



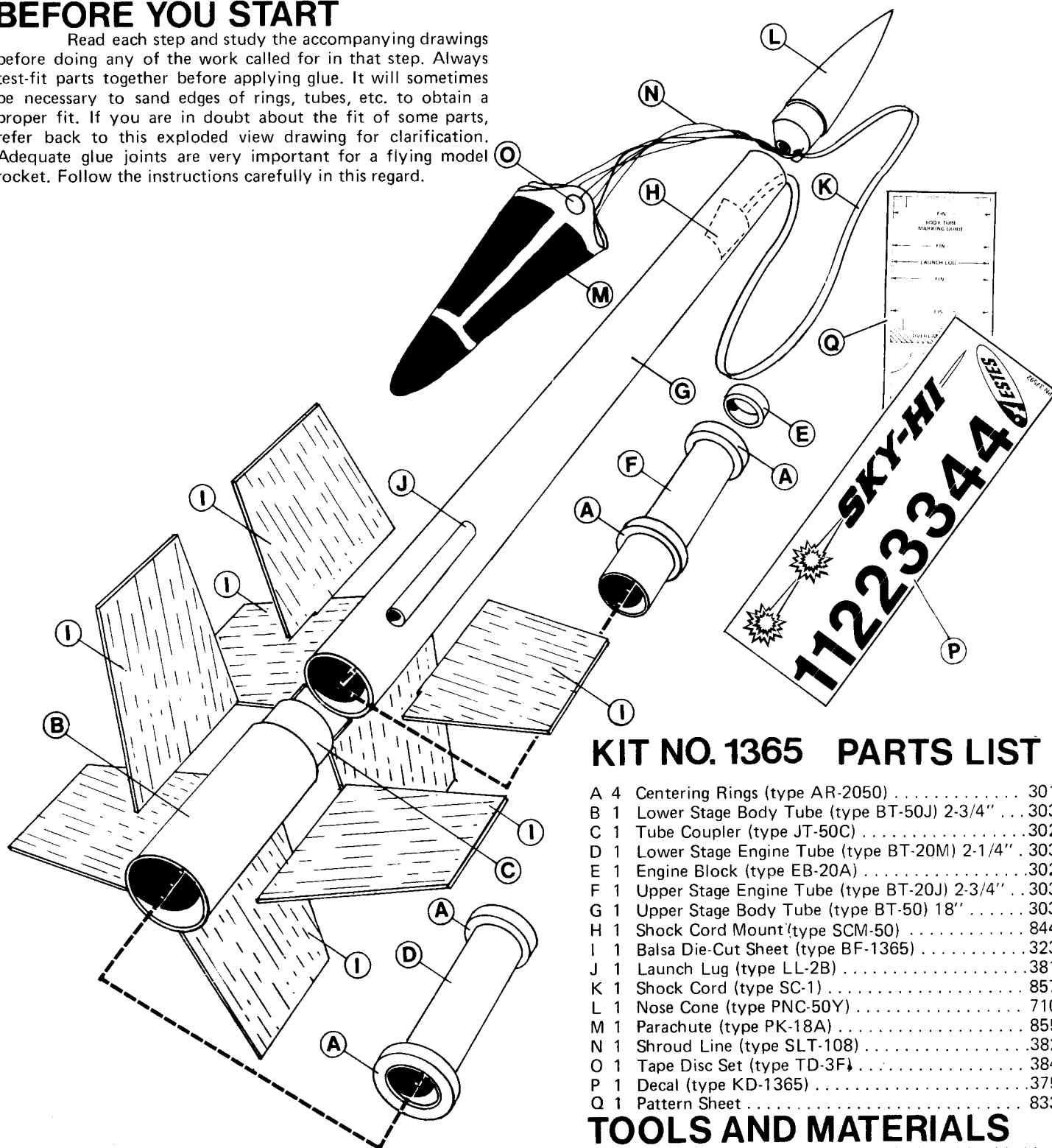


SKY-HI

SKILL LEVEL 2 - Recommended for Intermediate Rocketeers.

BEFORE YOU START

Read each step and study the accompanying drawings before doing any of the work called for in that step. Always test-fit parts together before applying glue. It will sometimes be necessary to sand edges of rings, tubes, etc. to obtain a proper fit. If you are in doubt about the fit 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.



