The New

DEFENDER

Space Probe

The Defender represents the latest in futuristic Aero-Space design applied to a model rocket. Looking quite similar to the Saturn rocket series, the Defender is powered by a cluster of 3 engines. This powerful wallop will lift payloads weighing up to 3 ounces to high altitudes and recover them by a large, colorful parachute.

With proper construction, finishing, and care, the Defender can be launched many times. Please read the following instructions carefully, and assemble the parts in the order shown.

ASSEMBLY INSTRUCTIONS

In addition to the parts supplied, you will need the following items to assemble this kit:

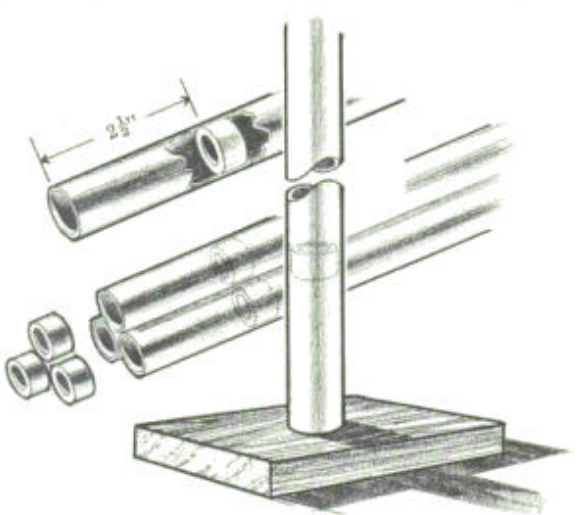
Modeling knife or single edge razor blade
White glue or modeling cement
Paint for finishing - preferrably spray type
Fine sandpaper - Scissors - Pen or pencil

STEP 1

POSITION THRUST RINGS IN MAIN BODY TUBES

As shown in Detail A, thrust rings must be installed in each of the three main body tubes. One at a time, apply a heavy bead of glue around the top of each thrust ring and insert into the body tubes. With the engine spacing tube, quickly push the thrust ring forward until 1/8" of the spacing tube extends beyond the end of the body tube.

Withdraw the spacing tube immediately and roll the body tube around slowly, on a flat surface, so that glue will flow into the ring-tube joint, bonding the thrust ring in place. Repeat this step for all three main body tubes. Now set all three tubes on end and allow glue to dry.



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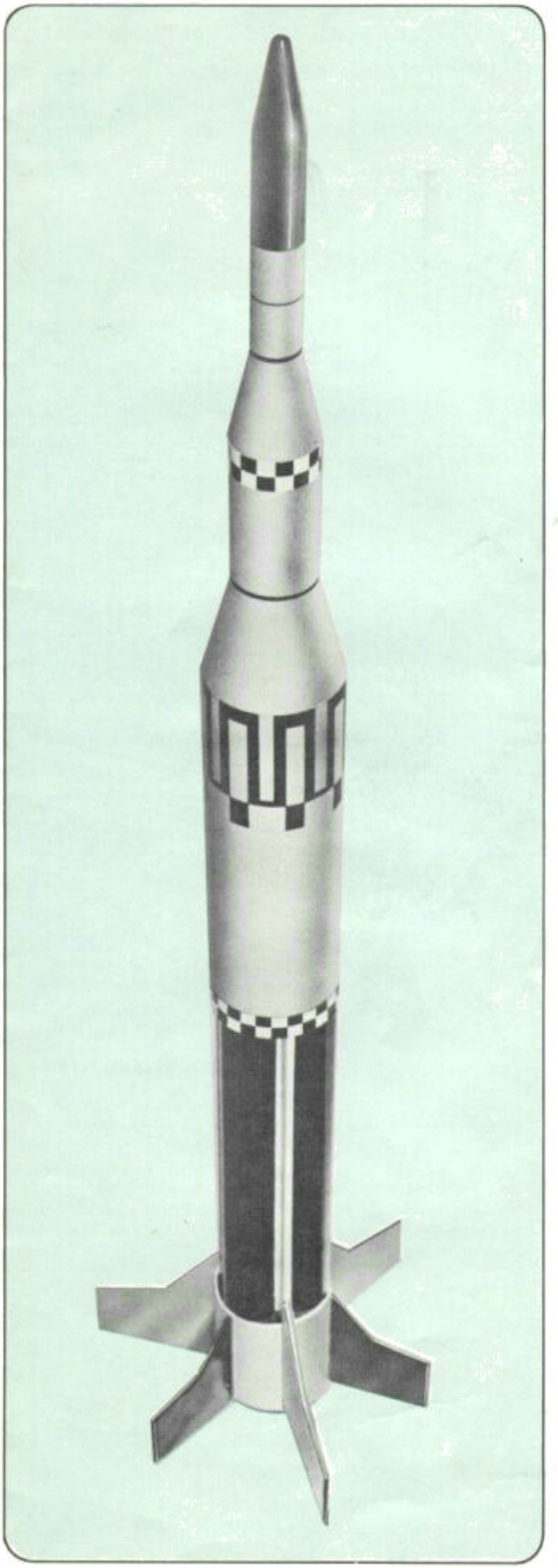
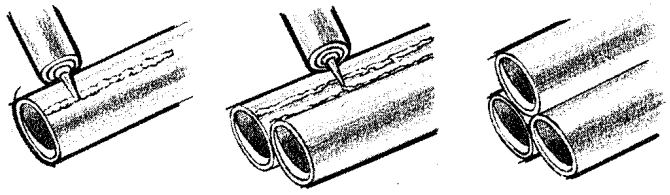


