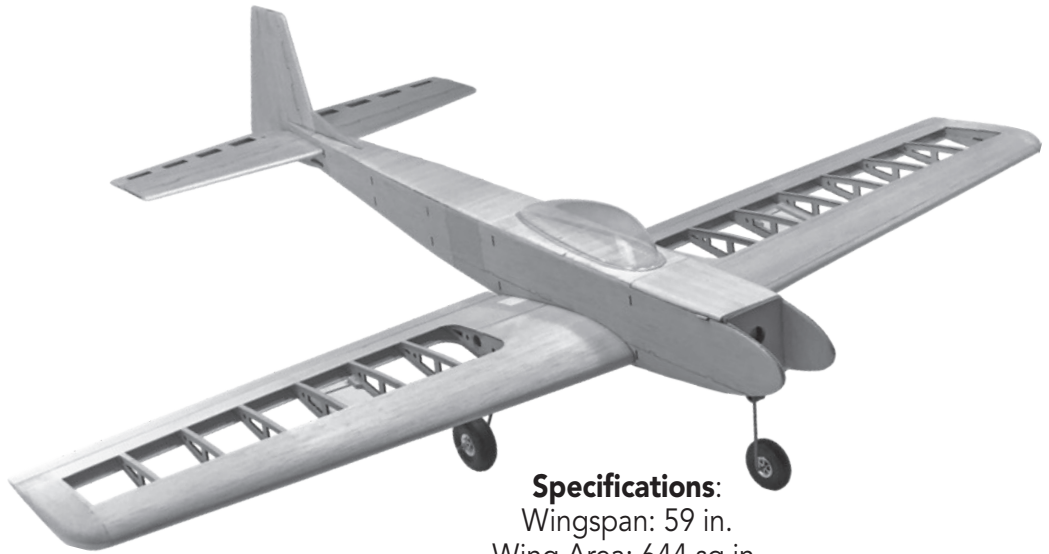


# KARDS



### Specifications:

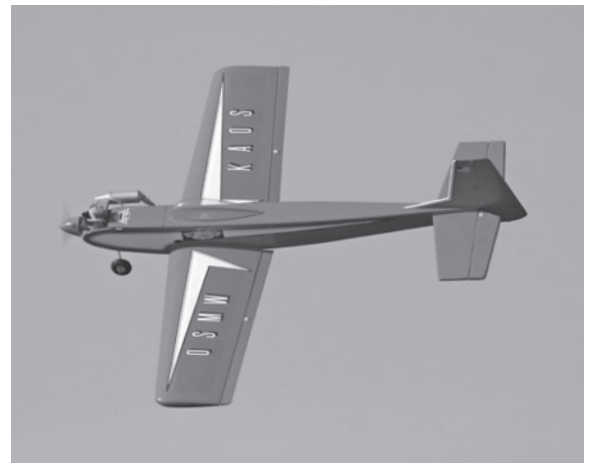
Wingspan: 59 in.  
Wing Area: 644 sq in.  
Airframe Length: 55.3 in.  
Weight: 6.5 - 8 lb.

### Using the Manual

Be sure to read each step thoroughly before you start the step. Test-fit the parts together to make sure they fit properly. If necessary trim to fit.

Beside each step you will notice a check box (or two). These are so you can keep track of your progress while building your kit. For steps that have two boxes, as in the construction of the left and right wing halves, these steps must be performed two times.

- Your **Old School Model Works** aircraft should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, this model, if not assembled and operated correctly, could possibly cause injury to yourself or spectators, and damage to property.
- You must assemble this model according to the instructions. Do not alter or modify this model, as doing so may result in an unsafe or un-flyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
- You must take time to build straight, true and strong.
- You must use a R/C radio system that is in first-class condition, a correctly sized power system and components (electronics, batteries, wheels, etc.) throughout the building process.
- You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air. (Installation shown in the manual is a suggestion. You may have to adjust the mounting steps to accommodate the size of your radio equipment.)
- You must check the operation of the model before every flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.



- If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.
- While this kit has been flight tested to exceed normal use, if this model will be used for extremely high stress flying, such as racing, or if a power system larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

**Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.**



[www.oldschoolmodels.com](http://www.oldschoolmodels.com)

## CONSTRUCTION MANUAL

# WARNING

**READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT WARNINGS AND INSTRUCTIONS CONCERNING THE CONSTRUCTION AND USE OF THIS MODEL.**

**A Radio-Controlled aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio, powerplant, electronics and batteries.**

- Inspect your model before every flight to ensure it is airworthy.
- Be aware of any other radio frequency user who may present an interference problem.
- Always be courteous and respectful of other users in your selected flight area.
- Choose an area clear of obstacles and large enough to safely accommodate your flying activity.
- Make sure this area is clear of friends and spectators prior to launching your aircraft.
- Be aware of other activities in the vicinity of your flight path that could cause potential conflict.
- Carefully plan your flight path prior to launch.
- Abide by any and all established AMA National Model Aircraft Safety Codes.

**IMPORTANT!!!** Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## INCLUDED ITEMS

### Wood parts included in this kit:

- 2 - LP1 - laser cut 1/8" x 6 x 24 sheet
- 2 - LP2 - laser cut 1/8" x 6 x 24 sheet
- 1 - LP3 - laser cut 1/8" x 6 x 24 sheet
- 1 - LP4 - laser cut 1/8" x 6 x 24 sheet
- 1 - LP5 - laser cut 1/8" x 6 x 24 sheet
- 1 - LP6 - laser cut 1/8" x 6 x 24 sheet
- 1 - LP7 - laser cut 1/16" x 3 x 4 sheet
- 1 - BP1 - laser cut 1/8" x 4 x 24 balsa
- 1 - BP2 - laser cut 1/8" x 4 x 24 balsa
- 2 - BP3 - laser cut 1/8" x 4 x 24 balsa
- 2 - BP4 - laser cut 1/8" x 4 x 24 balsa
- 2 - BP5 - laser cut 1/8" x 4 x 24 balsa
- 2 - BP6 - laser cut 1/8" x 4 x 24 balsa
- 2 - BP7 - laser cut 1/4" x 4 x 24 balsa
- 4 - BP8 - laser cut 1/16" x 4 x 24 balsa
- 2 - BP9 - laser cut 1/16" x 4 x 24 balsa
- 2 - BP10 - laser cut 1/16" x 4 x 24 balsa
- 2 - BP11 - laser cut 1/16" x 4 x 24 balsa
- 2 - BP12 - laser cut 1/16" x 4 x 24 balsa
- 5 - 1/16" x 4 x 36 balsa sheet
- 2-1/2 - 1/8" x 4 x 24 balsa sheet
- 2 - 1/2" x 1/2" x 36" balsa strips
- 3 - 1/4" x 1/2" x 36" balsa strips
- 4 - 1/4" x 1/4" x 36" balsa strips
- 5 - 1/8" x 1/8" x 36" basswood strips
- 4 - 1/4" x 1/4" x 36" basswood strips
- 2.5 - 5/16" x 1-1/4" x 36" tapered balsa strips
- 2 - 1/4" x 36" wooden dowels
- 1 - 1/4" ply firewall
- 1 - 1/4" ply dihedral brace

### Hardware parts included in this kit:

- 12 - magnets
- 2 - pre-bent main gear wires
- 1 - nose gear assembly

- 1 - Tail skid wire
- C/A type hinges for control surfaces
- 4 - control horns
- 2 - wheel collars 5/32" I.D.
- 4 - plastic gear straps
- 2 - 1/4"-20 wing bolts
- 8 - 2-56 x 1/2" machine screws
- 2 - 2-56 x 3/4" machine screws
- 20 - 2-56 x 3/4" self tapping screws
- 1 - pre-bent elevator joiner

### Other items included in this kit:

- 3 - Rolled plans (fuselage and wing)
- 1 - Construction Manual

## ITEMS NEEDED

### Hardware needed (not included in the kit)

For some of these items there is more than one option which will require a bit of decision making ahead of time. There isn't a right or a wrong choice, so choose the items that work best for you.

We strongly recommended supporting your local hobby shop.

- Powerplant: .61 sized 2-stroke glow engine (or similar electric system)
- Propeller
- Engine/Motor mount and mounting hardware
- 10 ounce Fuel Tank and fuel tubing
- Receiver - (4 channel minimum)
- 4 servos (electric) or 5 servos (if glow) - we recommend standard servos all around, although you can use a smaller servo on the throttle, if using glow power).
- "Y" servo harness (for ailerons)
- Pushrods (two 5" for ailerons, two 32" for elevator & rudder, one 14" for nose gear steering, one 10" for throttle if glow.)
- Clevises for the pushrods.
- Wheels: one 2-1/2" for nose, two 2-3/4" for mains.
- Covering

## Additional Required Building Tools and Adhesives

- Drill & assorted drill bits
- Hobby knife and #10 blades
- Sandpaper: coarse (80 or 100 grit) & medium (150-200 grit)
- Pencil or pen
- Ruler
- T-Pins
- Waxed paper
- Building board
- 2-part epoxy (6 or 15 minute)
- Epoxy brushes and mixing sticks
- Wood adhesives of your choice. We use medium CA (cyanoacrylate) viscosities, but aliphatic resin and/or carpenter's glues will work just as well and give longer working time.
- Thin CA for attaching the included hinges

Although an easy to build kit, our Kaos 60 kit is not for the novice builder. We are assuming the builder is used to constructing balsa kits and has the techniques and skills necessary to do so.

Closely inspect the supplied laser cut parts for damage. If you find any damaged or missing parts, contact us immediately.

When removing the laser cut parts from their sheets, you'll notice the parts are held in place by several small "tabs". These tabs are uncut pieces of wood and can sometimes make it difficult to remove a part. Rather than breaking and/or splintering the wood by forcing out the part, we recommend removing any laser cut parts from their sheets by using a hobby knife with a #10 blade. A quick cut of the tab will allow the piece to be removed with no damage. Sand any tab remainders flush with the part so there will be no problem aligning them later.

It's best to not remove parts from their sheets until they are needed. Refer to Appendix A of this manual as a reference to what all the laser cut parts look like and are called.

You'll notice a check box next to each step. Check these off as you go along so you don't miss a step. Note that some steps (in building the wing) have two boxes - this means that the step will be done twice - once for each wing half.

There could be a step or two which leaves you a bit puzzled. If this happens, step back and study the photo(s) for that step - both in this manual and online.

All photos shown in this manual are of different Kaos 60 prototypes. Several pieces may have changed slightly with improvements we've made so parts may look a little different in some steps.

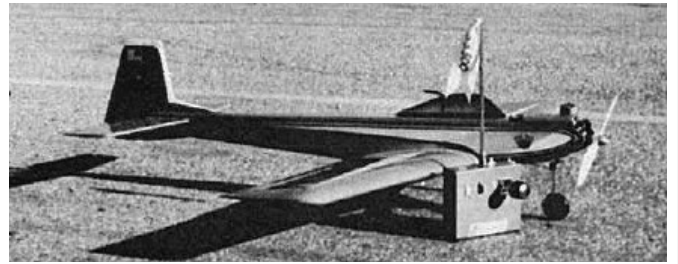
### Online Supplementary Photos

We realize that the smaller black-and-white photos in this manual might not show some of the steps as clearly as you might want. So we've anticipated this and made these photos available on our website. You can either scan the QR code or type this address into your browser:



[www.oldschoolmodels.com/mpics/ka60/](http://www.oldschoolmodels.com/mpics/ka60/)

## A FEW THOUGHTS BEFORE YOU START.



*We all have a top 10 list of models that were cornerstones of our hobby in some way. For me, the original Bridi Kaos 60 is a part of that list.*

*I've flown several versions including scratch-built originals, modified versions, and even the ARF version.*

*For me, the original always was the one I came back to because of its undeniable lines and great flying characteristics.*

*So what I've tried to do with our release of the Kaos is to duplicate Joe's original as close as possible. It's the same outline, same airfoil, same wing incidence, same down-thrust, same right-thrust, etc. The only thing I couldn't match was the exact curvature of the canopy, but the included canopy from SIG is a pretty good substitute to my eyes.*

*My changes are on the inside - updating the internals with laser-cutting, making it easier to build an accurate model than ever before.*

*But in addition to all that, I'm absolutely thrilled with the way our Kaos flies. I'd love to take credit, but I merely followed the road map that Joe drew up for us all to follow.*

*I wonder when Joe introduced his Kaos in the February 1970 issue of RCM Magazine, he could have imagined the legendary status it would earn. Well done Mr. Bridi - well done!*

*One last thing. The Kaos is NOT a 3D design, and it should NEVER be seen hovering!*

*It was designed for pattern competition (or vintage pattern as it's now known. And while we're on the subject, it's a legal design for SPA and VRCS competition and events.*

*I hope you enjoy our Kaos - both in the way it builds and the way it flies.*

*Mark Lanterman,  
Owner, Old School Model Works.*

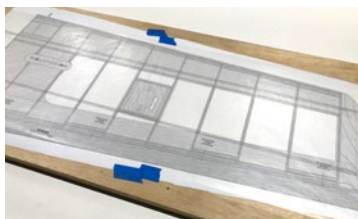


**IT IS VERY IMPORTANT THAT YOU ASSEMBLE THE KAOS 60 KIT IN THE ORDER DESCRIBED. SKIPPING FORWARD IN THE STEPS COULD LEAVE YOU WITHOUT THE PROPER LENGTHS OF WOOD TO FINISH THE KIT. WE'VE INCLUDED ENOUGH WOOD TO EASILY COMPLETE THIS KIT, BUT YOU MUST TAKE CARE TO PROPERLY MEASURE AND NOT WASTE WOOD WHEN CUTTING.**

**Let's begin construction by working on the starboard (right) wing of your Kaos 60.**

**Prepare your work area**

You'll need a flat building surface that is a minimum of 36" long. Position the starboard wing plan over the surface and tape into position. Tear off a length of waxed paper long enough to cover the right wing plan and tape that into position, over the plan.



**Step 1 - Alignment triangles**

Pre-cut into LP4 are three triangles. Two are 90° angles, one inside the other. The third is only used when aligning the wing's root rib. It's clearly marked as such so don't worry about that one for now.

