Spirit Pack Cosmetic Upgrade Kit Contents:

Ion Arm:
- #1 Brass rod with knurled pattern (80% scale)
- #2 4.5” Yellow tubing (replaces the blue tuning)

Booster Frame:
- #3 20” Twisted pair ribbon cable replacement (80% scale)
- #4 1x Ribbon cable C clamp to go on booster frame
  2x screws (#10-24, 3/4”)
  2x washers (#10, 0.44”)
  1x Fender Washer (#10 x 11/16”)
  2x lock nuts (#10-24)

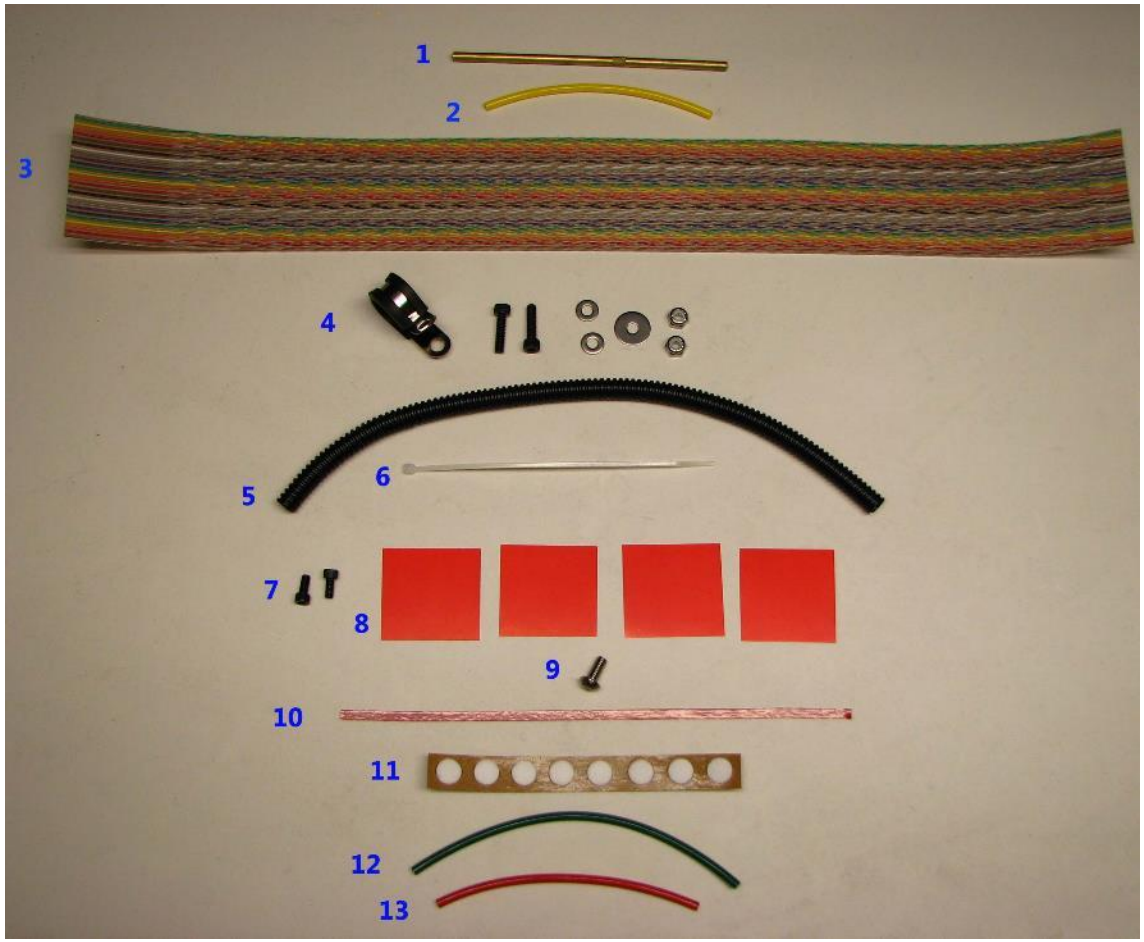
Pack Body:
- #5 12” Split loom to cover the green tubing
- #6 6” white cable tie

Cyclotron:
- #7 2x Ribbon Cable Cyclotron Plate screws (#8-32, 3/8”)
- #8 4x Cyclotron red filters (in front of the current frosted lens material - do not toss the frosted lens material, keep for electronics kit)

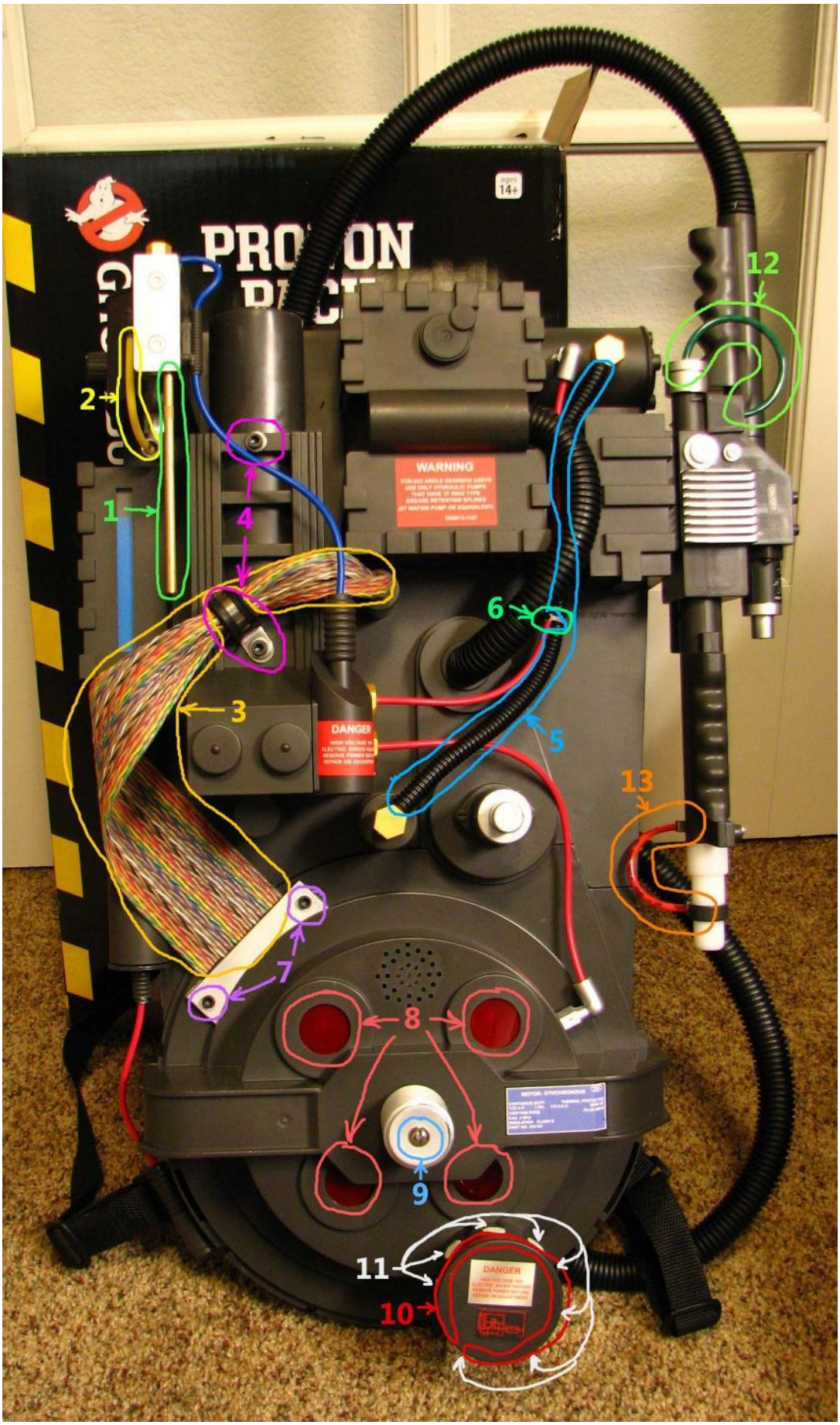
Bellows:
- #9 1x Slotted screw for bumper bellows (#12-24, 1/2")

N-Filter:
- #10 9” Red Striping Tape for N-filter (wrapped around the bag holding most of the parts)
- #11 8x white felt adhesive backed disks for n-filter

Wand:
- #12 6” Green tubing for wand (replace the blue tubing)
- #13 4.5” Red tubing (for wand tip)



Parts Locations:



Specific Tools Needed:

Drill bits:
- 3/16” for bellows screw (item #9) and the Brass Rod (Item # 1)
- 5/32” for tubing holes, and ladder screws (item #4)
- 1/8” for ribbon cable plate screws (item #7)

Hex keys:
- 5/32” for item #4
- 9/64” for item #7

Socket: 3/8” for item #4

Glue: Hot Glue gun
??? adhesive – wonderful stuff for plastic, but fairly runny

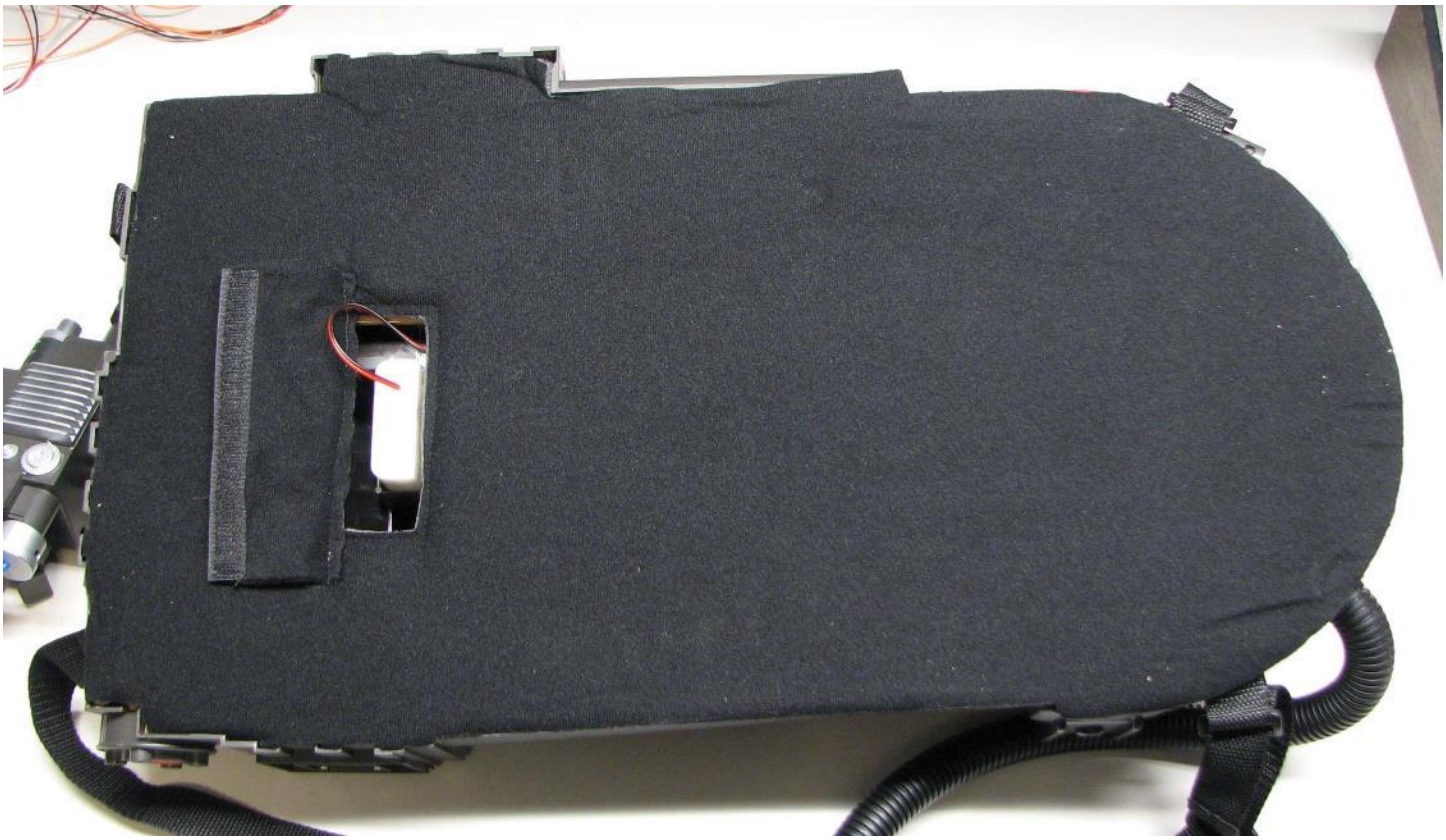
Philips head screwdriver - medium to small
Flat Head Screwdriver - medium

X-acto knife / razor blade

Scissors (to trim the tape, the loom and tubing)

Getting started:
Though there are multiple items that do not need access to the inside of the pack, let’s get the back off of the Spirit Pack first and not deal with this in the middle of the upgrade.

