

# mini Cowabunga™

## Specifications:

Length: 13"  
Diameter 1.6"  
Weight: 4oz  
Recovery: 14" Nylon Chute  
Motor Mount: 24mm  
Fins: 3 - 1/8" Plywood  
CP: 11.6" from nose tip  
CG: 10" from nose tip

## Recommended Motors:

D12-7 1110'  
E9-8 1874'

## Parts List

1. (1) Fiberglass nose cone
2. (1) Body tube
3. (2) Centering rings
4. (1) 24mm motor tube
5. (1) Motor Clip
6. (1) Thrust Ring
7. (3) laser-cut fins
8. (1) Kevlar® shock cord section
9. (1) Nylon shock cord section
10. (1) 6"x6" flameproof chute protector
11. (1) 14" Nylon chute
12. (2) 1/4" launch lugs

**Required to complete:** 5 minute epoxy, 120/220 sandpaper, masking tape, finishing filler/paint.

K-180



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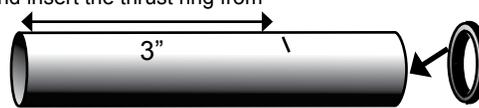
Please make sure you read all directions and understand how to assemble your model before you start construction. It is also a good idea to test fit each part before assembly – some manufacturing tolerances may require light sanding before final assembly.

Laser cut parts will exhibit varying amounts of charring on the edges depending on the density of the plywood. The charred edges do not interfere with bonding and do not need to be cleaned before assembly. In most cases the charring will be cleaned up during sanding for finishing and painting.

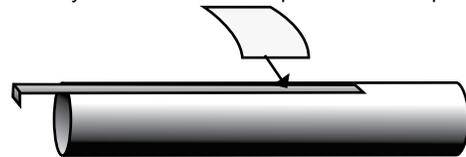
## Step 1 – Motor Mount Assembly

Sand the glassine coating off of the motor tube. Glue will not stick very well to the glassine and roughing the tube will help the glue stick. Test fit the centering rings over the motor mount tube and sand if necessary. The ring should slide snug over the motor tube without deforming it. Also test fit the centering rings in the body tube and sand if necessary.

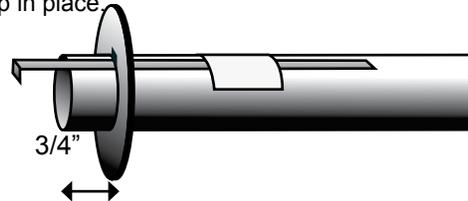
Cut a 1/4" wide slot 3" from the aft end of the motor tube. Apply some wood glue to the thrust ring (1/4" long ring that fits inside the motor tube) and insert the thrust ring from the forward end of the motor tube until it is flush with the slot cut earlier. Be careful not to push the ring past the slot or you will not be able to put the motor clip in next.



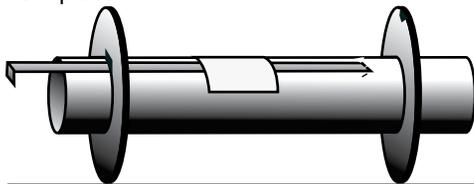
Insert one end of the motor clip into the slot cut earlier. Use a piece of masking tape to hold the clip in place.



Line up the inside slot on one of the centering rings over the motor clip and slide the ring over the aft end of the motor tube until there is 3/4" exposed. Apply wood glue around the centering ring to hold it in place.



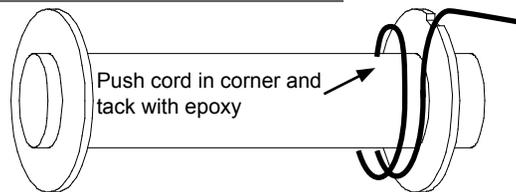
Glue the remaining centering ring with the outside notch close to the forward edge of the motor tube with about 3/4" of motor tube exposed.



## Step 2 – Shock Cord Attachment

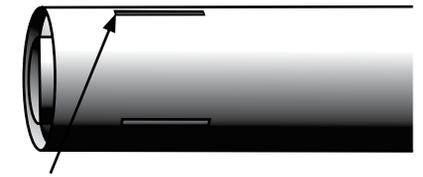
The shock cord in this kit consists of a shorter section of Kevlar and a longer section of nylon cording. The two sections should be tied together using a single overhand, ring bend or double fisherman's knot. The Kevlar section will be attached to the motor mount and the nylon section will be attached to the nose cone.

