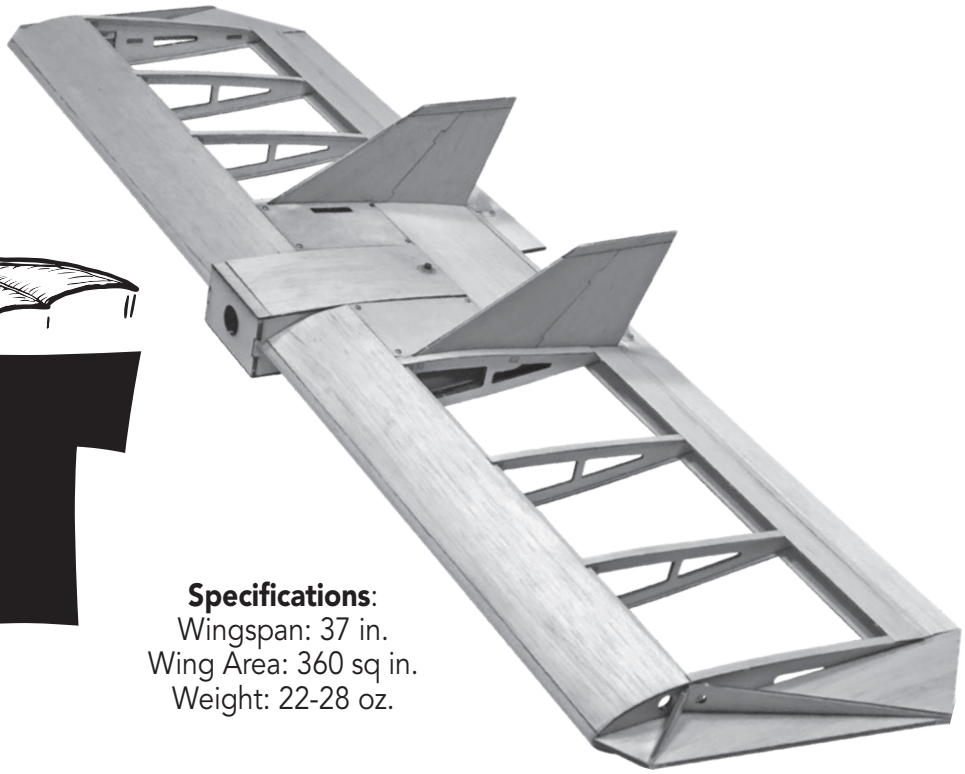
BAT



Specifications:
Wingspan: 37 in.
Wing Area: 360 sq in.
Weight: 22-28 oz.

CONSTRUCTION MANUAL

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 vertical fins, 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.

Old School MODEL WORKS

www.oldschoolmodels.com

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.

INCLUDED ITEMS

Wood parts included in this kit:

- 1 - LP1 - laser cut 1/8" x 4.5" x 10" sheet
- 1 - LP2 - laser cut 1/16" x 4.75" x 12" sheet

- 1 - BP1 - laser cut 1/8" x 4" x 24" sheet
- 2 - BP2 - laser cut 3/32" x 4" x 24" balsa
- 1 - BP3 - laser cut 3/32" x 4" x 24" balsa
- 1 - BP4 - laser cut 1/16" x 4" x 24" balsa
- 1 - BP5 - laser cut 1/16" x 4" x 24" balsa
- 1 - BP6 - laser cut 1/16" x 4" x 24" balsa
- 1 - BP7 - laser cut 1/16" x 4" x 24" balsa

- 2 - 1/16" x 4" x 12" balsa sheet

- 2 - 1/4" x 1/4" x 36" balsa strips
- 3 - 1/4" x 1/4" x 36" basswood strips
- 1 - 1/8" x 1/8" x 24" basswood strips

Hardware parts included in this kit:

- 10 - 2-56 x 3/4" self tapping screws
- 5 - 2-56 x 1/2" machine screws
- 2 - control horns
- 1 - 4-40 x 1" socket head cap screw
- 2 - 4-40 lock nuts
- 3 - #4 washers
- 1 - 4-40 nut

Other items included in this kit:

- Rolled plan
- 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: .09-.11 sized 2-stroke glow engine (or similar electric system - 250+ watt, 3s lipo)
- Propeller
- Engine/Motor mount and mounting hardware
- 2 ounce Fuel Tank and fuel tubing (if glow)
- Receiver - (3 channel minimum)
- 2 servos (electric) or 3 servos (if glow) - we recommend sub-micro servos all around.
- Pushrods (two 6" for elevons, one 8" for throttle if glow.)
- Clevises for the pushrods.
- 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.

Although an easy to build kit, our Bat 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 on-line.

