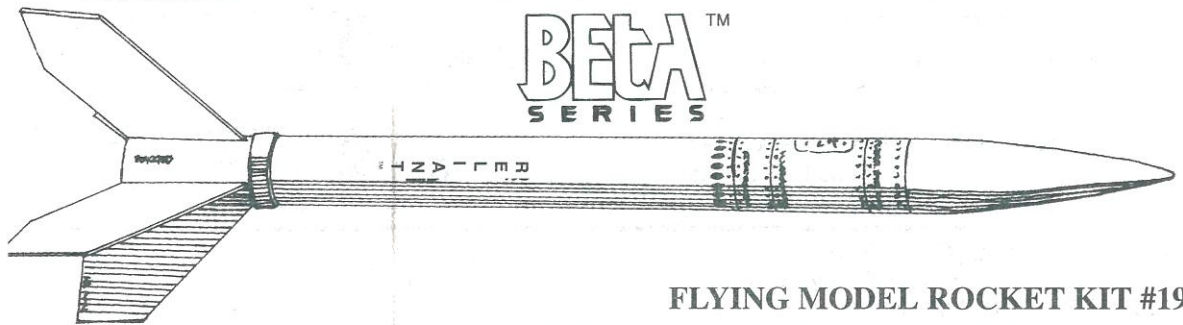




ESTES INDUSTRIES  
1295 H STREET  
PENROSE, CO 81240 USA

**RELIANT™**



**FLYING MODEL ROCKET KIT #1986**

**HOW TO USE THESE INSTRUCTIONS:**

**READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL**

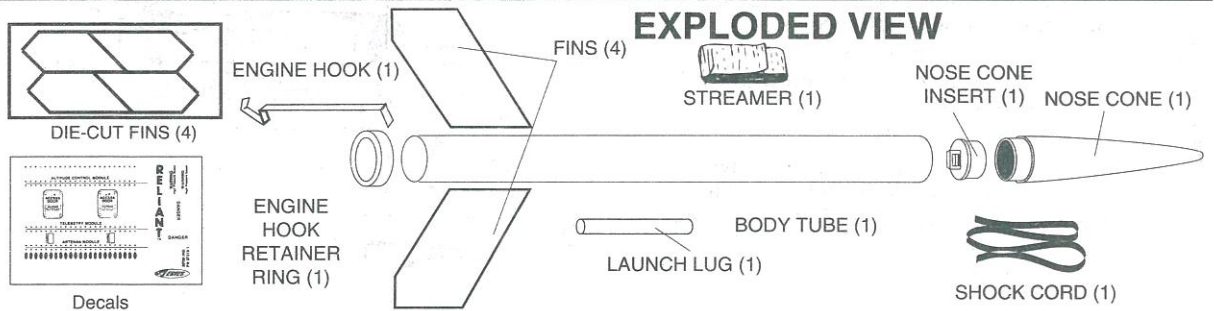
- A. This rocket, incorporating basic model rocketry construction techniques, will help you in the development of your rocketry modeling skills.
- B. **Read each step first** and visualize the procedure thoroughly in your mind before starting construction.
- C. Lay parts out on the table in front of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

**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.



**GLUE IS APPLIED TO SURFACES SHOWN IN RED.**



**EXTREMELY IMPORTANT: THE EXPLODED VIEW IS FOR REFERENCE ONLY! DO NOT USE THIS DRAWING ALONE TO ASSEMBLE THIS MODEL.** The exploded view is only intended to assist you in locating the parts included in this kit. Refer back to this exploded view as you build your model step by step. This method will help you to put the parts into perspective as you progress through the construction.

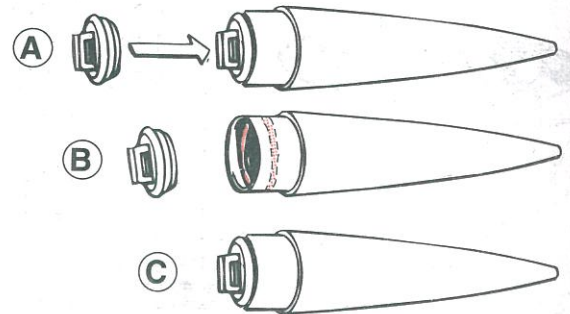


## 1. NOSE CONE ASSEMBLY



**NOTE:** This is the only step in the construction of your model rocket that requires plastic cement.

- A.  Test fit the nose cone insert into the nose cone. **Do not glue at this time.** Remove the insert.
- B.  Apply plastic cement as shown in the illustration.
- C.  Assemble the nose cone and insert pieces. Allow assembly to dry.

