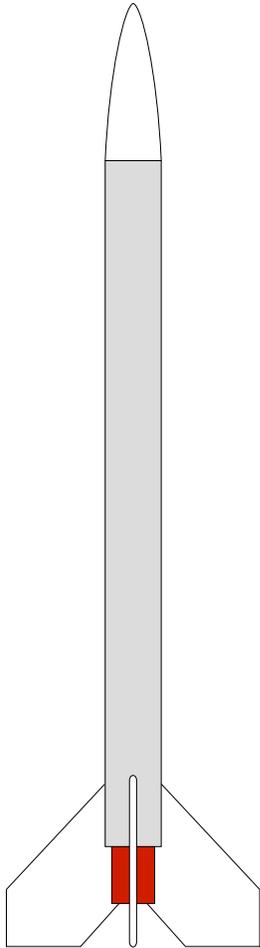


# Neo Mini

An easy-to-build and great flying model rocket kit! Ideal kit for beginners and a fun sport model for the more experienced modeler! Uses economical 13mm "Mini" Engines.



## Specifications:

Length: 11.875"/30.2 cm  
Diameter: 0.739"/18.8 mm  
Weight: 0.4 oz/11.3 gm  
9" Parachute Recovery  
Recommended Engines: 1/4A3-3T;  
1/2A3-2T; 1/2A3-4T; A3-4T; A10-3T  
Skill Level: Beginner  
Center of Pressure: 9.5" from tip of nose

This is a model rocket kit requiring construction. Tools, adhesives, finishing materials, launch equipment and engines are not supplied.



P.O. Box 1408, Gibsonton, FL 33534  
[www.asp-rocketry.com](http://www.asp-rocketry.com)

## Estimated (calculated) altitudes:

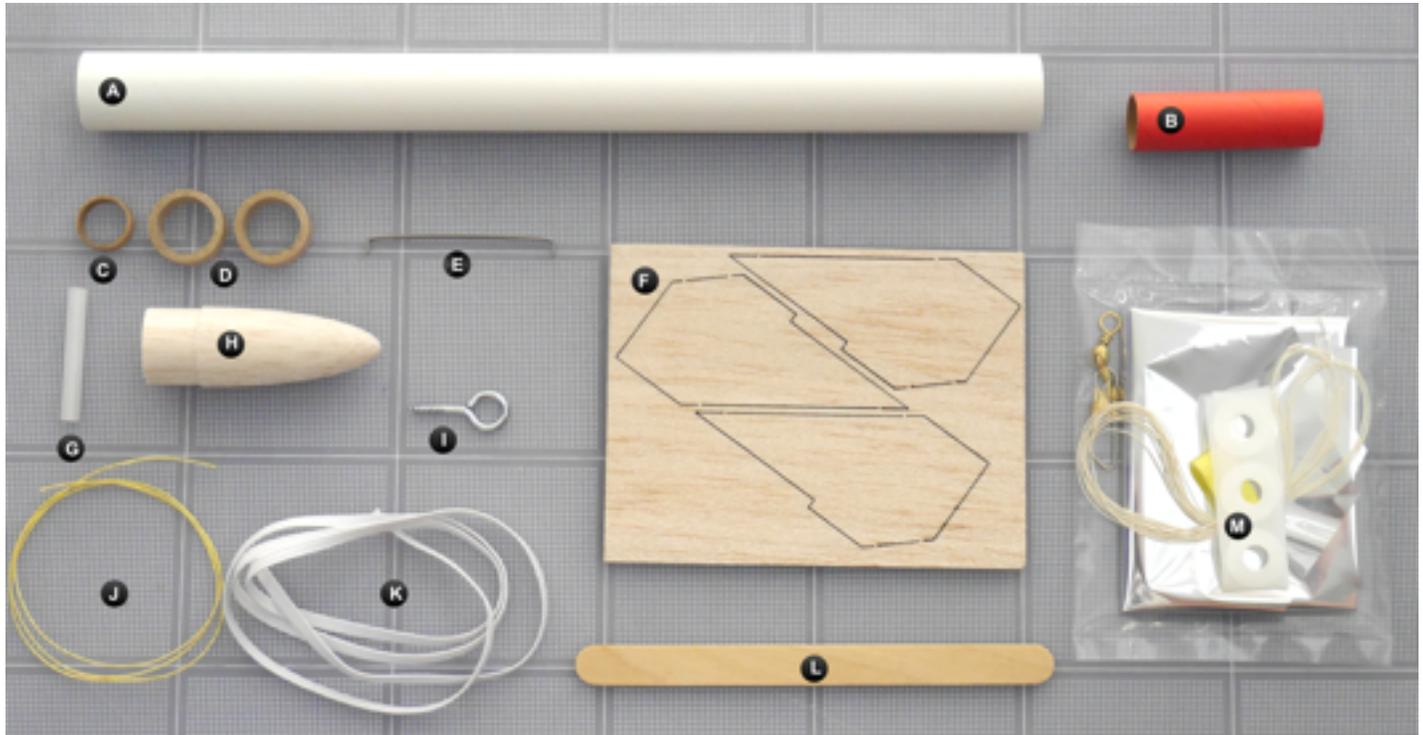
with 1/4A3-3T: 135 feet/41 meters  
with 1/2A3-2T: 265 feet/81 meters  
with 1/2A3-4T: 295 feet/90 meters  
with A3-4T: 575 feet/175 meters  
with A10-3T: 520 feet/158.5 meters

