

The “FROG”

Assembly Instructions

Welcome intrepid explorer. Please if you can, take pictures during the construction phase. Share them with all of us here at the FoamFly.com gallery.

Please feel free to call, or email me at anytime if you have questions, or get stuck during the assembly process. I can be reached at: (734) 528-9446 Ext 1 any day. I want your project to be a success.

A note about the Foam: Due to the nature of the raw materials available, you'll notice that most of the pieces have printing on one side. Now, you can do what you want, but I recommend planning ahead so that you put all the printing towards the inside of the plane. ;)

1) Parts List:

a) Foam Parts:

- 2 Fuselage halves, Left and Right.
- 1 Vertical Stabilizer
- 1 Horizontal Stabilizer
- 1 Rudder
- 1 Elevator
- 2 Motor Pylon halves, Left and Right.
- 2 Motor Pylon center pieces, Top and Bottom.
- 2 “Canopy” covers, Left and Right.
- 2 “Canopy” centers.
- 1 Wing center
- 2 Wing tips, Left and Right.
- 2 Tapered foam strips for tail top and bottom
- Many thin strips for the fuselage top, wing support, battery support, and battery hatch.

Included Optional Pieces:

- 2 Ski/Float Supports
- 2 Skis/Floats
- 2 Wing Reinforcements
- Scrap foam for practice and repairs

b) Other Stuff

- Paper clips (or misc. wire bits)
- 2 pieces of sticky tape (for servos)
- 1 Motor wooden mount
- Plastic “Leading Edge Protectors” (Drinking Straws)
- 1 Frog Logo Sticker
- Super Cheap paint brush (for brushing on the glue)

2) The Techniques: You'll probably want to practice these on a piece of the scrap foam.

a) "Cut & Peel"

In certain areas you'll need to peel some of the skin from the blue foam to ensure that you get a good solid glue joint. If you don't do this, everything will be fine, but in case of an "impact" the skin could peel away, and you'd have to glue it back in place (A real pain.)

Here's how you do it. Use a SHARP razor blade, or X-Acto knife, and run it lightly across the foam so that the tip just pierces the skin. Then, when you've finished, stick the knife/razor point just under the edge of the skin, and lift up one corner. Now carefully peel back the skin. Do it slowly, the skin can tear when the peel reaches the little holes. Like I said, if you practice this will make a lot more sense.

b) "The Bend"

You'll be bending the foam where the strips form the center of the fuselage. You might want to cut a similar sized strip of scrap to practice. You need to get a feel for how much pressure the foam will take before it gives. Remember to support the inside of the bend with your fingers. You don't want to form a sharp crease by accident.

c) "Basic Glueing"

The contact cement will test your patience. I know you'll be tempted to stick the pieces together immediately, but don't be give in. The 3M-77 will form the strongest bond, if you allow it to dry for AT LEAST 5 minutes before putting the pieces together. Put the glue on BOTH surfaces to be joined. If you're not used to contact cement, remember you really only get ONE CHANCE at putting the pieces together. It really is instant glueing! (except for the waiting, but that's already over at that point)

d) "Advanced Glueing"

The 3M-77 is ideally a spray glue, and there are some instances where you can actually spray it during this project. You'll want to make sure that you carefully mask off any areas where you don't want the glue. You can do this by cutting custom shaped glue shields out of paper, or masking tape. Be sure to test your masking tape on the scrap foam to make sure that it doesn't peel the skin off when you remove it.

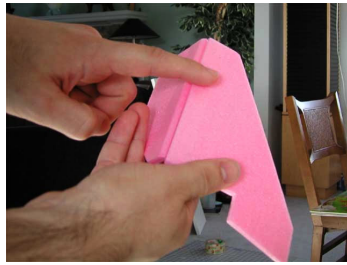
For the rest of the areas (Like attaching the wingtips) you'll want to brush the glue on. Just spray some in a DISPOSABLE cup, and use a throwaway brush to paint it right on both surfaces to be glued.

