

# BULLET BOBBY XXL

## FLYING MODEL ROCKET INSTRUCTIONS



### Build Notes/Tips

- This kit is a Skill Level 3 and High Power Flying Model Rocket kit, meaning that you should have plenty of prior experience assembling and launching Low Power and/or Mid Power flying model rockets. You also must be L1 HPR Certified or be attempting a certification flight in order to launch this rocket, as its weight lends itself to be classified as a Class 2 Model Rocket.
- Please read all instructions before proceeding or launching.** This kit contains materials and build techniques you may not be familiar with. Due to the rocket's size, special precautions should be taken when building and launching.
- This rocket is not a toy, nor is it intended for children. This rocket should not be built or launched by anyone under the age of 18 without adult supervision.
- This kit contains a custom 3D-printed nose cone. This nose cone **WILL** deform or shrink if left in a hot garage or vehicle above 100° F (38° C), even for short periods of time. It is advisable to store this model in a temperature-controlled environment, and to not leave it in prolonged direct sun at the launch site or after launching.
- Wood glue is sufficient for the internal components, but epoxy or J-B Weld should be used for the retainer, T-Nuts, and external fin fillets.
- Although all parts are test-fit before being packaged, you should test-fit parts (especially centering rings) before building or gluing. **Some parts may require sanding for better fit.**
- The fins in this kit are 5-ply aircraft-grade Birch plywood, but even so, this design is a bit of a "fin-smacker." Take care when building to make strong external fillets, try not to launch it on windy days, nor land on hard ground if possible, and it will last launch after launch!
- These instructions are just a guide. Chances are, if you have purchased this kit, you may already have preferred building techniques for mid- and high-power rocket kits. Feel free to make the build your own.

### Parts Layout and List

- A. LOC Precision Body Tube
- B. 3D-Printed Nose Cone
- C. Plywood Fins (4)
- D. Forward Centering Ring
- E. Aft Centering Rings (2)
- F. 38 mm Motor Mount Tube
- G. Swivel
- H. Kevlar Shock Cord
- I. Launch Lug (1/4") (6.35 mm)
- J. Eye Bolt, Washer, Nut
- K. Rail Button Set
- L. Vinyl Body Decals
- M. Vinyl Aft Decals

SCAN THIS CODE for a PDF of the instructions, decal installation tips, and OpenRocket simulation file.

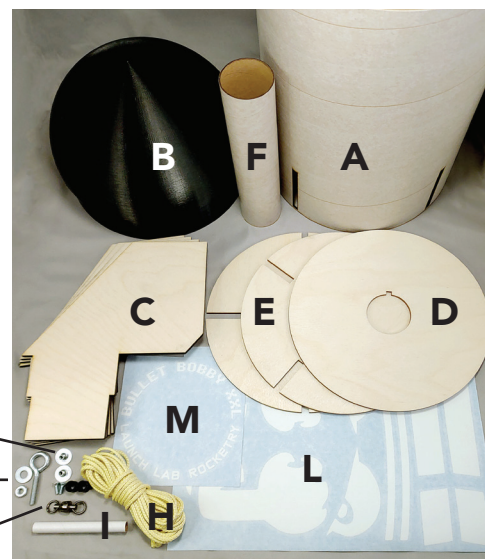


Or visit:  
[launchlabrocketry.com/bobbyxxl](http://launchlabrocketry.com/bobbyxxl)

**Not included in Basic Kit but necessary:**  
Parachute, 40" - 48" (101.6 cm - 122 cm) recommended  
Parachute Protector 18" x 18" (45.7 cm) recommended  
Nose Cone Weight, about 6 oz. (170 g) needed  
Motor Retainer

### Other supplies required (not included)

Hobby knife, pencil, wood glue, epoxy or J-B Weld, thick CA (Super Glue), 80 - 120 grit sandpaper, ruler, scissors, masking tape, black spray paint, grease (optional), scale.

