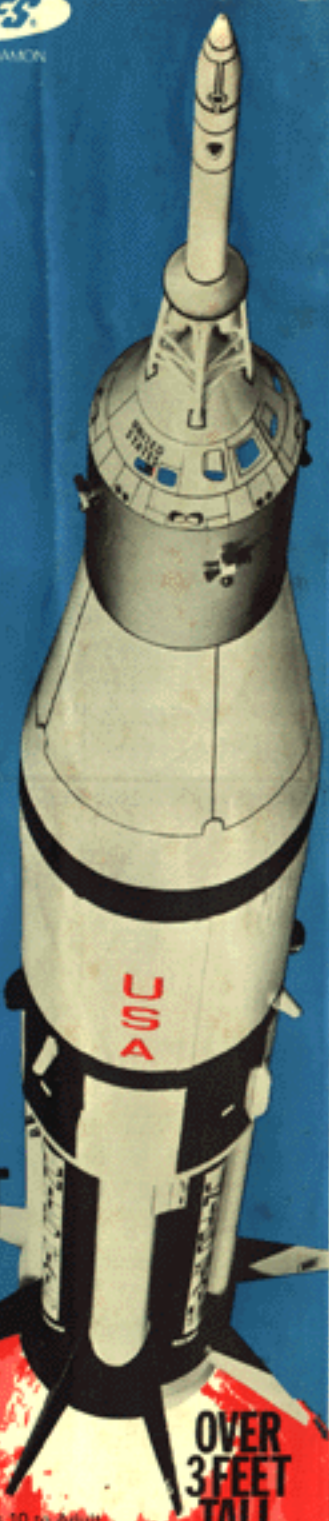






SATURN 1B

FLYING MODEL ROCKET KIT
1/70 SCALE MODEL



OVER 3 FEET TALL

Recommended for Ages 10 to Adults.
This is a hobby kit requiring construction.
Does not include launcher, engines, glue or finishing supplies.

MODEL SATURN 1B SPECIFICATIONS

- Length.....37" (94 cm)
 - Diameter.....3.938" (100 mm)
 - Weight.....9.9 oz (280 gr)
- RECOMMENDED ENGINES**
A8-3, B6-2 or any B6-4, B6-5
A8-3, B6-2 or any B6-4, B6-5 engines, advanced igniters required.
Launcher and Engines not included.



1/70th scale Apollo capsule with highly detailed escape tower.



Accurately scaled stabilizer fin assembly plus four engine cluster power for really dramatic lift-offs.



Precision corrugated body wrap-ons and authentic USA/NASA decal make this one of our most impressive scale models.

ESTES INDUSTRIES
Phoen. Cal., U.S.A.



The Estes launch system makes it fun to safely fly the Saturn 1B. Engine recommendations are given on the box and in the Model Rocketry Catalog. Clear the range and start your count down.

The multiple parachute recovery for this kit's 1B is designed to bring your model safely back to earth. Check it out. Reload it. You're ready for another launch.



Build and fly all the exciting MAXI-BRUTES

Even engineers have developed easy-to-follow scale model plans of the original Saturn 1B. The step-by-step instructions guide you through building, painting, and finishing the model.



This kit is a completely detailed model of the giant rocket that lofted the lunar module into earth orbit. A real NASA workhorse, the Saturn 1B has most recently been used to shuttle astronaut crews to Skylab. Known for its mission reliability and consistent performance the Saturn 1B has become known as one of our Space Program's most useful vehicles and a real "Stepping Stone to the Stars."

ESTES INDUSTRIES
Phoen. Cal., U.S.A.

SATURN 1B



A SUBSIDIARY OF DAWSON

FLYING SCALE MODEL (1:70)

SATURN 1B

LOFTED THE LUNAR MODULE
ON ITS FIRST FLIGHT TEST

- 3 CHUTE RECOVERY
- 4 ENGINE POWER



Has a 12 volt car battery and a 12 volt
Ester 10-0 jet engine (check manual spec-
tate for alternative ignition)

SATURN 1B

KIT NO. K-29

NO. 1228

SPECIFICATIONS

Length 57"
Body Dia. 3.53"
Weight 9.50 oz.

RECOMMENDED ENGINES

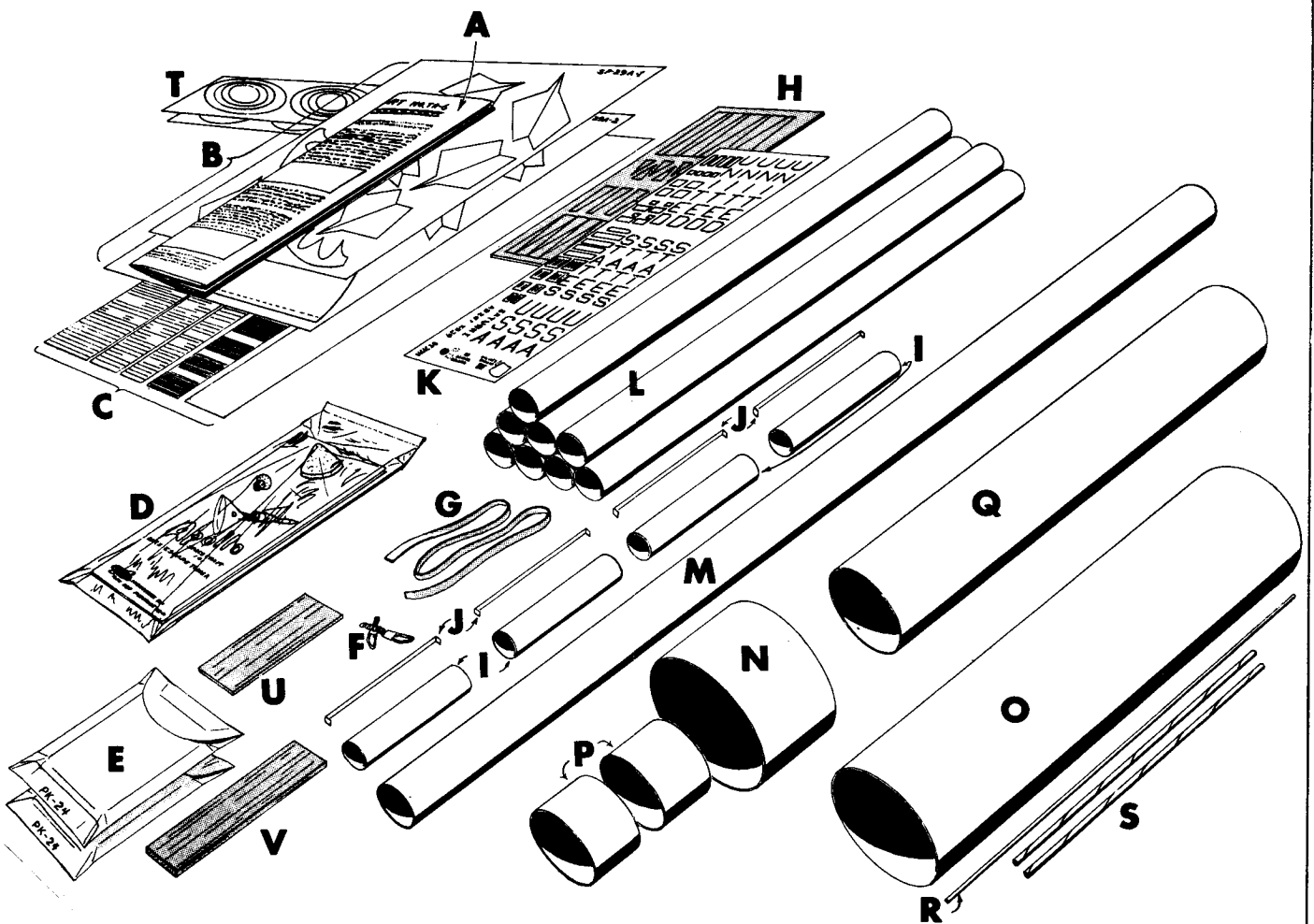
(All four must be the same.) A8-3, B4-4, C4-5
(Use B4-4 for First Flight.)

PARACHUTE RECOVERY

About the Assembly Instructions . . .

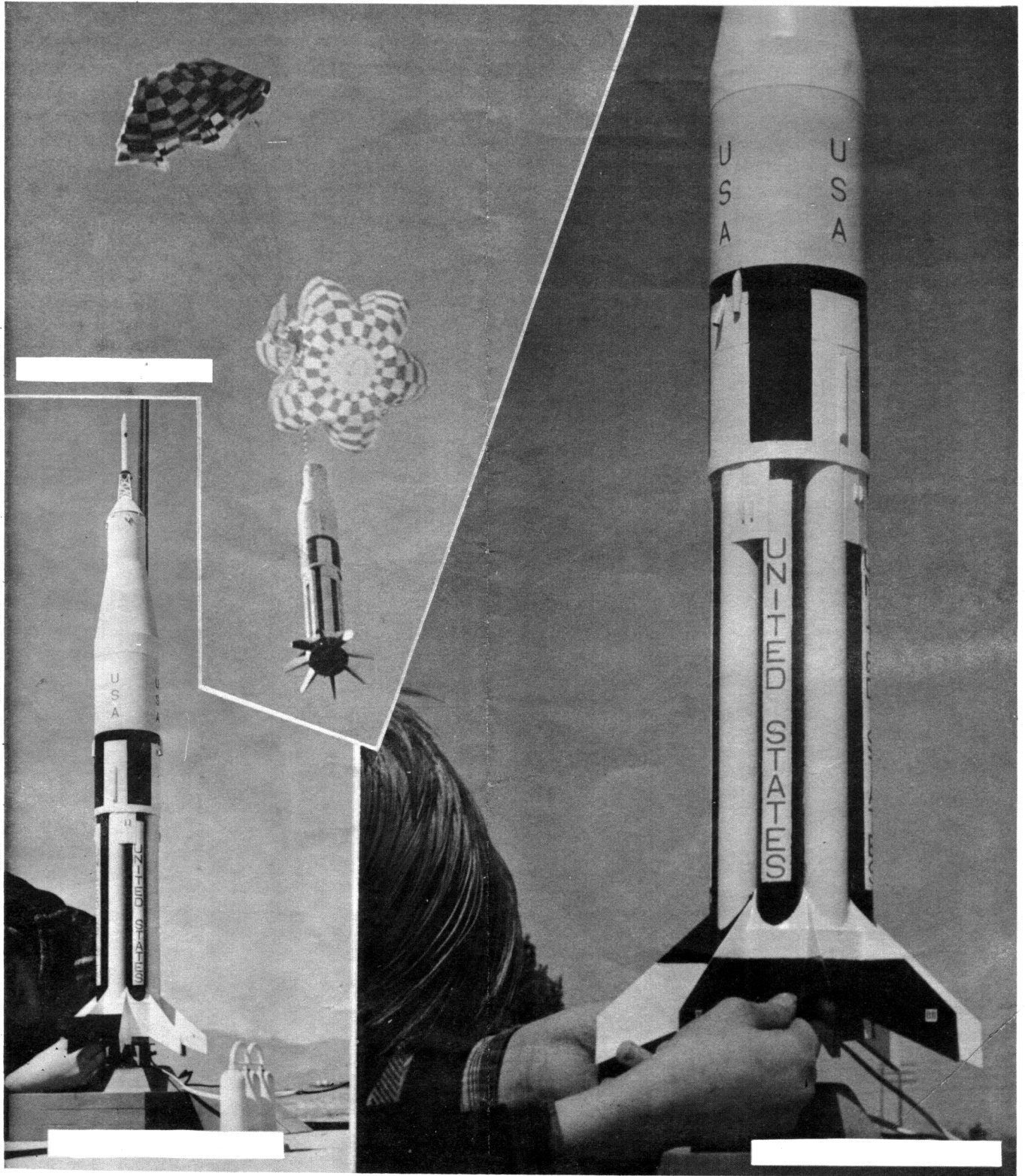
Your step-by-step instructions start on the accompanying sheets. As the assembly of the UPRATED SATURN I progresses, you will be referred to PANEL ONE, PANEL TWO, PANEL THREE or PANEL FOUR for visual aid through each assembly step. Read the entire set of instructions first, and be sure you understand each step, know the parts used in each step, and see the relationship of one step to the next. This model rocket MUST be assembled in proper sequence of steps and the strength of the entire bird depends on adequate glue joints. If you proceed at random, several of the critical measurements and glue joints will be impossible to make. REMEMBER, STUDY THE PLANS AND DRAWINGS --- BE CERTAIN YOU HAVE ALL THE PARTS OF THIS KIT BEFORE STARTING ASSEMBLY...then have fun assembling a very advanced model rocket kit!

Parts for the Uprated Saturn I



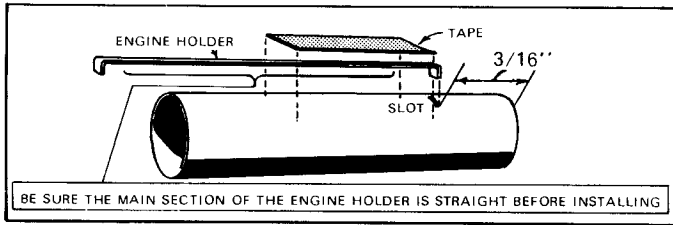
- | | | |
|--|---|---|
| A 1 - TR-6 Technical Report | J 4 - Engine Holder Spring #EH-2 | P 2 - Tank Support Tube #BT-63Y*
(1.34" long) |
| B 1 - Pattern Set #SP-29A 1 & 2* | K 1 - Special Decal Sheet #KD-29* | Q 1 - Parachute Tube #BT-70V*
(10.6" long) |
| C 1 - Exterior Detail Panel Set #SP-29B* | L 8 - Fuel Tank Tube #BT-51N*
(12.42" long) | R 1 - Dowel (Yaw & Pitch Nozzles) WD-1 |
| D 1 - Apollo Capsule Kit #NCK-29 | M 1 - Stuffer Tube #BT-50 | S 2 - Launching Lug #LL-2D
(Launching Guide & Other Details) |
| E 2 - 24" Parachute Kit #PK-24 | N 1 - Tail Ring Tube #BT-101T*
(2.78" long) | T 1 - Adapter Ring & Detail Set #TA-29* |
| F 2 - Snap Swivel #SV-12 | O 1 - Upper Body Tube #BT-100Z*
(10.894" long) | U 1 - Sheet Balsa Stock #BFS-40T* |
| G 1 - Shock Cord #SC-2 | | V 1 - Sheet Balsa Stock #BFS-80S* |
| H 1 - Die-cut Balsa Parts #BF-29* | | |
| I 4 - Engine Holder Tube #BT-20J
(2.75" long) | | |

* Stocked for Kit use only: Not listed in Catalog.

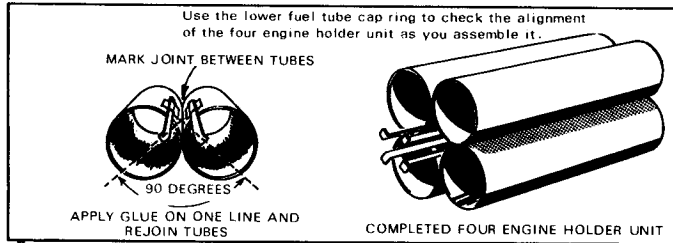


Basic Assembly

1. Mark a BT-20J engine holder tube $3/16''$ from one end and cut a $3/32''$ slot as shown below. Insert one hook of an EH-2 in the slot with the shank laying back along the tube as shown. Cover the hook end and slot with a drop of glue, then lay a 1'' piece of masking tape over the shank to hold it in place. Repeat this step with the other three engine tubes and hooks.

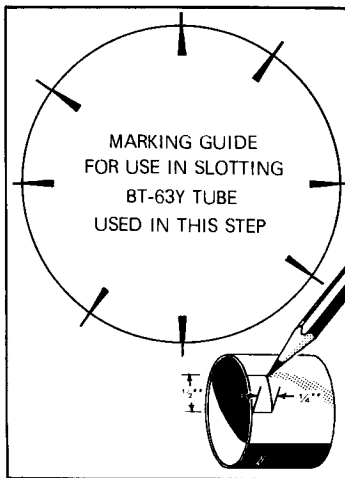


2. Lay two units together as illustrated below, and draw a line down the joint where they meet. Run a line of glue along one of the lines and join the two tubes as before. Repeat this step with

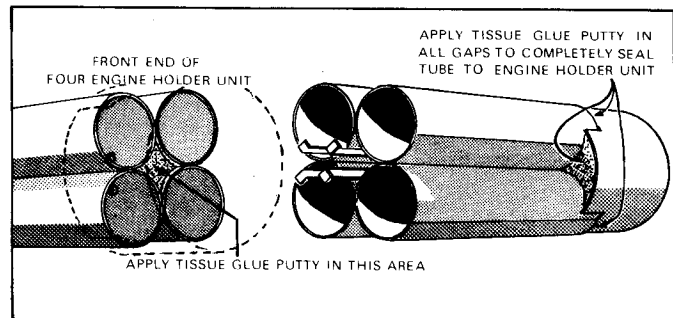


the other pair of engine holder assemblies. After the glue has set, place one pair on top of the other; mark and glue together forming the four-engine holder unit. Allow this assembly to dry completely.

3. Place the end of a BT-63Y tube over the marking guide to the right. Mark the side of the tube at each arrow point and extend the lines $1/4''$ up the side of the tube. There are four pairs of lines, $1/2''$ apart. Connect these pairs with a line parallel to and $1/4''$ from the edge of the tube. Cut out the four $1/4'' \times 1/2''$ areas using a sharp model knife. Fit the four-engine holder unit into this notched end of the tube. Trim if necessary to be sure all four engine tubes "seat" against the bottom of their slots, then glue the engine holder unit to the tube at all points of contact.

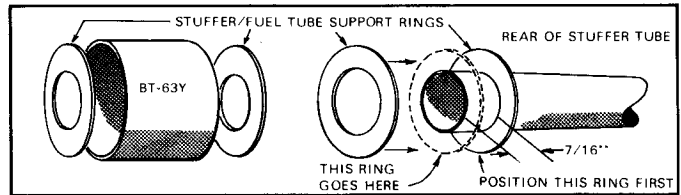


4. Squeeze a puddle of white glue into a paint can lid or other disposable container. Work bits of Kleenex or other tissue into the glue, using a stick to stir. Add bits of tissue until the mixture is the consistency of putty or plaster. Fill the four gaps as shown with the glue-tissue putty to a depth of $1/4''$. Also fill the



forward end of the opening between the engine tubes with the glue-tissue mixture to a depth of $1/4''$. Set the assembly aside to dry.

5. Remove the four stuffer/fuel tube support rings from the card. Glue two of them just inside each end of the remaining BT-63Y tube. While this sub-assembly dries, mark the BT-50 stuffer tube $7/16''$ from one end and slip one of the remaining fuel tube support rings onto the tube to the mark and apply glue fillets to both sides of the tube-ring joint. Be sure the ring is perfectly aligned before the glue sets. Apply a line of glue around the outside edge of the stuffer tube and place the last fuel tube support ring onto the tube-end allowing no more than $1/16''$ of the tube to appear through the ring center. Fillet as before and align this ring before proceeding with the next step.

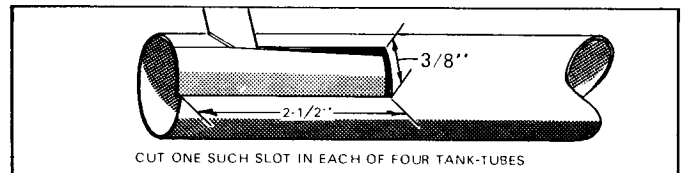


6. Measure and mark the stuffer tube $9-1/16''$ from the rear as seen in the STUFFER ASSEMBLY drawing, PANEL ONE. Slide the ring-tube assembly down the tube from the front until the ring center just touches the mark. Glue the ring-tube assembly to the stuffer tube at this point and let dry.

7. Final assembly of the stuffer tube assembly and engine holder unit is next. To make sure your model will stand up to many flights, coat the inside surface of the BT-63Y portion of the engine unit and the rearmost facing of the support ring which goes into it with a film of white glue. This forms the collection chamber for the ejection gases from four engines when it has been assembled. While this glue film is still very wet, join the two assemblies, referring to the STUFFER ASSEMBLY and construction notes 1, 2 & 3 on PANEL ONE.