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## Parts List - Be sure to check the following list to assure your kit is complete:

1 White Body Tube (A); 1 Red Engine Tube (B); 1 Engine Block (C); 2 Centering Rings (D); 1 Metal Engine Hook (E); 1 Set of Laser-Cut Balsa Fins (F); 1 Launch Lug (G); 1 Balsa Nose Cone (H); 1 Metal Screw Eye (I); 1 Kevlar® Cord (J); 1 White Elastic Shock Cord (K); 1 Wooden Craft Stick (L); 1 Parachute Kit (M).



## Tools & Materials - You will need the following to complete your model:

Required: Adhesive (A wood glue, such as Elmer's Carpenters Glue or Titebond can be used for all steps and is recommended); sandpaper (medium - 220 or 280 grit); pencil or ball point pen; scissors; hobby knife; tape (cellophane, aka Scotch Tape, and/or masking).

Optional: sandpaper (fine - 320 or 400 grit, extra fine - 500 or 600 grit); sanding sealer (or balsa fillercoat); thinner (appropriate type for the sanding sealer); small paint brush; paint (Spray paint, such as Krylon or Testors is recommended. Be sure not to mix different types or brands of paint without testing.) - primer; colors as desired & clear; sanding block; tack cloth.

You can download the "Rocket Caddy" from the Downloads section of our website to make a stand that will hold your model horizontally. You may find this helpful to use when building this kit.

## Assembly Instructions - you can use the checkboxes to mark off each step as they are completed.

1) First you'll make the engine mount, refer to Figures A and B as needed for this step. Locate the red engine tube, the Kevlar® cord (it looks like a piece of heavy thread), the metal engine hook, the two centering rings (the larger ring shaped pieces that fit the outside of the engine tube) and the engine block (the small ring shaped piece that fits inside the engine tube). Test fit the engine tube into the centering rings. If the engine tube does not fit smoothly, you may need to sand the inside of

the rings or remove a layer or two of the paper wrap from the inside of the centering ring (use your knife to loosen an edge of the paper and carefully pull it out). Take the engine tube, and with your hobby knife make a small horizontal slit about 1/8" wide and 3/16" from one end of the tube. Make a pencil mark 5/8" from the other end of the tube.