Flip the pack over and we need to locate the screws that hold the fabric covered cardboard “motherboard” to the back of the pack.



We need inside to add the nuts to the screws that go in the ladder (items #4), fold the Ribbon cable (item #3) in place and to add the red translucent material to the Cyclotron holes. You could also add glue or nuts (not included) to the Cable Clamp screws, but I didn't feel it was needed on my pack because those screws were quite snug.

You have two main choices here, 1) remove the fabric to expose the cardboard and then glue the fabric back on when done, or 2) make small cuts in the fabric above each screw and leave the fabric attached to the cardboard. I liked option #2 as I expect to open up the pack again (for new illumination electronics, hint hint!)

Open up the battery cover and then stick your hand between the cardboard and the fabric that is glued to the cardboard around the edges. You can feel around and locate 4 of the 5 screws that are holding the cardboard to the plastic pack.

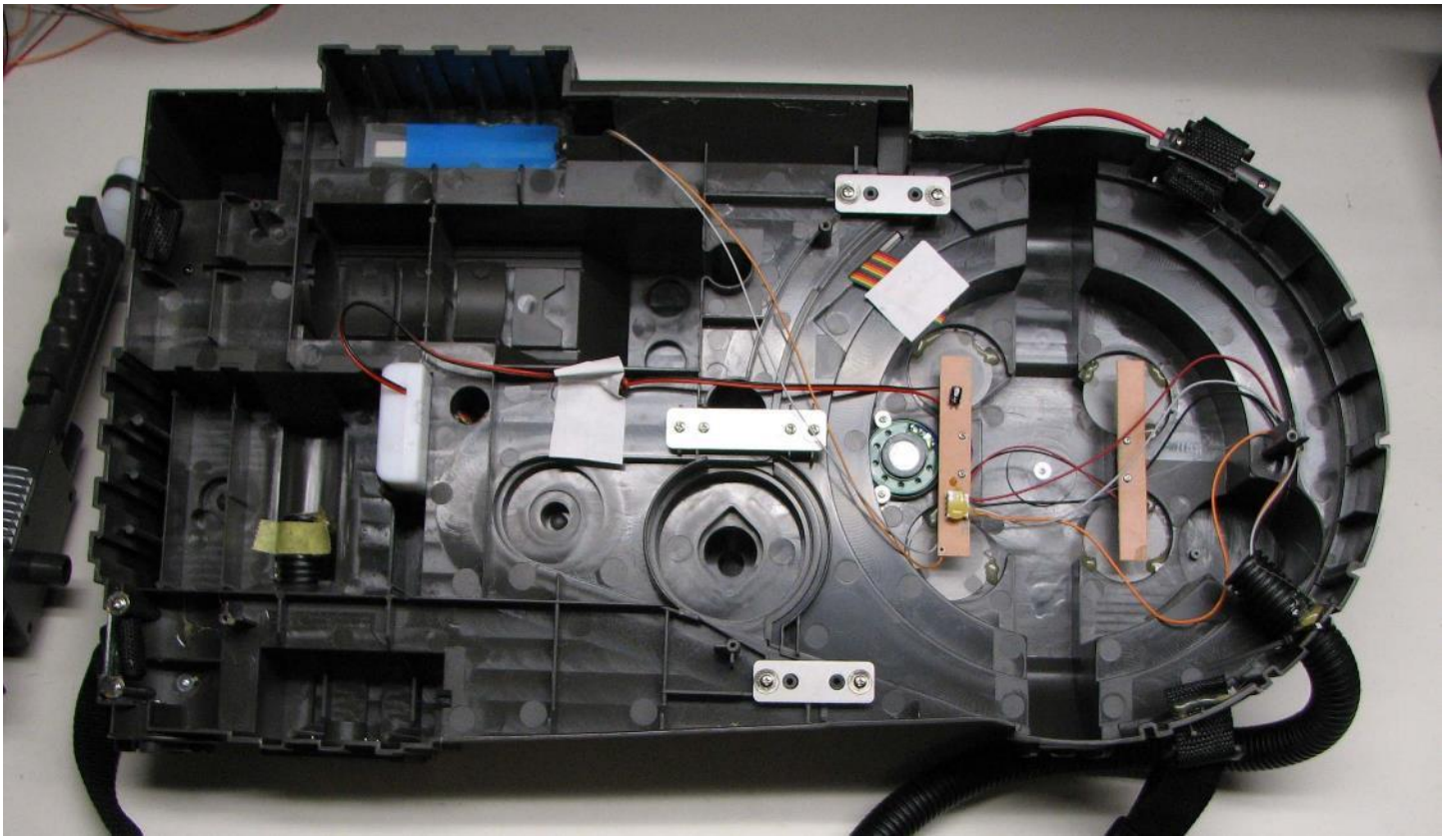
When located, use the X-acto knife or razor blade to make a small cut in the fabric to expose the head of the tiny Philips head screw. I could reach 4 of the screws, but the 5th I could not feel from inside, so pressed around the material from above and located the screw. Knowing where they are would have helped, so here I pulled the material around the screw and washer so you could easily see where you _*should*_ find these screws:



After re-installing the back cover, the screws can still be essentially hidden and only small cuts in the material above them allow easy access for the next time you want access in to the pack.

The screws aren't the only thing holding the cardboard onto the pack, and the cardboard is not very stiff, so great care should be taken removing the cardboard backing from the pack. Near the straps, the loom and some random spots along the edge, glue to hold those items of the fabric also oozed out enough to connect the cardboard to something else in the pack. I used a flat screwdriver to carefully separate the cardboard and the pack plastic, frame or loom while slightly lifting the cardboard. I worked my way all around the edge before lifting the cardboard fully off of the pack. I did not have any places in the middle of the pack have glue, it was only around the outside edges.

Once you get the back removed, here is the view inside the pack:



You can leave the screws in the cardboard or remove them and put them in the posts they come from so they don't get lost.

You can install the mods in any order you want, but I left the Brass rod on the ion arm for last (even though I wanted to do it first!) since I kept flipping the pack over and did not want to damage or bend the arm while doing the other mods.

Ladder Screws and Cable Clamp (items #4)

Items #4 are to be installed on the ladder that is on top of the booster tube. The top screw matches the one used to hold the C Clamp. On the topside, both screws use the small washer and on the bottom side of screw holding the C clamp we use the larger washer.

Using the 5/32" drill bit, drill two holes, one on the top ladder rung (centered on the rung), and the bottom one centered left-to-right, but centered about level with the top of the ladder. It could be slighter higher and the washer inside would be held flatter, but this looked like it should be the correct placement. The photo has some barrel distortion from the camera lens, but where the yellow lines cross des represent where the hole should be centered.

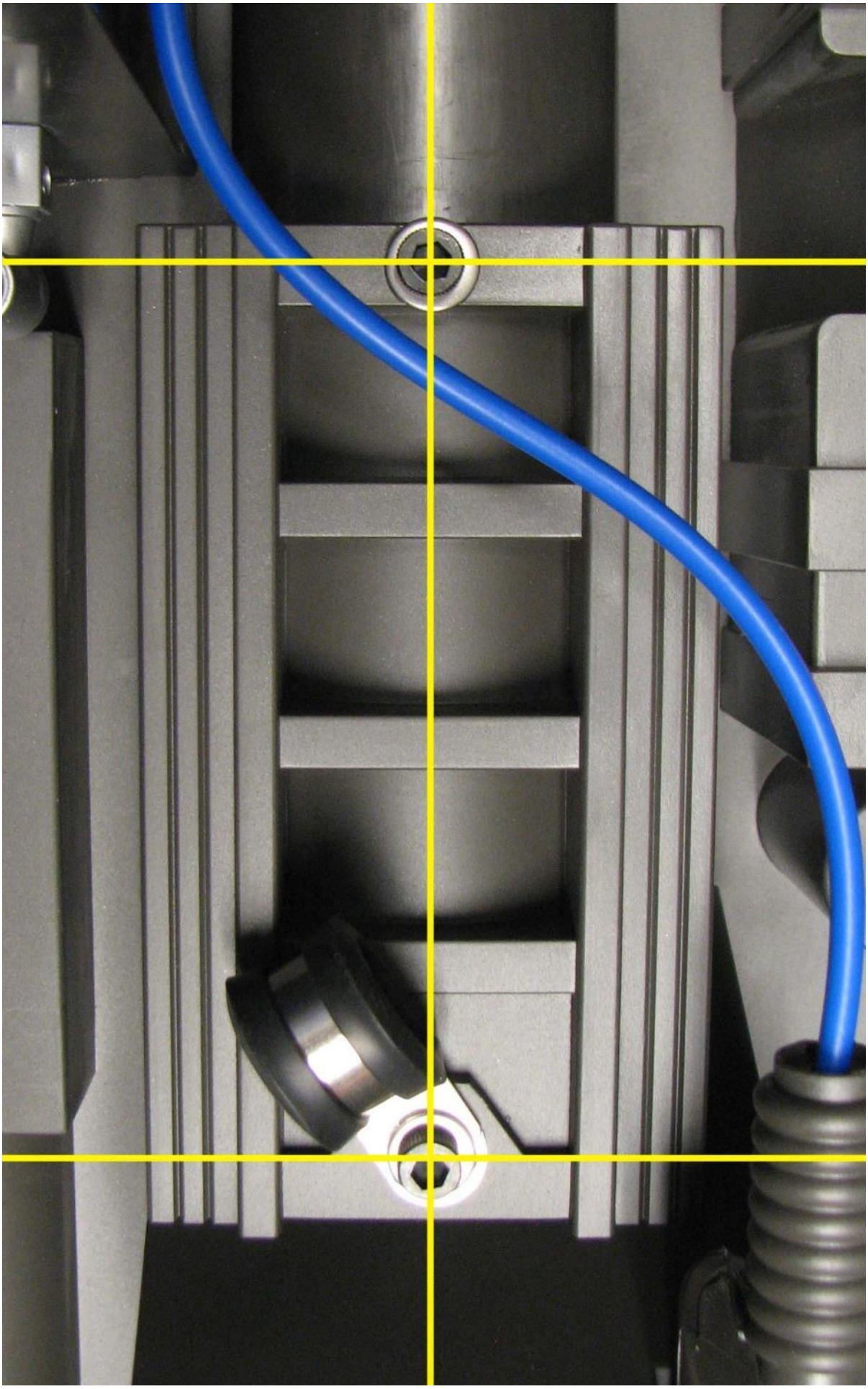
Top screw:

Screw Head --- Small Washer --- Plastic Pack --- Lock nut

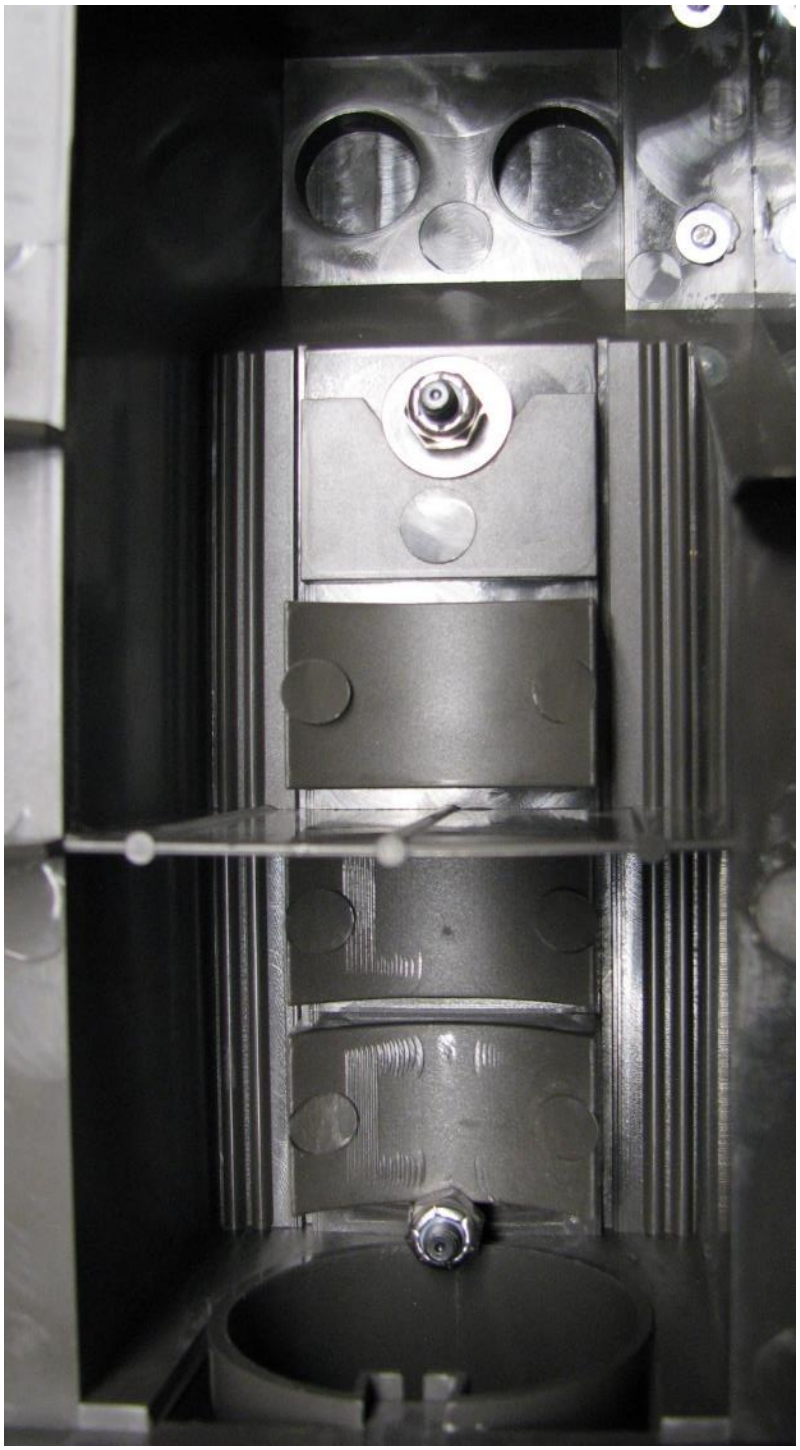
Bottom screw:

Screw Head --- Small Washer --- Cable Clamp (both legs) --- Plastic Pack --- Large Washer --- Lock nut

Secure the lock nut with a 5/32" Hex Key on top and 3/8" socket on the inside.