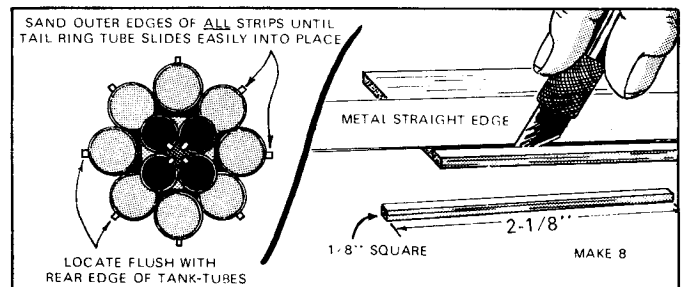
Fuel Tank Tubes are Next

8. Select four of the BT-51N tubes and lay out lines for cutting a $3/8'' \times 2-1/2''$ slot in one end of each tube. Refer to PANEL ONE, FUEL TANK TUBES drawing, Note 4, and see that each tube with a slot is centered directly over an engine tube. Apply a line of glue as shown in the illustration and fit the first tube in place. When the glue has set, apply a fillet of glue to each side of the slot, joining the tank tube to the engine tube. Repeat this part of

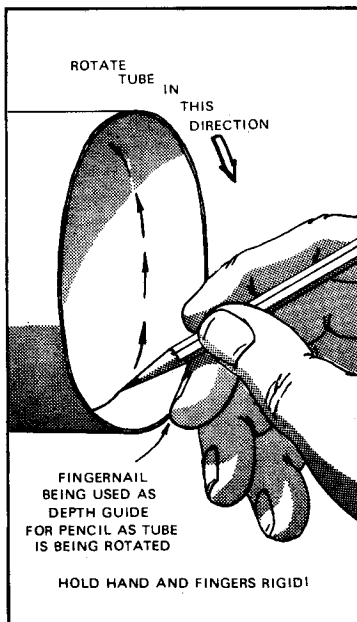


the step with the other three slotted tubes. CORRECT ALIGNMENT OF THESE TUBES IS NECESSARY to insure proper fit of the four remaining tank tubes. Refer to Notes 5 & 6 and proceed to position and glue the tubes in place. KEEP ALL TUBE ENDS FLUSH OR THE TANK TUBE CAP RINGS WILL NOT FIT PROPERLY.

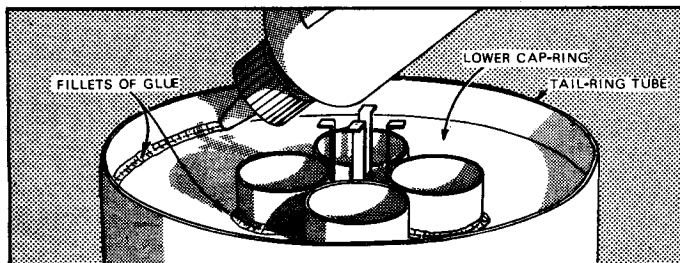
9. Using a straight edge, cut the BFS-40T into eight pieces $1/8''$ square and $2-1/8''$ long. Glue one piece to the outermost part of each tank tube as shown, making sure that the pieces run perfectly parallel to the centerline of each tube and have their ends even with the ends of the tubes.



□ 10. Mark the inside of one end of the BT-101T 0.65" (21/32") from one edge. Using a fingernail as a depth guide, hold a pencil as shown and draw a line all the way around the inside. This tube should be a slide fit over the balsa strips. (Sand all of the strips equally until this type of fit is obtained.) Slide the tube into place with the inside line even with the end of the tank tubes. Mark the tube where it contacts each balsa strip and remove the tube. Run a line of glue forward from the line to the front of the tube from each strip mark then slide the tube back over the balsa strips with the glue lines between the strips. When in place, turn the tube until all the glue lines are in firm contact with the balsa strips.



□ 11. Slide the lower cap ring into place. It should fit around the protruding engine tubes and flush against the bottom edges of the tank tubes. Run fillets of glue around the joints of the ring and engine tubes and at the joint between the ring and the BT-101T. Support the rocket vertically while the glue sets.



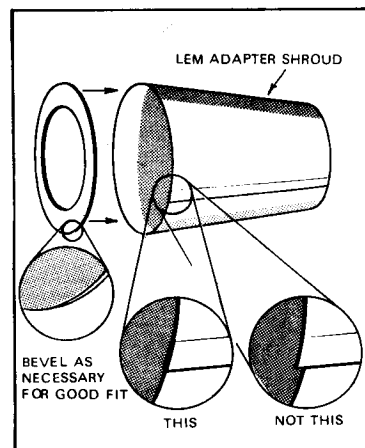
□ 12. Carefully cut out the fairing shroud and glue its ends together. Pre-form the fairing panels to form a round shroud base and slip the shroud over the fuel tubes from the front. The base of the shroud will fit evenly around the front edge of the tail-ring tube while each fairing point will touch near the bottom of the joint between tank tubes. If you have cut the shroud carefully, little trim work will be needed to seat the fairing panels into the joints. When correct fit is obtained, run a line of glue around the front edge of the tail ring tube and carefully seat the shroud base, then fillet the fairing panels to the tank tubes all the way around.

□ 13. Slide the upper tank tube cap ring over the front of the stuffer tube and into place against the top of the tank tubes. Run a fillet of glue around the joint between the ring center and the forward fuel tank support tube. Run another fillet around the exposed joints between the cap ring and the tank tubes.

□ 14. Refer to the 'CHUTE TUBE AND UPPER BODY drawing on PANEL TWO. Mark the forward end of the BT-50 stuffer tube .95" from the end. Mark the BT-70V at .95" inside one end and, using your fingernail and pencil as a depth gauge/marker, draw a line around the inside of the tube at the .95" depth. Put a line of glue around this mark and slide one of the 'chute tube rings into place, match its edge to the mark and apply a glue fillet to the ring-tube joint. Slide the other aligning ring into place on the front of the stuffer tube and fillet with glue on both sides. Mark the outside of the BT-70V at a point 3.225" from the end in which you put the aligning ring. Slide the 'chute tube/upper body support ring to this mark, align and apply a glue fillet to both sides of the joint.

□ 15. Join the 'chute tube assembly to the stuffer tube by applying a line of glue around the outside front edge of the stuffer tube and around the inside rear edge of the BT-70V tube. Mate the ring inside the BT-70V tube with the end of the stuffer tube, and at the same time, slip the ring just inside the end of the BT-70V tube.

□ 16. Cut the LM housing shroud from the pattern sheet and assemble it as shown in the illustration to the right. As this piece is glued together, be sure to align carefully to obtain a flush fit of the base of the shroud to the top of the BT-100Z tube. After the glue has set, fit the remaining upper body support ring into (and flush with) the base of the shroud. It may be necessary to sand the edge of the ring to a slight bevel to obtain the correct fit. Run a thin line of glue around the base of the shroud on the inside edge and put the support ring in place

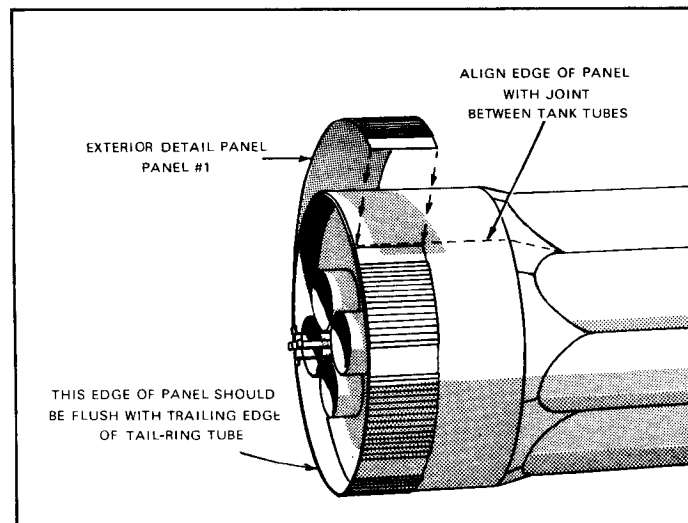


□ 17. Apply a line of glue around the rim of the upper fuel tube cap ring and around the inside front edge of the BT-100Z tube. Slide the tube down from the front of the bird, over the upper body support ring until the rear edge of the tube just slips over the upper fuel tube cap ring. At this point (and quickly before the glue sets) bring the front edge of the tube flush with the upper body support ring. Make a smooth fillet out of any excess glue that appears around this top joint, and allow the assembly to dry thoroughly.

□ 18. Slide the shroud assembly down the 'chute tube and check the fit of the shroud base where it joins the top end of the BT-100Z tube, and the length of the exposed part of the 'chute tube (which should be 2.559") from the front end of the tube to the top edge of the shroud. If all is well, move the shroud assembly forward and run a line of glue around the top edge of the BT-100Z tube. Slide the base of the shroud into place. Smooth out any excess glue that squeezes out of the joint. Apply a thin fillet of glue at the top end of the shroud and tube joint, smooth out and let dry. Check these joints again later (before painting) to be sure of a completely smooth seam at both ends of the shroud. Sand and fillet as necessary to obtain a smooth joint.

Now... the Exterior Detail Panels

□ 19. Refer to PANEL THREE for the positioning of the exterior detail panels. Follow the directions for location of all parts as listed and described in this and the following steps. From the die-cut Exterior Detail Panel set, select panel number 1. Notice this panel has eight flat sections--one of which is split between the two ends of the panel. Apply glue to the back of the panel and align

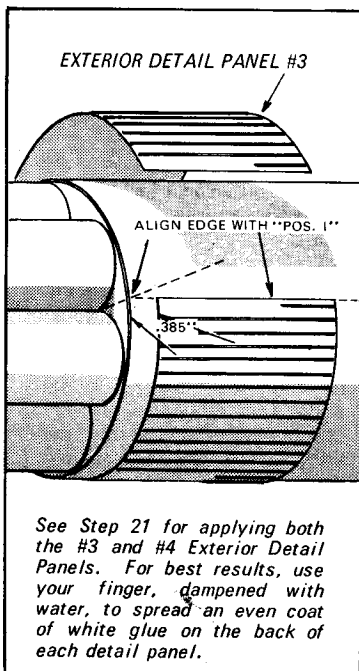


one end paralleling a joint between tank tubes and one edge flush with the rear edge of the tail ring tube. Carefully smooth out the panel, keeping the rear edge flush with the rear edge of the tail-ring tube. The ends of this panel should just meet and the joint becomes one of the eight fin-root locations.

□ 20. Panel number 2 is the one plain piece in the set. It fits parallel to the first panel on the tail-ring tube its edge 1/32" from the forward edge of panel 1. Apply glue to one side of this panel and align and smooth out as shown on **PANEL THREE**.

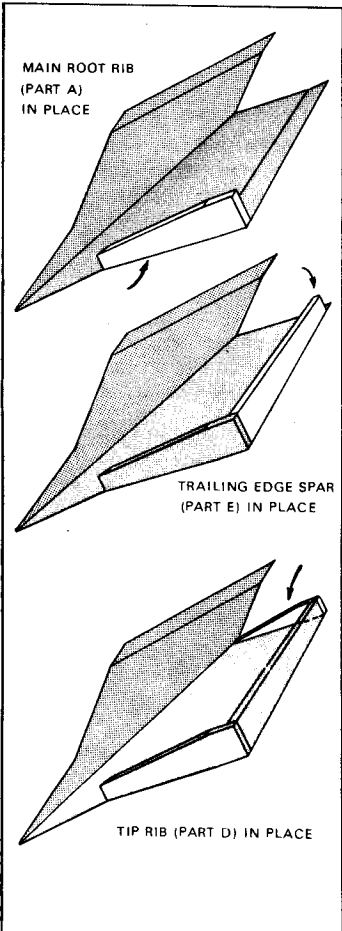
□ 21. Panel number 3 (the widest of the set) has four flat sections, one of which is again divided between ends of the panel. Apply glue to the back-side of this panel and align as shown on **PANEL THREE**. Panel number 4 goes on just above number 3 as shown with its edge against the upper edge of number 3. Its end joint matches the end joint of panel number 3. This placement automatically aligns the flat spots on both panels 3 and 4 for the additional details yet to be applied.

□ 22. Before applying panel number 5, measure .518" from the joint at the front edge of the upper body tube as shown in **PANEL THREE** and make a small mark. Position the top edge of the panel on this mark with the left edge aligned directly above the joints in the panels below. Wrap it around and smooth it out in this location. **RECHECK ALL PANELS FOR SMOOTHNESS. MAKE SURE ALL JOINTS HAVE ADHERED AND ARE SMOOTH. SET THE MODEL ASIDE TO DRY COMPLETELY.**



See Step 21 for applying both the #3 and #4 Exterior Detail Panels. For best results, use your finger, dampened with water, to spread an even coat of white glue on the back of each detail panel.

Fin Preparation

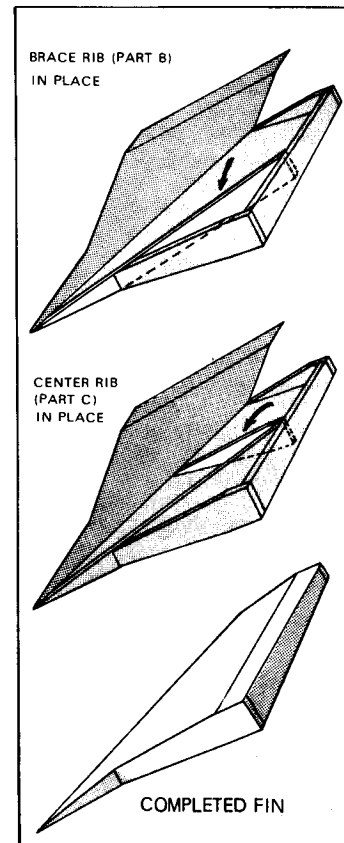


□ 23A. A sharp knife, straight edge and cutting board are necessary for this step. **YOU HAVE PUT A LOT OF WORK AND CARE INTO YOUR MODEL SO FAR. . . DON'T WASTE IT BY HURRYING NOW.** Cut around the eight "fin skins" with scissors, then with the sharp knife and the straight edge, carefully cut right to the line marking the outside edge of each "skin" piece. When all eight pieces are trimmed, get a table knife (the kind with a rounded edge, not a sharp edge) and lay a skin piece, printed side up, on your cutting board. Align the straight edge with the line marked "sharp fold" and carefully draw the table knife along this line heavily enough to put a definite crease in the skin but not enough to cut through. Align the straight edge with either "crease" line and put a lighter crease in the skin. Repeat this with the other crease line. Carefully fold the skin along the "sharp fold" line to produce a sharp leading edge.

□ 23B. Remove one part A from the BF-29 sheet. Open one skin as shown to the left and fit this part into place, beveling and trimming as

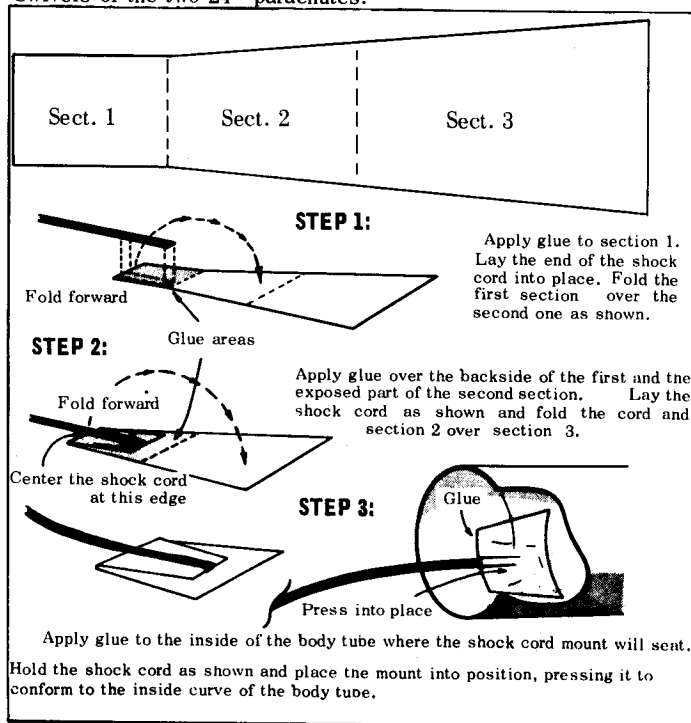
necessary for an exact fit. Apply glue to the edge as shown and put part A into place. **REMEMBER, WHEN GLUING WOOD TO PAPER A LITTLE GLUE IS ENOUGH. . . TOO MUCH GLUE TENDS TO SHRINK** and will pull the skin out of shape. Glue the other seven A pieces to their fin skins.

□ 23C. Remove part E next and dry fit it in its location. Apply glue to the edges shown and set it into place. Part D is next to be first fit, then glued into place. Follow this with part B and finally part C. After the glue has set on part C, apply a line of glue to all edges of the framing, then press the other half of the skin into place. If you have trimmed and fitted everything carefully, the root, trailing and tip edges should be in perfect alignment. There should be no skin overhang . . . but if there is, it may be sanded off when the fin is dry. Smooth sand each trailing and tip edge of the completed fin. Repeat this step with the remaining seven fins.



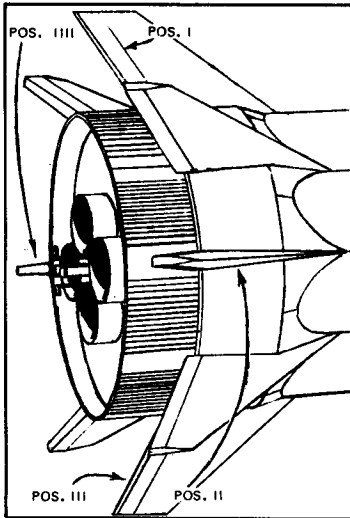
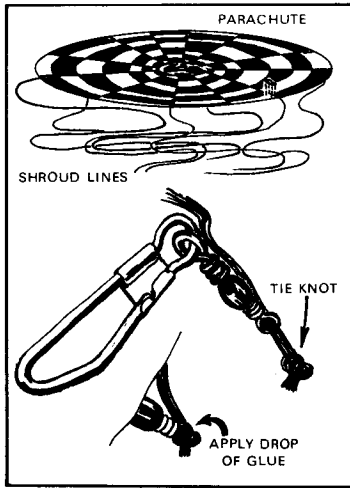
□ 24. Apply glue to the root edges of one fin. Align the fin so the front tip is centered in the joint between fuel tubes and the rear edge is centered in the flat area of panel 1. Sight-aligning should show the centerline of the fin to be parallel to the centerline of the bird. Repeat this step with the other seven fins. When the step is complete, your model will appear as seen in the position detail on **PANEL THREE**. Each fin should point straight away from the centerline of the rocket.

□ 25. Prepare the shock cord anchor as shown in the illustration below. Apply glue to the completed shock cord and anchor and place in the chute tube at least 1" from the front end. Make a loop in the free end of the shock cord as shown for the attachment of the snap swivels of the two 24" parachutes.



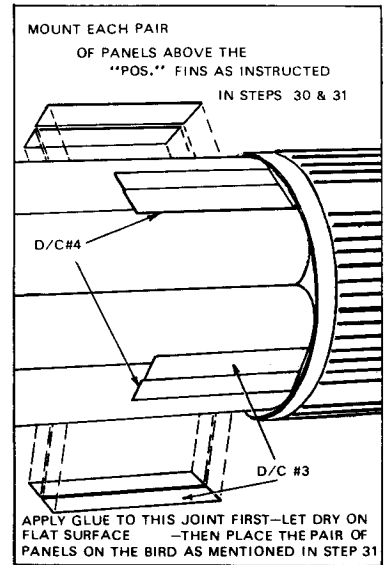
Apply glue to the inside of the body tube where the shock cord mount will seat. Hold the shock cord as shown and place the mount into position, pressing it to conform to the inside curve of the body tube.

