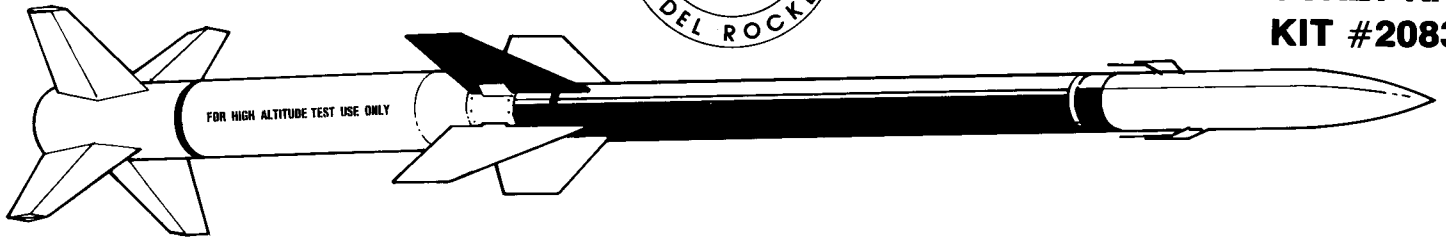




ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA



TERRIER/ SANDHAWK™ FLYING MODEL ROCKET KIT KIT #2083

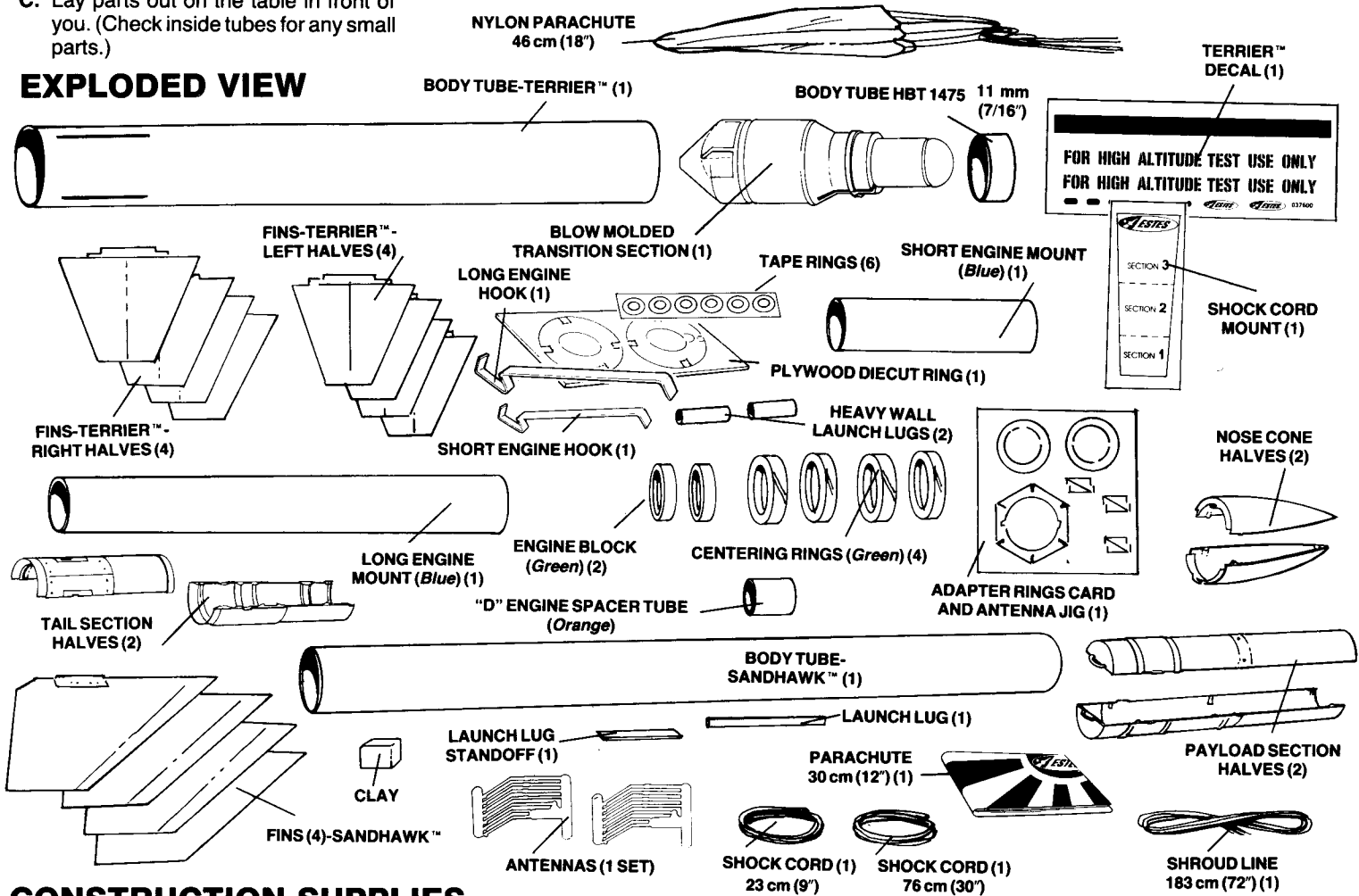


HOW TO USE THESE INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL

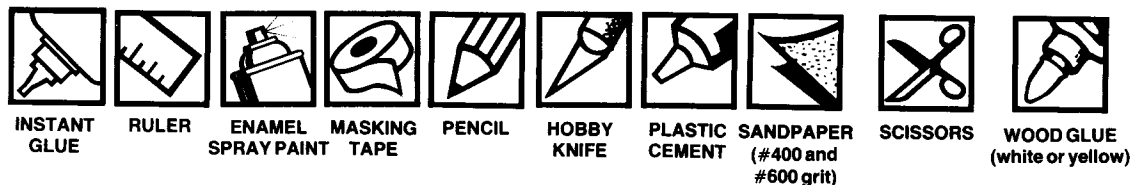
- A. This rocket, incorporating basic model rocketry construction techniques, will help you in the development of your rocketry modeling skills.
- B. Read each step first and visualize the procedure thoroughly in your mind before starting construction.
- C. Lay parts out on the table in front of you. (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.
- G. Sand parts as necessary for proper fit.
- H. The construction supplies required for each step are listed at the beginning of each step.
- I. Check off each step as you complete it.

