

Smoke N' Fire

Instructions for building and flying the, "Smoke N' Fire!"

Thank you for choosing the Thrustline "Smoke N' Fire" rocket kit. Below is a brief list of some suggested items that you might need to assemble this model:

Sandpaper

Yellow Glue

Polyurethane glue (Optional-I like Elmer's Pro Bond) - *For engine & Nose cone areas only!*

Ca Glue (Thin and Thick)

Scissors

A shape razor blade or Xacto knife

Straight Edge or straight Door jamb

Spray Paint

Sanding sealer

Fin alignment tool (optional)

Making Tape

The best way to complete this project successfully is to read over the entire construction guide and Inventory sheets prior to starting. In this way, all of the steps will make more sense as you progress. If at any time you have any questions, please feel free to contact me at rocketman1959@netzero.com

Thanks again.

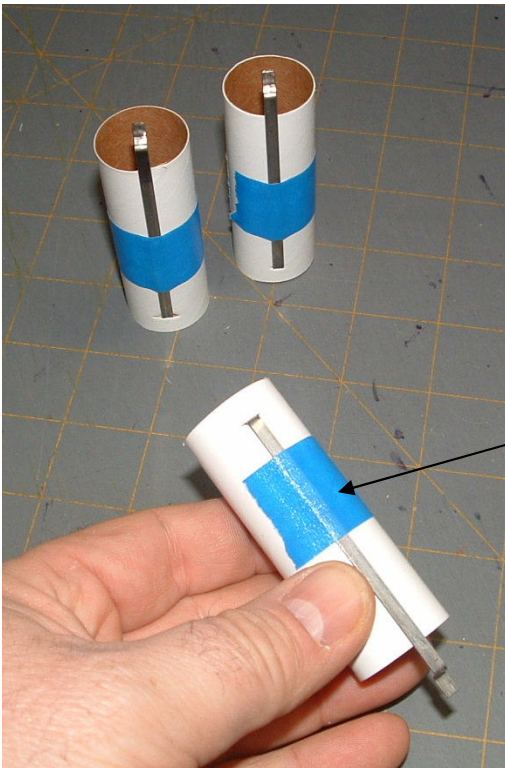
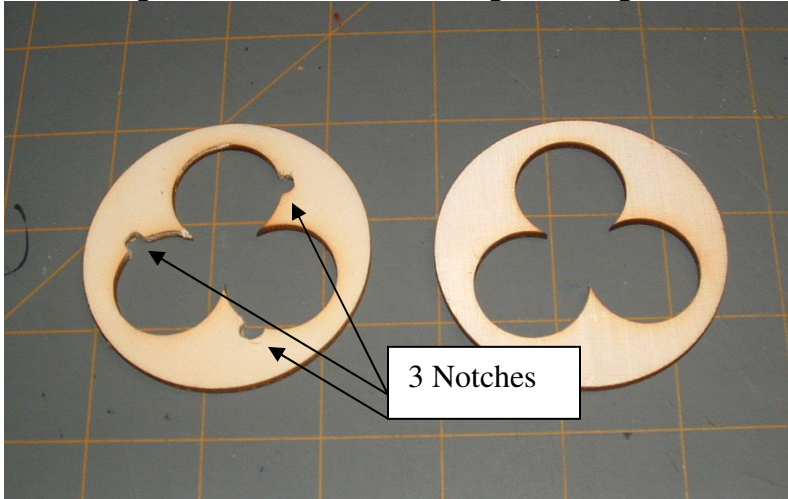
Thrustline Aerospace
WWW.THRUSTAERO.COM

Thank you for choosing Thrustline Aerospace!

Please read through all of the instructions first!

Engine Mount Assembly-

1.) Using one of the cluster engine rings, make three slots (as shown) to allow for the engine clips/hooks. Take notice where these slots are in relation to each other in the photo below. You have to make the slots in such a manner as to not compromise the structure of the ring yet still be able to move the clips to remove and replace the motors. Be sure to remove enough material so the engine hooks can flex enough for engine removal and replacement.

