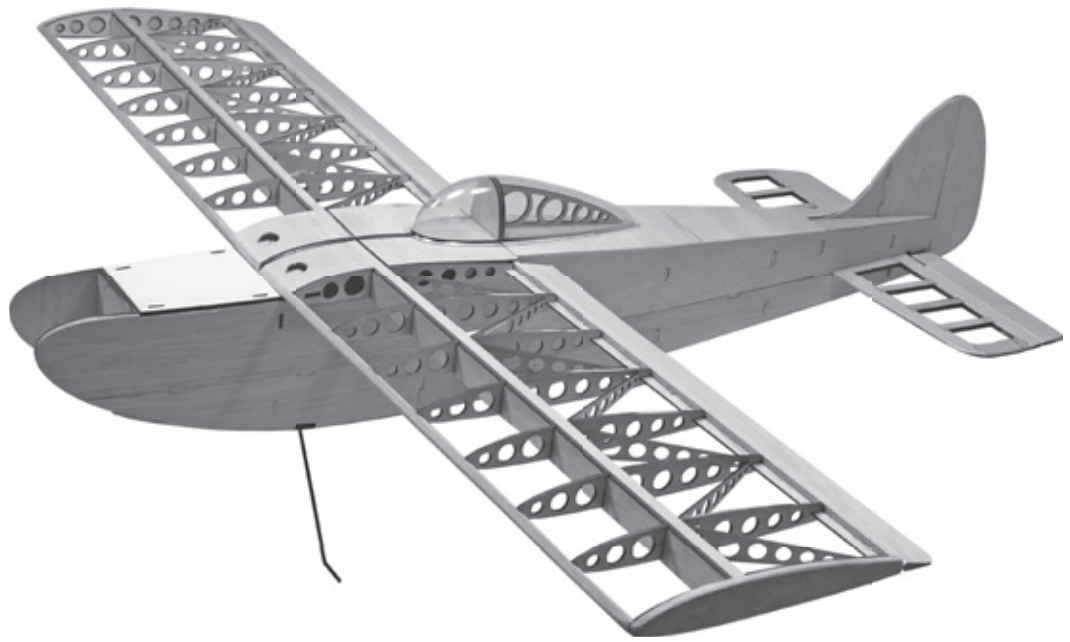


CONSTRUCTION MANUAL



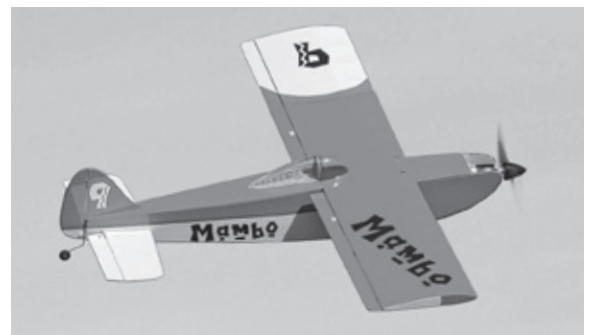
Specifications: Wingspan: 44 in. • Wing Area: 365 sq in.
Airframe Length: 39 in. • Weight: 2.5-3.5 lb.

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

Mambo!

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.

INCLUDED ITEMS

Wood parts included in this kit:

- 1 - LP1 - laser cut 1/8" x 5.5 x 24 sheet
- 1 - LP2 - laser cut 1/8" x 5.5 x 24 sheet
- 1 - LP3 - laser cut 1/8" x 5.5 x 24 sheet
- 1 - LP4 - laser cut 1/8" x 5.5 x 24 sheet
- 1 - LP5 - laser cut 1/8" x 3.5 x 6 sheet
- 2 - BP1 - laser cut 3/32" x 4 x 24 sheet
- 1 - BP2 - laser cut 3/32" x 4 x 11.5 sheet
- 1 - BP3 - laser cut 3/32" x 4 x 11.5 sheet
- 1 - BP4 - laser cut 3/32" x 4 x 24 sheet
- 1 - BP5 - laser cut 3/32" x 4 x 24 sheet
- 2 - BP6 - laser cut 3/32" x 4 x 24 sheet
- 2 - BP7 - laser cut 3/32" x 4 x 24 sheet
- 1 - BP8 - laser cut 3/32" x 4 x 11.5 sheet
- 1 - BP9 - laser cut 3/32" x 4 x 11.5 sheet
- 2 - BP10 - laser cut 3/32" x 4 x 24 sheet
- 1 - BP11 - laser cut 1/16" x 4 x 24 sheet
- 1 - BP12 - laser cut 1/16" x 4 x 24 sheet
- 1 - BPTIP - laser cut 1/4" x 4 x 9 sheet
- 1 - 3/32" x 12 x 24 sheet
- 3 - 1/16" x 4 x 24 sheet
- 5/16" x 5/16" x 36" balsa strips (2 pieces)
- 1/4" x 1/2" x 36" balsa strips (2 pieces)
- 3/16" x 3/16" x 36" balsa strips (4 pieces)
- 5/16" x 1-1/4" x 36" tapered balsa strips (2 pieces)
- 3/16" x 3/8" x 24" basswood strips (4 pieces)
- 1 - 1/4" x 6" wooden dowel
- 1 - 3/16" x 4" wooden dowel

Hardware parts included in this kit:

- Pre-bent main gear wire
- C/A type hinges for control surfaces
- 4 - control horns
- 2 - wheel collars 1/8" I.D.
- 2 - plastic gear straps
- 2 - 1/4"-20 wing bolts

- 10 - 2-56 x 1/2" machine screws
- 5 - 2-56 x 3/4" self tapping screws
- 4 - 1/4" Neodymium disc magnets

Other items included in this kit:

- 2 - Rolled plans (fuselage and wing)
- 1 - Construction Manual
- 1 - canopy

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:
 - if Electric (minimum 15-size, 840Kv brushless outrunner motor, 30amp esc and 3-4S LiPo pack)
 - if Glow (.15-.30 engine, 6 ounce tank, fuel tubing)
- Propeller
- Engine/Motor mount and mounting hardware
- Receiver - (4 channel minimum)
- Sub-micro servos (4 for electric, 5 for glow) - 1 each for elevator and rudder; 1 for each aileron 1 for throttle (if glow)
- "Y" servo harness (for ailerons)
- Pushrods (two 5" for ailerons, two 24" for elevator & rudder, one 10" for throttle if glow powered)
- Clevises for the pushrods (8 if electric, 10 if glow).
- 2.5" diameter wheels
- Tailwheel assembly
- Covering
- Optional pilot figure for the cockpit.

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
- Canopy glue

Before Starting Assembly

From the start, we've designed the Mambo to be easy to build for the first time builder. We've kept the parts count low and incorporated a wealth of interlocking parts which are self-aligning.

Closely inspect the supplied laser cut parts for damage. If you find any damaged or missing parts, contact us within 60 days of purchase.

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 prototype Mambos. 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:



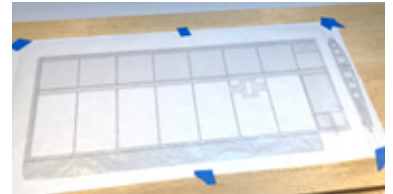
www.oldschoolmodels.com/mpics/mambo

IT IS VERY IMPORTANT THAT YOU ASSEMBLE THIS MAMBO 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 port (left) wing of your Mambo.

Prepare your work area

You'll need a flat building surface that is a minimum of 24" long. Position the left 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

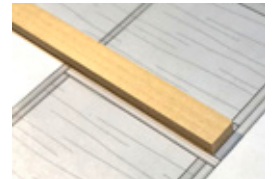
Pre-cut into LP4 are two triangles, one inside the other. These can be used to vertically align any of the parts in the construction of your Mambo. LP4 also includes two foot pieces that can be used with the triangles to hold both triangles vertical hands-free.



We recommend using the smaller triangle in the wing construction as it's small enough to fit between the ribs.

Step 2 - Wing Assembly (position lower spar)

Using a length of 3/16 x 3/8" basswood, measure and cut it to form the lower spar. Note that it runs from R2 to the last R5 rib at the wing's tip - it does not extend into R1.

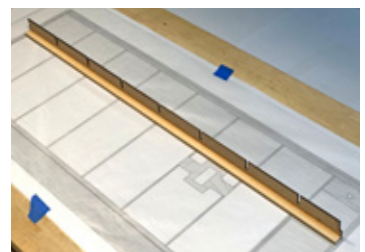


Attach it over the plans, using a few small drops of medium CA along it's length (or you could use t-pins). Be sure it is aligned properly and is straight over it's entire length. The alignment of this spar is critical as the rest of the wing panel is based off this single piece.



Step 3 - Wing Assembly (J1)

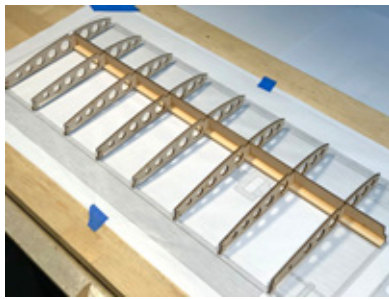
Locate one of the J1 jigs from BP11. As this is cut from 1/16th balsa, take care not to break it. On one end you'll see a small engraved circle. This notes the end that will be located towards the wing's root (R1). Carefully align J1 so each cutout perfectly aligns over the ribs on the plans, then glue it to the front of the spar.



□ □ Step 4 - Wing Assembly (R3, R4 and R5 ribs)

This step will require one R3 rib (from BP7), two R4 ribs (from BP10) and five R5 ribs (also from BP10).

