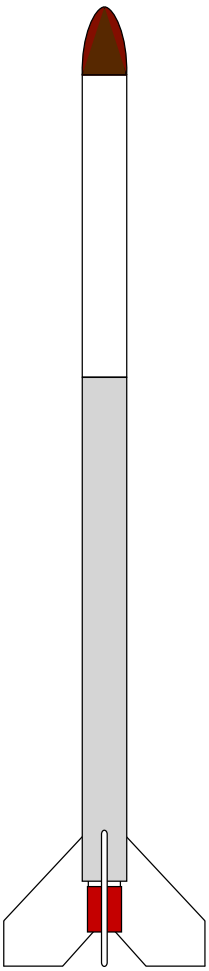
Neo Mighty

Big and easy-to-build model rocket kit with a clear payload section! Ideal kit for beginners and a fun sport model for any experience level! Uses "Mighty" 24mm Engines.



Estimated (calculated) altitudes:

with C11-5: 500 feet/152.5 meters

with D12-5: 1020 feet/311 meters

with E20-7: 1780 feet/meters

With 18/24mm adapter (not included):

with C6-3: 525 feet/160 meters

with C12-6: 625 feet/190.5 meters

with D16-6: 795 feet/242.3 meters

Specifications:

Length:28"/71.1 cm
Diameter: 1.326"/33.7 mm
Approx. Weight: 3 oz/85 gm
15" Parachute Recovery
Recommended Engines: C11-5; D12-5; E20-7
Skill Level: Beginner
Requires 3/16" Launch Rod
Center of Pressure:22.9"/58 cm from tip of nose

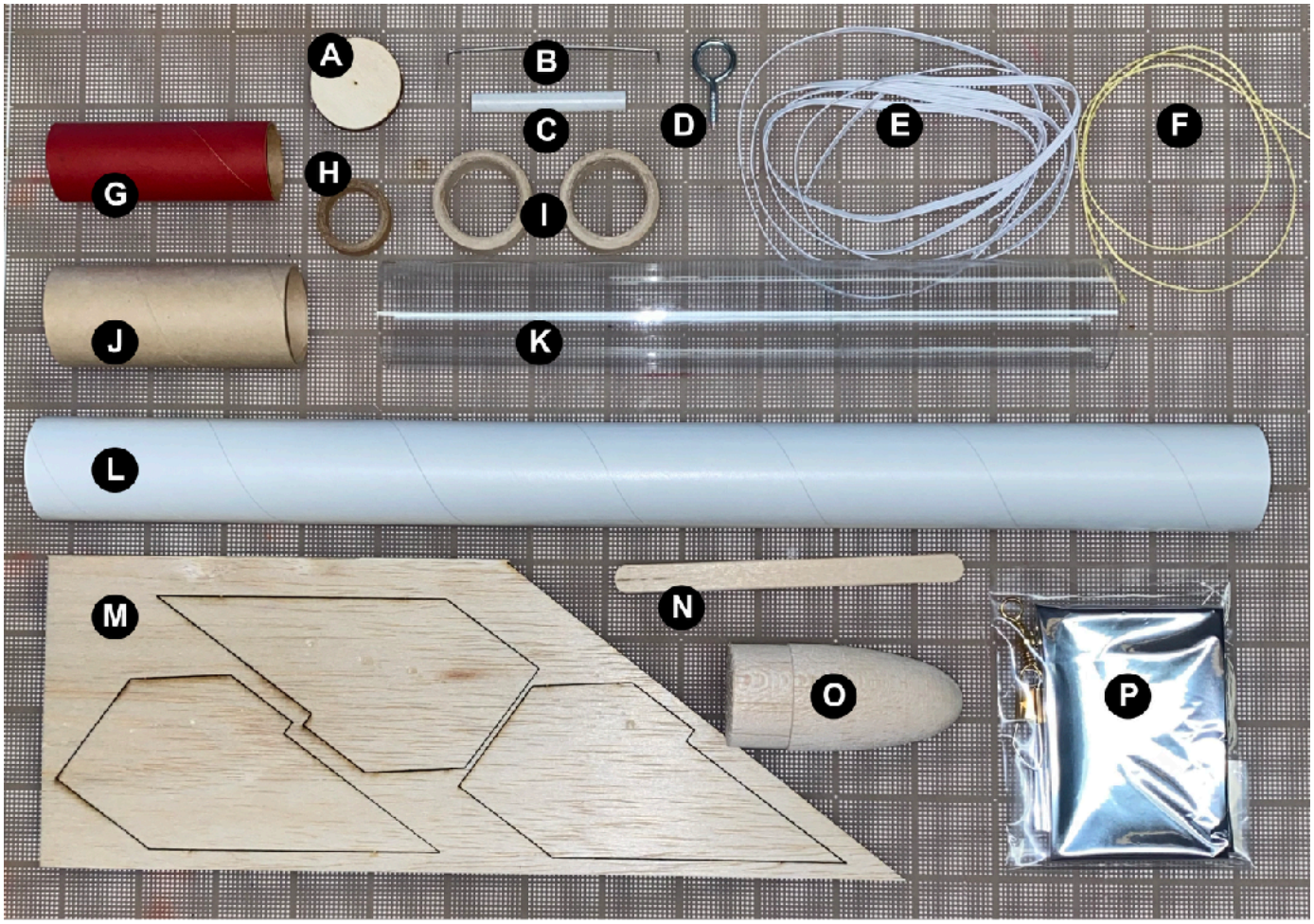
This is a model rocket kit requiring construction. Tools, adhesives, finishing materials, launch equipment and engines are not supplied.

