

# BLACK BRANT II

## Specifications

Length: 79"

Diameter 4.0"

Weight: 7lbs

Motor Mount: 54mm

Fins: 3 - 1/8" G10

Estimated CP: 60" from nose tip

## Parts List

- (1) Nose Cone
- (1) Tail Cone
- (1) Pre-slotted body tube
- (1) Forward body tube
- (1) Coupler
- (4) Bulkheads
- (2) Centering rings
- (1) Aft Tail Ring
- (1) 54mm motor tube
- (3) G10 fins
- (1) Fiberglass Tape (30")
- (4) Eyebolts
- (10) Nuts
- (10) Washers
- (2) Threaded Rods
- (2) Nylon shock cords
- (2) Rail buttons and screws
- (1) Vinyl Decal

## You'll need these items to complete this kit

- 5 Minute Epoxy
- Filler and Paint
- Zap or CA Super Glue
- Motor Retainer
- Pencil
- 120/220 Sandpaper



K-156



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.

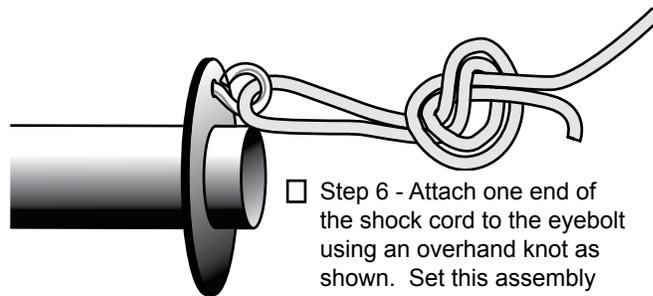
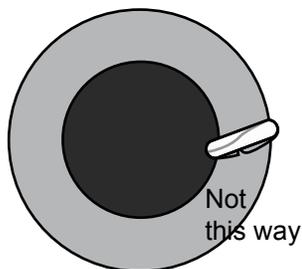
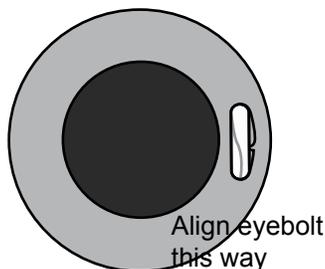
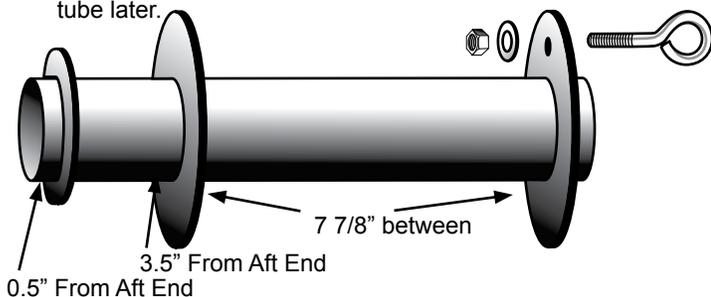
Fiberglass parts still contain small amounts of mold release and other materials on the surface that will inhibit adhesives and/or paint. It is important to clean each part prior to assembly with a solution of 1 part rubbing alcohol, 3 parts water and a drop of dish washing soap. **IMPORTANT:** do not sand any parts until after you have cleaned them - you will embed the materials you are trying to clean making it difficult to clean.

Some G10 parts may have holding tabs left over from the CNC machine. These small tabs will need to be sanded off before assembly.

**IMPORTANT:** Before assembling any part with epoxy, rough up the surface to be epoxied using 60-80 sandpaper. The scratches in the fiberglass surface will give the epoxy something to grab onto. Epoxy will not soak into the fiberglass like wood or cardboard - epoxy will not grip very well to fiberglass without this rough surface. You can use Zap or CA glue to tack parts into place before you apply epoxy.