3) Let's get started!

a) Tape the Control Surface hinges. Get out your packing tape. Cut a strip of packing tape long enough to do the job, and 1.5 inches wide. If you can't think of anything else, you can stick the tape on waxed paper, and cut with your razor.

Tape the Elevator first. Put the tape on the top, and the cut edge of the Elevator goes on the





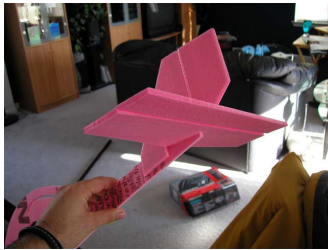
bottom to allow freedom of movement. Trim off the excess with your razor. Next, the Rudder. Put tape on the rudder piece first aligning one edge of the tape with the bottom. Put the tip of the rudder against the center of the Vertical Stabilizer and pushed at full deflection while

you smooth the tape onto the Vert. Stab. Bend the Rudder the other way, and tape that side, again working from the bottom to the top.

- b) Glue the Vertical Stabilizer to the Horizontal Stabilizer. You'll need to cut and peel a small section on the Horiz. Stab. where the two pieces meet. Make sure that the pieces are straight and perpendicular.



- c) Attach the control surfaces to one half of the fuselage. Cut and



peel the tab at the bottom of the Vert. Stab., and the matching parts of the inside of the fuse, and the bottom of Horiz. Stab. (Boy will the pictures help here...) While you're at it, now is the time to cut and peel the 1/4 inch strip that goes all the way around the outer edge of the inside of the fuselage. Glue the pieces together using the slot in the fuse, and the tab on the rudder to get the pieces to go on straight.

- d) Assemble the motor Pylon. Set out the four pieces that make up the Pylon.

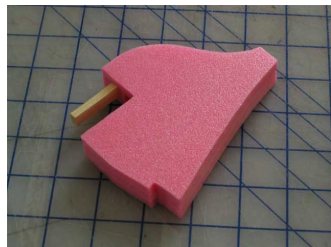
- i) Peel off the skin from the insides of the left and right halves. Peel the skin from both sides of the center pieces.

- ii) Align the top piece with the top edge of the Pylon, insert the motor mount into the slot, and press the three pieces together until they fit flush. (You may have to scrape the foam a bit with the motor mount to make a suitable groove. Set the Motor mount aside.



- iii) Here's your chance to actually spray the glue. Lightly spray the insides of both halves, and both sides of the center pieces. When the glue is ready, carefully align the foam pieces and press them firmly together.

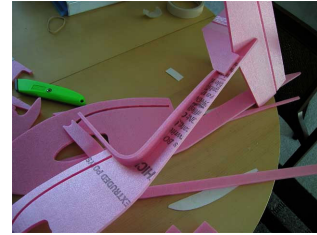
- iv) Carefully narrow one end of the motor mount until it fits tightly all the way into the hole in the back of the gearbox.



Use a little Epoxy, or Polyurethane Glue, or Foam safe CA, to attach the motor mount into its slot.

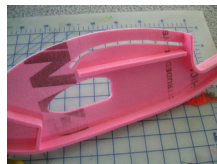
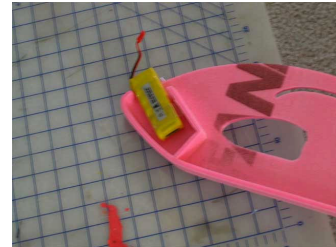
- v) Line up the bottom of the Pylon with the top of the wing slot, and the rear of the fuselage. Cut and Peel the overlap on both sides.

- e) Find the shorter tapered strip of foam. Paint on the glue, and glue the top half of the back of the fuselage. Start at the tail, and work forward slowly aligning the strip with the edge of the fuselage, bending it around the corner, and going straight up the back. Trim off any excess with your razor.