All photos shown in this manual are of different Bat 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:

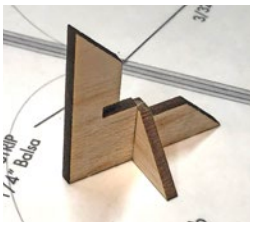
www.oldschoolmodels.com/mpics/bat/

IT IS VERY IMPORTANT THAT YOU ASSEMBLE THE BAT 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.

☐ **Prepare your work area**

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

☐ **Step 1 - Alignment triangles**

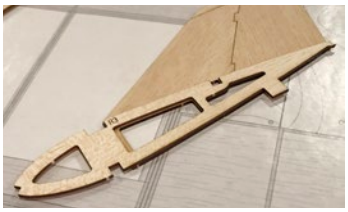


Pre-cut into BP1 are two triangles. Punch out the two 90° triangles as these can be used to vertically align any of the parts in the construction of your Bat. BP1 also includes foot pieces that can be used with the triangles to hold both triangles vertical hands-free.

☐ **Step 2 - VF1, VF2, VF3**

Locate both VF1s, both VF2s and both VF3s from BP3.
Glue one VF1 to one VF2, making sure it is flat along the entire length of the joint.
Once the glue has cured, glue VF3 to the top of the VF1/VF2 assembly as shown - making sure it's properly aligned with the leading and trailing edges.
Now do the same to complete the other vertical fin.

☐☐ **Step 3 - R3 ribs**



Locate one R3 from BP2. Before gluing, take a moment to align the rib with one of the vertical fin assemblies from the last step, as shown here. The square notch in the top of the rib should align with the square cutout in the fin.
Also the bottom of the rib should align with the bottom of the fin - along it's entire length. When you see how this should align, remove the rib, apply glue and attach it to the fin. Use a weight to apply pressure to that the rib and fin are perfectly flat against each other while the glue cures.

☐☐ **Step 4 - R2 ribs**

Locate one R2 from BP2. Flip over the vertical fin assembly from the previous step and use the same techniques to align R2 to the vertical fin as shown here.
Glue it in place and weigh it down while the glue cures.

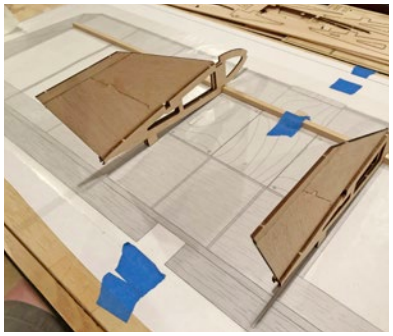
☐ **Step 5 - Vertical fin assembly**

Now using the same techniques you used in steps 3 and 4, go back and assemble the other vertical fin assembly as a mirror image of the first one.
Refer to this photo for an example of what your two fins should look like after they are completed.

☐ **Step 6 - Lower spar**

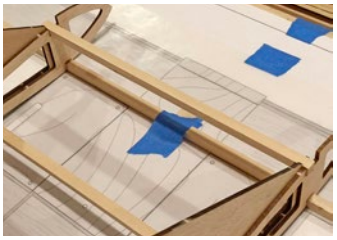
Locate one of the 1/4" square x 36" basswood strips. This will form the lower spar. Position it over the plan, measure the length and cut. We prefer to tack-glue this piece to the waxed paper, holding it in place using a few small drops of medium CA, instead of t-pins. Be sure it is aligned properly and straight over it's entire length. The alignment of this spar is critical as the rest of the Bat's airframe is based off of this piece.

☐ **Step 7 - Wing Assembly (Vertical fin assemblies)**



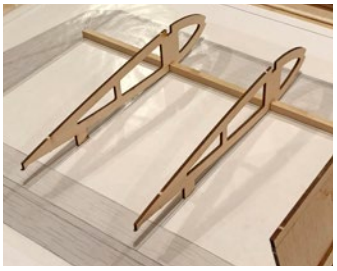
Locate both vertical fin assemblies you created earlier. These are now glued in position as shown here. When properly positioned the R2 portion of each assembly should face each other.
Apply a little glue inside the rib's pre-cut squares and just a touch on the bottom of the rear standoff.
Gently push the fin assembly in place, making sure it is properly aligned according to the plans. Also make sure it is pushed completely onto the spar and that it is a perfect 90° to the building board (use the supplied triangles).
Do the same for the other vertical fin.

☐ **Step 8 - Upper sub-spar**



Locate another length of 1/4" square by 36" basswood. Measure and cut two lengths that will connect the two vertical fins as shown here.
The first one fits into the rear portion of the cutout just in front of the vertical fins. The second one fits into the square cutout that is about 1/2-way back on the bottom of the vertical fin.

☐ **Step 9 - R4 ribs**



Locate all four R4 ribs from BP2. Two ribs are glued into place on each side of the vertical fins, as shown here. Make sure they are properly aligned and 90° to the building board.