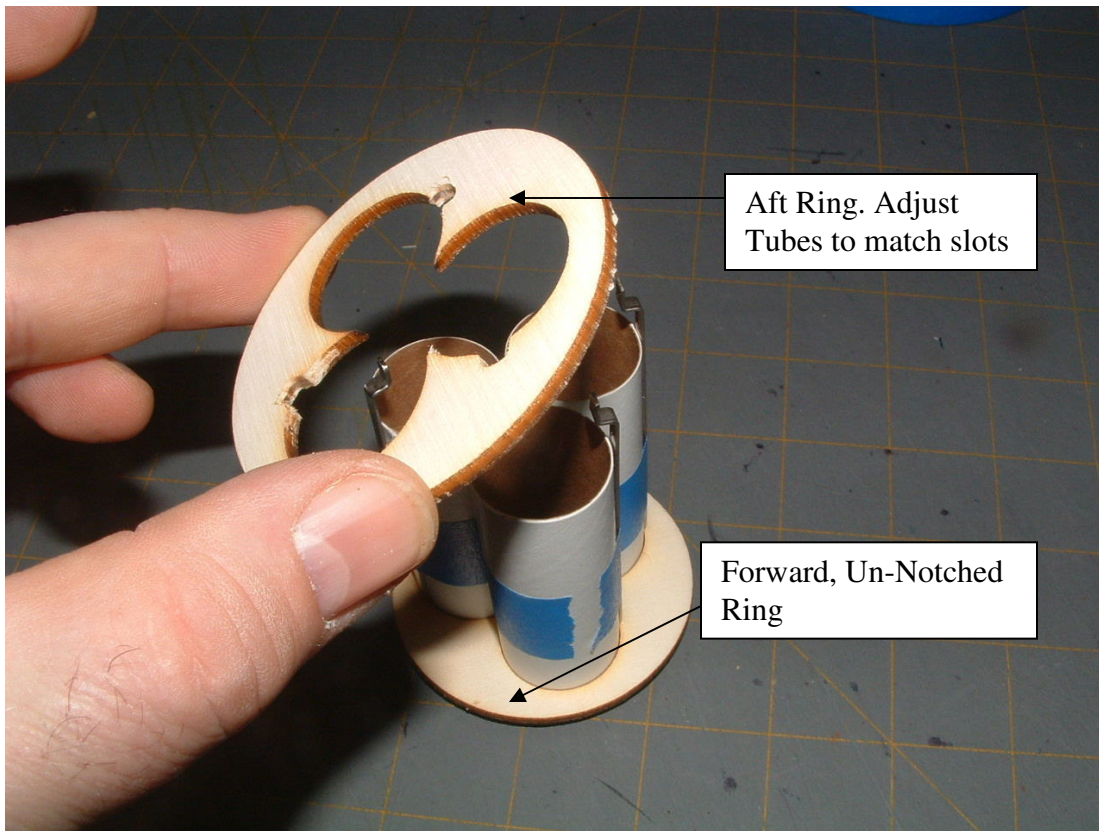


2.) Glue the three engine blocks in the ends of the three motor tubes so that they are flush on the end. When dry, make a $1/8^{\text{inch}}$ wide slot, $1/4^{\text{inch}}$ from the end of the tube the block is glued in. This is where the forward end of the motor hook will be inserted. Insert motor hooks and wrap hooks with 2 layers of $3/4^{\text{inch}}$ masking tape to keep hooks straight. The photo should give you an idea as to the position and function of the masking tape. Do not use more than 2 layers as this will affect the fit of the tubes later on when we insert them into the cluster rings!

