



Model Rocket Safety Code

- 1. Materials.** I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.
- 2. 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.
- 3. Ignition System.** I will launch my rockets with an electrical launch system and electrical motor igniters. 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.
- 4. 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 its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.
- 5. 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 away to a safe distance.
- 6. Launcher.** I will launch my rocket 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 will cap the end of the rod when it is not in use.
- 7. Size.** My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If my model rocket 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 regulations before flying.
- 8. Flight Safety.** I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.
- 9. Launch Site.** I will launch my rocket outdoors, in an open area at least as large as shown in the accompanying table, and in safe weather conditions with wind speeds no greater than 20 miles per hour. 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.
- 10. Recovery System.** I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.
- 11. Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

LAUNCH SITE DIMENSIONS

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00 — 1.25	1/4A	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 — 40.00	E	1000
40.01 — 80.00	F	1000
80.01 — 160.00	G	1000
160.01 — 320.00	2 Gs	1500

SLS Laser-X

FUTURISTIC SPACE PROBE

GREAT MID-POWER DEMO BIRD

FUN TO BUILD AND FLY

BALSA NOSE CONE AND TRANSITION

LASER-CUT BASSWOOD FIN'S

FLYING MODEL ROCKET KIT

SEMROC

Made in the U.S.A by Semroc Astronautics Corporation - Knightdale, N.C. 27545

SLS LASER-X Kit No. KLV-33

Specifications	Engine	Approx. Altitude
Body Diameter	E23T-5	850'
Length	F26FJ-6	1600'
Fin Span	G35EJ-7	2300'
Net Weight		

Nylon Parachute Recovery

What is a *Semroc* RePro?

A *Semroc* RePro is a retro reproduction of an out-of-production model rocket kit. It is a close approximation of a full scale model of an early historically significant model rocket kit from one of the many companies that pioneered the hobby over the past half century. A *Semroc* RePro is not a true clone or identical copy of the original. It incorporates improvements using modern technology, while keeping the flavor and build appeal of the early kits.

About Centuri Engineering Company

Centuri Engineering Company was started in 1961 by Leroy (Lee) Piester in his garage while he was still in college in Phoenix, Arizona. With his wife, Betty, they built Centuri into one of the largest model rocket companies ever.

Centuri was known for its unusual and innovative designs, producing over 140 different kits with something for every model rocketeer. They also produced model rocket engines and pioneered the modern composite high powered engines with their Enerjet line.

Centuri Engineering was sold to Damon in the late 1960's and shared the same parent corporation with Estes Industries, the largest model rocket company in the world. The Centuri product line was kept separate from the Estes line until 1983. A few of the old kits have been reissued by Estes since then, but for the most part, Centuri Engineering Company lives today only in the dreams of the senior members of the model rocket community.

November 23, 2005

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Box 1271 Knightdale, NC 27545 (919) 266-1977

LIMITATION OF LIABILITY

Model rockets are not toys, but are functional rockets made of lightweight materials and are launched with NAR or Tripoli safety certified model rocket motors, electrically ignited and flown in accordance with the NAR Model Rocket Safety Code. If misused, model rockets can cause serious injury and property damage. Semroc certifies that it has exercised reasonable diligence in the design and manufacture of its products. Semroc cannot assume any liability for the storage, transportation, or usage of its products. Semroc shall not be held responsible for any personal injury or property damage whatsoever arising out of the handling, storage, use, or misuse of our products. The buyer assumes all risks and liabilities therefrom and accepts and uses Semroc products on these conditions.

Your purchase and use of any Semroc products is construed as your agreement to and acceptance of these terms. If you do not agree to these terms and conditions, you must return the product, unused, for refund or credit.

100% SATISFACTION GUARANTEE

If you are not 100% satisfied with your Semroc product, we will make it right by providing whatever you consider fair, from refund to replacement.

Contact us at:

Semroc Astronautics Corporation
Customer Service Department
P.O. Box 1271
Knightdale, North Carolina 27545

JOIN THE NAR!

