RAC #10020

Space Needle Jr.

ROGUE AEROSPACE

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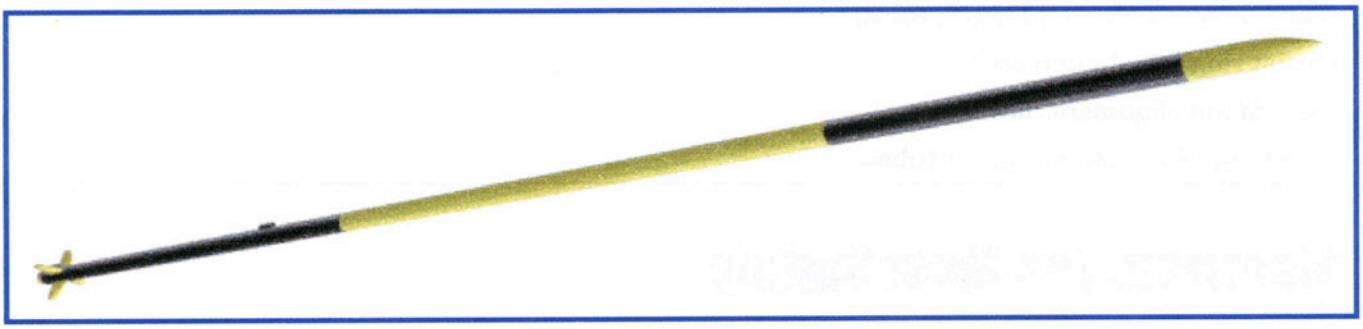
Skill Level 1

Incredible flights on Apogee Micro-Motors!

Recommended Engines: ½A2-4, A2-7, B2-9 (all Micro-Motors)

"Micro-Motors" (10.5mm diameter model rocket engines) are available exclusively from Apogee Components*



Rules to Live By

1. Before you begin to build your model, **make sure you have read and understood all steps in these instructions.** It's much better to spend a few minutes becoming familiar with these instructions now, than a few hours trying to correct a major mistake later. A good rocketeer is a careful modeller. Do not proceed with any step until you are certain you know what to do. Make all measurements twice before cutting or gluing.

2. **Do not alter the basic design of this model rocket in any way.** Most importantly, do not reduce the number or size of fins, shorten the body tube, use a different nose, or add fins to the rocket. Any of these changes would affect the stability of the rocket and could cause it to lose the ability to fly straight. An unstable rocket is less than worthless and is no fun for anyone. Of course, you can change the color scheme, decals, and so forth as you wish.

3. Once you've finished your rocket, **launch it only in accordance with the Model Rocket Safety Code** created by the National Association of Rocketry. A copy of the Code is included with your model. If you don't follow the Code, you could jeopardize the future of model rocketry…and make every other model rocketeer in the world angry. Follow the Code.

Rogue Aerospace Corporation has exercised reasonable care in the design and manufacture of this kit, and warrants it to be free from manufacturing defects for 1 year from the date of purchase. If your kit is missing a part, please call or e-mail us for a replacement.

*Apogee Components can be reached in any of the following ways:
World-Wide Web: http://www.ApogeeRockets.com
E-Mail: 102374.2533@compuserve.com
Voice/Fax: (719) 548-5075
Mailing Address: 1431 Territory Trail, Colorado Springs, CO 80919-3323

Materials Included in this Kit

T-11 paper tube (86cm [34"] long)
BNC-11B balsa nose (2" Long, + 1/2" long shoulder)
TR-10 thrust ring
Screw eye
Two LL-3 3mm (1/8") launch lugs (each 13mm [1/2"] long)
KC-4 Kevlar tether (2m [79"] long)
Nomex streamer (61cm [24"] by 2.5cm [1"])
Balsa fin stock (1.5mm [1/16"] thick)
Thrust ring installation dowel
Launch lug alignment dowel
Set of two Micro-Motor spacer tubes

Materials You Must Supply

Adhesives (see note below)	Masking tape
Pencil	Fine and extra-fine sandpaper
Scissors	Paint
Hobby knife	Sanding sealer (optional)
Metal ruler	

A Note on Adhesives

There are several different kinds of adhesives (glues) you can use to build this kit. The most common is white or "school" glue. This glue works fine, but you must hold freshly glued parts in place for quite a while before the glue sets. Wood or carpenters' glue is stronger than white glue. A very useful adhesive is cyanoacrylate (CA), also known as "super glue" or "hot stuff." If you want to use CA, you should buy "medium thickness" CA from a hobby shop – and you should be *very* careful not to glue yourself to your model! When you use CA, always have "debonder" on hand in case of emergency.

Whenever you must glue parts together in building this kit, you can use any of the glues listed above, unless a specific glue is mentioned in the instructions. You can generally substitute wood glue for white glue, and CA for plastic cement.

Assembly Instructions

1

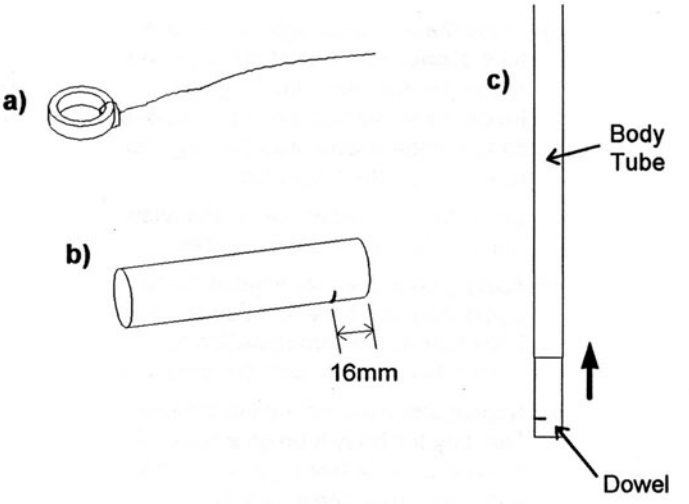
Install thrust ring.

a) Tie one end of the Kevlar tether *securely* to the thrust ring.

b) Mark the thrust ring installation dowel (the thicker dowel) 16mm (5/8") from one end.

c) Spread glue inside the body tube, using a scrap piece of balsa or dowel if possible. Use the thrust ring installation dowel to push the thrust ring into the tube until the mark you made is even with the back of the body tube. Allow the Kevlar tether to hang out the back of the tube. Remove the dowel once the thrust ring is in position.

d) Make certain the Kevlar tether is not trapped by glue or the thrust ring. Tape the free end of the tether to one end of the launch lug alignment dowel (the thinner dowel). Use the dowel to push the tether through the body tube and out the front end.



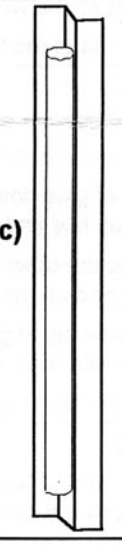
2

Mark body tube.

a) Cut out the fin marking guide. Wrap it around the body tube and tape it together. Using a pencil, make a mark on the body tube for each mark on the marking guide. Label the Launch Lug mark with an "L" so you will remember it later.

b) Slide the fin marking guide on the tube so that one edge is 13mm (½") from one end of the body tube. Use the guide to draw a ring around the body tube at that point.

c) Remove the fin marking guide. Using a piece of angled metal or a door jamb, extend the marks you made the length of the body tube.



3

Make fins.

a) Cut out the fin pattern. Lay it on the balsa sheet as shown and draw outlines for four fins. Make sure you lay out the fins *exactly* as shown, so the balsa grain will be aligned properly!

b) Using a hobby knife, cut out the fins along the outlines you drew. It is easier to cut a straight line if you use a metal straight-edge as a guide.

c) Stack all four fins together and sand their edges so they are straight and even.

4

Attach fins.

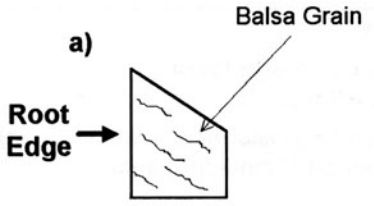
a) Apply glue to the root edge of one fin. Make certain you choose the correct edge as shown.

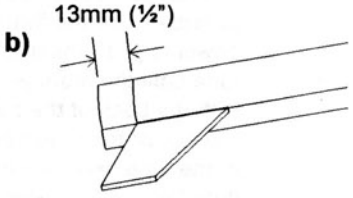
b) Press the root edge against the body tube aligned with one of the lines you made (but not the launch lug line). Place the fin so that the back corner of its root edge is even with the ring you drew around the body tube.

c) Immediately remove the fin and allow the glue to dry for a few minutes.

d) Apply glue to the root edge of the fin again, and press the fin against the body tube in the same position as before. Hold it there until the glue sets.

e) Repeat steps a-d for the other three fins. Lay the body tube on a table with the end with the fins hanging off the edge, and allow the glue to dry.





5

Prepare nose cone.

a) Screw the screw eye into the base of the balsa nose cone by hand. When it is about 3/4 of the way in, unscrew it and remove it from the nose cone.

b) Squirt white glue into the hole left by the removal of the screw eye. Immediately replace the screw eye, screwing it in all the way until the base of the screw eye's loop is resting against the nose cone.

c) Tie the free end of the Kevlar tether *securely* to the screw eye.

6

Attach launch lugs.

a) The launch lugs will be attached along the line you drew down the body tube and marked "L." Make a mark 28cm (11") forward of the ring you drew around the tube, on the launch lug line.

b) Run a bead of glue down one side of one of the launch lugs. Attach the launch lug to the body tube aligned with the launch lug line and with its rear end on the mark you just made.

c) Apply glue to the other launch lug. Attach the launch lug to the body tube aligned with the launch lug line and with its rear end on the ring you drew around the body tube (13mm from the rear of the tube).

d) Run the launch lug alignment dowel (the thinner dowel) through the two launch lugs, using it to ensure that they are lined up with each other.

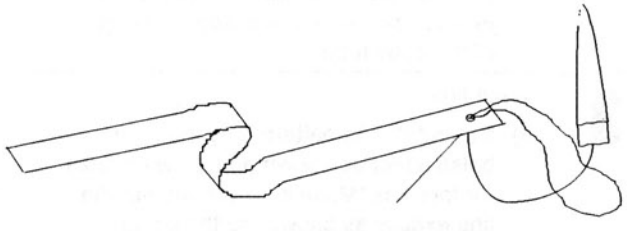
e) Carefully remove the alignment dowel and allow the glue to dry.

7

Attach streamer.

a) Form a loop in the Kevlar tether and pass it through the eyelet in the Nomex streamer.

b) Pass the loop over the nose cone and pull it tight. The streamer is now attached securely to the rocket, but can be removed for replacement if necessary.



8

Assemble rocket into flight configuration.

a) Slide the Nomex streamer all the way up the tether to the nose. Roll the streamer up just tightly enough to fit into the body tube, and slide the streamer inside the body tube. Packing this streamer inside this minimum-diameter tube can be tricky. It is recommended that you roll the two ends of the streamer up separately, to provide for a narrower package.

b) Pack any remaining length of Kevlar tether on top of the streamer, and insert the nose cone into the tube. Adjust the fit of the nose cone, if necessary, by sanding or applying transparent tape to the shoulder.

9 [OPTIONAL] Streamline fins.

a) To obtain the best performance and the highest flights, you should streamline the balsa fins.

b) Use fine sandpaper to sand the leading and trailing edges of each fin round. Take care not to sand so much that the shape of the fin is distorted!

c) Do not round the tip edges of the fins.

10 [OPTIONAL] Sand and seal fins.

a) To obtain the best performance and the highest flights, you should sand and seal the balsa fins.

b) Using extra-fine sandpaper, sand each face of each fin.

c) Apply a small amount of sanding sealer to each face (available at your hobby store). Allow to dry.

d) Using extra-fine sandpaper, sand each face of each fin. Repeat until all the balsa grain is filled in, and each fin face is as smooth as possible.

11 [OPTIONAL] Apply fin fillets.

a) To obtain the best performance and the highest flights, you should apply glue fillets to each fin.

b) Run a bead of glue down one fin-tube joint.

c) If you use white glue to make the fillet, smooth it out with your finger. If you use CA, spray a quick shot of accelerator on the fillet.

d) Repeat for the other seven fin-tube joints.

12 Paint rocket.

a) Painting your rocket improves its appearance as well as its performance. For best results, use enamel-type spray or bottle paints, and use several light coats of paint rather than one heavy one.

b) A suggested paint scheme is illustrated on the front of these instructions. To duplicate this scheme, use masking tape and newspaper to cover the front 12" of the body tube and the rear 12" of the tube, leaving the fins uncovered. Paint the exposed areas (fins, middle section of body tube, and nose) gloss yellow. After the paint has dried, remove the masking material. Mask off the parts you painted yellow, using masking tape and newspaper. Paint the remainder of the rocket gloss black. Allow the paint to dry, then remove the masking material.

