BARCLONE
Rocketry Products

Snitch

Created by C. P. McGraw

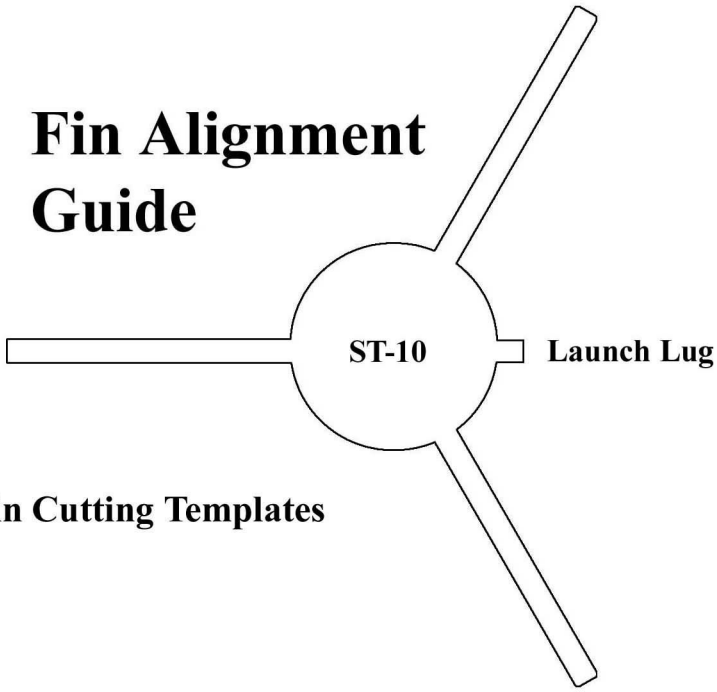
Length	**22.575”**
Diameter	**1.040”**
Weight	**1.2 oz**
Fin Span	**6.29”**

All of the major components needed to build this model can be ordered directly from **Semroc Astronautics Corporation**, through their website at **http://www.semroc.com**. Snap links can be found locally in sporting goods shops and departments within most superstores.

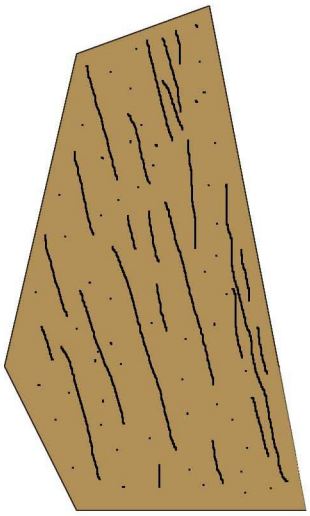
In addition to the items in the Parts List, you will need a sharp hobby knife, a small bottle of yellow carpenter's glue, sheets of 220-, 400-, and 600-grit sanding papers, a tack rag, soft hobby brushes, a pencil, and a steel (or steel-edged) ruler. Some suggested tools include a 12” length of 1/2” hard brass angle stock for drawing the alignment lines, and the plastic spindle from an empty CD-R package for use as a holding spike.

One item which you will find most useful is a copy of **The Model Rocketry Handbook, Seventh Edition**, written by G. Harry Stine and Bill Stine. Especially helpful are the chapters on **Construction** and **Tools**. This model is designed with the double-glue technique for attaching fins to the body tube, so reading and understanding this information will make the construction easier.

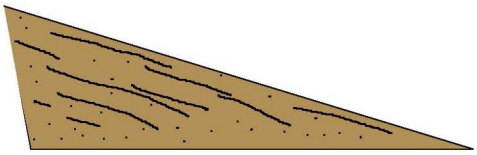
Fin Alignment Guide



Fin Cutting Templates



Main



Strake

Make 3 each from 3/32" balsa sheet

PARTS LIST

Nose Cone	BC-1052	Engine Mount	EM-710	
Main Body Tube	ST-10120	Parachutes	CPK-12	(2)
Payload Body	ST-1050	Kevlar Thread	SCK-24	(2)
Bulkhead	BTC-10	Shock Chord	SC-24	
Launch Lug	LL-18	Screw Eye	Large	
Balsa Sheet	3/32″ x 3″ x 12″	Snap Links	Medium	(3)

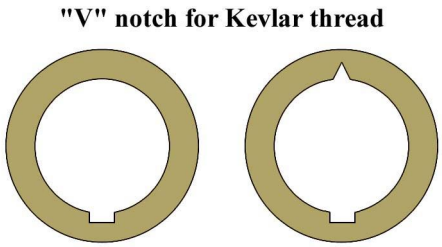


Fig. 1

- **Step 1** Modify the two large centering rings from the EM-710 package as shown in Fig. 1. Adjust the width of the flat notch to fit the engine hook.

