ROCKET ASSEMBLY

1. Mark engine mount tube at 1 inch and 2\(\frac{1}{2}\) inches from one end. Cut a 1/8 inch wide slit at the 2\(\frac{1}{2}\) inch mark.

2. A. Check fit of completed engine mount in body tube. Sand adapter ring edges if necessary.

A. Apply glue around inside of one end of body tube. Glue should be about 3/4 inch from end of tube.

C. Push engine mount into body tube until tube ends are even.

D. Add glue reinforcement around rear ring and body tube joint as shown.
3. Cut out tube marking guide above.
   B. Wrap guide around the tube and tape. Mark tube at arrows. Remove guide.
   C. Draw straight lines connecting each pair of marks.

4. Cut out fin pattern from pattern sheet.
   B. Use ball point pen to trace 2 fins on each balsa sheet as shown on fin pattern.
   C. Cut out fins with hobby knife and metal-edged ruler.
   D. Stack fins together and sand all edges smooth. Lightly sand away any remaining pen lines.

5. Apply glue to the root edge of a fin. Glue fin next to alignment line. Repeat for other fins. Apply each fin on same side of its fin alignment line. Let each fin dry several minutes before applying the next fin.
   B. Looking at the rocket from the rear, the fins should be in the positions shown with the trailing edge of each fin even with the end of the tube.
   **FINS MUST BE ATTACHED CORRECTLY FOR STABLE FLIGHT**

6. Glue launch lug to fin-body tube joint as shown.
7. A. Cut shock cord mount from top of page 2.  
   B. Crease on dotted lines by folding. Spread glue on section 1 and lay end of shock cord into glue. Fold over and apply glue to back of first section and exposed part of section 2. Lay shock cord as shown and fold mount over again.  
   C. Clamp unit together with fingers until glue sets.

8. A. Apply glue to inside front of body tube to cover an area no less than 2 to 3 inches from end. The glued area should be same size as shock cord mount.  
   B. Press mount firmly into glue as shown.  
   C. Hold until glue sets.

9. A. Apply a glue reinforcement to each fin/body tube joint.  
   B. Allow glue to dry thoroughly.

10. Trim excess plastic from around sides of nose cone with a sharp knife. Also remove any excess plastic from inside molded eyelet. Wipe nose cone with damp cloth to remove oil and dirt.

11. A. Cut out parachute on edge lines.  
   B. Cut three 23 inch lengths of shroud line.  
   C. Form small loops with shroud line ends and press onto sticky side of tape discs.  
   D. Attach tape discs with line ends to top of parachute as shown.  
   E. Firmly press tape discs into place until both tape discs and parachute material are molded around shroud line loops.  
   F. Pass shroud line loops through eyelet on nose cone. Pass parachute through loop ends and pull lines against the nose cone.  
   G. Tie free end of shock cord to nose cone eyelet.
FINISHING YOUR ROCKET
Apply sanding sealer to wood parts with small brush. When sealer is dry, lightly sand all sealed surfaces. Repeat sealing and sanding until balsa grain is filled and smooth. When sanding sealer and glue are completely dry, paint model with spray enamel. Follow instructions on spray can for best results. Let paint dry overnight before masking to paint second color. To apply decals, cut each out, dip in lukewarm water about 30 seconds, and hold until it uncurls. Refer to photograph on front of color panel for decal placement. Slip decal off backing sheet and onto model. Blot away excess water. For best results, let decals dry overnight and apply a coat of clear spray paint to protect decals.

ROCKET PREFLIGHT

CRUMPLE AND INSERT 4 TO 5 SQUARES OF RECOVERY WADDING

SPIKE FOLD ROLL
WRAP LINES LOOSELY AROUND 'CHUTE INSERT PARACHUTE IN ROCKET
INSTALL NOSE CONE IN PLACE

PREPARE ENGINE

SEPARATE THE IGNITERS
ENGINE INSERT IGNITER
IGNITER TIP MUST TOUCH PROPELLANT DEEP INSIDE NOZZLE OPENING
APPLY AND FIRMLY PRESS MASKING TAPE IN PLACE
INSTALL ENGINE IN ROCKET
HOOK MUST LATCH OVER END OF ENGINE

LAUNCH SUPPLIES
To launch your rocket you will need the following items:
—Estes Electrical Launch System and Launch Pad
—Estes Recovery Wadding No. 2274
—Recommended Estes Engines: A8-3 (First Flight), B4-4, B6-4, or C6-5.
Use A8-3 for first flight to become familiar with your rocket’s flight pattern.
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 500 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 40° Fahrenheit (4° Celsius)].
Parachute may be dusted with talcum powder to avoid sticking.

MISFIRES
Failure of the model rocket engine to ignite is nearly always caused by incorrect igniter installation. 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 tape the igniter leads firmly to base of engine as illustrated above. Repeat the countdown and launch procedure.

FOR YOUR SAFETY AND ENJOYMENT
Always follow the NAR-HIA* MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities.
*National Association of Rocketry-The Hobby Industry of America

COUNTDOWN AND LAUNCH

LAUNCH ROD
LAUNCH LUG
MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER
BLAST DEFLECTOR

10 REMOVE SAFETY KEY to disarm the launch controller.
9 Remove safety cap and slide launch lugs 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).
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—Replace cap on rod.
RASCAL FIN PATTERN

RASCAL KIT #2021
FIN PATTERN
PN 084202

1. CUT OUT FIN PATTERN
2. TRACE 2 FINS ON EACH BALSA SHEET AS SHOWN
3. CUT OUT FINS WITH HOBBY KNIFE AND METAL EDGE RULER
RASCAL™

SKILL LEVEL 1. Over one foot (30 cm) tall and brawny with flights to 800 feet (244 m), this model is sure to be a hit at rocket demonstrations. Kit features plastic nose cone, kit decal, 12 inch (30 cm) parachute, and 3/32” (2 mm) balsa fin stock.

Length: 13.6” (34.5 cm) Dia.: 1.637” (41.6 mm) Wt.: 1.5 oz. (42.5 g)

ENGINES: A8-3 (1st Flt.), B4-4, B6-4, C6-5.

No. 2021
Flying Model Rocket

RASCAL

FLYING MODEL ROCKET
SKILL LEVEL 1
ASSEMBLY REQUIRED

LAUNCH UP TO 600 FEET!