

SCALE

Kits

"D - Series"

Apex



Flights to 600'

Height - 32.2"

Weight - 4.7 oz.

Diameter - 1.6"

Motor Mount - 24mm

Recommended Motor - D12-5

Model Rocket Safety Code

Materials. I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.

Motors. I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.

Ignition System. I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.

Misfires. If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.

Launch Safety. I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance.

Launcher. I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.

Size. My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If my model rocket weighs more than one pound (453 grams) at liftoff or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration regulations before flying.

Flight Safety. I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.

Launch Site. I will launch my rocket outdoors, in an open area at least as large as required by the NAR in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.

Recovery System. I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.

Recovery Safety. I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

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Instructions

Cloning Note: Use Estes Big Bertha nosecone

Parts List

- 1 - 1.6" Elliptical Nose Cone
- 1 - 29.7" long 1.6" diam. Airframe *18" + 30cm*
- 2 - 1/8" balsa sheets
- 4 - balsa conduits
- 1 - 3" long motor mount tube
- 2 - centering rings
- 1 - engine block
- 1 - engine hook
- 1 - 18" mylar parachute
- 1 - 16 hole reinforcers
- 1 - 9 ft shroud line
- 1 - shock cord mount
- 1 - small swivel hook
- 1 - launch lug
- 1 - 36" elastic shock cord
- 1 - 1 oz of clay weight
- 1 - Fin pattern guide
- 1 - Sheet of decals
- 2 - red vinyl stripes *22" w. x 1/2" height*
- 1 - red vinyl stripe

Building items needed but not included are:

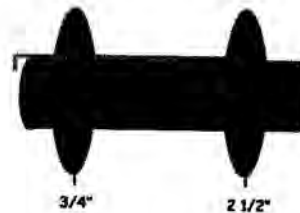
- White glue
- Razor blade knife
- CA glue
- Medium and Fine sandpaper
- Measuring device
- Paint

This kit is designed to fly with "D" motors.

Do not modify the design of this rocket as such changes will adversely affect the performance and safety of flights. Only use recommended motors.

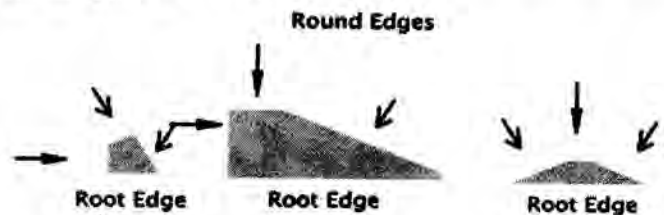
Step 1

Make $\frac{1}{8}$ " slot $2\frac{1}{2}$ " from the back of the motor mount tube for the engine hook. Insert the engine hook so that it hangs over the end of the tube $\frac{1}{2}$ ". Take the motor mount tube and make two marks on it for the centering rings. The first mark should be $\frac{3}{4}$ " from the bottom of the motor mount tube and the second at $2\frac{1}{2}$ " inches from the bottom of the motor mount tube. Sand the inside of each centering ring so that they fit easily onto the motor mount tube. Slide each of the centering rings onto the tube until they meet the lines drawn. Glue one side of each ring and let dry upright. Turn over the assembly and glue the opposite side of the rings into place and let dry. Glue the engine block into the forward end of the motor mount so that it rests against the forward tip of the engine hook.



Step 2

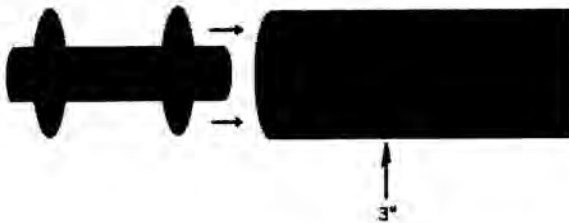
Take the balsa fin stock and using the fin patterns cut out 4 of each fin making sure the grain is lined up as shown on the fin patterns. Using fine sandpaper, smooth both sets of fins rounding the leading and trailing edges. Do not sand the root edges which will attach to the airframe. Apply sealer to the fins in multiple coats sanding thoroughly between each coat.