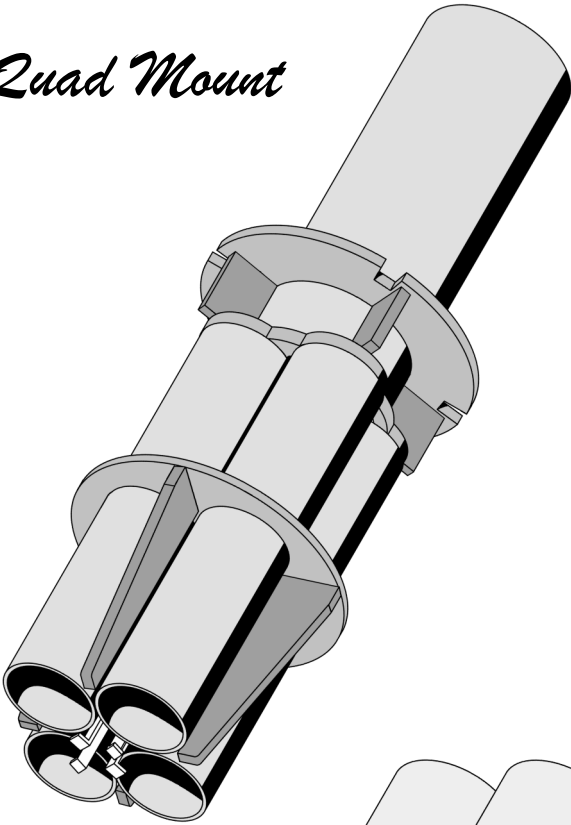
Sign up online at www.nar.org to join the premier model rocketry organization. Semroc fully supports the National Association of Rocketry and recognizes it as the sport's official voice. The NAR is the oldest and largest sport rocketry organization in the world. Since 1957 over 80,000 serious sport rocket modelers have joined the NAR to take advantage of the fun and excitement of organized rocketry. It is always more fun if you fly with friends. The *Sport Rocketry* magazine is one of the best ways to keep informed of new developments in the hobby. Check online at www.semroc.com/nar for promotions just for NAR members.



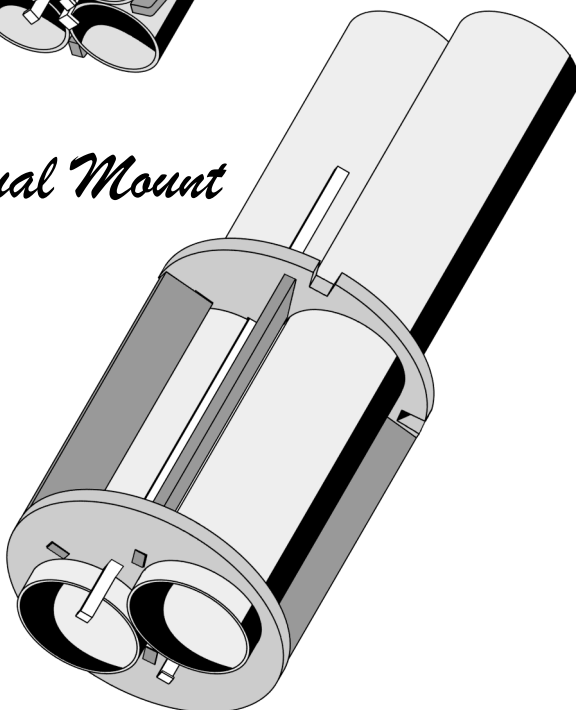
MORE ENGINE MOUNTS FOR YOUR SLS LASER-X!

Additional engine mounts are available for your SLS Laser-X for even more fun! The quad mount will accept four standard 18mm engines for low altitude, lots of smoke flights. The Dual mount will accept two 24mm D and E engines. All mounts are interchangeable and give you just the right combinations for any size field.

Quad Mount



Dual Mount



About the SLS Laser-X

The Centuri Laser-X was initially released in 1968 in the *American Rocketeer*, but did not make it into the 1968 catalog released later in the year. It was the first in a series of kits incorporating all die-cut parts. Its large size and futuristic appearance made it a great rocket for small fields and demonstration launches. The Laser-X became one of Centuri's most famous kits. The original had a BC-54 balsa nose cone, but later models were migrated to plastic nose cones. The Laser-X was Centuri #KC-50 and was introduced with a price of \$2.75.

The ~~arts~~ *Repro* SLS Laser-X is a 175% upscale of the original. It uses laser-cut basswood fins and through-wall construction in a thick-walled body tube. A scale balsa reducer and balsa nose cone are included for ease of construction. A full 24" Rip-stop® Nylon parachute is included along with 400 lb Kevlar® cord and a sturdy shock cord. Built tough for many flights. Several optional engine mounts are available for exciting flights with a wide variety of engines.

BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in the center of these instructions. In addition to the parts included in this kit, you will also need the tools and materials listed below. Read the entire instructions before beginning to assemble your rocket. When you are thoroughly familiar with these instructions, begin construction. Read each step and study the accompanying drawings. Check off each step as it is completed. In each step, test-fit the parts together before applying any glue. It is sometimes necessary to sand lightly or build-up some parts to obtain a precision fit. If you are uncertain of the location of some parts, refer to the exploded view in the center of these instructions. It is important that you always ensure that you have adequate glue joints.

TOOLS: In addition to the parts supplied, you will need the following tools to assemble and finish this kit.



