and the recesses in the fuselage sides. Wick thin CA in and around the landing gear pocket to bond assembly together. Apply the glue sparingly within the pocket - **DO NOT** fill pocket with glue!
27. Fit and bond part F25 to slots in F1 and former F11.
28. Begin building up the nose block by bonding Part 1 (3/16 in. balsa sheet) against Former F11. Apply medium CA to the mating surface of part 1 and former F11 and carefully position part 1 over F25 and against F11. Repeat this procedure for parts 2 through 6 in order.
29. Due to variances in material thickness at the balsa mill, check the fit of Part 7. If part 7 extends beyond F4, lightly sand the backside of part 7 until the front of part 7 is flush with the front of F4. Bond part 7 in place with medium CA.
30. Fit and bond parts 8, 9, 10, and 11 in order with medium CA. Ensure parts are seated correctly on F25 and the tongue of ply part F5.
31. Coat the back side of part 12 with thick CA and position on part 11, within the etched outline on part 11. **Alignment is critical**, or the slots for the motor mount will not line up!
32. Repeat the process in step 31 for parts 13a and 13b, carefully positioning the parts within the outlines on part 12.
33. Slide ply motor mount F26 into the slots in the nose block until it rests within F4. Ensure that the side of the handle marked "TOP" faces up to ensure the proper right offset for the motor. Double check orientation of the motor mount. **DO NOT** bond motor mount at this time.
34. Carefully twist handle, breaking it away from the motor mount. Bond motor mount to nose block by wicking thin CA along the edges of the mount where it fits in the slot in the nose block.
35. Fit bottom sheeting F27 to fuselage sides, tabbing into F6 and covering part 8 of the nose block. *Note: "U" shape cut to F27 opens to front of model.* Bond with thin CA.
36. Fit and bond part F28 to lower "stepped" recess in nose block parts 10 and 11. *Note: "U" shape cut to F28 opens to back of model.*
37. Moisten one side of cockpit sheeting F29 with glass cleaner and wipe off excess. Position F29 over cockpit area with the damp side out, the wider portion forward, resting on F11, and the narrow portion aft, resting on F13. Use low-tack masking tape to hold F29 in position until it is dry.
38. When part F29 is dry, remove tape and tack glue in place with tiny drops of medium CA. When you are satisfied with the position of F29, permanently bond in place with thin CA.
39. Remove stringers from cut sheet. *Note: There are 8 stringers, but you will only require 6 - this will give you a couple of extra stringers in case one breaks or is trimmed too short.* Fit one full length stringer in the center notched on one side of formers F13, F20, F21, and F15. Bond with thin CA.
40. Trim two stringers to 6-5/16 inches and fit on both sides of full length stringer between formers F13 and F21. The end of the stringer should butt up against F21, with its outer edge flush with the edge of F21. Do not rest the stringer on top of the former as this will create an unsightly bump that will have to be sanded away. *Tip: Trim long and sand stringer to final length.*
41. Follow steps 39 and 40 to fill in the stringers on the other side of the fuselage.
42. Lightly sand fuselage smooth. Following the pictures in the photo supplement and shape lines given on plan set, shape the nose block. *Note: While shaping may seem intimidating at first, it is as simple as lightly sanding the steps from the laminated wood parts.* Round the nose block as viewed from the top, and follow the contours on the plan for the side views. Sand the corners of F18 and F19 at

the rear of the fuselage to flow smoothly into the edge of former F15.

Set fuselage aside until final assembly.

## Tail Group.

The horizontal and vertical stabilizers, rudder, elevator, and sub-fin are designated with a "H", "V", "R", or "E", as appropriate, followed by a numeric. Parts have been numbered so that the assembly and required parts follows in numeric order. *Assemble parts over the plan, protecting the plan with the poly bag that this kit was shipped in.*