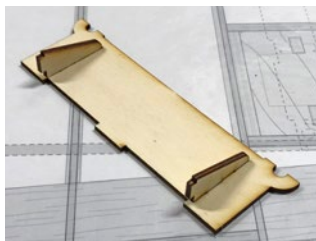


However, punch out the two 90° triangles as those can be used to vertically align any of the parts in the construction of your Kaos. LP4 also includes foot pieces that can be used with the triangles to hold both triangles vertical hands-free.

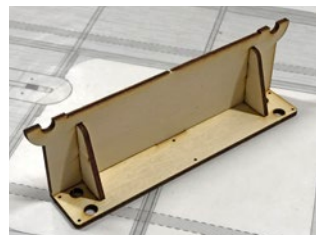
**Step 2 - Wing Assembly (J2 end jig)**

Locate both J1s and J2s from LP2, and four J5's located in LP1, LP2 and LP5.

Glue two J5's into J2 as shown here.



Then glue J1 to this assembly to complete one of the wing's J2 end jigs. Make sure the pieces are firmly pushed together to make a 90° bracket.



Now do the same to complete the other J2 end jig.

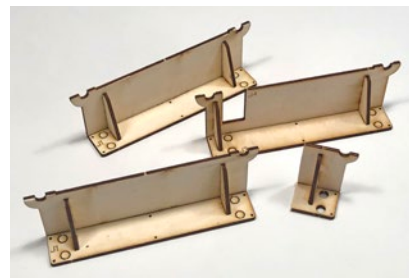
**Step 3 - Wing Assembly (J4 & J6 jigs)**

Locate J3 and J4 from LP3, J6 and J7 from LP5, and three J5's located in LP1, LP2 and LP5.

Glue two J5's into J4, then glue J3 to this assembly to complete one of the wing's J2 center jigs. Make sure the pieces are firmly pushed together to make a 90° bracket.

Now do the same to complete the other shorter J6 center jig.

When finished you should have 4 jigs which look like these.



These wing jig supports are designed to be used on two types of building boards. If you use a traditional board (where you use pins to hold things in place) use thumbtacks through the tiny pre-cut holes to hold them in place.

For magnetic boards, pop-out the pre-cut circles, and use the included magnets. Note - there are 12 magnets included in your Kaos. Since you'll use the three larger jigs first, push the magnets into those first - BUT DON'T GLUE THEM IN PLACE. The undercutting of the circles should provide more than enough friction stay in place. Plus, you'll be re-purposing some of these magnets later on in the build.

Lastly, wick some thin C/A into the "cupped" areas in the top of each of these mounts. THIS IS VERY IMPORTANT! When these are used in the upcoming steps, they are designed so the 1/4" dowels will have a slight "snap" to help lock them in place. Without wicking in thin C/A to harden these areas, they could splinter when removing the dowels.



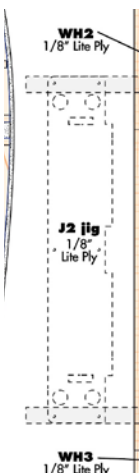
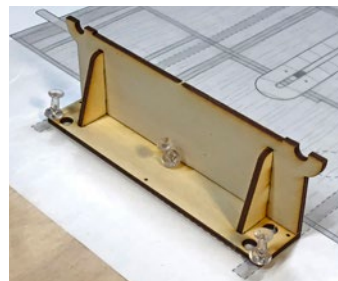
**Step 4 - Wing Assembly (dowels)**

Locate both 1/4" x 36" long dowels. Trim 4" off each dowel and set these shorter pieces aside. They'll be used as the wing-hold dowels later on in the construction.



**Step 5 - Wing Assembly (position jig supports)**

Place the jig supports in position over the wing plan. There are three spots which are noted by a dotted line on the plan. The two J2 jigs are placed on the ends, with their flat surface facing the ribs. The center J4 jig is placed mid-way, and make sure that the large cutout is positioned towards the wing's leading edge.

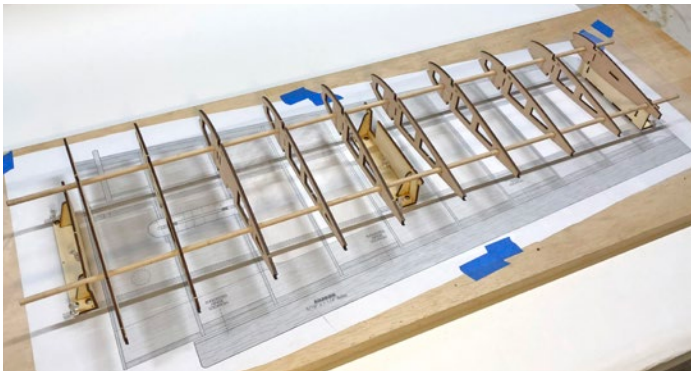


Note that the placement of the outer J2 jig will be up-against the R10 rib, as shown on the plans.

**Step 6 - Wing Assembly (position ribs)**

Locate one set of ribs - R1 through R10. R1 and R2 are on LP1, and the others are on BP3 and BP4.

Push these onto the front and the rear jig dowels. Make sure you slide them on in numerical order, and pay attention to their orientation. The etched rib number should be at the top when properly placed. Group the R1-R5 ribs together on the left side



and the R6-R10 to the right side of the middle jig. Now, snap the dowels on to the jig supports. Then carefully space the ribs apart, to their proper locations as shown in the photo.

### □ □ Step 7 - Wing Assembly (R10 & SW9)

Locate one SW9 from BP11. Note that this has an engraved circle, as do all of the sheer web pieces. This circle designates the top and should also be positioned towards the root rib (R1).



Glue SW9 to R10, making sure SW9's tab is completely pushed into the corresponding slot in R10. Also make sure the outer edge of SW9 contacts R10 along its entire height. Hold this away from the J2 jig until the glue cures. Once cured, then push R10 against J2.

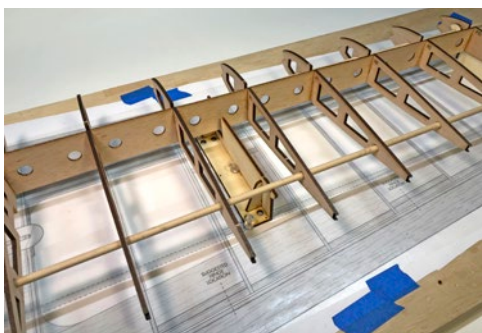
To help hold R10 (and any of the other ribs) in place, there's a bunch of J8's cut into LP1. Wick thin C/A into any of these you use first, then snap them on to the dowel and use them as a "stop".



### □ □ Step 8 - Wing Assembly (SW3-SW8)

Locate one set of SW3-SW8 sheer webs from BP13.

Starting with R9, you will attach each of the appropriate SW pieces (as noted on the plans) and glue them together as shown here. You can



either do one at a time, or position everything in place, then glue everything together at once.

Regardless of how you do it, make sure all of the SW circles are positioned properly and their tabs are completely inserted into the each rib's tab cutout before gluing. Also make sure that ribs are aligned to the plan (remember to use the triangles we talked about in step 1).

Even small errors here can multiply as you go along the wing and causing larger and larger misalignments as you move further along the wing.

### □ □ Step 9 - Wing Assembly (SW2)

Locate two SW2s from LP1 and LP2. These are installed the same way as the previous SW pieces, just doing it twice.

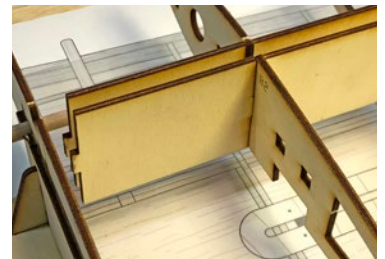


You are paying attention to where those etched SW circles are, right?

Also - take care not to get any extra glue in the space between the SW2 pieces (and the SW1s in the following steps). Any extra will have to be filed away later on when fitting the dihedral brace, keep this area as clean as possible.

### □ □ Step 10 - Wing Assembly (SW1)

Locate two SW1s from LP2. These are installed slightly differently as they are only glued to R2 at this time. You can push them into R1 to help position them, but don't glue them to R1. Don't do it. Trust me - it's better this way.



### □ □ Step 11 - Wing Assembly (WH1 & WH2)

Locate one WH1 and one WH2 from LP1. These have circles as well, showing upright and the edge that will be against R1. Glue these in position to R2, but again - not to R1. Trust me - this will all make sense in a couple more steps.



### □ □ Step 12 - Wing Assembly (WH3 & WH4)

Locate one WH3 and one WH4 from LP1. These also have circles and you should know the drill by now. Pay attention to the orientation, then glue them to R2, but not R1.

### □ □ Step 13 - Wing Assembly (R1)

Back in step 1 I mentioned the root rib triangle. Well, now it's time to use it.

Take some time with this step as you need everything aligned, but also you need R1 straight down its entire length. *Epoxy, or slower curing glue is recommended for this as there are several pieces being attached in succession.*



Starting at the leading edge, start gluing and inserting the tabs from the WH pieces the SWs and the remaining WH pieces into R1. When they're all properly seated into R1, R1 should be at a 2° angle. And you can verify this with the root triangle. Measure in several places, all the way along its length. And at the same time,

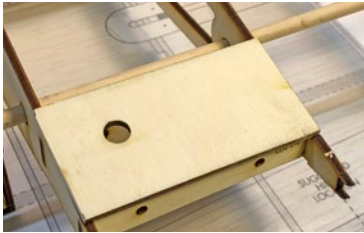


R1 needs to be flat along its entire length - from leading to trailing edge. Any warps or twists you build in now will make it harder to properly join the wing halves later on.

#### □ □ Step 14 - Wing Assembly (WH6)

Locate one WH6 from LP1. This fits into the pre-cut grooves on the rear portion of the R1 and R2 ribs.

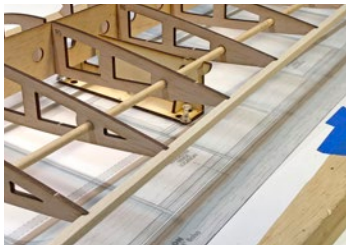
Again, this has the engraved circle that should be up against the root rib and closer to the leading edge. This will position the pre-cut circle to the left and slightly above the centerline of WH6, as shown here. Glue this to the ribs and to the WH3 and WH4 pieces already installed.



#### □ □ Step 15 - Wing Assembly (trailing edge)

Locate one length of 1/4" square x 36" square balsa stick. This is used as the trailing edge. Measure and cut it to length, giving yourself a 1/4" or so extra on each end, and make sure you also include the wing's tip when making the measurement.

Start at one end and glue the trailing edge to each rib, making sure it is completely seated in each rib's rear cutout. Do a little at a time, making sure that the ribs are properly positioned (Don't be afraid to use one of those 90° triangles - that's why we included them.)

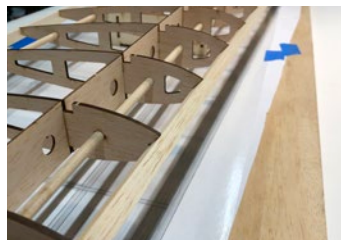


#### □ □ Step 16 - Wing Assembly (leading edge)

Locate one length of 1/2" square x 36" square balsa stick. This is used as the leading edge.

Using the same technique you just used for the trailing edge, cut and glue the leading edge in place, making sure it's completely seated in the notches in each rib.

Start at one end, do a little at a time and work your way to the other end. Make sure that the ribs are properly positioned (Yup, use that 90° triangle.)



#### □ □ Step 17 - Wing Assembly (top spar)

Locate one length of 1/4" square x 36" square basswood stick. Measure and cut it to length, giving yourself a 1/4" or so extra on each end.

This is used as the top spar and will fit into the top cutout of each rib. It is STRONGLY recommended that you test fit this first. You might have to sand here and there, as well as wiggle the basswood to get it to fit into the slots. It is a tight fit. Once you're satisfied with how it fits, remove it, then glue it in position to each rib, and to where it contacts the upper portions



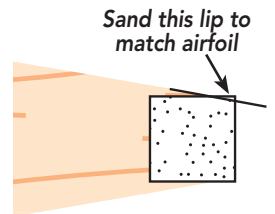
of SW1 and SW2.

Make sure it is completely seated in the slot of each rib. Use care when pushing down - sometime it's better to reach underneath the ribs and use more of a pinch to seat the spar in places.

#### □ □ Step 18 - Wing Assembly (sand trailing edge)

You'll now need to very lightly sand the trailing edge. Refer to this diagram to show what I'm on about.

The trailing edge needs a little sanded off the rear edge so it will continue the airfoil shape.

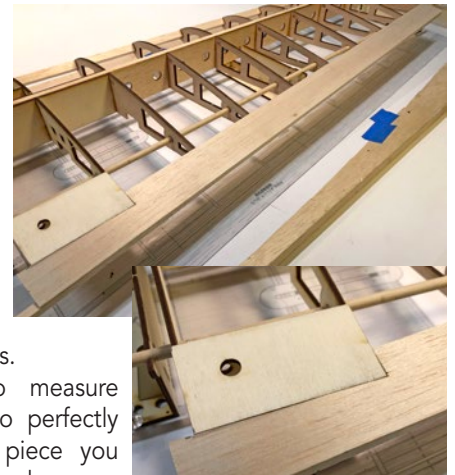


#### □ □ Step 19 - Wing Assembly (trailing edge sheeting)

Locate one of the 1/16" x 4" x 36" sheets of uncut balsa.

First you'll cut this sheet to length - roughly 28-1/2" long. Then you'll need to cut two lengths of sheeting 1-3/4" wide. One is used now, the other will be used when sheeting underside in a few steps.

Now you'll need to measure and cutout a notch to perfectly fit around the WH6 piece you installed earlier. Remember you can always take wood off, but it's tricky to put back on, so take your time and "sneak up" on it, little by little until you have a good fit. When satisfied, glue this sheeting to each of the ribs, the trailing edge and where it contacts WH6.



#### □ □ Step 20 - Wing Assembly (leading edge sheeting)

Locate another 1/16" x 4" x 36" sheet of uncut balsa.

Again, cut this sheet to length - roughly 28-1/2" long. Then you'll need to measure and cut the angle needed for this piece of sheeting.

It will need to butt-up against the leading edge and wrap around to roughly 1/2-way covering the top spar. This is a straight taper, so take your time, measure, measure, measure, double-check, then only when happy - it's time to cut. As the sheeting we get can vary in density, you might have to apply a bit of Windex® glass cleaner to loosen up the grain. Soak the outer side of the wood to expand the fibers. Now hold it to curvature needed, then use a hair dryer or covering heat-gun to help "set" the balsa's bend as it dries. Once dry, then you can glue it in position.

Glue it to the leading edge first, then to each of the ribs and finally to the top spar.



### □ □ Step 21 - Wing Assembly (WS1 & WS2)

Locate one WS1 and one WS2 from BP11. These are used for the center sheeting, between the leading and trailing edges.

Note that they are both purposely made a little long, so you'll need to trim them to get a perfect fit.

Also note that the outer (curved) edges of these pieces will overlap R3 by approximately a 1/8" as noted on the plans.

Start with WS2, measuring and notching around WH6 for a perfect fit. When satisfied with the fit, temporarily tape it to the trailing edge to hold it in position.

Now work with WS1, measuring and cutting as necessary to perfectly fit between the back of the leading edge sheeting, and the front of WS2.

When satisfied with how it all looks, remove the pieces, the tape and then glue these sheets in position. Make sure they are glued to all the ribs, to the top spar, WH6 and where they touch the leading and trailing edge sheeting. It should all be one smooth sheet that follows the airfoil shape of the wing.



### □ □ Step 22 - Wing Assembly (top cap strips)

Cut into BP11 and BP12 are a bunch of 1/4" strips. These are cap strips and should be applied to the top of each of the exposed ribs (R4 - R10).

As there are two lengths of pre-cut strips, use the shortest one that's appropriate for each rib. Each strip should be centered on the rib and run from the rear of the leading edge sheeting to the front of the trailing edge sheeting. Measure, cut, and glue each strip in position.

When you get to R10, the strip should be positioned so it's flush with R10's outer edge.



### □ □ Step 23 - Wing Assembly (flip the wing over)

Once all the glue has cured from the previous step, it's time to work on the other side. To flip the wing over, carefully apply a touch of upward pressure where the jig's dowels snap into the J2, and J4 jigs. You should find that the dowels pop out and you're left with an assembly that can be flipped over.

Before popping the dowels back into the jigs, you'll need to remove the center J4 jig. Once you've snapped the dowels back in place, you can find the shorter



J6 jig you made. This should be used to support the rear dowel, about half-way along the wing's length.

Also remove any/all of the J8 clips you might have used to hold ribs in place. If you don't remove those now, some could get trapped inside the wing after sheeting is applied.



### □ □ Step 24 - Wing Assembly (R2A & R3A)

Locate one R2A and one R3A from LP1.

This is glued to the outer sides of R2 and R3 respectively, making sure the cutouts are aligned as shown in this photo.



### □ □ Step 25 - Wing Assembly (R2A & R3A)

Locate one WH5A and one WH5B from LP1.

These are glued in between the WH3 and WH4 pieces already installed, and they should be right up against the pre-cut hole.

WH5A is on the inner side, WH5B on the outer side.



### □ □ Step 26 - Wing Assembly (WH7)

Locate one WH7 from LP1.

This fits into the pre-cut grooves on the rear portion of the R1 and R2 ribs.

Again, this has the engraved circle that should be up against the root rib and closer to the leading edge. This will position the pre-cut circle towards the root rib, as shown here. Glue WH7 to the ribs and to the WH3 and WH4 pieces already installed.



### □ □ Step 27 - Wing Assembly (MG3)

Locate two MG3s from LP1.

These are glued one on top of the other, then this assembly is glued into the square cutouts of R2/R2A.

Push it in from the R2 side and use epoxy for this step.

Take care to keep the pre-cut circle clear of glue. The main gear wire will extend into this piece in the next few steps.



### □ □ Step 28 - Wing Assembly (MG1)

Locate four MG1s from LP1 and LP2. Also locate one of the pre-bent main gear wires.

The MG1s are glued on top of each other to form a large, thick



piece that serves as the main gear support.

It is strongly recommended that epoxy be used for this step to give added strength.

Clamp the pieces together while they dry, and you can guarantee a good alignment by slipping the end of the main gear wire through the cutouts as shown here. Just make sure you don't glue the wire in place - that won't be a good thing.

When the glue is cured, lightly sand the edges and make sure that the hole remained clear. If not, carefully run a 5/32 drill through the hole to clear things out.



### □ □ Step 29 - Wing Assembly (MG2)

Locate one MG2 from LP1. This is glued to the top of the MG1 assembly from the last step.

When the glue has cured, carefully cut a radius where the gear will pass from the groove into the pre-cut hole as shown here.



### □ □ Step 30 - Wing Assembly (MG assembly)

Now the MG assembly is glued in place. To make sure this works as planned, dry fit this first, and sand as necessary. Also you can use the main gear to aid in alignment again, making sure that the MG assembly is properly aligned with the MG3 assembly already in place.



Make sure this assembly is properly glued to both ribs, as well as the R2A and R3A pieces.

### □ □ Step 31 - Wing Assembly (hinge supports)

On the plans are 4 suggested locations for hinges. Use some scrap 1/4" square balsa to add extra material to support the hinges. Glue these to the inside of the trailing edge stock in those spots.



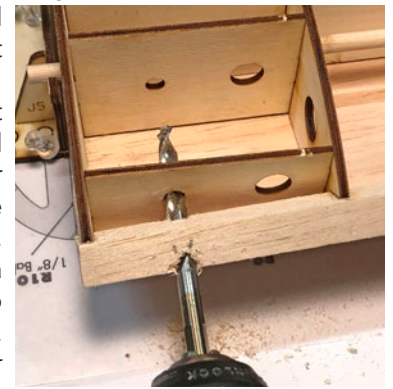
### □ □ Step 32 - Wing Assembly (sand trailing edge)

Just as you did on the top side, you need to very lightly sand the trailing edge so it will continue the airfoil shape.

### □ □ Step 33 - Wing Assembly (dowels)

Now it's time to mark and drill the leading edge to accept the wing hold dowel.

Using the two 1/4" pre-cut holes in WH1 and WH2, drill a small pilot hole in the center of leading edge. It should be in line with those two holes. Enlarge the holes with a reamer, or by stepping up to a 3/16" drill, then to a 1/4". Take it slow and remember that thing about it being easier to remove wood than put it back on.



### □ □ Step 34 - Wing Assembly (dowels)

Remember those two short lengths of 1/4" dowel you cut way back at the start? Time to find one of them.

Round the ends of each one either by hand, or do it like I do - chuck it up in a drill spin it like a little lathe. Use sandpaper to quickly round off one end, then the other.



Once rounded off, insert the dowel into the leading edge, through WH1 and WH2 and butting up against the jig dowel. You should have roughly 1/2" to 5/8" dowel protruding from the leading edge as shown here. Glue the dowel in place on the back of the leading edge, to WH1 and WH2. But not to the jig dowel as that would create a big problem.



### □ □ Step 35 - Wing Assembly (R2)

Now it's time to cut-away the center of R2. Here are the before and after photos to help show what needs to be done.

Make sure that the area is completely clean and smooth, as later on this will be a channel where the dihedral brace will slide through. The cleaner it is now, the easier it will be to slide in the brace when it's time.



Before cutting

After cutting

Take your time and use a gentle touch in this step as you don't want to cut more than you should, nor do you want to damage the shear webs in these spots as it could weaken the wing or cause a misalignment.



### Step 36 - Wing Assembly (bottom spar)

Locate one length of 1/4" x 36" square basswood stick. Measure and cut it to length, giving yourself a 1/4" or so extra on each end.

This is used as the bottom spar and will fit into the top cutout of each rib. It is STRONGLY recommended that you dry fit this first. You might have to sand here and there, as well as wiggle the basswood to get it to fit into the slots. It is a tight fit.

Once you're satisfied with how it fits, remove it, then glue it in position to each rib, and to where it contacts the upper portions of SW1 and SW2.

Make sure it is completely seated in the slot of each rib. Use care when pushing down - sometime it's better to reach underneath the ribs and use more of a pinch to seat the spar in places.



### Step 37 - Wing Assembly (trailing edge sheeting)

Locate the length of 1/16" sheeting you cut to a 1-3/4" width back when sheeting the top of the wing.

Now you'll use the same techniques to fit the trailing edge sheeting to the bottom surface. Measure and cutout a notch to perfectly fit around the WH7 piece you installed earlier. Remember you can always take wood off, but it's tricky to put back on, so take your time and "sneak up" on it, little by little until you have a good fit. When satisfied, glue this strip to each of the ribs, the trailing edge and where it contacts WH7.

### Step 38 - Wing Assembly (leading edge sheeting)

Locate another 1/16" x 4" x 36" sheet of uncut balsa.

Again, cut this sheet to length - roughly 28-1/2" long. Then you'll need to measure and cut the angle needed to for this piece of sheeting.

It will need butt-up against the leading edge and wrap around to roughly 1/2-way covering the top spar. This is a straight taper, so take your time, measure, measure, measure, double-check, then only when happy - it's time to cut.

As the sheeting we get can vary in density, you might have to apply a bit of Windex® glass cleaner to loosen up the grain. Soak the outer side of the wood to expand the fibers. Now hold it to curvature needed, then use a hair dryer or covering heat-gun to help "set" the balsa's bend as it dries. Once dry, the you can glue it in position.

Glue it to the leading edge first, then to each of the ribs and finally to the top spar.

### Step 39 - Wing Assembly (center sheeting)

Locate WS3 and WS4 from BP12.

Just as you did with the top side, you'll cut and glue this in place to form the center sheeting.

Again, these pieces are both purposely made a little long, so you'll need to trim them to get a perfect fit.

Also note that the outer (curved) edges of these pieces will overlap R3 by approximately a 1/8" as



noted on the plans.

Start with WS3, measuring and notching around WH7 for a perfect fit. When satisfied with the fit, temporarily tape it to the trailing edge to hold it in position.

Now work with WS4, measuring and cutting as necessary to perfectly fit between the back of the leading edge sheeting, and the front of WS4.

Also you'll see that WS4 has a cutout for the main gear and the gear's mounting straps. Make sure these are properly lined up as shown here.

When satisfied with how it all looks, remove the pieces, the tape and then glue these sheets in position. Make sure they are glued to all the ribs, to the top spar, WH7 and where they touch the leading and trailing edge sheeting. It should all be one smooth sheet that follows the airfoil shape of the wing.



### Step 40 - Wing Assembly (cap strips)

Just as you did on the top side, it's time to install the cap strips from BP11 and BP12 on the exposed ribs.



### Step 41 - Wing Assembly (remove jig dowels)

Now it's time to free the wing from the jig assembly. Easily pop the dowels from the J2, J4 and J6 supports. Then you should be able to slide the dowels out of the wing half.

If you've been a touch careless with your glue and managed to glue the dowel to one of the ribs, usually you can free the dowel by grabbing one of the exposed ends with a pair of pliers, then rotating it slightly to pop loose the glue joint.

### Step 42 - Wing Assembly (sand R10)

Grab your sanding block and it's time to true up the end of the wing. Carefully sand away any excess sheeting, leading and trailing edge stock or any of the spar that protrudes past R10.

It should be a smooth, flush surface.

### Step 43 - Wing Assembly (T1)

Locate one of the T1s from LP2.

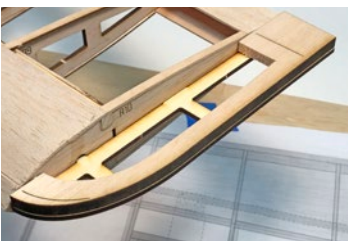
The tabs in T1 are pushed into the two dowel holes and the center cutout of R10.

Glue this in place, making sure it is held perfectly perpendicular to the surface of R10.



### Step 44 - Wing Assembly (T2)

Locate two of the T2s from BP7. Although the pieces are identical, there is a top and bottom and you can tell those by the etched guidelines. When glued in place on both sides of T1, the guidelines should be visible to aid in the installation



of the T3s in the next step. Glue one T2 to each side of T1.

#### **Step 45 - Wing Assembly (T3)**

Locate two of the T3s from BP7. The pieces are also identical, but again there is a top and bottom and you can tell those by the etched guidelines. When glued in place on the T2s, the guidelines should be visible to aid in the installation of the T4s in the next step.



Glue one T3 to each T2.

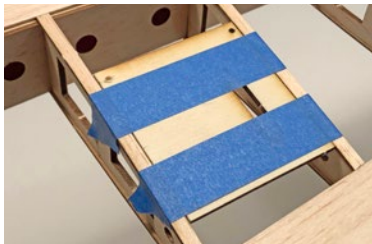
#### **Step 46 - Wing Assembly (T4)**

Locate two of the T4s from BP7. Glue one T4 to each of the T3s to finish the wing tip assembly.



#### **Step 47 - Wing Assembly (SH)**

Locate one of the SH from LP2. Look on the plans for the suggested location of this hatch and tape it position so it's flush with the cap strips on the bottom of the wing. (I guess you could make it flush with the cap strips on the top of the wing, but who mounts a servo to stick out the top of the wing? Let's just do it on the bottom.)



#### **Step 48 - Wing Assembly (SH)**

Cut four 3-1/2" and eight 3/4" pieces of basswood from the left-over 1/4" square you used for the spars. Glue one 3/4" piece to each end of a 3-1/2" piece together to double up their thickness, and to the same for the other pair.



Flip the wing over and lay one strip up against the ribs on each side of the SH as shown here. Center them along the edge so there's a little overhang on each end.

Tack these basswood pieces in place to the ribs, but not to the SH.

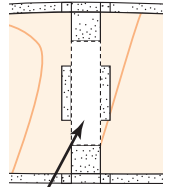
#### **Step 49 - Wing Assembly (SH2)**

Locate two SH2s from LP2. Now flip the wing back over and tack these SH2 pieces to complete the framing of the servo hatch as shown here. Remove SH, and then glue the basswood and SH2 pieces more permanently in place.



#### **Step 50 - Wing Assembly (R1 cutout)**

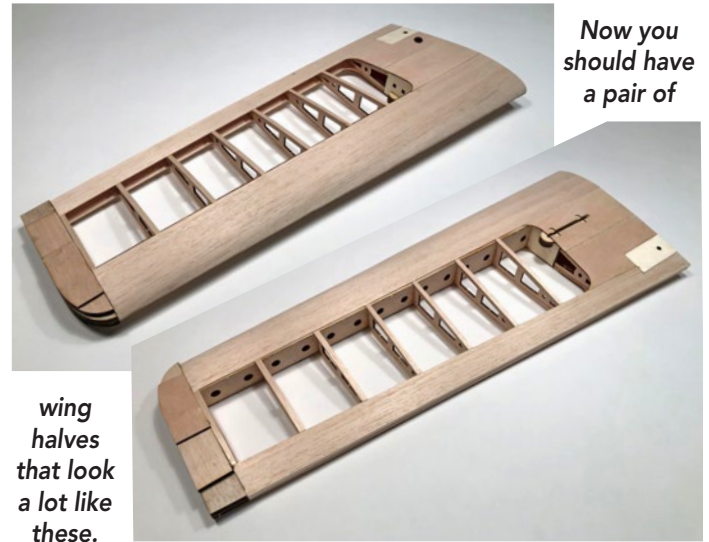
Now it's time to open R1 to accept the dihedral brace. Mark and cut open the rectangular area between the upper and lower spars, as well as the front and rear sheer webs. Refer to this drawing as a guide.



Use a rotary tool for the main portion, then a sharp hobby knife for the corners. Take care not to damage the balsa sheer webs or weaken the spars.

*Set the starboard wing half aside and begin work on the port wing half. Tape the port wing plan and fresh wax paper on your board. Then follow steps 4 through 50 to complete the port wing half. Once finished, then move on to step 51.*

**Note that when building the port half that many of the parts will need to be glued to the opposite side (the sheer webs, for instance). Always refer to the plans to make sure you're gluing the parts together in the correct way.**



#### **Step 51 - Wing Assembly (join the wing halves)**

Time to get to sanding again. This time, it's truing up the root ribs - R1 on both wing halves. A large, flat sanding block is best for this as you'll need the surface to be completely flat and free of any extra sheeting, balsa or basswood sticks.

#### **Step 52 - Wing Assembly (dihedral brace)**

Locate the pre-cut 1/4" ply dihedral brace (DB). Note that this is hand cut so there can be slight variances in each one. That being said, they're also slightly undersized to help aid in fitting. There is a possibility that you'll have to sand the surface to "thin" it slightly as each piece of wood is not necessarily uniform thickness.

So take some time test fitting and sanding as necessary to get a good fit in both wing halves. Don't take off too much, too fast. Carefully sand as necessary to make sure everything fits properly and the root ribs in each wing half are touching along their entire length when assembled into a single wing. Take your time and get a good fit that doesn't require a lot of force.

Remember you also will have to file in the boxes build into each wing half. Make sure they're smooth and the brace doesn't catch on any extra glue or protruding R2.



### Step 53 - Wing Assembly (join wing halves)

Test fit the wing halves together one last time and sand as necessary for a good fit.

After test fitting, join the wing halves permanently with 30 minute epoxy. Remove the dihedral brace and apply the epoxy into the pockets in each wing half and also coat the faces of each root rib. Slide all the dihedral brace into one of the wing halves, then slide remaining wing half in place. Using a couple of clamps (or tape), hold wing halves firmly together. Wipe off any excess epoxy and remove the clamps only after the epoxy has fully cured. Remember, any twist in the alignment of the panels cannot be fixed after the epoxy cures and will lead to a poor flying model.

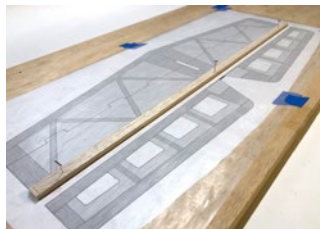
**This completes assembly of the Kaos 60 wings.  
Now it's time to start construction of the tail surfaces.**

### Prepare your work area

Now tape the elevator/stab plan and a fresh piece of waxed paper on your building board.

### Step 54 - Horizontal Stab Assembly (trailing edge)

Locate a 1/4" x 1/2" x 36" balsa strip, measure and cut a piece to form the trailing edge of the horizontal stab as shown on the plans. Pin this piece in position, using a straight edge to make sure it's straight along its entire length.



### Step 55 - Horizontal Stab Assembly (S1)

Locate both S1s from BP1. These are glued to the trailing edge as noted on the plans.

Glue one S1 in place first, then the other S1 on top, making sure they are perfectly aligned.



### Step 56 - Horizontal Stab Assembly (S2)

Locate four S2s from BP1 and BP2. These are glued to the outer edges of the trailing edge, two on each side.

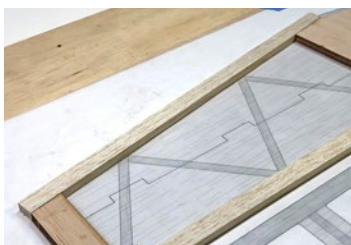
Glue one S2 in place first, then the other S2 on top, making sure they are perfectly aligned.

Then do the same for the opposite end.



### Step 57 - Horizontal Stab Assembly (leading edge)

Next is to cut and install the leading edge pieces. Check your scrap pile to see if you have the proper length first, but if not, use an uncut length of 1/4" x 1/2" x 36" balsa strip. Glue these in position.



### Step 58 - Horizontal Stab Assembly (internal bracing)

Locate a length of 1/4" square balsa stick. Use this to cut the 8 internal brace pieces, 4 on each side. Take some extra time to get the angles correct to help the glue do its job.



Carefully run a sanding block over this framing assembly to make sure it's perfectly flat.

### Step 59 - Horizontal Stab Assembly (outer sheeting)

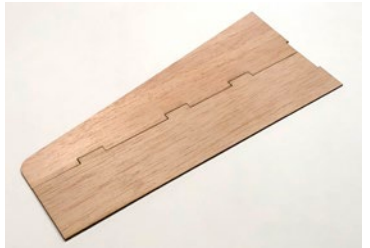
Locate four ES1 and four ES2 from BP8. An ES1 and ES2 are glued together to form a half sheet as shown here.

These pieces will properly only fit together one way.

When edge gluing the sheeting pieces together, first make sure the edges fit first.

When the adhesive is applied, place the sheeting on the waxed paper, so that it's flat (as shown in the photo). Hold it flat with a weight until it's cured to make sure it stays flat. When cured, you'll now have a single piece of sheeting.

Do this 3 more times to create 4 sheeting halves.



### Step 60 - Horizontal Stab Assembly (outer sheeting)

Take two of the sheeting halves from the previous step and glue them to the top of the elevator framing.

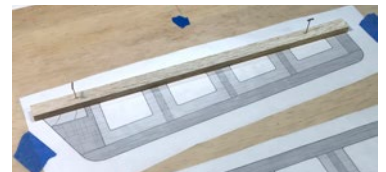
When cured, remove the assembly, flip it over and give the open framework a quick sand just as you did before.

Then apply the remaining two sheeting halves to complete the elevator.



### Step 61 - Elevator Assembly (outer sheeting)

Next is to cut and install the leading edge pieces of the elevator. Check your scrap pile to see if you have the proper lengths first, but if not, use an uncut length of 1/4" x 1/2" x 36" balsa strip. Pin these in position.



### Step 62 - Elevator Assembly (S3)

Locate four S3s from BP1 and BP2. These are glued to the inner edges of the leading edge, two on each side.

Glue one S3 in place first, then the other S3 on top, making sure they are perfectly aligned.

Then do the same for the other elevator half.



**Step 63 - Elevator Assembly (outer edge)**

Using scrap 1/4 x 1/2" balsa, cut and glue the outer tips for each elevator half as shown here.



**Step 64 - Elevator Assembly (outer edge)**

Using 1/4 x 1/2" balsa, cut and glue the trailing edges for each elevator half as shown here.



**Step 65 - Elevator Assembly (inner framing)**

Using 1/4 x 1/4" balsa, cut and glue the inner framing pieces for each elevator half as shown here.



Carefully run a sanding block over each elevator half framing assembly to make sure it's perfectly flat.

**Step 66 - Elevator Assembly (ES3)**

Locate two ES3s from BP10.

Glue one to the top of each elevator half.



**Step 67 - Elevator Assembly (CH1)**

Locate two CH1s from LP7.

Glue one inside the cutout in the ES3 as shown here. And yes, the leading edge of this piece will be a bit shy of the 1/4" x 1/2" balsa when properly positioned. That's so you don't have as much to sand later on.



**Step 68 - Elevator Assembly (ES3 & CH1)**

Remove the elevator half assemblies, flip them over and give the open framework a quick sand just as you did before.

Now locate the other two ES3s from BP10 and the two CH1s from LP7.

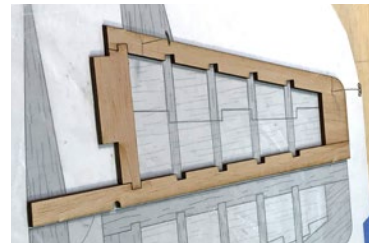
Glue these in place as you did before to complete the elevator halves.

**Prepare your work area**

Now tape the vertical fin/rudder plan and a fresh piece of waxed paper on your building board.

**Step 69 - Vertical Fin Assembly (VF1, VF2 & VF3)**

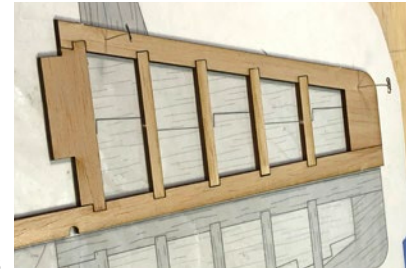
Locate VF1, VF2 and VF3 from BP1 and BP2. Pin VF1 in position, then glue VF3 to VF1. Now glue VF2 to both VF1 and VF3.



**Step 70 - Vertical Fin Assembly (VF7-VF10)**

Locate VF7, VF8, VF9 and VF10 from BP2.

These are glued in position to form the internal bracing of the vertical fin.

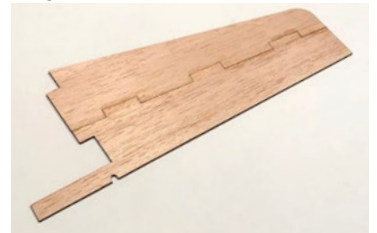


Carefully run a sanding block over the framing assembly to make sure it's perfectly flat.

**Step 71 - Vertical Fin Assembly (FS1 & FS2)**

Locate both FS1s and FS2s from BP9. Just as you did with the horizontal stab sheeting, glue one FS1 and one FS2 together to form a sheet for the vertical fin.

Make 2 of these.



**Step 72 - Vertical Fin Assembly (sheeting)**

Glue one of the sheets from the previous step to the framework. Then remove the assembly, carefully sand it, then glue the other sheet over it to complete the vertical fin.



**Step 73 - Rudder Assembly (VF4, VF5 & VF6)**

Locate VF4, VF5 and VF6 from BP1 and BP2. Pin VF5 in position, then glue VF6 to VF5. Now glue VF4 to both VF5 and VF6.



**Step 74 - Vertical Fin Assembly (VF11-VF14)**

Locate VF11, VF12, VF13 and VF14 from BP2.

These are glued in position to form the internal bracing of the rudder.



Carefully run a sanding block over the framing assembly to make sure it's perfectly flat.

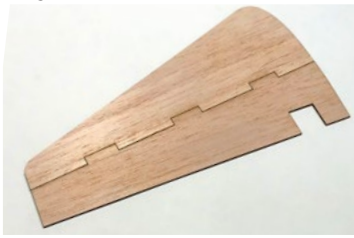


### Step 75 - Vertical Fin Assembly (FS3 & FS4)

Locate both FS3s and FS4s from BP9.

Just as you did with the vertical fin sheeting, glue one FS3 and one FS4 together to form a sheet for the rudder.

Make 2 of these.



### Step 76 - Rudder Assembly (sheeting)

Glue one of the sheets from the previous step to the rudder framework.

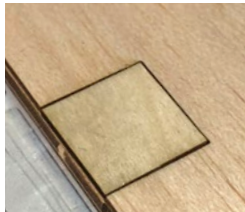
Then remove the assembly, carefully sand it, then glue the other sheet over it to complete the rudder.



### Step 77 - Elevator Assembly (CH2)

Locate two CH2s from LP7.

Glue one inside the cutout in the rudder sheeting as shown here, then flip the rudder over and do the same on the other side.



**This completes assembly of the Kaos tail surfaces.  
Now it's time to start construction of the fuselage.**

### Prepare your work area

Now a fresh piece of waxed paper on your building board. You'll also need the fuselage plans as a reference. No need to tape the side view down to the board as it's more for reference.

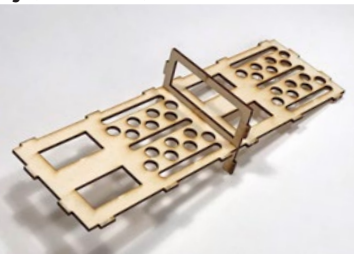
But you will need the top view later on in the build, so tape that part of the plan down.

### Step 78 - Fuselage Assembly (F4 & TR4)

Locate F4 from LP3 and TR4 from LP6.

Technically TR4 is symmetrical, side to side. But not front to back. Look for the etched circle that designates the front, starboard corner. Then glue F4 in place, by pushing it in from the top of TR4.

Make sure it's held at a 90° angle as the glue cures. (Remember those triangles?)



### Step 79 - Fuselage Assembly (F3 & TR4)

Locate F3 from LP3.

This is attached to the front of TR4 (designated by the etched circle) as shown. Pay attention to the orientation. Again, make sure it's held at a 90° angle to TR4 as the glue cures.



### Step 80 - Fuselage Assembly (F5)

Locate F5 from LP5.

