



# X-16

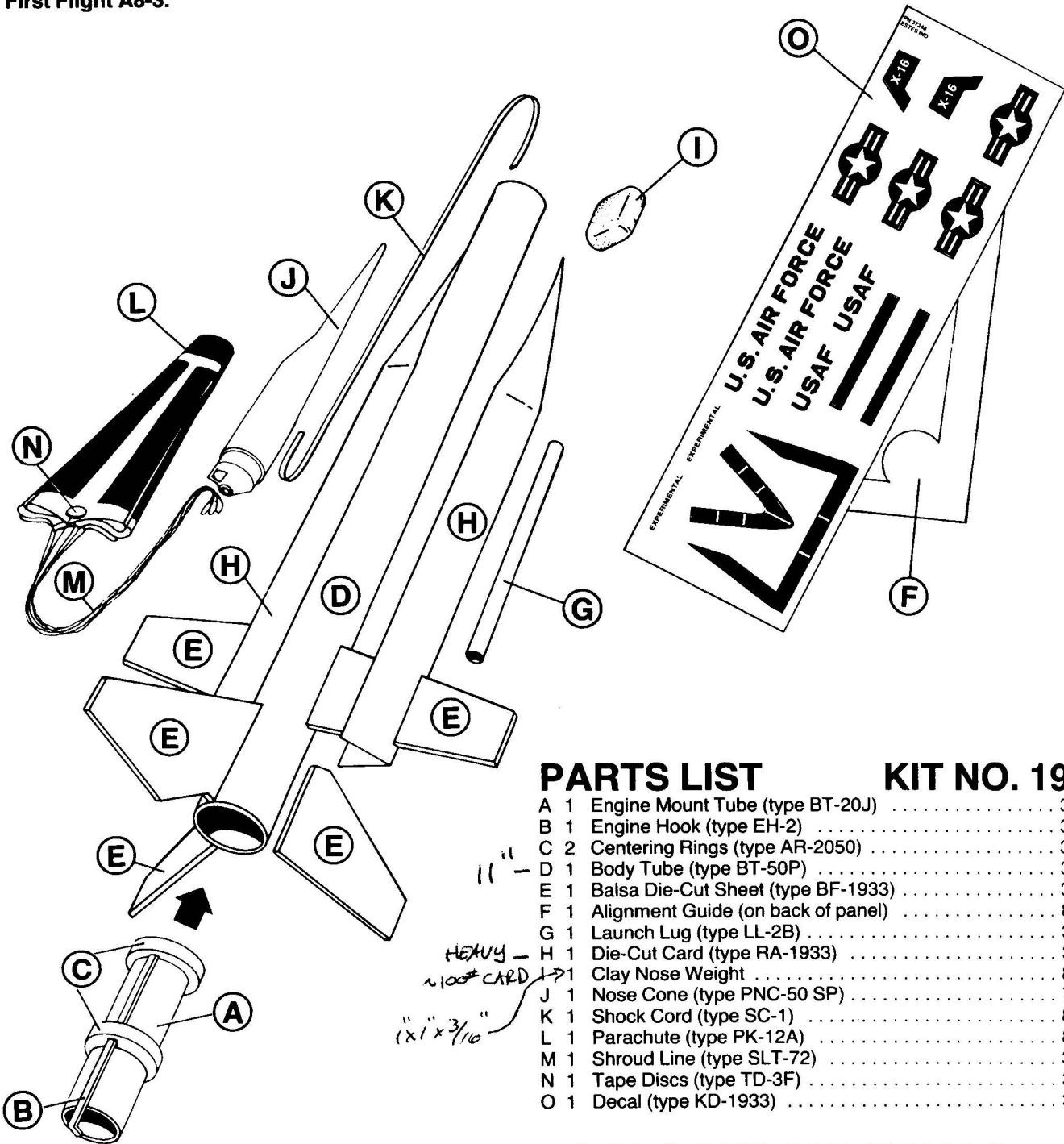
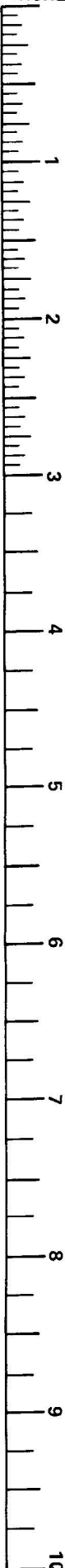
**SKILL LEVEL 3:**  
**Recommended for Craftsman Rocketeers.**

**RECOMMENDED ENGINES:**  
**A8-3, B4-4, B6-4, B8-5, and C6-5**  
**First Flight A8-3.**

## BEFORE YOU START

Read each step and study the accompanying drawings before doing any of the work called for in that step. Make sure you have all parts and materials. Check off each step as you complete it. Always test-fit parts together before applying glue. It will sometimes be necessary to sand edges of rings, tubes, etc. to obtain proper fit. If you are in doubt about the relative size or location of some parts, refer back to this exploded view drawing for clarification. Adequate glue joints are very important for a flying model rocket. Follow the instructions carefully in this regard.

INCHES



## PARTS LIST

## KIT NO. 1933

|   |   |                                    |       |
|---|---|------------------------------------|-------|
| A | 1 | Engine Mount Tube (type BT-20J)    | 30326 |
| B | 1 | Engine Hook (type EH-2)            | 35025 |
| C | 2 | Centering Rings (type AR-2050)     | 30164 |
| D | 1 | Body Tube (type BT-50P)            | 30365 |
| E | 1 | Balsa Die-Cut Sheet (type BF-1933) | 32633 |
| F | 1 | Alignment Guide (on back of panel) | 83719 |
| G | 1 | Launch Lug (type LL-2B)            | 38178 |
| H | 1 | Die-Cut Card (type RA-1933)        | 32458 |
| I | 1 | Clay Nose Weight                   | 85260 |
| J | 1 | Nose Cone (type PNC-50 SP)         | 71001 |
| K | 1 | Shock Cord (type SC-1)             | 85730 |
| L | 1 | Parachute (type PK-12A)            | 85564 |
| M | 1 | Shroud Line (type SLT-72)          | 38237 |
| N | 1 | Tape Discs (type TD-3F)            | 38406 |
| O | 1 | Decal (type KD-1933)               | 37248 |

## TOOLS AND MATERIALS

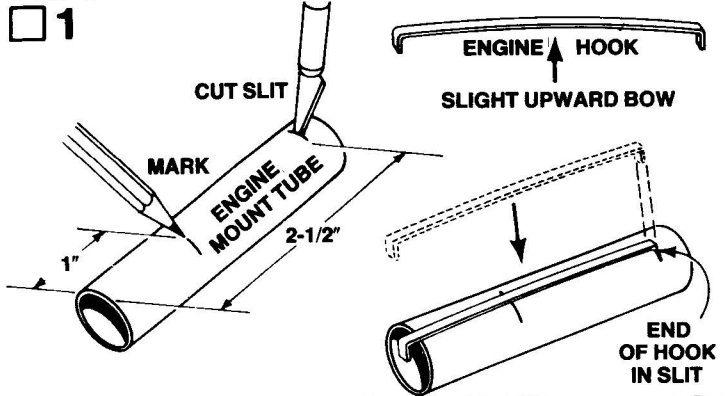
In addition to the parts included in this kit you will need: Scissors, pencil, ruler, tweezers, fine or extra-fine grit sandpaper, sanding sealer, a medium-size modeling paint brush, modeling knife with sharp blade, gloss black enamel spray paint, and household white glue or resin glue (Elmer's, Titebond, or similar). Other types of glue are not recommended.



