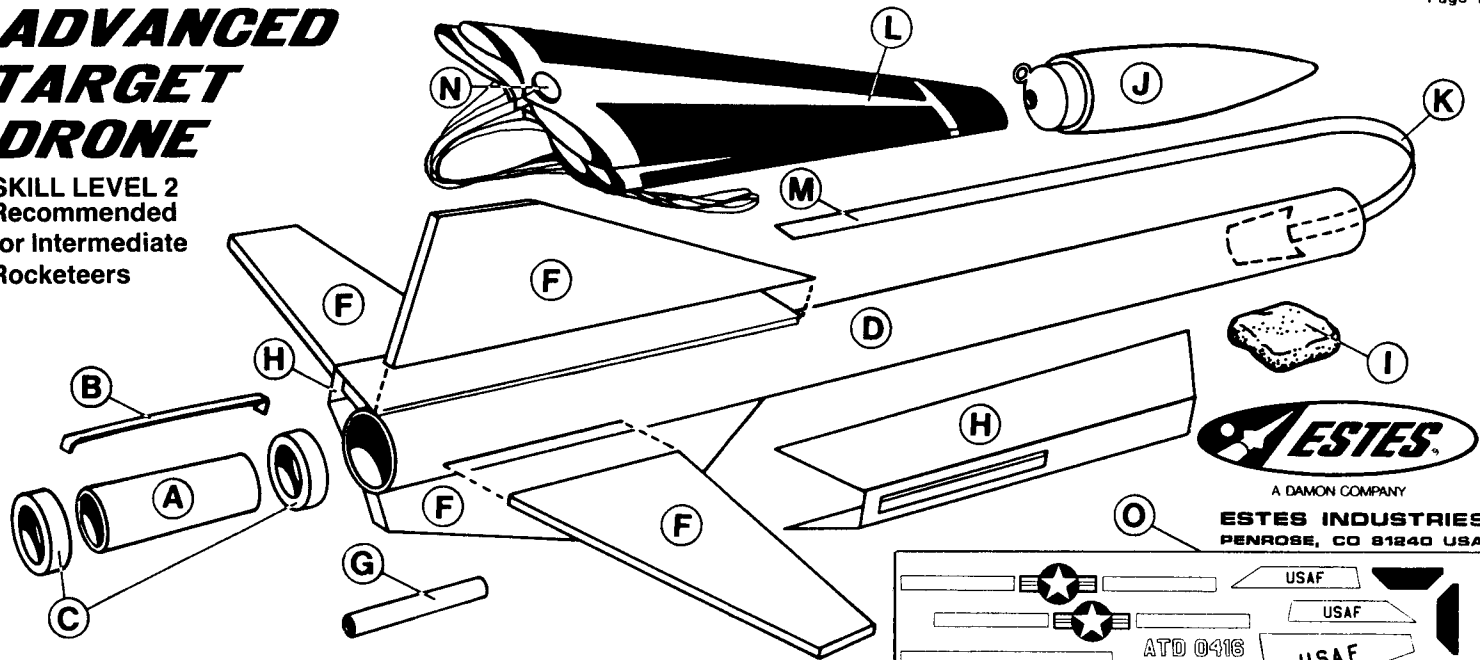




ADVANCED TARGET DRONE

SKILL LEVEL 2
Recommended for Intermediate Rocketeers

INCHES
1
2
3
4
5
6
7
8
9
10



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

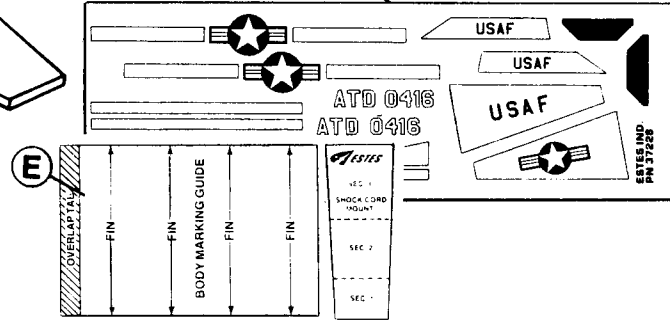
BEFORE YOU START

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 respect.

