



Wildman Rocketry

ALTIMETER/AVIONICS BAY

There are as many ways to build an Avionics Bay as there are rocketeers. The methods described below will result in a strong, durable, and user-friendly design that will work time and time again. Wildman recommends running dual altimeter setups so that you always have a backup charge just in case the main fails. For any hardware that will be exposed to black powder charges, use stainless steel parts. When cleaned properly after each flight, stainless steel will last without corrosion. Zinc-plated parts may be cheaper, but they will corrode much, much faster.

A well-constructed av-bay should hold your electronics secure and safe throughout the flight. It should have easy access to switches or twist-and-tape wires. Any altimeter or tracker can be used in an av-bay designed per these directions. These directions show a 98mm av-bay, but the methods should be the same no matter if you're using a 54mm av-bay or even a 150mm av-bay. For smaller av-bays, you may use smaller threaded rods (some of the printed sleds require smaller rods).

Be safe, and happy flying!

Parts list:

<u>Kit:</u> 2x bulkheads Av-Bay Coupler Vent Band	<u>Necessary Items:</u> ¼-20 Stainless Steel All-Thread ¼" Stainless Steel nuts 2x ¼" Eyebolts Altimeter Sled Altimeters 9V batteries 9V battery snaps	<u>Optional Items:</u> 2x ¼" Locking nuts 2x ¼" Wing nuts 3D Printed Altimeter Sled	<u>Needed Tools</u> Drill or Drill Press Clamps Masking Tape Epoxy 60 or 80 grit sandpaper
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STEP 1: PREPARE ALL PARTS

1.1: Wash all fiberglass parts

All fiberglass parts should be washed in a mild detergent, like dish soap (1.1a). This will clean off all the mold-release agent and dust from the cuts. Simply fill a sink or bucket with soapy water and wash the parts like you would wash the dishes. Rinse with clean water and dry them off.



1.1a →

1.2: Dry-Fit all parts

Make sure your coupler will slide into the nosecone (HED) or payload tube (standard DD) without too much difficulty. This might require some light sanding of the coupler. Sand and try fitting it until you can get the coupler into the nosecone or payload tube without too much effort and can get it out by hand. After you sand, be sure to wash the nosecone or payload tube to get all the dust out.

1.3: Prepare Av-Bay Coupler

1.3a) First, prepare the coupler by drawing lines equally spaced. This can be done using the fin slots of your kit. These lines will help later when drilling vent holes.



1.3a →

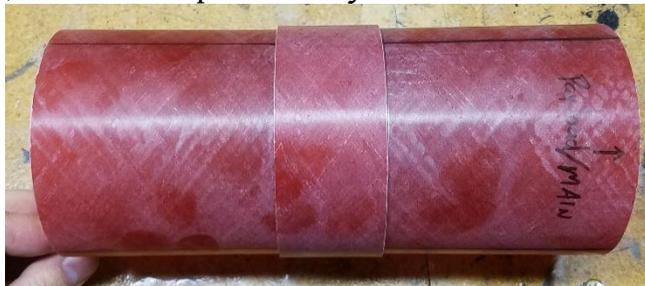
STEP 2: ATTACH VENT BAND & DRILL HOLES

2.1: Attach Vent Band

STANDARD DUAL DEPLOY

2.1a) Measure out where you want the Vent Band to be located on the Av-Bay coupler. This could require having your sled (Step 4) already built so you can align vent holes with switches. Or, you may want to make your vent band directly centered. Or you may want to attach it slightly above center to give more coupler length to the booster-side of your rocket.

2.1b) Slide the coupler where you want it on the vent band.



2.1b →

2.1c) Mark the location of the vent-band by wrapping masking tape around the coupler on one side of the vent band.



2.1c →

2.1d) ... Skip below to 2.1d under “HED-end Deploy” and continue from there.

HED-END DEPLOY

2.1a) For HED, insert the Av-Bay coupler WITH an aluminum bulkhead into the nosecone. It's critical that you have a bulkhead for proper alignment.

2.1b) Then, slide the vent band onto the coupler and mark it's place by wrapping masking tape precisely along the bottom edge of the vent band.



2.1b →

2.1c) Remove the coupler and vent band, then mark the location of the top of the vent band on the coupler with a pencil. This is a good time to mark which side of the coupler goes into the nosecone (2.1d).

