
USA

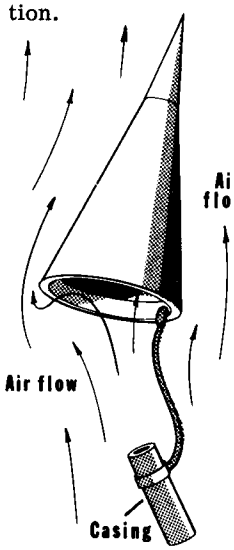
INTRODUCTION

The POINT is quite an unusual departure from the present day fin stabilized model rocket. Why is it stable? Simply because its center of gravity is designed to fall ahead of its aerodynamic center of pressure. This rule, as you probably already know, tells you whether or not a rocket will be stable in flight. The POINT is a useful educational tool because it demonstrates that every body, regardless of its shape, will be affected by the air which flows over it.

Knowledge of the aerodynamic center-of-pressure location on any shape means that a stable flying model rocket can be designed using this shape by simply insuring that the center of gravity is a reasonable distance ahead of the center of pressure. The important conclusion is -- that fins are not the only technique for aerodynamically stabilizing a rocket.

RECOVERY

The POINT does NOT use TUMBLE recovery. It comes down as shown in its highest aerodynamic drag configuration.



At ejection, the engine casing, POINT combination becomes unstable. The engine casing has much less drag than the POINT body so it ends up falling faster and in so doing pulls the rear of the POINT body so it ends up pointed backwards to the air flow. This, of course, is a very high drag configuration for the cone shape. The POINT body and the engine casing are thus stabilized in a manner quite similar to using a flexible parachute (that is, the high-drag body wants to go slow and the low-drag body wants to go fast, thus one pulls against the other on the entire trip down).

LANDING

The empty engine casing (which is about half of the entire rocket weight) impacts the ground first and the lightweight body section lands next. This means the energy that has to be absorbed into the structure (which is after all what causes damage) is thus half of what it might be if it TUMBLED down with the extra weight of the engine casing still inside the body.

SPECIAL FEATURE

The pre-printed body and astronaut cockpit gives you a futuristic detailed spaceship appearance with a minimum of effort.

The ram-scoop behind the astronaut's cockpit immediately brings to mind the science fiction writers concepts for theoretical ships which in exceeding the speed of light can quite nicely scoop up the few hydrogen molecules existing in the so-called vacuum of space and use it for fuel. (The latest scientific guess is one such molecule per each 3.5 cubic foot of outer space nothingness).

List of Required Equipment:

Superbond Glue
Scotch Tape
Pencil
Razor knife with sharp blade

Painting materials:
Fillercoat, brushes
Sandpaper
Color of your choice

the POINT!

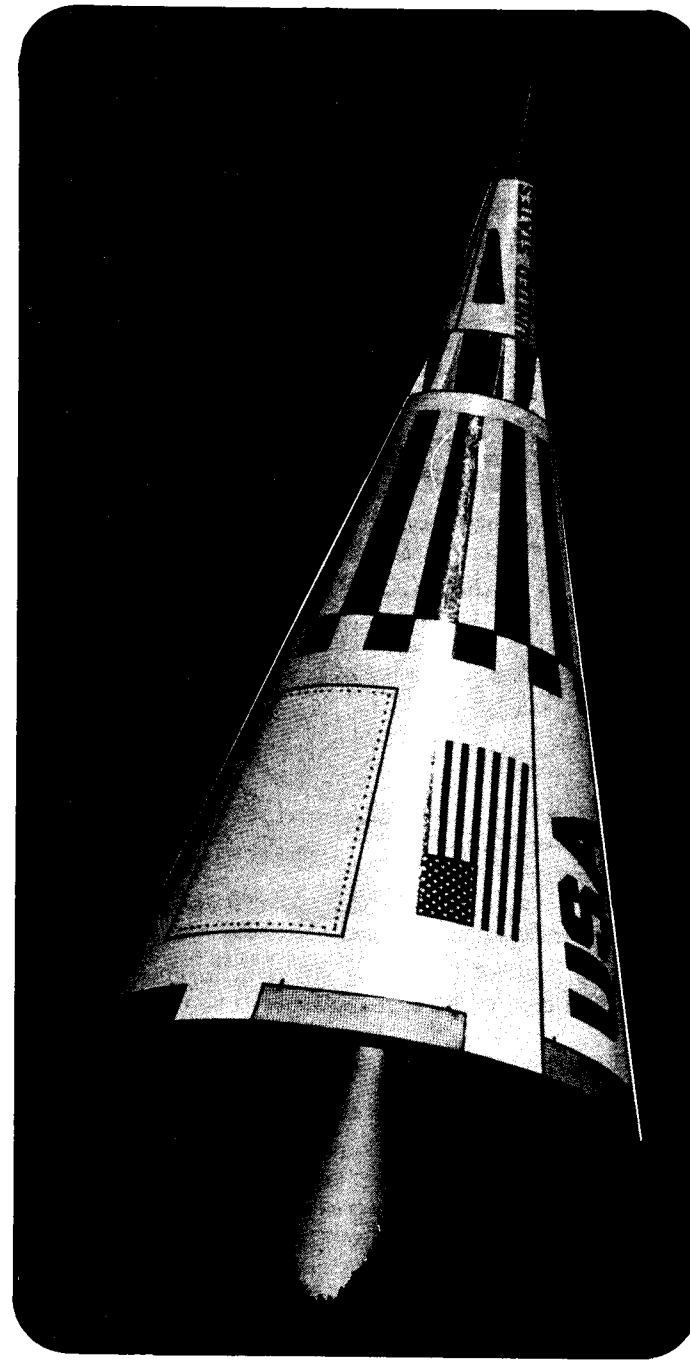
SPECIFICATIONS
LENGTH ____ 8.1"
BASE DIA ____ 3.9"
WEIGHT ____ .55 oz.

