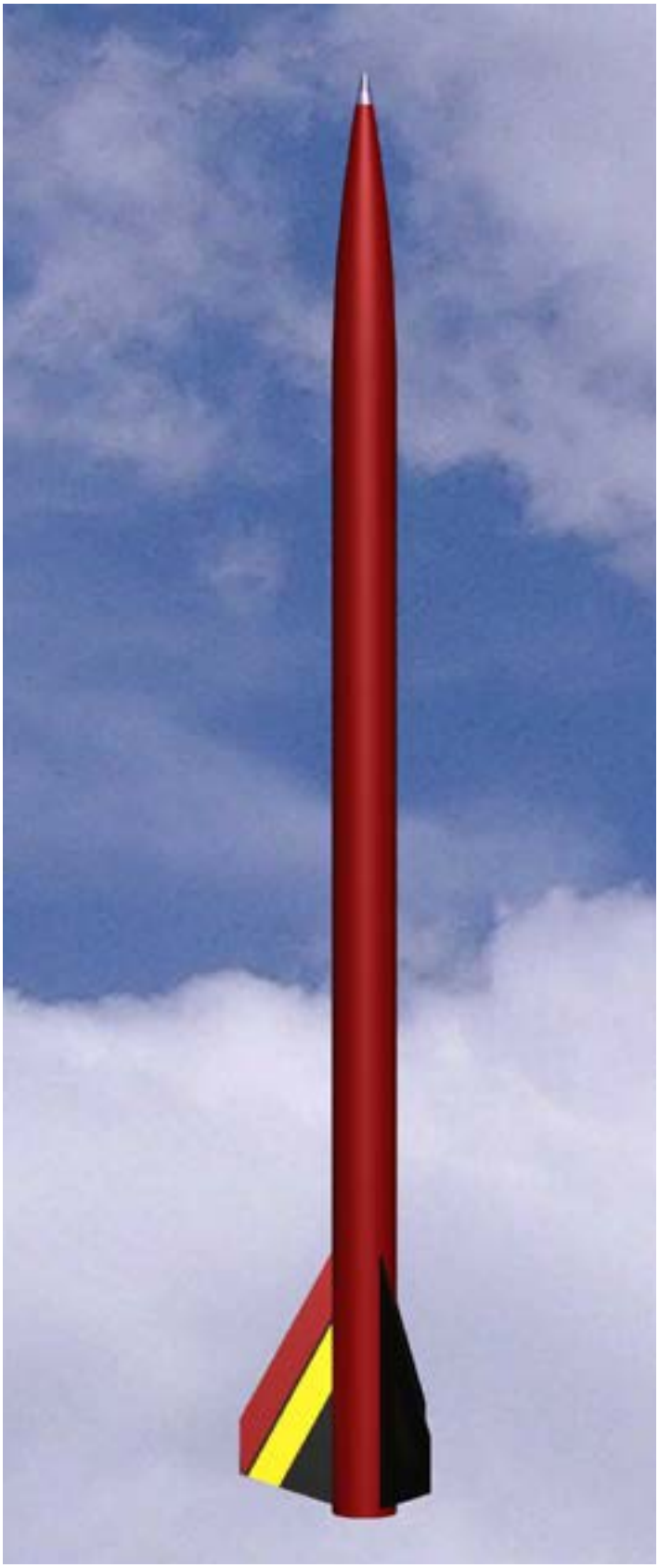
ALL FIBERGLASS MANIA™



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Specifications

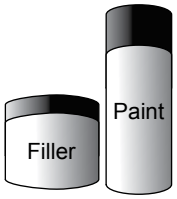
Length: 90”
Diameter 4.0”
Weight: 14 lbs
Motor Mount: 75mm
Fins: 3 - 3/16” G10
CP: 71” from nose tip

Parts List

(1) Filament Wound 5:1 Ogive Nose Cone w/ Metal Tip
(1) Nose Cone Coupler
(1) Pre-slotted main body tube
(1) Payload section body tube
(1) Switch Band
(3) Centering rings
(1) Coupler
(5) Bulkheads
(1) 75mm Motor tube
(3) 3/16” G10 fins
(3) Forged Eyebolts
(9) Nuts and (9) Washers
(1) Nylon shock cord
(2) Rail buttons, (2) screws
(2) Threaded Rods

You’ll need these items to complete this kit

☐ Epoxy



☐ Filler and Paint

☐ Zap or CA Super Glue

☐ Motor Retainer

☐ 60/80 Sandpaper

☐ Pencil

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put some fun in your rockets!