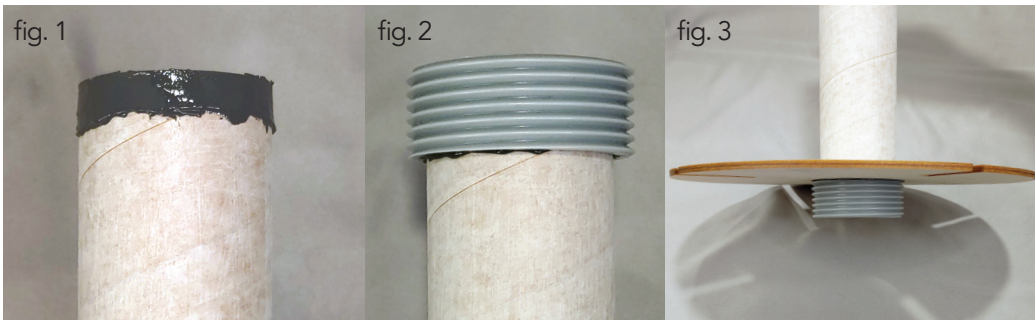


### 1. Motor Mount Assembly

Sand the entire motor mount tube to remove some of the smooth glassine layer. This will allow glue and epoxy to better adhere. Prep your motor retainer by washing all parts with soap and water, and thoroughly drying. Sand the inside of the retainer collar to roughen it for epoxy. Mix a bit of J-B Weld or epoxy according to the package directions, and spread about 1/2" (12.7 mm) of it around the outside of one end of the motor mount tube (fig. 1). Attach the retainer collar over this epoxy and give it a twist until fully seated (fig. 2). Clean off the excess epoxy.

Using epoxy or wood glue, glue one aft centering ring in place against the retainer (fig. 3).

**Allow this motor mount assembly to dry completely.**



## 2. Body Tube Preparation

Launch Lab recommends launching this rocket from a 6' (1.8 m) or 8' (2.4 m) rail, but if you (or your local club members) don't have a rail, you can install the launch lug as well for versatility. We don't recommend installing only the launch lug, but instructions follow for all variations. Please read through them all before continuing so you can make the decision that's best for your launching scenarios.

To install just the rail buttons, mark a straight vertical line directly in the middle between 2 fin slots, extending the full length of the body tube. Starting at the aft end of the body tube, along the line you made, measure and mark crossing perpendicular lines at 1.5" (3.8 cm) and 9" (22.8 cm) measurements (fig. 4). At both of the crossing marks, make a hole by drilling through the body tube with a 3/16" (4.7 mm) drill bit.

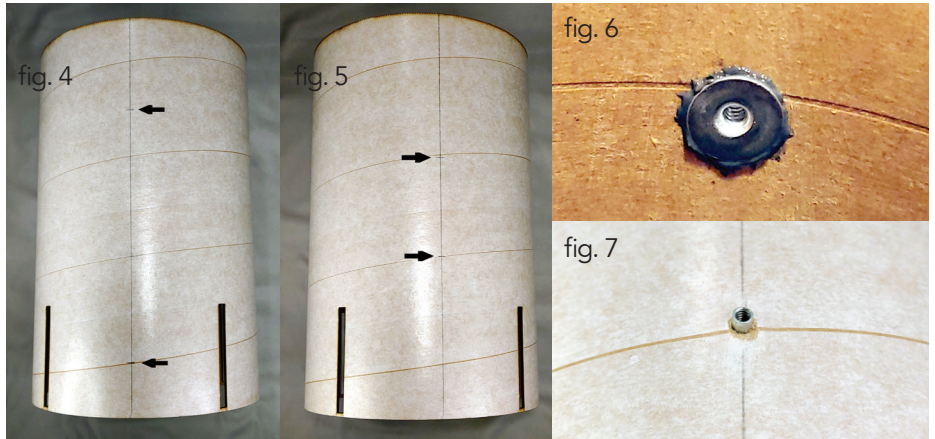
To install just the launch lug, mark a straight vertical line directly in the middle between 2 fin slots, extending the full length of the body tube. Along the line you made, measure and mark crossing perpendicular lines at 4.5" (11.4 cm) measurements from each end (fig. 5). Sand the body tube between the crossing marks to remove some of the smooth glassine layer to allow epoxy to better adhere.