AEROSPACE SPECIALITY PRODUCTS

www.asp-rocketry.com

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

1 Plywood Bulkhead (A); 1 Metal Engine Hook (B); 1 Launch Lug (C); 1 Metal Screw Eye (D); 1 White Elastic Shock Cord (E); 1 Kevlar® Cord (F); 1 Red Engine Tube (G); 1 Engine Block (H); 2 Centering Rings (I); 1 Brown Tube Coupler (J); 1 Clear Payload Tube (K); 1 White Body Tube (L); 1 Set of Laser-Cut Balsa Fins (M); 1 Wooden Craft Stick (N); 1 Balsa Nose Cone (O); 1 Parachute Kit (P); 1 Tube Marking Guide (Not Pictured).



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 most steps and is recommended (see Step 10 for recommendations for gluing the clear payload tube); 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 Rust-Oleum, 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. Note: while waiting for glue to dry in any Step up to Step 7, you may complete Steps 9 and 10. At any time during construction you can make the parachute, Step 11.

☐ 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. Test fit the engine tube into the centering rings. If the engine tube does not fit smoothly you can use the edge of your thumbnail to score the inside edge of the rings. If needed you may sand the inside edge of the ring as well. Take the engine tube, and with your hobby knife make a small horizontal slit about 1/8" wide and 1/4" from one end of the tube. Make a pencil mark 1" from the other end of the tube.

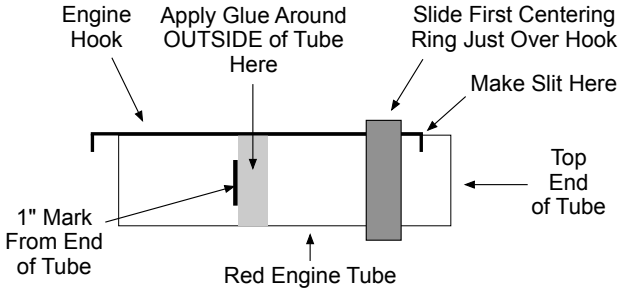


Figure A

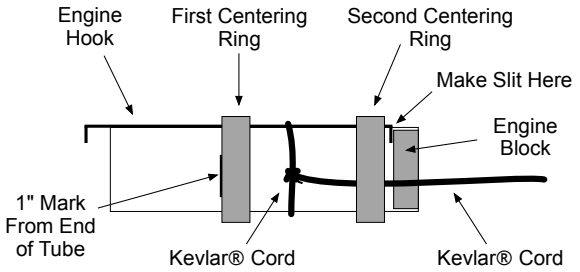


Figure B

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 1" 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.

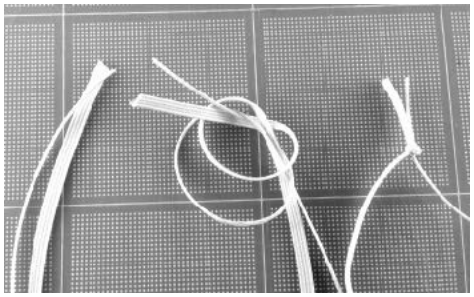


Figure C

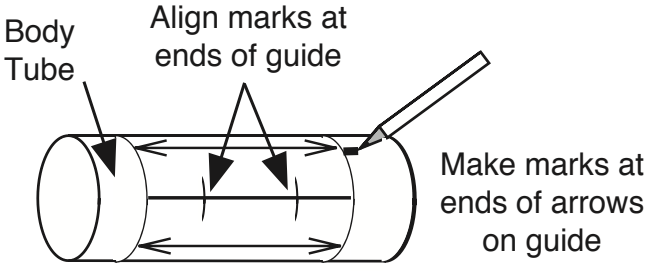


Figure D

☐ 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. Locate the Tube Marking Guide and cut it out. 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. 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 the marks 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 into the body tube. 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 on the craft stick 1" from one end. Put some glue on the end of the stick and spread a even layer of glue 1" up on the *inside* of the body tube (see Figure H).

