

Instructions for the 2-piece 3D printed 9V battery holder for the “ART Phantom II Pro”

There are two STL files:

- 9V battery holder.stl
- 9V battery holder- rear spacer.stl

Download these two files and open them in your 3D printer’s slicer software, e.g. PrusaSlicer. You can open BOTH on the workspace at the same time, side by side (or you can even more if you are trying to print the parts for more than one battery holder).

Note that the main part of the battery holder (NOT the rear spacer) will import with the incorrect orientation. It needs to be rotated such that it rests on one of its open ends; it is recommended to rotate the X axis of this part by 90 degrees (at least, this specific rotation works correctly on the PruseSlicer) so that the part rests on the printer’s hot table (bed) on its front end; once rotated, look at the protruding bulge on one side of the holder, and note that there is less distance between it and the hot table/bed than there is between it and the top of the part.....this way, the printer won’t need to spend as much time printing the necessary ‘support structure’ to hold that bulge. ***Make sure to set your slicer to add a break-away support structure from the hot table (bed) to hold the bulge.***

This main part of the holder has thin walls, only 1mm thick on three of the sides. This should be perfectly do-able on most decent quality printers. You might want to tell your slicer to add a “brim” where the thin walls touch the bed; this increases adhesion so the thin walls don’t wander sideways during printing.

There is no need to print the parts of this battery holder at high resolution or quality settings in the slicer software. The ‘layer thickness’ can be set fairly tall, and other precision settings can also be set rather ‘rough’. However, the prototype was printed at a 0.2mm “quality” setting, and even with this the print time was less than 2 hours on a Prusa i3 Mk3S printer. With less precise settings, the print time can be significantly reduced.

There is also little advantage to having a lot of ‘infill’ specified in your slicer settings. You could have both parts printed entirely without infill, if your slicer allows that.

Once both parts are printed, use a gel formulation CA glue (super glue) to attach the rear spacer part to the rear open end of the main part. MAKE SURE to attach the rear space to the correct end of the main part.....the side bulge on the main part needs to be further away from the rear (closer to the open end that does NOT have the rear spacer). The main part and the rear spacer both have notches on their top ends which need to line up. The bottom edge of the rear spacer will NOT reach all the way down to the bottom of the main part; this is to provide clearance for some surface mount components on the circuit board. Once you have the two parts carefully aligned, use a pencil to mark where the edges of the rear spacer meet the thin edges of the main part, so you know where to apply the glue, and where not to. Add the glue, fit the two parts

together and adjust quickly, then either hold them until the glue sets, or apply a CA glue accelerant to speed things up.

On the ART Phantom II Pro, remove the two screws on the curved ends of the rear faceplate (the side with the battery holder hatch), and remove ALL screws from the front faceplate (the side with the power switch and AUX power connector); this includes the two screws on the curved ends of the front plate, as well as the four screws that secure the “Microphone Input” XLR connectors. Use a good quality Phillips screwdriver that is not worn out and which correctly fits the screw heads; the screws can be quite tight initially, and a bad fitting screwdriver can strip out the screw heads. Slide the circuit board and rear plate out of the case.

Remove the battery connector and its wires from the default cardboard & foam block battery holder, and discard the old holder. Place the new 3D printed and glued holder in the same place on the circuit board. The side bulge should touch, or nearly touch, the “Microphone Output 2” XLR connector body. The side of the holder opposite the bulge should come to between 1mm and 2mm from the edge of the circuit board (if it reaches the edge of the board, it won't be able to slide back into the case). The end of the rear spacer should be close to the inside face of the AUX power connector; the holder should have about 2mm of ‘wiggle room’ where it can touch the AUX connector but not quite reach the inside of the rear faceplate, or it can touch the rear faceplate but not touch the AUX connector. Make sure that the red and black battery cable wires do not get pinched between the bulge and the XLR connector body, and pass OVER the bulge rather than under it. The tiny notch on the bottom of the holder will fit over surface-mount transistor Q3 on the circuit board. Feed the 9V battery connector through the opening on the rear of the holder, and pass through the holder and out the front opening.