Take the 4 tail fins and using an exacto knife make a notch slightly smaller than $\frac{1}{8}$ " wide in the leading edge of the fin. The notch should be parallel to the root edge and at a distance of 1" from the root edge. It should be $\frac{1}{2}$ " deep.

Step 3

Take a scrap piece of wood or dowel and place glue 3" from the bottom of the airframe on the inside of the tube (this is where the top centering ring should come to rest). Push the motor mount with centering rings into the bottom end of the airframe until the bottom of the motor mount is $\frac{1}{2}$ " above the bottom of the airframe. Now apply CA to the bottom centering ring to glue it to the airframe.



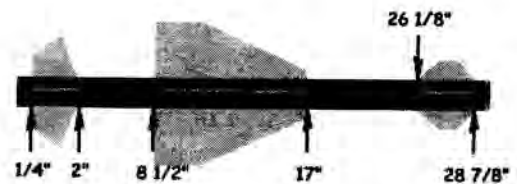
Step 4

Cut out the fin mark guide supplied in the kit and wrap onto the airframe and secure with tape. Make a mark at the top and bottom of the fin mark guide on the airframe for each fin, conduit and launch lug mark. Remove the fin mark guide and use a long straight edge to mark a line along the complete airframe length for each of the pairs of marks made from the fin mark guide.



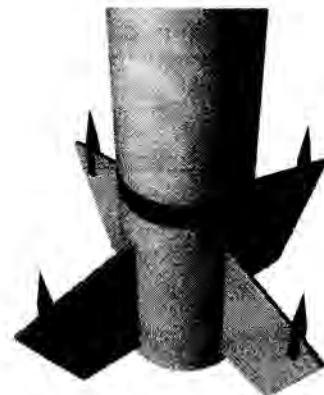
Step 5

Lightly sand the entire airframe with fine sandpaper to prepare it for gluing and finishing. Make 6 marks along each of the four fin lines from step 4. The marks should be at $\frac{1}{4}$ ", 2", $8\frac{1}{2}$ ", 17", $26\frac{1}{8}$ ", and $28\frac{7}{8}$ " from the bottom end of the airframe. Lightly sand the airframe along each of the fin lines between the pairs of marks on the airframe. This will give the glue a better bonding surface. Using CA, glue each of the four tail fins, main fins, and nose fins to the fin lines, aligning each fin before the glue dries. When all twelve of the fins are set apply glue fillets to both sides of each fin.



Step 6

Take the four poplar radar antennas and sand the leading end of the dowel into a point. Using either thick CA or epoxy, glue each of the four radar antennas into the notches on the tail fins.



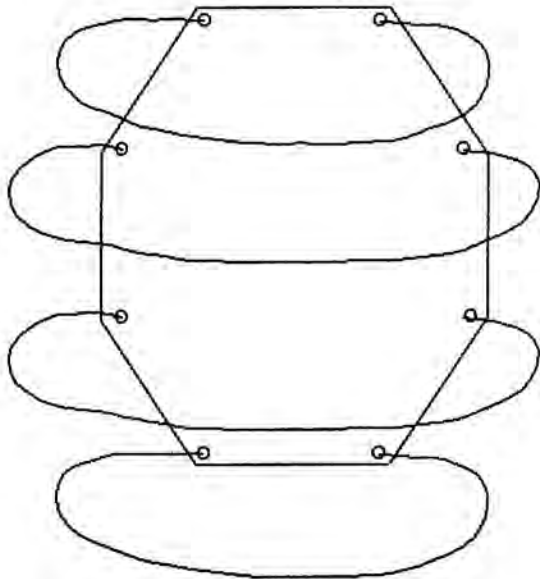
Step 7

Glue the shock cord to the shockcord mount folding along the lines as you glue. When dry, glue the shock cord mount on the inside of the airframe, far enough from the top of the airframe so that the nose cone slides on easily. Cut the launch lug in two. Take the two launch lugs and glue them along the launch lug line made in step 4. The lower lug should be located at the bottom of the airframe. The upper launch lug should be located 16" from the bottom of the airframe. Take the 4 balsa conduits and place 1" below each of the four upper fins along each fin line.

