

# BUSH HAWK XP

## ASSEMBLY MANUAL



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## BEFORE YOU BEGIN

### A word about laser cut parts and adhesives.

There are three primary types of adhesives recommended for constructing your model. They are CyanoAcrylate (CA) in all viscosities, Aliphatic Resin Glue (carpenters glue) and Epoxy. CA is the primary adhesive to use however there are times when it is not the best choice. They are;

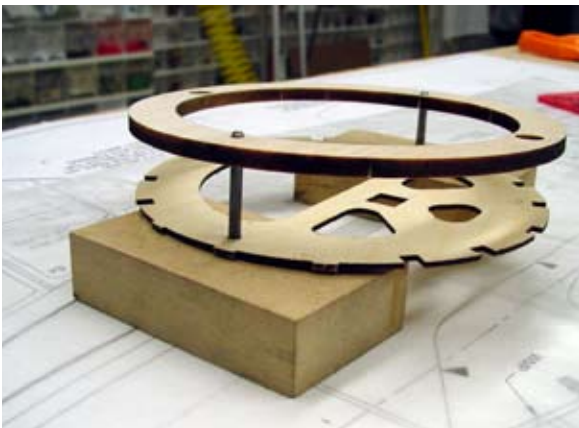
1. When you need more time to carefully position a part then a fast setting adhesive will allow.
2. When attaching plastic such as a windshield (Use Pacer formula 560 here).
3. When gluing laser cut aircraft grade plywoods. The microwave set adhesives used in aircraft grade plywood does not ablate well under a laser beam. As a result it burns the wood fibers near by leaving a charred edge. Fast setting CA adhesives do not allow time for the adhesive to penetrate this layer of char and bond to the wood fiber underneath. Use a slower setting adhesive such as Aliphatic Resin or for maximum strength use Epoxy on aircraft grade ply parts. Lite Ply's do not use this type of adhesive and do not suffer from this problem.

To apply thin CA I recommend the Dave Brown pipets available at your hobby shop. Be sure to stretch the end (pull it with a pair of pliers) to a thin applicator tip, as they are not supplied in this configuration and some folks don't know that you have to do this. No mention of this is made on the package they come in.

### PIN REGISTRATION

A great shop technique introduced by Top Notch Products is the use of 1/8" piano wire pins to quickly and precisely position laminated parts such as fuselage doublers etc. Many of the parts in Top Notch kits utilize this method and are supplied with pinning holes. Take the time to construct two of these handy tools. Use two small hardwood blocks and two short lengths of 1/8" music wire. Round the ends for easy insertion into the parts.

Below are two examples of this technique as used in the Cessna 195 kit. On the left, two fire wall components are being assembled using the pins. Any time precision placement is required, this method is used. You will find the pinning holes are easily filled after completing the model. This method allows the use of fast setting adhesives such as CA because the parts cannot be out of register. In the photo on the right, landing gear components are being assembled with the pins. Precision placement of these parts is required to assure that the 1/8" landing gear wire will fit snugly into this assembly. In the background is the completed fire wall assembly.



Use a sheet of Wax Paper to protect your plans. When assembling flat sheets such as the stabilizer skins I recommend laying the parts on a sheet of parchment paper. Assemble the parts, apply thin CA and frequently lift the part and wipe up any excess CA from both the part and the paper with a piece of paper towel.

## OK, LETS BUILD A BUSH HAWK

## WING ASSEMBLY

### BUILDING NOTE

Many of the wing components have dash cut stand off feet attached that will set the correct angle of all parts. It is important that these stand off's be flat on the building board throughout the construction process. Check periodically to make sure that is the case. After assembly these will be snapped off and discarded.

- 1 Remove as needed all wing components from their carrier sheets and clean up any nubs left by the retainer breaks.
- 2 Use the pin register method and assemble W3 and W3-A, make sure W3-A is on the outboard side.
- 3 Laminate Aileron Bay Liner (ABL) and ABL-B together. Be sure ABL-B is on the aileron or outside. You will note that the notches for the ribs are in ABL and that must be on the inside.
- 4 Use a straight edge to align FLE with the wing drawing and tack glue pinning tabs (located on sheet 23) to the stand off feet, then pin these tabs securely to the building board.
- 5 Locate section SW-A of the spar web and slide ribs W2 thorough W7 into the appropriate slots in the spar web. Next slide the remaining spar web section SW-B down onto the ribs from the top. Tack glue the spar webs together lightly at each end.
- 6 Locate tip spar web segment SW-C and install ribs W9, W10 and W11. Install tip spar segment SW-D from the top similar to the root spar and tack glue the ends. You should now have the two spar webs with all but the end ribs captive.
- 7 Install but do not glue all ribs into their appropriate notches in the false leading edge (FLE).
- 8 Install and Glue WGA to W3 and FLE. WGA will set FLE and W3 at a 90° angle.
- 9 Test fit CLE and bevel the top to conform with the rib contour. Then install CLE to ribs W1, W2 and W3.
- 10 Glue all ribs to FLE keep all ribs at 90°.
- 11 Glue SWC and SWD assembly to the SWA and SWB assembly at W8, then glue ABL & ABL-B assembly to ribs W8 through W12. Taper the tab at the end of ABL to seat properly in the notch in W8.
- 12 Glue all ribs to the spar web segments.
- 13 Install the ABL assembly and glue to ribs W8 thorough W12, then install gussets WGB and WGC.
- 14 Assemble the 1/16" spar flanges (SF) and install the top spar flange. The spar flange must be in good contact with the sheer web and glued along the entire length of the spar.
- 15 Install top trailing edge sheet.
- 16 Plane FLE and CLE to contour with the ribs. Locate and test fit the 1/32" leading edge sheeting, mark the spar flange at the root where the sheeting stops. Apply a liberal bead of thick CA to the spar flange from this mark to the tip and then install the top sheeting.
- 17 Remove the wing from the plans and use thin CA to glue the sheeting to each rib and FLE.
- 18 Install one section of top center section sheeting (CSS) and then measure, trim and install the second CSS to fill the top center section.
- 19 Remove all stand offs and pinning tabs. Clean up these areas with a light sanding.
- 20 Taper slightly the trailing edge of the bottom trailing edge sheeting (TES) and glue in place.
- 21 Glue the servo mount (SM) in place and then glue on the servo mount screw doublers.
- 22 Glue on the bottom ply spar flange. Weight this assembly sufficient to assure good contact with the spar web (SW) until cured.