View inside of the ladder screws and nuts:



Ribbon Cable (Item #3)

First decide if you want the cable to have the straight section (non-twisted) coming out of the cable clamp next to the cyclotron or only have the twisted pairs visible. The screen used packs had some variety when they were built, so both ways are acceptable – choose the one you like best:



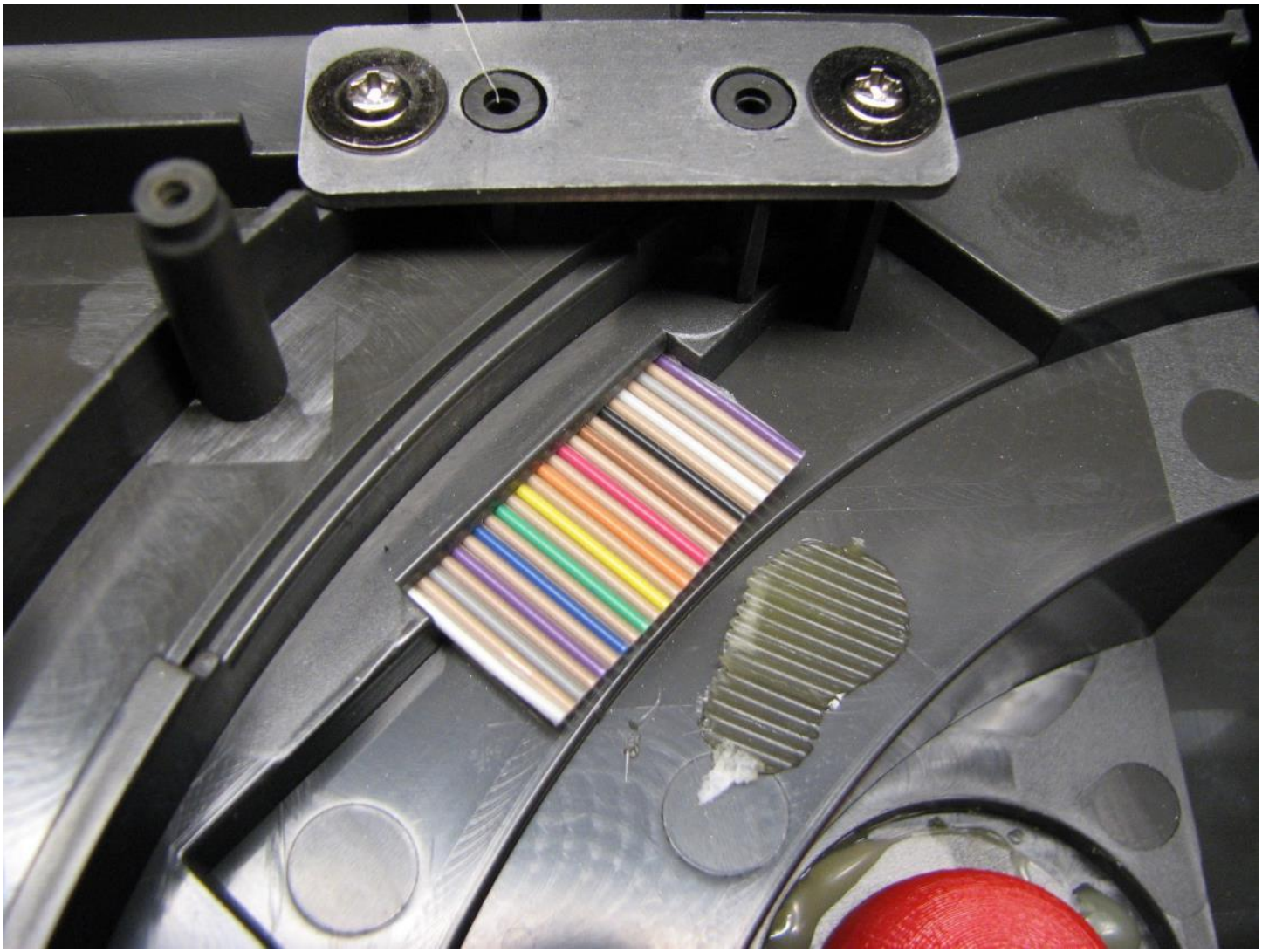


Next, remove the existing ribbon cable. It is glued on both ends. I used the flat screwdriver to pry between the cable and the plastic proton pack case to get the ribbon cable off of the pack.

Some modders have widened the slot that was designed to fit the narrow cable that came with the pack so the full ribbon cable can go inside the pack. This requires sopme skill in making a stright even slot, so I chose to leave the slot as is and carefully trim the cable:



The center portion of the cable then extends inside the case. It should be a bit longer, but this was long enough to secure inside:



You can see the leftover glue from the original narrow cable. You will later glue this in place, but it may be easier to arrange the cable first before permanently attaching the cable with glue.

Roll the cable lengthwise into a tight “tube” so it can be threaded through the C Clamp that is bolted to the ladder. This wasn’t too bad, but maybe it would have been easier to feed through the C Clamp before it was bolted to the ladder…

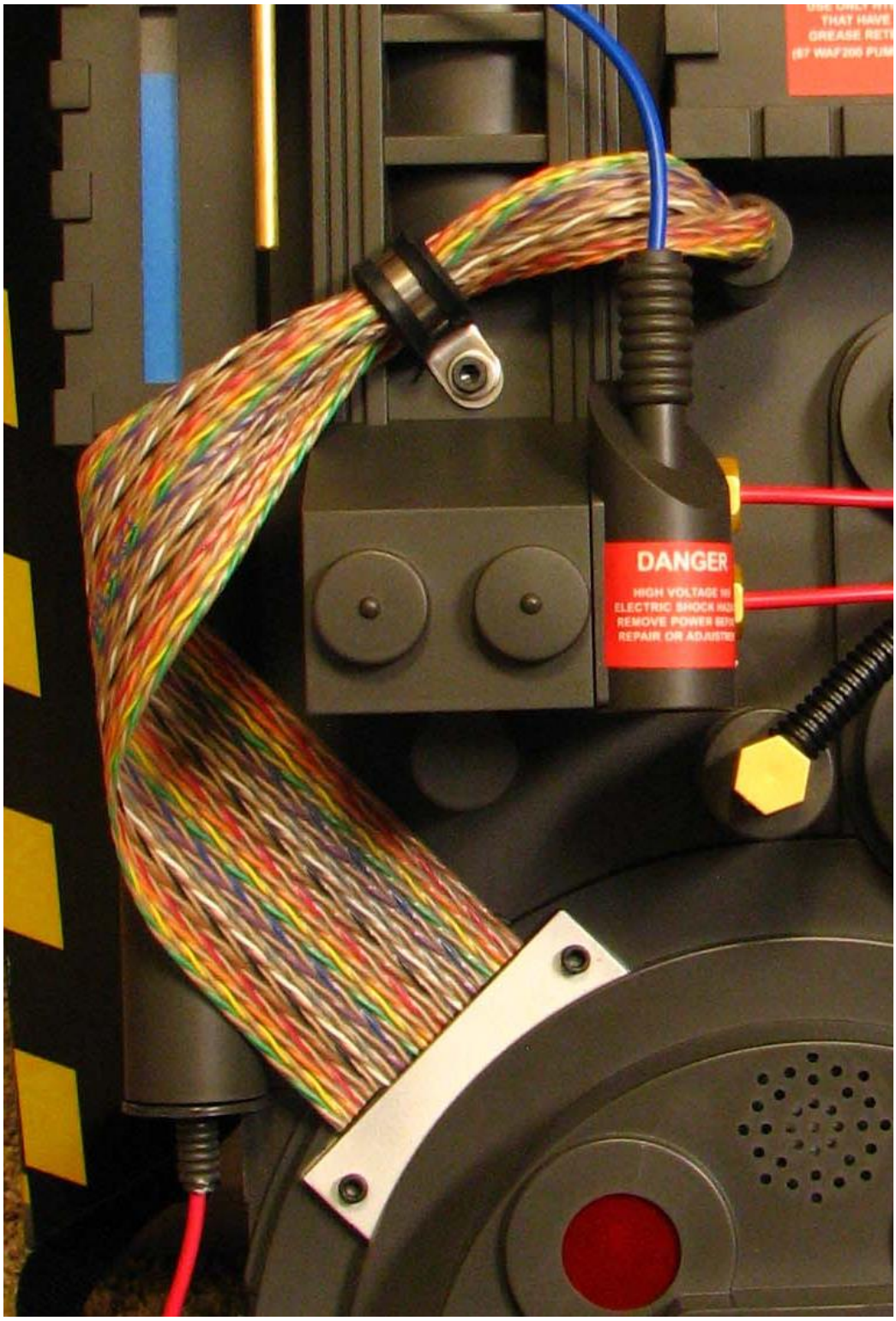
Arrange the cable between the Cyclotron Clamp and the C Clamp and let the rest of the cable just hang out over to the right side. Once you like how it looks, cut the ribbon cable down on the right had side to about 3” past the hole where the ribbon cable goes back down into the pack.

Other modders have cut off/down this piece where the cable goes into or drilled out the insides to make it wider so the ribbon cable could go inside. I chose to leave that post as-is and modify the cable to fit the tiny hole. Cut the end of the cable at an angle from about the middle of the cable. Cut the wedge out on the side that will be the INSIDE of the rolled-up cable so it will not be visible, but makes the “tube” of cable have a smaller diameter and at least some portion of the end can now fit inside the hole in the pack:


WARNING
FOR-043 ANGLE GEARBOX ASSYS
USE ONLY HYDRAULIC PUMPS
THAT HAVE 'O' RING TYPE
GREASE RETENTION SPLINES
(67 WAF200 PUMP OR EQUIVALENT)
SS9013-1167

You may end up with too much cable and will have to cut down this end again and again cut the slanted section out of it. Try and get an inch or more of the cable down into the hole. It ends up being a very tight fit. After arranging the cable to look like how you want it, you can glue the cable (from the inside of the pack) if you feel you want a more permanent attachment.

