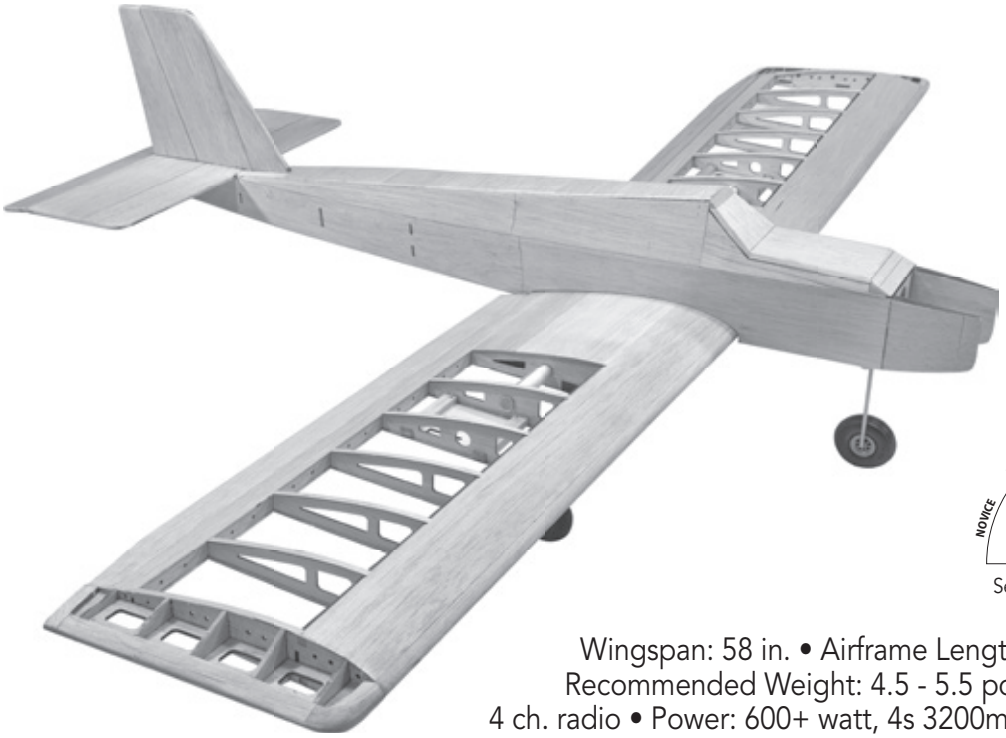
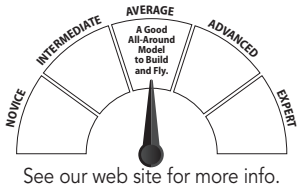
SPORT AIR 40 CONSTRUCTION MANUAL



Skill Level



See our web site for more info.

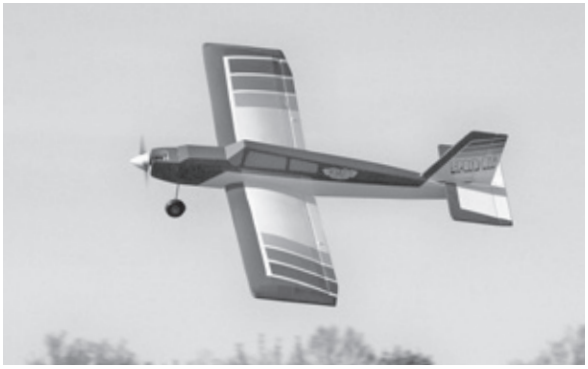
Wingspan: 58 in. • Airframe Length: 43.5 in.
Recommended Weight: 4.5 - 5.5 pounds (RTF)
4 ch. radio • Power: 600+ watt, 4s 3200mAh (.35-.46 glow)

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 at two different 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.

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 4.8" x 24" lite ply
- 1 LP2 - laser cut 1/8" x 4.8" x 24" lite ply
- 1 LP3 - laser cut 1/8" x 2.2" x 24" lite ply
- 1 LP4 - laser cut 1/8" x 4.75" x 20" lite ply
- 1 LP5 - laser cut 1/8" x 3.6" x 20" lite ply
- 1 LP6 - laser cut 1/8" x 3.5" x 20" lite ply
- 1 LP7 - laser cut 1/8" x 3.8" x 12" lite ply
- 1 LP8 - laser cut 1/8" x 3.75" x 17" lite ply
- 1 DH1 - laser cut 1/4" ply dihedral brace

- 1 BP1 - laser cut 1/8" x 4" x 24" balsa
- 1 BP2 - laser cut 1/8" x 4" x 12" balsa
- 1 BP3 - laser cut 1/8" x 4" x 12" balsa
- 1 BP4 - laser cut 1/8" x 4" x 12" balsa
- 1 BP5 - laser cut 1/8" x 4" x 12" balsa
- 1 BP6 - laser cut 3/32" x 4" x 12" balsa
- 1 BP7 - laser cut 3/32" x 4" x 12" balsa
- 1 BP8 - laser cut 3/32" x 4" x 12" balsa
- 1 BP9 - laser cut 3/32" x 4" x 24" balsa
- 2 BP10 - laser cut 3/32" x 4" x 12" balsa
- 2 BP11 - laser cut 3/32" x 4" x 24" balsa
- 2 BP12 - laser cut 3/32" x 4" x 12" balsa
- 2 BP13 - laser cut 3/32" x 4" x 12" balsa
- 2 BP14 - laser cut 3/32" x 4" x 12" balsa
- 2 BP15 - laser cut 1/16" x 4" x 24" balsa
- 2 BP16 - laser cut 1/16" x 4" x 24" balsa
- 2 BP17 - laser cut 1/16" x 4" x 24" balsa
- 1 BP18 - laser cut 1/16" x 4" x 24" balsa
- 1 BP19 - laser cut 1/4" x 4" x 24" balsa

- 4 1/16" x 4" x 36" balsa sheets
- 6 1/16" x 4" x 12" balsa sheets
- 1 3/32" x 4" x 36" balsa sheet

- 2 1/2" square x 36" balsa strips
- 2 5/16" square x 36" balsa strips
- 4 1/4" square x 36" balsa strips
- 2 3/8" x 1-1/2" x 36" shaped balsa strip
- 4 1/4" square x 36" basswood strips

Hardware parts included in this kit:

- 15 CA hinges
- 16 2-56 x 1/2" self tapping screws
- 8 2-56 x 3/4" machine screws
- 2 5/32" wheel collars & screws
- 4 control horns
- 4 plastic gear straps
- 2 1/4" x 20 wing bolts
- 4 magnets
- 1 1/4" x 6" wooden dowel
- 1 nose gear assembly
- 2 pre-bent main gear wires

Other items included in this kit:

- 2 rolled plans (1 fuse, 1 wing)
- 1 construction manual
- 1 sticker sheet

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: 600+ watt, 4s 3000+ mAh (electric); .35-.46 (glow)
- Fuel tank and tubing if glow (6+ ounce)
- Propeller
- Motor mount and mounting hardware
- Receiver - 4 channel
- Servos: Standard (Hitec HS-311 or similar) - 4 if electric, 5 if glow
- "Y" servo harness
- Pushrods - (6" ail., 26" ele./rud., 12" nose gear, 12" thr. if glow)

- Clevises for the pushrods.
- Three, 2-1/2" wheels.
- Covering: If you're using simple color scheme, 2 to 2-1/2 rolls of iron-on covering will be enough. You will need more if applying a more complicated livery.
- Optional - 2-1/4" to 2-1/2" spinner.

Additional Required Building Tools and Adhesives

- Drill & assorted drill bits
- Hobby knife and new, sharp blades
- Sandpaper: coarse (80 or 100 grit) & medium (150-200 grit)
- Pencil or pen
- Ruler
- T-Pins
- Waxed paper
- Building board
- Wood adhesive of your choice. We use medium viscosity CA (cyanoacrylate) , but aliphatic resin and/or carpenter's glues (used correctly) will work just as well and give longer working time.

We advise the following:

Closely inspect the supplied laser-cut parts for damage. If you find any damaged or missing parts, contact us within 60 days of purchase (not your dealer).

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 sharp 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.

Don't remove parts from their sheets until you need them. 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.

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 Sport Air 40 prototypes. Several pieces may have changed slightly with the 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/sa40/

IF YOU READ NOTHING ELSE IN THIS MANUAL, PLEASE READ THESE FIVE POINTS.

#1 - We've done everything we can to make the Sport Air 40 a fun and easy-to-assemble kit. However, this is NOT a trainer. It is a lively sport model that can get away from you in a hurry if you've never soloed before.

#2 - PLYWOOD HAS SLIGHT BOWS IN IT 93.48% OF THE TIME. We don't like it, but that's the way plywood is. Because of this, we engineered the Sport Air 40 to eliminate these warps whenever possible - we'll make recommendations on how to overcome them as we go along.

#3 - BALSA HAS SLIGHT BOWS IN IT 81.53% OF THE TIME. We don't like it, but that's the way balsa is. We'll make recommendations on how to overcome them as we go along.

#4 - It is very important that you assemble the Sport Air 40 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.

5 - Save ALL of the scrap wood as you build - the ends of sticks, the leftover sheets, etc. You will use some of this in assembly and can use other parts if you need repairs.

Whether you're hinging, mounting, gluing, sanding, soldering, or installing, chances are we've got a video tip to make the task easier.

OSMW has created a series of videos to not only help you build your aircraft, but build it better. Our Bright Idea videos can come in handy for some of the following steps.

Check them out today - they're FREE, and we're adding to them all the time!

Visit oldschoolmodels.com/tips.htm or scan this QR code.

Remember, building is not a race.
You are the craftsman here.
If you take your time, take the time to understand the steps, and make the effort to do good work, it will certainly show when your Sport Air 40's airframe is completed.

☐ **InstaCAddy**

Throughout this manual, you'll see photos with our InstaCAddy on the bench. This is a unique collection of Bob Smith C/A glues, accelerator, and pipettes. What makes this special is the box, as it has cutouts that make it the perfect tool to hold everything in one spot - ***and the glue won't spill!*** If you're needing C/A, consider our InstaCAddy!

Let's begin with the easy stuff first to get you warmed up. We'll start by building the tail surfaces of your Sport Air 40.

☐ **Prepare your work area**

Tape down the vertical fin / rudder plan on your work surface. Tear off a piece of waxed paper to cover this part and tape it to your building surface. Make sure the plans and waxed paper are completely flat with no wrinkles.

☐ **Step 1 - Vertical Fin Assembly (VF1)**

Locate VF1 from BP3 and pin it in place over the plans. Be sure of its orientation and that it is aligned because the rest of the vertical fin is based off of this piece.

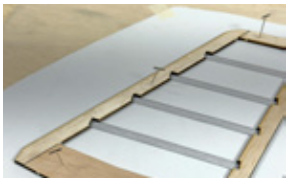
☐ **Step 2 - Vertical Fin Assembly (VF2)**

Locate VF2 from BP2 and glue it to VF1, where the two pieces touch. Pin the front portion of VF2 in place to make sure it stays in position.