Wing construction under way with FLE tacked to the building board with pinning tabs and the ribs in place on SW-A, SWB and SWD will be installed next.

- 22 To glue on the bottom leading edge sheeting use the following sequence. Apply aliphatic resin glue to all ribs between FLE and SW. Then apply medium or slow CA to the spar. Install the leading edge sheet and hold it firmly against the spar until cured. Next using finger pressure, pull the leading edge sheeting firmly against each rib to make good contact with FLE. Use thin CA to glue it to FLE. Proceed from the center out toward to both end of the wing
- 23 Install the 1/4" balsa leading edge and then add LEF at the root end.
- 24 Laminate two 1/4" WT parts together to form the wing tip block and then glue in place.
- 25 Assemble the remaining wing half by repeating steps 1 through 23.
- 26 To assemble the wing halves cut two 1/2" pieces of 1/8" dowel and glue them into the holes in WJ. These will serve to align the two wing panels. Glue WJ to one wing panel and then glue this assembly to the remaining wing panel. Use Epoxy to glue SFJ to the spar flanges on the top and bottom of the wing. Note that WJ is cut 1/64" oversized to accommodate sanding out flush with the wing sheeting.

### FINISHING THE WING

*It is best to finish shaping the leading and trailing edges after the wing halves have been assembled. Do not shape the wing tip trailing edges until you have completed the aileron assembly. Use LEF as a guide to shaping the leading edge, also use the supplied leading edge template to check for the correct shape. This work is best accomplished with a razor plane and a sanding bar. The tip block leading edge (WT) can be formed at the same time as the leading edges. To finish forming the tip block, first assemble the ailerons. Tape them in place along the entire aileron leading edge and then align them with the wing trailing edge at the root and tape them in place. Use the aileron tip to mark the wing tip block (WT) and do the final shaping of the wing tip block. Note that 3° of wash out is introduced into the outer wing panel from W8 to the tip. Sand the trailing edge to a rounded contour.*

### AILERON ASSEMBLY

- 1 Locate and prepare the aileron base (AB). Install A1, note the A1 must be canted in slightly, use the aileron dihedral gauge (ADG) to set the correct angle.
- 2 Install and glue A2 through A5. Note that these must be at 90° to AB. A5 simulated the aileron counter balance and must be parallel with the end of the aileron base.
- 3 Plane a slight bevel on the bottom of ALE to provide good contact with the aileron base, and then glue it to the aileron base and the front of A1 through A4.
- 4 Glue the aileron horn plate (AHP) to the aileron base where indicated.
- 5 Plane the top leading edge of ALE to contour with the ribs. The aileron will be attached to the wing with aileron tape along the top leading edge after covering.

### STABILIZER ASSEMBLY

*Building note:*

*When installing the stabilizer parts onto the core sheet, make sure the parts are pressed flat against the bench. This is especially important for the leading and trailing edge installation. Remember that the shape that the stabilizer is in when you apply glue is the shape it will retain.*

- 1 Install all split ribs on one side of the stabilizer core sheet. Start with S-1 and proceed out in both directions to the tip.
- 2 Install ETE trailing edge.
- 3 Install SD ply brace.

- 4 Install leading edge (ELE) in the same manner as the trailing edge.
- 5 Flip the assembly over and install the remaining ribs.
- 6 Install the remaining trailing edge and leading edges.
- 7 Install the remaining ES ply brace.
- 8 Plane and sand out the leading and trailing edges to contour with the ribs.
- 9 Assemble the eight sections of 3/32" stabilizer sheeting (ES) to produce four assemblies. Select the best side of each of these assemblies and sand them out smooth while still flat. Sand the leading and trailing edges of the stab assembly to contour with the ribs and then glue on each section of sheeting.
- 10 Carefully remove that portion of S1 and the core sheet that is in line with the hole in the center sheeting. This will allow pass through of the rudder horn shaft when installed.

### ELEVATOR

- 1 The elevator core sheets are composed of a 1/16" balsa main section (EC) with a 1/16" ply trailing edge section (ECTE). These must be assembled prior to building the elevators. The recommended method is to place the parts together on a sheet of parchment paper (available in the baking department of your grocery store). Keep a folded pad of paper towel handy, run a bead of thin CA along a section of the joint between the two parts. Use the paper towel and a quick swipe to remove any excess glue. Lift the assembly and wipe off any glue on the reverse side as well as the parchment paper. Repeat this process until the core assembly is completed.
- 2 Assemble the elevator horn and joiner assembly.
- 3 Install E1 through E6.
- 4 Install EHD over the elevator horn slot.
- 5 Install ELE.
- 6 Flip the assembly over and install E1 through E6 and ELE.
- 7 Install ELE at the front of ribs E5 and E6.
- 8 Sand and shape the tip leading edge. Sand the leading edge hinge line to approximately a 20° angle to allow clearance for hinging.
- 9 Repeat for the second elevator.
- 10 Flatten a piece of 1/8" x 5/8" brass tube about 1/8" at both ends at 90° to each other. Drill a 1/16" hole at one end for the push rod clevis pin and then silver solder the opposite end to the stabilizer joiner. Note the off center position at 90° to the bend as shown.
- 11 To assemble the elevator halves, first locate a 12" piece of 1/4" scrap balsa. Sand the edge to make sure it is perfectly straight. Pin this to the building board. Secure two 1" x 1/2" pieces of scrap 3/32" balsa to use a shims. Test fit the assembly by inserting the linkage rod into both elevator halves. Place the assembly with the hinge line against the straight edge of the 1/4" scrap piece and place a 3/32" shim under each leading edge at the E4 location. The shims will maintain a straight hinge line. When satisfied with the assembly remove it, disassemble it and then use epoxy to secure the halves permanently. Be sure that the leading edge rests on the building board at the center and on the 3/32" shims at the E4 location.