To install both the rail buttons and the launch lug, shift your vertical lines about 1" (2.5 cm) to the left and right of center, or, install the lug directly between 2 fin slots, and the rail buttons between 2 neighboring fin slots.

With a hobby knife and sandpaper, clean up excess cardboard in and around the rail button holes you previously drilled. Using epoxy, install the T-Nuts from the inside and push through the holes in the body tube, being careful not to get any epoxy in the screw hole (fig. 6 and fig. 7 for reverse angle). Clean up any excess epoxy on the outside or inside of the body tube. Please note: There is a smooth end and a concave end to the rail buttons. The screw goes through the concave end. With a little bit of grease (optional) on the screw shaft, install the rail buttons from the outside and tighten. Once tight, the T-Nuts should be fairly flush with the inside of the body tube (fig. 6).

If using the launch lug, lightly sand the outside of the lug, apply epoxy to the lug, and place the lug on the body tube along the vertical line and in between the two perpendicular marks you made. It should be directly in the middle of the body tube. Apply external epoxy fillets to the side joints where the lug meets the body tube.

The body tube slots allow fin and centering ring installation **inside** the body tube, or, by cutting off the bit of tube at the bottom of the slots, the fin could be assembled completely **outside** the body tube, and then pushed in as one unit. These instructions only cover internal assembly. If you wish to assemble the fin can outside the body tube, cut off the bit of tube left at the end of the slot and build externally.



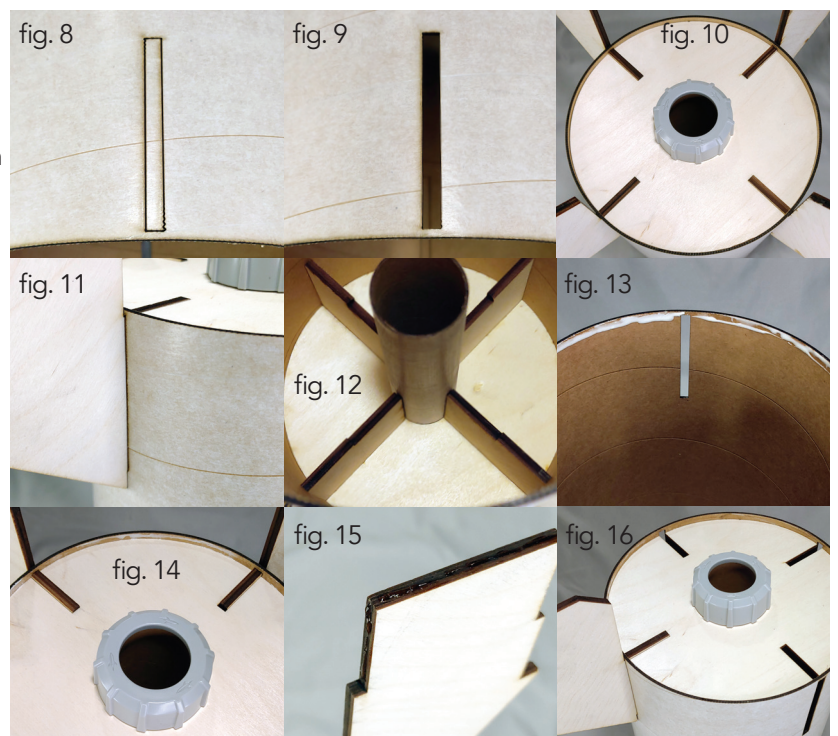
## 3. Fin Can Installation

**Please wait until motor mount assembly is completely dry before proceeding.**

If the body tube slots did not get laser cut all the way through (fig. 8), simply finish cutting that cardboard rectangle out with a hobby knife (fig. 9). Test-fit the completed motor mount assembly, fins and additional centering ring inside the body tube, lining up the slots in the centering ring with the slots on the body tube (figs. 10, 11, 12). Sand if necessary, refit, then remove them all.

Apply wood glue to the inside of the body tube, along the bottom edge (fig. 13), and, using the fins as a guide for placement, insert the completed motor mount assembly (fig. 14). Once in place, remove the fins while the glue tacks up.