Wrap the end of the Kevlar shock cord around the forward end of the motor tube and tack in place with CA. Make sure the cord lays flat enough so it will not interfere with the body tube when you slide the motor tube inside. Apply some epoxy to the cord to hold it in place. Make sure the cord is secure and will not come loose later with ejection forces that will pull on the shock cord.



## Step 3 – Insert Motor Tube Assembly into Body Tube

Test fit each of the fins into the pre cut fin slots. Because plywood thickness varies, you may need to sand the slot to the correct width. Wrap the shock chord into a small bundle and stuff it inside the motor tube for this next step. Test fit the motor tube assembly into the body tube to ensure a snug fit. Sand the centering rings if necessary. When you are satisfied with the fit, spread some epoxy on the inside of the body tube and slide the forward centering ring of the motor assembly into the body tube. **Make sure you have the motor assembly facing the right way!** Spread some more epoxy on the inside edge of the body tube before sliding the rear centering ring into the body tube. Continue sliding the assembly inside the body tube until the aft centering rings are just clear of the fin slots. It's a good idea to test fit a fin in each slot here before the epoxy sets. Make



Ensure rings are clear of the fin slots

## Step 4 – Fin Assembly

Using a door jam or small section of angle stock, pencil a line halfway between two of the fins that extends from the front to the back of the body tube. This line will be used later to align the launch lugs. Test fit each of the fins into the pre cut fin slots. The fin should seat firmly against the motor tube - sand each fin or slot if necessary. When you are satisfied with the fit, apply some epoxy to the end of the fin tang that will contact the motor tube. Also, spread a thin layer of epoxy on each side of the fin tang. Slide the fin into place and check the alignment. Continue rechecking the fin alignment until you are sure the epoxy has set. Clean any excess epoxy from around the fin joint. Repeat for the remaining fins. Next, apply epoxy fillets to both sides of each fin by applying a thin bead of epoxy at the fin-body tube joining. Carefully smooth the epoxy fillets with your finger before the epoxy sets. Allow each fillet to set before rotating the airframe for the next fillet.

## Step 5 – Launch Lug

Mark the CP point along the launch lug line you made in the previous step. Make sure you measure the CP point from the tip of the nose cone and NOT the end of the body tube. Apply a small amount of epoxy on the launch lug line about 3/4" long on the CP mark. Press one of the launch lugs into the epoxy and ensure that it is aligned with the launch lug line previously drawn on the body tube. You can sit down the tube and look through the launch lug to make sure it is straight. Similarly epoxy the second launch lug about 2" from the aft end of the body tube (aligned with the aft end of the fins). Site down both launch lugs and make sure they are both aligned. If you have a 1/4" launch rod, you can use this to ensure that both lugs are aligned properly.

## Step 6 – Balancing Your Model

Assemble your model and insert the largest motor you intend to fly (or simulate the weight with a substitute) and ensure that the CG is at least 1 body diameter in front of the estimated CP point specified on the first page. The CP point is measured from the tip of the nose cone. If the CG is behind the desired point, add weight inside the nose cone with modeling clay or by pouring lead shot into the nose cone tip and adding some epoxy.

## Step 7 – Nose Cone Assembly

Tie some knots in the end of the nylon section of the shock cord and lay the shock cord onto the inside of the nose cone. Cover the shock cord with epoxy to secure it to the inside, side or tip of the nose cone.

## Step 8 – Flying Your Model

Attach the parachute to the shock cord 2/3 of the way between the nose cone and body tube. You can also attach the chute protector to the shock cord near the parachute. When packing your chute, wrap the chute protector around the chute with the opening in the chute protector facing forward. Always make sure your chute is well protected as the hot ejection motor gasses will melt the nylon chute.

**IMPORTANT:** always use positive motor retention to secure the motor. Failure to use motor retention will cause the motor to be ejected instead of the parachute making for a dangerous ballistic reentry.

**IMPORTANT:** always remember to check your balance point and ensure your CG is forward of the specified CG point.

**IMPORTANT:** Always follow the NAR safety code and remember that rockets are not toys and can be dangerous if not prepared and used properly. If you are a beginner, it is a good idea to fly with a club or other group of experienced rocketeers until you have gained some experience.

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**IMPORTANT:** Please contact us via phone or email if you have any questions about constructing or flying your model.



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