White Glue or Wood Glue

Spray Paint

Fill 'N Finish or Sanding Sealer

Fine Sandpaper 320 to 600 grit

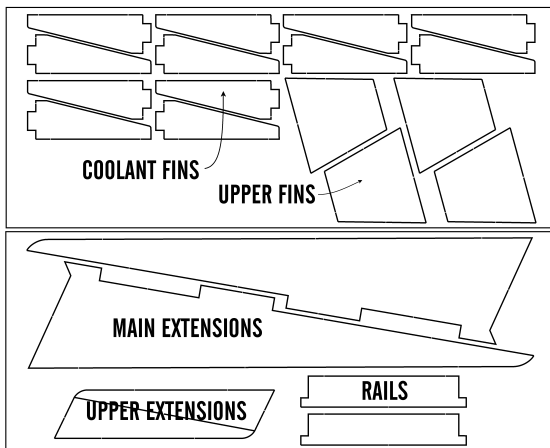
Ruler Hobby Knife

ASSEMBLY

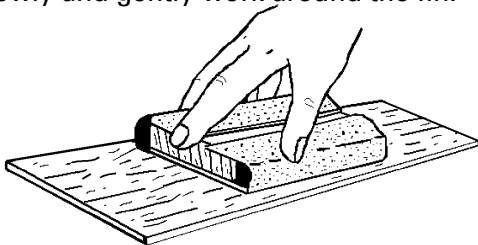
- ❑ **1.** These instructions are presented in a logical order to help you put your SLS Laser-X together quickly and efficiently. Check off each step as you complete it and enjoy putting this kit together.

FIN PREPARATIONS

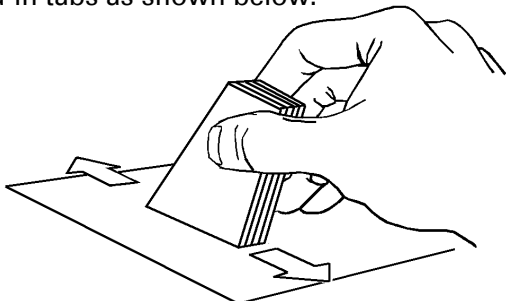
- ❑ **2.** There are many different basswood fin parts. Use the guide below to identify the parts that are called out in these instructions. The four fins not shown are the main fins. There are two sheets of extensions and rails.



- ❑ **3.** Lightly sand each side of the laser-cut basswood fin sheets. Carefully push the laser-cut fins from their sheet. Start at one point on each fin and slowly and gently work around the fin.



- ❑ **4.** Stack all the fins in groups of four fins each. Line each group up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs as shown below.



- ❑ **35.** After the paint has dried, decals should be applied. The decals supplied with the SLS Laser-X are waterslide decals. Each decal should be cut separately from the sheet. Apply each decal before starting the next. Think about where you want to apply each decal and check for fit before wetting the decal. There is no set place for each decal. Use your imagination.

FLIGHT PREPPING

- ❑ **36.** The included engine mount is designed for a 29mm engine. Use tape to friction fit the engine. Twist the engine mount into the end of the SLS Laser-X. It should turn almost 90 degrees.

- ❑ **37.** The SLS Laser-X has an Ejection Baffle to help protect the Nylon chute from the hot gasses. The use of recovery wadding will provide additional insurance. Pack the recovery wadding from the top of the body tube. Use a sufficient quantity to protect the parachute, but not too much that there is no room left.

- ❑ **38.** Fold the parachute and pack it and the shock cord on top of the recovery wadding. Slide the upper section into place, making sure it does not pinch the shock cord or parachute.

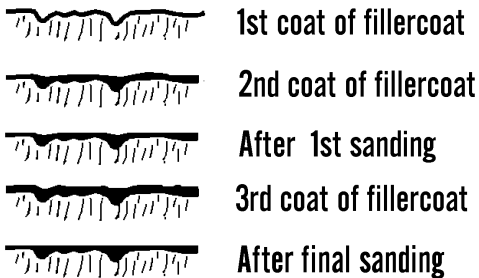
- ❑ **39.** Refer to the model rocket engine manufacturer's instructions to complete the engine prepping. Different engines have different igniters and methods of hooking them up to the launch controllers.

- ❑ **40.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the SLS Laser-X from a 3/16" diameter by 36" long or longer launch rod.

- ❑ **41.** After each flight, remove the engine mount and clean it thoroughly for many hours of fun flying with your SLS Laser-X!

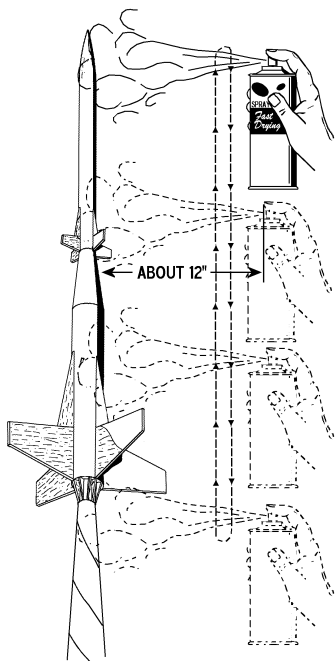
FINISHING

❑ **32.** When the fillets have dried, prepare balsa and basswood surfaces for a smooth professional looking finish. Fill the wood grain with diluted Fill n' Finish or sanding sealer. When dry, sand with fine sandpaper. Repeat until smooth.