Starting from the root (right side), carefully insert each rib into place as shown, making sure they are completely inserted into the corresponding slot on

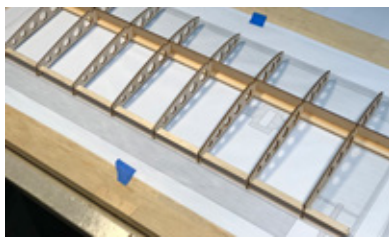


J1, completely seated on the spar, and the tab on the back of each rib is touching the plans. Working from the root, insert R3 first, then both R4's, then the five R5 ribs.

Don't glue the ribs in place just yet.

□ □ Step 5 - Wing Assembly (attach J2)

Locate one of the J2 jigs from BP11. As this is cut from 1/16th balsa, take care not to break it. On one end you'll see a small engraved circle. This notes the end that will be located towards the wing's root (R1).



Carefully slide J2 into place, into the cutouts on the rear of each rib as shown here. When properly positioned, it will lock each of the ribs in place with the proper spacing.



This J2 piece is quite fragile until it is glued in place. Be very careful not to use too much force when placing it in position in each of the ribs.

When J2 is in place, make sure all of the ribs are properly aligned with the plans as shown, all the parts are firmly seated, then glue each rib to J1, J2 and the lower spar.

□ □ Step 6 - Wing Assembly (trailing edge)

Measure and cut the trailing edge from a piece of 1/4" x 1/2" balsa strip.

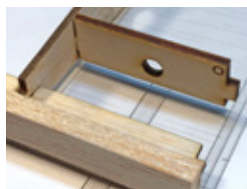
When properly positioned, the 1/4" side will rest on the "ledge" cut into each rib's rear tabs. The 1/2" side will touch along the entire length of J2. Test fit, then when satisfied, glue this piece to J2 and the ribs as shown. No need to glue it to the tab ledges.



□ □ Step 7 - Wing Assembly (WH6)

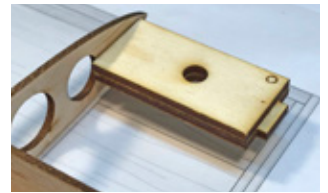
Locate one WH6 from LP3. Note the engraved circle. When properly inserted into R3, this circle should face R2 and be at the top as shown here.

Make sure it is perpendicular to R3, then glue in position.



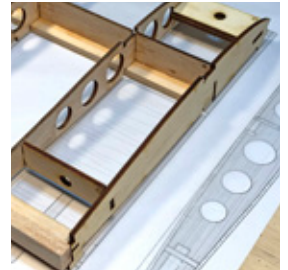
□ □ Step 8 - Wing Assembly (WH4 and WH5)

Locate one WH4 and one WH5 from LP1. First, position WH4 into R3 with its engraved circle facing R2 towards the leading edge of the wing as shown. Glue this in position, then glue WH5 on top of WH4, aligned as shown.



□ □ Step 9 - Wing Assembly (attach R2)

Locate one R2 from LP4. It is slid into place with the tabs from WH4 and WH6 fully inserted into the slots pre-cut into R2. Also, because of the angle already cut into WH4 and J1, when R2 is flush with these parts, it will have a slight angle to allow for the wing's dihedral.



It's crucial that this part be glued in correctly and that it is glued with no warps or twists.

□ □ Step 10 - Wing Assembly (leading edge)

Locate one of the 5/16" square balsa strips. Measure and cut this to length to form the wing's leading edge.

Glue in place, making sure the strip is fully seated to each rib. Also make sure that all the ribs are straight, with no twists or bends before, or after gluing.



□ □ Step 11 - Wing Assembly (upper spar)

Using a length of 3/16 x 3/8" basswood, measure and cut it to form the upper spar. Note that it runs from R2 to the last R5 at the wing's tip - it does not extend into R1.

Glue this in position, making sure it is securely attached to all of the ribs and to J1.

□ □ Step 12 - Wing Assembly (R3a)

Locate one R3a from BP6. This is glued to the outer surface of the R3 rib you glued in place previously.

Note that the J2 has an angled notch to help position it in place as shown.

Glue this in position.



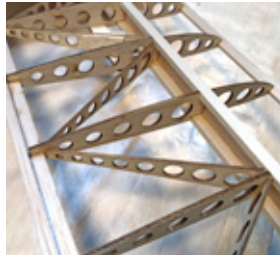
□ □ Step 13 - Wing Assembly (R6 and R7)

Locate six R6's and one R7 from BP12. These are sub-ribs used to add torsional rigidity to the wing. Each one is placed in at an angle and because of that angle, the edges that touch the ribs will need a slight bevel sanded into them.

Because the pieces alternate as they're installed, only work with 1 piece at a time so you don't accidentally bevel the wrong edge.



Start with the R6 installed between R2 and R3. Hold it in place over the plans to get an idea of which side of the piece need the bevel sanded. Then test fit it in place. Adjust as necessary and when satisfied with the fit, glue it in place to both ribs. The R7 is next and it has a notch pre-cut into it. This notch needs to face the bottom of the wing. Bevel the appropriate ends and glue it into place to the ribs when the fit is correct. Work your way along the rest of the wing, alternating as you go.



Step 14 - Wing Assembly (removing tabs)

Once the glue has cured, the wing half can be removed from your building board. It's now time to carefully remove the tabs on each rib.

All ribs have two tabs and they need to be carefully cut away and the ribs lightly sanded to maintain their airfoil shapes. There's a number of ways to do this but we find a Japanese saw is the perfect tool. These saws are small, have flexible blades and the lack of off-set teeth makes a smooth, straight cut.



Step 15 - Wing Assembly (starboard wing)

Set the port (left) wing half aside and begin work on the starboard (right) wing half. Tape the right wing plan and fresh wax paper on your board. Then go back and follow steps 2 through 14 to assemble the right wing half. Once finished, then move on to step 16 to complete the wing assembly.

Note that when building the right half, some of the parts will need to be glued to the opposite side (R3a, for instance). Always refer to the plans to make sure you're gluing the parts together in the correct way.

Step 16 - Wing Assembly (upper D1)

Lightly sand R2 so it is flat and there is no extra basswood spar, or balsa leading/trailing edges protruding.

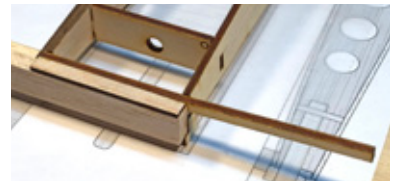
Locate one R1 from LP3 as this is one of three dihedral braces that will be used in the wing's construction. Also locate the port wing half. Place the wing as shown (right-way-up). This particular D1 will fit into the pre-cut slots in R2 and R3, just to the rear of the upper spar.



We recommend epoxy for this step and make sure it is firmly seated while the glue cures. Also make sure to remove any excess epoxy that may drip on the face of R1. Epoxy is easier to clean off before it cures by using a paper towel lightly soaked in a bit of denatured alcohol.

Step 17 - Wing Assembly (D2 and WH7)

Locate D2 from LP1. It is glued in as shown here - in the pre-cut slots in R2 and R2 - just in front of the trailing edge. Using the same techniques and care as you did when epoxying D1 in the last step.



Once the epoxy has cured, locate WH7 and glue it in position on top of the trailing edge as shown here.



Yes, this photo does show center sheeting already installed on our prototype. Please disregard that for now as the sheeting will be installed in a few steps.

Step 18 - Wing Assembly (R1)

Make sure that R2 is smooth and flat, then install R1 (from LP4) on to the port wing.

Slide D1 and D2 into R1's slots, then push it flat against R2. We recommend using epoxy for this step to give you more working time than quick setting glue does. Once R1 is in place, make sure it is still flat against R1, then tape or clamp it in position until the glue cures.

Step 19 - Wing Assembly (R1)

Locate the other R1 from LP4 and glue it in place, up-against, and aligned with the R1 you just installed. Again, use epoxy here.

Step 20 - Wing Assembly (join wing halves and D2)

Locate D1 from LP3 and both wing halves. At this time the wing halves will be joined into a single wing - again we recommend epoxy to glue these two halves together. Carefully slide the two halves together, taking care not to damage or break off D1 or D2.



When properly aligned, there will be a slight bend at the center of the wing (dihedral).

At the same time, also epoxy the remaining D1 to the underside of the wing as shown here - just in back of the lower spars, in the pre-cut notches in R1, R2 and R3.

Make sure the two wings are firmly clamped together and allow the epoxy to completely cure.

Step 21 - Wing Assembly (center sheeting)

Now the center section of the wing is sheeted on each side of R1, so we'll focus on the top sheeting first. You'll notice that R1, D1 and D2 are slightly proud of (raised above) R2 and R3 - creating a 1/16th "pocket" that the sheeting will fit in to.

We'll do this in two sections - the front and then the rear - which are

divided by the upper spar. Let's tackle the front section first - this is the area from the leading edge back to upper spar.

Using 1/16" x 4" x 24" balsa sheet, measure and cut a section that covers this area and will rest on top of ribs R2 and R3. Make sure that the grain of the wood is "cross-grained" - that is running along the length of the wing, from R2 to R3.

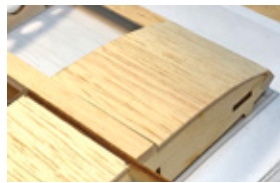
On the front edge, lightly sand a bevel as shown here. This will allow the sheeting to fit up against the leading edge.