*The elevator horn is silver soldered to the elevator linkage rod. The rod is 1/16" M.W and the horn is fabricated from 1/8" brass tubing.*

- 12 Cut two hinges in half lengthwise to produce four 1" x 3/8" hinges. Install these to the elevators and stabilizer at the locations indicated on the plans. Do not glue until after covering. This concludes the stabilizer/elevator assembly.



*RIGHT*

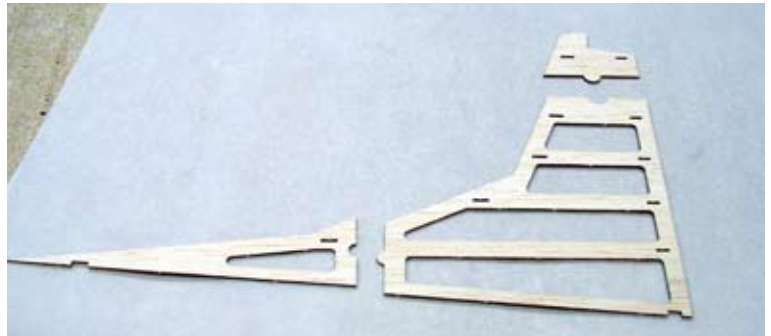
*The completed stabilizer and elevator assembly ready for covering and then installation on to the fuselage assembly. Assure that the hinges work freely and that the elevator counterbalance protrusions do not bind, allow for covering material.*

### RUDDER ASSEMBLY

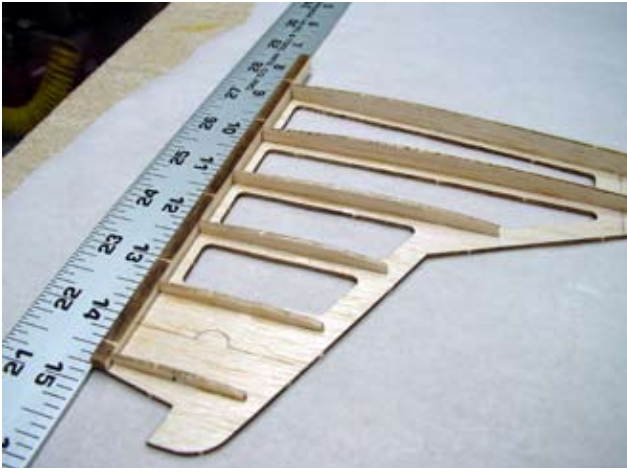
- 1 The rudder core sheet (RC) has a ply trailing edge (RTE) similar to the elevator core sheets. Assemble the rudder core sheet.
- 2 Install R1 through R6.
- 3 Install the rudder leading edge RLE. Install R8 and R9.
- 4 Install the rudder horn caps RHC.
- 5 Sand or plane a 20° angle on the rudder leading edge for hinge clearance.
- 6 Cut a 5/8" length of 1/8" brass tube. Crush flat about 3/16" at both ends. Drill a 1/16" hole in both ends about 3/32" from the end. Bend the 1/16" M.W. rudder torque rod and slide the one end of the brass tube onto the end of the torque rod. Solder in position at 90° to the bend. Do not install permanently in the rudder until after covering.

### VERTICAL FIN ASSEMBLY

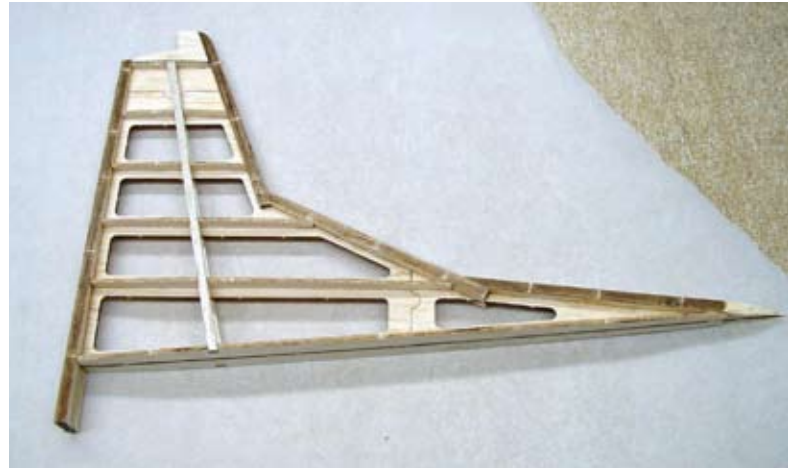
- 1 Assemble the three fin core sheet sections. Use the same technique as you did on the stabilizer core sheet assembly.
- 2 Install ribs V-1 through V6. Use a straight edge to assure that V-1 is straight and at 90° to the core sheet. This will provide the platform of the fin that will attach to the fuselage top and must be flat.



*Like the stabilizer and elevator assemblies, the vertical fin is built on a core sheet. Shown here are the three sections of the vertical fin core sheet ready to be assembled.*



*The vertical fin trailing edge is positioned by setting the tab in VTE in the notch on the core sheet. Then the trailing edge is glued to the core sheet.*



*The vertical fin assembly shown here with all internal components installed. The leading and trailing edges must be sanded to the contour of the ribs and then the covering can be applied to complete the structure.*

- 3 Using a straight edge to assure straightness, install the vertical fin trailing edge VTE. Note VTE will extend beyond the bottom edge of the core sheet. This extension will become the rudder post.
- 4 Install VLE-3. Trim VLE-2 to fit to VLE-3 and then install VLE-2. Trim VLE-1 to fit to VLE-2 and then install VLE-1.
- 5 Flip the assembly over and repeat this procedure to complete the vertical fin.
- 6 Plane and sand the leading edge to shape.
- 7 Assemble the 1/32" vertical fin sheeting from three sections. Select one side as the outside and sand that side smooth while it is still flat.
- 8 Note that the sheeting is positioned by two tabs in the trailing edge. Place one of the vertical fin skins in position and apply thin CA to all ribs, leading and trailing edges from the opposite side while forming it to the ribs.
- 9 Install the remaining vertical fin skin by applying aliphatic resin glue to all ribs. Then place the remaining vertical fin skin in position and apply thin CA along all leading and trailing edges.
- 10 After curing, sand the vertical fin leading edges to shape and then sand all surfaces smooth. Install the rudder and put this assembly aside. The vertical fin and rudder assembly is ready to cover.

