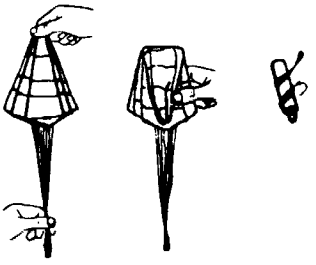
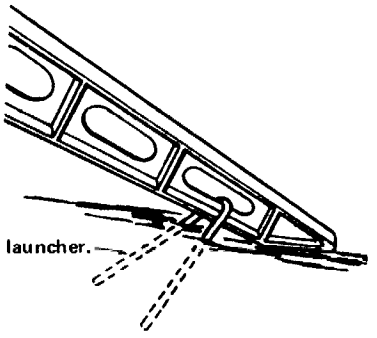

Estes
THUNDER ROC

FLIGHT PREPPING

1. If you are flying your model with Super-C engines, insert the convertible engine mount into your model.
2. Inspect the entire recovery system for good condition before each flight. If recovery system is tangled from last flight, untangle and cut it apart and attach it properly.
3. Insert Centuri crepe or fibre type recovery wadding into your model. This should be loosely packed and you should use enough to protect your parachutes from being burned by the engine's ejection charge. Do not pack too tightly. Fill up about 1-1/2 body diameters with the wadding.
4. Fold the parachutes as shown and insert them into the body tube. Place the nose cone in place, making sure the fit of the nose cone is correct. It should fit snugly.



5. Insert the igniter into the engine following the instructions enclosed with the engines.
6. Insert engine into mount.
7. Mount the rocket on your launcher. Due to the size of the Thunder Roc, it is VERY IMPORTANT that you weight or secure the launch pad in place. This can be done by placing a brick on each leg of the launcher or by cutting apart coat hangers and making stakes as shown. DO NOT ATTEMPT TO LAUNCH YOUR ROCKET WITHOUT SECURING THE LAUNCH PAD IN PLACE. ALWAYS USE A 3/16" DIAMETER LAUNCH ROD WHEN LAUNCHING YOUR THUNDER ROC.



CAUTION:
Coat hanger stake on each leg of launcher.

BUILD AND FLY THE WHOLE SERIES!

THUNDER

THUNDER ROC #5340

CENTURI'S LONGEST ROCKET! THE FIRST OF THE NEW 'D' CONVERTIBLES!

Thunder Roc uses two chutes plus 'Pop'n Go' engine mount for use with 'C's'.

Skill Level: 3
Recovery: . . . Two 16" chutes
Engine Mount: . . . standard & Magnum D; 2 engine locks
Length: . . . 61.5" (156.2 cm)
Body Diam: . . 1.64" (4.2 cm)
Net Weight: . 6.6 oz (187 gm)

THUNDER BIRD #5339

BIG & EASY TO ASSEMBLE! IDEAL KIT FOR THOSE IMPRESSIVE DEMO FLIGHTS!

The long Thunder Bird includes extra large chute for eye-catching recovery.

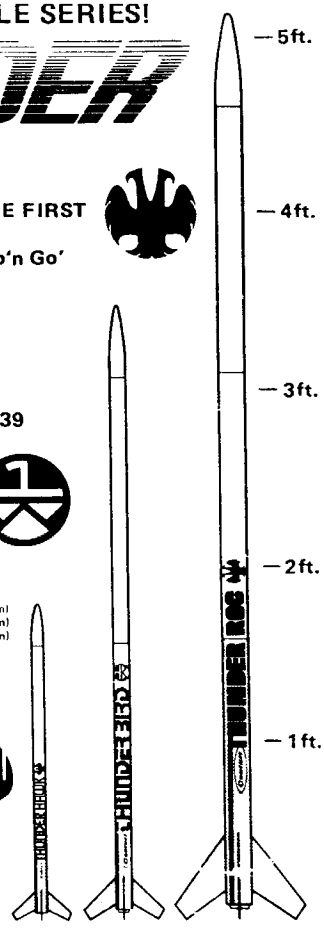
Skill Level 2
Recovery . . . . . 20" chute
Engine Mount: with engine lock
Length: . . . . 41.75" (106 cm)
Body Diam . . . . . 1.0" (2.5 cm)
Net Weight: . . . 2.7 oz (77 gm)

THUNDER HAWK #5338

LONG & LOW PRICED! CENTURI'S LEAST EXPENSIVE LONG KIT!

The sleek Thunder Hawk features extra long streamer for sure recovery.