USES ONLY
B4-2 ENGINE
(NOT INCLUDED)

PREPRINTED IN COLOR TO LOOK LIKE A SCIENCE FICTION SHIP

WEIRD SMOKE TRAIL

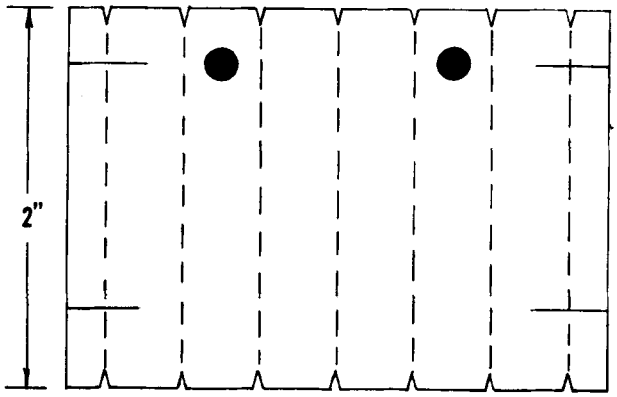
UNIQUE RECOVERY



$1.50 CAT. NO. KC-13

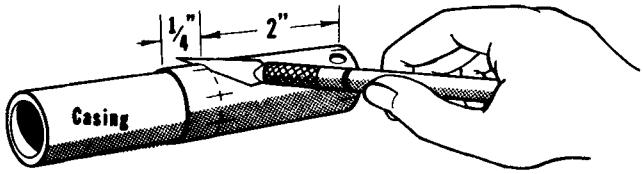
RAM SCOOP ASSEMBLY

Cut out the positioning guide and use it to mark the proper spacing for the 6 ram-scoop duct supports. Be sure to line the pattern up properly with the two ejection charge vent holes.



At this time, also use the guide to mark the $2\frac{1}{4}$" long body tube for cutting down to a 2" length.

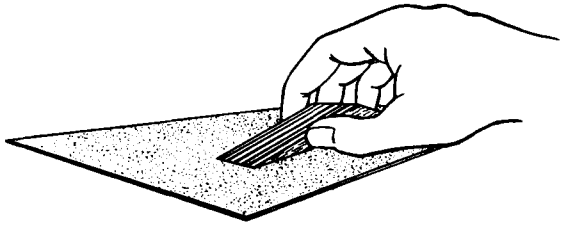
Wrap enough Scotch or masking tape around the empty engine casing so it is a reasonably tight fit in the body tube, then insert it in the tube. It is used for back-up support when cutting the tube with your knife as shown. Roll the tube as you cut.



DO NOT throw away the remaining small piece of tube as it is used later as part of the recovery system.

RAM SCOOP DUCT SUPPORTS

Cut out the ram-scoop duct support pattern and use it to make the 6 balsa supports. Next, hold all 6 pieces together and sand to a uniform size on all 3 sides as shown.

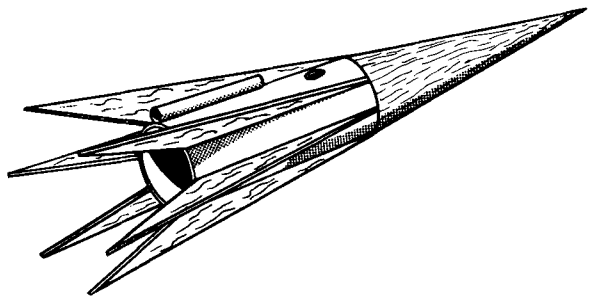


While still holding the 6 supports together, apply a thin film of glue to the edges which will be bonded to the tube.