☐ **Step 10 - Wing tip assemblies**

Locate both T1s from BP1, both T2s, and T3s from BP3, as well as both T4s, and T5s from BP2. Using these pieces, you'll make both wing tips.
It won't matter which pieces you use on the top and bottom, as it will all come out the same. You'll use one longer piece (T3 or T5) and one shorter piece (T2 or T4) per face. Their tabs fit into the pre-cut notches in T1. Apply glue, then push them in place making sure they are 90° to T1. Then use the alternate pieces you didn't use to complete the other face T1. Make two complete wing tip assemblies.

☐ **Step 11 - R5 ribs**

You'll see that the edges of the T2-T5 pieces protrude a bit from the inside edge of T1. These small edges need to be sanded down so the assembly will rest flat against R5. Do this for both wing tip assemblies.
Now locate both R5 ribs, then glue the wing tip assemblies to them, making a port and starboard wing tip.

☐ **Step 12 - Wing tip assemblies**

Install both R5 assemblies in place to each end of the Bat's airframe. Take care to glue the port tip to the port side, and the starboard tip to the starboard side.
Make sure they are properly aligned and 90° to the building board while the glue cures.

☐ **Step 13 - Top spar**

Locate the last un-cut 1/4" square x 36" basswood stick as it will be used for the top spar. Measure and cut it to length. Then glue it in place, making sure it is completely pressed into and glued to each of the pre-cut slots of each rib.

☐ **Step 14 - R1b sub-ribs**

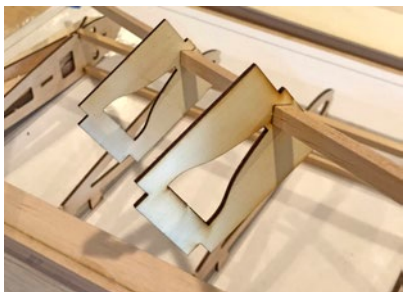
Locate both R1B sub-ribs from BP2.
These are glued in place as shown, making sure they are aligned with the plans, as well as 90° to the building surface.

☐ **Step 15 - 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. Then starting at one end, 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 - Leading edge**

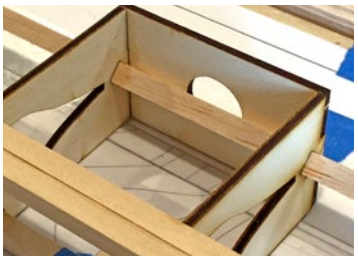


Locate the other length of 1/4" square x 36" square balsa stick. This is used as the leading edge.
Also locate two other pieces - but the ones you choose is dependent on the type of power you're going to use with your Bat. If you choose to power your Bat with the glorious sounds of a snarling, nitro-powered, single-cylinder, locate both R1Gs from LP1. If you're using a quieter, cleaner, electric setup, locate both R1Es from LP1.
Carefully slide each of the R1E or R1G pieces onto the leading edge strip as shown here. Make sure they are both in the same orientation. The square (diamond) cutout in those pieces will be a snug fit onto the 1/4" strip so use care as to not snap the leading edge balsa. Move these two pieces so they're roughly midway on the leading edge strip.

☐ **Step 17 - Leading edge**

Using the same technique you used for the trailing edge, glue the leading edge in place, making sure it's completely seated in the notches of each rib.
Start at one end, do a little at a time and work your way towards the center section. Once you reach that point, you can fine-tune the positioning of the R1E or R1G pieces over the plans. Make sure they are 90° to the building board and that they're seated on both the upper and lower spars.
Glue those in position, and continue to work your way towards the other the other end of the spar. Make sure that the ribs are properly positioned (yup, keep using that 90° triangle.)

☐ **Step 18 - Firewall**



Locate F1 from LP1. This is the firewall and is glued in place to the front edge of both R1G (or R1E) pieces.
Before gluing it in place, use a saw and cut away the leading edge in the area between the R1 pieces. (I know it's shown here, but we found it better and easier to remove it now.)
Now glue the firewall in place using epoxy. Use enough to secure it in place, but don't overdo it, as it can have an impact on the C.G. later on.
Also we advise using a couple small pieces of the 1/8" square basswood to form inside gussets between the R1 sides and the firewall. Cut two pieces roughly 1-1/4" long and glue them in place on the inside corners of R1 - again with some epoxy.

☐ **Step 19 - H1**

Locate H1 from LP2. This is attached to the top of the firewall, flush with it's front face and the sides of whichever R1 pieces you used. This forms a lip to hold down the front edge of the battery/radio hatch. Glue this in place.

☐ **Step 20 - Top trailing edge sheeting**

Locate two TSH from BP4-BP7. These are used as the trailing edge sheeting and are slightly longer than they need to be.
These are glued up against the outer edge of the vertical fin, and to the back of each rib, as well as where this sheeting touches the trailing edge.
Do this to the port and starboard sides, then trim off the extra so it is flush with the outer edge of the R5s.