26. Remove the 24" parachutes from their kit packages, cut them out on their edge lines and attach six 24" long shroud lines to each using the tape strips provided. Gather the free ends of the shroud lines, thread them through the small loop in the snap swivel and tie a knot. Draw the knot against the loop and put a small drop of glue to secure the knot to the loop. Repeat this step with the lines of the second 24" parachute. When both parachutes are ready, attach the snap swivels of each to the loop in the shock cord and temporarily stow them in place inside the chute tube of the rocket.



27. REFER BACK TO PANEL THREE. Identify the Position 1 fin with a pencil mark that can be covered with paint later. This is the reference starting point. Mark the second fin to the right "POS. II", then two fins further right "POS. III" and finally, "POS. IIII".

30. There are four #3 & four #4 D/C parts. These are antenna mount panels and are attached in pairs over the joint between tank tubes directly above the four "POS." fins. Glue a #3 and a #4 panel together and let dry. Do the same with the other three pairs.



31. Apply glue to the top edge and to the right and left edges of one pair of panels. Select a tank tube joint above a "POS." fin and attach the panel pair with the center seam directly over the joint and the top edge against the upper fuel tube cap ring as shown. Attach the other three panel pairs in the same way.

32. There are eight #5 D/C parts. Each is located 2.13" from the base of the upper body tube and centered directly above each tank tube as seen in PANEL FOUR. Note that it may be necessary to cut out or at least flatten a portion of a corrugation at the location of these parts so they will fit flush to the surface.

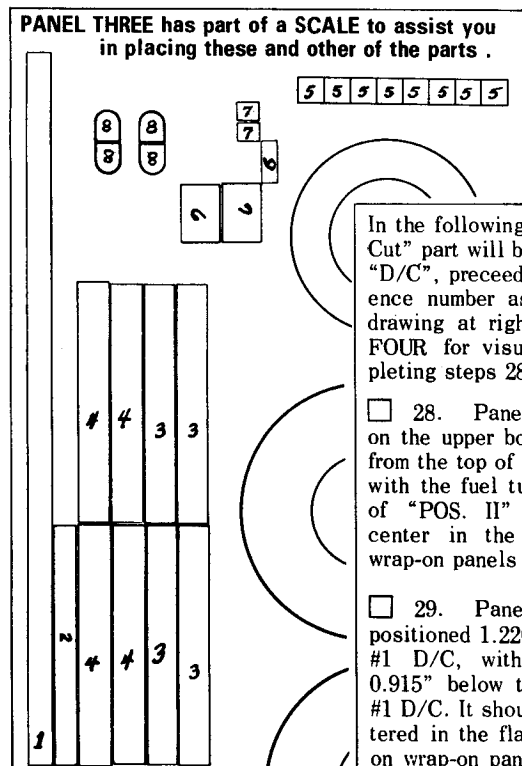
33. Two #6 D/C parts are next. They are attached to the upper body tube 0.419" to either side of and even with the top edge of part #1 D/C. (Center each part in the flat spot provided for it on wrap-on panel 5.)

34. Two #7 D/C parts go on the instrument unit (the portion of the upper body tube extending above wrap-on panel 5). Center one part horizontally, its left edge directly in line with the left edge of part #1 D/C below it. The remaining #7 D/C part goes on 2.118" to the left of the first one.

35. The four #8 D/C parts are latch pads. They should be located on a line 1.200" above the base of the upper shroud, directly in line with the "POS." fins.

36. One #9 D/C part remains. Position its top edge 0.515" below the top edge of wrap-on panel 5; its right edge should be parallel to and 0.591" from the panel to its immediate right. (This part fills the remaining flat spot provided on wrap-on panel 5.)

Die-cut Parts are Applied Next



DIE-CUT PIECES AS THEY APPEAR ON THE TA-29 SET SHEET

In the following steps, a "Die-Cut" part will be referred to as "D/C", preceded by its reference number as shown in the drawing at right. See PANEL FOUR for visual aid in completing steps 28 through 45.

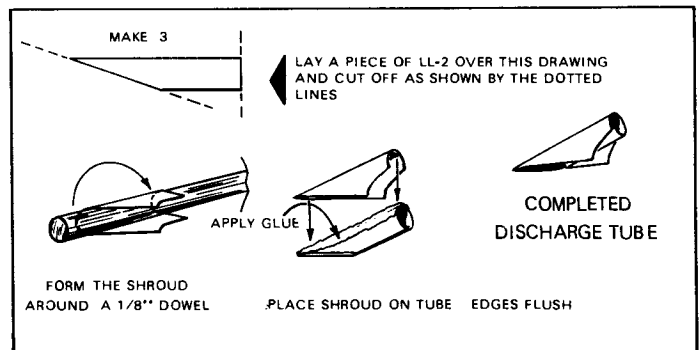
28. Panel #1 D/C goes on the upper body tube 0.990" from the top of the tube in line with the fuel tube to the right of "POS. II" fin. It should center in the flat areas on wrap-on panels 4 and 5.

29. Panel #2 D/C is positioned 1.220" to the left of #1 D/C, with its top edge 0.915" below the top edge of #1 D/C. It should then be centered in the flat area provided on wrap-on panel 5.

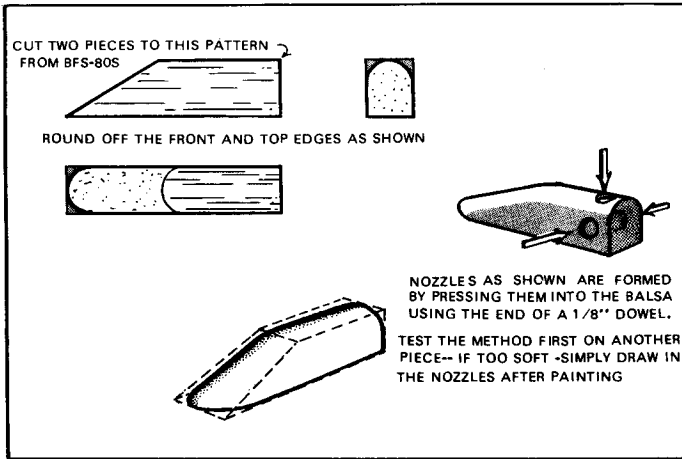
PREPARATION OF THE LARGER EXTERNAL DETAILS

For the remaining details, you will use the scrap BF-20 pieces, launching lugs and the three pieces left on the pattern sheet marked "Discharge tube shroud" and the 1/8" dowel. For one step, you will also need extra fine sandpaper and a small blade-type pencil sharpener.

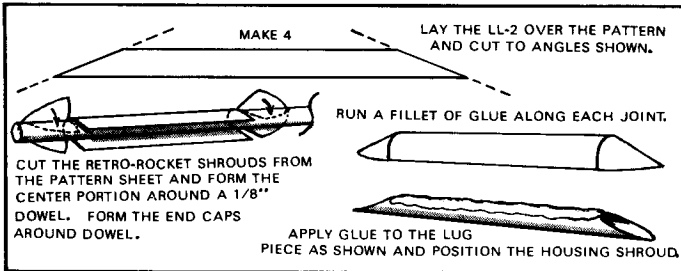
37. Make three discharge tubes and shrouds as shown below. Lay one end of a launching lug over the drawing and cut the angle and the end. Cut the other two pieces required in the same way. Cut out the discharge tube shrouds and form them carefully around the piece of dowel first, then glue them to each of the tube pieces as shown. Locate these items on wrap-on panel 4, centering them in the flat spots provided.



□ 38. To make the vector control jet housings for the SIVB stage, cut two pieces of BFS-80S to the size of the pattern provided in the drawing below. Round off the top (see drawing) and the front edge of each with sandpaper. Sand the remaining sides and end smooth. The two parts are glued to wrap-on panel 4, one on each of the two remaining flat areas. The front edge of each piece should be flush with the front edge of the panel. Center the part in its flat area as shown on PANEL THREE.



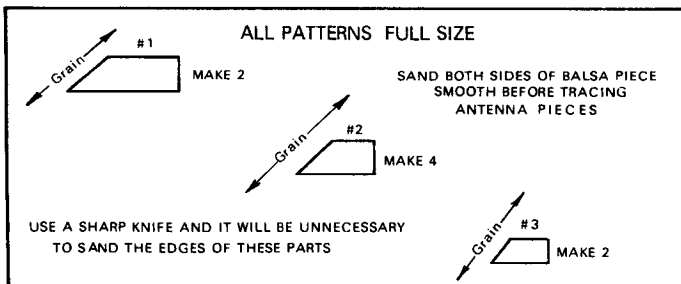
□ 39. Four retro-rocket housings are spaced equally around the SIVB section and are made from pieces of launching lug covered by a shroud. Lay the launching lug over the side view drawing below and cut each of four pieces to the length and angle on each end as shown. Cut out the shrouds and carefully form them around the dowel, then glue the shrouds to the launching lug pieces as shown. The one exception in this step is the one housing that will double



as the upper launching lug. Cut the end caps from one of the housing shrouds before gluing it to the lug piece. This exposes the ends for use as a launching lug without changing the illusion of being fully shrouded when on display. Locate each assembly on the four flats provided on wrap-on panel 3, with the rear edge $3/32$ " from the bottom edge of panel 3 and the right edge of each housing $1/32$ " from the corrugation on the right side of each flat.

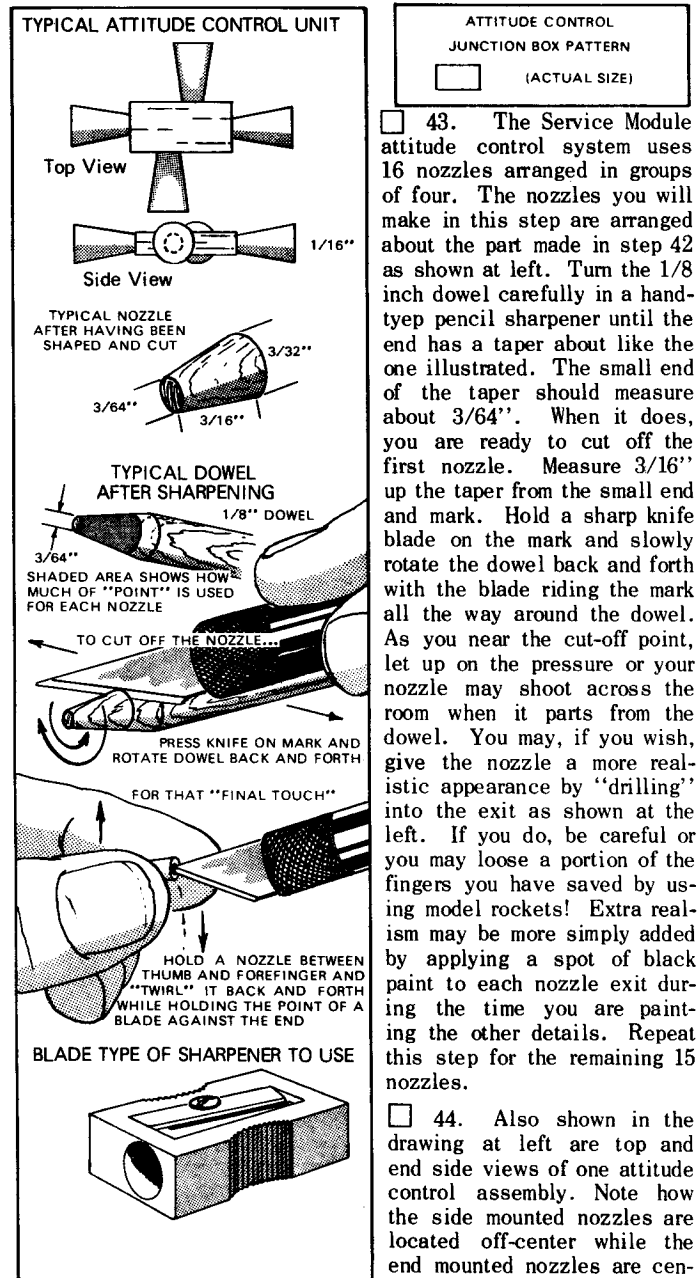
□ 40. Cut a 1" piece of launching lug and glue it beside the fin most nearly in line below the retrorocket housing you have selected to serve as the upper launching lug. Sight through the two lugs and adjust as necessary to provide a no-bind path for rod travel. To keep the lug from shifting during the time the glue is drying, you may find it convenient to slip a 36 " launching rod through the lugs, tape it to the body, and leave it until dry.

□ 41. There are 3 sizes of antennae. The patterns for each size appear in the drawing below. Written beside each pattern is the number of units to make of that size. Select piece(s) of scrap BF-29



(or a piece of BFS-20 from your stock) large enough to make these parts. Sand both surfaces until smooth. Trace the required number of pieces onto the stock, aligning the tapered edge of the pattern with the grain direction in the balsa (just as you would when making a fin). Though small in size, the antennae can be damaged if your model is examined by friends who are not too careful. Cut out the antenna pieces with an extra sharp knife. If the knife is sharp enough, it should not be necessary to sand the edges. One of the longest antenna pieces is mounted at the center of the right hand panel above fin position II, the other above fin position III, each $1-3/8$ " up from the bottom edge of its panel. The four middle-sized pieces are mounted on each panel above fin positions I and III, each one centered in its panel and $29/32$ " up from the bottom edge of the panel. The two smallest pieces fit one above the other on the left panel above fin position III. Center the first one $29/32$ " up from the bottom edge of the panel, then place the second one directly above the first piece $9/32$ ", centered in the panel.

□ 42. Trace the junction box pattern below onto scrap BF-29 and make four such pieces. When combined with the next step, you will have assembled four exact scale attitude control nozzle units.



□ 43. The Service Module attitude control system uses 16 nozzles arranged in groups of four. The nozzles you will make in this step are arranged about the part made in step 42 as shown at left. Turn the $1/8$ inch dowel carefully in a hand-typ pencil sharpener until the end has a taper about like the one illustrated. The small end of the taper should measure about $3/64$ ". When it does, you are ready to cut off the first nozzle. Measure $3/16$ " up the taper from the small end and mark. Hold a sharp knife blade on the mark and slowly rotate the dowel back and forth with the blade riding the mark all the way around the dowel. As you near the cut-off point, let up on the pressure or your nozzle may shoot across the room when it parts from the dowel. You may, if you wish, give the nozzle a more realistic appearance by "drilling" into the exit as shown at the left. If you do, be careful or you may lose a portion of the fingers you have saved by using model rockets! Extra realism may be more simply added by applying a spot of black paint to each nozzle exit during the time you are painting the other details. Repeat this step for the remaining 15 nozzles.

□ 44. Also shown in the drawing at left are top and end side views of one attitude control assembly. Note how the side mounted nozzles are located off-center while the end mounted nozzles are centered. Grasp a nozzle by the exit end with tweezers and apply a drop of glue to the small end. Place it against the side of the junction block, $1/16$ " from one end and pointing straight away from the block. Apply glue to another nozzle and locate it on the opposite side of the block, ($1/16$) from

the other end and pointing straight away. Apply glue to the ends of the third and fourth nozzles in turn, and place one at each end of the junction block, exits of each nozzle pointing straight away from the block. Repeat the step with all remaining nozzles and junction blocks. Let the units dry before proceeding to the next step.

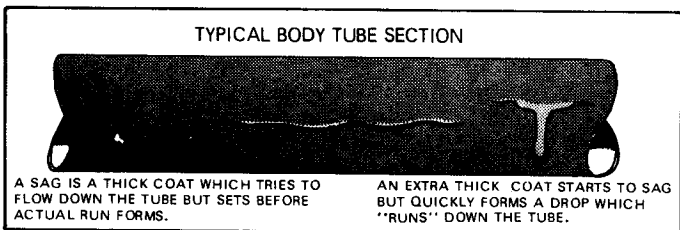
45. The attitude control assemblies are attached to the BT-70V tube directly in line with the POS. fins. Sight along the tube to locate the attachment points, then measure down $23/32$ " from the front edge of the chute tube at each attachment point and place a small mark. Apply glue to the backside of one attitude control unit and place the front edge of the junction block (NOT the front edge of the nozzle) on this mark. Repeat this part of the step for the other three units. (At this point you may sit back and admire your handiwork---

PAINTING the Saturn

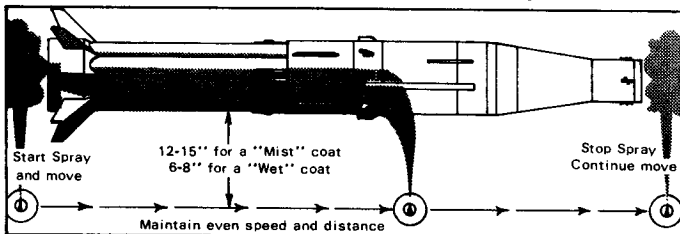
The basic color scheme of the AS-207 is white (the base color) with black patterns, both red and black lettering and also black numbers. Letters and numbers as well as flush mounted panels which have visible joints are provided in the decal sheet KD 29. However, the decals will not be used until the basic colors have been applied to the rocket. At this point you have a decision to make: What kind of paint do you handle best? There are some tight places to get into with some of the black and so you should plan to use the type of paint you can best control. The original model's black panels, tube sections and fin segments were applied by brush using black enamel---the kind you may obtain in quarter-ounce cans or bottles at any dept. store paint section for 39¢. If you use black dope, be sure to use only white dope of the same type for the base color. When you have decided which paint to use, proceed to step 46.

46. Using a small brush, apply a light coat of sanding sealer to all exposed balsa parts. Sand the parts lightly but as thoroughly as possible. Then give them all a regular second coat of sealer. When they are completely dry, sand all the parts again.

47. Locate a fairly large, dust-free area. Support the model so that you can get to all sides of it as you apply three coats of white base color. (If your brush work is good, you may desire to brush on the white enamel or dope rather than follow the instructions in this step which cover preparation and spraying procedures.) Spray on the first light coat of white, moving around as necessary to get the paint as far under the antenna panels as possible, down to the base of the joints between fuel tubes, etc. **LET THE FIRST COAT DRY COMPLETELY.** Apply a second and then a third light coat of white. **WHEN COMPLETELY DRY,** apply the fourth and final coat as a "wet" coat. A "wet" coat of paint is one which gives the surface the appearance of a high gloss just after the the spray has passed. The trick is not to get the surface too "wet" for if you do, sags or runs will appear and mar the job. Start the



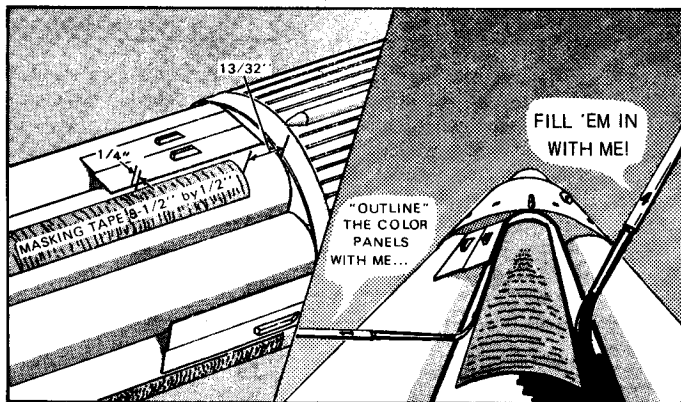
spray beyond the front of the rocket and move it steadily across the bird and do not release the spray button until past the end of



every part. This way, you do not build up that heavy layer of paint at either end of your rocket, which would otherwise occur during the split-second between starting the spray itself and starting the move across the rocket and again at the end of the stroke. A light or "mist" coat is one applied to the work from a distance of 12 to 15 inches; no attempt being made to obtain an opaque covering. This type of coat allows the paint to get a good grip on the surface to which it is applied and supplies a good base for the wet coat.

48. Since the exterior of the S IV B stage is corrugated, its roll pattern must be brushed on by hand rather than attempting to use masking tape. Draw a line marking the edges of the area to be black using a pencil (and a straight edge where possible). See PANEL FOUR for the dimensions and general location of the black area. Use a #1 brush to apply the paint along the edge lines of the black area. A #4 brush may be then used to fill in the rest of the black without danger of getting paint where it is not supposed to be.