When dry, sand each support separately using very fine #400 sandpaper.

Apply a second film of Superbond to the first duct support and attach it in place. You will note that using this two step gluing method increases the tackiness and set-up time for the glue. It allows you to then proceed with the remaining duct support gluing and alignment in a much quicker time. Next, use a liberal amount of glue on the nose cone shoulder and insert it in the tube.

When all the duct supports are firmly dry, apply a small additional fillet of glue to each joint. Next, cut the launch lug to a length of $1\frac{1}{4}$" and glue it next to any of the 6 duct supports as shown.



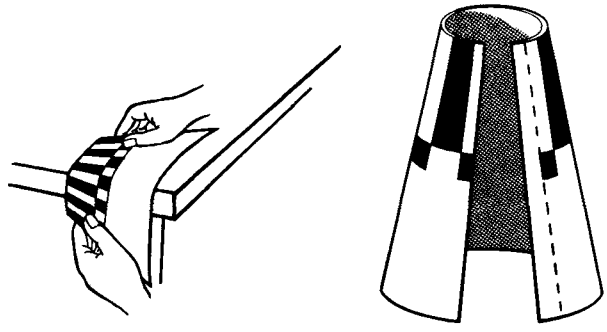
When entirely dry the cockpit assembly should be sprayed (or brushed) with your favorite color. Our favorite paint pattern is all white with a red point on the top $1\frac{1}{4}$" of the nose. This does not have to be carefully masked as the self-sticking cockpit pattern assures a clean line. Note that the empty engine casing serves quite well as a support for holding the assembly during painting.

CONE BODY ASSEMBLY

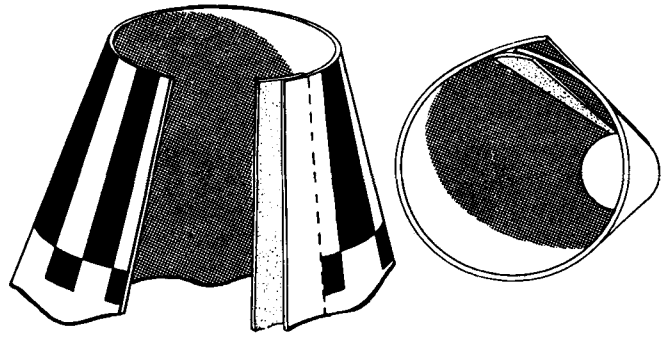
If your hands are dirty at this point, wash and dry them thoroughly before proceeding. The main cone section is pre-printed and if you get any dirt smears on it you'll have to paint the entire rocket skin. Painting will ruin the spaceship detail and add an unnecessary weight penalty.

Very carefully cut out the main pre-painted cone pattern with a sharp blade. Use a steel straight edge if possible as a guide for cutting the two straight edge portions.

To make an easier job out of joining the cone seam together you should pre-curl the cone shape by gently drawing the sheet several times over the edge of a smooth table as shown. The cone will then sit by itself as shown.

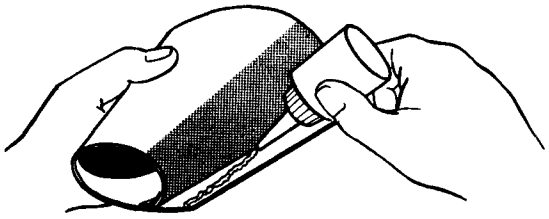


Apply Scotch tape the length of the entire seam as shown.

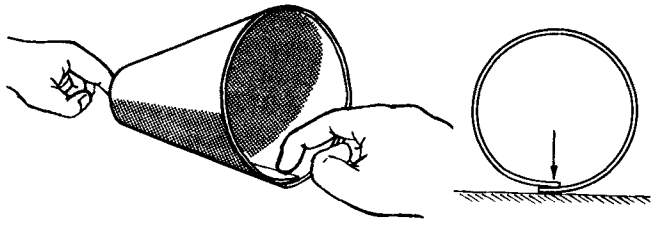


The tape is used to key the joint in place prior to any gluing. First tack the small end of the cone together, then key in the large end, and finally connect the entire seam in its proper place.

Now we are ready to do the actual gluing of the seam overlap area. Squeeze the cone together slightly to better expose the gluing surface. Run a bead of Superbond along the edge shown and immediately smooth it with your finger until just a thin film of glue covers most of the overlap tab. This way no blobs of glue will squeeze out and mar the pre-printed pattern.



Push the joint against a table surface (protected by wax paper or cardboard). Slide your finger back and forth to insure that the entire overlap is bonded.



