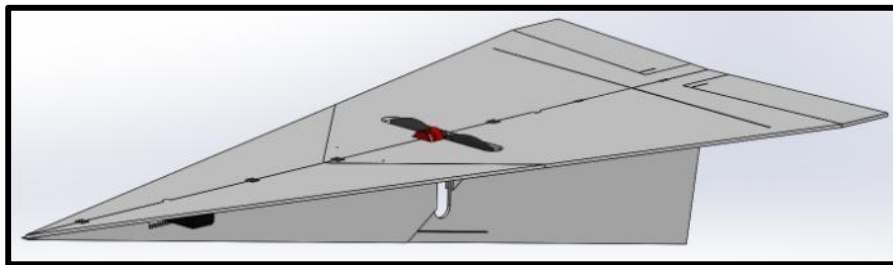




Paper Airplane SE Assembly and Setup Manual



Specifications	
Wingspan	24"
Overall Length	48"
Wing Area	600 in ²
Flying Weight	X.XXoz / XXg
Intended Use	Outdoors

Recommended Power System	
Motor	28-12 1534kv Brushless Outrunner
ESC	30A Brushless
Servo	2x 5-gram sub-micro
Battery	1000mAh 2S or 3S
RX	4-channel or more



Thank you from Sawn Craft.

Thank you for purchasing the Sawn Craft Special Edition Paper Airplane aircraft. In your hands is a remarkably versatile airplane designed to deliver a pleasure cruiser with a unique look that we all know. The lightweight and rigid XPS and carbon construction makes it possible for you to experience a wide performance envelope. This means that no matter how you like to fly, you'll enjoy both stability and maneuverability without any sacrifice in precision or control feel. Your Sawn Craft Special Edition Paper Airplane aircraft represents the benchmark of performance and aerobatic versatility. All you have to do next is read and apply the information presented in this instruction manual.

I sincerely hope that you enjoy your model as much as we do! If you have any troubles with these instructions or in the setup of your model feel free to contact us and we will provide you with the service you expect from a hobbyist-owned and operated business.

Jonathan Sawn

Owner, Sawn Craft

Jonathan@Sawn-Craft.com

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1 Introduction

The contents of this manual assume the operator will have the following prerequisites:

- Understanding of all appropriate safety procedures and requirements
- The ability to follow written procedures and possess basic hobby building skills

1.1 Style Conventions

Below are the important style conventions that will be used throughout the guide.

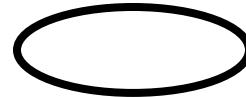
Note: Key points or hints for success will be formatted in this manner.

Warning: Any area that poses either a physical hazard or the danger will be formatted in this manner.

Arrows inform where to click or to perform the specified operation.



Circled items inform of items of interest for the specified operation. Circled items will typically be accompanied by text further identifying the region of interest.



1.2 Required Tools & Supplies

The list below contains all of the required tools and supplies that are required for the assembly and tuning of this model.

- Clean, flat work surface
- #11 hobby knife
- Straight-edge ruler
- Foam-safe adhesive
- 3M Blendederm tape or Clear packing tape
- 200-grit Sandpaper
- Soldering iron & solder
- Heat gun
- Wire cutters
- Needle nose pliers

Sawn Craft recommends the use of Beacon Foam-Tac adhesive and 3M Blended Hinge Tape for the construction of this model due to its strength, light weight, and easy use. Both Blended and Foam-Tac can be purchased by visiting the [Building Supplies](#) tab on [Sawn-Craft.com](#)

1.3 Required Parts for Completion

This model was designed to utilize inexpensive and readily-available components. The list below contains the tested and recommended parts for your model:

- **150-300 watt Brushless Outrunner Motor** - Emaxx FC 28-12 1534kv Brushless Outrunner
- **30A Brushless ESC** - Most 30A ESC's will work just fine
- **5g Sub-Micro Servo (2x)** - Hextronik HXT500
- **1000mAh 2S or 3S LiPo** - Most will work just fine
- **2S Propeller** - 8"x4" Electric Slow-Fly
- **3S Propeller** - 7"x4" Electric Slow-Fly
- **4+ Channel Receiver** - LemonRX 6-Ch DSM2 Receiver - [Available from Sawn Craft](#)
- **18" Servo Wire Extension (2x)**
- **8" Motor Wire Extension (3x)**

Please note that other power systems and components may be compatible and may work without issue, but the listed components have been used successfully by Sawn Craft.

Optional Parts for Completion

To make your build easier and ensure the nicest looking finished product, the following products are offered on [Sawn Craft.com](#). See the [Building Supplies](#) tab for these products.