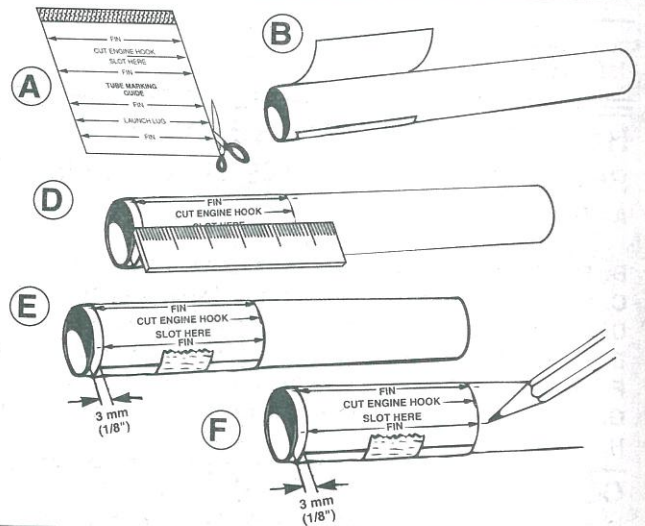


## 2. TUBE MARKING DETAIL

**HINT:** Fins can be glued on easier by lightly sanding the body tube with #600 grit sandpaper. Do this before you mark the body tube.



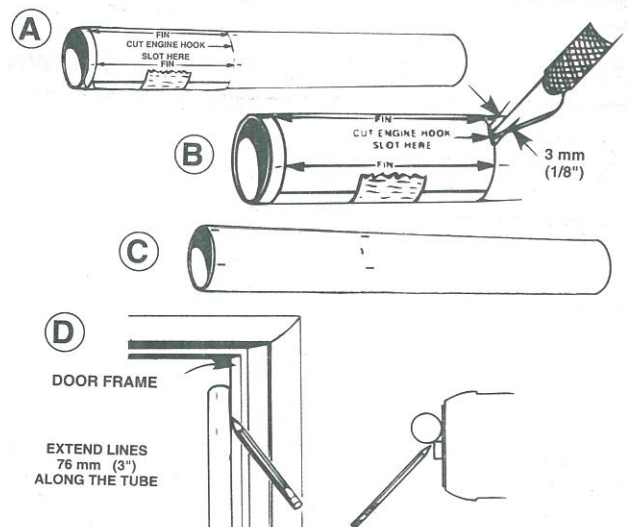
- A.  Locate the tube marking guide on page 7. Cut the guide along the outline.
- B.  Wrap marking guide around tube.
- C.  Locate the ruler on page 8 of this instruction sheet.
- D.  Lay one end of the body tube on the zero mark of the ruler.
- E.  Position guide on the tube 3 mm (1/8") from zero. Tape guide in place as shown.
- F.  Mark tube at all arrow locations. One line on your tube marking guide is labeled LL, this means launch lug. Write LL on the body tube for that line. **Do not remove marking guide.**



## 3. HOOK SLOTTING DETAIL



- A.  Printed on the marking guide is the note: "Cut engine hook slot here."
- B.  Cut a 3 mm (1/8") wide slit for the engine hook in the tube next to the arrowhead of this note as shown.
- C.  Remove marking guide.
- D.  Using the door frame as a guide, draw straight lines connecting each pair of fin marks. Extend these lines 76 mm (3") along the tube. Draw a 102 mm (4") line along the tube for launch lug.