2.1d) Slide the vent band off the coupler



2.1d →

2.1e) Sand the surface of the coupler where it will bond with the vent band. After sanding roughly, use acetone to wipe off all the dust.

2.1f) Smear epoxy where the vent band will adhere



2.1f →

2.1g) Twist and slide the vent band into place. Excess epoxy should squeeze out onto the masking tape you placed earlier.



2.1g →

2.1h) When the vent band is in place, peel away the masking tape, leaving little to no excess epoxy to wipe away. Then set this aside to cure. Be sure to set it laying down as the vent band may slide if it is set vertically.



2.1h →

2.2: Drill Vent holes in Av-Bay

2.2a) Place a piece of masking tape all the way around the vent band. Along the lines marked at the beginning of the build, mark halfway up the vent band.

2.2b) Drill 3 11/64" vent holes for the av-bay (or other properly sized holes, see your altimeter manual).



2.2a →



2.2b →

2.3: Drill Shear Pin holes in nosecone (or plastic rivet holes)

2.3a) Place a piece of masking tape around the bottom of the nosecone or payload tube. Using the lines on the av bay, mark 3 drill holes 1 1/2" to 2" from the top of the vent band.



2.3a →

2.3b) Then, with the payload tube or nosecone flush against the vent band, rotate the av-bay/coupler 60° (halfway between the marks), and drill the holes for shear pins or plastic rivets. For 2-56 Shear pins, each hole should be 5/64", and for plastic rivets, each hole should be 5/32". Be sure to drill a hole, place a shear pin or rivet in the hole before moving to the next one.



2.3b →

2.3c) After drilling all the shear pin/rivet holes and vent holes, sand inside the av-bay coupler to clear out any loose fiberglass strands, and you can use a small file to make sure the vent holes are clear of all fiberglass.

2.4: Make a Key-Mark

2.4a) With the shear pins or rivets in place, it's a good idea to make a key-mark to make alignment easier later. Place a piece of tape over the vent band and payload tube/nosecone. Use a dremel cutting wheel to cut a very shallow line across both. Remove the tape.



2.4a →

STEP 3: PREPARE BULKHEADS & ALL-THREAD

3.1: Drill Center holes

3.1a) Clamp down the bulkhead so that it doesn't catch and spin during drilling

3.1b) Drill 1/4" Holes through the center of the bulkheads, one at a time



3.1a&b →

3.2: Drill Sled Holes &

3.2a) Measure where you want to put your altimeter sled. If you're using a 3D-printed av-bay sled, be sure to measure your hole slightly off center to accommodate the full sled in the finished av-bay.

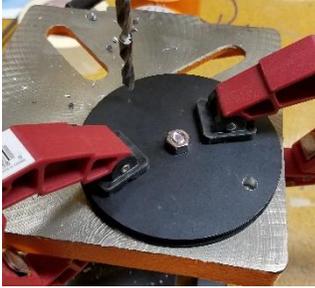
3.2b) Bolt together the two av-bay bulkheads using a small ¼” screw and nut



3.2b →

3.2c) Clamp down the bulkheads so that they don't spin during drilling

3.2d) Drill ¼” holes (or the proper size for your altimeter sled) on the marks you made earlier



3.2d →

3.2e) Drill a hole (or holes) for the e-matches you'll use later for ejection charges. 1/8” is plenty to pass 2 e-matches through if you're using a Main + Backup arrangement.

3.2f) Separate the two bulkheads and clean up the holes, if needed



3.2f →

3.3: Measure and Cut All-Thread

3.3a) Measure the length of all-thread you will need for your av-bay. For a typical av-bay, the all-thread should be the length of the coupler + 1”.



3.3a →

3.3b) Make a mark on the all-thread using a permanent marker

3.3c) Carefully cut the all-thread using a hacksaw or a cutting wheel.

3.4: Attach Eyebolts and All-Thread

3.4a) Using washers and locking nuts, attach eyebolts to the center holes of both bulkheads. Be sure that the eye is on the outside of the bulkhead (the inside is the side with the “step”). On the aft-bulkhead (either one), make sure the eyebolt is turned 90° from the sled holes so it doesn’t interfere with the wing-nuts used to close the av-bay.



3.4a →

3.4b) Screw locking nuts (or cap nuts with thread-locker) onto one end of each all-thread.