- **Step 2** Assemble all of the EM-710 components together as shown on the Semroc instruction sheet, placing the ring with the "V" notch to the front of the mount. Align both rings so that the flat notches are over the engine hook. If any glue fills the "V" notch, clean it out before it cures, as this notch is important in the next step.

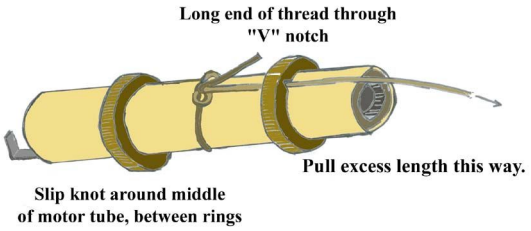


Fig. 2

- **Step 3** Tie a slip-knot in one end of the SCK-24 Kevlar thread, and loop this around the middle of the EM-710 subassembly, as shown in Fig. 2. Push the long end of the thread through the "V" notch, and slide the loop up against the back of the forward ring, pulling the long thread as you go. Apply a layer of glue to the thread to secure it in place.

- **Step 4** Cut out the fins as shown on the Pattern Sheet, and give the surfaces a light sanding with the 220-grit paper. Round over all of the outer edges of the fins, but do not round the root edge or the joint edge between the main fin and the strake fin.

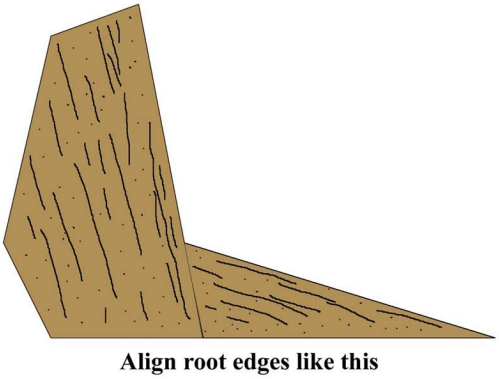


Fig. 3

- **Step 5** Lay a piece of wax paper on a flat surface, and assemble three sets of main fins as shown in Fig. 3. Make sure the root edges of both pieces are aligned with each other. Carefully sand the joint edges of the two pieces to get the best fit. Use clamps or weights to ensure the two pieces remain flat while the glue dries.

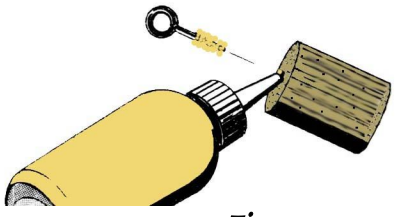


Fig. 4

- **Step 6** Insert the screw eye into the base of the balsa bulkhead, carefully cutting the threads into the wood. See Fig. 4. Remove the screw eye and force some glue into the hole. Coat the threads of the screw eye with glue and reinsert into the hole. Do not wipe away the excess glue. Allow to dry.

- **Step 5** Give both body tubes a light sanding with 220-grit paper to remove the shine from the surface. Do not sand through to the inner layer of the tube.

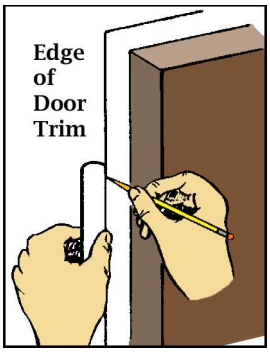


Fig. 5

- **Step 8** Mark the main body tube for three fins and the launch lug using the marking guide on the pattern sheet. As shown in Fig. 5, use a straight edge such as the trim around a door, or the brass angle stock, to extend the fin lines upward from the base of the tube to a height of 4". Extend the lug line upward to 5". Place marks on each of the fin alignment lines at 3.5" from the base. Place marks on the lug alignment line at 2.75" and 5" from the base.