Now glue the sheeting in place - first by gluing it to the leading edge and the ribs as shown here.



Once that glue has cured, apply glue to the top of the ribs and the back edge of the sheeting. Press this sheeting in place and secure it until the glue has cured.



□ Step 22 - Wing Assembly (top center sheeting)

Now you need to sheet the rear portion of the center section. This will require edge-gluing two pieces of 1/16 balsa sheet together to make a slightly longer piece of wood - and making two of them (one for each side).



When edge gluing the sheeting pieces together, first make sure the edges are flat (give a quick swipe or two with a sanding block). Then tape the two pieces together as shown here with a piece of tape. As you lift the sheeting from the board you'll see that the tape will act as a hinge allowing you to put a small amount of adhesive in the joint. When the adhesive is applied, place the sheeting back down on the waxed paper, so that it's flat (as shown in the photo). When cured, you'll now have a single, longer piece of sheeting.



Carefully measure and cut these. Test fit and sand as necessary to obtain a good fit between the upper D1 and WH7. When satisfied with the fit, glue these sheets in position, one at a time.

□ Step 23 - Wing Assembly (wing dowels and DG)

Locate the 6" piece of 1/4" dowel (not the 3/32" dowel that will be used later on in the elevator construction. Measure and cut two 2-1/4" pieces. Round both ends of both pieces and set them aside. Now locate DG from LP1 and tape in place to the rear of the wing, right in the center - use the pre-



etched DG center line to help align it exactly to the center of the wing. With it properly in place, DG's angle will match the dihedral of the wing.

Now using a 1/4" drill, you can make two holes into the center of the trailing edge so the dowels can be installed. Only drill through the trailing edge stock and the J2 pieces - DO NOT DRILL INTO THE WH6 PIECES which already have pre-cut 1/4" holes. Remove DG and then insert the dowels through the trailing edge until they protrude about an 3/16" out of the trailing edge as shown. Glue both dowels in position.

□ Step 24 - Wing Assembly (top center sheeting)

Before we tackle the bottom center sheeting, we have to transfer the wing bolt locations to the top sheeting so it can be trimmed. We found the easiest way to do this is to use a sharpened #2 pencil, but probably not in the way you think.

Placing the pencil in the pre-cut holes in the WH4/WH5 assembly as shown here, and making sure it's held straight, you can use the pencil to gently push through the wing's upper sheeting.



All you need is enough of the graphite to protrude through the wood so you know where to mark the clearance holes. Do this for both wing bolt locations.

Now you can place the wing back on your building surface, right side up. Locate one of the H2 pieces from LP2 and use it as a guide. Center the cutout circle in H2 over each of the pencil holes you made. Now, trace around the rounded outside portion of H2 to make half a circle, flip H2 around, re-aligning it and then trace the other half of the circle.



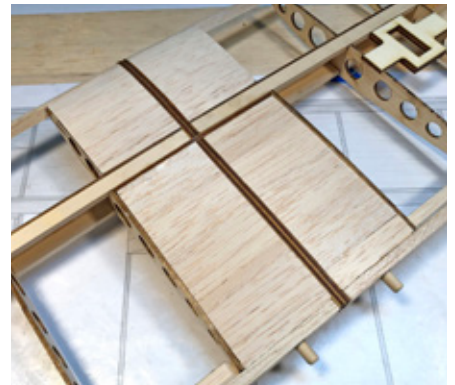
Now using a hobby knife or a rotary tool, carefully trim away the wood to make two clearance holes for the wing bolts to pass through.



□ Step 25 - Wing Assembly (bottom center sheeting)

Now it's time to sheet bottom of the wing's center section.

Using the same techniques as you did for the top side, measure, cut and sheet the bottom of the wing's center section with the same 1/16" x 4" balsa sheeting



Step 26 - Wing Assembly (aileron servo mount)

Cut into LP4 are the aileron servo mounts. However there are two slightly different sizes to help accommodate the different brands servo sizes. You'll need one SM1 and one SM2 for each aileron mount. The pieces that are slightly larger are designed with the etched circle.



Glue one SM2 to SM1 as shown here - making sure both pieces either have an etched circle, or they both don't (matched pairs). Now do this again so you'll have two matching aileron mounts.

Step 27 - Wing Assembly (aileron servo mount)

The aileron mount you just assembled in the previous step is now glued into place on the bottom of the wing, as shown here.



Note that if you're using the slightly large SM1/SM2 pieces, it will only properly fit when the longer edge (designated by the etched circle) is orientated towards the trailing edge of the wing.

Also note that SM1 should be flush with the wing's surface, with SM2 orientated inside the wing. (Refer to the photo.)

When satisfied with the fit and orientation, securely glue both aileron mounts in position.

Step 28 - Wing Assembly (Tip)

Locate both of the TIP pieces from BPTIP.

These are the wing tips and are glued into place, up against the outer R5 tip ribs.

Make sure each R5 is sanded flat with no extra wood protruding, then glue one TIP to each end.

You'll need to make sure they are properly positioned as there isn't a guide to aid in this step. Also, these TIP pieces are slightly oversized to give a bit of "wobble-room".



This completes assembly of the Mambo wing.

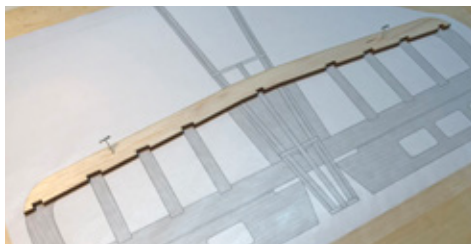
Now it's time to start construction of the tail surfaces.

Prepare your work area

Now tape the horizontal stabilizer plan and a fresh piece of waxed paper on your building board.

Step 29 - Horizontal Stab Assembly (S1)

Locate both S1's from BP1. These are glued on top of each other to form a thicker S1. Make sure they are exactly aligned with each other when gluing them together.



Then pin them in place over the plan as shown here.

Step 30 - Horizontal Stab Assembly (S2)

Locate both S2's from BP1. These are glued together to form a thicker S2, then glued to the center of S1, as shown here.



Step 31 - Horizontal Stab Assembly (S3)

Locate both S3's from BP1. These are glued together to form a thicker S3, then glued to the S2, as shown here.



Step 32 - Horizontal Stab Assembly (S4)

Locate four S4's from BP6 and BP7. These are glued together to make a pair of matching, thicker S4's. Then these S4's are glue in place as the stab's tips as shown here - one each end of the horizontal stab.

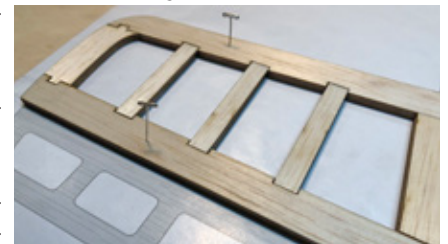


Step 33 - Horizontal Stab Assembly (S5, S6, and S7)

Locate four S5's, four S6's and four S7's from BP1.

Glue two S5's together to make a thicker S5, then do the same to make a matching pair of S5's. Do the same for the S6's and S7's.

These are now glued in place as shown, making sure they are firmly seated in the pre-cut notches in S1 and S3.



Step 34 - Elevator Assembly (E1)

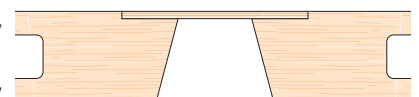
Locate four E1's from BP1. Glue two E1's (perfectly aligned on top of each other) to form a thicker E1, then do the same for the remaining E1's. This will give you the left and right elevator halves.



Step 35 - Elevator Assembly (joiner)

Locate the 4" length of 3/32" dowel to create the elevator joiner. Measure and trim it to the length as shown on the plans - roughly 3-1/4".

Pin both elevator halves in position, making sure they are perfectly aligned with each other, then securely glue the elevator joiner dowel place.



Prepare your work area

Now tape the fuselage side plan and a fresh piece of waxed paper on your building board.

Step 36 - Vertical Fin (V1, V2 and V3)

Locate both V1's from BP3 and BP9, both V2's from BP2, and both V3's from BP3.

Glue both V1's together to form a thicker V1, both V2's to form a thicker V2, and both V3's to form a thicker V3.



Step 37 - Vertical Fin (V1, V2)

Glue the V1 and V2 assemblies together as shown here to form the completed vertical fin.



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

Fuselage Assembly (power choice time)

We've now reached the point of our program where it's time for you to make a choice. This choice is what you'll be using to power your Mambo.

If you are using the powerplant and mount from an older Apprentice 15e or Apprentice S, you'll build the central plywood fuselage crutch one way - if not, you'll build it another way.

The reason for this choice right now, is that if you're using the Apprentice's motor and motor mount, the mount has a significant amount of right-thrust already built into it. So when building the crutch, we'll actually build it to take out some of this right thrust.

These next steps also rely on you noting the large laser-cut numbers in the FS1 and FS2, as well as the circle engraved into TR1.

So, now is the time to make this choice. If you're using Apprentice parts, continue on with step 38. If not, skip forward to step 38, on page 9.



If using the Horizon Apprentice S or 15e motor AND Apprentice mount, follow these steps.

Step 38 - Fuselage Assembly (TR1, F3)

Locate TR1 from LP3 and F3 from LP1. Both of these pieces have orientation marks that you'll need to refer to in this step.

The top of F3 has two pre-cut notches. TR1 has an etched circle on the top surface, at the front edge.

Since you're using the Apprentice motor and motor mount, hold F3 as shown (top up on the building board), then slip TR1 in at an angle, making sure that the etched circle faces down.

