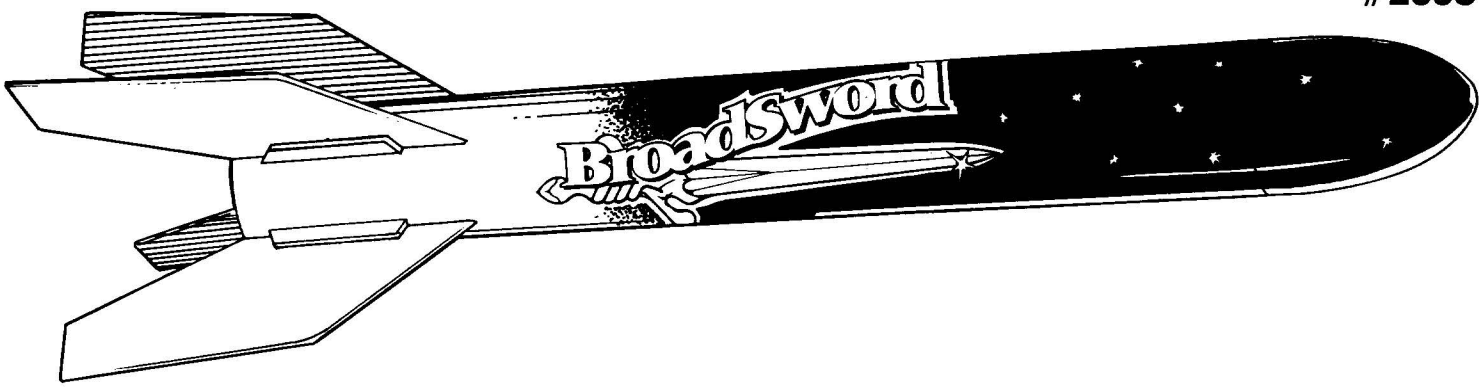

BROADSWORD

ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA

BroadSword™

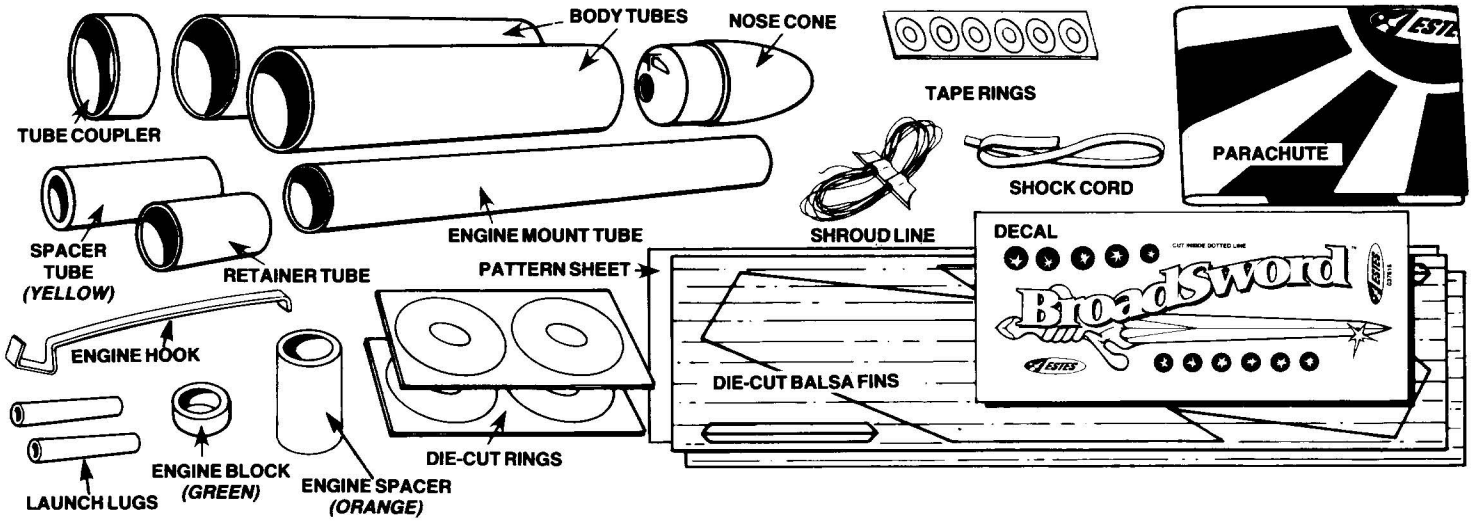
FLYING MODEL ROCKET KIT #2093



HOW TO USE THESE INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL

A. This rocket incorporates basic model rocketry construction techniques and will help you in the continuing development of your rocketry modeling skills.
B. **Read each step first** and visualize the procedure thoroughly in your mind before starting construction.
C. Lay parts out on the table in front of you. (Check inside tubes for any small parts.)
D. Use parts illustration to match all parts contained in kit.
E. Collect all construction supplies that are not included in the kit.
F. The tube marking guide is printed separately.
G. Test fit parts before applying any glue.
H. Sand parts as necessary for proper fit.
I. The construction supplies required for each step are listed at the beginning of each step.
J. Check off each step as you complete it.



PARTS ILLUSTRATION

The parts illustration is only intended to assist you in locating the parts included in this kit. Refer back to this illustration as you build your model step by step. This method will help you to locate the correct parts into perspective as you progress through the construction.

CONSTRUCTION SUPPLIES

In addition to the parts included in your kit, you will need these construction supplies. Each step shows which supplies will be required.