☐ **Step 3 - Vertical Fin Assembly (VF3)**

Locate VF3 from BP1 and glue it to VF1, where the two pieces touch. Pin the front portion of VF3 in place to make sure it stays in position.

☐ **Step 4 - Vertical Fin Assembly (VF4)**



Locate VF4 from BP3 and glue it to VF2 and VF3, where the pieces touch. Pin the center portion of VF4 in place to make sure it stays in position.

☐ **Step 5 - Vertical Fin Assembly (VF5-VF8)**

Locate VF5, VF6, VF7, and VF8 from BP3.
Starting at the bottom, glue VF5 in between VF1 and VF4, into the pre-cut slots. Make sure it is completely pushed into the slots and flush with VF1 and VF4.
Now work your way up the fin, installing VF6, VF7, and V8.

☐ **Step 6 - Rudder Assembly (VF9)**

Locate VF9 from BP3 and pin it in place over the plans. Be sure of its orientation and that it is aligned because the rest of the rudder is based off of this piece.

☐ **Step 7 - Rudder Assembly (VF10)**

Locate VF10 from BP2 and glue it to VF9, where the two pieces touch. Pin the rear portion of VF10 in place to make sure it stays in position.

☐ **Step 8 - Rudder Assembly (VF11)**

Locate VF11 from BP1 and glue it to VF9, where the two pieces touch. Pin the rear portion of VF11 in place to make sure it stays in position.

☐ **Step 9 - Rudder Assembly (VF12)**

Locate VF12 from BP3 and glue it to VF10 and VF11 where the pieces touch. Pin the center portion of VF12 in place to make sure it stays in position.

☐ **Step 10 - Rudder Assembly (VF13-VF15)**

Locate VF13, VF14, and VF15 from BP1.
Starting at the bottom, glue VF13 in between VF9 and VF12 into the pre-cut slots. Make sure it is completely pushed into the slots and flush with VF9 and VF12.
Now work your way up the rudder installing VF14 and V15.

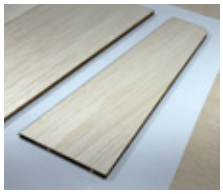
☐ **Step 11 - Vertical Fin Assembly (VF17)**

Remove the pins from the vertical fin and rudder frames, but don't remove the parts assemblies from the building surface yet. Lightly sand the surface of these to make sure they are smooth across their entire surfaces.
Now locate VF17 from BP15 and glue it into position on the smoothed face of the vertical fin assembly as shown here. Make sure it is perfectly aligned with the frame and that it is held flat while the glue cures.

☐ **Step 12 - Vertical Fin Assembly (VF16)**

Locate VF16 from BP15 and glue it into position on the vertical fin assembly and up against the leading edge of VF17 that you just installed.
Again, make sure it is properly aligned and flat while the glue cures.

☐ **Step 13 - Rudder Assembly (VF18)**



Locate VF18 from BP15 and glue it to the smoothed surface of the rudder assembly. Make sure it is properly aligned and flat while the glue cures.

☐ **Step 14 - Vertical Fin Assembly (VF16, VF17, VF18)**

Remove both assemblies from your building surface and flip them over. Lightly sand the surface of both to make sure they are smooth across their entire surfaces.
Just as you did on the port side of these pieces, you'll now glue VF17, VF16, and VF18 in place. Again, take care with the orientation of each piece and make sure they are held flat along their entire surfaces while the glue cures.

Now set the vertical fin and rudder assemblies aside as we begin construction on the Sport Air 40's stab and elevator.

☐ **Prepare your work area**

Tape down the horizontal stab/ elevator plan on your work surface. Tear off a piece of waxed paper to cover this part and tape it to your building surface. Make sure the plans and waxed paper are completely flat with no wrinkles.

☐ **Step 15 - Horizontal Stab Assembly (E1)**

Locate E1 from BP1. Pin it in place, making sure it is straight along its entire length. Use a straight edge, as shown here, to help guarantee it's perfect.

☐ **Step 16 - Horizontal Stab Assembly (E2)**

Locate E2 from BP1. Glue the narrow end of E2 into the center cutout of E1. Make sure it is flat and flush with the surface of E1 while the glue cures.
Also pin the top of E2 in position so it doesn't move or lift up during the next several steps.

☐ **Step 17 - Horizontal Stab Assembly (E3)**

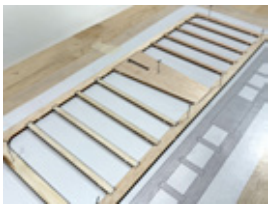
Locate both E3s from BP2 and BP5. Glue one to the port end and one to the starboard end as shown here. Pin the tops of these in place to hold them in the proper position.

☐ **Step 18 - Horizontal Stab Assembly (E4)**

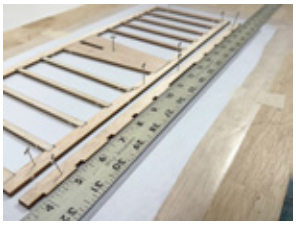
Locate E4 from BP1. Glue to the top of E2 and both E3s. Make sure it is properly inserted and flat as the glue cures.

☐ **Step 19 - Horizontal Stab Assembly (E5)**

Locate all E5s from BP2 and BP4. Four are glued on the port side and four on the starboard side, between the E1 and E4 pieces.
Make sure each is completely inserted in the pre-cut slots and held flat while the glue cures.



☐ **Step 20 - Elevator Assembly (E6)**

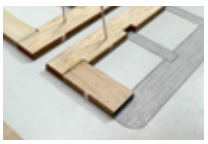


Locate E6 from BP1. Pin it in place, making sure it is straight along its entire length. Use a straight edge, as shown here, to help guarantee it's perfect.

☐ **Step 20 - Elevator Assembly (E7)**

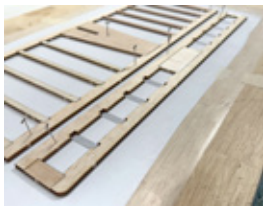
Locate E7 from BP2. Glue it inside the center pre-cut notch in E6, making sure it's flat and flush with the surface of E6.

☐ **Step 21 - Elevator Assembly (E8)**



Locate both E8s from BP2. Glue one to the port end and one to the starboard end of E6, as shown here.

☐ **Step 22 - Elevator Assembly (E9)**

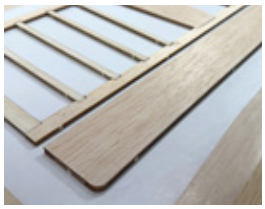


Locate E9 from BP1. Glue it in place, attached to E7 and both E8s. Make sure it is flat along its entire surface.

☐ **Step 22 - Elevator Assembly (E10)**

Locate all E10s from BP2 and BP4. Four are glued on the port side and four on the starboard side, between the E6 and E9 pieces. Make sure each is completely inserted in the pre-cut slots and held flat while the glue cures.

☐ **Step 23 - Elevator Assembly (E13)**



Remove the pins from the horizontal stab and elevator frames, but don't remove the parts assemblies from the building surface yet. Lightly sand the surface of these to make sure they are smooth across their entire surfaces.
Now locate E13 from BP18 and glue it into position on the smoothed face of the elevator assembly as shown here. Make sure it is perfectly aligned with the frame and that it is held flat while the glue cures.

☐ **Step 24 - Horizontal Stab Assembly (E12)**

Now locate E12 from BP17 and glue it into position on the smoothed face of the rear of the horizontal stab assembly, as shown here. Make sure it is perfectly aligned with the frame and that it is held flat while the glue cures.

☐ **Step 24 - Horizontal Stab Assembly (E11)**

Now locate E11 from BP16 and glue it into position on the smoothed face of the rear of the horizontal stab assembly, as shown here. Make sure it is perfectly aligned with the frame, up against the edge of E12, and that it is held flat while the glue cures.

☐ **Step 25 - Horizontal Stab Assembly (E11, E12, E13)**

Remove both assemblies from your building surface and flip them over. Lightly sand the surface of both to make sure they are smooth across their entire surfaces.

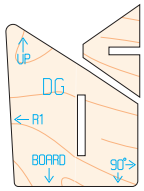
Just as you did on the other side of these pieces, you'll now glue E13, E12, and E11 in place. Again, take care with the orientation of each piece and make sure they are held flat along their entire surfaces while the glue cures.

Now set the horizontal stab and elevator assemblies aside as we begin construction on the Sport Air 40's STARBOARD wing panel.

☐ **Prepare your work area**

Tape down the starboard wing plan on your work surface. Tear off a piece of waxed paper to cover it and tape it to your building surface. Make sure the plans and waxed paper are completely flat with no wrinkles.

☐ **Step 26 - Wing Assembly (triangle)**



Before we start on the wing construction, there is a triangle tool that is pre-cut into LP1.

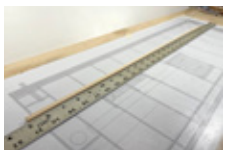
It has two angles - one is a 90°, which you can use to make sure all of the ribs are standing nice and straight when making the wing panels.

The other side has an angle that is used when aligning the R1 ribs to set the correct dihedral angle.

Also, you'll find a foot piece that can be used with the triangle to hold it vertically (hands-free).

☐ ☐ **Step 27 - Wing Assembly (lower spar)**

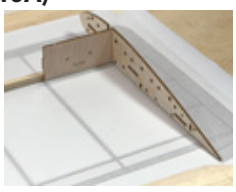
Locate one of the 1/4" sq. x 36" basswood sticks. This is used as the lower wing spar. Position it on the plans, measure and cut it to length, leaving about a 1/8" or so on each end - just to be safe.



Then it needs to be attached in place over the plans. We use a few drops of medium C/A to tack-glue this piece to the waxed paper to hold it in place instead of T-pins. Use your long straightedge to make sure it is aligned properly and is straight over its entire length. The alignment of this spar is critical, as the rest of the wing panel is based off this single piece.

☐ ☐ **Step 28 - Wing Assembly (R8, SW5A)**

Locate one R8 from BP12 and one SW5A from BP14.



SW5A is glued into R8's port side, perfectly perpendicular (90° angle). Make sure that SW5A's tab is fully inserted into the pre-cut slot in R8. Then, this assembly is glued in place to the bottom spar and aligned with the outline on the plan. Make sure that the square cutout on the bottom of R8 is fully pushed onto the spar so that the rib rests completely flat on the building surface. SW5A should rest against the backside of the spar, and its bottom edge will be flat on the building surface.

☐ ☐ **Step 29 - Wing Assembly (R6s, R7s, SW4As)**

Locate two R6s and three R7s from BP11 and BP12 as well as four SW4As from BP14.

Using the same technique as in the previous step, glue one SW4A to one R7, then glue it in place on the wing. Then repeat this two more times. Then glue the R6s and SW4As in place.