STEP 2 GLUE MAIN BODY TUBES INTO A CLUSTER

Apply a strip of glue, in a straight line, along one of the main body tubes, from one end to the other.

Join this tube along with a second tube at the glue line.

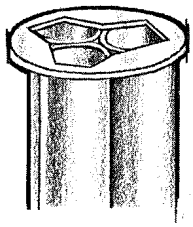
Place the third tube in the groove between the first two tubes and run a strip of glue along the joints.



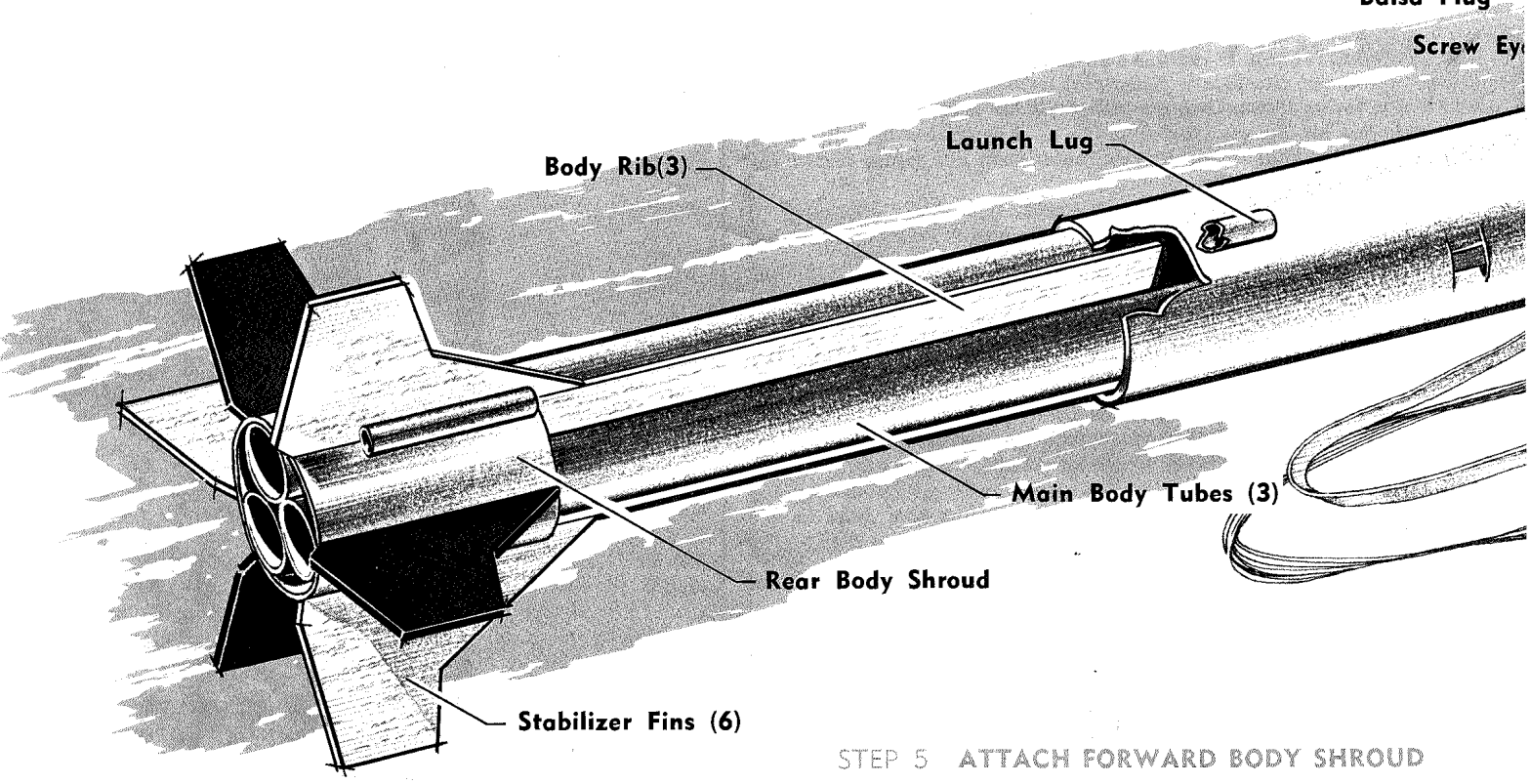
IMPORTANT: Make sure that all three tubes are lined up evenly at the ends, and that all the thrust rings are at one end of the cluster (in other words, all "aft ends" together.)

