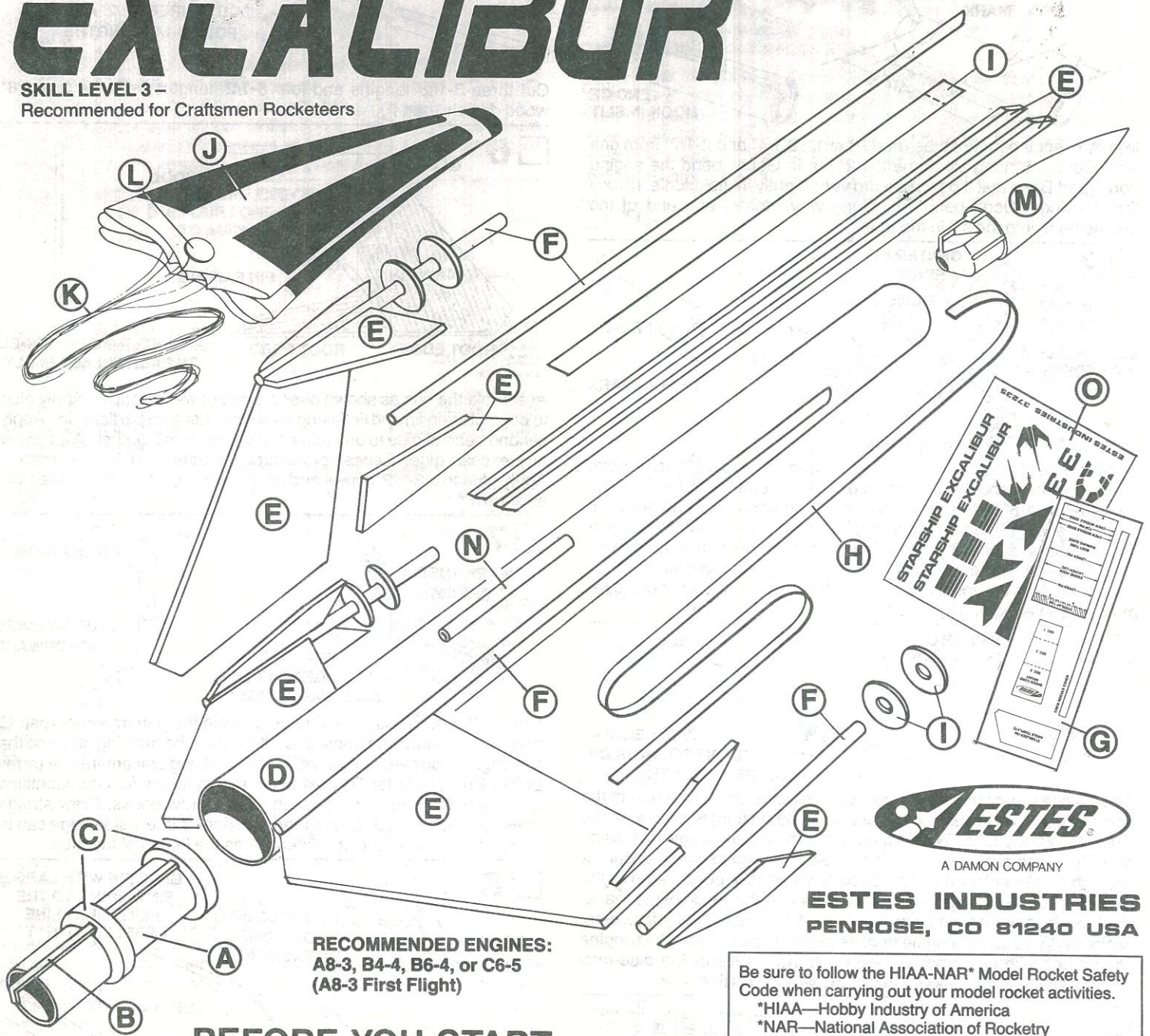


STARSHIP EXCALIBUR

SKILL LEVEL 3—
Recommended for Craftsmen Rocketeers

INCHES
1
2
3
4
5
6
7
8
9
10



RECOMMENDED ENGINES:
A8-3, B4-4, B6-4, or C6-5
(A8-3 First Flight)



ESTES INDUSTRIES
PENROSE, CO 81240 USA

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

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, masking tape, modeling knife with sharp blade, gloss white enamel spray paint, and household white glue or resin glue (Elmer's, Titebond, or similar). Other types of glue are not recommended.

