

Quest Penetrator Addendum for E80 Spring 2011

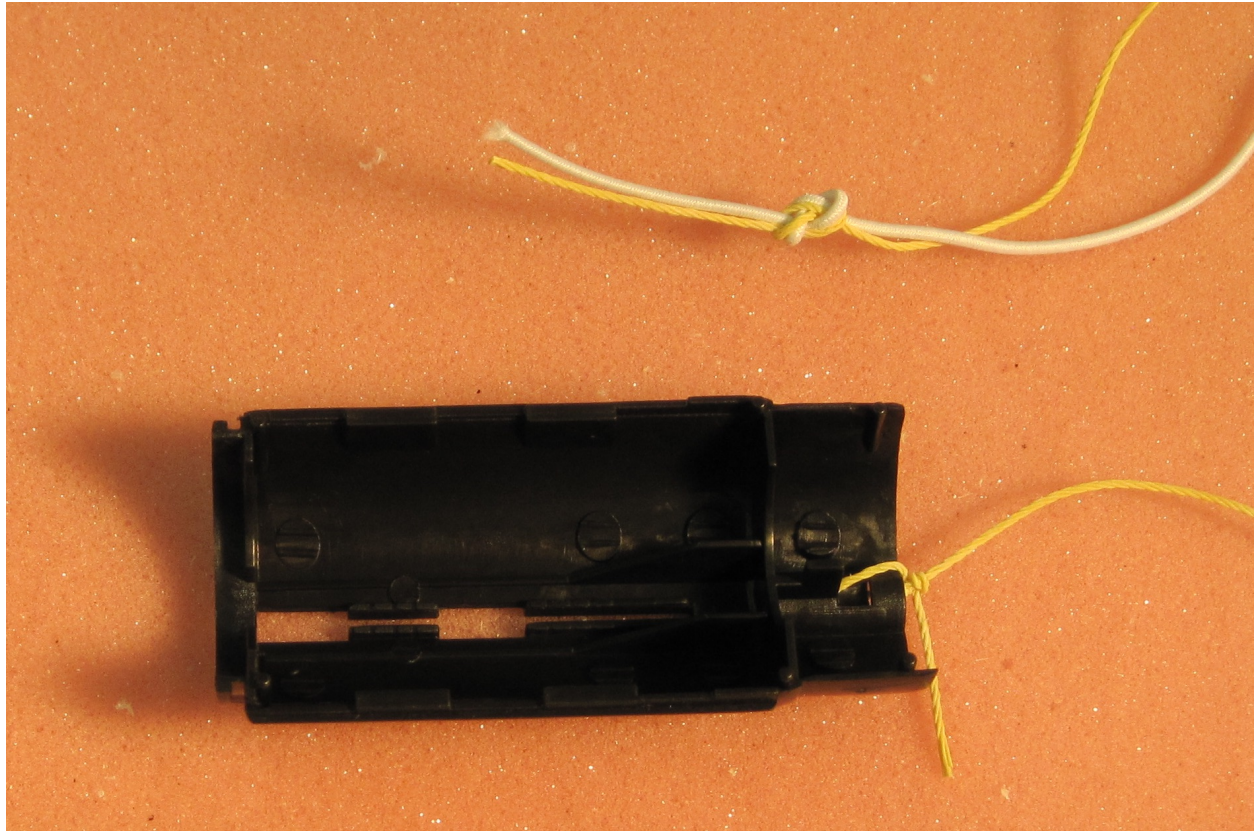
The parts and supplies needed for assembly are shown below.