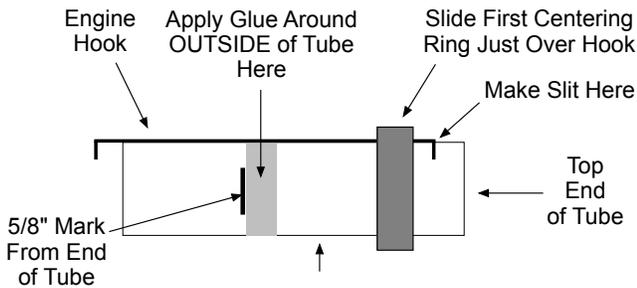


Figure A

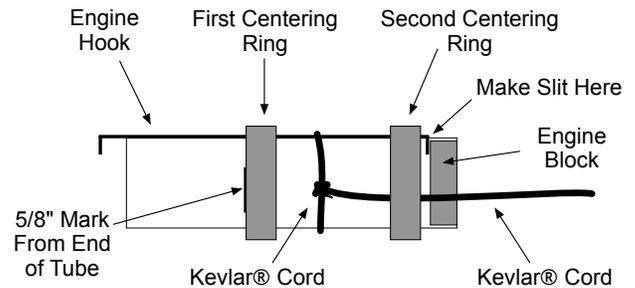


Figure B

Slip one of the “hook” ends of the metal engine hook into the slit (you can hold the hook in place with a small piece of tape if you need to) - be sure the hook is straight along and parallel to the tube. Slip one of the centering rings over the top end of the tube (the end closest to the slit) and down just over the hook. Apply a thin layer of glue to the outside of the engine tube just above the 5/8" mark (see Figure A) and slide the centering ring down until it is in the proper location (see Figure B, this is the location of the “First Centering Ring”) - be sure to check the alignment of the engine hook.

Take the Kevlar® and tie one end firmly around the middle of the engine tube and hook as shown in Figure B. Slip the second centering ring over the loose end of the Kevlar® and down over the end of the tube. Apply glue around the outside of the tube and slide the second ring in place as shown. Apply a small amount of glue inside the top of the tube above the end of the metal hook and push the engine block into place. Allow the glue to dry thoroughly.

□ 2) Locate the white elastic shock cord. Take the loose end of the Kevlar® and one end of the elastic and hold the ends evenly. Tie a simple overhand knot about 1/2" to 1" from the ends and tighten down the knot firmly so the two pieces of material are held tightly together. If needed, trim the loose ends to about 1/4" to 1/2" long. See these steps shown left to right in Figure C.



Figure C

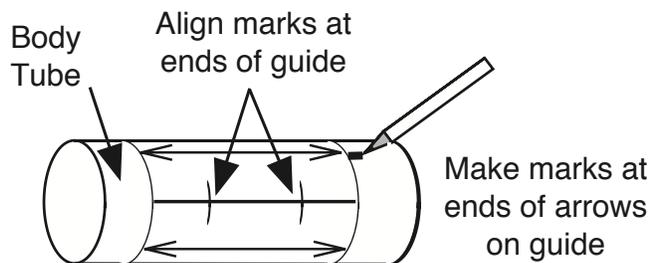


Figure D

□ 3) Locate the white body tube. Very lightly sand the outside the of the tube with medium or fine sandpaper until the surface just loses its shine. This will allow the glue to penetrate the paper of the tube and the fins to stick to the tube better. Cut out the Tube Marking Guide from the last page of these instructionst. Wrap the guide around the body tube - line up the marks on each end to align

the guide (see Figure D). Use a piece of tape to hold the guide in place. With a sharp pencil (or pen), mark the body tube at the arrows at the end of each line for the three fins and the launch lug. Be sure to note which line is for the launch lug. Remove the guide from the tube. Using something such as a door frame (as shown in Figure E, try not to get pencil marks on the door frame while you do this!), a piece of metal angle (see Figure F), or a drawer edge, extend each mark the full length of the tube.



Figure E



Figure F

□ 4) When the engine mount has completely dried it is time to glue it into the body tube. First take the loose end of the shock cord and thread it through the top end of the engine mount tube (the end the engine block is in) so that it hangs out the back of the tube (see Figure G) - this will help to prevent from getting glue on the shock cord while you are gluing the engine mount in.

Test fit the engine mount assembly into the body tube. If needed, sand the outside of centering rings for a smooth, but snug, fit. You should be able to slide the engine mount into the tube in one smooth motion. Remove the engine mount from the body tube.

Locate the wooden craft stick and make a mark 1/2" from one end. Put some glue on the end of the stick and spread a even layer of glue 1/2" up on the *inside* of the body tube (see Figure H).