STEP 4 GLUE ON HEAD PLATE

Glue the paper disc marked "Head Plate" to the forward end of the clustered main body tubes. Make sure that the disc is positioned over all tubes evenly and glue securely from the underside.

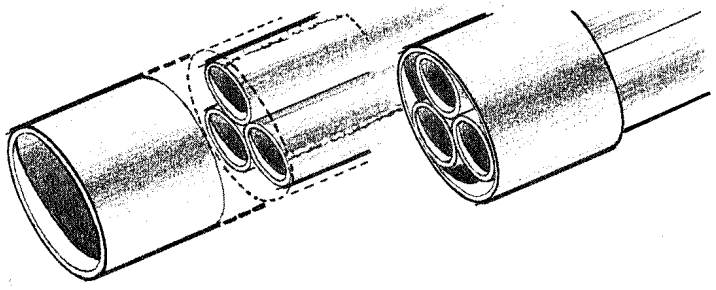


The purpose of this disc is to allow the ejection gases to pass forward, yet prevent them from escaping to the rear through the gaps between the main body tubes and the forward shroud tube.



STEP 3 ATTACH REAR BODY SHROUD

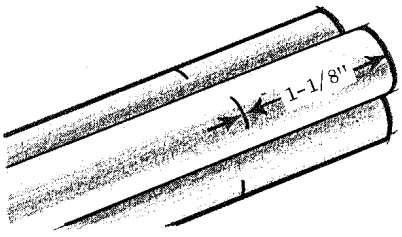
Apply a 2" long bead of glue along the outermost side of each main body tube. Slide the 2" long rear body shroud over the clustered tubes until all "aft ends" are even. Apply additional glue as needed to assure a good bond.

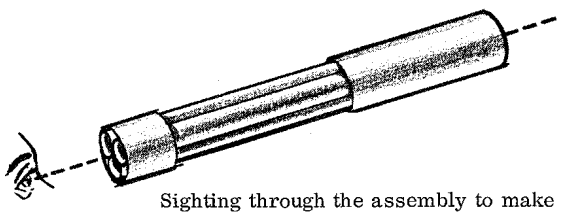


STEP 5 ATTACH FORWARD BODY SHROUD

With a ruler, measure and mark a distance of 1-1/8" from the forward end of each main body tube in the cluster.