Using thick CA (Super) glue, apply a few drops along the root edge and the bottom edge of a fin (the part that makes contact with the bottom centering ring) (fig. 15). Slip fin in place through the slot, align, and hold it for 30 seconds until the glue sets (fig. 16). Repeat this for the other 3 fins.



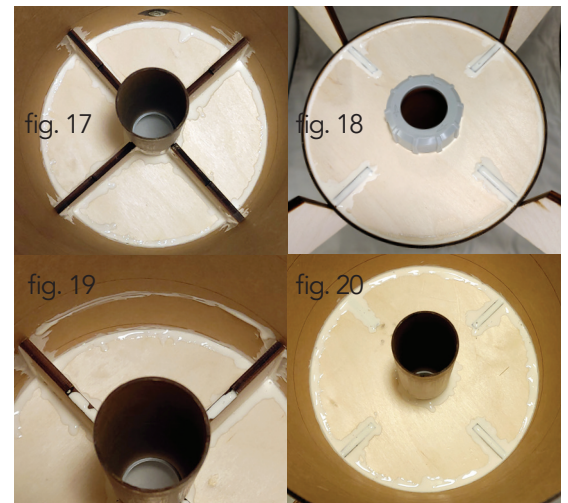


### 3. Fin Can Installation (Continued)

Using a scrap piece of wood (a chopstick works really well), apply wood glue fillets to all joints (aft centering to inside and bottom of body tube and motor mount tube, fins to aft centering ring slots on top and bottom, fins to motor mount tube, fins to body tube wall) (fig. 17). Don't forget the joints on the bottom of the rocket (fig. 18).

Apply wood glue to the inside of the body tube, along the line where the forward part of the fin tabs meet the body tube (fig. 19). Also apply wood glue to the forward fin tab edges and the motor mount tube where the tabs meet the tube (fig. 19).

Install the remaining aft centering ring (a flathead screwdriver may aid in aligning the slots and tabs) and add wood glue fillets to the exposed joints (ring to inside of body tube and ring to motor mount tube, slots to fin tabs) (fig. 20). Let dry completely.

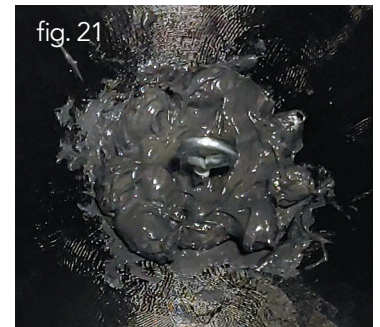


### 4. Nose Cone Preparation

This kit contains a 3D-printed nose cone. This nose cone WILL deform or shrink if left in a hot garage or vehicle above 100° F (38° C), even for short periods of time. It is advisable to store this model in a temperature-controlled area, and to not leave it in prolonged direct sun.

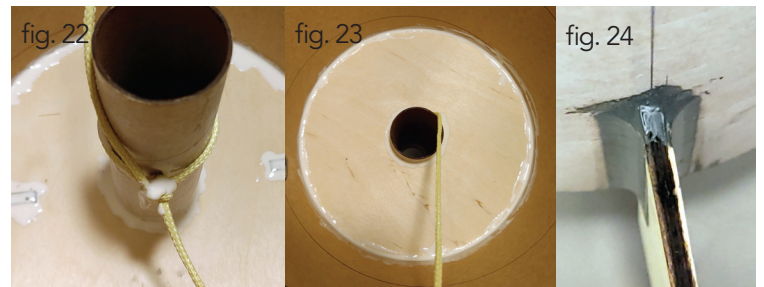
The basic kit does not come with weights; you will have to add your own. The Deluxe version of the kit includes more weight than you need. Use your scale for these next steps to obtain proper final weight.

In this next step, you'll be adding weight and the eye bolt to the nose cone. Slip the washer on the shaft of the eye bolt and add the nut behind it, only screwing it about 1/4" (6.3 mm) onto the bolt. This assembly will be nestled in between weights and secured in place with epoxy. Your nose cone by itself should weigh about 10 oz (283 g). You will need to add weight to the inside tip of the nose cone to shift the center of gravity and make the rocket more stable. Test-weigh your nose cone and add weights so the total final weight is 16 -17 oz (453 g - 482 g) **with epoxy** (approximately 1 - 2 oz (28 g - 57 g) of epoxy). Using epoxy underneath and on top to glue them in place, add the weights (along with the eye bolt assembly nestled in the center) to the inside tip of the nose cone (fig. 21). Let dry completely.