KIT NO. 1365 PARTS LIST

A	4	Centering Rings (type AR-2050)	30164
B	1	Lower Stage Body Tube (type BT-50J) 2-3/4"	30362
C	1	Tube Coupler (type JT-50C)	30260
D	1	Lower Stage Engine Tube (type BT-20M) 2-1/4"	30334
E	1	Engine Block (type EB-20A)	30224
F	1	Upper Stage Engine Tube (type BT-20J) 2-3/4"	30326
G	1	Upper Stage Body Tube (type BT-50) 18"	30352
H	1	Shock Cord Mount (type SCM-50)	84444
I	1	Balsa Die-Cut Sheet (type BF-1365)	32368
J	1	Launch Lug (type LL-2B)	38178
K	1	Shock Cord (type SC-1)	85730
L	1	Nose Cone (type PNC-50Y)	71009
M	1	Parachute (type PK-18A)	85566
N	1	Shroud Line (type SLT-108)	38239
O	1	Tape Disc Set (type TD-3F)	38406
P	1	Decal (type KD-1365)	37592
Q	1	Pattern Sheet	83343

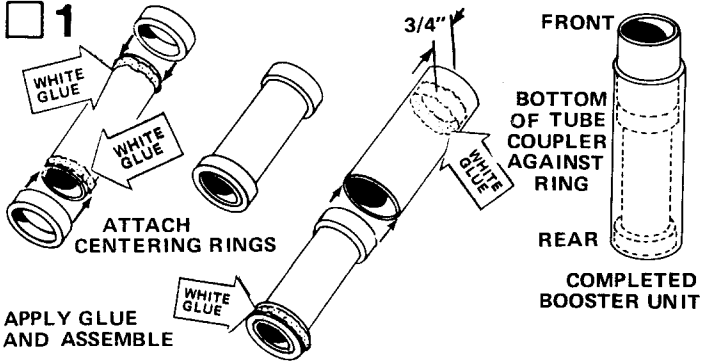
TOOLS AND MATERIALS

In addition to the materials included in this kit you will need a sharp modeling knife, ruler, pencil, small brush, balsa sanding sealer and thinner, scissors, masking tape, fine grit sandpaper, gloss red and gloss black spray paint, and white glue. White glue is a household cement marketed under names such as "Elmer's Glue All", "Wilhold White Glue", etc. A yellow resin glue, "Franklin Titebond", may also be used. Other types of cement are NOT recommended.



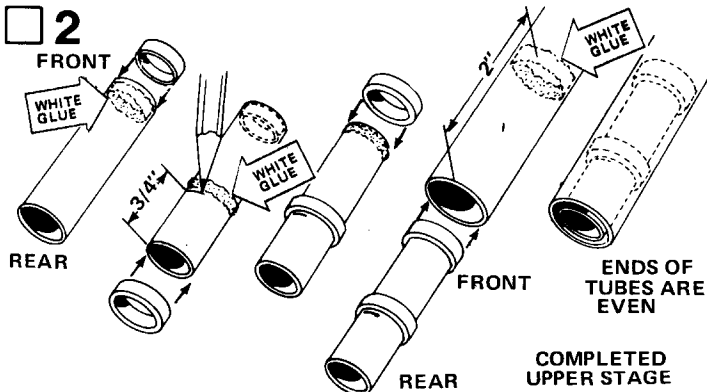
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ASSEMBLY INSTRUCTIONS

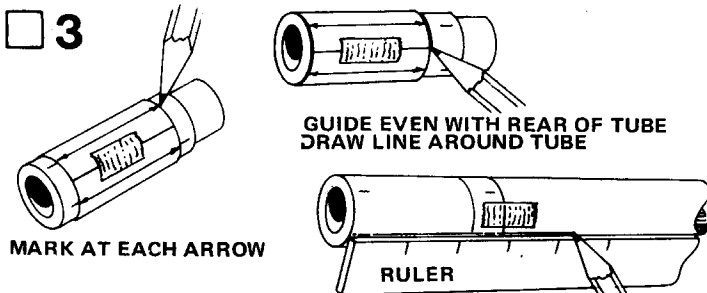


APPLY GLUE AND ASSEMBLE

Locate the following parts: Two centering rings (part A), the BT-50J body tube (part B), the JT-50C tube coupler (part C), and the BT-20M body tube (part D). This last tube is only 2-1/4" long. There is a 2-3/4" long BT-20 tube that is used in the upper stage. DO NOT get the wrong tube. Apply glue to both ends of the BT-20M tube. Slide a centering ring onto the ends of the tube. The rings should be even with the ends of the tube. Allow the glue to dry before proceeding. Use a stick to apply a bead of glue 3/4" inside one end of the BT-50 tube. Slip the BT-20 unit part-way in to the OPPOSITE end of the tube. Apply a bead of glue to the outside of the exposed centering ring. Slide the unit all the way into the tube until the ends are even. Apply glue around the inside of the FRONT of the BT-50 tube and push the tube coupler in until it rests against the centering ring. The coupler should now extend 1/2" from the end of the body tube.