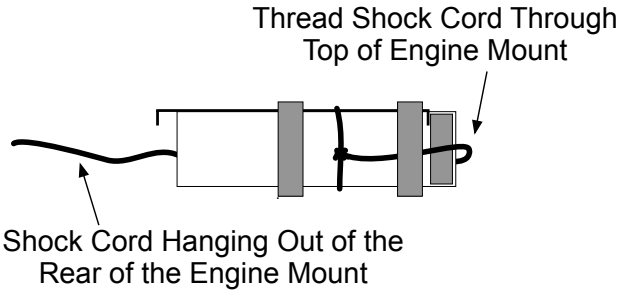


Figure G

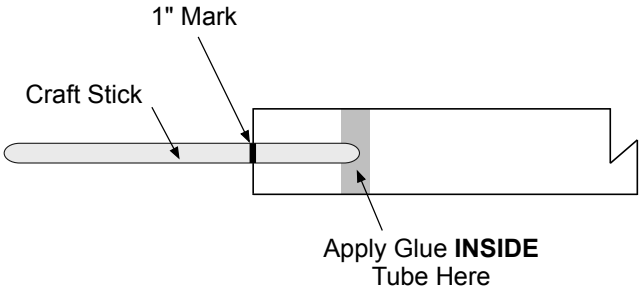


Figure H

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.

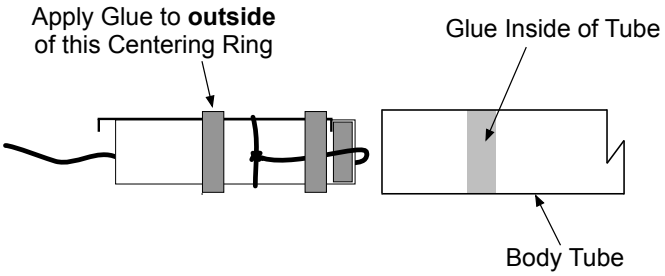


Figure I

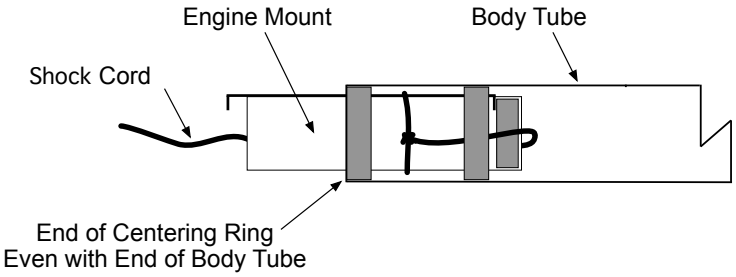


Figure J

☐ 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 tube) 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.

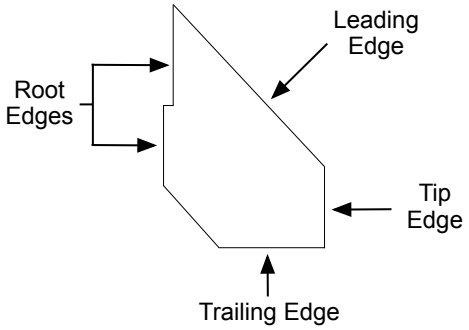


Figure K

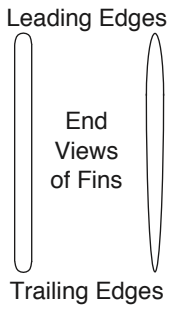


Figure L

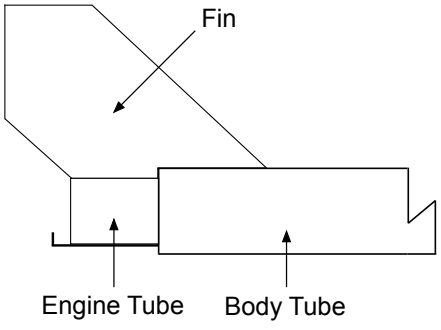


Figure M

☐ 6) You will now attach the fins to the body tube; refer to Figure M as needed for this step. Before applying adhesive, test fit one of the fins to the tube to be sure there are no major gaps in the fin root edges that will be glued to the body and engine tube; sand the root edges if needed for a good fit.
To glue the fins on 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 wood 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 on too much). 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. 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.