49. The black paint on the fuel tubes is also applied by brush. Masking tape can be used to get straight edges if you wish. Each black tank has a white panel in which "UNITED STATES" appears in vertical red lettering (supplied on the decal sheet). Cut four pieces of masking tape with square ends, each $8-1/2$ " long by $1/2$ " wide. Lay a strip of tape on the tube to the right of one pair of antenna panels with one end $13/32$ " from the lower end of the



upper body tube and $1/4$ " to the right of the right edge of the antenna panel which is glued to that tube. Smooth out the tape so it runs straight down the tube. Apply the other three pieces of tape in the same way to every other tank tube. Each strip should be on a tube which is immediately to the right of an antenna panel. Press the tape down firmly along all edges, then apply a coat of white or clear paint to the tubes around the tape to seal the edges.

50. There is usually a quarter of an inch of concentrated color pigment at the bottom of a paint can or bottle. Just shaking the bottle will not mix this pigment properly. Instead, use a stick or dowel and mix it thoroughly. If the paint is properly mixed it will be easier to control and should cover the rocket well with just one coat.

51. Begin applying black paint to the booster at the first tube to the right of the POS. I fin. Study the first paint pattern illustration on PANEL FOUR. Using a #1 brush, reach down into the joint between tanks and apply black paint to the first tube as needed to get a smooth, continuous line. Bring this line down to the fairing shroud, then paint another line down the joint between tubes on the other side of the first tank tube. Paint across the top edge of the tube and down along the line between the tape and the antenna panel. Next outline the tape, brushing parallel to its edges. Looking at the POS. I view on PANEL FOUR, you will see that the right side of the POS. I fin is black, both sides of the fin to its right are black and the left side of POS. II fin is black. The portions of the tail ring and fairing shroud between these fins are also black. Carry the black down half of the fin tips and trailing edges too. Fill in the rest of the black area with a #4 brush after you have outlined it with the #1 brush.

52. Turn the rocket one quarter turn to the left so the fin at POS. II is pointing at you. Viewing the POS. II drawing on PANEL FOUR, you see that only the top half of the right

side of the POS. II fin is black, as are the top halves of both sides of the fin on its right. Only the left side top half of the fin at POS. III is black. Also note that the fairing shrouds between these two fins are black, as is the top portion of the tail ring from the fairing down to a line straight across from one fin to the other at the color break. Measure 25/32" from the fairing shroud-tail ring joint along each fin root and mark this point on the tail ring. Connect the marks with a pencil line parallel to the trailing edge of the tail ring tube. Glancing at the POS. III drawing on PANEL FOUR, you see this color break line continues on around the bird to the left side of the fin at POS. III, and since it is convenient at this time to do so, continue measuring and marking this line around to the POS. III fin. The color break line extends out on the fins to a point which is 2-13/32" from the forward point of the leading edge of each fin. Measure and mark the point on each fin involved and extend the color break line from the point on the tail ring to the point at the fin leading edge. Use the #1 brush to outline the black area as seen in the POS. II drawing, then fill in again with the #4 brush.

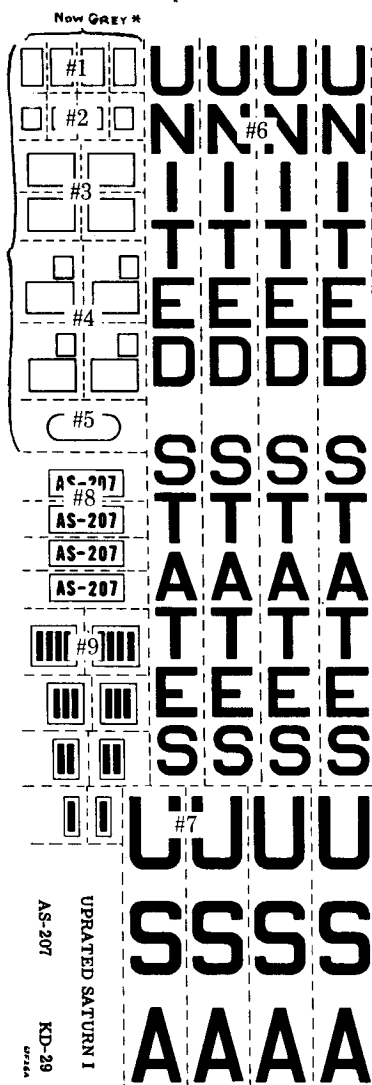
53. Give the rocket another one-quarter turn to the left. The POS. III drawing on PANEL FOUR shows the areas of fuel tube tail ring and fin portions that are to be black. Outline these areas first with the #1 brush and fill in with the #4 brush as you did in the preceding steps.

54. The final one-quarter turn leaves the POS. III fin pointing toward you. The drawing of POS. III on PANEL FOUR shows that only the fuel tube receives the black trim. Paint the tube the same way as in step 51, but confine the outlining at the base of the fuel tube to the joint between the tube and fairing shroud. Outline and fill in as previously instructed.

Read the instructions on the back of the decal sheet. In the following steps the decal to be applied and its exact position on the rocket will be identified. At right is a drawing of the decal sheet with each decal or group of decals having an identifying number. These numbers will be referred to in the steps to follow. Cut out only the section of the decal you are working with in each step.

55. No, we didn't forget...but by now the paint should be hard enough. Go around the edges of all pieces of masking tape used on the tank tubes in step 49 with a model knife lightly—use just enough pressure to cut through any black paint that may be bonding to the tape. Pick up one corner of a piece of tape with the tip of the blade and gently peel back the tape. DO IT GENTLY since some tapes hold more firmly than others and can pull the base coat loose if removed too forcefully. (Or if the base coat was not allowed to dry thoroughly as instructed.) Remove all other masking tape you may have applied during steps 49 through 54.

56. Decal #1 consists of four white* rectangles. These decals go on the tank tubes, one rectangle centered on each black tube just to the right of fin POS. I, II, III, and IIII. The long side is parallel to the base



of the upper body tube and is .165" from it.

57. The #2 decals are four small black* rectangles. Each one mounts with its narrow sides parallel to the base of the upper body tube and 0.07" down from it, one on each white tube to the left of fin POS. I, II, III and IIII. Also, the right edge of each decal is centered on the fuel tube.

58. The #3 decals are four larger black* rectangles. Each decal mounts with its long side parallel to the joint between wrap-on panels 1 and 2 to the right of fins at POS. I, II, III and IIII. The bottom edge of the decal is placed 0.34" above the panel joint and 0.42" to the right of the fin base.

59. Decal #4 consists of four double rectangles; 2 white* and 2 black*. Mount each double rectangle as one unit with the small rectangle to the right of the larger one. The white ones mount to the left of fin POS. II and IIII. The black ones go to the left of fin POS. I and III. As you apply the decal, locate the bottom edge of the large rectangle 0.34" above the panel's joint and the right edge of the large one 0.42" to the left of the fin base.

60. Decal #5 is a white* oval. This decal locates on the remaining flat provided on wrap-on panel #4. As seen by the shape of the flat, this decal should be oriented vertically with its sides paralleling the centerline of the rocket.

61. Decal #6 is "UNITED STATES" in vertical red lettering. Center each strip both vertically and horizontally in the white panel provided on each black trimmed fuel tube.

62. Decal #7 is "USA" in vertical red lettering. Align each strip above the centerline of a white fuel tube by sight with the top edge of the "U" located 0.463" below the lower edge of wrap-on panel #5.

63. The #8 decals are "AS-207" lettered in black on white. Center each strip horizontally with the top edge of the white panel 0.28" below the lower edge of the white panel now containing "UNITED STATES" on each black fuel tube.

64. The #9 decals are black fin position numbers on a white background. Each position number decal has different dimensions and a slightly different location on its fin. All dimensions listed are measured first from the edge of the tip plate in, then up from the tip of the trailing edge. For those decals located on the left side of the fin, the lower right corner goes on the point of intersection of the two measurements—for those that go on the right side of the fin the lower left corner of the decal is put at the intersection.

65. At this point you have completed the booster portion of the Saturn C 1B (Updated Saturn I) plus all stages forward through the service module. Open up the Apollo Capsule kit and proceed with construction of that unit. When it has been completed, carry on the steps that follow here dealing with pre-flight procedure.

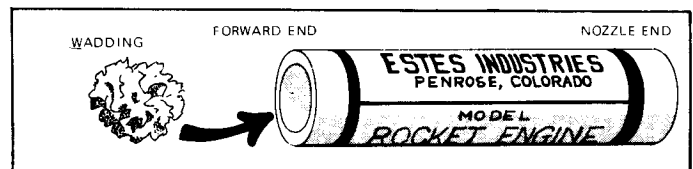
RECOMMENDED ENGINES

Four A8-3 Engines Four B6-4 Engines Four C6-5 Engines

RECOMMENDED LAUNCH EQUIPMENT

FS-5 Launch Control System with 12 Volt Car Battery

14. Cut one square of flame-resistant wadding into four equal parts—wad up one part and insert into the FORWARD end of one engine above the end cap. Repeat this with the other three engines and pieces of wadding.



FACTS ABOUT THE UPDATED SATURN I

The giant Updated Saturn I is NASA's shakedown booster vehicle for the Apollo spacecraft. It is capable of lifting a 38,000 pound payload into a 100 nautical mile orbit. (1 nautical mile equals 6,080.20 feet.)

The first stage (S-IB) is built by Chrysler Corp. It is 82 feet tall and 21-1/2 feet in diameter. Powered by a cluster of eight H-1 Rocketdyne motors the S-IB stage can produce 1,600,000 pounds of thrust, while burning RP-1 (Kerosene) and liquid oxygen.

McDonnell-Douglas (Douglas Aerospace Div.) is prime contractor on the second stage (S-IVB). It is powered by one restartable J-2 motor built by Rocketdyne. During the second stage burn of 470 seconds it consumes 230,000 pounds of liquid hydrogen and oxygen and produces 200,000 pounds of thrust. The S-IVB stage is 21-2/3 feet in diameter and 59 feet long.

Immediately above the second stage is the 3 feet high, 22 feet diameter instrument unit. From this unit on-board computer and ground fed data is intergrated and relayed to the control systems of the Saturn's two stages. This unit is built by International Business Machines Corporation.

The Apollo spacecraft system is made up of three sections the first of which is the Command Module (or Apollo capsule) and is the crew compartment. As its name implies it is the command center. It is conical (cone) in shape, 11 feet tall by 13 feet in diameter and weighs 11,000 pounds. Because it is the unit which reenters the earth's atmosphere, it has a heat shield at the rear of the module capable of withstanding temperatures to 5,000 degrees F.

The service module is cylindrical in shape—14 feet high and 13 feet in diameter. It houses life support and environmental systems along with the main 22,000 pound thrust motor and small reaction control motors. On the Saturn V flights this motor will be used for mid-course correction and escape from Lunar orbit.

The third section is the Lunar Module. It is designed to land two men on the moon (Apollo Saturn V flights). The LM is not carried by the Updated Saturn I, but is mentioned as it is essential to the Apollo program. Prime contractor for the LM is Grumman Aircraft.

An important subsystem is the command module's escape tower. In case there is a pad abort or early termination of the flight during first stage burn, the escape motor on the tower pulls the command module away from danger. The escape system has been tested in both simulated pad abort and flight abort modes.

Total weight of the entire Updated Saturn I-Apollo is 1,294,000 lb. and it stands 224 ft., making it over twice as tall as the Gemini-Titan combination.

Your model Updated Saturn I is in scale. With proper building and flying care you will have a model of which you can be proud. Detail has been kept as close to scale as is possible. Details, dimensions and color scheme information courtesy NASA and Huntsville.

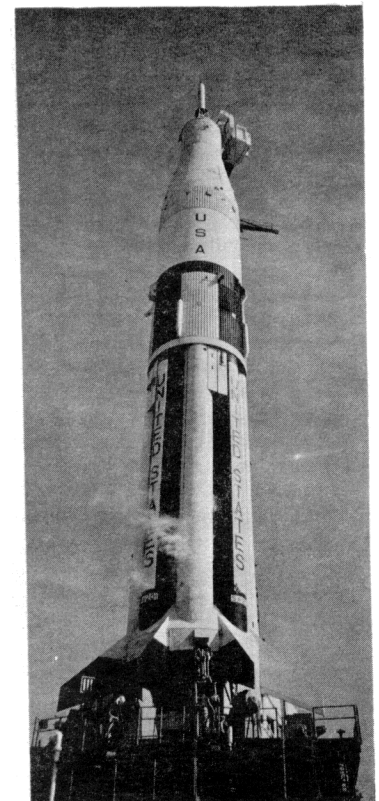
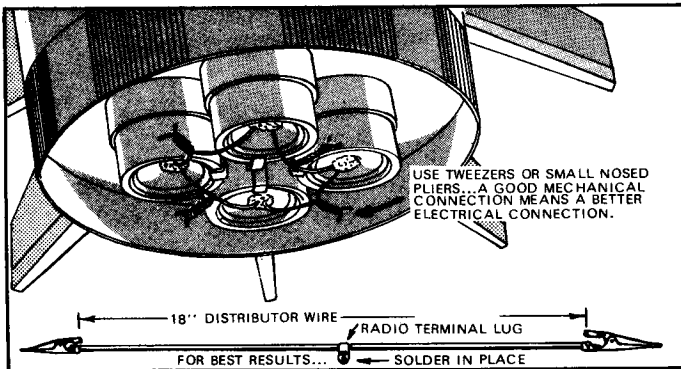


Photo courtesy NASA

Preparing SA-201 for flight
Launch Complex 34

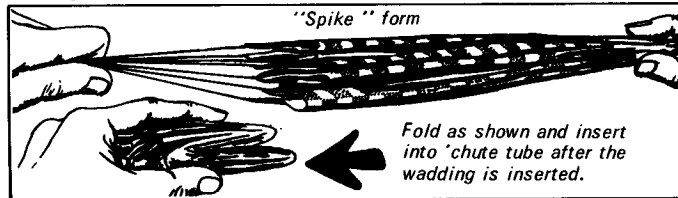
13. Install an electrical igniter in each engine as directed in the instructions which came with the engines. Place one prepared engine in each of the four tubes of the engine holder unit. Use a pair of tweezers or small nosed pliers to twist the igniter leads together as shown below. (Also shown are the special dis-



tributor leads you should have for use in launching this bird. They assure equal current to each igniter which is necessary for simultaneous ignition.)

12. Loosely crumple five squares of flame-resistant wadding and place it in the 'chute tube as far down as possible, making sure it covers the inside diameter of the 'chute tube.

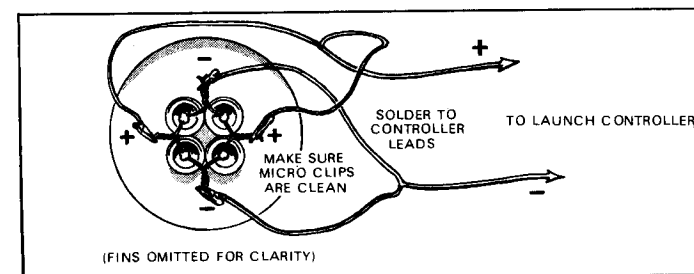
11. Hold one 24" 'chute between two fingers at its center and pass the other hand down it to form a "spike" shape. Fold this spike into two or three sections as shown in the illustration.



Push the folded 'chute into the tube, followed by its shroud lines and the shock cord. Shape and fold the second 24" 'chute in the same way but insert the shroud line into the tube first, then the folded 'chute—pushing it down far enough to allow an inch or so of room at the top of the tube. Shape and fold the Apollo Module 'chute as before and stow it in this space, coiling the shroud lines on top. Seat the Apollo unit in the front of the 'chute tube and proceed to your launch pad

10. Remove the safety interlock key from the launch controller or panel and hand it to the launch safety officer, or carry it with you to the pad as you hook up your bird.

9. Place the AS-207 on the launch rod, and block it up as needed so the igniter leads or micro-clips will not short-out on the blast deflector plate. Clean and attach the micro-clips as illustrated.



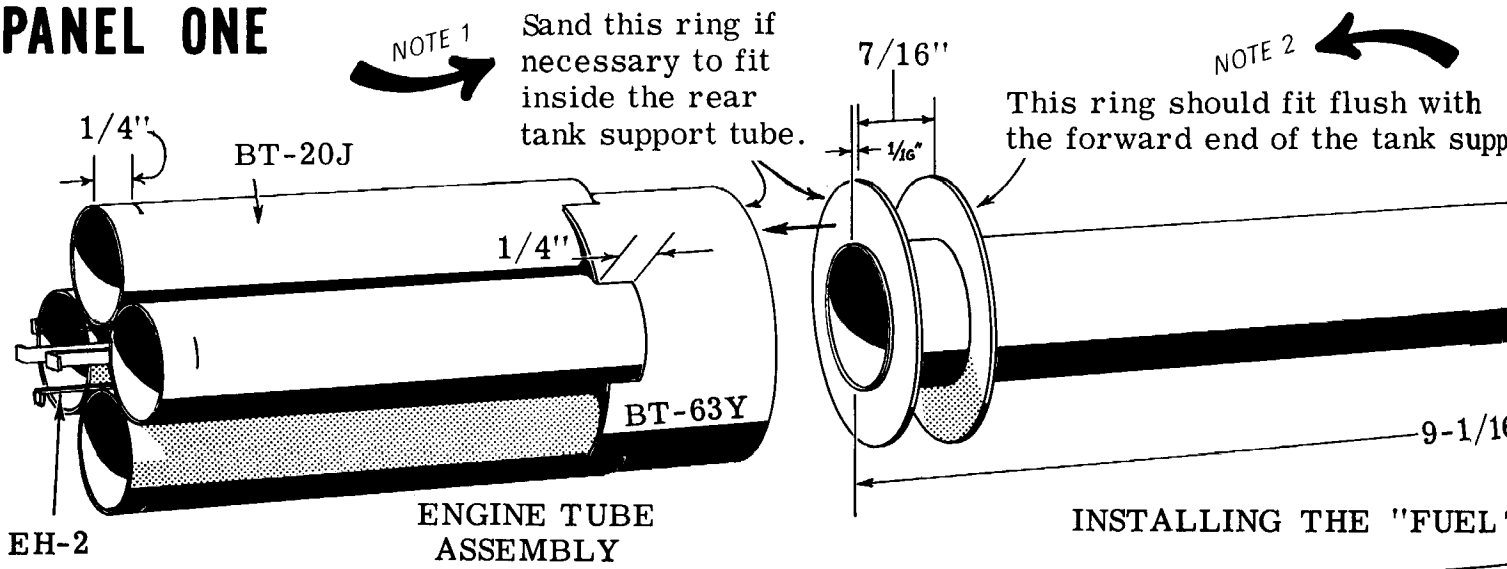
8. CLEAR THE LAUNCH AREA. Alert the recovery crew and trackers.

