



ROCKET KIT NO. 8-2

# ASTRON MARK



EASILY BUILT  
RINGS TO OVER 1000 FEET

**Price \$1.25**

Estes Industries, Inc.

BOX 227

PENROSE, COLORADO

# ASTRON MARK

## ASSEMBLY INSTRUCTIONS

YOUR ASTRON MARK ROCKET KIT CONSISTS OF THE FOLLOWING PARTS AS ILLUSTRATED IN THE DRAWING AT RIGHT:

- (1) NOSE CONE--PART #BNC-30E
- (2) BODY TUBE--PART #BT-30B
- (3) ENGINE BLOCK--PART #EB-30
- (4) ENGINE CASING--PART #EC-1
- (5) SHOCK CORD--PART #SC-1A
- (6) FIN MATERIAL--PART#BFS-20
- (7) LAUNCHING LUG--PART #LL-1B
- (8) SCREW EYE--PART #SE-1
- (9) STREAMER--PART #SM-1A
- (10) TAPE DISC--PART #TD-1

NOTE: THE ENGINE CASING PROVIDED HEREIN IS ONE WHICH HAS BEEN REJECTED AS UNSUITABLE FOR USE IN THE CONSTRUCTION OF A ROCKET ENGINE. IT IS PROVIDED AS A MEASURING DEVICE ONLY, AND IS NOT SUITABLE FOR ANY OTHER USE. A LIVE ENGINE IS NOT INCLUDED WITH THE KIT BECAUSE MANY OF THE KITS WILL BE SOLD IN COUNTRIES OR AREAS WHICH PROHIBIT THE FLYING OF ROCKETS.

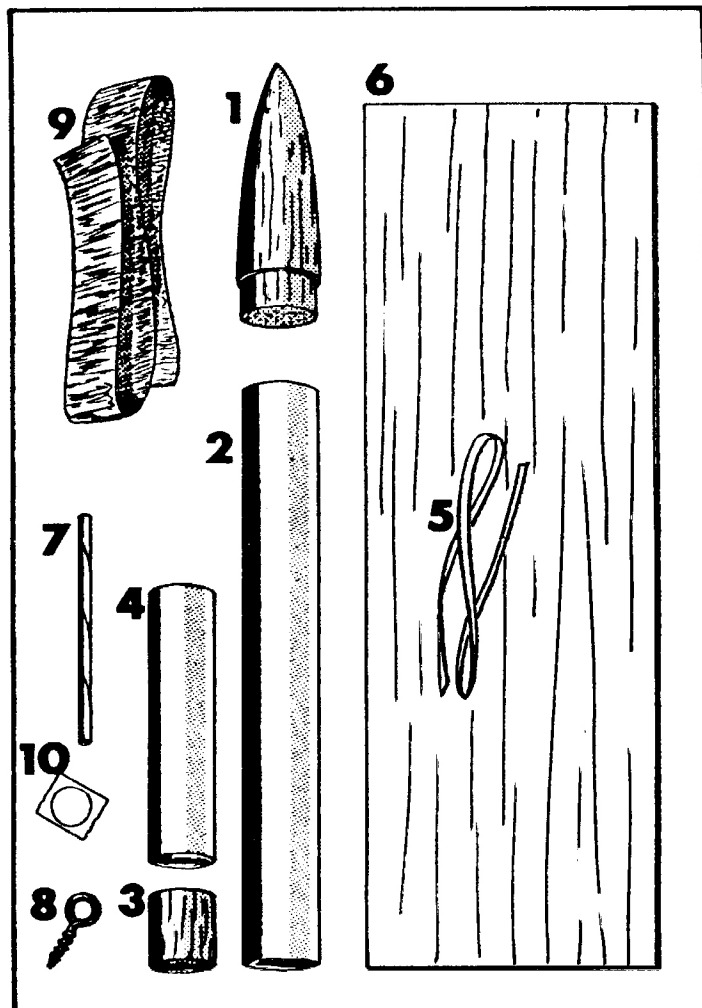
IN ADDITION TO THE MATERIALS INCLUDED WITH YOUR KIT YOU WILL NEED THE FOLLOWING TOOLS AND SUPPLIES.

1. SINGLE EDGE RAZOR BLADE, MODELERS KNIVES, OR MODELERS SAW.
2. EXTRA STRONG WHITE GLUE.
3. FINE GRIT SANDPAPER.
4. BALL POINT PEN OR PENCIL.

CHECK TO BE SURE YOUR KIT IS COMPLETE, THEN READ THE COMPLETE INSTRUCTIONS BEFORE BEGINNING TO ASSEMBLE YOUR ROCKET.