Again, make sure that the tabs in the sheer webs are FULLY inserted into the pre-cut holes in the ribs. If you're off a bit, these small gaps will accumulate over the length of the wing, making it harder to place pieces in the correct positions.

☐ ☐ **Step 30 - Wing Assembly (SW5B)**

Locate one SW5B from BP13. This is glued in between R8 and R7, in the cutouts on the rear of the ribs.

☐ ☐ **Step 31 - Wing Assembly (SW4B)**

Locate four SW4Bs from BP12 and BP13. These are glued in between the R6 and R6 ribs, in the cutouts on the rear of those ribs.

☐ ☐ **Step 32 - Wing Assembly (servo rails)**

Locate the leftover 1/4" square basswood you trimmed to form the lower spar. Cut two 3-5/8" lengths.

Also locate another uncut 1/4" square basswood strip and cut two more 3-5/8" lengths. (Set aside the long remainder of this piece to use as the upper spar in a few steps.)

Glue two pieces together to form a wider rail, then glue the other two, forming two rails, as shown here.

☐ ☐ **Step 33 - Wing Assembly (servo rails)**

Slide these two rails into the cutouts on the bottom of the R6 ribs. Center them, then glue them to both of the ribs.

☐ ☐ **Step 34 - Wing Assembly (R5, LG4)**

Locate R5 from BP11 and one LG4 from LP2, LP4, or LP5.

LG4 is glued to the inside face of R5 - the side facing the root rib. It strengthens this cutout on the bottom of the rib. Make sure it is perfectly aligned.

Once glued in place, then attach this assembly to the lower spar and the SW4A already in place.

☐ ☐ **Step 35 - Wing Assembly (SW4A, SW4B)**

Locate one SW4A from BP14 and SW4B from BP12 and BP13. Glue these to R5 rib you just installed. Again, make sure that the tabs in the sheer webs are FULLY inserted into the pre-cut holes in R5.

☐ ☐ **Step 36 - Wing Assembly (R4, LG4)**

Locate R4 from BP11 and one LG4 from LP2, LP4, or LP5.

LG4 is glued to the outside face of R4 - the side facing the tip rib. It strengthens this cutout on the bottom of the rib. Make sure it is perfectly aligned. Once glued in place, then attach this assembly to the lower spar and the SW4A already in place.

☐ ☐ **Step 37 - Wing Assembly (SW3B)**

Locate SW3A from BP14 and SW3B from BP12. Glue these to R4 rib you just installed. Again, make sure that the tabs in the sheer webs are FULLY inserted into the pre-cut holes in R4.

☐ ☐ **Step 38 - Wing Assembly (SW2A)**

Locate two SW2As from LP1, LP2, or LP3. These are to the R4 rib you just installed and to the lower spar. One goes on the front of the spar and one on the rear, as shown here. Again, make sure that the tab in the sheer web is FULLY inserted into the pre-cut hole in R5.

Also, take care to keep glue out of the area between the sheer webs, as this can interfere with the fit of the dihedral brace later on.

☐ ☐ **Step 39 - Wing Assembly (R3, LG4)**

Locate R3 from LP2 and one LG4 from LP2, LP4, or LP5.

LG4 is glued to the inside face of R3 - the side facing the root rib. It strengthens this cutout on the bottom of the rib. Make sure it is perfectly aligned.

☐ ☐ **Step 40 - Wing Assembly (R3)**

Now glue the R3 assembly to the lower spar and the SW3As already in place.

Take care to keep glue out of the area between the sheer webs, as this can interfere with the fit of the dihedral brace later on.

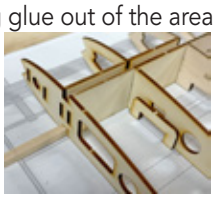
☐ ☐ **Step 41 - Wing Assembly (SW2B)**

Locate SW2B from BP13. This is glued in between the R4 and R3 ribs, in the cutouts on the rear of the ribs.

☐ ☐ **Step 42 - Wing Assembly (R2, SW2A)**

Locate R2 from LP1 or LP2 and two SW2As from LP1, LP2, or LP3. Glue both SW2As in place first, again keeping glue out of the area between the sheer webs.

Then, fit and then glue R2 in place, making sure the tabs on both sheer webs are fully inserted and it is flush against the building surface.



☐ ☐ **Step 43 - Wing Assembly (SW2B)**

Locate SW2B from BP13. This is glued in between the R4 and R3 ribs, in the cutouts on the rear of the ribs.

☐ ☐ **Step 44 - Wing Assembly (tube)**

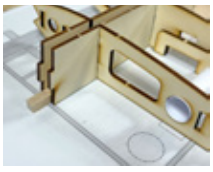
On the back page of this manual is Appendix B. This is what you'll use to make a servo extension tube. Follow the instructions, on that page to make a simple paper tube that helps when fishing the servo extension wires through the wing later on in the build.

☐ ☐ **Step 45 - Wing Assembly (SW1A)**

Locate two SW1As from LP1, LP2, or LP3. Note the etched circle on these pieces. What, you might ask, does this beautifully etched circle mean? Why, it's the top edge.

Glue both of these in place, on each side of the bottom spar. The circles should be on the top and facing the root rib, R1, which will be installed in just a few steps. Also, their tabs should be pushed completely into the cutouts in R2.

Again, take care to keep glue out of the area between the sheer webs, as this can interfere with the fit of the dihedral brace later on.



☐ ☐ **Step 46 - Wing Assembly (WH4, WH5)**

Locate WH4 and WH5 from LP1 and LP2. Again, note the etched circle for the top and root orientation.

Glue both of these in place into the R2 rib. These will be "floating" above the building surface until the root rib is installed, so take care to make sure they are properly attached.

☐ ☐ **Step 47 - Wing Assembly (SW1B)**

Locate SW1B from LP1 and LP2. Again, note the etched circle for the top and root orientation. Glue this in place, into the R2 rib.

☐ ☐ **Step 48 - Wing Assembly (SW1C)**

Locate SW1C from LP1. Again, note the etched circle for the top and root orientation. Glue this in place, into the back cutout of the R2 rib.

☐ ☐ **Step 49 - Wing Assembly (R1)**

Locate R1 from LP1 or LP2, and grab the triangle referenced back at the start of the wing assembly.

It's highly recommended to test fit R1 in place first, as there are a lot of tabs from all of the SW and WH pieces you just glued into R2. R1 needs to be pressed up against all of those pieces, as well as being pushed flat onto the building board so it will be properly seated on the lower spar.

Also use the angled part of the triangle to make sure you have the correct dihedral angle along R1's entire length.

When you're satisfied with how all this goes together, remove R1, apply glue everywhere needed, and then place R1 back in position. Also make sure that R1 is straight along its entire length while the glue cures.

☐ ☐ **Step 50 - Wing Assembly (trailing edge)**

Locate one 5/16" square balsa stick to use as the trailing edge.
Measure and cut this to length, leaving about an 1/8" or so extra past the R1 and R8 ribs. Glue this in place, making sure it is glued to each and every rib.

☐ ☐ **Step 51 - Wing Assembly (leading edge dowel)**

Locate the 1/4" x 6" dowel from the hardware bag.
Cut two equal 2-1/2" lengths. Round the ends of each one either by hand, or do it like I do - chuck it up in a drill and spin it like a little lathe. Use sandpaper to quickly round off one end, then the other.

☐ ☐ **Step 52 - Wing Assembly (drill guide)**

This is something new I figured out and have included in the Sport Air 40 - it's a drill guide to help perfectly drill the hole for the wing's leading edge dowels.
If you've been building as long as I have, one of the true "black arts" is getting the holes in the right place for the wing's leading edge dowels - usually they're off a bit, but every once in a while, we get lucky.
Well, let's throw a bit of common sense at the problem. Using the following steps has allowed me to pretty much nail the proper spot for the pesky but much-needed dowels. So here we go.

Locate one J1, two J2s, and one J3 in LP5 and LP6. These are glued together to make a simple box. J1 is on the bottom, J2's make up the sides, and J3 forms the top. All are at right angles to each other. The extra rounded portions of J1 are tabs for your fingers to hold the guide in place a bit easier.
Now do the following steps in order - trust me:

- Locate a 1/2" square x 36" balsa stick that will become the trailing edge.
- Measure and cut it to length, leaving about 1/2" extra on each end - ***yup, that's a bit more than usual, but trust me.***
- Dry-fit this in place and mark where the dowel's hole will need to be drilled.
- Apply a few drops of thin CA on the front and back of where the hole will be drilled to keep the wood from splintering.
- Once the glue has cured, slide the wood into the drill guide, centering up the mark you made on the guide's top circle.
- Using a drill press or carefully using a hand drill, drill the 1/4" hole down through the guide and through the 1/2" balsa.
- Remove the leading edge and slip one of the dowels you just a couple steps ago into the slot. You can now use this dowel as a "locator" when fitting the leading edge in place - by sliding the dowel in through WH4 and WH5, which are already installed into the wing.

☐ ☐ **Step 53 - Wing Assembly (leading edge)**

So once those steps are done, you can then glue the leading edge in place, making sure it is glued to each and every rib.
You can also glue in the dowel at this point, making sure it is also glued to WH4 and WH5.

☐ ☐ **Step 54 - Wing Assembly (WH2)**

Locate WH2 from LP1 or LP2. This is glued in place, on top of the R1 and R2 ribs, as shown here. The etched circle should be towards R1 and over the SW1C installed earlier.
Glue this in place, making sure it's attached to the ribs as well as the top of SW1C and the trailing edge.

☐ ☐ **Step 55 - Wing Assembly (dihedral box)**

Before cutting

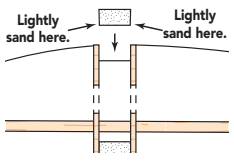
After cutting

Now it's time to cut away the center of three ribs - R1, R2, and R3. Here are the before and after photos to help show what needs to be done.
Before you make cuts, be sure that the sheer webs are securely glued to the ribs and lower spar.
Make sure that the area is completely clean and smooth, as later on this will be a channel where the dihedral brace will slide through. The cleaner it is now, the easier it will be to slide in the brace when it's time.
Take your time and use a gentle touch in this step, as you don't want to cut more than you should, nor do you want to damage the sheer webs in these spots, as it could weaken the wing or cause a misalignment.

☐ ☐ **Step 56 - Wing Assembly (upper spar)**

Locate the 1/4" square basswood that you trimmed a few steps back, as this will be used for the upper spar. It will need to be trimmed to length, but leave it slightly oversized so it extends roughly 1/8" past R1 and ends at the outer edge of R8.

It is HIGHLY advised that you take a test run on installing this lower spar before any glue gets out of the bottle.