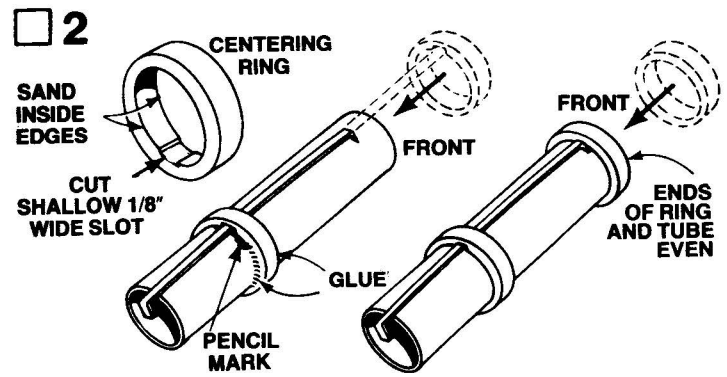
**ESTES INDUSTRIES**  
 PENROSE, CO 81240 USA

A DAMON COMPANY

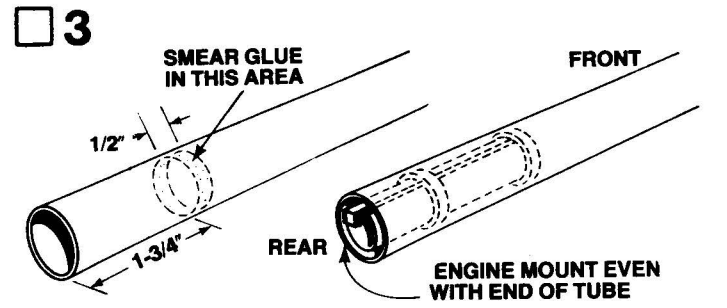
Page 2  
**ASSEMBLY INSTRUCTIONS**



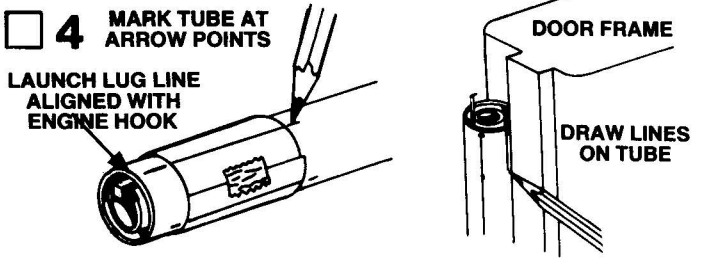
**1** Mark the engine mount tube (part A) at 1" and 2-1/2" from one end. Cut 1/8" long slit at the 2-1/2" mark. Gently bend the engine hook (part B) so that it bows upward very slightly in the middle. (Study the drawing—Don't bend the wrong way.) Insert one end of the engine hook into the slit in the tube.



**2** Sand the inside edges of the two centering rings (part C) to remove burrs. The rings should slide easily onto the engine mount tube. Cut a very shallow 1/8" wide slot inside one centering ring so it will fit over the engine hook. Slip the ring onto the front end of the engine mount tube and slide it down to the 1" mark. Make sure the engine hook runs straight down the tube, then apply glue to both sides of this ring. Apply glue around the front end of the engine mount tube and slide the remaining centering ring into place (front of ring even with the end of the tube).

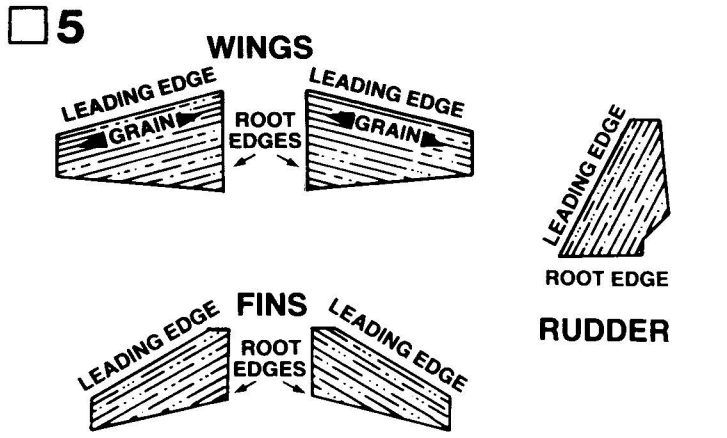


**3** The engine mount unit will be pushed into place so that the rear of the engine mount unit (end with engine hook projecting) is even with the end of the body tube (part D). Test fit the engine mount into the body tube. Sand the inside edge of the body tube and the centering rings, if necessary, to obtain a good fit. Use a stick to apply a generous bead of glue around the inside of the body tube about 1-3/4" from the end. Making sure the engine hook extends to the rear, slide the engine mount into the body tube until the end of the mount is even with the rear of the body tube. Do not pause or the glue may "lock" with the mount in the wrong position.



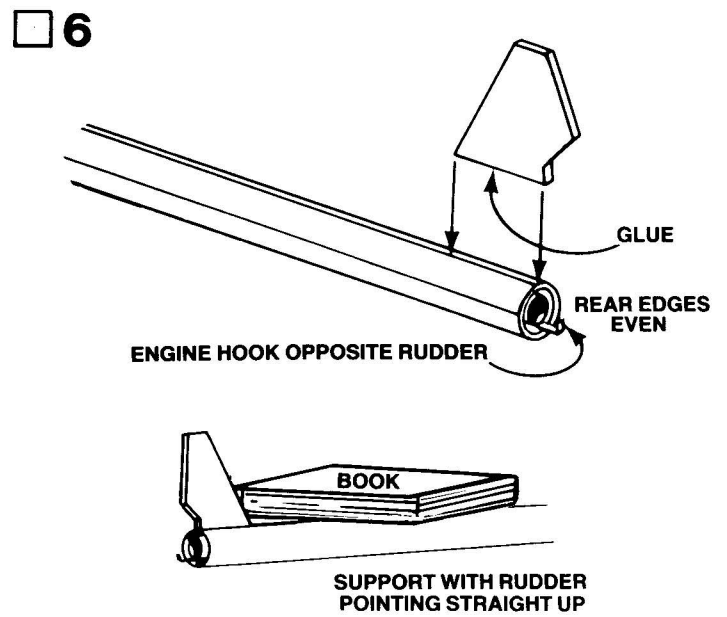
**4** MARK TUBE AT ARROW POINTS  
 LAUNCH LUG LINE ALIGNED WITH ENGINE HOOK  
 DOOR FRAME  
 DRAW LINES ON TUBE