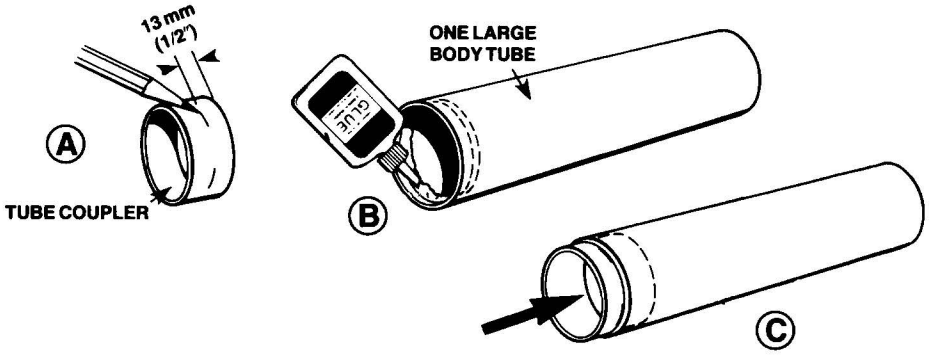
SANDPAPER (#400 and #600 grit) | PENCIL | PAINT | HOBBY KNIFE | SCISSORS | GLUE (white or yellow) | MASKING TAPE

Proceed to the Rocket Assembly Instructions.

ROCKET ASSEMBLY INSTRUCTIONS

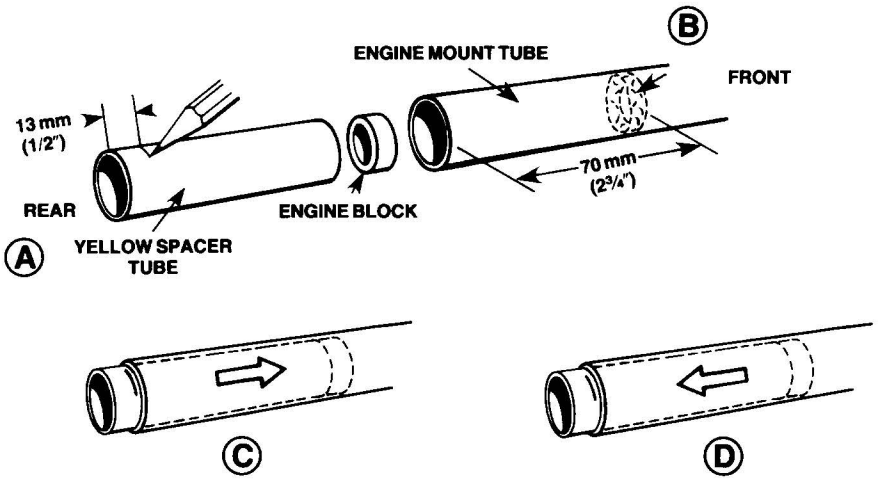
1. INSTALL TUBE COUPLER

- **A.** ☐ Mark the tube coupler 13 mm (1/2") from one edge at three or four places.
- **B.** ☐ Place a band of glue around the inside edge of one end of one of the large body tubes.
- **C.** ☐ Push the tube coupler into the tube until the marks are even with the end of the tube.



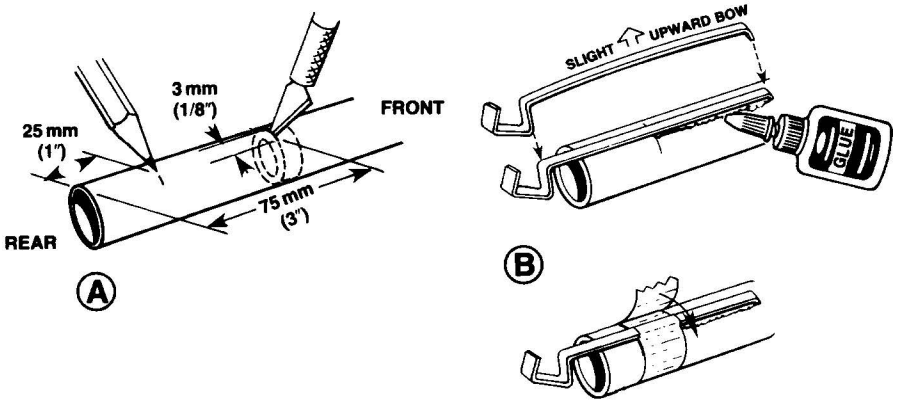
2. INSTALL ENGINE BLOCK

- **A.** ☐ Mark the YELLOW spacer tube 13 mm (1/2") from one end.
- **B.** ☐ Place a band of glue around the inside of the engine mount tube about 70 mm (2¾") from one end.
- **C.** ☐ Insert the engine block into the tube and push into place with the YELLOW spacer tube. Stop when mark is even with the end of the tube.
- **D.** ☐ Remove the spacer tube IMMEDIATELY and discard.



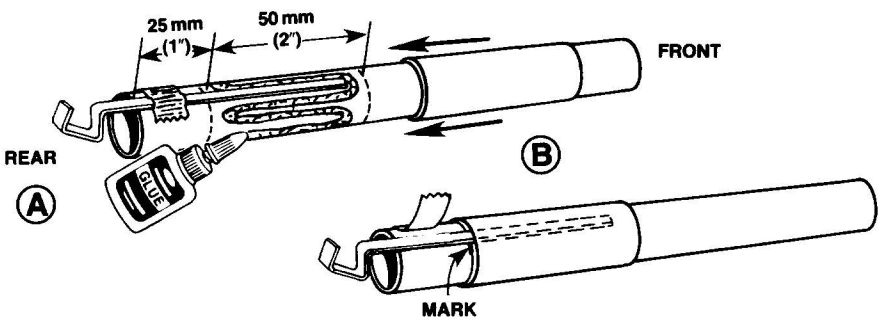
3. ATTACH ENGINE HOOK

- **A.** ☐ Mark the end of the engine mount tube with the engine block at 25 mm (1") and 75 mm (3"). Cut a 3 mm (1/8") wide slit at the 75 mm (3") mark.
- **B.** ☐ Bend engine hook slightly as shown. Apply a line of white glue from slit rearward to the 25 mm (1") mark. Push one end of the engine hook into the slit and align it straight on the tube. Hold the hook temporarily in place with masking tape.



