As with all prototype builds, some changes will be incorporated into the final product. Because of this, not everything in these notes will be identical to the kit, but should be a reasonable representation.

A good flat surface is always necessary for building a good performing model and the Kingfisher is no exception. I took advantage of two work surfaces to speed up construction. If you decide to do this, it helps to carefully cut the plans separating the wing layout and the fuselage layout. Then tape the plans down to the flat work surface or surfaces.

**WING**

Locate the two trailing edges (1/4” thick x 35 3/8 long” to be laminated together. Glue the two trailing edges one on top of the other. Be sure to accurately line up the two trailing edges and the slots. It is important to use a straight edge or some other method to keep the trailing edge straight during this process (see picture). After the glue has dried, the wing trailing edge should be tapered to 3/16” at the rear of the trailing edge (the edge to be tapered does not have slots for wing ribs). You can use the glue line between the two laminates as a reference during this process (3/32” on each side of the glue line).

If you have a wing jig, the ribs have the holes for the shafts for wing construction. Since I never got around to using a wing jig, I’ll discuss an alternate method. I cut three balsa spacers (strips) using a straight edge. Two of the three spacers should be 36” inches long from ¼” stock and the other should be 36” inches from and 1/16” stock. The two ¼” spacers should be 11/32” x ¼ x 36” and ½” x ¼” x36”. The 1/16” spacer should be ¼” x 1/16” x 36”. Sand or plane a slight taper on one edge of the ½” space to allow for the taper of the trailing edge.

Working on the plans, pin down the 1/16” spacer with the 3/16” x ¼” wing spar on top of the spacer. Line up the ½” spacer and the 11/32” spacer with trailing edge spar and pin as shown above. Trail fit wing ribs R1, wing tip ribs labeled R2 and 3/8” square x 36” leading edge. This is to check the trailing edge alignment to the ribs. If the trailing edge doesn’t line with the wing ribs perfectly, make minor adjustments to the aft spacers (not the 1/16” spacer) to get proper alignment.

Now you can pin down the trailing edge to the spacers and then pin and glue the wing ribs and the 3/8” square x 36” leading edge into place. **Decision time:** time to choose whether to build a sport carrier plane with adjustable lead outs or install a line slider for serious competition. For the sport carrier, install the adjustable plywood lead out wing rib doublers as shown on the plans. The picture below shows the test fit of a plywood adjustable slider. This test fit is not located where it is shown on the plans. I would recommend using the location shown on the plans for sport models and not for carrier use. The plywood **carrier slider** is not recommended and not included.
If you choose to go with the line slider, the pictures that follow will speak more than words. I traced a rib on lite ply and epoxied it to existing balsa rib. I would recommend that you locate the lite ply slider wing rib inboard only one wing rib from the wing tip rib if you choose to follow what I did. The slider will have less resistance sliding back especially when using a jump buster. During the test flight, the slider did work quite well.

**Slider Comments**

As tested, the Kingfisher was a little light on the lines during high speed flight where I located the lead outs. A little more rudder off set should solve that issue if it was one. I certainly wouldn’t move the high speed position any further forward and would consider moving it slightly back. In the high speed position, the forward lead out cable was approximately 5/8” forward from the back edge of the wing spar and rear lead out cable is 1” behind the forward lead out cable (a little further back would be good thing). I also angled the rear of the slider inboard and feel it should have a little more angle and the slider should be located on the first wing rib inboard of the wing tip rib. The slider worked fine as is, but these would be changes I would make if I built it again.

I used rare earth magnets to keep the slider from moving around once in the low speed position. Here is a picture of the completed slider.

Assuming that you have decided on the type of lead out function you want and you have the slider or adjustable lead out hardware in place, install and glue in the top wing spar. Assemble the wing tip weight box and install in
the outboard wing as noted by plans. Add the 1/16” wing leading edge sheeting and wing center sheeting. When the glue dries and the pins are pulled, turn the wing over. I’ll take this opportunity to show one way to route the slider release cable. The following pictures show what I did.

Making sure the wing is straight and not twisted or warped; install 1/16” sheeting to the bottom of the wing.

**FUSELAGE**

This would be a good time to measure your engine for the spacing between motor blocks. The main laminate fuselage comes in four ¼” laser cut planks (two upper and two lower). If you remove the wing cutout from the lower fuselage halves and accurately align and glue them together, then you have a tool to help accurately align the lower fuselage halves when gluing. Carefully align the two lower fuselage halves, glue and weight or clamp. Do the same with the upper fuselage halves. After the glue has cured, use a long flat sanding block and carefully check and sand the mating surfaces between the upper and lower fuselage halves. Once a good fit is obtained, test fit the halves along with the maple motor blocks. Check the opening between the motor mounts for your engine. Glue and clamp maple motor mounts in lower fuselage half. When motor block install glue has cured, align fuselage halves and glue together.