- **Step 9** Using a soft-bristle hobby brush, apply a layer of thinned yellow glue to the body tube along the fin alignment lines, between the base of the tube and the 3.5" marks. Do the same with the lug alignment line, between the 2.75" and 5" marks.

- **Step 10** Carefully sand the surfaces of the fins, removing any excess glue. Square up the root edge to provide the best glue face against the body tube. Apply a thinned layer of glue to the root edge of all three fins, and to the launch lug, and allow to dry.

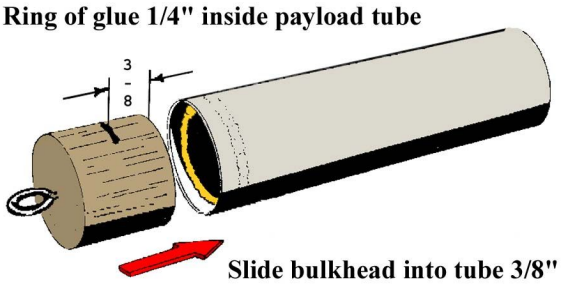


Fig. 6

- **Step 11** As shown in Fig. 6, mark the bulkhead 3/8" from the end opposite to the screw eye. Run a bead of glue completely around the inside diameter of one end of the payload body tube, about 1/4" from the edge. With a continuous motion, slip the bulkhead into the payload body, and into the glue ring, until the mark is even with the edge of the tube. Make sure the bulkhead is straight in relation to the tube while the glue is still wet. Set this subassembly aside to dry.

- **Step 12** Assemble the parachutes as shown in the Semroc

instructions, except attach the shroud lines of each parachute to one of the snap links instead of to the screw eye.

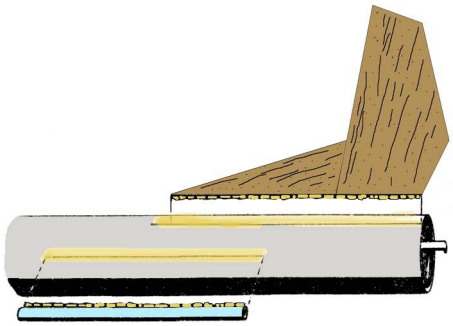


Fig. 7

- **Step 13** Apply a small bead of glue to the body tube along one of the fin alignment lines, directly on top of the glue from step 9, and to the root edge of one of the fins, directly on top of the glue from step 10. Press the fin into place as shown in Fig. 7, making sure the fin is in proper alignment with the tube, and hold steady for about 30 seconds. Use the hobby brush, slightly damp, to smooth out the glue that is squeezed out from the joint. Allow to dry completely, then repeat with each remaining fins, one at a time. Attach the launch lug to the lug alignment line between the 2.75" and 5" lines in the same manner.

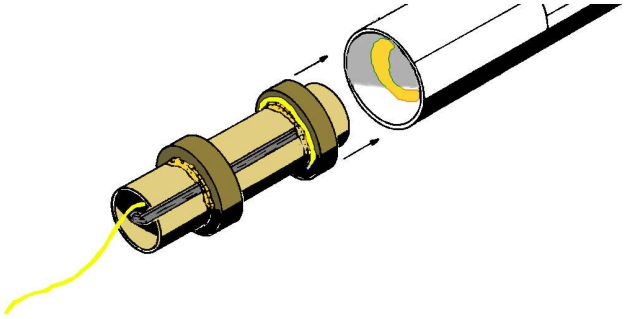


Fig. 8

- **Step 14** Push the loose end of the Kevlar thread down from the top through the engine mount and pull tightly. As shown in Fig. 8, apply a generous bead of glue around the inside of the main body tube, about 1.5" up from the base of the tube. With a continuous motion, push the motor mount into the main body tube, through the bead of glue, until the base of the motor tube is even with the base of the body tube. Do not pause during this critical step! If you stop before the mount is fully in position, the glue will "freeze" the mount in the wrong place.

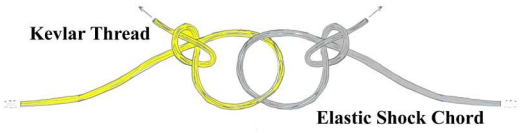


Fig. 9

- **Step 15** Push the Kevlar thread back through the engine mount, through the main body tube, and out the top of the tube. As shown in Fig. 9, tie a slip knot in the loose end of the Kevlar thread. Loop one end of the elastic shock chord

through that slip knot, and tie a similar slip knot in the elastic. Pull the two knots tightly together, and coat the knots with a layer of thinned yellow glue, to keep the knots from coming apart. Attach the remaining snap link to the loose end of the elastic chord, and coat that knot with thinned glue. Allow to dry.