### FUSELAGE ASSEMBLY

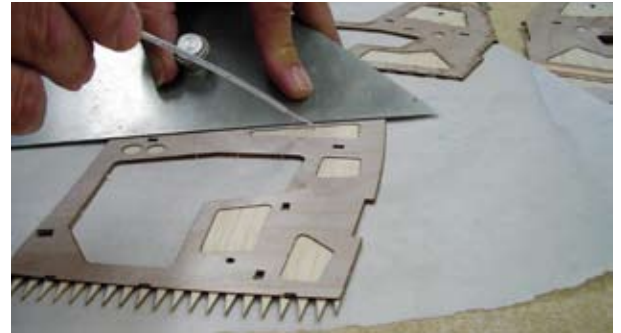
*Each fuselage side is supplied in three sections. The three main sections are the front, cabin and tail or aft section. In addition there is a small piece that must be added to the cabin section at the front just ahead of the wing seat. The 1/64" ply doublers are glued in place prior to assembling the three fuselage sections. When assembled, the three fuselage sections will form a fuselage side that is angled at the front and at the back. It is important that these angles are correct and exactly the same on both fuselage side assemblies. Jig FFA (forward fuselage angle) and AFA (aft fuselage angle) are temporarily installed on the outside of the front and back fuselage sections to assure the correct angle when assembling the three fuselage sections.*

- 1 Prepare the balsa fuselage sections for assembly. Glue on the small piece at the top forward part of the center section.
- 2 Prepare the two 1/64" ply fuselage doubler sections for assembly.

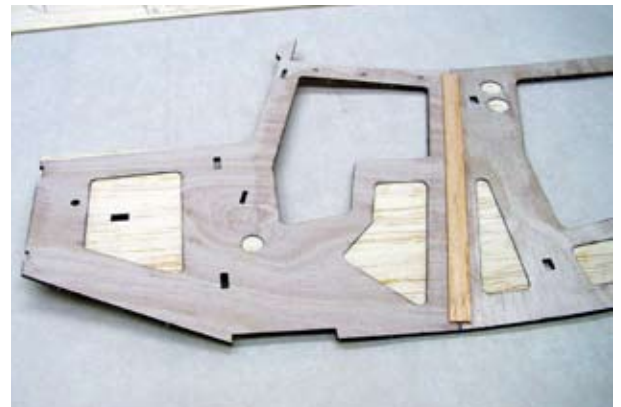
- 3 Precise placement of the fuselage doublers is critical, use the pinning method described at the beginning of this manual. Lay out all six fuselage sections on the bench to create a left and a right side. Note that the aft section has marking on it to locate the 1/8" x 3/16" stiffeners. These markings must be on the inside of the fuselage. Pair up the 1/64" ply fuselage doublers with the fuselage sides. Place one of the balsa forward sections on the pins, then place the doubler on the pins over the side. Force the two into contact and tack glue with CA. Repeat this procedure for all four fuselage doubler sections. Note that in the photo at the right, the two 1/8" music wire pins have been mounted in a small MDF block to simplify use of this method.
- 4 Turn this assembly over with the ply side down on a piece of parchment paper. Use a straight edge to press the parts flat and apply a bead of thin CA along all edges. The thin CA will wick into the balsa and ply along the edges and bond the two securely. Have a piece of paper towel handy and when necessary make a quick swipe with it to clean up any excess CA glue. Occasionally remove the assembly from the parchment paper and wipe up any excess CA with the paper towel.
- 5 Repeat this process for the center section and the center section ply doubler.
- 6 Place the center section on the bench with the doubler side up. Use a straight edge or a piece of ridged wood and weight to assure that the forward edge is flat on the plans.
- 7 Tack glue or pin FFF to the outside of the forward section and then place the forward section in position against the center section. FFF will set the correct angle for the forward section. They should fit tightly together with no gaps. Glue along the entire joint between the forward and center sections. Cut a piece of 1/32" scrap balsa 1/4" wide and 5" long. Place this over the hinge joint on the 1/64" ply and using a straight edge to force it into contact with the ply, apply thin CA to this joint. This concludes joining the forward and center sections.



*ABOVE RIGHT* The center fuselage section shown here being assembled with the 1/64" ply doubler. The pinning method is used here to assure perfect alignment of all notches. Additional holes are provided to be used as glue ports. It is important that these ply doublers be positioned accurately.



*A straight edge is used to hold the the 1/64" ply doubler flat and in good contact with the balsa fuselage side. A liberal application of CA is added and any excess removed with a paper towel.*



*See the text for more information on the process of gluing the doubler to the fuselage side along the window openings and exterior edges. It is important that the doublers be se-curlly bonded to the fuselage sides.*