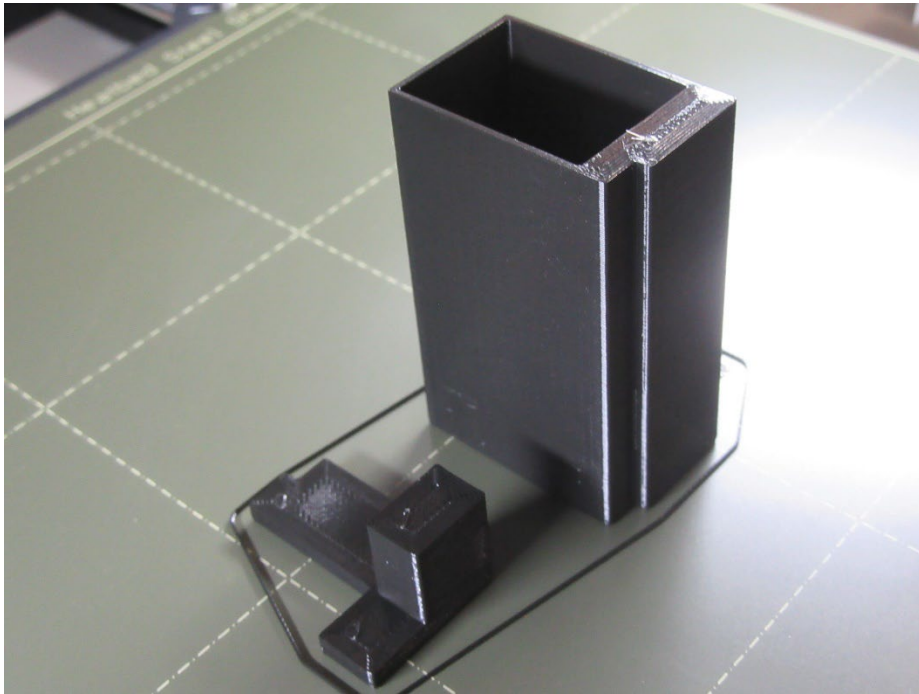
Carefully slide the circuit board, with new battery holder, back into the case. Note that the edges of the circuit board fit into slots inside the case. There should be very little clearance between the top of the battery holder and the inside top of the case; this is intentional. If it seems to not fit, make sure that the holder's bulge is touching the XLR connector body and it is laying flat on the top of the circuit board.

Replace all screws.

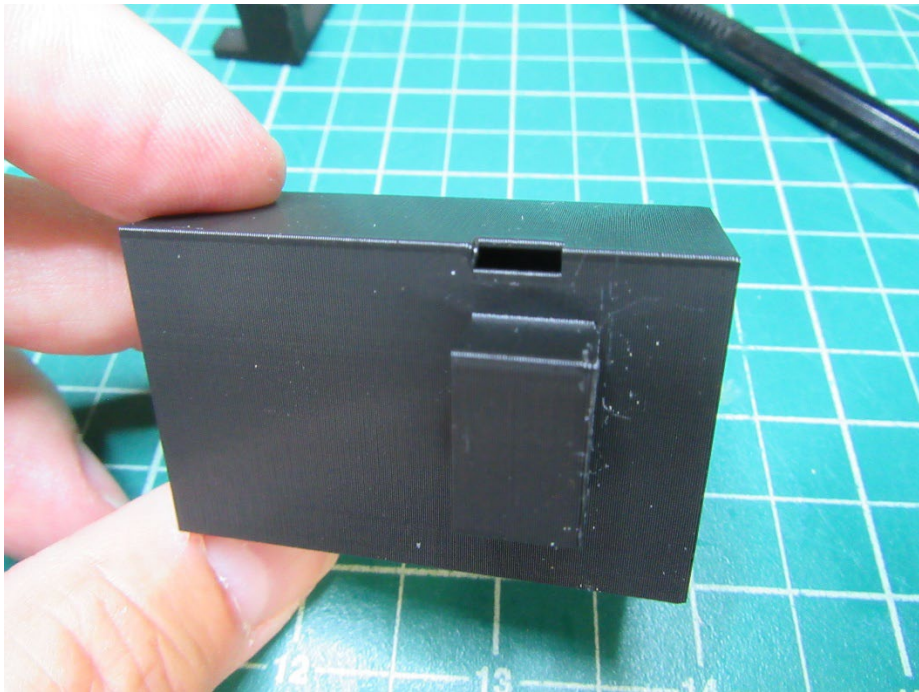
Connect a 9V battery to the connector, and fit the battery into the holder via the rear faceplate opening, pushing the extra wire length ahead of the battery; the wire will either wad up inside the rear end of the holder, or it might slide out through the holder's rear opening and into open space inside the unit. The battery connector will just fit in through the rear panel opening; you might have to jam it in a bit. Replace the battery holder hatch and turn the thumb screw in all the way; note that the screw threads into both the latch and a nut that is part of the rear panel.....this means you must have the hatch fully closed, and the screw turned almost completely out, before then starting to screw it back in through both the hatch and the nut simultaneously.