Cut out the body marking guide from page 5 of these instructions. Wrap the guide around the rear of the body tube and tape the ends together. Rotate the guide until the launch lug line is aligned with the engine hook. Mark the body tube at each of the arrow points. Remove the guide. Using the inside edge of a door frame as a guide, draw lines connecting each pair of marks. Extend the rudder and fin lines about 3" from the rear of the body tube. Extend the launch lug line about 6" and draw the wing lines the entire length of the tube.



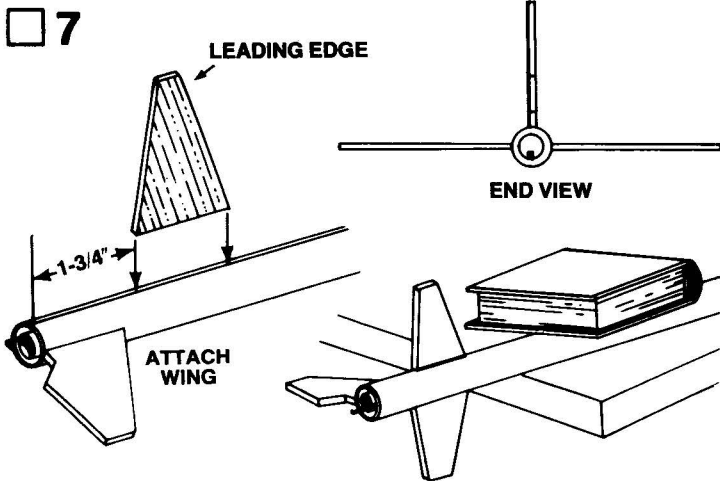
**5** WINGS  
 LEADING EDGE  
 GRAIN  
 ROOT EDGES  
 LEADING EDGE  
 LEADING EDGE  
 ROOT EDGE  
 RUDDER  
 LEADING EDGE  
 ROOT EDGES  
 LEADING EDGE

Lightly sand both sides of the die-cut balsa sheet (part E). Free the parts by running a knife along the die-cut lines. Sand all edges square. Sort and identify the parts as shown above. "Leading edge" is the edge that faces forward and "root edge" is the edge that is glued to the body tube.

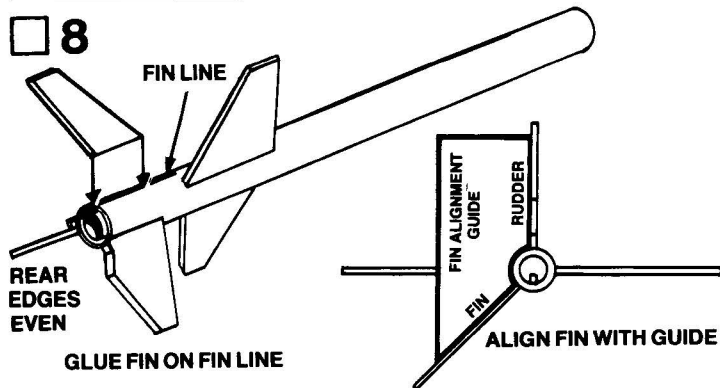


**6** REAR EDGES EVEN  
 ENGINE HOOK OPPOSITE RUDDER  
 GLUE  
 BOOK  
 SUPPORT WITH RUDDER POINTING STRAIGHT UP

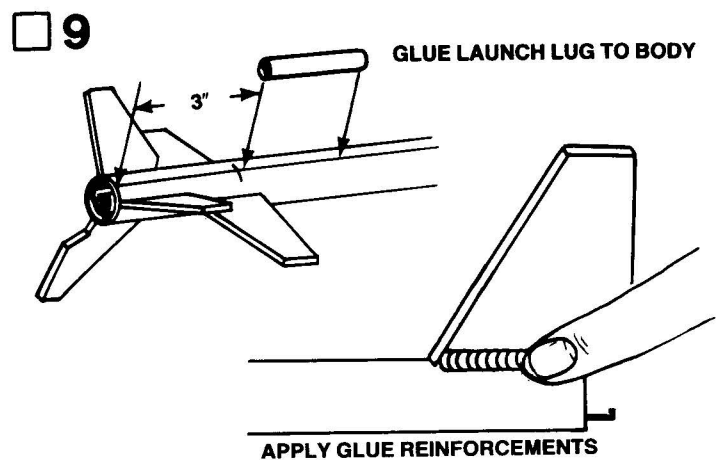
Apply a bead of glue to the root edge of the rudder. Attach it to the body, centered on the rudder line as shown. Make sure the rudder extends straight from the body. Set the body on a table with the rudder pointing straight up. Lay a book or similar object on the front of the body so it won't roll. Allow the glue to dry.



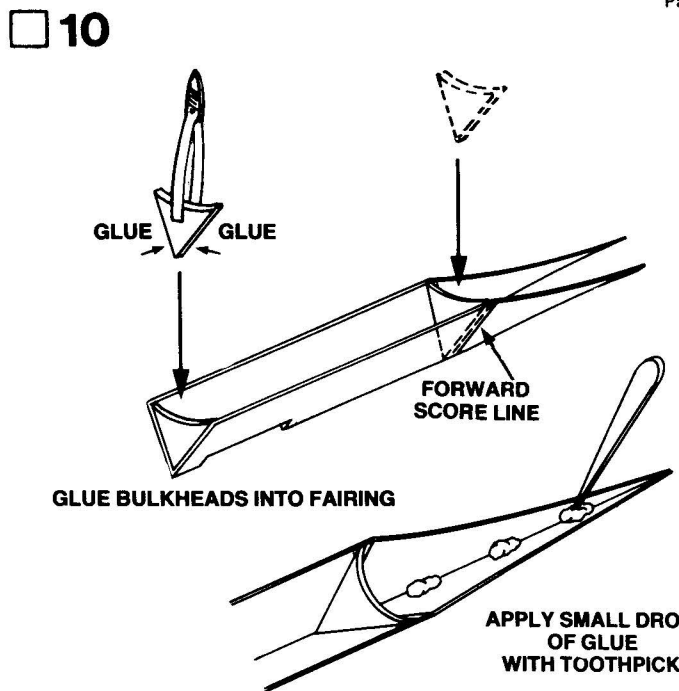
Place a mark on each wing line 1-3/4" from the rear of the body. Before gluing the wings, make sure you have them oriented as shown. The grain of the wood is parallel with the leading edges. Glue one wing in place, centered on the line, with the rear edge on the 1-3/4" mark. Adjust the wing so it extends from the body at a 90° angle to the rudder. Support as shown while the glue dries. Attach the remaining wing in the same manner.