First, lightly sand the edges of the spar's bottom face as shown in the drawing to the right. This will help the spar slide in easier.
Now start pressing it in place, starting at the tip rib and working your way towards the root a little at a time. This will be a tight fit and might require "wiggling" the spar from side to side to slip in between the webs. Be sure to press the spar completely into the slot in each rib,

making it flush with the webs.
Once you get to the open area between the R1 and R3 ribs, you'll make sure that you don't push the top spar in too far. Doing so will make it impossible to install the dihedral brace later on.
Now that you know how to install the upper spar, it's time to glue it in place. Gluing this spar in correctly will take a bit of time, so we recommend against using an instant-setting glue. If you are using CA, use a thicker formulation that gives you a bit of working time.
Once the spar is in place, wick thin C/A in each of the spar and web joints (front and back), along the entire length of the spar.
When fitting the spar in the area of the dihedral box, be careful not to drip excess glue into the box formed between R1 and R3 ribs.

☐ ☐ **Step 57 - Wing Assembly (trailing edge sheeting)**

Locate an uncut length of 1/16" x 4" x 36" sheeting. This will be cut to form the wing's top leading and trailing edge sheeting.
Cut a 1" x 36" wide strip from this piece to use at the trailing edge. Measure and cut this to length, then glue it in place on top of each rib, to each of the rear sheer webs, and to the trailing edge.
Make sure it is flat along its entire length.

☐ ☐ **Step 58 - Wing Assembly (leading edge sheeting)**

Locate the 1/16" x 3" x 36" balsa sheet you trimmed in the previous step. Trim this to a width of 2.4" x 36".
We found it best to glue the forward edge of the sheeting to the leading edge first.
Carefully position a couple of weights on the rear of the wing to keep it in place while attaching the sheeting. We used a couple of larger LiPo packs, but most anything with a little weight will work.
To apply constant and firm pressure along the length of the sheeting, we advise using a yardstick or long straightedge. Place the thin edge of the straightedge on top of the sheeting and hold (or tape in place) it until the glue cures.
Once the glue holding the front edge of the sheeting has cured, apply glue to the ribs where the sheeting will attach, as well as the upper spar. Then gently wrap the sheeting around the curvature of the wing ribs.
As the sheeting we get can vary in density, you might have to apply a bit of Windex® glass cleaner to loosen up the grain and allow it to bend without cracking. Soak the outer side of the wood to expand the fibers. Now hold it to the curvature needed, then use a hair dryer or covering heat gun to help "set" the balsa's bend as it dries. Once it's dry, then you can glue it in position.
Note: using the same straight-edge, apply constant and firm pressure to the sheeting by slowly working from the leading edge, pushing the sheeting onto the ribs. Slowly work your way back to the rear of this piece of sheeting until it is attached to the upper spar.

☐ ☐ **Step 59 - Wing Assembly (center sheeting)**

Locate two uncut 1/16" x 4" x 12" balsa sheets to use as the center sheeting.
Trim the first one to length, extending from R1 to R5, leaving about a 1/8 or so extra on each end. Glue this in place up against the leading edge sheeting and down against the portion of the R1-R5 ribs that it covers.

Once that piece is in place, trim the second piece of sheeting to length, then also trim it so it fits snugly between the sheet you just installed and the front of the trailing edge sheeting you installed earlier. Glue this in place.

☐ ☐ **Step 60 - Wing Assembly (cap strips)**

Located in BP16 and BP17 are a lot of cap strip lengths. You'll use these to cover the tops of the R6 through R8 ribs. Measure and cut them so they run from the back of the leading edge sheeting to the front of the trailing edge sheeting. Center them on each of the R6 and R7 ribs as you glue them in place.
For R8, position the strip so it is flush with the outside edge of the rib when you glue it down.

Your wing panel should look a lot like this now. Time to remove it from the work surface and begin work on the bottom side.

☐ ☐ **Step 61 - Wing Assembly (WH3)**

Locate two WH3s from LP1 and LP2. Please test fit these before gluing.
Take a look at the pieces, and you'll note that one side has more of an angle than the other. This is the top edge and continues the airfoil shape of the wing's top surface.
WH3s are inserted into the gap between SW1C and the trailing edge - on either side of the circular cutout in WH2. When satisfied with how these fit, glue these in place.

☐ ☐ **Step 62 - Wing Assembly (WH1)**

Locate WH1 from LP1 or LP2. This is glued in place, on top of the R1 and R2 ribs, as shown here. The etched circle should be towards R1 and over the SW1C installed earlier.
Glue this in place, making sure it's attached to the ribs as well as the top of SW1C, both WH3s and the trailing edge.

☐ ☐ **Step 63 - Wing Assembly (trailing edge sheeting)**

Locate an uncut length of 1/16" x 4" x 36" sheeting. This will be cut to form the wing's bottom leading and trailing edge sheeting.
Just as you did on the top side, cut a 1" x 36" wide strip from this piece to use at the trailing edge. Measure and cut this to length, then glue it in place on top of each rib, to each of the rear sheer webs, and to the trailing edge.
Make sure it is flat along its entire length.

☐ ☐ **Step 64 - Wing Assembly (LG3)**

Locate two LG3s from LP1 and LP2. You'll make a thicker LG3 by gluing them together.
Make sure the pieces are perfectly aligned when gluing and keep glue out of the pre-cut holes.

☐ ☐ **Step 65 - Wing Assembly (LG3)**

LG3 is glued to the outer face of R3, making sure that its tab is fully inserted into the precut slot in R3. We recommend epoxy for this step.

☐ ☐ **Step 66 - Wing Assembly (LG1, LG2)**

Locate one LG1 and two LG2s from LP1 and LP2, and we recommend epoxy for this step.
Two LG2s are glued one on top of the other, taking note of the pre-cut holes lining up.
Then LG1 is glued to this sub-assembly, and note that it only aligns correctly in one way.

☐ ☐ **Step 67 - Wing Assembly (LG1)**

Locate one of the main gear legs, as you'll use it as a tool when installing LG1.
First, test fit the LG1 assembly into the slots in R3, R4, and R5. Sand the block as necessary to get a good fit.
Now to align LG1, push the main gear wire into it, and then you can push the end of the guide in LG3 you installed a couple steps ago.
When you see where LG1 should be, mark it, remove it, remove the landing gear wire, and epoxy LG1 in place. Make sure it is completely pushed into each of the ribs.

☐ ☐ **Step 68 - Wing Assembly (leading edge sheeting)**

Locate the 1/16" x 3" x 36" balsa sheet you trimmed when cutting the trailing edge sheeting a few steps back. Trim this to a width of 2.6" x 36".
We found it best to glue the forward edge of the sheeting to the leading edge first.
Carefully position a couple of weights on the rear of the wing to keep it in place while attaching the sheeting. We used a couple of larger LiPo packs, but most anything with a little weight will work.
To apply constant and firm pressure along the length of the sheeting, we advise using a yardstick or long straightedge. Place the thin edge of the straightedge on top of the sheeting and hold (or tape in place) it until the glue cures.

☐ ☐ **Step 69 - Wing Assembly (center sheeting)**

Locate two uncut 1/16" x 4" x 12" balsa sheets to use as the center sheeting.
Trim the first one to length, extending from R1 to R5, leaving about a 1/8 or so extra on each end. You'll also need to trim around the LG1 block.

Glue the sheeting in place up against the leading edge sheeting and down against the portion of the R1-R5 ribs that it covers. Also make sure it's attached to the three sides of the LG1 block.
Once that piece is in place, trim the second piece of sheeting to length, then also trim it so it fits snugly between the sheet you just installed and the front of the trailing edge sheeting you installed earlier. Glue this in place.

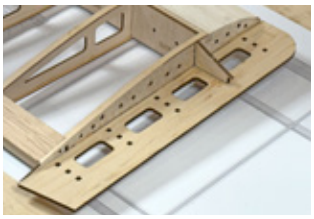
☐ ☐ **Step 70 - Wing Assembly (cap strips)**

Located more of the cap strip lengths from BP16 and BP17. You'll use these to cover the bottoms of the R6 through R8 ribs. Measure and cut them so they run from the back of the leading edge sheeting to the front of the trailing edge sheeting.
Center them on each of the R6 and R7 ribs as you glue them in place. For R8, position the strip so it is flush with the outside edge of the rib when you glue it down.

☐ ☐ **Step 71 - Wing Assembly (sanding R8's outer face)**

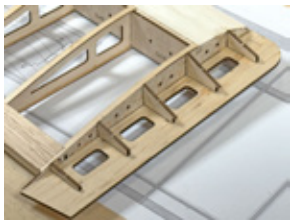
Take a few moments to sand the outer face of the R8 rib so it's flat. The rib itself should already be flat, but you need to remove any excess leading edge, trailing edge, spar, and sheeting so it's all flush and smooth so the wingtip can be installed in the next steps.

☐ ☐ **Step 72 - Wing Assembly (T1, T3, T8)**



Locate T1 from BP13, as well as T3 and T8 from BP5.
T1 is glued to R8, making sure all of its tabs are fully inserted into R8's precut slots. It needs to be perpendicular to R8 as well.
Then attach T3 in place on the top side of the tip and T8 on the bottom. Note that T3 and T8 have tabs that fit into the pre-cut holes.

☐ ☐ **Step 73 - Wing Assembly (T2 though 11)**



Now you'll attach the rest of the angled T2 through T11 pieces (from BP5) to the top and bottom of the wingtip. These only properly fit in their proper position, so please check the plans as you do this. Test fitting is good before locking things in position.

☐ ☐ **Step 74 - Wing Assembly (T12)**

Locate four T12s from BP1, BP2, and BP4.
Two are glued on top of the leading edge of the tip, and two on the bottom. Make sure they are aligned when you do this.

☐ ☐ **Step 75 - Wing Assembly (T13)**

Locate four T13s from BP3, BP4, and BP5.
Two are glued on top of the outer edge of the tip, and two on the bottom. Make sure they are aligned when you do this.

☐ ☐ **Step 76 - Wing Assembly (T14)**

Locate three T14s from BP1.
Two are glued on top of the outer edge of the tip, and two on the bottom. Make sure they are aligned when you do this.

Your wing panel should look a lot like this now. Now it's time to set this panel aside and start work on the port panel. Remove the starboard plan and tape the port plan on your building board, along with a fresh sheet of waxed paper. Go back to step 27 and repeat all of the wing steps up to 76. Once that's completed, you can then move on to step 77.

☐ **Step 77 - Wing Assembly (sanding R1's outer face.)**

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

☐ **Step 78 - Wing Assembly (DH1)**

Take some time test fitting and sanding the dihedral brace as necessary to get a good fit in both wing halves. Don't take off too much, too fast. Carefully sand as necessary to make sure everything fits properly and the root ribs in each wing half are touching along their entire length when assembled into a single wing. Take your time and get a good fit that doesn't require a lot of force.
Remember, you may have to file inside the boxes built into each wing half. Make sure they're smooth and the brace doesn't catch on any extra glue.