TOOLS AND MATERIALS

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

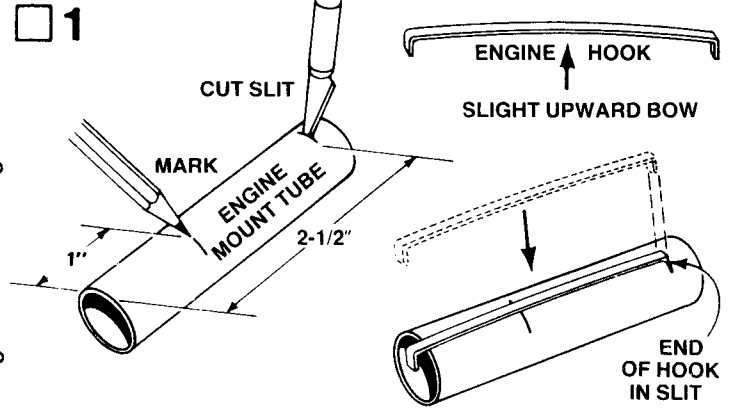
For easy and positive alignment of the fins on your model, we recommend the use of Estes' Fin Alignment Guide, Part No. 2231.



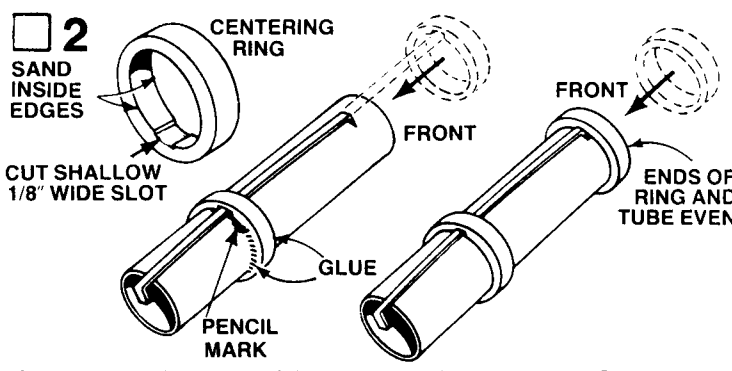
PARTS LIST KIT NO. 1913

A	1	Engine Mount (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	Pattern Sheet	83659
F	1	Balsa Die-Cut Sheet (type BF-1913)	32613
G	1	Launch Lug (type LL-2B)	38178
H	1	Die-Cut Card (type RA-1913)	30135
I	1	Clay Nose Weight	85260
J	1	Nose Cone (type PNC-50Y)	71009
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-1913)	37228

ASSEMBLY INSTRUCTIONS

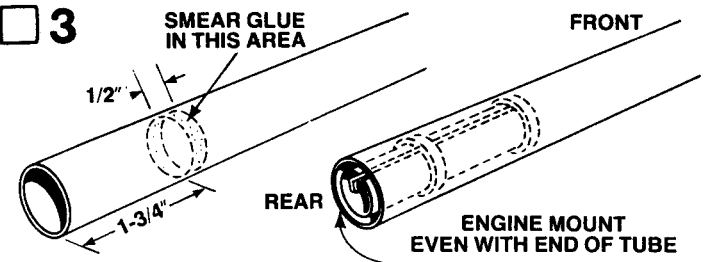


Mark the engine mount tube (part A) at 1" and 2-1/2" from one end. Cut a 1/8" long slit at the 2-1/2" mark. Gently bend the engine hook (part B) so that it bows upward very slightly in the middle. (Study the drawing—Don't bend the wrong way.) Insert one end of the engine hook into the slit in the tube.



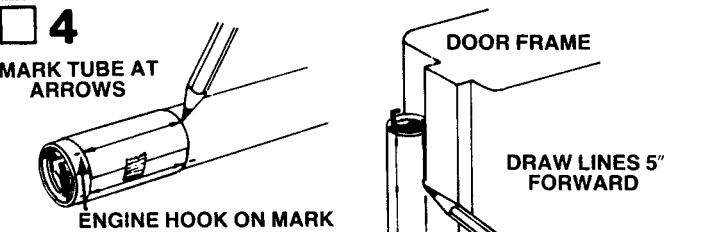
Sand the inside edges of the two centering rings (part C) to remove burrs. The rings should slide easily onto the engine mount tube and slide it down to the 1" mark. Make sure the engine hook runs straight down the tube, then apply glue to both sides of this ring. Apply glue around the front end of the engine mount tube and slide the remaining centering ring into place (front of ring even with the end of the tube).

