



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

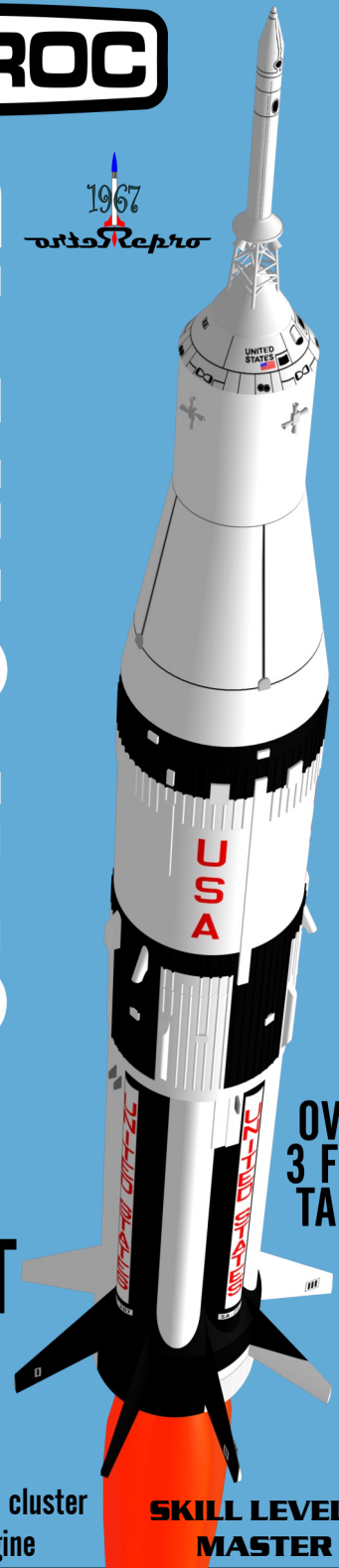
SEMROC

SATURN 1B

FLYING MODEL ROCKET KIT

1/70 SCALE MODEL

Build for a four 18mm cluster or a single 24mm engine



OVER 3 FEET TALL!

SKILL LEVEL 4 MASTER

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

Saturn 1B Kit No. K5-1

Specifications	Engine	Approx. Altitude
Body Diameter 3.938" (10.0cm)	C6-3 (four)	600'
Length 37.7" (95.8cm)	D12-3	220'
Fin Span 8.2" (20.8cm)	D15-4	325'
Net Weight 9.9oz. (280.9g)		

32" PARACHUTE RECOVERY

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.

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.

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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.



LAUNCH PREPARATION

❑ **88.** Mounting the engines: If configured as a four engine cluster, all engines must be the same type. Fill the top of each engine with recovery wadding in case it does not ignite. If the ejection charge of one engine ignites the top of an unburned engine, the results are catastrophic!

❑ **89.** 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. When firing more than one engine, always make sure you have at least a 12 volt car battery in top condition. The lead wire should be at least 16 gauge or less and no more than 20 feet in length. Make sure all connections are tight and the electrical system is in perfect order.

Hook up the igniters using bus bar or use "Clip Whips" designed for clusters.

A full tutorial on clustering is outside the scope of these instructions. If you are not experienced with clustering, a search online will yield many tutorials to get you started on one of the most challenging propulsion methods for model rocketry.

❑ **90.** Pack the recovery wadding into the parachute tube. Use a sufficient quantity to protect the parachute, but not too much that it will interfere with the proper deployment of the parachutes.

❑ **91.** Fold the main parachute first and loosely wrap the shroud lines and shock cord. and pack over the recovery wadding. Fold the capsule parachute and pack on top of the main parachute. Slide the Apollo Capsule into place, making sure it does not pinch the shock cord or parachutes.

❑ **92.** Place a block or standoff under your Saturn 1B to keep the base far enough from the blast deflector that the initial blast does not scorch the base and fins.

❑ **93.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the Saturn 1B from a 1/8" diameter by 36" long launch rod. A longer rod will result in better flight control and stability.

About the Saturn 1 B

The Estes Saturn 1B was released in 1967. Culminating in over a year of development driven by Chief Illustrator Gene Street, the Saturn 1B was a major work of model rocketry art. Not quite an actual scale model, but a close interpretation that has stood the test of time as one of the giant leaps in the hobby. It was followed by much more faithful scale models over the years, but the Gene Street paper and balsa interpretation transcends the more perfect plastic versions. A true modeler's kit requiring master modeling skills, the Saturn 1B reflects the builder rather than the kit manufacturer. The Estes Saturn 1B was #K-29 and was introduced at a price of \$9.95.

The Semroc Retro-Repro Saturn 1B is a faithful reproduction of the original. It uses laser-cut balsa fin ribs and smooth finished balsa parts for ease of construction. Heavy embossed wraps are included like the original with a paint-ready glossy surface. A single 32" parachutes is supplied.

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. You will also need masking tape and a few wooden toothpicks.



ASSEMBLY

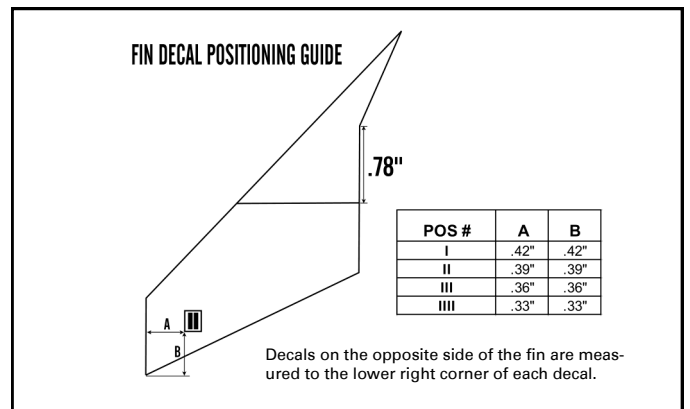
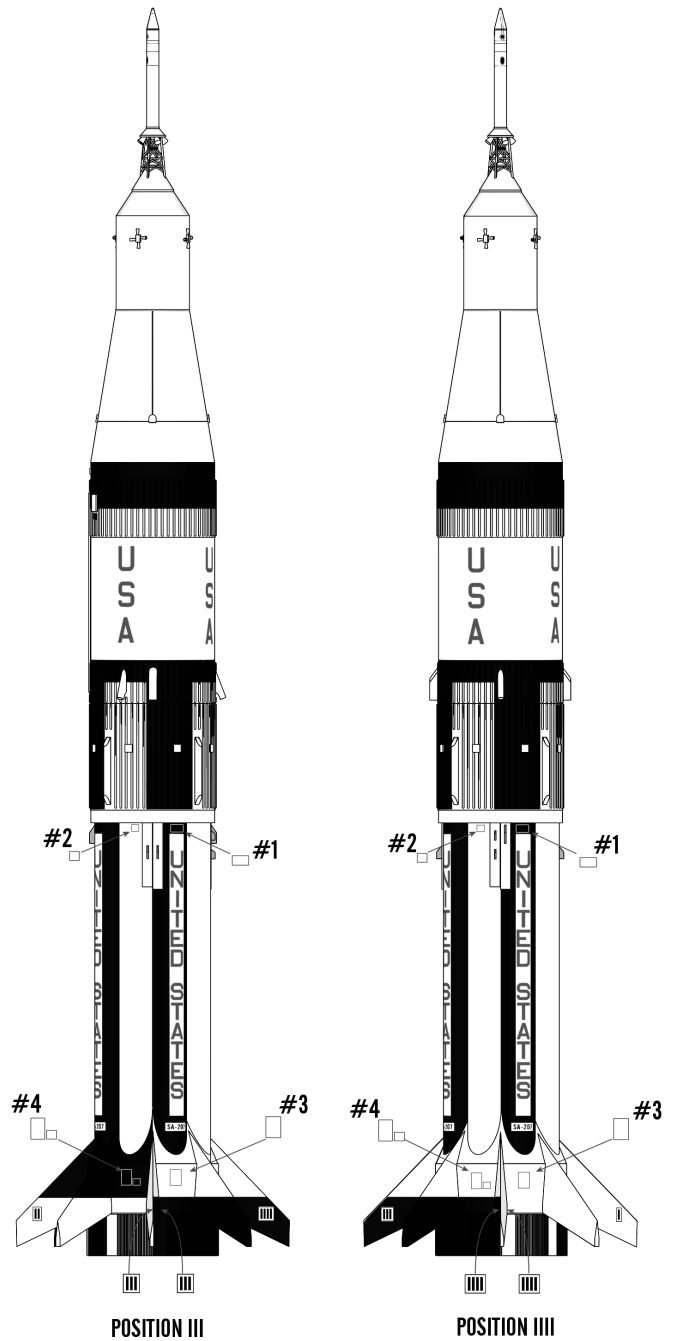
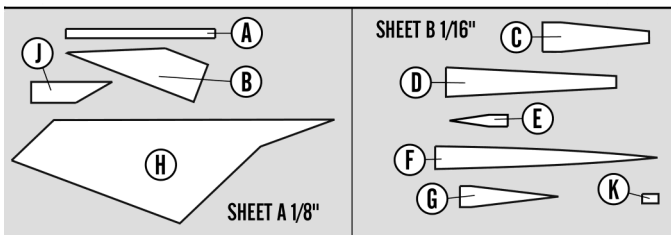
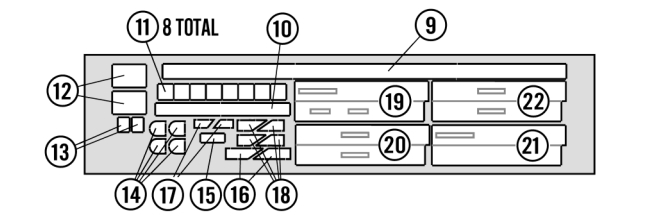
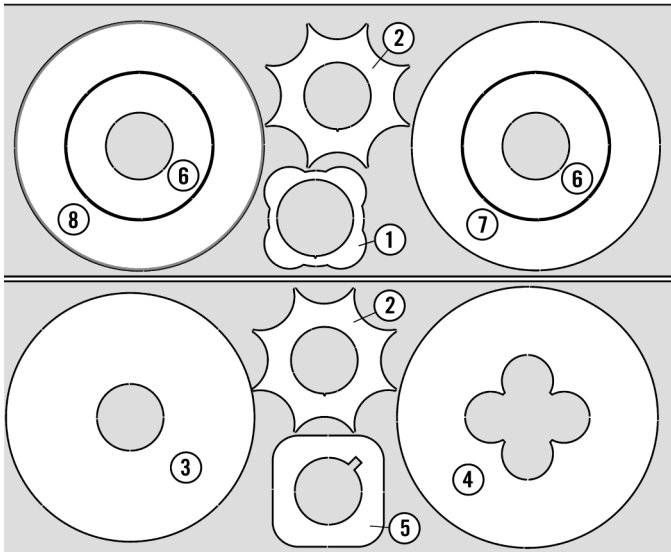
1. These instructions are presented in a logical order to help you put your Semroc Saturn 1B together quickly and efficiently. Check off each step as you complete it and enjoy putting this kit together.