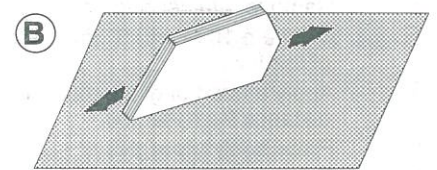
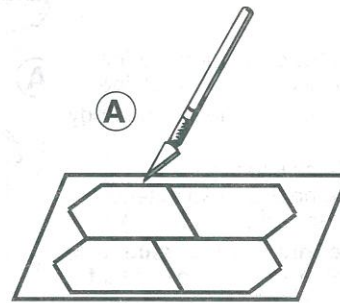
#### 4. FIN PREPARATION



**NOTE:** Read before proceeding with this step.

- Since your fins are not completely cut out of the white card stock, you will need to **work carefully** with your hobby knife to free the fins from the card.
- Be sure to cut completely around each fin outline before attempting to remove fins from the card.
- Check both sides of the card to make sure you cut through.
- Pay close attention to the corner areas where die cutting is not complete.
- As you cut around each fin, cut away from the adjacent fins so you will not damage the other fins on the card.

- A.  Free the fins from the card stock with your hobby knife.
- B.  Lay sandpaper, rough face up, on your table. Stack the fins together and **lightly** sand the edges smooth and flat.



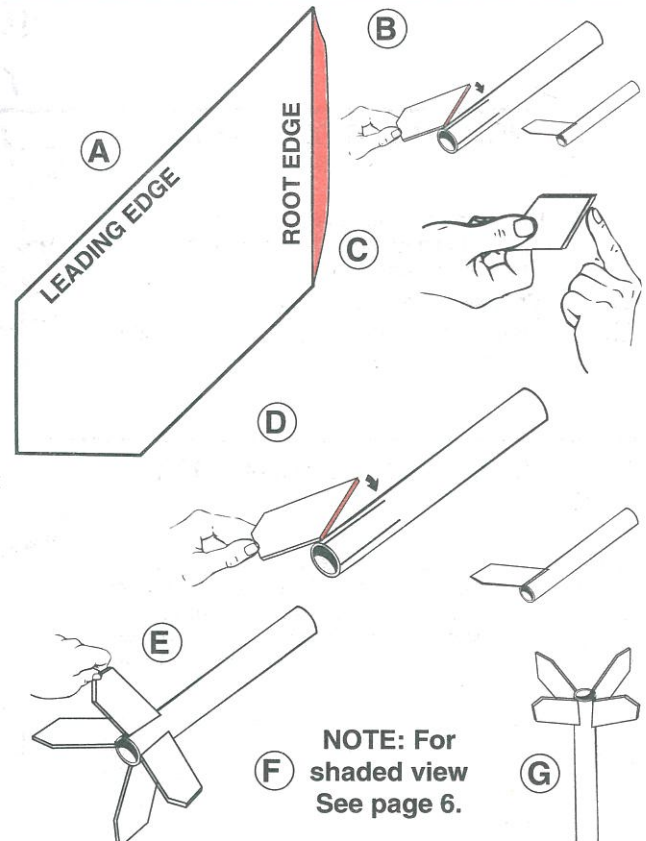
#### 5. FIN ATTACHMENT



**NOTE:** Before gluing your fins, match the fin shape to the fin pattern shown in this step. Identify the root edge that will be glued to the body tube and the front (leading) edge. This will help you attach your fins correctly.

**Remember:** Fins must be attached correctly for stable flights.

- A.  Apply a thin film of glue to the root edge of one fin.
- B.  Set the rear edge of the fin at end of body tube and gently press the root edge along the body tube fin line.
- C.  Remove fin and allow glue to become tacky. Add a bit more glue to the same fin.
- D.  Place back on tube line.
- E.  Carefully adjust the fin, if needed, so it will project straight up from body tube as shown. Work slowly and carefully so as not to disturb the glue joint. Attach remaining fins in the same manner. Do not set rocket on fins while glue is wet.
- F.  After all fins are attached, use shaded end view on **page 6** to check proper fin spacing.
- G.  Stand the rocket on the table as shown to allow the fins to dry thoroughly before proceeding.