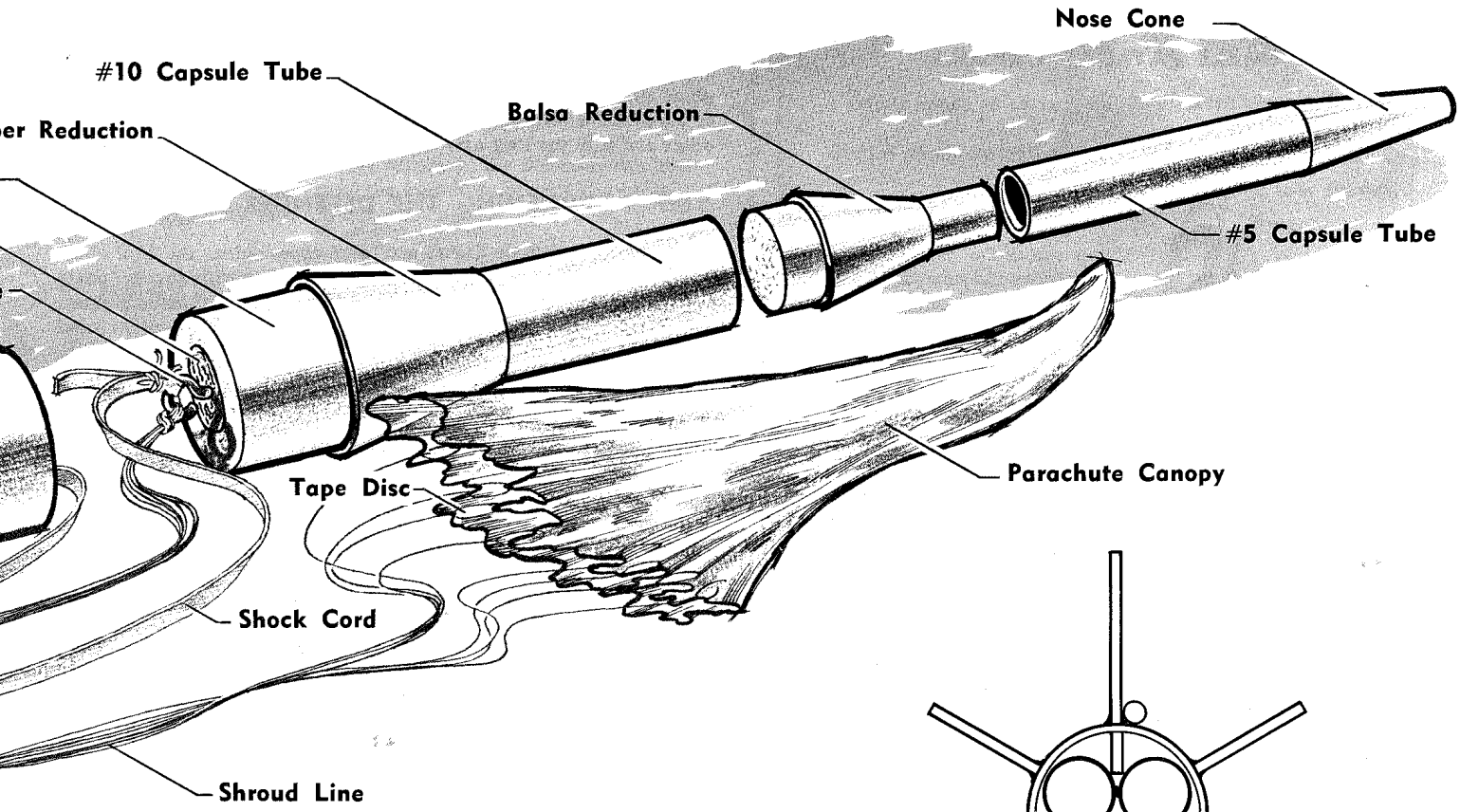
Apply a bead of glue 1-1/8" long along the outermost side of each tube in the cluster. Slide one end of the forward shroud tube over the cluster until it reaches the 1-1/8" mark. Quickly, sight down the entire assembly like a rifle sight, making sure that all is lined up straight.





