

Rapier

ASSEMBLY INSTRUCTIONS:

Start assembly of nose cone by inserting cord through hole in bottom of nose cone adapter. Tie knot large enough to keep cord in place. Tie a loop in the other end for the shock cord.

Put a thin coat of plastic (styrene) cement around inside of nose cone. Rub cement with the end of your finger to smooth it out and remove excess. Use cement sparingly as it will melt nose cone. Insert adapter into nose cone then slip nose cone into body tube to insure alignment. With a twisting motion, carefully remove nose cone from body tube and allow to dry.

For best performance, insert the nose cone into the body tube and sand the joint between the body tube and nose cone smooth before painting the rocket. Use very fine sandpaper.

Cut two slots $1/2''$ apart, approximately $1/4''$ from each end of the shock cord anchor. Insert one end of rubber shock cord thru slot as shown. Glue anchor securely $1''$ from top of body tube with shock cord hanging down. When dry, pull shock cord to top of body tube and tie to string in nose cone.

Glue EB90 engine block flush with front edge of $2\ 3/8''$ engine mount. When dry, insert FSI engine into mount, smear inside of body tube with glue and push engine in mount into body tube until engine is flush with rear. Remove engine and allow to dry. If no engine is available, make distance from engine block to rear of body tube $2\ 3/4''$.

Sand fins to an airfoil shape. The front (leading) edge should be rounded while the rear (trailing) edge should be sharp like a knife. The root edge (part that glues to the body) should be straight and square. Sand body tubes at fin locations. For fin spacing, mark bottom of body tube in four places 90° apart. Use a "V" notch of a drawer or door frame and draw a line at the mark parallel to the body. Glue the four fins on this line flush with the bottom of the body. When dry, apply a glue fillet on each side of all fins.

Sand body tube and fins with fine sandpaper until smooth, then seal and paint with a bright color.

At this stage the Rapier can be flown with FSI engines (21mm dia.).

To convert to standard engines, Estes, Centuri, etc. (18mm dia.), glue EB74 engine block, using white glue, inside 18mm engine mount flush with edge. Glue $3/16''$ fiber spacer to engine mount $3/4''$ from end opposite engine block. Use white glue. Allow to dry.

After assembly dries completely, coat EB90 engine block inside body tube and around inside the body tube $3/4''$ from rear with white glue. Insert engine mount assembly carefully into body tube until it slips into engine block, then push entire engine mount assembly until end is flush with rear of body tube.

Build pop launch lug and construct parachute. (See instructions.)

FLYING INSTRUCTIONS:

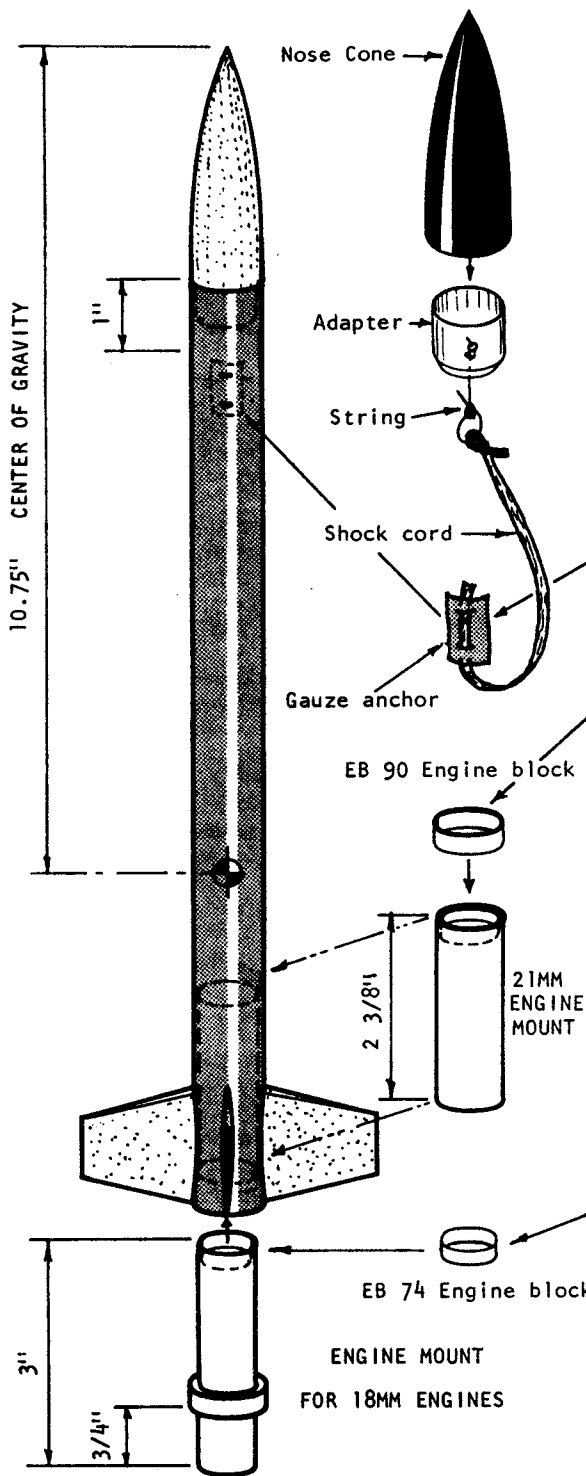
The Rapier is a high performance single stage model rocket that uses FSI (21mm dia.) or Estes, Centuri (18 mm dia.) engines depending upon how it is constructed. It is designed as a parachute duration rocket but is great for sport flying. The basic kit contains a 12" diameter lightweight parachute for testing or sport flying. It can be used with a 36" diameter lightweight parachute for duration. The bird can be flown with a 1/2A, A, B and C type engines as long as the center of gravity is where indicated on drawings or forward.