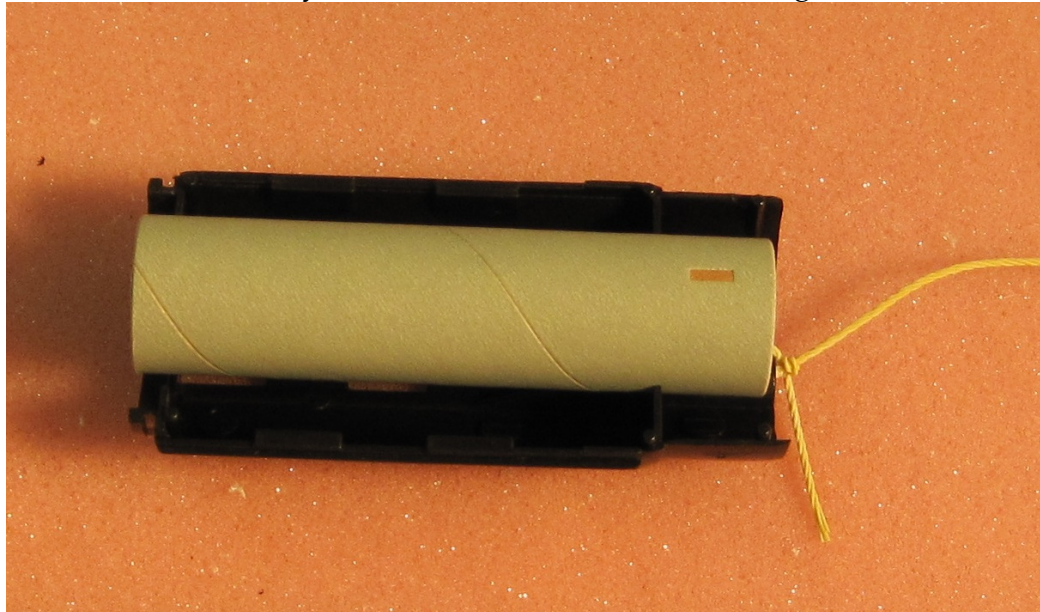
The payload section of the Penetrator must be modified to permit the altimeter to be installed and removed easily. Once installed the altimeter must be held securely and protected against damage. The payload section must also have ventilation holes installed so that the pressure inside the payload section is the same as the free-stream pressure outside the rocket for the altimeter to work properly.

The addendum was updated in 2015 for use of the Pnut altimeter.

The knots in Step 1 are shown below. The overhand knot in Step 1B can be replaced with a figure 8 knot (as shown) for extra strength. The double knot in Step D is also known as a double half hitch.



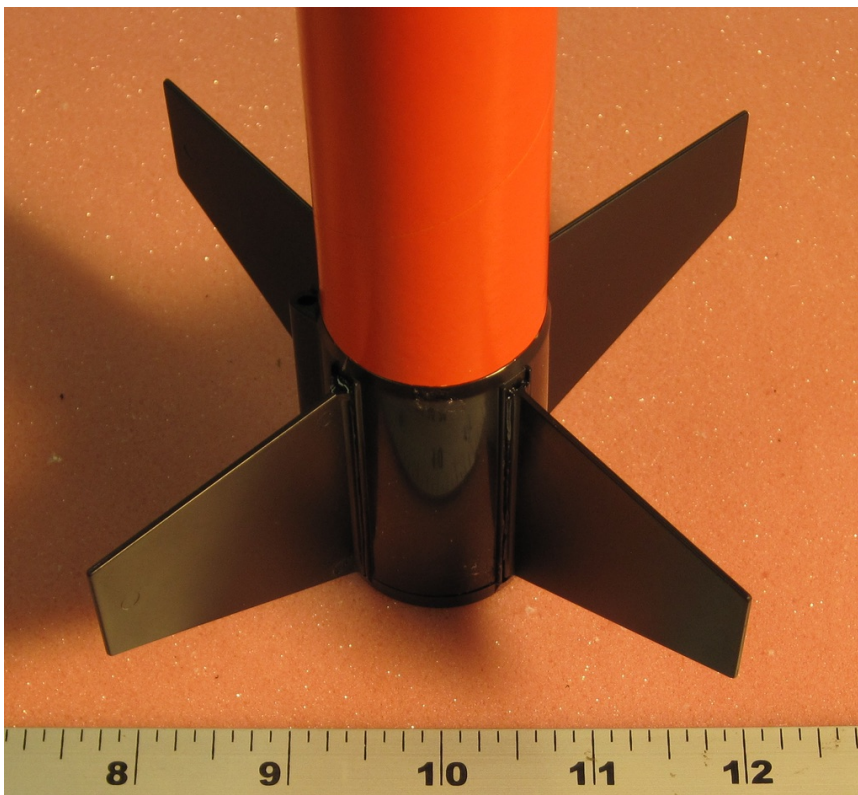
Placement of the Gray Motor Tube in the Motor Housing is shown below.