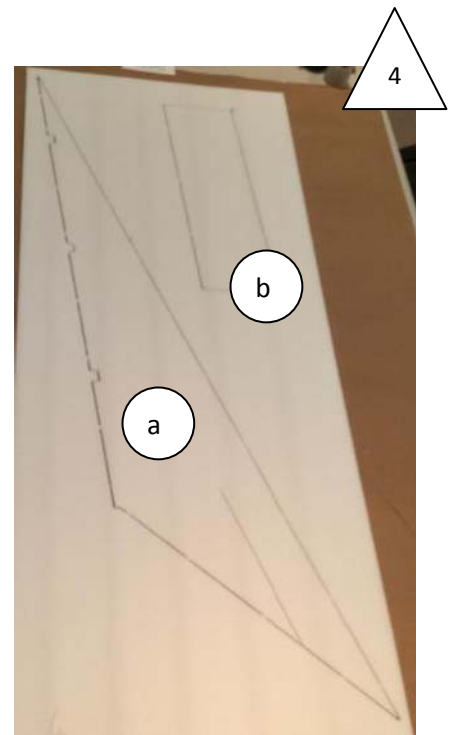
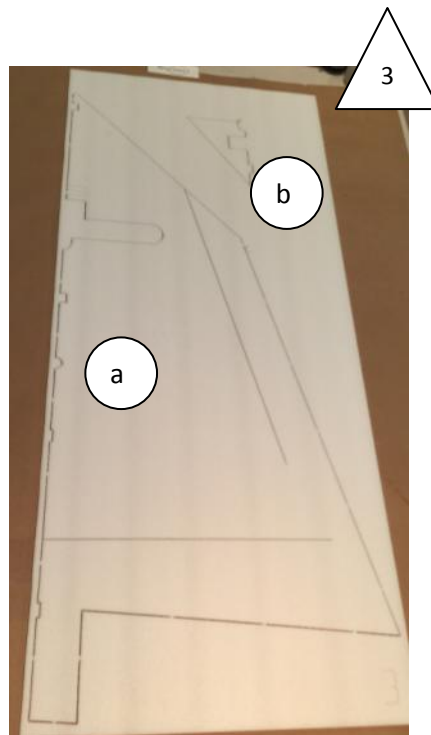
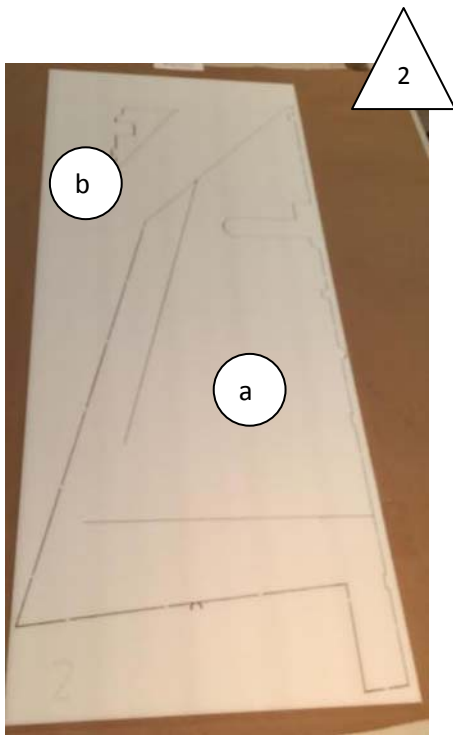
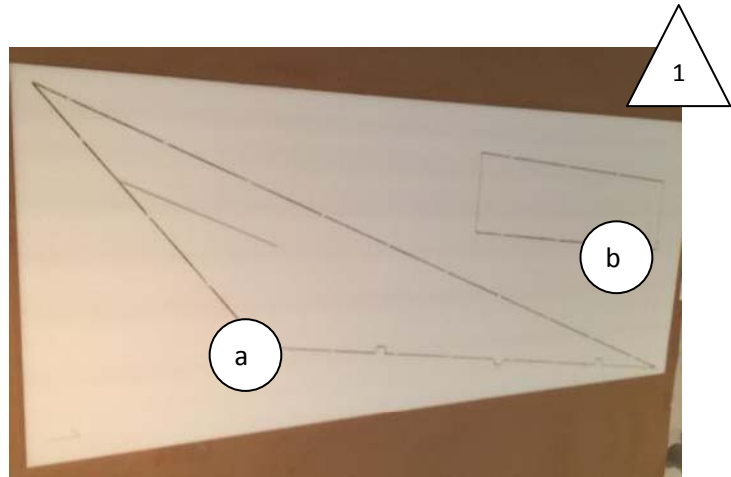
- [Colored Packing Tape](#)

The order of assembly presented in this instruction has been tested and it is recommended that you do not differ from them to provide the most accurate and easiest assembly possible. Also, the construction techniques of many of our aircraft are extremely similar. Though we will try to include as many photos of your specific kit in this instruction, other kit assembly photos may be used if the instruction and "look" of the assembly is the same.

1.4 Included Parts Description

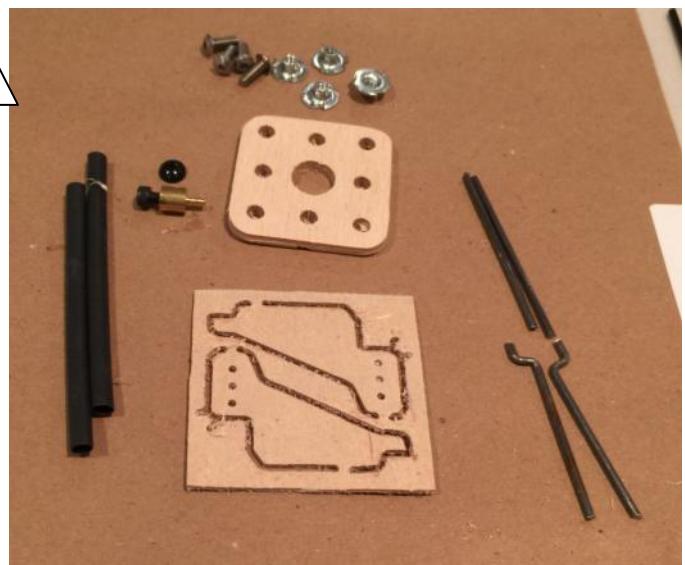
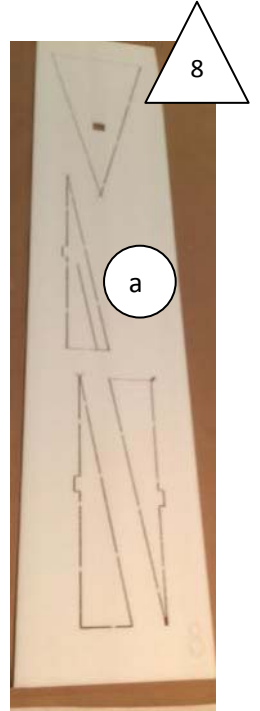
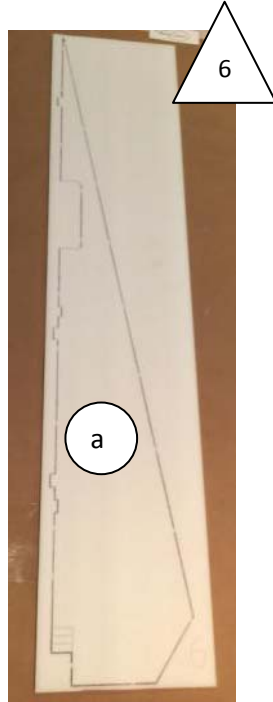
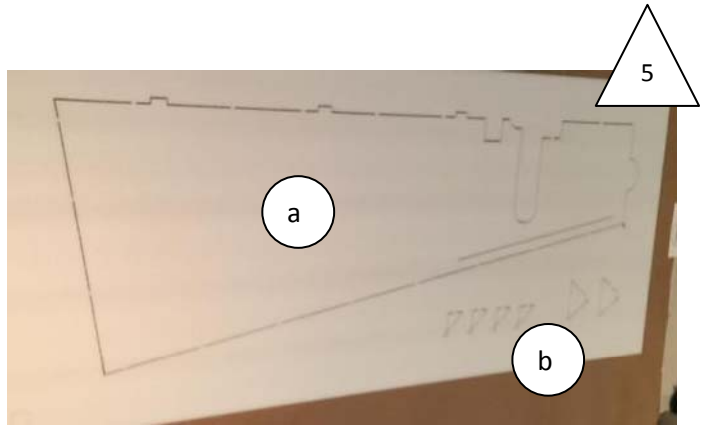
Please inspect your kit and ensure that all listed parts are present and undamaged. If you find missing parts or signs of damage please contact Support@Sawn-Craft.com for assistance.

- 1) Sheet #1
 - a) Front Left Wing Half
 - b) Elevon
- 2) Sheet #2
 - a) Rear Left Wing Half
 - b) Servo Doubler
- 3) Sheet #3
 - a) Rear Right Wing Half
 - b) Servo Doubler
- 4) Sheet #4
 - a) Front Right Wing Half
 - b) Elevon



Sawn Craft Paper Airplane SE Manual

- 5) Sheet #5
 - a) Fuse Half Rear
 - b) Motor Mount Fairings
- 6) Sheet #6 (2 included)
 - a) Outer Fuse Half Front
- 7) Sheet #7
 - a) Inner Fuse Half Front
- 8) Sheet #8
 - a) Spare Nose Parts
- 9) Hardware Pack/Carbon
 - a) 8" Carbon Strip (2 each)
 - b) 19.5" Carbon Strip (2 each)
 - c) 20" Carbon Strip
 - d) 12" Carbon Tube (2 each)
 - e) 2" Z-Bends (2 each)
 - f) 2" Straight Wire (2 each)
 - g) 3" Shrink Tube (2 each)
 - h) Control Horns (2 each)
 - i) Quick-adjust Linkage Stopper (2 each)
 - j) Motor Mount
 - k) 4-40 Blind Nuts (4 Each)
 - l) 4-40 Bolts (4 each)



2 Assembly Instructions

2.1 Parts Sheet Removal

- **Parts Required:**
 - All Kit Parts Sheets
 - Hardware Pack
- 1) Lay all kit parts sheets out as well as the hardware pack to inspect for damage and confirm that all pieces are in the kit. If you find that there is an issue, please send an email to Support@Sawn-Craft.com and we'll get right back to you.
 - 2) Using a sharp hobby knife, carefully cut the foam parts out of the sheets. The small tabs holding the parts into the sheet can sometimes be tricky to find so if you have trouble removing a part from the sheet keep looking for that last tab. Once out of the sheet, you may choose to clean up the remaining tab on the foam pieces with some sandpaper.

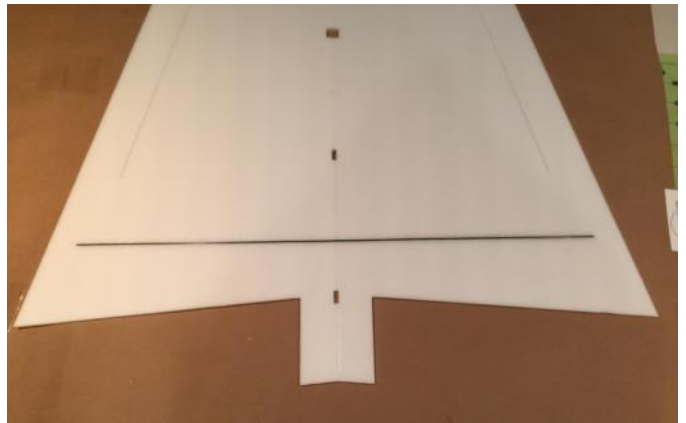


2.2 Rear Wing Assembly

- **Parts Required:**

- Rear Right Wing Half
- Rear Left Wing Half
- 20" Carbon Strip

- 1) Lay both wing halves flat on the table with the recessed slots facing up. Apply a bead of glue along the entire center mating surface.
- 2) Press the wing halves together ensuring that the locating tab is properly seated and all cut slots are aligned.
- 3) Once the center joint glue is cured, apply glue into the main spar channel and insert the 20" carbon strip. Ensure that the entire strip is sufficiently glued into the channel.
- 4) Set the assembly aside while the glue cures and proceed.

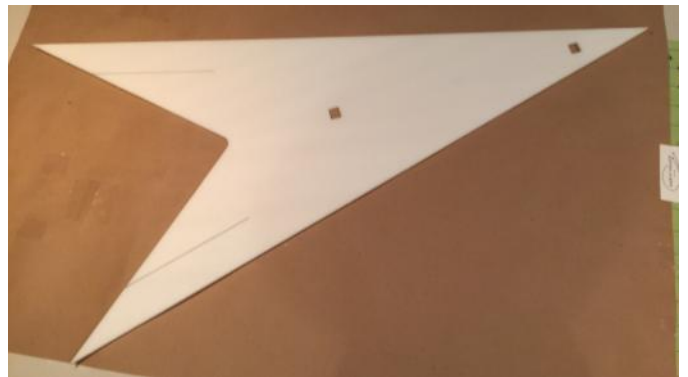


2.3 Front Wing Assembly

- **Parts Required:**

- Front Right Wing Half
- Front Left Wing Half
- Kfm Step

- 1) Lay both wing halves flat on the table with the recessed slots facing up. Apply a bead of glue along the entire center mating surface.
- 2) Press the wing halves together ensuring that the locating tab is properly seated and all cut slots are aligned.
- 3) Set the assembly aside while the glue cures and proceed.



2.4 Center Fuse Assembly

- **Parts Required:**

- Fuse Half Front
- Fuse Half Rear
- 8" Carbon Strip (2 each)

- 1) Lay both fuse halves flat on the table. Apply a bead of glue along the entire center mating surface.
- 2) Press the fuse halves together ensuring that the locating tab is properly seated.
- 3) Once the center joint glue is cured, apply glue into the carbon strip channels and insert the 8" carbon strips. Ensure that the entire strip is sufficiently glued into the channel.
- 4) Set the assembly aside while the glue cures and proceed.

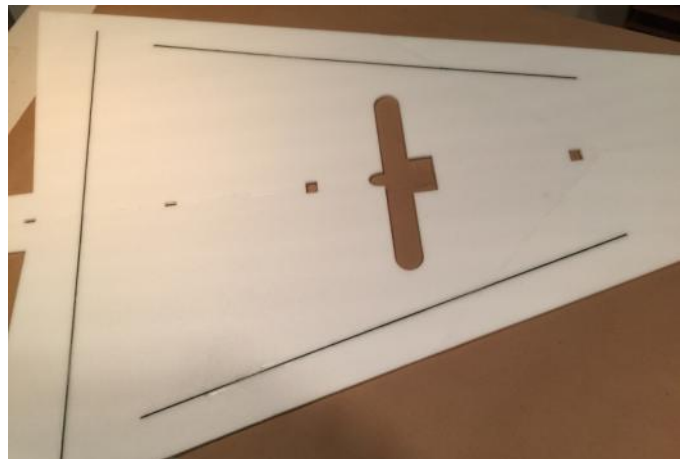
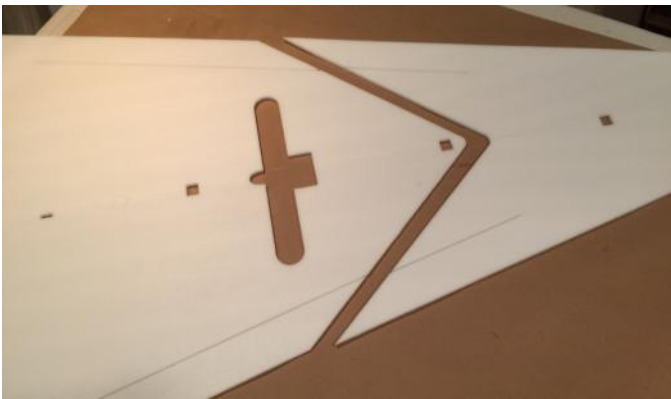


2.5 Wing Assembly

- **Parts Required:**

- Front Wing Assembly
- Rear Wing Assembly
- 19.5" Carbon Strip (2 each)

- 1) Lay both wing assemblies flat on the table. Apply a bead of glue along the entire center mating surface.
- 2) Press the wing assemblies together ensuring that the seam is very tight and the carbon channels are aligned properly.
- 3) Once the main joint glue is cured, apply glue into the carbon strip channels and insert the 19.5" carbon strips. Ensure that the entire strip is sufficiently glued into the channel.
- 4) Set the assembly aside on a flat surface while the glue cures and proceed.

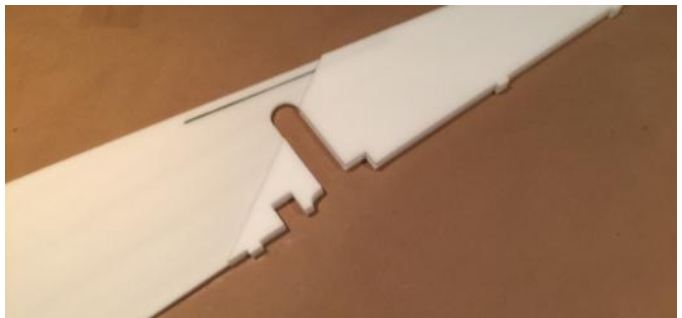
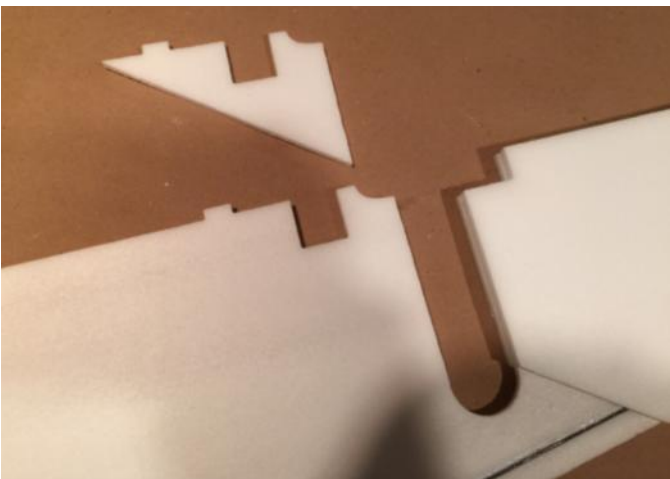


2.6 Fuse Lamination

- **Parts Required:**

- Fuse Assembly
- Outer Fuse Half Front (2 each)
- Servo Doubler (2 each)

- 1) Lay the fuse assembly on the table. Apply a bead of glue around the entire perimeter of the outer fuse half front as well as to the inner portion of the part.
- 2) Press the glued side of the outer fuse half front onto the fuse assembly, aligning the battery cut-out and the tabs at the top of the fuse.
- 3) Apply a bead of glue around the entire perimeter of the servo double as well as to the inner portion of the part. Press the glued side of the part to the fuse assembly, aligning the servo cut-out and the tabs at the top of the fuse.
- 4) Repeat this process on the opposite side of the fuse assembly.
- 5) Set the assembly aside and allow the glue to cure fully. Proceed to the next step while glue is curing.

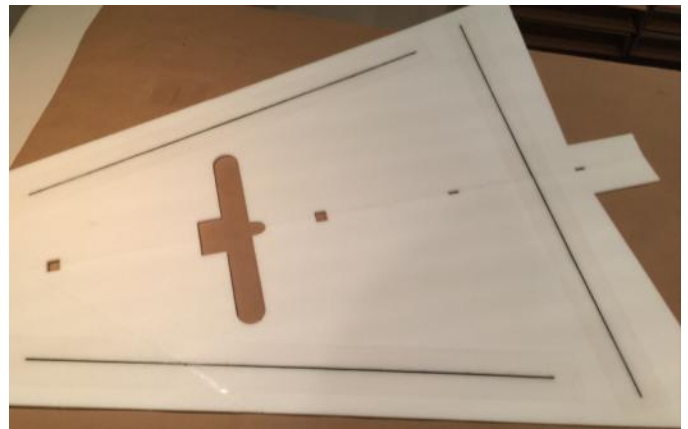


2.7 Packing Tape Reinforcement

- **Parts Required:**

- Wing Assembly
- Fuse Assembly
- Clear Packing Tape

- 1) Apply a strip of clear packing tape to the single-thickness, rear of the fuse assembly to reduce wear caused by landings.
- 2) Apply a strip of clear packing tape directly over the carbon rods inserted into the wing assembly to give the joint even more strength.
- 3) *Optional:* Apply a strip of clear packing tape to the entire leading edge of the wing assembly.

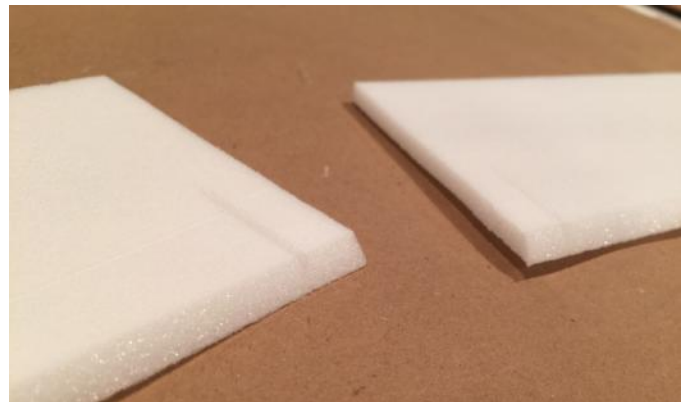


2.8 Elevon Installation

- **Parts Required:**

- Wing Assembly
- Elevon (2 each)
- Blendederm Hinge tape

- 1) Lay the elevons on the table and cut a 45° bevel into the leading edges (edges with the control horn slots) of the elevons. Ensure that you have mirror images of the elevons before you cut the bevels.
- 2) Place the wing assembly with the smooth side up. Align the elevons with the control horn slots facing toward the inside of the wing and the bevel on the bottom of the elevon. Apply Blendederm hinge tape to the entire length of the hinge.

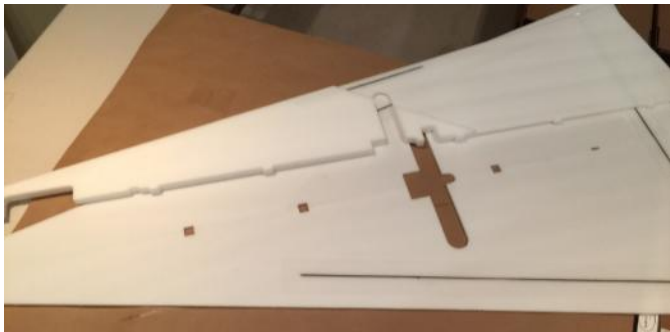


2.9 Fuse Installation

- **Parts Required:**

- Wing Assembly
- Fuse Assembly
- Control Horn (2 each)

- 1) Lay the wing assembly on the table with the carbon rod side facing up. Dry-fit the fuse assembly into the slots in the wing assembly. The tabs should fit snug in the slots, but if they seem to be too tight simply trim a small amount off the slots to enlarge them.
- 2) Apply glue to the entire mating surface of the fuse assembly and install it into the slots in the main wing. Take care to ensure that the entire mating surface is coated in glue and is making proper contact with the wing assembly.
- 3) Use a razor or sandpaper to trim the excess foam from the fuse assembly at the nose.
- 4) Remove the control horns from their sheet. Apply glue to the bottom portion of the horns and insert them into the slots in the elevons. Ensure that the holes in the control horns are directly above the hinge line.



2.10 Control Rod Assembly

- **Parts Required:**

- 12" Carbon Tube (2 each)
- 2" Z-Bend (2 each)
- 2" Straight Wire (2 each)
- 3" Shrink Tube (2 each)

- 1) Cut the shrink tube pieces in half.
- 2) Apply some glue to the end of the carbon tubes. Attach the Z-Bend to one end of a rod and the straight wire to the other. With about 1/2" of wire overlapping the carbon rod, slide the shrink tube sections over the joints and shrink them to secure. If you need to adjust the length of the rod after shrinking you can simply reheat the joint and make your length adjustment (if you used Foam-Tac for assembly).

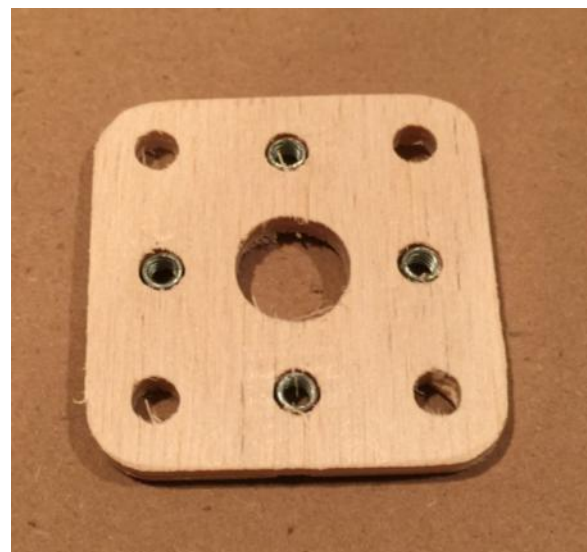
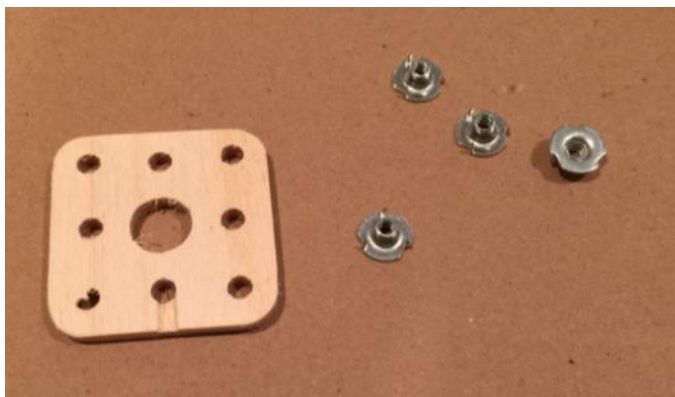


2.11 Motor Mount Assembly

- **Parts Required:**

- Motor Mount
- 4-40 Blind Nut (4 each)

- 1) If desired, sand the edges of the motor mount to remove any tabs of fuss from the machining process. Insert the 4-40 blind nuts into the holes in the motor mount that align with your motor.

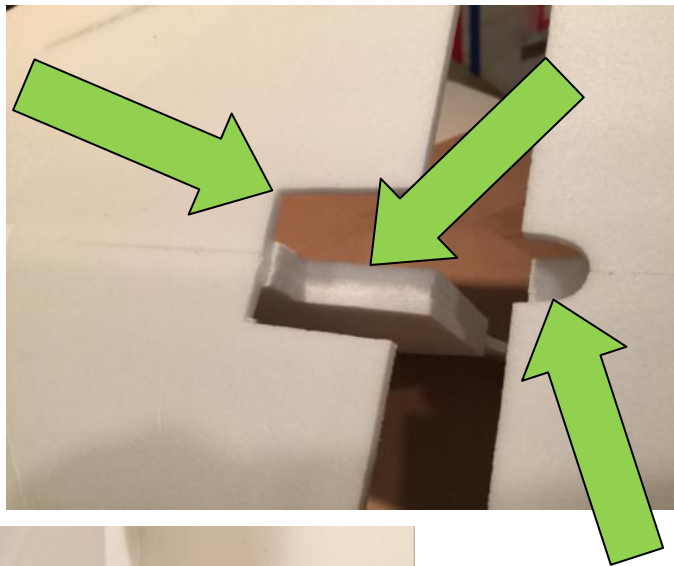
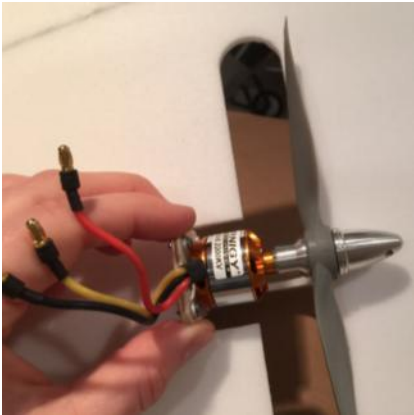


2.12 Motor Fitting and Adjustment

- **Parts Required:**

- Motor Mount Assembly
- 4-40 Bolts (4 each)
- Motor, Spinner, & Prop

- 1) Mount the spinner and prop on your motor and then the motor to the motor mount assembly. Since there are variations in motor and spinner size we will manually align the front of the motor mount to the trailing edge of the wing at the motor mounting slot. Note the location of the prop and spinner in relation to the prop slot and the wing directly after the slot. Proper installation of the motor will locate the prop evenly in the center of the slot and the spinner completely clear of any foam.
- 2) If adjustments are necessary to move the motor mount forward to enable the prop to fit correctly in the slot, carefully trim the wing and fuse at the motor mounting slot section until the prop fits properly. Lines have been milled in the surface of the foam to aid in your trimming.
- 3) Check that the end of the spinner clears the wing and fuse. Trim the foam away if contact is possible.

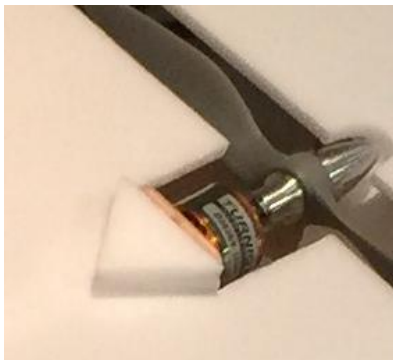


2.13 Motor Mount Fairing Installation

- **Parts Required:**

- Main assembly
- Motor Mount Fairings

- 1) Apply glue to the face and right angle edges of the small, triangular fairings. Glue these pieces to the wing (edge) and the fuse (face), ensuring to line up the trailing edge of the fairing with the motor opening in the wing and fuse. Glue two of these fairing in the same location on either side of the fuse.
- 2) Apply glue to the face of the larger, rounded triangular fairing and glue the pieces to the top of the wing, ensuring to line up the trailing edge of the fairing with the motor opening in the wing. This fairing will be two pieces thick so glue one on top of the other.

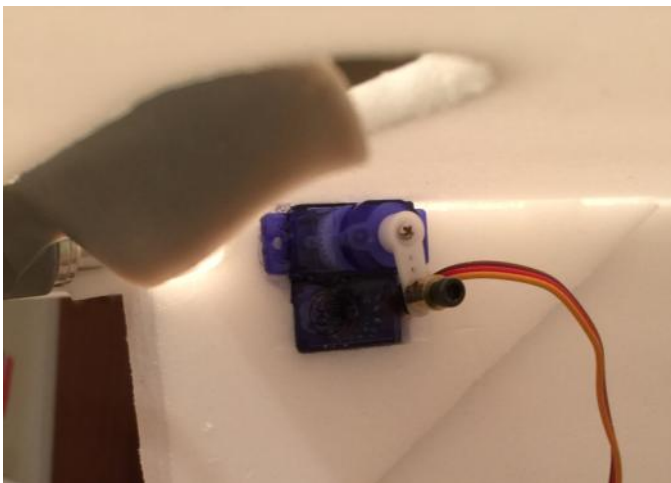


2.14 Servo Installation

- **Parts Required:**

- 5g Servo (2 each)
- Quick-adjust Linkage Stopper (2 each)
- Control rod assembly (2 each)

- 1) Install the Quick-adjust linkage stoppers to the outer-most mounting hole of the servo horns possible.
- 2) Center the servos using a servo tester or your radio. Install the servo horns on the servos ensuring that they are mounted 180° from each other as the servos will protrude from opposite sides of the fuse.
- 3) Apply glue to the mounting tabs as well as the main body of the servos and install them in the servo mounting slot such that the output shaft is on the rearward portion of the servo. Allow the glue to cure fully before proceeding.
- 4) Carefully insert the control rod assembly Z-bends into the control horn on the outer-most holes and slide the straight wire end into the quick-adjust linkage stoppers. Adjust the rod in the stoppers until the elevons are flush with the angle of the wing and tighten the linkage stopper setscrew to lock the control rod length.



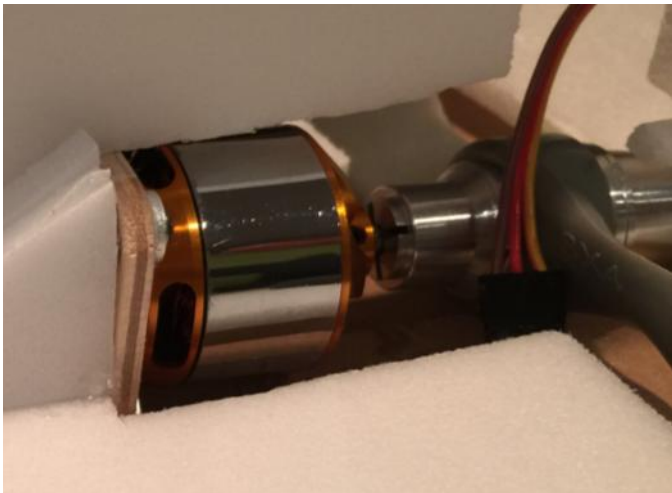
2.15 Motor Mount Installation

- **Parts Required:**
 - Motor Mount Assembly
 - Motor/Prop
 - 4-40 bolt (4 each)

- 1) Glue the motor mount to the trailing edge of the motor mount fairings and the wing/fuse motor slot. Ensure that a generous portion of glue is used here as failure in this joint would be detrimental to flight.

Note: For some motors it may not be possible to install the motor mount and then the motor due to the prop-in-slot construction of this model. If this is the case, you will need to install the motor/prop assembly onto the motor mount before gluing to the aircraft. You will need to ensure that the joint is well supported during the curing process to maintain the 0° thrust angle the aircraft was designed for.

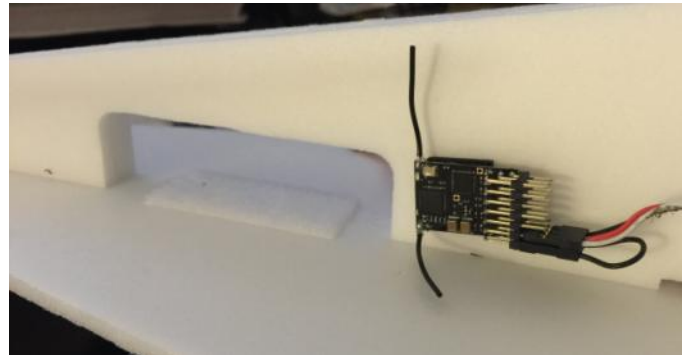
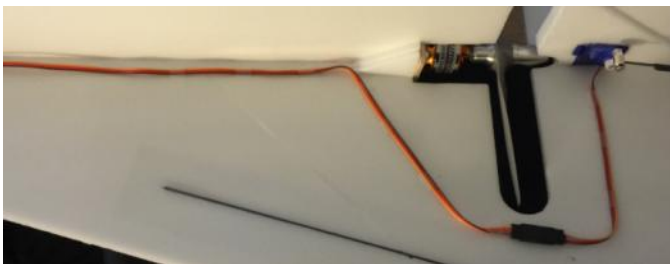
- 2) Install the motor on the motor mount using the included 4-40 bolts.



2.16 Electronics Installation

- **Parts Required:**

- Completed Paper Airplane kit
 - Brushless ESC
 - 4+ channel Receiver
 - 18" Servo wire extension (2 each)
 - 8" Motor wire extension (3 each)
 - Velcro
1. Route the servo wires and extensions around the prop slot and secure to the bottom of the wing using Blenderm tape. You may utilize the small slots in the top of the fuselage to route wires on only one side of the fuse if desired.
 2. Install the motor wire extensions and connect the motor and ESC. For best performance, twist the three motor wires along their run. Secure the wires to the wing using a sufficient amount of Blenderm tape.
 3. Mount the ESC and receiver on opposite sides of the fuse, directly behind the battery slot.
 4. Apply glue to the wing inside the battery slot and then attach a piece of Velcro, opposite that of your batteries, to secure the battery in flight.



3 Setup and Tuning

3.1 Center of Gravity

The CG of this plane is located approximately 5 1/4" in front of the prop slot. Moving the CG fore and aft will dramatically change the handling of the plane so adjust to your liking. An aft CG will allow for slow, high-alpha flight while a more fore CG will provide a faster flight experience. Use the fore/aft location of the battery to adjust the CG without adding additional weight.

3.2 Radio Setup & Mixing

Depending on the transmitter that you are using to control your model you may find that you need to do some special setup to make the controls work properly.

<u>Elevon Mixing Reference</u>				
<u>Transmitter</u>	<u>Wing Mode</u>	<u>Mix 1</u>	<u>Mix 2</u>	<u>Notes</u>
Spektrum DX6i	Delta	N/A	N/A	If the controls are moving in the proper direction in one control (aileron), but are incorrect in the other control (elevator) simply swap the servo plugs on the receiver. You may have to reverse the servos, but that should solve the problem.
Spektrum DX7s & DX8	Elevon	N/A	N/A	If the controls are moving in the proper direction in one control (aileron), but are incorrect in the other control (elevator) simply swap the servo plugs on the receiver. You may have to reverse the servos, but that should solve the problem.
Spektrum DX6, DX7, DX9 & DX18	Elevon	N/A	N/A	If the controls are moving in the proper direction in one control (aileron), but are incorrect in the other control (elevator) simply swap the servo plugs on the receiver. You may have to reverse the servos, but that should solve the problem.

Note: The mixes given above reflect what was tested using our prototype setups and electronics. They should be used as a starting point and you may find that you end up with a different setting. If you are having trouble please contact us for assistance.

3.3 Control Throws & Expo

By altering the amount of control throw the surfaces have you can fine-tune the handling and performance. Below are the recommended settings as tested that will provide a successful flying experience. Throws are measured at the point farthest from the hinge.

<u>Control Surface</u>	<u>Low Rate Throw</u>	<u>Low Rate Expo</u>	<u>High Rate Throw</u>	<u>High Rate Expo</u>
Elevon	1/2in (50%)	25%	1.5 in (100%)	40%

3.4 Launching

Launching this aircraft is a little challenging based purely on its size. It is preferable to have your spotter launch your aircraft by holding it by the edge of the wing and the fuse, rear of the prop. Advance the throttle to full and gently push forward, releasing it with wings level and a slightly up attitude.

3.5 Flying Tips

This aircraft is designed to fly in a relatively small space, but is large so care must be taken when selecting a flying site. Being such light weight, it is recommended that this aircraft be flown in calm wind conditions, but it will handle more moderate winds. Always ensure that you are comfortable with the aircraft and its flight characteristics prior to flying in a small venue. Never fly over people or animals.

The delta-wing design is inherently stable and makes this model a pure joy to fly! This model can fly slowly in high alpha flight, but when you drop the nose it is remarkably quick and nimble. Landing the aircraft is simple; keep some throttle applied and as the plane nears the ground, pull back on the elevator to flare.

3.6 Decorating/Finishing

The beauty of this aircraft is that you have the opportunity to finish it with the look that you desire. We recommend using our colored packaging tape (available on the [Building Supplies](#) tab) for decorating as it is easy to use, lightweight, and provides a nice, glossy finish. Water-based paints have been used with success in the past as have permanent markers. Prior to using any paints or markers, test on a scrap piece of foam to ensure that it doesn't damage the foam.

Remember that any weight you add to the airframe will affect its performance so keep heavy applications of paint and decals to a minimum.

3.7 Repairs & Spare Parts

Due to this models extremely light weight, it is surprisingly durable! If a part of the model is damaged it can typically be repaired using small pieces of packaging tape or by gluing using [Beacon Foam Tac](#).

If a part is damaged beyond repair, simply send us an email at Support@Sawn-Craft.com as we have replacement parts for purchase.