(1) FITTING THE NOSE CONE: INSERT THE NOSE CONE INTO THE FORWARD END OF THE BODY TUBE. THE NOSE CONE SHOULD FIT SNUGLY ENOUGH SO THAT IT WILL HOLD ITSELF IN A STRAIGHT ALIGNMENT, BUT LOOSE ENOUGH SO THAT ONLY VERY SLIGHT PRESSURE IS NECESSARY TO REMOVE IT. IF IT IS TOO TIGHT, SAND THE SHOULDER SLIGHTLY. IF THE FIT IS TOO LOOSE, WRAP THE SHOULDER WITH TAPE TO BRING IT TO A PROPER FIT. REMOVE THE NOSE CONE AND SET IT ASIDE TO USE LATER.

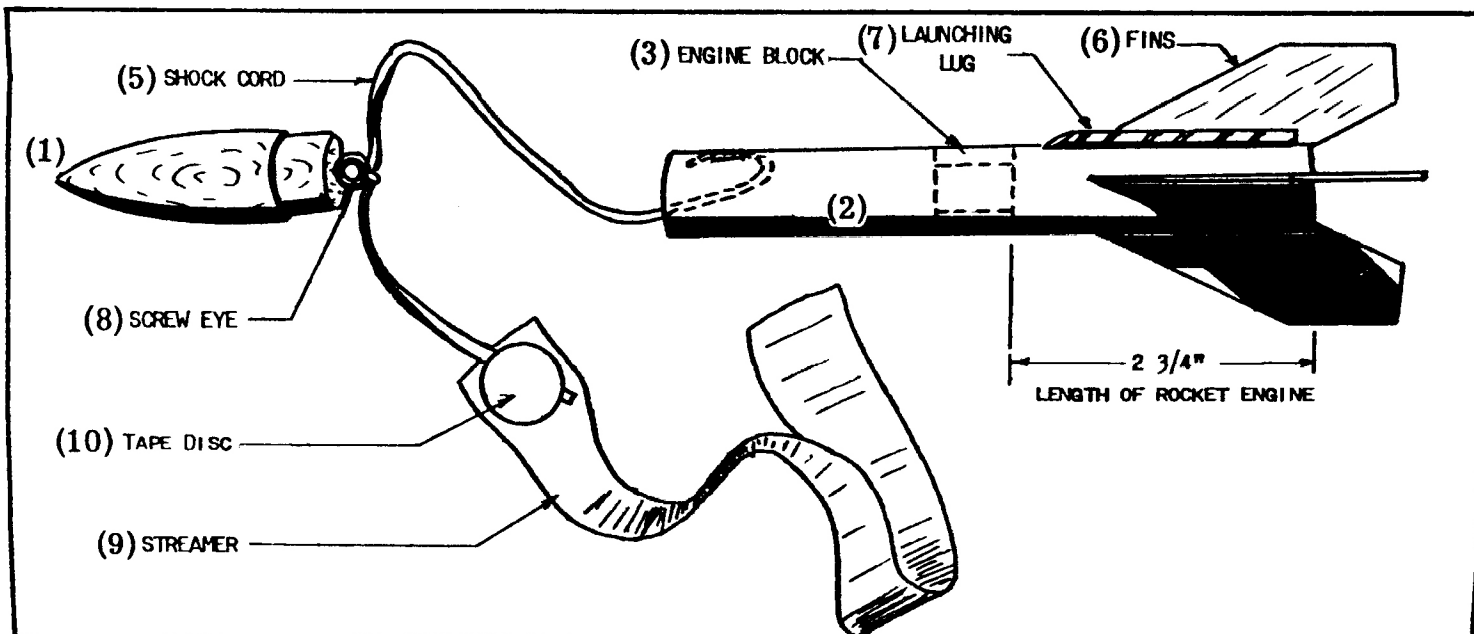
(2)(3)(4) THE ENGINE BLOCK: THE ENGINE BLOCK IS TO BE PLACED  $2\frac{3}{4}$ " AHEAD OF THE REAR OF THE ROCKET BODY. PLEASE NOTE ILLUSTRATION. THIS IS EXACTLY THE LENGTH OF A STANDARD ROCKET ENGINE CASING. THE EMPTY CASING ENCLOSED WITH THE ROCKET KIT IS TO AID YOU IN THE PROPER PLACEMENT OF THE ENGINE BLOCK. PLACE A LARGE DAB OF GLUE NEAR THE END OF YOUR LITTLE FINGER (IF YOU PREFER YOU MAY USE A BRUSH). THEN, REACHING THROUGH THE LOWER END OF THE BODY TUBE, SPREAD THE GLUE AROUND THE INSIDE AS FAR UP INSIDE THE BODY TUBE AS YOU CAN REACH. DO NOT GET ANY OF THE GLUE NEAR THE LOWER END. PLACE THE EMPTY ENGINE CASING AGAINST THE ENGINE BLOCK AND PUSH FORWARD UNTIL THE END OF THE CASING IS JUST EVEN WITH THE END OF THE BODY TUBE. AS THE ENGINE BLOCK MOVES FORWARD IT WILL PICK UP SUFFICIENT GLUE