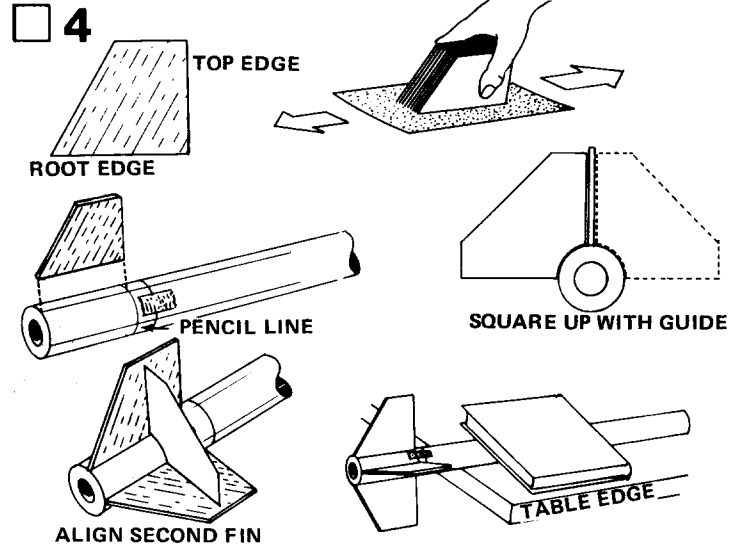


Locate the engine block (part E), upper stage engine tube (part F), two remaining centering rings and upper stage body tube (part G). Glue the engine block into the engine tube flush with one end. This will be referred to as the FRONT of the tube. Measure 3/4" from the REAR of the tube and mark with a pencil. Apply glue ABOVE this mark and slide a centering ring over the rear of the tube and push up into the glue. The rear of the ring should be on the pencil mark. Glue the last centering ring to the front of the tube, even with the end. Let glue dry before proceeding. Use a stick to apply a generous bead of glue around the inside of the main body tube about 2" from one end. Slide the engine mount assembly, FRONT END FIRST, into the body tube. Push in until the ends of the two tubes are even.

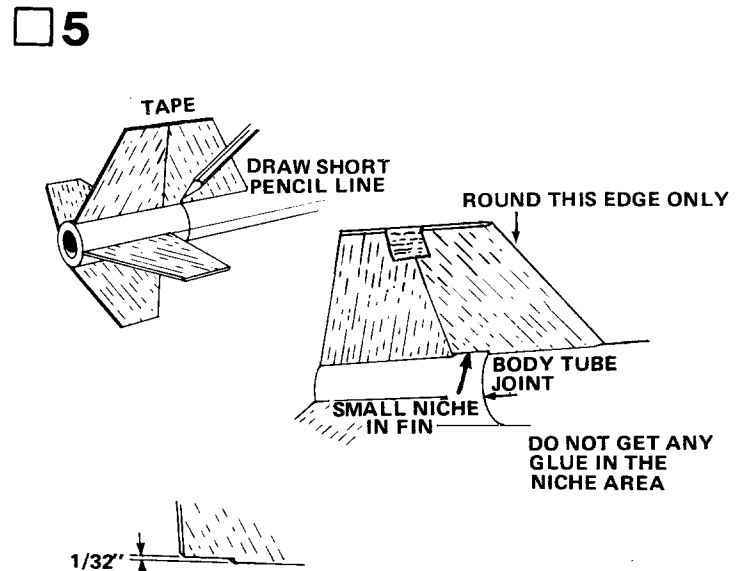


Cut out the body tube marking guide from the back of the panel. Wrap the guide tightly around the lower stage body and tape ends together. Mark the fin and launch lug locations on the body at both ends of the guide. Slide the guide down so it is even with the REAR

of the body and draw a line around the body at the top of the guide. Remove the marking guide. Socket the rear of the upper stage onto the front of the lower stage. Tape the tubes together in two places, making sure the tape does not cover the fin or launch lug marks. Lay a ruler on the bodies and line up on one pair of fin marks. Draw a pencil line connecting the marks and extend the line onto the upper stage body for about 2-1/2". Repeat for the remaining locating marks.