The assembly after Step 2 is shown below.



The assembly after Step 3 is shown below. You can be quite generous with the plastic model cement in Step 3. If needed, blue tape can be used to hold the fins straight as the cement hardens. The straighter the fins, the better the rocket flies. The instructions call for the fins to be swept up, but the rocket flies fine with the fins swept in either direction.



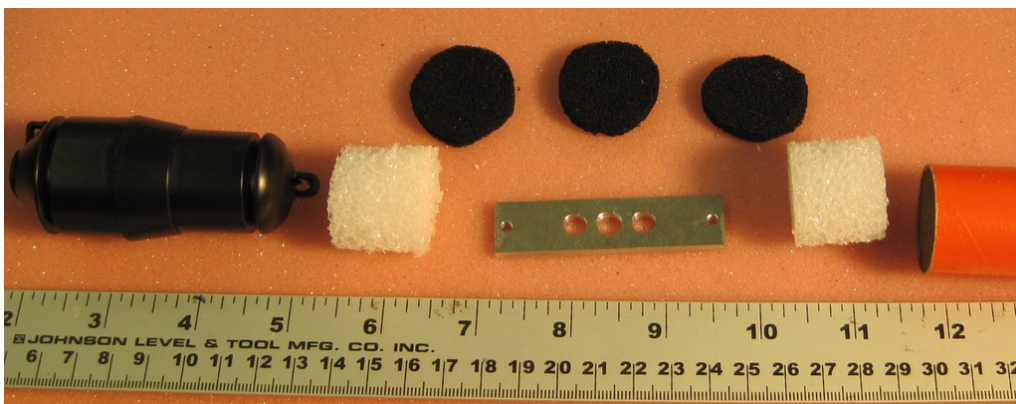
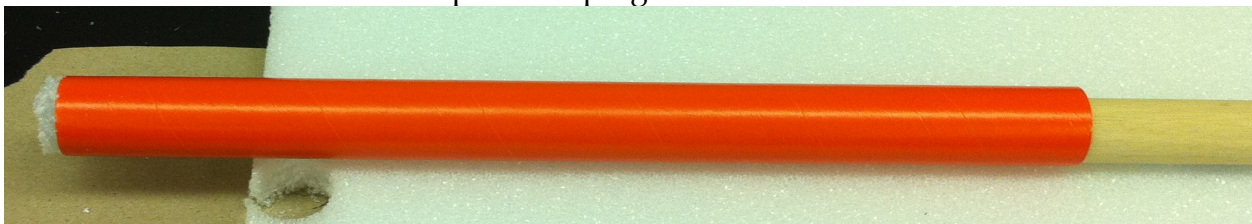
Replace Step 4 in the model instructions with the following steps

1. Cut three disks of conductive foam to the diameter of the Small Payload Tube. The conductive foam is roughly $\frac{1}{4}$ in thick and comes in sheets. **Do not** use any other foam in the lab for this step. It's easiest to push a tube gently into the conductive foam to create an outline and then trim around the outline with scissors, although you can completely cut the foam with the a tube with enough force.

2. Using the small payload tube punch out two plugs of the 1-in thick white foam (one at a time). Rotate the tube as you push down. The white foam is roughly 1 in thick, is rigid, and comes in sheets. **Do not** use any other foam in the lab for this step.