43. Dry assemble horizontal stabilizer over the plan, from parts H1, H2, and H3. Bond with thin CA.
44. Remove the six short ribs from the cut sheet. Fit ribs to the outer frame and bond with thin CA. **DON'T FORCE THE FIT!** If the rib doesn't fit, it's the wrong rib or in the wrong place. Double check rib length against the plan before bonding in place.
45. Dry assemble two elevator halves over the plan from parts E1 through E5 each.
46. Remove the eight longer ribs from the cut sheet. Fit ribs to the outer frame and bond with thin CA. Again, **DON'T FORCE THE FIT!** Double check length and placement of ribs against the plan.
47. Using a straightedge as a guide, bond the elevator halves to the hardwood elevator joiner E6 with medium CA.
48. Follow the above procedures to build the vertical stabilizer from parts V1, V2 and V3 and the two short ribs. Build the rudder from parts R1 through R5 and the four longer ribs.
49. Refer to the tape hinge diagram, located on the wing plan set, and bevel the leading edges of the rudder and elevator. Bevel the left side of the rudder, and the bottom of the elevator.

## Wing.

The wing is composed of one spar, leading edge, trailing edge, ribs and tip sheeting. Wing parts are designated with a "W" followed by a numeric. Parts have been numbered so that the wing

assembly and required parts follows in numeric order from W1 to W31.

The wing is assembled at center section first, then one half at a time (left then right). When a part is required in the build sequence (for instance "W3") refer to the plan set for part placement.

You will dry fit the majority of this wing assembly together only gluing at the final instructional steps. When parts cannot easily be retained with friction, use a single tiny drop of medium CA glue applied sparingly through a CA glue applicator tip to "tack glue" the part in place. Should you commit an error in assembly it will be easier to recover from the mistake and remove or correct the part fit in error if you do not slather the assembly in glue after each step! Further, this method of assembly will allow our interlocking design to do it's job as each successive part installed within the wing will help pull the entire structure square and true.

50. Begin by building the center of the wing. Locate part W1a and two parts W1b. Fit and bond W1b's on either side of W1a aligning at dove tail joints.
51. Using the plan set as a guide, dry fit center section ribs W2 and W3 to the same slot within spar W1. W2 will be on the outside and W3 to the inside. Note: The bottoms of all ribs should seat flush with bottom of spars.
52. Slide ply sub-spar W4 through slots in ribs behind main spar W1. Center W4, but **DO NOT** bond at this time. *Note: Lightly sand W4 to facilitate fit (Do not force fit).*
53. Fit sub-ribs W5 through slots in W1 and W4.
54. Fit W6 to tabs on the W5's and the slots in ribs W3.
55. Fit and tack glue center section trailing edge W7 between the two ribs W3.
56. Bond W8 over W7 with thick CA.
57. Begin left side of wing. Fit rib W9 to spar W1. Refer to plan for correct location.
58. Fit and tack glue the leading edge web W10 to ribs W9 and W2. *Note: Arrow on W10 should face center section rib W2.*
59. Build up trailing edge and wing tip by fitting and bonding together parts W11, W12, and W13.

60. Fit and tack glue trailing edge/tip assembly to ribs W3 and W9, and the spar W1.
  61. Fit leading edge doubler W14 and rib W15 to wing tip and leading edge. Align W14 over leading edge web W10 (W15 helps key parts) and bond with thin CA. Fit wing tip doubler W16 over wing tip in corner created by W14 and rib W15 and bond with medium CA.
  62. Fit slots in leading edge W17 to tabs in leading edge web W10. Tack glue with medium CA. *Note: Arrow on W17 should face wing center section at W2.*
  63. Fit rib W18 to leading edge, spar and trailing edge. Refer to plan for correct location.
  64. Fit rib W19 in location indicated on plan. *Note: Upper portion of spar slot is slightly wider to allow the two ply rib doublers W20 and W21 to be inserted alongside W19.*
  65. Tack glue rib doublers W20 and W21 on either side of rib W19. The tops of W20 and W21 will end 1/16 in. below the top of rib W19.
  66. Fit rib 22 to spar, leading and trailing edges where indicated on plan.
  67. Fit diagonal braces W23, W24, W25, and W26 between ribs, leading edge, and spar where indicated on plan. Each diagonal is slightly different in length and shape - make sure they are in the correct location.
  68. With wing squared on a flat surface, bond all mating surfaces between ribs, spars, leading and trailing edges with thin CA.
  69. Fit and bond half rib W27 to the leading edge and spar where indicated on plan.
  70. Fit and bond remaining half ribs W28, W29, W30, and W31 in their correct locations along the wing leading edge and spar (reference plan set for part placement).
  71. Create the strut attach points by inserting 1/16 in. diameter by 1/4 in. long aluminum tubes into the pockets created by the doublers on rib W19. Ends of the tubes will be flush with the top of the rib. Apply a small drop of thin CA along the side of the tube, being careful not to fill the center of the tube with glue.
  72. Repeat steps 57 through 71 to build right half of wing. **Building Tip:** Turn plan over and place on a light colored surface - the back side of the other plan sheet works well - so that you can see the wing plan through the paper. Build your right wing over this "mirror image" of the left wing.
  73. Sand wing lightly, rounding leading edge to match the profile on the plan. Reduce thickness of the leading edge at the tip to flow smoothly into the tip rib, and round the junction between the leading edge and the rib as indicated on the plan. Leave the trailing edge square.
  74. Cut the 2 in. length of 1/8 in. dowel to 7/8 in. long. Lightly sand dowel, rounding one end as shown on plans. Fit dowel through holes in W6, Spar W1 and sub-spar W4, with the rounded end pointing forward. The aft end of the dowel will be flush with the aft surface of W4. Bond with medium CA behind W6 and on each side of W1/W4.
- Set wing aside until final assembly.