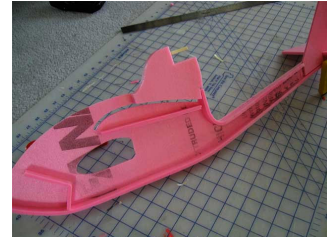
- f) Using the longer tapered strip of foam, glue from the tail forward working your way around the edge until 1/2 inch past the point of the nose. Cut off any excess.

- g) Get another strip of foam, crease one side, and put a 90 degree bend in the form to form the battery compartment. Make sure that you leave enough room to get the battery in and out, and room at the top for the wires to reach the battery. Cut and Peel where you need to, and glue the battery compartment in place.



- h) Find a suitable strip of foam, and Cut and peel, and then glue it in place just below the wing slot to reinforce the fuselage. Leave room in front and behind for the antenna wire to get past it.

- i) Glue the Pylon to the half of the fuselage that you've already started. It has a slot should fit right onto the strip from the last step. Align the bottom edge of the Pylon with the top of the wing slot. Make sure that the motor mount is parallel with the flat bottom of the fuselage.



- j) Now it's time to start laying out your components inside the plane. Get your battery pack, and place it into the fuse just behind the tip of the nose. (See Photo.) Glue on the Top of the fuselage, working forward from the Pylon, glue along the edge of the fuselage, and make sure to leave an opening slightly larger than the width of the battery, so you can get it in and out easily. Trim off the excess.

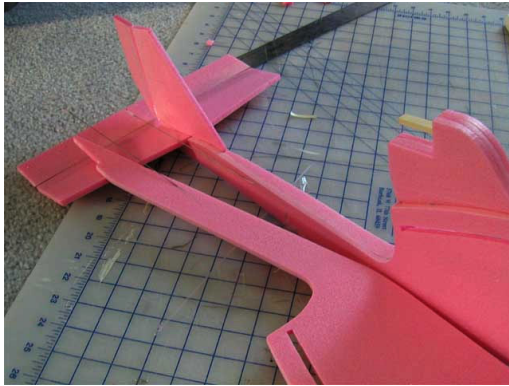
- k) Test fit the servos into place in the opening in the fuselage. They should go on the inside with the top of the servo case flush with the bottom of the opening. Before sticking anything, it's a good idea to power up, center the servo arms, and put the little connectors into the servo arms. Attach the sticky tape to the servos so that the arms point into the plane,



and then attach one servo to the inside of each half of the fuselage, making sure that they don't hit each other when you lay the halves together.

- l) Get out your pushrods, or find two suitable pieces of .032" wire. You need to push the wires carefully through the foam with a slight twisting motion. You might want to practice on scrap foam first. You can also get the hole started with a long pin, or sewing needle.

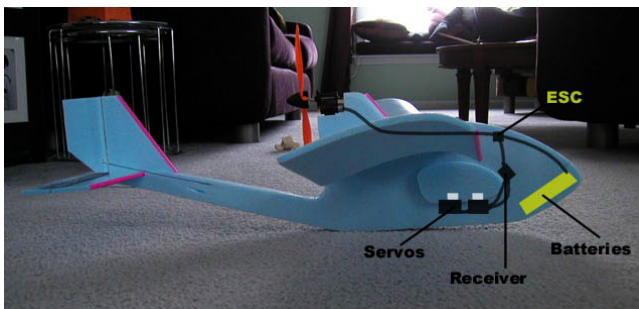
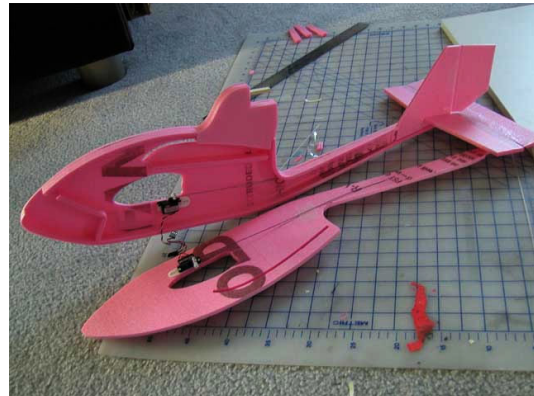
i) The Rudder pushrod goes on the right hand side of the plane, parallel to the top of the tail boom, and 1 foam thickness away from the top. The wire should pierce the foam about 2 inches from the front of the vertical stabilizer, and come out on the inside 2.5 inches further along.