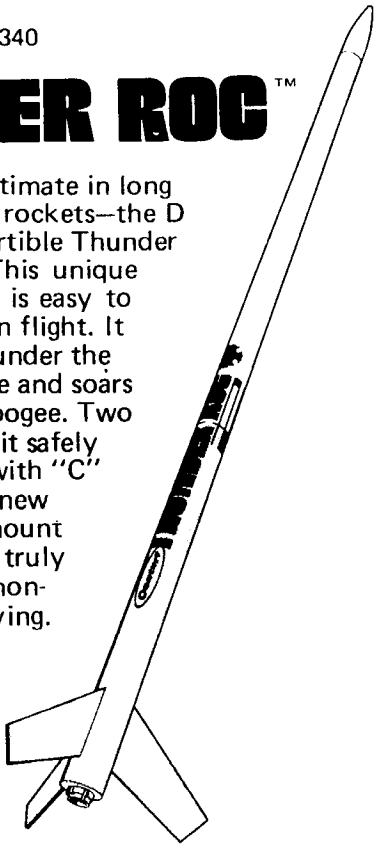
Skill Level 1
Recovery . . . . . Streamer
Engine Mount . . . . . Basic
Length . . . . . 21.5" (54.6 cm)
Body Diam . . . . . .76" (1.9 cm)
Net Weight . . . . . 1 oz (28 gm)



Centuri #5340

THUNDER ROC™

The ultimate in long model rockets—the D Convertible Thunder Roc. This unique model is easy to build and impressive in flight. It thunders off the pad under the power of a "D" engine and soars hundreds of feet to apogee. Two 16" parachutes bring it safely back to earth. Fly it with "C" engines too, with the new "Plug'n Go" engine mount included in the kit. A truly unique model for demonstrations and sport flying.



MODEL ROCKETEER'S SAFETY CODE

CONSTRUCTION
My model rockets will be made of only lightweight materials such as paper, wood, plastic, and thin metallic foils, with the exception of payloads and engine holders made of wirelike material.

ENGINES
I will use only pre-loaded factory made model rocket engines in the manner recommended by the manufacturer. I will not change in any way nor attempt to reload these engines.

RECOVERY
I will always use a recovery system in my model rockets that will return them safely to the ground so that they may be flown again.

WEIGHT LIMITS
My model rocket will weigh no more than 453 grams (16 oz.) at liftoff, and the engines will contain no more than 113 (4 oz.) of propellant, as prescribed by Federal Regulations.

STABILITY
I will check the stability of my model rockets before their first flight except when launching models of already proven stability.

LAUNCHING SYSTEM
The system I use to launch my rockets will be remotely controlled and electrically operated, and will contain a switch that will return to "off" when released. I will remain at least 15 feet away from any rocket that is being launched.

LAUNCH SAFETY
I will not let anyone approach a model rocket on a launcher until I have made sure that either the safety interlock key has been removed or the battery has been disconnected from my launcher.

LAUNCH AREA
My model rockets will always be launched from a cleared area, free of any easy-to-burn materials, and I will only use non-flammable recovery wadding in my rockets.

BLAST DEFLECTOR
My launcher will have a blast deflector device to prevent the engine exhaust from hitting the ground directly.

LAUNCH ROD
To prevent accidental eye injury I will always place the launcher so the end of the rod is above eye level or cap the end of the rod with my hand when approaching it. I will never place my head or body over the launching rod. When my launcher is not in use I will always store it so that the launch rod is not in an upright position.

POWER LINES
I will never attempt to recover my rocket from a power line or other dangerous places.

LAUNCH TARGETS AND ANGLE
I will not launch rockets so their flight path will carry them against targets on the ground, and will never use an explosive warhead nor a payload that is intended to be flammable. My launching device will always be pointed within 30 degrees of vertical.

PRE-LAUNCH TEST
When conducting research activities with unproven designs or methods, I will, when possible, determine their reliability through pre-launch tests. I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.

FLYING CONDITIONS
I will not launch my model rocket in high winds, near buildings, power lines, tall trees, low flying aircraft or under any conditions which might be dangerous to people or property.

CENTURI Engineering Co., Inc., Phoenix, AZ 85001
Printed in U.S.A. 9/79 81637

HOW IT WORKS

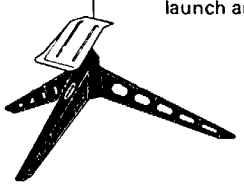
Your Thunder Roc model rocket is designed to fly in the same manner as other model rocket kits. The electrically ignited engine provides the power to boost the rocket to peak altitude. The rocket is guided off the launcher by two launch lugs. At peak altitude the engine's ejection charge is activated to eject the parachutes for recovery. The Thunder Roc returns to Earth ready for another flight. This model can be launched with either a Super-C or Magnum D engine. Refer to the flight instructions later in these instructions for special information about flying your Thunder Roc.

WHAT IT TAKES TO FLY

You will need engines, igniters, an electrical launch system and a 3/16" DIAMETER LAUNCH ROD to launch your Thunder Roc. These supplies are not included in individual rocket kits. Engines, igniters and launch systems are included in every Centuri Starter Set or Rocket Outfit. A 3/16" launch rod is available from your local Centuri retailer or direct from Centuri.

We recommend the use of Centuri Super-C or Magnum D engines; each package includes the famous "Sure-Shot" igniters, acclaimed as the world's most reliable model rocket igniter.

The popular Centuri Power Tower launch stand and Powr-Control launch system are ideal for launching your Thunder Roc. In addition, they can be used to launch any other kit Centuri makes.



Always use standard remote-control electrical ignition and follow the engine recommendations. Be sure to comply with any laws that may apply in your area, for the good of Model Rocketry and your own enjoyment.