EXPLODED VIEW



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.

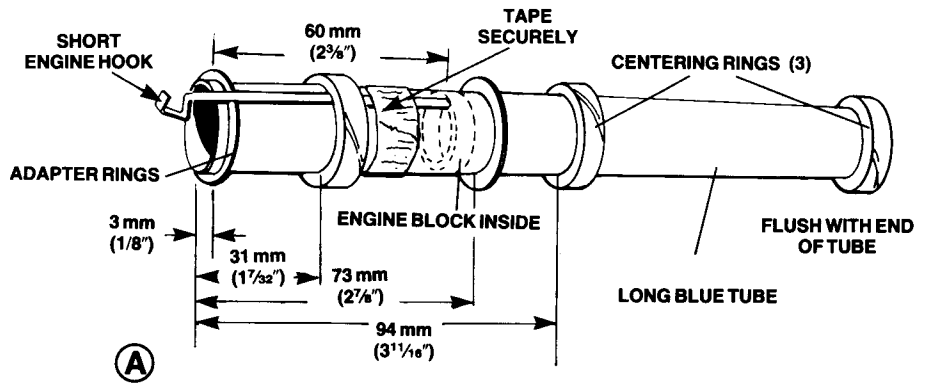


1. SANDHAWK™ ASSEMBLY

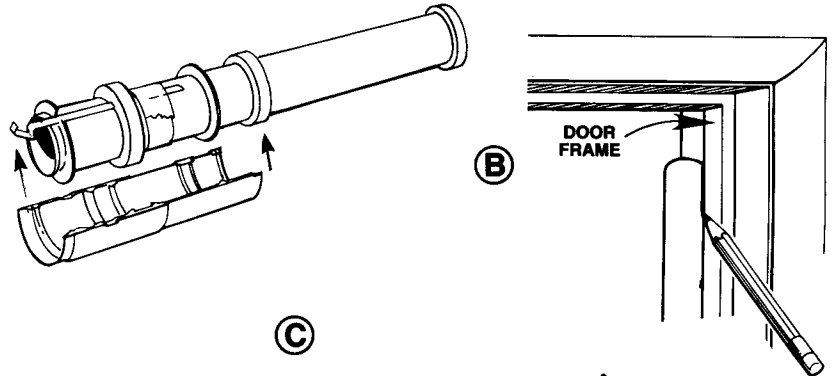


NOTE: Use white glue on paper-to-paper joints; plastic cement on plastic-to-plastic joints; and for paper-to-plastic joints, pre-cement the paper with plastic cement and when dry, join as per plastic-to-plastic joints.

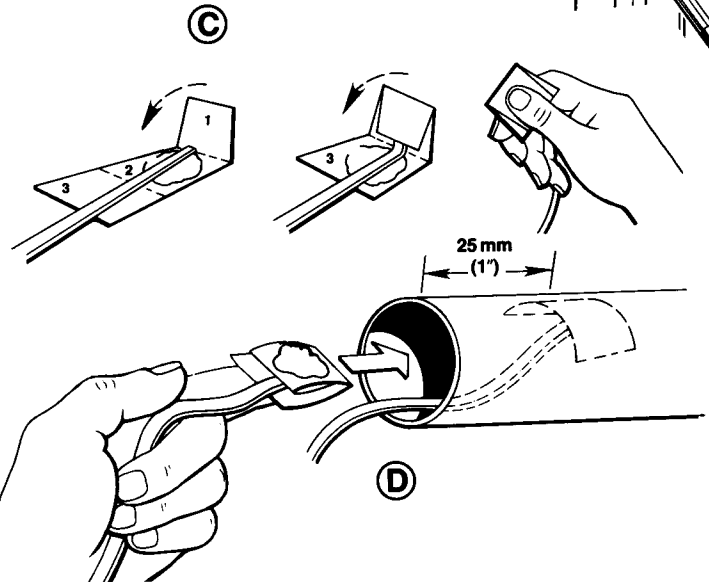
- A. Build engine mount assembly using wood glue. See sketch showing ring position. (Use a tail section half to check positioning of rings.)



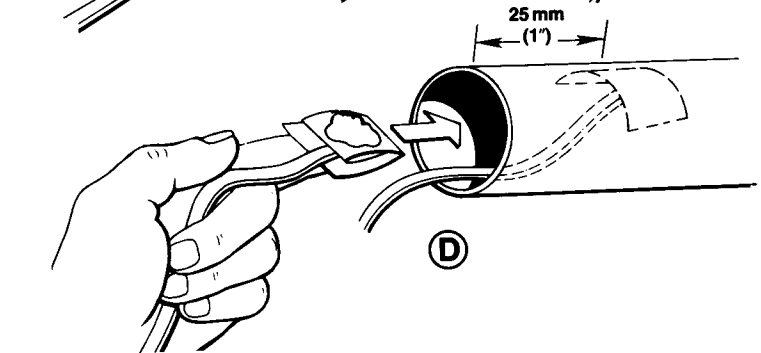
- B. Mark the long body tube (Sandhawk™) with a single line along the entire length for launch lugs.



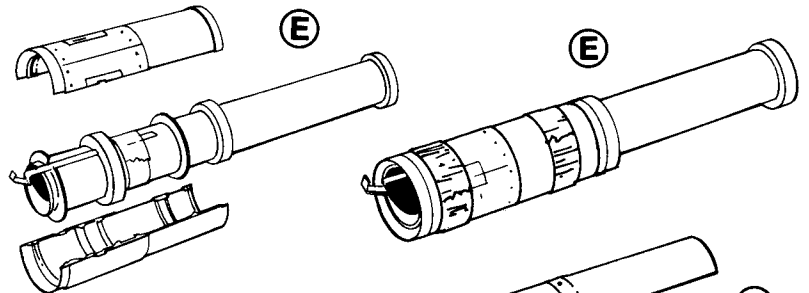
- C. Cut out the shock cord mount along the solid black outline. Crease on dotted lines by folding. Spread glue on section 2 and lay end of 76 cm (30") shock cord into glue at a slight diagonal as shown. Fold section 1 forward. Fold forward again. Clamp fingers with your fingers for two minutes until glue dries.