Step 8

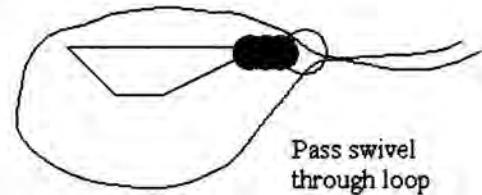
Assemble the parachute as shown below using the hole reinforcers and the string provided. Use a hole punch to make the holes in the mylar. Cut the string into 4 equal lengths and attach after placing a hole reinforcer on each side of the hole.

Parachute Kit



Step 9

Gather all of the shroud lines of the parachute at their midpoints and pass them through the hole of the swivel with lock to make a loop on the other side. Pass the swivel through the loop securing the shrouds around the swivel.



Attach the other swivel to the shock cord by passing the elastic through the other end of the swivel and securing with a tight knot 8" from one end of the shock cord. Clip the swivel with the parachute to the swivel attached to the shock cord. Attach that end of the elastic shock cord to the eyelet of the nose cone with a secure knot. Take the clay provided and insert into the nose cone, packing it into the forward end.

Step 10

Fill tube seams if desired. Paint using the scheme shown on the next page. The entire rocket should be painted gloss white. Two 1/4" wide red vinyl stripes should be applied at 2 1/2", and 7 1/4" from the bottom of the airframe. The silver or red vinyl stripe can be applied at 17 1/2" from the bottom of the airframe. This should be just above the main fins. Add decals by cutting them out and placing in water for several seconds and applying to the rocket. Apply sealer to the decals. Spray entire model with sealer to complete kit.

Paint and Decal Scheme



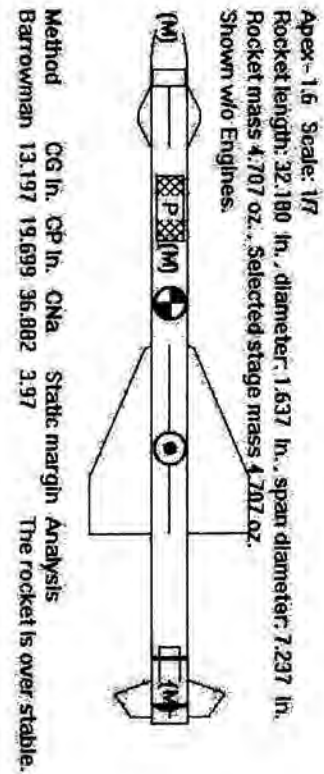
Estimated Altitudes

<u>Motor</u>	<u>Altitude</u>
D12-5	600'

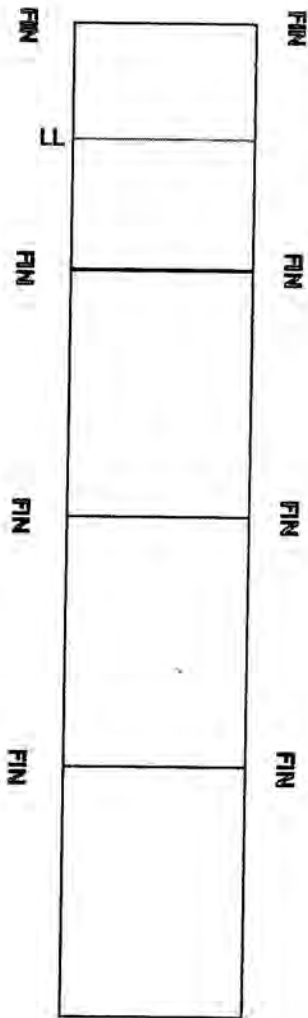
These are estimated altitudes based on a completed rocket weight of 4.7 oz. Actual weight will cause differences in the flight profile obtained.

Flight Prep

Make sure to use plenty of wadding, at least three times the width of the body tube, or a shield like nomex to protect the chute from the exhaust gas. Always test that the cg is at least one body diameter in front of the cp using the diagram below as a guide.



Fin Pattern Guide



Because Scale Kits cannot control or monitor the use of its products once they are sold, the Buyer assumes all risks, responsibilities, and liabilities therein. The Buyer also, from using this product accepts these risks, responsibilities, and liabilities.

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