NOTE: *The Semroc Saturn 1B is not for inexperienced modelers. If you have not developed sufficient skills to build this kit, wait until you have built a few more models. It will wait for you. Patience is required as well as a careful review of each instruction before continuing. If you are ready for this challenge, "Let's get started!"*

There are so many critical measurements required that a ruler is supplied with this kit. Cut it out next and keep it handy!

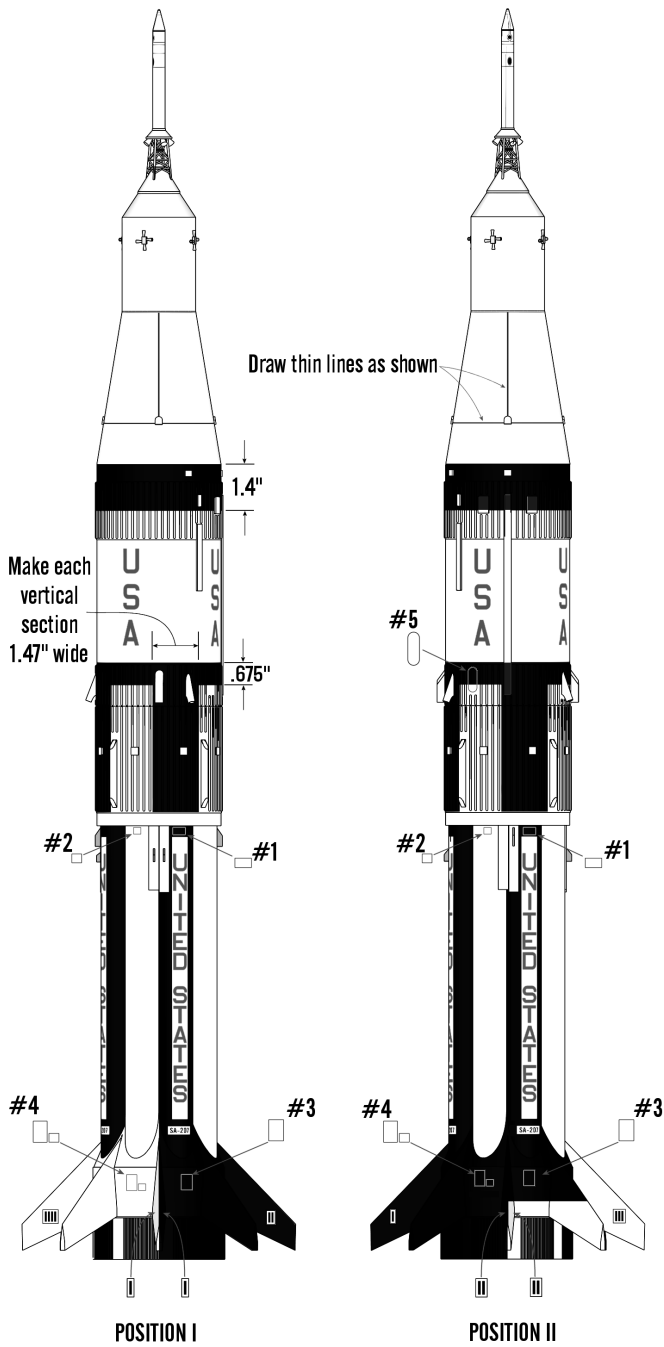
PARTS IDENTIFICATION

2. There are many different balsa and fiber parts included in this kit. Use the guide below to identify the parts that are called out in these instructions. Some of the parts are similar, but will not work if exchanged. Some of the parts have a top and a bottom and must be installed correctly or other parts will not fit later. If you "goof," contact us and we can possibly help you out. The laser-cut rings and parts are messy. Use paper towels to wipe all the edges as you punch them out.



Decals on the opposite side of the fin are measured to the lower right corner of each decal.

PAINT DETAILS AND DECAL LOCATIONS



Color Scheme	
White	Main Body Retro-Rocket Housings Discharge Tubes Antenna panels
Black	Roll patterns Fins, shroud, and tail cone as above Fuel tanks
Silver	Antennae
Gold	Heat shield (rear cap-ring)

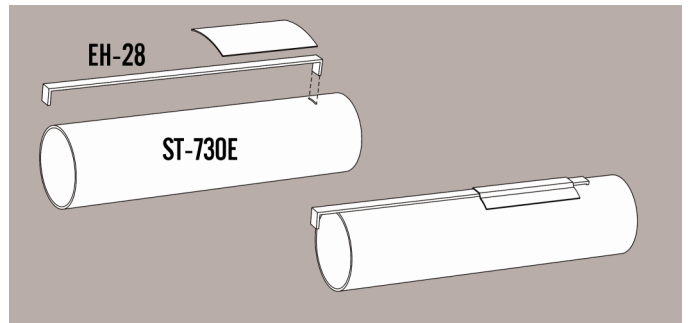
ENGINE MOUNT

First Major Decision!

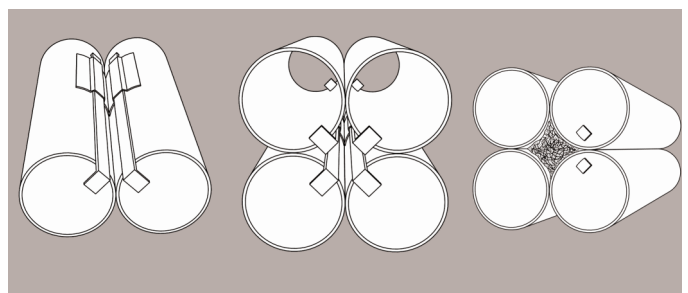
There are parts for two different motor mounts, a four engine cluster for standard 18mm engines or a single 24mm engine. There are pros and cons for both mounts. The original used a four engine cluster with lots of smoke, fire, and sound. Cluster ignition is left for the most experienced rocketeers. Faulty ignition, improper launch equipment, or simply bad hookup techniques can have disastrous consequences. Done properly, a four engine cluster of C engines in a Saturn 1B is impressive. A single 24mm engine like the D12-3 will not reach the altitudes of the cluster, but is generally much more reliable. Some of the newer 24mm reloads can be just as impressive. It is not in the scope of these instructions to make an interchangeable mount, but an experienced modeler should be able to accomplish the task. Continue with the next step if you want to build the four engine cluster or skip to step 7 to build the single engine version.

Option A - Four Engine Cluster

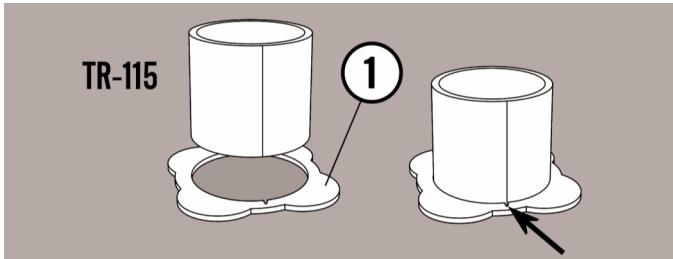
3. Insert one of the short engine hooks (EH-28) in the slot at one end of an engine mount tube (ST-730E). Starting at the slot, apply a bead of glue along the engine hook for about 1". Cover the glue with a piece of masking tape or paper. Repeat for the other three engine mount tubes. Allow them all to dry.



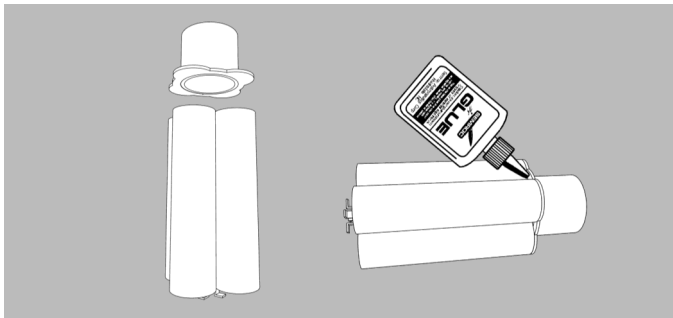
4. Glue two of the engine mount assemblies together as shown below. Keep glue off the engine hooks. Glue a second set together identical to the first. Make sure the engine hooks are at right angles. When both assemblies are almost dry, stack them as shown and glue them together. Apply a ball of tissue in the top central channel formed by the four tubes. Add a glue fillet over the tissue and along each joint formed by the tubes. Keep turning it to prevent runs and allow the assembly to dry completely.



- ❑ **5.** Using a drawer or door facing, draw a line on the TR-9115 ring. Remove the cluster bulkhead (1) from the ring set. As with all the fiber parts, sand the hold-in tabs slightly and use a toothpick to soak each edge with cyanoacrylate glue to keep them from de-laminating. Glue the ring in the cluster bulkhead (1), aligning the notch with the line. Apply a fillet around the outside joint.

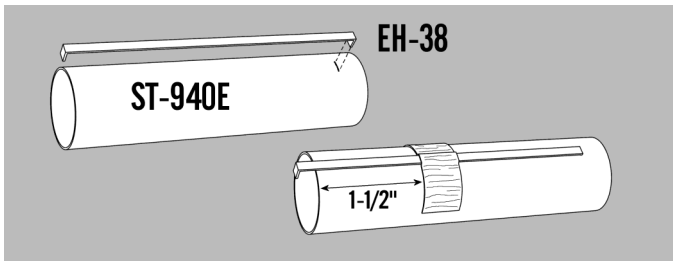


- ❑ **6.** Apply a bead of glue around the tops of the engine mount tubes. Align the cluster bulkhead assembly over the engine mount tube assembly as shown. Apply a bead of glue on the joint between the two assemblies. Set the assembly aside to dry. Skip to step 9.

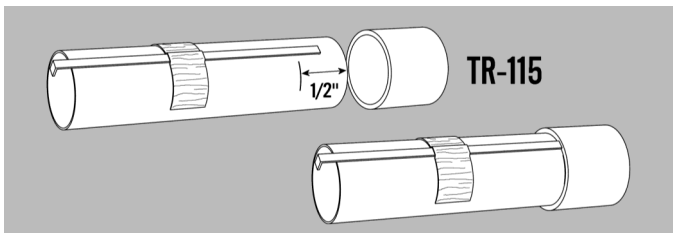


Option B - Single 24mm Engine

- ❑ **7.** Insert the long engine hook (EH-38) in the slot at one end of the large engine mount tube (ST-940E). Apply a piece of masking tape 1-1/2" from the bottom of the tube. Apply a bead of glue along the engine hook from the slot to the tape.