☐ **Step 79 - Wing Assembly (DH1)**

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

☐ **Step 80 - Wing Assembly (servo pockets)**

Once the epoxy has cured from the previous step, it's time to finish the servo pockets.
Locate both SH from LP1 and LP2. Also locate the 5/16" square scrap you trimmed when creating the trailing edge of the wings.
Working on one wing panel at a time, place the SH onto the mounting rails you've already installed in the wing. Then carefully measure and cut two lengths of 5/16" balsa that will span the distance between the R6 ribs.
Test fit them forward and aft of the hatch, leaving just a little room for clearance of the covering later on. When satisfied with how they fit, glue them in position, making sure they are flush with the wing's surface (the cap strips).
Then do the same for the other aileron servo pocket.

☐ **Step 81 - Wing Assembly (ailerons)**

Locate both 3/8" x 1-1/2" shaped balsa strips that will be used to make the ailerons. Measure and cut them to length, using the plans as a guide. Also cut the tips so they match with the tips - refer to the plans.

This completes assembly of the wing. Please set it aside, and let's get to work on the fuselage. Remove the starboard wing plan and tape the fuselage plan on your building board, along with a fresh sheet of waxed paper.

☐ **Step 82 - Hatch Assembly (H1, H2)**

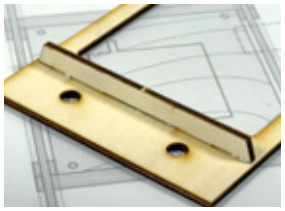
Locate H1 and H2 from LP8. You might also want the 90° triangle from back in the wing assembly.
Glue H2 to H1 at a perfect 90° angle, as shown here.

☐ **Step 83 - Hatch Assembly (H3)**

Locate H3 from LP5. Glue this in place, on the same side as H2, at a perfect 90°angle.

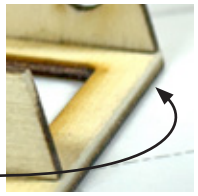
☐ **Step 84 - Hatch Assembly (H4)**

Locate H4 from LP6. Glue this in place, on the same side as H2 and H3, at a perfect 90°angle.



☐ **Step 85 - Hatch Assembly (sanding)**

This is probably hard to see in the photo, but you need to sand a bevel on the sides of H1 to match the angle of the H2, H3, and H4 pieces.



Sand a bevel on the long sides of H1.

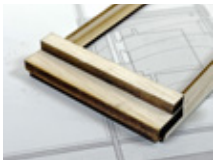
☐ **Step 86 - Hatch Assembly (H5)**

Locate two H5s from BP10. These are glued to the framing. H5 should be flat with H1 and flush against the 90° angle of H2.
Glue one to each side.

☐ **Step 87 - Hatch Assembly (H6)**

Locate H6 from BP19. This is glued across the front of H1, up against H3 and the H5 sheeting you just installed.

☐ **Step 88 - Hatch Assembly (H7)**



Locate H7 from BP19. This is glued on top of H7, up against H3 and the H5 sheeting.

☐ **Step 89 - Hatch Assembly (H8)**

Locate H8 from BP19. This is glued on top of the hatch assembly as shown. Match up the taper of this piece to the taper of the hatch when gluing it in place.

☐ **Step 90 - Hatch Assembly (H1)**

Sand a slight bevel on the top of H1 to match the slope of the side sheeting.

☐ **Step 91 - Hatch Assembly (H9)**

Locate H9 from BP19. You'll need to sand a bevel in the lower side of H9 where it mates up with H8. Sand a little at a time, test fitting as you go, to get the perfect fit.
When satisfied, glue this in place.

☐ **Step 92 - Hatch Assembly (magnets)**

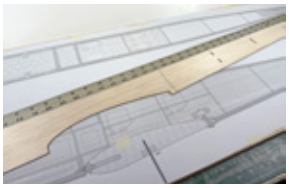
Locate two magnets from the hardware bag. These are glued in place into the pre-cut holes in H1. Make sure they are completely pushed in and flush when doing this.

☐ **Step 93 - Hatch Assembly (pegs)**

Locate the leftover 1/4" dowel you trimmed when making the wing-hold dowels. Cut two equal lengths, roughly a 1/2" or so in length. Round off one end of each, and these are glued into the smaller pre-cut holes in H1, as shown here. Make sure they stick straight out from the surface of H1. Also, they each need to protrude out a minimum of 1/4" from the back of H1.

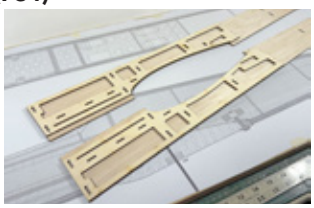
Put the hatch aside as it's time for the last big build for the Sport Air 40 - the fuselage.

☐ **Step 94 - Fuselage Assembly (FS2, FS3)**



Locate both FS2s from BP6 and BP8, as well as both FS3s from BP7 and BP9.
One FS2 is glued to one FS3 to create a fuselage side. When doing this, use your old, trusty straight edge across the top edges to guarantee that the side is straight along its entire length. Do this for other pieces to create the port and starboard fuselage sides as shown here.

☐ **Step 95 - Fuselage Assembly (FS1)**



Locate both FS1s from LP5 and LP6. Place both of the FS2/FS3 side sheets on your work surface, one mirroring the other.
These pieces align along the wing saddle and along the top edges.

Now glue an FS1 to each of the sheets to create a port and starboard fuselage side as shown here.
DO NOT MAKE TWO DUPLICATE SIDES - THEY NEED TO BE MIRRORED.

☐ **Step 96 - Fuselage Assembly (FS4, FS5)**

Locate both FS4s from BP10 as well as both FS5s from BP7 and BP9.
Using the same straight-edge technique, create a fuselage upper side sheet by gluing one FS4 to one FS5. Then do the same to create the matching side sheet.

☐ **Step 97 - Fuselage Assembly (TR1A, TR1B)**

Locate both TR1As and TR1Bs from LP4. One "B" is glued to one "A" to form one assembly, but then the other "A" and "B" are glued together to form a mirror image of the first assembly - as shown here.
Make sure that the "B"s are aligned with the "A"s, and try to keep glue out of the pre-cut holes.

☐ **Step 98 - Fuselage Assembly (t-nuts)**

Locate two t-nuts from the hardware bag. These are pressed into the TR1Bs of both assemblies made in the previous step. Apply a little glue to hold them in position, but make sure that no glue gets into the nut's threads!

☐ **Step 99 - Fuselage Assembly (FS1, TR1A/B)**

Now these TR1A/B assemblies are glued into the FS1s. The TR1B (with the t-nut installed) will point towards the bottom of the fuselage. Test fit, then glue these in place, making sure that they are mirror images of each other.

☐ **Step 100 - Fuselage Assembly (F3, F3A)**

Locate F3 from LP8 and both F3As from LP5. The F3As are glued to each side of the F3. Make sure they are perfectly aligned, and try to keep glue out of the pre-cut holes.

☐ **Step 101 - Fuselage Assembly (F1, F2)**

Locate both F1s LP4 and LP5 as well as F2 from LP6.
Use epoxy for this step, please. Glue both F1s together, nice and aligned, then glue F2 to the F1 assembly. When doing this, note the etching on F2. Make sure this is on the outside - so you can see once these pieces are glued together.

☐ **Step 102 - Fuselage Assembly (WH6)**

Locate the four WH6s from LP2 and LP3. These are glued one on top of the other to create a super-thick WH6. Use epoxy for this step and make sure they are all perfectly aligned with each other as the glue cures.

☐ **Step 103 - Fuselage Assembly (F5, TR3)**

Locate F5 from LP4 and TR3 from LP7.
Before assembling these, cut out the bottom cross-member of F5. Then slip F5 onto TR3. Make sure it is pushed into the side cutouts until it is flat against the surface of the tray.
Glue these two pieces together, making sure they are 90° to each other.

☐ **Step 104 - Fuselage Assembly (F4)**

Locate F4 from LP4. It is glued to the front of the TR3 assembly as shown here. Make sure that F4 is also at a 90° angle to the tray.

☐ **Step 105 - Fuselage Assembly (TR2)**

Locate TR2 from LP7. It is glued to the bottom of F4 as shown here. Make sure that TR2 is at a 90° angle to the F4.

☐ **Step 106 - Fuselage Assembly (TR2/3, starboard FS)**

Grab the starboard fuselage side and place it on your workbench with the plywood framing facing up. Now you can test the TR2/3 assembly in the framing. Make sure that all of the tabs fit completely into the framing's pre-cut slots.
When satisfied on how this fits, remove the TR2/3 assembly, apply glue everywhere it touches the framing, and then push it into place.

☐ **Step 107 - Fuselage Assembly (F6)**

Locate F6 from LP4. This is glued to the back of the tray assembly and into the side sheeting as shown here.

☐ **Step 108 - Fuselage Assembly (F3)**

Locate the F3 assembly from a few steps back. This is now glued in place into the side framing as shown here. Make sure it is perfectly perpendicular to the side sheeting.

☐ **Step 109 - Fuselage Assembly (F1/F2)**

Locate the F1/2 assembly from a few steps back. This is now glued in place into the side framing as shown here. Make sure it is perfectly perpendicular to the side sheeting.

☐ **Step 110 - Fuselage Assembly (WH6)**

The WH6 assembly from a few steps back is now glued in place - into the large rectangular cutout in FS1. Make sure it is completely inserted into the cutout and that WH6 is perpendicular to the side sheeting.

☐ **Step 111 - Fuselage Assembly (port fuselage side)**

Now locate the other fuselage side (port), and it's time to attach it to the fuselage assembly.
Test fit it first, making sure all of the tabs are being fully inserted in the pre-cut tabs.
When you're satisfied with the fit, apply glue everywhere the pieces touch and glue the port side into place.

☐ **Step 112 - Fuselage Assembly (fuselage jig)**

Hey, let's make a simple jig to help with the next steps. Locate the leftover 1/2" square balsa and pin it over the top plan so it will "cradle" the fuselage sides. Then cut and pin a short length of leftover 5/16" square balsa over the rear edge of F6 on the plans. You then should be able to place the fuselage assembly into this "jig" and it will hold the fuselage in place while you work on the back end.

☐ **Step 113 - Fuselage Assembly (J5, J6)**

Now with the fuselage being cradled in this makeshift "jig," you can also use another jig - J5 and J6. Grab those pieces from LP4. I don't have photos of this because I came up with it after the prototypes were made, but it's pretty simple to visualize.
J6 is glued to J5 by inserting the tab into the pre-cut slot. Make sure the two pieces are perpendicular to each other.
Now you can use this jig as another set of hands by sliding the aft ends of the fuselage sheeting through the large slot. Then you can pin down the base of the jig to your building board to hold it at the right spot. This will effectively "clamp" the fuse sides together, holding them while you work on installing the formers.
Leave the fuselage in these makeshift jigs for the next steps.

☐ **Step 114 - Fuselage Assembly (F7, F8, F9)**

Locate F7 and F8 from BP8, as well as F9 from LP8. These formers fit into the pre-cut slots in the fuselage side sheeting. The order these are installed doesn't matter much - just make sure they are all firmly seated into the fuselage sheeting as you go.