The job is done!

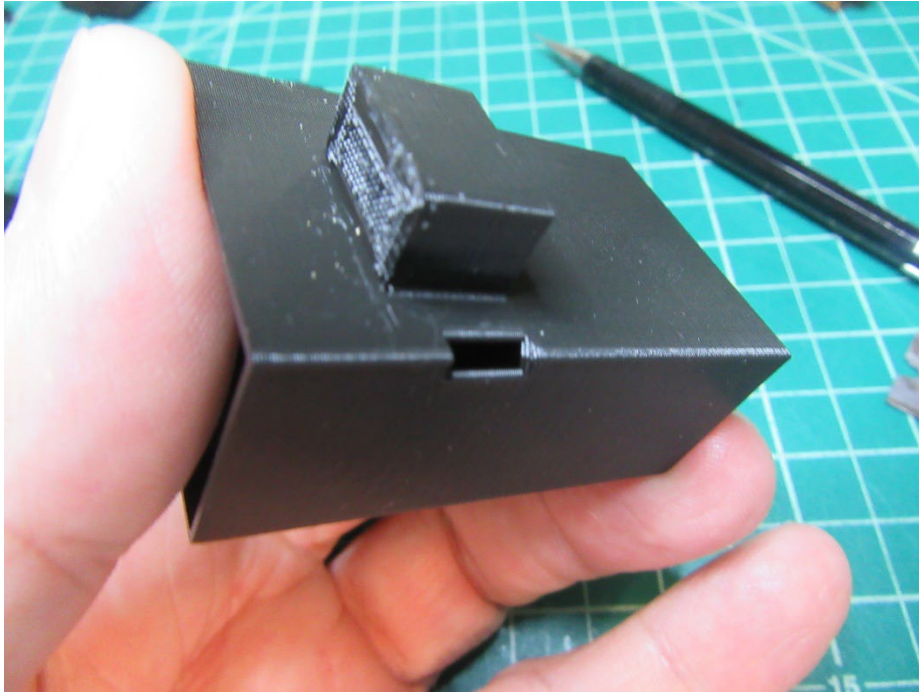
Assembly photos:



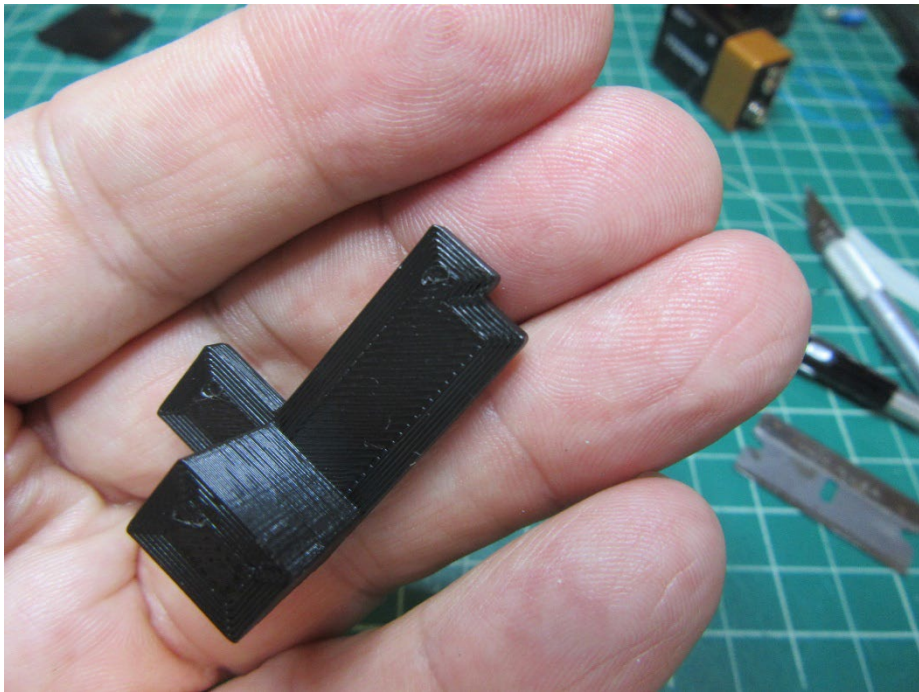
Rear Spacer part and Main part after printing; discard the thin 'skirt'