- ❑ **8.** Mark the engine mount tube 1/2" from the top. Apply a film of glue to this area and slide the ring (TR-115) over the tube until it is even with the mark. Apply a bead of glue around the joint and allow to dry.



- ❑ **81.** Cut the #3 decals from the large sheet. They should be applied with the long sides parallel to the base of the ring tube and mounted to the right of fins at POS I, II, III, and IIII. The bottom edge is .34" above the joint between Warps #1 and #2 and the left edge of the decal is .42" from the fin. Repeat for the other three.

- ❑ **82.** Cut the #4 decals from the large sheet. Careful, they are a two part decal. They are applied so they resemble an "L" and are mounted to the left of fins at POS I, II, III, and IIII. The bottom edge is .34" above the joint between Warps #1 and #2 and the right edge of the LARGE rectangle is .42" from the fin. Repeat for the other three.

- ❑ **83.** Cut the #5 decal from the large sheet. It is mounted in the remaining flat area on Wrap #4. This is the position for the LH2 fill valve and should have been about the same shape, but about 1/8" high.

- ❑ **84.** Cut the long "UNITED STATES" decals from the sheet. They are applied to the four black fuel tank tubes, centered inside the white area that was masked previously.

- ❑ **85.** Cut the "USA" decals from the sheet. They are applied on the upper body tube with the top edge .463" below the bottom edge of Wrap #5 and centered in line with each white tank tube.

- ❑ **86.** Cut the "SA-207" decals from the sheet. They are applied on the black fuel tank tubes centered with the upper part of the decal .28" below the white area that now has "UNITED STATES".

- ❑ **87.** Cut the fin position numbers from the white decal sheet. These are placed on both sides of the fins at POS I, II, III, and IIII. Use the position location guide to locate them on the corresponding fins. The distances given in the table are from the fin tip to the closest corner.

❑ **70.** Refer to the paint diagram for the following steps. Paint a black band 1.4" wide starting at the top of the upper body tube and continuing down into Wrap #5.

❑ **71.** Paint a second black band .675" wide starting at the top of Warp #4.

❑ **72.** Paint four vertical panels 1.47" wide from the second black band to the bottom of Wrap #3 and centered in line with each black fuel tank. Leave the discharge tubes and vector control jet housings white.

❑ **73.** Paint a thin line from the top of each latch to the top of the LEM shroud. Paint a thin line around the LEM shroud between each latch.

❑ **74.** Paint each antenna silver. Leave the antenna panels white.

❑ **75.** Paint the bottom cap ring gold.

APOLLO CAPSULE

❑ **76.** While the paint is drying, set the Saturn 1B aside and begin the assembly of the Apollo Capsule kit. It has its own parachute that also has to be assembled.

MAIN CHUTE

❑ **77.** Assemble the chute using the instructions supplied. Tie the shroud lines securely to the end of the elastic cord.

DECALS

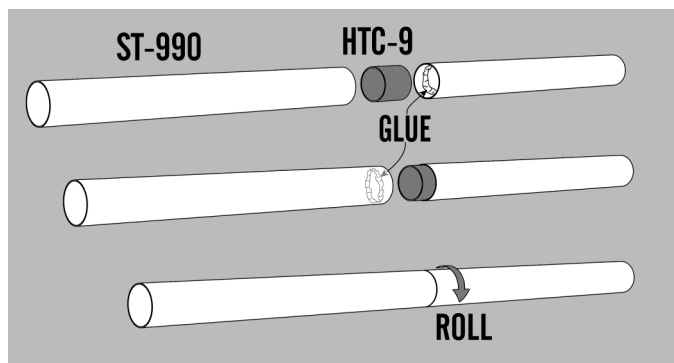
❑ **78.** Carefully remove the masking tape on each fuel tank tube. Remove any other masking tape you may have applied in painting your model. The decals supplied are waterslide decals. Cut each one out carefully, dip in clean water for about 30 seconds and slide onto the model. One decal is printed on white decal paper. Each decal on that sheet should be cut as close to the surrounding black line as possible.

❑ **79.** Start with the #1 decals on the large sheet. They should be applied with the long side parallel to the base of the upper body tube and spaced .165" down on the center of the black tube. Repeat for the other three.

❑ **80.** Cut the #2 decals from the large sheet. They should be applied with the narrow sides parallel to the base of the upper body tube and spaced 1/16" down on the white tubes. They are off center with the right edge centered on the tube. Repeat for the other three.

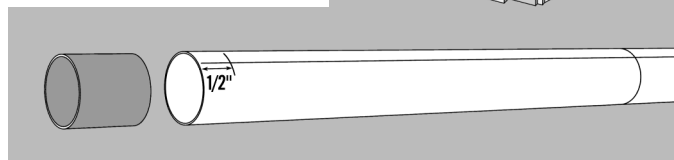
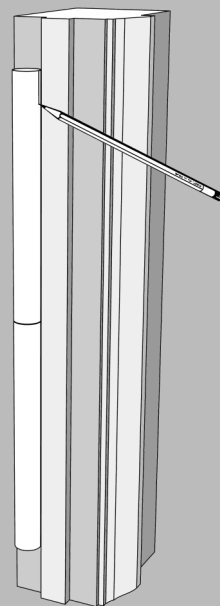
MAIN ASSEMBLY

❑ **9.** Apply a bead of glue inside one end of one of the stuffer tubes (ST-990). These tubes are 9" long and should not be confused with the BT-51N tank tubes! Insert the tube coupler (HTC-9) into one end of a tube to about 1/2". When it sets sufficiently, add a bead of glue inside the other stuffer tube and join the two tubes. Roll on a flat surface to make sure the resulting tube is straight.

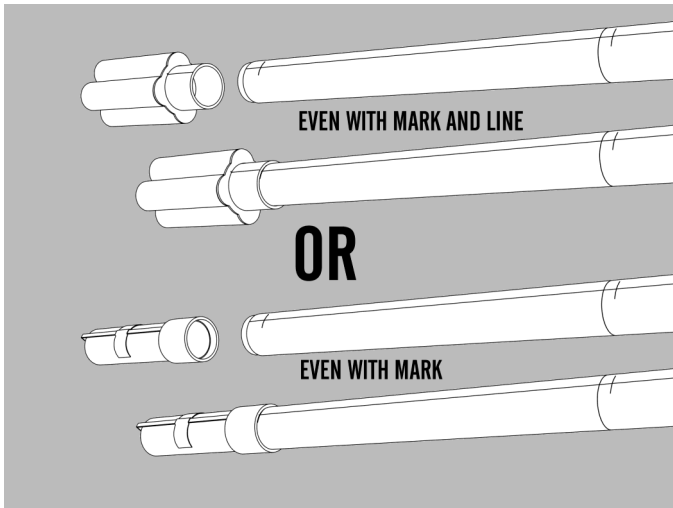


❑ **10.** When the stuffer tube is dry, hold it against a door facing, drawer edge, or another channel and make a long continuous line down the length of the tube.

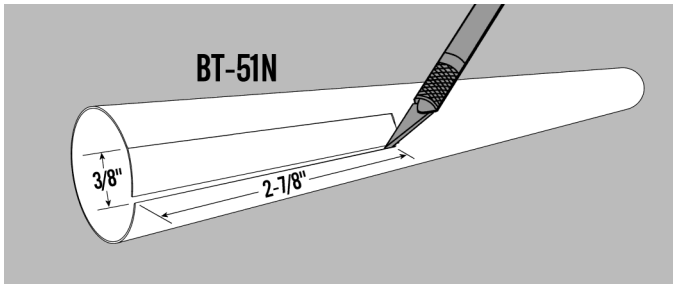
❑ **11.** Mark one end of the stuffer tube 1/2" from the end of the tube over the long line just drawn. Add a bead of glue inside the stuffer tube and insert a tube coupler (HTC-9) until it has about 1/4" exposed. This will help protect the stuffer tube from hot gases.



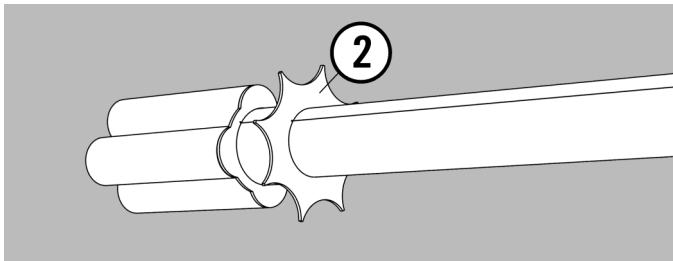
❑ **12.** Apply a film of glue around the end of the stuffer tube between the mark and the end of the tube. Insert the top of your engine mount (cluster or single) over the stuffer tube until the top of the ring (TR-115) is even with the 1/2" mark. Do not fillet the joint between the thrust ring and the stuffer tube. **If you are using the cluster mount, make sure the line drawn on the thrust ring is aligned with the long mark drawn on the stuffer tube. This is very important! The tank tubes will not fit if this is not correct.** If you are using the single engine mount, it is not important how the mount is aligned as long as it is even with the 1/2" mark. Allow this assembly to dry completely.



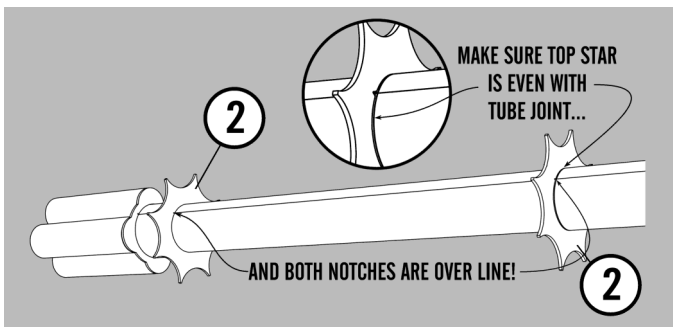
❑ **13.** This step can be skipped if you have the single 24mm engine mount. Locate four of the fuel tubes (BT-51N.) Mark a rectangle on the end of each tube 3/8" wide by 2-7/8" long. Carefully cut out a slot from all four of the tubes. Leave the remaining tubes alone for now.