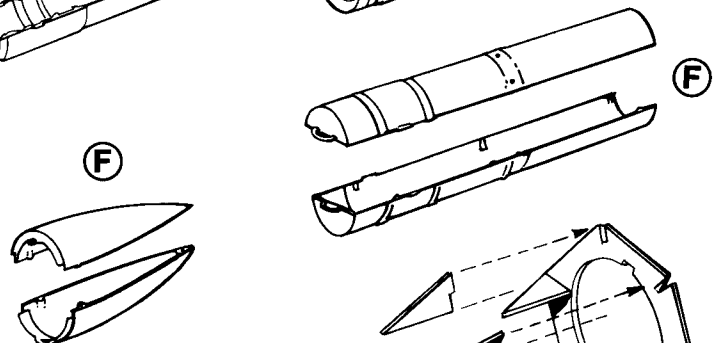
- D. Locate the Sandhawk™ body tube. Apply glue to the shock cord mount and insert at least 25 mm (1") back to allow for nose cone clearance and press mount firmly into place as shown. Hold until glue sets.



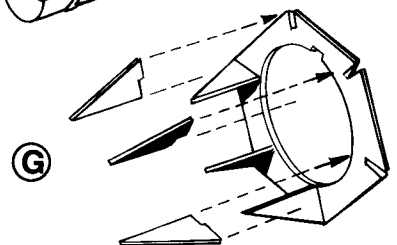
- E. Cement both tail sections onto motor mount assembly using plastic cement. Tape and leave to dry thoroughly.



- F. Cement both nose cone halves and payload section halves together. Tape and leave to dry thoroughly.



- G. Assemble antenna drilling and mounting jig from remainder of diecut parts. Glue the triangles in slots with white glue. Stand upright to dry.



- H. Glue body tube to tail section using a 13 mm (1/2") wide band of wood glue, 6 mm (1/4") in from the end of the paper tube. Align launch lug line between fins with molded launch lug on tail section. Glue on launch lugs.

NOTE: Antennas set is composed of seven antennas plus spares for your convenience. You will find up to 14 in the set, however, you will need only seven to complete the model.

- I. **ANTENNAS:** Decide at this stage whether you wish to use the semi-scale plastic antennas or make scale antennas from 0.5 mm (0.02") music wire (not included). The semi-scale plastic antennas are simply cemented on prior to painting. See diagram showing positioning of Type "A" and "B" antennas on payload section.

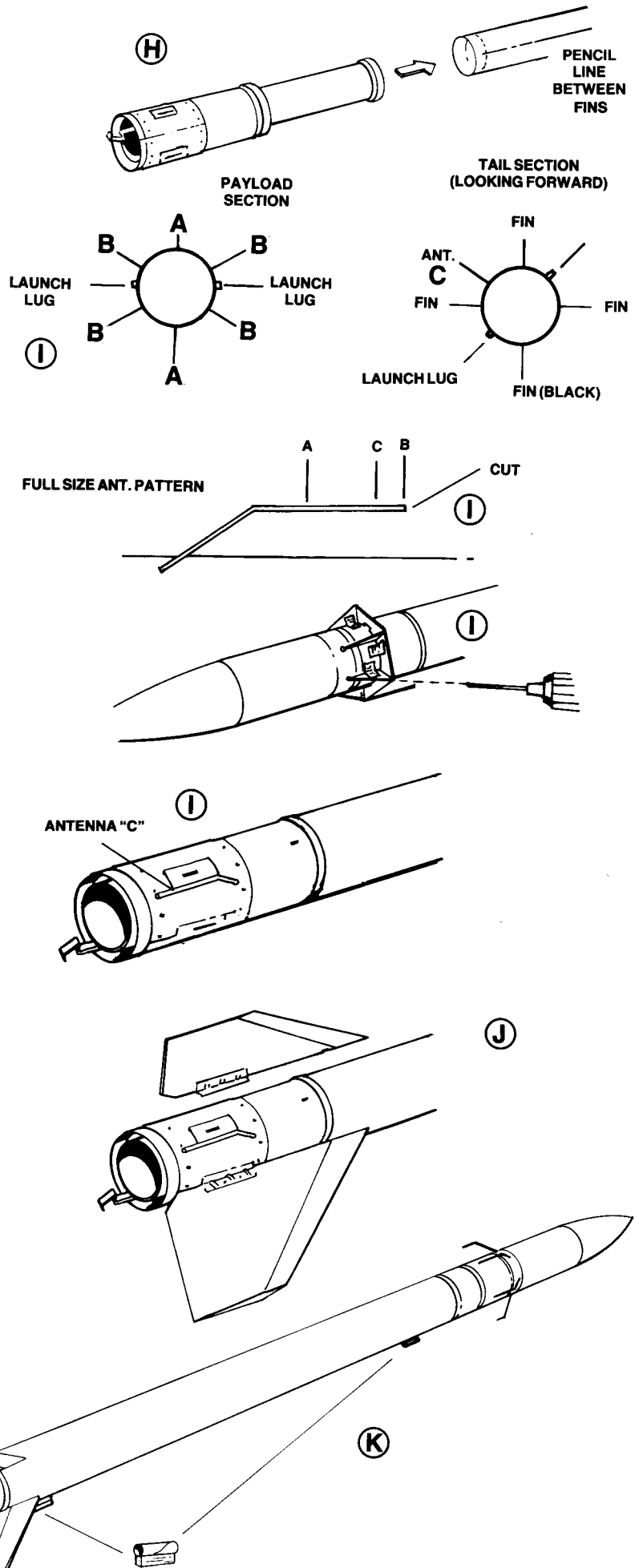
If you wish to use wire antennas, proceed as follows:

Tape antenna jig to payload section as shown so that points of triangular templates rest on circular antenna position marks. Using jig to line up, drill six holes at correct holes at correct angle with #65 (or 1 mm-1/32") drill bit. Make up seven antennas (2 - type "A", 4 - "B", 1 - "C") with #8 (or 0.5 mm-0.02") music wire to full size pattern shown. Two type "B" and one "A" antenna are glued into the holes in each payload section half as shown using instant adhesive only.