3. Use a 1-in diameter dowel to push the plugs back out of the tube.



The unassembled pieces of conductive foam and white foam are shown above.

4. Carefully sand or abrade one piece of foam to reduce the diameter slightly, so that it fits easily in the Small Payload Tube. This piece will be attached to the Blow Mold Transition. Push the foam back into the payload tube to about 1-in depth.

5. Push the Blow Mold Transition into the same end of the tube as the foam.

6. Hold the assembly by the Blow Mold Transition and insert the 1-in dowel into the other end of the Small Payload Tube. Push the dowel toward the Blow Mold tube until the foam is pushed around the plastic loop on the Blow Mold Transition and then push the blow mold transition and foam plug out of the Small Payload Tube.

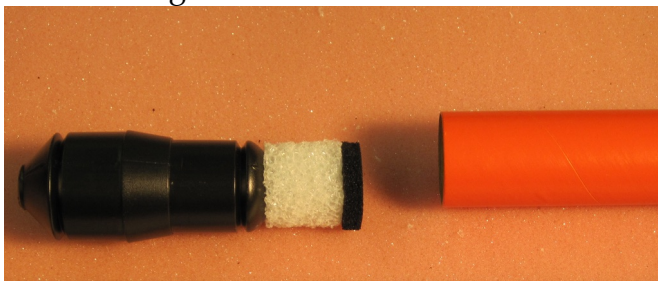
7. Without changing the orientation of the two parts, compress the foam onto the Blow Mold Transition until its shape conforms largely to the Blow Mold Transition. Do not over-compress the foam. Punch out a new piece of foam if you went too far.

8. Remove the foam. Apply plastic model cement to the top of the Blow Mold Transition and reattach the foam to the Blow Mold Transition. *Do not apply plastic model cement directly to the foam.* The plastic model cement is a solvent and will turn your foam into a gooey mess if you use too much. It's probably wise to apply gentle pressure to the foam while the cement begins to harden.



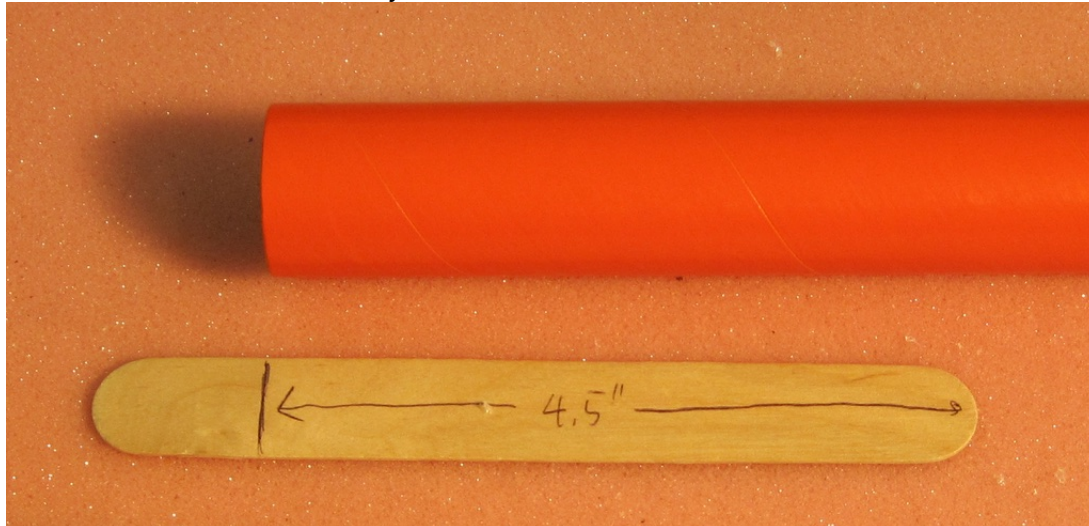
9. If necessary, carefully sand the outside of the foam plug glued to the Blow Mold Transition until it slides freely into the Small Payload Tube.