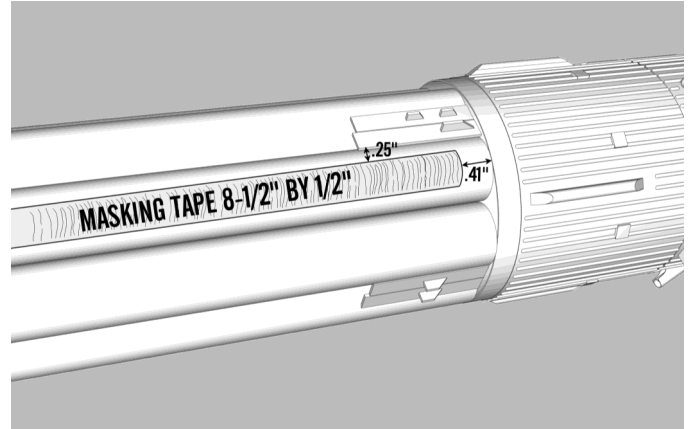
❑ **14.** Place one of the stars (2) over the stuffer tube and slide it into place against the thrust ring on the engine mount. **Align the small notch on the star with the long line on the stuffer tube.** Place a fillet of glue on each side of the star.



❑ **15.** Place the other star (2) over the stuffer tube and slide it into place even with the top of the **mid joint** and **with the small notch aligned with the long line on the stuffer tube.** Place a fillet of glue on each side of the star.



body tube and 1/4" to the right of the antenna panel. Apply the tape smoothly down the tube, centered between joints. Apply the other three pieces of tape, each on the tank to the right of an antenna panel. Apply a thin coat of white along each edge with a brush. After the white paint is dry, use brushes to paint each fuel tube. Keep paint off the adjoining tubes. Use care to get the desired result. Refer to the side views to paint the lower section of each tube against the fairing.



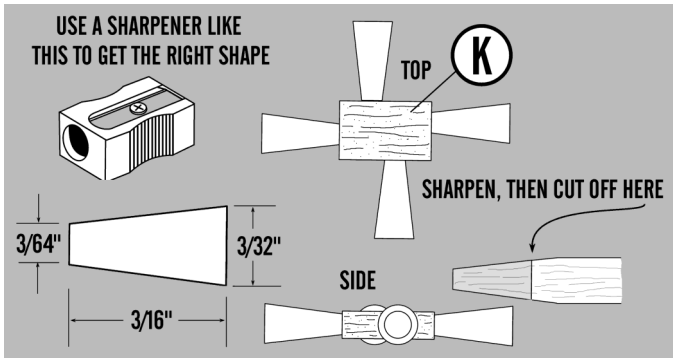
❑ **66.** Position the model so POS I is pointed toward you. The right side of the fin at POS I is black as are both sides of the fin to its right (POS I/II) and the left side of the fin at POS II). The corresponding fairing shroud at these positions is also black. The tail ring is also painted black. Use a small brush to paint the edges and fill the area with a larger brush.

❑ **67.** Position the model so POS II is pointed toward you. The top half of the right side of the fin at POS II is black as are both side of the fin to its right (POS II/III) and the left side of the fin at POS III). The corresponding fairing shroud at these positions is also black. The tail ring is also painted black to match the fins. Mark the break line between on the tail ring at .78" (25/32") from the top of the tail ring at the fairing joint. Mark each fin at 2.41" (2-13/32") from the top of the fin along the leading edge. This point should be at the same level as the mark on the tail ring. Connect these lines as paint guides. Mark the next four fins to the right and continue the line around the model for later steps. Masking tape should not be used or used very carefully with the fin covers and the shrouds! Use a small brush to outline the demarcations and fill the area with a larger brush.

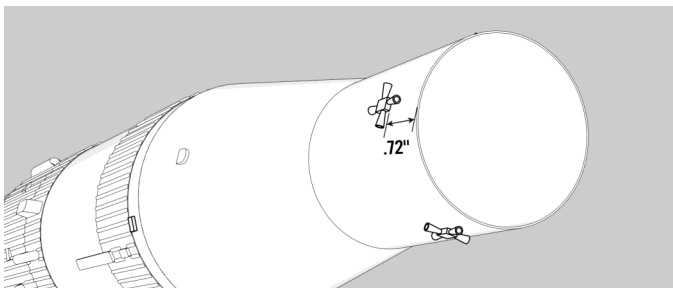
❑ **68.** Position the model so POS III is pointed toward you. The bottom half of the right side of the fin at POS III is black as are both sides of the fin to its right (POS III/IIII) and the left side of the fin at POS IIII). The corresponding fairing shroud at these positions is left white. The bottom of the tail ring is also painted black to match the fins. Using the mark from the last step, paint the bottom halves now. Use a small brush to outline the demarcations and fill the area with a larger brush.

❑ **69.** Position the model so POS IIII is pointed toward you. Only the fuel tube is painted black in this position. Leave the fairing white.

cil sharpener as shown in the diagram. Carefully "sharpen" an end of the 1/8" dowel (WD-212.) Trim off the pointed end so it is 3/64" in diameter. Roll the dowel under your hobby knife about 3/16" from the point to generate the nozzle. This may take a few pieces to practice getting the correct shape. Make 16 identical pieces. Locate the four small junction box pieces (K) that you set aside earlier. Sand them slightly. Use the top and side views as a guide to glue four nozzles on each junction box. You may use a hobby knife or small drill bit to form a nozzle in each large end to make it look more realistic.



❑ **62.** Glue the four assemblies equally spaced around the parachute tube .72" (23/32") from the top edge and directly over the latches and POS. fins.



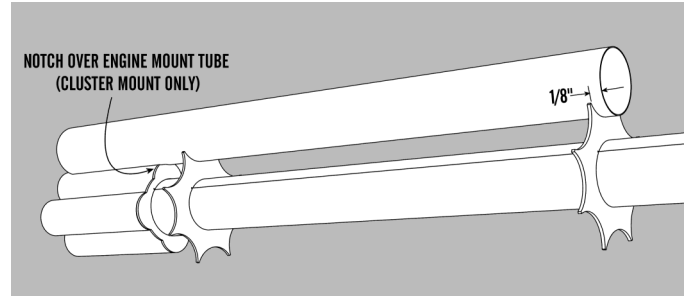
PAINTING

❑ **63.** Before painting the Saturn 1B, all balsa surfaces should be sealed with Fill 'n Finish or sanding sealer. Wipe any dust from your model.

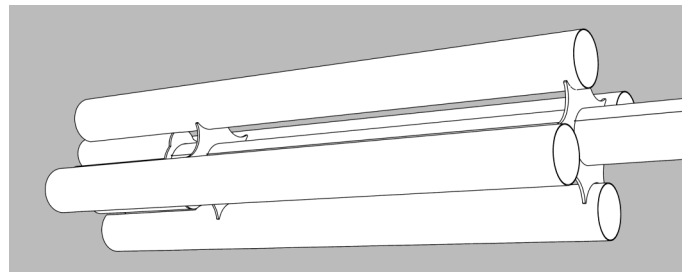
❑ **64.** The Saturn 1B should be painted with a base coat of gloss white paint. A spray enamel paint works best for this. Support your model using a dowel in the engine mount tubes or a string tied to an engine hook and run all the way through the model and out the parachute tube at the top. Apply the paint in a large dust-free area, preferably outside. Apply thin coats so the corrugated patterns and details do not get covered with thick layers of paint. Allow the base coats to dry completely before starting with the roll patterns and tanks.

❑ **65.** Use a strip of masking tape 8-1/2" long and 1/2" wide on four of the fuel tanks to mask off the area that the long "United States" decals will be placed. Make sure both ends are cut square. Mask the fuel tanks to the right of each antenna panel. Start the tape at the top of the tank tube .41" (13/32") from the bottom of the upper

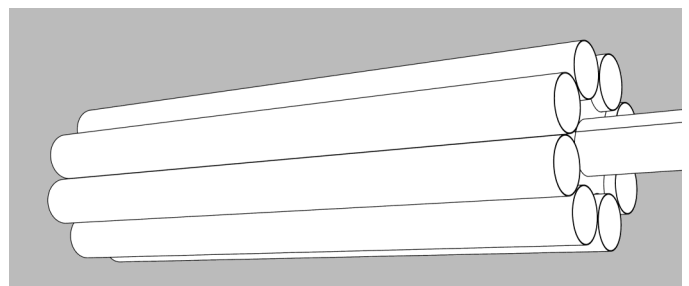
❑ **16.** Mark the end of each stuffer tube 1/8" from the end. The four slotted tubes should be marked at the opposite end from the slot. (If the tubes were not slotted for the 24mm option, use any four tubes.) Glue the first slotted tank tube to the two stars as shown, with the slot over one of the engine mount tubes and the 1/8" mark even with the top of the star. Since the walls are thin on the tank tubes, be careful as you handle this section.



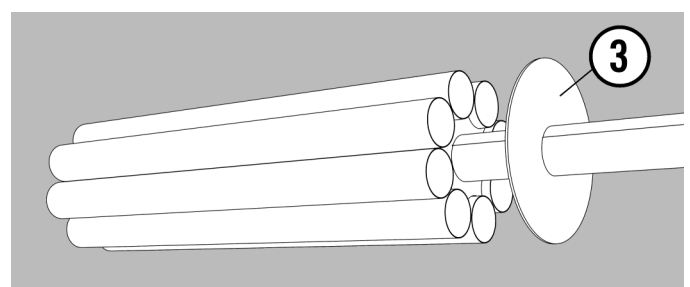
❑ **17.** Repeat for the other three slotted tank tubes, keeping them 1/8" from the top of the star. It gets harder to glue as more tubes are added. Make sure you have good joints on the stars. Also watch for drips since there are many joints and lots of glue used in these steps.



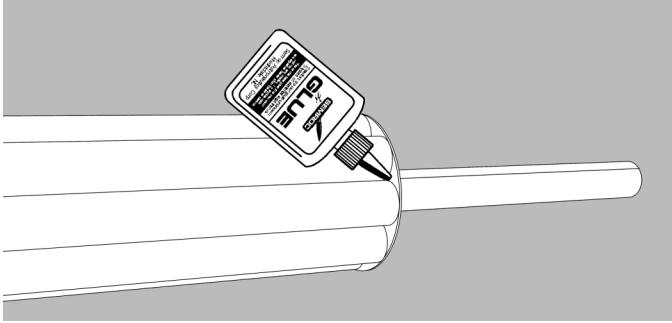
❑ **18.** Glue the remaining four tubes between the first four, also keeping them aligned at the top 1/8" from the star. Run a fillet of glue around all the joints at the top of the assembly.



