About Estes Industries, Inc.

In July 1958, G. Harry Stine of Model Missiles, Inc. in Denver, Colorado approached Vern Estes about making model rocket engines for them. On January 15, 1959, Vern's automated model rocket engine fabricating machine, "Mabel", produced the first of many millions of Estes model rocket engines. In 1960, Estes was producing more engines than Model Missiles could sell. Vern and his wife Gleda opened a mail order rocket company and introduced the Astron Scout and Astron Mark.

In 1961, a catalog was mimeographed and hand stitched on Gleda's sewing machine. Later that year, Estes Industries had outgrown the confined space in Denver. In December 1961, the entire operation was moved to an old farm in Penrose, Colorado quickly establishing the small town as the "Model Rocket Capital of the World."

Estes Industries was sold to Damon in September 1969. The name Estes is synonymous with model rocketry. Almost everyone remembers growing up firing Estes rockets or knowing someone that did. Estes Industries has introduced millions of youngsters of all ages to model rocketry for almost half a century.

About the Trident™

The Astron Trident was released by Estes Industries in the 1968 catalog. It was designed by Gene Street when he was the Chief Illustrator at Estes. Featuring a new ducted ejection system, the Astron Trident became an icon for futuristic models that would follow. It was released as Catalog No. 681-K-33 and retailed for $4.00.

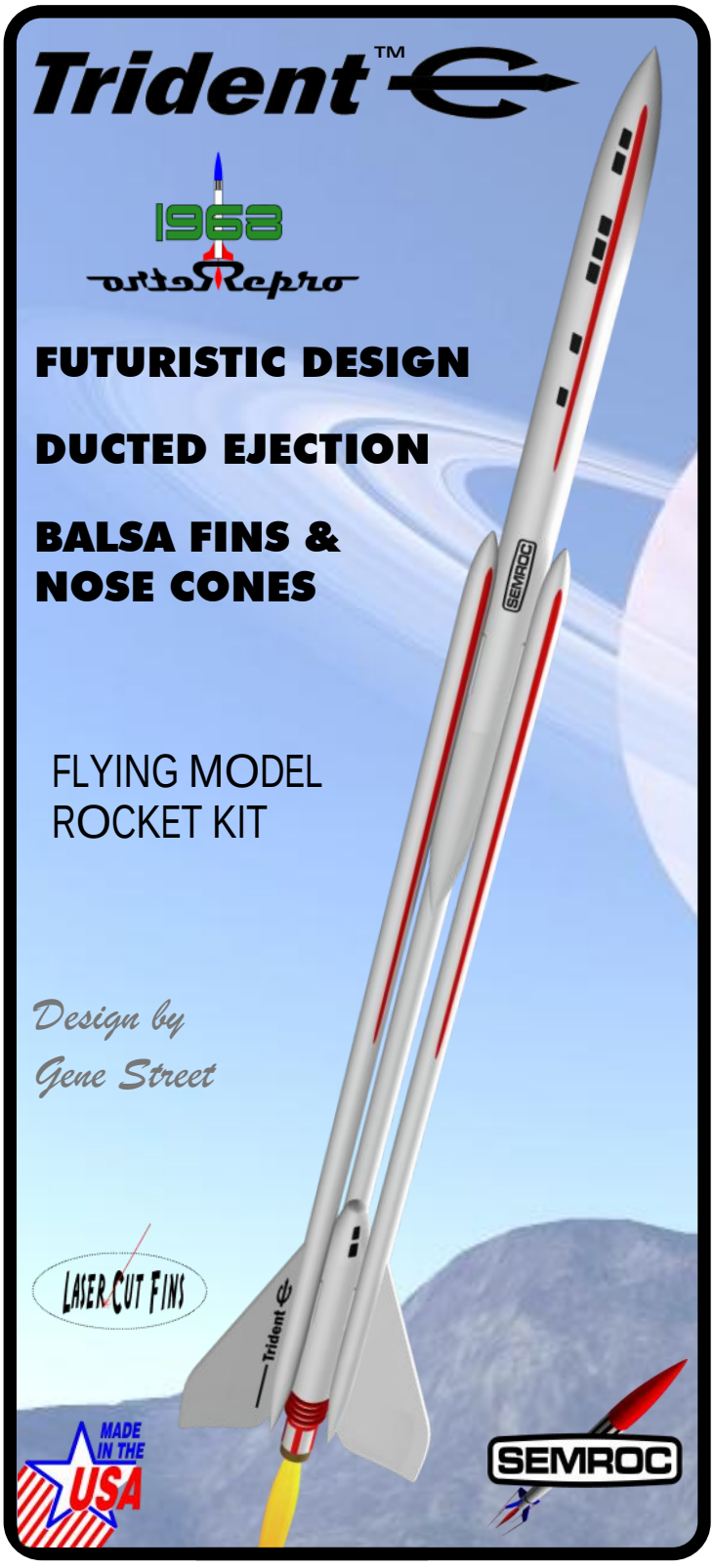
The Semroc Retro-Repro™ Trident™ is very faithful to the original design, using nine precision balsa nose cones. The original did not have decals, but instructions were included to make some from cellophane tape, paint and India ink. A waterslide decal is provided to replicate the original design. To make the alignment easier, a laser-cut guide is provided to make it more fun to build. Pre-slotted tubes are also provided to eliminate the second biggest hassle in assembly.