4. ATTACH ENGINE HOOK RETAINER

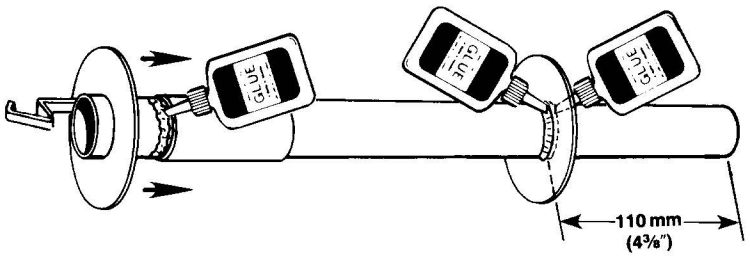
- **A.** ☐ Apply glue around the engine mount tube as shown.
- **B.** ☐ Slide the hook retainer tube onto the front of the engine mount tube and down over the glue, stopping at the 25 mm (1") mark. Remove the masking tape.



5. ATTACH CENTERING RINGS

A. ☐ Apply glue around the engine mount tube just behind the retainer tube. Slide one of the die-cut rings onto the tube and up against the retainer tube.

B. ☐ Mark the forward end of the engine mount tube 110 mm (4⅜") from the end. Slide one of the die-cut rings onto the tube and position it on the mark. Apply glue around both sides of the ring where it touches the engine mount tube.

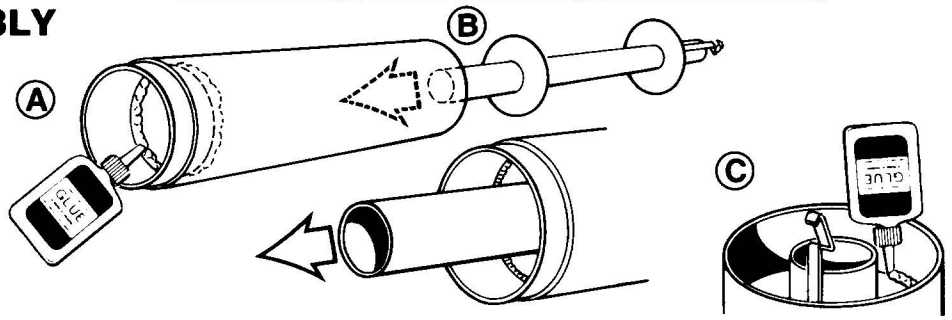


6. ENGINE MOUNT ASSEMBLY

A. ☐ Apply glue around the inside of the large body tube just behind the tube coupler.

B. ☐ Slide the completed engine mount into the body tube and up against the tube coupler as shown.

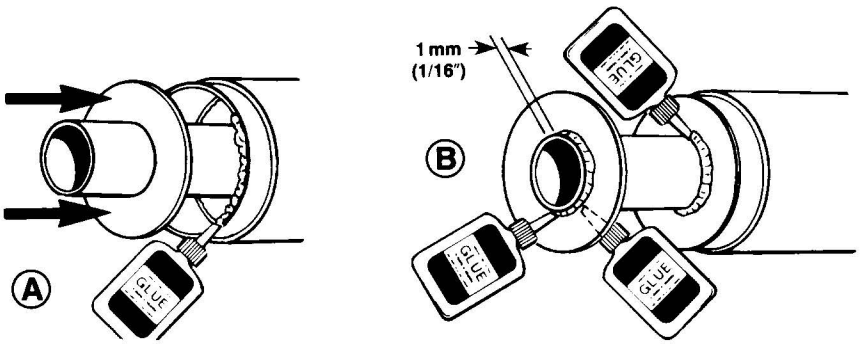
C. ☐ Apply glue around the inside of the rear of the body tube where it touches the die-cut ring.



7. ATTACH FORWARD CENTERING RING

A. ☐ Apply glue to the edge of the tube coupler. Slide a die-cut ring onto the protruding engine mount tube and seat it all around on the tube coupler. Apply glue around the ring where it touches the tube.

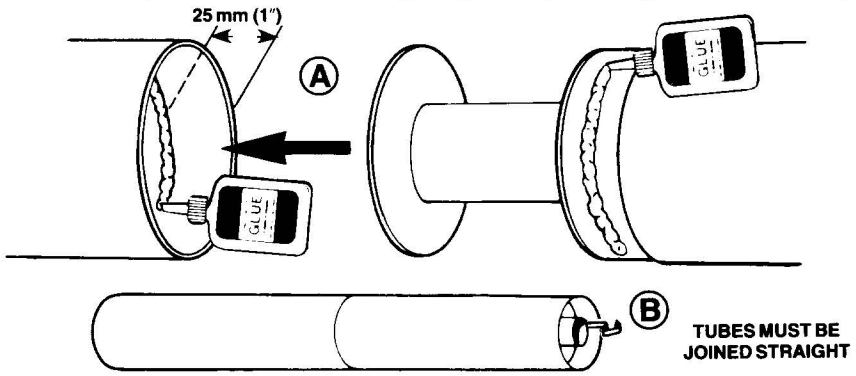
B. ☐ Slide the remaining die-cut ring onto the engine mount tube 1 mm (1/16") from the end. Apply glue around both sides of the die-cut ring where it touches the tube. Allow the glue to dry.



8. JOIN BODY TUBES

A. ☐ Apply glue around the inside of the remaining large body tube about 25 mm (1") from one end. Apply glue around the outside of tube coupler as shown.

B. ☐ Join the body tubes by pushing them together as shown. Wipe away any excess glue. Make sure tubes are straight.

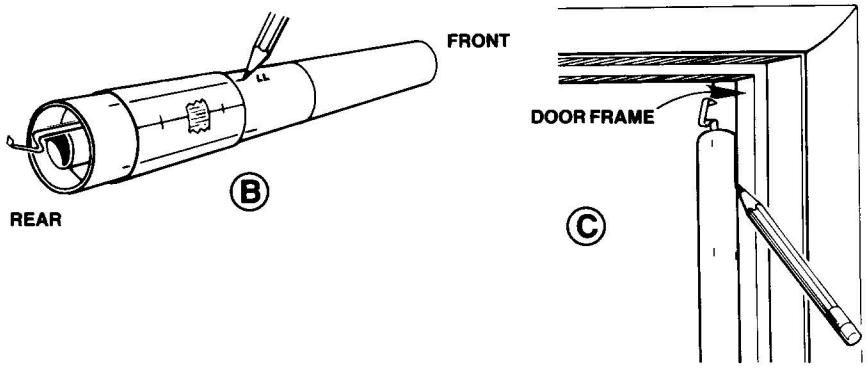


9. MARK FIN ATTACHMENT LOCATIONS

A. ☐ Cut out tube marking guide from pattern sheet.

B. ☐ Wrap guide around the tube, aligning the launch lug line with the engine hook, and tape in place. Mark tube at arrows. Remove guide.

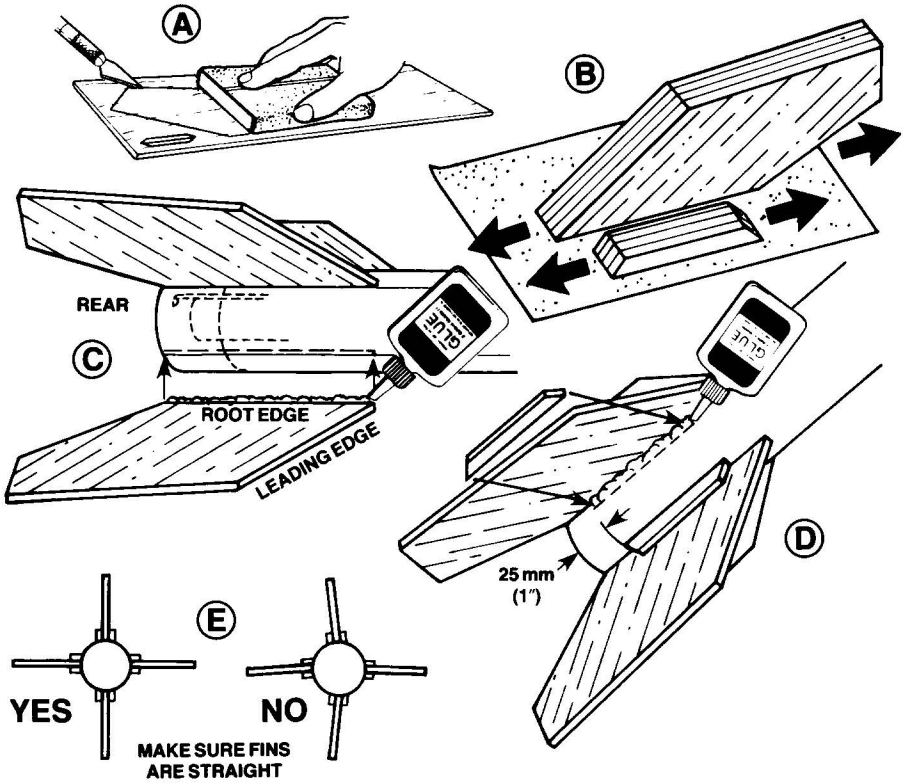
C. ☐ Draw straight lines connecting each pair of marks. Extend launch lug line to body tube joint.



10. ATTACH FINS

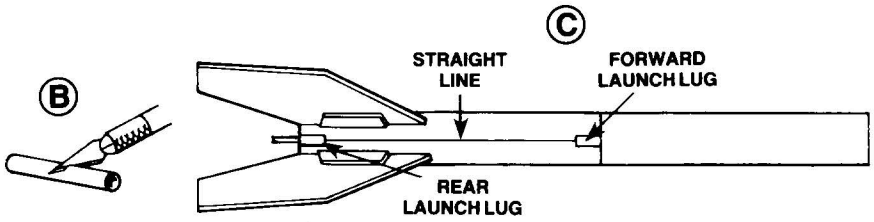
- **A.** ☐ Fine-sand balsa die-cut sheets until smooth. Carefully remove parts by freeing edges with sharp knife.
- **B.** ☐ Stack fins and fin gussets together. Sand all edges smooth.
- **C.** ☐ Apply glue to the root edge of a fin. Glue fin next to alignment line with the trailing edge fin even with the end of the tube. Repeat for other fins. Apply each fin on same side of its alignment line. Let each fin dry several minutes before applying the next fin.
- **D.** ☐ Glue fin gussets to body tube/fin joints as shown.
- **E.** ☐ Looking at the rocket from the rear, the fins should be in the positions shown.

FINS MUST BE ATTACHED CORRECTLY FOR STABLE FLIGHT.



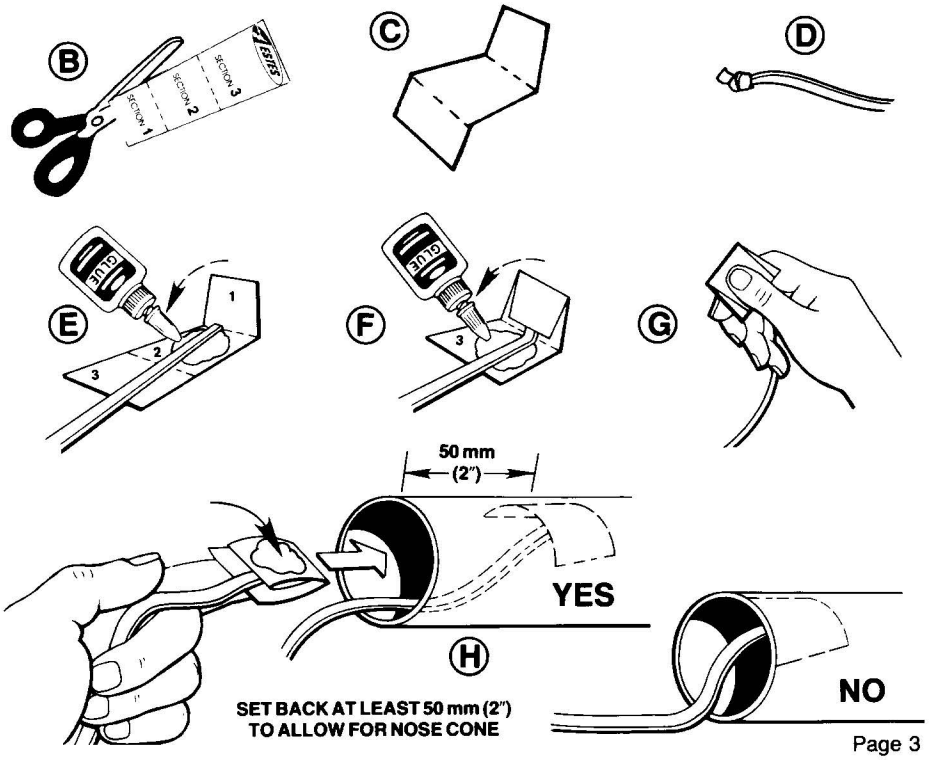
11. ATTACH LAUNCH LUGS

- **A.** ☐ Select 5 mm (3/16") or 6 mm (1/4") launch lug to match your launch pad rod.
- **B.** ☐ Cut launch lug in two pieces of equal length.
- **C.** ☐ Glue one lug on launch lug line even with end of body tube and then glue remaining lug on line next to tube joint as shown.

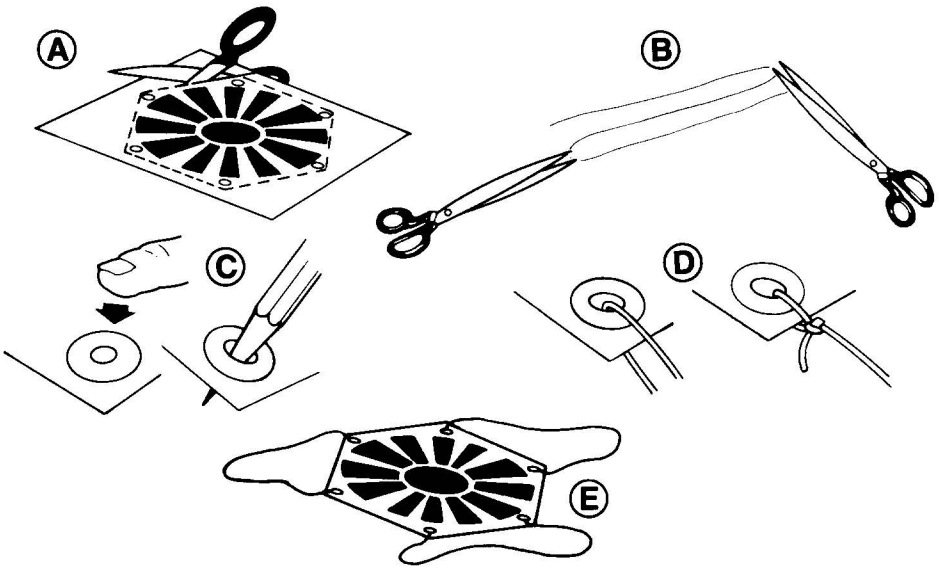


12. SHOCK CORD MOUNT ASSEMBLY

- **A.** ☐ Locate the shock cord mount on the pattern sheet.
- **B.** ☐ Cut out the shock cord mount along the solid black outline.
- **C.** ☐ Crease on dotted lines by folding.
- **D.** ☐ Tie a knot at the very end of the end of the loose shock cord.
- **E.** ☐ Spread glue on section 2 and lay knotted end of shock cord into the glue at a slight diagonal as shown.
- **F.** ☐ Fold section 1 forward. Apply glue to section 3. Fold forward again.
- **G.** ☐ Clamp firmly with your fingers for two minutes until glue dries.
- **H.** ☐ Apply glue inside front of body tube no less than 50 to 75 mm (2-3") from end. The glued area should be same size as shock cord mount. Press mount firmly into glue as shown. Hold until glue sets.

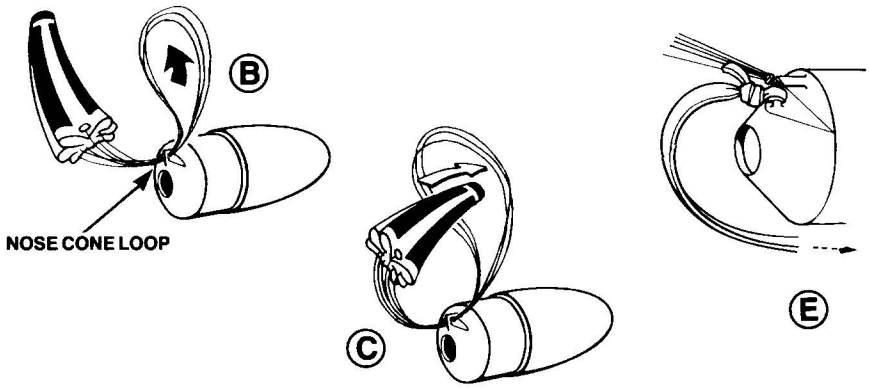


13. PARACHUTE ASSEMBLY



- **A.** ☐ Cut out parachute on printed edge lines.
- **B.** ☐ Remove tape from shroud line, unwind line, fold and cut into three equal lengths.
- **C.** ☐ Attach tape rings to top of parachute and press firmly into place. Punch hole through the parachute material with the point of a sharp pencil. (Do not use a dull pencil or ballpoint pen.)
- **D.** ☐ Pass shroud line through hole in parachute and tape ring. Tie lines together with a double knot.
- **E.** ☐ Attach remaining lines to other corners to complete parachute.