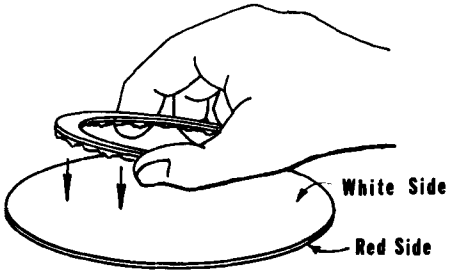
Hold down for about 1 minute to allow time to dry sufficiently.

RING STIFFENER

Next we start building the ring stiffener assembly for the base of the cone. This structure is necessary to prevent the basic conical shell from collapsing under high speed aerodynamic pressure forces. It also gives the paper shell a permanent circular shape which improves the appearance of the "POINT".

DISK

First, the paper disk is carefully cut out. Next, it is glued to the back of the large red circle as shown. Do not use an excessive amount of glue.

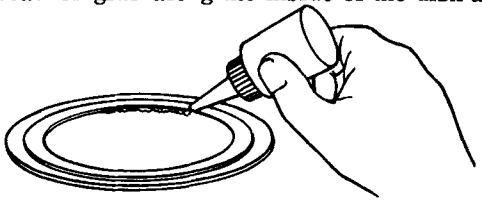


Roll your Exacto knife handle over the disk to flatten and smooth it.

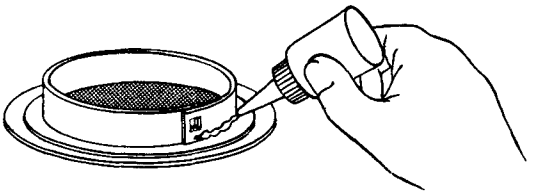
CYLINDER

Cut out the long red strip and glue it to itself so it forms a cylinder and the red surface is on the inside. Be careful that the square holes on the gluing tab are exactly matched as this cylinder is designed to fit perfectly inside the disk assembly.

Run a bead of glue along the inside of the disk as shown.

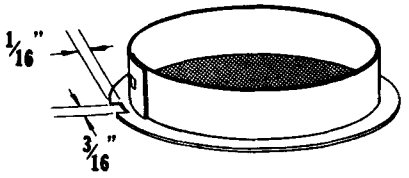


Then insert the cylinder and apply a fillet of glue to the joint as shown.

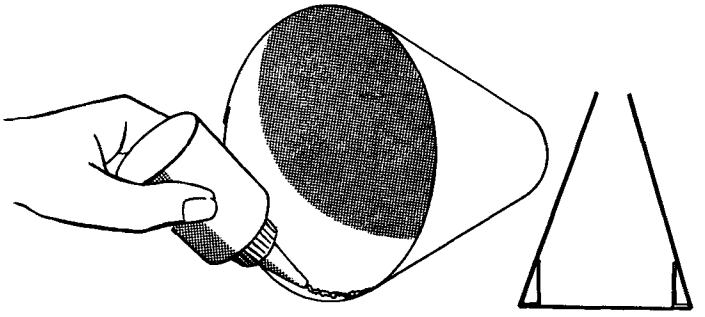


A book should be placed on top of the cylinder while the assembly is drying to aid alignment. Even though this structure is made of lightweight paper, you will already note it is quite rigid.

When the above assembly is dry, use a sharp knife to trim the outside of the large circle around the disk away. Do not cut out the inner circle as yet since it acts as a rigidizing membrane to hold the circular shape during assembly to the conical shell. Next cut a 3/16" by 1/16" notch in the disk directly below the square hole in the cylinder as shown.

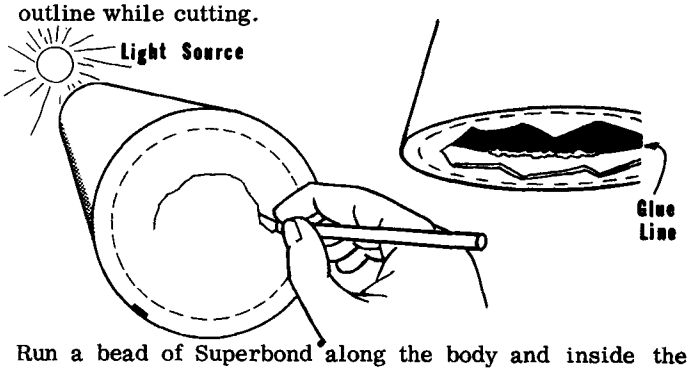


Check the fit of the cone over the base stiffener assembly. Lightly sand the assembly, if necessary, to obtain a perfect fit. Run a bead of glue along the inside of the cone as shown. Smooth the bead with your finger and immediately place over the base stiffener assembly.