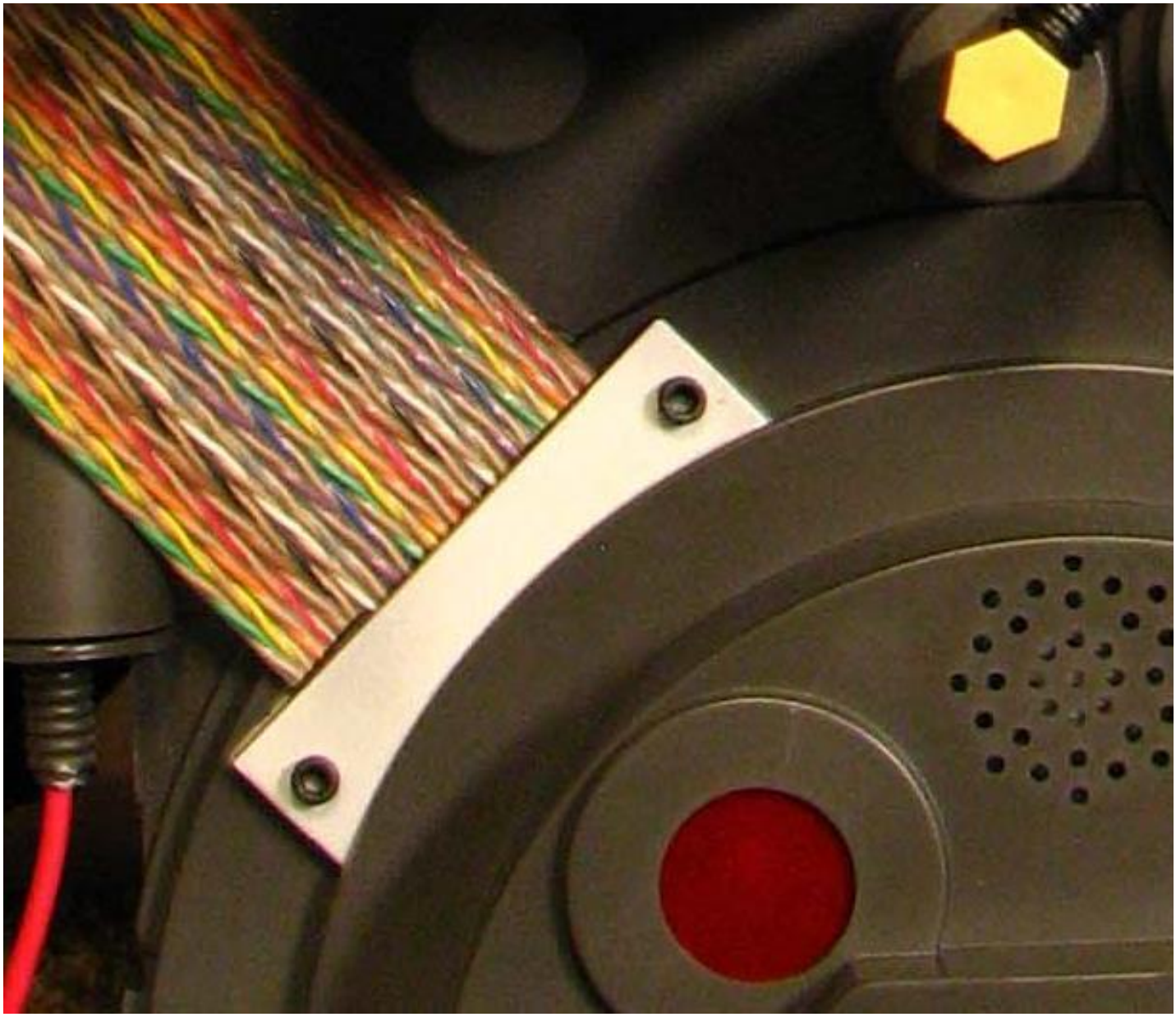
After the entire cable has been arranged how you would like it to look, it is time to permanently attach the cable with glue. Aligning and trimming the top side outer edges of the cable to be flush with the cable clamp (no gaps!), I used the plastic glue to bond the cable on the inside. I also taped the cable in place and let it dry for 24 hours before doing the next upgrades. I didn't apply glue to the cable on the top side and so far, the outside cable wires are staying in place. If they tend to bend up or show some gap, I may put a small amount of glue to hold them down.



Cable Clamp Screws (Item # 7)

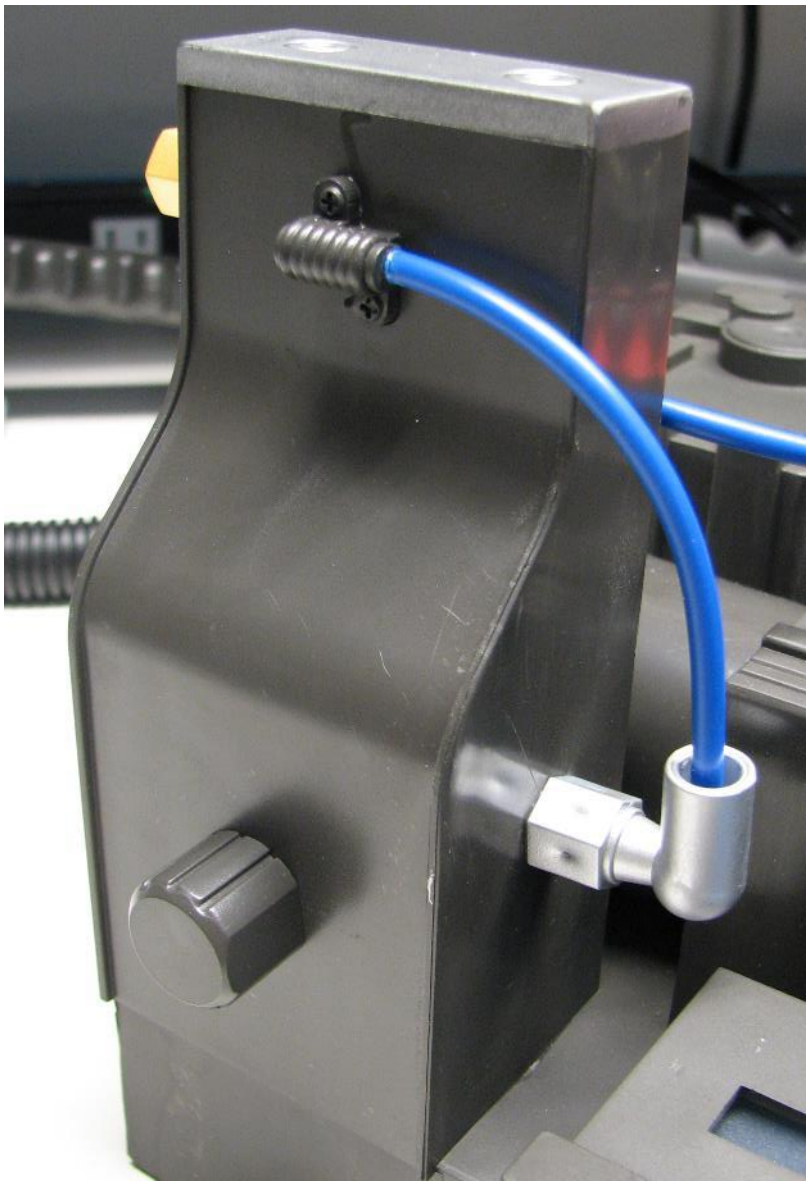
I like the look of real screws near the new cable, so we are going to replace the molded in silver screws with the black ones provided. Drill a hole in the center of both of the two screws in the cable plate with the 1/8" drill bit. I also took a Dremel with a very small grinding bit and flattened the leftover edges of the screws so the head would be flat on the plate. This is not required and you need to have a very steady hand since the head of the screw is very small. If you slip and grind too wide, it will be visible, and can probably be covered by a washer if needed (not included).

The hole is small enough that the screw should thread in and be held very securely. Use the 9/64" Hex Key to attach the screw. If you want, you can glue the screw from the inside of the pack, or add a nut if there is space inside.



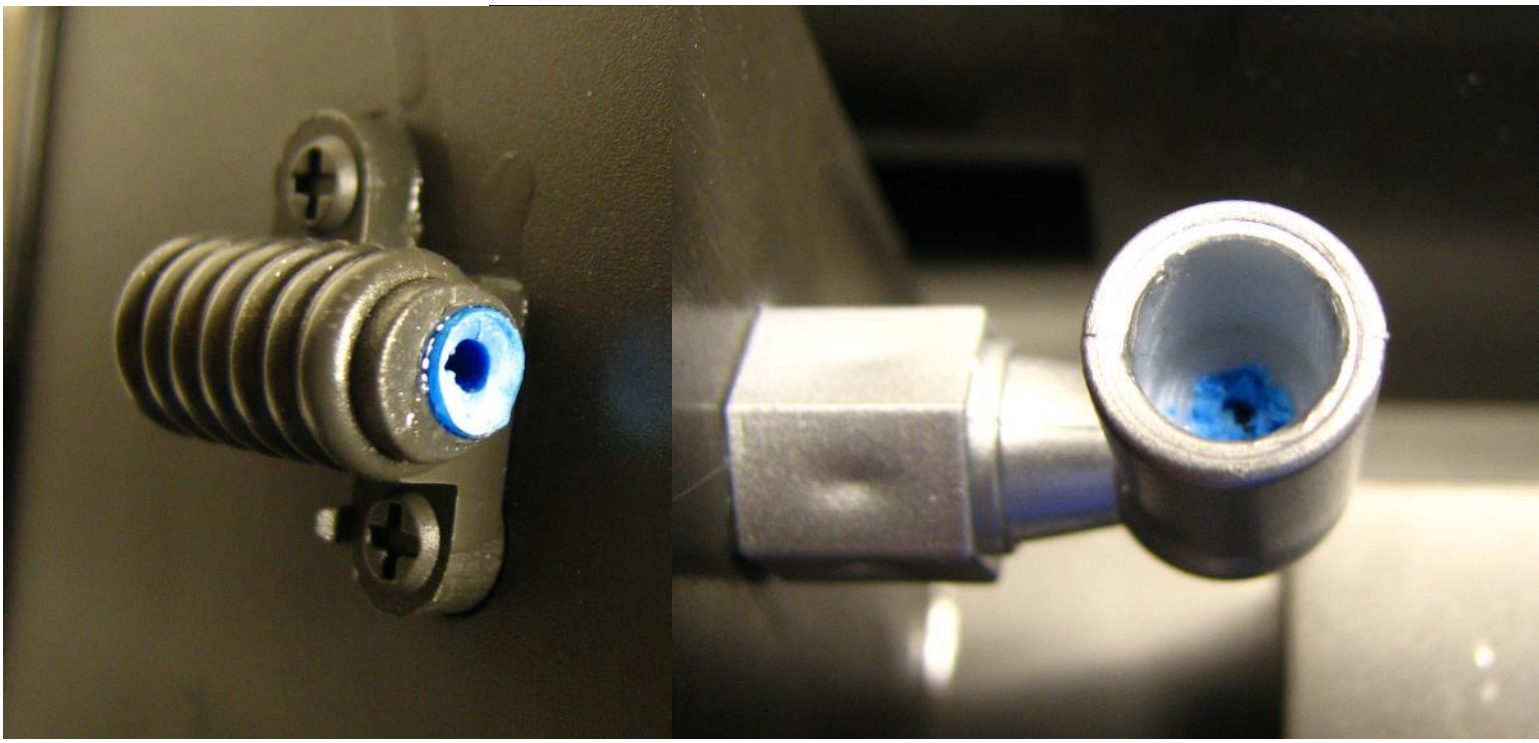
Ion Arm Yellow Tube (Item # 2)

We need to remove the Blue tube on the side of the ion arm and replace it with a yellow tube.

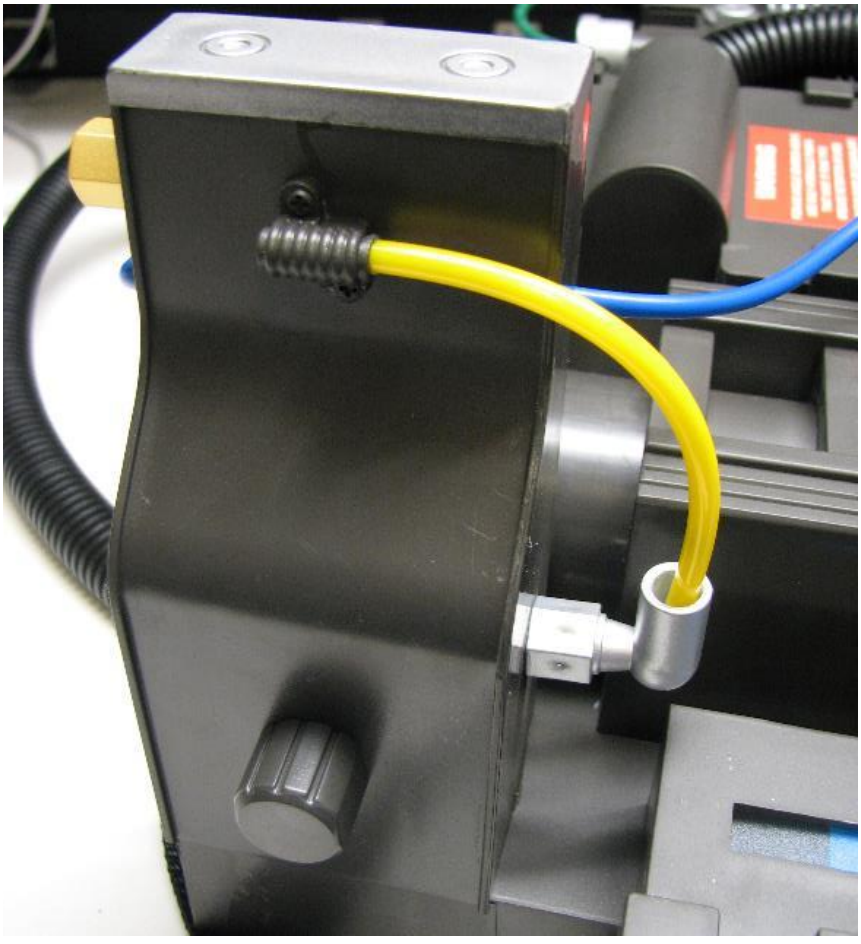


Both ends are glued in, so here is what I tried, but there may be a better way to do this. For the upper side connected to the black “power resistor”, just cut it off as close to the black part as possible. I tried tugging and heating this and nothing worked!