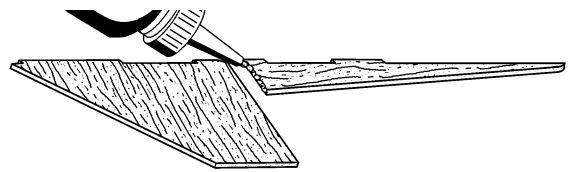


❑ **33.** After all balsa and basswood surfaces have been prepared, wipe off all dust with a dry cloth. First spray the model with an enamel primer. Choose a high visibility color combination like white and red for the final color.

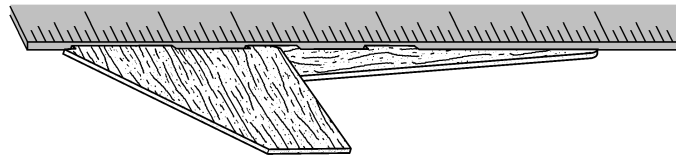
❑ **34.** Spray painting your model with a fast-drying enamel will produce the best results. PATIENCE...is the most important ingredient. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. Keep the can about 12" away and use quick light coats. The final coat can be a little heavier to give the model a glossy wet-looking finish.



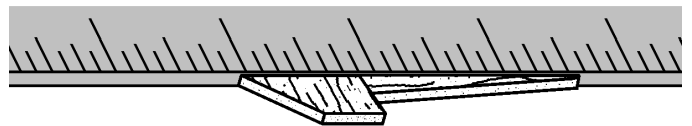
❑ **5.** Glue each main fin to its extension as shown in the diagram. Wax paper will prevent parts from sticking to your workspace..



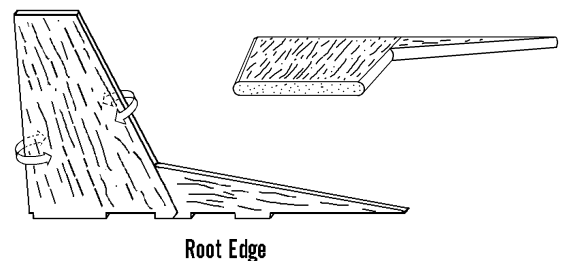
❑ **6.** Use a ruler to align the two parts along the root edges. Make sure the two parts of the fin are glued well and properly aligned before the glue dries.



❑ **7.** Glue each upper fin to its extension and align the root edge with a ruler as you did with the main fins.



❑ **8.** Repeat for all eight sets of main and upper fins. Round leading and trailing edges. Leave the tip and root edges flat.

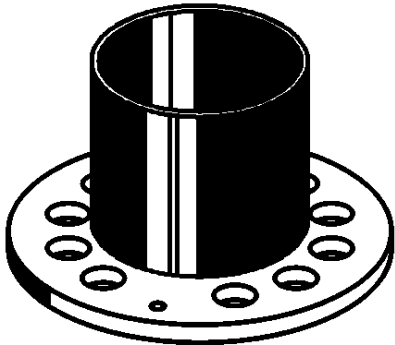


❑ **9.** Stand the long, small body tube on the fin guide below and make the fin position marks on the sides of each tube. Find a convenient channel or groove such as a partially open drawer, a door jamb (as shown,) or a piece of molding. Using the channel, extend the marks the full length of the tube to provide lines for aligning the fins.

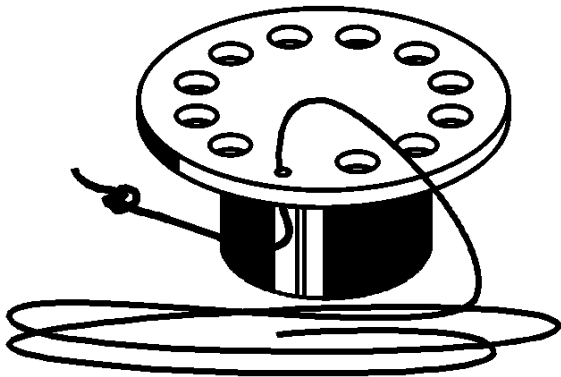


EJECTION BAFFLE

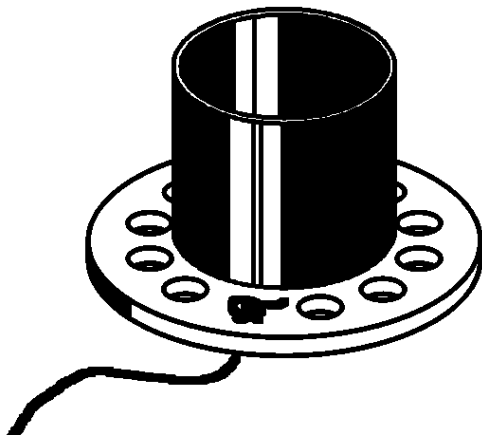
- ❑ 10. Center the black tube coupler on the plywood ejection baffle as shown. Apply a bead of glue around the joint on the outside and inside of the coupler. Do not allow the glue to fill any of the holes. Allow this assembly to dry.