MEMBRANE REMOVAL

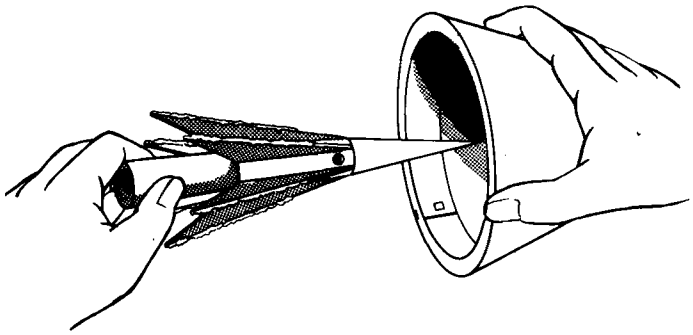
When thoroughly dry, cut out some of the membrane as shown. In order not to cut into the cylinder section, hold the structure up to a light so that you can see the inside outline while cutting.



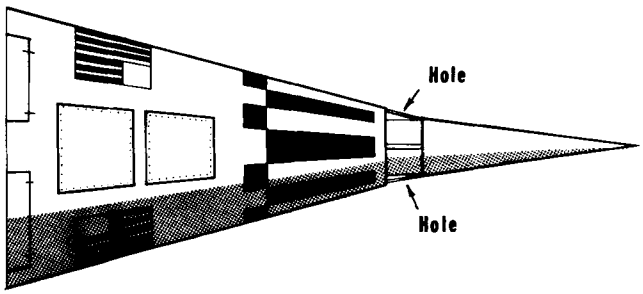
Run a bead of Superbond along the body and inside the cylinder joint as shown above. Smooth the glue with your finger. When thoroughly dry the assembly will be rigid enough so that the final trimming away of the membrane can be performed.

FINAL ASSEMBLY

Next, the ram-scoop duct assembly is glued into the cone body assembly. After applying glue, use the empty engine casing to push the ram scoop in place as shown.



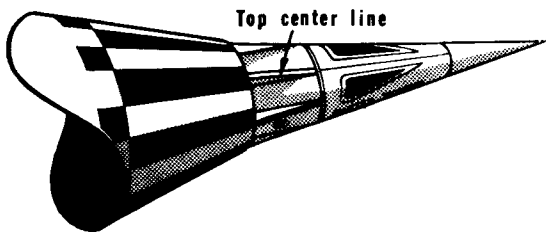
Be sure to align one of the duct supports in the middle of the very top roll pattern segment in order to give the design a proper symmetrical appearance. The ejection port holes should be at the sides.



The nose cone now can be gripped for easier final alignment. This is done to insure that the engine thrust will not be cocked off to one side during flight.

COCKPIT PATTERN APPLICATION

When the glue has dried, the cockpit pattern should be cut out, moistened and applied. Also moistening the nose cone aids sliding the pattern into position. The line splitting the two windows should be aligned with the top ram-scoop support. Note that the back of the cockpit pattern almost touches leading edges of the duct supports.

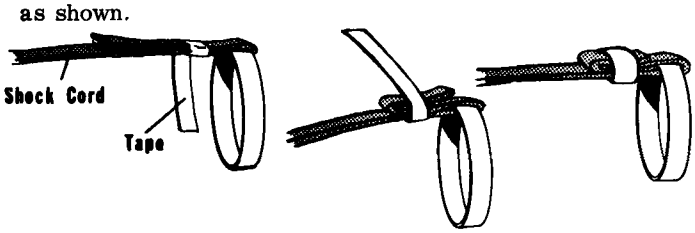


FLAMEPROOFING

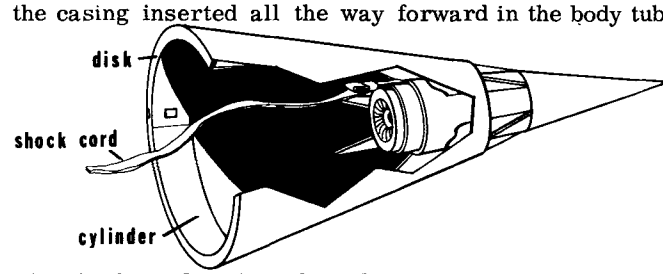
If you have flameproofing solution, a small amount should be applied to the rear edge of the balsa duct supports. Otherwise, coat with a thin film of Superbond. DO NOT flameproof the inside of the paper cone as it is not needed and it just adds unnecessary weight.

SHOCK CORD ATTACHMENT

The shock cord is now attached to the $\frac{1}{4}$" length of #7 tube as shown.