3



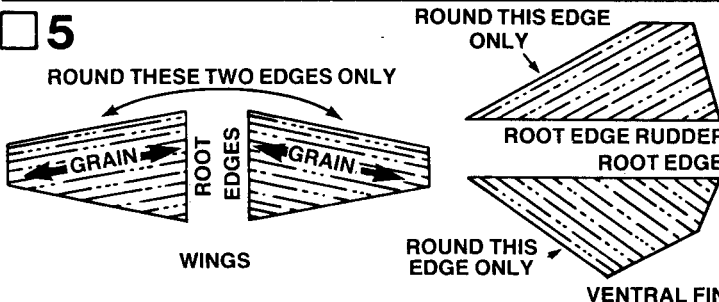
The engine mount unit will be pushed into place so that the rear of the engine mount unit (end with engine hook projecting) is even with the end of the body tube (part D). Test fit the engine mount into the body tube. Sand the inside edge of the body tube and the centering rings, if necessary, to obtain 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



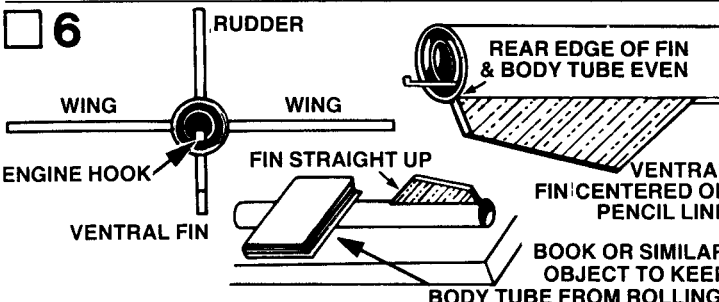
Cut out the tube marking guide from the pattern sheet (part E) and wrap it around the rear of the body tube. Place the tube marking guide so that the engine hook lines up with a fin placement (arrow point). Mark the body tube at each of the arrow points. Remove the marking guide. Using a door frame as a guide, draw lines connecting each pair of marks. Extend the lines about 5" forward along the body tube.

5



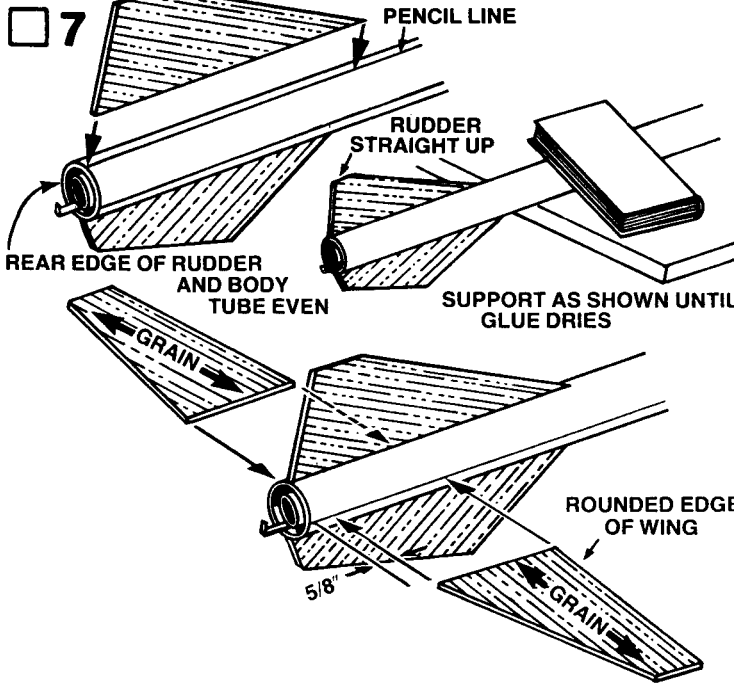
Lightly sand both sides of the die-cut balsa sheet (part F). Free the parts by carefully running a knife along the die-cut lines. Use sandpaper to round only the edges shown. Sand all other edges square. Note: The two wings are symmetrical, make sure they are oriented as shown with the rounded edges parallel with the grain direction in the wood. The word "root edge" means the edge of each part that is glued to the body tube.

6



The balsa parts are attached to the body in the positions shown. Attach the ventral fin first. Note that it is aligned with the engine hook. Apply a bead of glue to the root edge of the fin. Hold it for a minute to allow the glue to become tacky, then attach the fin to the body in the position shown. Wipe away any excess glue. Make sure the fin projects straight from the body. Support the body with the fin in an upright position and allow the glue to dry.