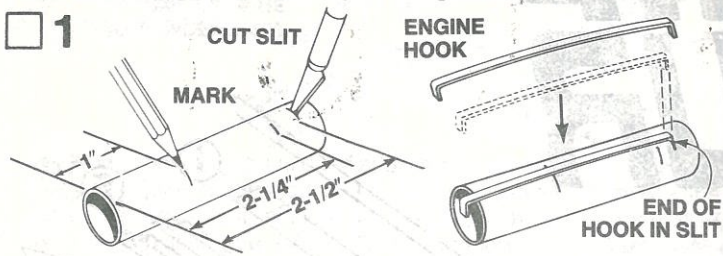
PARTS LIST

KIT #1920

A	1	Engine Body Tube (type BT-20J) 2-3/4" Long	30326
B	1	Engine Hook (type EH-2)	35025
C	2	Centering Rings (type AR-2050)	30164
D	1	Body Tube (type BT-50L) 12-3/4" Long	30366
E	1	Die-Cut Balsa Sheet (type BF-1920)	32620
F	4	Wood Dowels (type WD-1920) 12" Long	85901
G	1	Pattern Sheet (type SP-1920)	83682
H	1	Shock Cord (type SC-1B)	85734
I	1	Die-Cut Card (type DC-1920)	32440
J	1	Parachute (type PK-12)	85564
K	1	Shroud Line (type SLT-72)	38237
L	1	Tape Discs (type TD-3F)	38406
M	1	Nose Cone (type PNC-50KA)	71028
N	1	Launch Lug (type LL-2A)	38175
O	1	Decal (type KD-1920)	37235

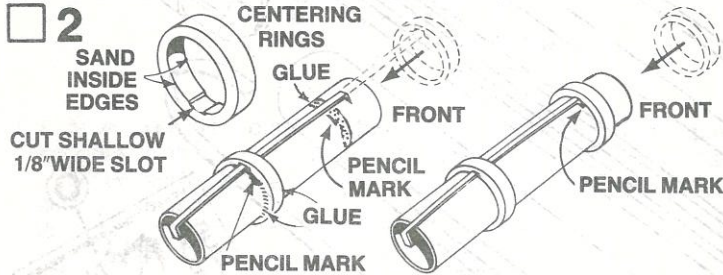
ASSEMBLY INSTRUCTIONS

1



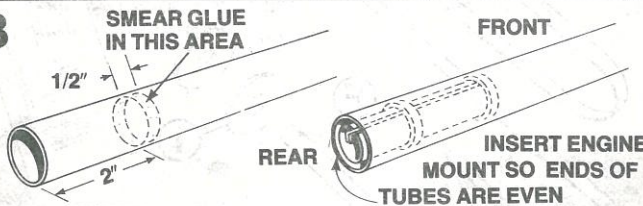
Mark the engine mount tube (part A) at 1", 2-1/4" and 2-1/2" from one end. Cut a 1/8" long slit at the 2-1/2" mark. Gently bend the engine hook (part B) so that it bows upward very slightly in the middle. (Study the drawing.—Don't bend the wrong way.) Insert one end of the engine hook into the slit in the tube.