9. Trim one of the conductive foam disks with scissors until it is slightly smaller than the payload tube inner diameter. Use a generous amount of white glue on the conductive foam and glue it onto the end of the foam plug attached to the Blow-Molded Transition as shown below. The white glue takes a while to set. A little gentle pressure while setting doesn't hurt.

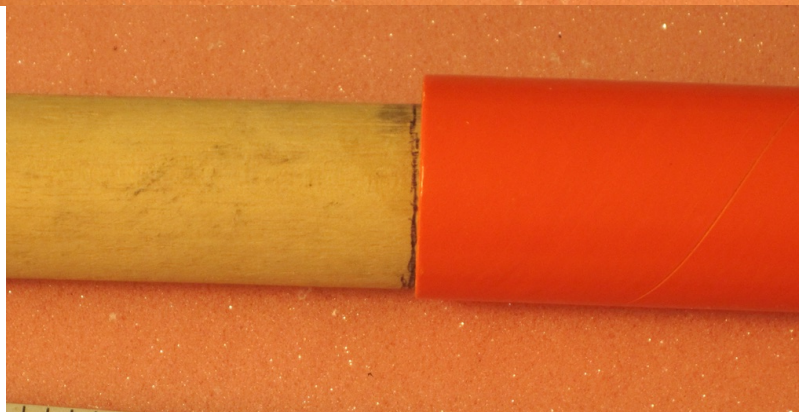
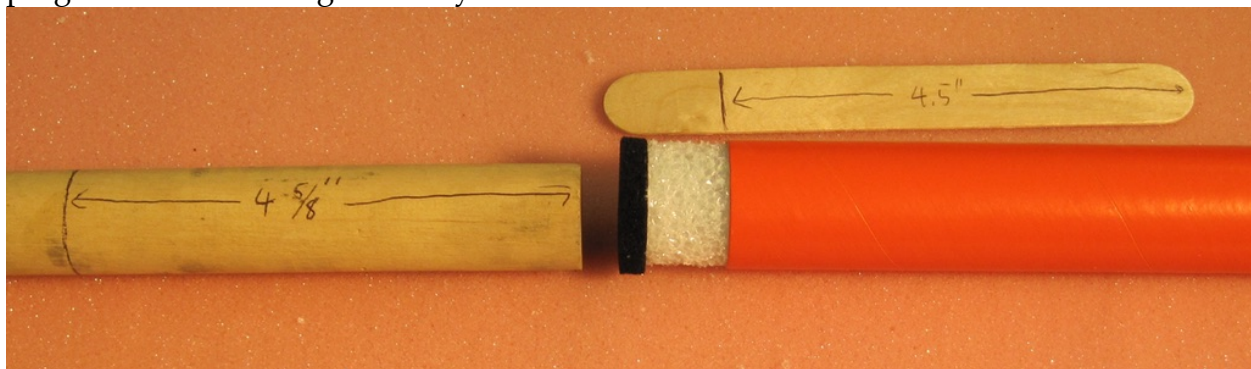


10. Use a generous amount of white glue and glue one of the remaining foam disks to the remaining foam plug. The white glue takes a while to set. The intent is that when assembled, the altimeter will be held in place by the two conductive foam disks.

11. Using a long swab or stick put a ring of white glue approximately 4.5 inches from the end inside the Small Payload Tube.