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.

Use only a high quality epoxy like Aeropoxy or West System to bond parts together. You can use a colloidal silica filler like West System 404 or 406 to thicken epoxy when making fillets. When using a filler for fillets a consistency like peanut butter or syrup is best For extra strength you can add 1/16" or 1/32" milled glass fiber.

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.

☐ Step 1 - Use the slotted main body tube to mark 3 evenly spaced marks around the shorter coupler tube.

☐ Step 2 - Use a door jamb to mark the full length of the coupler. This will help later when marking other tubes.

☐ Step 3 - Sand the outside end of the coupler and the inside of the nose cone where the coupler and nose cone parts will bond together. Also sand the inside of the opposite side of the coupler where the bulkplate will be bonded.

☐ Step 4 - Mount the eyebolt with a nut and washer and secure with epoxy so it will not come apart later.

☐ Step 5 - Epoxy the bulkplate into the end of the coupler where you sanded the inside. Leave about 3/8" for a fillet. After the epoxy sets, apply a fillet around the inside edge.

☐ Step 6 - Drill a 1/8" vent hold in the bulkplate to let the air out while you epoxy the coupler into the nose cone base. Epoxy the coupler into the base of the nose cone and make sure you leave at least 4" of the coupler exposed. Also ensure you get epoxy on the whole area where the coupler and nose cone will contact to ensure a good bond. It is best to put epoxy inside the nose cone and not the outside of the coupler. Make sure you have a clean coupler so as to not interfere with the payload body tube later.

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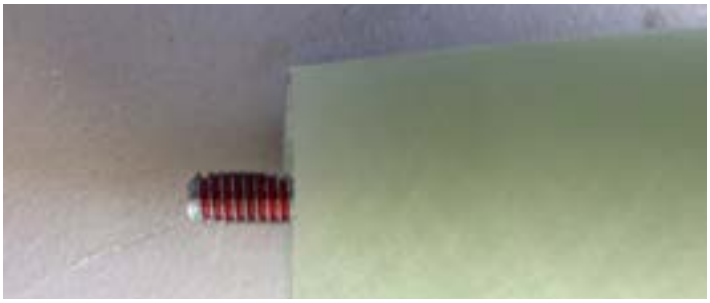
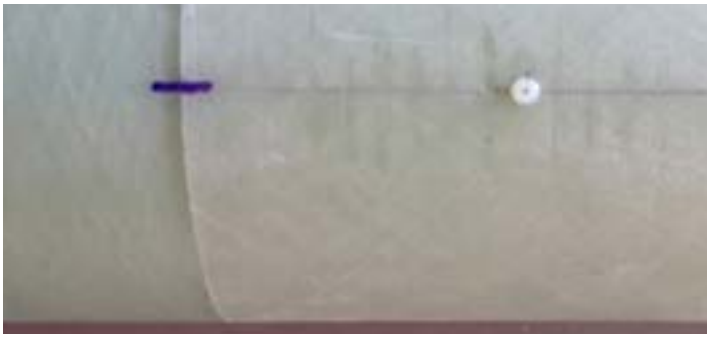
☐ Step 7 - Use lock-tite on the nose cone tip to make sure it does not come loose during transportation.



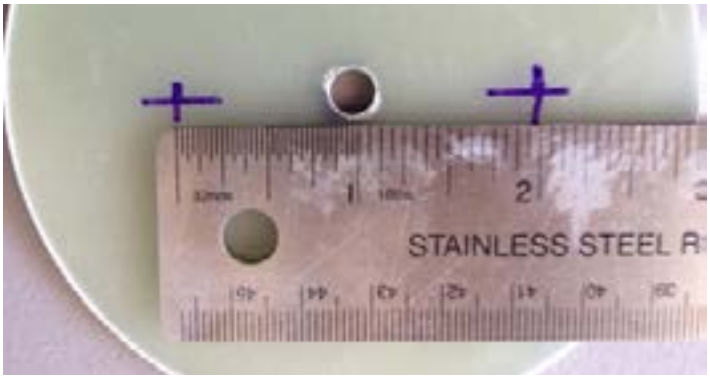
☐ Step 8 - Put the shorter payload body tube on the nose cone coupler and transfer the 3 evenly spaced marks to the payload tube. Use a door jam like you did earlier to mark the entire length of the payload tube.

☐ Step 9 - Measure to the middle of the payload tube and drill a single 1/8" hole for a vent hole.