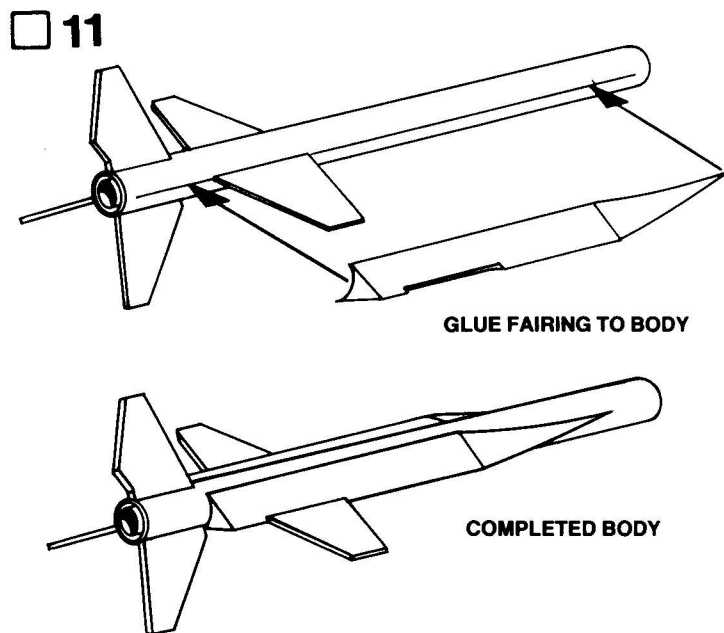
Cut the fin alignment guide from the back of the kit panel (part F). Glue a fin to the body as shown. Use the fin alignment guide to properly align the fin angle. Support as previously described while the glue dries. After the assembly has set for 5 minutes, re-check the alignment and, if necessary, adjust the fin. Repeat the procedure with the remaining fin.



Place a mark on the launch lug line 3" from the rear of the body. Glue the launch lug (part G) in place, centered on the line, with the rear of the lug on the 3" mark. For added strength, all glue joints must be reinforced. Apply a bead of glue to both sides of the rudder-body tube joint. Pull your finger along the joint to smooth the glue into an even fillet. Repeat the procedure with the wing, fin, and launch lug joints. Lay the model in a horizontal position and allow the glue to dry.

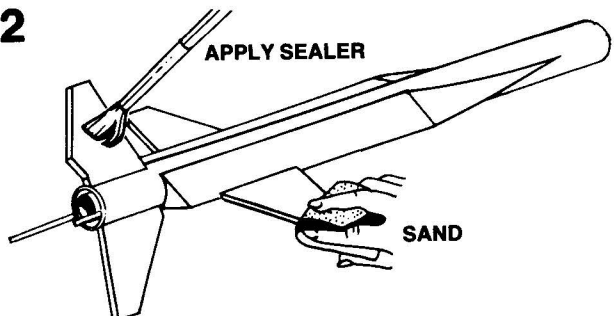


Free the parts from the die-cut card (part H) by running a knife along the die-cut lines. Fold up one fairing. Holding one of the bulkheads with a pair of tweezers, apply a very small bead of glue to the 2 angled edges. Glue the bulkhead into the rear of the fairing. Glue a second bulkhead into the fairing just behind the forward score lines. Using a toothpick, apply a reinforcing bead of glue to the joints. Allow the glue to dry. Holding the front edges of the fairing together, apply a few small drops of glue to the inside of the joint. Hold the front of the fairing together until the glue dries. Apply a reinforcing bead of glue all along the joint. Assemble the second fairing in the same manner.



Slide one fairing onto a wing and up against the body. The rear of the fairing should be just forward of the fin. The front tip of the fairing should be aligned on the pencil line. Remove the fairing and apply glue to the edges that fit against the body. Slide the fairing into place, align, and hold against the body until the glue dries. Attach the other fairing in the same manner. Apply a bead of glue to both sides of the wings where they exit the fairings. Smooth the glue with your finger. Do the same thing with the joints between the fairings and body tube. When the glue is completely dry, repeat the glue application once more. This will help to fill the seams and smooth the fairings into the body.

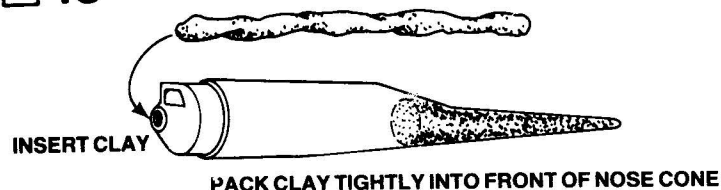
# 12



Apply a coat of sanding sealer to the wings, fin and rudder. When the sealer is dry, lightly sand the sealed parts with fine sandpaper. Repeat the sealing and sanding process until the balsa grain line is filled and the parts look and feel smooth. Lightly sand the glue joints on the cardstock fairings.

# 13

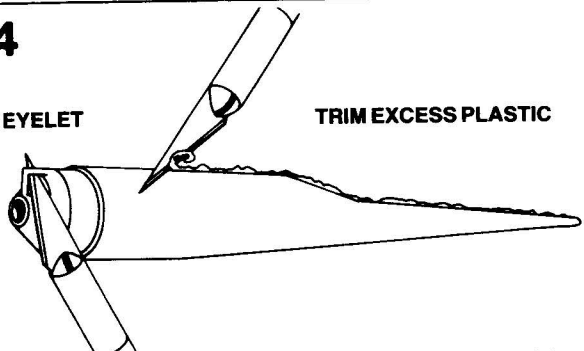
ROLL CLAY INTO "SNAKE"



Roll the clay nose weight (part I) between your hands to make a "snake" about 1/4" diameter. Poke the clay through the hole in the rear of the nose cone (part J). Use a dowel or piece of scrap wood to push the clay forward into the cone until it is packed tightly in the front of the cone.

# 14

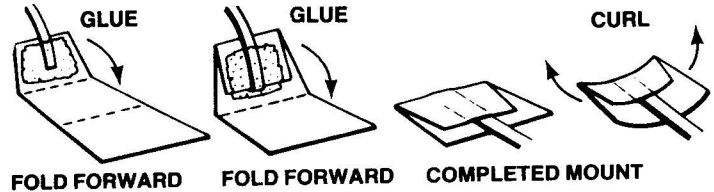
CLEAR EYELET TRIM EXCESS PLASTIC



Trim or sand any excess plastic from around the sides of the nose cone. Use a sharp knife to remove any excess plastic from the inside of the molded eyelet at the rear of the nose cone. Wash the nose cone with lukewarm soapy water, rinse well, and dry.