What is a Retro-Repro?

A Retro-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 Retro-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.

November 24, 2010

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



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

Trident™
Kit No. KV-71

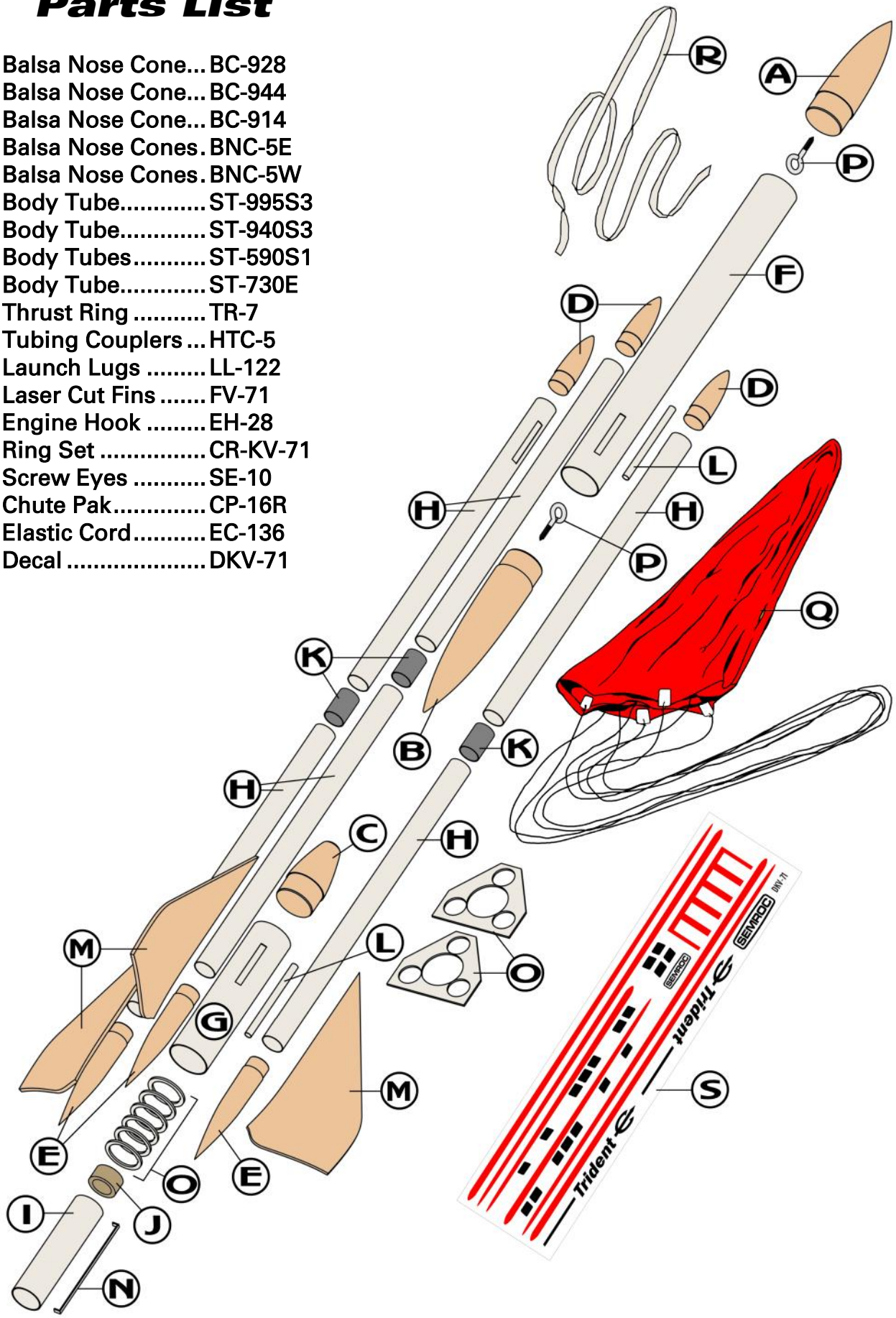
Specifications		Engine	Approx. Altitude
Body Diameter	0.998" (4.6 cm)	A8-3	100'
Length	31.2" (79.2 cm)	B6-4	300'
Fin Span	6.6" (16.8 cm)	C6-5	850'
Net Weight	2.3 oz. (65.3 g)		