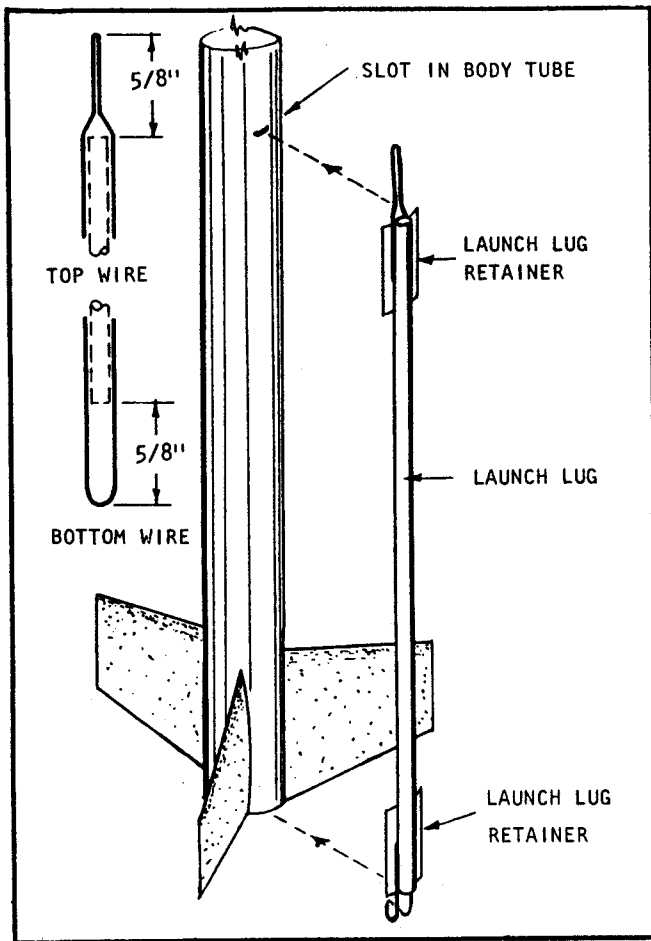
To check center of gravity, balance fully loaded bird with engine installed, on a sharp edge. Mark the point where the rocket balances perfectly. This is the C.G. Check this point against the dimension on the drawing. If it is to the rear of the point shown on the drawings, add clay weight to the nose cone until it is correct.

To prepare for flight, pack flameproof wadding into body until it rests against the engine stop. Fold parachute carefully and insert it in body tube making sure snap swivel is attached to nose cone. Insert nose cone.

Attach "pop" launch lug to rocket by inserting it into slot in body tube and hooking it over rear of rocket. Launch lug is always attached after parachute is inside rocket to prevent binding. Put rocket on rod, then wrap two or three turns of masking tape around top of rod to act as a stop for the launch lug.

Following safety instructions of engine manufacturer, attach igniter clips, start countdown and fire. The bird should rise off the pad smoothly and leave the launch lug on the rod.