2



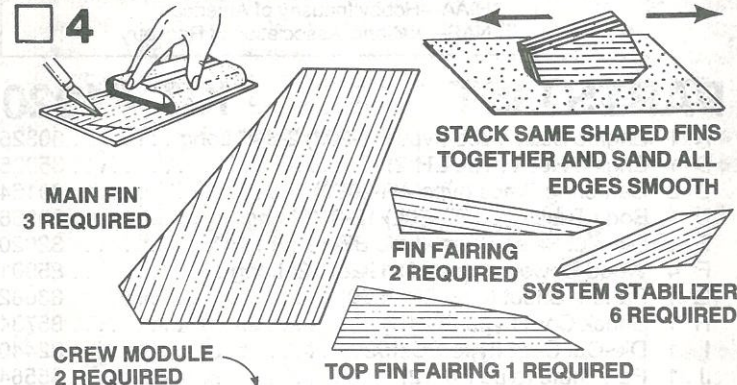
Sand the inside edges of the two centering rings (part C) to remove burrs. The rings should slide easily onto the engine mount tube. Cut a very shallow 1/8" wide slot inside the two centering rings so they will fit over the engine hook. Slip one ring onto the front end of the engine mount tube and slide 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 tube at the 2-1/4" mark and slide the remaining centering ring into place down to the 2-1/4" mark.

3



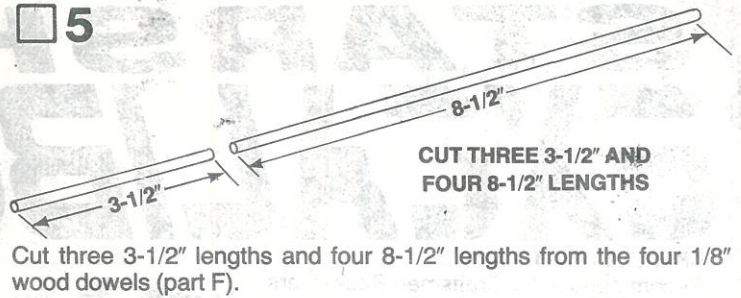
The engine mount unit will be pushed into place so that the rear of the engine mount unit (end with engine hook projecting) is even with the rear of the body tube. Test-fit the engine mount unit several times by smoothly inserting and removing it. Sand if necessary to assure a smooth fit. Once this can be smoothly and easily done, remove the engine mount unit. Apply a ring of glue around the inside of the rear of the main body tube (part D) about 2" to 2-1/2" from the end of the tube. Make certain that the engine hook is to the rear and insert the engine mount unit with one smooth motion. Do not pause or the glue may "lock" with the engine mount unit in the wrong position.

4



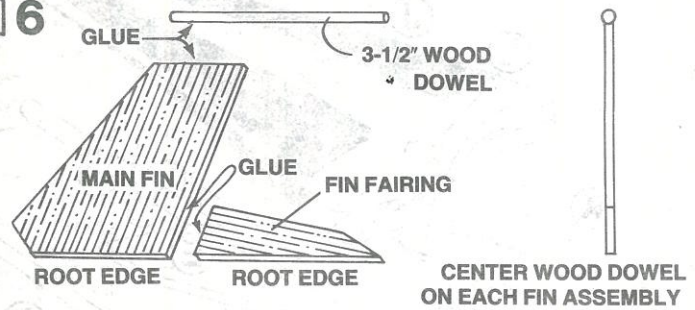
Fine-sand both sides of the balsa die-cut sheet (part E), then carefully remove the die-cut parts from the sheet by freeing the part edges with a sharp knife. Sand the edges of the fin parts slightly to remove any rough spots.

5



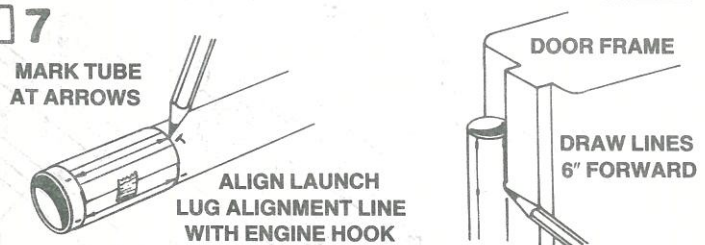
Cut three 3-1/2" lengths and four 8-1/2" lengths from the four 1/8" wood dowels (part F).