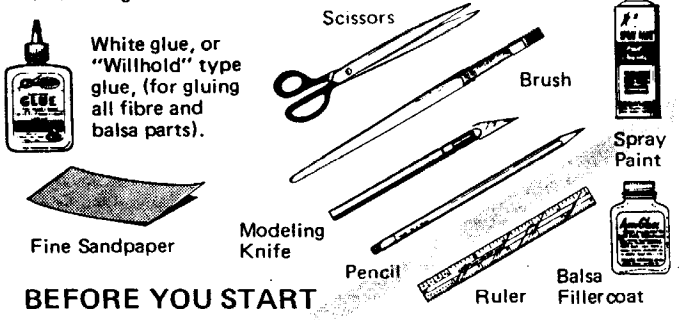
RIGHT MATERIALS FOR THE JOB

Different model rocket kits are made out of a variety of materials, depending on the needs of each kit. The chart below explains why this particular kit is designed using certain materials.

PART	REQUIREMENTS	MATERIAL
Body & Fins	• Light Weight • Strength	Balsa & Paper
Nose Cone	• No finishing • Strength	Plastic

TOOLS YOU WILL NEED

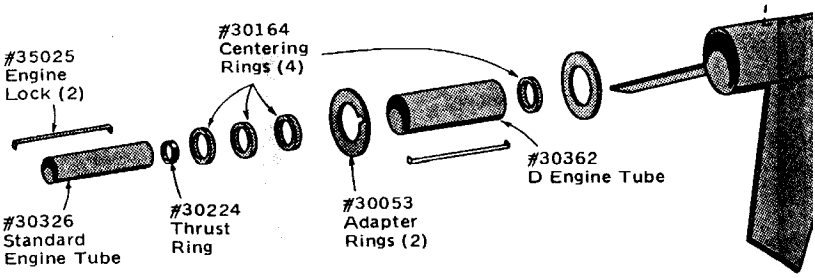
In addition to the parts supplied, you will need the following tools to assemble and finish this kit (DO NOT use model airplane glue for building model rockets).



BEFORE YOU START

If you are new to model rocketry, here are some general tips to get you off to a good start.

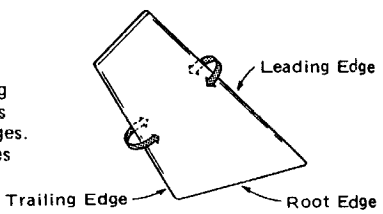
- Choose a practical assembly area: well lighted, big enough to work in, and out of the way of relatives or pets who might accidentally mess up your work.
- Cover your worktable with plywood or heavy cardboard to protect the table from glue, paint, cuts, etc.
- Remove the entire contents of your kit package carefully to avoid losing or damaging small parts. Lay them out neatly and identify each by referring to the "exploded view" drawing on this instruction.
- NOTE: Sometimes certain parts are packed INSIDE of other parts, such as tape discs inside parachutes, decals or couplers inside body tubes, etc.



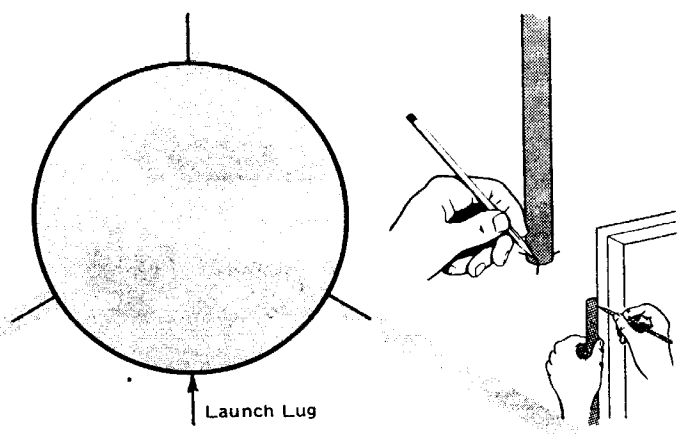
ASSEMBLY INSTRUCTIONS

You MUST follow these instructions for satisfactory flights. The shape and placement of the model's parts has been carefully engineered for safe flights. DO NOT try to change the design, "customize" it, or leave off any parts.

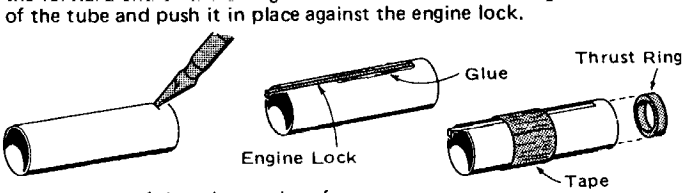
1 Carefully remove the fins from the die cut balsa sheet, using a modeling knife if necessary. Sand the surfaces of the fins to remove any rough edges. Round the leading and trailing edges of the fins as shown.



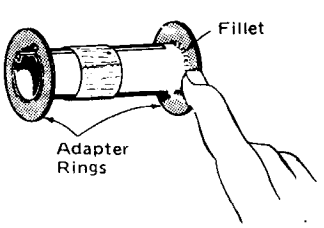
2 Place one body tube over the fin guide below. Mark the body tube with a pencil at each location of the fins and launch lug. Find a convenient groove or channel such as a partially open drawer or door jamb and extend the marks the full length of the tube.