ii) The Elevator pushrod goes on the left hand side of the plane, entering the foam 1 thickness away from the bottom, and heading towards a point 1 thickness away from the top of the boom where it

joins the fuselage.

- iii) Cut two 4 inch lengths of sleeve tubing for your pushrods, and slide one piece onto each after it has been threaded through its side of the fuselage. Move the tube back to the point where the boom meets the body, and tape the sleeves to their own sides of the fuselage. Check to make sure that the pushrods move freely, and then slide them into the mini connectors on the servo arms.



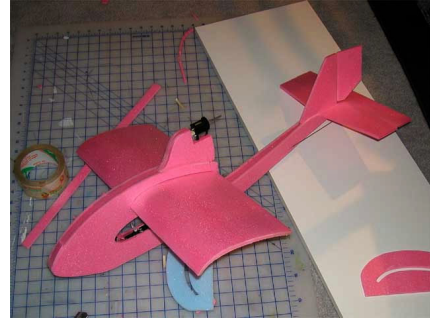
- m) Now fit the rest of your gear. Thread the motor wire through the pylon, and slide the motor onto the stick. Double stick, or scotch tape the receiver in place. Try to position it so you will have access later. Connect motor BACKWARDS (Red to Black, and Black to Red.) , and plug in the servos and ESC. Turn everything on now, and make sure that you have the correct servo plugged in the correct place. TEST fit the halves of the fuse together.

The servo more towards the front should have its pushrod go on top of the other one.

n) When you are confident, glue the two halves together. Don't forget to put glue on the other half where the wing reinforcement, pylon, and battery box will touch it. Also, the bottom of the Horiz. Stab should be glued to the top of the fuselage half. Work from the back to the front, and be careful to make sure everything is straight, especially the wing slot.

o) Take your wing center section, and carefully slide it through the wing slot until it is exactly centered, and straight.

p) Paint the 3M-77 onto the outside edges of the center wing, and the inside edges of the wing tips. Make sure you get good coverage. Wait at least 8 minutes, as you want it to be really solid, and then carefully fit the wingtips in place. Apply a good firm pressure and double check that the pieces fit flush along the entire length of the glue joint.

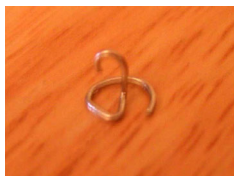


q) Now to make the canopy covers. Here's where you'll need a little ingenuity. Get out the canopy centers, and test fit them into the openings in the fuselage. You will need to trim away some in order to give the servos proper clearance. Each side will be different. Trim a little at a time, until you're sure that the servo arm won't hit the foam while it is moving.



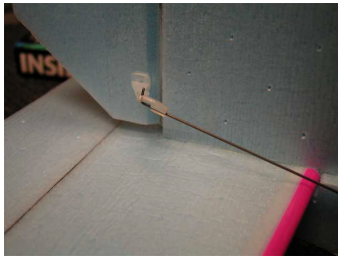
i) Glue the canopy centers to the canopy covers. Peeling is not necessary here since these joints won't

be under stress. If you feel the need at this point to stop and pretend you are Mr. Spock, go ahead. Next. Grab a couple of the paper clips, and bend and snip them into a hook shape with a base. Then slip the hooks under the edge of the canopy center at the top of