PARACHUTE RECOVERY

Parts List

A	1	Balsa Nose Cone...	BC-928
B	1	Balsa Nose Cone...	BC-944
C	1	Balsa Nose Cone...	BC-914
D	3	Balsa Nose Cones.	BNC-5E
E	3	Balsa Nose Cones.	BNC-5W
F	1	Body Tube.....	ST-995S3
G	1	Body Tube.....	ST-940S3
H	6	Body Tubes.....	ST-590S1
I	1	Body Tube.....	ST-730E
J	1	Thrust Ring	TR-7
K	3	Tubing Couplers ...	HTC-5
L	2	Launch Lugs	LL-122
M	1	Laser Cut Fins	FV-71
N	1	Engine Hook	EH-28
O	1	Ring Set	CR-KV-71
P	2	Screw Eyes	SE-10
Q	1	Chute Pak.....	CP-16R
R	1	Elastic Cord.....	EC-136
S	1	Decal	DKV-71

EXPLODED VIEW

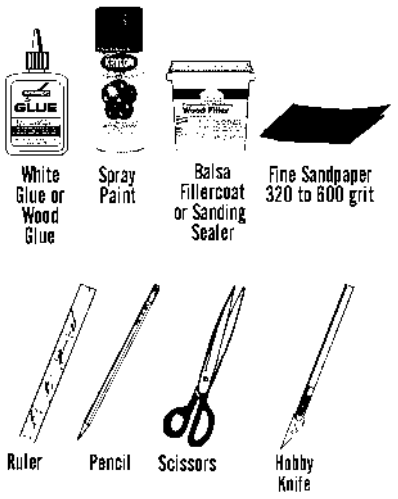


BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List to the left. 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 to the left. 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.

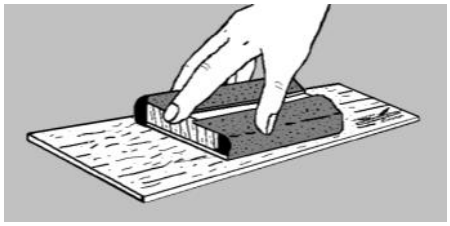


ASSEMBLY

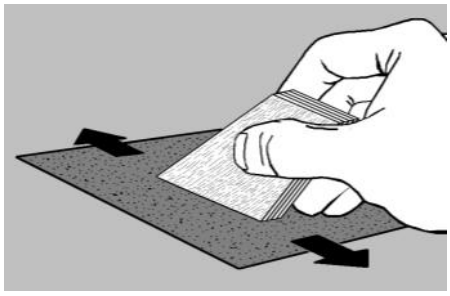
❑ **1.** These instructions are presented in a logical order to help you put your Trident™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

FIN PREPARATION

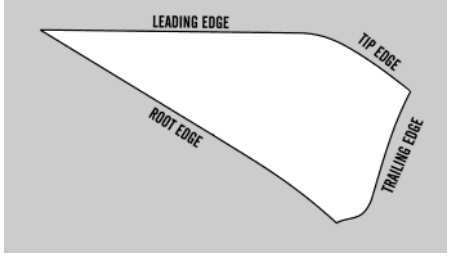
❑ **2.** Lightly sand each side of the laser-cut fin sheets (**FV-71**). Carefully push the laser-cut fins from their sheets. Start at one point on each fin and slowly and gently work around the fin.



❑ **3.** Stack all three fins in a group. Line the set of fins up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs as shown below.

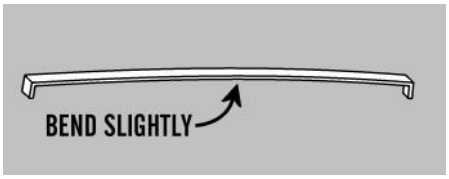


❑ **4.** Round the leading, trailing and tip edges of each fin. Leave the root edges flat. The root edges will be glued to the body tube and nose cone.