For the lower side that goes into the silver painted part, I could not easily cut the tube near where it was glued, so tried heating the tubing with a very narrow stream of heated air (Hot Air rework tools!). You could try a heat gun, but be careful not to melt the plastic. A hair dryer may also work. This basically let me pull on the tubing and it stretched and broke off near where it was glued in. Not perfect, but easy enough to clean up with the drill:

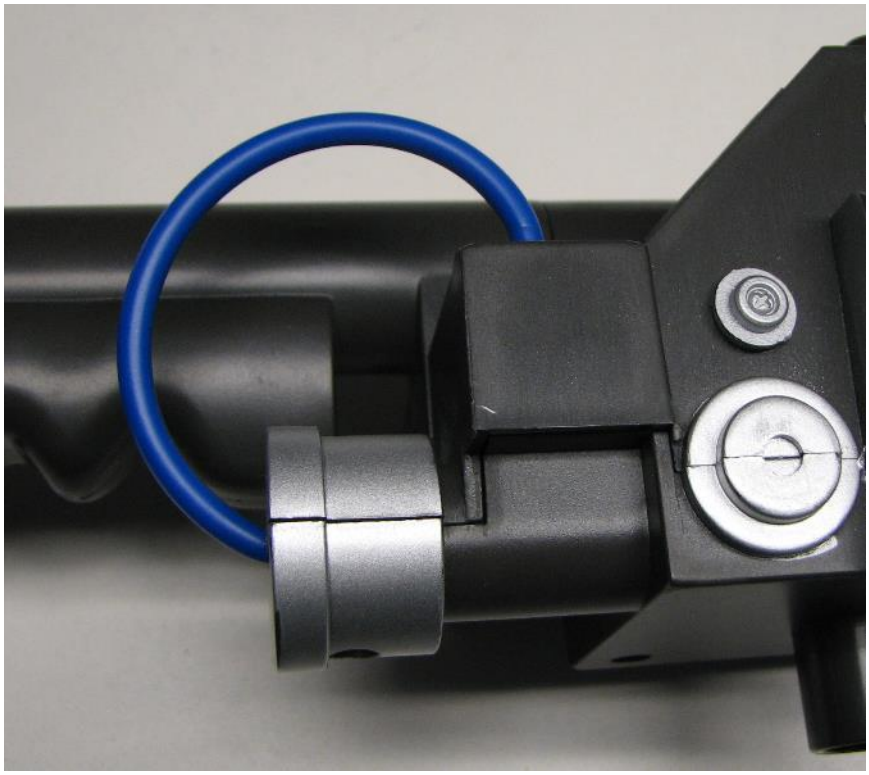


I then used the 5/32” drill to drill the hole. This cleaned out the tubing and glue. Be careful not to drill too deep! Test fit the Yellow tubing and ream out the holes if needed (tight fit is desirable). Then trim to the desired length to achieve the shape you want. Remove and glue if desired. Mine was such a tight fit didn’t even glue it. (Probably still a bit too long…)

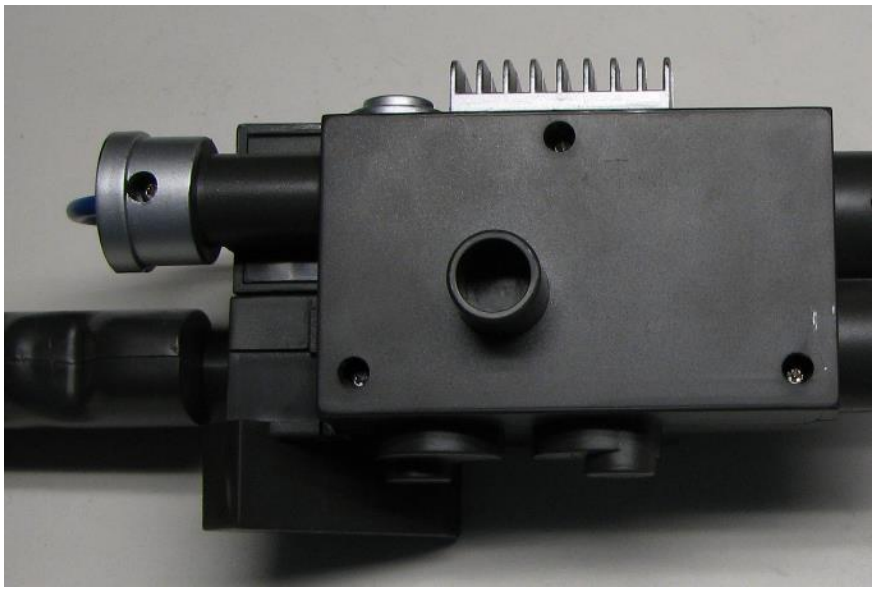


Wand Tubing (items #12 and #13)

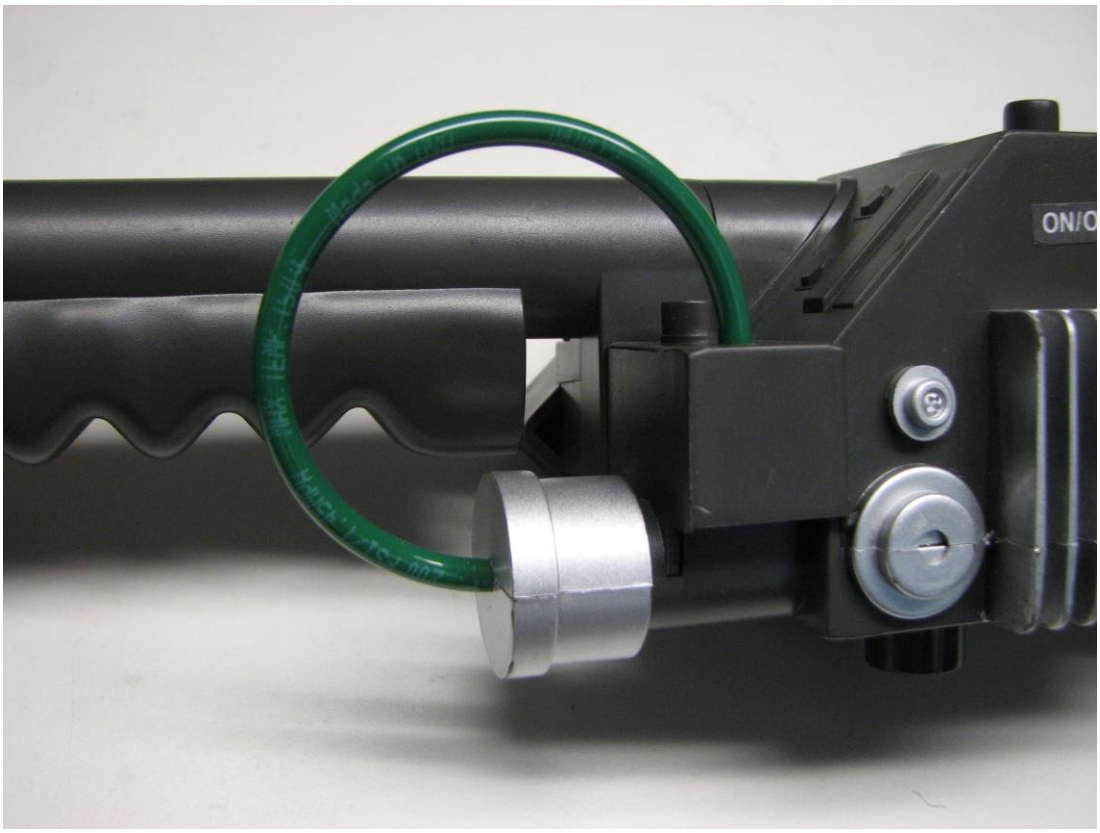
The wand needs to have the Blue tubing replaced with Green. This tubing was not glued on the wand I had and was easy to remove.



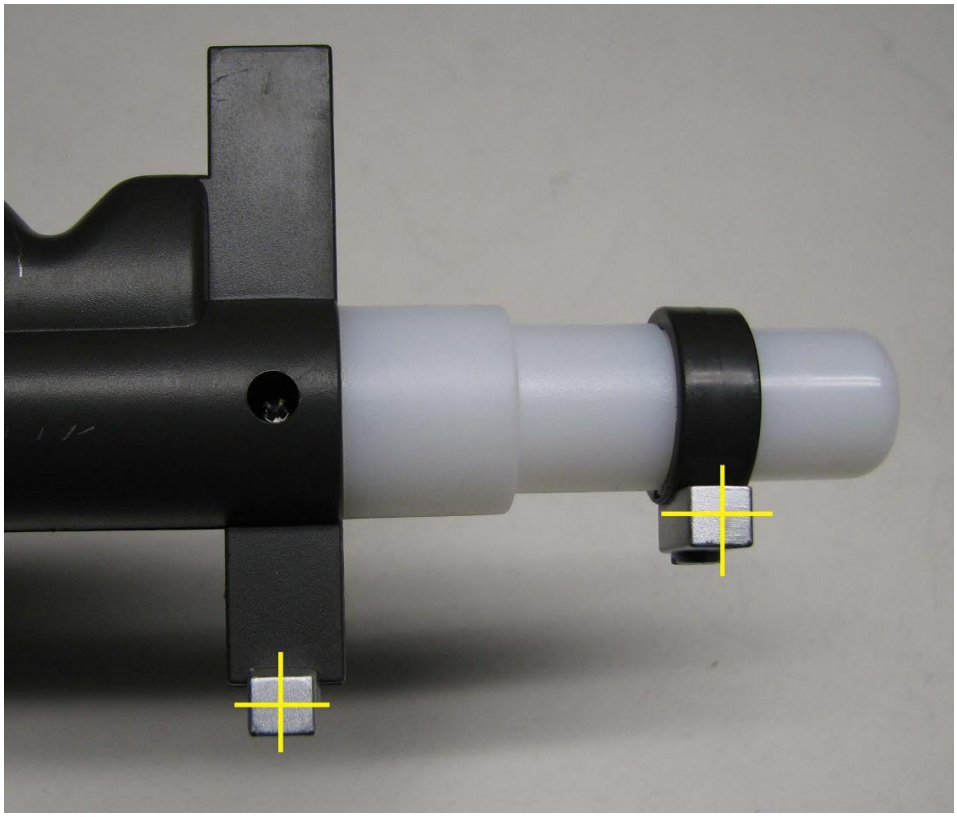
Loosen the 4 screws (do not need to remove) on the bottom of the wand to allow the green wire to be easily pulled free from the wand:



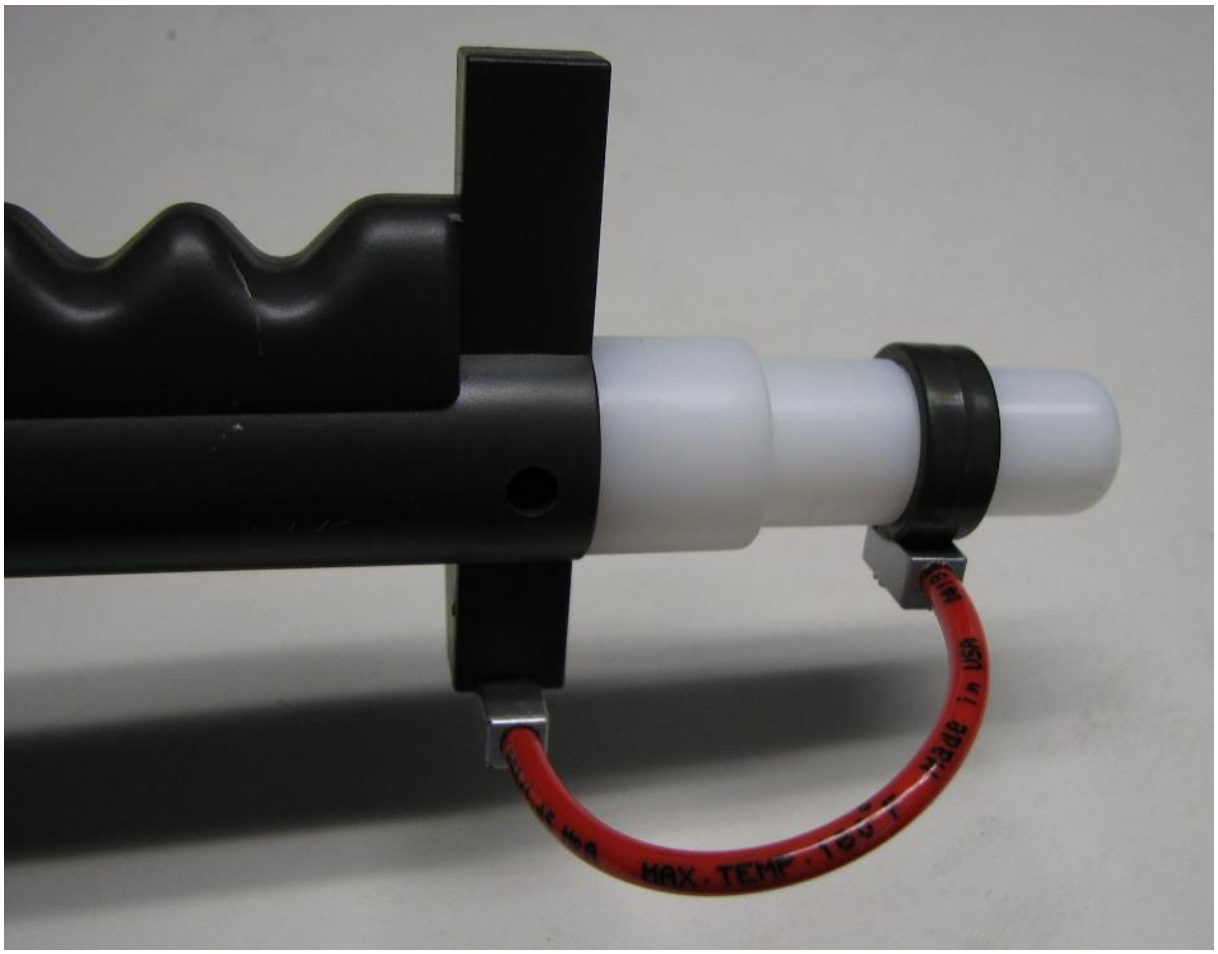
Then drill out the top hole with the 5/32" drill bit. Press the green tubing into the top hole. A snug fit is desirable and then maybe you won't have to glue. Place the other end of the green tubing into the silver piece and adjust the loop until you like how it looks. Then tighten down the screws. If you don't like how it squeezes the tubing when tightened or leaves too much gap in the silver piece halves, loosen the screws again and remove the tubing from the silver piece. Tighten the screws and drill the hole with the 5/32" bit. Press in or loosen and insert tube and tighten again.