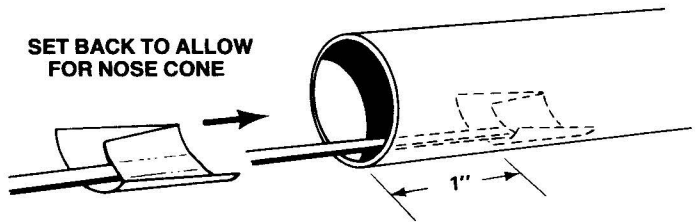
NOTE: Nose cone should separate easily from rocket body tube, but should not be extremely loose. If fit is too tight, sand inside of body tube and shoulder of nose cone with fine sandpaper. If fit is too loose, add a wrapping of transparent tape to the shoulder of the nose cone.

# 15



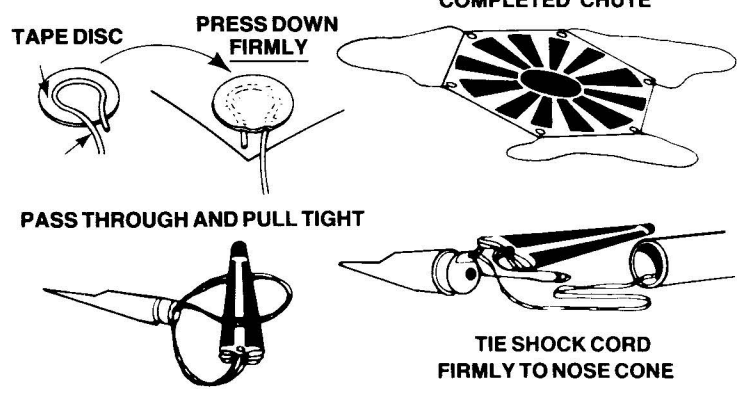
Cut out the shock cord mount from the instructions. Fold on dotted lines, then unfold and apply glue to Section 1. Lay the end of the shock cord (part K) into the glue. Fold over and apply glue to the back of Section 1 and the exposed portion of Section 2. Fold again to complete mount. Curl the edges of the mount up so it will match the contour of the body tube and hold with your fingers until the glue sets.

# 16



Use a finger or stick to apply glue to the inside of the front of the body tube, 1" to 2" from the front of the tube. Press the shock cord mount firmly into position in glue far enough from the front edge of the tube to allow clearance for the nose cone to fit into place. To insure a good bond use a stick or your finger to smear a film of glue over the mount and surrounding area in the body tube.

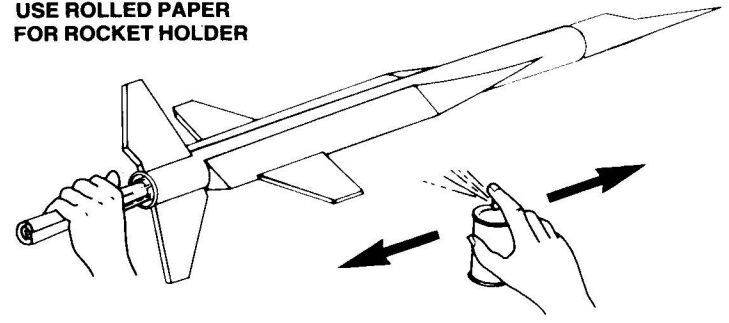
# 17



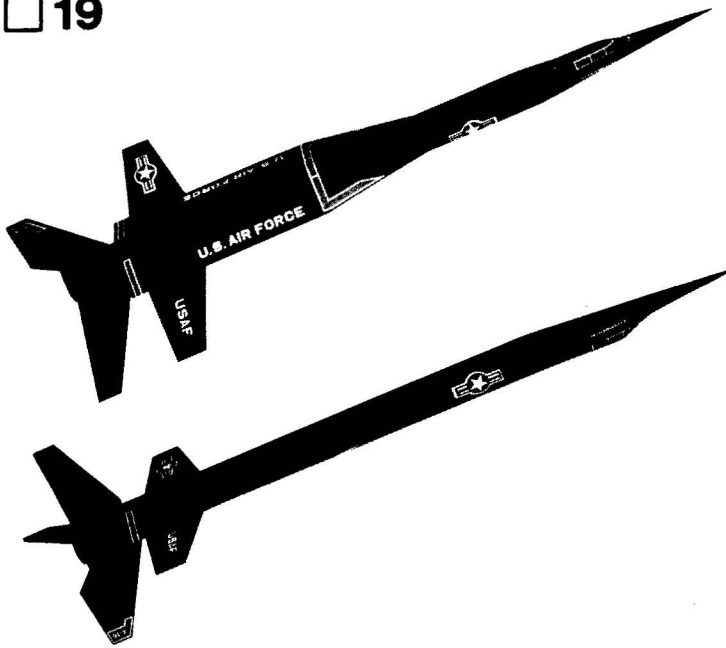
Cut out the parachute (part L) on its edge lines. Cut three equal lengths of shroud line (part M). Attach line ends to the top of the parachute with tape discs (part N) as shown. Form a small loop in the end of a shroud line. Holding loop, gently center loop inside tape disc on the sticky side. Then carefully press tape disc onto its proper place on the top of the parachute. Firmly press the tape disc into place until both tape disc and parachute material are molded around the shroud line loop. Repeat for other shroud line ends and tape discs. Pass the shroud line loops through the eyelet on the nose cone. Pass the parachute through the loop ends and pull the lines tight against the nose cone. Tie the free end of the shock cord firmly to the nose cone loop. A square knot or strong double knot should be used. Pack 'chute and shock cord into body and socket nose cone in place.

# 18

USE ROLLED PAPER FOR ROCKET HOLDER



Paint the entire model with gloss black spray enamel (do not use lacquer paint). Follow the directions on the spray can for best results. Let the paint dry thoroughly (usually several hours) before continuing.



When all paint is dry, apply the decals (part O) in the positions shown. (A) Cut only one decal at a time from decal sheet. (B) Submerge decal in lukewarm water until decal slides on backing paper (usually 15 to 30 seconds). (C) Gently slide decal from backing paper onto model. (D) Move decal into exact position and carefully blot away excess water with a soft cloth. (E) If the decal "sticks" before you have it in position, apply water over the decal with a brush. This will permit the decal to be moved. (F) Smooth out all wrinkles and air bubbles before the decal dries. Refer to the photograph for decal positions.