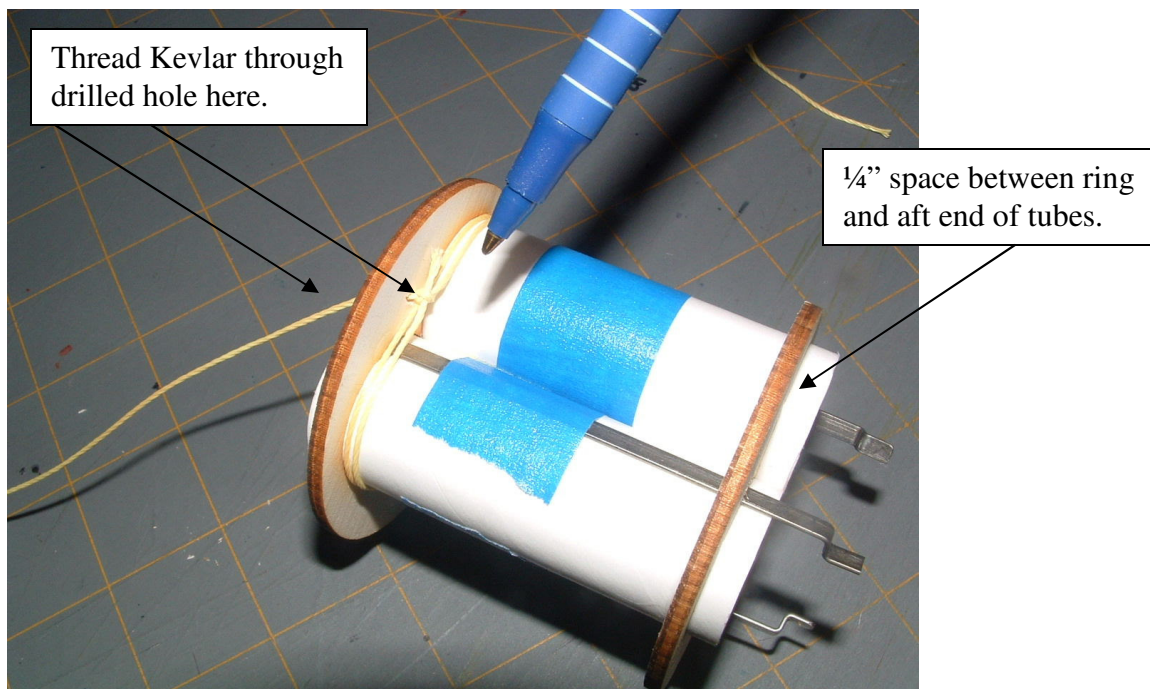
Tape
Position

3. With the ring that you **did not** notch laying on a flat surface, insert all of the motor tubes (don't glue yet) so that the forward end (the end with the engine blocks) are inserted into each hole of the ring. Once they are all inserted, rotate each individual tube so that the engine clips will match up with the slots you made in the other ring. Do this by test

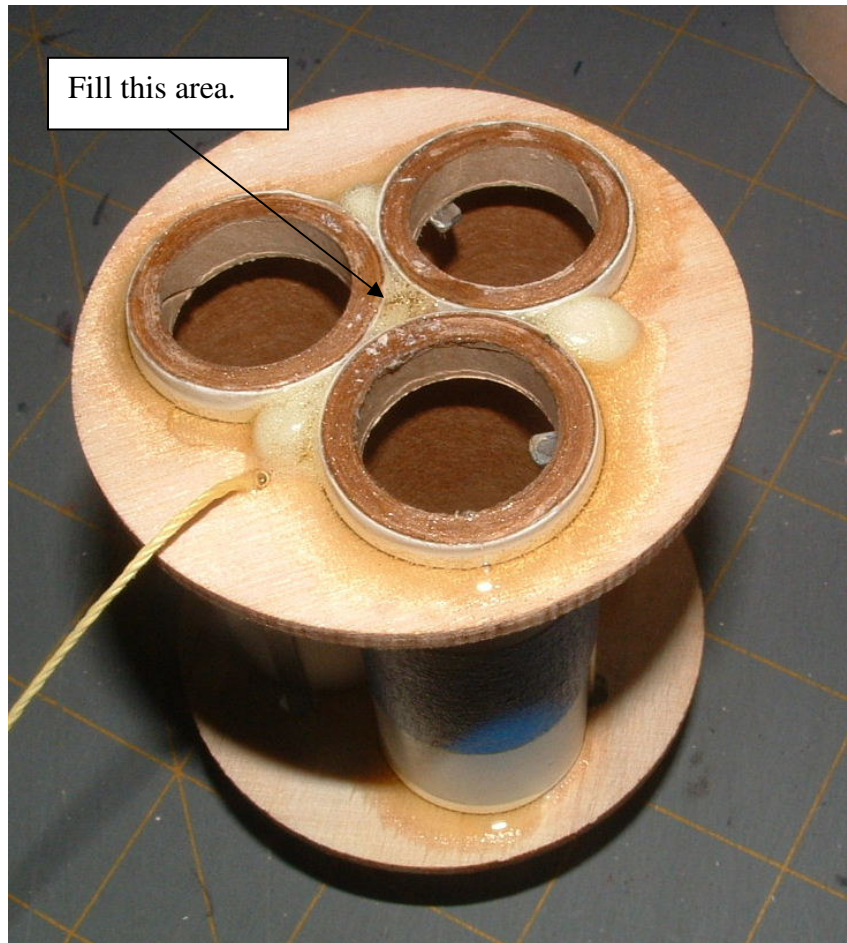
fitting the aft ring. Slide the forward ring until it meets the insertion point of each engine hook and glue into place.



4. Position the aft ring about a 1/4" from the aft end of the motor tube. PLEASE USE ALL OF THE PHOTOS TO HELP ADD CLARIFICATION. Once it is in position and straight (use a ruler), glue the ring in place. I use thick CA here to tack, and then I come back and lay in a layer of Elmer's Pro-Bond Polyurethane glue. This glue foams slightly and expands so if you use it, be careful around the engine clips that you don't accidentally glue them! Once the assembly has dried, drill a small hole (1/16th inch) through the forward ring. This will accommodate the Kevlar cord. Tie one end around the engine tubes and thread the free end forward through the hole. Apply a liberal amount of the glue to help anchor and seal the cord.



5.) Be sure to fill the hole in the middle of the engine mount with scrap balsa and glue. This will keep the ejection gases escaping during recovery. See photo below for clarification. The photo below also shows great detail of the polyurethane glue application and how it foams, filling as it cures. Make sure all areas have a good fillet of glue for strength. Let assembly dry before inserting into body.