6



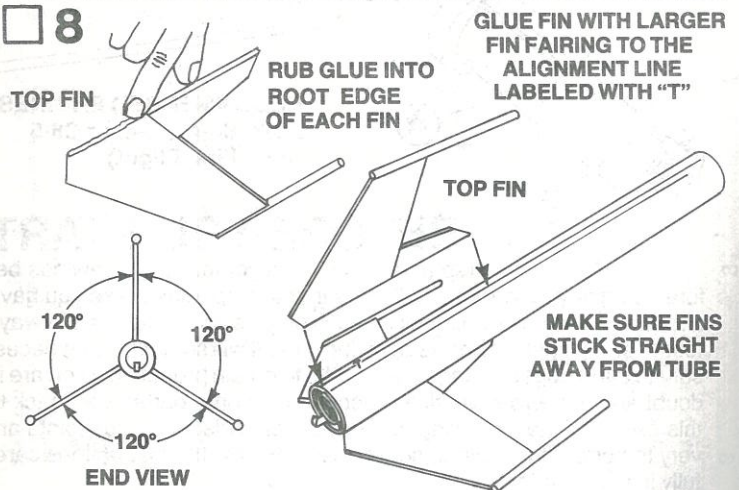
Assemble the fins as shown over a piece of waxed paper. Apply glue to edge of main fin and fin fairing as shown. Let glue partially dry. Apply second bead of glue to one edge and press parts together. Wipe away any excess glue. Repeat procedure for other two fin assemblies. Apply glue to a 3-1/2" dowel and position on top of each fin assembly as shown.

7

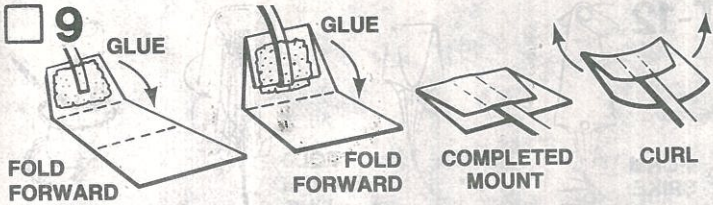


Cut out the body tube marking guide from the pattern sheet (part G) and wrap it around the body tube. Place the tube marking guide so that the engine hook will line up with the launch lug placement line (arrow point). Print the letter "T" next to the top fin marks for later identification. Mark the body tube at each of the arrow points. Draw straight lines connecting each pair of marks. A door frame inside edge can be used as a guide as shown. Extend lines the length of the tube.

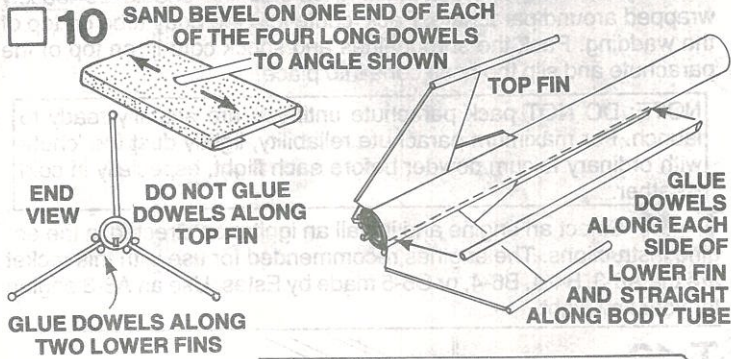
8



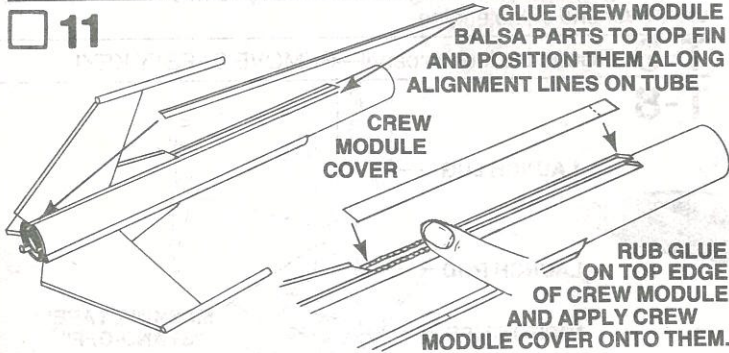
Rub a line of glue into the root edge of each fin and allow to dry. Apply glue to the fins again and position fins on the alignment lines in their correct positions on the tube. Glue top fin with the larger top fin fairing to the alignment line labeled with a "T". Refer to the illustration to be sure of these positions. Adjust the fins so they project straight away from the body tube. Do not set the rocket on its fins while the glue is wet.