Sighting through the assembly to make all tubes are lined up.

The Defender requires a total of six stabilizer fins. Three are large and the other three are small. Wrap the paper Fin Positioning Guide around the rear body shroud tightly and tape the loose end closed. Rotate the Fin Guide until three of the marks line up with the center of the body ribs. Hold the Guide in place and mark all six fin locations with a pen or pencil. Then remove the Guide.

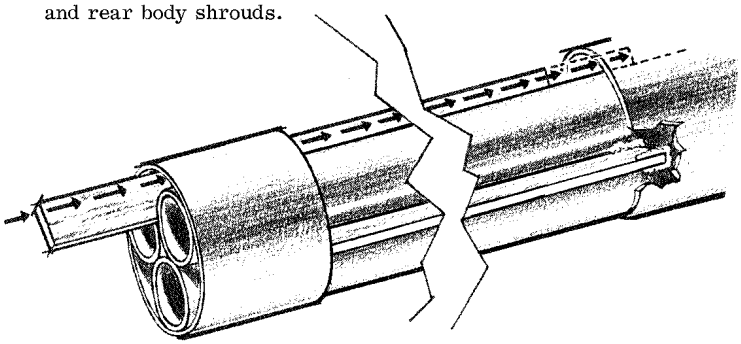


STEP 6 ATTACH STABILIZER FINS AND BODY RIBS

The 3 body ribs included with this kit have already been cut to the exact length and width required.

Run a bead of glue along each of the three valleys between the main body tubes and insert body ribs as shown.

The ends of each body rib should extend 1/8" under the forward and rear body shrouds.

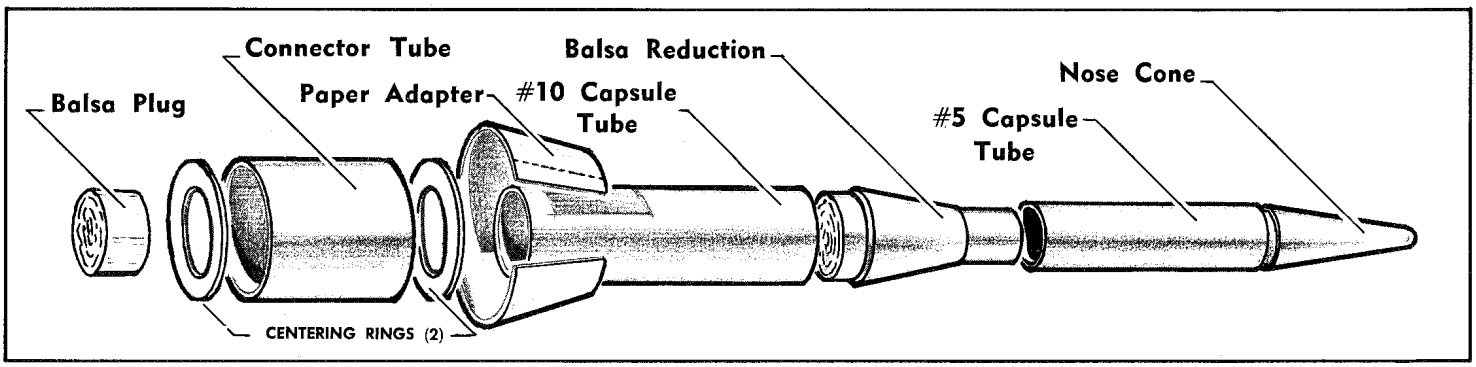


Cut out the six fins from the printed balsa sheet with a sharp modeling knife. With fine sandpaper, round the leading and tip edges, and slightly taper the trailing edges. Square the root chord edge.

First, glue the larger fins to the rear body shroud lined up with the body ribs. Glue the three smaller fins to the body shroud along the other three location marks.

With the Fin Allignment Guide, check the angle between fins before glue has completely set. Opposite fins should be in line with each other. Stand the entire rocket assembly on its forward end and allow to dry.