- **Step 16** Fill the grain of the fins and the nose cone with your choice of lightweight filler compound. We prefer Elmer's Fill-N-Finish, thinned to a pea-soup consistency, and brushed into the grain. Allow to dry thoroughly for at least a full day before attempting to sand smooth.

- **Step 17** The illustration in Fig. 10 shows the correct method of applying primers, paints, and clear coats to your model. Always spray in the same direction, top to bottom -- never side-to-side or bottom-to-top. Our preferred finishing method involves several coats of Rust-O-Leum White Clean Metal Primer, with sanding after the second coat to remove rough patches using 220-grit paper, followed by repeated coats of primer and sanding with 400-grit, and finally 600-grit paper. When the surface is smooth, and as free of imperfections as possible [ie – the spiral-wrap in the tube is completely filled, and there are no bare places where the tube shows through...], tack-rag the model to remove all of the sanding dust.

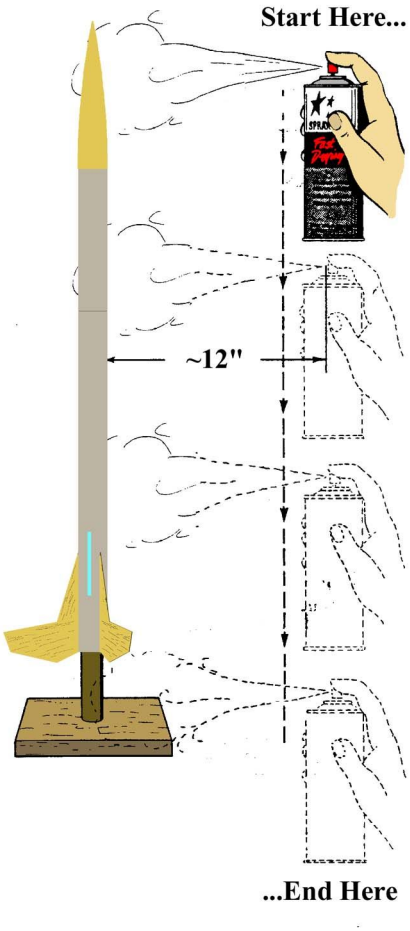


Fig. 10

- **Step 18** The colors you choose for your model, as well as the type of paint you wish to use, are entirely up to you. Be sure to test your paint on a prepared test surface with the primer you chose. Finding out after you've sprayed the model that your paint is not chemically compatible with your primer is bad for your model...

- **Step 19** We suggest painting the nose cone and the payload body separately, with a scrap piece of body tube as a holder. Do not get any primer, paint, or clear coat on the shoulder area of the cone or the bulkhead. Doing so may cause the shoulders to become too tight when they are slipped into the body tubes, damaging the tubes and possibly the shoulders themselves.

- **Step 20** We recommend the use of waterslide decals, either those printed commercially or those you can print yourself using a personal computer and an ink jet (or laser) color printer. Prepare the decals according to the instructions provided by the distributor of the sheet. Apply at least one complete coat of high-gloss acrylic clear [we've used both Krylon and Valspar brands with success...] to the model, and allow to dry thoroughly – at least one full day. Apply all of the decals and allow these to dry at least one full day before wiping down any adhesive residue with a dry, soft cloth. Finally, apply a sealing layer of the acrylic spray over the decals and allow this to dry at least a full day before handling the model.

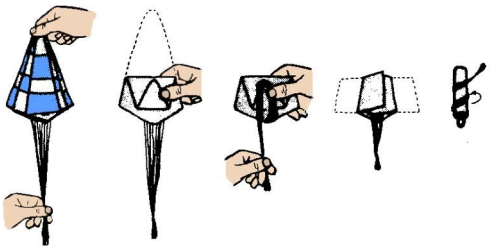


Fig. 11

- **Step 21** Study the method for packing the parachutes shown in Fig. 11. The object is not to crush or compress the parachutes in such a way that they cannot open when deployed. Wrap the lines around the folded material a little loosely, never tightly. In cold climates, or during winter, it is highly recommended that you give the parachutes a dusting with talcum powder before folding them. Never fold your parachutes or pack them for storage inside the body tubes of your rockets. Leave them opened, and separate from the rockets. That's why we suggest attaching them with snap links – it's easier to remove them after flight.