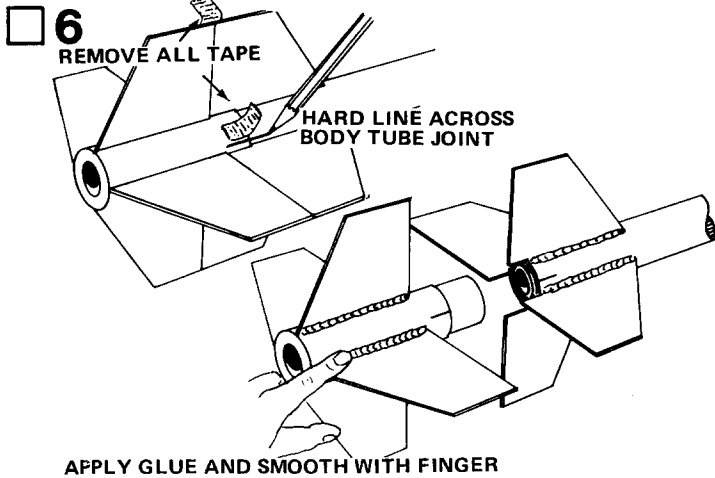


Lightly sand both sides of the balsa sheet (part I). Free the fins from the sheet with a knife. Stack the fins together and hold them tightly between your fingers. Run the stack back and forth over a piece of sandpaper. Rotate the stack so that you sand all four edges. This will ensure that all fins are exactly the same size. Apply a bead of glue to the root edge of one fin and attach to lower stage body with the fin centered on a fin line and the top edge of the fin on the pencil line (the bottom edge of the fin will be about even with the rear of the body). Remove the fin immediately and allow the glue to dry for a minute or two. Apply a second bead of glue to the fin root edge and re-attach to body. Cut the fin alignment guide from the panel. Hold the guide on first one, then the other side of the fin and square the fin with the body. Place the body on a flat surface with the fin extending straight up. Weight the body with a book so it won't roll and allow the glue to dry completely. The remaining fins are attached to the lower stage in the same manner. Allow the glue to dry completely in each case.

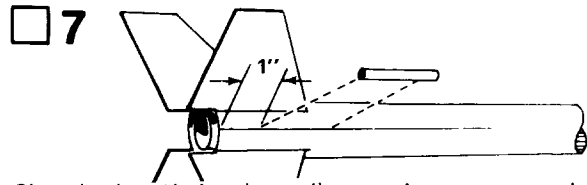


Round the TOP EDGE ONLY of the four remaining fins. Place a fin on the body, butted against a lower stage fin. Mark the fin where it intersects the body tube joint. Sand or cut a shallow niche

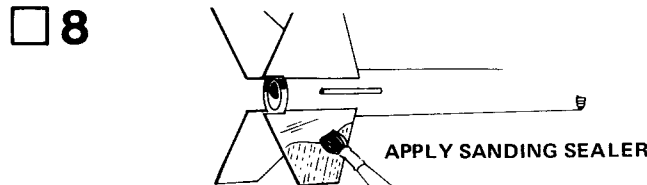
into the lower portion of the fin where it overlaps the lower stage body tube. This niche need only be 1/32" deep; just enough to allow the stages to be joined easily. Repeat with the remaining three fins. The fins are glued to the body in the manner previously described. **DO NOT** get any glue in the niche area that overlaps the lower stage. It is best to keep the glue about 1/8" above the niche to prevent accidentally gluing the upper stage fin to the lower stage body. Once the upper stage fin is aligned on the center line, put a piece of tape over the end of the fins. This will hold the upper stage fin in perfect alignment until the glue dries. Once all the upper stage fins are glued in place, set the assembly aside to dry.