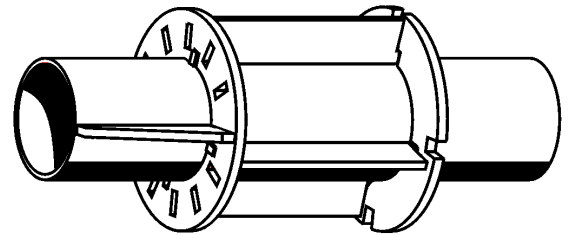
- ❑ 11. Insert one end of the Kevlar® Cord into the smallest hole in the baffle. Tie a large knot in the end on the side of the coupler as shown.



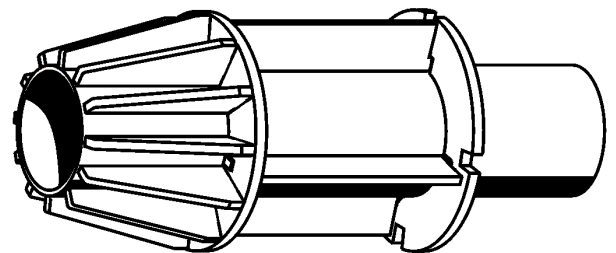
- ❑ 12. Turn the assembly over and pull the cord tight securing the knot against the ring. Apply a liberal amount of glue to the knot and ring. Keep glue off the outside edge of the ring and out of the holes. Also apply a liberal amount of glue on inside and outside surfaces of the coupler to help protect it from the ejection and delay flames and gasses. Allow to completely dry.



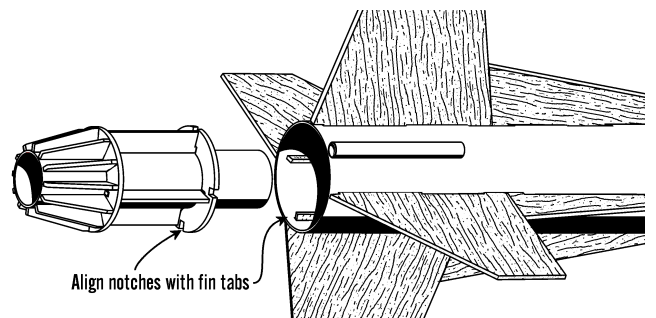
- ❑ 29. Slide the top centering ring over the front of the engine mounting tube. Make sure it is inserted as in the drawing below. The notches on the outer edge should line up as shown. If this is installed upside down, the mount will have “left-hand” threads! When this assembly is lined up so all the rails are parallel to the engine mounting tube and perpendicular to the centering rings, apply a small amount of glue to each joint between the rails and centering rings. **Keep glue away from the slots that will receive the coolant fins.**



- ❑ 30. Now insert the remaining coolant fins in their slots and glue into place. Apply fillets along all the joints. Stand on one end and allow to dry, checking for runs.



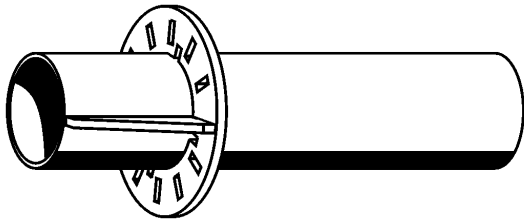
- ❑ 31. Test fit the engine mount in the main body tube. Align the notches on the engine mount with the fin tabs. Push until flush and twist counter-clockwise. If the mount does not twist, don't force it. Sand a slight bevel on the notch, check for excess glue, and try again..



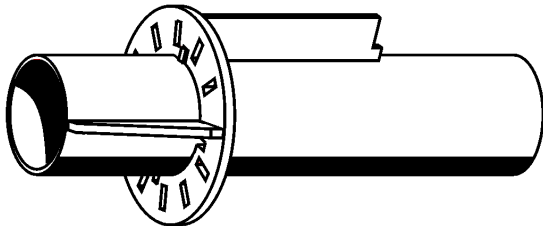
ENGINE MOUNT

Note: The included engine mount accepts 29mm engines. An adapter for 24mm engines (EM-9115) is available from Semroc. A quad 18mm mount (EM-33-4) and a dual 24mm mount (EM-33-2) are also provided by Semroc at www.semroc.com for several different flight configurations.

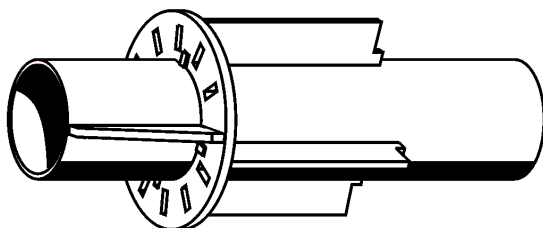
❑ **26.** Locate the rear centering ring with the twelve cutouts. Slide it over the rear end of the engine mounting tube. Insert the tab of one of the coolant fins in one of the slots in the centering ring as shown. The other end should be even with the end of the engine mounting tube. Use a small amount of glue to tack the two in place.



❑ **27.** Insert a tab on one of the rails into the centering ring on the opposite side in one of the four slots near the inner edge. Do not glue at this time.