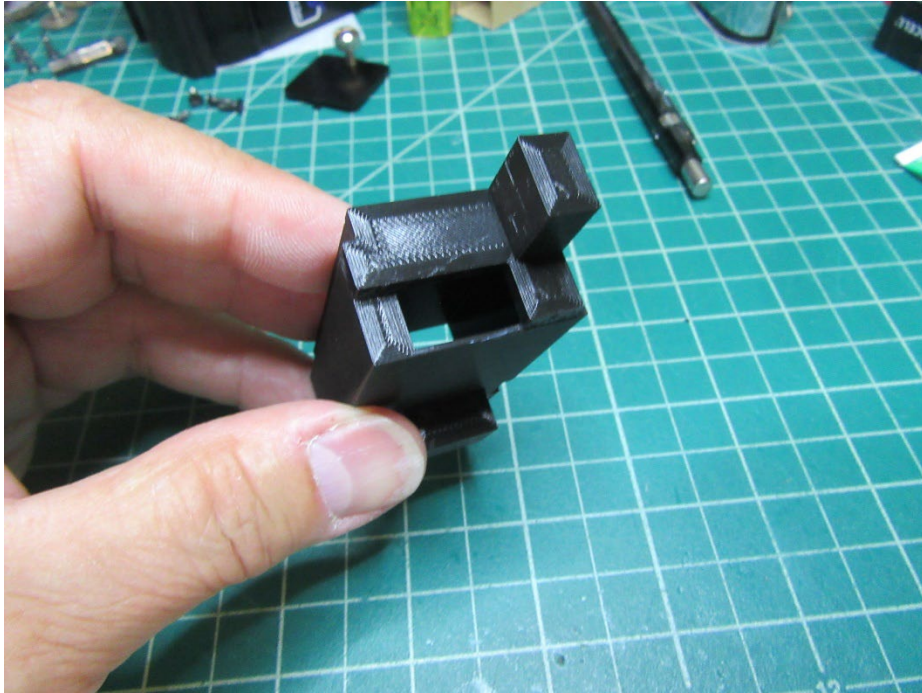
Main part with Q3 clearance notch and the 'bulge'; FRONT end at right



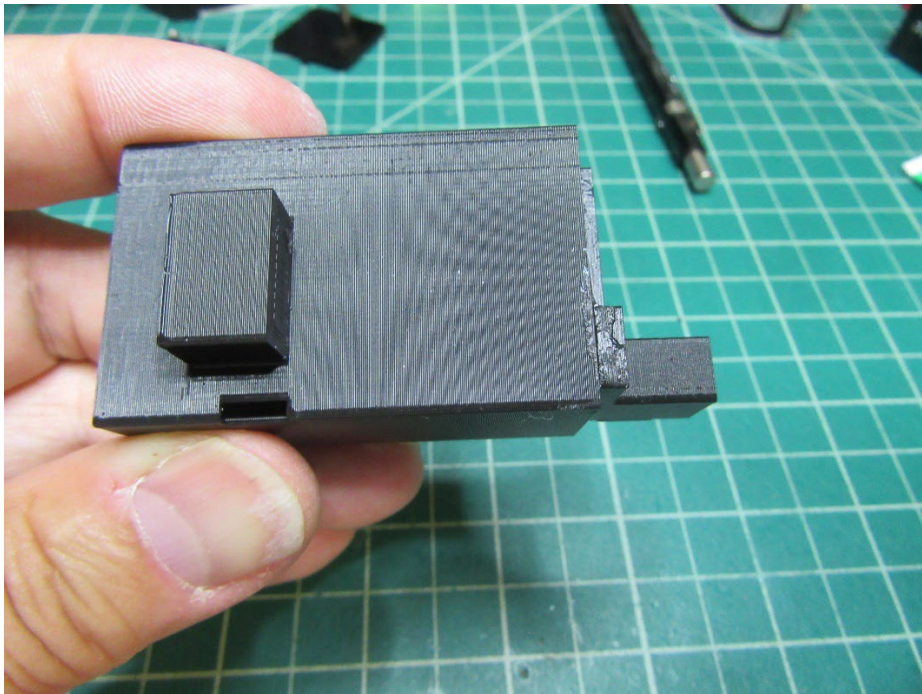
*Main part with Q3 clearance notch and the 'bulge'; FRONT end at left
Note that the necessary 'support structure' for the 'bulge' has been removed*