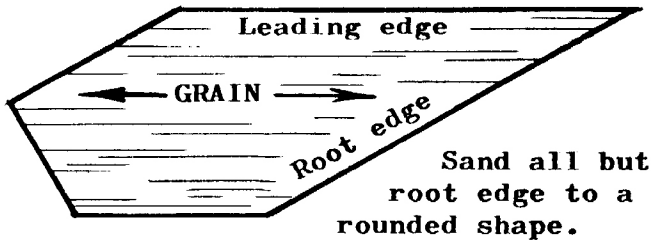
FROM THE BODY TUBE TO ANCHOR IT IN PLACE. CAUTION: ONCE YOU HAVE STARTED TO PUSH THE ENGINE BLOCK FORWARD DO NOT STOP UNTIL IT IS IN PLACE. SOME GLUES SET VERY QUICKLY AND STOPPING FOR AS LONG AS ONE SECOND MAY CAUSE IT TO "FREEZE" IN THE WRONG PLACE.

(5) ATTACHING THE SHOCK CORD: MAKE TWO SMALL CUTS THROUGH THE WALL OF THE BODY TUBE ABOUT  $\frac{3}{8}$ " APART, WITHIN  $\frac{3}{4}$ " OF THE UPPER END OF THE BODY TUBE AS ILLUSTRATED. CAVE IN THE PORTION BETWEEN THE TWO CUTS AND SLIDE ONE END OF THE SHOCK CORD THROUGH THE OPENING AS SHOWN. APPLY GLUE UNDER AND OVER THE SHOCK CORD AND ALONG THE CUT EDGES OF THE BODY TUBE. NEXT, REACH INSIDE AND PUSH THE CAVED-IN PORTION OUTWARD AS NEAR TO ITS ORIGINAL POSITION AS POSSIBLE. WHEN THE GLUE DRIES THE SHOCK CORD WILL BE SECURELY FASTENED.

(6) FINS: USING THE PATTERN ON THE OPPOSITE PAGE, CUT OUT THREE IDENTICAL FINS. BE CAREFUL TO ALIGN THE GRAIN OF THE Balsa WOOD AS INDICATED ON THE PATTERN. GLUE THE THREE FINS INTO PLACE EXACTLY PARALLEL TO AND ALONG THE RIGHT SIDE OF EACH OF THE MARKS ON THE BODY TUBE. SAVE THE REMAINING Balsa FIN STOCK FOR REPLACEMENT IN CASE YOU LATER BREAK OR DAMAGE ONE OF THE FINS. BE SURE EACH FIN



## FIN PATTERN



Sand all but root edge to a rounded shape.

PROJECTS STRAIGHT OUT FROM THE ROCKET AS SHOWN IN THE BOTTOM VIEW DRAWING.

(7) LAUNCHING LUG: GLUE THE LAUNCHING LUG INTO A CORNER MADE BY THE BODY TUBE AND ONE OF THE FINs AS SHOWN IN THE ILLUSTRATIONS. IF POSSIBLE, DO THIS WHILE THE GLUE ON THE FINs IS STILL WET SO THAT A HARDENED PIECE OF GLUE WILL NOT INTERFERE WITH A PROPER FIT. BE SURE THE LUG IS ALIGNED TO POINT EXACTLY FORWARD. WHILE THE GLUE IS STILL SOFT, CHECK AGAIN TO BE SURE THE FINs ARE ALIGNED PROPERLY. SET THE MODEL ASIDE TO DRY.

(8) SCREW EYE: ATTACH THE SCREW EYE TO THE CENTER OF THE LOWER END OF THE NOSE CONE. TWIST THE SCREW EYE ALL THE WAY IN SO THAT ONLY THE ROUND LOOP PROJECTS BEYOND THE REAR OF THE NOSE CONE.

(9)(10) AFTER THE ROCKET HAS DRIED SUFFICIENTLY TO BE HANDLED, TIE THE SHOCK CORD TO THE SCREW EYE. LEAVE ABOUT  $\frac{2}{3}$  OF THE LENGTH OF THE CORD BETWEEN THE SCREW EYE AND THE ROCKET BODY AND ABOUT  $\frac{1}{3}$  EXTENDING FROM THE SCREW EYE FOR FASTENING TO THE STREAMER. UNLESS THE GLUE IS THOROUGHLY DRIED BE CAREFUL TO AVOID APPLYING EXCESSIVE STRESS TO THE CONNECTION BETWEEN THE BODY TUBE AND THE OTHER END OF THE SHOCK CORD. SECURE THE STREAMER TO THE END OF THE SHOCK CORD USING THE TAPE DISC AS INDICATED IN THE DRAWING.