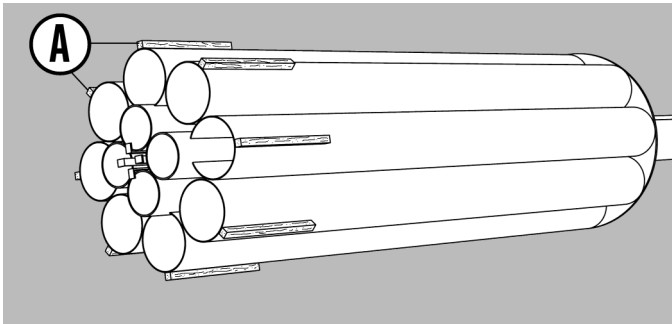
❑ **19.** Slide the tank tube cover (3) over the stuffer tube and glue into place flat against the tops of the tank tubes..



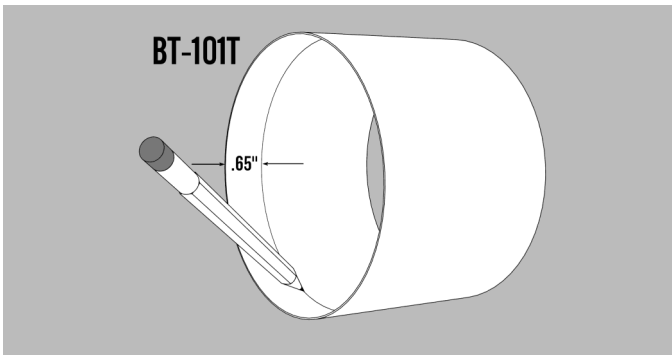
- ❑ **20.** Apply fillets around each joint between the tank tubes and the tank cover.



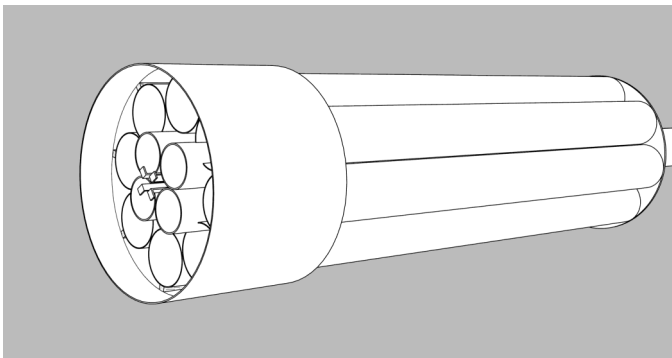
- ❑ **21.** Remove the 8 spacer strips (A) from the balsa sheets. Sand slightly to remove tabs. These will be covered so finishing is not necessary. The strips are not square so glue the laser-cut edge to the tank tubes for best fit. Glue one to the outermost part of each tank tube and even with the bottom edge.



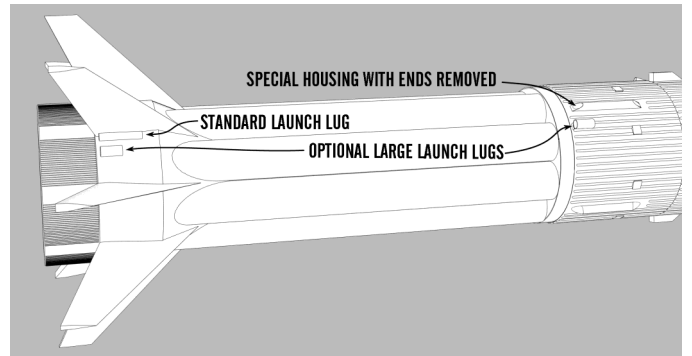
- ❑ **22.** Place a mark .65" (21/32") inside the edge of the tail ring tube (BT-101T).



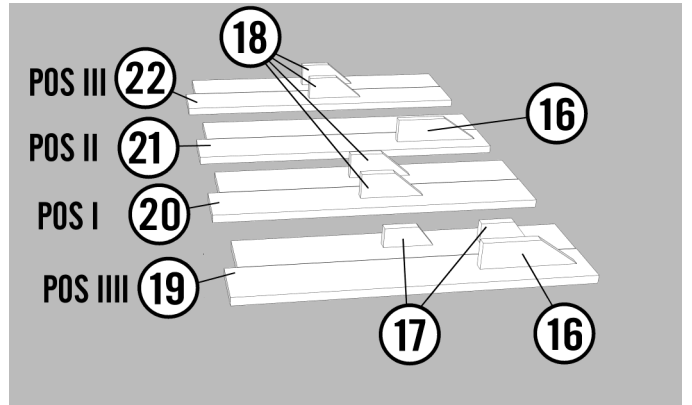
- ❑ **23.** Slide the tail ring over the tank tube assembly until the balsa spacer strips line up with the line drawn on the inside of the tail ring. Apply a fillet of glue along each joint.



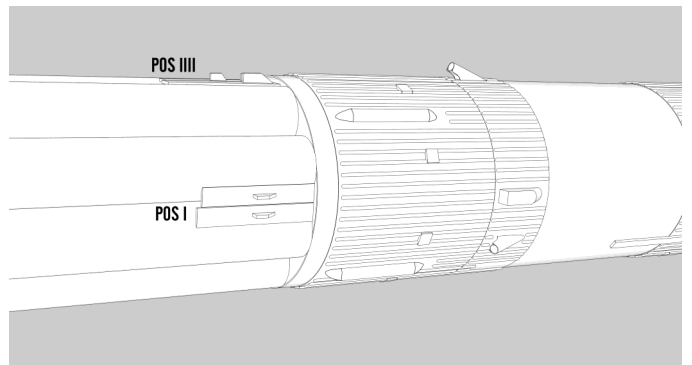
1/2" long piece of the large launch lug about 1/4" from a fin and on the bottom of Wrap #2. Cut a 1/2" piece and using a small scrap piece of balsa as a standoff, glue it on Wrap #3 and in line with the lower launch lug. Make sure it clears the camera target (11).



- ❑ **59.** Attach the antennae to the antenna panels. Line them up as shown and identify all the small parts. The panels have a faint outline of the position of each antenna. Be sure to use Cyanoacrylate glue to seal all the edges before gluing them on. Panels I and III are the same.

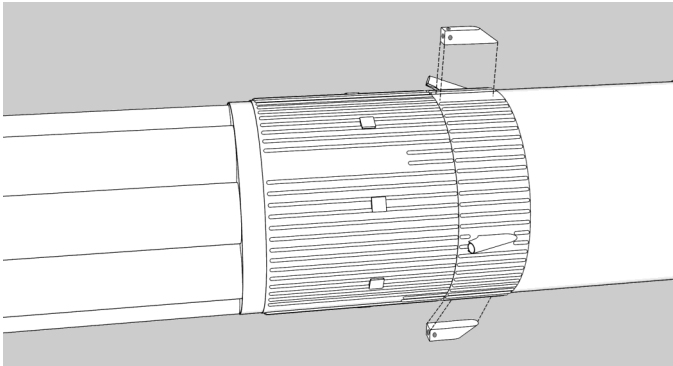


- ❑ **60.** These are glued inline with the POS. fins. Apply a small bead of glue to the top (straight end) and both long sides and position each panel between two tanks and touching the tank cap. Refer to the drawings to locate the positions.

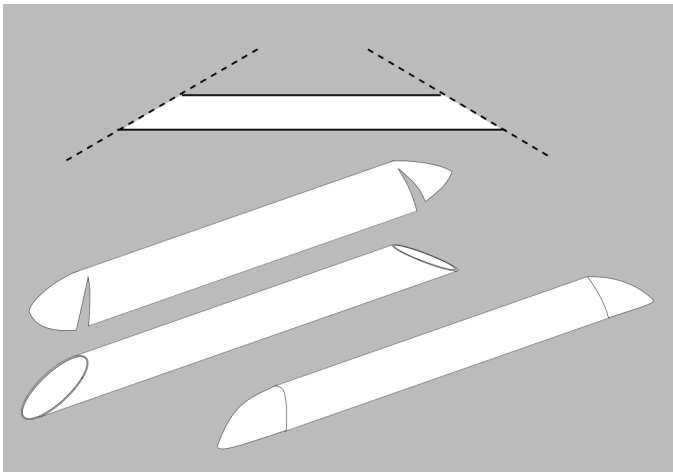


- ❑ **61.** The four Service Module attitude control system nozzles are the last parts! They are the biggest challenge and require much patience. Four small nozzles will be glued around each junction box. The best way to create the small scale nozzles is by using a small hand held pen-

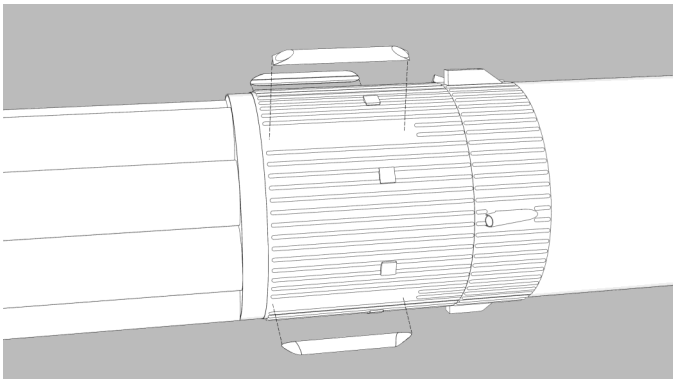
- ❑ **55.** Attach the two vector control jet housings on Wrap #4 on the last two flat areas with the top edge even with the top of the wrap.



- ❑ **56.** Build the four retro-rocket housings from the small launch lug material (LL-180) and the cut-outs from the shroud sheets. Use the guide below and cut the launch lug pieces to size. Wrap the cover around the launch lug and glue as shown. Cut two of the end caps off one of the housings so it is open at the ends to be used as the upper launch lug.

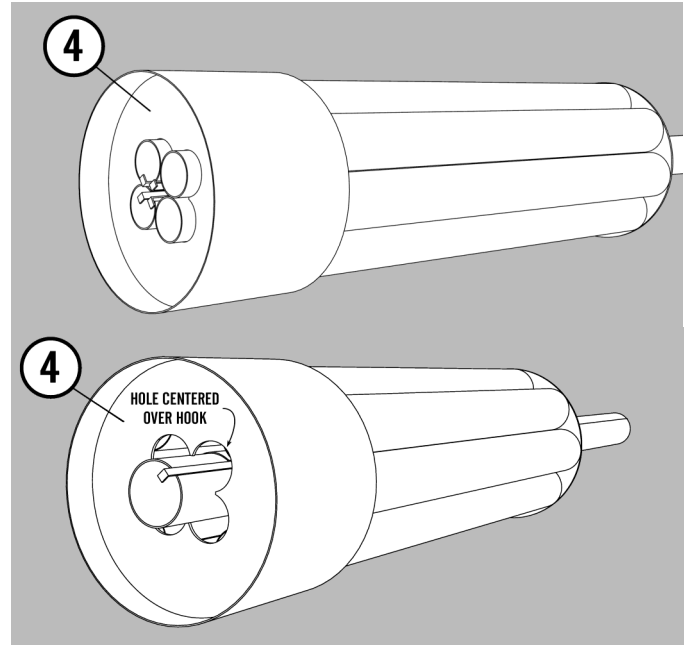


- ❑ **57.** Glue the four retro-rocket housings to Wrap #3 centered on the four flat spots and 3/32" from the bottom of the wrap.