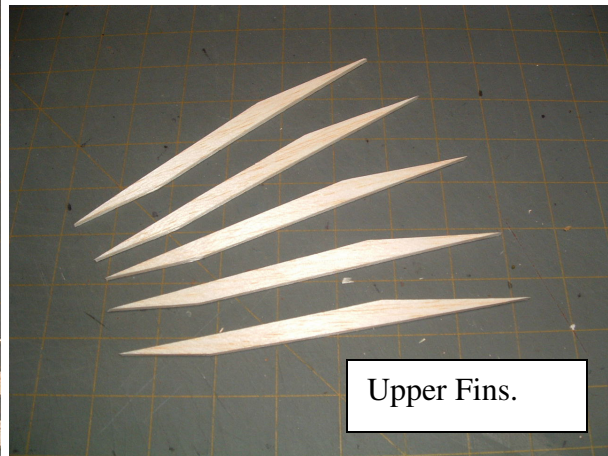
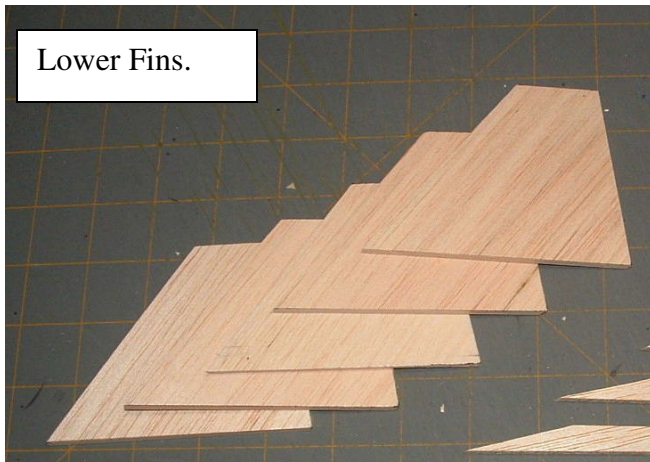
5. Before we glue the motor mount assembly into the body tube, cut out the 2 wrap-around fin marking guides and wrap them around both of the body tubes. After taping those in place mark all the fin positions on both the large and smaller body tubes. You should end up with five fin positions on each. Make the lines on the smaller (upper payload tube) longer so that the lines can help you line up the fins. Launch lug placement is up to you but I will suggest placement later on. If it is your wish to have the launch lug placed between fins, go ahead and make a mark now.



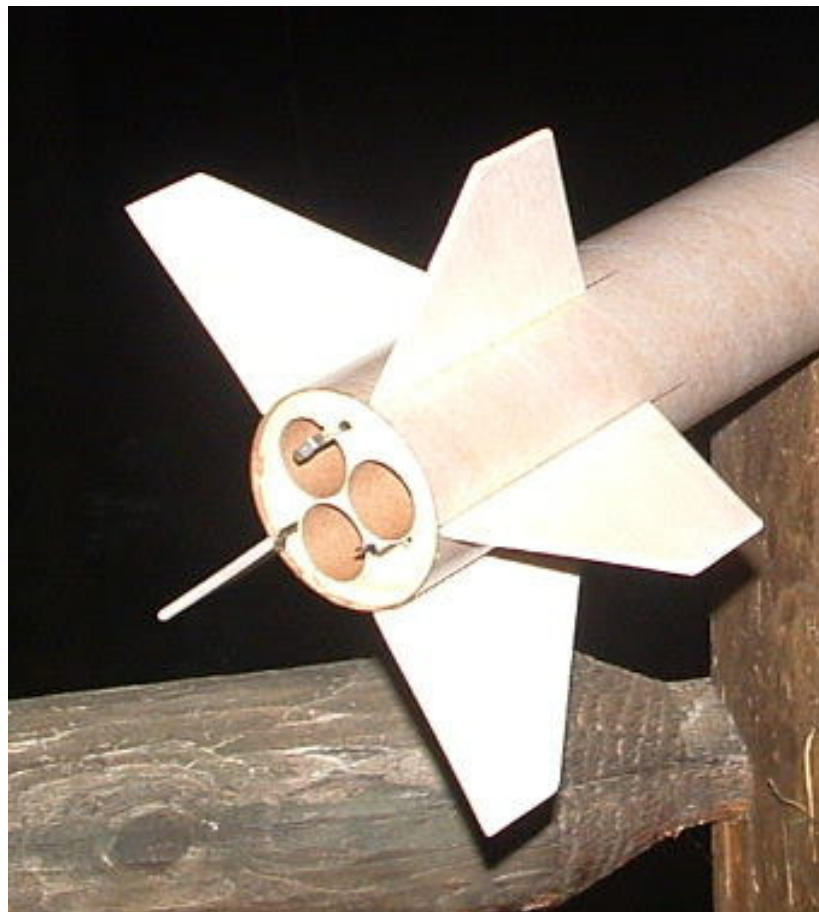
5a. After the motor mount has dried, thread the Kevlar back through one of the engine tubes to keep it out of the way. This will help keep it from getting caught up inside the body tube as the motor mount assembly is glued into place. Now place a liberal amount of glue just inside of the large body tube. Slide mount assembly into tube until the aft ends of the motor tubes are flush with the surrounding body tube. Let dry. To keep the glue from collecting on one side of the centering rings, stand this tube straight up so the glue will level.