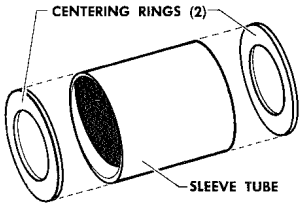
For increased fin strength, run a fillet of the same glue along each fin-tube joint after the initial glueing has thoroughly dried.



STEP 7 ASSEMBLE PAYLOAD CAPSULE

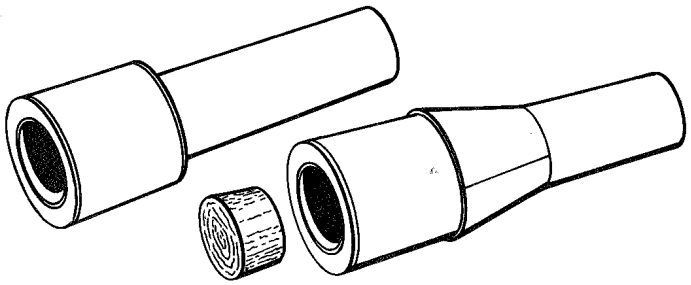
The Payload Capsule consists of eight parts, as shown above:

Assemble the rear section of the capsule first as shown below:



Glue the "Centering Rings" to the end faces of the "Coupler Tube". Allow to dry and sand off any ridges on the centering rings extending above the sleeve tube.

Next, insert the #10 Capsule tube into the Coupler Assembly as shown and glue into place.



Cut out the printed paper "Adapter" carefully, apply glue to one end and overlap opposite end to the dotted line. Before the glue sets, slip this adapter over the #10 Capsule tube and onto the coupler assembly. The rear edge of the paper adapter should extend out slightly beyond the coupler tube so that it will match smoothly with the forward shroud tube when inserted. Glue paper adapter to Coupler Assembly and #10 Capsule Tube as shown.

Assemble the balance of the payload capsule as snown in the main Assembly Drawing. All of these parts should fit together tightly so that they do not come apart unintentionally during the recovery portion of flight. A layer or two of scotch tape wrapped around a fitting will make it fit tighter.

STEP 8 RIG PARACHUTE AND SHOCK CORD

First glue the "Capsule Base Plug" into the aft end of the payload capsule.

Assemble the parachute as shown in the enclosed Chute Assembly Directions. Attach one end of the rubber shock cord to the body tube as shown below. Cut two slits, about 3/8" long and 3/8" apart in the shroud tube one inch down from the top end. Insert one end of the rubber cord into the tube from the top end, and depress the tube paper between the slits. Bring the cord out through the first slit, and back into the body tube through the second slit. Apply glue to the body tube to form a good bond.

Thread the screw eye into the Payload Capsule base, and unscrew the eye from the base. Squirt glue into the resulting hole and re-thread the eye into the fitting. Now tie the shroud ends to the screw eye together with the rubber shock cord as shown in the assembly drawing.

Fold the chute temporarily, insert into the top of the body tube, and place cone capsule in place. Glue the launch lugs to the body tube in the position shown. Make sure that both lugs line up with each other and with the long axis of the body tube.

STEP 9 FINISHING THE DEFENDER

For maximum altitude flights and ideal appearance, the grain texture of the nose cone and fins should be filled in with several coats of balsa filler. Sand smooth between applications. The body tubes do not require this special treatment. Finish with lightweight paint such as spray dope or laquerized enamel. For ease of tracking, use bright colors such as white, yellow, orange, or red. Flourescent colors are extremely easy to spot at high altitudes.

Apply the decals supplied to provide contrast and simulate authentic aero-space markings.

STEP 10 MOUNTING THE DEFENDER ENGINES

The Defender is designed for "3-engine power" and must always be flown with 3 identical engines. The following engine combination can be used:

3 – ½A6-2's or 3 – A5-4's or 3 – B6-4's or 3 – C6-5's

Complete engine mounting instructions are included with all Centuri rocket engines. Just before each flight, check to make sure that all three engines are friction-fitted securely in place.

STEP 11 ADJUSTING PAYLOAD WEIGHTS

The Defender is designed to be flown with a payload weighing up to 3 ounces. Two separate compartments are available for housing the payload. Caution: Do not exceed 3 ounces in payload weight.