## Motor Mount Assembly

- Step 1 - Rough the surface of the motor tube where the centering rings will contact it - also rough the surface where the fin tangs will contact the motor tube.
- Step 2 - Test fit the centering rings over the motor mount tube and sand if necessary. Also test fit the centering rings in the body tube and sand if necessary.
- Step 3 - Mark the motor tube 0.5" and 3.5" from the aft end of the motor tube. Spread some epoxy on the motor tube around the mark and slide the aft centering ring on the tube making sure there is 3.5" of motor tube exposed. Next, spread some epoxy on the motor tube and slide the aft tail ring on the motor tube making sure there is 0.5" of motor tube exposed.
- Step 4 - Drill a 1/4" hole in the forward centering ring for the eyebolt. Mark the motor tube 7 7/8" from the aft centering ring. Spread some epoxy around the mark and slide the centering ring on the motor tube making sure there is 7 7/8" between the 2 centering rings.
- Step 5 - Mount the eyebolt using the nut and washer in the forward ring hole. Apply some epoxy to the threads of the eyebolt and nut to ensure it will not come loose later. Make sure the eyebolt is aligned so that it will not interfere with the body tube when the motor assembly is inserted into the body tube later.

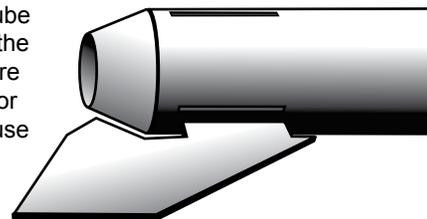


- Step 6 - Attach one end of the shock cord to the eyebolt using an overhand knot as shown. Set this assembly aside for later.

## Body Tube Assembly

- Step 7 - Cut the tail cone shoulder so that it is no more than 1/2". Test fit the tail cone into the body tube and sand if necessary.
- Step 8 - Using the motor tube assembly, 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 aft end of the body tube to ensure a snug fit. Sand the centering rings if necessary. Make sure you rough up the inside of the body tube where the centering rings will attach.
- Step 9 - When you are satisfied with the fit, spread some epoxy on the inside of the body tube just in front of the fin slots 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 - the centering ring with the eyebolt should slide in first!**

Keep going by spreading some more epoxy on the inside of the body tube near the aft edge before sliding the aft centering ring into the body tube. Continue sliding the assembly inside the body tube until the aft centering ring is all the way in body tube, but doesn't yet interfere with the fin slot. It's a good idea to test fit a fin in each slot here before the epoxy sets. Also, **IMPORTANT** - test fit the tail cone to make sure the shoulder doesn't interfere with the aft centering ring. Hold the body tube with the motor tube assembly down until the epoxy sets. Make sure the weight of the motor assembly doesn't cause it to slide out of alignment.



- Step 10 - test fit the tail cone over the small tail centering ring and sand either the centering ring or the inside of the tail cone (or both) until the tail cone seats correctly.

Rough the inside of the body tube where the tail cone shoulder will contact the body tube. Also rough up the tail cone shoulder. Epoxy the tail cone into the aft end of the body tube.

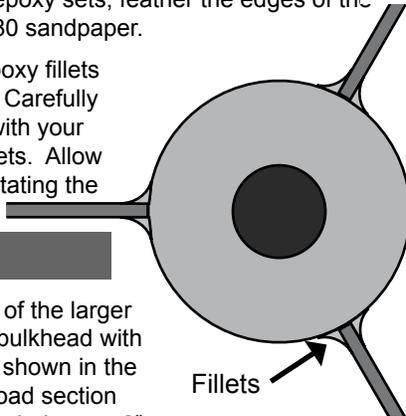
## Fin Assembly

- Step 11 - Test fit each of the fins into the pre cut fin slots. The fin should seat firmly against the motor tube - sand each fin if necessary. Don't forget to rough up all surfaces. When you are satisfied with the fit, apply some epoxy to the end of the fin tang that will contact the motor tube as well as any fin root that will contact the body 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.

- Step 12 - There will be a gap between the aft portion of the fin and the tail cone. Use the fiberglass tape to form a fillet on both sides of the aft portion of the fin to fill the gap and attach the fin to the tail cone.