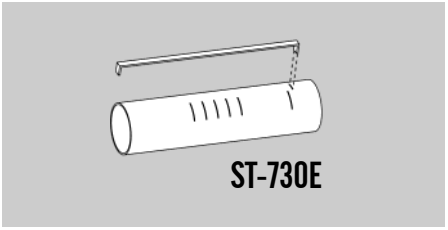


ENGINE MOUNT

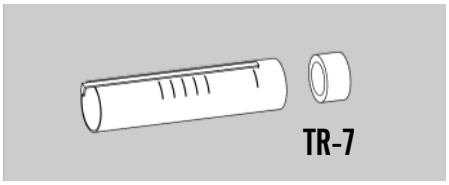
❑ **5.** Bend the engine hook (**EH-28**) slightly so it forms a slight bow in the direction shown.



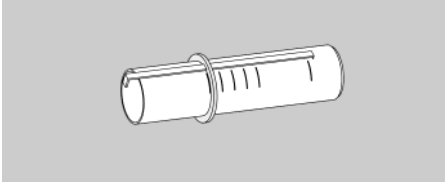
❑ **6.** Mark the engine tube (**ST-730E**) at six locations. Make the first mark 1″ from the end away from the pre-punched slit and continue marking at 1-3/16″, 1-3/8″, 1-9/16″, 1-3/4″ and 2-1/2″. Insert one end of the engine hook into the punched slit in the engine tube.



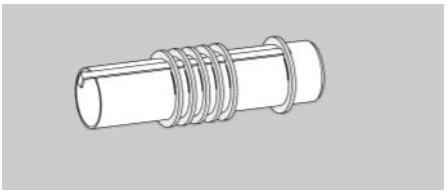
❑ **7.** Glue the thrust ring (**TR-7**) against the top of the engine hook. After the ring is in place, run a bead of glue around the inside of the ring to protect it from the ejection gases.



❑ **8.** Carefully remove the six rings from the laser-cut ring sheet (**CR-KV-71**). Slide one of the rings over the end of the engine tube with the small notch on the inside of the ring aligned over the engine hook. Align it so the first mark at 1″ is just visible, as shown.

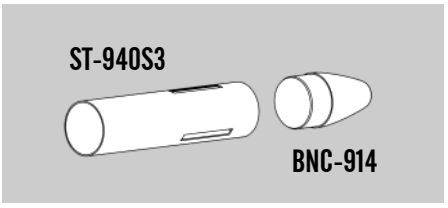


❑ **9.** Align the remaining five rings so they are all perpendicular to the engine tube and just touching their respective marks. When all six rings are correctly placed, run a thin bead of glue around each side of each ring along the joint it makes with the engine tube. Set the assembly aside to dry.

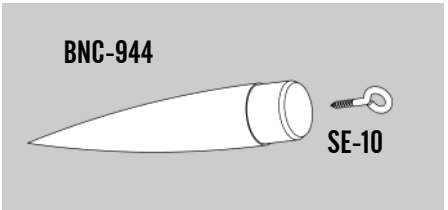


NOSE CONES

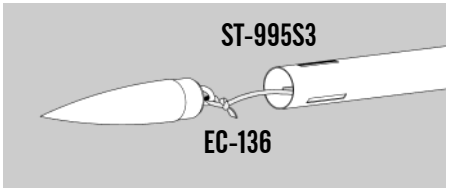
❑ **10.** Apply a bead of glue inside the short slotted body tube (**ST-940S3**) in the end nearest the slots. Insert the stubby nose cone (**BNC-914**) in the body tube and allow to dry. Sand the shoulder slightly until it is the same diameter as the body tube.



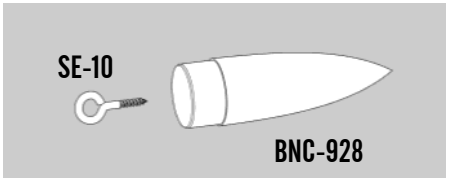
❑ **11.** Turn the screw eye (**SE-10**) into the longest nose cone (**BNC-944**) and remove. Add a drop of glue in the hole and reinsert the screw eye.



❑ **12.** Tie one end of the elastic shock cord (**EC-136**) to the screw eye in the longest nose cone and feed the elastic cord through the long slotted tube (**ST-995S3**) in the end nearest the slots. Apply a bead of glue inside the body tube and insert the nose cone. Pull the elastic cord to keep it away from the glue. Allow to dry. Sand the shoulder slightly until it is the same diameter as the body tube.