Rotate TR1 into place, again making sure that the etched circle faces down. Glue it to F3, making sure it is perpendicular to F3 and firmly seated against the two center tabs in F3.



Step 39 - Fuselage Assembly (SUP, FS1)

Locate both SUP support pieces from BP6. These will not be part of the fuselage, but rather are used as support pieces. Also locate FS1 from LP2.

Test fit FS1 to the port side of TR1/F3 assembly. Only test fit the tabs from F3, rearward (the flat section).

Now lay the assembly on your board as shown in the photo, using the SUP pieces to support this assembly. (The SUP pieces raise the assembly up just enough to clear F3's side tabs that extend through FS1.)

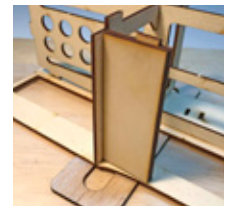
When satisfied with the orientation and fit of the tabs, remove FS1, apply glue and fasten FS1 to F3 and TR1 from F3, rearward.



Step 40 - Fuselage Assembly (WH1, WH2)

Locate WH1 from LP2 and both WH2's from LP3. Glue WH1 in place first, making sure it's tabs are firmly seated in the pre-cut slots in FS1 and F3.

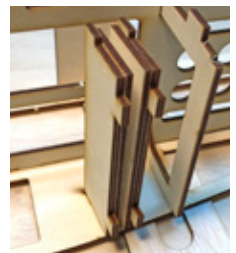
Now glue WH2 in place on top of WH1, as shown here, then the other WH2 on the other side (bottom) of WH1.



Step 41 - Fuselage Assembly (LG1, LG2)

Locate both LG1 from LP3 and both LG2 from LP2. One LG2 is glued to one LG1, making sure it is aligned perfectly. Then glue the other LG1 and LG2 together so you'll have a matched set.

These sub-assemblies are now glued in place. Take care that these pieces are orientated the right way when glued to FS1. When correct, both LG2's will face each other and the tabs of LG1 will be firmly seated in FS1.



Step 42 - Fuselage Assembly (FS2)

Locate FS2 from LP1. Test fit it in position, making sure you can insert all of the tabs into the slots in FS2.

When satisfied with the fit of the tabs, remove FS1, then glue it to F3 and to TR1 from F3, rearward.



If using another form of engine/motor and mount, follow these steps.

Step 38 - Fuselage Assembly (TR1, F3)

Locate TR1 from LP3 and F3 from LP1. Both of these pieces have orientation marks that you'll need to refer to in this step. The top of F3 has two pre-cut notches. TR1 has an etched circle on the top surface, at the front edge.

Since you're not using the Apprentice motor and motor mount, hold F3 as shown (top up on the building board), then slip in TR1 at an angle, making sure that the etched circle faces upward.

Rotate TR1 into place and glue it to F3, making sure it is perpendicular to F3 and firmly seated against the two center tabs in F3.



Step 39 - Fuselage Assembly (SUP, FS2)

Locate both SUP support pieces from BP6. These will not be part of the fuselage, but rather are used as support pieces. Also locate FS2 from LP1.

Test fit FS2 to the port side of TR1/F3 assembly. Only test fit the tabs from F3, rearward (the flat section).

Now lay the assembly on your board as shown in the photo, using the SUP pieces to support this assembly. (The SUP pieces raise the assembly up just enough to clear F3's side tabs that extend through FS2.)

When satisfied with the orientation and fit of the tabs, remove FS2, then glue it to F3 and to TR1 from F3, rearward.



Step 40 - Fuselage Assembly (WH1, WH2)

Locate WH1 from LP2 and WH2 from LP3. Glue WH1 in place first, making sure its tabs are firmly seated in the pre-cut slots in FS2 and F3.

Now glue WH2 in place on top of WH1, as shown here.



Step 41 - Fuselage Assembly (LG1, LG2)

Locate both LG1 from LP3 and both LG2 from LP2. One LG2 is glued to an LG1, making sure it is aligned perfectly. Then glue the other LG1 and LG2 together so you'll have a matched set.

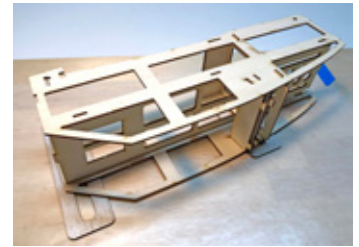
These sub-assemblies are now glued in place. Take care that these pieces are orientated the right way when glued to FS2. When correct, both LG2's will face each other and the tabs of LG1 will be firmly seated in FS2.



Step 42 - Fuselage Assembly (FS1)

Locate FS1 from LP2. Test fit it in position, making sure you can insert all of the tabs into the slots in FS2.

When satisfied with the fit of the tabs, remove FS1, then glue it to F3 and to TR1 from F3, rearward.



Step 43 - Fuselage Assembly (WH3)

Locate both WH3 from LP3.

Glue them together to form a thicker WH3.

Now glue this sub-assembly in position as shown, making sure it is firmly glued to FS1 and FS2.



Step 44 - Fuselage Assembly (LG3)

Locate both LG3's from LP1 and LP2. Flip the fuselage on its top and notice the tabs extending from the previously installed LG1/LG2 assemblies.

Both LG3's are installed on to these tabs, one on top of the other. When gluing on the first LG3, make sure it is firmly seated. Then the second LG3 is installed as shown.

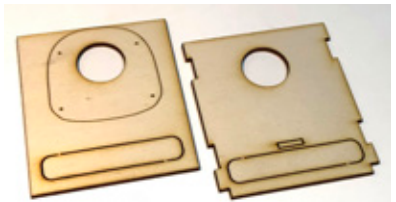


Step 45 - Fuselage Assembly (F1, F2)

Locate F1 and F2 from LP2. If you're using electric power, punch out the large rectangular cutouts on the bottom of each piece.

However, if you're using glow to power your Mambo,

place these two pieces on a piece of waxed paper as shown. Mix up a small amount of 6 minute epoxy and use it to carefully fill in the cuts around the large rectangular cutouts on the bottom of each piece. Take care to remove any excess epoxy on the face of each piece. Epoxy is easier to clean off before it cures by using a paper towel lightly soaked in a bit of denatured alcohol. Allow to cure completely before moving on. Lightly sand the front and back of each piece to ensure no excess epoxy is proud of the surfaces.



Step 46 - Fuselage Assembly (F2)

We advise attempting a dry fit on this step before applying any glue.

FS2 is now installed to the front of the fuselage. This will involve squeezing the fuselage sides together and attaching them to the front of TR1.

It's possible that a little bit of light

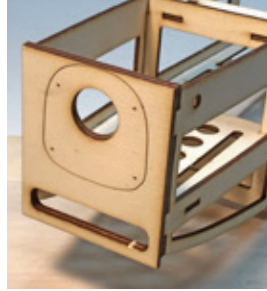


sanding is needed to bevel the sides of F2 to obtain a secure fit. F2 needs to be flush against the front of TR1, and the tabs from both fuselage sides need to be inserted into the pre-cut slots in F2. When satisfied on how these pieces go together, it's time glue things in place and we recommend using epoxy for this step for it's extra strength and working time.

You may also need to use a couple of clamps or some masking tape to hold everything in position securely while the glue dries.

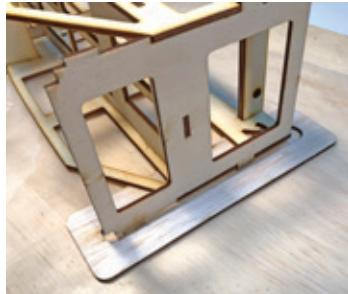
□ Step 47 - Fuselage Assembly (F1)

F1 is now glued into place on F2. If you're using the Apprentice motor setup, attach it so the etched mounting diagram is facing out, as shown. If using another powerplant, then flip the piece over, hiding this etching.



□ Step 48 - Fuselage Assembly (F4)

Locate F4 and LP1. This is glued in place to the back of this assembly, as shown. Make sure that all of the tabs are fully seated in the precut notches.



When finished with this step, this completes the initial assembly of the internal plywood fuselage frame. It should look like this.

Take this time to double-check that all the joints are securely glued. Don't add excess glue as it adds to the final weight, but be sure all pieces are firmly attached and add glue as needed - especially around the higher stress WH1/WH2, WH4 and LG1/LG2 areas.



□ Step 49 - Fuselage Assembly (side sheeting - front half)

Locate FSP1 and FSP2 from BP4. These two pieces are glued together to form a larger piece that makes up the front half of the port side fuselage sheeting.



Use the same technique that you used to join the wing sheeting together back on step 22 regarding edge gluing sheets together, to make sure you end up with a nice, flat joint.

Also locate FSS1 and FSS2 from BP5. These two pieces are glued together to form a larger piece that makes up the front half of the starboard side fuselage sheeting.

□ Step 50 - Fuselage Assembly (FS3, FS4)

Locate both FS3's from BP7 and both FS4's from BP6.

Use the same edge-gluing technique to glue one FS3 to one FS4 as shown here. This forms a back half fuselage sheet. Set this aside and do the same thing with the remaining FS3 and FS4 to form the other back half fuselage sheet.



□ Step 51 - Fuselage Assembly (port & starboard sheeting)

Take one of the front sides from step 49 and one of the back sheets from step 50. These are glued together to form a completed fuselage sheet.