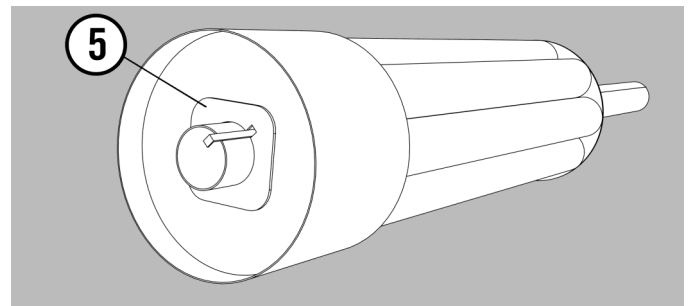


- ❑ **58.** Cut a 1" long piece of the small launch lug material (LL-180) and glue it to the fin joint most in line with the retro-rocket housing that is missing the end caps. A larger launch lug (LL-320) is provided for use with a 3/16" launch lug. If you will use a 3/16" launch rod, glue a

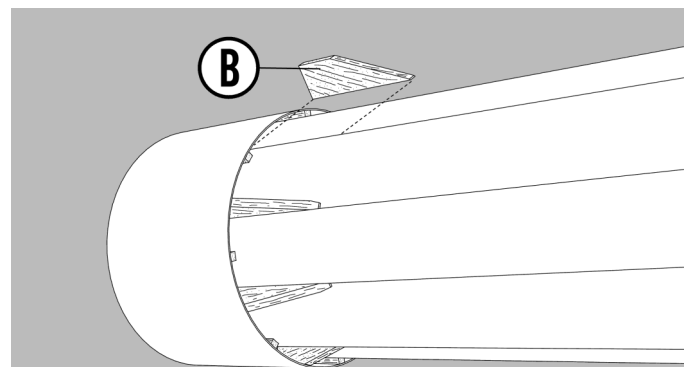
- ❑ **24.** Insert the lower cap ring (4) over the end of the motor mount and flush against the tank tubes. If you have the 24mm single mount, align the engine hook in the center of one of the holes. Apply a fillet of glue around all the joints.



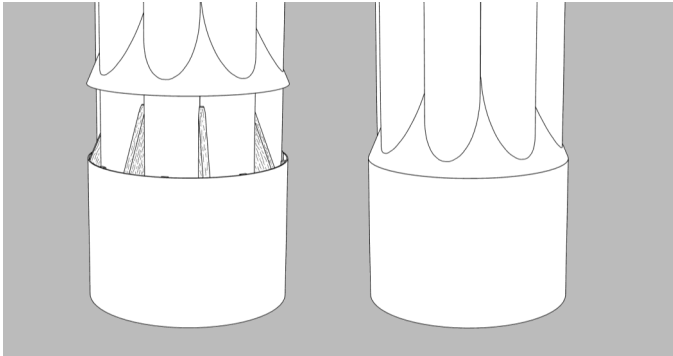
- ❑ **25.** If you have the 24mm single mount, glue the hole cover (5) over the engine tube with the hook centered in the slot. Apply a fillet of glue around the cover.



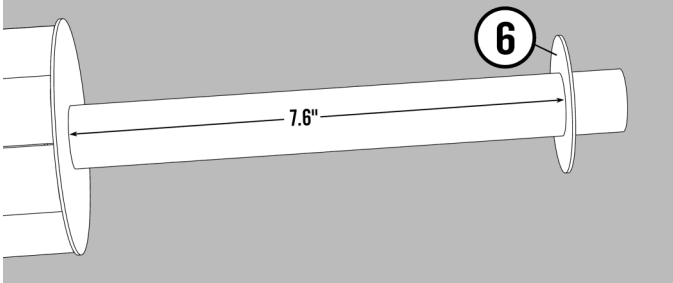
- ❑ **26.** Remove the 8 fairing supports (B) from the two balsa sheets. Sand them lightly to remove the tabs. Bevel the longest edge slightly and fit them into the joint between the tank tubes and the tail ring. Glue them into place with the short edge even with the top of the tail ring. These will provide support for the tank fairing in the next step. Use a scrap piece of balsa to get glue on the joints with the tail ring. Allow to dry.



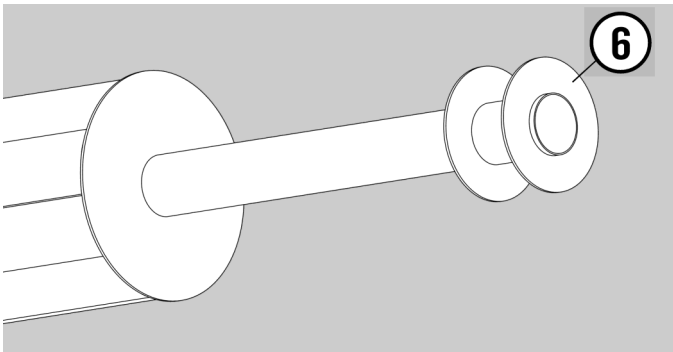
❑ **27.** Carefully cut out the fairing shroud and glue the ends together with the glossy side out. Slide the fairing over the tank tubes and against the fairing supports and the tail ring. Check it for fit and trim slightly if necessary. Pull it back and apply a small bead of glue on each fairing rib and around the tail ring. Reseat the fairing and apply glue fillets at all joints.



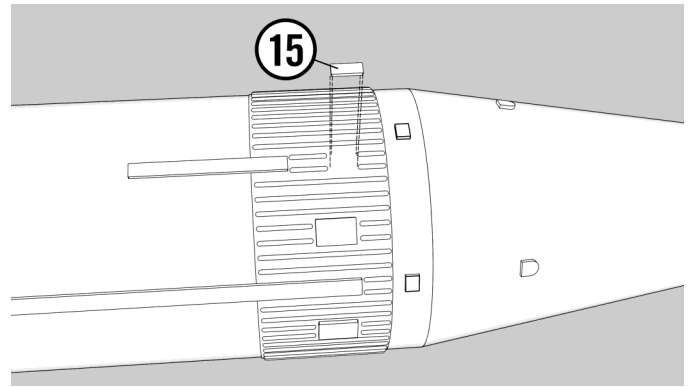
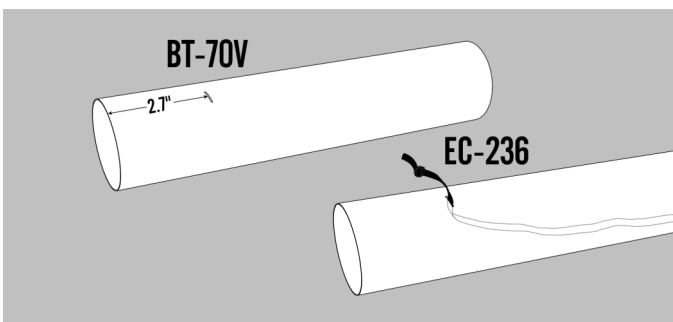
❑ **28.** Measure 7.6' (7-19/32") from the tube cover on the exposed end of the stuffer tube. Glue one of the adapter rings (6) even with the mark. Apply a fillet around both sides of the joint.



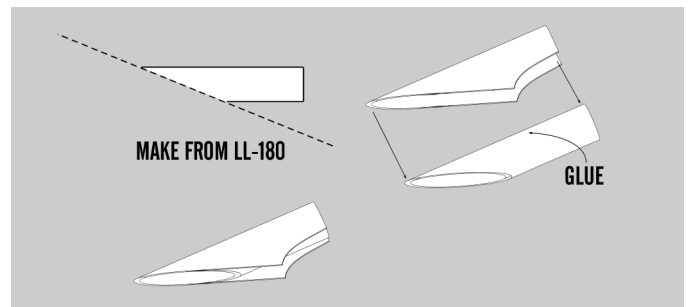
❑ **29.** Glue the other adapter ring (6) to the end of the stuffer tube. Apply a fillet around both sides of the joint.



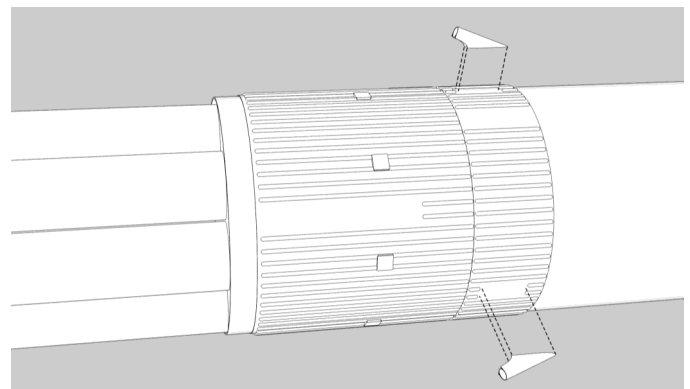
❑ **30.** Place a mark at 2.7" (2-11/16") from the end of the parachute tube (BT-70V.) Slot it with your hobby knife and insert the shock cord (EC-236.) Tie a knot in the end and pull the opposite end until the knot is against the tube. Apply a bead of glue to the knot and tube joint.



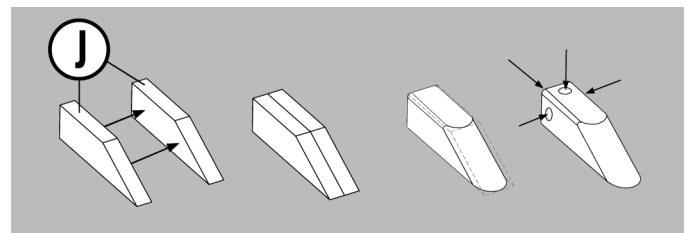
❑ **52.** Make three discharge tubes as shown below. Cut a piece off one of the small launch lugs supplied (LL-180) using the guide. Cut out the discharge tube shroud and fold it around the launch lug with the glossy side to the outside. Glue it to make the shape as shown. Repeat for the other two discharge tubes.