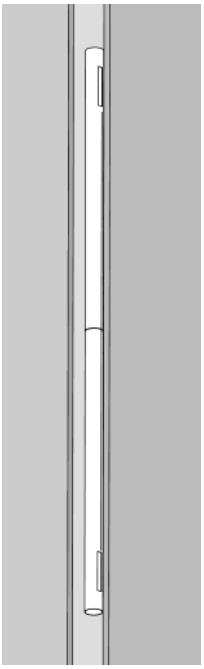


❑ **13.** Push the shock cord into the body tube and insert the remaining nose cone (**BC-928**) and check for proper fit. The nose cone should be snug to hold itself in alignment. If it is too loose, add masking tape. If it is too tight, sand the shoulder slightly. Turn the screw eye (**SE-10**) into the cone and remove. Add a drop of glue in the hole and reinsert the screw eye.



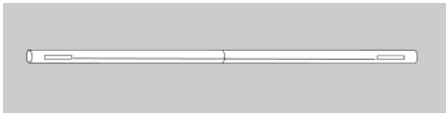
PODS

❑ **14.** Place two of the pod tubes (**ST-590S1**) along a drawer edge, door facing or something similar that will provide an 18" long angle to mark the tubes. Align the tubes with the slots at the far ends and with both slots even with he edge of the drawer or facing. Place a mark along both tubes so you can align them in the next steps.

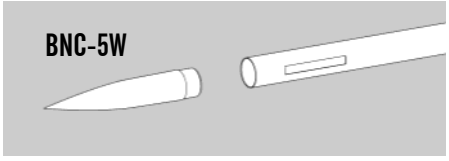


❑ **15.** Apply a bead of glue inside one of the tubes in the end opposite the slot. Insert one of the tube couplers (**HTC-5**) in the tube until half of the coupler remains exposed.

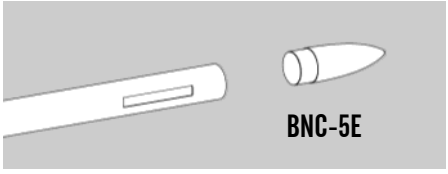
❑ **16.** Apply a bead of glue in the end of the second tube opposite the slot. Join the two ends with the marks aligned. Sight down the tubes to make sure the slots are aligned. Roll the assembly on a flat surface to ensure that the tubes are straight. Set the tube aside and allow to dry. Repeat for the other two pods.



❑ **17.** Apply a bead of glue inside one end of one of the pod tube assemblies. Insert one of the three long nose cones (**BNC-5W**) in the tube. Sand the shoulder slightly until it is the same diameter as the body tube.

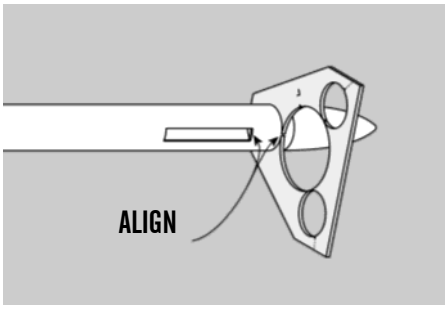


❑ **18.** Apply a bead of glue inside the opposite end of the pod tube assembly. Insert one of the three short nose cones (**BNC-5E**) in the tube. Sand the shoulder slightly until it is the same diameter as the body tube. This end will be the top of the assembly. Glue both nose cones in the two remaining pod tube assemblies. Allow them to completely dry.

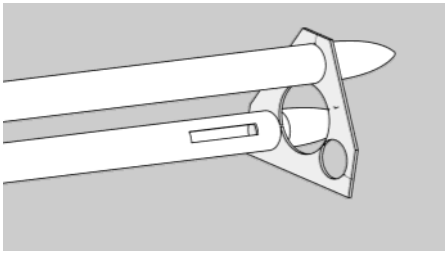


ALIGNMENT

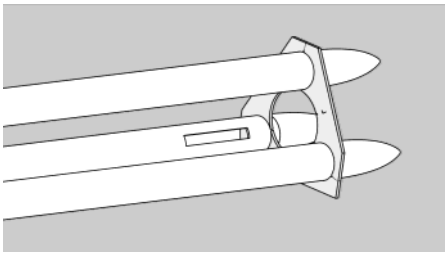
❑ **19.** Carefully remove the two alignment guides from the laser-cut ring sheet. Slide one of the alignment guides over the top (with smaller nose cone) of one of the pod assemblies. Turn the tube until the slot in the tube is centered with the gap in the alignment guide. The top of the tube should be about 1/8" from the alignment guide.