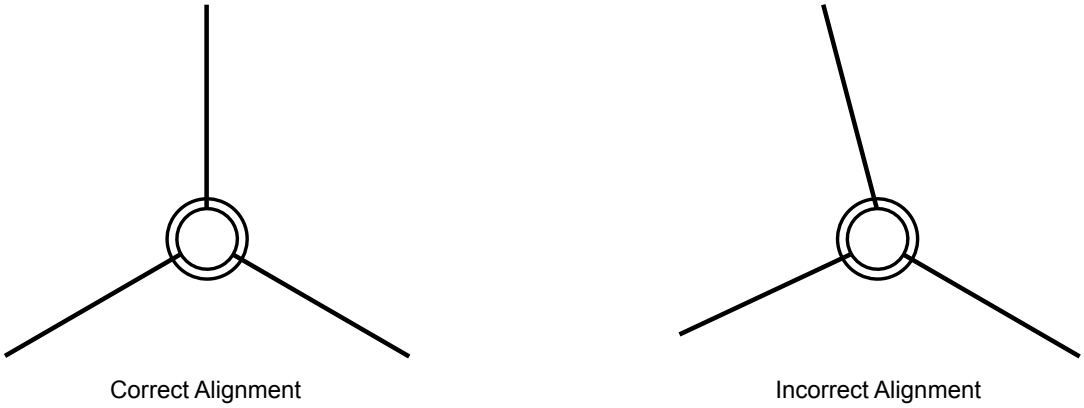


Figure N

☐ 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.

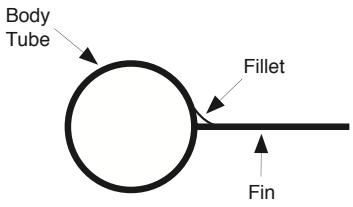


Figure O

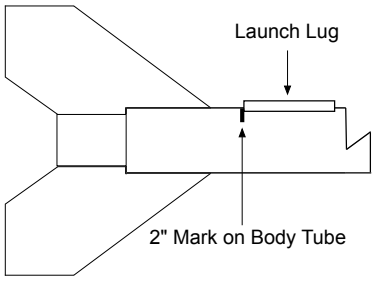


Figure P

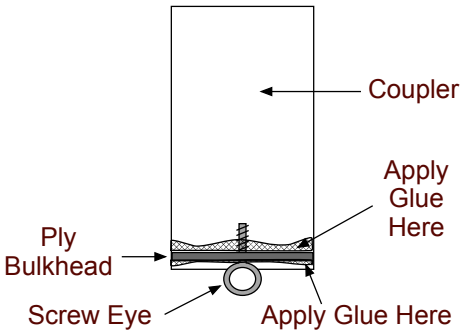


Figure Q

☐ 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. 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) Refer Figure Q as needed for this step. Locate the brown tube coupler, the flat plywood bulkhead (that fits inside the coupler), and the metal screw eye. Thread the screw eye through the hole in the ply bulkhead. Check the fit of the bulkhead into one end of the coupler. Sand if too tight, but be sure that there is a snug fit. Remove and apply a generous amount of glue about 1/8" inside one end of the coupler. Insert the bulkhead and be sure that the bulkhead is up in the coupler evenly and not sitting at an angle. Allow to stand upright while the glue dries. After it is dry, apply a generous fillet of glue inside the coupler and over the screw eye to hold it and the bulkhead firmly in place. After the glue has dried, turn the coupler over and apply another generous amount of glue on the other side of the bulkhead and allow to dry.