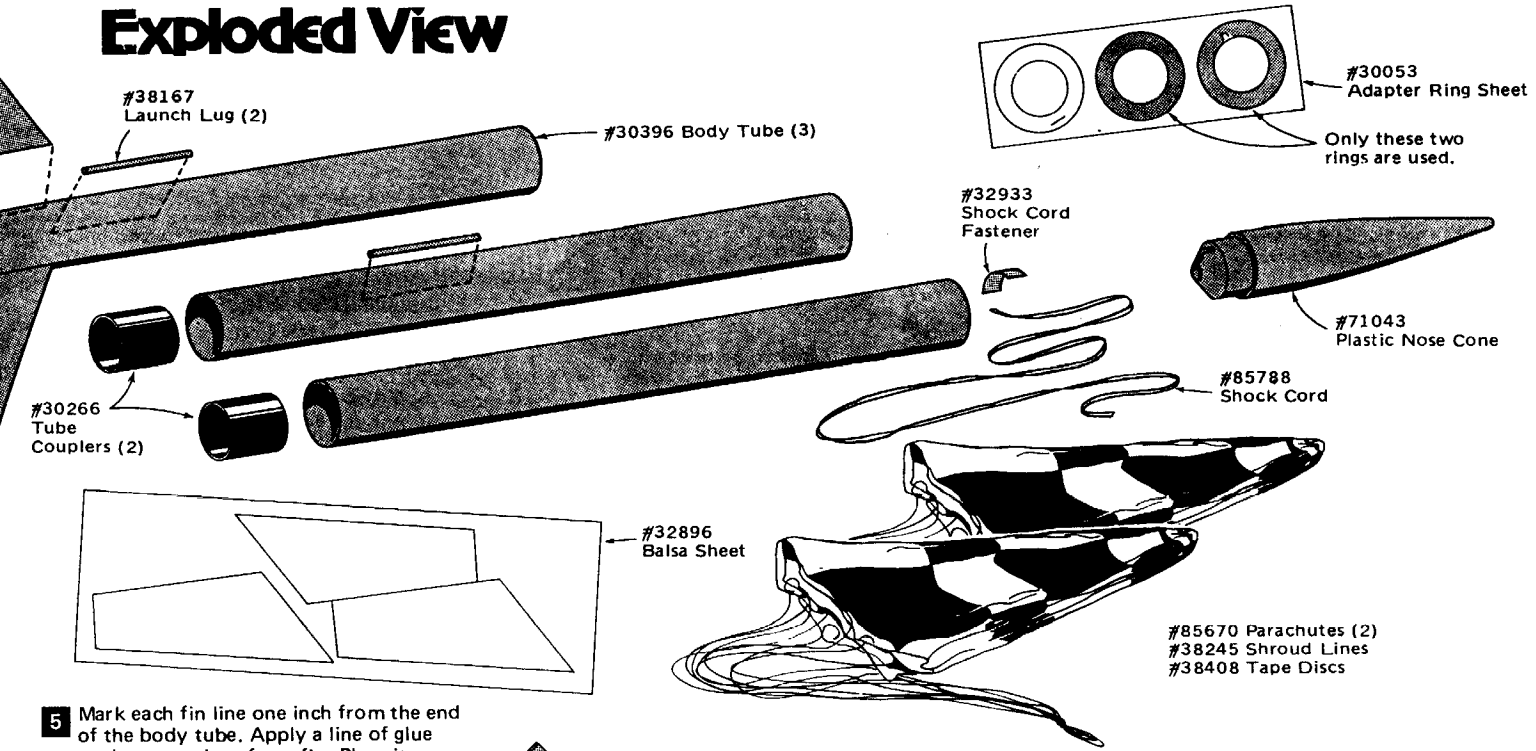
3 Locate the adapter ring set, D engine tube, one engine lock, and one of the four centering rings. Cut a 1/8" wide slit in the D engine tube 1/4" from one end as shown. Apply a 1-1/2" long line of glue to the tube as shown. Push one end of the engine lock into the slit and press the main part of the lock into the glue. Wrap a layer of masking tape around the engine tube as shown. Apply a ring of glue inside the forward end of the D engine tube. Place the thrust ring in the end of the tube and push it in place against the engine lock.



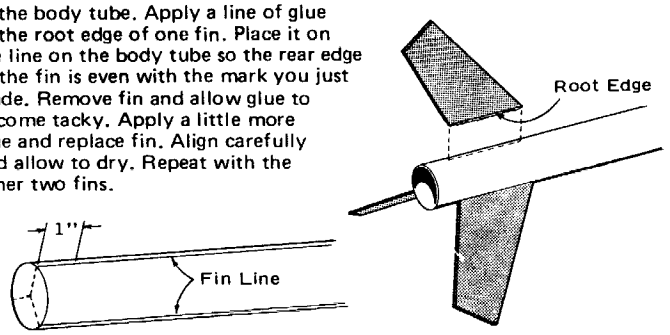
4 Remove two of the adapter rings from the adapter ring set. Glue one ring to each end of the D engine tube as shown. The notched ring should be placed over the engine lock. Apply a glue fillet to each side of the ring. A fillet is made by applying a line of glue to the joint and smoothing it with your finger as shown. This adds extra strength to your model and is very important.