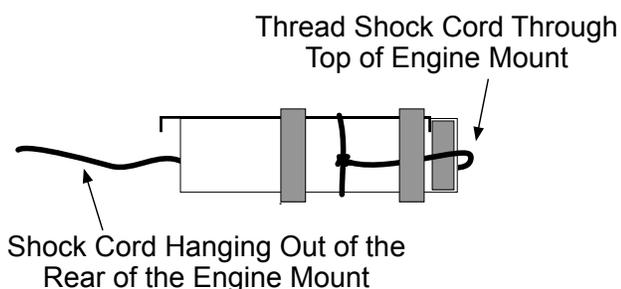


Figure G

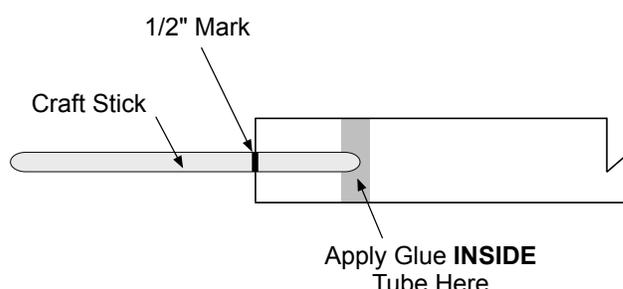


Figure H

Next apply a thin layer of glue to the outside of the rear centering ring (the one further away from the engine block, see Figure I). Rotate the engine mount so that the engine hook is in line with the launch lug line drawn on the body tube and in one smooth motion insert the engine mount into the bottom of the body tube (be sure to insert the end with the engine block first!). The bottom of the lower centering ring should be even with the bottom of the body tube (the red engine tube will extend out from the bottom of the body tube), as shown in Figure J. Wipe away any excess glue that may have

come out near the rear centering ring and allow to dry completely. After the mount is dry, thread the shock cord back through the engine mount so that the cord is inside the body tube.

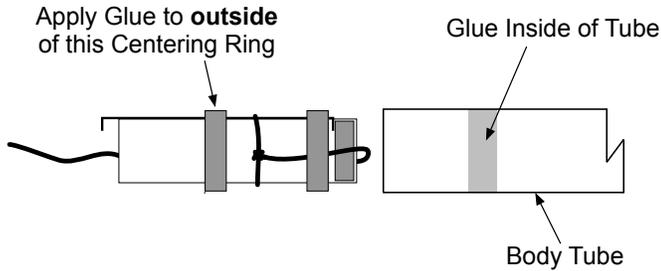


Figure I

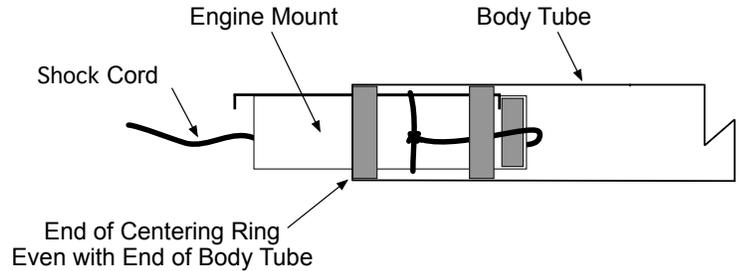


Figure J

□ 5) Locate the set of fins. Carefully remove the fins from the laser cut sheets of wood. You may need to separate them from the surrounding wood with your hobby knife.

It is not required, but if desired, you may round or airfoil the leading and trailing edges of the fins. This will make the fins more aerodynamic and allow your rocket to fly higher than it would if you just left the fin edges square (the airfoiled, or "teardrop" shaped fin is more aerodynamic than a fin that is just rounded). In either case, be sure to keep the root edges (the edges that will be glued to the body and engine tubes) square. The tip edge may be kept square or rounded. See Figures K and L (the left example in Figure L is a rounded fin, the right example is an airfoiled fin). Using medium grit sandpaper, shape each fin as desired - a sanding block may be used for this. If you don't have a sanding block, lay the sandpaper down on a flat surface and move the edges of the fin against the sandpaper. Be careful not to remove too much wood at one time - roughly shape one side then turn the fin over and do the same on the other side. Continue this procedure with the medium and then fine sandpaper to further shape and smooth the fins until you are satisfied with their appearance. Repeat with extra fine sandpaper if desired.