(11) FINISHING: SAND THE FORWARD AND OUTER EDGES OF THE FINs UNTIL ROUNDED. SAND THE NOSE CONE UNTIL SMOOTH. COAT WITH WHITE DOPE AND SAND AGAIN UNTIL SMOOTH. PAINT THE

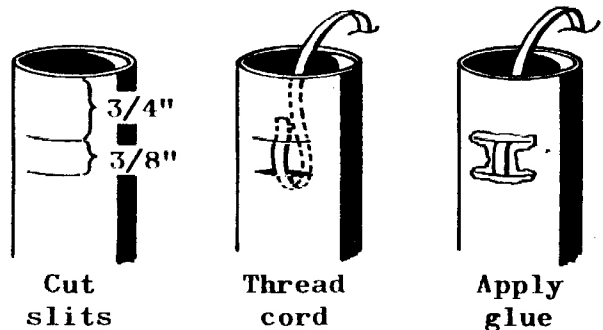
ASTRON MARK RED, OR OTHER COLOR OF YOUR CHOOSING. APPLY A BLACK MARK ALONG ONE SIDE AND LETTER AS INDICATED IN THE FINISHED DRAWING.

## FLYING THE ASTRON MARK

1. BEGINNING AT THE LOOSE END, ROLL THE STREAMER INTO A CYLINDRICAL SHAPE, WRAP WITH ONE OF THE PROTECTORS INCLUDED WITH THE ROCKET ENGINES, AND INSERT INTO THE FORWARD PART OF THE ROCKET BODY BETWEEN THE NOSE CONE AND ENGINE BLOCK. (NOTE: WE SUGGEST THAT THE ENDS OF THE PROTECTOR BE CUT OFF SO THE PROTECTOR WILL BE ONLY ABOUT  $\frac{1}{2}$  ITS ORIGINAL LENGTH.)
2. BEFORE INSERTING THE ROCKET ENGINE, WRAP IT WITH TAPE SUFFICIENT TO MAKE IT A TIGHT FIT. THE ENGINE MUST BE A TIGHT FIT SO THAT IT WILL NOT BLOW OUT WHEN THE EJECTION CHARGE GOES OFF.
3. LAUNCH THE ASTRON MARK USING AN APPROVED, ELECTRICALLY OPERATED MODEL ROCKET FIRING SYSTEM. CONSULT OUR CATALOG, DESIGN BOOKLET OR THE STORE WHERE YOU PURCHASED YOUR ROCKET FOR FURTHER DETAILS.
4. USE CAUTION WHEN FLYING ROCKETS. DO NOT LAUNCH IN HIGH WINDS, NEAR FLYING AIRCRAFT, OR AROUND PERSONS NOT PARTICIPATING IN OR WATCHING THE ROCKET LAUNCHING. ALWAYS FOLLOW THE N.A.R. SAFETY CODE. INSPECT THE ROCKET CARE-