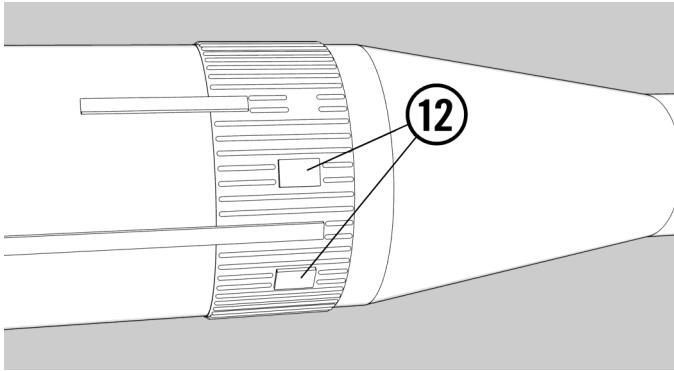
❑ **53.** Attach the discharge tubes to Wrap #4 centered in the two flat spots as shown. The third spot (not shown) is on the opposite side. There are three flat spots close together. The discharge tube goes on the middle spot. It is the only spot that has a corrugation pattern like the two shown below with two short bars on either side.



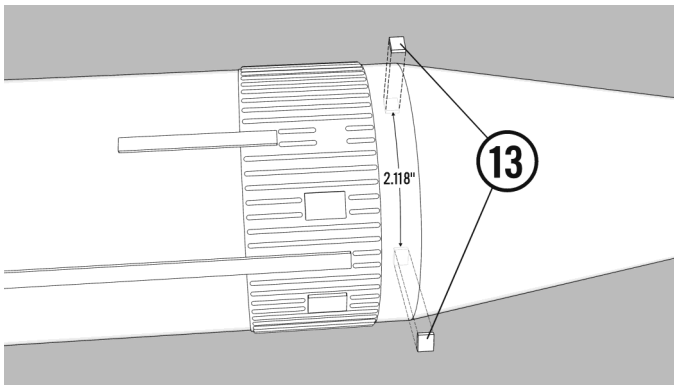
❑ **54.** Build the vector control jet housings from the balsa pieces (J) provided. Glue two halves together and allow to dry. Sand the front edge round and round the top edges. Use the end of the dowel to depress four nozzle openings in the piece as shown. Repeat for the other housing.



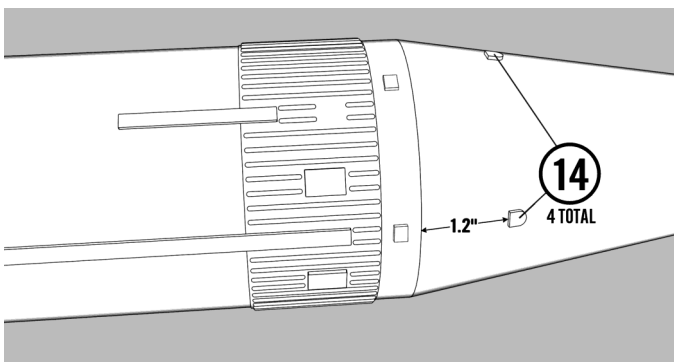
- ❑ **48.** Detach the two telemetry antennae (12) from the fiber sheet. Align them as shown below and glue into place on Wrap #5. They should be centered over the two flat spots on either side of the main channel.



- ❑ **49.** Detach the thermal sensors (13) from the fiber sheet. Align them as shown below and glue into place on the upper body tube. Center them between the top of the upper body tube and the top of Wrap #5. Align the first one directly over the long main tunnel and space the second one 2.118" towards the auxiliary tunnel. Refer to the drawing.

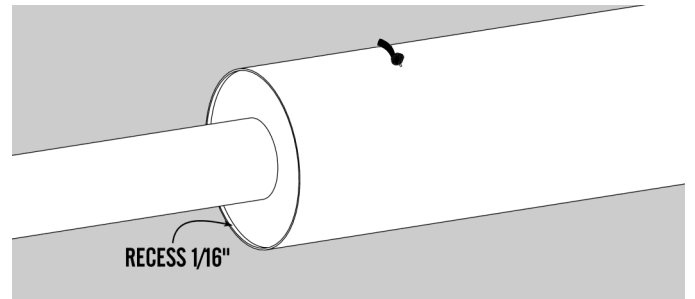


- ❑ **50.** Detach the four latch pads (14) from the fiber sheet. Align them as shown below and glue into place on the LEM shroud. They should be in line over each POS. fin and 1.2" from the base of the shroud.

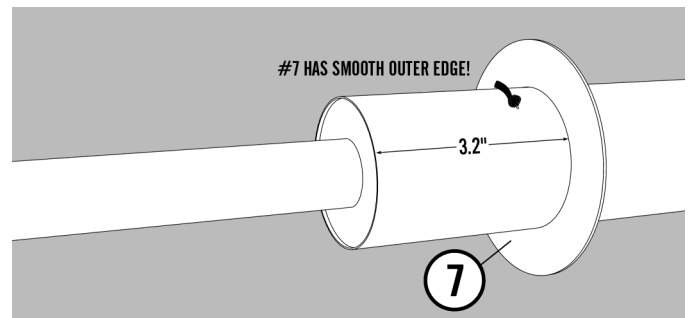


- ❑ **51.** Detach the cover (15) from the fiber sheet. Center it on the final flat spot on Wrap #5 and glue it into place.

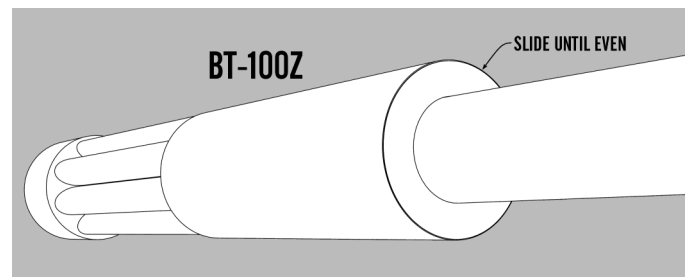
- ❑ **31.** Pull the shock cord out of the top of the parachute tube so it is out of the way. Apply a bead of glue inside the end closest to the knot. Slide the main tube assembly into the parachute tube until the bottom ring is recessed 1/16". Let the glue dry in an upright position, then turn it upside down and add a fillet against the recessed ring.



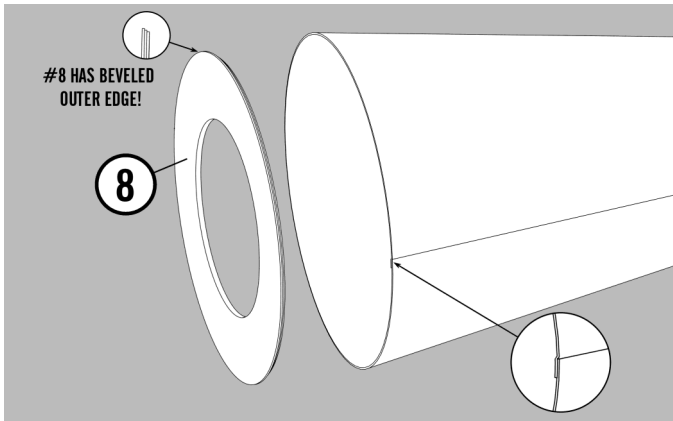
- ❑ **32.** Locate the parachute tube adapter ring (7). This is the ring with the smooth outer edge. Do **not** confuse this with the shroud adapter (8) which is the same size but has a beveled edge. Glue it to the parachute tube 3.2" (3-13/64") from the bottom edge. Apply a fillet of glue to each side, heavy to the bottom and thinner to the top. Allow to dry.



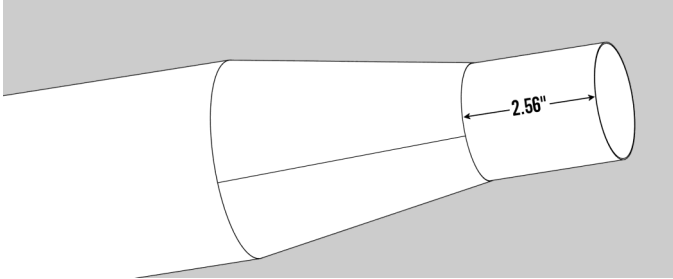
- ❑ **33.** Fit the upper body tube (BT-100Z) over the parachute tube ring and over the tank cover ring. **It should be even with the top ring and have a slight overlap over the bottom ring.** Remove the tube and apply a bead of glue around the top edge of both rings. Quickly slide the tube back into place, wiping any glue that may drip. Allow the tube to dry, then apply a fillet at the bottom end. Wipe the top ring so it is smooth and the ring is flush with the tube.



- ❑ **34.** Carefully cut out the LEM shroud from its sheet. Roll it into a conical section with the **glossy side out**. Apply a thin film of glue on the overlap area. Press the other end into place making sure it is even with the marked area. Hold it in place while the glue sets. Use your finger to remove the beveled edge from the shroud adapter ring (8) Run a thin bead of glue just inside the LEM shroud and glue the ring in place with the bevel facing inside.

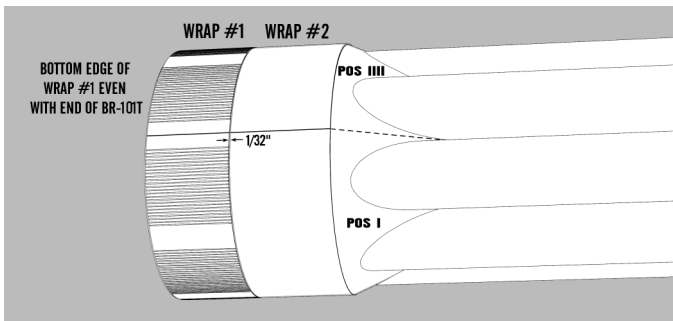


❑ **35.** Apply a bead of glue around the top of the parachute tube ring and upper body top. Slide the LEM shroud over the parachute tube and into place over the parachute tube ring. fit the base of the shroud to the upper body tube and smooth any excess glue. Apply a thin fillet of glue around the top joint and smooth it into place. There should be 2.56" of the parachute tube left exposed.



WRAPS

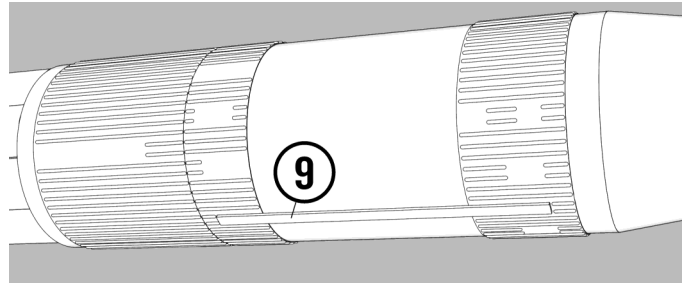
❑ **36.** Start with Wrap #1, the longest corrugated piece. Fit it around the base of the ring tube. Trim if necessary. Apply a thin film of white glue on the dull side and place it around the ring tube, even with the bottom and the edge lined up and parallel with one of the tank tube joints. Refer to the drawing below. The joint selected will become the fin position between POS. I and POS. III. Repeat with Wrap #2, the wrap with no corrugations. It should be placed glossy side out and almost touching Wrap #1 and with the edges in line.