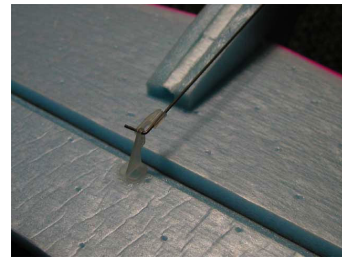
each side. Fix them in place with a little foam safe CA, or Epoxy. Then find a small rubberband and string it between the two hooks. Twist the two pieces around until they pull closer together than the width of the fuse. You can easily install and remove them by slipping one half through the fuse, and then snapping the two pieces into place.





r) Install the control horns. You might need to shorten the pins on the control horn so that they don't poke all the way through the foam. Test this on scrap. Follow the pushrods back to the rudder and elevator, find a place to attach the control horn that puts the least stress on the pushrod. Fit the control horns so that the little

holes are as close as possible to being directly over the hinge line. You'll probably need to poke a hole with a pin or an X-Acto knife so that they'll go in without crushing everything. Use a tiny amount of Epoxy, or foam safe CA to glue the control horns in place.



- s) After you hook up the control horns, center the servos, and then center the control surfaces before tightening down the screw on the pushrod connector.
- t) Get out the straws. From here on known as, "Leading Edge Protectors" ;) Pinch the straw between your fingers, and then slide your pinched fingers down the length of the LEP. Do this several times until you have a nice crease. Carefully use a pair of scissors to cut down the length of this crease. When you've cut both, you should have two identical half-tubes. You can use a little sandpaper to even out your scissor job if you need to. Then, lay the LEPs flat side down on your work surface, and stick a full length piece of Scotch tape the the rounded sided. Trim the LEP to length, and then fit it over the leading edge. Using thumb and forefinger, smooth down the tape along the Leading Edge Protector until it is firmly attached. Proceed to all the leading edges Wings, Wingtips, and Tail Surfaces.
- u) The Battery Hatch. Find a short strip, and bend it to match the curve over the battery box. Cut the strip to be slightly longer than the opening. (So it will be a tight fit.) Cut two pieces of tape the same widths as the strips, (about 5/8") and tape the outside of the door in place at the bottom. Open the battery door all the way, and press it tightly against the fuse. Tape the inside of the door hinge. If the door starts to become loose, a piece of scotch tape folded over at one end makes a handy latch.
- v) How paranoid are you? There are several levels of reinforcement that can be added to the Frog.
- i) First off, if you'll be landing on anything other than the soft green grass of your local field, you'll want to run a piece of packing tape FLAT along the bottom of the fuselage from the base of the battery door to halfway up the tail boom. Use your razor to cut from the edge of the tape to the fuse about 1 cut every 1/2 inch only where the curves are. Then fold up the edges of the tape working from the back to the front, overlapping the cuts to work around the curves. (hope that makes sense.)

- ii) Second, if you think you might be crashing into anything, you'll probably want to run a similar piece of tape from the Pylon to the other end of the battery box. But wait there's more.
- iii) If that's not enough, you can wrap a 2.5 inch piece of tape over the leading edge of the wing right where it goes through the fuselage. (A good reinforcement if you're planning to fly the plane overweight.) I never bothered to do this.
- iv) For those that think they'll be doing some crashing, there are two extra wing ribs. These can be glued right under each wing where it meets the fuselage to keep the wing from moving about in the event of an, "Impact." If you're a fairly confident pilot, I would recommend flying the plane before doing this in case the wing needs any wiggling to balance things out. Just glue to both the fuse and the wing. DON'T do any cutting or peeling here. An accidental cut too deep could seriously weaken the wing.
- w) Which brings me to repairs. With luck you shouldn't need any serious repairs. That being said, I'll get to the Number 1 repair secret. In most cases the glue will let go before the foam tears in a crash. The great thing about 3M-77 is that it can be re-activated with HEAT. This means that if the tail, or half the fuse pops loose, you can simply warm it all up with an ordinary hairdryer, and press the pieces back together QUICKLY while it's still hot. I just heat evenly until I can feel my fingers burning, and then I press the pieces together, remove the heat, and hold for 5-10 seconds. This works great, because the new joint is the same strength as the old one, and you haven't added ANY WEIGHT.