Fin Assembly-

1. Carefully cut both of the paper fin templates out and trace them onto the balsa stock taking care that the grain runs parallel to the leading edge of each fin. If you have some scrap balsa, make a master template first and use this template to trace out the rest of the fins. If you have any future fin breakage, this template can be used for repairs.
2. Stack the fins into 2 piles respective to shape and sand them until they are uniform. Round all edges with the exception of the root edge, or that edge that will be glued to the body tubes. Coating the fins with thin CA will help give them strength, though this step is optional.

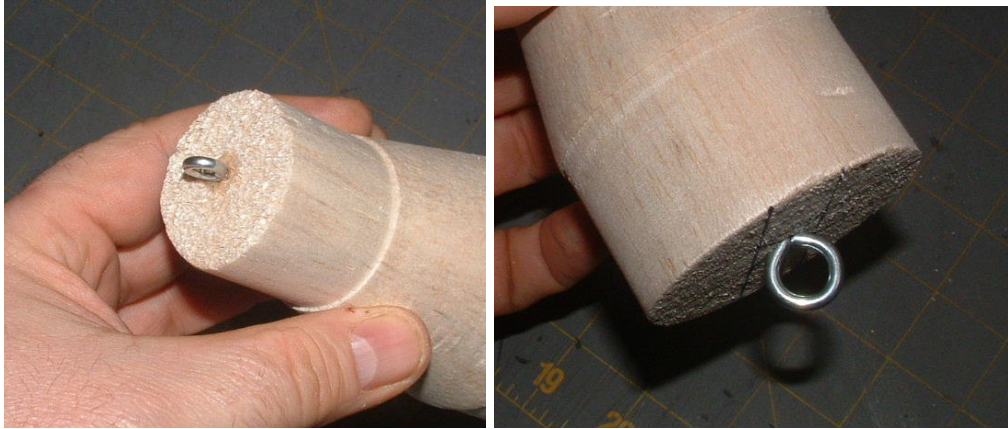


3. Starting with the larger of the 2 body tubes, begin gluing the fins using the fin reference guide lines you marked earlier. The trailing root edges of the fins are flush with the engine mount end of the body tube. If possible, use a fin alignment tool or ruler. Whatever method you use, take care insuring that each fin is straight and true.



4. Glue a small eyelet into small end of the balsa transition. Then, glue a large eyelet into the large end of the same transition (SEE PHOTO). Using the $\frac{1}{4}$ " shock cord supplied with the kit tie one end to the eyelet on the small end of the transition. Tie the other end of this cord to a swivel. Put a dab of glue on each knot to keep the cord from coming undone. This will be threaded through the upper payload section as it's glued to the transition. The swivel end will be attached to the nose cone. This will act as