7. Check for low flying aircraft in the vicinity and unauthorized persons in the recovery area.

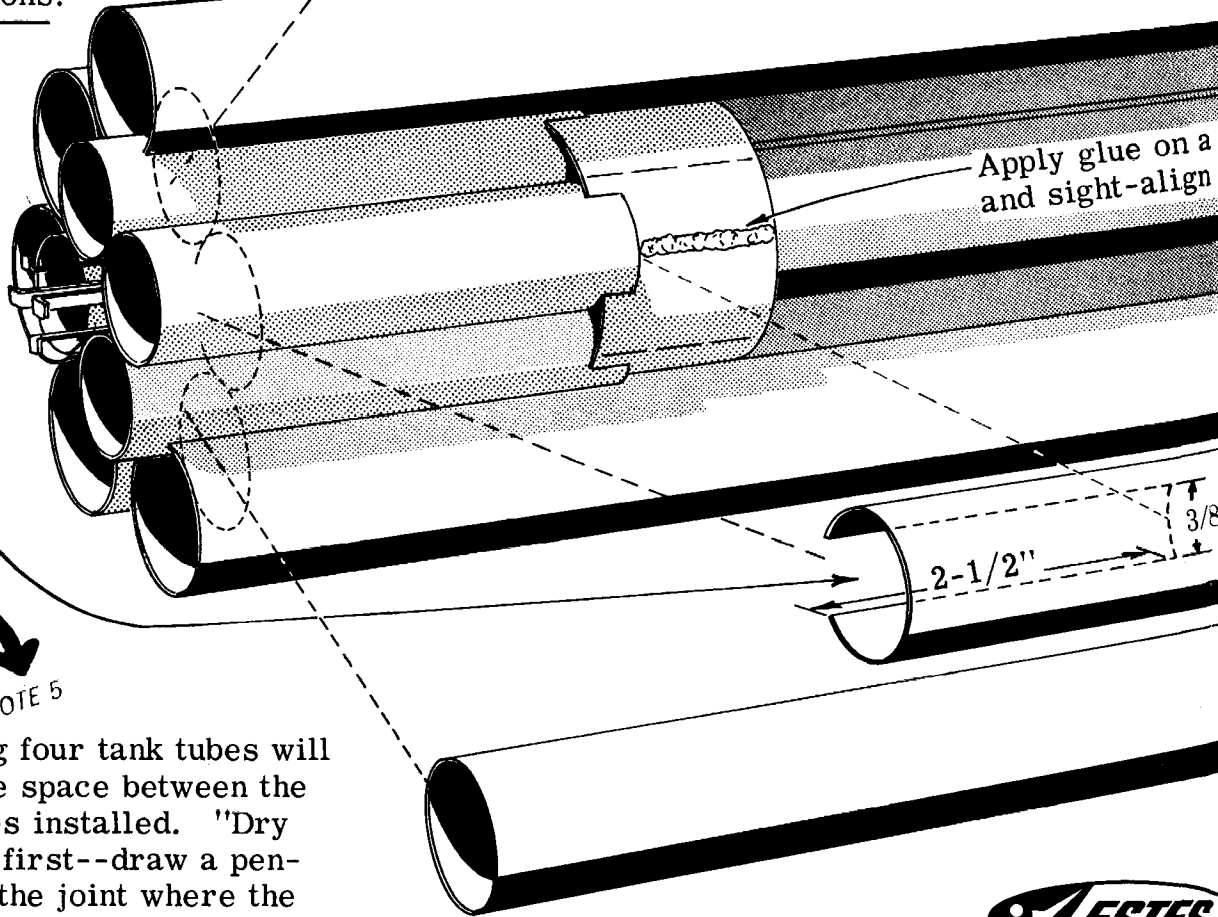
6. Arm the launch controller or panel and begin the final count down.

- 5- -4- -3- -2- -1- LAUNCH!

PANEL ONE

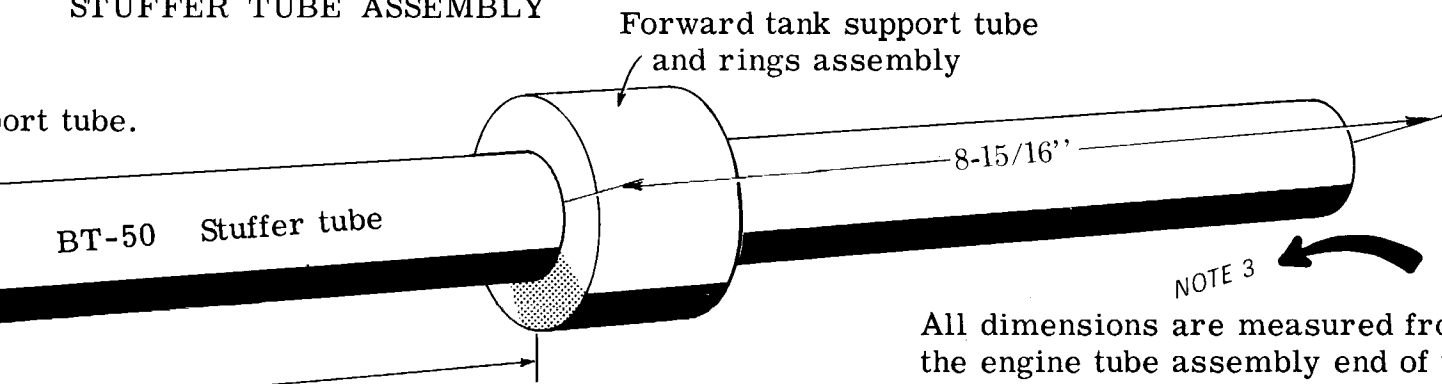


NOTE 4 → Four of the BT-51N Tank tubes must be slotted as shown to fit over the engine tubes. See the general instructions.



NOTE 5 → The remaining four tank tubes will exactly fill the space between the first four tubes installed. "Dry fit" each tube first--draw a pencil line along the joint where the tube you are fitting, touches the adjacent tubes. Run a line of glue along these lines and set the tube into place.

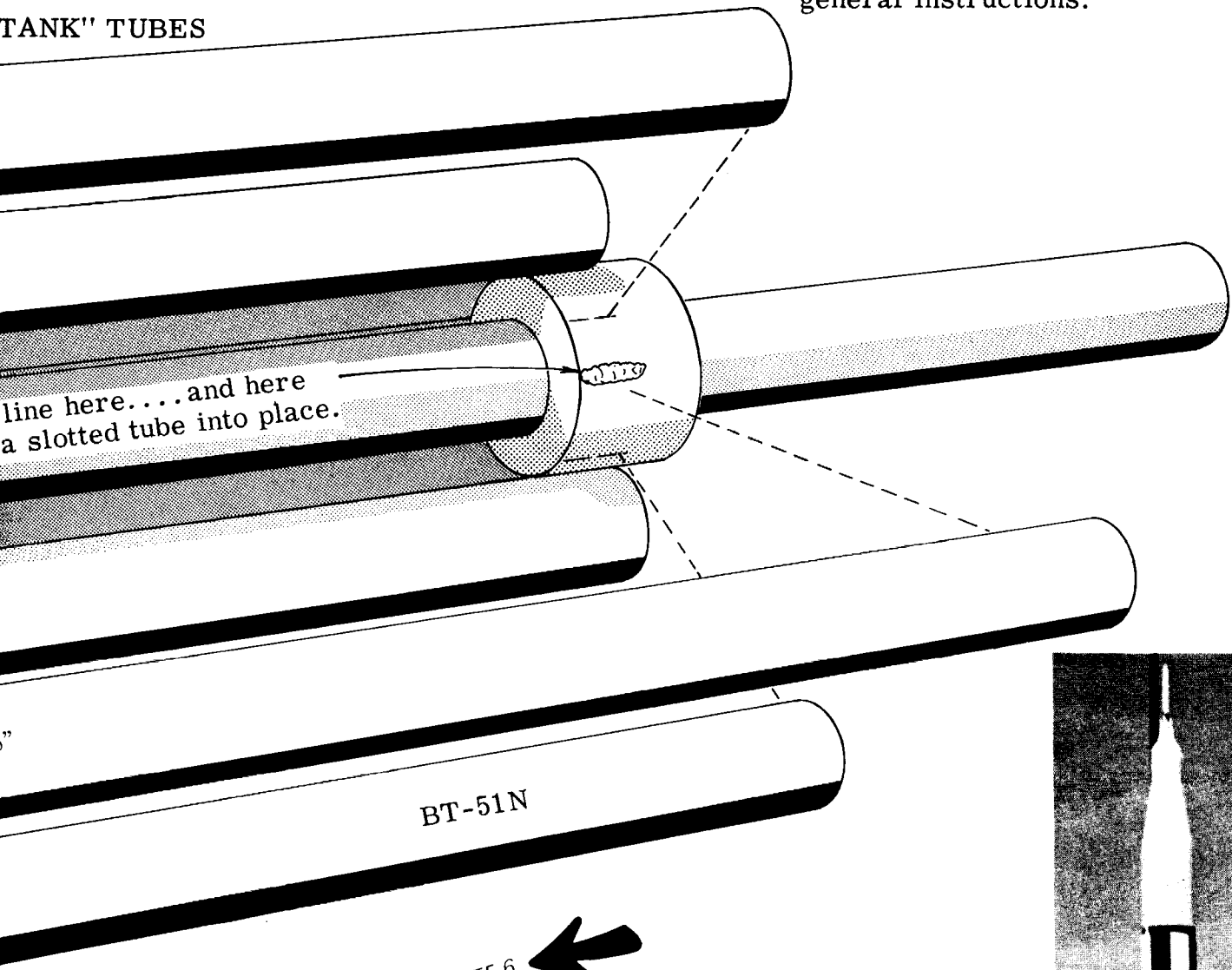
STUFFER TUBE ASSEMBLY



NOTE 3

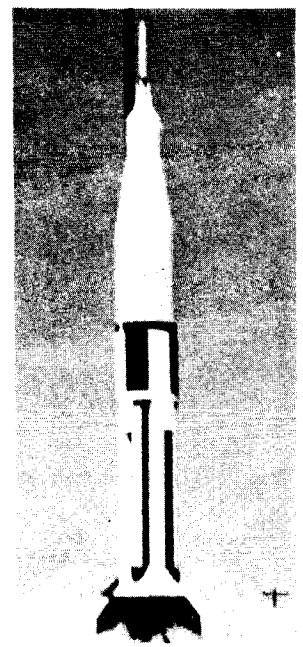
All dimensions are measured from the engine tube assembly end of the stuffer tube. It is important that you read and understand Step 5 of the general instructions.

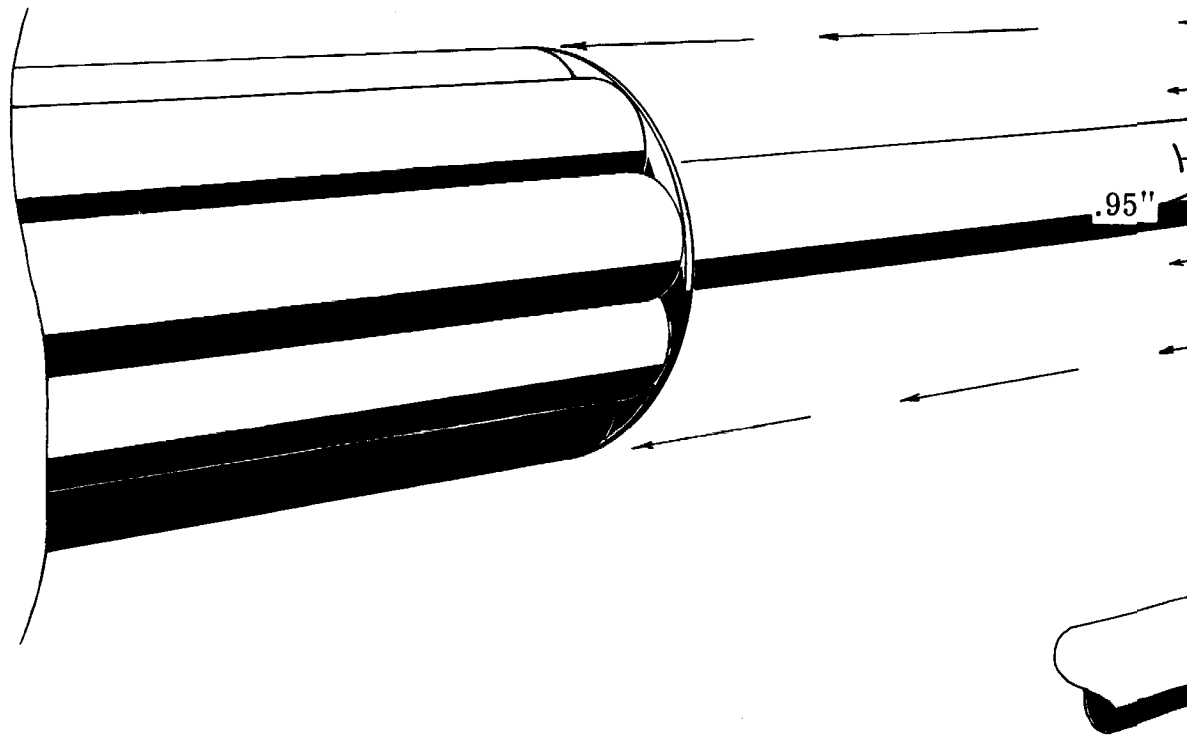
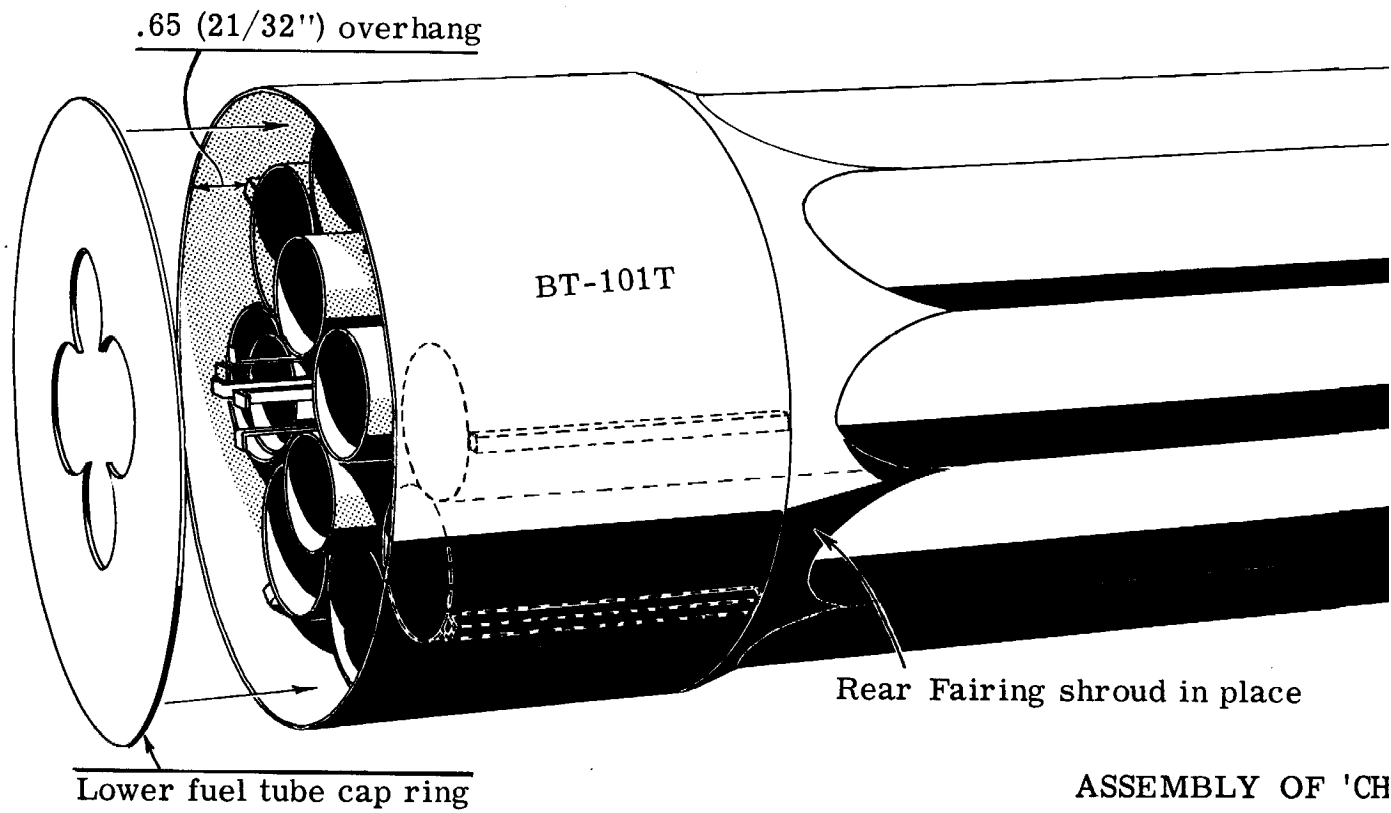
TANK" TUBES



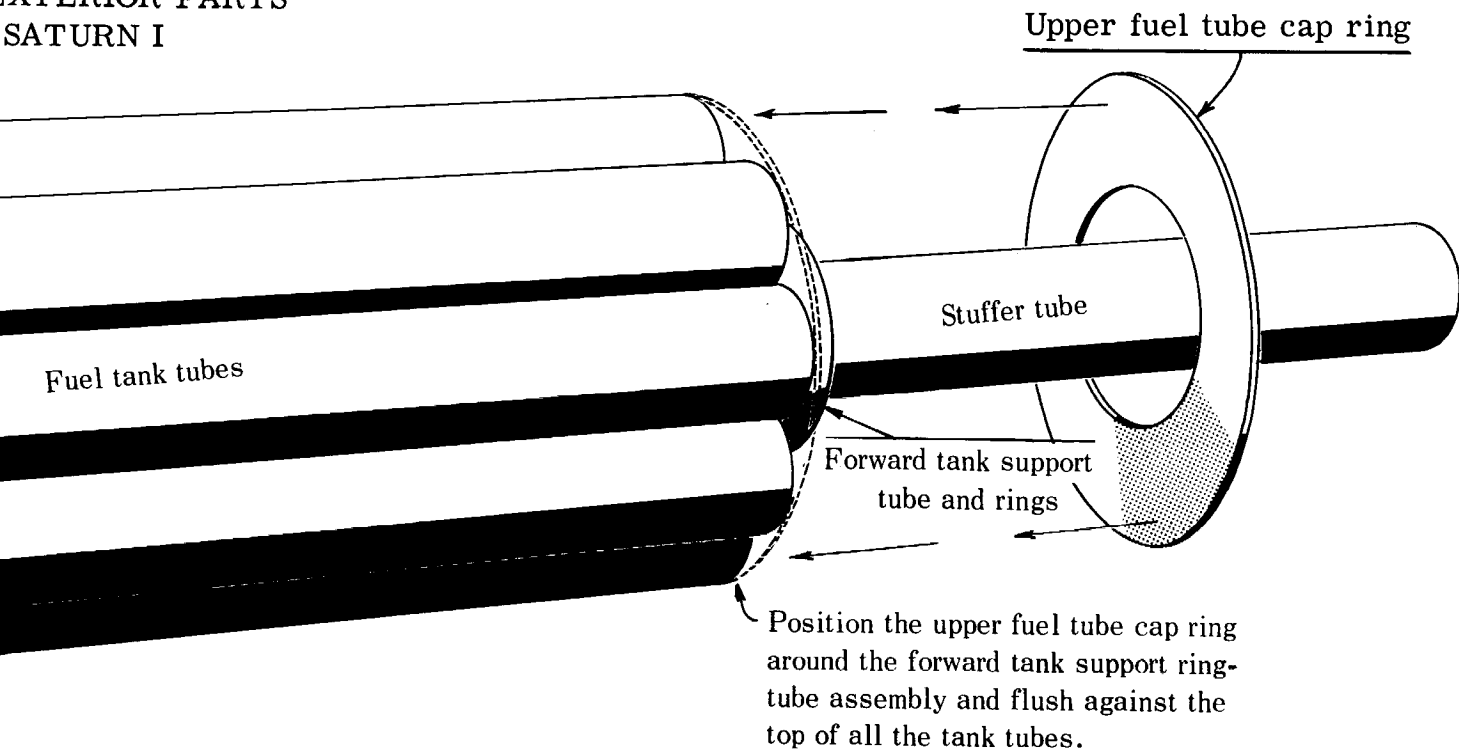
NOTE 6

It will not be necessary to draw guide lines on the tank support tubes as shown. Lines shown in the drawing simply indicate the contact points of each tube not already in place.