This is attached to the rear of TR4 as shown here. Pay attention to the orientation. Again, make sure it's held at a 90° angle to TR4 as the glue cures.



### Step 81 - Fuselage Assembly (WH8)

Locate four WH8 from LP2.

These are stacked up, one on top of the other. Please use epoxy for this step, and clamp them together to make sure they are held perfectly in line as the glue cures.



### Step 82 - Fuselage Assembly (FS1)

Locate FS1 from LP3.

This is the port side of the fuselage box. Dry fit this first, making sure you know where all the tabs are. It should fit flush against the three formers and TR4.

Note that there are extra long tabs on F3 and F5. These should stick out roughly 1/8" from above the outer surface of FS1.

When you know how it all works, remove the side and glue it in place. Make sure it is glued to each of the formers and TR4.



### Step 83 - Fuselage Assembly (W8)

Locate the W8 assembly from a couple steps back.

This is inserted in the square hole towards the rear of FS1 as shown here. Lightly sand the tab on W8 as needed to get a good fit. Epoxy this in place.

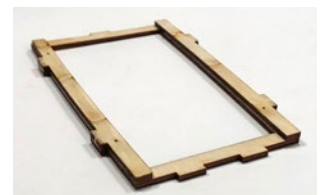


### Step 84 - Fuselage Assembly (TR2, TR3A & TR3B)

Locate the TR2 from LP4 and TR3A and TR3B from LP3.

Note the circle etched on TR2 and on TR3B. Flip TR2 over and glue TR3B to the top of the side with the circle (the shorter side). Then glue TR3A to the other side.

Make sure they line up properly as shown in the photo.



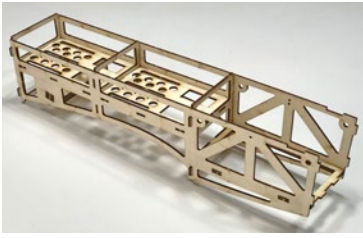
### Step 85 - Fuselage Assembly (TR2 assembly)

Now the TR2 assembly from the previous step is installed into the front of the fuselage as shown here. You'll need to put a little pressure to bend the side (FS1) as needed for all of the tabs to completely seat in the slots. Glue this in position, noting that FS1 will need to curve in slightly to match up with the curvature of TR2.



### Step 86 - Fuselage Assembly (FS2)

Locate FS2 from LP5. This is now glued in place as the starboard side of the fuselage box. Again, test fit this first as there's a lot of tabs to fit into FS2. When you've figured out how it all fits, then remove it and glue into position. It is recommended to start at the back and work your way forward. Remember that the front will need to curve to match the profile of TR2.



Note - the top of this assembly is flat and to make sure it's all true as the glue dries, it might be easier to flip it over and hold it flat with a weight or two.

### Step 87 - Fuselage Assembly (F2)

Locate F2 from LP4. This is glued to the front of the box, forming the surface where the firewall will be attached later on. This will have an angled surface when properly attached (down-thrust and right-thrust). Epoxy this in place.



### Step 88 - Fuselage Assembly (WS)

Locate both WS from LP2. These are glued to the inside of FS1 and FS2 to strengthen the wing saddle. Glue one to each side as shown here.



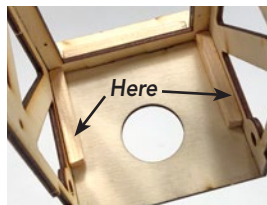
### Step 89 - Fuselage Assembly (WH9)

Locate both WH9s from LP2. These are stacked together and glued to the front side of F3, to strengthen the bottom portion of that former. Pay attention to the orientation so their holes line up with the holes in F3.



### Step 90 - Fuselage Assembly (FS2 support)

Cut two small lengths of 1/4" square basswood that was used for the wing spars. They should be approximately 1-7/8" long, but no longer. Glue these in place to the back of F2, where it meets FS1 and FS2, and so they touch T2 as shown here.



Epoxy is best here, but be neat with the applications.

### Step 91 - Fuselage Assembly (fuselage side sheeting)

Locate FS3B and FS3C from BP4, FS3D and FS3E from BP5 and FS3A from BP6. These 5 pieces are glued together to form the fuselage side sheeting. Refer to the diagram on the fuselage plan sheets on how these notch together.

You'll use the same techniques that you used when edge gluing



sheeting together for the wing and tail surfaces. The only difference being that these sheets are thicker 1/8" balsa sheets.

Start by gluing FS3A and FS3B together. Then glue FS3C, noting it's orientation. Then glue FS3D, and finally FS3E to form the completed sheet.

Make 2 completed sheets.

### Step 92 - Fuselage Assembly (port sheeting)

Now take one of the sheets from the previous step. Lightly sand each side along the seams to make sure they're flat and free of extra glue.

Glue this sheet to the port side of the fuselage box as shown here. Note that the

extra long tabs of F3 and F5 will fit into the pre-cut holes in the sheeting. This helps align the sheet properly.

Make sure it is firmly pushed up against the entirety of the fuselage box as it dries, including the curvature near the front.



### Step 93 - Fuselage Assembly (starboard sheeting)

Just as you did in the previous step, attach the starboard sheeting. Remember to lightly sand

each side along the seams to make sure they're flat and free of extra glue.

Glue this sheet to the starboard side of the

fuselage making sure it is firmly pushed up against the entirety of the fuselage box as it dries, including the curvature near the front.



*Take a moment to hold the fuselage so you can look down at the nose. It should look exactly like this - with the F2 looking like it's all out-of-whack compared to the rest of the build. Also the fuselage sides should taper in towards the nose just like you see here.*

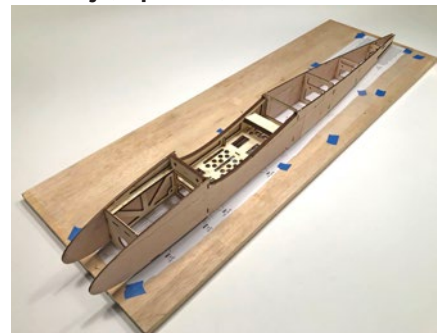


### Step 94 - Fuselage Assembly (top view.)

If you recall at the start of the fuselage construction you needed to tape down the top view with some waxed paper. If you haven't, hop on it as we need it for this step.

Lay the fuselage upside-down on the top view, matching it to the plans

along it's entire length. Yes, F2 will be the opposite from the plans,





but the middle of F2 should line up with the middle of the F2 on the plans. Basically what we're looking for here is the fuselage to be lined up on the centerline of the plans, as well as front to back by matching up the former locations.

Now, holding the front of the fuselage steady with some weight (by front I mean the area around the inner plywood box, place some pins along its length to help hold it in place. Don't pin the sides to the board, just place the pins up-against the sides so it will have a hard time moving.



#### □ Step 95 - Fuselage Assembly (F6, F7 & F8)

Locate F6, F7 and F8 from BP2. These are symmetrical, side to side and for the purposes of this step, the pre-cut pushrod guide circles should be orientated upwards as you install them.

Starting with F6, insert its tabs into one side of the fuselage, then the other. You'll need to squeeze the fuse sides together as you do this. When it's in place, align it with the top view and place a few more pins to keep it there.

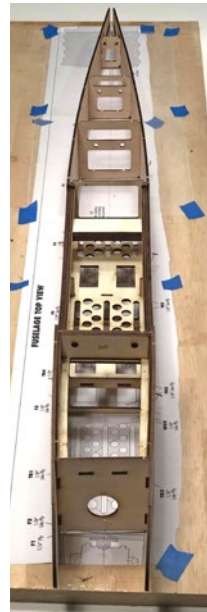
Don't glue this yet.

Now work your way back doing the same with F7 and F8, again not gluing it yet.

Now you should have something that looks a lot like what's in the photo.

Double check the alignment to make sure it's straight - no "banana" warping as the fuselage goes from front to back.

When satisfied, place some weights to keep everything flat, then glue these 3 formers to the fuselage sides.



#### □ Step 96 - Fuselage Assembly (rear 1/8" basswood)

Locate two of the 1/8" square x 36" basswood sticks. These will be glued to the inner edge of the fuselage sides, starting at the back of the wing saddle, to roughly 1" from the back edge of the fuselage.

Cut one for each side, and glue them in place making sure they are not only glued to the fuselage along their entire length, but also pressed into the pre-cut gap into each of the formers.



#### □ Step 97 - Fuselage Assembly (front 1/8" basswood)

Locate another length of 1/8" square x 36" basswood stick. These will be glued to the inner edge of the fuselage sides, starting at F2 and extending to the front of the wing saddle.

Cut one for each side, and glue them in place making sure they are not only glued to the fuselage along their entire length, but also pressed down onto the plywood fuselage box which has a bit of a curvature to it.

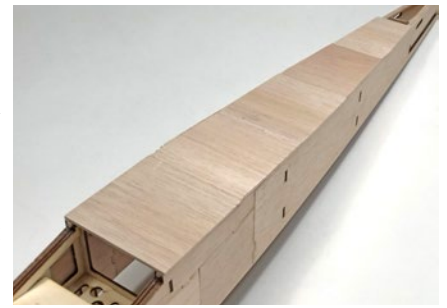


#### □ Step 98 - Fuselage Assembly (bottom fuse sheeting)

Leave the fuselage on the building board and now locate the sheets of uncut 1/8" x 4" x 36" balsa. These will be used to sheet the bottom of the fuselage.

This is done a piece at a time, starting at the back of the wing saddle.

Hold the 1/8" sheeting against the fuselage, making sure the grain is cross-ways. Mark, cut and glue a portion of the sheeting in position. Make sure that the fuselage is held flat as you glue this piece in position. Repeating this technique, work your way backward until you almost reach F8 (5 pieces of sheeting). Stop there.



#### □ Step 99 - Fuselage Assembly (front fuse sheeting)

Use more of the 1/8" balsa to sheet the forward area of the fuselage, covering F2, back to the beginning of the wing saddle.

Again, make sure that the fuselage is held flat as you glue these pieces in place.



#### □ Step 100 - Fuselage Assembly (F1)

Locate F1. It is glued in place to the front face of F2. To properly position it vertically, slide it down so the bottom edge is flush with the 1/8" sheeting. The front edge will look like it's sticking out a bit, but that's to be sanded later on.

Note the etching on the front of F1. When glued in, this should be visible, with the lines at bottom as shown here. Also, epoxy is a MUST for this step.

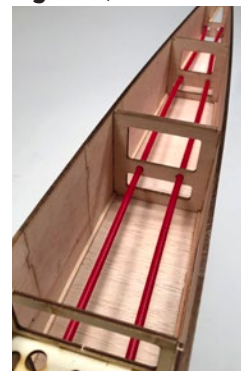


#### □ Step 101 - Fuselage Assembly (pushrod guides)

You can remove the fuselage from the board and you should have a fairly rigid piece that's nicely aligned.

Hold it so it's right-side-up and you'll have access to the inside of the fuselage.

Now is the time to think about what elevator and rudder pushrods you'll be using. Although there are other brands out there, we prefer to use Du-Bro's Laser Rods. They're flexible and work quite nicely in this setup. Whichever brand you choose, if they have an outer sleeve, now its the best time to install those sleeves, while you have easy access. Push the sleeves through the pre-cut guide holes in the formers and then out the fuselage side's exit holes. Trim them as needed and glue them in position.



### □ Step 102 - Fuselage Assembly (top 1/8" basswood)

Locate the last two lengths of 1/8" square x 36" basswood stick. These will be glued to the inner top edge of the fuselage sides, starting at F3. You'll use the entire length of these, so no trimming needed.



Glue them in place making sure they are not only glued to the fuselage side along their entire length, but also pressed down onto the plywood fuselage box and formers.

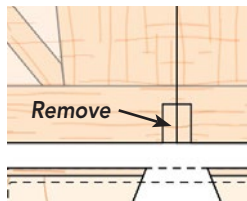
### □ Step 103 - Fuselage Assembly (top fuse sheeting)

Now it's time to sheet the top of the fuselage, using the same techniques you used when sheeting the bottom. Cut pieces of 1/8" balsa sheeting cross-grained and work your way back towards F8. As on the bottom sheeting, stop before you get to F8.



### □ Step 104 - Fuselage Assembly (horizontal stab)

Place the fuselage aside for now. Find the horizontal stab. You'll need to cut a notch in the center of the trailing edge to allow the vertical fin's post to slide through. Use the cutouts in the top sheeting as a guide, then test fit by dry fitting the vertical fin onto the stab. It should slide into this notch as well as into the pre-cut hole in the center of the stab. Lightly sand as necessary until the two assemblies fit together properly, and at a perfect 90° angle to each other. (Yup, back to using the triangle...)



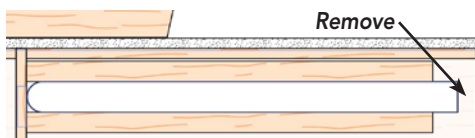
When satisfied with that fit, remove the fin and glue it to the stab, holding it at that 90° angle while the glue cures.

### □ Step 105 - Fuselage Assembly (horizontal stab)

Sand the leading edge of the horizontal stab to round it off, as it's easier to do now, than when installed.

Also lightly sand it's top and bottom to make sure the sheeting is smooth and flat, especially at the sheeting joints. When finished sanding it's time to test fit it into the back of the fuselage.

To do this, you'll need to cut open the back of the elevator cutouts in the fuselage side sheets.



Then slide the stab into place, centered on the fuselage. Place the fuselage down on a flat, level surface and make sure that the stab is level. If not, sand the fuselage opening(s) as necessary to level it. Do not glue it just yet.

Double check that it's centered, by looking down the fuselage and seeing that the vertical fin is straight as well. When satisfied that the alignment is spot-on, then tack the stab to the fuselage sides - just enough to hold it place.

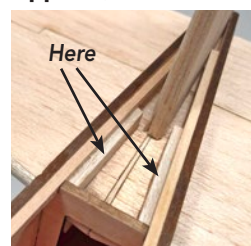
### □ Step 106 - Fuselage Assembly (stab supports)

Using scrap 1/4" square balsa, cut 4 supports for the stab. These will be glued where the stab contacts the inner surface of the fuselage sides.

You'll glue two on the top of the stab, then flip the fuse over and do the same on the bottom.