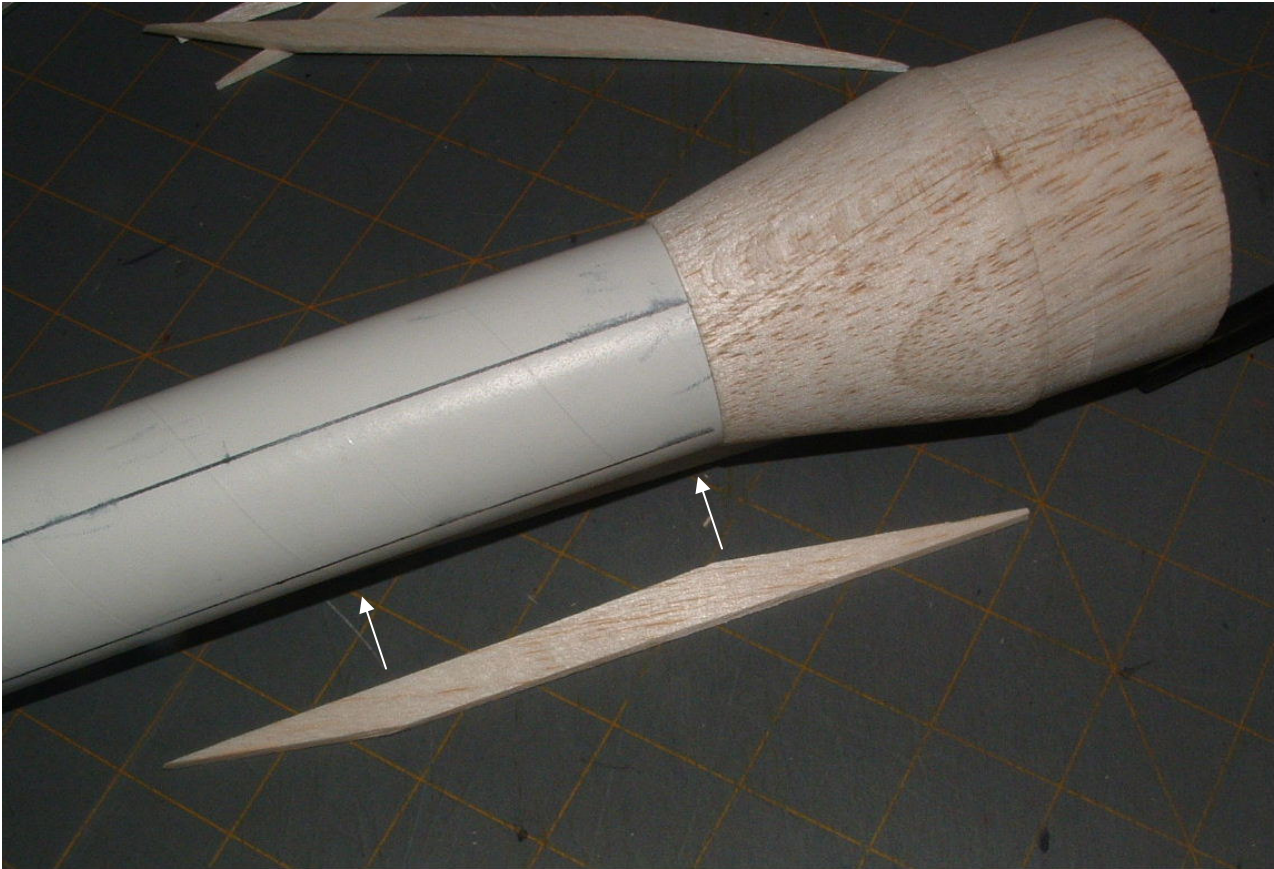
safety tether in the event your nose cone ever comes off accidentally during recovery. We will tie off the other shock cord later in the process.



5. Glue the smaller end of the transition into the smaller, upper body tube. Thread the 1/4" shock cord through as discussed in the previous step. Set aside to dry.



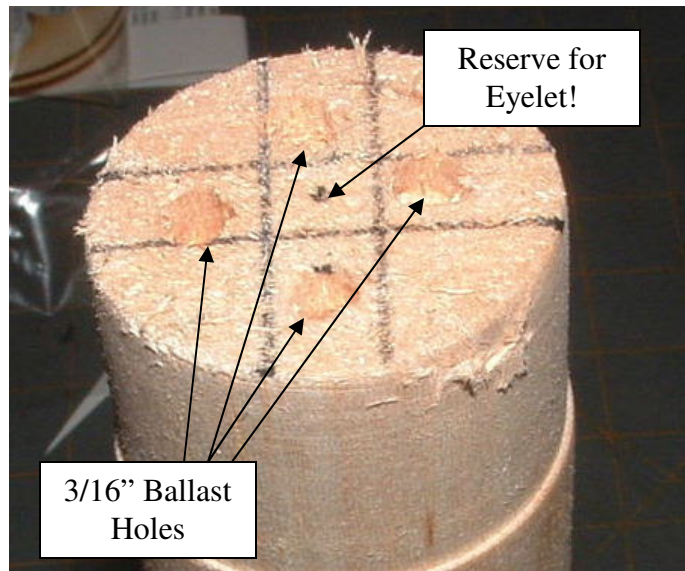
6. Once the payload section of the rocket has dried, glue the upper fins using the reference lines previously drawn. The best way to do this is to dry fit them first to insure a proper fit against the transition. Eyeball the fins and make sure their straight.(See next Photo)



7. When all of the fins have had a chance to dry thoroughly, run another bead of glue along each of the fin joints for extra strength. If you are using yellow or white glue, use a wet finger to help smooth the fillet.