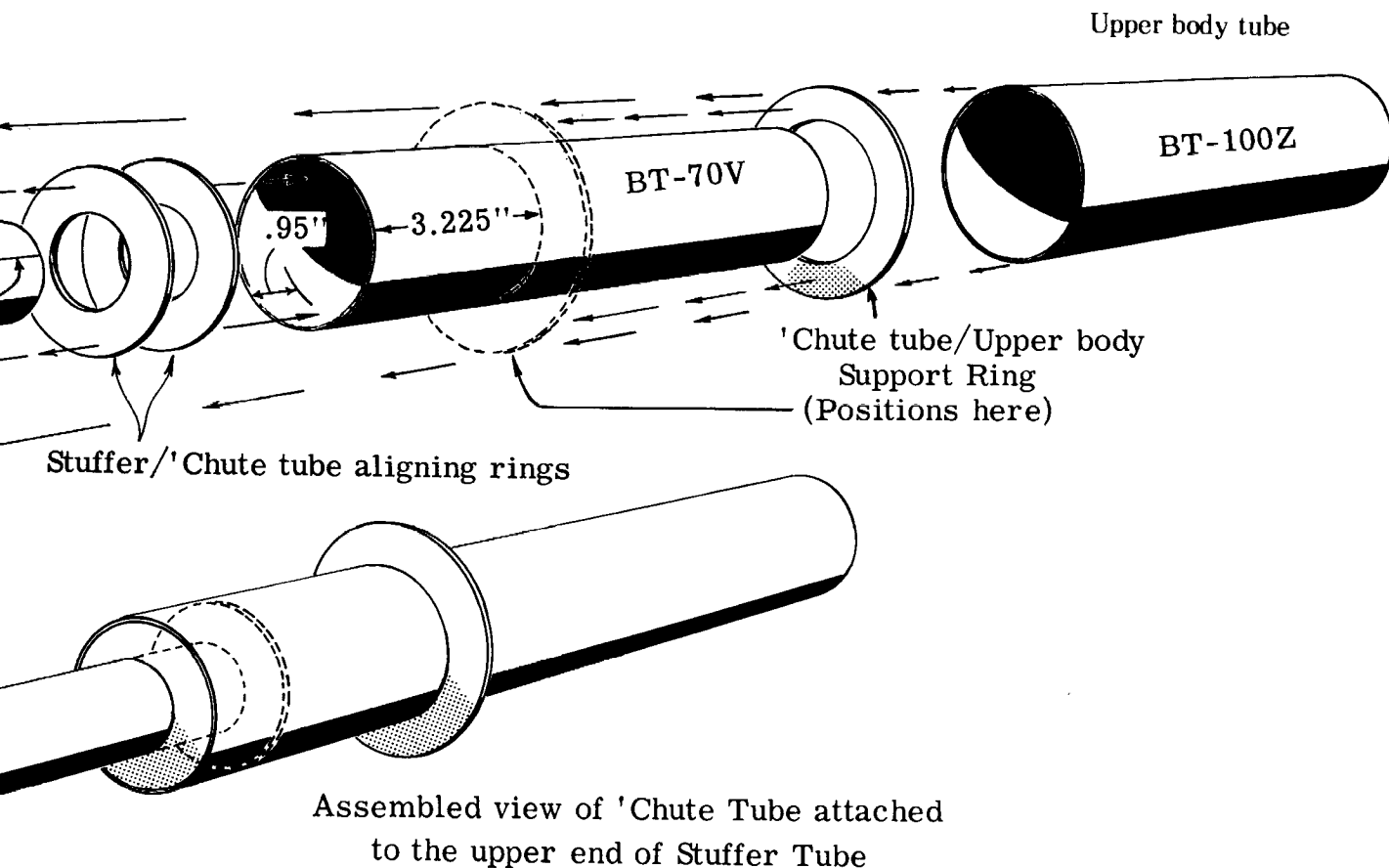




EXTERIOR PARTS
SATURN I

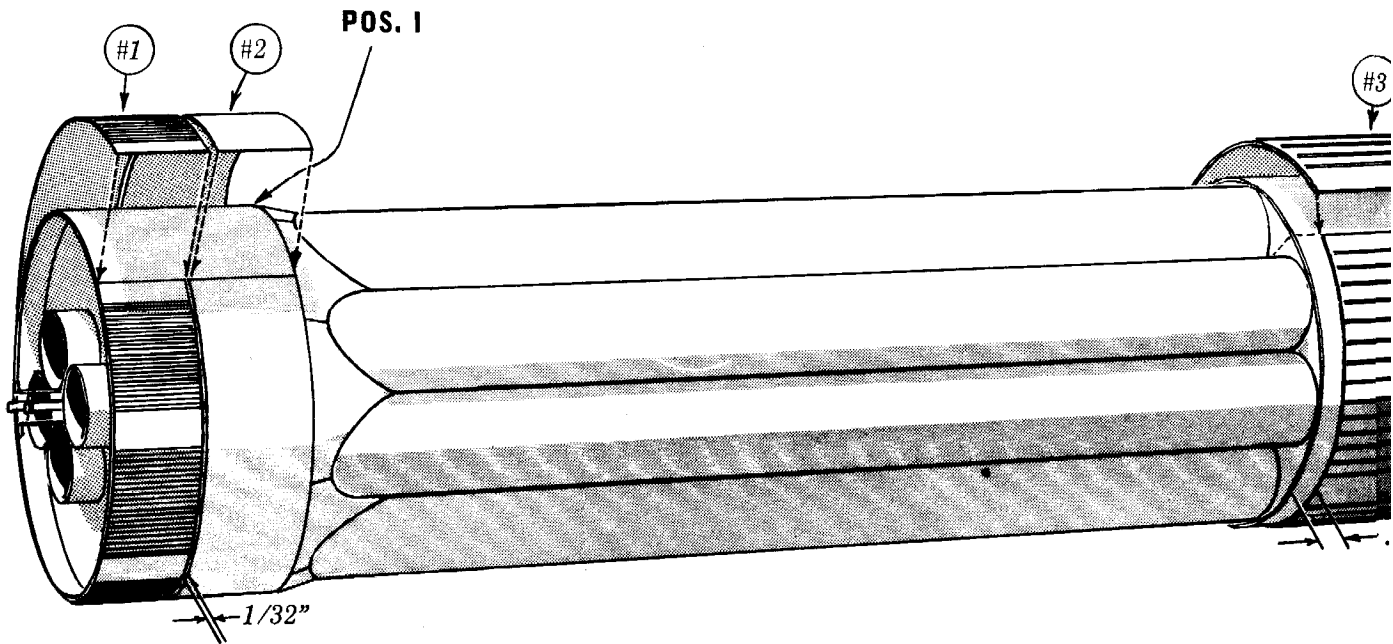


'CHUTE TUBE AND UPPER BODY PARTS

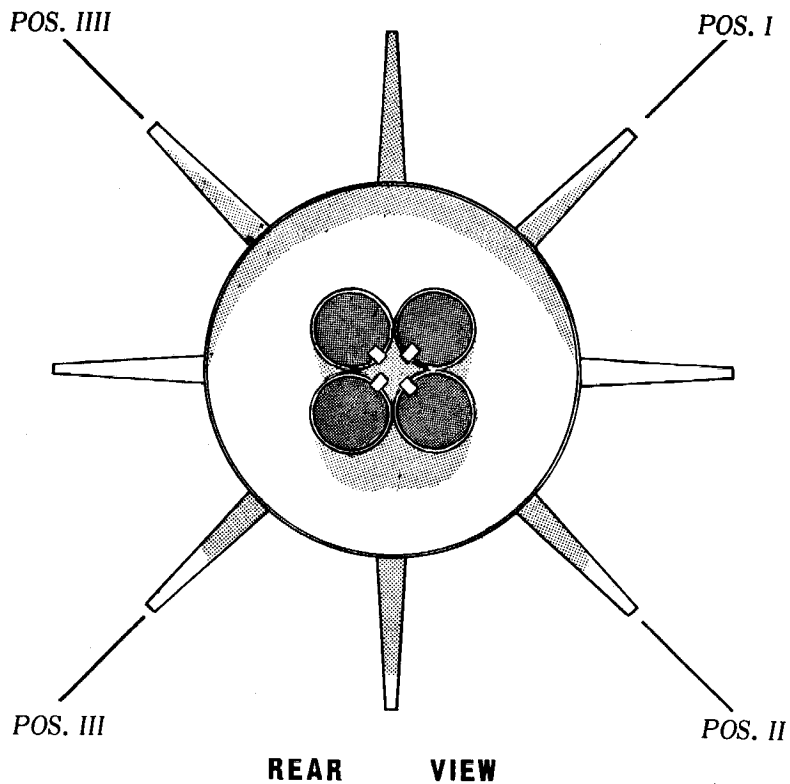


PANEL THREE

DISPOSITION OF EXT

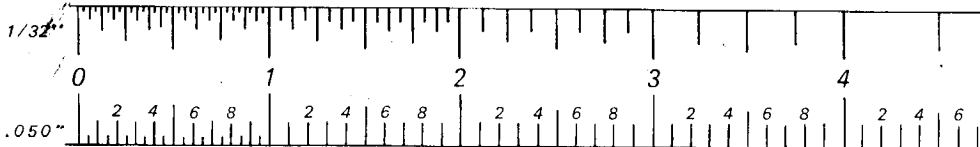
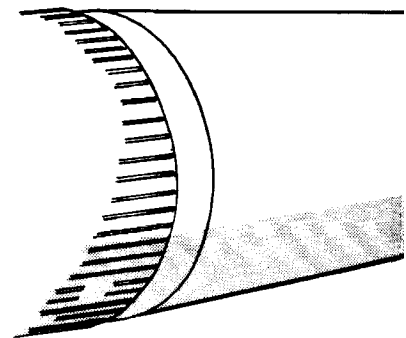


FIN POSITION DETAIL



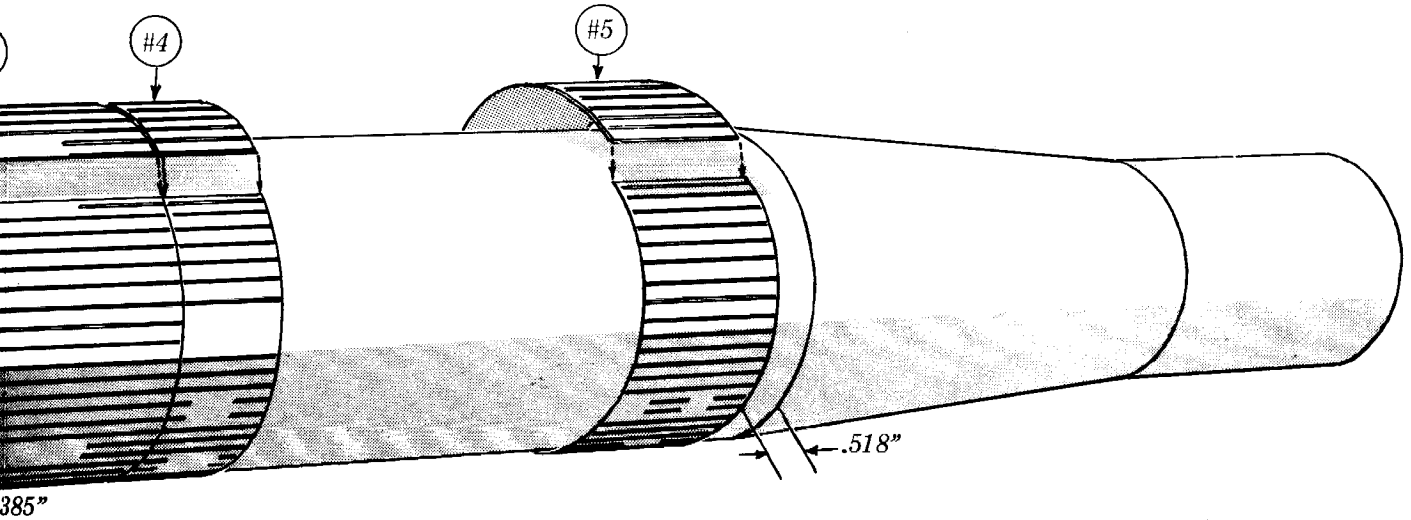
After preparing both parachutes according to the instructions in their kits, attach a snap swivel to each set of shroud lines and snap them to the loop tied into the shock cord.

SHOCK COR
D



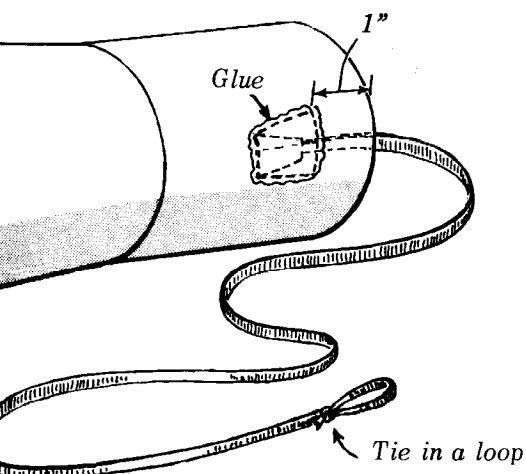
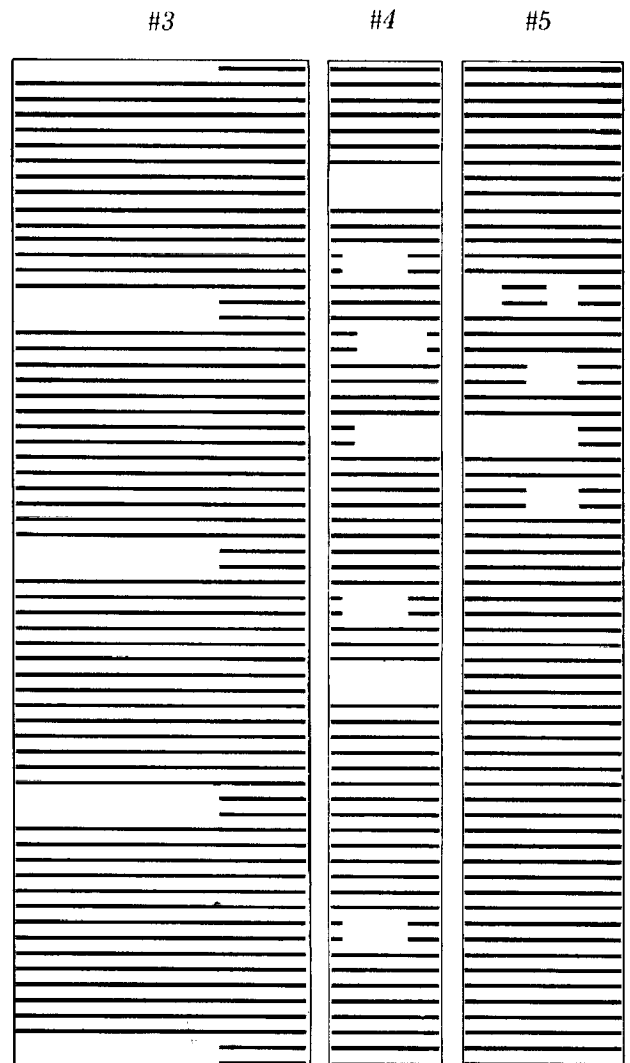
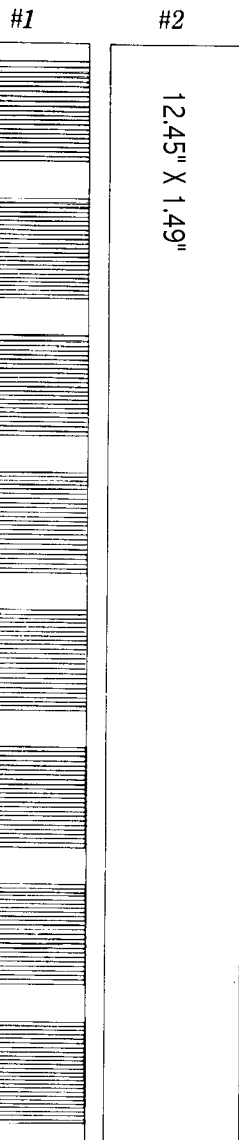
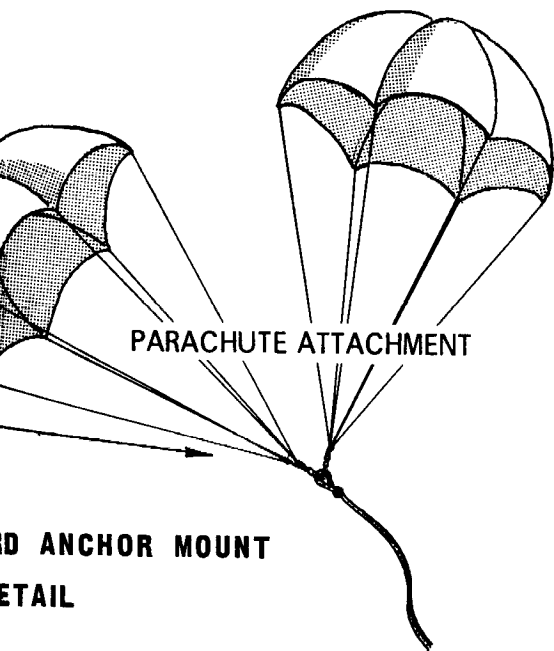
IT IS BEST TO USE A GOOD SCALE
REPRODUCTION WILL HELP YOU M

RIOR DETAIL PANELS



TO HELP YOU IDENTIFY THE INDIVIDUAL PANELS IN THE SP-29 SET

If you *reverse* any one of #3, #4 or #5 panels, your other details will not locate correctly.



...BUT IF NONE IS AVAILABLE, THIS
TAKE MOST OF THE MEASUREMENTS.

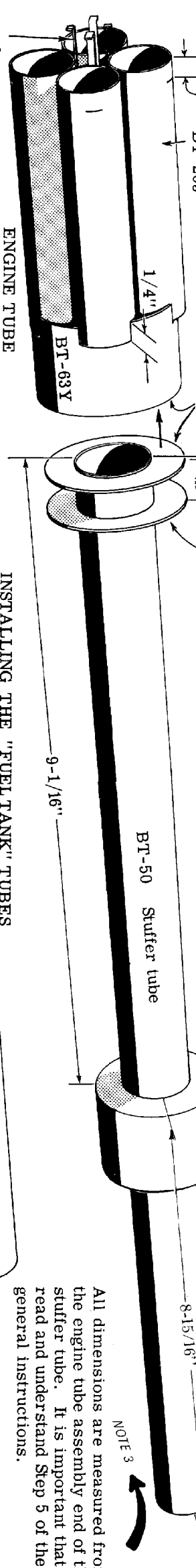
PANEL ONE

NOTE 1 Sand this ring if necessary to fit inside the rear tank support tube.

NOTE 2 This ring should fit flush with the forward end of the tank support tube.

STUFFER TUBE ASSEMBLY

Forward tank support tube and rings assembly



ENGINE TUBE ASSEMBLY

INSTALLING THE "FUEL TANK" TUBES

Four of the BT-51N Tank tubes must be slotted as shown to fit over the engine tubes. See the general instructions.

Apply glue on a line here... and here and sight-align a slotted tube into place.

BT-51N

NOTE 4

NOTE 5

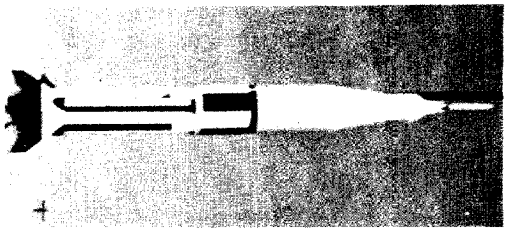
NOTE 6

The remaining four tank tubes will exactly fill the space between the first four tubes installed. "Dry fit" each tube first--draw a pencil line along the joint where the tube you are fitting, touches the adjacent tubes. Run a line of glue along these lines and set the tube into place.