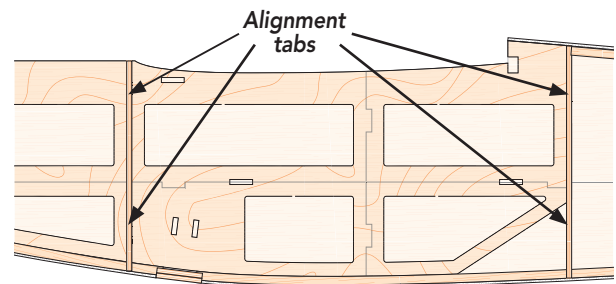
When gluing these together, make sure they are properly aligned by positioning them over the fuselage plan sheet.

Do this twice - to make the port and starboard fuselage side sheets.



No, the plans aren't shown in this photo, as they didn't exist for this prototype - but you have them, so please use them so you don't end up with a mis-aligned fuselage in later steps.

□ Step 52 - Fuselage Assembly (port & starboard sheeting)



Now it's time to attach the side sheeting to the internal plywood fuselage frame. You'll note that there are 4 tabs which protrude each side of the plywood frame. These tabs will fit into the slots cut into the fuselage sides.

Test fit the both side sheets the plywood frame, making sure you place the port sheeting (slightly longer side) to the port side, and the starboard (slightly shorter side) to the starboard side. Ensure, they align correctly when brought together at the rear of the fuselage. Lightly sand as necessary, then when satisfied, remove the port side and apply glue to the port side of the plywood fuse frame between F3 and F4 (the flat portion). Refit the port sheeting to attach it in place. Once the glue has cured, flip it around to the starboard side and do the same to glue that sheeting in place.

When dry, apply a bit more glue on the forward, side sections of the plywood frame (from F3 up to F1) and bend the side sheeting inward on each side to glue it in place.

□ Step 53 - Fuselage Assembly (rear pins)

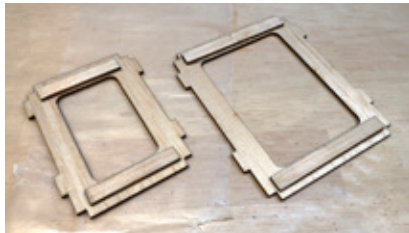
Use a couple of t-pins (or tape) to bring the two fuselage sheets together at the rear, as shown. Don't glue these together! This simply holds them as shown to guarantee alignment for the next few steps.



□ Step 54 - Fuselage Assembly (F5, F5A, F6, F6A)

Locate F5, F6, both F5A's and both F6A's from BP8.

Lay F5 and F6 on your building surface as shown, then glue one F5A across the top and one F5A across the bottom of F5 to strengthen it.



Do the same for F6 and the F6A's.

□ Step 55 - Fuselage Assembly (F5, F6)

Now it's time to slip F5 and F6 into place, between the fuselage sides. Both of these pieces must be oriented the correct way, as they are not symmetrical, top to bottom. You'll notice the tabs are offset towards the bottom when correctly installed in their corresponding slots in the fuselage side sheeting.



Glue these two formers in place, making sure that the rear fuselage sides remain aligned. Refer to the top view on the fuselage plans to see how the rear of the fuselage should be curved - symmetrically straight and true - not bowed to the left or right (banana shaped).

□ Step 56 - Fuselage Assembly (F7)

Locate F7 from BP4 and glue it in position as shown. Again note the orientation of the piece - with the large opening for the vertical fin towards the fuselage top. Also keep that fuselage aligned as we previously mentioned.



□ Step 57 - Fuselage Assembly (F8A, F8B)

Locate F8A and F8B from BP4. Glue these in position as shown, again paying attention to their orientation.

You should remove the pins from the back of the fuselage to install these two pieces. No problem as they aren't needed anymore.



□ Step 58 - Fuselage Assembly (rear cap)

Back when you made the wings, the leading edge was created from 5/16" square stock. Use a piece of this stock to form the rear

fuselage cap. This piece will fit between the fuselage sides as shown here.

Measure and cut the piece, then slightly taper the sides so it will contact the sheeting along its length.

Glue this in position.



□ Step 59 - Fuselage Assembly (rear longerons)

Using the 3/16" square stock, it's time to measure, cut and install the corner longerons for the rear of the fuselage. There will be two longer strips that run along each side of the bottom, from the LG3



pieces to the rear fuselage cap.

There are also two slightly shorter top pieces that run along each side of the top from F4 to the rear fuselage cap.

Take care that these are fully seated into each of the corner cutouts in each of the formers when gluing them in.

You'll also need to sand/cut a slight taper in the longerons where they touch, back by the rear fuselage cap.

□ Step 60 - Fuselage Assembly (front longerons)

Using the scrap 3/16" square balsa stock from the previous step, measure, cut and install the front longerons.

These two bottom pieces will run from the front of LG3 to the cutouts in F2, on each side of the fuse.



□ Step 61 - Sanding (Wing, stab, elevator, fin and rudder)

Set the fuselage aside and now is the time to get quite familiar with the sanding tools of your choice to do a good sanding on the wing, horizontal stab, elevator, vertical fin and rudder.

On the wing, take the time to preform 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 ribs, continuing the curvature of the wing.

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

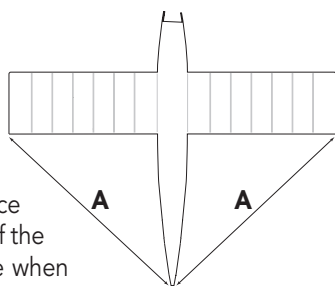
Sand bevels into the leading edge of both elevator halves and the rudder.



Step 62 - Fuselage Assembly (wing attachment bolts)

Slide the wing into the wing saddle and push the rear hold down pins into WH4 (lightly sand as necessary for a good fit).

Then allow the wing to rest in the wing saddle. The wing is perfectly aligned when the distance from the left wing tip to the rear of the fuselage is the same the distance when measured from the right wing tip.



When the wing is aligned, use a pencil to transfer the wing's bolt holes through to WH1/WH2 already installed in the fuselage.

Remove the wing then drill two 3/16" holes, centered on the marks you just made. When drilling, take your time and make sure the drill is held so the bit is held straight. Remove the drill, and clean up around the new holes you drilled.

Run a 1/4x20 tap through holes you just drilled 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.

But, if you prefer, you can enlarge these holes to 5/16", then install 1/4x20 t-nuts instead (not included).

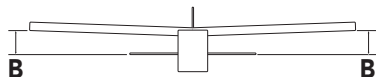


Step 63 - Fuselage Assembly (stab alignment)

Although we've done everything possible to engineer the Mambo so it will build straight and true, take a few minutes to guarantee things are straight before gluing on the tail surfaces.

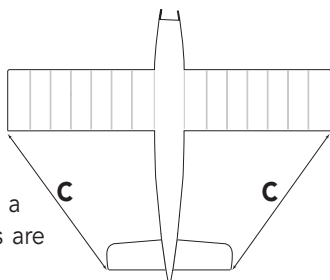
First bolt on the wing. Now, to align the stab, slide it in place.

Look at the fuselage straight on, from the nose (or tail) and make sure that the stab is level with the wings. If not, remove the stab and gently sand the stab cutouts in the fuselage sheeting a little at a time. Check the stab and re-sand the supports as needed.



Step 64 - Fuselage Assembly (stab alignment)

Once leveled, ensure that the stab is aligned with the wing by measuring the distance from the left wing tip to the left tip of the stab. Compare this to the distance between the right wing and right stab tip. Slide the stab a bit until these two measurements are equal.



Use a pencil to mark on the stab where it intersects with the fuselage on each side, then

Remove the stab, apply glue in the fuselage slots, then attach the stab in place.

Using scrap 3/16" square balsa, cut two pieces, roughly 3" in long. From the underside of the fuse, glue one of the strips in on each side where the fuselage and stab join - this will stiffen up and support the joint.



Step 65 - Fuselage Assembly (PG)

Before the top and bottom sheeting is installed, we recommend installing the elevator and rudder pushrod guides inside the fuselage. Pushrods are not included and we recommend a set of flexible pushrods, similar to those by Du-Bro, Sullivan, etc.



These have an outer tube which is permanently installed in the fuselage. We include a set of PG pieces on BP4 to act as pushrod supports. These are meant to be glued to a couple of the formers and the pushrod's outer tubing then glued to the PG pieces, similar to what's shown in the photo.

Step 66 - Fuselage Assembly (aft bottom sheeting)

Now, using the 1/16" sheets it's time to sheet the bottom of the aft fuselage.

This is done a piece at a time, starting up against the back of LG3. Hold the 1/16" sheeting against the fuselage, making sure the grain is cross-ways. Mark, cut and glue the first 4" section of sheeting in position.

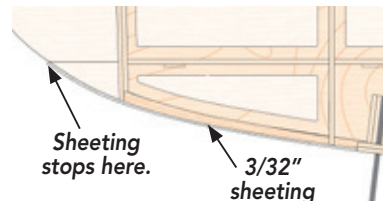


Using this same technique, work your way backward 4" at a time, until you reach the rear of the fuselage. Be careful not to waste as little of the sheeting as possible.

Step 67 - Fuselage Assembly (front bottom sheeting)

Now, using the 3/32" sheet it's time to sheet the bottom of the front of the fuselage.

This is done a piece at a time, starting up against the front of LG3 and running up to the joint in the fuselage side sheeting (see diagram). Carefully mark, cut and glue sections of cross-grain 3/32" sheeting.



Step 68 - Fuselage Assembly (vertical fin)

Locate the vertical fin assembly from and glue it in place as shown. The fin should be firmly seated in the pre-cut grooves in both F7 and F8A.