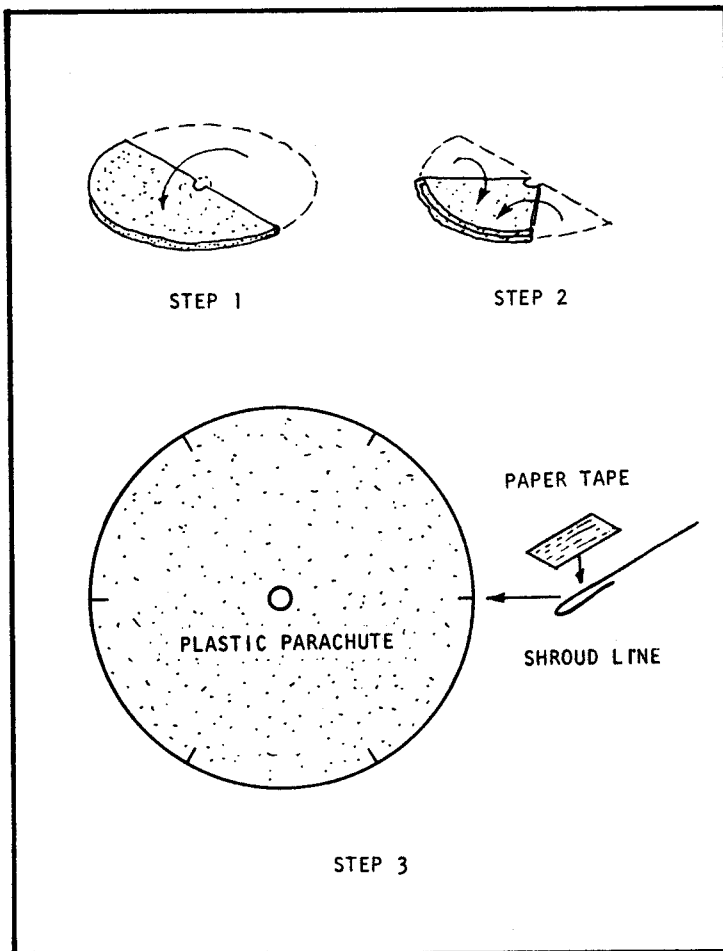


POP LAUNCH LUG INSTRUCTIONS:

Cut two pieces of wire 2 3/4" long. Bend one to fit top and one to fit bottom wire patterns shown at left. Glue two small 3/8" x 1" launch lug retainers to launch lug and lay on flat surface so that retainers are on bottom and launch lug is on top. Place wires into junction of launch lug retainers and launch lug so that 5/8" protrudes beyond edge of launch lug. Add more glue until a good fillet is formed. When dry, shape bottom wire to hook over bottom of rocket body tube.

Hook launch lug over bottom of rocket body tube, or lower stage, mark where bend of top wire intersects rocket body. Cut small slot to fit top wire. Bend slot out slightly to allow wire to be inserted. Two slots or two launch lugs of different lengths are required if bird is to be flown single and two stage. Bend protruding portion of top wire inward slightly so that it fits into the slot more easily. Insert top wire slightly into body tube, then hook over bottom and push into place. Adjust so that launch lug is snug but will come off easily when pushed on top.

The pop launch lug is always attached after the rocket is prepared for launching complete with engine, recovery device and nose cone installed. To use "pop" launch lug, slide lug over rod, wrap top of rod with 2 or 3 turns of masking tape. Rod must be tight on launch pad. After rocket leaves pad the "pop" lug will remain on the rod. The rocket can be reattached to the lug without removing the lug from the rod.



PARACHUTE INSTRUCTIONS:

Parachute is precut to a circular shape. Fold in half, then fold in thirds to obtain the location of the shroud lines. Crease parachute at folds or mark with marking pencil. Cut off tip of parachute when folded to provide a vent hole to aid in parachute folding and opening after ejection. When reopened there should be 6 equally spaced places for shroud lines.

Cut 6 shroud lines, equal in length to the diameter of the parachute.

Cut 6 pieces of wide tape about 5/8" long. Peel off paper backing and attach by pressing tape over a loop of shroud line.

Gather free ends of shroud line together, insert through snap swivel and tie into a knot. Apply a drop of glue to knot so it will not loosen. Attach snap swivel to hook in nose cone or payload coupler.

There are many ways of folding a parachute for insertion into a body tube. Experience will dictate the best method for each individual. One way is to first dust the parachute with talcum powder to keep it from sticking to itself. Then form the parachute by holding the snap swivel with one hand and tip of canopy with the other and straighten the chute. Fold the canopy once or twice to fit the space in the body tube and insert it. Pack the shroud lines and shock cord in over the parachute and push the nose cone or payload section into place.