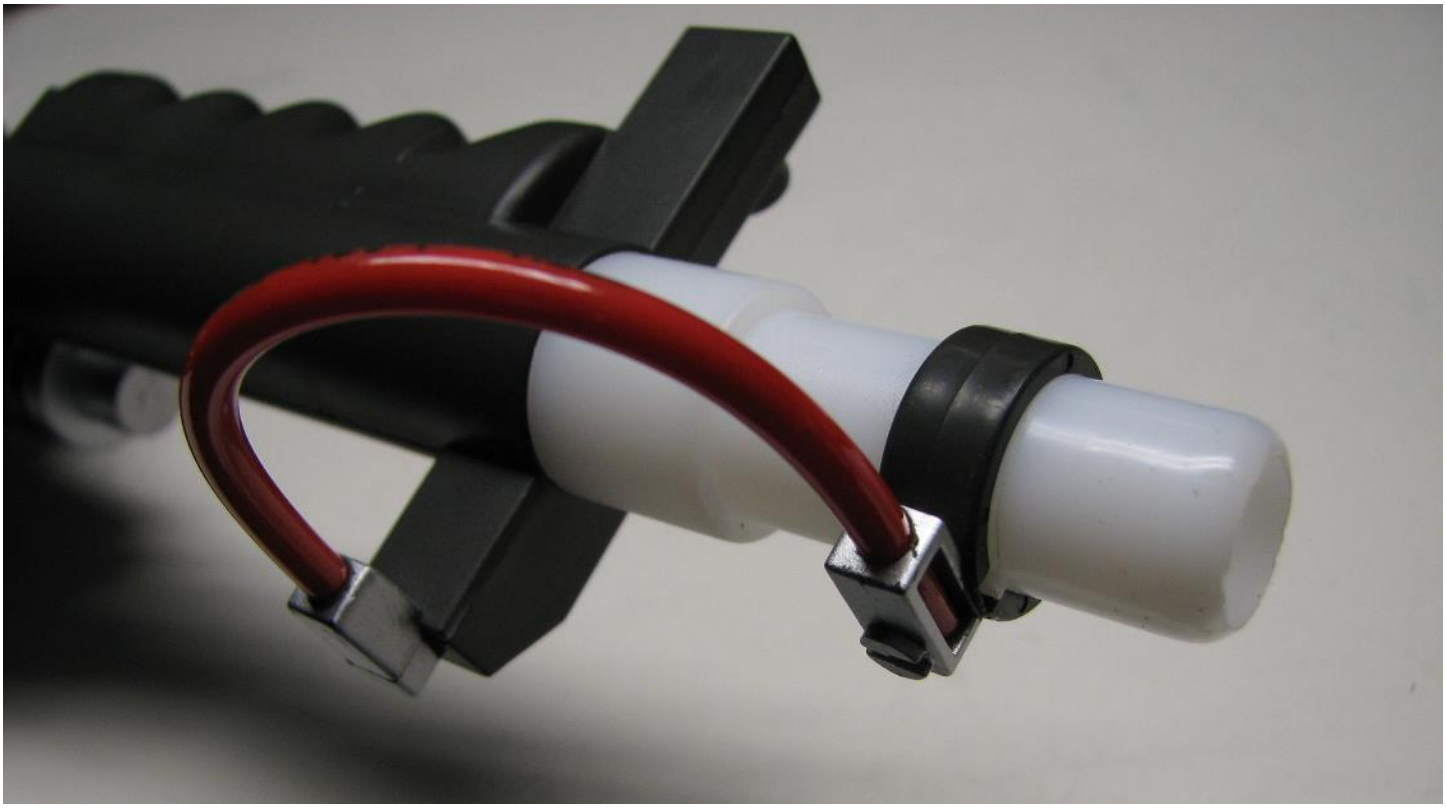


The Red tubing needs to go between the two “banjos” on the end of the wand. A hole will need to be drilled into both of these to secure the red tubing. Use the 5/32” drill bit and try and center on the two square end surfaces:



Then press in the tubing as far as possible and if too long, free one end and cut it down some and try again. Repeat until the desired shape is achieved.


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Bellows Screw (Item #9)

The Silver Bellows on the bumper were held in place by a slotted head screw in the screen used packs. To add the screw just drill a hole with the 3/16" drill bit in the center of the bellows part from the top side. Deep enough for the entire screw, but not too deep since there is something deep inside that we do not want to drill out!

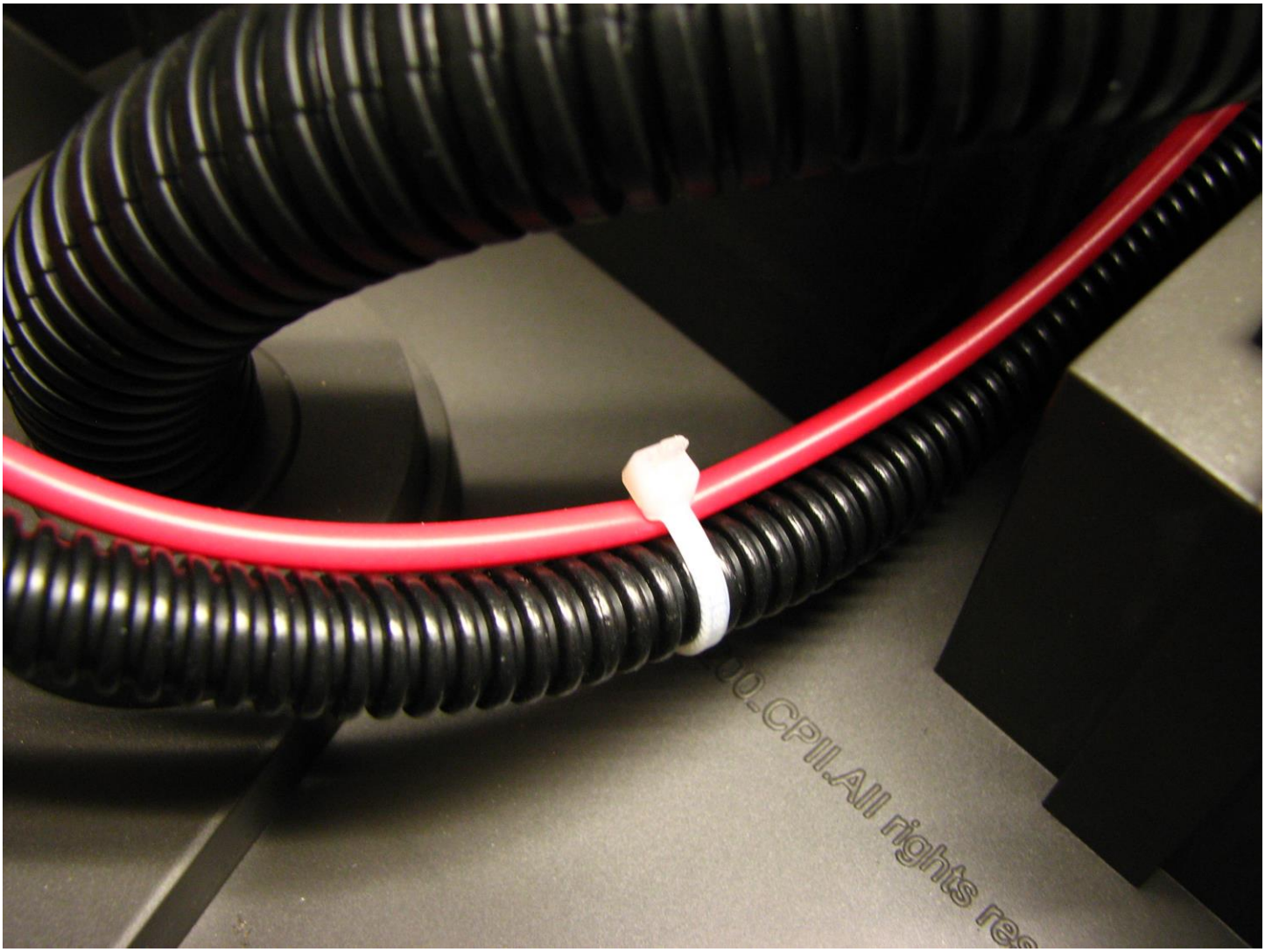
Then just thread the screw in! It should be a snug fit, so no glue is needed and the screw should stay.



Loom and Wire Tie (Items #5 and #6)

The loom is split, so can be placed over the Green (wrong color!) tubing that came with the pack and hide it like the red or blue tubing that was hidden in the screen used packs. I used my fingers to open up the loom on one end and place it over the tube near the cyclotron side. I then continue to open it up a bit and slide it over the green tubing in the same spot while sliding the already attached loom up towards the top of the pack. The loom is probably a bit too long, so when you get to the end see how much needs to be removed. Pull a bit of it back off, trim a little off (less than you think should be trimmed) and try again.

Once the loom is completely covering all the green tubing, adjust the tubing so that the split portion is not visible. Then near the middle of the loom, add the wire tie to hold the loom and the nearest Red tubing together.



Cyclotron Red Filters (Items #8)

The four cyclotron openings should have a Red look to them. Here is a comparison of the original lenses (on the upper left), the red filter on the outside of the original lens (upper right) and the red filter behind the original lens (bottom two):



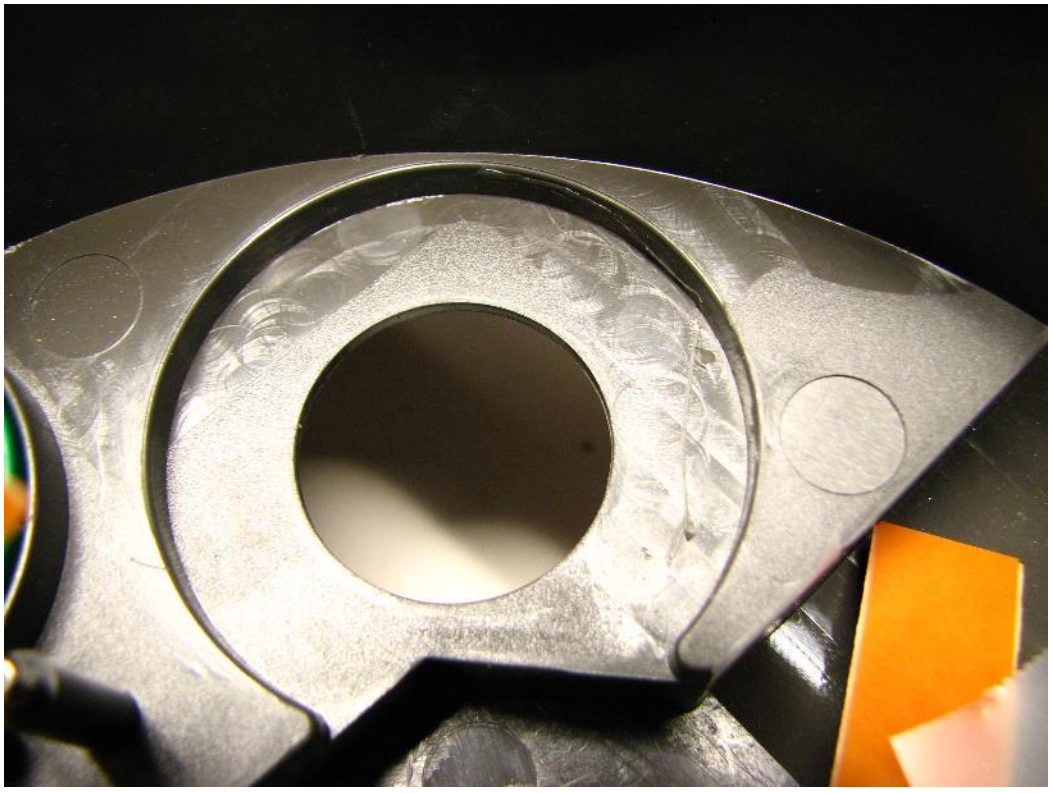
It is easiest to install the red filter behind the existing filter, but I prefer the red filter showing directly. To mount the filter so it is directly seen, the frosted lenses need to be removed.