Locate the maple landing gear block and landing gear wood dowel. Locate from plans and cut a cutout in the fuselage for the landing gear block. Glue and install the landing gear block and dowel.
If you want to make your profile a little sleeker, here is what I consider a short cut. Instead of building the model and then trying to round edges and corners fighting plywood, epoxy and balsa, here is my process. I measure in 1/8” and mark on the plywood nose doubler where I want the fuselage edges to be round and trim the plywood doubler to those markings. Then using a sanding block, I sand a partial round to the doubler. This leaves a lead in curve to the fuselage balsa, because I trimmed back the doubler. Once the doubler is glued on, it is very easy to sand and give a nice round effect to your fuselage. Inboard and outboard nose doublers are not the same, so please pay special attention and check the plans carefully.

Next, take a sanding block and taper the rear inboard fuselage side to ¼”, making the taper approximately seven inches long. Glue the two balsa vertical tail pieces together and sand an airfoil shape to the vertical tail. Locate the vertical tail on the fuselage and with a straight edge, mark an outline of where the tail will be glued to the fuselage. With a sanding block, round the fuselage edges where the vertical tail attaches being careful not to sand inside the area marked. You have the option to carefully gouge or route a slot into the fuselage where the tail is attached. Make sure to give it a minimum of a 1/8” offset to the tail on the fuselage and offset the rudder another 1/8” also. Once the vertical tail is attached, cut (2) 1/8” brass tubes, approximately 5/8” long and locate the round plywood discs for the tail hook bearing and the hook stop. Note: personal preference, I changed the location of the hook stop. Glue and insert brass tubes and glue discs on the fuselage. Cut a 1/16”groove and drill a 1/16” hole in the tail wheel/skid block. Add a cutout to the fuselage for the tail wheel block per plans. Install tail wheel/skid block and wire gear as note on plans. I chose to shorten the tail skid to 1 ¾” on my Kingfisher.
Before doing anything else to the fuselage, drill the holes for landing gear, gear retainers and engine mounting holes. For the forward landing gear, I drilled 5/32” Dia hole and glued in a 5/32” brass tube a little shorter than the width of the fuselage for the main landing gear wire bearing surface. Sand and shape the leading edge of the horizontal stab and taper the trailing edges of the two elevator pieces. Put in hinge slots, drill for elevator joiner wire and add slots to inset the elevator joiner wire. If you decide to assemble the horizontal tail before installing it in the fuselage, be aware that you will have to cut out the slot in the fuselage to get the horizontal stab in and then glue in a filler block. It is a good idea to add small 1/32” plywood doublers on the elevator where the control horn is mounted to give additional strength. Be sure to check alignment of the horizontal stab to the vertical tail is 90 degrees.

This would be a good time to check fitment of the 1/8” bell crank mount in the cutout provided in the fuselage above the wing. (Easier to make adjustments now)

Assemble the leading edge sanding block and use 80 – 120 grit sand paper with self-adhesive backing. Use some blue painter’s masking tape to protect the wing sheeting when sanding the leading edge with the assembled profile sanding block. A more detailed assembly view for our L.E. shaping blocks can be seen at:
http://www.builtrightflyright.com/New_Web_Pgs/kits/Stuka/stkabld00.htm

Assembly

Trim off excess wing sheeting and spars at wing tips and clean up the wing cutout in the fuselage. Test fit wing to the wing cutout. A little trimming and sanding will be necessary to achieve a good fit. Use 30 minute epoxy glue and glue the wing into the fuselage. Make absolutely sure the leading edge is square with the fuselage and the wing is in perfect alignment with the horizontal stab. Install blind nuts to the bell crank mount for the bell crank and install mount in provided cutout with epoxy.

Align and glue wing tips on to the wing, add the triangle wing tip supports. I choose to add a couple of wing tip ribs to bottom of the wing tips for additional support. On the top of the outboard wing tip against the triangle brace, I added 2 ½ ounces of permanent tip weight. Sand a taper to the trailing edge of the wing flaps and glue into place. Just for a little extra help, I glued the inboard flap 1/16” lower than neutral and the outboard flap 1/16” higher than neutral to help keep the plane banking away from me the pilot.

Most carrier pilots have their own set ups for hook release, slider release and throttle linkage (etc). Use your own setup or use the plan for an example. Here are some pictures of how I set up my controls.
Cover and finish your Kingfisher using your preferred materials and in your favorite color scheme. Add the gear, wheels, fuel tank, bell crank and engine etc. and complete final assembly. When mounting engine, be sure to add thrust shims or washers to help keep the airplane tight on the lines during flight. If you are a prop hanger, then you will more than likely need to add some tail weight to get the plane to hang properly.

I hope building Walter Umland’s Kingfisher will be as much fun for you as it was for me. The plane was a pleasure to fly and I hope it is for you to. Good flying.