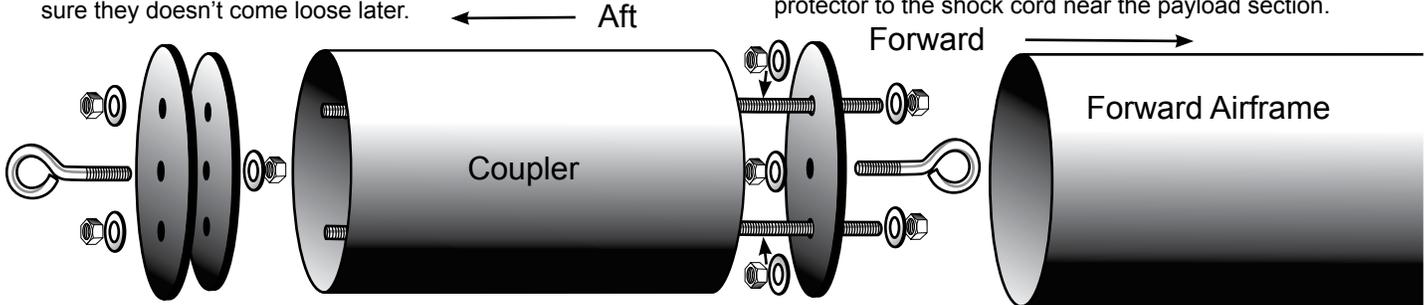
Cut the fiberglass tape into 6 equal sections. Soak the tape in epoxy and apply to the aft portion of both sides of the fin to cover the gap. After the epoxy sets, feather the edges of the fiberglass tape using 60-80 sandpaper.

- Step 13 - Next, apply epoxy fillets to both sides of each fin. 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.



## A-Bay Assembly

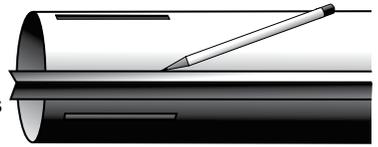
- Step 14 - Mark and drill 2 of the larger bulkheads and 1 smaller bulkhead with 2 additional 1/4" holes as shown in the Dual Deploy version payload section assembly diagram. These holes are 2" apart or 1" from the center hole.
- Step 15 - Start with one of the larger bulkheads and attach the eyebolt and two threaded rods as shown in the diagram above. Use two washers and two nuts on each threaded rod to trap the bulkhead. Most of the threaded rod should extend into the coupler. Leave about 1/4" of exposed threaded rod that extends forward. Use thread lock on all nuts to make sure they doesn't come loose later.



- Step 16 - Tack the forward bulkhead you just worked on to one end of the coupler with epoxy or CA glue. Be very careful that the bulkhead is aligned and flush with the outside of the coupler so that it will slide into the airframe later. Also make sure there is no glue on the outside of the coupler or bulkhead that would interfere with inserting into the airframe.
- Step 17 - Carefully align the three holes in the remaining large bulkhead and the one of the remaining small bulkheads and attach them together using the remaining eyebolt (the last small bulkhead is for the nose cone later). Use thread lock to make sure the eyebolt doesn't come loose later. The smaller bulkhead will go into the coupler first. **IMPORTANT:** do not glue the bulkheads into the coupler - they need to be removed to insert the altimeter. Insert onto the open end of the coupler and attach with the remaining washers and nuts. **IMPORTANT:** do not use thread lock on these nuts so they can be removed later.
- Step 18 - Apply epoxy to the inside of the forward airframe and insert the coupler assembly until there is 5" exposed (3" will be inserted into the airframe). **IMPORTANT:** make sure you insert the right end. The removable bulkheads should be outside the airframe.

## Rail Button Attachment

- Step 19 - Using a door jam or small section of angle stock, pencil a line halfway between two of the fin slots on the main body tube that extends from the front to the back of the body tube.
- Step 20 - Drill a 5/64" hole on the rail button line for the forward and aft rail buttons. The aft hole should be 1 1/2" from the aft end of the aft body tube and the forward hole should be 7" from the forward end of the aft body tube.
- Step 21 - Apply a small amount of epoxy in the holes and attach the rail buttons using the supplied #6 wood screws. Make sure the screw is loose enough for the rail button to spin freely - this ensures the button is not compressed to the point it will hang on the rail guide.



**IMPORTANT: Make sure the forward rail button screw protruding through the body tube doesn't snag the chute. Epoxy over the screw to provide a smooth surface.**

## Final Assembly

- Step 22 - Using the same knot you used in step 6, attach the other end of the shock cord to the payload section eyebolt. Also attach the remaining shock cord between the nose cone and the forward a-bay eyebolt. Attach the parachute to the shock cord near the payload section. Also attach the chute protector to the shock cord near the payload section.