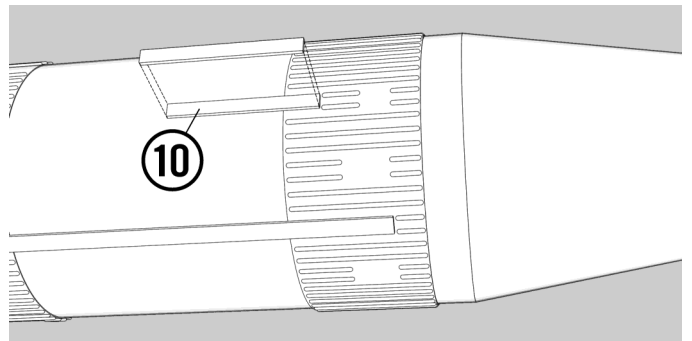
❑ **37.** Wrap #3, the widest corrugated piece, is next. It should be glued with the flat spots toward the rear on the upper body tube. The edges should be aligned with the edges of the first two wraps. The bottom edge should be .385" from the edge of the upper body tube. Refer to the drawing. Fit it into place and draw a line around it to make it easier to align while gluing it in place. Make sure

FINAL DETAILS

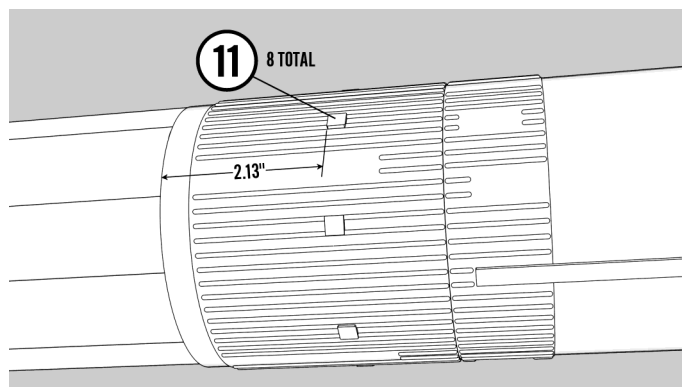
❑ **45.** All the remaining small laser-cut fiber parts will be attached in the following steps. They are small and look very much alike so keep the parts identification page handy. As each piece is removed, a very light sanding should be used to get rid of any tabs. Use cyanoacrylate glue applied to each edge with a toothpick to seal the layers of paper so they do not de-laminate. Select the main tunnel (9) from the fiber sheet. Center it on the two corresponding flat spots on the two upper wraps.



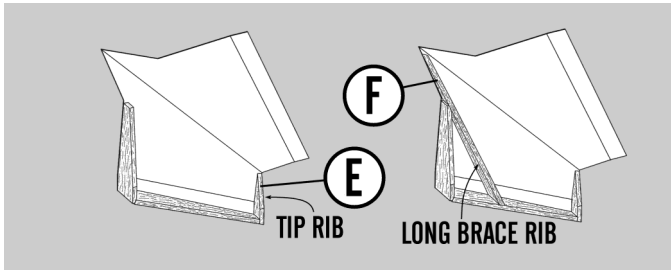
❑ **46.** Detach the auxiliary tunnel (10) from the fiber sheet. Align it on the flat area on Wrap #5 beside the main tunnel extended onto the upper body tube and glue into place.



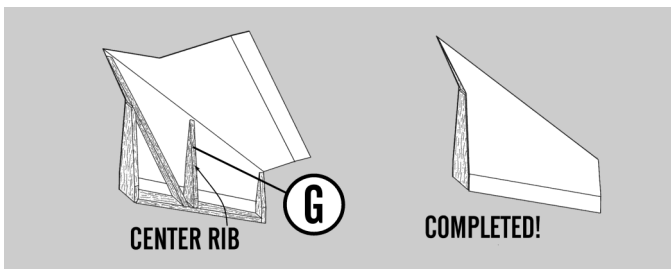
❑ **47.** Detach the eight camera targets (11) from the fiber sheet. Align them as shown below. They should be centered over each tank tube and 2.13" from the bottom edge of the base of the upper body tube. It may be necessary to depress the corrugation slightly to get a close fit on the wrap.



❑ **41.** Test the tip rib (E) for fit and add it next. It may be necessary to sand the edge of the trailing edge spar. Test fit the long brace rib (F) next. The bottom may need to be beveled to fit. Apply a small amount of glue and set it into place over the dotted line.

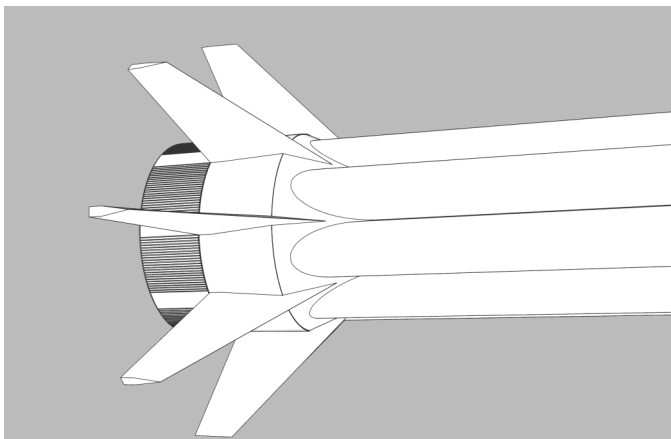


❑ **42.** Test the center rib (G) for fit and place it along the dotted line. Glue it into place. After the glue has set on all pieces, run a thin bead of glue around each internal joint for strength. Fold the fin cover and test for fit. Apply a thin bead of glue on all the top edges of the ribs and fold the cover over into its final position. Hold it in place until the glue sets. If all the pieces fit correctly, little additional work is required. If there are edges that do not line up, wait for the glue to completely dry and sand the fin. Fill 'n Finish can be used to smooth the tip and trailing edge. Repeat for the remaining seven fins.

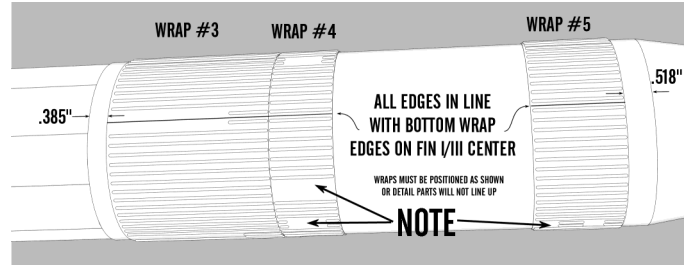


❑ **43.** If you decided to use the balsa fins (H) instead of the built-up fins, sand a gradual bevel on each so the leading edge is smaller than the trailing edge. Use Fill 'n Finish to fill the balsa and sand it smooth. Repeat for all eight fins.

❑ **44.** Check each fin for fit using the drawing below. Each fin should be centered between two tank tubes and against the Wrap #2 and the fairing shroud. Use enough glue to get a good joint. a very small fillet can be used on the root joint, but most of the strength comes from the glue on the root edge.



it is aligned exactly as shown before continuing. As with the first wraps, glue it with the glossy side out. Wrap #4, the smallest remaining wrap, is glued just above Wrap #3. **Make sure it is positioned as shown by the NOTE!** If it is installed upside down, none of the detail pieces will fit later. Wrap #5 is glued .518" from the top of the upper body tube. Also refer to the drawing carefully for the correct position of the corrugations. All the edges should be in a straight line.



FIN CONSTRUCTION

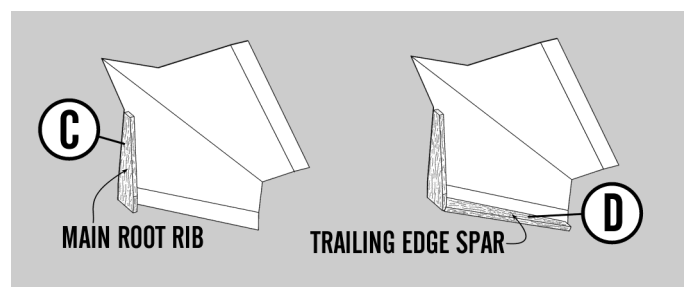
Second Major Decision!

The built-up fins are one of the most difficult steps in the construction of the Saturn 1B. They require lots of patience, but give the best result. We have provided 1/8" laser-cut balsa fins as an alternate solution. At a distance, they are hard to tell they are not the real thing. If you do decide to use the balsa, still give the built-up fins a try. They will give you a flavor of building the original model.

❑ **38.** Carefully cut out eight of the fin covers. Place a straight edge along the center fold line. Draw a dull table knife or a ball-point pen along the line to score the paper without cutting through. Align the straight edge on the two crease lines and make a lighter crease on each of those. Fold the fin cover in half along the fold line. Slightly crease each of the crease lines. Repeat for all eight covers.

❑ **39.** Sand both sides of the 1/16" thick laser-cut sheet B carefully before breaking the individual pieces out. They are hard to sand once they are loose since they are so small. Remove the four small junction boxes (K) and put them in a safe place. They are easily lost.

❑ **40.** Remove all the rib parts from the laser-cut sheet. Sand them slightly to remove the hold-in tabs. Separate them into eight sets of parts. Start with the main root rib (C) and test it for fit over the dotted line. Add a small bead of glue to the edge of the root fin and apply it to the fin cover. Add the trailing edge spar (D) against the main root rib with a small amount of glue.



Parts List

- A 1 Apollo Capsule KS-2
- B 8 Body Tubes BT-51N
- C 1 Body Tube BT-70V
- D 1 Body Tube BT-100Z
- E 1 Body Tube BT-101T
- F 2 Body Tubes ST-990
- G 4 Body Tubes ST-730E
- H 1 Body Tube ST-940E
- I 2 Launch Lugs LL-180
- J 1 Laser-cut Fin Set (3) FS-1
- K 1 Thrust Ring TR-115
- L 1 Launch Lug LL-320
- M 1 Elastic Cord EC-236
- N 4 Engine Hooks EH-28
- O 1 Engine Hook EH-38
- P 3 Tubing Couplers HTC-9
- Q 1 Wood Dowel WD-212
- R 1 Centering Ring Set (3) CR-KS-1
- S 1 Body Wrap Set (5) IKS-1W
- T 1 Shroud Sheet Set (3) IKS-1S
- U 1 Chute Pak CP-32Y
- V 1 Decal Set DKS-1
- W 1 Saturn 1B Ruler IKS-1R
- X 1 Instruction Manual IKS-1

EXPLODED VIEW