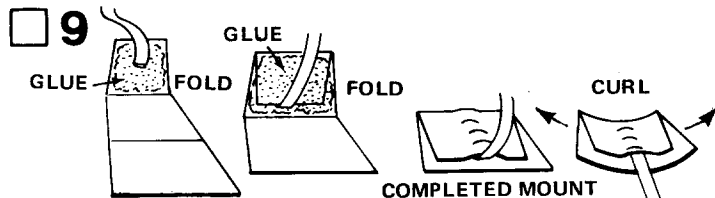
Proceed with this step **ONLY** after glue has **THOROUGHLY DRIED** (from previous step). Remove all the tape from the fins and body tubes. Draw a short pencil mark across the body tube joint in one place. Make the mark hard enough so the impression will show after the paint has been applied. This mark will enable you to put the stages back together in exactly the same relationship later. Separate the upper and lower stage. Run a bead of glue along both sides of a fin. Draw your finger along the joint to smooth the glue and remove any excess. Repeat this with all the fins.



Glue the launch lug (part J) onto the upper stage body centered on the pencil line and with the rear of the lug 1" from the rear of the body tube. Sight along the launch lug to make sure it runs parallel with the body. Apply a glue reinforcement to each side of the joint using a scrap of balsa for an applicator.

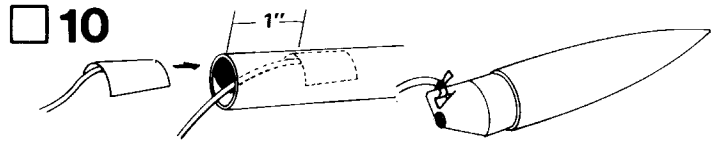


Proceed with this step **ONLY** after the glue reinforcements (step 6) are **THOROUGHLY** dry. Brush a coat of sanding sealer on all exposed surfaces of each fin. Let the sealer dry, then sand each fin with fine sandpaper. Repeat the sealing and sanding process until the balsa grain lines are completely filled and the fins feel smooth.



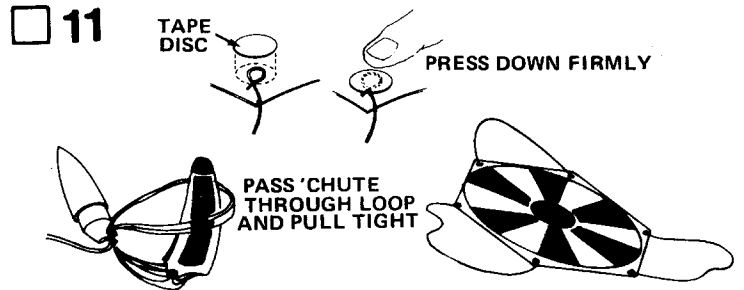
Cut out the shock cord mount (part H). Fold on dotted lines, then unfold and apply glue to Sec. 1. Lay the end of the shock cord

(part K) in the glue. Fold over and apply glue to the back of Sec. 1 and the exposed portion of Sec. 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.

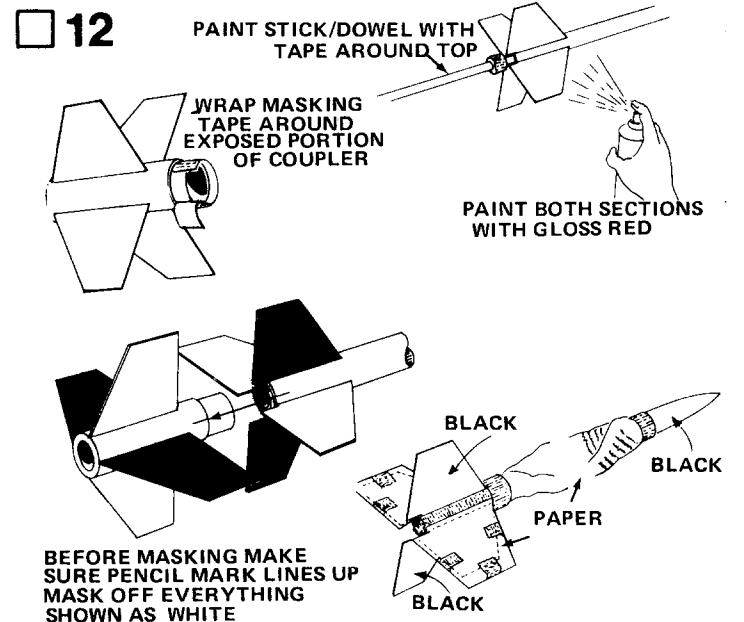


TIE SHOCK CORD TO RING ON NOSE CONE

The shock cord is glued into the front of the body tube 1" from the end. This allows clearance at the front of the tube for the nose cone to socket in place. Use a stick to deposit a generous dab of glue inside the body tube, 1" from the end. Slide the shock cord mount into the tube and press into the glue. To insure a good bond, use the stick or your finger to smear a film of glue over the mount and the surrounding area in the body tube. Tie the free end of the shock cord to the ring on the nose cone (part L).