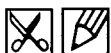
The jig is now used to locate the antennas in exactly the right position at the right angle while the instant adhesive is curing. Remove jig very carefully when the instant adhesive is fully cured, cutting the card away if necessary between the antennas. Cut out one segment of the jig, tape to the tail section with the point on the position mark for the "C" type antenna. Drill out as before and glue the type "C" antenna in place with instant adhesive.

- J. Trim off all molding or cementing flash from fins and assembled tail section. Ensure that fins fit snugly to tail section. Pre-cement the paper body tube area where the fin will contact, then cement each fin in place, taping carefully in place until completely dry. Make sure perfect alignment is maintained during drying, support body tube during this period in a vertical position.

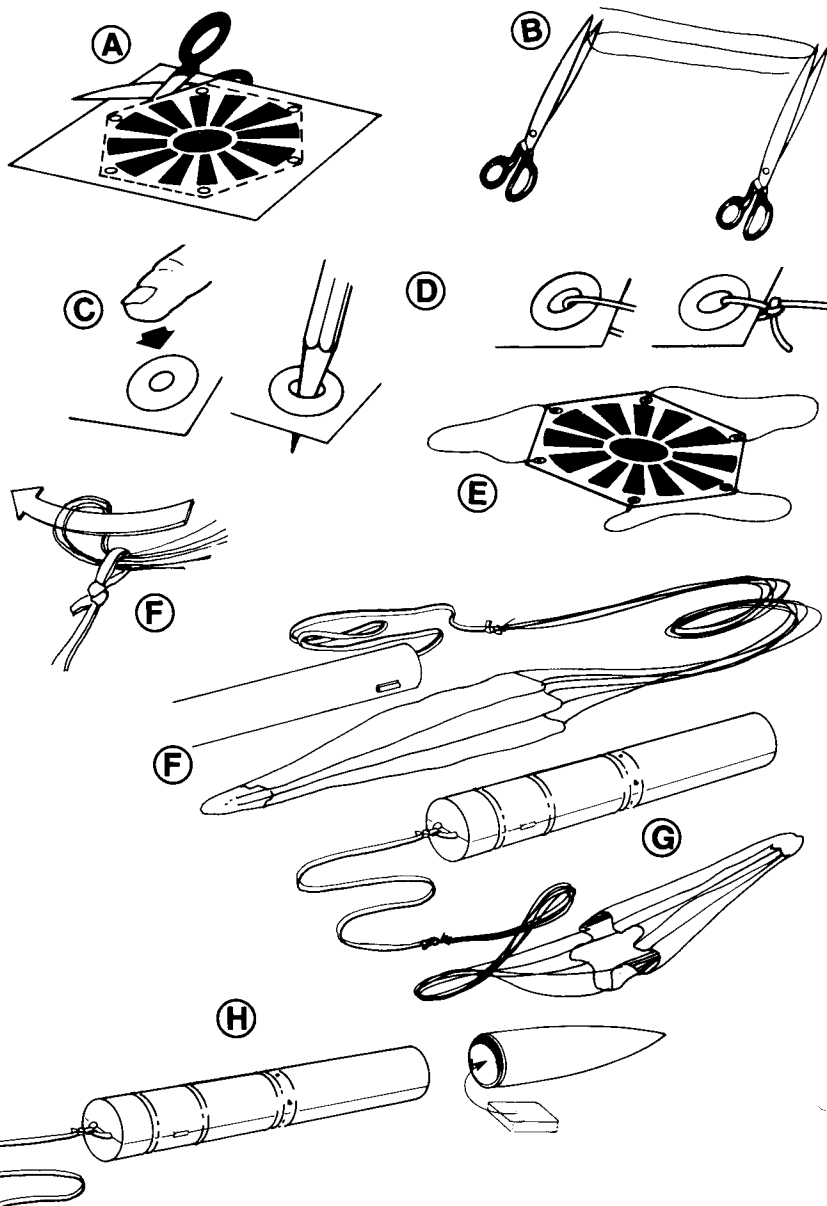
- K. Carefully cut both the small launch lug and the small strip of balsa wood in half. Glue the launch lugs to the balsa and then both assemblies to the rocket along the line previously drawn as shown in illustration.



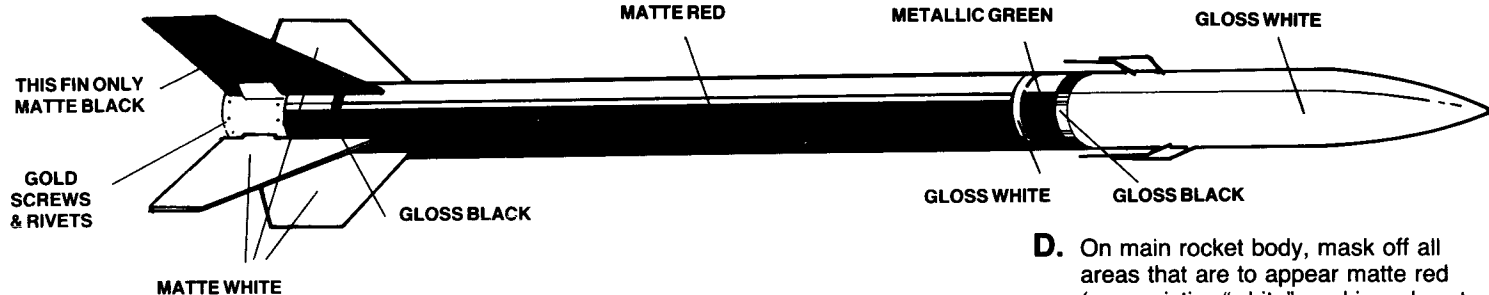
2. SANDHAWK™ PRE-FLIGHT ASSEMBLY



- A. Cut out parachute on printed edge lines.
- B. Remove tape from shroud lines, 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 disk. Tie lines together with a double knot.
- E. Attach remaining lines to other corners to complete parachute.
- F. Attach large nylon 46 cm (18") diameter parachute to main rocket shock cord. Do this by first making a loop in the 76 cm (30") shock cord, then thread shroud lines through loop. Pass parachute back through loop of shroud lines as shown. Pull lines tight.
- G. Attach small shock cord to molded loop on base of payload section. Fit small 30 cm (12") parachute to this shock cord in the same manner as described in step F. Assemble rocket and prepare for painting.
- H. Press clay into nose cone. Attach nose cone onto payload section.