**NOTE:** For shaded view See page 6.

**At this point, it's a good idea to rest for a few minutes. Get up and stretch or read through the next steps before doing any more work.**

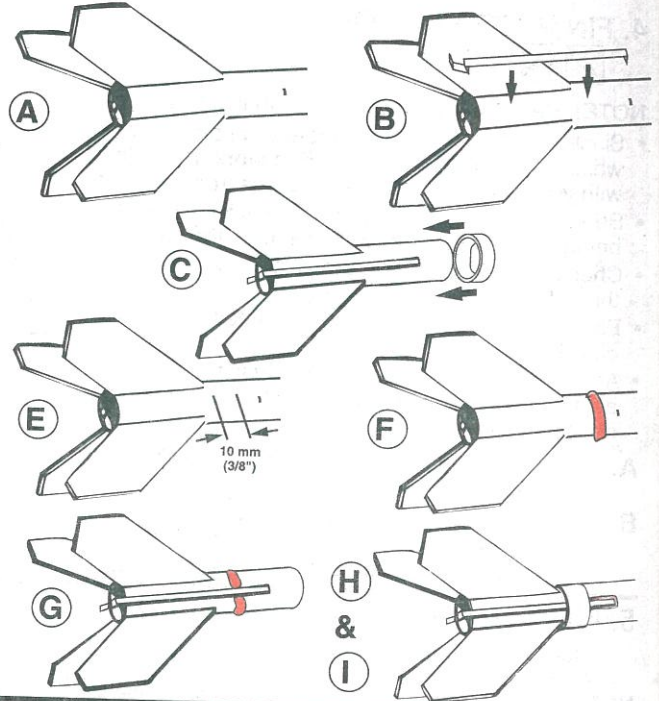


## 6. ENGINE HOOK ATTACHMENT



**NOTE:** Proceed with this step only when the fins are completely dry. Test fit all parts before gluing.

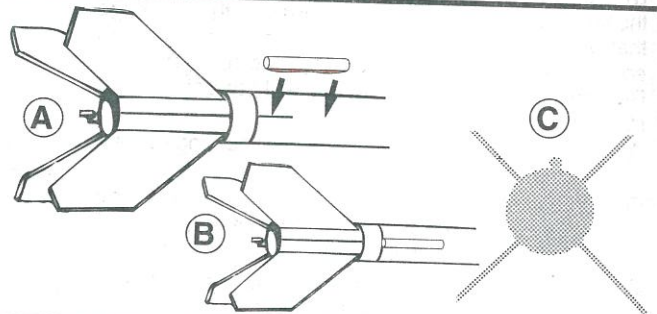
- A.  Locate the engine slit you made in the body tube in step 3B.
- B.  Insert the engine hook into the slit as shown. The engine hook should extend beyond the rear of the engine tube.
- C.  **Test fit the retainer ring without glue.** Slide the ring over the engine hook so that the ring is touching the front edge of the fins.
- D.  Remove retainer ring and engine hook.
- E.  Measure 10 mm (3/8") from the front edge of the fins.
- F.  Apply a bead of glue around the tube at this distance from the fins.
- G.  Place hook into slot.
- H.  Slide retainer ring back into position.
- I.  Add glue reinforcement to engine hook as shown.



## 7. LAUNCH LUG ATTACHMENT



- A.  Run a line of glue along one side of the launch lug and place it in front of the retainer ring as shown.
- B.  Smooth out the excess glue.
- C.  Make sure the launch lug is aligned with the body tube as shown on the end view. Allow to dry.

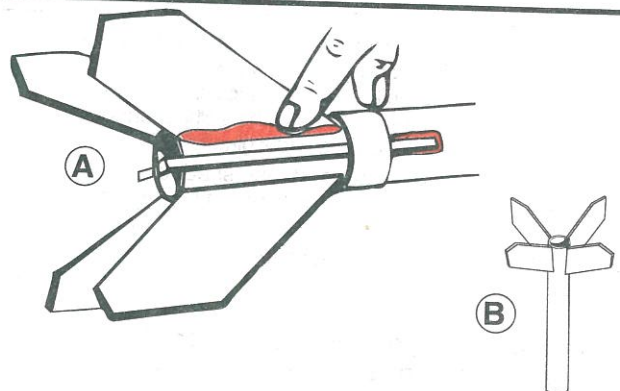


## 8. GLUE REINFORCEMENT DETAIL



**NOTE:** Glue joint reinforcements or fillets are important because they help blend the fins, launch lugs or other components into the body tube. This blending improves the looks of your model, allows smoother air flow over your rocket during flight and strengthens the attachment points.