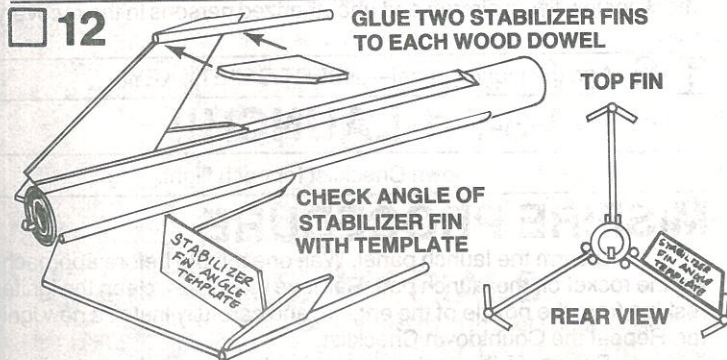
Cut out the shock cord mount from the pattern sheet. Fold on dotted lines, then unfold and apply glue to Section 1. Lay the end of the shock cord (part H) into the glue. Fold over and apply glue to the back of Section 1 and the exposed portion of Section 2. Fold again to complete mount. Curl the edges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



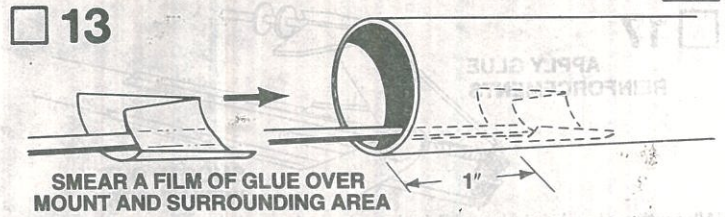
Locate the four 8-1/2" lengths of wood dowel from step 5. Sand a bevel on one end of each dowel to the angle shown. Glue the dowels, one on each side of the two lower fins, straight along the body tube. Do not glue dowels along the top fin.



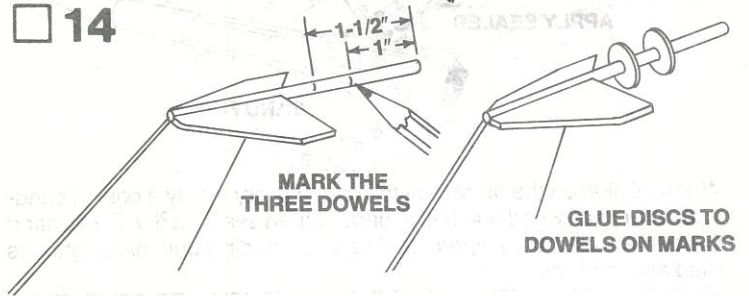
Apply glue to the root edge of each crew module die-cut balsa part and allow to dry. Apply glue again and position the crew module parts on each side of top fin. Make sure each part edge is straight along its alignment line on body tube. Cut out the crew module cover from the pattern sheet. Smear glue on top edges of crew module balsa parts and center cover over them. Press cover into glue working from back to front. Apply a thin film of glue to front of crew module parts and tube and press cover down onto tube. Hold front part of cover down until glue sets.



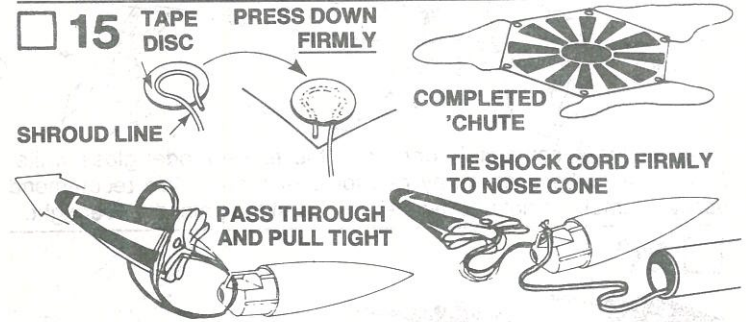
Cut out the stabilizer fin angle template from the pattern sheet. Apply glue to each stabilizer fin root edge and align two fins on each dowel as shown. Check angle of each stabilizer fin with template and allow glue to set. Do not set rocket on fins while glue is wet.