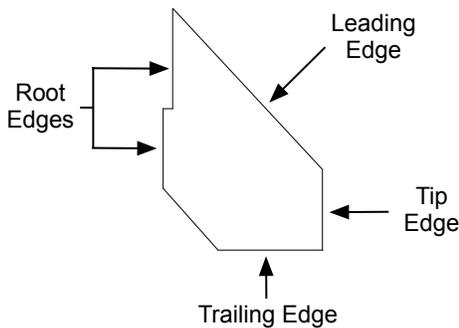


Figure K

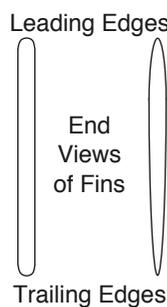


Figure L

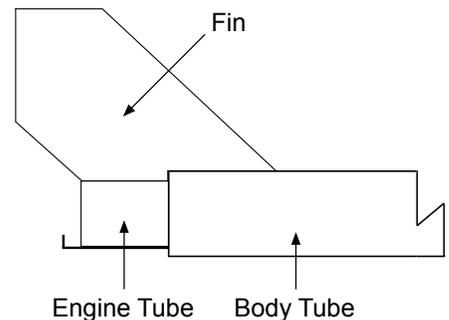


Figure M

□ 6) You will now attach the fins to the body tube. We like to use the "Double - Glue Joint" method - it makes a strong bond and it's easy to attach the fins without having to hold them in place for a long time while the glue dries.

One fin at a time, apply a thin layer of glue to the root edge of each fin and also to the body tube along the fin line and red engine tube where the fin will be attached and allow the glue to dry (you can apply the glue to the root edges of the fins then lightly press them on the tubes to apply the glue to the tubes - remove any excess glue with your finger if you put too much on). You can set the fin on a piece of wax paper or just over the edge of a table while the glue dries - it will just take a few minutes until the glue is dry to the touch.

Now apply another thin layer of glue to the root edges of the fin and firmly press the fin in place along the fin line you drew on the body tube. Note that the notched edge of the fin should be up against the centering ring and the end of the root edge should be about even with the end of the red engine tube (see Figure M). As the glue sets, be sure that the fin is straight out from and parallel to the tube. Looking from the base of the model you can sight down the lines drawn down the body tube as a guide to be sure the fins are straight. You can also use the Fin Alignment Guide on the last page of these instructions to help you in aligning the fins straight out from the body tube. Allow the model to rest horizontally while the glue dries on each fin (you can download the "Rocket Caddy" from our website to make a stand that will hold your model horizontally). Repeat for the remaining fins. See Figure N for what correctly aligned fins should look like and an example of incorrectly aligned fins.

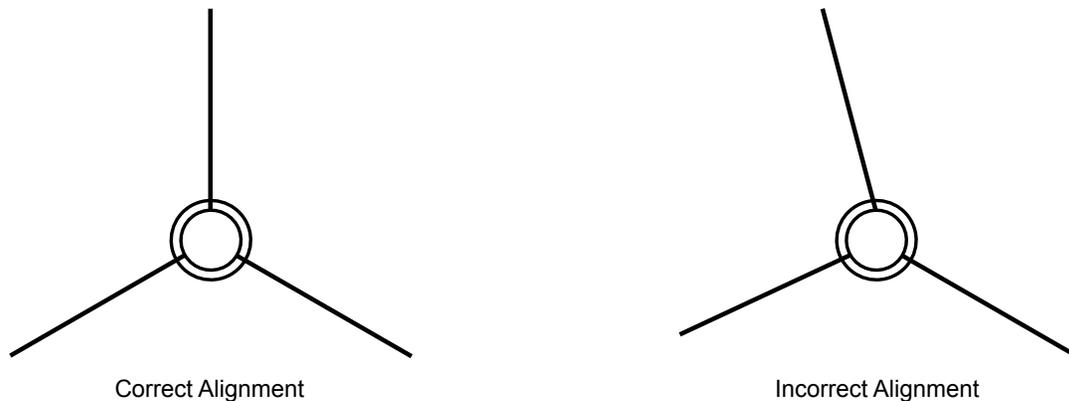


Figure N

□ 7) After the fins are completely dry, apply a small amount of glue to the joint between the root edge of the fin and the body tube. Smooth the glue with your finger to form a small, smooth fillet and remove any excess glue (see Figure O). The fillets will strengthen the fin attachment.