- A.  Reinforce each fin/body tube joint with glue. Use your finger to help smooth the glue fillet.
- B.  Stand rocket on table as shown. Wipe away any excess glue that may run down the side of the body tube. Allow to dry.

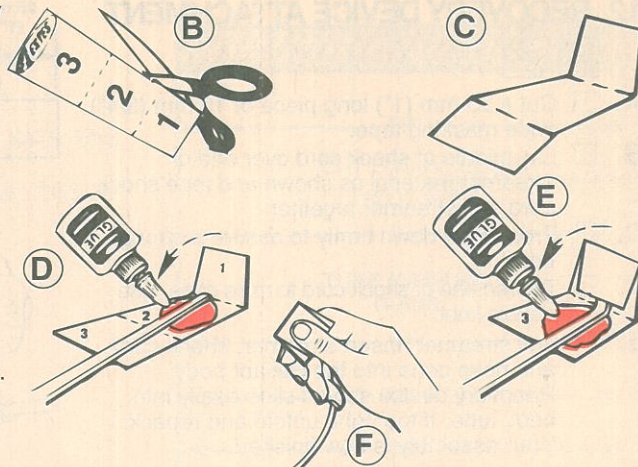




## 9. SHOCK CORD MOUNT ASSEMBLY



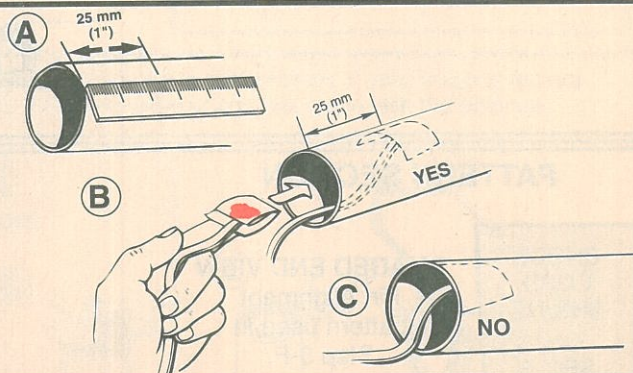
- A.  Locate the shock mount on page 6.
- B.  Cut out the shock cord mount along the solid black outline.
- C.  Crease on dotted lines by folding.
- D.  Spread glue on section 2 and lay end of shock cord into glue at a slight diagonal as shown.
- E.  Fold section 1 forward. Apply glue to section 3. Fold forward again.
- F.  Clamp firmly with your fingers until glue dries.



## 10. SHOCK CORD MOUNT ATTACHMENT



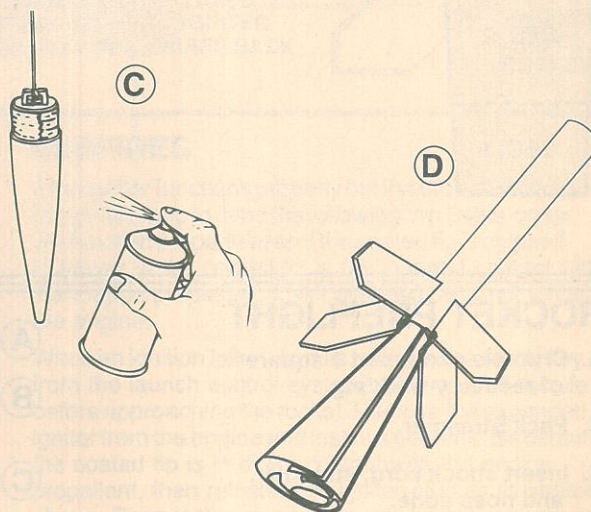
- A.  Measure approximately 25 mm (1") from the front end of the body tube.
- B.  Apply glue to shock cord mount and insert into tube.
- C.  Set the mount back at least 25 mm (1") to allow for nose cone clearance and press mount firmly into glue as shown.
- D.  Hold until glue sets.