## Final Assembly

75. Cover model with a lightweight material. We suggest AeroLITE, available at [stevensaero.com](http://stevensaero.com). **Leave the bottom portion of the fuselage uncovered for now.** This will be covered later after pushrods have been installed.
76. Following "Landing Gear Detail" on plan set accurately bend landing gear using needle nose pliers and included 1/32 in. wire.
77. Trim covering on fuselage to expose landing gear pocket. Install landing gear within fuselage and retain with 1/32 ply part F30 as illustrated on plan set. Friction alone should be sufficient to retain F30 allowing easy removal of landing gear. If desired, retain F30 and landing gear within fuselage using thin CA glue.
78. Prepare the receiver/servo brick for installation. The battery lead will need to be lengthened by clipping off the terminal and soldering an additional lead [PKZ3052] to the remaining wires. Alternately, when using the larger 200 mAh battery [EFLB2001S25], the



battery adapter lead [EFLA7002UM] may be used instead.

79. Install receiver/servo brick to the bottom of F1 as indicated on the plan with double sided tape [DUB634].
  80. Follow the Push Rod Detail on the plan to make a "snake" bend in one end of each of the .015 in. wires. Feed pushrods - straight end first - through the nose block and back to F2. Feed the rudder pushrod through the OUTER-LEFT hole in F2, and the UPPER-LEFT hole in F14. Then, open the covering over the upper exit slot on the RIGHT side of the fuselage in F17. Pass the rudder push rod through this slot and allow to extend beyond the end of the fuselage - the excess will be trimmed later. Repeat this process for the elevator pushrod, passing it through the INNER-RIGHT hole in F2, the LOWER-RIGHT hole in F14, and the lower exit slot on the LEFT side of the fuselage in F17. Twist the push rod snake bends through the MIDDLE hole in each servo tab as shown on the plan.
  81. Cover the bottom of the fuselage at this time.
  82. Position the motor/gearbox [PKZ3624] in the slot on the motor mount, and secure with a small drop of medium CA under each tab. Hold the propeller shaft with a small pair of needle nose pliers and screw on the propeller [EFL9051].
  83. Mount a narrow strip of sticky back Velcro - the 'hook' side - on the bottom of F5 within the battery compartment. mount a corresponding strip of 'loop' on your battery.
  84. Assemble the dummy motor cylinders by stacking parts M1 through M7 on a scrap length of 1/32 in. wire. bond them together with thin CA and paint flat black. Trim the wire, leaving about 1/16 in. extending from each end.
  85. Apply a small amount of medium CA to M7 (the bottom of the cylinder) and press cylinder in place within the relieved areas on the nose block where indicated on the plan.
  86. Open the covering over the magnet pockets on each side of the fuselage at F2. Press in one 1/8 in. diameter Ring Magnet in each pocket and bond with a small drop of thin CA.
- Ensure the center hole of the Ring Magnet is not filled with glue.**
87. Mount two #1 x 3/16 in. screws in the holes in F9. Secure with a small drop of thin CA.
  88. **Landing Gear:** Fit and bond ply parts LG1 and LG2 to form left and right landing gear struts.
  89. Open slots in F27 and dry fit landing gear struts. Dry fit ply spreader bar LG3 to slots in struts. Center assembly between wire landing gear, and bond LG3 to the LG1/LG2 assemblies. Remove completed landing gear assembly.
  90. Paint landing gear to match the fuselage color.
  91. Re-fit the landing gear assembly, check alignment, and bond in place with small drops of medium CA. Use the glue sparingly, as this will allow the ply landing gear to part from the fuselage during a hard landing with minimal damage.
  92. Mount balsa wheel discs W to each side of the provided wheels [DUB150ML] and sand to a streamlined shape. Cover or paint wheel discs to match fuselage and mount wheels on wire landing gear. Trim wire 1/8 in. beyond outside of wheels and press on the retainers supplied with the wheels.
  93. Paint ply tail skid TS flat black and mount in the slot on the bottom of the fuselage, at the aft end of F16.
  94. Install acetate windscreen on the deck in front of the cockpit where indicated on plan. Bond with canopy glue or small drops of thin CA.
  95. Paint pilot profile P flat black and mount to the slot in F1 within the cockpit.
  96. Follow the Tape Hinge Diagram on the wing plan set to mount the elevator and rudder to the horizontal and vertical stabilizers.
  97. Fit and bond rudder control horn R to RIGHT side of rudder. Fit and bond elevator horn E to LOWER-LEFT side of elevator.
  98. Open the covering over the slots in the horizontal stabilizer. Fit the vertical stabilizer tabs through the slots in the horizontal stabilizer and into the slots in F19. Ensure