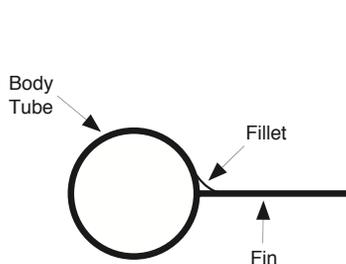


Figure O

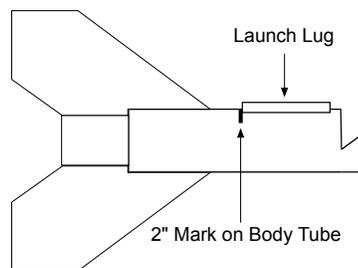


Figure P

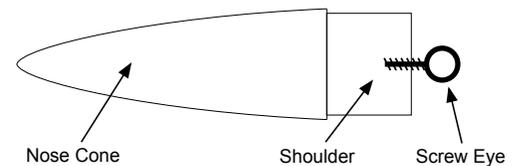


Figure Q

□ 8) Locate the launch lug (the small white tube). Make a mark 2" from the bottom of the white body tube on the launch lug line you drew in step #3. Using the same method as you used to attach the fins, glue the lug to the body along the launch lug line you drew earlier. The bottom edge of the lug should be at the 2" mark you made on the line - See Figure P. Be sure the lug is parallel to the body. After the glue is dry, apply fillets to the lug.

□ 9) See Figure Q for this step. Locate the balsa nose cone and the metal screw eye. Test fit the shoulder of the nose cone into the top end of the white body tube - sand the shoulder if needed for a smooth fit.

Thread the screw eye into the center of the bottom of the nose cone. Remove the screw eye and put some glue into the hole in the base of the nose cone and thread the screw eye back in and allow to dry. Firmly tie the loose end of the white shock cord to the screw eye.

□ 10) Refer to Figures R through V as needed for this step. Locate the bag containing the parachute material, the round self-adhesive reinforcements, the three pieces of shroud line and the snap swivel

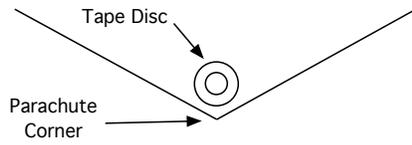


Figure R

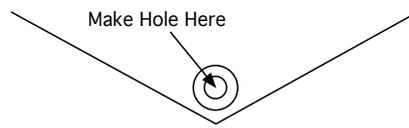


Figure S

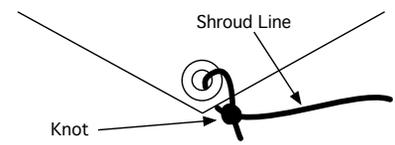


Figure T

Apply one of the self - adhesive discs to each corner of the parachute as shown in Figure R. Press each **firmly** in place. Next cut a hole (or an "X") in the center of each disc with your hobby knife (see Figure S). Press down again on the self - adhesive discs to make sure they are well attached. Tie the end of one of the shroud lines through the hole in one of the discs as shown in Figure T. **Do not** tighten the knot all the way down as this will weaken the parachute material. Tie the other end of the shroud line through the hole on the adjacent side of the canopy. Repeat for the remaining lines. It should now look like Figure U. With one hand, pick up the parachute by the top center of the canopy. With your other hand, gather together the shroud lines. Pull down on the lines so that the points of the canopy are all even (see Figure V). Tie a knot about two inches from the bottom of the lines. Thread the ends of the lines through the eyelet of the snap swivel (moisten the lines if needed) and tie firmly. Apply a small amount of wood glue to the knot and allow to dry. Attach the parachute to the rocket by attaching the snap swivel to the screw eye at the bottom of the nose cone.