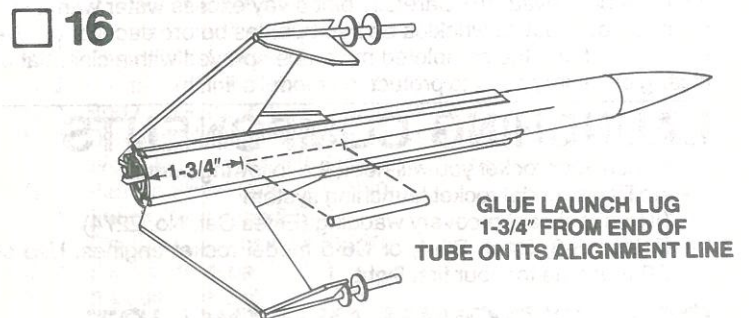
Use a finger or stick to apply glue to the inside of the front of the body tube 1" to 2" from the front of the tube. Press the shock cord mount firmly into position in glue far enough from the front edge of the tube to allow clearance for the nose cone to fit into place. To insure a good bond use a stick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



Remove the six discs from the die-cut card (part I). Use a sharp knife to free the parts from the card. Mark dowels as shown. Glue the discs to dowels on marks. Set assembly aside to dry.



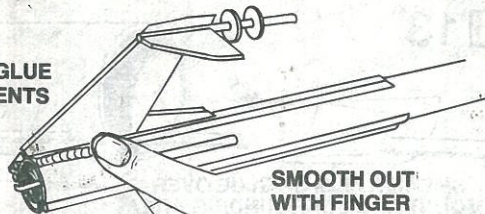
Cut out the parachute (part J) on its edge lines. Cut three equal lengths of shroud line (part K). Attach line ends to the top of the parachute with tape discs (part L) as shown. Form a small loop in the end of a shroud line. Holding loop, gently center loop inside tape disc on the sticky side. Then 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. Use a sharp knife to remove excess plastic from inside molded eyelet at rear of nose cone (part M). Trim or sand any excess plastic around sides of nose cone. 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 parachute and shock cord into rocket body and slip nose cone into place.



Glue launch lug (part N) to body tube on launch lug line. The rear of the launch lug should be 1-3/4" from the rear of the body tube. Align the launch lug straight along the tube.

17

APPLY GLUE REINFORCEMENTS

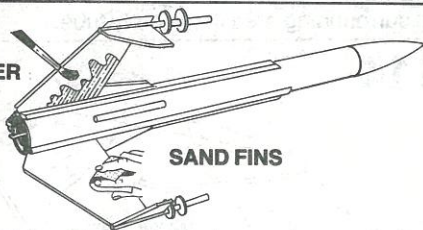


SMOOTH OUT WITH FINGER

When the glue joints have dried apply a glue reinforcement to each fin/body tube joint, around launch lug, and wood dowels. Apply a line of glue to the joint, then smooth out the glue with your finger and wipe away any excess glue. **IMPORTANT** - support rocket horizontally, on table edge until glue dries.

18

APPLY SEALER

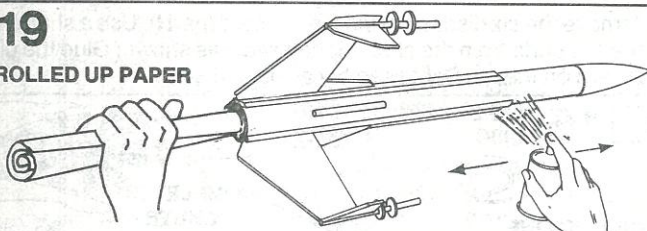


SAND FINs

When all glue on the outside of the rocket is dry, apply a coat of sanding sealer to all wood and paper parts. When sealer is dry, lightly sand the sealer surfaces. Repeat sealing and sanding until balsa grain is filled and smooth.