surfaces are square to each other and perpendicular to the fuselage, and bond with medium CA.

99. Follow the Pushrod Detail on the plans and complete the connections between the pushrods and their corresponding control horns.
100. Open the covering over the pockets in wing trailing edge and press in two 3/16 in. diameter disc magnets. Bond with medium CA. These magnets will engage the screws in F9 to retain the wing.
101. Make up six wing strut fitting wires from 0.015 in. wire. Make a 90 degree bend 1/16 in. from one end, then trim wire fitting to a total length of 1 in.
102. Assemble struts from parts S1 and S2. Ensure etching on both parts is on the same side. Use a scrap piece of 0.015 in. wire to scrape away the etched areas to create a channel for the wire fittings to rest in. Install fittings at the base of the 'V' with the short 1/16 in. end inserted in the hole at the end of the etching, and the long end resting in the channel. At the base of the 'V' where the strut will contact the fuselage, trim the wire to extend 1/8 in. from the end of the strut. Final trimming will be done when fitting the strut.
103. Repeat the procedures above to install the wire fittings at the ends of the struts.
104. Make a bend 1/16 in from the end of the strut. Match bend angle to that shown on the strut front view on the plan. **Ensure that you make a RIGHT and a LEFT strut assembly!** Finished strut assemblies should have the wire fittings on the underside of the struts.
105. Paint struts to match fuselage. Scrape any overspray from the wire fittings to ensure a smooth fit in the wing tubes.
106. Mount the wing to the fuselage by inserting the locating dowel in the hole in the landing gear pocket. The magnets in the trailing edge of the wing will engage the screws in the fuselage, firmly securing the wing in place.

Insert the dowels in the wing tubes first and check fit. The fuselage end should fall inline with the magnet in the fuselage side. If not, re-bend the wires at the wing until the top of the strut is aligned correctly.

Check the fit of the fuselage end of the strut. The wire should fit in the hole in the magnet without displacing the wing. Trim the wire fitting until this is achieved. If you accidentally trim the wire too short to engage the hole in the magnet, carefully remove the wire fitting and replace with a new one.

**Congratulations!** Your model of the DeHavilland DH.53 Hummingbird is complete! The colors scheme indicated on the plan represents the Hummingbird in the collection of the Old Warden Aerodrome in England. This was the last flying example left in the world until recently grounded due to it's scarcity and the unreliability of it's engine. Of the fifteen Hummingbirds originally built, only one other example is known to exist, and is undergoing restoration at this writing.