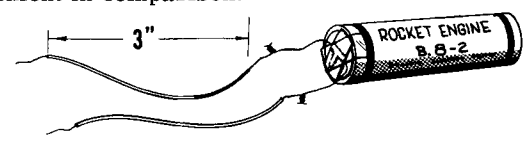
The short tube should now be slid on the engine casing and the casing inserted all the way forward in the body tube.



The shock cord is then slipped into the square hole in the cylinder and out the disk hole. It should be attached as before using tape or $\frac{1}{4}$" PRO/STRIPE. Then lots of glue should be squirted into both holes. Note that a small amount of tension in the shock cord will prevent it from falling in the way of the exhaust and burning through. As the shock cord stretches somewhat with age, simply wind it up a bit before inserting the engine casing. Also be sure to tape the short $\frac{1}{4}$" tube to the engine casing when making actual flights so that the engine casing will not slip from the ejection charge force.

MICRO-CLIP ATTACHMENT

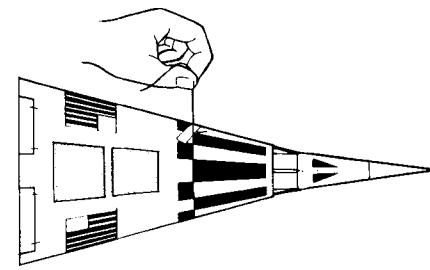
Twisting 3" lengths of fine insulated wire to the nichrome igniters as shown makes it a lot easier to attach your micro-clips. You can reach in and hook up your micro-clips directly to the nichrome wire, but it is awkward and inconvenient in comparison.



PRE-FLIGHT STABILITY CHECK

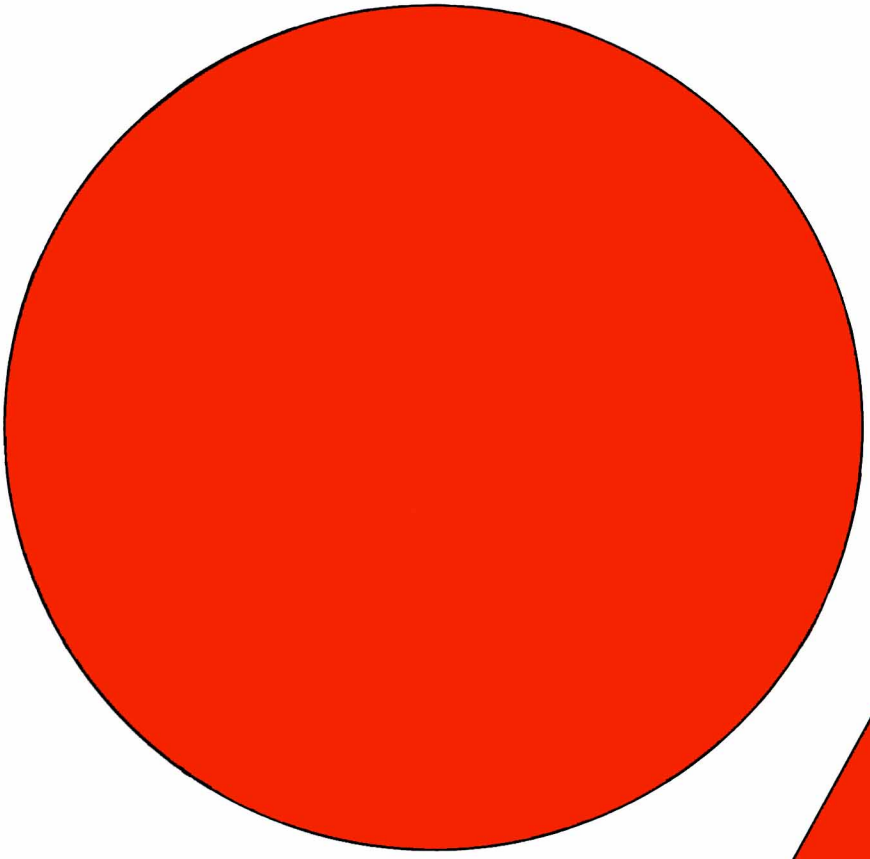
Before an actual flight, a stability check must be made. The balance point (center-of-gravity) must be ahead of the center of aerodynamic pressure. The fins on a regular rocket provide corrective aerodynamic forces when it is disturbed to an angle-of-attack. The conical body of the POINT also will provide proper corrective aerodynamic forces when the balance point (with engine in place) is at or ahead of the roll pattern break as shown.

A piece of string attached with Scotch tape to the bottom of the rocket will make finding the balance point easier (don't worry, it won't pull off the printing).