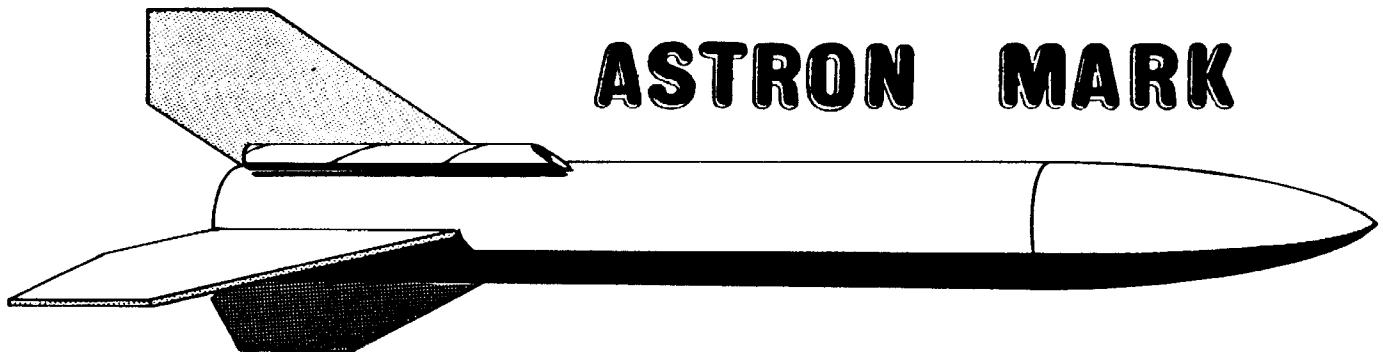
## SHOCK CORD ATTACHMENT

Shock cord



ROCKET KIT NO. K-2

# ASTRON MARK



EASILY BUILT  
ZOOMS TO OVER 1000 FEET

Price \$1.25

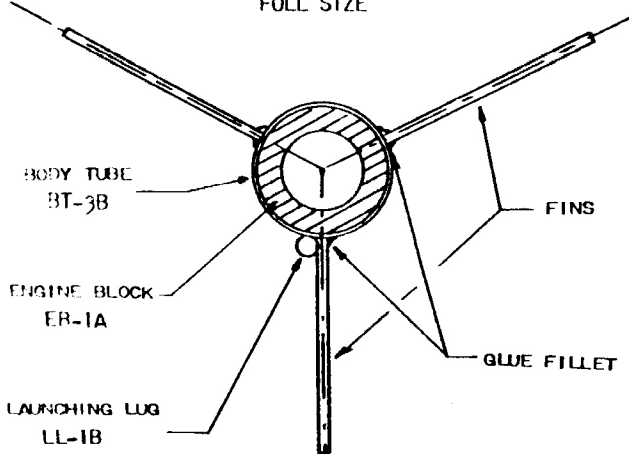
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## BOTTOM VIEW

FULL SIZE



FULLY AFTER EACH FLIGHT TO MAKE SURE IT HAS NOT BEEN DAMAGED AND IS IN SATISFACTORY CONDITION FOR THE NEXT FLIGHT.

5. ANY OF THE FOLLOWING ROCKET ENGINES MAY BE USED TO LAUNCH THE ASTRON MARK:  $\frac{1}{2}$ A.8-2; A.8-3; B.8-4; B 16-5. WE STRONGLY RECOMMEND THE  $\frac{1}{2}$ A.8-2 FOR THE FIRST TEST FLIGHTS, FOR BEGINNERS, AND FOR LAUNCHINGS WHERE THE RECOVERY AREA IS SMALL. AFTER EACH FLIGHT, THE EXPENDED ROCKET ENGINE CASING CAN BE REMOVED BY REACHING THROUGH THE FORWARD END OF THE ROCKET BODY WITH A LONG PENCIL, SMALL DIAMETER ROD OR OTHER SIMILAR OBJECT, AND FORCING THE ROCKET ENGINE CASING REARWARD BY PUSHING AGAINST THE INSIDE OF THE ENGINE NOZZLE.

Estes Industries, Inc.

BOX 227  
PENROSE, COLORADO

A Quality Product of

**ESTES**

ESTES INDUSTRIES,  
INC.

PENROSE, COLO.  
81240

# ASTRON MARK

**SPECTACULAR  
HIGH  
ALTITUDE  
PERFORMANCE**

**STREAMER  
RECOVERY**

**EASY  
TO BUILD**

*Only*  
**\$1.25**

X-2

RECOMMENDED  
ENGINES  
E-1000, A3-4,  
A8-C, B5-A, C6-3

**ESTES** Industries, Inc.

Box 227, Penrose, Colo. 81240

# Astron Mark Assembly Instructions

Your Astron Mark model rocket kit consists of the following parts as illustrated in the drawing at right:

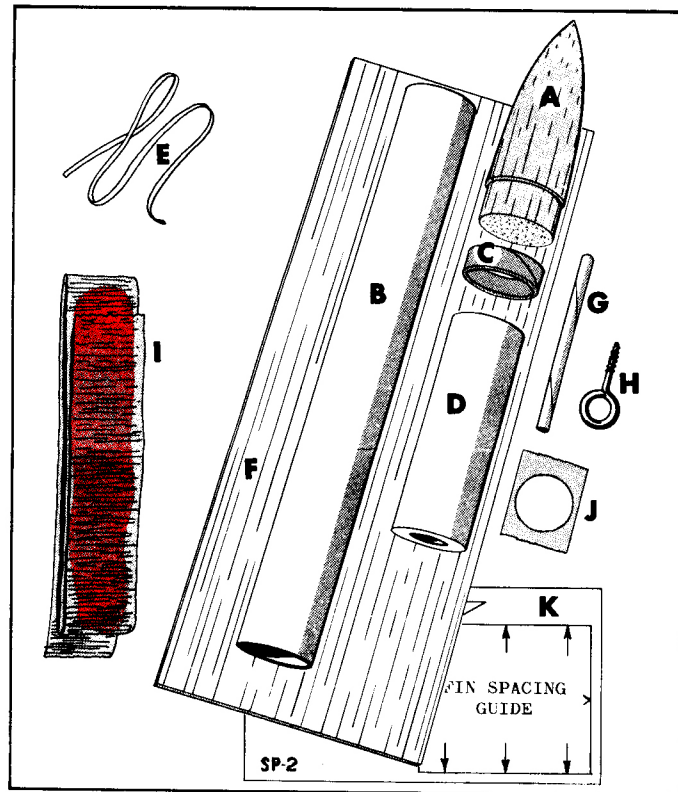
- (A) 1 Nose Cone--Part #BNC-30E
- (B) 1 Body Tube--Part #BT-30B
- (C) 1 Engine Block--Part #EB-30A
- (D) 1 Reject Engine Casing--Part #EC-2
- (E) 1 Shock Cord--Part #SC-1B
- (F) 1 Balsa Fin Stock--Part #BFS-20
- (G) 1 Launching Lug--Part #LL-2B
- (H) 1 Screw Eye--Part #SE-1
- (I) 1 Streamer--Part #SM-1A
- (J) 1 Tape Disc--Part #TD-1A
- (K) 1 Pattern Sheet--Part #SP-2