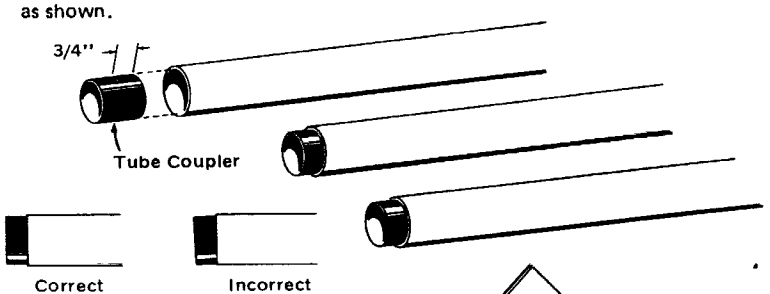
Exploded View



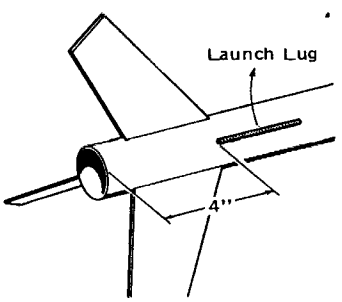
5 Mark each fin line one inch from the end of the body tube. Apply a line of glue to the root edge of one fin. Place it on the line on the body tube so the rear edge of the fin is even with the mark you just made. Remove fin and allow glue to become tacky. Apply a little more glue and replace fin. Align carefully and allow to dry. Repeat with the other two fins.



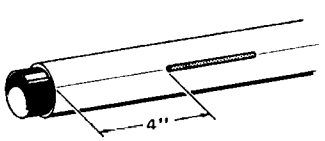
6 Locate the two remaining body tubes and the two tube couplers. Mark each tube coupler 3/4" from one end. Apply a line of glue inside one end of each body tube and insert a tube coupler in each so the line is even with the end of the body tube. Align carefully as shown.



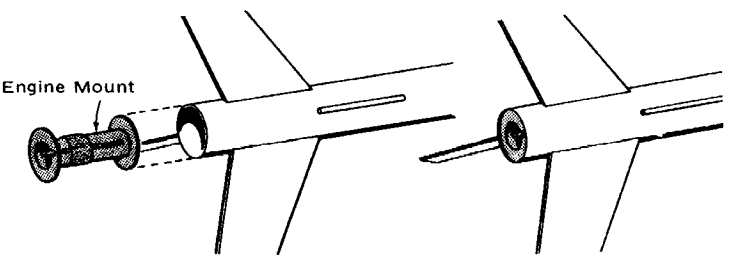
7 Locate one of the launch lugs. Mark the launch lug line 4 inches from the end of the lower body tube. Place a line of glue on the launch lug and glue it in place so the rear of the launch lug is even with the mark you just made. Align carefully so launch lug is straight in relation to the body tube and allow to dry.



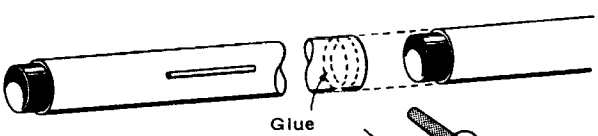
8 Place one of the remaining tubes in the groove or channel used in step 4. Draw a single line the length of the body tube. Mark the tube 4" from the end with the coupler. Apply glue to the other launch lug and glue it along this line so that the end of the launch lug is even with the mark you just made.



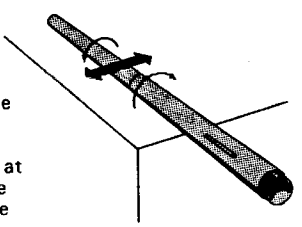
9 Test fit the engine mount in the end of the lower body tube. Remove and apply glue inside the lower body tube. Insert engine mount into the tube until the rear ring is just inside the end of the body tube and the engine lock is aligned with the launch lug.

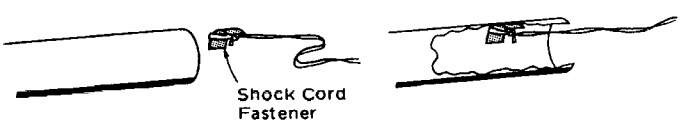


10 Apply glue to the inside of the end of the body tube with the second launch lug. Join the third body tube section to the middle section, aligning carefully so the tubes are straight. Roll the tubes on a flat surface (hanging the end with the launch lug over the edge) to be certain they are properly aligned.

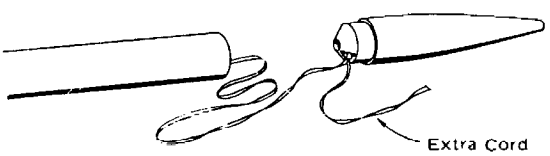


11 Locate the shock cord and mount. Tie the shock cord around the mount as shown. Apply glue to the mount and glue in place in the upper body tube, at least 1-1/2" from the open end of the tube. Tamp the mount firmly in place and allow to dry.

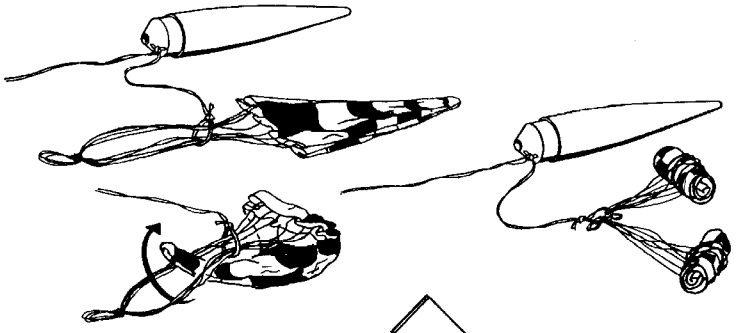




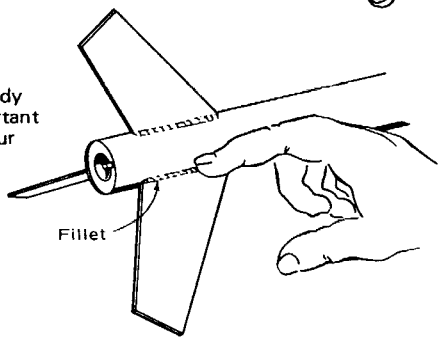
12 Tie the free end of the shock cord to the nose cone as shown. Allow approximately 2–3 inches of extra cord to extend beyond the end of the cone attachment.



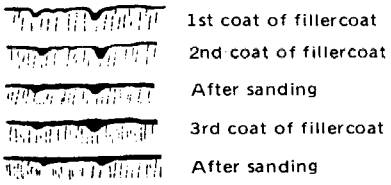
13 Assemble the parachutes according to the instructions printed on them. Tie a loop in the free end of the shock cord near the nose cone. Run the shroud lines through the shock cord loop. Separate the shroud lines evenly and bring the parachute up through as shown below and then pull tight.



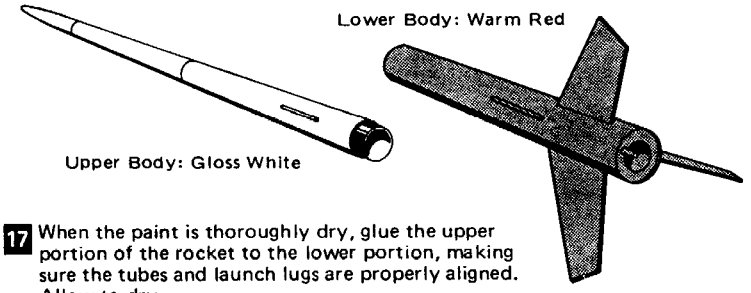
14 Apply glue fillets to all fin/body tube joints. This is very important and adds extra strength to your model.



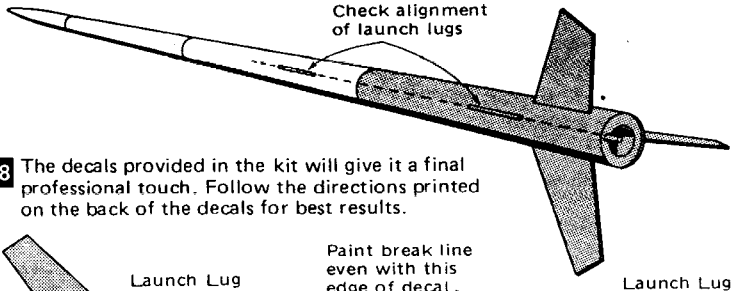
15 Using a sanding sealer or balsa fillercoat, fill the wood surfaces of your model to obtain a smooth finish. Use several coats and sand between each coat to get a smooth finish.



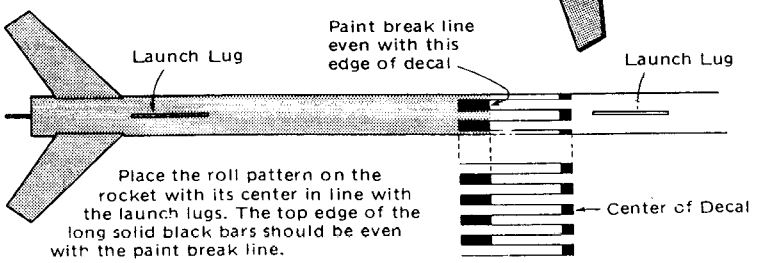
16 Your model will look more professional and last longer if you give it a good paint job. Paint the upper body and nose cone gloss white. The lower body can be painted any bright color such as warm red. Use enamel spray paint for the best results. Do not try to paint your model in one coat, but use several light coats and one finish coat.

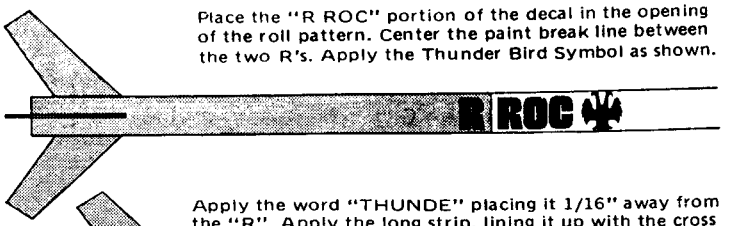


17 When the paint is thoroughly dry, glue the upper portion of the rocket to the lower portion, making sure the tubes and launch lugs are properly aligned. Allow to dry.

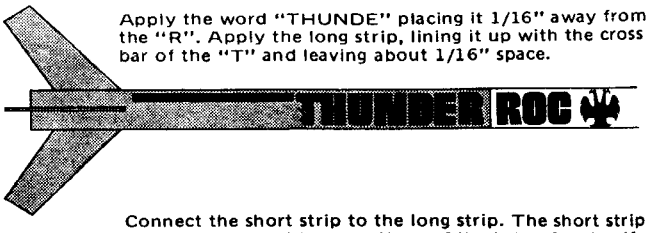


18 The decals provided in the kit will give it a final professional touch. Follow the directions printed on the back of the decals for best results.

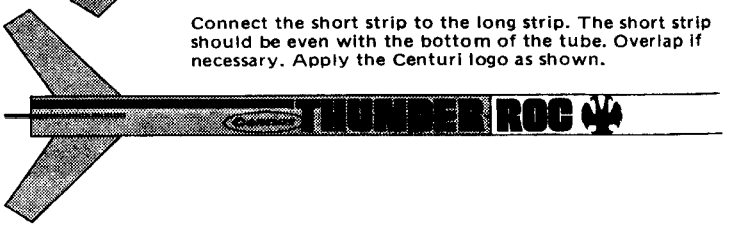




Place the "R ROC" portion of the decal in the opening of the roll pattern. Center the paint break line between the two R's. Apply the Thunder Bird Symbol as shown.



Apply the word "THUNDE" placing it 1/16" away from the "R". Apply the long strip, lining it up with the cross bar of the "T" and leaving about 1/16" space.

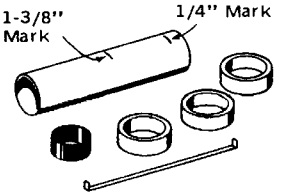


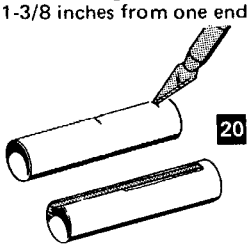
Connect the short strip to the long strip. The short strip should be even with the bottom of the tube. Overlap if necessary. Apply the Centuri logo as shown.

WHEN FLYING YOUR THUNDER ROC WITH SUPER C ENGINES, USE THE EASY TO CHANGE ENGINE MOUNT SHOWN BELOW.

19 Locate the three remaining centering rings, the thrust ring, the remaining engine lock and the engine tube.

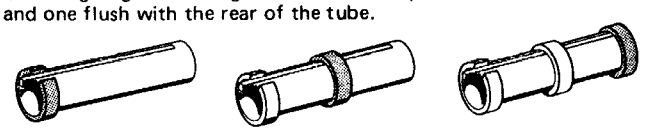
Mark the engine tube 1/4 inch and 1-3/8 inches from one end.



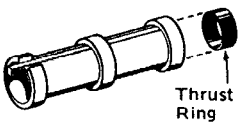


20 Cut a 1/8" slit in the engine tube at the 1/4" mark. Run a line of glue along the tube, 1-1/2" from the slit. Put the engine lock into place and wipe away excess glue.

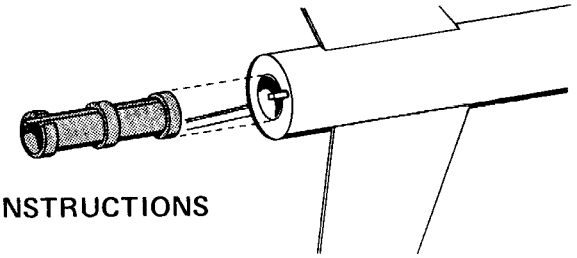
21 Cut a 1/4" gap in one of the three centering rings. Glue this ring to the rear end of the engine tube as shown. Glue the remaining two centering rings to the engine tube as shown, one over the 1-3/8" mark and one flush with the rear of the tube.



22 Run a ring of glue inside the forward end of the engine tube. Place the thrust ring in the end of the engine tube and push it into place against the engine lock.



23 When all the glue has dried, test fit the mount inside your model. The engine lock on the Thunder Roc should hold the mount in place. It can quickly be removed to convert your model back to D engines.