☐ **Step 115 - Fuselage Assembly (top framing)**

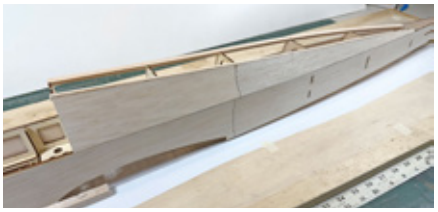
Locate two uncut 1/4" square balsa strips. You'll use these to form the top framing that runs along the cutouts in the formers.
Measure and cut these to length, running from F4 to F9.
You'll need to use a little force to bend these into place as you glue them. Make sure that the formers remain straight - not bent from the force - especially F4, or the hatch will not line up correctly.
Glue these two framing pieces in place.

☐ **Step 116 - Fuselage Assembly (stab framing)**

Using a little of the leftover 1/4" square balsa, measure and cut two lengths to form the horizontal stab supports as shown here. These are glued to the inside of the fuselage sides, flush with the top edge. You'll need to trim/sand the aft ends to blend together as the fuselage narrows.

☐ **Step 117 - Fuselage Assembly (upper sheeting)**

Locate the two upper side sheets you assembled a while back. These are now to be glued to each side of the fuselage, as shown here.



Do one side at a time, first by sanding a slight bevel in the bottom edge, where the upper sheeting will contact the fuselage sheeting. Apply glue to the framing and the upper edge of the fuse sheeting, then attach the first upper sheet. You'll have to use a little force to bend it to the fuse contour as you move from F4 toward the back.

When the first side is in place, sand a bevel on the other upper sheet and then glue it in place using the same techniques.

☐ **Step 118 - Fuselage Assembly (sanding upper framing)**

As it currently sits, the upper framing's angles make it so the outer corners need to be lightly sanded to bring the framing down to the level of the sheeting you just installed. A light sanding across the frame will make it all flat for the next step.

☐ **Step 119 - Fuselage Assembly (top sheeting)**

Locate the uncut 3/32" sheeting, as well as the leftover 3/32" sheeting in BP7.

You'll now measure and cut pieces of this to form the fuselage's top sheeting. This needs to be cross-grained (running port to starboard). Also be careful on your measurements and cuts—there's enough to do this, but not a ton of extra sheeting.

Hold the 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 get close to the vertical fin cutout. Then you'll have to trim the piece to fit the remaining distance.

Be careful to waste as little of the sheeting as possible.

☐ **Step 120 - Fuselage Assembly (tail surfaces)**

Grab the vertical fin and the horizontal stab you made way-back-when.

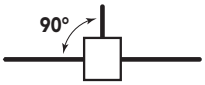
These should now be glued together, with the vertical fin's notch completely inserted into the stab's cutout.

Test fit and sand as necessary so the two pieces mate up as they should. Then glue them together, using that 90°angle as a reference to make sure they're perfectly perpendicular.

☐ **Step 121 - Fuselage Assembly (tail surfaces)**

Now the tail assembly is offered up to the fuselage. Again, this will require a bit of test fitting, as you might need to sand a few things to make sure it fits as it should.

Place the tail assembly on the fuselage, then sight down the fuselage. It should hopefully be level with your building surface. If it needs a little adjustment, note which side is high, then remove the stab and lightly sand the fuselage on the appropriate side.



Refit the tail assembly, and keep doing this until you have it as perfect as you can. You shouldn't need to do much of anything here, but remember - you can easily take wood off, but it's much harder to put back on!

Now with the tail assembly level, you want to make sure that it's straight. Sight down the fuselage and make sure that the vertical fin isn't pointing to the left or to the right - you want it bang-on-straight.

Once you have the tail assembly all lined up, make a few marks on the stab so you can easily realign this to the fuselage. Remove the fin, apply glue to where the surfaces will touch, then attach the tail surfaces to the back of the fuselage.

☐ **Step 122 - Fuselage Assembly (top sheeting touchup)**

Using some scrap 3/32" sheeting, cut two pieces to finish off the top sheeting on either side of the vertical fin.

Glue those in place as shown here.

Now you can remove the fuselage from the makeshift jigs.

☐ **Step 123 - Fuselage Assembly (lower framing)**

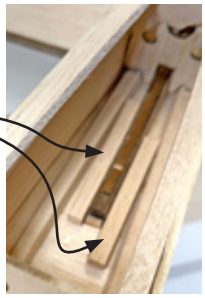
Locate the rest of the 1/4" square balsa strips, as well as any scrap pieces. These will now be used to form the internal lower framing.

These can be pieced together out of smaller strips as well.

Measure and cut the two rear pieces that run from the back of the wing saddle to the rear of the fuselage. Note that they will have to be blended together at the rear for a good fit. When you have those cut, apply glue to the fuselage sides and each of the cutouts in the formers, then push the framing in place so it is flush with the fuselage sides.

Do the same to form the front lower sheeting that runs from the back of F2 to F3.

☐ **Step 124 - Fuselage Assembly (optional vertical fin support)**



From underneath the fuselage, you can see where the vertical fin extends through the top sheeting. If you'd like, you can add a couple of small pieces of square balsa to give support in this area, like as shown here.

☐ **Step 125 - Fuselage Assembly (pushrod time)**

Before the 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 that is permanently installed in the fuselage. You'll push these tubes in through the pre-cut holes in F6, F7, and F8 and then out one of the fuselage side's elongated cutouts. The rudder will exit out of the top of the fuselage, on the side of the vertical fin.

☐ **Step 126 - Fuselage Assembly (nose gear block)**

Locate the nose-gear assembly bag from the hardware bag. You'll need the mount, the 4 mounting screws, the 4 washers, the 4 lock washers, and the 4 T-nuts. Forget about the gear wire and the other parts for now.

On the back side of the firewall are two etched lines towards the bottom. These are to aid in the location of mounting the nose gear block. Position the block so it's about an 1/8" above the bottom of the firewall and so the mounting holes are lined up with the lines etched on the firewall. Mark the position of these 4 holes and drill through the firewall. Mount the block to the back of the firewall using the 4 mounting screws, t-nuts and washers from the nose gear bag. You can trim off the length of the screws if they interfere with your engine's mounting at a later time.

☐ **Step 127 - Fuselage Assembly (bottom rear sheeting)**

Just as you did for the top sheeting, carefully cut and attach the bottom fuselage sheeting from leftover 3/32" x 4 sheets. This should run cross-grained as before, running from the back of the wing saddle to the rear of the fuselage.

☐ **Step 128 - Fuselage Assembly (bottom front sheeting)**

Using the last of the 3/32" sheeting, now cover the area from the firewall back to the front of the wing saddle.

Make sure it's cross-grained as before.

☐ **Step 129 - Fuselage Assembly (H10)**

Locate H10 from LP5 and the other two magnets from the hardware bag.

H10 is glued across the back of the firewall, flush with the top edges of the fuselage sides.

The magnets are glued into the pre-cut holes. Make sure they are the right way so they attract, not repel, the magnets in the bottom of the hatch.

☐ **Step 130 - Fuselage Assembly (cheeks - part one)**

Locate both FS6s and FS7s from BP19.

You will glue one FS6 to one FS7, making sure to note their orientation as they only line up correctly one way. Their rear edges should line up flush with each other.

Then glue the remaining FS6 and FS7 together - ***AS A MIRROR*** of the first - not a duplicate.

☐ **Step 131 - Fuselage Assembly (cheeks - part two)**

Lightly sand the rear edge of the cheeks you just assembled so they are flat. Then you'll glue them in place, as shown here, flush with the fuselage sides.

☐ **Step 132 - Fuselage Assembly (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 wing's leading edge and wingtips. Go over the entire wing, making sure the sheeting is smooth and the trailing edges are blended into the sheeting, continuing the curvature of the wing.

Smooth out the sides and edges of the fuselage. Because of the sheeting and the 1/4" balsa supports installed around the fuselage's perimeter, you can be a little aggressive in rounding the corners. Also, you can sand a slight curvature into the cheeks so they'll look similar to this:

Tackle the wing, smoothing its surfaces, rounding off the leading edge, and taking a bit of time to smooth out the wingtips. All of those pieces you glued on will blend together to make it look like one seamless piece when sanded correctly.

Go over the tail surfaces, making sure they are smooth and the leading edges and sides are rounded off. Sand bevels into the leading edge of the control surfaces and the ailerons, then take the time to round off their trailing edges.

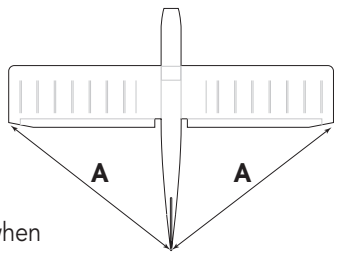
The idea is to spend some time caressing this awesome airframe you've created, smoothing the rough edges until it's something so slippery that it will cut through the air like a knife through melted butter.

☐ **Step 133 - Fuselage Assembly (wing test fit)**

It's time to mate the wing to the fuselage. Test fit the wing pegs into the pre-cut holes in F3. They should slide in with little effort, but you might need to use a file to slightly sand the holes to get a good fit - but not a sloppy fit! ***DO NOT SAND THE DOWELS*** - as it will weaken them.

☐ **Step 134 - Fuselage Assembly (wing alignment)**

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



measured from the starboard wing tip to the rear of the fuselage. You shouldn't need to twist the wing much at all for this to match up.

☐ **Step 135 - Fuselage Assembly (wing bolt holes)**

With the wing aligned, drill two 3/16" holes for the wing bolts, using the pre-cut holes in WH1 as a guide. Use caution to make sure the wing does not move until both holes are drilled.

When drilling, take your time and make sure the drill is held so the bit is in the center of the wing holes and perpendicular with the wing's sheeting.

This will make it so the wing bolt goes in at an angle, but the screw's head will be flat on the wing surface. Remove the drill, remove the wing, and clean up around the new holes you drilled.

Run a 1/4x20 tap through the WH6 pieces so that the wing bolts will thread into this block. A few drops of thin CA will help strengthen and secure the threads you've cut.

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

Once you have the holes drilled and tapped, mount the wing to the fuselage and bolt it in place.

☐ **Step 136 - Servo Hatches (SH, parte uno)**

You'll have just enough leftover 1/4" square basswood that was used in the spars and servo hatch rails.

Locate them and cut eight 5/8" pieces. Make a post by gluing two of these pieces together. Then do the same to make the other three posts.

Now place the SHs on your work surface, mirroring each other as shown here.

Position your aileron servos on the inside of the SH1s so the servo arm output shaft is centered in the opening.

On the inside of each aileron hatch, glue one post on each side of the servo as shown in the photo.

Note that the left hatch is a mirror image of the right hatch.