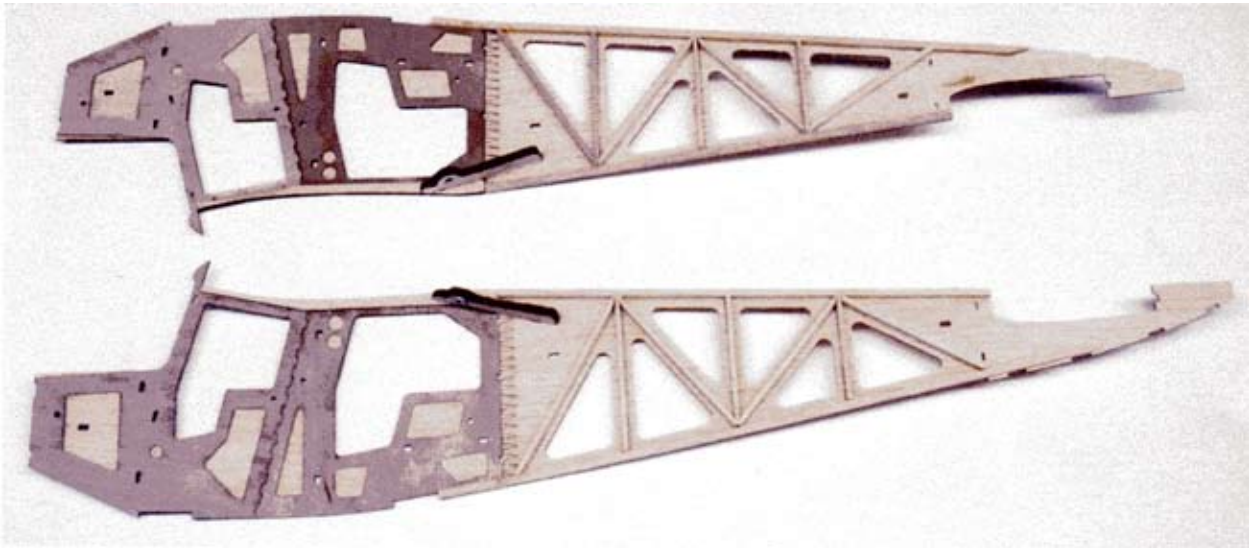
*BELOW:*

*Here a completed fuselage side with doublers installed is ready for formers. Note the 1/32" balsa strip along the forward finger joint.*





- 8 Use a piece of scrap 1/32" material to shim up the center section about one inch ahead of the finger joint at the aft edge. This will allow the fingers from the aft section to better center on the center section fingers. Use a weight on top to hold the center section perfectly flat. Install AFF into the aft section to set the correct angle.
- 9 Press the aft section into position with the center sections until all the fingers are completely meshed. Apply a generous bead of thin CA to this joint.
- 10 Remove the assembly from the parchment paper and repeat for the other fuselage side. Be sure to make a left and a right side.
- 11 Install the 3/16" square stock along the top and bottom of the aft section. Then install the 1/8" x 3/16" stiffeners.
- 12 Install the 1/16" ply wing saddle (WS)
- 13 Install the 1/4" lite ply wing mounting plate (WMP). Note prior to installing WMP, press in the #832 T-Nuts.



*Fuselage side subassemblies ready to install the formers. All formers should be installed with the former labels facing forward. Here the three fuselage sections have been assembled with the 1/64" ply doublers, wing saddle doubler, wing bolt plate and all balsa stiffeners in the aft section.*

- 14 Use Epoxy to install F4 and F5 to one fuselage side. Make sure both formers are at 90° to the fuselage center section.
- 15 Install the other fuselage side to this assembly.
- 16 Install F1, F2 and F3, note that the labeling side of these formers MUST face forward.
- 17 Laminate LGM and LGM-A together. Use the pinning method to assure accurate alignment.
- 18 Install the LGM assembly with Epoxy.
- 19 Install the two LGC's. Note that the hole in LGM must align with the slot in LGC. If it does not, move that LGC to the other side of the fuselage and use the remaining LGC.
- 20 Cut four 1-1/2" lengths of 1/8" x 1/4" basswood, glue these to the bottom of the servo tray along the servo screw line. This will provide additional material for the screws to grip.

- 21 Install the servo tray.
- 22 Install stabilizer doubler STD.
- 23 Install F6.
- 24 Install BTC to the aft bottom of the fuselage.
- 25 Install TGP.
- 26 Install FLA.
- 27 Glue a piece of 3/16" Sq. to the top back edge of F5. This will support the top sheeting.
- 28 Glue a piece of 3/16" Sq. to the top front of F6.
- 29 Assemble the aft deck (ATS) and install the 3/16" sq. Cross pieces. Glue this assembly to the aft top fuselage.
- 30 Install FCP, chamfer the edges to match formers F1 and F2.
- 31 Assemble the aft bottom sheeting (ABS) and add the 3/16" bracing where indicated, Glue this assembly to the aft bottom of the fuselage.
- 32 Install F-10 (2) between F1 and F2. Bevel both edges of F10. Then install F11 at the bottom also between F1 and F2.
- 33 Locate the fiberglass cowl and the ply cowl ring (CW). Place the cowl with the spinner ring flat against the bench and draw a line all the way around it at exactly 3-1/2" from the bench top. This is easiest if you use a stack of magazines or other object to hold your pencil flat at that elevation. Then rotate the cowl against the pencil while holding it flat against the bench. Trim the cowl on this line. Use the template supplied to mark the cowl openings in the front of the cowl and cut these openings. Glue the cowl ring into the back of the cowl with Epoxy.
- 34 Temporarily install the cowl and finish shaping the forward section of the fuselage. Fair it in with the shape of the cowl.
- 35 Add 1/4" triangle stock to the bottom of the fuselage sides between FHP2-A and LGM-A.



*Looking back through the tail section of the model you can see the square balsa added to the fuselage sides as well as the top and bottom for additional strength.*



*Forward section with corner sheeting installed and ready for shaping. Note that this model is being constructed with the glow firewall for use with a glow engine.*



*A look inside the cabin section showing the servo tray on the right and the landing gear mount on the left. The wing saddle doubler is at the top and the wing mounting bracket and blind nut are on the upper right.*



*This view shows the cabin and forward section of the fuselage. The landing gear mount is on the right and the ply plate on the left is to support the aft mount for floats if so desired. A float kit is available for this model.*