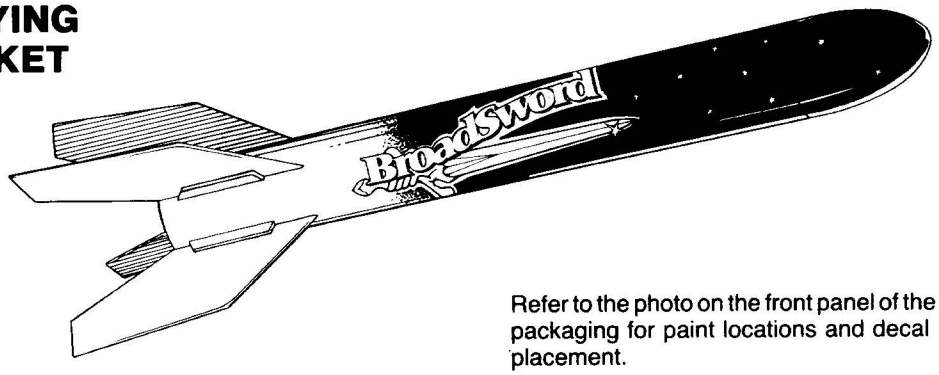
14. PARACHUTE ATTACHMENT



- **A.** ☐ Clear loop on nose cone with the point of scissors.
- **B.** ☐ Thread shroud lines through loop on on nose cone.
- **C.** ☐ Pass parachute back through loop of shroud lines as shown.
- **D.** ☐ Pull lines tight.
- **E.** ☐ Tie free end of shock cord to the loop on the nose cone.

WHAT TO EXPECT WHEN FLYING YOUR BROADSWORD™ ROCKET

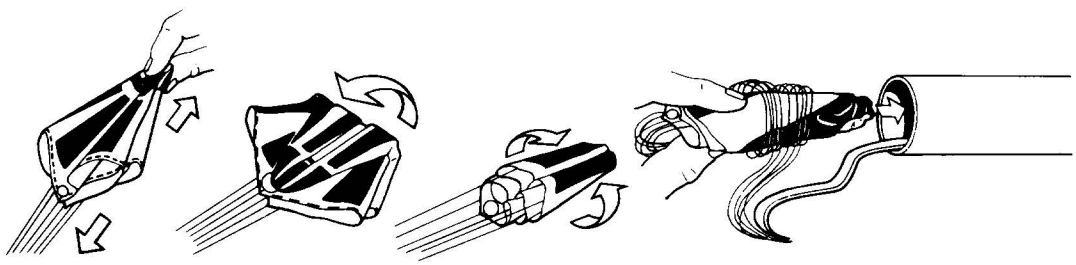
The sleek and classic Broadsword™ with parachute recovery is perfect for flying any time. With an Estes D12-5, the Broadsword™ will fly to nearly 100 meters (325 feet). With an Estes E15-6, the Broadsword™'s altitude will almost double! Don't fly it with this engine on a breezy day or it will drift away. Watch for the brightly colored parachute as it's ejected at the apogee (the highest point in the rocket's flight). The 'chute will also help you find the rocket once it has landed.



Refer to the photo on the front panel of the packaging for paint locations and decal placement.

PREPARE ROCKET FOR FLIGHT

1. Hold the recovery system shock cord to one side of the inside of the body tube. Insert six to ten squares of recovery wadding into the rocket body. The wadding should remain loose. NEVER tamp the wadding tightly into the tube.
2. Fold the parachute and wrap the shroud lines around it as shown. The lines should be just tight enough so that the parachute will slide easily inside the rocket body. Insert the parachute into the rocket onto the top of the recovery wadding. Then insert the shock cord into the rocket on top of the parachute.



3. Install the nose cone into the forward end of the rocket body. Be certain the fit is neither too loose or too tight. If the nose cone falls out of the rocket body when the model is pointed downward, the fit is too loose. If while pointed downward, the nose cone can't be shaken out of the tube, the fit is too tight. If too loose, wrap tape around shoulder for snug fit. If too tight, lightly sand shoulder slightly for looser fit.

Refer to Flight Instructions for Launch.

FLIGHT INSTRUCTIONS

PREPARE ENGINE

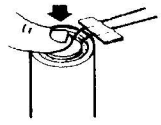
NOTE: Igniter plugs come with rocket engines. If your engines did not come with plugs, follow the instructions that came with the engines.

SEPARATE IGNITER AND IGNITER PLUG

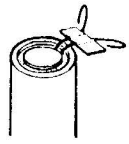
IGNITER MUST TOUCH PROPELLANT

HOLD ENGINE UPRIGHT, DROP IN IGNITER

INSERT IGNITER PLUG

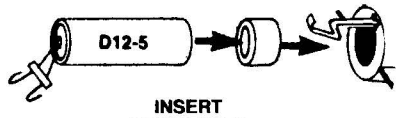


FIRMLY PUSH ALL THE WAY IN



BEND IGNITER WIRES BACK

When flying your rocket with a D12-5 you will need to first slide the orange engine spacer into the engine tube, then the "D" engine. For the E15-6 engine flights, the orange spacer is not needed.



INSERT ENGINE INTO ROCKET

LAUNCH SUPPLIES

To launch your rocket, you will need the following items:

— Estes Electron Beam® launch controller for D engines or Estes Command Control™ launch controller for E engines
— Estes Power Plex™ launch pad and a 5 mm (3/16") or 6 mm (1/4") launch rod
— Estes Recovery Wadding No. 2274
— Recommended Estes Engines: D12-5 (First Flight), E15-6
Use orange engine spacer when using D engines.

To become familiar with your rocket's flight pattern, use a D12-5 engine for your first flight. **Use only Estes products to launch this rocket.**

FLYING YOUR ROCKET

Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 100 meters (325 feet) square. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are great.