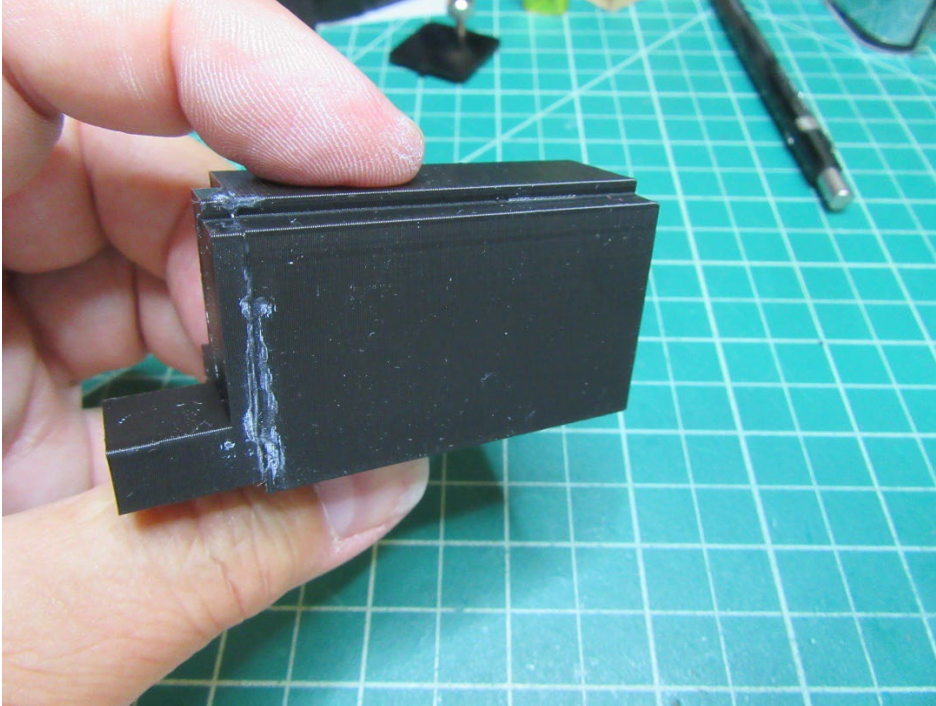
*Rear Spacer part's protuberance facing the camera will touch the
inside face of the AUX power connector*



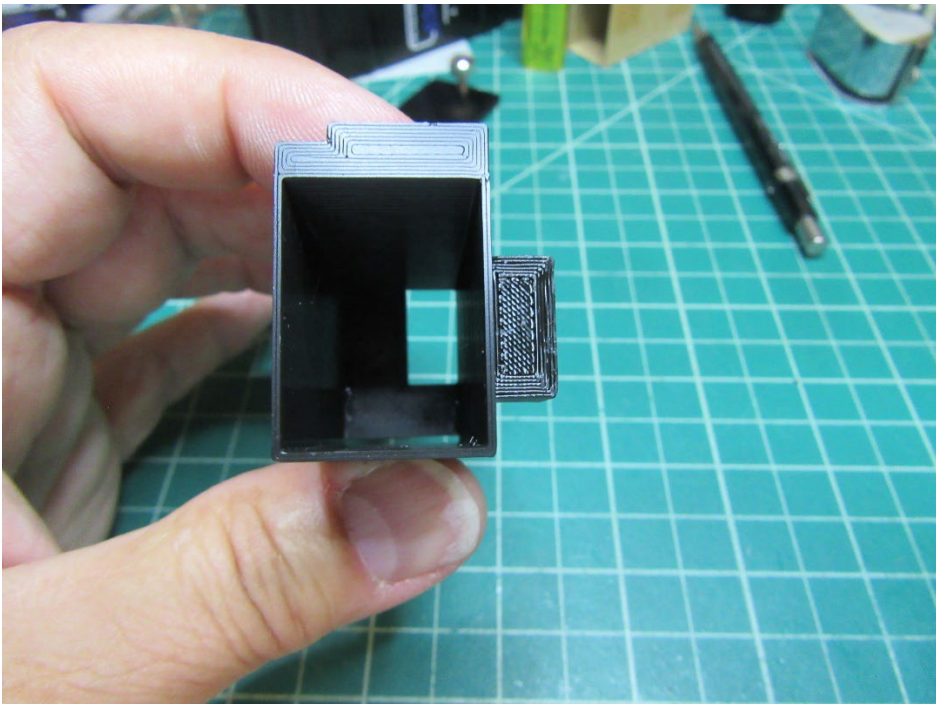
Rear Spacer part super glued to rear end of Main part