For what we shall call "more serious" repairs, I recommend PolyUrethane glue for tears in the foam, Foam save CA, or Epoxy if that's too much of a pain, and various kinds of tape for the rest. Be creative, and please let me know what works best for you.

- x) Optional pieces, and flight instruction:
 - i) There was optionally going to be a wheel for ground landings, but I think it just adds unnecessary weight. I had a neat wheel mounting system worked out though, so let me know if you'd like to try it. (I recommend getting everything up and flying well before adding any mods.)
 - ii) The other big addition is the skis/floats. I'm experimenting with various ways to reinforce the ski support. None seems to be necessary for use on water, or in low-wind situations, however... I've tried these, and all seem to work: Stick packing tape on both sides of the support, and trim it around the edge. Or, get a piece of .032 wire, or a thin bamboo skewer, and twist it carefully through the foam from the top down the



length of the support. Carefully bend the skis so that they fit the curve of the support. Cut and Peel a strip off the top of the ski, and glue it to the bottom of the support. Really wait the full 5-8 minutes before putting these together, in order to really stick it on. Next, put glue on the top of the ski rib only. Stick it under the wing while the glue is still wet. By glueing only one half of the joint, you deliberately weaken it so that the ski will break off instead of breaking in a hard landing. It can be easily re-attached using the hairdryer method.

iii) The Sticker. The frog logo is computer cut vinyl. Carefully peel back the top layer, the sticker should come with it. Go slowly. Align the masking and sticker where you want it, and rub it down smoothly. Peel off the mask slowly, while rubbing down the vinyl. Again, go slowly. After all the masking is off, again rub down the sticker, and voila!

y) Balance: If you use all the recommended equipment, you shouldn't have any problems with the balance, Here's how to double-check. The Frog should balance at a point about 2.5" back from the leading edge of the wing. If you put your fingers under the wing at the highest point, that's where it should balance. If it's within 1 finger's width of that point you're probably okay.

Control throws: If everything is properly configured the tail end of the rudder should move back and forth about 1.25 inches in either direction, and the back of the elevator should move up and down about .75 inches in either direction. For a complete beginner, less rudder movement will probably help keep you out of trouble.

Weight: The total weight with the batteries should be between 7.5 and 8.4 ounces depending on what type of batteries you use. If your weight is over 8 Ozs, You should probably start with the 10x4.7 prop. The prop should be mounted with the rounded side of the blades facing towards the front of the plane.

z) Your first flight: After checking the control throws, make sure that the control surfaces actually move in the right direction. Right for right, left for left, up when you pull the stick back, and down when you push the stick forward. First launch should be a hand-toss. With all the control surfaces centered, give full throttle, and give a toss directly into the wind. Make sure you've got enough room to maneuver. Adjust the trims so that the plane is climbing slowly at full throttle. If you've been flying Firebirds, or other 2-channel planes, remember that you'll have to add up elevator in a turn to maintain altitude.

Note: The plane may seem underpowered, depending on the weight, at lower throttle settings. Keep this in mind: The motor is mounted high above the wing, and this gives it a lot of leverage to force the nose down. If it seems like the plane doesn't have enough power, give a little up elevator, you should find that it will still climb easily. This is actually a joy for me, and anyone who's used to how badly most slowflyers will pitch-up.

Other Note: Always keep a little throttle on. That big heavy propeller will drag the plane out of the sky. If you keep it spinning a little, it will remove most of that drag, and the plane should glide gracefully. If you get into trouble, full throttle can help you maneuver, the prop wash passes directly over the control surfaces, so the more air, the more control you have.

Good Luck! Please share your comments and pictures with us here at FoamFly.com. Thanks, -Dan