☐ Step 10 - Measure 2" from one end of the payload tube on each of the lines. This is where you will drill the shear pin holes. With the nose cone seated properly, drill a single 5/64" hole at one of your 2" marks. IMPORTANT: insert a 2-256 nylon screw into this hole before you rotate the tube for the other 2 holes. Last make an alignment mark on the nose cone and payload tube so you can remember the orientation since the spacing of the shear pins may not be even. Make sure you transfer this mark when you paint the rocket.



☐ Step 11 - Mark one of the bulkplates as shown.



☐ Step 12 - Stack the 2 large bulkplates and 2 smaller bulkplates and temporarily secure the plates with a single eyebolt to hold them together. Drill through all 4 bulkplates at the points you just marked with a 1/4" drill bit.

☐ Step 13 - Separate the bulkplates and then glue a large bulkplate to a smaller bulkplate while aligning the holes. You will make 2 sets like this. Make sure the bulkplates are centered so that they will go into the ends of the coupler and not interfere with the body tube. You can secure with an eyebolt, nut and washer while these dry. After the epoxy has set, trap the two 14" threaded rods using 2 nuts and two washers each as shown. Use thread lock to make sure these don't come undone later. Also, remove the nuts on the 2 eyebolts and replace using thread lock.

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☐ Step 14 - DO NOT EPOXY OR USE THREAD LOCK FOR THIS STEP. Place the bulkplate set with the threaded rods on one end of the long coupler. Place the other bulkplate set on the other end of the coupler and secure using a nut and washer on each threaded rods. The larger bulkplates should seat against the coupler edge with the smaller bulkplates going inside the coupler. After you are satisfied with the fit, you can remove for the next steps.

☐ Step 15 - Mount the switch band in the center of the long coupler so 5” of coupler is exposed on each side. Place a thin layer of epoxy in the center of the coupler and slide the switch band over the epoxy while rotating so the epoxy slowly goes under the switch band. Make sure you clean up the edges of the switch band so it seats against the body tube later. After the epoxy sets, you can drill any desired altimeter vent holes and switch holes you need in the switch band.

☐ Step 16 - Measure 2” from the aft end of the payload tube on each of the lines (the opposite end you did the shear pins earlier). This is where you will drill the rivet pin holes. IMPORTANT: when you seat the altimeter bay inside the payload tube, make sure your altimeter vent holes are not lined up with the rivet lines - turbulence from the rivets can disrupt the airflow over the altimeter vent holes. With the altimeter bay seated properly, drill a single 5/32” hole at one of your 2” marks. IMPORTANT: insert a rivet into this hole before you rotate the tube for the other 2 holes. Last make an alignment mark on the altimeter bay and payload tube so you can remember the orientation since the spacing of the rivets may not be even. Make sure you transfer this mark when you paint the rocket.

☐ Step 17 - Sand the outside of the motor tube to rough up the surface for the epoxy to stick to.

☐ Step 18 - Mark the motor tube 6 1/8” and 1/2” from one end of the motor tube. Epoxy two of the three centering rings on each of the marks. IMPORTANT: make sure the motor tube is clean of epoxy from the centering ring that is 6 1/8” from the end for the remaining 15 or so inches of the motor tube because the fin roots will need a clean surface to attach to. At this point it is a good idea to test fit the retainer because it is much easier to sand the motor tube now rather than later.

☐ Step 19 - Sand the slotted main body tube for at least 1/2” around the fin slots inside and outside to rough the surface for the fin fillets. Also sand where the centering rings will attach in front of the fin slots on the inside. You can wrap sand paper around a large dowel to help sand the inside of the body tube.

☐ Step 20 - Test fit each of the fins in the fin slots and file the slots to make sure you have a snug but smooth fit. Also sand the sides of the fin tangs so the entire tang plus at least 1/2” of the exposed fin above the body tube is roughed up so epoxy will stick to the fin. You can clean any residue from the machining process using acetone. It is a good idea to number your fins and slots to remember which fin fits best in what slot.