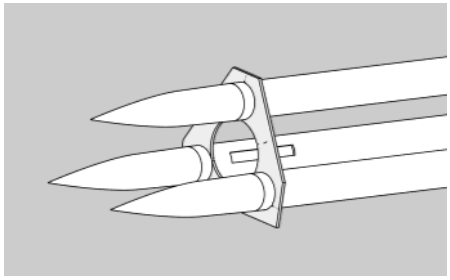
❑ **20.** Insert the top of the second pod assembly into the alignment guide. Turn the tube until the slot in the tube is centered with the gap in the alignment guide. The top of the tube should be about 1/8" from the alignment guide. The two tubes should have the slots facing inwards. NO glue yet!



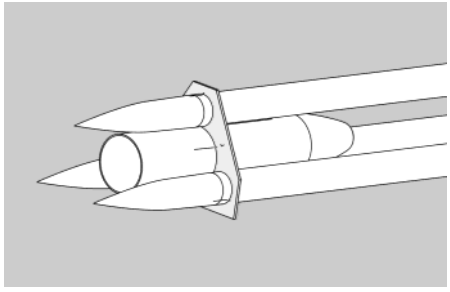
❑ **21.** Add the third pod to the alignment guide and center its slot as the other tubes were centered. Place the alignment guide on a flat surface with the longest edge on the surface. NO glue yet!



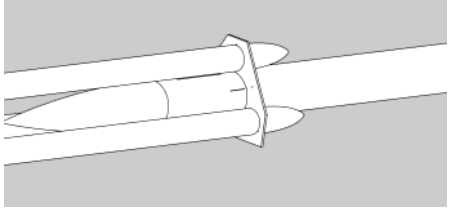
❑ **22.** Carefully insert the three long nose cones into the second alignment guide. Make sure the small "L" cut into the guide is aligned with the "L" in the first alignment guide. This will be the mark for the launch lug in a later step. Slide the alignment guide until 1/8" is showing from the end of the tube to the alignment guide. NO glue yet!



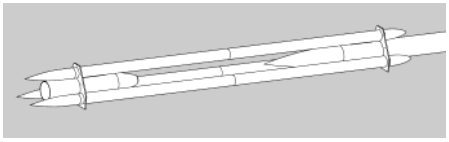
❑ **23.** Slide the short slotted body tube assembly into the bottom alignment guide (with long nose cones) and line up the slots in the pod tubes with the slots in the large body tube. When the slots are aligned, place a mark at the small triangles on the alignment guide on the three pod tubes and the "L" on the large body tube. NO glue yet!



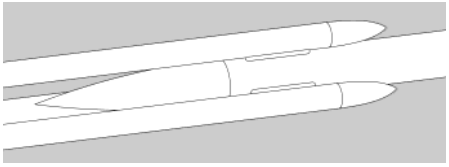
❑ **24.** Slide the long slotted body tube assembly into the top alignment guide and line up the slots in the pod tubes with the slots in the large body tube. When the slots are aligned, place a mark at the "L" on the large body tube. NO glue yet!



❑ **25.** Check the entire assembly for alignment. Make sure the alignment guides are flat on the table. Make sure all the slots in the two large tubes are aligned with the corresponding slots in the pod tubes. When you are satisfied that everything is aligned, tack each pod tube to the larger tubes using a small amount of glue. Keep the glue away from the alignment guides. Allow the glue to dry.

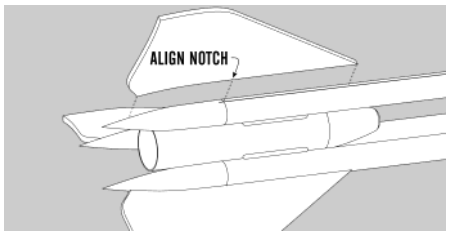


❑ **26.** When the glue is dry, break away the alignment guides on the scored sections. Apply a bead of glue to each area that has slots, forming a bead over the slots. If there is a gap at any joint, place a small sliver of balsa over the gap to prevent glue from filling the slots.