## LAUNCHING COMPONENTS

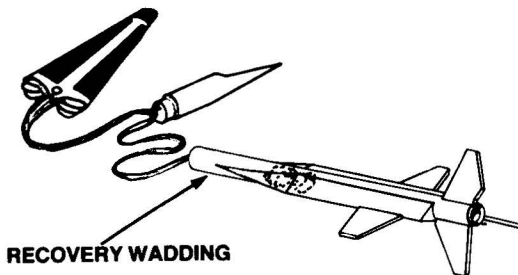
To launch your rocket you will need the following items:

- An Estes model rocket launching system
- Flame resistant recovery wadding (Estes Cat. No. 2274)
- Estes A8-3, B4-4, B6-4, B8-5, or C6-5 model rocket engines. Use an A8-3 engine for your first flight.

Be sure to follow the HIAA-NAR\* Model Rocket Safety Code when carrying out your model rocket activities.  
 \*HIAA—Hobby Industry of America  
 \*NAR—National Association of Rocketry

## COUNTDOWN CHECKLIST

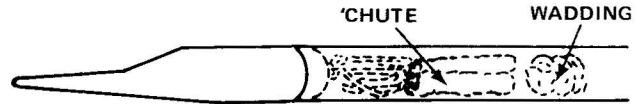
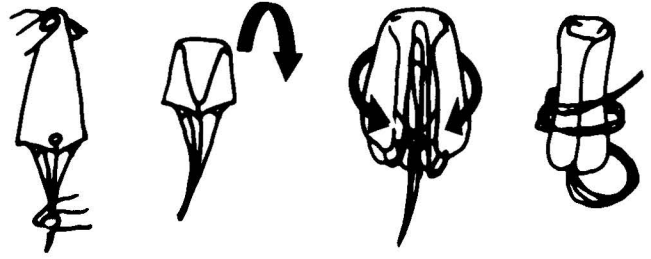
### T-13



Pack 3 or 4 squares of loosely crumpled recovery wadding into the body tube. Usually this will fill the body tube for a distance equal to about 1-1/2 times its diameter.

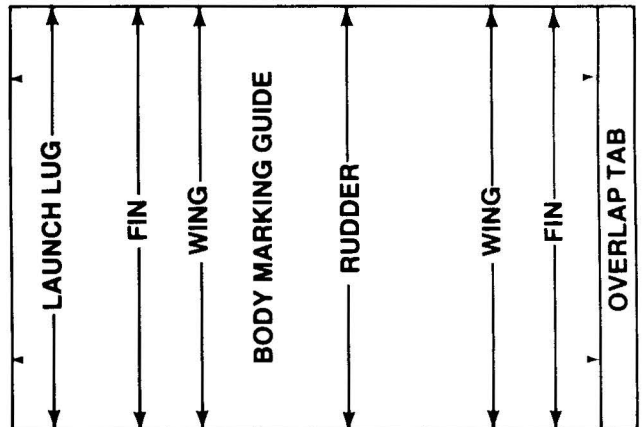
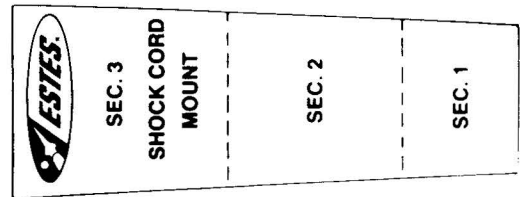
## T-12

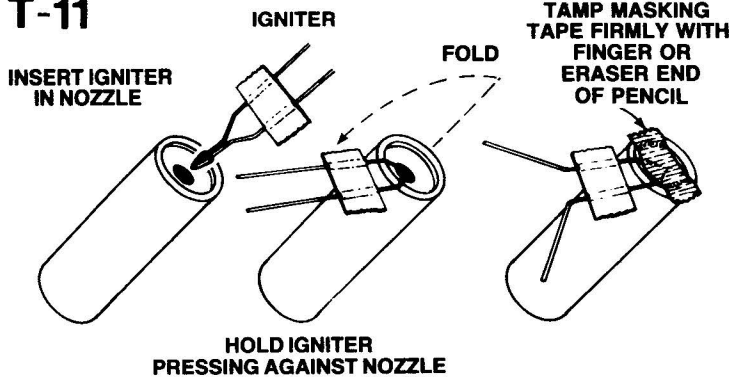
FORM SPIKE    FOLD CANOPY    FOLD SHROUD LINES    ROLL CANOPY



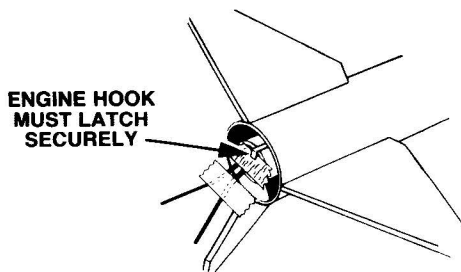
Hold the parachute at its center and pass the other hand down it to form a "spike" shape. Fold this spike in half. Fold shroud lines back along parachute and then back down to lower edge of parachute to reduce length of shroud line "left over". Roll parachute into tube shape to fit easily into body. Any remaining shroud line should be loosely wrapped around parachute. Pack chute into the body tube on top of the wadding. Pack the shroud lines and shock cord in on top of the parachute and slip the nose cone into place.

NOTE: DO NOT pack parachute until you are actually ready to launch. For maximum parachute reliability, lightly dust the chute with ordinary talcum powder before each flight, especially in cold weather.

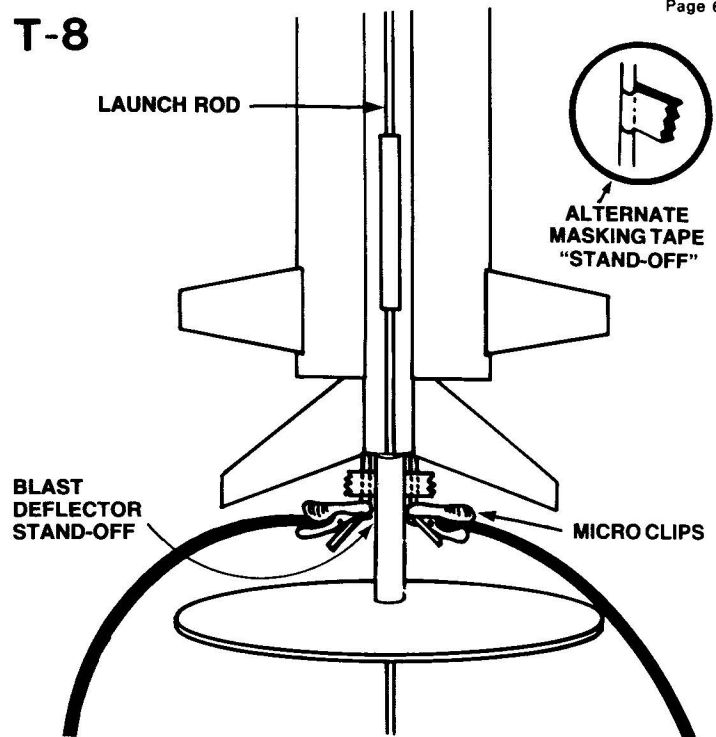


**T-11**

Select an engine and install an igniter as directed in the engine instructions. The engines recommended for use with this rocket are the A8-3, B4-4, B6-4, B8-5 or C6-5 made by Estes. Use an A8-3 engine for your first flight.