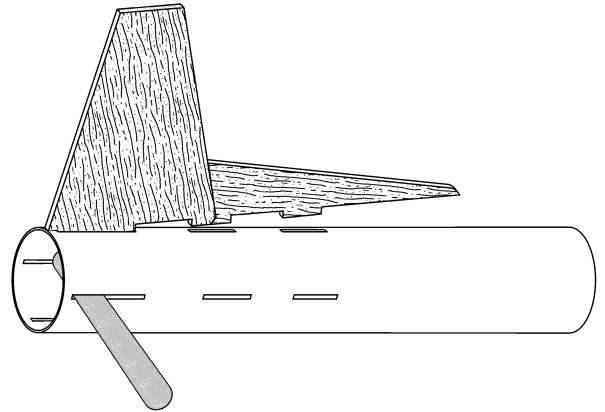


❑ **28.** Insert the other three rails as shown. Use a rubber band if needed to keep the rails aligned. Do not glue yet.

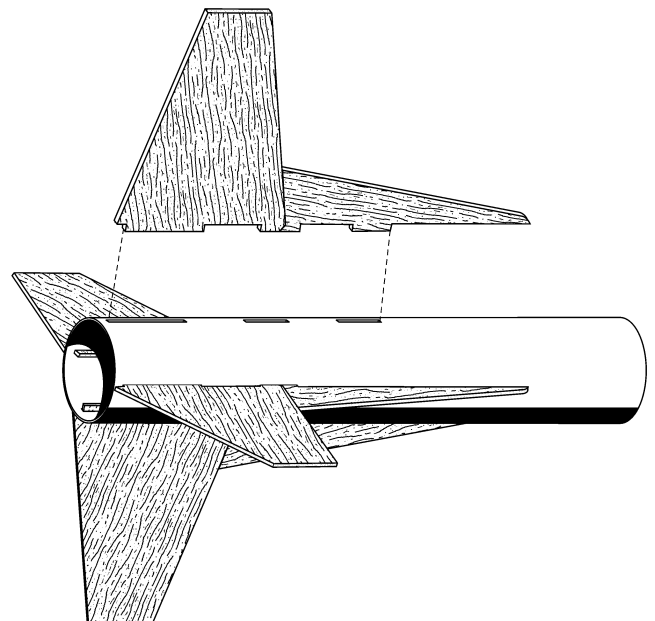


MAIN FINS

❑ **13.** Check all four main fin assemblies for fit in the slots in the large body tube. These are tight so the fins will be supported well. Bevel the root edge slightly for easier insertion. A small piece of sandpaper or a nail file will help with the fit.

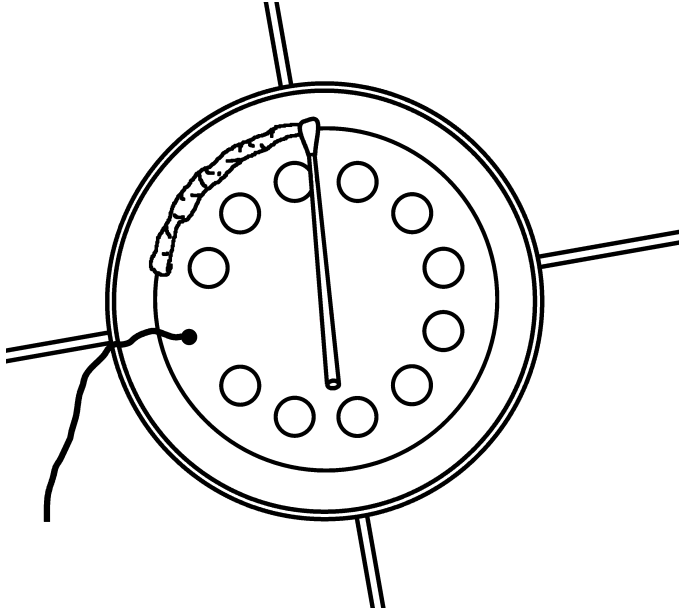


❑ **14.** When all four fins fit properly, apply a bead of glue along one root edge including the three tabs. Insert the fin into the slots, checking for alignment. Make sure the bottom fin tabs are free of glue on the ends. The motor mount will not work properly if too much glue remains on those surfaces. Repeat for the other fins. While the glue is setting, keep checking for proper alignment. Stand the tube on end and wipe all glue runs.