☐ **Step 21 - Top center sheeting**

Locate CSH from BP4. This is the top center sheeting between the two vertical fins.
Check the fit and sand as necessary to get a good fit between the two fins as shown here. Once satisfied with fit, remove it, apply glue, and secure it in place, making sure it's attached to the R1Bs and R2s.

☐ **Step 22 - Top leading edge sheeting**

Locate two LSH from BP4-BP7.
It will need butt-up against the leading edge and wrap around to cover roughly half of the top spar. As the sheeting we buy 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 23 - Top cap strips**

Once all the glue has cured from the previous step, it's time to attach the top cap strips.
There are pre-cut strips in BP5 and BP7, so use these for this step. 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 either of the R5 ribs, the strip should be positioned so it's flush with R5 outer edge.

☐ **Step 24 - Release the airframe from the board**

Now it's time to remove the airframe from your building board. Flip it over and carefully trim away all of the alignment tabs on the rear of each rib. Be careful when trimming them as you want to make the cut so it is a continuation of the airfoil shape.
Remove the small "lip" which the trailing edge rested on. When properly removed, there will be a 1/16th "step" that will allow the sheeting to rest flush against the surface of the trailing edge.
Lightly sand as necessary and remove any lumps or globs of glue that may have happened during the build so far.

☐ **Step 25 - Bottom leading edge sheeting**

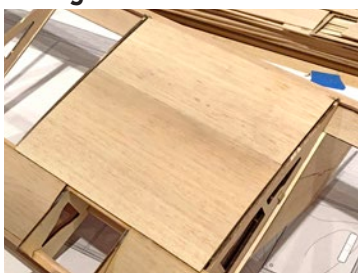
Locate the remaining two LSH from BP5 and BP7. Using the same techniques as you did on the top side, now it's time to form and glue the leading edge sheeting to the bottom of both sides of the wing.

☐ **Step 26 - Bottom center sheeting**

Locate the two pieces of un-cut 1/16" x 4" x 12" sheeting. These two pieces are used to form the center sheeting of the bottom surface and need to be edge-glued together.

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.
You'll need to join a few pieces together to make it long enough to reach from the leading edge sheeting to the trailing edge.

☐ **Step 27 - Bottom center sheeting**



Using the sheeting from the previous step it's time to measure, cut and glue in place the center sheeting.
This piece extends from the rear of the leading edge sheeting, to the front of the trailing edge.
This sheeting should be just shy of covering the R3 ribs on each side, as it should be just wide enough to cover the vertical fin and R2 ribs. R3 should be clearly visible as it will be used as a "platform" in the next step.

☐ **Step 28 - Bottom trailing edge sheeting.**

Locate the remaining two TSH from BP4-BP7. Using the same technique you used to apply the top trailing edge sheeting, now glue these bottom trailing edge sheets in place.
These are glued to the back of each rib, as well as where it touches the trailing edge and center sheeting.
Do this for the port and starboard sides.
Again, these pieces are slightly longer than they need to be so trim off the extra so it is flush with the outer edge of the R5s.

☐ **Step 29 - Bottom box sheeting**

Locate BSHG (glow) or BSHE (electric from LP2. This is glued to the bottom of the airframe, flush with the firewall and ending at the center sheeting as shown here. Sand as necessary, then glue in position.

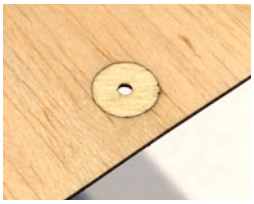
☐ **Step 30 - Bottom cap strips**

Cut and attach the bottom cap strips using the same techniques as you did for the top strips.

☐ **Step 31 - Hatch**

Now flip the fuselage upright. Locate H3 from BP6. This is sized for the electric version, so if you're using glow, you'll need to trim it to the proper length. Make any trim from the edge opposite the circular cutout.
Now locate H2 from LP2. There is an engraved line on this piece. When glued in place, this line should run along the front edge of H3, the engraved "H2" should not be seen, and it should be centered on H3.

☐ **Step 32 - Hatch**



Locate H5 from LP2. This is glued into the pre-cut hole in H3 as shown here. We found that a little thin CA did the trick.

☐ **Step 33 - Hatch latch**

Locate H4 from LP2, as well as the following hardware:
1 - 4-40 x 1" socket head cap screw
2 - 4-40 lock nuts
2 - #4 washers
1 - 4-40 nut

Slide one washer onto the 4-40 x 1" cap screw, then push it through the hole in H3 from the top as shown here. Now, from the underside, slip on another washer, then thread on the 4-40 nut (not the lock nut). Run this all the way up the screw and when tightened, it should just allow the bolt to turn in the hatch freely, and without a lot a slop.
Now thread on one of the 4-40 lock nuts all the way to jam against the 4-40 nut previously installed.
Next push on H4, then thread the last 4-40 lock nut all the way to jam against H4 and lock it in position. This assembly should look

similar to what we've shown here and be fairly easy to turn with your fingers. This forms an easy to turn hatch latch that will catch on the rear sub spar to hold the hatch in place.