7

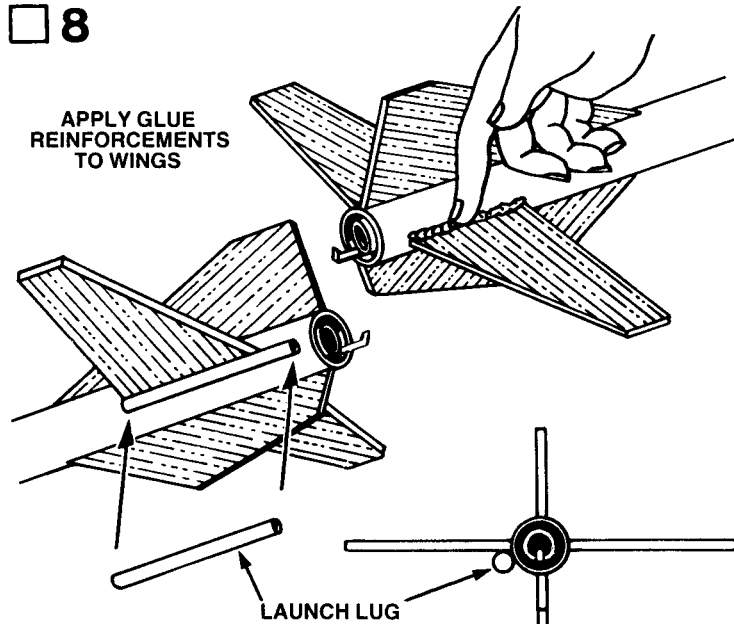


Glue the rudder to the body in the position shown. Make sure the rudder extends straight from the body. Lay the body on a table with the fin and rudder extending off the edge. Make sure the rudder is pointing straight up and weight the front of the body so it won't roll. Allow the glue to dry before proceeding.

Place a mark on each wing line 5/8" from the rear of the body. Note: The front edges of the wings are those that were rounded in step 5. Do not attach them backwards. Glue one wing to the body with the wing centered on the pencil line and the rear edge of the wing on the 5/8" mark. Check the wing alignment and support as previously described until the glue dries.

Attach the other wing in the same manner.

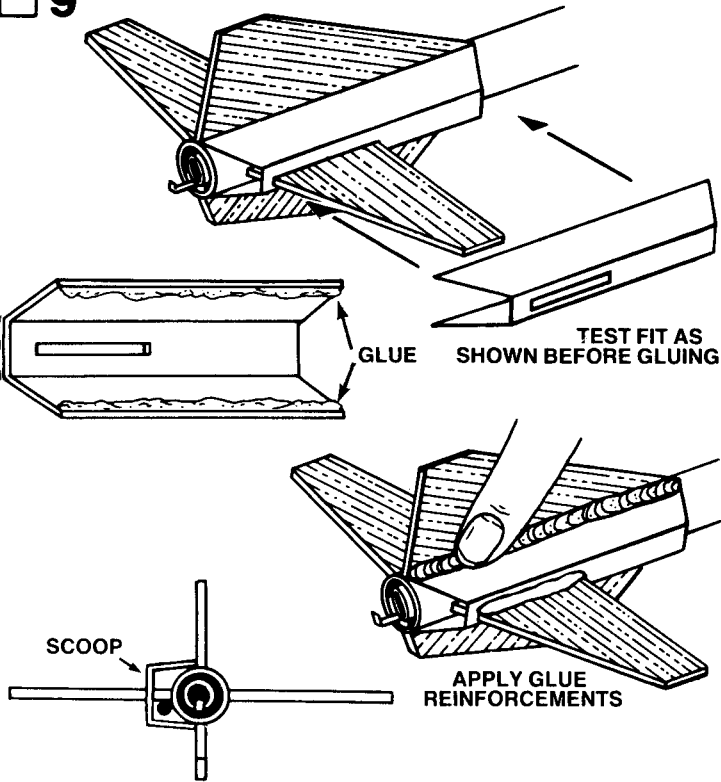
8



Apply glue reinforcements to the two wing-body joints. (Do Not reinforce rudder and dorsal fin at this time.) Apply a bead of glue to both sides of each wing-body tube joint. Pull your finger along the joint to smooth out the glue and to remove excess glue. Set the model in a horizontal position until the glue dries.