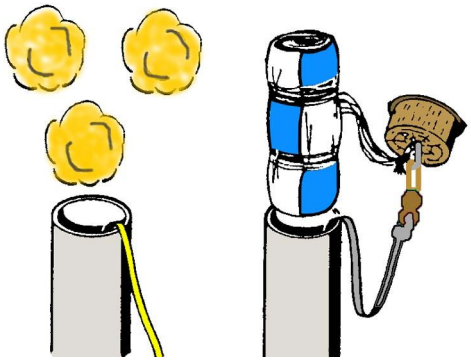


Fig. 12

- **Step 22** The correct method to pack your parachutes into the model is shown in Fig. 12. If you

are using the traditional sheet of flameproof wadding (similar to a sheet of bathroom paper, but treated with a flame-resistant chemical) be sure to use at least three sheets, more likely four sheets, crumpled into loose wads. If you choose to try shredded newsprint cellulose insulation (just what it sounds like, uses the same type of flame-resistant chemical treatment), use enough to achieve about 2” to 3” of fill at the inside-bottom of the main body tube. Push the material into the body tube with a wooden dowel, or a large-diameter pencil, but do not pack either material tightly into the tube. The object with both materials is to create a gas seal, protecting the plastic parachute material from the hot gases and particles ejected from the top of the motor when the recovery deployment charge goes off. These wadding components must blow out of the rocket, pushing the parachutes out ahead of them. One advantage to using the cellulose wadding is that it instantly disperses in the air and floats back slower than the wadding sheets, giving any hot residue more time to cool down. It also doesn't fall in one big lump, either. It scatters, making it less objectionable.

- **Step 23** When preparing the rocket for flight, fit the nose cone into the payload body and check to see if the fit is loose or tight. If loose, wrap a layer of masking tape around the shoulder of the cone and try fitting it again. You don't want an excessively tight fit, but you don't want the cone coming out in flight, either. Depending on your flight, whether you have a payload in the rocket or you're flying light, you should decide on whether to use one or both parachutes. If you're flying light, use one parachute. Use two if you have a payload, so that it doesn't hit the ground too hard. If you are flying for altitude, without a payload, you might wish to substitute a 1.5” x 18” streamer in place of of the parachute, to reduce drift. A parachute at high altitudes can mean a long and difficult walk recovering the model.

Developed for BARCLONE Rocketry by C. P. McGraw

Model Rocket Safety Code

Materials: **I will use only lightweight, non-metal parts for the nose cone, body, and fins of my rockets.**

Motors: **I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.**

Ignition System: **I will launch my rockets with an electrical launch system and electrical motor ignitors. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.**

Misfires: **If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock, or disconnect it's battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.**

Launch Safety: **I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with "D" motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them to a safe distance.**

Launcher: **I will launch my rockets from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or I will cap the end of the rod when it is not in use.**

Size: **My model rocket will not weigh more than 1,500 grams (53 oz) at liftoff, and will not contain more than 125 grams (4.4 oz) of propellant or 320 N-sec (71.9 lb-sec) of total impulse. If my model weighs more than one pound (453 grams) at liftoff, or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration (FAA) regulations before flying.**

Flight Safety: **I will not launch my rockets at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload into my rockets.**

Launch Site: **I will launch my rockets outdoors, in an open area at least as large as shown below, and in safe weather conditions with winds speeds no greater than 20 MPH. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.**

LAUNCH SITE DIMENSIONS

Total Impulse (nSec)	Motor Size	Minimum Size
0.00 – 1.25	1/4A – 1/2A	50'
1.26 – 2.50	A	100'
2.51 – 5.00	B	200'
5.01 – 10.00	C	400'
10.01 – 20.00	D	500'
20.01 – 160.00	E, F, G	1000'
160.01 – 320.00	2G	1500'

Recovery System: **I will use a recovery system, such as a streamer or parachute, in my rockets so that they return safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rockets.**

Recovery Safety: **I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.**

Model Rocket Safety Code
developed by the
National Association of Rocketry
Revised Code November, 2004