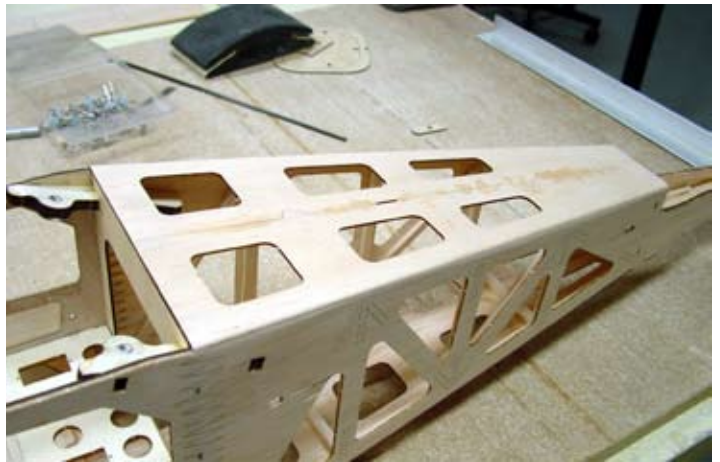
## EMPENAGE INSTALLATION

*The rudder and elevator linkages are concealed inside the fuselage. It is important therefore that these assemblies be carefully constructed and installed for long trouble free operation. If you do not wish to go to this trouble, you can bring the control linkages out the side and top of the fuselage as you would on a sport model. If you are not familiar with silver soldering techniques please see the Silver Soldering Primer on my web site under Shop Tips. Use the following sequence to install the vertical fin, stabilizer, rudder and elevator.*

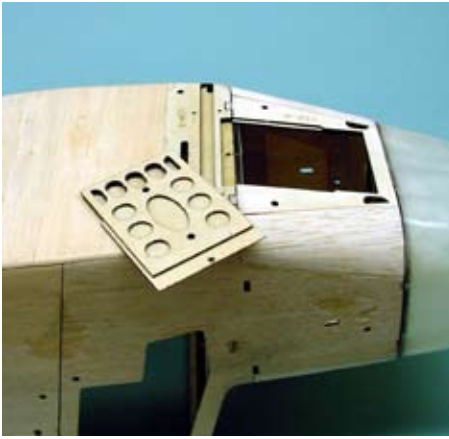
- 1 Cover the stabilizer, elevator assembly, vertical fin and rudder.
- 2 Install the hinges on the stabilizer and elevators.
- 3 Assemble the linkages for the rudder and elevator. These will be installed along with the stabilizer and rudder.
- 4 Assemble the elevator and elevator push rod assembly. If using a clevis be sure to use a keeper, usually made from a short section of fuel line.
- 5 Place the stab assembly in the stab cradle and mark the covering for removal. Trim the material about 1/16" inside this line and remove the center section covering.
- 6 Place the rudder linkage and horn into position in the fuselage. The rudder horn will extend up through the stabilizer assembly when installed. The rudder horn should be on the left side of the fuselage and the linkage extends up to the left servo opening in the servo tray.
- 7 Glue the stabilizer assembly in making sure it is square to the fuselage and that the hinge line is at 90° to the fuselage center line.
- 8 Install the two filler pieces (SF) and then the top 1/16" sheeting (T). Note that the top sheeting has a hole to allow the rudder torque rod to extend up through.
- 9 Sand the fuselage top aft section to shape and then cover the aft top section of the fuselage.
- 10 Test fit the vertical fin, and mark the fuselage top for covering removal. Once again, remove the covering where the vertical fin will glue on and then glue on the vertical fin.
- 11 Install the rudder, control horn and hinges.



*Bottom view of the tail section showing the bottom tail cap installed. The notch and tab construction assures that the fuselage sides are aligned and parallel to each other. No banana's here. Below this is the stabilizer saddle.*

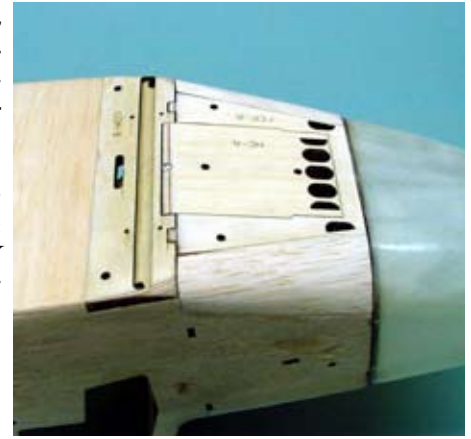


*Shown here the aft fuselage section is nearing completion with the stabilizer saddle on the right. The cabin area and tail cone are cavernous with plenty of room to work and space for gear.*



The photo on the left shows the assembled battery hatch cover ready to be installed. The shape of these parts will enable the cover to key into position in the hatch cover opening and provide a secure opening for accessing the flight pack.

In the photo on the right, the battery hatch cover has been installed. The flange on the front of the hatch cover will retain the front of the cover while a #2 X 3/8" sheet metal screw retains the cover. Note that the aft edge of the cover has been sanded to contour with the bottom of the fuselage.



## LANDING GEAR ASSEMBLY

### Mains

The main gear struts are formed from 1/8" music wire, you will need to solder a #8 washer to the gear leg to act as a stop on the inboard side of the wheel. On the outboard side a 1/8" wheel collar is used to retain the wheel. If you are not familiar with silver soldering, see the Shop Tips section on my web site [www.topnotchkits.com](http://www.topnotchkits.com).

- 1 Solder a #8 washer to each gear leg as shown in the photo below.

- 2 Refer to the stack order of the gear strut cover on the plans sheet. Lay the parts out as shown on the right to assemble a left and a right strut cover. Glue LGD to LGB.

- 3 Glue the LGD and LGB assembly to LGA.

- 4 Use the formed wire landing gear as a spacer and then glue LGC to LGA leaving a slot for the gear strut.

- 5 Sand a 45° bevel on LGA at the wide end (top) to allow clearance for the fuselage. Sand only down to the ply core (LGD).

- 6 Install the landing gear and retain it with two 1/16" ply landing gear straps and four #2 x 1/4" S.M. screws. Temporarily install a hinge into the strut cover assemblies and test fit them onto the gear. Mark the location of the outer most center hinge hole on the fuselage, drill a 1/16" hole for a #2 x 1/4" S.M. retainer screw and install.

- 7 Install the 1/16" ply gear retainer clip in the hole provided at the bottom of the strut. The strut cover installation is now complete. Do not install permanently until after covering. Use a small dab of Epoxy in the hinge slot to retain the hinge. Be sure to add about 3° of toe in to the gear leg before final assembly.