FINAL FLIGHT PREPARATION

A small amount of tape should be wrapped around the **B4-2** engine for a snug fit in the body tube. It should be just tight enough so that the weight of the attached micro-clips will not pull the engine out while sitting on the launch rod. It cannot be overly tight because it must be kicked out at ejection. It helps to use Scotch tape to hold the igniter wire in the engine. If you are using Sure-Shots, seal the rim with Scotch tape. This prevents any initial blast of exhaust gases from leaking through the opened sides and impinging on the inside cone surface just prior to burning a hole through the paper disk.



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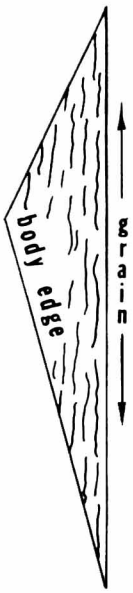
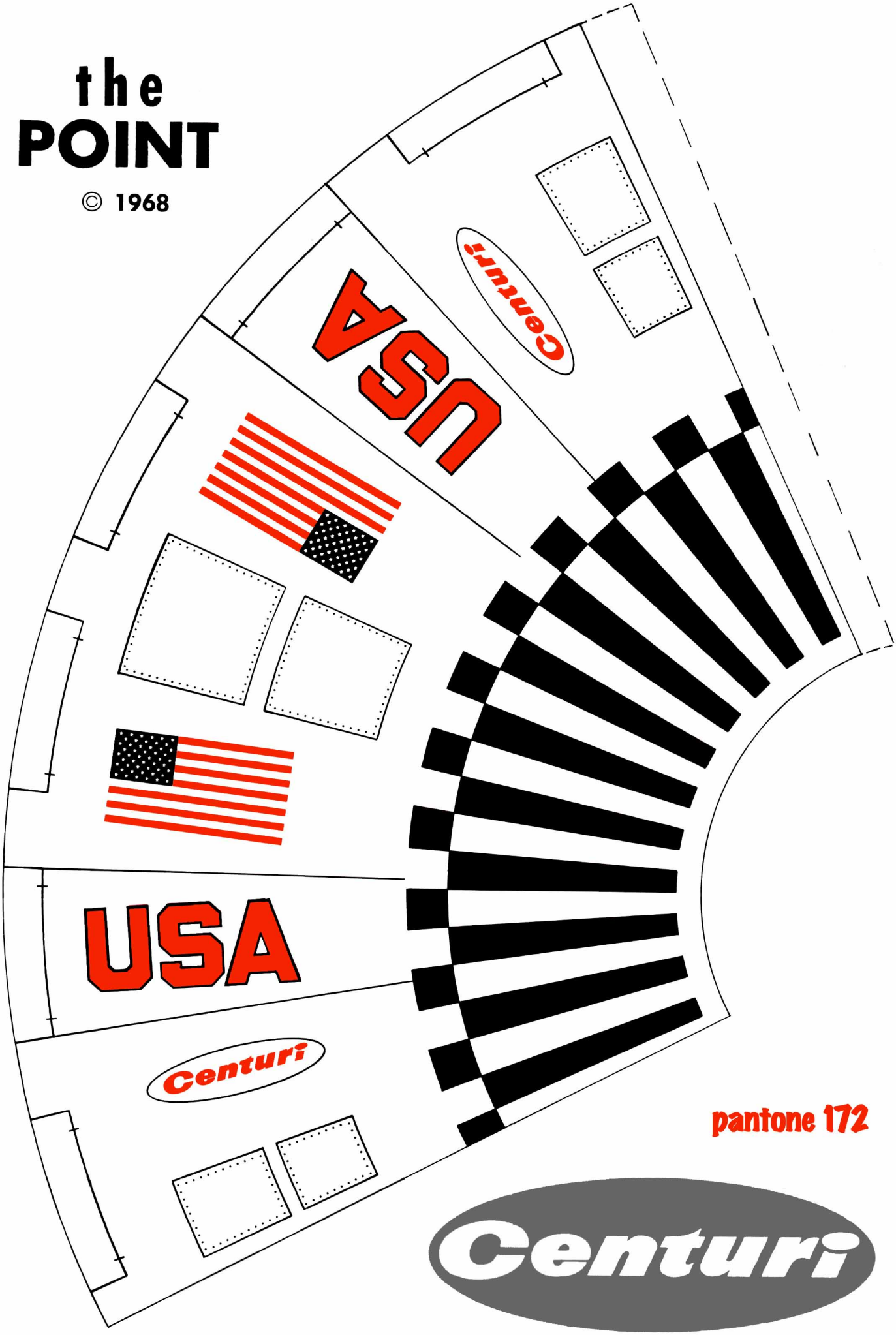
CYLINDER STRIP