Sand the fin if necessary to get a firm, slop-free fit. Also ensure that the fin is perfectly vertical (90° in relation to the stab).



Mark and trim the 3/16" longerons as needed for clearance.

Step 69 - Fuselage Assembly (top sheeting)

Using the same techniques used to sheet the bottom of the fuselage, it's now time to sheet the top. Again, use 1/16" sheets, cross-grained, in 4" sections at a time.

When you reach the front of the



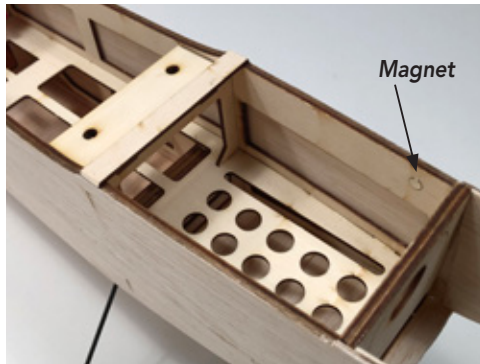
vertical fin, you'll need to fit a smaller piece.

On each side of the vertical fin, two "trapezoidal" pieces will need to be cut and fitted. The grain for these two pieces switches from cross-grain, to run with the length of the fuse.

□ Step 70 - Fuselage Assembly (H4, magnets)

Locate H4 from LP2 and glue it in place on top of the fuselage, as shown here - straight across with the rear edge even with the rear of F3.

Also locate two of the magnets. Push one into the pre-cut circles on each side of the fuselage, as shown in this photo.



□ Step 71 - Fuselage Assembly (H1, H2, H3, magnets)

Locate H1 and both H3's from LP3, both H2's from LP2, and the remaining two magnets. These parts make up the top hatch.

H1 has an angle cut on the front end, so depending on the powerplant choice you made when constructing the fuselage either side be

the top - test both ways for the best fit. When properly seated, it will fit in the area between H4 you just installed and F2. You may have to do a little sanding to get a good fit.

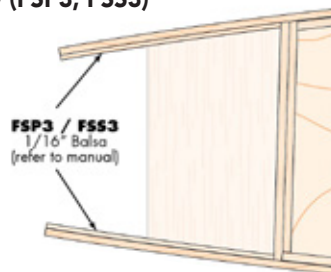
Make a mark to designate the top of H1, then remove it and place it up-side-down on your workbench. Glue both H2's in the front slots and both H3's in the rear slots as shown.

Also press in the magnets into the H2's, making sure the magnets are oriented properly to attract, not repel, the corresponding magnets in the fuselage.



□ Step 72 - Fuselage Assembly (FSP3, FSS3)

Locate FSP3 and FSS3 from BP12. These are glued to the insides of the fuselage sheeting, in front of F1. FSP3 is glued to the inside of the port side, and FSS3 is glued to the inside of the starboard side. These may have to be trimmed and sanded slightly to match the fuselage sheeting shape.



□ Step 73 - Sanding (fuselage)

Now it's time to get out your sanding tools again and give the fuselage a smoothing over.

Smooth out the edges of the fuselage. Because of the 3/16" framing installed in each corner under the fuselage sheeting, you can be a little more aggressive in rounding the corners if you'd like.

□ Step 74 - Elevator Slot

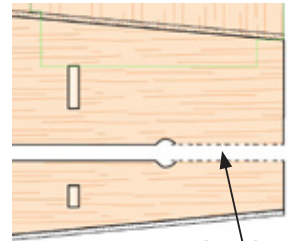
For the most of the Mambo build, we've tried to do as much engineering and pre-cutting for you.

But, for this step, you'll need to do a little bit of work yourself.

Referring to the diagram, you'll need to mark a 3/16" wide slot from the rounded portion of the elevator cutout, straight back to the end of the fuselage. The easiest way to do this is to lay a straight-edge on the top of the elevator and mark the line, then do the same on the underside of the elevator.

Now, using either a sharp hobby knife or small hand saw, carefully cut out this area of sheeting and the portion of the rear fuselage cap.

This area will need to be filled in later using some scrap balsa, but only after the stab and elevator has been covered and hinged.



□ Step 75 - Ailerons

Locate both 5/16" x 1-1/4" shaped balsa sticks. These will form the ailerons. Measure and cut the strips so you'll end up with two ailerons of equal length - roughly 19-1/2" long. Sand bevels into the leading edge of both ailerons and round the outer tips to match the curvature that you sanded into the wing tips.



This completes the major assembly of the Mambo's airframe.

□ Step 76 - Tailwheel choice

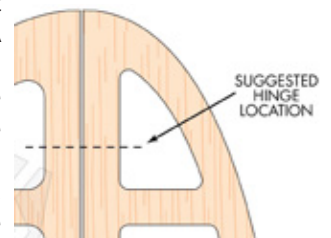
There are two ways to go with the tailwheel for your Mambo. You can visit your local dealer to pickup one of many different assemblies available, or you can make your own with a little effort. This choice is important as the type of tailwheel may require drilling into the leading edge of the rudder before it is installed in the next step.

We chose to make our own by bending a piece of wire to create a wire that can be inserted into the rudder, eliminating the need for brackets, screws and springs. A piece of 1/16" or 5/64" music wire typically works nicely. In either case you'll need to supply your own tail wheel and wheel collar.



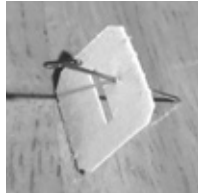
□ Step 77 - Hinge the control surfaces

Included with your Mambo kit are strips of hinges. These are CA hinges, requiring a little bit of thin CA to secure them in place. These hinges come in strips, so separate them into individual hinges. Referring to the plans you'll see a number of spots called out where



we recommend these CA hinges to be installed. Starting with the horizontal stab, mark the locations of each of the hinges. Now using a sharp hobby knife, carefully cut a hinge-sized slot in each of the four locations, making sure the slots are cut perfectly in the center of the stab's trailing edge.

Now slide the elevator in place (through the slot you cut earlier) and mark the leading edge of the elevator for hinge location. Remove the elevator, then make the matching slots in the elevator. Take 4 of the hinges and stick a t-pin into them as shown here, right in the center. These pins will help in installing the pins half-way into the stab and elevator.



Slide each of the 4 hinges into the elevator slots, then slide the elevator into position on the back of the horizontal stab. Continue working the hinges in to the horizontal stab until they are fully seated up against the t-pins.

When happy with the fit, remove the elevator and the hinges, then set them aside.

Now using this same technique, cut the hinge slots for the both ailerons and the rudder. Test-fit all of them to make sure the slots are the proper depth and the hinges can be properly inserted.

Step 78 - Covering (horizontal stab and elevator)

We advise covering your model in two steps. First is to cover the horizontal stab and elevator, then stopping there. After you've covered both parts, then the elevator needs to be permanently installed using the CA hinges. Push the elevator into place, then when properly seated, remove the t-pins from each of the hinges. Place a couple drops of thin CA on each hinge and allow it to wick into the hinge material and cure. It takes just a few drops so don't overdo it. Continuously work the elevator back and forth to make sure any excess glue doesn't accidentally glue the elevator right to the stab in a fixed position.

Step 79 - Fuselage Assembly (fill elevator slot)

We mentioned this earlier, but after the elevator is properly installed, now use a bit of scrap wood to fill in the slot that was cut into the rear of the fuselage. Once the glue has cured, sand this area smooth before continuing.

Step 80 - Covering (remainder of airframe)

Now it's time to cover the rest of the Mambo. Double check that all surfaces are smooth and ready to cover. Sand as necessary, then cover the rest of the 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 rear of the fuselage. We choose to cut a hole just forward of the stab, on the underside of the fuselage.



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 on the previous page.



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

The next steps shown are not in a particular order but will all need to be done, unless marked optional.

Step 81 - Optional canopy

Included in the Mambo kit is a canopy and several small pieces to make up internal framework. This is optional and you're free to change things up if you'd like, but the following steps will describe how to assemble these pieces as shown on our prototypes.

- Locate all the pieces from BP9, and C3 from BP5.

- C3 is glued to C1, but be sure to use CJ as a jig to get the angle correct. Don't glue CJ to these pieces - just use it to get the right angle.



- Next, C5 is glued to C2, with C5's tabs fitting into the pre-cut C2 slots. Then glue C4 in place as shown.



- When these two sub assemblies are completed, lightly sand the top edge of C1 and C2 to bevel them. This will allow the canopy to fit better in the next few steps.

- Temporarily tape these two pieces in place on the airframe. The C1/C3 assembly is positioned at the rear of the wing, right in the center, and the C2/C4/C5 assembly is positioned on the fuselage sheeting, just in back of the C1 C3 assembly.

- Now take the canopy and trim along it's 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.

- Test the canopy in place and see if will rest flat on the wing and fuselage sheeting. If not, remove it and lightly sand the interfering area on the canopy assemblies. Not all canopies are exactly identical, so a bit of trial and error is needed to get a good fit. Try not to sand/bevel too much wood away - just take a little at a time.



- When happy with the fit of the canopy, it's time to mark where it will split. Make several marks around the canopy at the gap between the two canopy assemblies. We used a Sharpee for this as the marks can easily be removed with a touch of denatured alcohol.