NOTE: The engine casing provided with this kit is one which has been rejected as unsuitable for use in the construction of a rocket engine. It is provided as a measuring device only, and is not suitable for any other use.

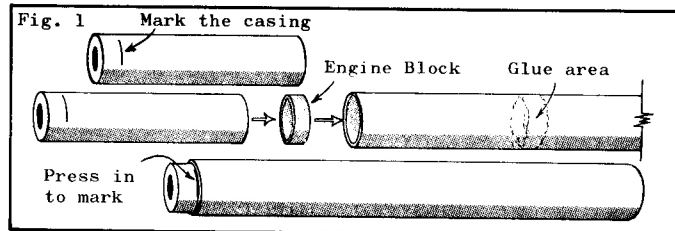
In addition to the materials included with your kit you will also need the following tools and supplies:

- 1) Modeling knife or single edge razor blade
- 2) Scissors
- 3) Extra strong white glue
- 4) Ball point pen or pencil
- 5) Fine and extra fine grit sandpaper
- 6) Sanding sealer and paint or dope

Read the entire assembly instructions carefully before beginning work on your rocket. Then start construction, following each step in order, checking off each step as it is completed.



- (1) To install the engine block, first mark the empty engine casing 1/4 inch from one end. Using your little finger or a brush, smear glue around the inside of the body about 2" from one end. Insert the engine block into this end and push it forward with the casing until the mark is even with the end of the tube (so only 1/4" of the casing projects from the end of the body). Do not pause during this operation or the glue may set with the block in the wrong position. Remove the casing as soon as the block has been positioned.



## ASTRON MARK

**SPECTACULAR  
HIGH ALTITUDE  
PERFORMANCE**

**STREAMER  
RECOVERY**

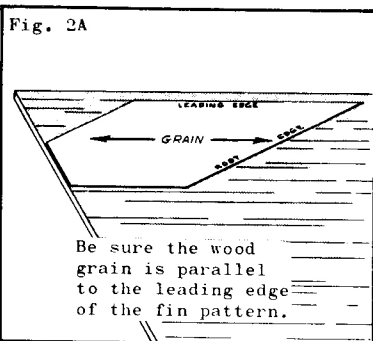
**EASY  
TO BUILD**

**Only \$1.25**

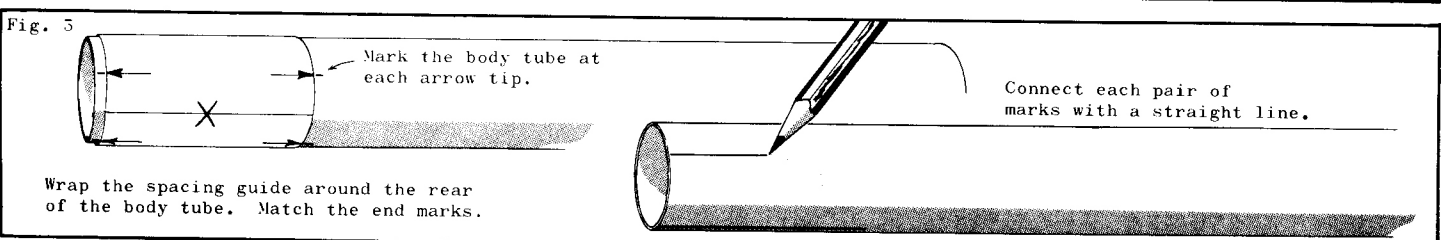
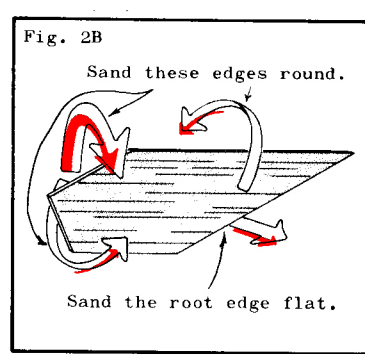
K-2