See, that's why we stopped sheeting at F8 - see, it's all part of the plan.

Now permanently attach the stab to the fuselage sides, and also glue the sides to the vertical fin's post.

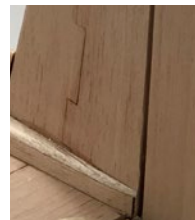


### □ Step 107 - Fuselage Assembly (fuse sheeting)

Now you can finish up the bottom and top sheeting. The bottom is easy - cross-grained.

The top sheeting should be tackled in two ways. Continue the top cross-grained sheeting until it touches the leading edge of the vertical fin. Then cut long-grained pieces to fit on either side of the vertical fin.

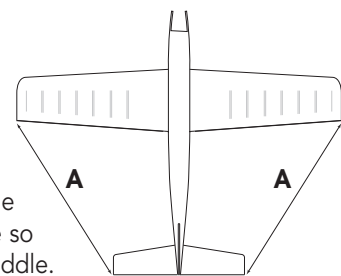
Glue all this in place.



### □ Step 108 - Fuselage Assembly (wing mounting)

Now it's time to offer up the wing to the fuselage.

First, you'll need to do a quick sand of the wing's leading edge, from the center of the wing out about 3 inches on either side. You'll need to round off the leading edge to the airfoil shape so it will fit correctly into the wing saddle.



When finished, insert the wing into the fuselage, making sure the front dowels slide smoothly into the holes in F3. If they don't fit as nicely as you'd like, don't mess with the dowels. Instead, file a bit on the holes until you get the dowels to slide in as they should.

To align the wing properly on the fuselage, place the wing in position, then allow the wing to rest in the wing saddle. The wing is perfectly aligned when the distance from the port wing tip to the port stab tip is the same the distance from the starboard wing tip to the starboard stab tip.

### □ Step 109 - Fuselage Assembly (drill wing bolt holes)

With the wing aligned, drill two 3/16" holes for the wing bolts, using the pre-cut holes in WH6 and WH7 as a guide. Before powering up, position the drill down through these holes and only then turn on the power to drill down through WH8 assembly in the fuselage.

Use caution to make sure the wing does not move until both holes are drilled.

When drilling, take your time and make sure the drill is held so the bit is in the center of the wing holes. This will guarantee that the holes drilled in WH8 will be perpendicular with the wing's sheeting. This will make it so the wing bolt goes in at an angle, but the screw's head will be flat on the wing surface. Remove the drill, remove the wing and clean up around the new holes you drilled.

Run a 1/4x20 tap through the WH8 pieces so that the wing



bolts will thread into this block. A few drops of thin CA will help strengthen and secure the threads you've cut. We've found this to be a very secure way of holding the wing in place for all of our prototypes, but... if you don't want to go this way, you can also use 1/4x20 t-nuts (not included). If you go that route, you may also need slightly longer bolts, but that's something you'll have to find out for yourself.

#### □ Step 110 - Fuselage Assembly (VF16)

Locate both VF16's from BP2. Glue these together, then glue the assembly in place as shown here to form the front strake of the vertical fin. Make sure it is straight when attaching.



#### □ Step 111 - Fuselage Assembly (VF17)

Locate both VF17's from BP1. Glue these together, then glue the assembly in place as shown here to form the ventral fin. Make sure it is straight when attaching.



#### □ Step 112 - Fuselage Assembly (NP & NS)

Locate NP and NS from LP6. These will be the inner supports for the front of the fuselage - the "cheek" areas. NP is for port, and I'm pretty sure you can guess what NS is for. Glue these in position against the sheeting and up against F1.



#### □ Step 113 - Wing assembly (ailerons)

Locate shaped 5/16" x 1-1/4" x 36" balsa strips. These are used as the ailerons. Measure and cut them to length.

#### □ Step 114 - Sanding

Before I set you loose with your sanding tools, there is one area NOT to sand. This is the area around the fuel tank / battery hatch. This means the top of the fuselage sheeting in that area, as well as the top of the firewall. Don't touch'em, don't even think about it. Again, there's a reason for this and it will make sense in a few steps. Trust me.

So with that being said, now is the time to get quite familiar with the sanding tools of your choice. Take the time to perform a good sanding, rounding the wing's leading edge and blending it into the wingtips. Go over the entire wing, making sure the sheeting is smooth and the trailing edges are blended into the cap strips, continuing the curvature of the wing. Pound out the extra time on those wing tips to make sure they are smooth, perfect works of art and match each other exactly.

Smooth out the edges of the fuselage. Because of the 1/8" sheeting and the 1/8" basswood support installed around the fuselage's perimeter, you can be a little more aggressive in rounding the corners.

Round the leading edge of the stab as well as the trailing edges of the elevator and rudder. When rounding the leading edge of the

vertical fin, blend it into the VF16 pieces installed a few steps back. Sand bevels into the leading edge of both elevator halves, the rudder, and the ailerons. And speaking of the ailerons, round off the back outer corners with a nice radius.

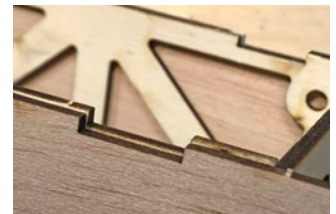
The idea is to spend some time caressing this awesome airframe you've created, smoothing the rough edges until it's something so slippery that it will cut through the air like a knife through melted butter.

What you should end up will be thing of beauty - something that looks pretty darn close to this (but without the hatch and landing gear which I haven't told you how to install yet.)



#### □ Step 115 - Fuselage Assembly (notches)

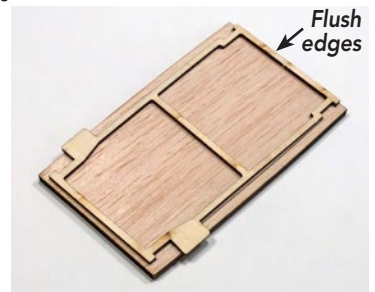
In the tank /battery area of the fuselage, you'll see two notches cut into the plywood sides. You'll need to use a hobby knife to cut away balsa on the outer fuse sides to match. Do this for both sides - nice clean cuts please.



#### □ Step 116 - Hatch Assembly (H1 & H2)

Locate H1 from BP7 and H2 from LP4. Note that H1 has some etched lines on what will be the bottom of the hatch. These lines match up with the outline of H2.

Now glue H2 on to H1, making sure the back edges are flush, and that H2 is centered side-to-side between those etched guidelines.



When the glue is setup, lightly sand the back edge so it's perfectly flush and smooth. Now test fit the hatch in place. Don't worry about the side to side overhang. The only thing we're interested in is to carefully sand the front edge of the hatch (beveled) so the hatch will comfortably sit in place, with the tabs also seated in the fuselage side's cutouts. Take your time - to get a nice, slop-free fit.

#### □ Step 117 - Hatch Assembly (H3 & magnets)

Locate four H3s from LP2 and retrieve 8 of the magnets with from the hardware bag, or from the wing jig stands. Push one magnet into each of the H3's pre-cut holes. Make sure they're completely pushed in - flush on both sides.

Inside the fuselage's tank/battery area



you'll see 4 pre-cut holes into the plywood side-frame - two on the port side, two on the starboard. Push a magnet into each of these holes - again making sure their flush, but take care when squeezing them in place so you don't damage the outer balsa skin. Don't worry about positive/negative poles and attraction - that's in the next step.

### Step 118 - Hatch Assembly (H3)

This step requires attention and visualization to make sure you glue the H3's in place so the matching magnets attract - not repel each other.

Snap each of the H3's in place to the magnet inside the fuselage, to the flat side of each H3 is facing upward. Now, take your hatch assembly and hold it over this area so the wider end faces the rear of the fuse.



Make sure you're also holding the hatch so the balsa side is up, the plywood frame is down.

Now, one at a time, you can remove each H3, and press it in place into the corresponding pre-cut notch on the sides of H2. They need to stick straight up (or down, depending on how your holding the hatch), 90° to the hatch surface.

Each should be a nice, press fit that will hold them in place fairly well so you can dry fit the hatch before permanently gluing these in place.

Once each of the H3s are pressed in place, dry fit and make sure each of the corners are attracting, not repelling each other.

When you're good with everything, remove the hatch, then carefully glue each H3 in place, by noting it's orientation, removing it, applying glue, then pushing it back in to place - firmly seated and at the correct angle.

### Step 119 - Hatch Assembly (sanding)

When everything has dried from the previous step, snap the hatch back in place. Now it's time to sand. Take the time to round off the hatch to match the radius you sanded into the fuselage sides. You'll also be sanding the top of the firewall so it's flush with the top and has a radius on the sides as shown here.



**This completes assembly of the Kaos airframe.**

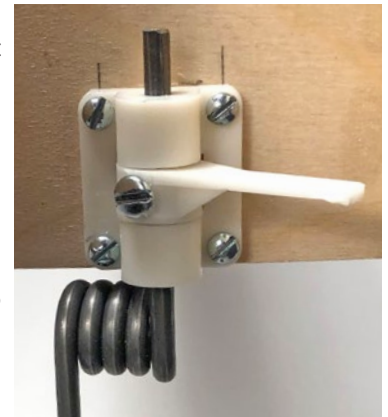
**These next few steps can be done in most any order - up until it's time to cover.**

### Nose gear assembly.

Everything you need to assemble the nose gear is in one package. The nose gear wire is partially pushed up through the white mounting block. Slip the steering arm in place, then push the nose gear wire all the way through the arm and the block. Stop when the wire is flush with the top of the mounting block.

With the nose gear positioned so the coil is towards the rear of the plane, position the steering arm at a 25-30° angle, then tighten

the set-screw in the steering arm just tight enough so it should make a mark on the nose gear wire. Loosen the screw and remove the wire. Grind a small flat on the nose gear where the screw made a mark, then re-attach. Use a touch of thread-locking compound on the screw to make sure it doesn't vibrate loose later on down the road (or more to the point - down the runway).



### Nose gear mounting

On the bottom of the firewall are two etched lines. These are there to aid in the location of mounting the nose gear block. Position the block so it's about an 1/8" above the bottom of the firewall, and so the mounting holes are lined up with the etched firewall lines. Mark the position of these 4 holes and drill through the firewall. Use the 4 mounting screws and the 4 t-nuts from the nose gear bag. Mount the nose gear block to F1 as shown above.

### Main Gear mounting

Locate the two main gear wires, four 1/8" plastic landing gear straps and 8 of the 2-56 x 3/4" self tapping screws. Push the main gear into the wing until it's fully seated in the slot on the underside of the wing. Then place two of the plastic mounting straps into the cutouts and use 4 of the screws to mount it in place. Repeat this for the other side.



### Tank / Battery floor (TR1)

You don't need to install this now, but TR1 serves as the floor for the tank/battery compartment. It's held in with 4 2-56 x 3/4" self tapping screws. The reason for the screws is to make it removable. You might need to locate something under this floor to aid in C.G. later on.



### Tank / Battery compartment fuel proofing

If you're using a glow engine to power your Kaos, it is strongly recommended that you fuel proof the inside of the battery compartment. As you know, fuel has a nasty way of penetrating wood, causing it to disintegrate over time. Spray (or brush) this on, also remembering to protect the underside of the hatch and the engine compartment (firewall and inside of the fuselage cheeks).

### **Power system**

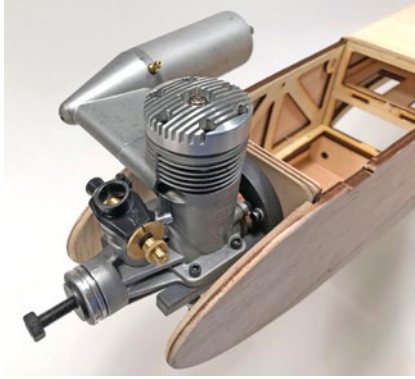
Installing your power system of choice is up next. We'll show



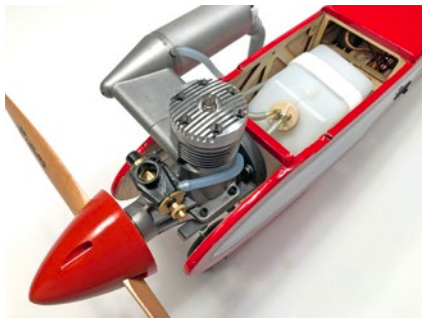
photos for regarding electric and glow installations. Note that these are suggestions only as your power system might vary from what's shown here.

### Glow power

Mounting the engine is a fairly simple thing. It should mount upright and use the thrust lines on the fuselage plans as a general guide. With the nose gear block in place, things are a little tight, so plan this out before drilling any holes. What you see in our prototype is the mighty Lee Custom K&B .61 mounted on to a Dave Brown Products engine mount (now available from Ohio Superstar as of the time this manual was written). Other mounts will work just as well - use what's best for you.



A 10 ounce tanks works well and give a nice flight time, although you might be able to squeeze some 12 ounce tanks in. Again, plan this out before committing to anything permanent.



### Electric power

There's a lot of choices out there for electric power, but we've reached out to Innov8tive Designs for their recommendations on power. You'll see those on our website for both their Cobra and BadAss brands. What you'll see here is their BadAss setup on another of our prototypes.



Because of the size of most 6S LiPo battery packs, you'll need make a modification to F3 and the radio tray. Remove the inner cross brace of F3 and the area between the two servo cutouts in the tray, as shown here. Doing this will not weaken this area, as the cross brace was only there to help hold the throttle servo in place. But since you won't be needing a throttle servo, you'll use the space differently.

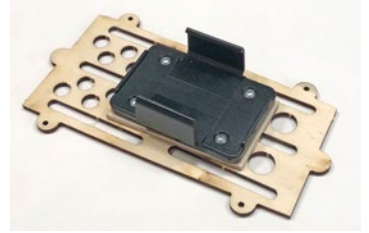


Now, figuring out how to keep things cool takes a bit more planning. Every setup will be different but basically, cooling holes will need be drilled through the firewall (and possibly into the fuselage around the battery area in some



setups). This will get a cooling air flow from the prop blast in to the batteries. In the case of the prototype shown here, we cut into the bottom planking, and made an air scoop out of some of the spare 1/8" balsa sheeting.