IMPORTANT: With certain engine combinations, the Defender must be flown with the following minimum payload weights to be stable in flight. Each weight weighs 0.09 ounces.

Engine Combination	Minimum Payload Wt. Required
Three ½A6-2's	2 weights (0.18 oz.)
Three A5-4's	2 weights (0.18 oz.)
Three B6-4's	3 weights (0.27 oz.)
Three C6-5's	3 weights (0.27 oz.)

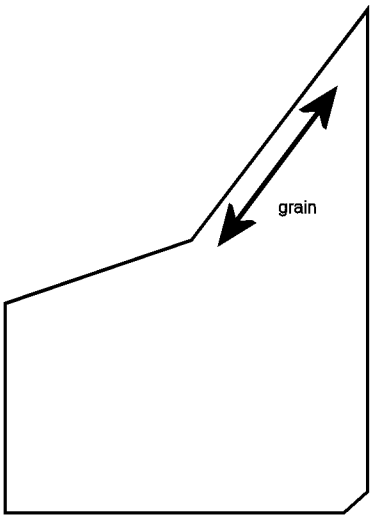
Make sure that all capsule fittings are snug to prevent the payload from falling out during chute ejection and recovery.

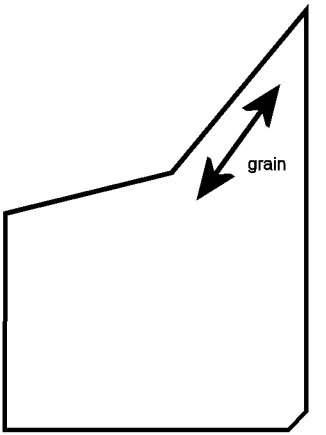
STEP 12 LAUNCHING THE DEFENDER

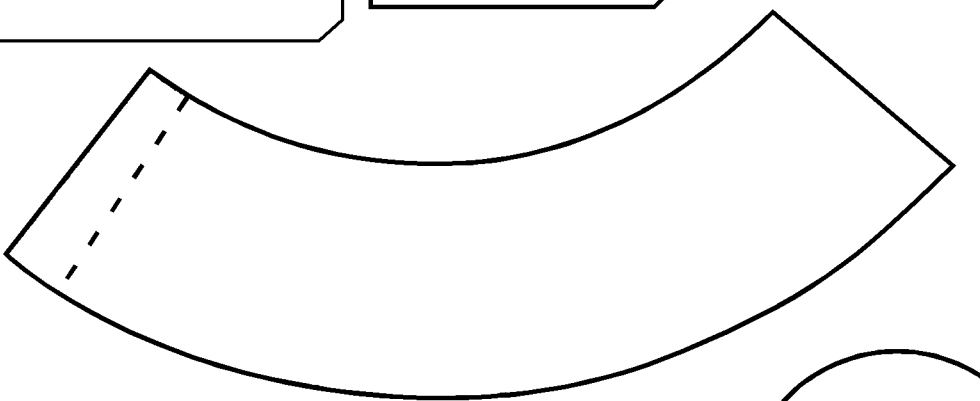
Launch the Defender from a 1/8" diameter x 36" long steel launching rod. Use electrical ignition only as outlined in these instructions. Additional launching instructions are given in the Engine Operating Instructions. Select a clear unobstructed launch site away from houses highways, and trees. The Defender should be launched from the center of an open field measuring at least 500 feet on a side or having the equivalent area.

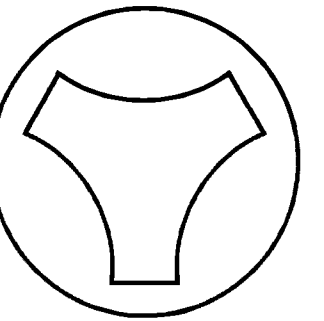
Upon ignition, the DEFENDER will rise under power, high into the sky, coast on to maximum altitude, eject its parachute, and return to Earth to be flown again.