**T-10**

Insert engine into rocket engine mount. Engine hook must latch securely over end of the engine.

**T-9** Disarm the launch panel—REMOVE SAFETY KEY!**T-8**

Slide the launch rod through rocket launch lug. Make sure the rocket slides freely on the launch rod. The rocket must be supported by a "stand-off" to keep the igniter wires from touching the metal blast deflector. If your launch system does not have a stand-off, wrap a piece of masking around the launch rod to support the rocket. Clean the micro-clips and attach them to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector.

**T-7** Clear the launch area. Alert recovery crew and trackers. Check for low flying aircraft and unauthorized persons in the recovery area.

**T-6** Arm the launch panel—INSERT SAFETY KEY!

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

Repeat Countdown Checklist for each flight.

**MISFIRE PROCEDURE**

Disarm the launch panel. Wait one minute before approaching the rocket on the launch pad. Remove the rocket, clean the igniter residue from the nozzle of the engine, and carefully install a new igniter. Repeat the Countdown Checklist.

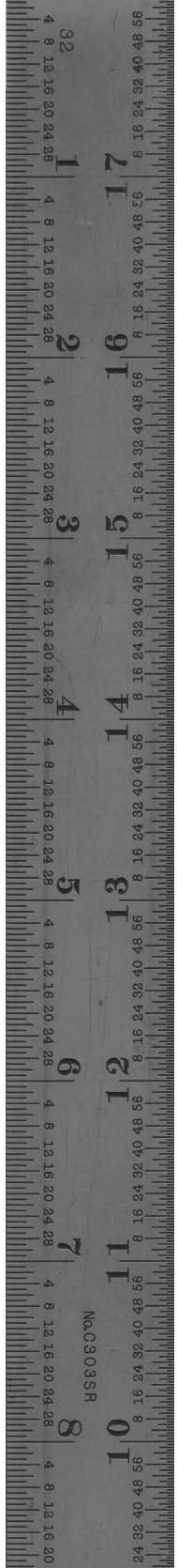
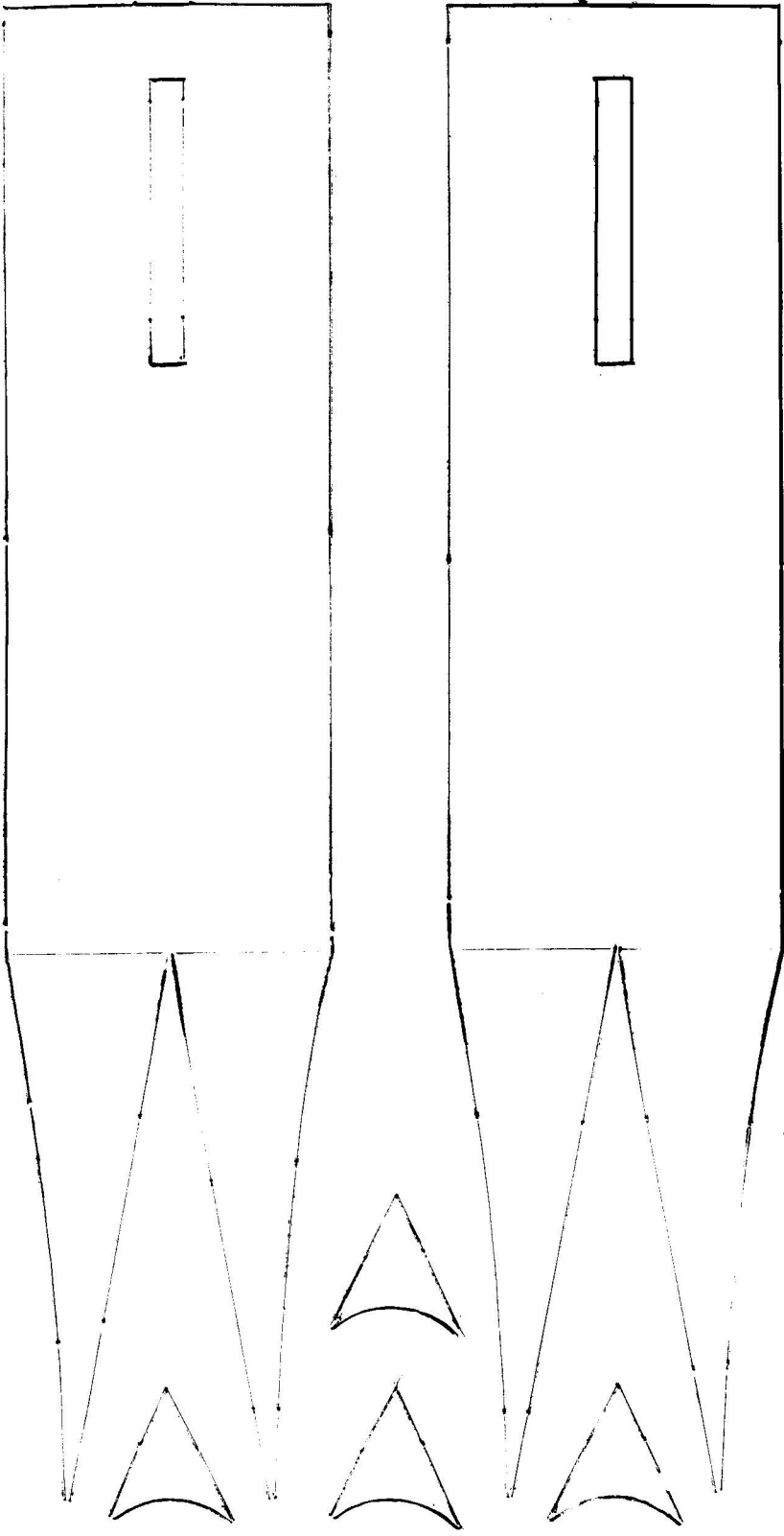
Failure of the rocket engine to function properly is nearly always caused by a failure to install the igniter correctly. This failure permits the igniter to heat and burn into two pieces without igniting the engine.