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Devoted to Safety and Education in Rocketry

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- (2) Cut out the fin pattern. Lay the pattern on the balsa fin stock with the grain of the wood and the grain shown on the pattern matched perfectly. Trace out three copies of the fin. Cut out the fins carefully with a sharp blade. Be especially careful to make straight, clean cuts. Sand the sides of the fins so they are flat and smooth. Round all edges of the fins except the root edge with sandpaper. Sand the root edges so they are flat and square with the sides of the fins.
- (3) Cut out the fin spacing guide, wrap it around the rear end of the body and mark the tube at each of the arrow points. Draw a straight connecting line between each matching front and rear mark (fig. 3). Be sure to mark the end in which the engine block was installed.



(4) Apply glue to the root edge of one of the fins. Attach the fin to the rocket's body tube with the edge of the fin along one of the lines drawn in step 3. Align the fin so it projects straight away from the body tube. Following the same procedure, attach the other two fins. Do not set the rocket on its fins while the glue is wet.

(5) Glue the launching lug to the body tube so its rear is even with the front of the fins and is halfway between two fins as shown. Sight along the tube and align the lug so it runs parallel to the body tube.

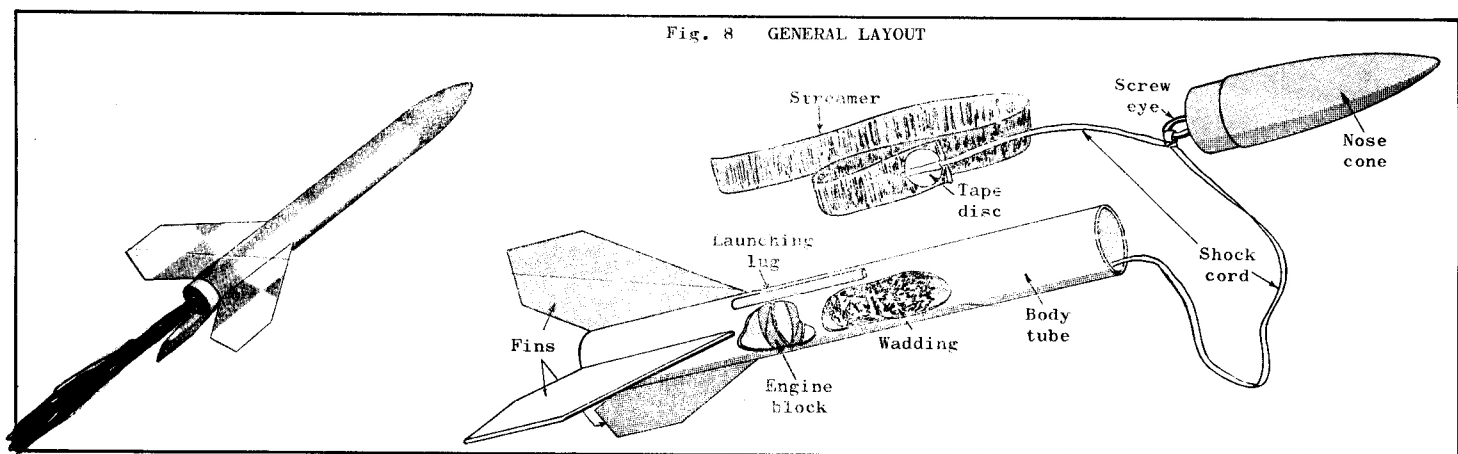
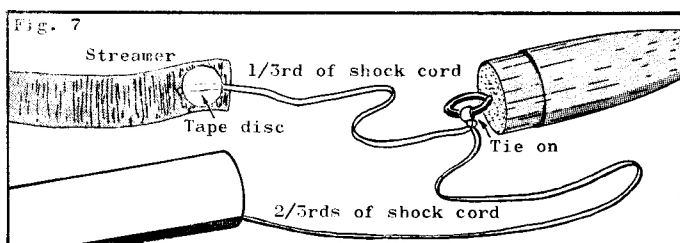
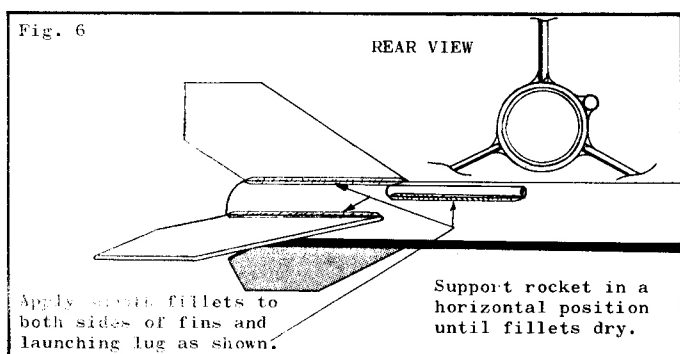
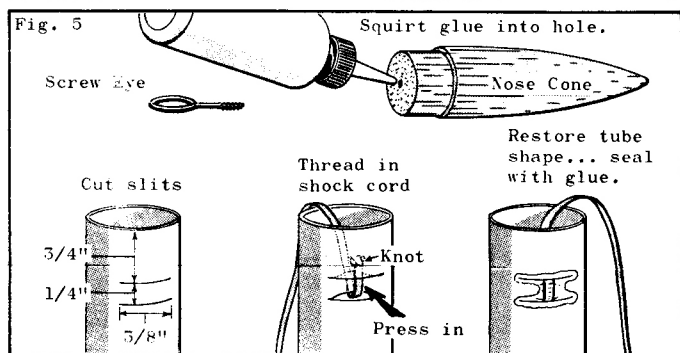
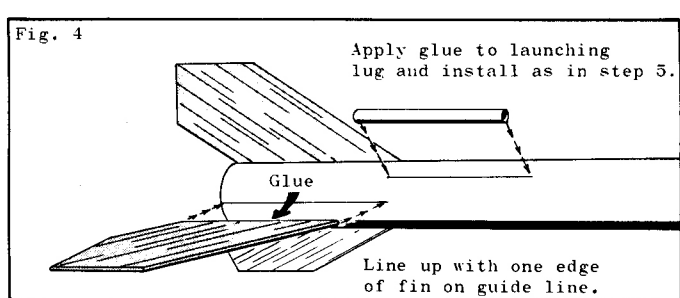
(6) Insert the screw eye into the base of the nose cone. Remove the screw eye, press the nozzle of the glue bottle to the hole and squirt glue into the hole. Replace the screw eye and wipe away any excess glue.