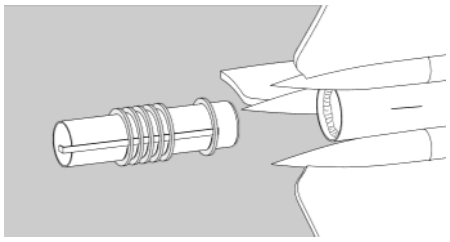
FINS

❑ **27.** Using a door facing, drawer or other edge, place a line on the marks that you placed earlier on each pod tube near the longer pod nose cones. Apply glue to the root edge of one of the fins and position it along one of the lines. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other two fins. If you follow these instructions, the fins will not require much additional work to keep them aligned. Allow the fins to completely dry, checking carefully to make sure they are aligned properly.

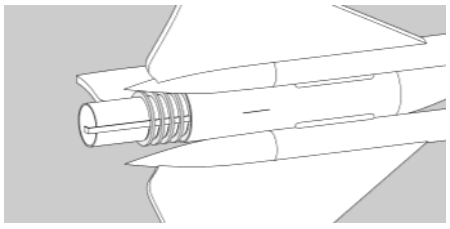


ENGINE MOUNT

❑ **28.** Apply a bead of glue inside the bottom body tube (near the fins).

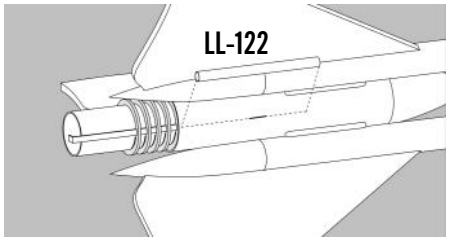


❑ **29.** Insert the engine mount into the body tube until only the two top rings are inside the tube. The second ring from the top should be flush with the end of the body tube. Align the engine hook so it is between two fins and aligned with the "L" line drawn earlier.

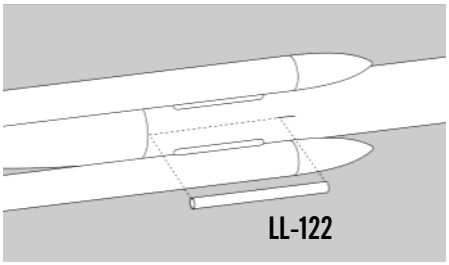


LAUNCH LUGS

❑ **30.** Apply a bead of glue to one of the launch lugs (**LL-122**) and glue it on the "L" line on the lower body tube and even with the end of the body tube.

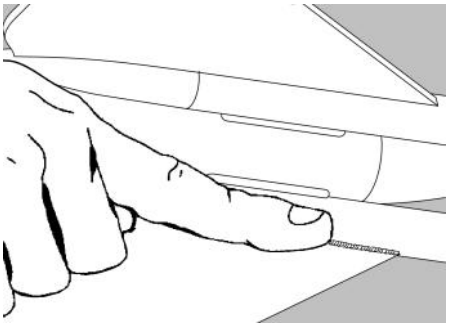


❑ **31.** Apply a bead of glue to the other launch lugs (**LL-122**) and glue it on the "L" line on the upper body tube and even with the end of the body tube near the nose cone. Sight down the tube to make sure both launch lugs are aligned. Allow to dry.



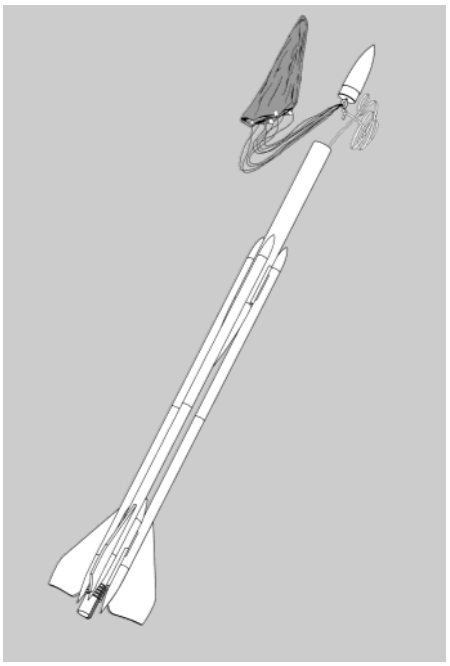
APPLY FILLETS

❑ **32.** After the fin assembly is completely dry, run a small bead of glue along both sides of each fin-body tube joint. Using your forefinger, smooth the glue into fillets. Allow this assembly to dry in a vertical position.