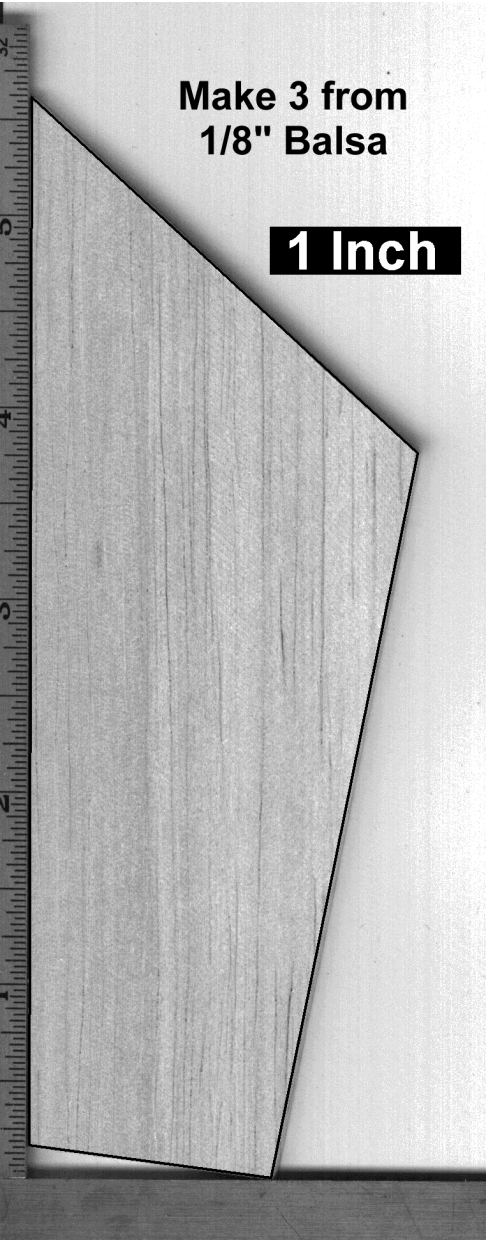
FLYING INSTRUCTIONS

ENGINES

Igniters and complete instructions are included in "Engine Operating Instructions" which accompany all Centuri Super-C and Magnum D engines.

Your THUNDER ROC can be launched with the following engines:

ENGINE	APPROX. ALTITUDE	PURPOSE
C5-3S	100 feet	LOW ALTITUDE: for small launching areas
D12-5	200-500 feet	MEDIUM ALTITUDE: for general flying and average sized launch areas.


Make 3 from
1/8" Balsa
1 Inch


R ROC
THUNDE
#36857
Centurı

THUNDER

FROM CONTEST'S LONG 'N LEAN LINE

THE LONGEST LONGEST

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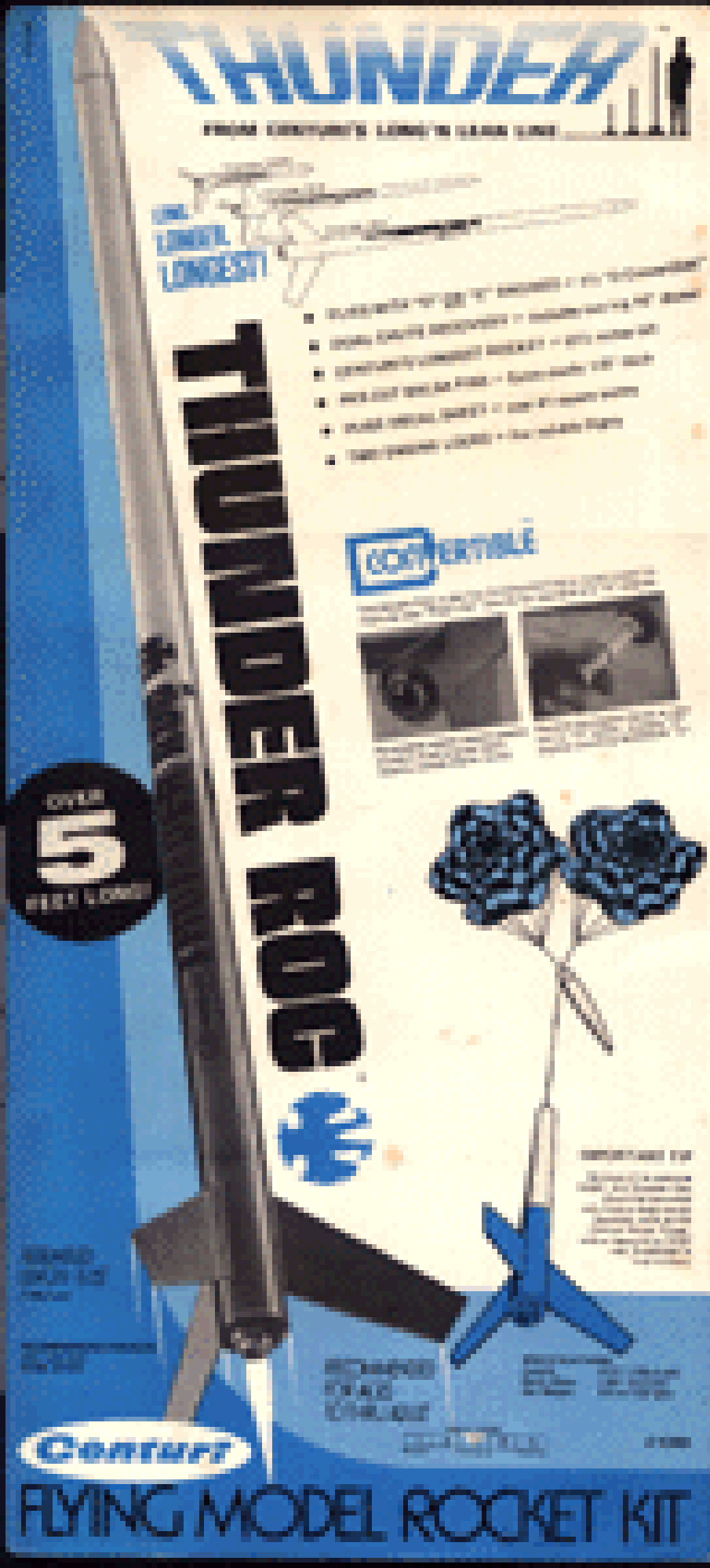
THUNDER ROG



OVER 5 FEET LONG!

Centuri

FLYING MODEL ROCKET KIT