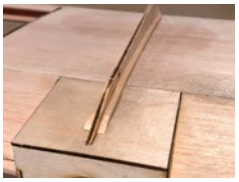
☐ **Step 34 - H6**

Locate H6 from LP2. Glue this across hatch as shown to strengthen it. Make sure it is centered and just covering the edge of the H5 circle installed earlier.

☐ **Step 35 - Skid**

Flip the airframe back on it's top (up-side-down). Measure and draw a light pencil line that is the exact center of the airframe - similar to what's shown here.

☐ **Step 36 - Skid and supports**

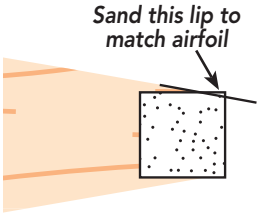


Locate SK from LP1. This is the bottom skid. The thicker section is the rear and should be positioned so lines up with the rear of the trailing edge and the pre-cut hole is positioned so it is beneath leading edge of the spar.

Locate the 1/8" square basswood and cut two 8" lengths. Bevel the leading and trailing edges a bit to make them more aerodynamic.

Now glue these pieces in place, starting with the skid. Make sure it is 90° to the airframe's sheeting. Then add the basswood supports to either side of the skid. We found it easiest to glue the front of the 1/8" supports to the flat portion of the sheeting first, then work your way back to complete gluing the rear portion of the supports to the sheeting.

☐ **Step 37 - Sanding**



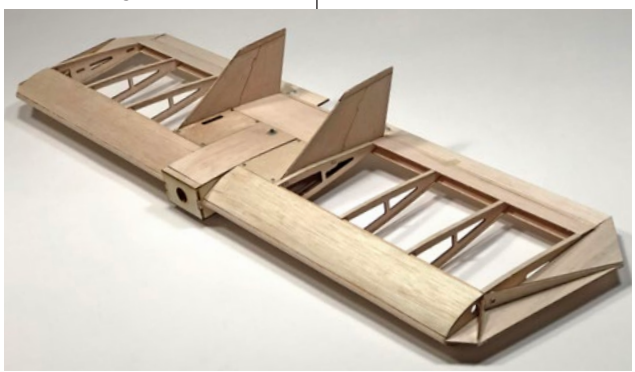
Now is the time to get quite familiar with the sanding tools of your choice. Take the time to perform a good sanding, rounding the leading edge and blending it into the wingtips. Go over the entire wing, making sure the sheeting is smooth and the trailing edges are blended into the cap strips, continuing the curvature of the wing. Pound out the extra time on those wing tips to make sure they are smooth.

Round the leading edges of the vertical fins.

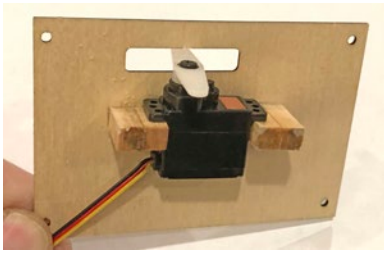
Also locate both elevons (from BP1). Sand bevels into the leading edge of both elevons, and round off their back edges.

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 servo hatches which I haven't told you how to install yet.)



☐ **Step 38 - Servo hatch**



Locate both SHs from LP2. these are the servo hatches, and the servos are mounted to the underside of them.

Using your leftover 1/4" square basswood, cut 8 pieces that are roughly a 1/4" wider than the servos you are using. Glue two pieces together to form 4 mounting rails. Lightly sand the ends of the rails to true them up.

Now take one SH and place your servo on it as shown. Make sure that the servo arm is centered in the slot in both directions. Now carefully glue one of the standoffs you just created to SH, on each side of the servo - as shown in the photo. Take care not to glue the servo to these pieces, or to SH.

So the same for the other hatch, but make sure it's a mirror image of the first one.

You can then mount your servos to these rails using whatever hardware was supplied the servos - and drilling the appropriate sized mounting holes into the rails.

☐ **Step 39 - Servo hatch**

Position the servo hatches as shown, making sure the cutouts are up-next to the vertical fins. We prefer to place the cutouts towards the rear of the airframe to keep the pushrods as short as possible.

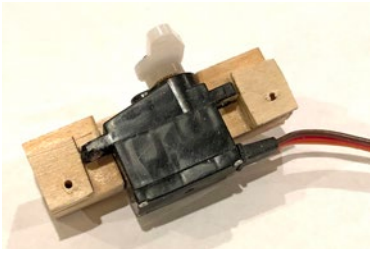
When in place, use a 1/16" bit to drill through the 4 pre-cut mounting holes in each hatch, into the 1/4" basswood underneath. Later on, you can use the supplied 2-56 x 3/4" self tapping screws to hold these in position.