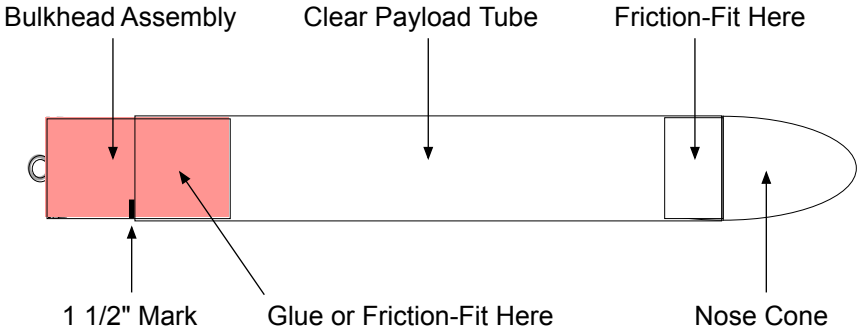


Figure R

☐ 10) Take the bulkhead assembly you made in Step 9 and make a pencil mark half-way along the length of the coupler (about 1 1/2” from one end). Locate the clear payload tube and apply a layer of glue up inside one end and then insert the bulkhead assembly (with the screw eye end facing out) up to the pencil mark. See Figure R. Note: Epoxy is the best choice for adhesive here if you have that available, cyanoacrylate [CA] is also a good choice if you are familiar with its use. Roughing up the inside of the plastic tube with sandpaper where the adhesive will be applied before gluing will help the glue to adhere better.
Alternately, you can friction-fit the bulkhead into the clear tube by wrapping enough tape (masking or cellophane) around the coupler so that it fits *very* firmly into the clear tube (this might be the better choice if you don’t have epoxy or CA).
After the glue is dry, locate the wood nose cone and test fit into the open end of the clear payload tube. If needed, sand the shoulder of the nose cone for a smooth, yet snug, fit. If too loose, wrap some tape around the shoulder until it is tight enough not to come loose during flight. Firmly tie the loose end of the elastic shock cord to the screw eye.

☐ 11) Refer to Figures S through U as needed for this step. Locate the bag containing the parachute material, the round self-adhesive reinforcements, the four pieces of shroud line and the snap swivel.

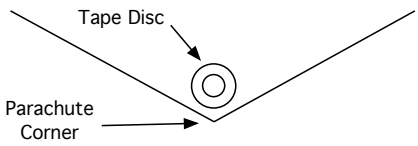


Figure S

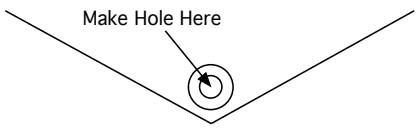


Figure T

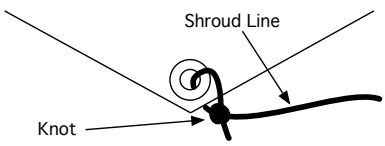


Figure U

Apply one of the self - adhesive discs to each corner of the parachute as shown in Figure S. Press each ***firmly*** in place. Next cut a hole (or an "X") in the center of each disc with your hobby knife (see Figure T). 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 U. ***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 V. 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 W). 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 bulkhead.

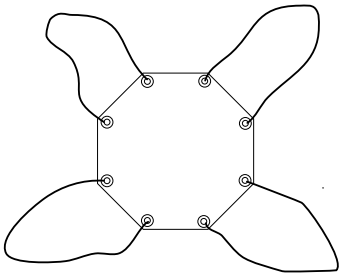


Figure V

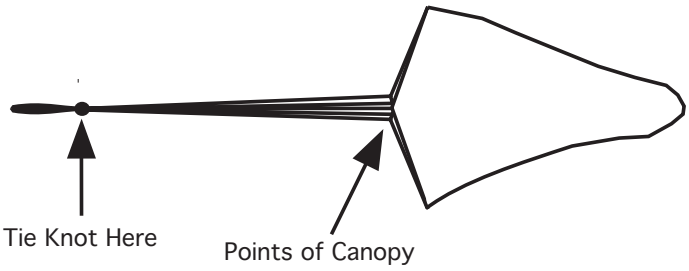


Figure W

☐ 12) 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 bulkhead 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.

☐ 13) 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. Next apply a coat of sanding sealer to all wood parts (the nose cone and fins). 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.

☐ 14) Assuming you want to keep the payload section clear, you can use masking tape and paper to cover the payload section (you *may* want to paint the parts of the tube at each end where the bulkhead and the base of the nose cone extend into the clear tube).

☐ 15) 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.

☐ 16) 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.

☐ 17) 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.

☐ 18) 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 payload section 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 1/2" - 2", usually about three or four squares of wadding).

Pack the parachute as you did in Step 12. Insert most of the shock cord, then the parachute, down into the body tube. Slide the bulkhead into the body tube. Be sure to check the fit of the payload section into the tube; if too tight, sand the shoulder of the bulkhead down; if it is too loose, wrap with tape. The payload section 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)