- Now remove the canopy and cut along the marks you just made to separate the canopy into two sections.
- Remove the canopy assemblies and paint them to match your Mambo's color scheme.
- Once the paint has dried (and after the airframe has been covered, permanently attach the canopy assemblies to the airframe with glue.
- If you're going to add a pilot figure (not included), now is the time to test-fit, then glue it in place. You can pickup a pilot at your local hobby shop and for a few bucks you can add a nice look to that front cockpit area.
- Give both pieces of the canopy a quick wash in warm, soapy water.
- Use a bit of canopy glue to attach both canopy piece in place to the fuselage, and the canopy assemblies. So they won't move while the glue cures, hold them in place with a bit of low-tack masking tape.



Step 82 - Attach the Control Surfaces

Now is the time to attach the rest the control surfaces to the airframe, by gluing the hinges in position with thin C/A, just as you did with the elevator.

Step 83 - Landing Gear (main gear, straps)

The pre-bent landing gear (or landing gear from Horizon's Apprentice) slides into the pre-cut slot on in LG3. Slide it all the way, then position a landing gear strap on each side as shown in this photo.



Using a 1/16" drill bit, drill through the holes in each strap, then use four of the included 2-56 x 3/4" self-tapping screws to attach the straps to the fuselage.

Use the included 1/8" 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.

The following steps will show various pieces and parts which are not included in your Mambo. These are some of the parts we referenced as "needed to purchase" towards the front of this manual.

The parts shown in the photos were those we had on hand. Please pay no attention to the brand names of these parts as aren't recommending any particular brand.

Step 84 - Radio and pushrod installation

Shown here a few photos of the pushrods and radio gear installation in one of our Mambo prototypes. These are shown only for a guide, as each installation is unique, and the radio system you have might require adjustments from what you see here.

Make sure that when installing the control horns, they are placed

in-line with the pushrods, and that the line of holes where the clevises attach are positioned over the hinge line.

For the average pilot, we recommend that clevises are attached to the second outermost hole on each control horn.



On the plans you'll see a callout suggesting a spot where a hole needs to be cut in the wing's bottom sheeting. This hole allows the aileron servo wires to pass through the sheeting and exit the wing. Make these roughly 1/2" to 3/4" in diameter.



Cut into LP4 are SM3's (elevator, rudder and throttle, servo mounts).

As we provided with the aileron mounts, there are two slightly different sizes to help accommodate the slightly different sized servos. The pieces that are slightly larger are designed with the etched circle.



You'll need glue two SM3's on top of each other to form a single mount. Then mount your servo to the SM3 assembly. Now slip this in place as shown here for the elevator and rudder servo locations. There is a bit of extra room in the TR1 cutouts to allow for precise positioning of these mounts. Once you've figured out the correct spot, mark where they should go, then remove the SM3, apply glue and fasten it in place. Do this for both the elevator and rudder servos. If using a throttle servo, mount it further forward on TR1, closer to F3.

Finish the installation of your radio gear by adding the receiver,

flight pack battery and the switch. We mounted the receiver to the fuselage side using a bit of self-adhesive hook-and-loop (not included).

Because of the light-weight nature of TR1, there are a lot of holes cut into it. Use one of the larger scrap plywood pieces as a receiver tray that can be glued on the tray to form the receiver mount.

One very important note if you're using the Apprentice receiver or any receiver with active stabilization.

As noted before, the Mambo is not a trainer airplane, it is meant as a first build for those who have become competent with a trainer, or for those who have been flying for some time and want to try their hand at building. It is easy and fun to fly without the need for active stabilization.

However, if you're installing a receiver from an Apprentice or any other receiver with built-in stabilization, we ask that you pay VERY close attention to the guidelines that came with your system. Installing the receiver in the wrong place, and/or the wrong orientation can cause you to lose control and crash.

We are not against stabilization as we do use it on occasion for some of our own personal models. However, because of the critical nature of how receivers with active stabilization need to be installed, we strongly advise you to disable any stabilization on the setup and first test flights of your Mambo.

After you've trimmed out your Mambo and have become familiar in the way that it flies, then activate it if you'd like. When active, make sure that any correction the receiver may add is in the correct way to help - not hurt.

Step 85 - Power system

Installing your power system of choice is up next. We mentioned this earlier, but it bears repeating. Our engine size recommendation range is a .15-.30 two-stroke or an electric motor with similar power output.

On the fuselage plans, you'll notice a dotted line referred to as the "thrust line". This is the suggested line where the crankshaft of the motor (or engine) should be located. A little variation is ok, stay as close to the recommended line so your Mambo will fly as intended.

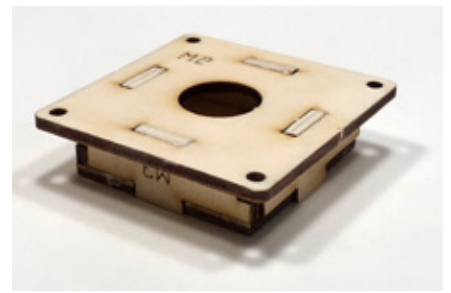
Electric power

If you're using the Apprentice motor mount and motor, simply line up the mount on the firewall, drill 4 mounting holes into the firewall, then attach the mount using 4 bolts and nuts (not included).



Note that the Apprentice mount also has down-thrust built into it. By using a couple washers between the mount and the firewall on the bottom two mounting screws, you can take out some of this thrust.

If you're using a different motor, you might need to space it out from the firewall a bit. We've included the parts to make a motor spacer on the lite-ply BOX sheet. Whether or not it's right for your particular needs is something you'll need to judge.



To assemble the spacer box, locate your motor's mounting bracket on the center of M2, then mark and drill its mounting holes into M2. We recommend using t-nuts (blind nuts) on the backside of M2 you won't have access to other types of nuts/locking systems once the box is assembled.

M1 is designed to be the base of this box, with the 4 M3 pieces forming the walls of the box. Then M2 is glued in place.

When assembled, M1 is the side that should be glued to the firewall. Carefully measure where this should go on the firewall, then epoxy it in position.

The ESC can mount underneath the battery tray or to the wall of the battery compartment, while the motor's power battery mounts to the tray. Both the ESC and battery are held in place with self-adhesive hook-and-loop (not included).

Glow power

For glow engines, you'll need to attach your engine mount to the firewall. Carefully measure where the mount should be attached, making sure your engine's crankshaft will be in-line with the thrust line noted on the plans.

Once it is attached, you may need to cut out some of the side sheeting so your engine's muffler can be installed and so you will have access to the carburetor's needles, throttle linkage and fuel tubing.

The fuel tank should be mounted on the tray, as well as the throttle servo and throttle pushrod.

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

Step 86 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 Mambo is measured 2.9" back from the leading edge of the wing, 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 as a last resort from your local hobby store and can work for this purpose when shifting of the internal components just isn't enough.

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 the closest or exact control throws listed.

Aileron 1/2" up/down
Elevator 1/2" up/down
Rudder 3/4" left/right

These control throw are suggested and work well. We ask that you start with these settings, then adjust them as needed as you become familiar with the flying characteristics of your Mambo.

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.

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.

If you find any damaged or missing parts, contact us within 60 days from purchase to receive replacement(s).

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.

As of this printing, you are required to register with the FAA if you own this product. For up-to-date information on how to register with the FAA, visit <https://registermyuas.faa.gov> . For additional assistance on regulations and guidance of UAS usage, visit <http://www.knowbeforeyoufly.org> .



For more information on all of our other products, as well as the latest news from Old School Model Works:

Please check out our website: www.oldschoolmodels.com

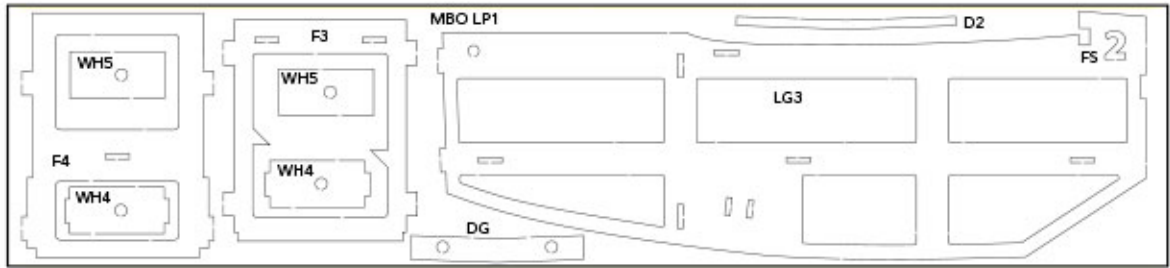
You can reach us on Facebook: www.facebook.com/oldschoolmodelworks

Instagram: www.instagram.com/oldschoolmodelworks/

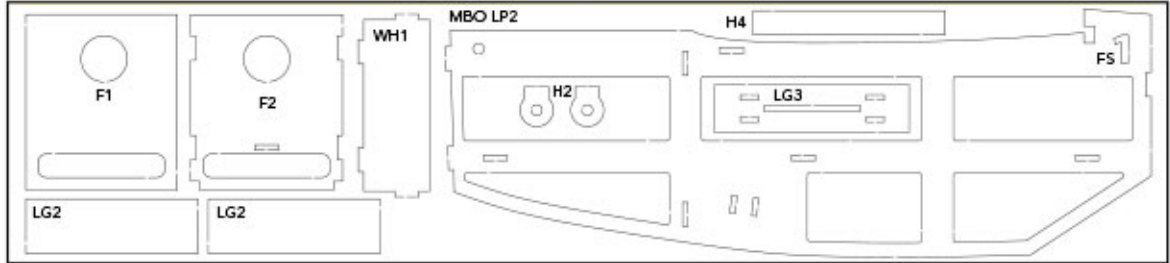
Twitter: www.twitter.com/oldschoolmodels