Nose Cone-

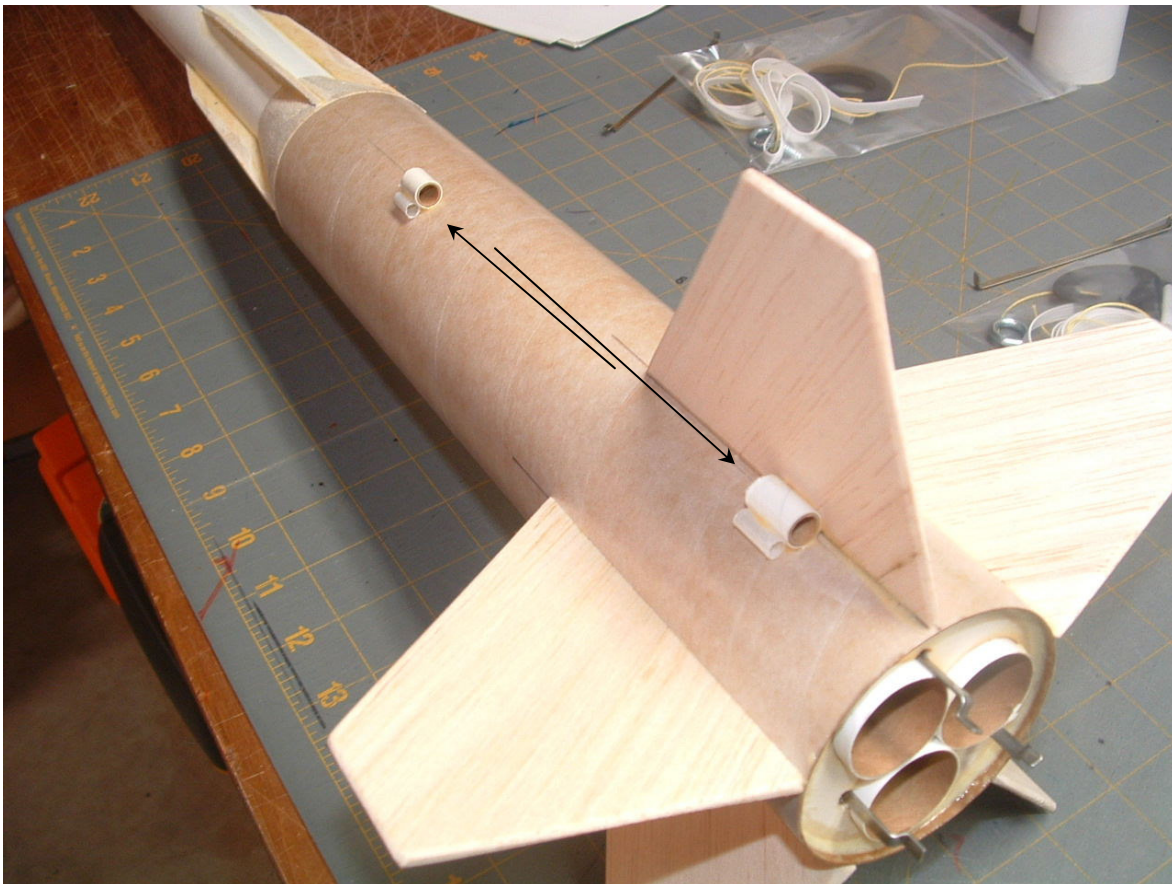
1. Mark off the nose cone so that it has five points as shown in the next photo. With a 3/16 inch drill, make 4 holes in all but the center mark. Drill as deep as the drill will go without drilling through the outside of the cone. Try to remove as much sawdust as possible. The reserved mark will be used for the other small steel eyelet shock cord anchor which will be installed after this step. Take the BB's that were included with the kit and start loading them into the holes, distributing them evenly as you go. You may find that a small screw driver or nail will help pack the BB's. You should end up with some space at the top of each column of BB's. Taking polyurethane glue or other favorite glue, seal the top of each of the holes. You may find that you have to add more glue during the curing process as the glue has a tendency to settle through the BB's.



2. Glue a small eyelet into the center of the nose cone at the last reserved mark. Set the nose cone assembly aside to dry taking care not to let the glue run out of the holes.

Launch Lug Placement-

Generally, the accepted practice is to install the launch lug on or around the CG (Center of Gravity). Having stated that, I have aligned mine along one of the main fins, gluing the second one at the top of the lower body tube. In the photo you'll notice I used 2 sizes stacked against each other at 2 and 8 inches from the end of the body tube. This allows me some flexibility when choosing launch rods at club launches. See photo below. I have included 2 sizes (2 each) so that if you prefer, you can use a similar method.



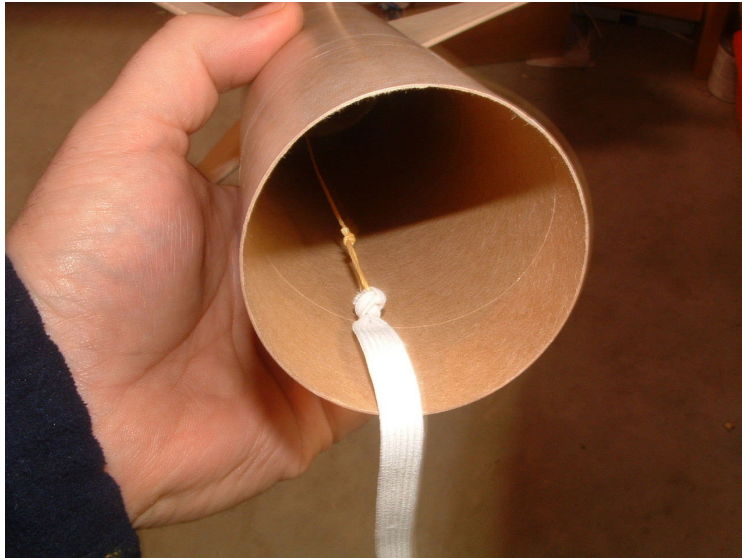
Getting The Model ready For Paint!