## 11. FINISHING YOUR ROCKET



- A.  Before you paint your rocket make sure all of the glue joints are completely dry.
- B.  Optional: For a smoother and better looking finish, spray a coat of automotive primer on your rocket. Do not apply too much. Lightly sand the rocket with a 400 to 600 grit sandpaper. Apply another coat if needed. Sand between coats. The primer will allow the final coats of paint to adhere better to the rocket. Several light mist coats of paint are preferable. Too much paint will add to the rocket's weight.
- C.  Refer to the illustration on the front of the color panel for paint locations and decal placement. Mask the shoulder of nose cone with tape to prevent overspray. Suspend nose cone from a string and paint. Allow to dry.
- D.  Use spray enamel to paint your model rocket. Roll a piece of paper into the rear as shown to hold the model while painting. Allow to dry.

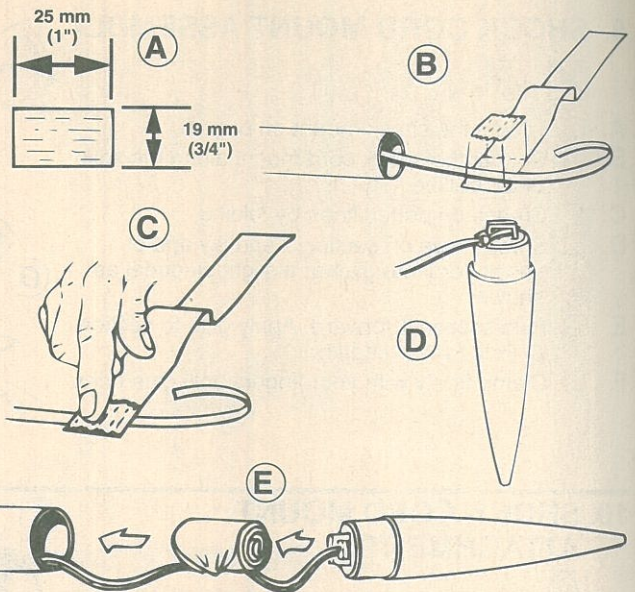




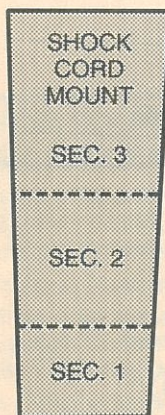
## 12. RECOVERY DEVICE ATTACHMENT



- A.  Cut a 25 mm (1") long piece of 19 mm (3/4") wide masking tape.
- B.  Lay middle of shock cord over end of streamer material as shown and tape shock cord and streamer together.
- C.  Press tape down firmly to assure a strong bond.
- D.  Tie free end of shock cord to nose cone. Use double knot.
- E.  Roll streamer. Insert streamer, shock cord and nose cone into the Reliant body. Recovery device should slide easily into body tube. If too tight, unfold and repack. Your assembly is now finished.



## PATTERN SECTION



**SHADED END VIEW**  
Fin Alignment  
pattern used in  
Step 5-F.

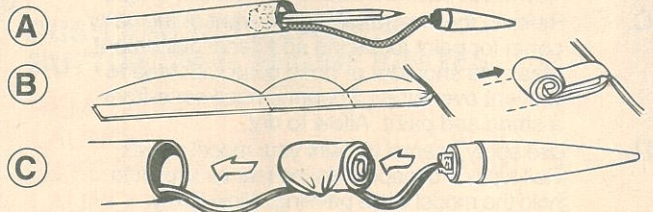


## WHAT TO EXPECT WHEN FLYING YOUR RELIANT™ ROCKET

The Reliant™ is an excellent beginner's rocket. It is easy to build, paint and fly. The recovery system on the Reliant™ is a streamer. This allows for a quick but safe recovery making the Reliant™ a good small field flier. Be careful. A "C" or even "B" engine will put this model out of sight. Make sure you and your recovery crew have sharp eyes when you fly with larger engines.