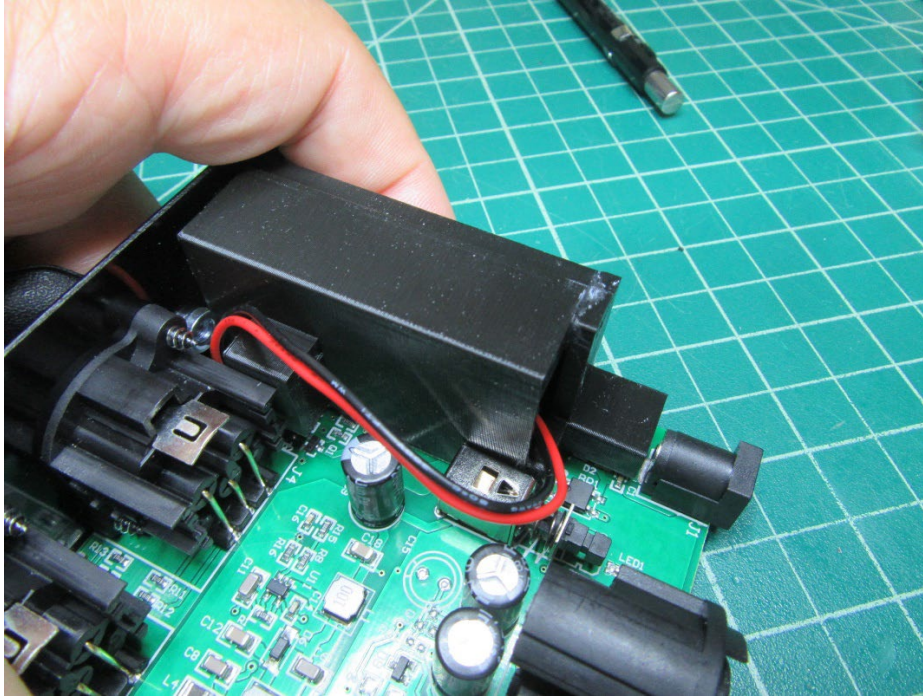
*Rear Spacer part super glued to rear end of Main part
Note that bottom of Rear Spacer is aligned with the top of the holder,
but is NOT aligned with the bottom of the holder; there is a 2mm offset*



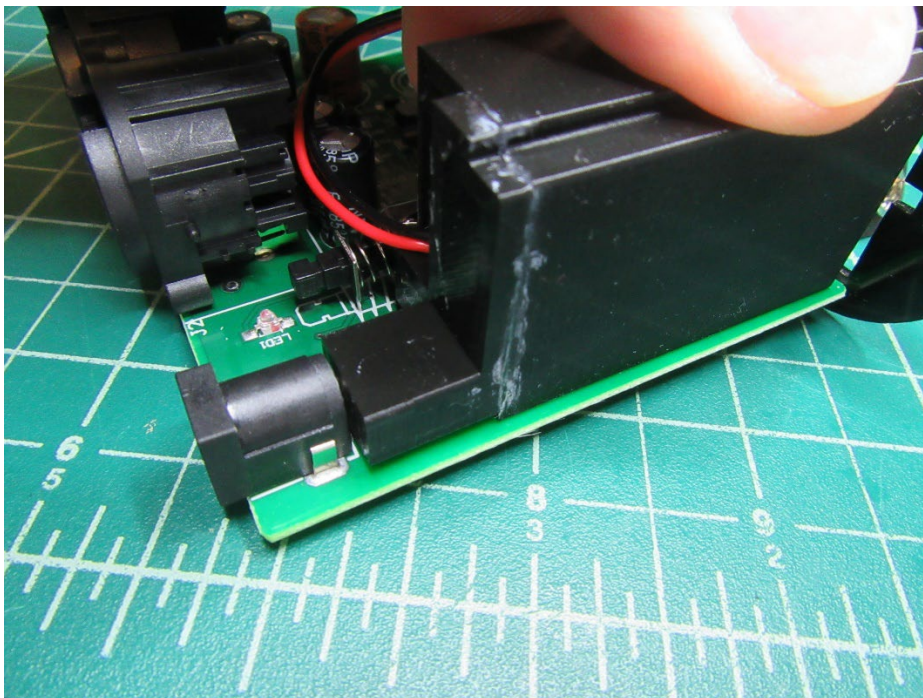
*Rear Spacer part super glued to rear end of Main part
Apply the glue only where the two parts will meet!*