### 5. Final Body Assembly

Tie the shock cord to the motor mount with a triple knot, and wood glue it in place (fig. 22). Rub some wood glue into the frayed ends of the shock cord and into the knot to make sure it doesn't unravel. Run the shock cord through the forward centering ring notch, add wood glue to the forward 1/2" (12.7 mm) of the motor mount and to the inside of the body tube along the same parallel. Install the forward centering ring and add wood glue to the exposed joints (ring to inside of body tube and ring to motor mount tube) (fig. 23).



Apply generous external fillets with epoxy to where the fins meet the body tube (fig. 24). Smooth and let dry.

### 6. Recovery Assembly

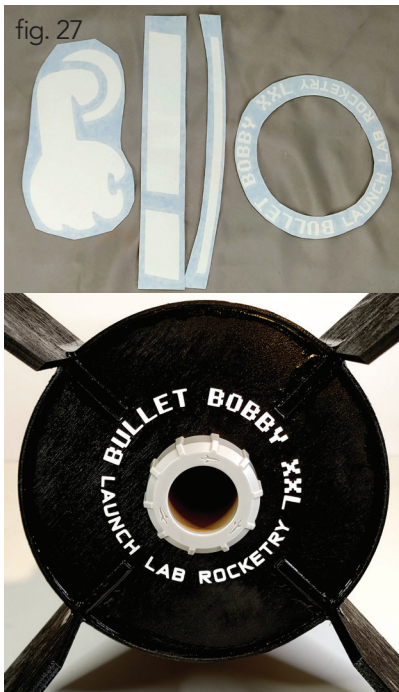
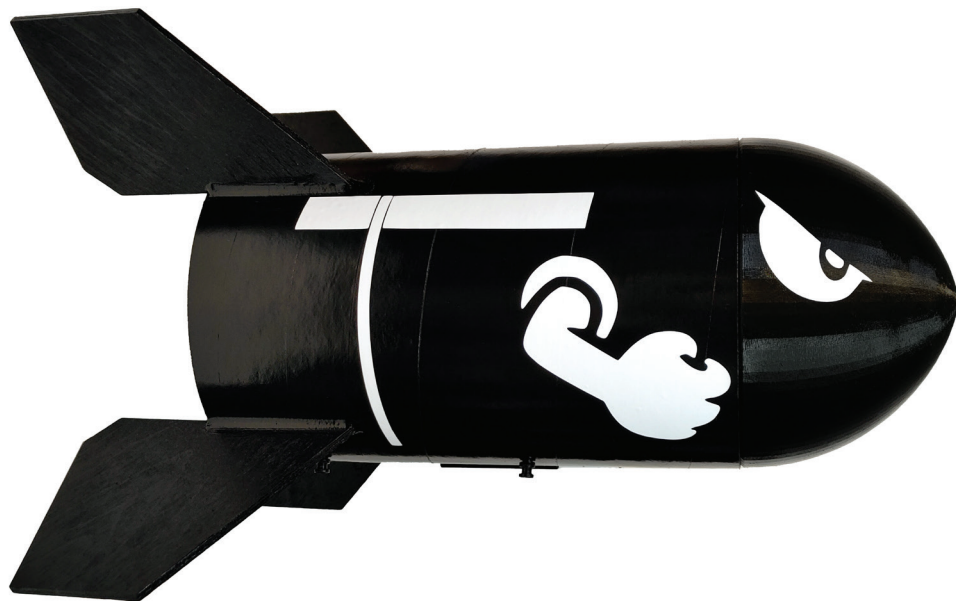
Slip one loop of the swivel onto the shock cord, and with the swivel in hand, tie an overhand knot in the shock cord about 1/3 of the way down, keeping the swivel in the loop you just made (fig. 25). Add your parachute protector to the shock cord closer to the rocket body, looping the cord back through the button hole in the protector to keep it secure (fig. 26). Tie the loose end of the shock cord to the eye bolt in the nose cone using at least a triple knot, and rub some wood glue into the frayed ends of the shock cord and into the knot to make sure it doesn't unravel. Tie your parachute to the free end of the swivel (or loop the shroud cords through it). Test-fit the nose cone into the body and add painter's tape/masking tape to the nose cone shoulder if the fit is too loose. Drill a 1/8" (3.1 mm) or 3/16" (4.7 mm) hole through the side of the rocket, somewhere between the forward centering ring and the bottom of where the nose cone shoulder rests. We recommend drilling this hole close to where the rail buttons are installed to hide it. This hole is for ventilation and pressure equalization. Sand the cardboard remnants of the hole flat on the inside and outside of the rocket. Your rocket is now complete.