## ROCKET PREFLIGHT

- A. Crumple and insert 1 square of recovery wadding.
- B. Pack Streamer.
- C. Insert shock cord, streamer, and nose cone.





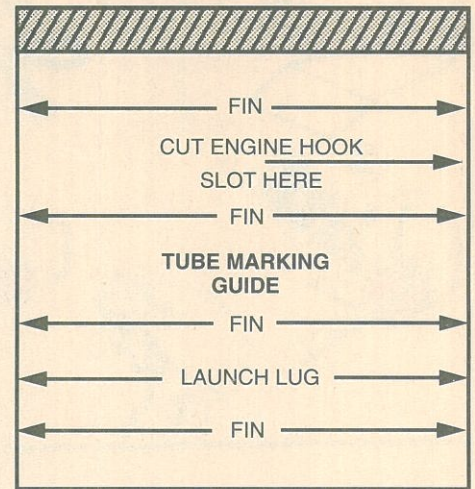
## LAUNCH SUPPLIES

To launch your rocket you will need the following items:

- Estes Electrical Launch Controller and Launch Pad
- Estes Recovery Wadding No. 2274
- Recommended Estes Engines: 1/2A6-2 (First Flight), A8-3, A8-5, B4-4, B4-6, B6-4, B6-4, B6-6, C6-5 or C6-7

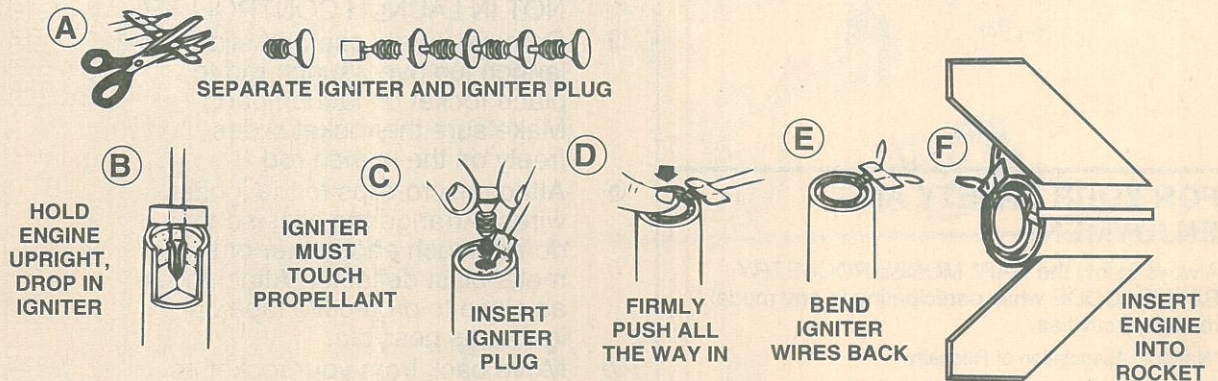
To become familiar with your rocket's flight pattern, use a 1/2A6-2 engine for your first flight.

**Use only Estes products to launch this rocket.**



## 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.



## FLYING YOUR ROCKET

Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 76 meters (250 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.

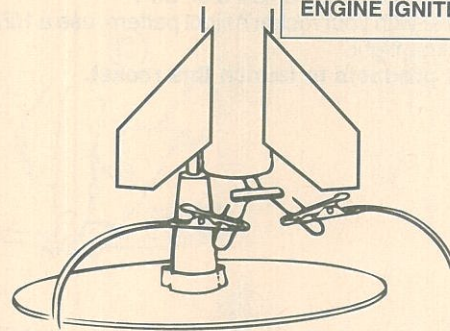
\*National Association of Rocketry

**If you use the ultrasafe E2™ or Command 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 red L.E.D. will now begin to flash on and off and the audio continuity indicator will beep on and off.
- B. Hold the yellow (left) arm button down. The L.E.D. will stop flashing and 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.

**MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER**

**SAFETY KEY MUST NOT BE IN LAUNCH CONTROLLER WHEN ATTACHING MICRO-CLIPS TO ENGINE IGNITERS**



## 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 15 feet - 5 meters).
- 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. REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.**