3. SANDHAWK™ FINISH DETAIL



NOTE: Carefully study paint scheme, noting the difference between the matte-finished and gloss-finished surfaces. Also note the following sequence of coats.

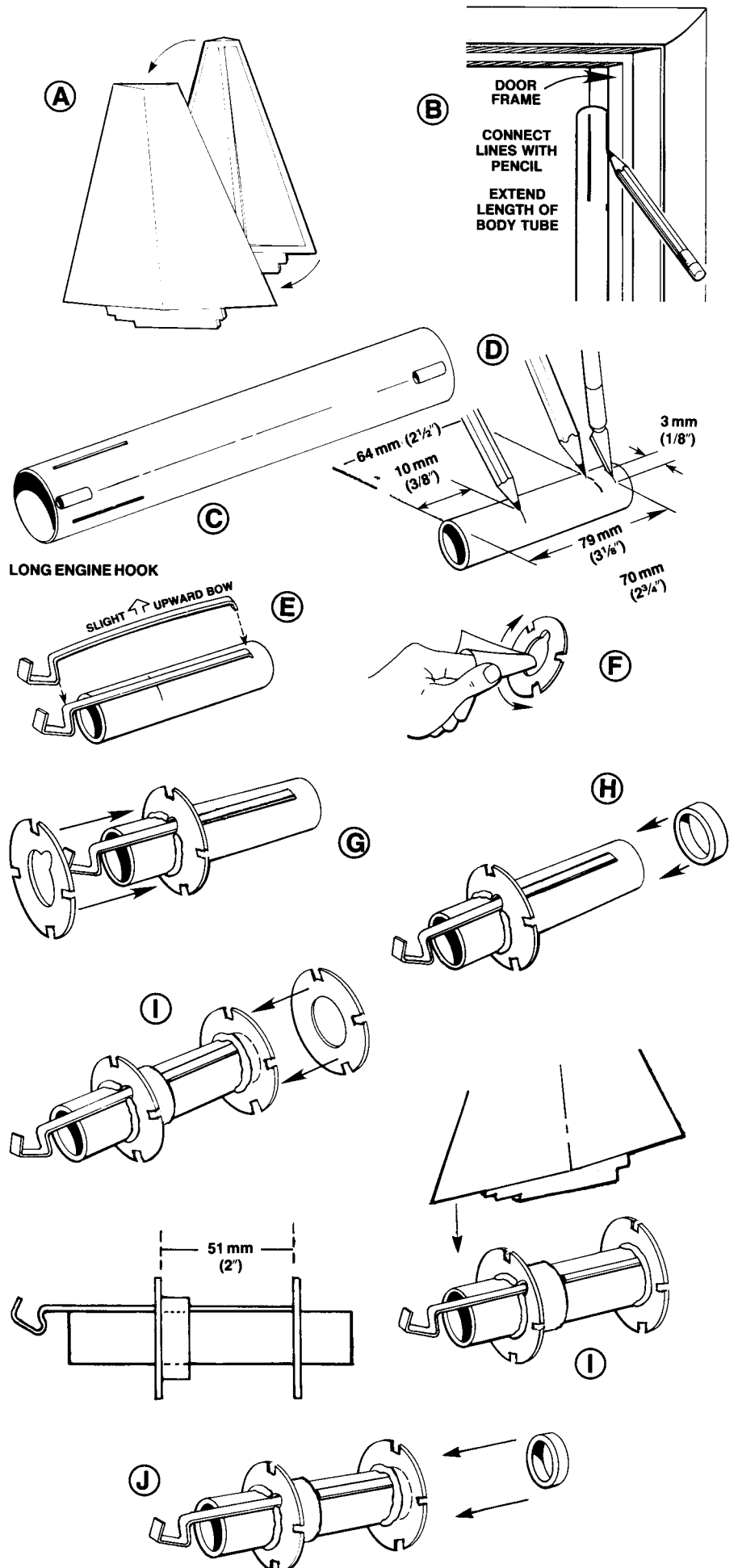
- A. Apply LIGHT tones first: Gloss white spray entire payload section and nose cone including antennas. Matte white spray **entire** remainder of rocket including body tube. This will ensure an even appearance to final color coat. Let dry thoroughly.

- B. Mask off all areas that are finally to appear white, whether gloss or matte, and spray the body tube matte red. Apply a base coat of silver to the payload section band that is finally to appear metallic green. Let dry thoroughly.
- C. Spray the metallic green area with transparent candy green over the silver base. Let dry thoroughly.
- D. On main rocket body, mask off all areas that are to appear matte red (over existing "white" masking - do not remove this). Spray remainder matte black. Let dry thoroughly.
- E. Apply further masking to expose only gloss black portions: rocket nozzle section, fin support band and band on payload section. Spray with gloss black paint. Let dry thoroughly.
- F. Remove all masking. Clean and touch up any small imperfections with a very fine brush. By hand, paint the screw heads and rivet detail on the tail section gold using either a toothpick or a very fine brush.