☐ **Step 40 - Throttle servo (glow only)**

If you choose to power your Bat with the glow, then you'll need to plan for a throttle servo. It's too soon to mount it yet, as you don't have the engine installed, however it is a good time to make the servo mount. Here's a way that we created a very light-weight mount that allows the servo to be removed.

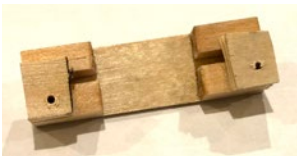
Located on LP1 are two S4s. On LP2 are S1, two S2s and S3. Gather up these parts, along with scrap 1/4" square basswood.

Using S1 as the base, center the servo, allowing the top of the servo with the arm to overhang the top edge.

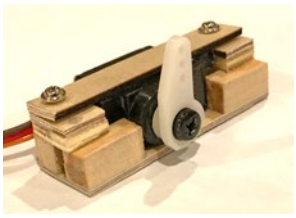


Now cut a few pieces of 1/4" square to "sandwich" the mounting ears of the servo, and glue them in place so

they're also resting up against the servo. (But don't glue the servo in place.)



When that's finished you can use a combination of the S4 and S2 parts on either side of the servo to match the servo's width. This makes it so the strap (S3) can be used to hold the servo firmly inside this mount.



You'll need to drill a couple of mounting holes for the strap and use the servo's mounting screws to hold it place.

When it's all together, you can then trim away the extra bulk of S1 to help lighten it, and sand as needed to knock off even a bit more weight.

You should end up with a very light weight mount that can then be glued to the internal sheeting once the engine has been located and you know where the pushrod will run. And the servo will still be removable.

This completes assembly of the Bat airframe.

☐ **Tank / Battery compartment fuel proofing**

If you're using a glow engine, it is strongly recommended that you fuel proof the inside of the tank 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.

☐ **Covering**

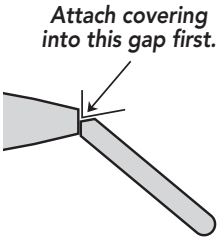
Now it is time to cover the Bat. Double check that all surfaces are smooth and ready to cover. Sand as necessary, then cover the entire airframe with the covering/finish of your choice.

Note that if you're powering with an electric motor, you'll need to make an exit for the cooling air to escape the rear of the airframe.

☐ **Elevons**

It's time to attach the elevons. Although you can use hinges (not included), we chose to hinge the surfaces using the iron-on covering as the hinge. As this is a small, light-weight design, this works well and saves you the chance of splintering through the thin 1/8" elevons.

To do this, cut four lengths of covering about 5/8" wide, and 14-3/4" long (just shy of the elevon's full length). Fold a seam down the middle of the entire length of these pieces, so the adhesive side is facing outward.



Now, hold the elevon in position as we've shown in this diagram and tack the covering into the hinge gap, little by little, working your way down the elevon - making sure the elevon is centered on the trailing edge. When the covering has been applied into the gap, then you can iron down the edges.

When one side is finished, flip it over, bend the elevon the other way and iron a second strip to the reverse side.

Then do the same for the other elevon.

☐ **Control horns, servo & pushrod installation**

If you haven't already, install the elevon servos and attach the servo hatches, remembering that the port hatch is a mirror image of the starboard hatch.

Attach the control arms so they're directly in line with the servo arms, then attach your pushrods.

Now, before we install anything else, everything you do from here on out needs to be carefully considered because of the hyper-sensitive nature of the Bat's C.G. location.

☐ **Recommended C.G. setting**

The Bat's design of a simple flying wing makes it EXTREMELY sensitive to the C.G. location. Having the C.G. off by as little as a 1/8" can be the difference between going home with a pile of broken parts, and successfully flying again and again.

CAUTION! DO NOT SKIP THIS STEP!

The C.G. location for the Bat is 2-1/4" back from the leading edge of the wing. That puts it right on the leading edge of the main spars. And if installed properly, the skid has a pre-drilled hole in it that should line up with the location.

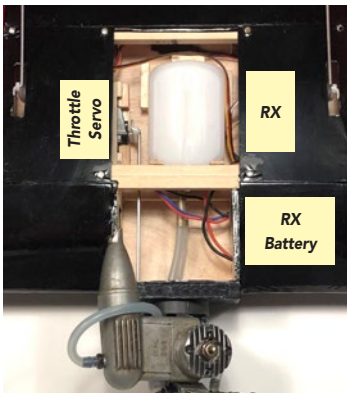
Because of all this, you need to pay attention to how and where things are installed. Obviously the engine/motor has to be mounted to the firewall, but most of the other things (fuel tank, battery, ESC, receiver, throttle servo) can be mounted most anywhere inside the center section of the Bat.