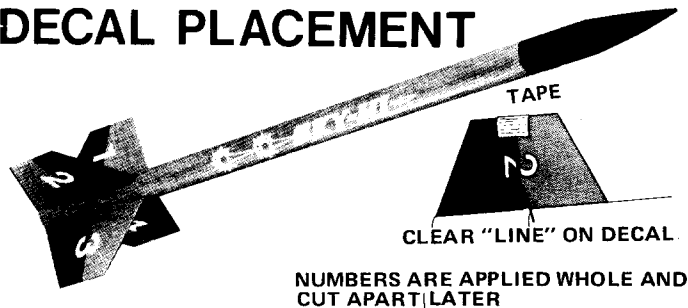
Cut out the parachute (part M) on its edge lines. Cut the shroud line (part N) into three equal lengths. Form a small loop in one end of a shroud line and attach to a corner of the 'chute with a tape disc (part O). Press the tape disc down very firmly over the line. Attach the opposite end of the shroud line to the next corner of the 'chute. Attach the remaining shroud lines in the same manner. Pass the 'chute through the ring of the nose cone. Pass the 'chute through the loops and draw the lines tight. Fold the 'chute, pack 'chute and shock cord into body and socket nose cone in place.



Wrap masking tape around the exposed portion of the tube coupler on the lower stage. Paint both sections of the rocket with gloss red spray paint. Spray several light coats rather than one heavy coat to prevent "runs". Allow the paint to dry overnight before proceeding with the masking. Mask off the lower stage. Place masking tape around the base of two opposite fins. Use tape and paper to cover

the body tube and the other two fins. Before masking the top stage, orient the sections so that the two halves of the impression from the pencil mark (step 6) are lined up. Mask the upper stage so that two different opposing fins are left exposed. (Study illustration.) The upper stage body tube is wrapped with paper, but the nose cone is left exposed. Check to see that there are no openings where paint can penetrate the masked areas. Spray the exposed fins and nose cone gloss black. Allow paint to dry for two hours, then carefully remove the tape and paper. NOTE: If you do not wish to attempt masking, the model may be left one color or you may brush paint the black on the fins and nose cone.

DECAL PLACEMENT



NUMBERS ARE APPLIED WHOLE AND CUT APART LATER

General Application Instructions: (A) Cut one decal at a time from the decal sheet (part P). (B) Submerge decal in water for 20-30 seconds (until decal slides on backing paper). (C) Gently slide decal from backing paper onto model. (D) Position decal and blot away excess water. (E) If the decal sticks before you have it in position, apply water over the decal with a brush. This will allow decal to be moved. (F) Smooth out all wrinkles and air bubbles before the decal dries.

Re-assemble the two stages, lining up the orientation mark as before. Align the fins exactly and put a piece of masking tape over the ends of the fin sets so they won't move. The numbers are centered on a fin set. They are applied whole and cut apart later. To help center the numbers vertically, each number has a clear "line" through its middle. Position the number so this clear space is on the joint between the fins. After all numbers are applied, let the decals dry for 1/2 hour. Carefully run the point of a knife along the joint between the fins to cut the numbers. Make sure all the decals are cut before separating the stages.

LAUNCHING COMPONENTS

To launch your rocket you will need the following items:

- An Estes model rocket launch system
- Parachute recovery wadding (Estes Cat. No. 2274)
- Estes A8-3, B4-4, B6-4, B8-5, or C6-5 model rocket engines for single stage flights.
- Estes A8-5, B4-6, B6-6, B8-7, or C6-7 engines for upper stage -- A8-0, B6-0, B8-0, or C6-0 engines for booster stage for two stage flights.

Be sure to follow the HIAA-NAR* Model Rocketry Safety Code when carrying out your model rocket activities.

*HIAA -- Hobby Industry Association of America
NAR -- National Association of Rocketry

Your Sky-Hi model has been designed as a high performance, two-stage, sport model. The upper stage may also be flown by itself as a single-stage sport or demonstration model. Here are some suggestions for getting the best results from your model:

Obtain a copy of Estes Industries Technical Report TR-2 and study it over before flying two-stage models.

Always be extra careful when installing engines. Make sure they face the correct direction for proper staging. Make sure they are held tightly in place to insure proper recovery operation.

Have an extra person with you when launching to watch the booster stage and retrieve it after flight.

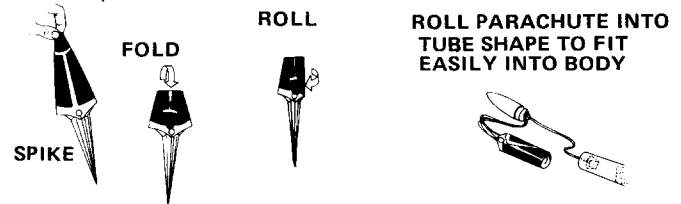
Launch in calm weather. The upper stage will drift a long way in a wind.

When flying as a single stage model, make sure the engine is securely held in place.

Always follow the Countdown Checklist when launching your model.

COUNTDOWN CHECKLIST

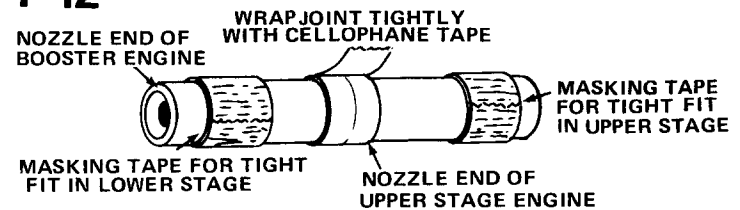
T-13 Pack 4 or 5 squares of loosely crumpled recovery wadding into the body tube from the front.



Hold the parachute at its center and pass the other hand down it to form a "spike" shape. Fold this spike in half. Roll parachute into tube shape to fit easily into body. Pack 'chute into the 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.

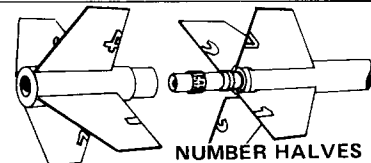
NOTE: DO NOT pack parachute until you are actually ready to launch. For maximum parachute reliability, lightly dust the 'chute with ordinary talcum powder before each flight, especially in cold weather.

T-12



Position the engines with the nozzle of the upper stage engine against the top end of the booster engine. Wrap a layer of cellophane tape tightly around the joint as shown. Check to be sure the engines are in their proper relative position. Wrap masking tape around the top of the upper stage engine so it makes a tight friction fit in the engine mount tube. Insert the upper stage end of the engine unit into the upper stage engine mount.

T-11



Wrap masking tape around the lower portion of the lower booster engine. Slide the lower stage onto the booster engine. Make sure you have enough masking tape around engine for a tight fit. Twist the lower stage to align the fins exactly.

T-10 Install an igniter in the booster engine as directed in the engine instructions.

T-9 Disarm the launch panel -- REMOVE SAFETY KEY!

T-8 Place rocket on launch pad, making sure rocket slides freely on launch rod. Clean the micro-clips and attach to the igniter.

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!!

MISFIRE PROCEDURE

Occasionally the igniter will heat and burn into two pieces without igniting the engine. This is almost always caused by a failure to install it correctly. Disarm the launch panel, remove the model, clean the igniter residue from the nozzle, and install a new igniter. Follow the launching procedure again.

all 8 fins identical

1 Inch



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SEC. 3

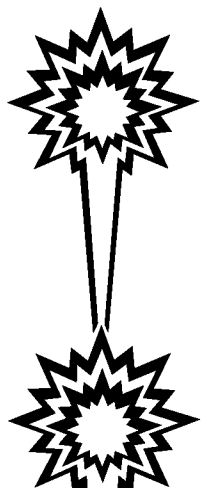
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SEC. 2

SEC. 1

**SHOCK CORD
MOUNT**

SCM-50

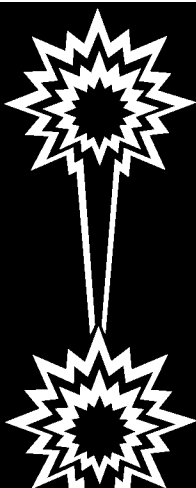


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