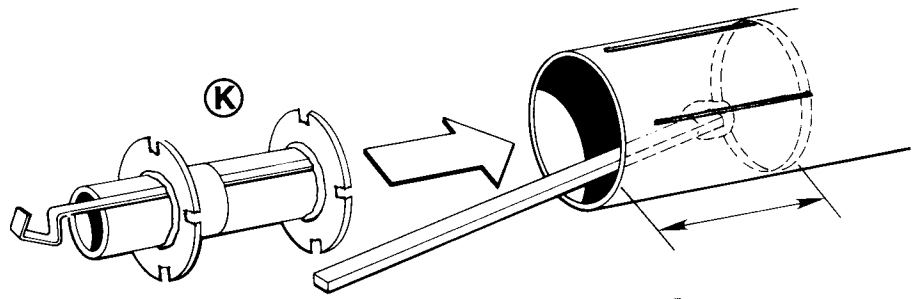
4. TERRIER™ ASSEMBLY



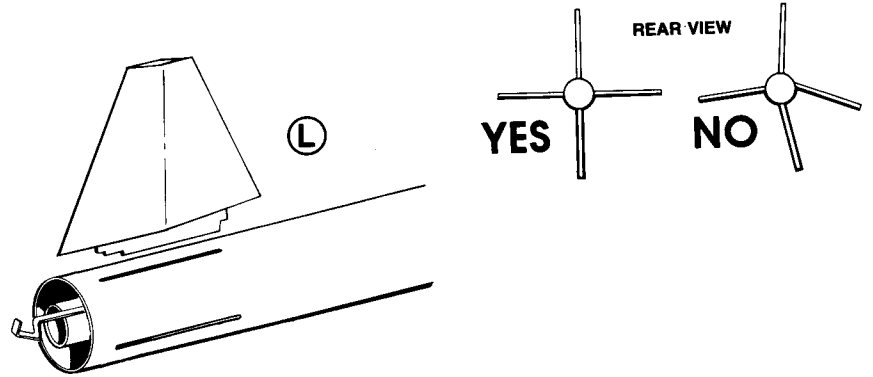
- A. Assemble and glue the left and right fin halves together using plastic cement to make four fins. Tape together and allow fins time to dry.
- B. Draw a line the length of the Terrier™ body tube halfway between any two fin slots. Use a door frame to draw the line.
- C. Glue the two heavy wall launch lugs onto the tube along the line, one at each end. Allow glue time to dry.
- D. Mark the short blue engine tube at 10 mm (3/8"), 64 mm (2 1/2") and 79 mm (3 1/8") from one end. Cut a 3 mm (1/8") long slit at the 79 mm (3 1/8") mark on the tube.
- E. Slightly bow the long engine hook and stick the forward end into the slot on the blue tube.
- F. Remove the plywood rings from the wood and gently sand the inside and outside so that it fits over the blue tube and inside the large body tube.
- G. Slide the plywood ring with the engine hook notch onto the blue tube so that it just passes the 10 mm (3/8") mark on the tube. Glue it on at this position.
- H. Glue the green engine hook retainer ring over the blue tube so that it touches the plywood ring.
- I. Apply wood glue to the blue tube at the 64 mm (2 1/2") mark. Slide the other plywood ring onto the tube until it just touches the mark. Check the spacing of the rings against the diagram shown. Before the glue sets, align the fin cutout notches by temporarily inserting a fin into the notches as shown. Allow engine mount time for glue to dry.
- J. Glue green engine block into the front of the engine mount. It must rest up against the engine hook.



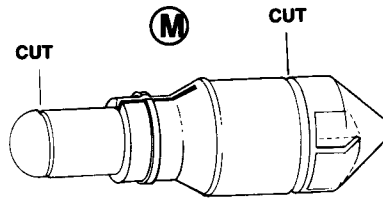
- K.** Apply a ring of wood glue inside the aft end of tube. Push the engine mount into the tube until both notches in the rings are visible in the cut-out area of the tube. Rotate the engine mount as necessary to get the notches to line up. Test fit a fin into each slot to verify alignment. Allow glue time to dry.



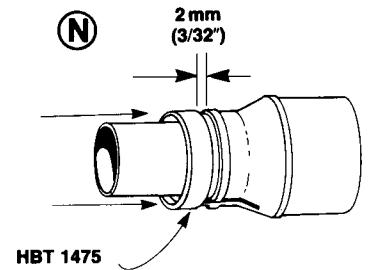
- L.** Using instant adhesive, glue the fins into the slots in the body tube. Sand inside the slots as necessary to achieve proper fit and alignment before gluing.



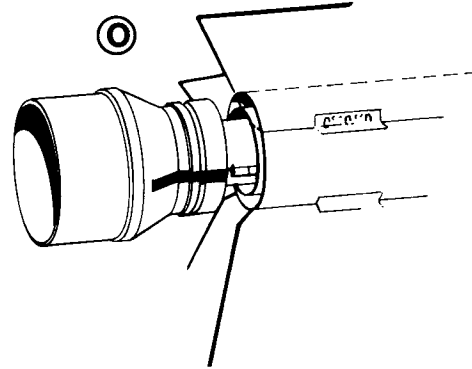
- M.** Cut off both ends of the plastic transition section in the "V" grooves provided.



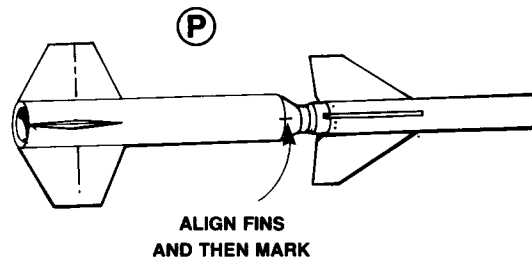
- N.** Test fit the short body tube over the end of the Sandhawk™ tail section. Sand as necessary to achieve a smooth fit. Glue the short body tube onto the plastic transition section leaving 2 mm (3/32") of the transition exposed as shown. Allow glue to dry.



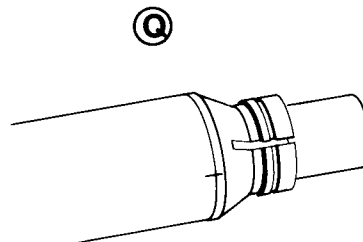
- O.** Cut the cardboard ring on the adapter to expose the slot for the Sandhawk™ engine hook. Slide adapter into back end of Sandhawk™ rocket. Engine hook slides into slot in adapter. **DO NOT GLUE.**



- P.** Slide adapter into front end of Terrier™ body tube. Rotate aft body so that the aft and forward fins are in a straight line. Mark the body tube/adapter location with a pencil.