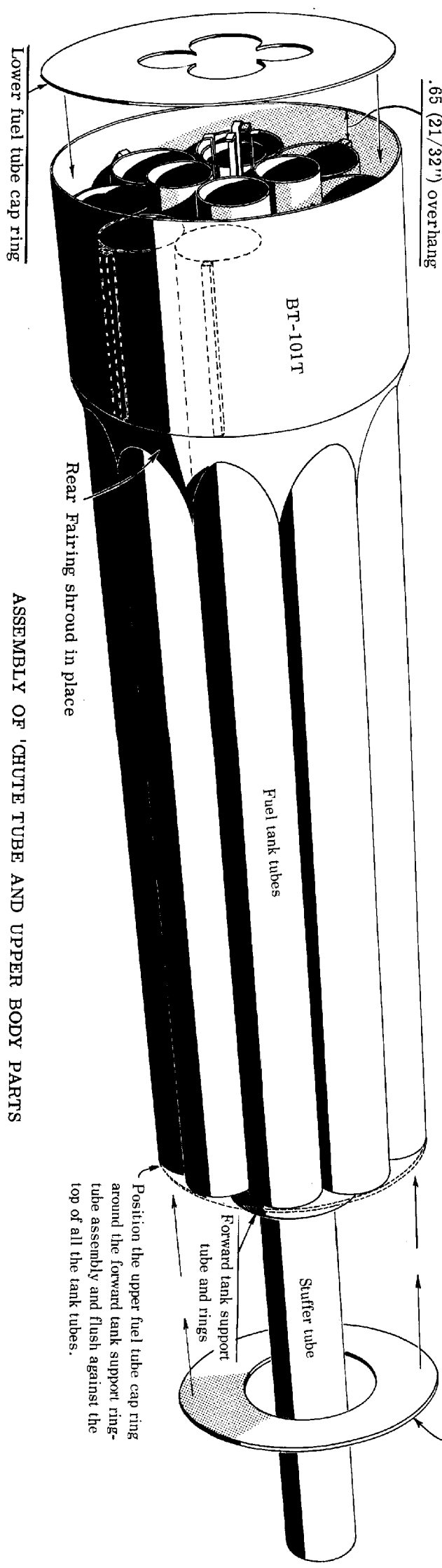
NOTE 3 All dimensions are measured from the engine tube assembly end of the stuffer tube. It is important that you read and understand Step 5 of the general instructions.



It will not be necessary to draw guide lines on the tank support tubes as shown. Lines shown in the drawing simply indicate the contact points of each tube not already in place.

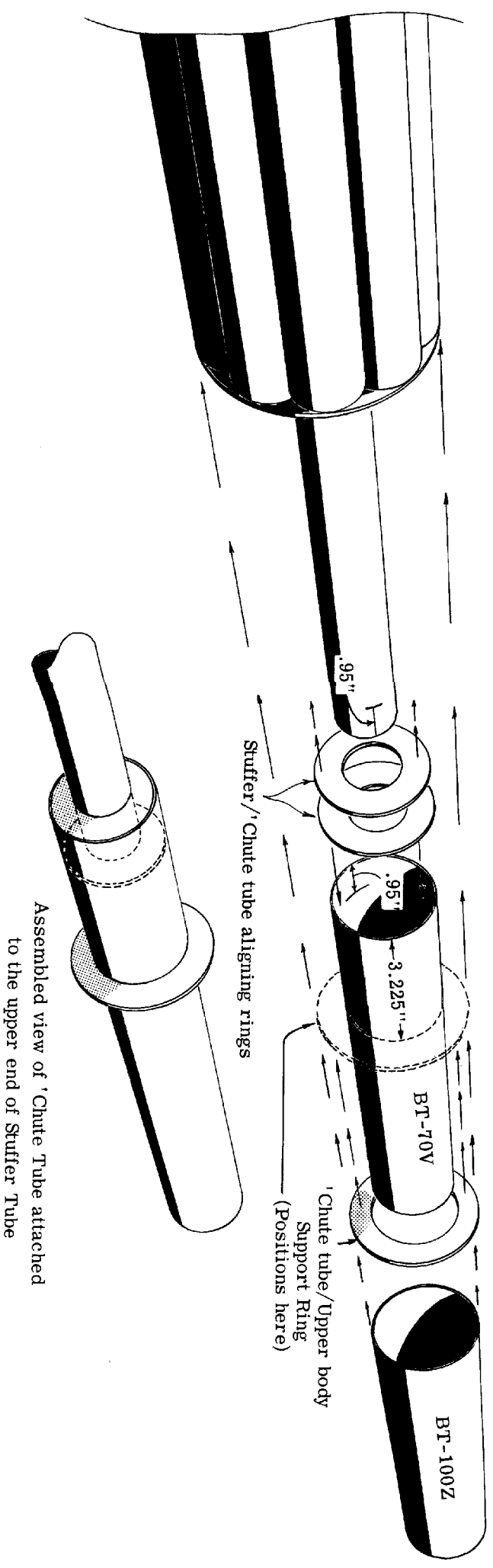


ASSEMBLY OF EXTERIOR PARTS
BASE OF SATURN I



Position the upper fuel tube cap ring around the forward tank support ring-tube assembly and flush against the top of all the tank tubes.

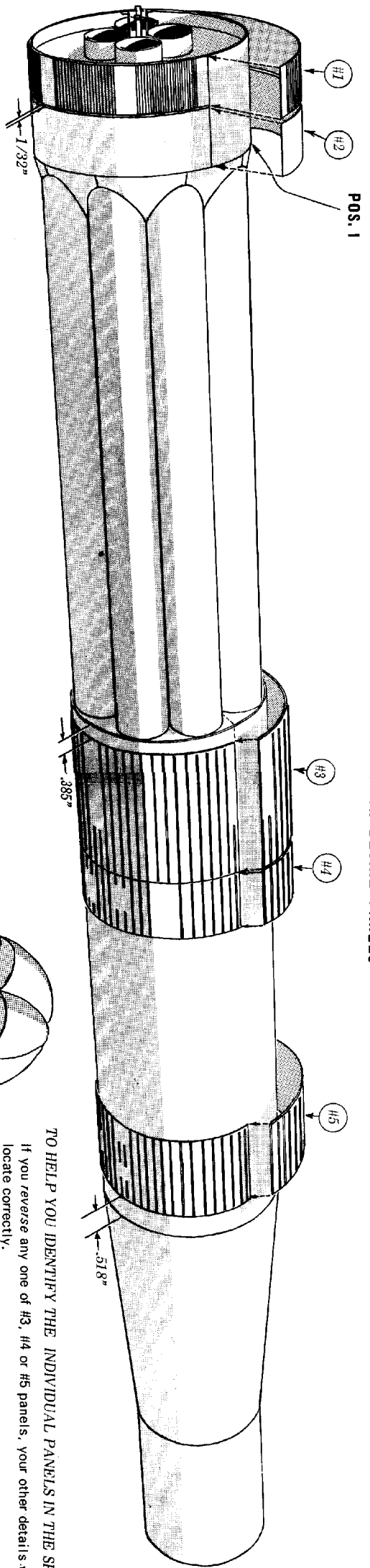
ASSEMBLY OF CHUTE TUBE AND UPPER BODY PARTS



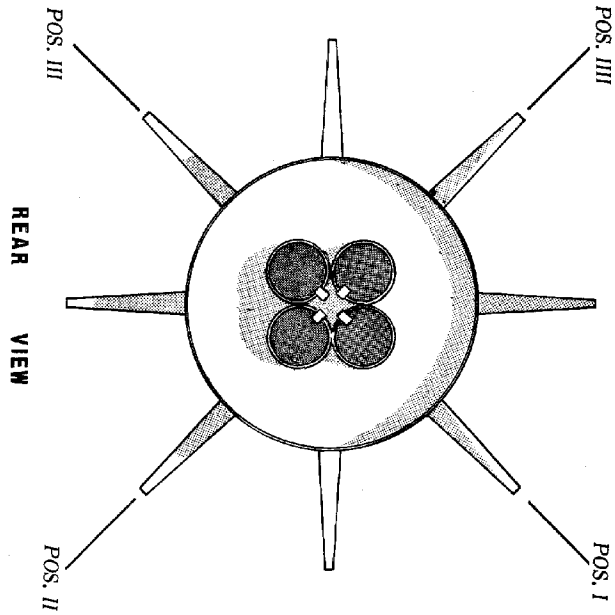
Assembled view of 'Chute Tube attached to the upper end of Stuffer Tube

PANEL THREE

DISPOSITION OF EXTERIOR DETAIL PANELS

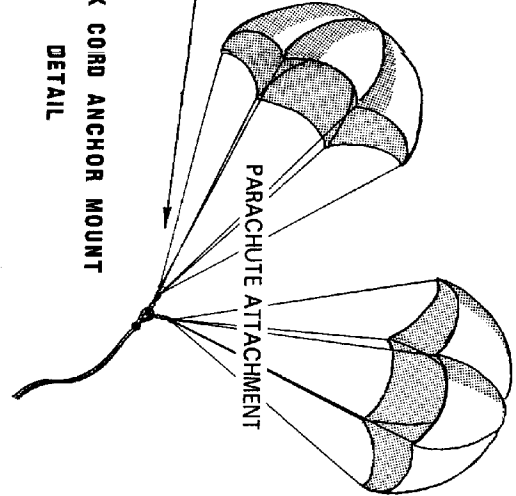


FIN POSITION DETAIL

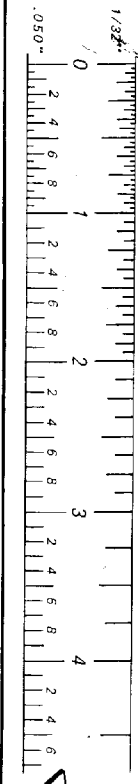
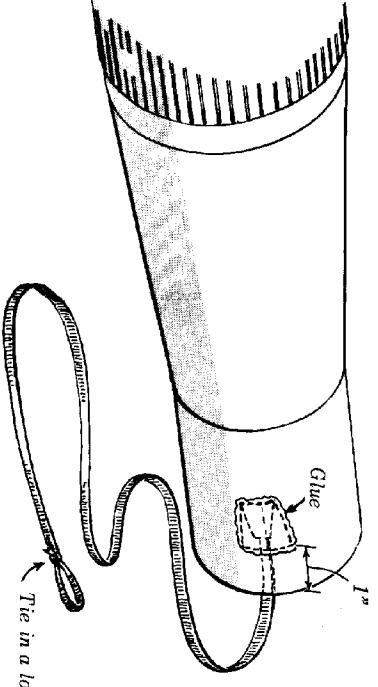


REAR VIEW

After preparing both parachutes according to the instructions in their kits, attach a snap swivel to each set of shroud lines and snap them to the loop tied into the shock cord.

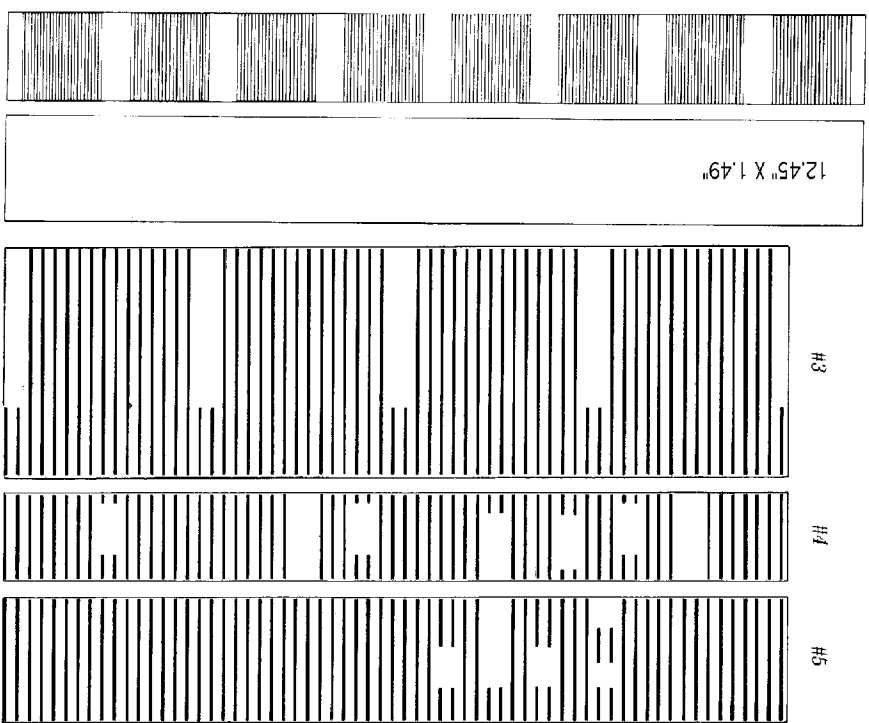


SHOCK CORD ANCHOR MOUNT DETAIL

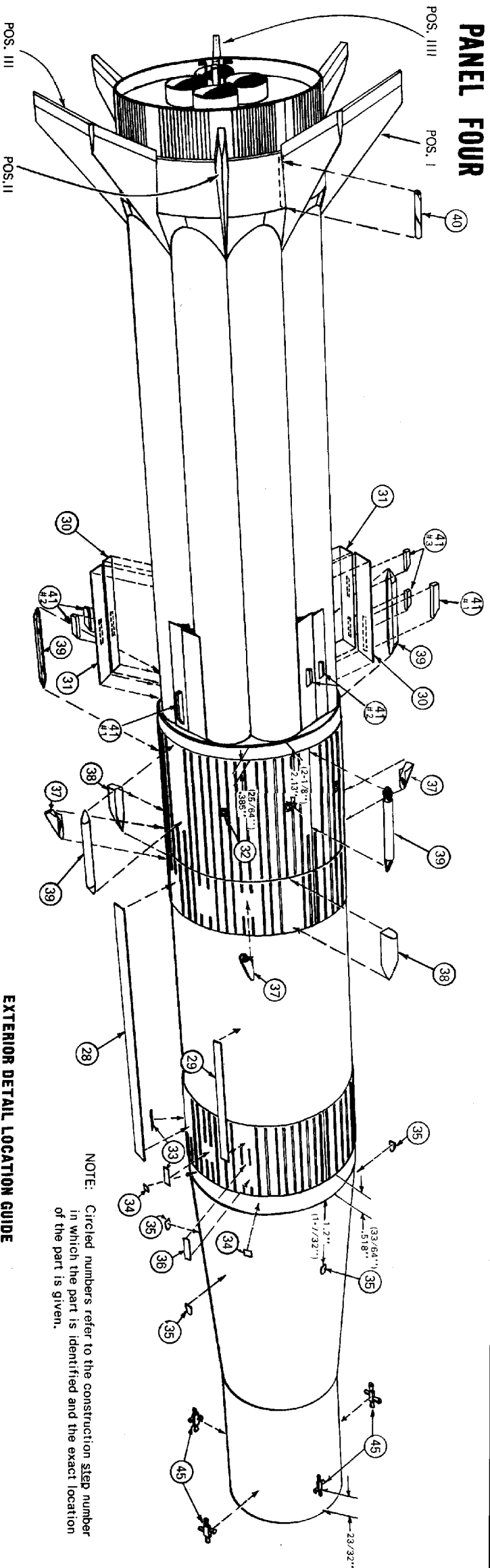


IT IS BEST TO USE A GOOD SCALE... BUT IF NONE IS AVAILABLE, THIS REPRODUCTION WILL HELP YOU MAKE MOST OF THE MEASUREMENTS.

TO HELP YOU IDENTIFY THE INDIVIDUAL PANELS IN THE SP-29 SET If you reverse any one of #3, #4 or #5 panels, your other details will not locate correctly.



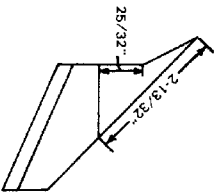
PANEL FOUR



PAINT PATTERN AND DECAL LOCATION GUIDE

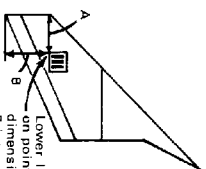
EXTERIOR DETAIL LOCATION GUIDE

FIN
COLOR BREAK LINE
LOCATION



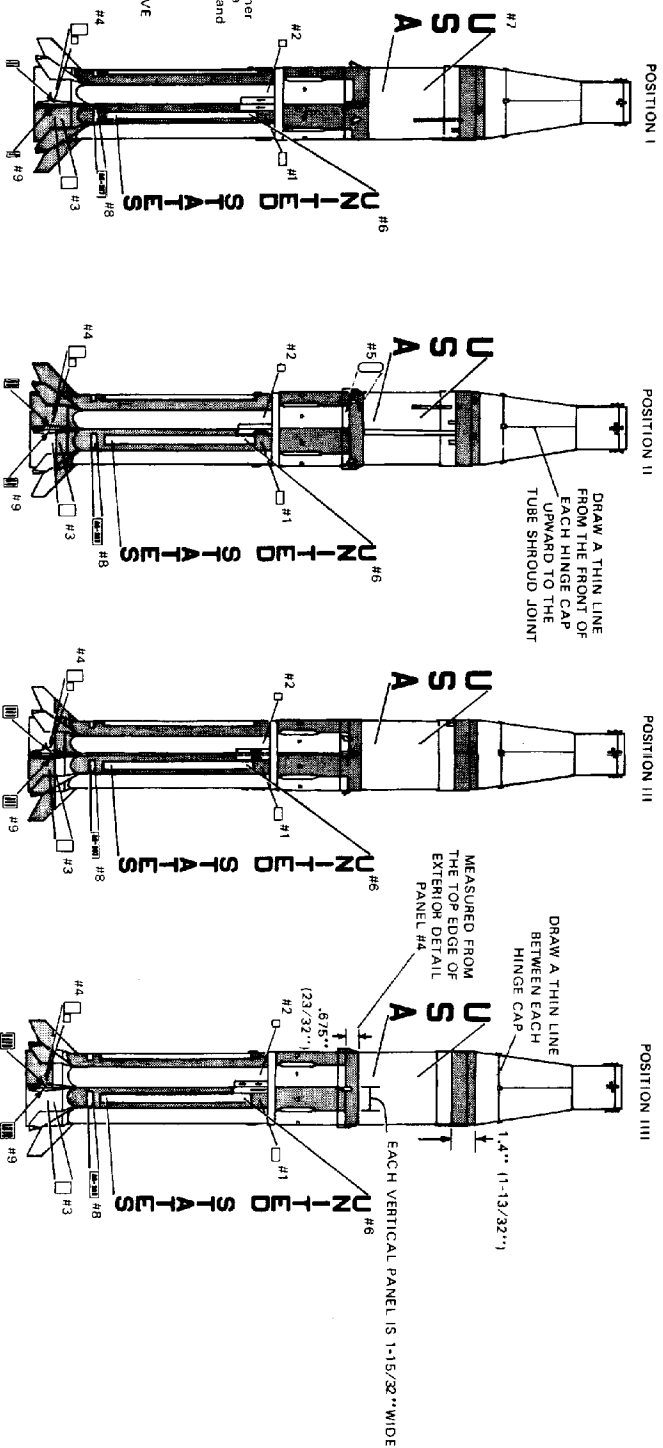
POSITION DECAL
LOCATION

POS.#	A	B
I	4.2"	4.2"
II	3.97"	3.97"
III	3.67"	3.67"
IIII	3.37"	3.37"