Following are two photos showing what worked for us in both electric and glow setups. Your mileage may vary, but this should help you get started in the right direction.

Recommended power.

We always give recommendations for power systems in our kits, and the same is true for the Bat. We've had great fun with the recommended power systems, but as long as you keep a good eye on the C.G. (and lateral balance) you can strap on a little more power and really streak through the skies.

Obviously some common sense needs to be applied here, but the structure is strong and can withstand a little overpowering with no problems.

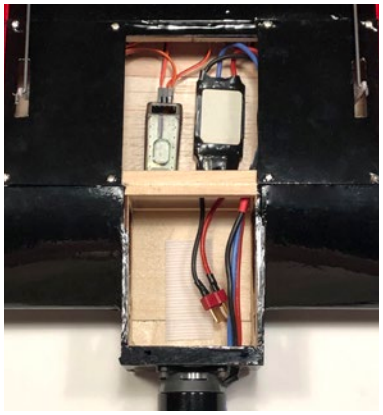


Glow power

Mounting the engine is a fairly simple thing. We chose to mount it at a slight angle to allow the muffler to clear the

leading edge.
The throttle servo was mounted next to the fuel tank. We've also marked off the location of the receiver and rx battery. These are offset to the port side to help with the lateral balance.
Your setup will vary and you might want to use a smaller tank and place it in the area right in back of the firewall for a more reliable C.G.

Electric power
The electric setup is a bit less complicated, but you still need to plan. In the photo you'll see that the battery mounted just behind the firewall. At the top of the photo is the receiver and the ESC.



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.

Elevons 1/2" up/down (35% 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.

Flying:
I normally don't write about flying our kits, but I want to make a few notes here, as this isn't the typical kit.
Launching the kit is normally done the same way you'd throw a paper airplane, just with a little more "umphf". Hold it similarly to what's shown here - by the skid, throttle up, then throw the Bat forward and just slightly nose-up. ***And I do mean slightly - not 45°.***

Also, I need to stress the care that needs to be taken when hand-launching any airplane. You've got the potential for serious harm should you lose your grip. If you're unsure of safely doing this yourself, please ask for assistance from another pilot to launch the Bat while you're on the controls.

After launching, allow it to gain speed before pulling up or turning. Then you're off to the races. You'll find the Bat is quite comfortable at high and low speeds. The only thing you'll need to watch is your speed in the turns as it will loose altitude quickly if you don't keep up a bit of speed.

Landings are just like most, other than you'll typically want to land in the grass, rather than pavement. Either way, lower the throttle and allow the Bat to bleed off speed on the base, crosswind, and final approach. Because the Bat has little drag, it does take a while for the speed to bleed off, so plan accordingly.

Now, when you're flying, and you don't have the C.G. correct, you might find that the Bat has radical changes in climbing and diving even with slight movements by you - especially at higher speeds. This is called porpoising and that means the Bat is tail-heavy. Climb to a few mistakes high, lower the throttle and gently glide it into a landing. Re-distribute to give you a bit more nose weight and try again.

Once properly balanced, you'll find that the Bat can be many things - a radically powerful combat machine, a small field flyer that is extremely aerobatic, and even slight bits of a glider when you reduce the power.

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.

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

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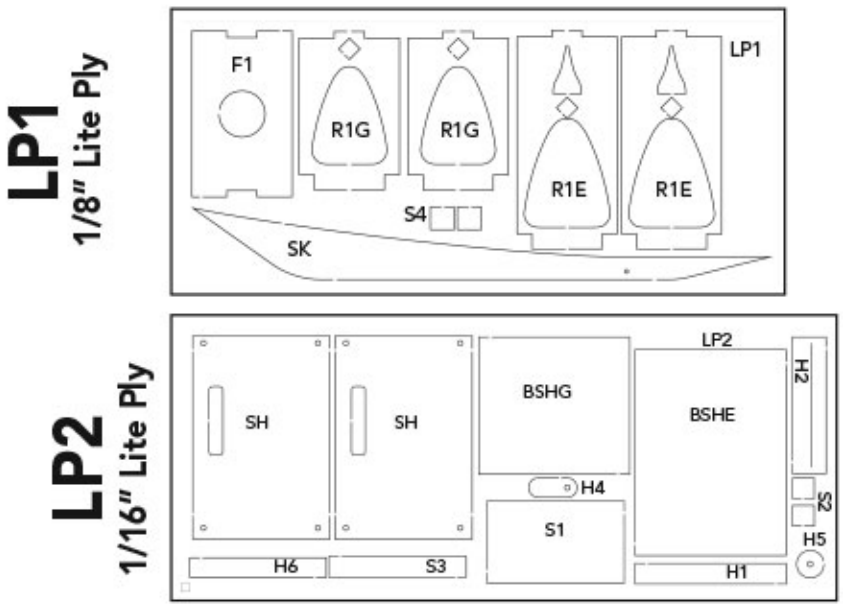
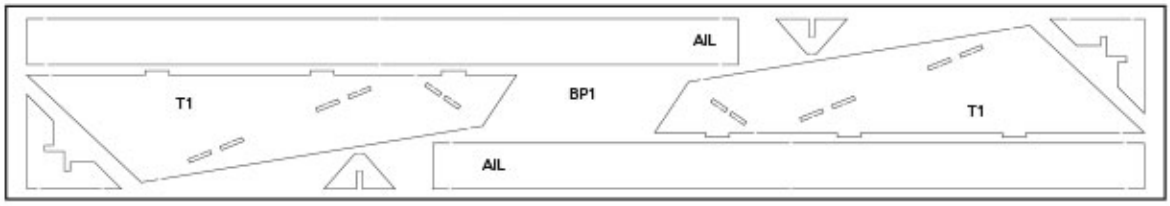
As of this printing, you are required to register with the FAA if you own this product.