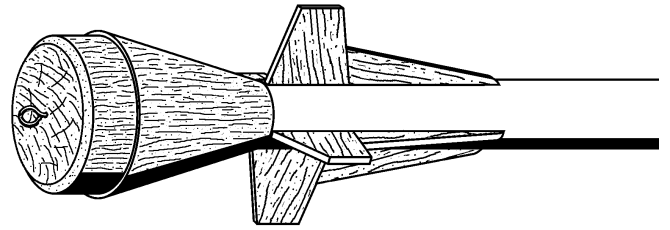
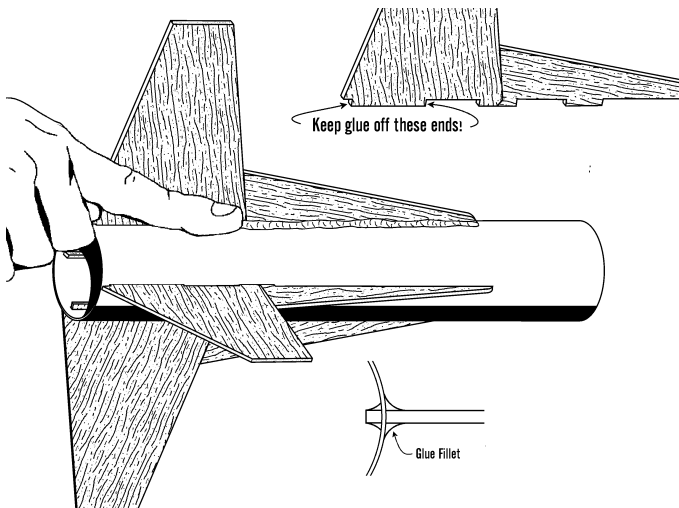
GLUE EJECTION BAFFLE

- ❑ 15. When the fins are dry, insert the completed baffle from the top of the main body tube black coupler end first. Make sure the Kevlar® cord comes out of the top of the tube. It should rest on the top fin tabs. Align the ring so the Kevlar® attachment point is near one of the fin joints. Using the glue applicator, apply a heavy bead of glue around the edge of the baffle ring and body tube joint from the top of the body tube.

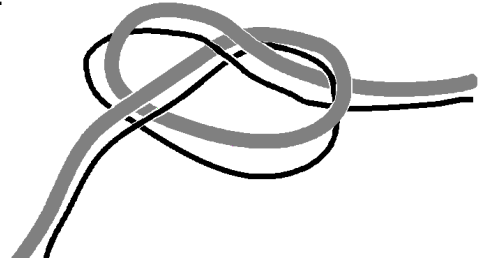


FINISH MAIN SECTION

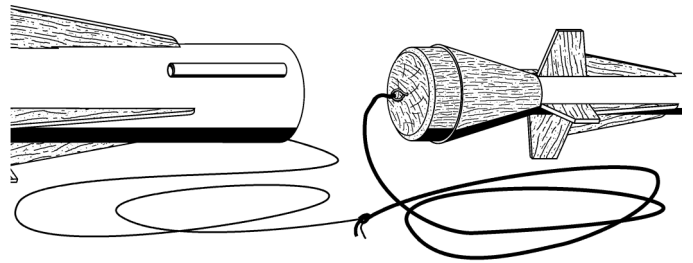
- ❑ 16. Using the glue applicator, apply a thin bead along the fin tabs on the inside of the tube. Keep glue off the ends of the bottom fin tabs. Using your finger, apply fillets of glue along the outside fin-to-body tube joints.



- ❑ 23. Prepare the shock cord as follows. Line up one end of the elastic shock cord with the free end of the Kevlar® cord extending from the top of the body tube. Tie an overhand knot at the end of the two cords. Pull the knot tight and place a small drop of white glue on the knot to prevent it from loosening.

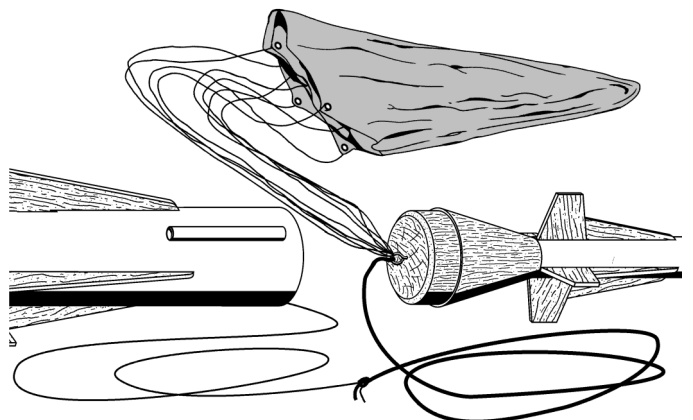


- ❑ 24. Tie the free end of the elastic cord securely to the screw eye in the balsa reducer.