Launch area must be free of dry weeds and brown grass.

Launch only during calm weather with little or no wind and good visibility.

Don't leave parachute packed more than a minute or so before launch during cold weather [colder than 4° Celsius (40° Fahrenheit)].

Parachute may be dusted with talcum powder to avoid sticking.

MISFIRES

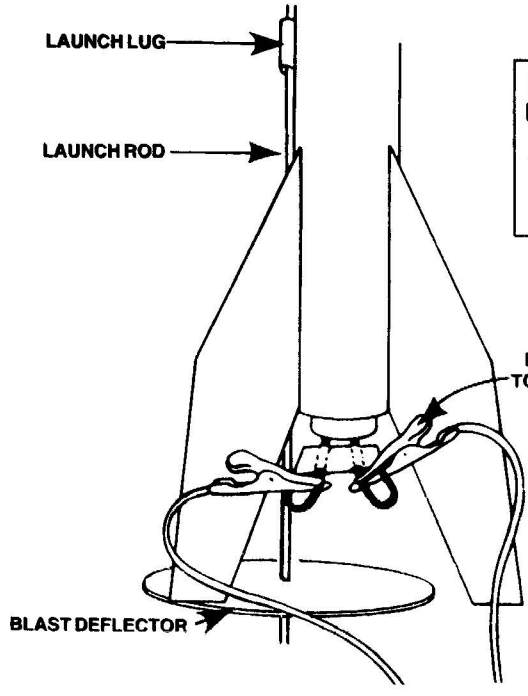
If the igniter functions properly but the propellant does not ignite, keep in mind the following: An Estes igniter will function properly even if the coated tip is chipped. However, if the coated tip is not in direct contact with the engine propellant, it will only heat and not ignite the engine.

When an ignition failure occurs, remove the safety key from the launch control system and wait one minute before approaching the rocket. Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant, then reinstall the igniter plug as illustrated above. Repeat the countdown and launch procedure.

FOR YOUR SAFETY AND ENJOYMENT

Always follow the NAR* MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities.

*National Association of Rocketry



COUNTDOWN AND LAUNCH

⑩ BE CERTAIN SAFETY KEY IS NOT IN LAUNCH CONTROLLER.

⑨ Remove safety cap and slide launch lug over launch rod to place rocket on launch pad. Make sure the rocket slides freely on the launch rod.

⑧ Attach micro-clips 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.

⑦ Move back from your rocket as far as launch wire will permit (at least 5 meters - 15 feet for D engines and at least 10 meters - 30 feet for E engines).

⑥ INSERT SAFETY KEY to arm the launch controller.

Give audible countdown 5...4...3...2...1

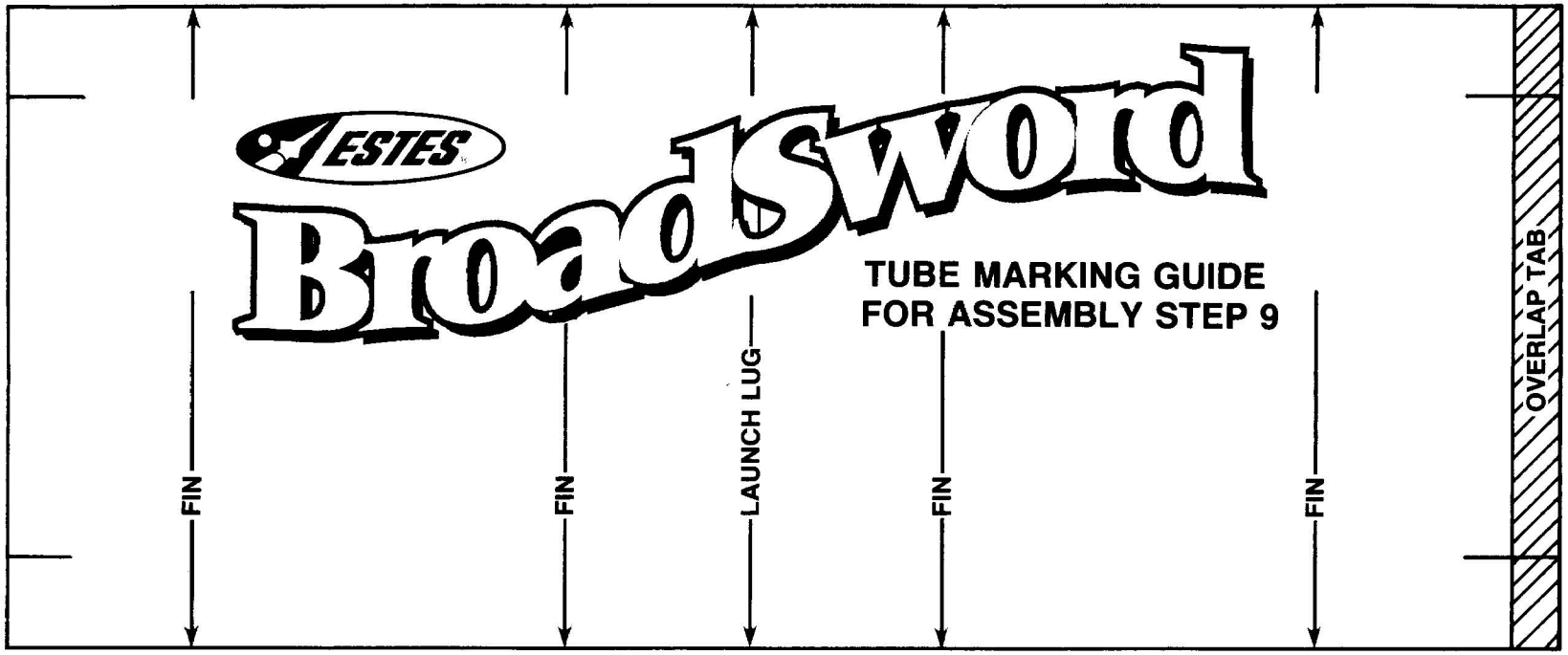
LAUNCH!!