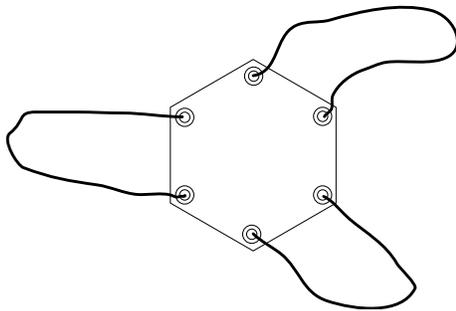


Figure U

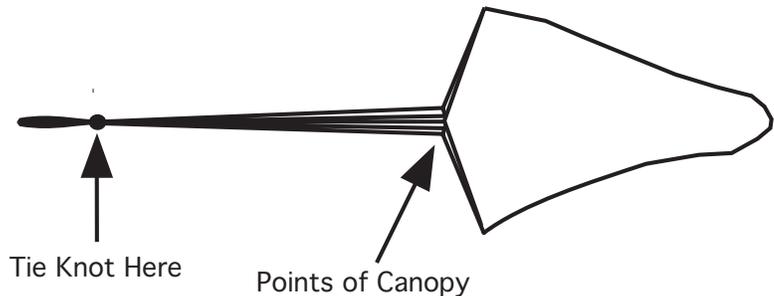


Figure V

Pack the parachute according to the following directions (or use any method that you feel comfortable with). Hold the parachute by the top of the canopy and the ends of the shroud lines until the canopy of the parachute is formed into a spike. Fold the canopy in half vertically then roll into a cylinder small enough to fit easily into the body. Wrap the shroud lines around the parachute. Insert the shock cord, then the parachute down into the body tube then insert the nose cone into the end of the body tube.

## Finishing and Decorating

The model may be decorated and/or painted in many ways, depending on how you want it to look and how much time you wish to put into it. The following instructions refer to a full finishing of the model including filling the wood grain. Be sure to do all balsa filling, painting, etc. in a well ventilated area.

Alternately you may simply decorate the model with any colors of felt tip markers, decals/stickers, etc. You may paint the model with spray or brush paint without filling the wood grain as described below, but the finish will be rougher and it may take several coats to get the color(s) as desired as the wood parts can soak up the paint. If you decide not to fully finish the model as described below, skip on to the Flight Preparation and Launching section.

□ 11) Prior to beginning this step, be sure to read any instructions on the brand of sanding sealer you are using - follow the manufacturers directions if they vary from those below. Be sure to use the thinner recommended by the manufacturer to clean your brush. Using fine sandpaper (then extra fine, if desired) go over all the wood parts to ensure they are smooth. Wrap a single layer of cellophane tape (or masking tape) around the shoulder of the nose cone (the part that goes into the body tube) - this will prevent building up the thickness of the shoulder while painting. Insert the nose cone shoulder into the top of the body tube. Next apply a coat of sanding sealer to all wood parts (the nose cone and fins)- it is not necessary to seal the nose cone shoulder. Allow the sealer to dry then apply a second coat. After the second coat is dry, sand with medium or fine sandpaper until the surfaces are smooth. Continue with single coats of sealer, sanding in between each coat, as needed until the wood grain is completely filled and the surface is smooth.

□ 12) You will need to use something such as a dowel or a section of newspaper rolled into a tight cone inserted into the base of your model to hold it while painting. If desired, lightly go over the model with a tack cloth to remove any excess dust or other particles which could mar the finish. It is a good idea to do this before applying each coat of primer and paint. Be sure to read the instructions on the brand of paint you are using - follow the manufacturers directions carefully. Be sure not to mix different types or brands of paint without testing. It is recommended (but not absolutely necessary) that you apply one or more coats of primer before the color coats of paint - this will give a much smoother surface to your model and allow the paint to adhere better. If using primer, sand with fine and/or extra fine sandpaper after each coat is completely dry. Use as many coats as needed to get a smooth finish before proceeding to the color coats.

□ 13) First give a base coat of the lightest color you will be using on the model - several light coats are preferable to one or two heavy coats (this will be true for all the colors you will be using). Apply as many coats as needed to get a nice even color. Allow to dry thoroughly.

□ 14) If applying other colors, use masking tape to cover up the areas of the model you do not wish to paint with the second color. Apply the second color as you did the first and allow to dry. Continue this process if other colors are desired. After the paint has dried carefully remove the masking.