☐ **Step 137 - Servo Hatches (SH, seconda parte)**

Now fit the servo hatches into position on the bottom of the wing. Using the pre-cut holes as a guide, drill four 1/16" mounting holes into the hatch mounting strips. Harden the wood with a bit of thin CA, and you can use the supplied 2-56 x 3/4" self-tapping screws to secure the hatches in place.

This completes assembly of the Sport Air 40's airframe. These next steps can be done in most any order, but it's probably advisable that you do the covering first.

Covering

Before covering your Sport Air 40's airframe, 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.

You can also download a .pdf of the livery sheet from our website and print as many as you need. They are perfect for planning the color scheme for your model. Get out your crayons, markers, colored pencils, paint & brushes - or whatever you use - and let your mind go wild.

To cover the Sport Air 40 as shown in our prototypes, it took a couple rolls of white and then one roll each of the other colors involved. . But 2-3 rolls of iron-on covering would easily cover the entire airframe, with some to spare.

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. She is a very well-known provider of custom graphics for R/C models.

We have supplied her with the artwork needed, and you can order straight from her, choosing the colors that work for you.

Contact Callie Graphics at this link: https://callie-graphics.com

or scan the QR code.

Note that Callie Graphics is not affiliated with Old School Model Works, nor does Old School Model Works generate any income from this partnership. She just does good work at a very reasonable price!

Attach the Control Surfaces (CA hinges)

Attach all the control surfaces to the airframe by gluing the hinges in position with thin C/A. We've noted suggested hinge locations for each of the control surfaces on the plans, and you'll need to make the appropriate slots for each hinge.

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

Attach the main gear

Locate both pre-bent main gear wires, four landing gear straps, and eight 2-56 self-tapping screws. Using a 5/32 bit, run those down through the pre-cut holes in the LG1 blocks, clear out any excess glue, and then push the main gear wires into place.

To hold them in place, install the landing gear straps as shown in the photo. Use a 3/32" drill to drill down through the pre-cut mounting holes for the screws, and then attach the straps in position.

Attach the nose gear

Everything you need to assemble the nose gear is in one package. Push the nose gear wire partially up through the block. Slip the steering arm in place, then push the nose gear wire all the way through the block and the arm.

With the nose gear positioned so the coil is towards the rear of the plane, position the steering arm at a 25-30° angle, then tighten the setscrew in the steering arm just tight enough so it should

make a mark on the nose gear wire. Also, mark where the wire should be trimmed off, above the mounting block.

Loosen the screw and remove the wire.

Grind a small flat on the nose gear where the screw made a mark, and trim the excess top wire, then reattach. Use a touch of thread-locking compound on the screw to make sure it doesn't vibrate loose later on down the road (or, more to the point - down the runway).

Attach the wheels

Test-fit the wheels onto the axles, then mark where the wheel collars will be positioned on the axles. Remove the wheel and collar, then grind a small flat on the wire. Reattach the wheel and collar. Use a touch of thread-locking compound on the grub screw to make sure it doesn't vibrate loose later on down the road (or, more to the point - down the runway).

Radio installation

Now it's time to install your receiver and hook up all of the radio for the first time.

Attach the aileron servo hatches (with the servos mounted) and run the wires through the tubes installed during the wing construction. You'll need to cut a couple of holes in the top sheeting to allow the wires to exit the wing. (You'll probably have to use a short servo extension along with a "Y" harness for the aileron servos, depending on the brand you use.)

To install the rudder and elevator servos, those are mounted in the rear tray. Cut into LP1 and LP4 are TR4s, which should be used to double-cup the areas where the servo mounting screws are attached.

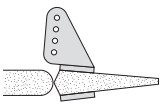
Finish the layout of your radio gear by adding the receiver and battery (or ESC if electric). We mounted the receiver on the tray. The battery (or ESC) goes up front, under the removable floor in the hatch area (TR1 from LP4, held in place by the two 4-40 hex bolts in the hardware bag).

Use a bit of self-adhesive hook-and-loop (not included) to hold the receiver, battery, and the ESC in place.

Control horn installation

Now it's time to mount all of the control horns, one for each control surface. A control horn consists of the horn's plastic backer plate and two 2-56 x 1/2" self-tapping screws; you'll find all of that in the hardware bag.

Each control horn should be mounted so it's in line with the pushrod opening, and the holes in the control horn should be in line with the hinge, as shown in this diagram.



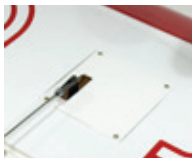
You'll need to carefully mark and drill the mounting holes, using the control horn as a guide. Then you insert the screws and thread them into the backer plate from the other side. Tighten the screws to firmly hold the control horn in place, but do not crush the wood of the control surface.

Pushrod installation

As for the pushrods, we're not going to go in-depth on how they work, as that's covered in their included instructions. Basically, you'll measure and cut the pushrods to length, taking into account the length of any clevises (or z-bends) on the end of the pushrods. We typically have one end of the pushrod (the exposed end for the elevator) that has an adjustable clevis. The other end is usually a simple Z-bend that attaches to the servo horn. Doing it this way allows for fine adjustments in the field without having to get inside the plane, taking things apart.

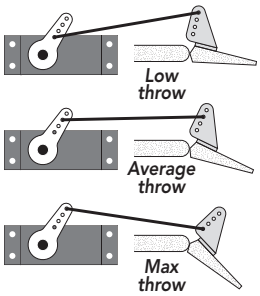
Elevator pushrod

Rudder pushrod



Aileron pushrod

Also, when setting up the pushrods, the various holes in the servo arm and the control horns can drastically change the amount of throw that the surfaces will have. Here's a rudimentary diagram that shows how you can remove or add throw to a surface mechanically - simply by changing the holes used.



Recommended Control Throws:

These are starting numbers. So you'll need to play with these to find the right combination of agility and controllability for your style of flying.

Aileron 1/2" up/down (30% expo)

Elevator 3/8" up/down (30% expo)

Rudder 1" port/starboard (10% expo)

Please, please, please!

Check the direction that each control surface moves.

Then double check the directions.

Walk away for a while, then come back and check the directions again.

The number one cause of a crash of any brand new airplane on its maiden flight is having the wrong throw for one (or more) of the control surfaces.

Power system install (glow)
Mounting a glow engine is fairly straightforward, simply bolting it to the firewall, usually in an upright orientation. You may have to make a cutout for the muffler, depending on the make of your engine.
The tank can either rest on the internal tray, or you can remove it to fit a larger tank. Fuel and vent lines would then run through the pre-cut hole in the firewall. However, you will have to mount your throttle pushrod and drill a hole for the throttle pushrod in the appropriate spot on the firewall.

Power system install (electric)
Mounting an electric motor requires adding the electric firewall pieces first:

- Locate both EF1s from LP8 and epoxy those together, making sure one of them has the etched "X" showing.
- Use the "X" to locate, drill, and mount the bracket that came with your motor.

- Locate both EF2s from LP6 and note the etched circle. This designates the top, front corner. These two pieces are epoxied to the sides of the fuse cheeks and up against the firewall on both sides of the fuselage. Refer to the plans and photo.

- The firewall will need a bevel to be sanded on the port and starboard sides. Do a test fit, and continue until the firewall can be slid down or slid up against the EF2 pieces you installed. It should be snug to the fuselage sides. Epoxy this in place when you're satisfied with the fit.
- Mount your motor to the firewall and run the wires either in through the center cutout or make a small cutout in the firewall underneath where the tray is, which is what we did on the electric prototypes.

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!

C.G. BALANCE POINT

The recommended Center of Gravity (CG) range for the Sport Air 40 is 3" to 3-1/2" 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 and/or receiver until the correct balance is achieved. If absolutely necessary, weight can be added - stick-on weights are available at your local hobby store and work well for this purpose.
We recommend starting with the C.G. in the forward position, then adjusting it as needed in subsequent flights, after you've trimmed and become familiar with the Sport Air 40's flight characteristics.

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., in 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.

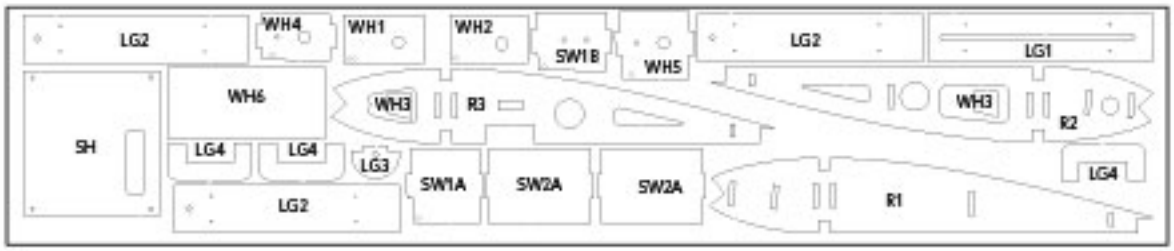
Range check your radio before flying
Before each flying session, range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane, but do not attach the arming switch.
With your airplane on the ground, you should be able to walk 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 unopened condition.

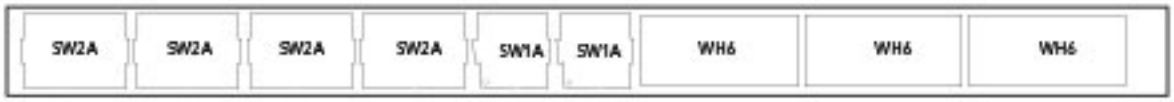
As of this printing, you are required to register with the FAA if you own this product. For up-to-date information on how to register with the FAA, visit: https://registermyuas.faa.gov .
For additional assistance on regulations and guidance of UAS usage, visit: http://www.knowbeforeyoufly.org .