The tank/battery tray was slightly modified. Rather than punching out all the lightning holes, any of the holes that would support the ESC were glued in place. Another thickness of 1/8" light ply was cut from the scrap and glued to the bottom of the tray. Then the ESC was mounted onto the bottom of the battery tray. The rest of the lightning holes were then punched out to allow for air flow and the wires to pass through.



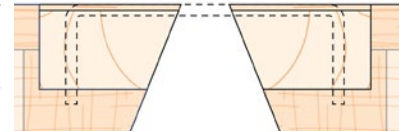
Some standoffs were sourced and the motor was mounted to the firewall as shown here.

Also, we're big believers in having an arming switch/plug when using electric powerplants of this size. There's plenty of options out there and it's something to think about. Remember, in case of an accident, your fingers probably don't grow back!

And one last thing - you'll also need to cut exit holes for the air to escape. Cut these towards the rear of the fuse, preferably on the bottom. This prototype has four 1/2" diameter holes between F7 and F8.

### □ Fuselage Assembly (elevator joiner)

Locate the pre-bent elevator joiner from the hardware bag. Make sure that this piece is perfectly flat, and that both bends are at 90° to the center of the wire. Adjust as needed.



Temporarily tape the elevator halves in position on the stab, making sure the ends are flush with ends of the stab.

Now place the elevator joiner on top of the elevator halves and mark where holes will need to be drilled (approximately 1-1/2" in from the center of the fuselage).

Remove each elevator half and carefully drill a hole at these marked locations with a 1/8" drill bit. The hole should be roughly 3/4" deep and straight into the center of the elevator's leading edge. Take care to not drill in at an angle or you risk the chance of the bit cutting through the surface of the piece.

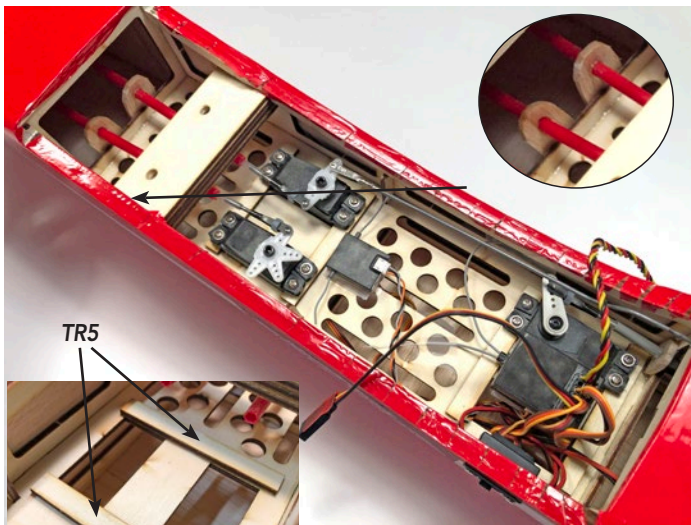
When finished drilling, use a hobby knife to cut a channel just wide and deep enough for the joiner's wire to fully seat flush with the leading edge of the elevator.

After you've completed this for both halves, use a bit of medium CA glue to permanently glue the joiner into both halves - making sure the completed leading edge of the elevator is perfectly straight and flat.

### □ Control horns, servo & pushrod installation

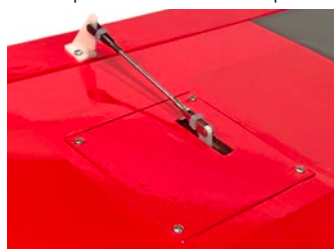
Although you can install the servos and control hardware after covering your Kaos, we find it easier to temporarily mount everything in place before covering. This way you have unblocked access inside the fuselage and wings to get the servos, extensions, and pushrods in place.

Shown in the following photo is an example of the radio gear's installation in one of the Kaos prototypes. Glue TR5 strips (from LP2) where the servos are mounted to thicken the mounting surface for the servo's screws.



Take a bit of time to plan things out, including how you'll run the throttle and nose gear steering pushrods.

Also, to help hold some pushrod ends in place, you'll find four pieces cut into BP2 that might help. In the enlargement you'll see two of them glued to the back of F5 - used to hold the elevator and rudder pushrod sleeves in place.



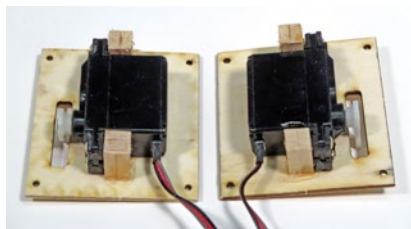
Typical aileron pushrod setup.



Typical elevator and rudder pushrod setups.

When mounting the servos to the both SH's you'll need to cut eight 3/4" lengths of the 1/4" square basswood scrap. Make four thicker mounting posts by laminating two pieces together then sand the ends flat.

Position your aileron servo on the inside of the aileron hatch so the servo arm output shaft is centered in the opening. On the inside of each aileron hatch, glue one post on each side of the servo as shown in the photo.



Note that the left hatch is a mirror image of the right hatch. Now fit the servo hatches into position on the bottom of the wing. Using the pre-cut holes as a guide, drill four 1/16" mounting holes into the basswood mounting posts you just installed. Harden the wood with a bit of thin CA and you can use the supplied 2-56 x 3/4" self tapping screws to secure the hatches in place. Finish the layout of your radio gear by adding the receiver, flight pack battery and the switch. We mounted the receiver to the tray by using a bit of self-adhesive hook-and-loop (not included). The radio's switch should be mounted to the opposite side of the muffler (to help keep the goop out of it). Or, for an even cleaner installation, it could be installed inside the tank/battery compartment - hidden under the hatch - VERY NICE!

## Covering

Now it is time to cover the Kaos. Remove the powerplant, main gear, nosewheel assembly, pushrods, and any other components that would get in the way of applying the covering.

Double check that all surfaces are smooth and ready to cover. Sand as necessary, then cover the entire airframe with the covering/finish of your choice.

Note that if you're powering with an electric motor, you'll need to make a hole for the cooling air to escape the bottom of the fuselage, near the rear.

When the covering is complete, re-attach all the components you removed earlier in this step.

## Logos, numbers, etc.

If you want to use graphics similar to the ones we used, Old School Model Works has teamed up with Callie Graphics as a supplier for pre-cut vinyl. They are a very well known provider of custom graphics for R/C models.

We have supplied them with the artwork needed to cut the correct size logos. You can order straight from them, choosing the colors that work for you.

Contact Callie Graphics at this link: <https://callie-graphics.com> or scan the QR code.

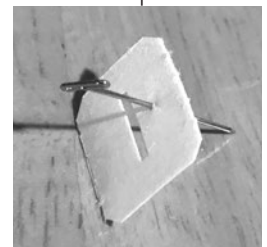


*Note that Callie Graphics is not affiliated with Old School Model Works, nor does Old School Model Works generate any income from this partnership.*

## Attach the Control Surfaces

Now is the time to attach all the control surfaces to the airframe, by gluing the hinges in position with thin C/A. We've noted suggested hinge locations for each of the control surfaces on the plans.

When using the CA hinges, first push a pin through on side, at the center of the pin as shown here. This will keep the pin centered as it's pushed into the surfaces. When you've got all the hinges for a surface in place, then remove the pins and glue the hinges.



Make sure that you attach the elevator first, then the rudder.

## Attach wheels

Use the included 5/32" i.d. wheel collars to hold each wheel (not included) on the axles. For a maintenance free installation, file a small flat on the axle where the set screw of the wheel collar touches. Also use a touch of thread-locking compound to keep the screw from loosening over time.

## Optional canopy

Included is a canopy and though it's certainly up to you if you choose to use it, the canopy is just a defining part of the Kaos' outline, so why not use it?

The following steps will describe how to properly prepare and attach it.



- Trim along its flat edge. You'll want to trim away the excess plastic and leave a smooth lip, roughly 3/16" wide around the it's perimeter.
- Place it on the fuselage and see if will rest flat. If not, remove it and lightly sand the bottom lip until it's flat. Not all canopies are exactly identical, so a bit of trial and error is needed to get a good fit.
- If you're going to add a pilot figure (not included), now is the time to test-fit, then glue it in place.
- Give the canopy a quick wash in warm, soapy water.
- If you're going to tint or paint the canopy, do this on the inside now and allow it to dry.
- Use a bit of canopy glue to attach the canopy. So it doesn't move while the glue cures, hold it in place with a bit of low-tack masking tape.

#### Optional rudder skid

Included in the hardware package is a 3" length of wire that can be bent to use as a rudder skid.

With the ventral portion of the rudder, it's quite possible to drag this

section on the runway from time to time. So, if you'd like to add this, note the sample drawing on the fuselage plan sheet. Bend something similar, then drill a couple of holes in the bottom of the rudder, spaced so the "legs" of this skid can be inserted. Secure with a bit of glue and you're all set.



**This completes the assembly of the Kaos. Now you'll need to adjust the control throws and check for balance.**

#### Recommended C.G. setting:

An important part of preparing the aircraft for flight is properly balancing the model. This is especially important because of the various motor/battery combinations that can be used.

### CAUTION! DO NOT SKIP THIS STEP!

The recommended Center of Gravity (CG) location for the Kaos is 4-1/8" from the leading edge of the wing, as measured at where the wing contacts the fuselage, and you'll see this marked on the fuselage plan with this symbol.

If necessary, move the battery, receiver, and/or add weight to either the nose or the tail until the correct balance is achieved. Stick-on weights are available at your local hobby store and work well for this purpose.

**C.G. BALANCE POINT**



#### Recommended Control Throws:

The amount of control throw should be adjusted as closely as possible using mechanical means, rather than making large changes electronically at the radio.

By moving the position of the clevis at the control horn toward the outermost hole, you will decrease the amount of control throw of the control surface. Moving it toward the control surface will increase the amount of throw. Moving the pushrod wire at the servo arm will have the opposite effect: Moving it closer to center

will decrease throw, and away from center will increase throw. Work with a combination of the two to achieve something relatively close to these throws that are good for everyday sport flying. If competing in pattern, you'll probably want to dial these down a bit to give a smoother appearance to your maneuvers.

**Aileron 3/4" up/down (35% expo)**

**Elevator 5/8" up/down (25% expo)**

**Rudder 1-1/2" left/right (20% expo)**

*(Expert tip: Once the control throws have been set, cut a few pieces of medium silicone fuel tubing (or heat shrink tubing) to go around each of the clevises. This will keep them from opening during flight.)*

#### Preflight:

Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases, the radio should be charged the night before going out flying.

Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the engine and make sure it transitions smoothly from idle to full throttle and back. Also ensure the engine is tuned according to the manufacturer's instructions, and it will run consistently and constantly at full throttle when adjusted.

Check all the control horns, servo horns and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

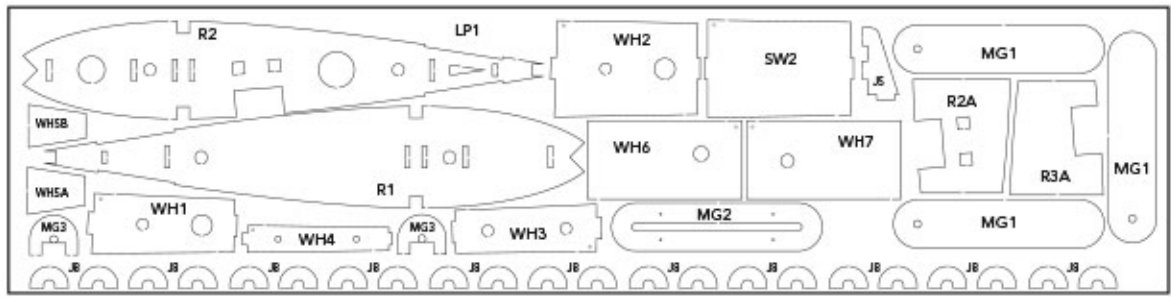
#### Range check your radio before flying

Before each flying session, range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane, but do not attach the arming switch.

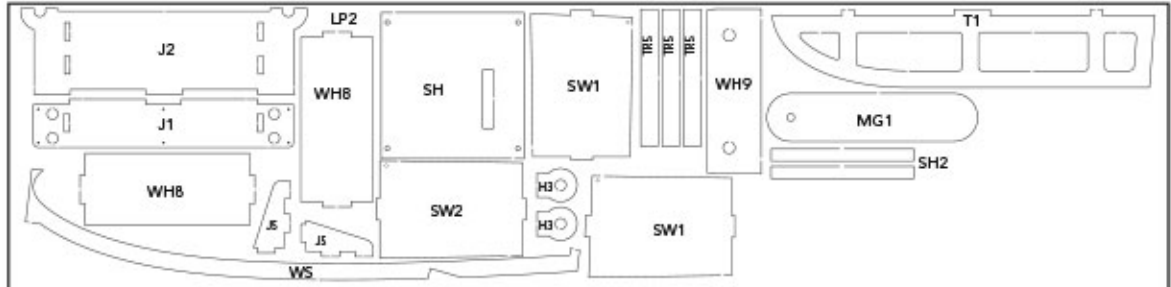
With your airplane on the ground, you should be able to walk 30 paces away from your airplane and still have complete control of all functions.