For up-to-date information on how to register with the FAA, visit https://registermyuas.faa.gov .

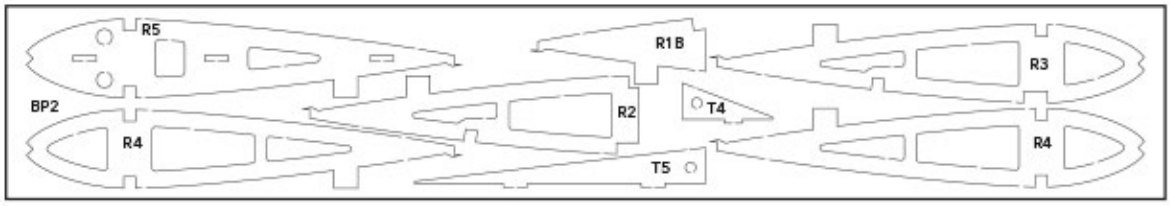
For additional assistance on regulations and guidance of UAS usage, visit knowbeforeyoufly.org .



BP1 1/8" Balsa

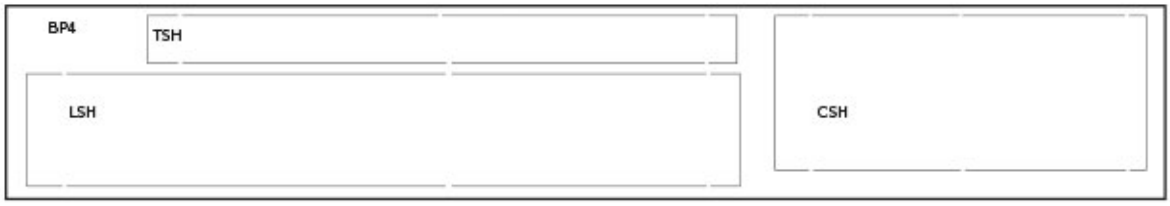


BP2 3/32" Balsa

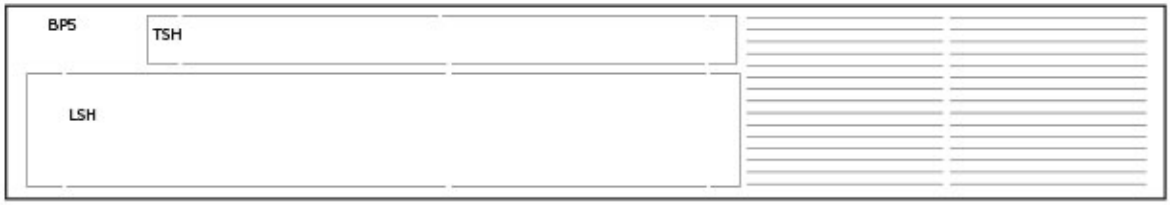


BP3 3/32" Balsa

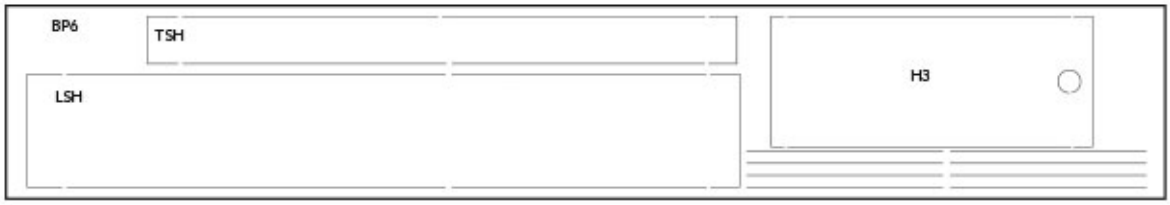
BP4 1/16" Balsa



BP5 1/16" Balsa



BP6 1/16" Balsa



BP7 1/16" Balsa