*Assembled battery holder viewed from front, with 'bulge' at right, and
notched thick top. Note that the front of the holder will fit up against the
inner surface of the unit's REAR faceplate, just inside the battery hatch*



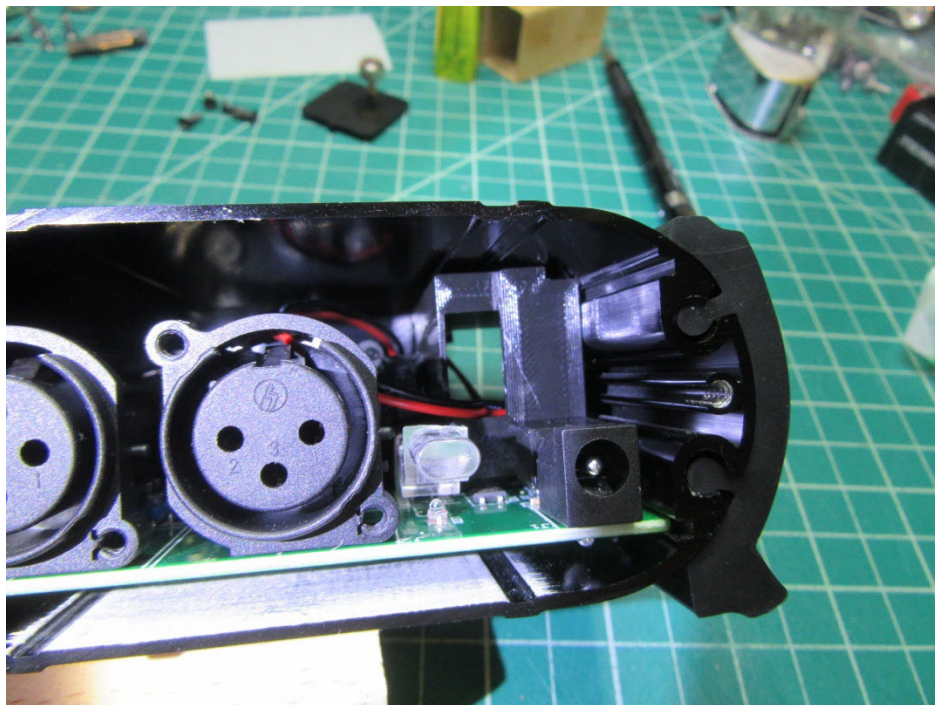
Holder in place on circuit board and touching the inside surface of the REAR panel. Note how the Rear Spacer almost reaches the inside face of the AUX power connector (which will fit into the FRONT panel). Also note how the battery wires pass up and over the 'bulge' and then go through the opening in the Rear Spacer of the holder



Holder in place on circuit board, with Rear Spacer almost reaching the inside face of the AUX power connector



Holder is visible through the rear panel's battery hatch, with the 9V battery connector passing through the holder and out of the hatch



Holder is visible through front opening of the case, behind the AUX Power connector. Note how the top notch of the holder fits the inside top of the case with little clearance



Battery connector (9V battery mostly hidden from view) pressed inside the rear panel's battery hatch. When the battery is inserted into the holder, the wires either wad up inside the holder, or slide out the opening of the holder's Rear Spacer part.