The installed strut cover is hinged to the fuselage at the top to allow it to flex with the gear leg. A #2 x 1/4" S.M. screw and ply retainer tab is used to secure it at the bottom. A #8 washer has been soldered to the inboard side of the gear to retain the wheel, a 1/8" wheel collar is used on the outboard side.



The strut cover parts are laid out to assure a left and right assembly. Note that the parts on the right, LGD and LGB have been assembled and a hinge (painted black for clarity) has been laid in position in the hinge slot in LGD. The hinge will be permanently installed after assembly.



### TAIL WHEEL

The scale tail wheel requires some fabrication as shown on the plans. If you do not wish to go to this trouble you can use the simplified design shown. If you would like to use a scale pull pull set up, you can use an E-flite HFL2282 micro pull pull kit. This not only looks good but it also works great. Note that in the photo on the right the tail wheel shows a lagging link, this is not necessary and is not scale. See the addendum in you kit regarding this change.



### COWL FLAP

The cowl flap is functional and should not be omitted. Without it the controller may not get adequate cooling. If you wish to omit the cowl flap you will need to make some other arrangement for cooling air to exit the fuselage. Assemble the three CF parts but do not install the assembly until after covering.

### SETUP

The proper C.G. can easily be achieved by moving the battery pack if you are using electric power. Be sure to do a lateral balance check to assure the model hangs wings level when supported by the motor shaft and the end of the tail cone. Add weight to the high wing until it is wings level.

Set the initial throws as follows. Ailerons -  $3/8$ " up and  $3/8$ " down Elevator -  $1/2$ " up and  $1/2$ " down Rudder - 1" right and left and wheel toe in of 3 degrees for best ground handling.

If you are setting your model up for float operation be sure to use the additional fin area supplied. The holes in the stab tips is designed to hold the ventral fins. The tail wheel assembly can be unbolted and the sub fin bolted in its place.

# Bush Hawk XP Parts Locator

PART#	SHEET #	MATERIAL	SIZE
A1 X2	1	AC PLY	1/16 X 6 X 23
A2 X2	5	BALSA	1/16 X 6 X 36
A3 X2	5	BALSA	1/16 X 6 X 36
A4 X2	5	BALSA	1/16 X 6 X 36
A5 X2	23	BALSA	1/8 X 3 X 36
ABL X2	9	BALSA	1/16 X 3 X 36
ABL-B X2	7	BALSA	1/16 X 4 X 36
ABS	7	BALSA	1/16 X 4 X 36
ABS X2	5	BALSA	1/16 X 6 X 36
ABS X2	6	BALSA	1/16 X 4 X 36
ACB X2	26	BALSA	3/16 X 3 X 36
AFF	24	BALSA	1/8 X 3 X 36
ALE WG-A X2	23	BALSA	1/8 X 3 X 36
ATS X2	6	BALSA	1/16 X 4 X 36
BM	27	BALSA	3/32 X 4 X 16
BM X2	25	LPLY	1/8 X 3 X 9
BTC	28	BALSA	3/32 X 4 X 16
BUILD SQUARE	16	LPLY	1/4 X 4 X 9
C X2	21	AC PLY	1/8 X 6 X 19
CF	11	BALSA	1/32 X 4 X 36
CF X2	23	BALSA	1/8 X 3 X 36
CLE X2	21	AC PLY	1/8 X 6 X 19
CR	27	BALSA	3/32 X 4 X 16
DONUTS X6	26	BALSA	3/16 X 3 X 36
E1 X4	28	BALSA	3/32 X 4 X 16
E2 X4	5	BALSA	1/16 X 6 X 36
E3 X4	5	BALSA	1/16 X 6 X 36
E4 X4	5	BALSA	1/16 X 6 X 36
E5 X4	1	AC PLY	1/16 X 6 X 23
E5 X4	5	BALSA	1/16 X 6 X 36
E6 X4	5	BALSA	1/16 X 6 X 36
EC X2	1	AC PLY	1/16 X 6 X 23
ELE X2	15	BALSA	1/4 X 3 X 36
ELE X4	26	BALSA	3/16 X 3 X 36
F1	27	BALSA	3/32 X 4 X 16
F10 X2	15	BALSA	1/4 X 3 X 36
F11 X2	15	BALSA	1/4 X 3 X 36
F1-GLOW	21	AC PLY	1/8 X 6 X 19
F2	21	AC PLY	1/8 X 6 X 19
F3	1	AC PLY	1/16 X 6 X 23
F4	21	AC PLY	1/8 X 6 X 19
F5	2	AC PLY	1/16 X 6 X 17
F6	2	AC PLY	1/16 X 6 X 17
FC X3	5	BALSA	1/16 X 6 X 36
FC-A X2	3	BALSA	1/16 X 6 X 36
FCP-B	2	AC PLY	1/16 X 6 X 17
FFF	24	BALSA	1/8 X 3 X 36
FHD X4	23	BALSA	1/8 X 3 X 36
FHL	15	BALSA	1/4 X 3 X 36
FHP-2A	16	LPLY	1/4 X 4 X 9
FLA	16	LPLY	1/4 X 4 X 9
FLE X2	24	BALSA	1/8 X 3 X 36
FT X2	23	BALSA	1/8 X 3 X 36
FUSE DOUBLER	17	AC PLY	1/64