I used a small flat screwdriver to scrape off the glue that holds the lens in place.



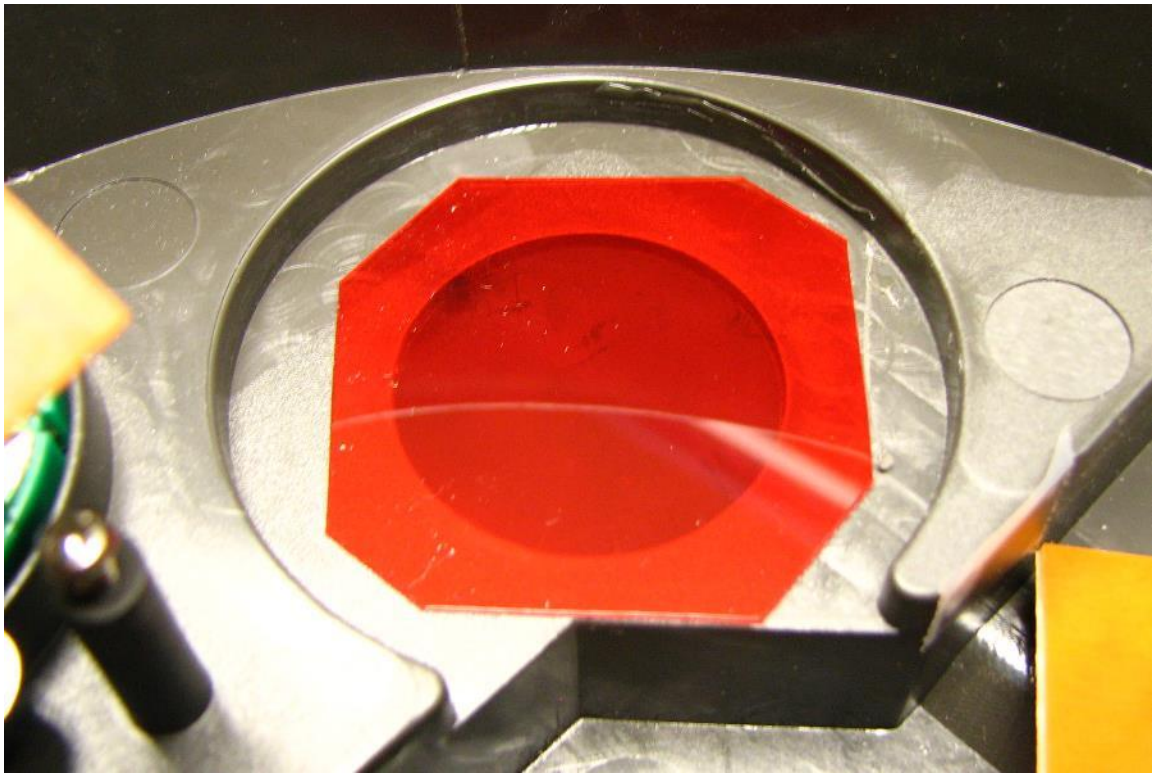
Once the top and edges were cleaned up, the frosted lens could be removed. It will probably still have glue on the other side (between the lens and the plastic), but this can be scraped off with your fingernails.

Then the plastic can be cleaned with the screwdriver to remove any residual glue:

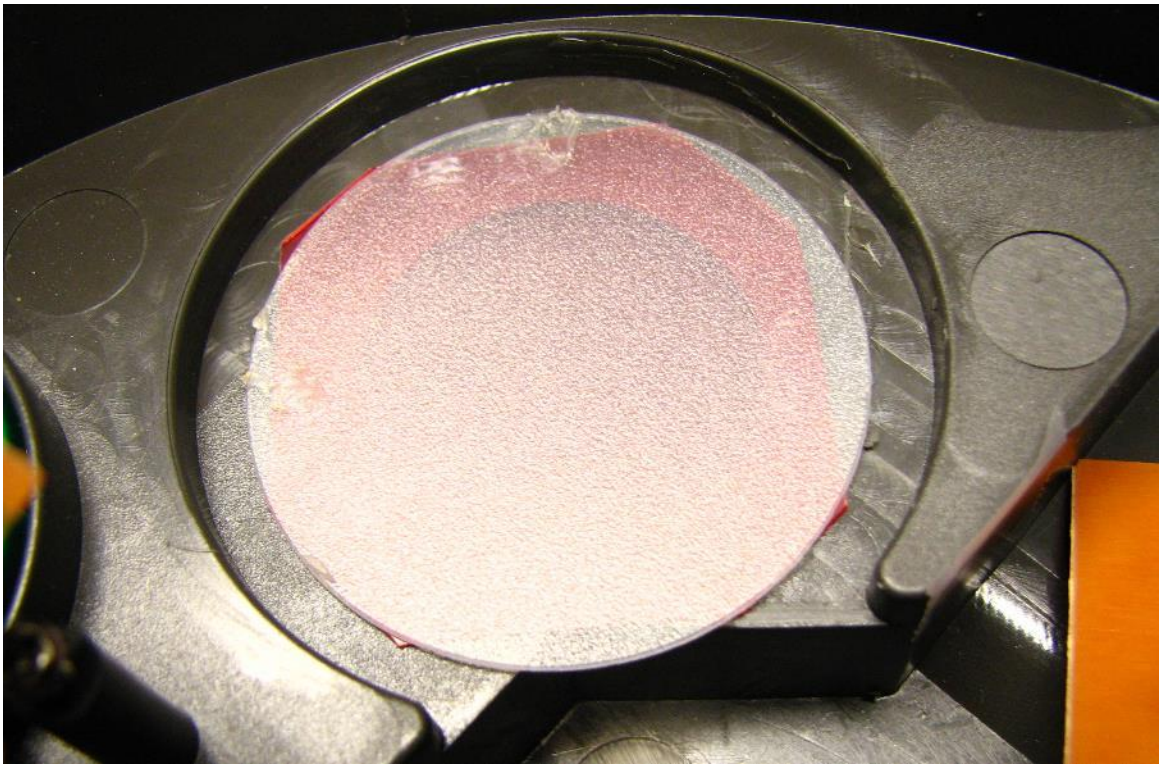


You may want to remove the circuit boards that hold the electronics for this process since it allows easier access to the Cyclotron areas. Just remove the two screws and move the circuit boards just enough for access.

I did a quick trim of the red filter and placed it over the hole. There is clear plastic film covering both sides of the filter to protect it from scratches. Remove at least the outside facing one before you glue everything in place!



If you keep it as large as possible it will have less chance to slide out of place. This was trimmed too much!
Then place the cleaned up frosted lens on top of it:



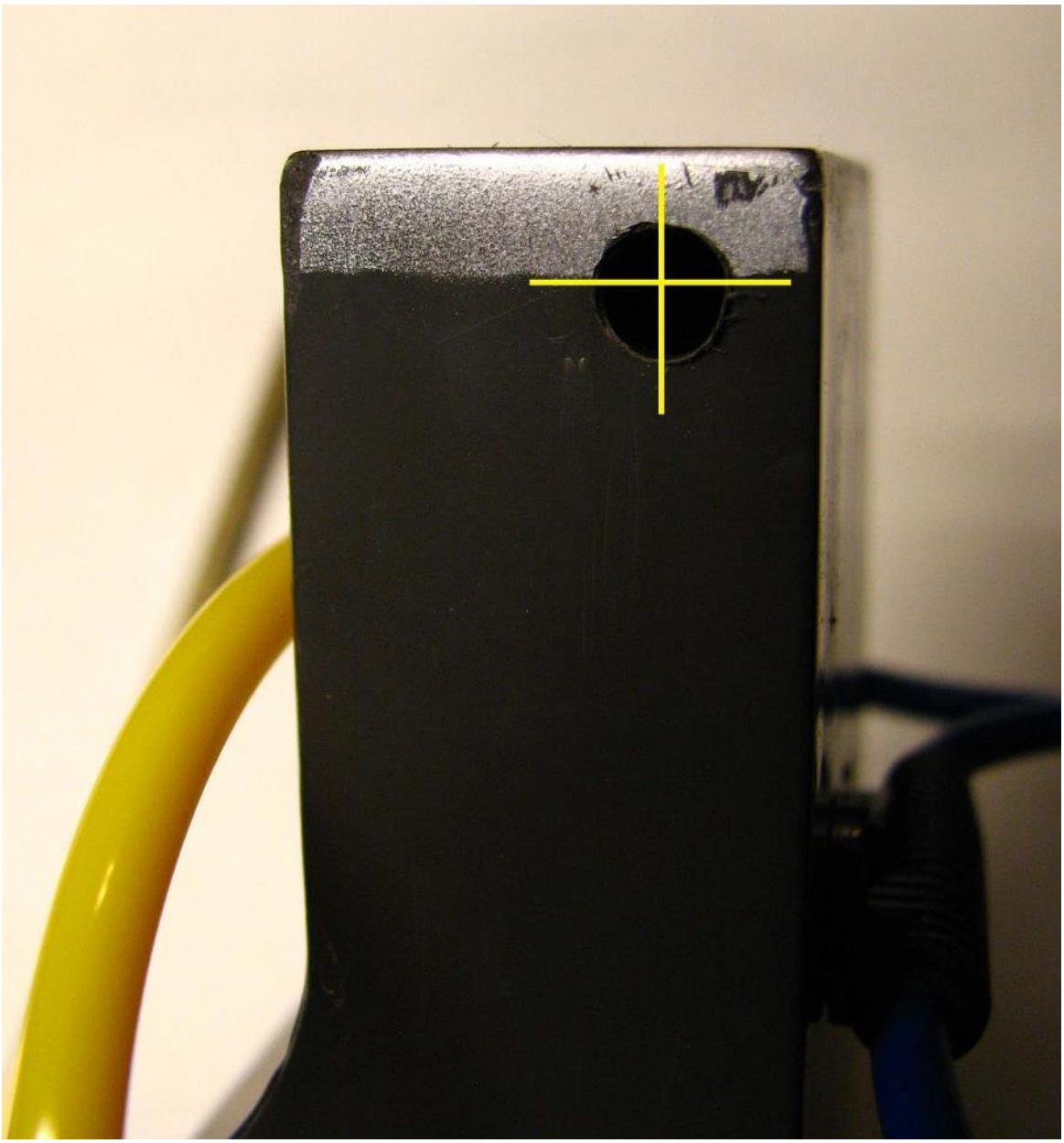
Not sure which glue is best to hold this in place. Maybe the hot glue gun? I used tape since I am working on the electronics and depending on what features you want the Red filter may need to be removed (in addition to regular Proton mode Red lights, the Slime Blower mode will use Green Cyclotron Lights…)

Repeat for the other three cyclotrons!