DECALS THAT LOCATE ON THE RIGHT SIDE OF FIN, DO SO, AS IN EXAMPLE ABOVE

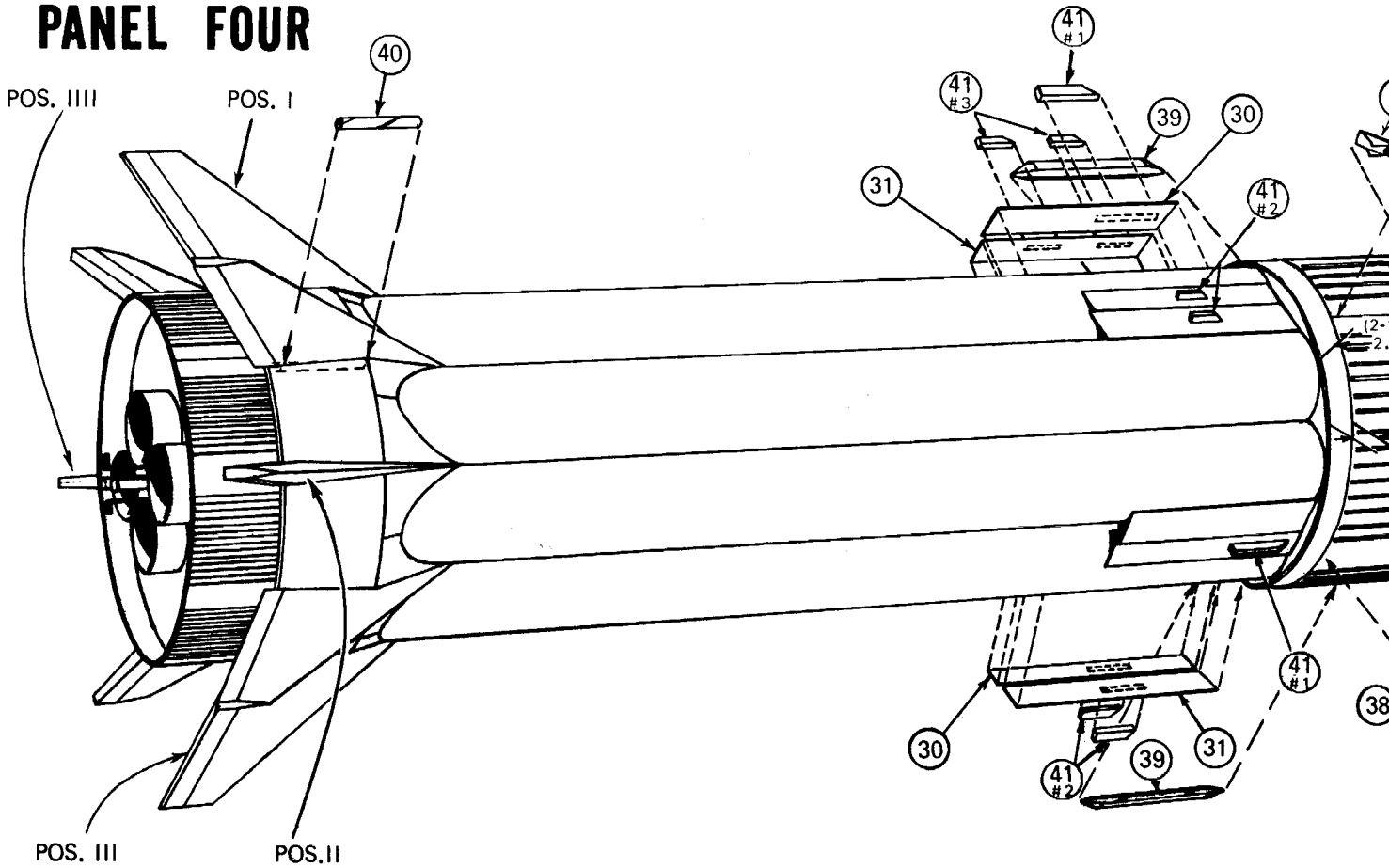
DECALS THAT LOCATE UPON LEFT SIDE OF FIN HAVE THE LOWER RIGHT CORNER AT THE POINT OF INTERSECTION



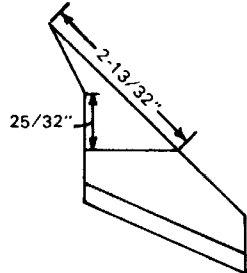
MAIN COLOR SCHEME

- WHITE
 - Main Body
 - Antenna Panels
 - Discharge Tubes
 - Retro rocket Housings
- BLACK TRIM
 - Roll Patterns
 - Fuel Tanks
 - Fin and tail ring sections as shown
 - Attitude Control nozzle ends (or inside surfaces)
- SILVER
 - Antennas
- GOLD
 - Heat Shield (Rear fuel tube cap-ring)

PANEL FOUR



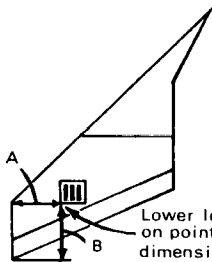
FIN COLOR BREAK LINE LOCATION



PAINT PATTERN AND DECAL LOCATION

POSITION DECAL LOCATION

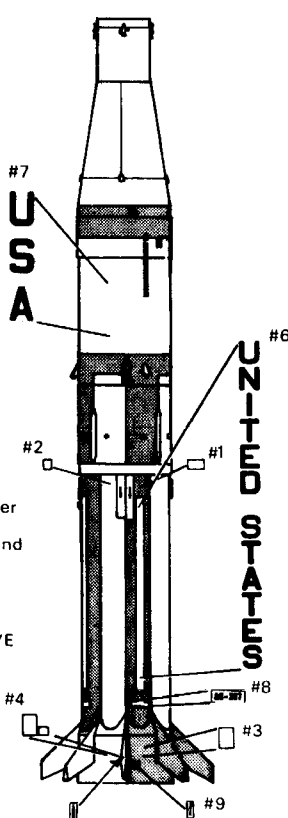
POS #	A	B
I	.42"	.42"
II	.39"	.39"
III	.36"	.36"
IIII	.33"	.33"



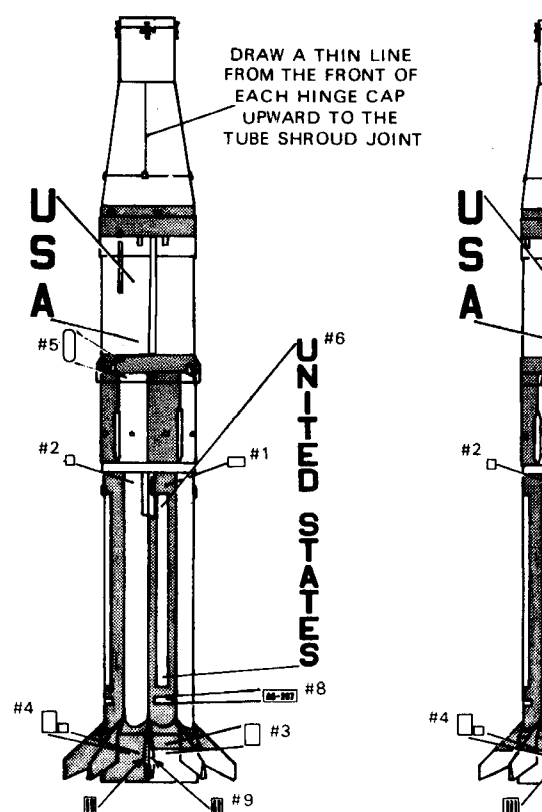
DECALS THAT LOCATE ON THE RIGHT SIDE OF FIN, DO SO, AS IN EXAMPLE ABOVE

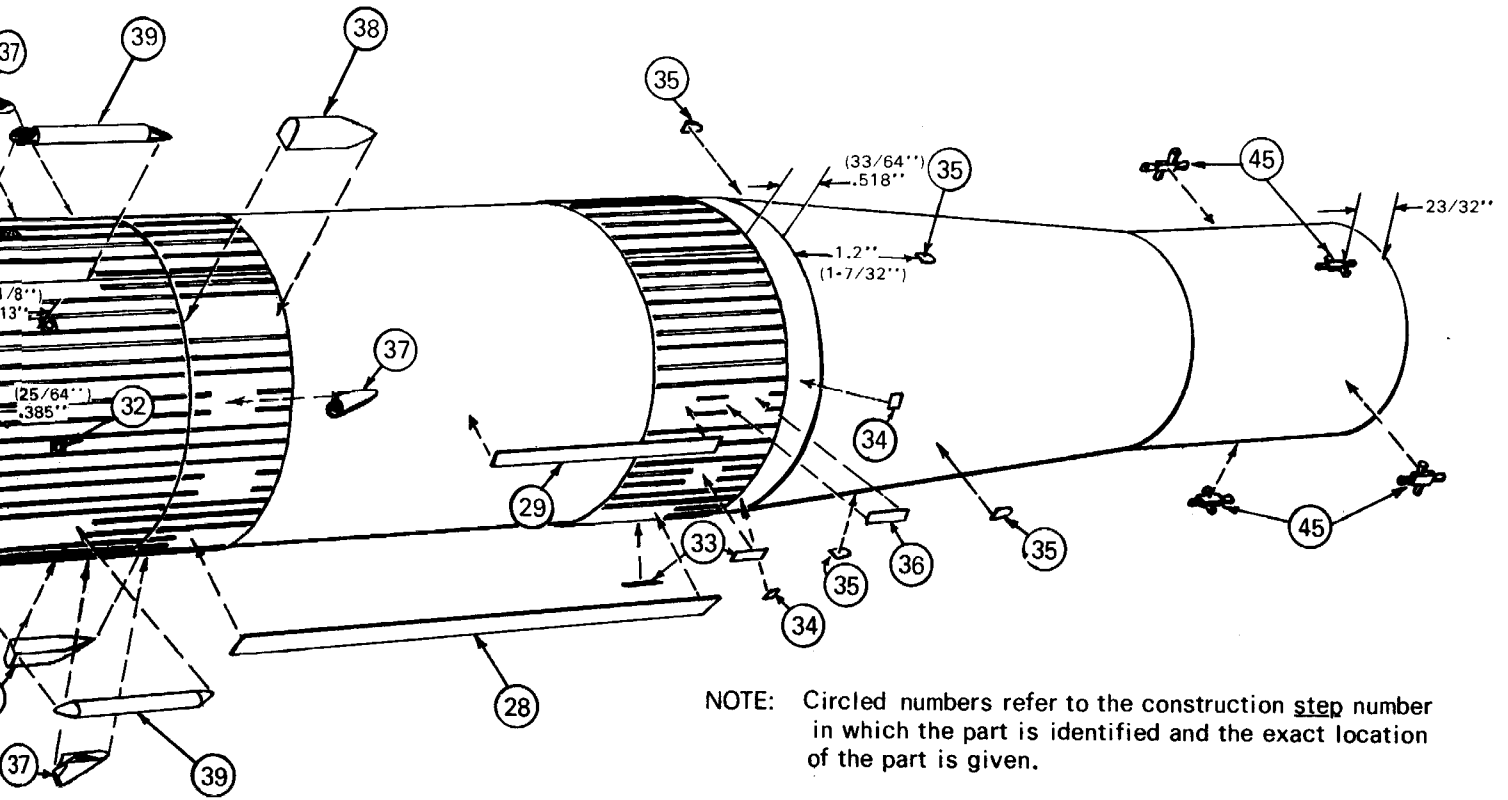
DECALS THAT LOCATE UPON LEFT SIDE OF FIN HAVE THE LOWER RIGHT CORNER AT THE POINT OF INTERSECTION

POSITION I



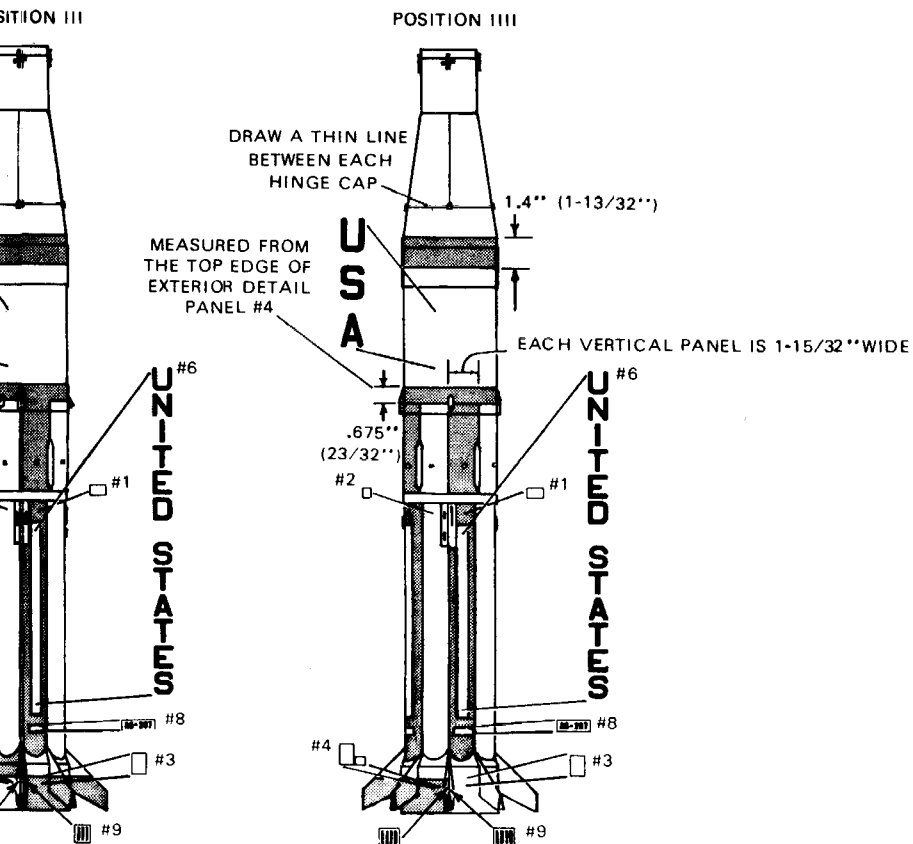
POSITION II





EXTERIOR DETAIL LOCATION GUIDE

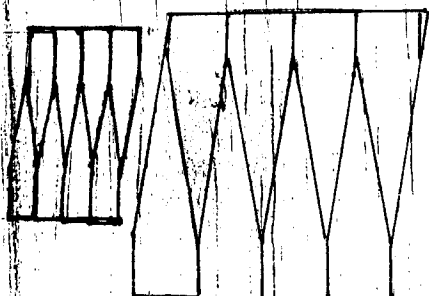
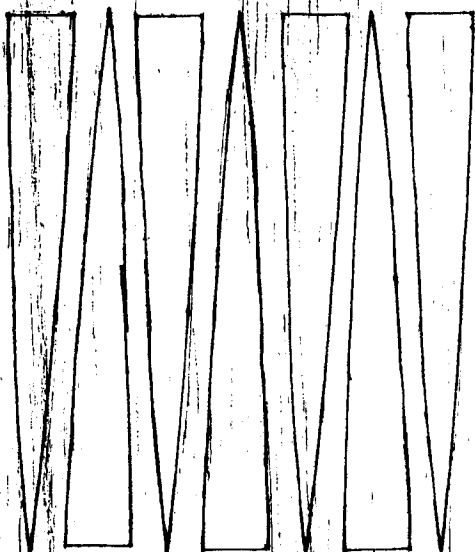
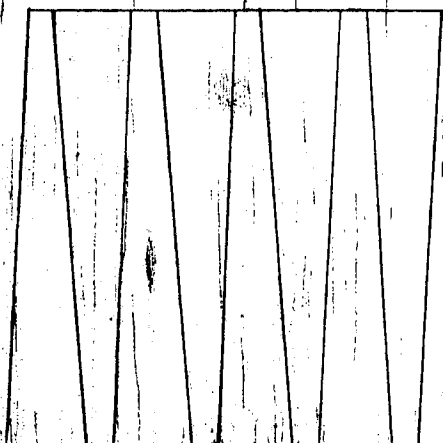
LOCATION GUIDE

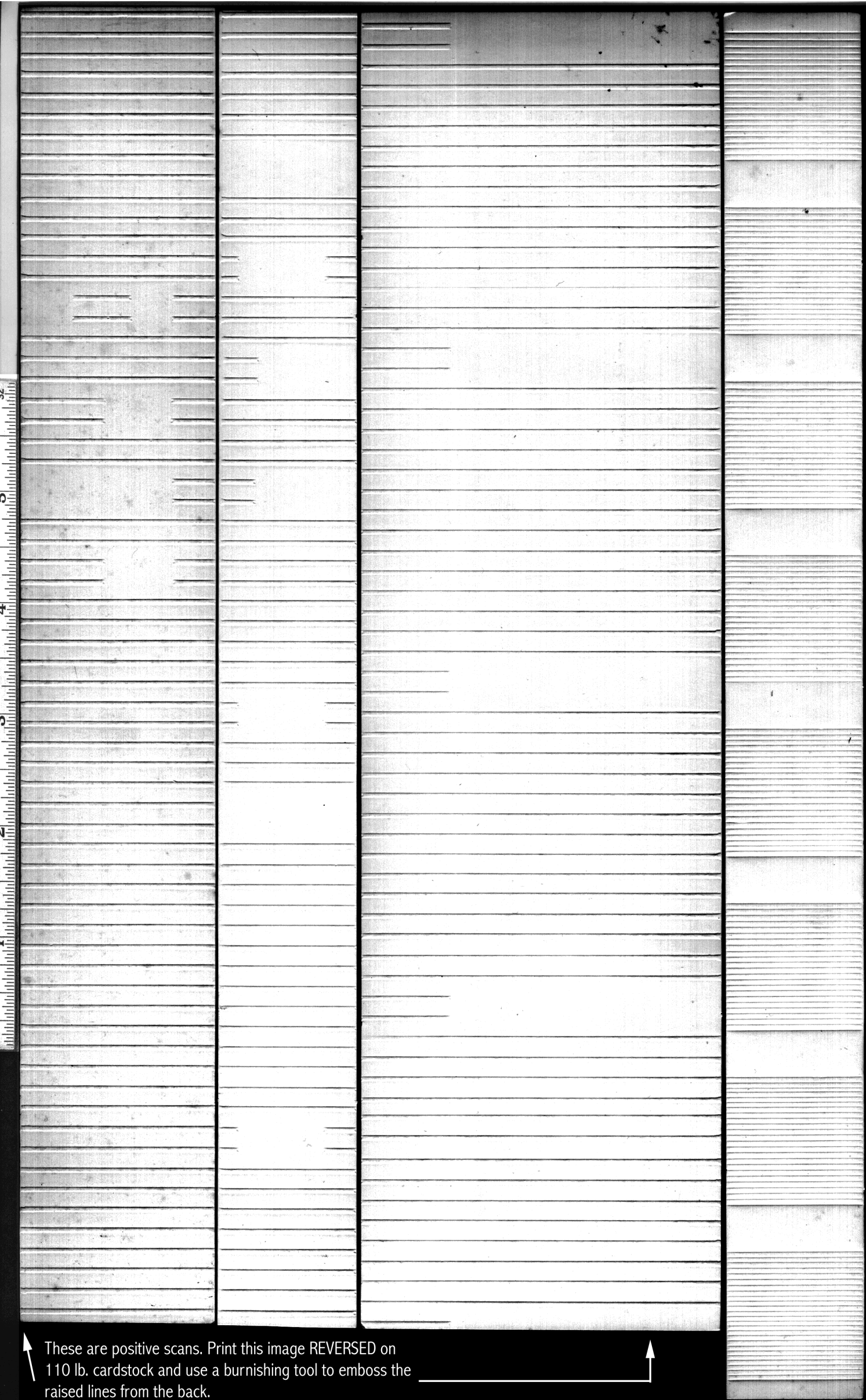


MAIN COLOR SCHEME

WHITE	}	Main Body
		Antenna Panels
		Discharge Tubes
		Retro rocket Housings
BLACK TRIM	}	Roll Patterns
		Fuel Tanks
		Fin and tail ring sections as shown
		Attitude Control nozzle ends (or inside surfaces)
SILVER		Antennas
GOLD		Heat Shield (Rear fuel tube cap-ring)

1/16"



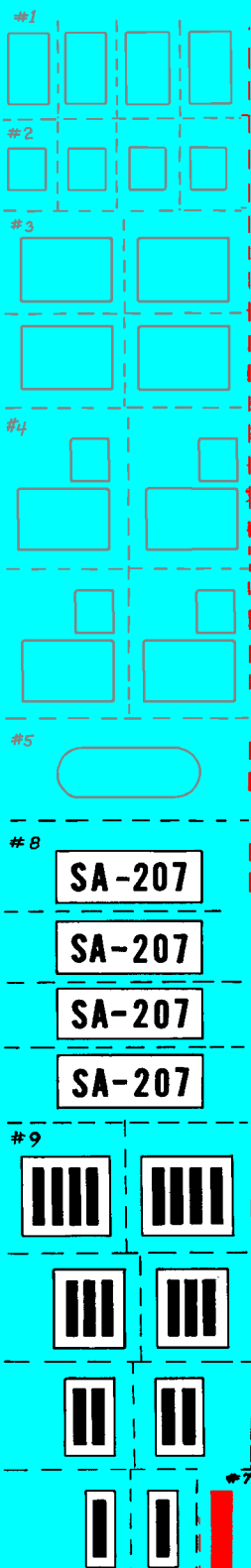


This wrap has depressed not raised detail. Use a steel rule and the tip of a butter knife to reproduce this detail from the top side.



These are positive scans. Print this image REVERSED on 110 lb. cardstock and use a burnishing tool to emboss the raised lines from the back.





#6
UUUU
NNNN
IIII
TTTT
EEEE
DDDD
SSSS
TTTT
AAAA
TTTT
EEEE
SSSS

#7
UUUU
SSSS
AAAA

UPRATED SATURN I

SA-207

KD-29