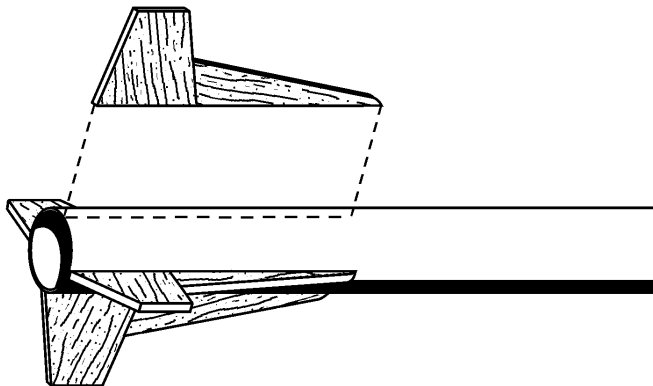


ATTACH PARACHUTE

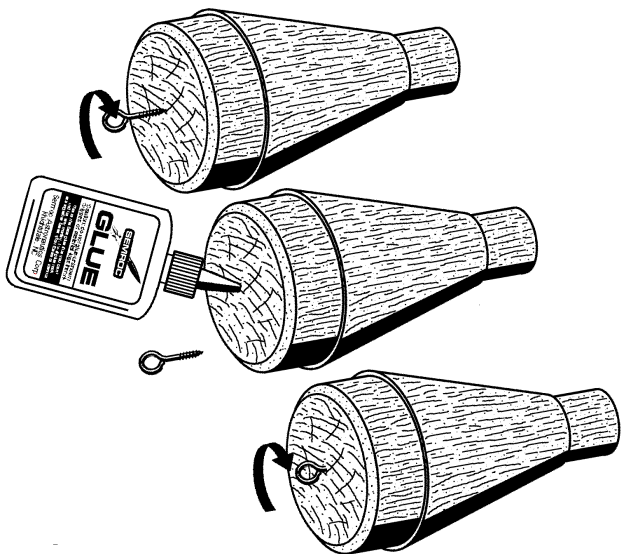
- ❑ 25. Attach the pre-assembled Nylon chute to the screw eye in the balsa reducer. Make sure all the lines are the same length. A snap swivel may be used to make detachment easier.



- ❑ **20.** Run a thin bead of glue along the root edge of one of the upper fin assemblies. Attach it to the body tube on one of the lines drawn earlier. Remove the fin and wait a few minutes until the glue gets tacky. Reapply the fin and check for proper alignment. Repeat for the other three upper fin assemblies. The fins should be flush with the end of the body tube.

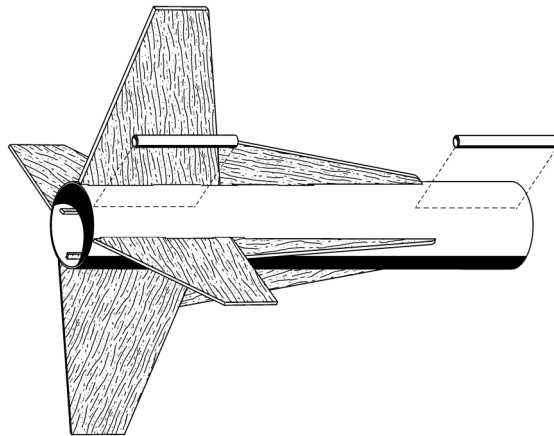


- ❑ **21.** Turn the screw eye into the center of the base of the balsa reducer. Unscrew it and squirt glue into the hole. Reinstall the screw eye and wipe off any excess glue.



- ❑ **22.** Check the balsa adapter for fit in the upper body tube and the lower body tube. A small amount of sanding may be necessary. Spread a small amount of glue on the inside of the upper body tube. Insert the balsa adapter until it seats even with the shoulder.

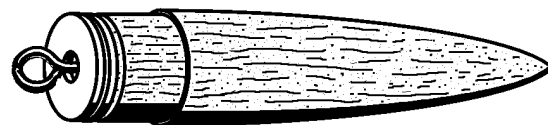
- ❑ **17.** Glue the bottom launch lug midway between two of the main fins and flush with the bottom of the main body tube. Glue the upper launch lug in line with the bottom lug and just below the top of the tube. Sight down the tube to insure the launch lugs are parallel with the fins and in line with each other. Apply a bead of glue along the sides of both launch lugs.



Note: The original Laser-X had “spikes” on the tip edges of the main fins. These are not provided on the SLS Laser-X because of the danger of injury and risk of tangling the chute.

UPPER SECTION

- ❑ **18.** Insert the nose cone in the small body tube and check for fit. A small amount of sanding may be necessary. Insert the two weights over one of the screw eyes and attach them to the nose cone. The provided weights are enough for most engine configurations. If you will launch with very heavy engines, don't glue the weights or the nose cone in the next step, since you may need to add additional weight in the top of the rocket.



- ❑ **19.** Apply a small bead of glue inside the top end of the small body tube. Insert the balsa nose cone into the tube and make sure it is seated properly. Allow to dry. If you chose not to glue the nose cone, make sure it is tightly fitted using masking tape if necessary.



Parts List

EXPLODED VIEW

- A 1 Body TubeLT-225140
- B 1 Body Tube.....LT-085160
- C 1 Body Tube.....LT-11555
- D 1 Balsa Nose Cone.....BC-08542
- E 1 Balsa ReducerBR-085225
- F 1 Laser Cut FinsFLV-33
- G 1 Tubing CouplerHTC-13
- H 2 Centering RingsCR-KLV-33
- I 1 Ejection Baffle Ring.....EBR-225
- J 1 Thrust Ring.....TR-115
- K 2 Launch LugsLL-330
- L 2 Screw Eyes.....SE-14
- M 1 Elastic CordECR-236
- N 1 Shock Cord.....SCK-436
- O 2 Washer WeightsWW-8
- P 1 Nylon Parachute.....PN-24
- Q 1 DecalDKLV-33
- R 1 Glue ApplicatorGA-2