Glue the launch lug (part G) to the bottom of the left wing-body tube joint. The front edge of the launch lug is even with the front edge of the wing.

□ 9



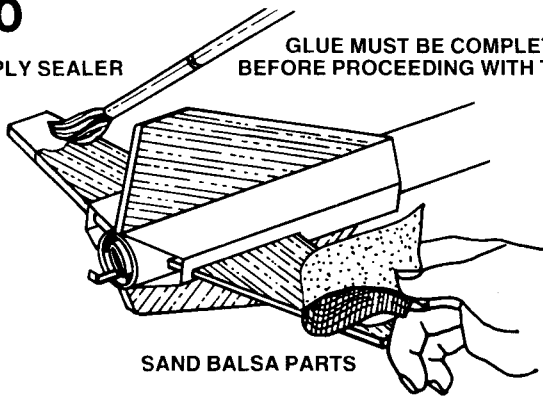
Use a knife to free the intake scoops from the die-cut card (part H). Bend the sides of one scoop inward at the scored lines and test fit onto the model as shown. Remove the scoop and apply a bead of glue to the inside edges. Re-attach the scoop to the model and hold it in place until the glue begins to dry. Apply a thin bead of glue to the joints where the scoop butts against the rudder and ventral fin and to both sides of the joint where the wing extends from the scoop. Pull your finger along the joints to smooth the glue.

Glue the remaining scoop to the other side of the model in the same manner.

□ 10

APPLY SEALER

GLUE MUST BE COMPLETELY DRY BEFORE PROCEEDING WITH THIS STEP



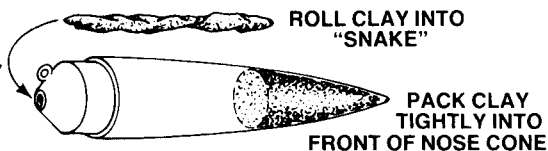
SAND Balsa PARTS

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.

□ 11

INSERT CLAY

ROLL CLAY INTO "SNAKE"



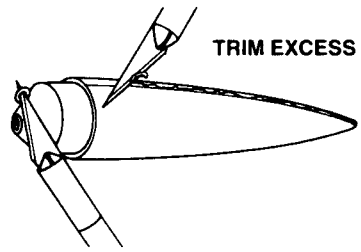
PACK CLAY TIGHTLY INTO FRONT OF NOSE CONE

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.

□ 12

CLEAR EYELET

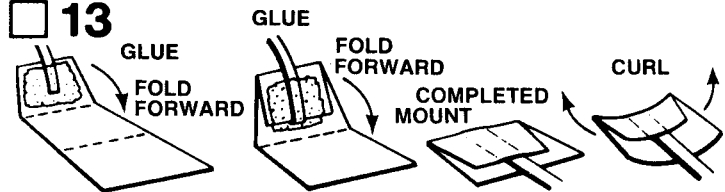
TRIM EXCESS PLASTIC



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 or masking tape to the shoulder of the nose cone.

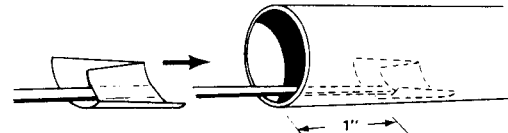
□ 13



Cut out the shock cord mount from the pattern sheet. 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.

□ 14

SET BACK TO ALLOW FOR NOSE CONE



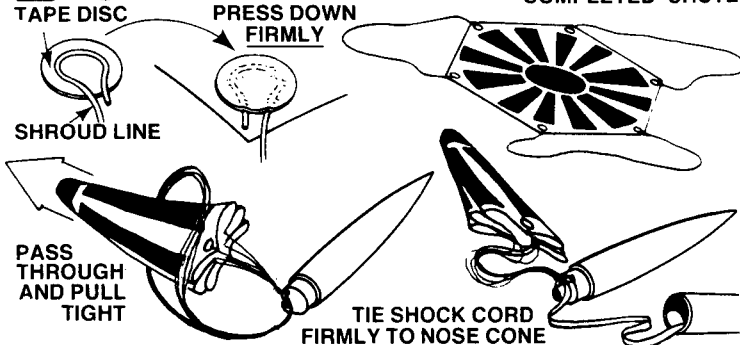
Use a finger or stick to apply glue to the inside of the front of the body tube, 1" to 2" from the front of the tube. Press the shock cord mount firmly into position in glue far enough from the front edge of the tube to allow clearance for the nose cone to fit into place. To insure a good bond use a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