Centuri Defender Space Probe

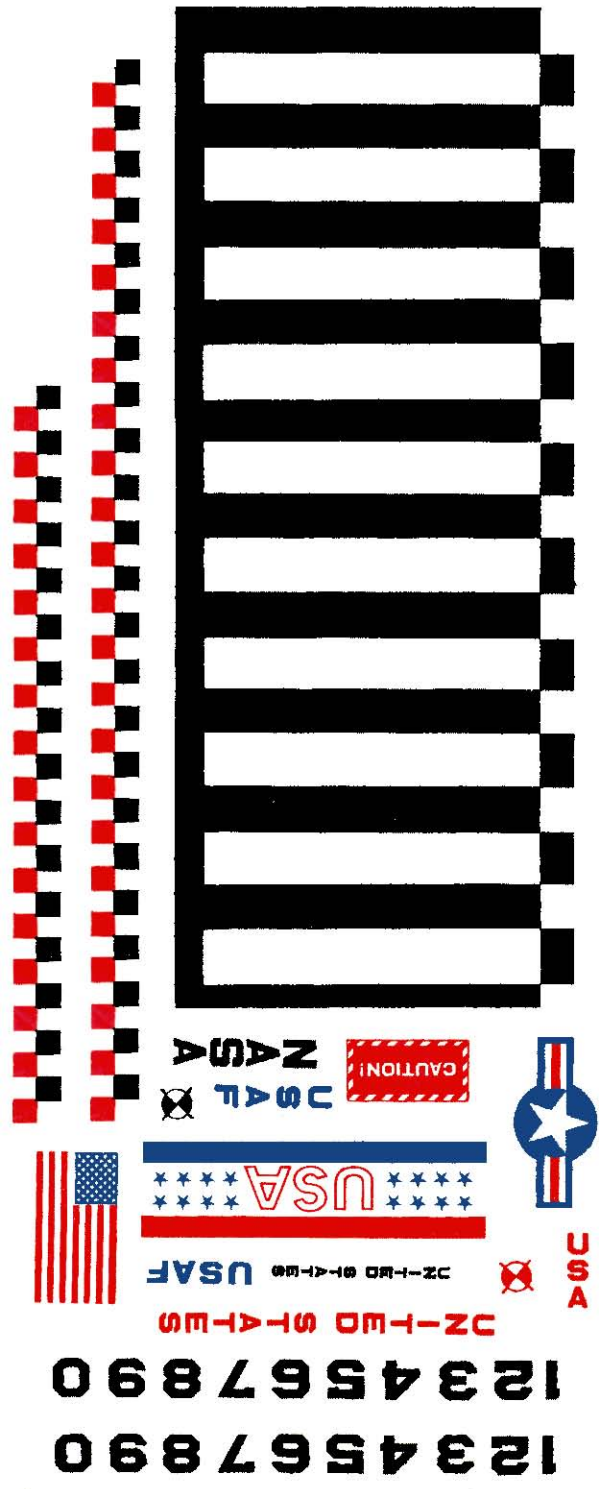








Modified MPC Decal - Good for Centuri
Defender Space Probe



Centuri Defender Space Probe

3	#7 Main Body Tubes, 9”	
1	#16 Rear Body Shroud, 2”	
1	#16 Forward Body Shroud, 5-1/4”	
1	#10 Capsule Tube, 5”	
1	#5 Capsule Tube, 3”	
1	Tubing Coupler	HTC-10
2	Centering Rings, #5-#10	
1	#10 Balsa Plug	BTC-10
1	Balsa Reducer	BR-5-10
1	Nose Cone	
3	Thrust Rings	TR-7
	Fin Stock, 3/32”	
1	Launch Lug, 1-3/4”	
1	Launch Lug, 9/16”	
1	20” Parachute	CP-20
1	Screw Eye	
1	Shock Cord, 1/8”	

Body ribs are 7” X 7/16” X 3/32”

The Centuri Tubing Coupler was 1-11/16” long. If the tubing coupler used is not this size, the #10 Capsule Tube length must be adjusted to 3-5/16”, plus the length of the tubing coupler.

Parts to clone the Defender can be purchased from Semroc at http://www.semroc.com.