If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

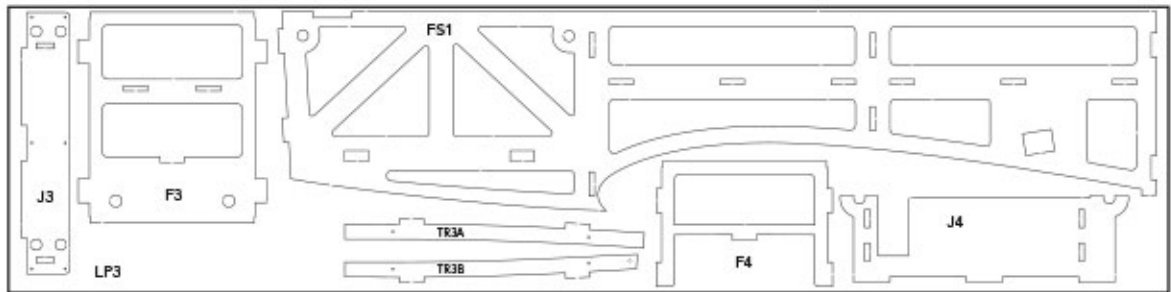
**LP1**  
1/8" Lite Ply



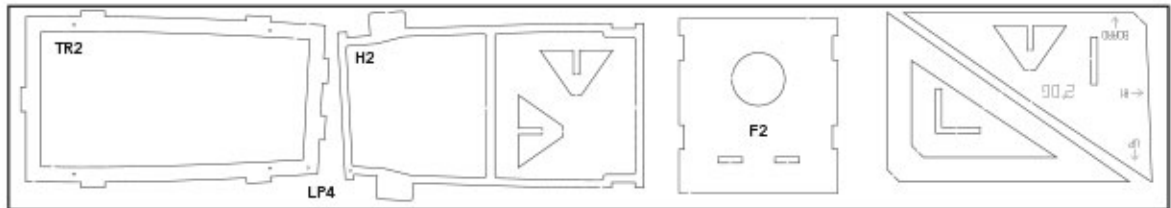
**LP2**  
1/8" Lite Ply



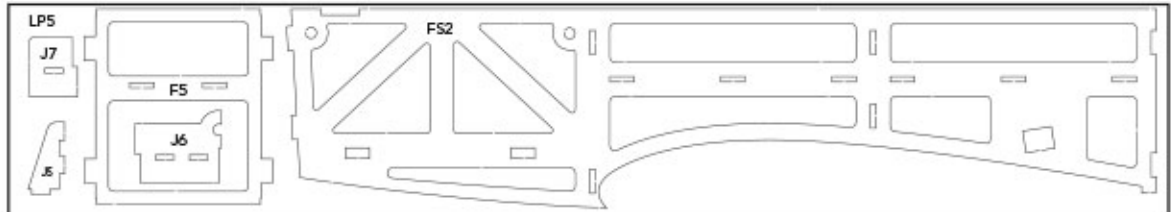
**LP3**  
1/8" Lite Ply



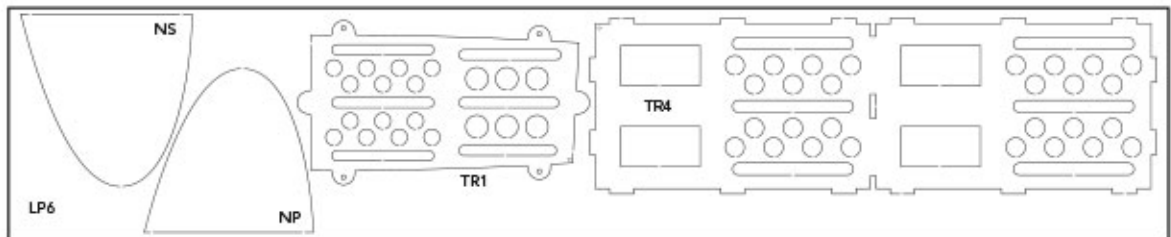
**LP4**  
1/8" Lite Ply



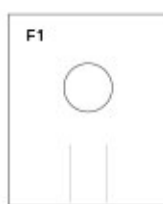
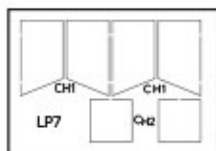
**LP5**  
1/8" Lite Ply



**LP6**  
1/8" Lite Ply



**LP7**  
1/16" Lite Ply



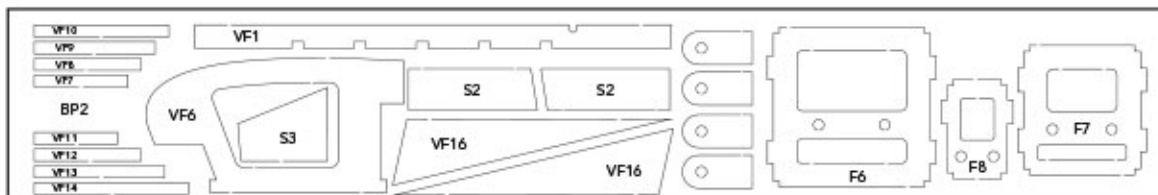


**BP1**

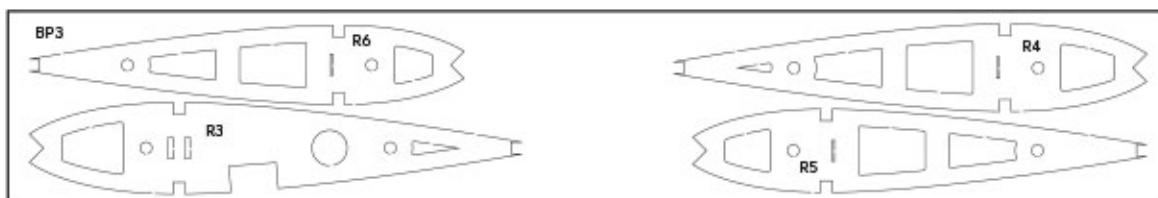
1/8" Balsa

**BP2**

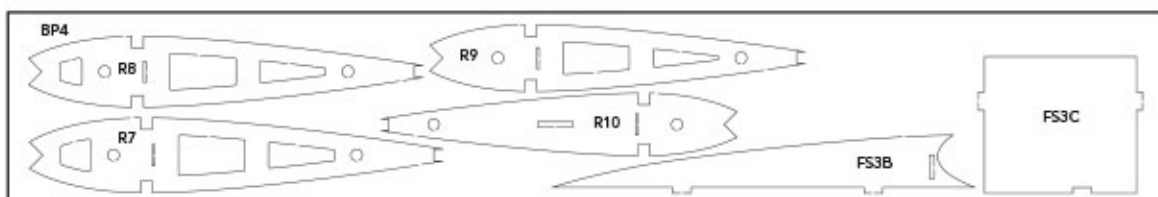
1/8" Balsa

**BP3**

1/8" Balsa

**BP4**

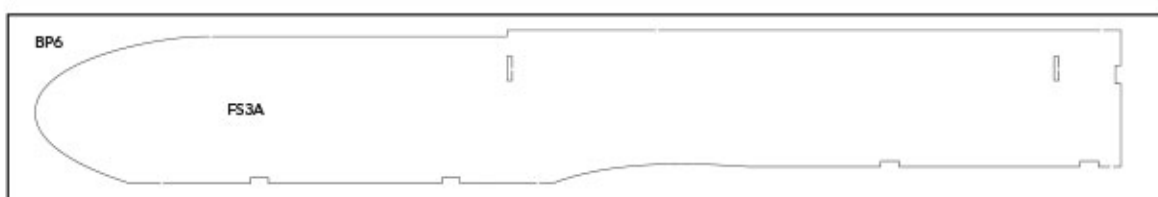
1/8" Balsa

**BP5**

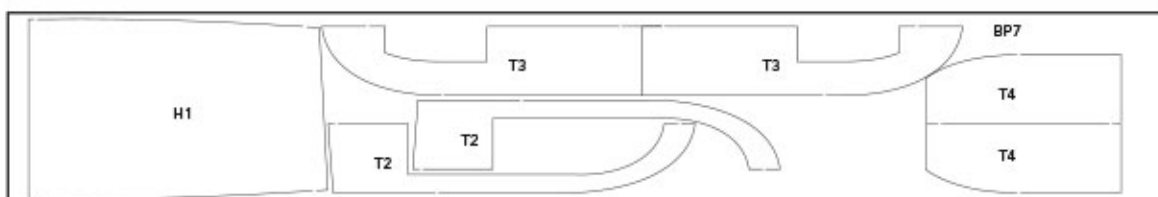
1/8" Balsa

**BP6**

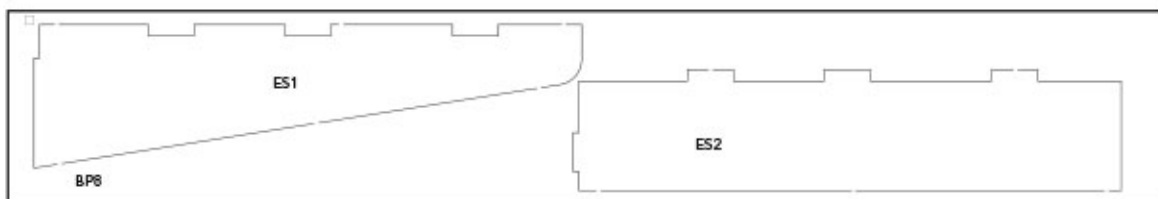
1/8" Balsa

**BP7**

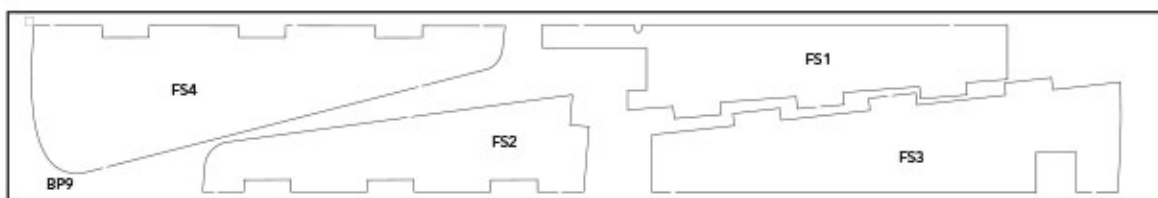
1/4" Balsa

**BP8**

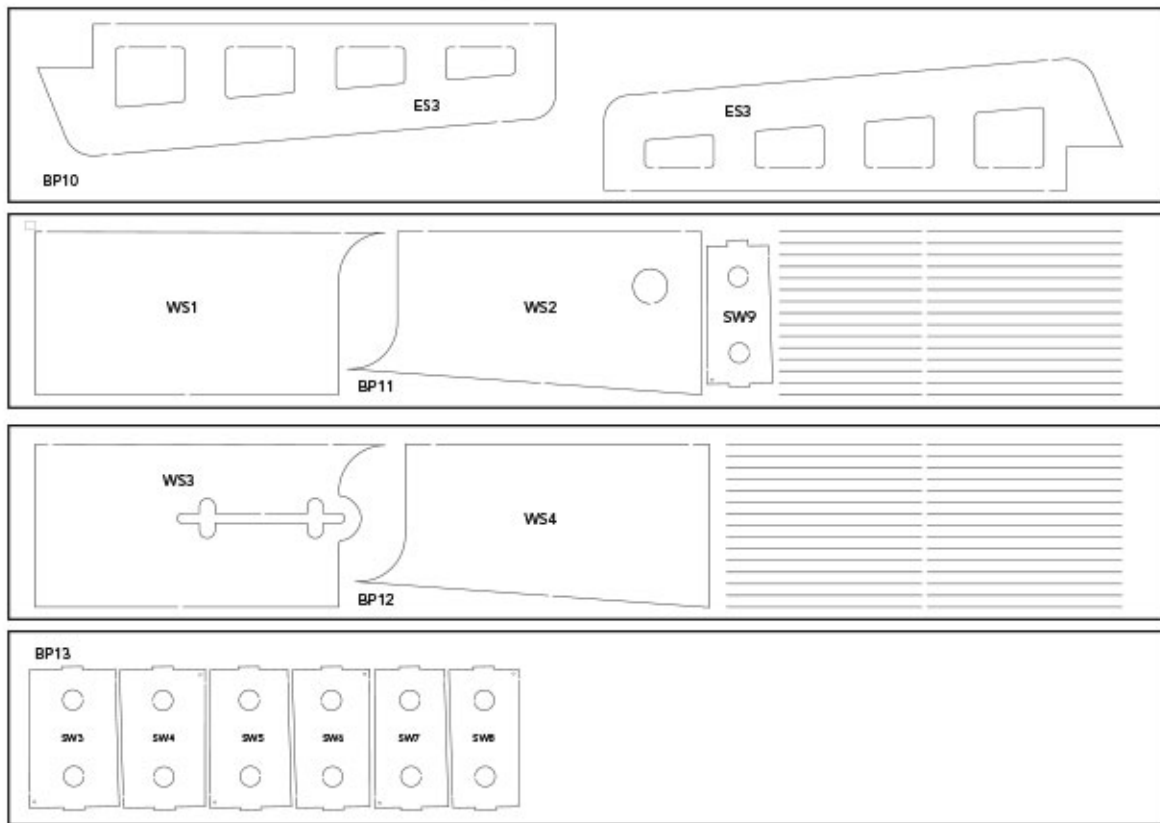
1/16" Balsa

**BP9**

1/16" Balsa



**BP10** BP10 BP10  
**BP11** BP11 BP11  
**BP12** BP12 BP12  
**BP13** BP13 BP13  
 1/16" Balsa 1/16" Balsa 1/16" Balsa 1/16" Balsa



**Warranty Information**

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

In that **Old School Model Works** has no control over the final assembly or material used for the final assembly, no liability shall be assumed nor accepted for any damage of the final user-assembled product. By the act of using the product, the user accepts all resulting liability.

**Limit of Liability**

In the use of this product, our only obligation shall be to replace such quantity of the product proven to be defective. The user shall determine the suitability of the product for his or her intended use and shall assume all risk and liability in connection therewith.

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 un-opened condition.



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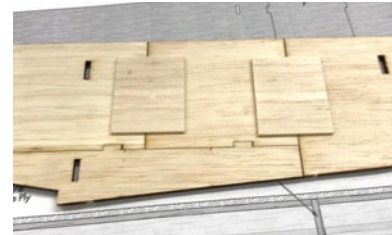
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See photos of our kits and customer builds on Flickr: <https://www.flickr.com/photos/oldschoolmodelworks/>

**Step 91 - Fuselage Assembly (a followup)**

We've never had a problem with the fuselage sides, the way it's described to assemble them - nor has any customer ever reported an issue.

However, you can choose to strengthen the end-joints of the fuselage sheeting by adding some 1/16" scrap utilizing face-grain to face-grain joints over the end-grain joints as shown here. This does not interfere with any formers.



If you do decide to add these scrap pieces, make sure you add them so they face the inside of the fuselage (making a left and a right side).