□ 15

TAPE DISC

PRESS DOWN FIRMLY

COMPLETED 'CHUTE



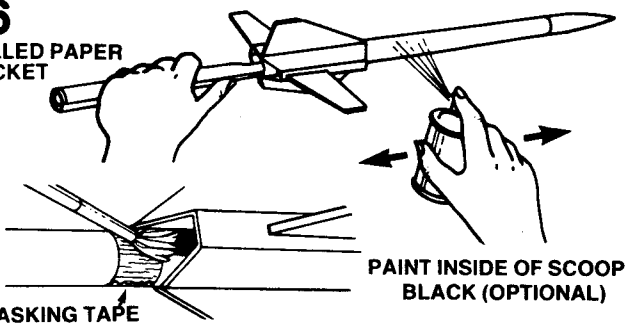
PASS THROUGH AND PULL TIGHT

TIE SHOCK CORD FIRMLY TO NOSE CONE

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 loop 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.

16

USE ROLLED PAPER FOR ROCKET HOLDER



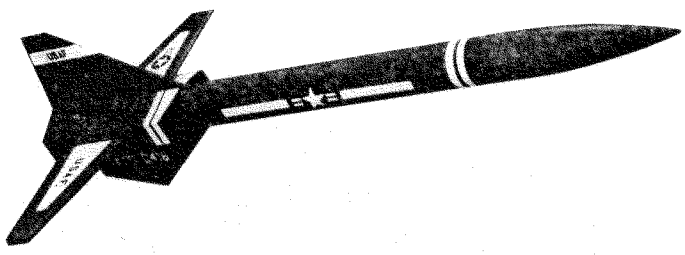
MASKING TAPE

PAINT INSIDE OF SCOOPS BLACK (OPTIONAL)

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

You may wish to paint the inside of the scoops black. This adds a nice touch, but is not necessary and should not be attempted unless you are good with a paint brush. Place a piece of masking tape around the body at the front of the scoop openings. Use black enamel paint and a small brush. Paint all around the inside of the scoop openings to a distance of about 1" inside the scoops. Do the same at the rear of the scoop openings. Once the paint is dry, remove the masking tape.

17



When all paint is dry, apply the decals (part O) in the positions shown. (A) Cut only one decal at a time from 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.

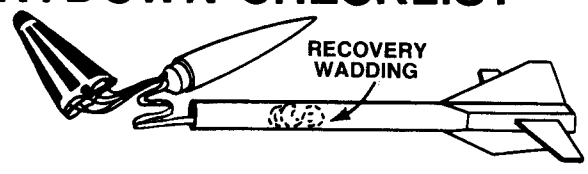
LAUNCHING COMPONENTS

- 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 a B4-4 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

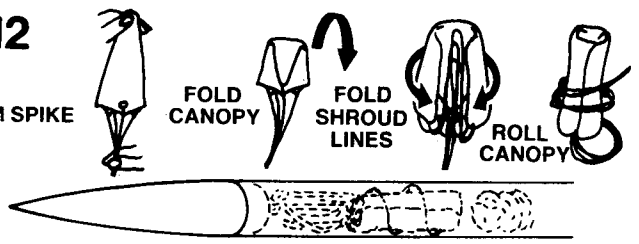
T-13



RECOVERY WADDING

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

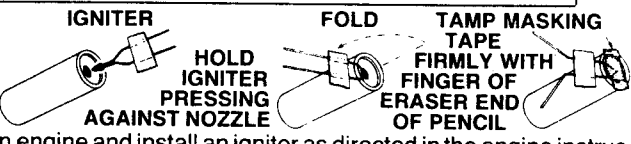
ROLL CANOPY

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

INSERT IGNITER IN NOZZLE



IGNITER

HOLD IGNITER PRESSING AGAINST NOZZLE

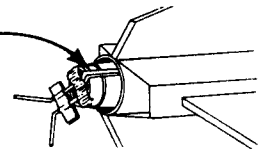
FOLD

TAMP MASKING TAPE FIRMLY WITH FINGER OF ERASER END OF PENCIL

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, and C6-5 made by Estes. Use a B4-4 engine for your first flight.