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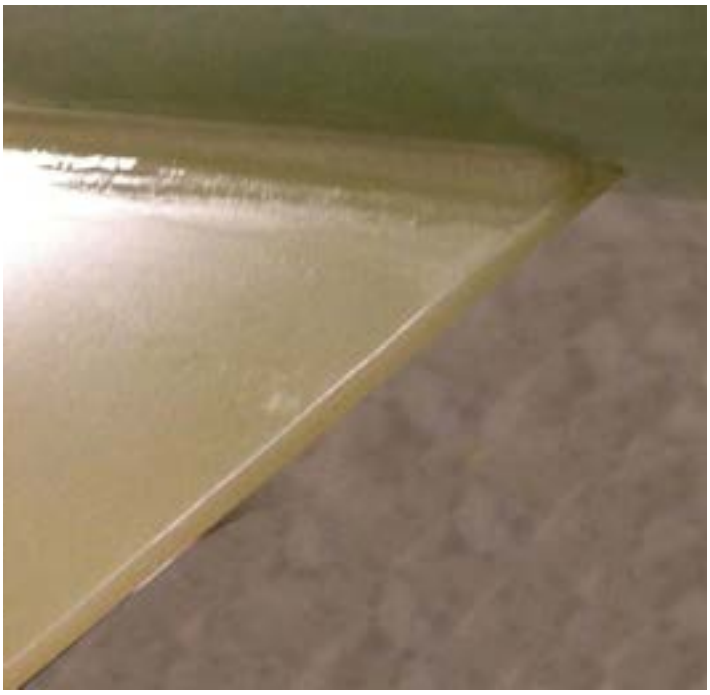
☐ Step 21 - Use a door jamb to mark half way between two fins on the slotted main body tube. This line will be used later to align the rail buttons.

☐ Step 22 - Test fit the motor tube assembly inside the slotted main body tube to ensure a smooth fit. The two centering rings should go in first. When you are satisfied with the fit, spread epoxy on the inside of the body tube above the fin slots and slide the motor tube in until the centering rings clear the forward fin slot. Make sure any fillet on the forward centering ring is clear of the slot also so the fin root can seat against the motor tube. The aft end of the motor tube should extend 1" aft of the fin slot if you are going to use a retainer that goes onto the motor tube, or extend about 1/4" aft of the fin slot if you are going to use a flange mount retainer. IMPORTANT: do not use epoxy on the 3rd centering ring yet. Insert the 3rd centering ring temporarily inside the aft end of the rocket to make sure the aft end of the motor tube remains centered while the epoxy sets.

☐ Step 23 - With the 3rd centering ring temporarily still in place, tack each of the fins in place using CA on the root edge of the fin. Make sure each fin seats properly to the motor tube before applying CA. Readjust your slot if needed. IMPORTANT: make sure you do not accidentally glue the 3rd centering ring in place. Remove the aft 3rd centering ring after the glue sets.

☐ Step 24 - It is a good idea to use masking tape to seal the outside of all the fin/body tube joints for this step in case there are any gaps where epoxy can leak through. Mix some epoxy and use thickener or milled glass to make a thick syrup like consistency. Pour the mixure down each fin line between the motor tube and body tube. Use a dowel and spread epoxy forming a fillet on all fin to motor tube joints and internal fin to body tube joints. Make sure you get a good fillet on the entire fin because this is main strength point of the fin joint. Failure to get a good solid strong joint at this point can lead to a fin separation in flight. You can use plastic syringes here if you want to help place the epoxy accurately. IMPORTANT: make sure you keep the aft part motor tube that extends beyond the fin clean where the 3rd centering ring and motor retainer will go.

☐ Step 25 - Use the same epoxy consistency to form fillets on the outside fin/body tube joint.



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- ☐ Step 26 - Test fit the 3rd centering ring and epoxy in place. Make sure you leave enough exposed motor tube to attach the motor retainer. Follow the manufacturers directions and attach the motor retaiiner at this point. We recommend a motor retainer that attaches to the motor tube and not the centering ring for this design.
- ☐ Step 27 - Drill a 1/8” vent hole just forward of the forward centering ring.
- ☐ Step 28 - Drill a 7/64” 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 slotted main body tube and the forward hole should be just behind the forward centering ring..
- ☐ Step 29 - 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.
- ☐ Step 30 - Cut the shock cord in half and use half to tie the nose cone to the forward side of the altimeter bay, and the other half to tie the aft end of the altimeter bay to the motor anchor bolt. This design relies on the motor’s forward closure retention eyebolt for the recovery attachment point.
- ☐ Step 31 - Pack the chutes 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 specificationed 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. Please note, it is unlikely you will need nose weight because of the long nose design.
- ☐ Step 32 - Your model is now ready to paint and 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: Proper CG is critical to the stability of this model. This model may require some ballast in the nose - the amount will depend on how you build and the size motor you use to fly. Do not fly without balancing this model properly as a dangerous unstable flight will result.

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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