- Q.** Remove Sandhawk™ rocket from adapter. Remove adapter from Terrier™ body and glue back into place with instant adhesive so that the mark on the tube lines up with the mark on the adapter.



5. TERRIER™ FINISH DETAIL

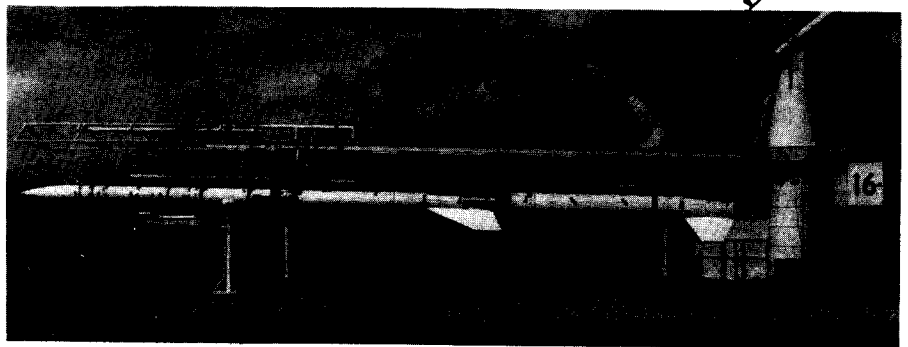
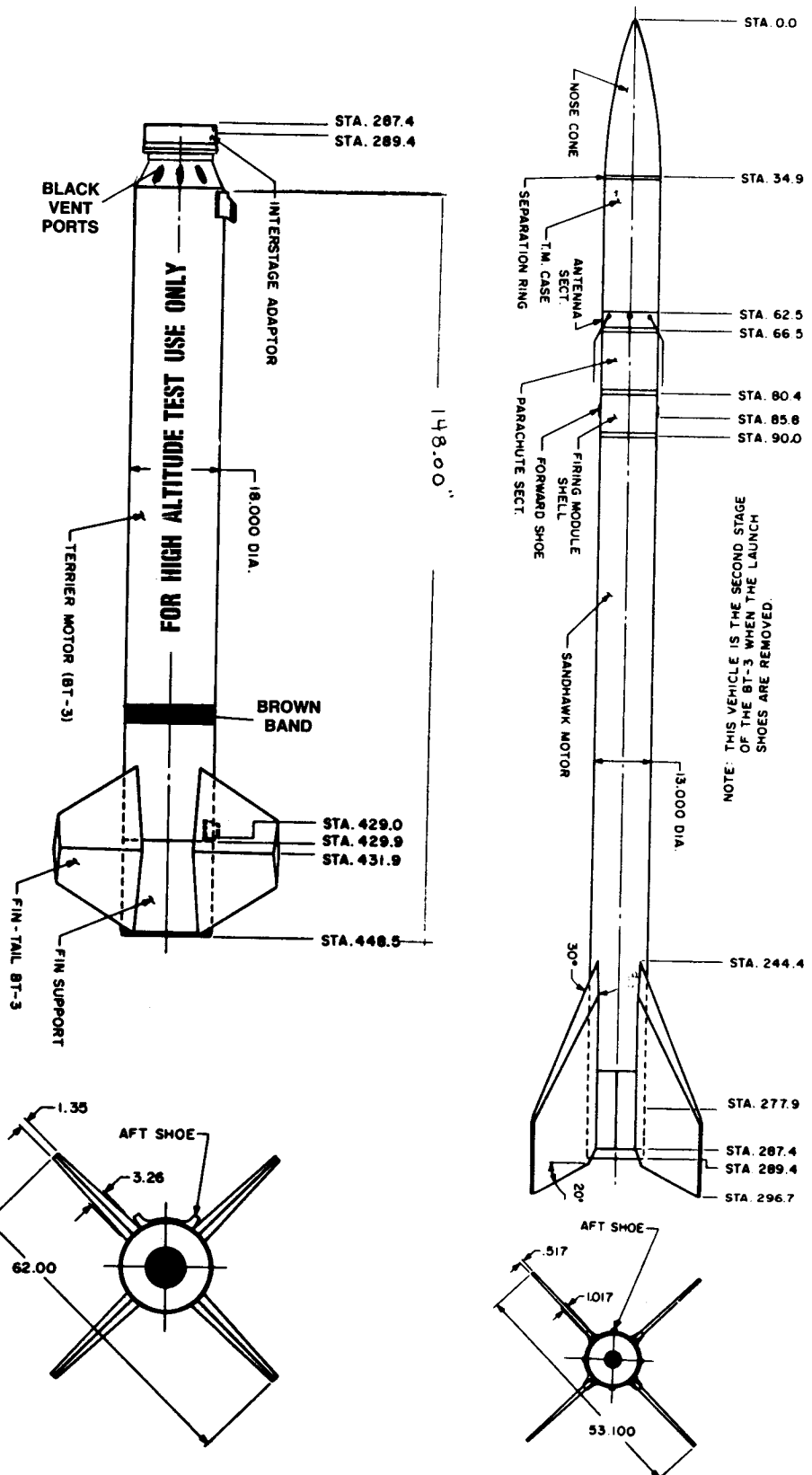
- A. Paint the entire model of the Terrier™ booster gloss white.
- B. The decals in this kit are the water soluble type. To remove the decals from the blue backing paper, soak for two minutes in a bowl of water. The backing paper will then slide easily away.
- C. To apply decals, cut each out and soak in water as described above. When decal uncurls in water, slip decal off backing material and onto model. Blot away excess water. Refer to scale data for proper decal location.

6. FLYING THE SANDHAWK™

- A. Pack six to eight squares of flameproof recovery wadding into the Sandhawk™ body tube. Fold and pack the main parachute into the body tube followed by the payload compartment parachute. Insert payload section and nose cone into the body tube.
- B. For the first flight, fly the Sandhawk™ on a D12-5 engine.
- C. The Sandhawk™ may also be flown with B4-2, B6-2, C5-3, or C6-3 engines when the EM-2050 adapter is used (not included in this kit).