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

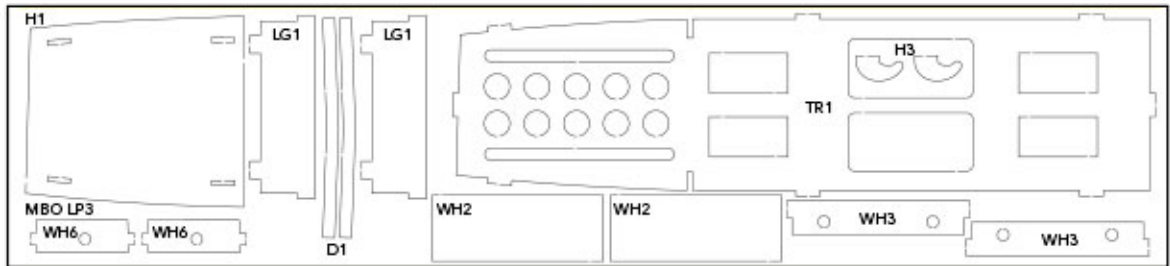
LP1
1/8" Lite Ply



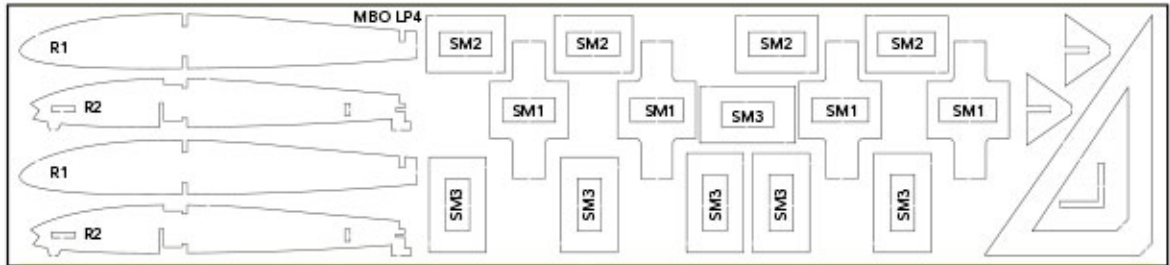
LP2
1/8" Lite Ply



LP3
1/8" Lite Ply



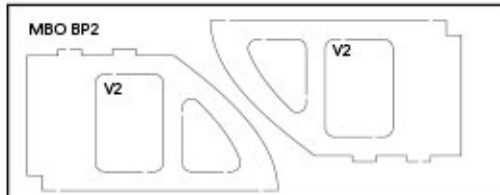
LP4
1/8" Lite Ply



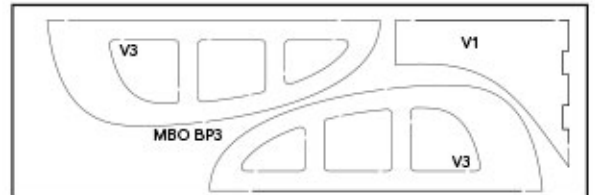
BP1
3/32" Balsa



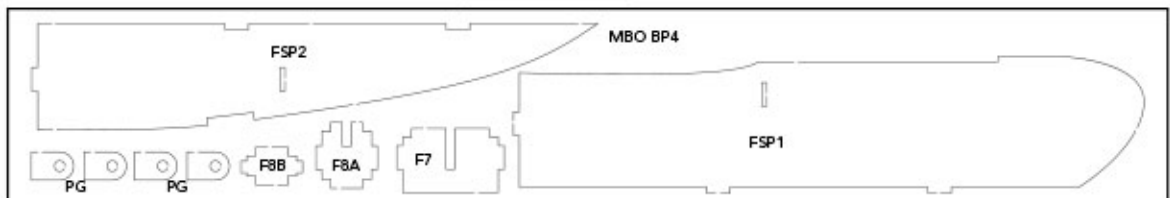
BP2
3/32" Balsa



BP3
3/32" Balsa

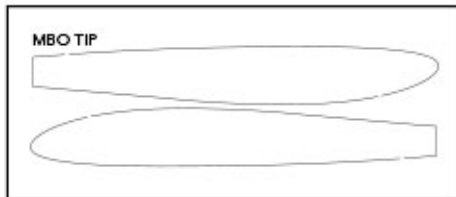


BP4
3/32" Balsa



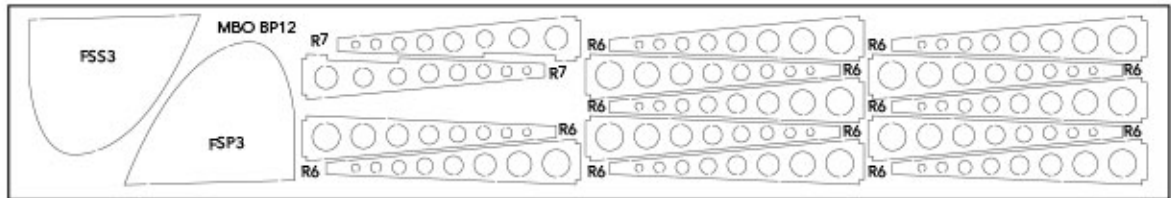
TIP

1/4" Balsa



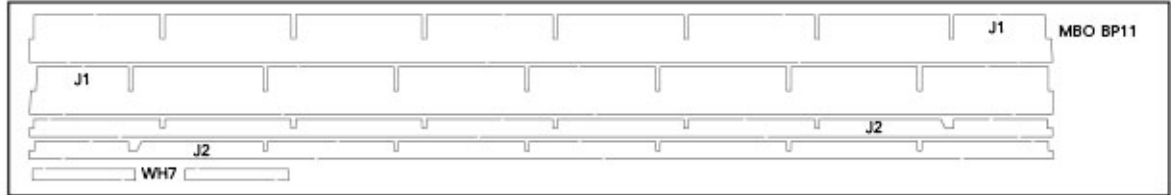
BP12

1/16" Balsa



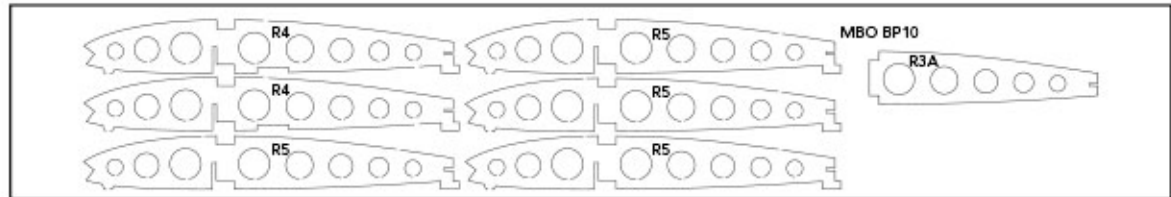
BP11

1/16" Balsa



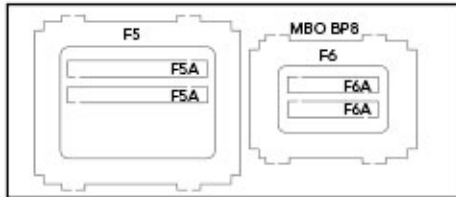
BP10

3/32" Balsa



BP8

3/32" Balsa



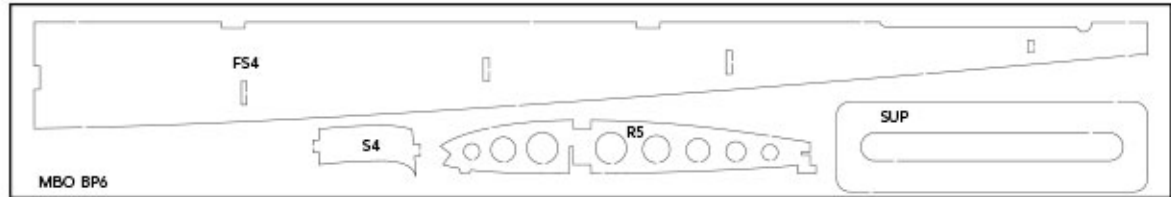
BP7

3/32" Balsa



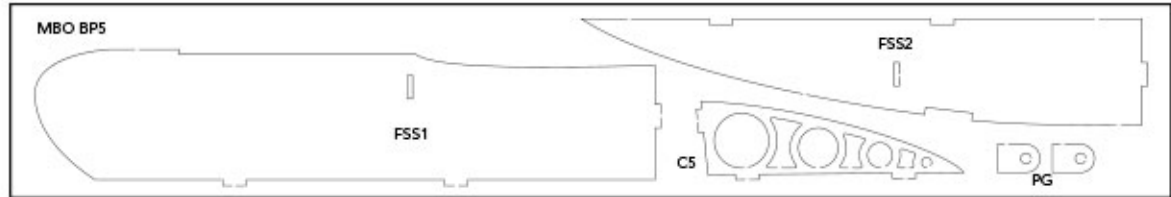
BP6

3/32" Balsa

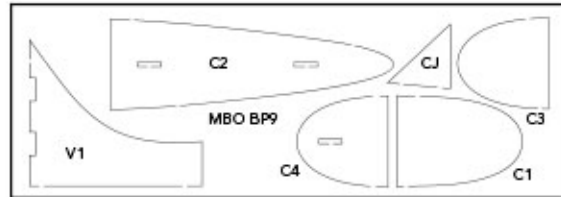


BP5

3/32" Balsa



BP9
3/32" Balsa



BOX
1/8" Lite Ply