□ 15) At this time you may apply any decals, stickers, trim tape, etc. if desired.

To protect the paint and other decorations, you may apply one or more coats of clear paint (such as Krylon Crystal Clear or similar) and allow to dry.

## **Flight Preparation & Launching**

Remove the nose cone and parachute from the body tube and loosely insert some flame - proof recovery wadding (such as that made by Estes or Quest) into the body tube. Use enough wadding to fill the tube to a depth of at least one and a half body diameters (1" - 1 1/2", usually about two or three squares of wadding).

Pack the parachute as you did in Step 10. Insert most of the shock cord, then the parachute, down into the body tube. Slide the nose cone into the body tube. Be sure to check the fit of the nose - if too tight, sand the shoulder down - if too loose, wrap with tape. The nose cone should be loose enough to slip out easily, but tight enough so that you can turn the model upside down without it falling out. Select an engine from the list of recommended engines (it's usually best to use a lower powered engine for the first flight). Slip the engine into the rear of the engine mount (be sure the nozzle end is facing out!) until the metal hook holds the engine in place. Insert the igniter according to the manufacturers directions.

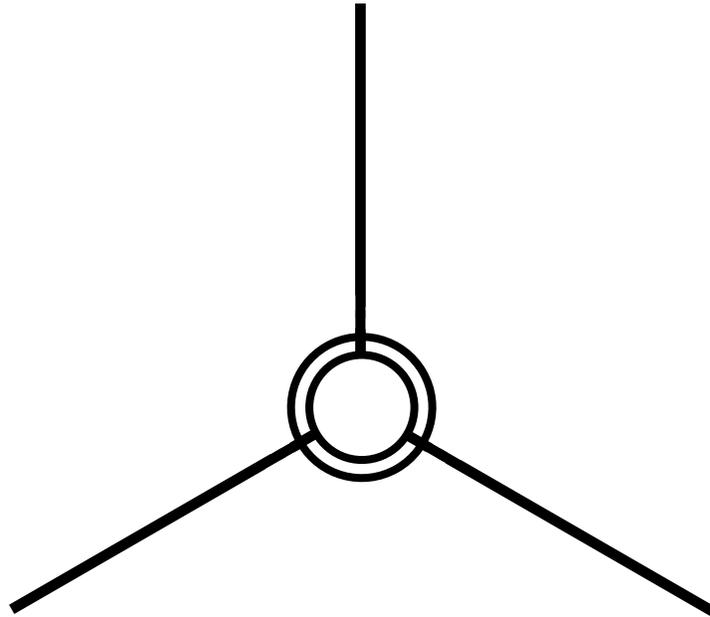
Place the rocket on the launcher by sliding the launch lug over the launch rod. Use something like a clothes pin on the launch rod to support the bottom of the model a few (2 or 3) inches up from the blast deflector. Be sure the safety key is out of your launch system and attach the micro - clips to the igniter. Move back to a safe distance and be sure the launch area is clear. Check for low - flying aircraft, insert the safety key, give the countdown and launch!

To fly your model again, pull back the metal hook and remove the used engine (be careful if you just flew it, it may be hot!). You may need to use a pair of pliers to grasp the exposed end of the engine to help pull it out. Then repeat the instructions above for your next flight!

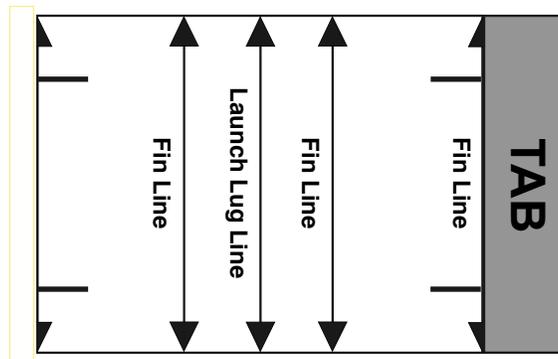
## **Be sure to read & follow the NAR Safety Code before flying this or any other model rocket!**

(Note: the NAR Safety Code is normally included with each package of Model Rocket Engines and can also be found on the National Association of Rocketry web site at [www.nar.org](http://www.nar.org))

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Fin Alignment Guide



Neo Mini Tube Marking Guide