Ram Scoop
Duct Support
FULL SIZE
PATTERN

DISK

the POINT



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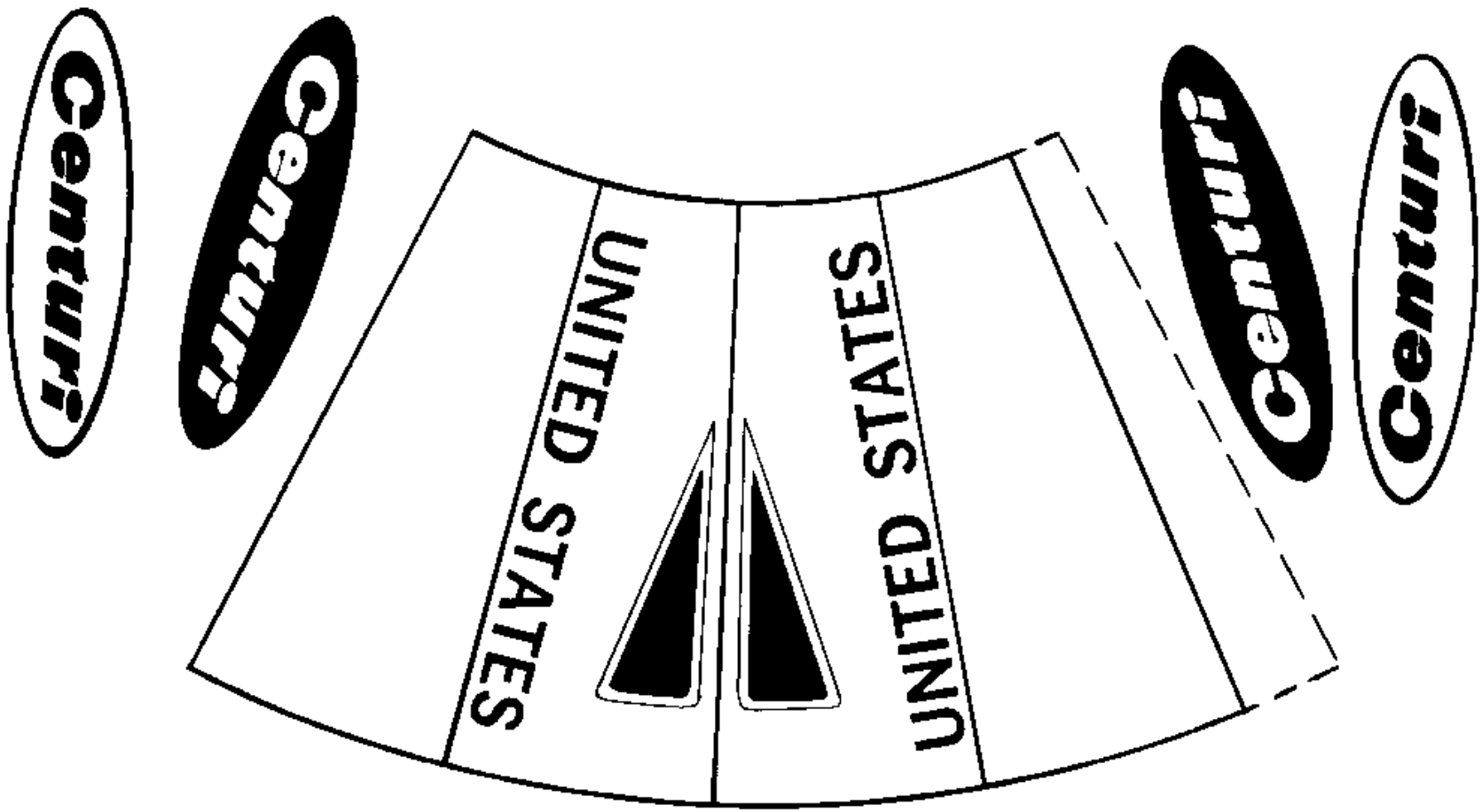
Centuri

"PACKED WITH PRIDE"

2 KPD

If you need to write regarding this product, attach this slip to your letter.



Centuri 'The Point' #KC-13

Q	Desc	Stk Num	Size	Other
1	Nosecone	???	4" Conical	Balsa
1	Shock Cord	SC-18	1/8"x16"	Rubber
1	Body Tube	ST-73	2 1/4"	
1	Balsa sheet	BFM-8	3"x12"x1/16"	
1	Cone pattern sheet		8.5x11	#65 card stock
1	Ring/Disk pattern sheet		8.5x11	#65 card stock
1	Cockpit pattern sheet		4x4	gummed paper

NOTE: Body tube has 2 1/4" holes, 1/4" from 1 end at 180 degrees.
Spray printed sheets with clear to prevent ink smear.
Cockpit can be printed on non-gummed laserjet paper.