If you walk up to 5 different modelers and ask them how they finish their rockets, chances are pretty good that you will get 5 different answers. Having said that, the following are guidelines on how to prep this model for paint but it is certainly not the only method. Use what works best for you!

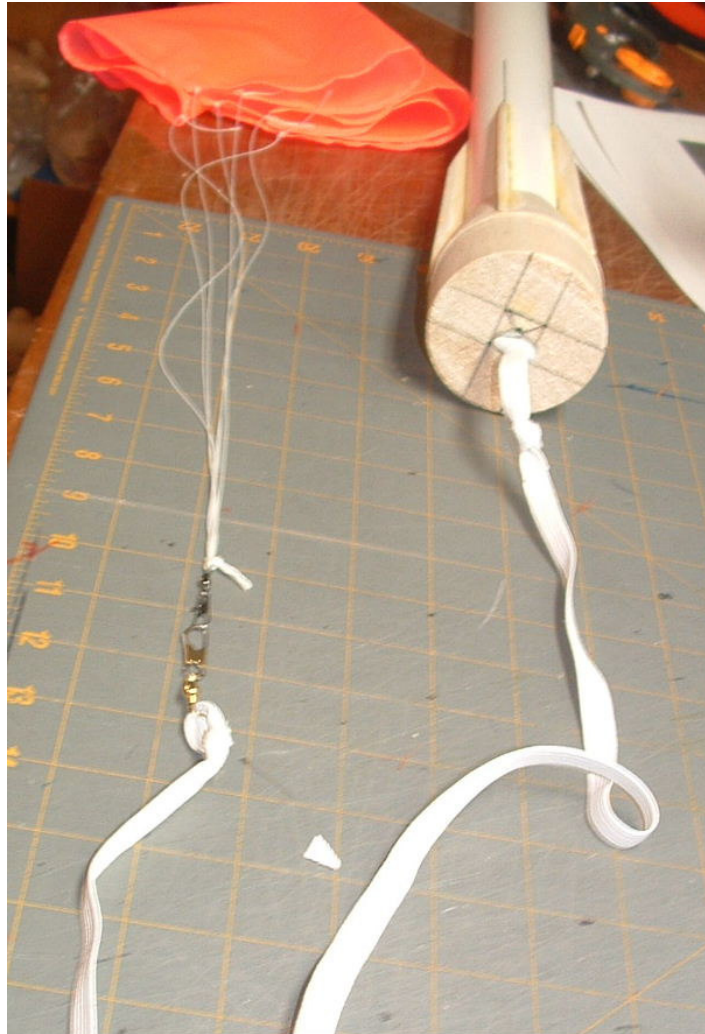
1. Sand all balsa surfaces and seal them with either fill n sand, or your favorite sealer. You can also use fill n sand on the spiral grooves on the body tubes as well. Sand again until all imperfections blended. This might take more than one application of filler. After finish sanding is complete, use a tack cloth and wipe the model down to remove all excess dust and dirt.
2. Following the manufactures instructions, Spray primer the entire rocket. Re-sand, and tack the model again.
3. From here, you may choose to apply another coat of primer or move on to the finish coats. I usually end up with at least 2 coats of primer sanding and "tacking" between coats. I then sand, tack and finish coat

Prepping the Smoke N' Fire for Flight-

1. Please read this entire step before tying the Kevlar. At this point the Kevlar thread is still tucked back through one of the engine tubes. If it's not, you'll have to thread it back to accomplish this next step. Tie the end of the Kevlar thread to the 3/8 inch shock cord, the larger of the two cords included with the kit. To do this, I usually tie a loop into the Kevlar and then tie the shock cord to the loop. You want the loop to not extend past the forward end of the main body tube when it's threaded forward. The reason is to keep the cord from ripping (zipper) the side of the body tube during recovery.



2. Tie the other end of the 3/8 inch shock cord to one of the #5 Swivels. This swivel will be where **18 inch parachute** will be attached.
3. Attach the second 3/8 inch shock cord to the large eyelet on the transition. Tie the other end to the other #5 swivel. This is where the other **18 inch parachute** will be attached. Both chute connections will have double swivels, one on the chute, and the other on the shock cord. This will help eliminate tangle during recovery. You will end up with each of the sections of the rocket with it's own shock cord and parachute system.



(Photo of payload section with its own recovery assembly)

4. Ensure that the safety tether is attached to the nose through the payload section.
5. Check nose cone for secure fit. It should fit snug so that it does not pop off during recovery.
6. Pack wadding and chutes as required.
7. Install 3 engines of choice. I recommend selecting D12-5's as the best choice for this rocket. Although it will fly on C11-5's, it is not recommended in windy conditions.

Good Luck!!