## 7. Finishing Your Rocket

**The quick way:** Paint your entire rocket gloss black with a spray enamel and let dry. Rotate the rocket so the rail buttons are on the bottom, and apply the vinyl decals to both sides of the rocket. To apply the decals, cut each piece of the body decals out of the sheet. Cut as close as you can around the outside and inside edges of the aft decals (fig. 27). Your decal will come with a backing (just like any peel-and-stick decal) and an application tape laid over it. Peel the decal and application tape off the backing, and place the decal where you want it on your rocket. Note: The decals are very sticky and have permanent adhesive...double-check placement before pressing down. Once in place, press down on the decal and application tape to firmly stick the decals on the rocket. Peel the backing tape off to expose your new decal!

**The not-so-quick way:** Sand the nose cone and apply filler to eliminate the 3D print lines. Sand the filler, and apply sanding sealer to the nose cone and fins. When dry, sand with fine sandpaper and repeat until smooth. Spray the rocket with primer, let dry, and sand some more. Spray paint the entire rocket gloss black and let dry. Rotate the rocket so the rail buttons are on the bottom, and apply the vinyl decals as detailed above. Apply a protective clear coat to the entire rocket and decals.



## 8. Preparing For Launch

**Simulate all launches first in a software simulator. This will help you dial in delay timing and altitude, and will be needed for an L1 certification flight, should you be attempting that. You must be L1 HPR Certified or be attempting a certification flight in order to launch this rocket, as its weight lends itself to be classified as a Class 2 Model Rocket.**

**Recommended Motors:** Any 29 mm (adapter needed) or 38 mm motor that will fit, from an H to a J will work well. The more initial thrust, the better. Some specific motors that have been tested include G83, G131, H112, H115, H128, H130, H135, H148, H182, H219, H250, H283, H550, I357, I140, I180, J240, J350, J500. Recommended delay is usually 6 seconds; slightly higher for larger motors. Recommended ejection black powder weight for High Power motors: .8 g - 1 g.

**Maximum Estimated Altitude:** 2400 ft (731 m) on a J, 800 ft (244 m) on a small H.

Insert your prepared motor into the motor mount. Due to this rocket's size and close proximity of the ejection charge to the parachute and nose cone, special precautions have to be taken to protect the recovery devices. We recommend the use of a parachute protector, but a handful of "dog barf" cellulose insulation will work fine too. Fold up your parachute via your preferred method, and either wrap it in your parachute protector or lay it on the insulation, directly on top of the forward centering ring. Coil the remaining shock cord over the parachute so it will unravel without issue, and put the nose cone back in place. You are now ready for liftoff! Reminder: Depending on how lightly or heavily you built this kit, it may be classified as a Class 2 High Power rocket. If the final weight with motor and recovery is over 3.3 lb (1500 g), it is a High-Power rocket, and you must be L1 HPR Certified or be attempting a certification flight in order to launch this rocket. If you are under the weight limit, this rocket has been successfully tested on G80 motors (and you may do so as well), but it really likes more thrust than a G80 provides. Fly with a G80 at your own risk.

Be sure to follow all safety protocols and local laws when launching.

### Disclaimers

Launch Lab Rocketry will not be held responsible for the use or misuse of this rocket. The buyer of this kit assumes all risks and liabilities, and uses this rocket kit on these conditions. The designer and vendor of this kit will be held harmless in case of any damage or injury.

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