T-10

ENGINE HOOK MUST LATCH SECURELY



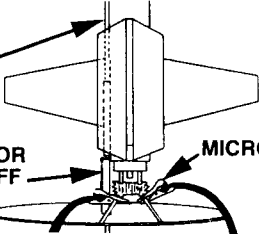
Insert engine into rocket engine mount. Engine hook must latch securely over end of the engine.

T-9

Disarm the launch panel—REMOVE SAFETY KEY!

T-8

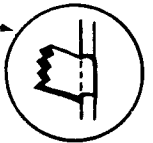
LAUNCH ROD



ALTERNATE MASKING TAPE "STAND-OFF"

BLAST DEFLECTOR STAND-OFF

MICRO CLIPS



Slide the launch rod through the 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. Attach the clips as close to the engine as possible. Arrange the clips so they do not touch each other or the 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!

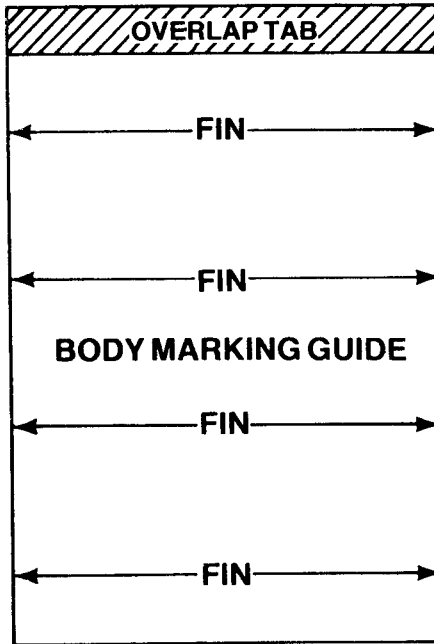
-5-4-3-2-1-LAUNCH!!

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.



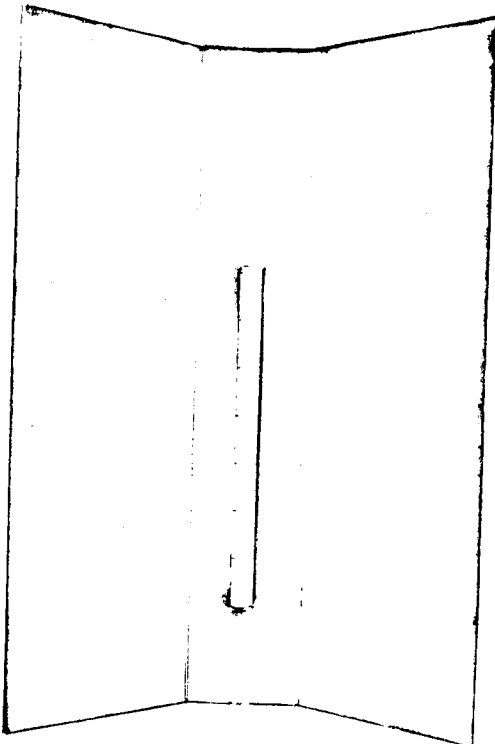
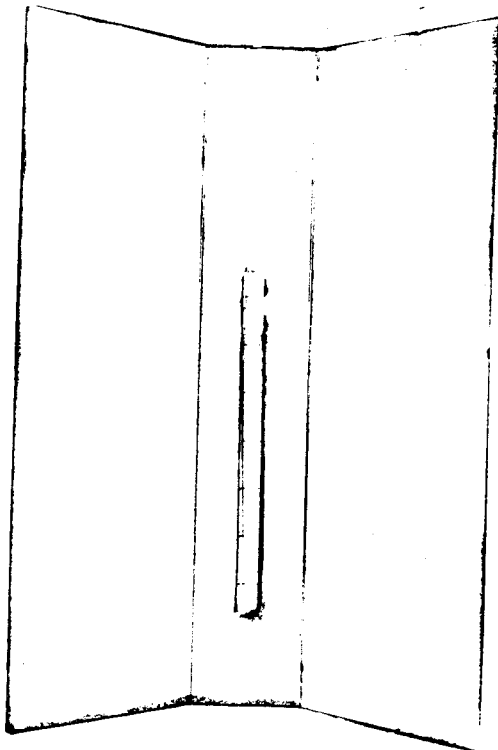
ESTES