3.4b →

3.4c) Slide washers down to the locking nuts and slide the all-threads into the sled-holes of the top bulkhead.



3.4c →

3.4d) On the inside of the bulkhead, thread a nut all the way down to lock the all-threads into place. You can use a locking nut or even a coupler nut (to keep the sled from being too close to the bulkhead), just be sure to use thread-locker and tighten the nut down well.



3.4d →

STEP 4: BUILD ALTIMETER SLED

There's a million ways to build an altimeter sled, and almost every rocketeer has his or her favorite ways of doing things. These directions are for the 3D printed sleds available through Wildman Hobbies.

4.1: Gather all your parts

You'll need your altimeters, sled, screws, standoffs, batteries, battery snaps, screws, switches (optional), etc. Get all these things together and lay them out to make things easier as you build.



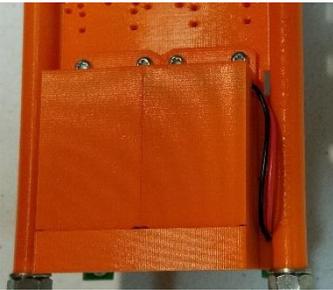
4.1 →

4.2: Place battery snaps

TIP: Complete this step without the batteries attached so you don't have to risk shorting the battery.

4.2a) Place the battery snaps in the battery compartment and route the wires out the side holes

4.2b) Route the wires to the front of the sled via one of the two slots near them.

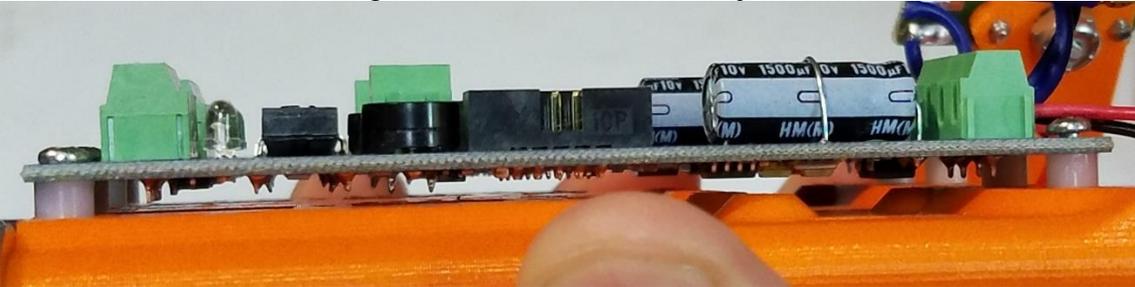


4.2b →

4.3: Mount the altimeters

4.3a) Locate the holes that align with the holes on your altimeters

4.3b) Mount the altimeters using the included screws and nylon standoffs

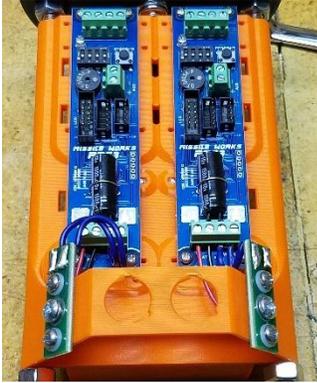


4.3b →

4.4: Connect wires

4.4a) Connect the battery wires to the altimeter, paying close attention to positive and negative leads.

4.4b) If you're using switches of some sort, mount them and attach the wires appropriately.



4.4b →

STEP 5: MOUNT ALTIMETER SLED

5.1: Position the sled

Find the proper position for your sled based on your ability to reach any switches you've mounted. If your switches do not line up with the vent holes, you can raise or lower the sled until you find proper alignment.

5.2: Secure the sled in position

Once you've found the proper location, you can secure the sled in position by threading nuts onto the all-thread and tightening them slightly. DO NOT overtighten the nuts as this puts undo stress on the plastic. Finger-tight is tight enough to keep the sled in position. You can also use thread-locker or even locking nuts if you want to be certain.



5.2 →

5.3: Close the Av-Bay

5.3a) Slide the whole assembly into the av-bay coupler

5.3b) Place the aft bulkhead on the all-threads. Make sure it's aligned properly

5.3c) Place washers over the exposed all-thread to protect the bulkhead. Lock the av-bay using wingnuts. Tighten them down tightly, hand-tight will do fine. There is no need to use pliers, and doing so could result in damage to the coupler.