(7) Cut two 3/8" wide slits in the forward end of the body as shown in fig. 5. Cave in the section between the slits and hook the shock cord through the slits as shown. For an extra secure attachment, knot the inside end of the shock cord. Press the caved-in portion of the tube outward until it is round again and apply glue to the cut edges and to the shock cord to anchor it in place.

(8) When the first glue on the fins and launching lug has become hard, apply a glue fillet to each of the fin-body joints and to the launching lug as shown. The fillets should be smooth and bubble-free. Support the rocket horizontally while the glue is drying.

(9) After the rocket has dried sufficiently to be handled, tie the shock cord to the screw eye. Leave about 2/3 of the length of the cord between the screw eye and the rocket body and about 1/3 extending from the screw eye for fastening to the streamer. Unless the glue is thoroughly dry, do not pull on the connection between the shock cord and the body tube. Attach the streamer to the shock cord as shown in the drawing.

(10) Before finishing let all the glue on the outside of the rocket dry so it is hard and clear. Cover all balsa surfaces with a coat of sanding sealer. Let it dry completely and sand lightly with extra fine sandpaper. Apply a second coat, sand and apply still another coat until all the pores in the balsa are filled and the surfaces look and feel smooth. Give the rocket at least one clean base coat of glossy white paint or dope, let dry and follow with a high visibility color such as red or fluorescent orange to aid in tracking and retrieving.



## General Information

The engine types recommended for use in the Astron Mark are the 1/4A. 8-2, 1/2A. 8-2, A. 8-3, B. 8-4 and B 3-5. For the first test flights 1/4A. 8-2 or 1/2A. 8-2 engines should always

be used. For best results, fly the Mark on calm, clear days. Launch the rocket using a standard electrical launching system with a 1/8" diameter guide rod at least 36" long.

## Countdown Checklist

-13- Pack flameproof recovery wadding into the body tube from the top. The wadding should fill the tube for a distance of about 1-1/2 inches and seal along the sides of the tube. Roll the streamer into a cylindrical shape, beginning at the loose end. Push the rolled streamer down into the tube on top of the wadding and pack the shock cord in on top of it. Slide the nose cone into place.

-12- Select an engine. Install an electrical igniter in the engine as directed in the instructions which came with it.

-11- Wrap the engine with masking tape until it makes a tight fit in the rocket body tube. This fit must be tight so the engine will not blow out when the ejection charge is activated. Insert the engine into the body so the rear of the engine projects 1/4" from the rear of the rocket.

-10- Remove the safety interlock or key from the launch control panel. (If a simple spring switch is used, install the protector around the spring.) Carry the key or interlock on the person of the launch control officer.

-9- Place the rocket on the launcher. Check to be sure the panel is disarmed. Clean the micro-clips and attach them to the igniter.

-8- Clear the launch area, alert the recovery crew and trackers.

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

-6- Arm the launch panel.

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