- Step 23 - Drill a small 1/8" hold in the chute compartments to allow venting. Make sure you do this without the chute in the chute compartment.
- Step 24 - Mount the remaining eyebolt using the nut and washer in the nose cone bulkplate. Apply some epoxy to the nut so it will not come loose later. Test fit the bulkplate in the base of the nose cone and sand if necessary.
- Step 25 - Epoxy the bulkplate into the base of the nose cone leaving at least a 1/4" lip to apply a fillet. Next, apply a fillet of epoxy around the bulkplate and nose cone shoulder joint.
- Step 26 - At this point install your positive motor retention device. The kit does not include a motor retention device and this will need to be purchased separately.

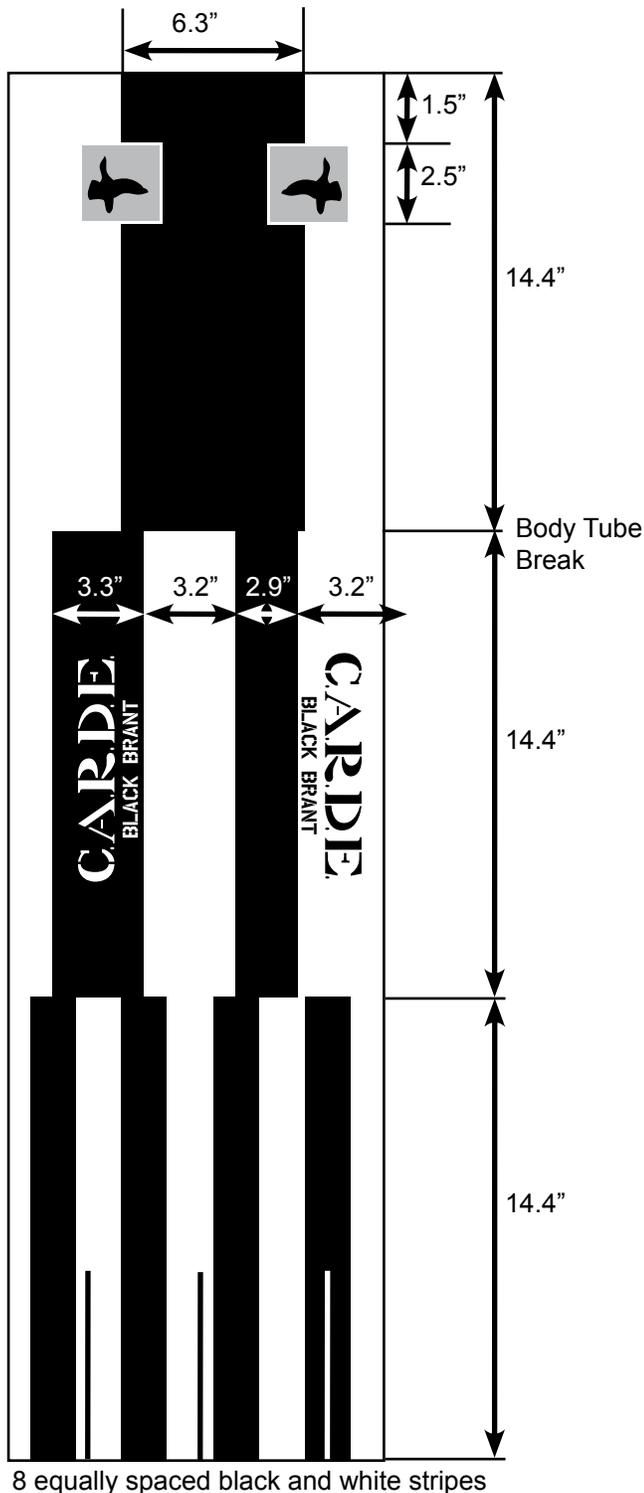
## Balancing Your Model

- Step 27 - Pack the chute and assemble the rocket. Insert the largest motor that you intend to fly (or simulate the weight with an appropriate 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 estimated CP should be measured from the tip of the nose cone. If the CG is too far back, add weight inside the nose cone by pouring lead shot into the nose cone and adding some epoxy.

- Step 28 - Your model is now ready to paint and apply the decals. To apply the cut lettering decal, carefully remove the backing from the decal - the individual letters will remain stuck to the top carrier. Next, position the decal where you would like it and carefully smooth out the top carrier to ensure the letters are securely attached to the rocket body. Last, carefully remove the top carrier making sure the letters stay attached to the rocket body and are not lifted with the carrier.

At this point your model is ready to fly.

Now go have some fun!



## Flying Your Model

**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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