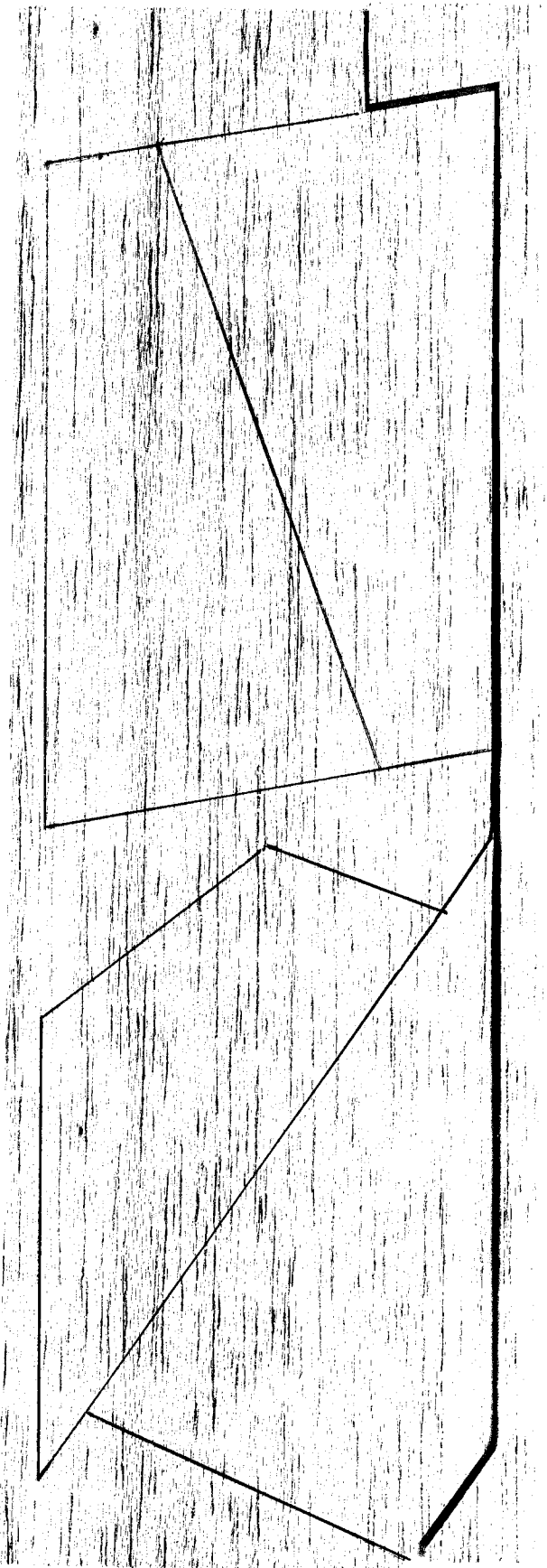
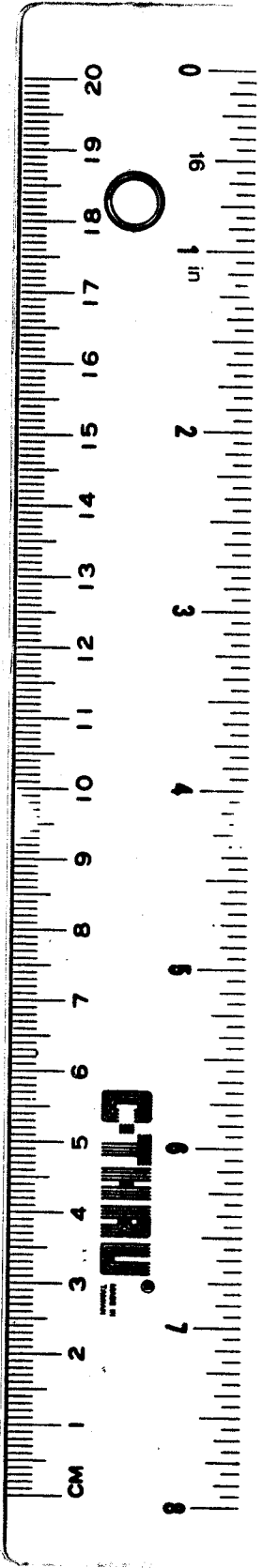
SEC. 3
SHOCK CORD
MOUNT

SEC. 2

SEC. 1

PN 83659







ATD 0416
ATD 0416

USAF

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