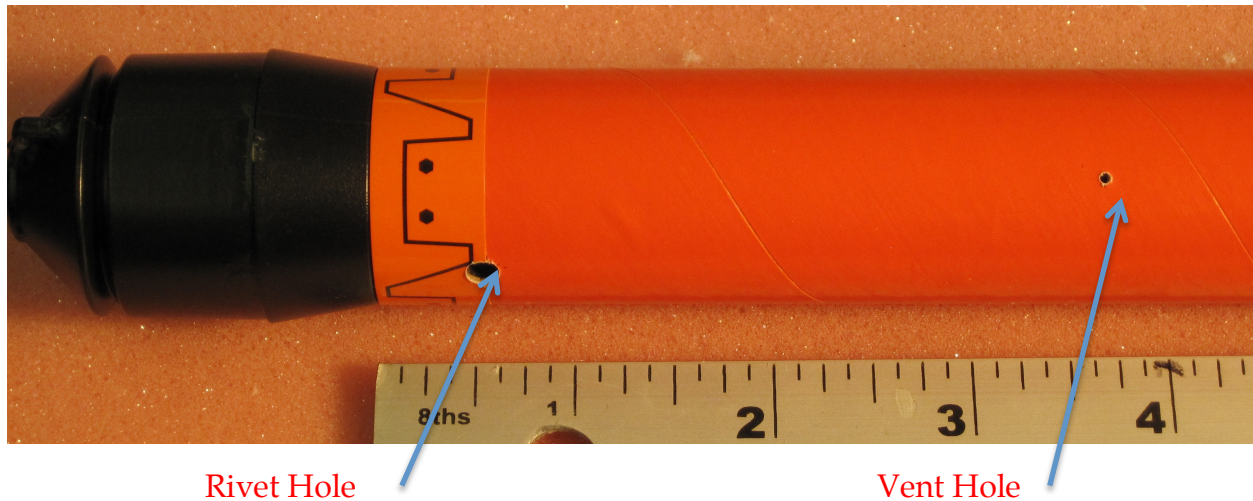
12. Put the white-foam-and-conducting- foam plug and in the end of the Small Payload Tube with the white-foam end going in first. With a smooth continuous motion use the 1-in dowel to push the plug to a depth of $4.63 + .10 / -.05$ from the end of the tube. After removing the dowel, stand the small payload tube on its end (the one you inserted the plug in and allow the glue to dry



13. With the 1-in dowel partially inserted into the tube to support it drill holes for static vent $3.250 \pm .050$ from end of the Small Payload Tube. Holes should be spaced at 120° around the tube. Calculate the hole diameter from the [Adept Rocketry guidelines](#). Use the +100% size option. Do not make the holes smaller than .050 regardless of your calculations. Smaller holes plug too easily.

14. Remove the dowel and insert the Blow Mold Transition into the Small Payload Tube.

15. Drill a hole for a plastic rivet. The hole should be $.500 \pm .010$ from the end of the Small Payload Tube, and $5/32''$ ($.156 + .004 / -.000$) in diameter. Drill simultaneously through both the tube and the transition. Be sure to use a plastic rivet in the hole for your launches.



16. Glue the nosecone in place as per Step 4A. of the printed instructions that came with your kit. Put the glue inside the tube, not on the nosecone shoulder. Set the tube with the nosecone pointed down while the glue dries. Do *not* do Step 4 B.

15. In Step 5 of the kit instructions, attach the parachute you put together to the loop in the white shock cord attached to the lower portion of the rocket, as per the on-line instruction, not those in the kit. The knot on the end of the shock cord is a figure-eight knot on a bight. Attach the nylon Top Flight parachute to the payload section, as per the on-line instruction, not those in the kit. You may find the plastic loop in the Blow Mold Transition too small to accept the parachute lines. An additional $5/32''$ hole drilled in the transition near the center hole (as per the example) may solve the problem.



19. Regarding Step 6, we recommend you put your parachutes inside your rocket only when you are prepping for launch. Leaving them inside the rocket can lead to them taking a set and not unfurling in flight. The results are not happy.

20. Regarding Step 7, the circumferential stickers add strength to the body tubes. They should be added. The other stickers are optional. However, please put one of your Section and Team Stickers on the booster section, and one on the payload section. With so many identical rockets, it's easy to get confused without ID on your rocket. Be sure to re-drill any holes you cover with the stickers. You can also drill the holes after you place the stickers, instead of before.

21. The third conductive foam disk should have a slot cut into it for centering the altimeter in the payload bay.