Brass Rod Ion Arm (Item #1)

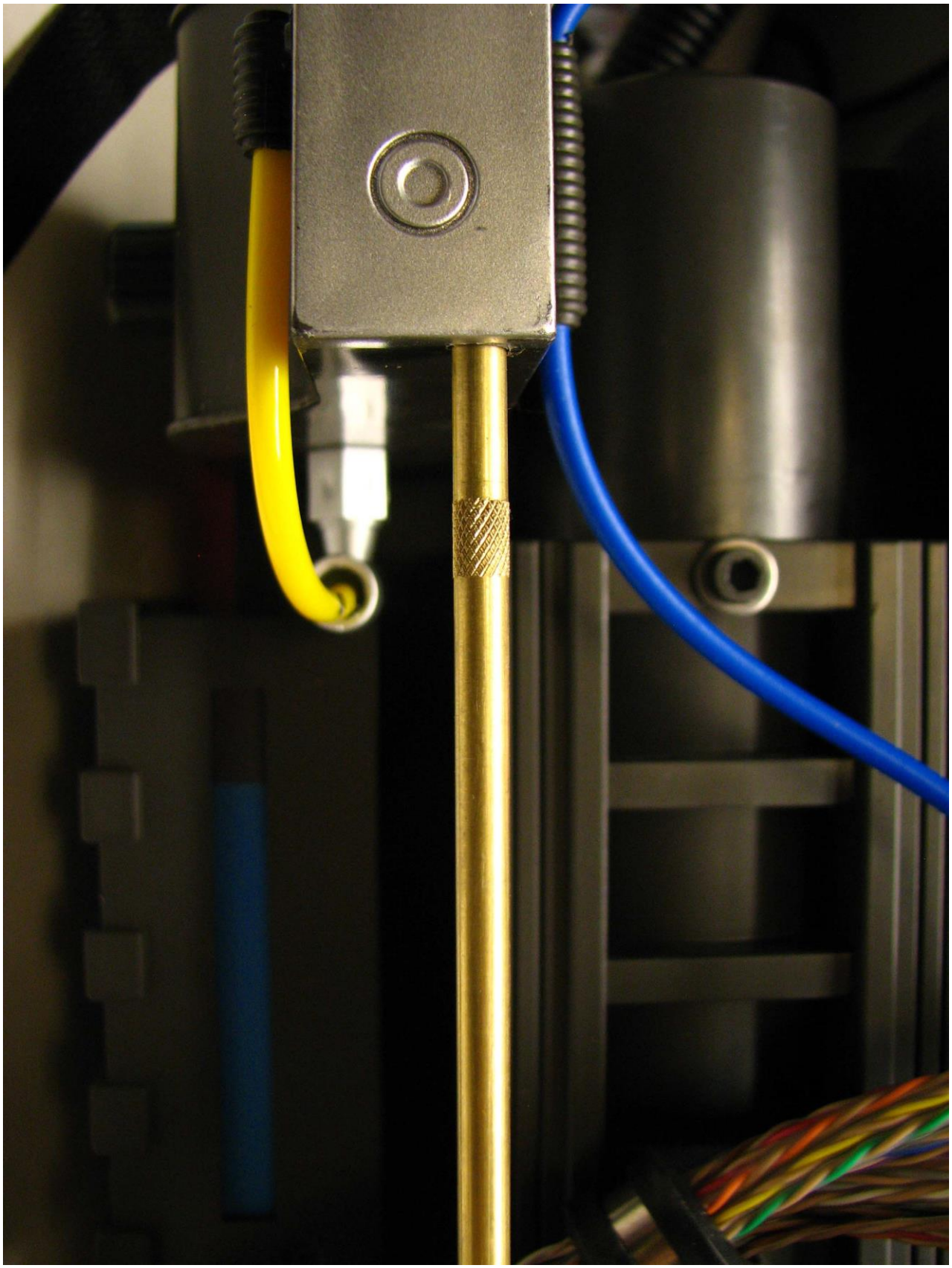
The Brass rod should have a knurled (patterned) section close to the part that holds it. The extra length of the brass rod is to go inside the pack and provide a more rigid piece that will not easily break off.

Drill a hole here with the 3/16” drill bit, roughly centered vertically on the Silver to black line, but offset to the right:



Slide the rod into the hole and adjust for how far you want the knurled portion to be away from the base. I taped it in place on the outside so I could glue it in place. Not sure the best glue to use. Just dripping in the hot glue and then pressing in some pink foam to pack it down may work. Be sure and hold the rod in place and adjust quickly if using hot

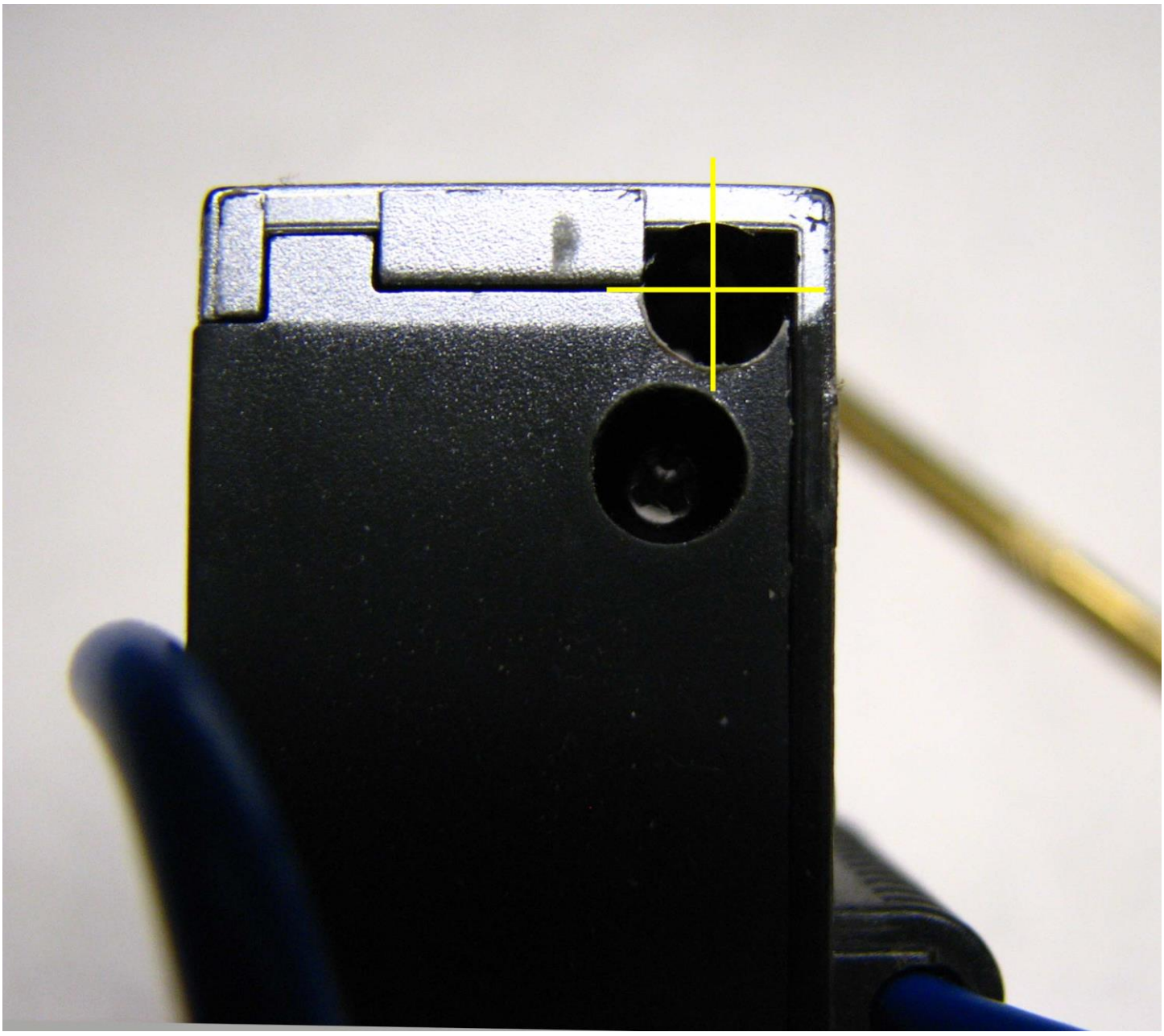
glue. I am using epoxy glue that has a few minutes of setting time so I can adjust the rod and make sure it is straight and parallel to the pack before the glue sets. It would be real annoying to have a very slanted Brass Rod!



Brass Rod Ion Arm (Item #1) with Different Pack

Some packs now have two metal screws that go through the top of the ion arm holder.

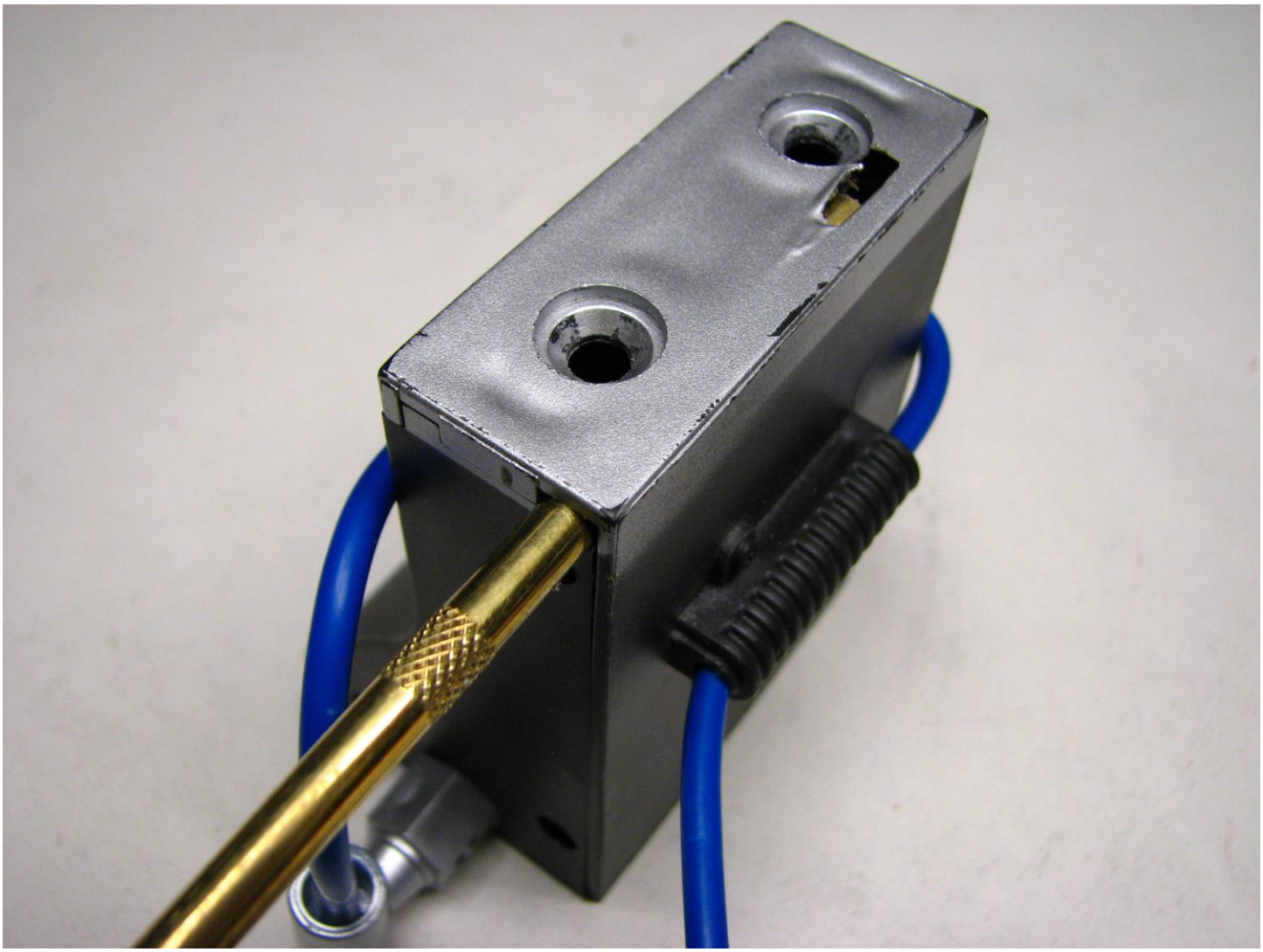
This will require some careful drilling to get around the screws. Drill a hole here with the 3/16” drill bit:



The right side tab will be drilled off, so the top edges are no longer round. This is not too noticeable, but can be filled in and painted later if you so desire. Be careful when drilling in here since if the drill bit is angled it can come out through the top or side. I speak from experience. 8-(

By drilling slowly, you can watch the top and side for signs of warping/melting to let you know if you are getting too close to the surface with the drill bit.

Here is a picture of the part I drilled improperly:



This can be fixed, but I should have been more careful so I wouldn't have to cover up the mistake! I also drilled farther into the part than needed. The rod will be very secure, so only drill as deep as needed.

N-Filter Trim (Items #10 and #11)

The N-Filter at the bottom of the pack needs to have more color than just being all black. The screen used props had a red pinstripe around them and there were holes to the inside witch had a wire screen and white fibrous filter material.

The Red Striping tape is attached to the plastic bag. It comes in larger rolls, so had to stick it somewhere!

The tape does stretch somewhat, so do not be concerned if it has some bend in it as you will be able to make a straight line with a _small_ amount of tension. I like starting and ending on the bottom of the pack so the overlap and seam will not be very visible. Loop all the way around the N-Filter between the top of the N-Filter and the 8 indented circles. The tape can be peeled up multiple times, so take your time and slowly work your way around the N-Filter.

The white felt adhesive back pads were custom cut to fit the indents, so need to be aligned well as you place them in each indent.

Here is what it should look like with the Red Striping and Felt Pads installed:



Reattach the cardboard motherboard to the back of your pack and it should now look like this one:

