

# **RIOT PLANES**

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## **Sea Monkey**

Slow Flier Seaplane

A Riot R/C kit

# ***Building Instructions***

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

Toll Free (866) 922-9477

**Take the time to read this entire manual, so that you are familiar with all the building steps and their proper order. Take your time; make sure you understand everything before you do it and you will be rewarded with an impressive flying plane...**

***The manufacturer assumes no liability for damages or other loss in the use of this product, as we have no control over the construction or end use of this product.***

# Specifications

Wingspan 35 inches  
Wing Area 290 square inches  
Weight 8 ounces  
Wing Loading 4 oz./sq. foot

## Tools and supplies needed to build

- Sanding block with 220 grit paper
- Pins
- Square
- FLAT Workbench
- Hot glue gun with glue stick (low or high temp)
- Gorilla brand polyurethane glue (white 2x type)
- Pins
- (Optional) Foam safe medium CA glue and foam safe accelerator
- Razor blade or X-Acto knife
- Blue masking tape
- Hinge Tape (Blenderm)
- Waxed paper
- 18-24 inch long 1-1/2 to 3 inch diameter object (1-1/2 PVC pipe is ideal)
- (Optional) Foam safe paint

## Additional items needed to complete

- 80-130 watt brushless motor (Riot 502 combo)
- Minimum 3 channel radio with small receiver
- 8x4.3 Slow Fly Propeller
- ESC to match motor
- 2S 800-1000 mah LiPo battery
- 5 to 9 gram servos (2) (Riot 5002)

Do an inventory of all the parts, to be sure that everything is there. If anything is missing or damaged, contact us as soon as possible, so that we can get replacements to you quickly.

We strongly recommend the use of polyurethane glue for the construction of this plane. We have found it to be very strong, waterproof and it allows a few minutes to position parts.

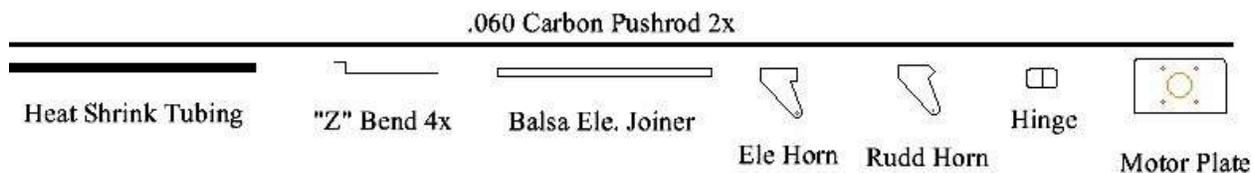
Some areas can be done with medium foam safe CA glue. We will specify where we used each type of glue.

If you use any CA, you should also use foam safe accelerator. Don't risk destroying your plane before you ever fly it!

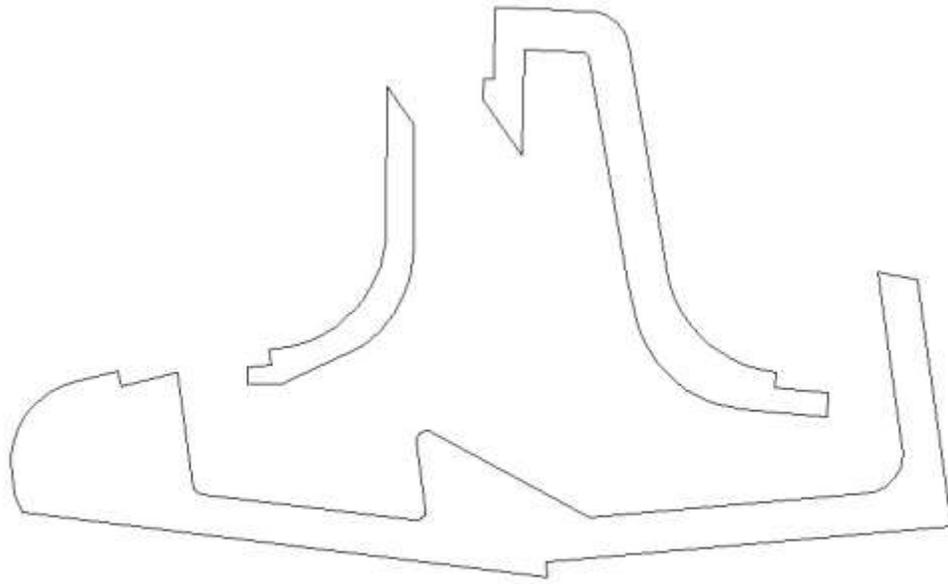
We will present these instructions in a specific order, mainly to help you get used to using tiny amounts of poly glue. If you use more than recommended, the glue will expand uncontrollably and while this does not incur any structural disadvantages, it sure looks ugly.

Take your time and really pay attention to how much glue you are using.

Let's identify the parts so that we can easily find them when needed.

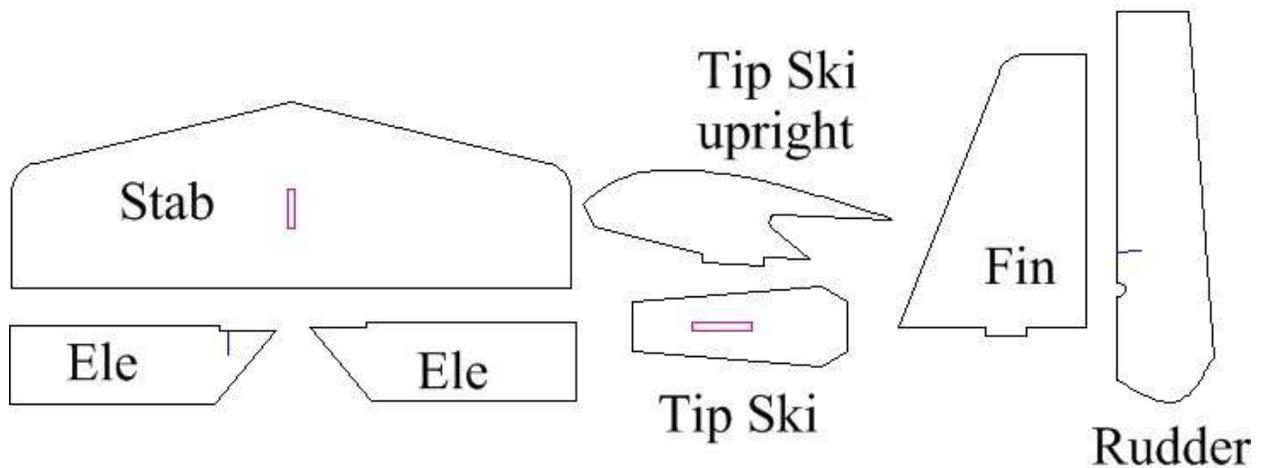


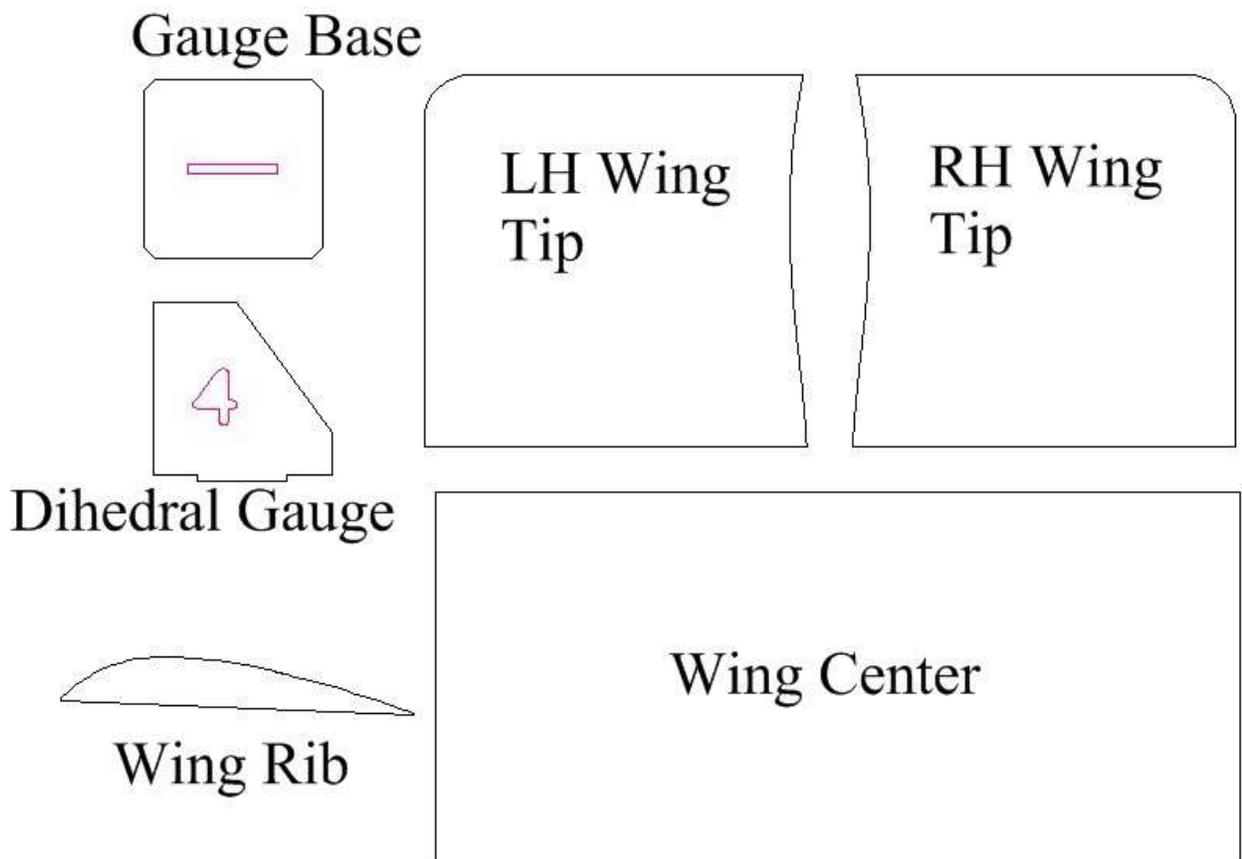
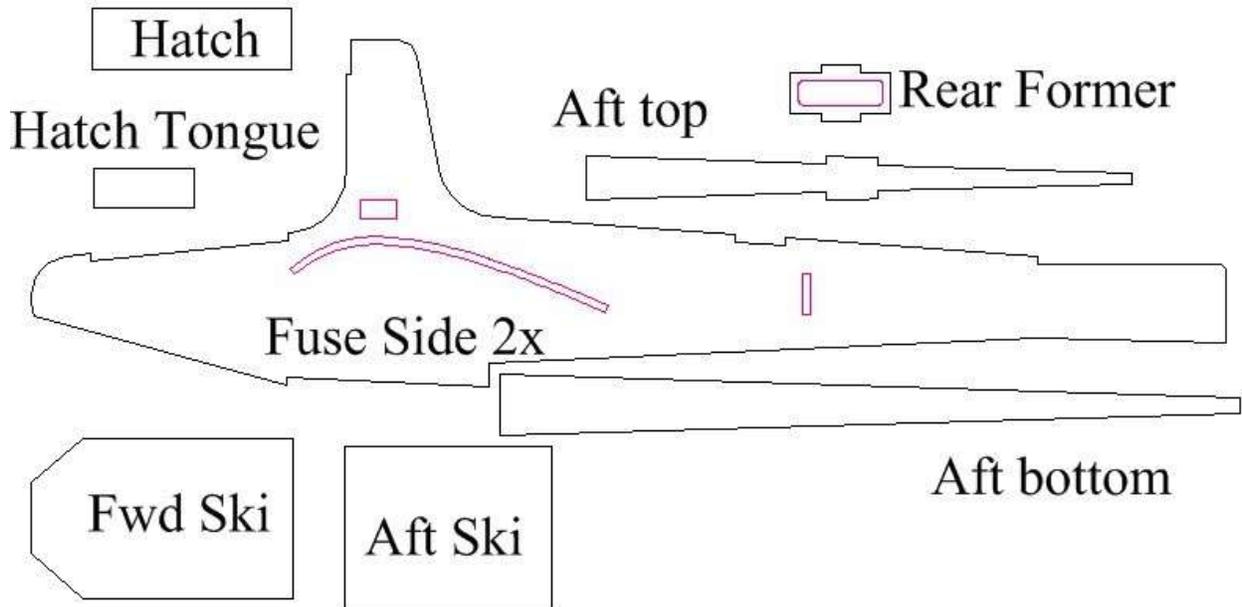
## Misc. Parts

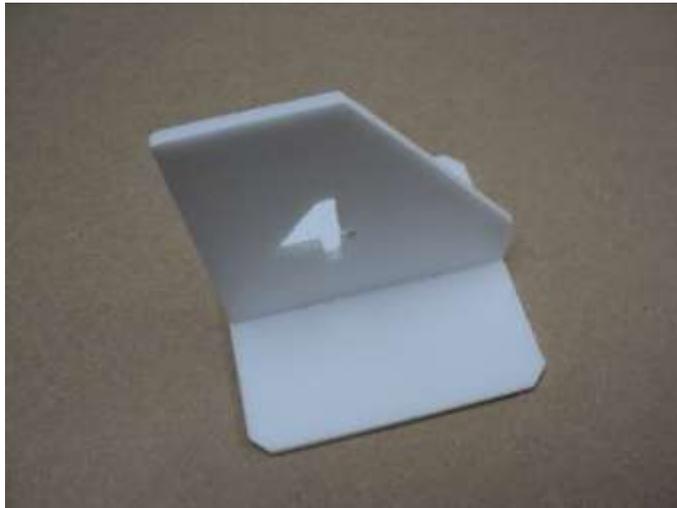
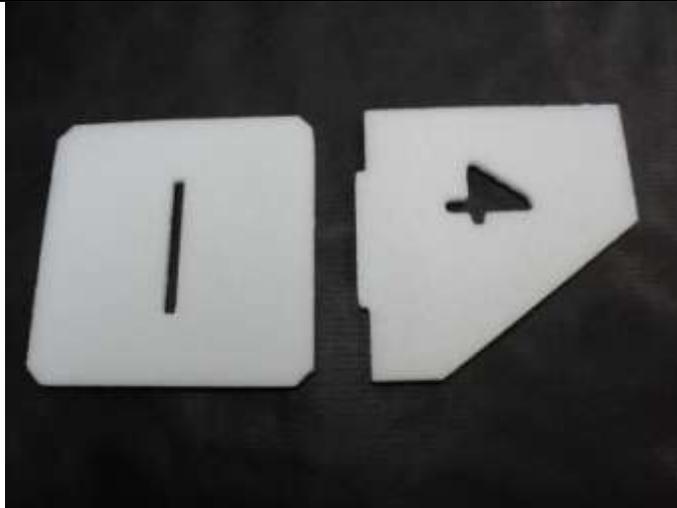


## 1 inch EPP foam Parts

## 5mm ESP foam parts







## Dihedral Gauge

Let's build the dihedral gauge.  
This will be practice for using a tiny amount of glue.

Gather the two parts for the gauge and lightly sand the edges to remove the small tabs left from the machining process.

Using poly glue, apply a tiny bead on each side of the tab.

Use the smallest bead of glue you possibly can. a 1/16 inch diameter bead is too large.

Put the tab in the slot and set aside on a piece of waxed paper.

Once this begins to cure, you will see how well you did in keeping with a tiny bead of glue.

## Elevators

Gather the two elevator halves, the horizontal stabilizer and the short balsa stick (elevator joiner).

Use pins or weight to keep the horizontal stab in position on the bench.

Put a piece of waxed paper over the rear of the stab.

Push the two elevator halves against the stab, align the tips and pin in place.



Be sure the elevator with the control horn slot is on the left hand side.

Check the fit of the elevator joiner. It should fit in the slots provided and not cause any space between the elevators and stab.

If all is well, use poly glue to attach it to the elevator halves.



Allow to cure.

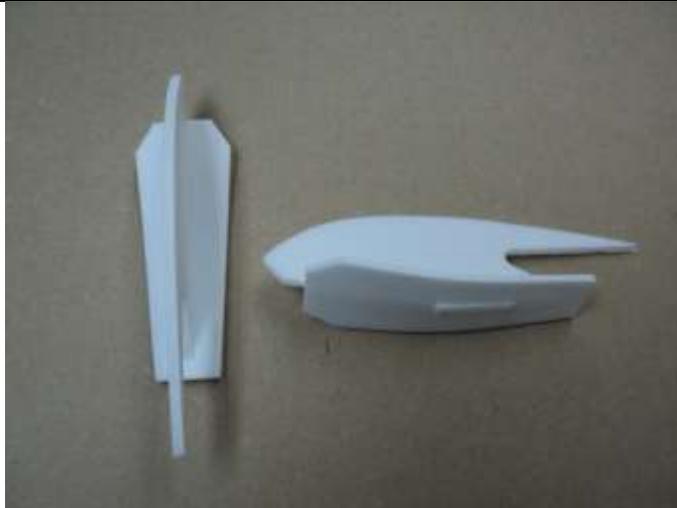
When cured, sand a 45 degree bevel on the trailing edge of the **stabilizer**.

Leave the front of the elevators square.



## Rudder

Sand a 45 degree bevel on the leading edge of the rudder, on each side to form a "V".



## Tip Skis

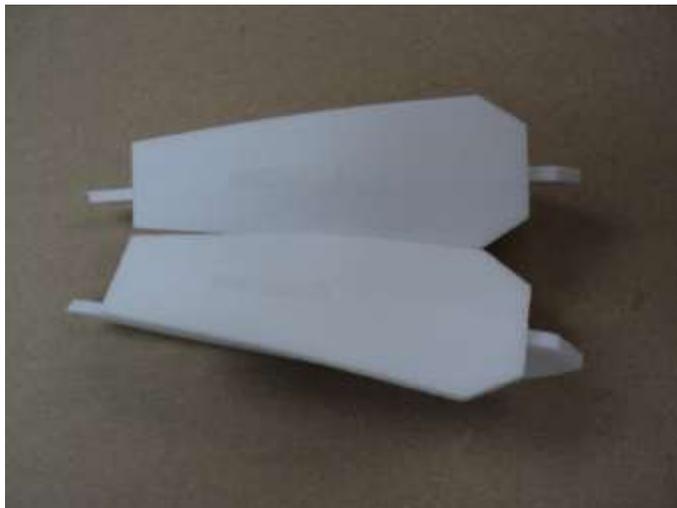
Gather the two parts for each tip ski and sand the edges smooth. Using medium CA, glue the ski bottom to the upright. Note that the wide part of the ski faces forward.

Spray the ski lightly with foam safe accelerator and use glue on the upright for an instant bond.

Be sure that the ski bottom is centered on the upright.

Glue the rear portion, allow a few seconds to cure then glue the forward section, bending the ski bottom to conform.

Repeat for the other tip ski.



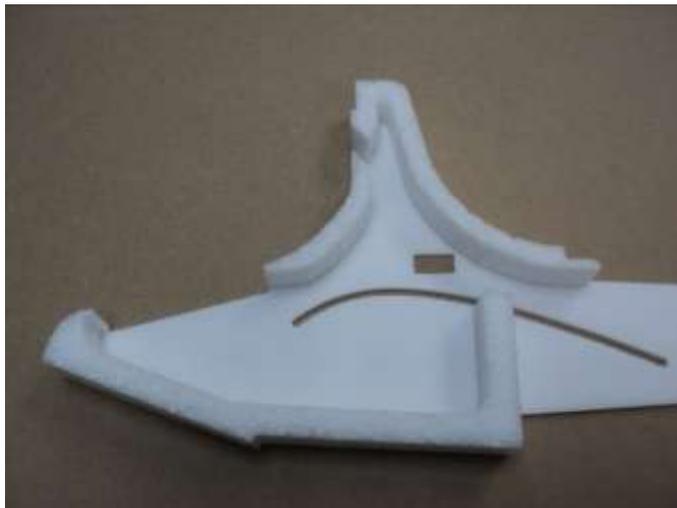
## Fuselage

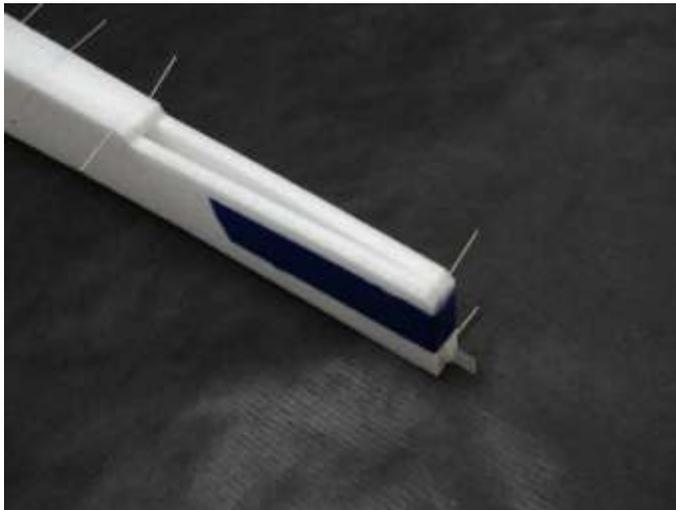
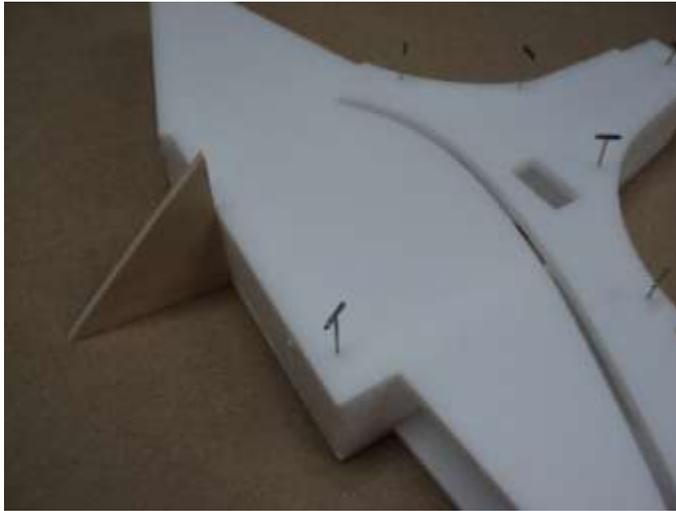
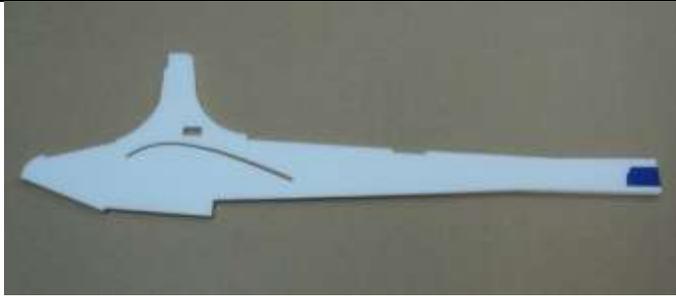
This is the most important part of the build. Take your time and build square and straight.

The fuse is made of two outer sides and an inner core of EPP foam.

We recommend using poly glue for all fuse construction as it allows you a few minutes to correctly position everything prior to curing.

Gather the two fuse sides and the three EPP parts.





Set the EPP parts in place on a fuse side as shown to see where they go.

Lay the other fuse side in place.

Tape the tail end of the fuse sides together so that they stay aligned.

When all is okay, use a medium bead (1/16 inch or so) of poly glue in the middle of the EPP foam.

Do both sides.

Use a square to make sure that the parts align perfectly. Check all the way around.

When satisfied with the alignment, use pins to keep everything in place until cured. You can use small weights as well, just double check with your square before you walk away.

Allow to cure completely.

Once cured we can finish up the fuse.

Glue the aft fuse former in place. You can use CA or poly glue.

Using a tiny bead of poly glue, attach the aft fuse top and bottom. Note that the top goes between the sides and the bottom goes on top of the sides.

Use pins to hold the top and bottom in exact position until cured.

Use sandpaper to rough up the plastic hinge, and flex it a few dozen times to "break it in".

Use a teeny bead of poly glue to glue the fuse at the tail.

Glue the hinge in place, between the sides about  $\frac{1}{4}$  inch from the bottom. Make sure that the joint on the hinge is right at the surface.

Only glue the last  $\frac{1}{8}$  inch or so of the fuse sides. Pin until cured.



Glue the 1/16 ply motor plate in place with poly glue. Tape in place until cured.

## Tail



Using Hinge tape, attach the elevator to the stabilizer. Be sure that the tips are aligned.

The elevator control horn slot should be facing up, and the bevel in the stabilizer should be down when you tape the elevator in place.

Trim the tape near the joiner, but don't cut into it.

Cut the tape where it covers the slot for the control horn.

Use poly to glue the 1/16 ply elevator control horn in place.



Note that the ply control horns for the elevator and rudder are different. The rudder horn has a "V" in the front.



Attach the rudder to the fin with hinge tape as well, only this time, use tape on both sides, pressing the tape into the bevel. Be sure to flex the rudder back and forth several times so that it moves freely.

Lay the rudder on its left side and glue the 1/16 ply rudder control horn in place.

Be sure that you have waxed paper under it so you don't glue it to the bench.

Allow to cure.



## Pushrods

Gather the pushrod parts:

- 4x "Z" bend wires
- Shrink tubing
- 2x Carbon pushrods

Using medium CA, glue one of the "Z" bend wires to **one end of each pushrod**.

Do not glue the other end yet.

The "Z" should be about 1/2 inch from the end of the carbon rod.

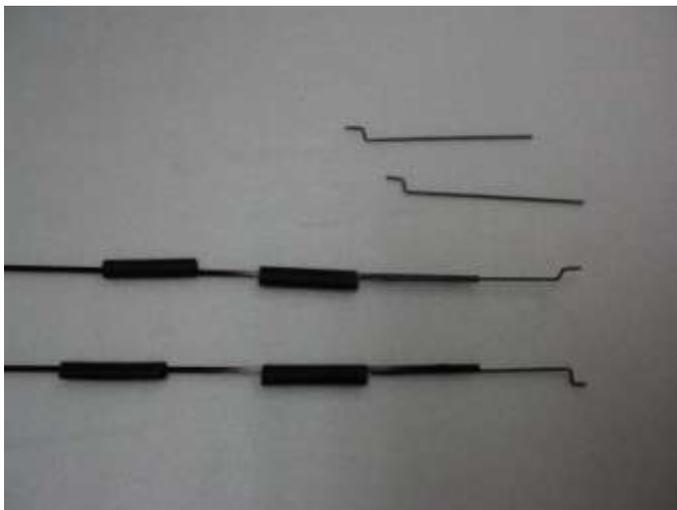
Cut the shrink tubing into 4 equal pieces.

Slide two pieces of shrink tubing on each pushrod as well.

Shrink the tubing over the wire you just glued.

Repeat on the other pushrod.

**Do not glue the other ends yet.**





## Wing

The wing needs to be curved before we assemble it.

Use any round object at least 18 inches long and 1-1/2 to 3 inches in diameter.

The wing has three parts; the center section and two tips.

The wing tips have a rounded corner on the forward leading edge.

Lay them out so that you have a right and left.

Use your round pipe (or whatever) as a mandrel to wrap the wing around.

We like to put the pipe on the wing, and pull up the leading edge to wrap around the pipe.

Keep your hands moving and curl the wing until it touches itself.

Be sure that you keep the pipe parallel with the leading edge and take your time.

You should end up with a wing that can be flattened into a pretty nice airfoil.

Do the same for the tips, making sure you have a right and a left.



Use one of the wing ribs and bend the wing curve so that it matches.

You can bend the wing to match the rib, but don't glue it yet.



## Dihedral Angle

Use the 4 inch dihedral gauge to prop up one wing tip at the edge of your bench.

Put a rib under the wing to support it as you sand the curved wing tip so that it is parallel with the bench.

Use a sanding block with coarse paper and take your time.

Make sure that the sanding block touches the entire edge of the wing tip.

Do this for both wing tips. Make sure you have a right and a left.





Glue one of the ribs to the very **left** end of the **wing center section**. Glue it so that it is half off the wing. This leaves a little “shelf” to pin the wing tip to.

Make sure it is 90 degrees to the wing and straight up and down.

**Do not glue the other wing rib at this time!**



We used medium foam safe CA and accelerator for this job.

Glue the left wing tip the **left** side of the wing center section.

Use the dihedral gauge and make sure that there is no gap between the wing and the tip.

You can pin the tip in place on the rib to get a nice joint.

We used medium foam safe CA and accelerator for this job as well.

**Do not glue the other wing tip at this time!**



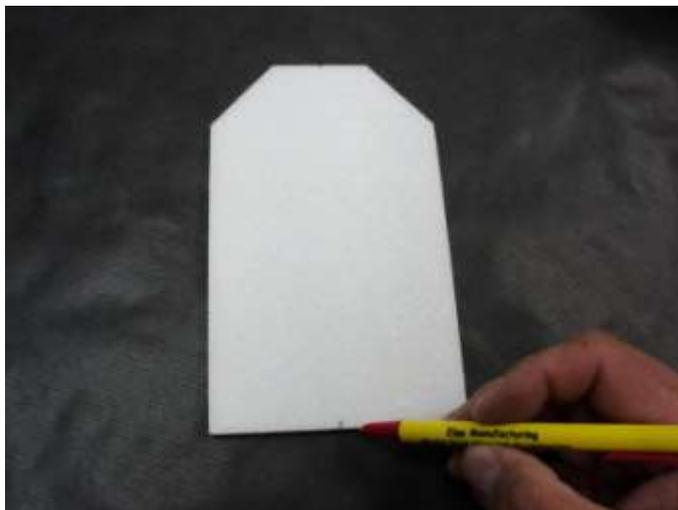


Slide the wing into the fuselage from the left. Slide it all the way until the rib contacts the fuse.

Glue in the wing rib to the right end of the center section. Be sure to leave half of the rib hanging over for the wing tip.



Glue the right wing tip in place, just like the left side.



## Hull

Put tiny marks at the center of both ski bottoms. Use these to align the skis.

Using poly glue, glue the aft ski in place, making sure it is centered on the fuselage.

Pin in place.

Glue the forward ski in place at this time as well and pin in place.



Note that the forward and aft skis overlap a little. Put a tiny bead of poly on the aft ski so that they are glued together.

Sighting from the front and rear, make sure that both skis are 90 degrees to the fuselage.

If needed, use additional pins to keep them level.

Allow to cure.



## Tail

Glue the fin to the stab with poly glue.

Use pins and check to be sure that it is 90 degrees.

Allow to cure.



Test fit the tail assembly to the fuselage. It should sit level with the wing and not have any gap in the front or at the back of the fuse.

If all is well, cut a slit into the rudder for the rudder hinge that *should be* sticking out of the fuse...

Put poly glue on the fuse and carefully start the hinge into the rudder and set the tail in place.

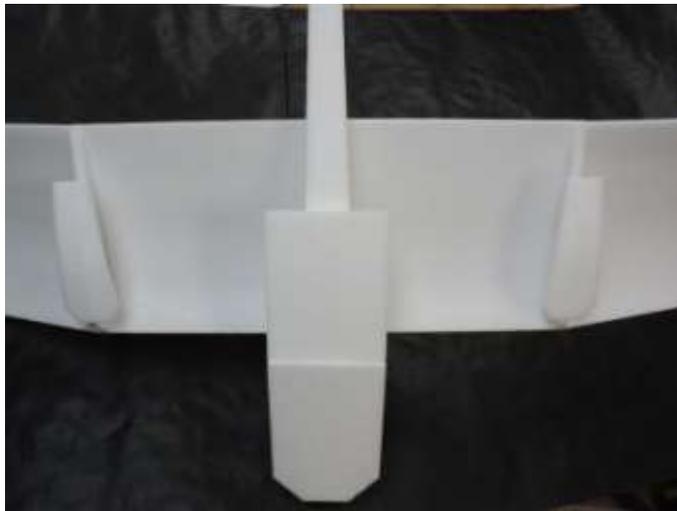
Use pins to keep it in place. Check to see that the stab is parallel with the wing by sighting from the rear.

Allow to cure.



## Tip Ski Installation

Glue each tip ski in place on the **inside** of the right and left wing ribs.



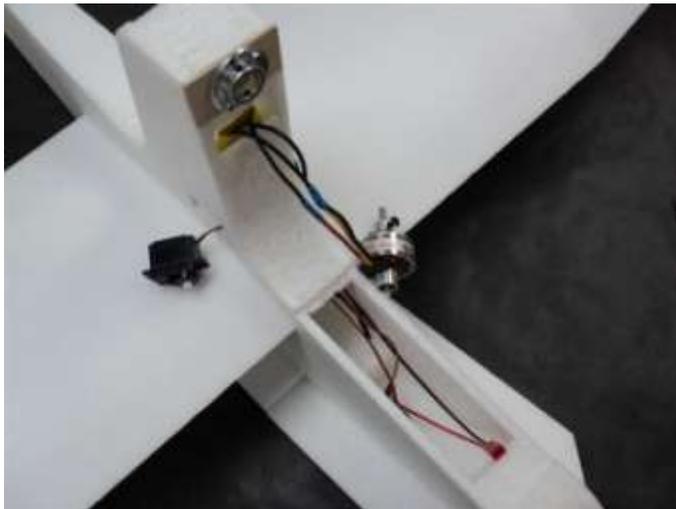
Try to match the leading edge of the ski upright with the wing leading edge. This gets the tip ski angle correct.



## Electronics

We solder the motor leads to the speed control without connectors. Here is the process; Solder and heat shrink one of the 3 wires. Solder the other two and slide the heat shrink in place but don't shrink. Make sure that the wires can't touch.

Plug in the ESC and throttle up without a prop and check motor direction. It should be counter-clockwise when viewed from the front. If it is backwards, un-solder the two wires and switch them around. Shrink the tubing and you are done.



## Motor

Slide the leads from the ESC into the slot in the motor pylon and into the front compartment. Slip the ESC in there as well.

It is important that the ESC sit flat on the wing. This puts it below the servos and out of the water if the plane flips over.

Check to be sure that your motor matches the bolt pattern on the ply mount. If not, drill 1/16 holes and use #2 sheet metal screws to attach it.

Attach your 8x3.8 or 8x4 slow fly prop and be sure that it clears the fuselage.

## Servos

Fit the servos.

Make sure that the servos face forward (servo arm towards the front).

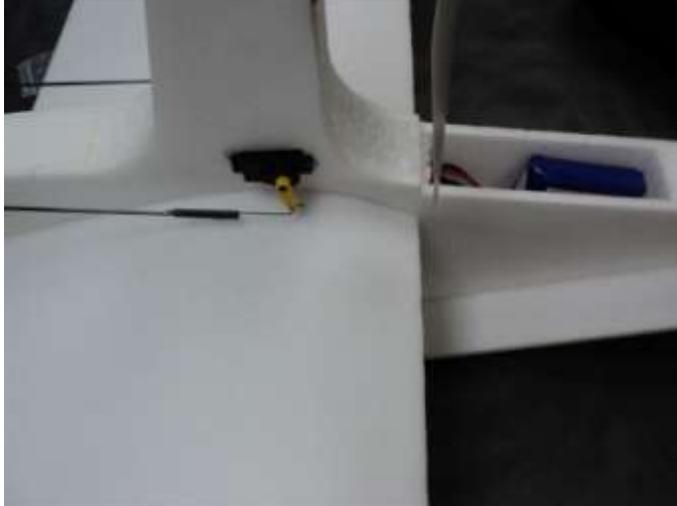
Feed the servo leads forward into the fuselage. You may need to push the ESC down to clear the servos.

Glue servos in place with a small drop of hot glue at each end.

## Battery

We use an 800 or 1000 mah 2S LiPo battery in all of our Monkeys.

We have not found a need for any more power than this. Most 3S setups will overpower this airframe and destroy it.



## Setup

Plug in your servos and ESC to the receiver. Push the receiver into the fuselage under the wing.

Turn on your transmitter and be sure that the trims are centered.

Verify that the left servo is elevator.

Install the servo arms pointing straight down and put the servo arm screw in.

Using the end of the pushrod you already made, put the "Z" bend into the elevator control horn.

Slide on a piece of shrink tubing.

Put the other "Z" bend in the servo and adjust the pushrod length so that the elevator is centered.

You can use the heat shrink to hold the wire on the carbon while you glue it.

Once you are sure that the elevator is centered with the radio on, carefully shrink the tubing over the wire end.

Do not melt any of the foam structure when shrinking the tubing... Use cardboard "shields" to insulate the foam while heating the tubing.

Repeat for the rudder.

## Hatch

Cut a bevel in the front of the hatch tongue.

Glue the hatch tongue to the rear of the hatch so that it is centered on the sides and flush with the rear.

Only glue about half of the forward portion of the tongue. This allows the tongue to bend.



Use Blendederm tape on the front of the hatch.

Sand the sides of the hatch to match the fuselage.

In use, you gently bend the hatch up at the center until the tongue releases at the rear and open.

## Balancing

The sea monkey should balance about 40% (3.2 inches) behind the leading edge of the wing.

The CG is important for an easy flying model.

If the CG is significantly behind this, add weight or use a larger capacity 2S battery.

If the CG is forward of this, fly it first. If it needs more up trim than you have, add weight to the tail or use a smaller 2S battery.



## Flying

Set the rudder and elevator so that they move  $\frac{1}{2}$  inch in either direction.

If you have dual rates use  $\frac{1}{2}$  inch on low rate and 1 inch on high rate.

This is a slow flyer. Full throttle is seldom used, except when climbing steeply.

Flight speed is very slow, so takeoff and landing speeds are almost nothing.

Always fly when the wind is calm. Any more than about 5 mph wind is not fun.

Always take off into the wind.





## Water Takeoff

**Do not fly off water if there is any wind more than about 1 or 2 mph...**

Set the plane in the water facing into the wind. If the wind is more than a whisper, you may not be able to turn into it.

Use lots of rudder and short blasts of high throttle to get the nose into the wind if needed.

Slowly advance the throttle while using the rudder to keep the nose pointed into the wind.

You should not need much more than about half throttle to get off the water.

The plane will lift off the water when it is ready. There is no need to haul it off the water.

Takeoffs into the wind will be very short (5-10 feet).

## Water Landing

The water landing is the same as any other. The plane does not care if you carry some speed, or just plop it in.

Landing with a little speed does make for a pretty landing.

If there is any wind, it may be wise to not try to turn around. Remember, this plane only weighs 8 ounces. If any wind gets under the wing as you turn 90 degrees, it will flip. This is not something you want with a seaplane...



## Optional Amphibious Kit

The amphib kit lets you fly your Sea Monkey from a smooth surface (gym, pavement or short grass).

It allows you to drive into the water to take off, and drive out after landing!

Drill a 1/8 inch hole in the fuselage in the corner where the two bottom skis meet. Use a long drill bit or a piece of 1/8 brass tubing.

Slide the carbon axle housing in place. Center this, and apply two blobs of hot glue over the housing and onto the foam.

Make these on both sides of the fuselage.

Using hot glue, attach the steel axles into the housing so that about 3/8 inch sticks out.

When cool, slip on a wheel and a plastic washer. Secure with a tiny dab of hot glue.

You are now ready to take off and land almost anywhere!

Thank you for purchasing this kit!

We hope you enjoy many relaxing flights with your Sea Monkey.

When you are ready for another outstanding flying model, why not check our other planes at [www.riotplanes.com](http://www.riotplanes.com)

# Tips

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**Do not use a 3 cell battery!** This is simply more power than the plane can handle.

**Do not “beef up” or “brace” any part of the plane.**

This only adds weight, causing the plane to fly faster, causing you to “beef up”, adding weight, causing the plane to fly faster, etc...

**Don’t try to fly this plane fast.** There is a reason that this is called a Slow Flier...

**If you have trouble taking off from water,** remove the wheels.

**If you dunk it-** Keep the plane upside down until all the water drains out.

DO NOT run the motor.

Unplug the battery ASAP.

Let the motor dry in the sun for a while.

Be sure that everything is dry before flying again.

**Put CA glue on the rudder bottom.** This will reduce the amount of wear if you take off from a hard surface.

**Have Fun!** Isn’t that what it is all about?

**Tell your friends!** One Sea Monkey is fun, two is combat!