PART#	SHEET #	MATERIAL	SIZE
FUSE DOUBLER	18	AC PLY	1/64
FUSE DOUBLER	19	AC PLY	1/64
FUSE DOUBLER	20	AC PLY	1/64
FUSELAGE SIDE LEFT	4	BALSA	1/16 X 3 X 36
FUSELAGE SIDE RIGHT	3	BALSA	1/16 X 6 X 36
GSR X2	1	AC PLY	1/16 X 6 X 23
H MM	21	AC PLY	1/8 X 6 X 19
HC-AFCP-A	2	AC PLY	1/16 X 6 X 17
HC-B	2	AC PLY	1/16 X 6 X 17
L.G/ STRAPS X4	1	AC PLY	1/16 X 6 X 23
LE X2	15	BALSA	1/4 X 3 X 36
LEF X2	26	BALSA	3/16 X 3 X 36
LGA	24	BALSA	1/8 X 3 X 36
LG-A	23	BALSA	1/8 X 3 X 36
LGB X2	11	BALSA	1/32 X 4 X 36
LG-C	23	BALSA	1/8 X 3 X 36
LGC X2	16	LPLY	1/4 X 4 X 9
LGC X2	23	BALSA	1/8 X 3 X 36
LGD X2	28	BALSA	3/32 X 4 X 16
LGM-A	21	AC PLY	1/8 X 6 X 19
LGM-B	21	AC PLY	1/8 X 6 X 19
MM CM	2	AC PLY	1/16 X 6 X 17
MM CM	21	AC PLY	1/8 X 6 X 19
PINNING TABS X10	23	BALSA	1/8 X 3 X 36
R2 X2	5	BALSA	1/16 X 6 X 36
R3 X2	5	BALSA	1/16 X 6 X 36
R4 X2	5	BALSA	1/16 X 6 X 36
R5 X2	5	BALSA	1/16 X 6 X 36
R6 X2	5	BALSA	1/16 X 6 X 36
RC-A	4	BALSA	1/16 X 3 X 36
RHC X2	23	BALSA	1/8 X 3 X 36
RLE X2	26	BALSA	3/16 X 3 X 36
RTE	1	AC PLY	1/16 X 6 X 23
S1 X2	28	BALSA	3/32 X 4 X 16
S2 X4	5	BALSA	1/16 X 6 X 36
S3 X4	5	BALSA	1/16 X 6 X 36
S4 X4	5	BALSA	1/16 X 6 X 36
S5 X4	5	BALSA	1/16 X 6 X 36
S6 X4	1	AC PLY	1/16 X 6 X 23
SB X4	28	BALSA	3/32 X 4 X 16
SC	5	BALSA	1/16 X 6 X 36
SC X2	26	BALSA	3/16 X 3 X 36
SC X2	28	BALSA	3/32 X 4 X 16
SF X2	24	BALSA	1/8 X 3 X 36
SFS X4	23	BALSA	1/8 X 3 X 36
SLE X4	26	BALSA	3/16 X 3 X 36
SM X2	1	AC PLY	1/16 X 6 X 23
SMD X4	1	AC PLY	1/16 X 6 X 23
SPAR X8	1	AC PLY	1/16 X 6 X 23
ST	25	LPLY	1/8 X 3 X 9
STAB SKINS	14	BALSA	1/32 X 4 X 36
STD X2	24	BALSA	1/8 X 3 X 36
STE X2	26	BALSA	3/16 X 3 X 36
SUB FIN	28	BALSA	3/32 X 4 X 16

# Bush Hawk XP Parts Locator (Cont.)

PART#	SHEET #	MATERIAL	SIZE
SUB FIN SHEETING X2	22	BALSA	1/32 X 4 X 36
SW-A	7	BALSA	1/16 X 4 X 36
SW-A	8	BALSA	1/16 X 3 X 36
SW-B	7	BALSA	1/16 X 4 X 36
SW-B	8	BALSA	1/16 X 3 X 36
SW-C X2	8	BALSA	1/16 X 3 X 36
SW-D X2	8	BALSA	1/16 X 3 X 36
T	28	BALSA	3/32 X 4 X 16
TEMPLATE	1	AC PLY	1/16 X 6 X 23
TGP	27	BALSA	3/32 X 4 X 16
V1 X2	26	BALSA	3/16 X 3 X 36
V1 X2	28	BALSA	3/32 X 4 X 16
V2 X2	5	BALSA	1/16 X 6 X 36
V3 X2	5	BALSA	1/16 X 6 X 36
V4 X2	5	BALSA	1/16 X 6 X 36
V5 X2	5	BALSA	1/16 X 6 X 36
V6 X2	5	BALSA	1/16 X 6 X 36
V6 X2	23	BALSA	1/8 X 3 X 36
V7	23	BALSA	1/8 X 3 X 36
V8 X2	23	BALSA	1/8 X 3 X 36
V9	23	BALSA	1/8 X 3 X 36
VF SHEET X6	22	BALSA	1/32 X 4 X 36
VLE-1 X2	26	BALSA	3/16 X 3 X 36
VLE-2 X2	26	BALSA	3/16 X 3 X 36
VLE-3 X2	26	BALSA	3/16 X 3 X 36
VMM	21	AC PLY	1/8 X 6 X 19
VTE X2	26	BALSA	3/16 X 3 X 36
W1 X2	29	BALSA	3/32 X 4 X 16
W10	6	BALSA	1/16 X 4 X 36
W-11 X2	6	BALSA	1/16 X 4 X 36
W12 X2	1	AC PLY	1/16 X 6 X 23
W2 X2	29	BALSA	3/32 X 4 X 16
W3 X2	29	BALSA	3/32 X 4 X 16
W3-A X2	28	BALSA	3/32 X 4 X 16
W4 X2	29	BALSA	3/32 X 4 X 16
W5 X2	29	BALSA	3/32 X 4 X 16
W6 X2	29	BALSA	3/32 X 4 X 16
W7 X2	28	BALSA	3/32 X 4 X 16
W8 X2	29	BALSA	3/32 X 4 X 16
W-9 X2	7	BALSA	1/16 X 4 X 36
WBP	2	AC PLY	1/16 X 6 X 17
WGA X2	15	BALSA	1/4 X 3 X 36
WGB X2	15	BALSA	1/4 X 3 X 36
WGC X2	8	BALSA	1/16 X 3 X 36
WGC X2	23	BALSA	1/8 X 3 X 36
WING CTR SHEETING X8	9	BALSA	1/16 X 3 X 36
WING SHEETING X2	12	BALSA	1/32 X 4 X 36
WING SHEETING X2	13	BALSA	1/32 X 4 X 36
WJ	23	BALSA	1/8 X 3 X 36
WMP X2	16	LPLY	1/4 X 4 X 9
WS X2	1	AC PLY	1/16 X 6 X 23
WT X4	15	BALSA	1/4 X 3 X 36
WTE X4	10	BALSA	1/16 X 4 X 36