## Flight Control Setup

- Inspect wing for any warps that may have worked their way in when covering, or while the model was in storage, and remove prior to flight. **DO NOT ATTEMPT FLIGHT IF WING IS WARPED.** Lack of aileron control on this model will make contending with a warped wing very difficult. **FIX THE WARP.**
- Center control surface then set direction, rate of travel, and dampening (expo).

Rudder servo should be controlled by the Aileron channel of your radio as rudder on this model also controls roll of the aircraft. Rudder should follow Aileron stick travel i.e. moving Aileron stick to right should move rudder to RIGHT of aircraft. Likewise, left Aileron stick input will move rudder LEFT.

Elevator servo will be controlled by elevator channel of your radio. Pulling back on the elevator stick should result in the elevator moving UP! Likewise, forward stick results in the elevator moving DOWN!

The **Hummingbird™** is designed to be a very docile flyer, therefore the flight controls are set up for fairly minimal throws. The rudder and elevator throws should be as follows:

Rudder Travel		
+/- 30 degrees		30% expo
Elevator Travel		
+/- 10 degrees		30% expo

The above exponential settings apply only to computer radios.

## Pre-Flight

Have an experienced pilot assist you with pre-flying your new model. Just like having someone proof read something you've written, having a second **fresh** set of eyes to inspect your final product is often helpful at avoiding disaster.

While not an exhaustive pre-flight check these are some of the major items that you should consider using when developing your own pre-flight check list. Get in the habit of always pre-flying your models before each and every flight.

- Weight and Balance** - Check the **Hummingbird's™** balance. The model should balance 1/8 to 1/4 in. behind the main spar. Use a permanent marker or trim tape to mark the underside of the left and right wing half at the CG measurement as given above.
- Use your right and left hand index fingers and suspend the model from below, between the marked CG measurements. Site from profile of aircraft against horizon. If the lower edge of the fuselage side along F1 appears to hang level with horizon line, then the **Hummingbird™** is properly balanced to fly. Move equipment and or battery within fuselage to obtain proper balance.
- Check Weather** - The **Hummingbird's™** first flight should be outdoors and in **zero** wind conditions. Due to the **Hummingbird's™** docile flight characteristics, **all** flights should be made in minimal or no wind.
- Inspect airframe** for warps and obvious signs of wear or damage. Do not fly a damaged or warped model.
- Inspect control surfaces** for center, proper direction of travel, rate of throw, secure pushrod connections, hinges, and receiver/servo mounting hardware.
- Check wing attach points** for damage and/or wear. Inspect magnets and struts, ensuring that they are installed correctly and in good condition to adequately retain wing.
- Inspect battery for full charge.** Never begin a flight with a partially charged battery.

- Clear prop!** Before applying power to the model, clear and keep clear of the prop arc.
- Range check radio.** Follow the radio makers guidelines for performing a proper range check.
- Check for traffic.** Proceed to the flight line (With your mentor/instructor if you are a novice pilot) and observe other RC traffic. If the runway is clear, and no one is in the pattern to land, loudly announce your intentions to take off. Remember etiquette dictates that all aircraft on ground must yield the runway to those landing.
- Go flying.** Point model into wind (if present) and steadily advance throttle to **full**. Use rudder to correct track while on ground roll. Within several feet the model should be airborne. Fly model to a comfortable 1-2 mistake high altitude, reduce throttle to stop climb, then trim model for straight and level flight at a comfortable cruise speed (Depending on speed control responsiveness, the **Hummingbird™** typically cruises at about 1/2 throttle).
- Setup for landing.** Clearly announce your intention to land. Make landings into the wind. With rudder/elevator control and no ailerons setting up landings in cross-winds should be avoided until you are comfortable with the model's in-flight behavior.

## Congratulations!

You've completed your first flight(s) on the **Hummingbird™**.

If your first flight was a bit more exciting than you'd have liked and are having problems with erratic flight performance; please inspect your equipment and airframe for damage, improper installation, and/or twists and warps.

We are committed to improving your build and flying experience and are constantly refining our processes, designs, and manuals to reflect customer feedback. You may correspond with Stevens AeroModel staff using any of the following methods:

E-Mail - [support@stevensaero.com](mailto:support@stevensaero.com)  
 RCGroups.com - Forum Build Threads  
 Facebook.com - Search for Stevens AeroModel  
 Phone - 719-387-4187