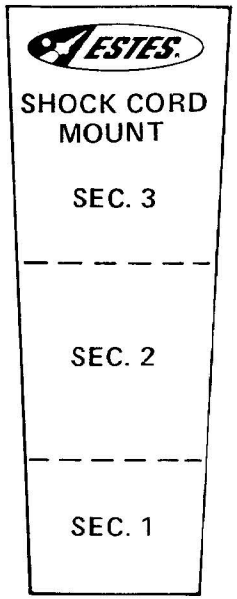
PUSH AND HOLD LAUNCH BUTTON UNTIL ENGINE IGNITES

REMOVE SAFETY KEY FROM LAUNCH CONTROLLER. KEEP SAFETY KEY WITH YOU OR REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.

When using the Estes E2™ or Command Control™ Launch Controllers to fly your models, use the following launch steps.

A. After attaching micro-clips, etc., insert the safety key into the controller receptacle. If the igniter clips have been attached properly to the igniter, the audio continuity indicator will beep on and off.
B. Hold the yellow (left) arm button down. The audio indicator will produce a steady tone.
C. Verbally count down from five to zero loud enough for the bystanders to hear. Still holding the yellow arm button down, push and hold the orange (right) button down until the rocket ignites and lifts off.



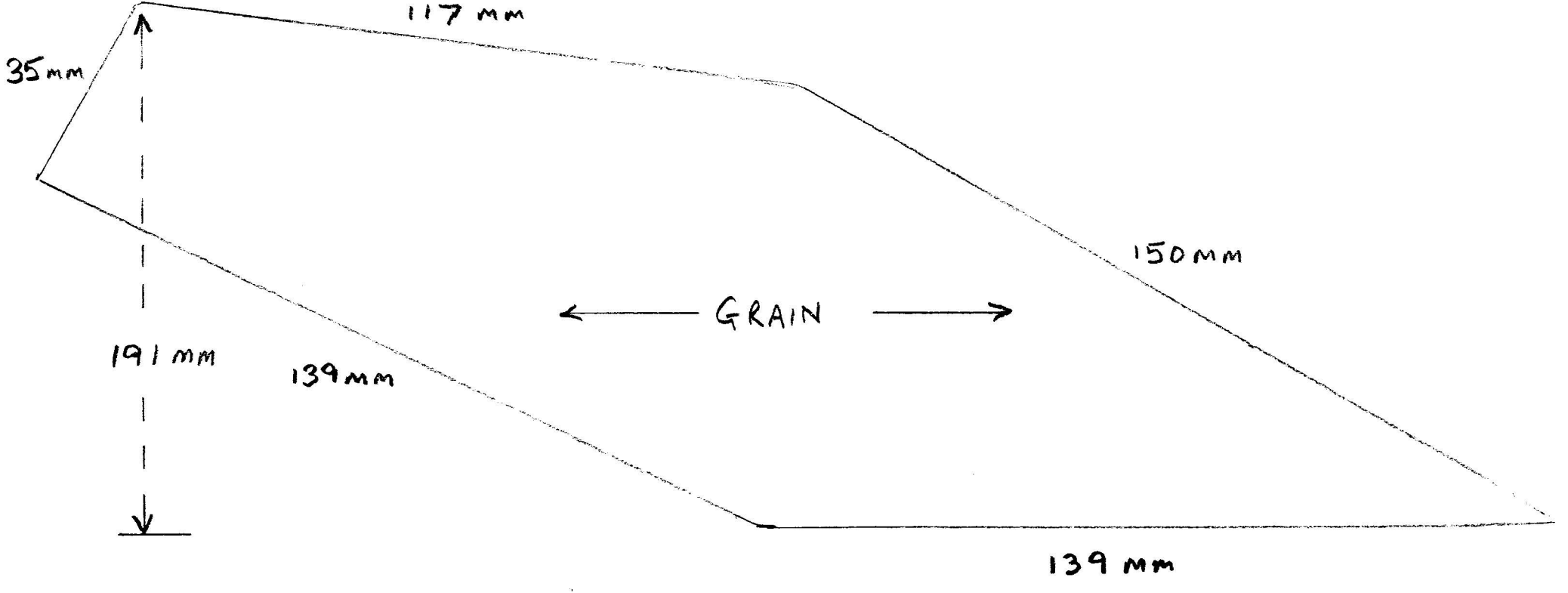


FOR ASSEMBLY STEP 12

PN 84360

Broadsword
ESTES
ESTES
CUT INSIDE DOTTED LINE
037616

1/8"


117 mm
35mm
150mm
GRAIN
191 mm
139mm
139 mm

Estes Broadsword #2093

Q	Desc	Stk Num	Size	Other
1	Coupler	3196	BT-80 1"L	3196 in assortment
2	Body Tube	3090	BT-80 14.2"L	
1	Plastic Nose Cone	3167	NC-80a	
1	Spacer Tube		3.5"L(empty casing)	fits inside BT-50
1	Retainer Tube		5"L	fits outside BT-50 (BT-52?)
1	Engine Tube	3086	BT-50 18"L	
1	Engine Hook	3143	for 'E' engine	3143 in assortment
1	'D' Engine Spacer	3143	.7"L	3143 in assortment
1	Centering Ring	2296	.25"L	2296 in assortment
1	Launch Lug	2320	3/16" x 2L"	2320 in assortment
1	Launch Lug	2320	1/4" x 1L"	2320 in assortment
4	Centering Rings	2295	BT-50 to BT-80	2295 in assortment
2	Balsa Sheet		1/8"T x 4"W x 16"L	
1	Parachute Kit	2267	18" Plastic	Orange/White/Blue
1	Shock Cord		1/4"W x 28"L	Elastic
1	Decal	037616		Self Stick


Challenge
BROADSWORD