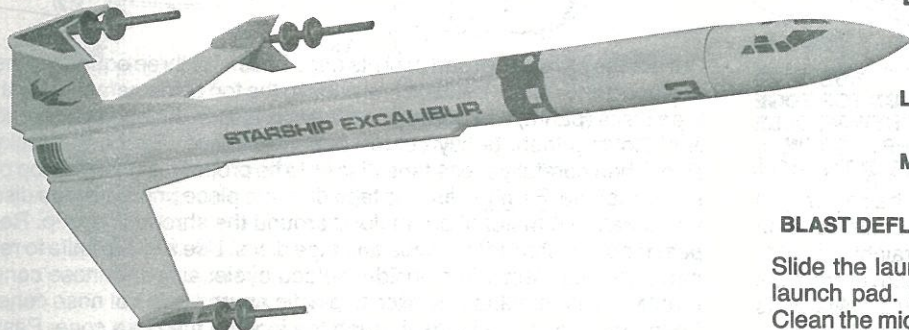
19

ROLLED UP PAPER



After sealer is completely dry, paint the entire model gloss white. Follow instructions on spray can for best results. We recommend spray enamel. Do not use lacquer paint. Let the paint dry overnight.

20



Apply the decals (part O) in the position shown above and on panel. (A) Cut individual decals apart. (B) Dip one decal at a time in lukewarm water for 10-20 seconds and hold it until it starts to uncurl. (C) Slip decal from backing paper onto model. (D) Move decal into exact position. If decal sticks before you have it in position, apply water to decal so it can be moved. (E) Carefully blot away excess water with a soft cloth. Smooth out all wrinkles and air bubbles before decal dries. We recommend that the completed model be sprayed with a clear flat or clear gloss spray paint to protect the model's finish.

LAUNCHING COMPONENTS

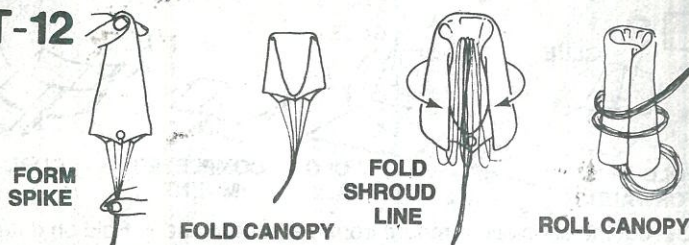
To launch your rocket you will need the following items:

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

COUNTDOWN CHECKLIST

T-13 Remove nose cone. Pack 3 or 4 squares of loosely crumpled recovery wadding into the body tube.

T-12



FORM SPIKE

FOLD CANOPY

FOLD SHROUD LINE

ROLL CANOPY

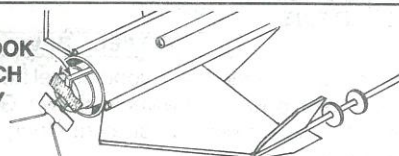
Hold the parachute at its center and pass the other hand down it to form a "spike" shape. Fold this spike in half. Fold shroud lines back along parachute and then back down to lower edge of parachute to reduce length of shroud line "left over". Roll parachute into tube shape to fit easily into body. 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, or C6-5 made by Estes. Use an A8-3 engine for your first flight.

T-10

ENGINE HOOK MUST LATCH SECURELY

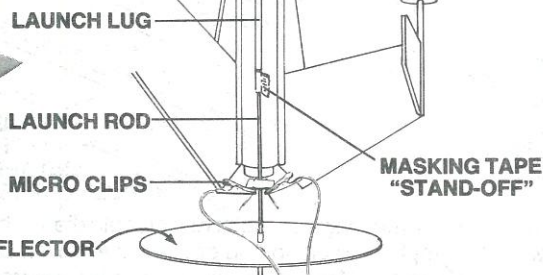


Insert engine into rocket engine mount. Engine hook must latch securely over end of the engine.

T-9

Disarm the launch panel—**REMOVE SAFETY KEY!**

T-8



Slide the launch rod through rocket launch lug and place rocket on launch pad. Make sure the rocket slides freely on the launch rod. 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. Attach clips as close to protective tape on igniter as possible.

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.