FINAL ASSEMBLY

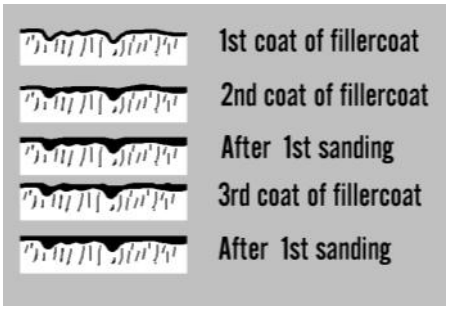
❑ **33.** Assemble the chute (**CP-16**) using instructions included with the chute. Pull the lines tight on the chute and make sure they are all of equal length. Attach the chute by tying them to the screw eye. Put a drop of glue on the joint to keep the lines from moving. Attach the free end of the elastic cord to the screw eye. Put a drop of glue on that joint as well.



This completes the assembly of your **Trident**

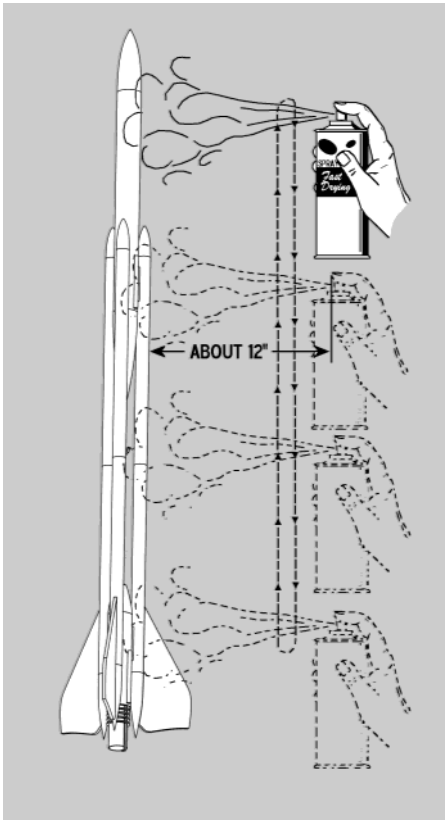
FINISHING

❑ **34.** When the fillets have dried, prepare balsa surfaces for a smooth professional looking finish. Fill the wood grain with balsa fillercoat or sanding sealer, When dry, sand with fine sandpaper. Repeat until smooth.

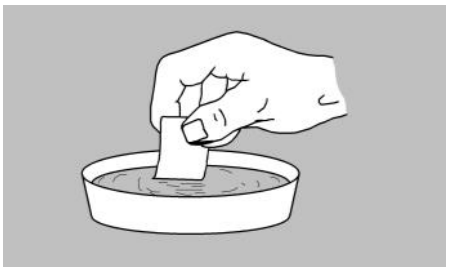


❑ **35.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer. Choose a high visibility color like white for the final color.

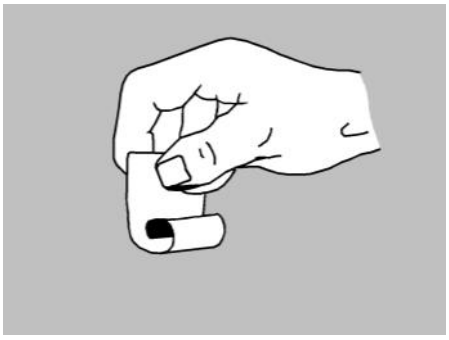
❑ **36.** Spray painting your model with a fast-drying enamel will produce the best results. PATIENCE...is the most important ingredient. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. 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.



❑ **37.** After the paint has dried, decals should be applied. The decals supplied with the Trident™ are waterslide decals. Each decal should be cut separately from the sheet. Think about where you want to apply each decal and check for fit before wetting the decal. Use the cover photo for suggested placement. Dip each decal in a small dish of water that has a drop of detergent. It will take about 30 seconds before the decal is loose enough to apply.



❑ **38.** Slide the decal in place and use the paper backing to work the bubble out. Repeat for all the decals. Be careful with covering decals with a clear coat. Many of the new sprays are not compatible. Future floor polish is suggested.



FLIGHT PREPPING

❑ **39.** Mounting the engine: Insert the engine and make sure the engine hook keeps the engine in snugly. The hook may be slightly bent to make sure the engine is retained.

❑ **40.** Apply a few sheets of recovery wadding in the top of the main body tube. Since the pods provide for an ejection baffled, recovery wadding may not be absolutely necessary. Fold the parachute and pack it and the shock cord on top of the recovery wadding. Slide the nose cone into place, making sure it does not pinch the shock cord or parachute.

❑ **41.** 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.

❑ **42.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the Trident™ from a 1/8" diameter by 36" long launch rod.

❑ **43.** After each flight, promptly remove the spent engine casing and dispose of properly. Clean any residue from your model for many flights.