LP1 1/8" Lite Ply

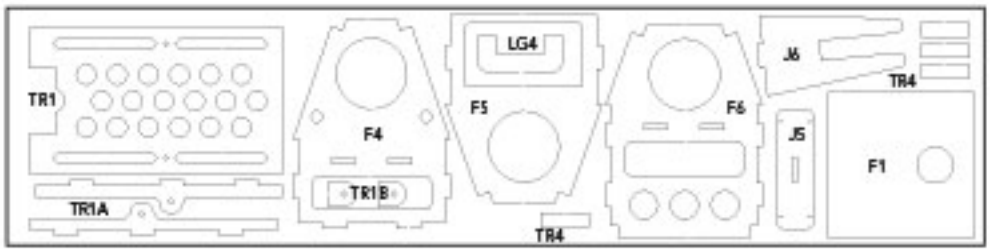
LP2 1/8" Lite Ply



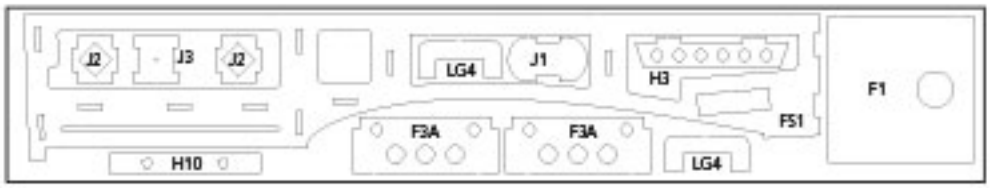
LP3 1/8" Lite Ply



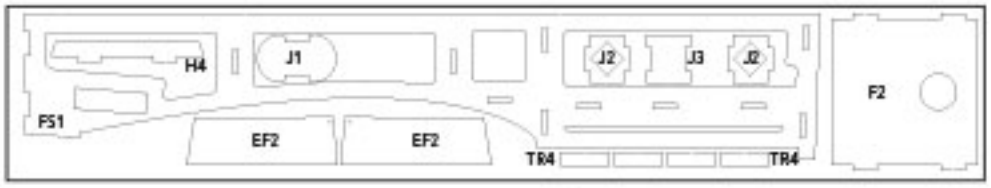
LP4 1/8" Lite Ply



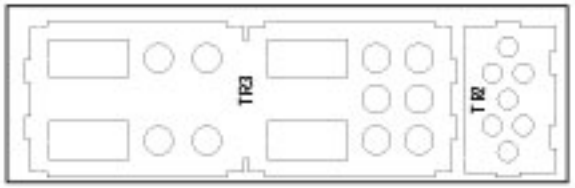
LP5 1/8" Lite Ply



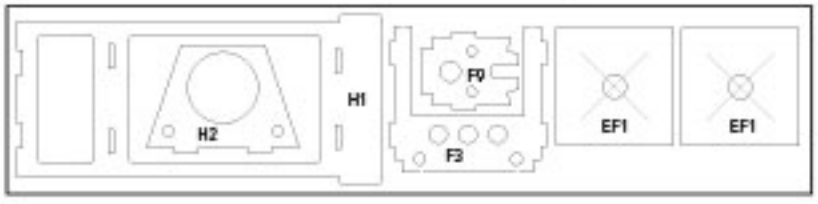
LP6 1/8" Lite Ply



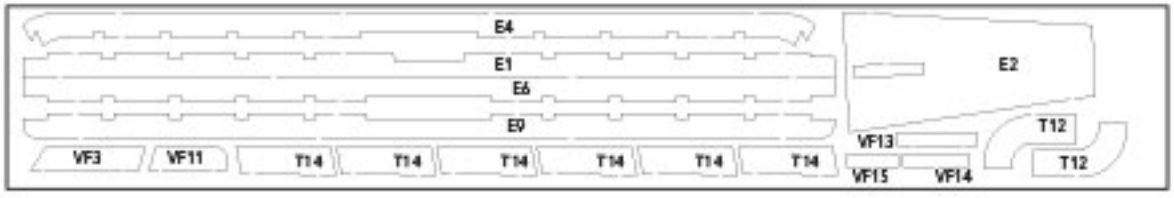
LP7 1/8" Lite Ply



LP8 1/8" Lite Ply

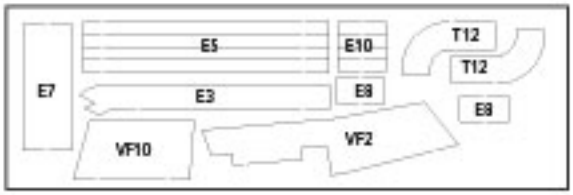


BP1 1/8" Balsa

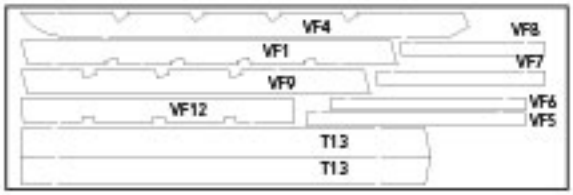


DH1
1/4" Ply

BP2 1/8" Balsa

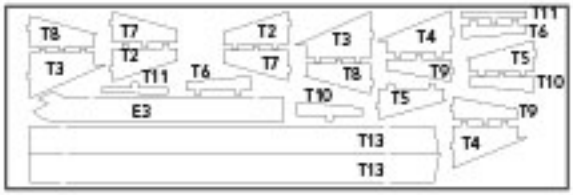


BP3 1/8" Balsa



BP4 1/8" Balsa

BP5 1/8" Balsa



BP6 3/32" Balsa

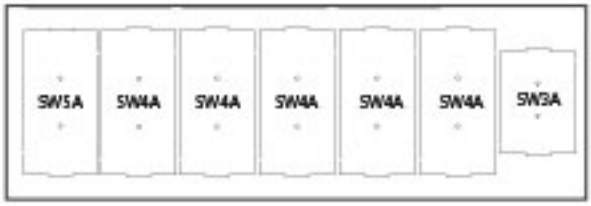
BP7 3/32" Balsa

BP8 3/32" Balsa

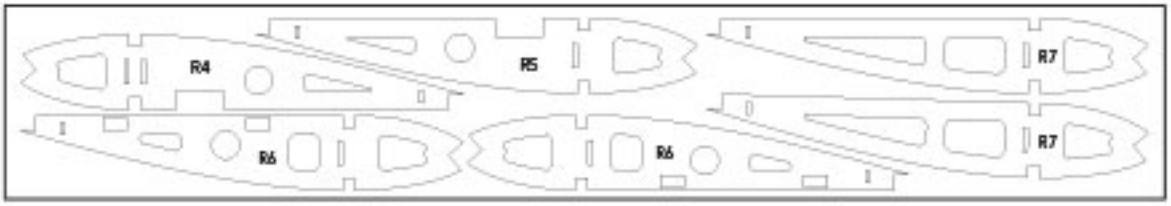
BP9 3/32" Balsa

BP10 3/32" Balsa

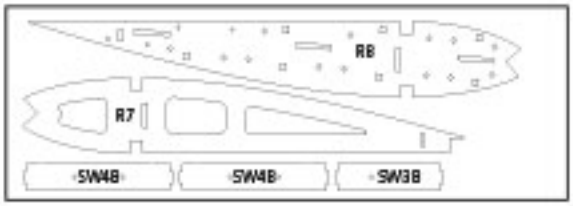
BP14 3/32" Balsa



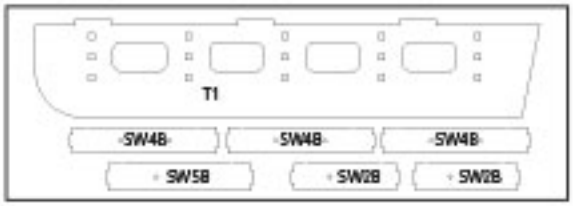
BP11 3/32" Balsa

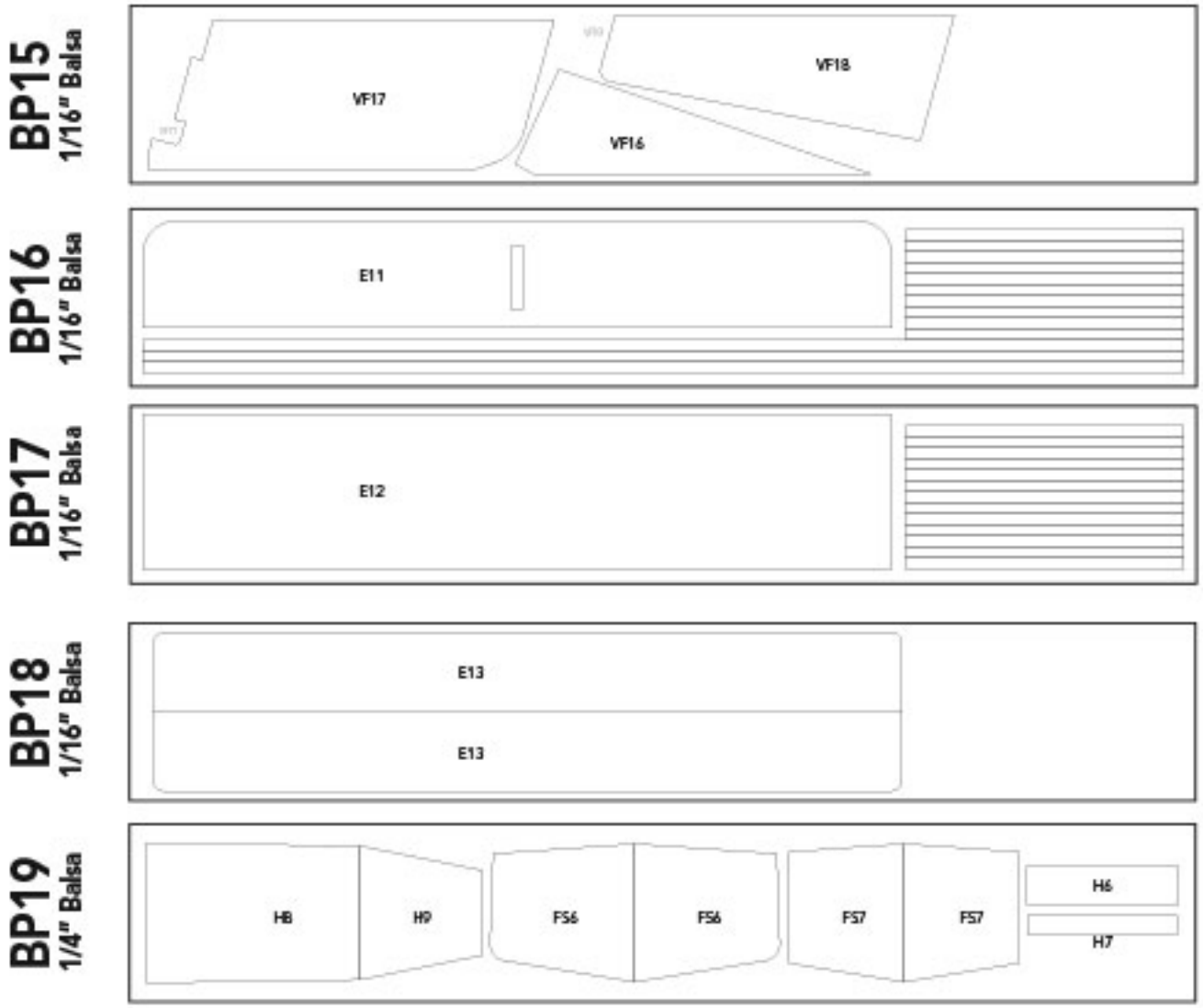


BP12 3/32" Balsa



BP13 3/32" Balsa





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OPTIONAL SPORT AIR 40 WING TUBES

To make the optional servo extension wing tubes, cut along the dotted lines to make two equal pieces of paper.

Roll these around a pencil, pen, or hobby knife handle to form a tight tube that's roughly 1/2" in diameter and 10-3/8" long.

While holding the tube tightly wound, feed this in through the circular cutout in ribs R2 through R6.

When it's all the way through these ribs, you can let go of the tube, and it should expand a bit to fill up the holes. Then you can use a little glue to tack the paper tube to each of the ribs to hold the tubes in place.