A DAMON COMPANY

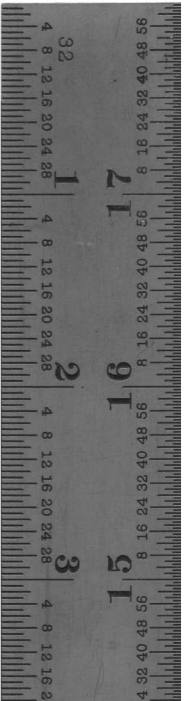
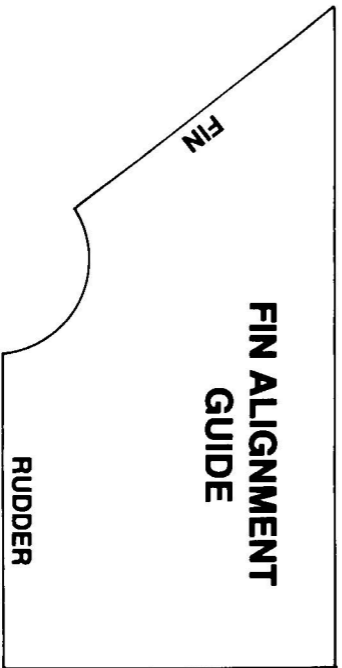
**ESTES INDUSTRIES**  
PENROSE, CO 81240 USA



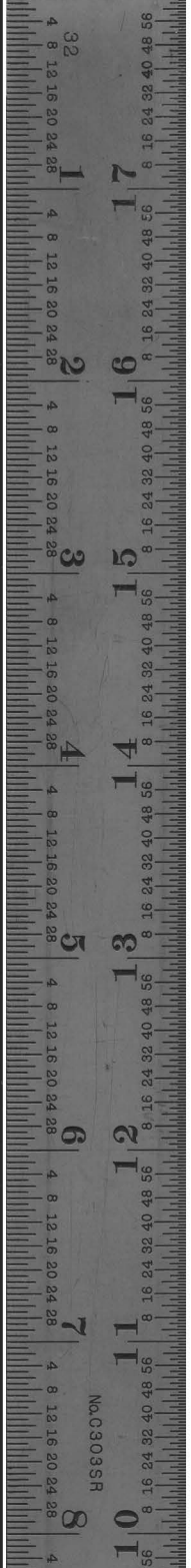


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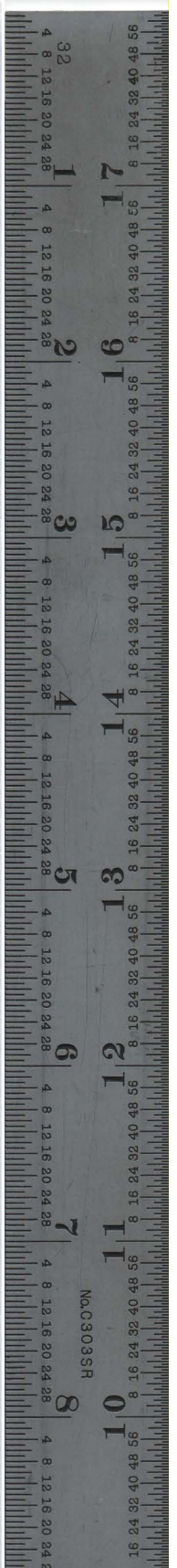
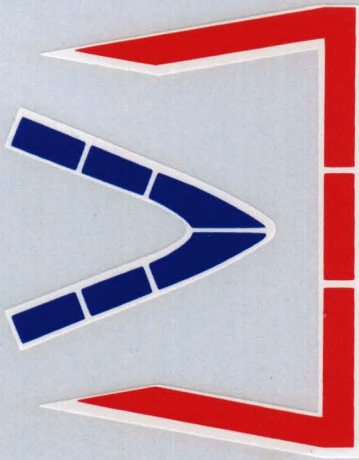
No. C303SR

EXPERIMENTAL EXPERIMENTAL

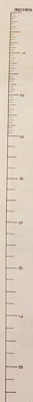
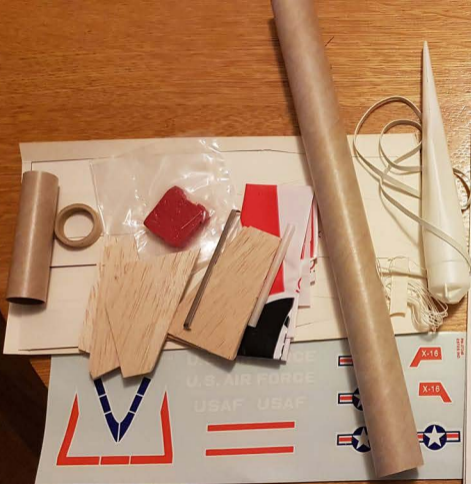
U.S. AIR FORCE

U.S. AIR FORCE

USAF USAF



No. C303SR



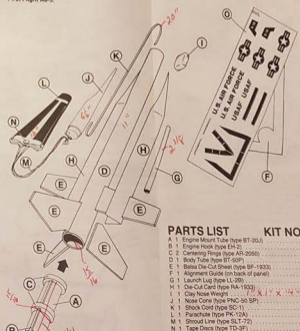
# X-16

**SKILL LEVEL 3:**  
Recommended for Craftsman Rocketeers.

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A8-3, B4-4, B8-4, B8-5, and C6-5  
First Flight A8-3.

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## PARTS LIST

**KIT NO. 1933**

|   |                                       |       |
|---|---------------------------------------|-------|
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| B | 1 Engine Hook (type EH-2)             | 35025 |
| C | 2 Centaring Rings (type AR-2050)      | 30164 |
| D | 1 Body Tube (type BT-50P)             | 30365 |
| E | 1 Ballis Die-Cut Sheet (type BF-1933) | 32633 |
| F | 1 Alignment Guide (on back of panel)  | 83719 |
| G | 1 Launch Lug (type LL-20)             | 36178 |
| H | 1 Die-Cut Card (type RA-1933)         | 32458 |
| I | 1 Clay Nose Weight                    | 65260 |
| J | 1 Nose Cone (type PNC-50 SP)          | 71201 |
| K | 1 Shock Cord (type SC-1)              | 85730 |
| L | 1 Parachute (type PK-12A)             | 85564 |
| M | 1 Shroud Line (type SLT-72)           | 38237 |
| N | 1 Tape Discs (type TD-3F)             | 38436 |

# X-16

## FLYING MODEL ROCKET

SKILL LEVEL 3

• Includes everything you need to build and fly  
• Wings, fuselage, nose cone, and fins are pre-cut  
• No glue or solder necessary  
• Includes motor tube  
• Motor fuel ports

Length: 10.5" (267mm)  
Wingspan: 3.5" (89mm)  
Weight: 1.2 oz (34g)  
Motor: 1/4" (6.35mm) diameter  
Motor length: 1.5" (38mm)

Includes: 1 x Motor tube  
1 x Motor fuel ports  
1 x Motor fuel ports  
1 x Motor fuel ports  
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ROCKET  
MOTOR  
PARTS



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