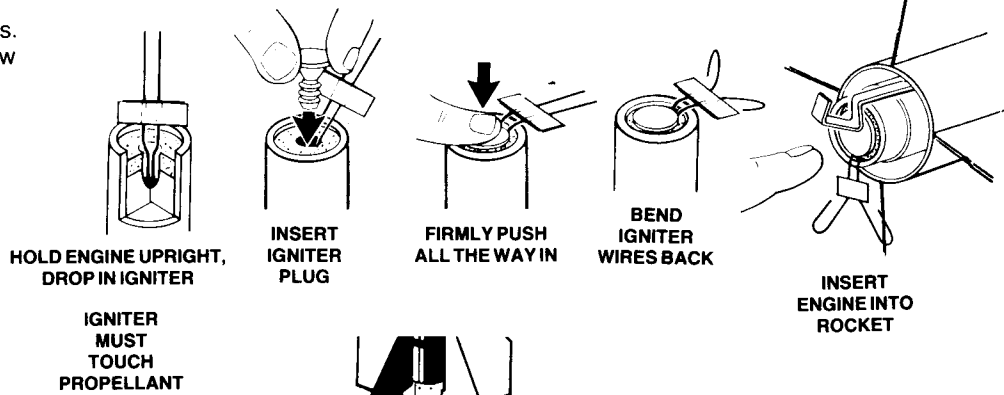
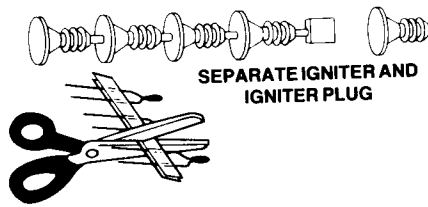
7. FLYING THE TERRIER/SANDHAWK™

- A. Slide the Sandhawk™ onto the Terrier™ booster. If it is not a tight fit, wrap masking tape around the forward end of the adapter until a tight fit is achieved.
- B. Pack six to eight squares of flameproof recovery wadding into the Sandhawk™ body tube. Fold and pack the main parachute into the body tube followed by the payload compartment parachute. Insert payload section and nose cone into the body tube.
- C. For the first flight, fly the Terrier/Sandhawk™ on a D12-3 engine. Use the orange spacer tube with the engine to prevent it from sliding forward.
- D. The Terrier Sandhawk™ may also be flown with an E15-6 or E15-8 engine.



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.



LAUNCH SUPPLIES

To launch your Terrier/Sandhawk™, you will need the following items:

- Estes Power Plex™ Launch Pad and Command Control™ Launch Controller with 6 mm (1/4") Launch Rod
- Estes Recovery Wadding No. 2274
- Recommended Estes Engines:
Terrier/Sandhawk™ - D12-3 (First Flight), E15-6, E15-8
Sandhawk™ only - D12-5
Sandhawk™ with EM-2050 adapter (not included) - B4-2, B6-2, C5-3, C6-3

To become familiar with your rocket's flight pattern, use a D12-3 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 305 meters (1000 feet) square. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are too small, find something larger.

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

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

MISFIRES

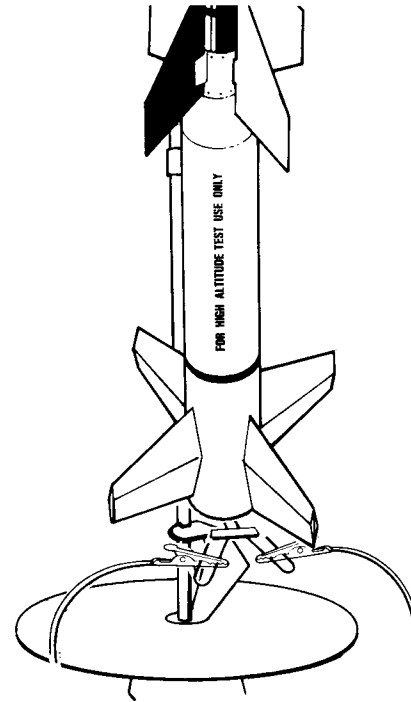
If the igniter functions properly but the propellant does not ignite, keep in mind the following: An Estes igniter will function properly even if the coated tip is chipped. However, if the coated tip is not in direct contact with the engine propellant, it will only heat and not ignite the engine.

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



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

MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER

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.

COUNTDOWN AND LAUNCH

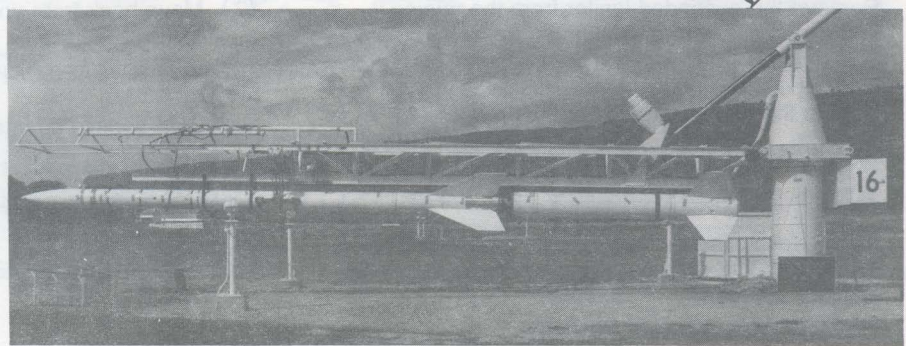
- ⑩ BE CERTAIN SAFETY KEY IS NOT IN LAUNCH CONTROLLER.
- ⑨ Remove safety cap and slide launch lug over launch rod to place rocket on launch pad. Make sure the rocket slides freely on the launch rod.
- ⑧ Attach micro-clips to the igniter wires. Arrange the clips so they do not touch each other or the 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).
- 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.



FOR HIGH ALTITUDE TEST USE ONLY

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