13 Prepare for launch.

a) To launch your rocket, first make sure the Nomex streamer is packed inside as described in step 8. Note that *no recovery wadding is required,* since the Nomex paper the streamer is made of is flame-resistant.

b) Select an engine of a recommended type to use for your flight. The Space Needle Jr. uses only Micro-Motors, available from Apogee Components. The three recommended engines are all the same diameter (10.5mm), but different lengths. The longest engine is the B2-9; it will fit into the engine compartment without a spacer. The next smaller size is the A2-7; before inserting the engine, you must slide the shorter of the two included blue spacer tubes into the engine compartment. The smallest size engine recommended for this rocket is the ½A2-4; to use this engine, you must slide the longer of the two spacer tubes into the engine compartment.

c) After inserting an engine spacer (if needed), slide the engine you have selected into the rear of the rocket so the nozzle is pointing outward. Push the engine in as far as it will go (about 3mm [1/8"] of the engine should still be visible). Wrap a piece of masking tape around the base of the rocket behind the fins, and press it against the engine to hold it in place.

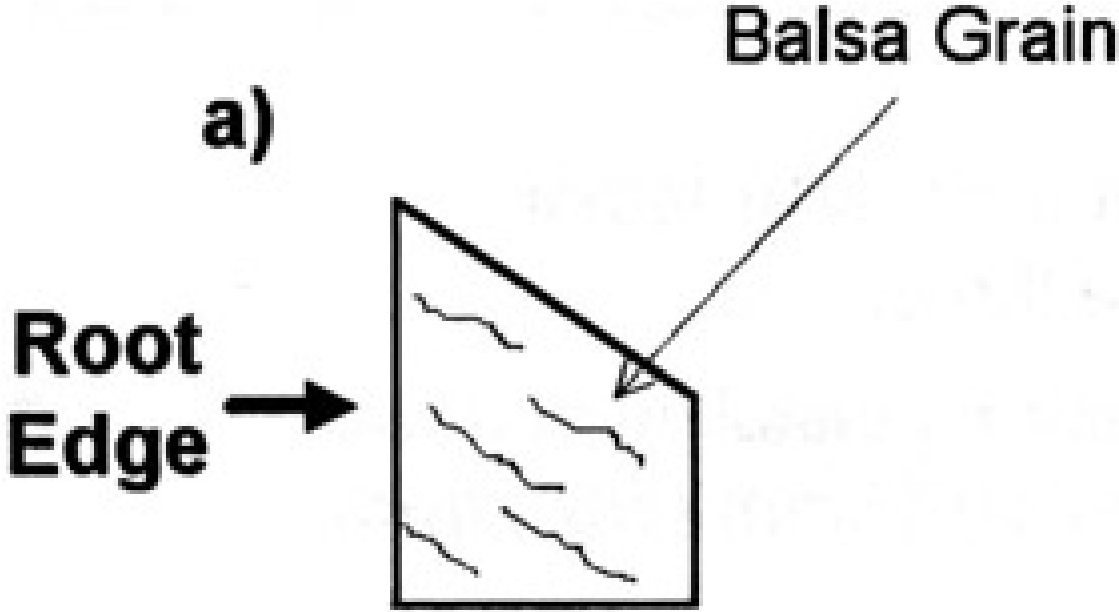
d) Install an electrical igniter into the engine as recommended by the engine manufacturer.

e) Mount a 1/8" launch rod on your launch pad and slide the launch lug down the rod. Connect the igniter to your electrical ignition system. (Launch systems are available from your local hobby store.)

f) Launch your rocket! Remember to follow the National Association of Rocketry Model Rocket Safety Code whenever you launch.

g) To remove engine spacer tubes after flight, we recommend using a pencil eraser inserted from the rear of the rocket to slide the tube out.

h) Let us know how you like the design! Write to us or e-mail us at the addresses listed on the front of these instructions, and tell us what you did or didn't like about this kit. You can help us better the hobby by sharing your opinions and ideas!



Root Edge = 11/16"