Introduction

Congratulations on purchasing the Spirit WandLights Kit that adds some serious lighting effects to your nuclear accelerator's wand!

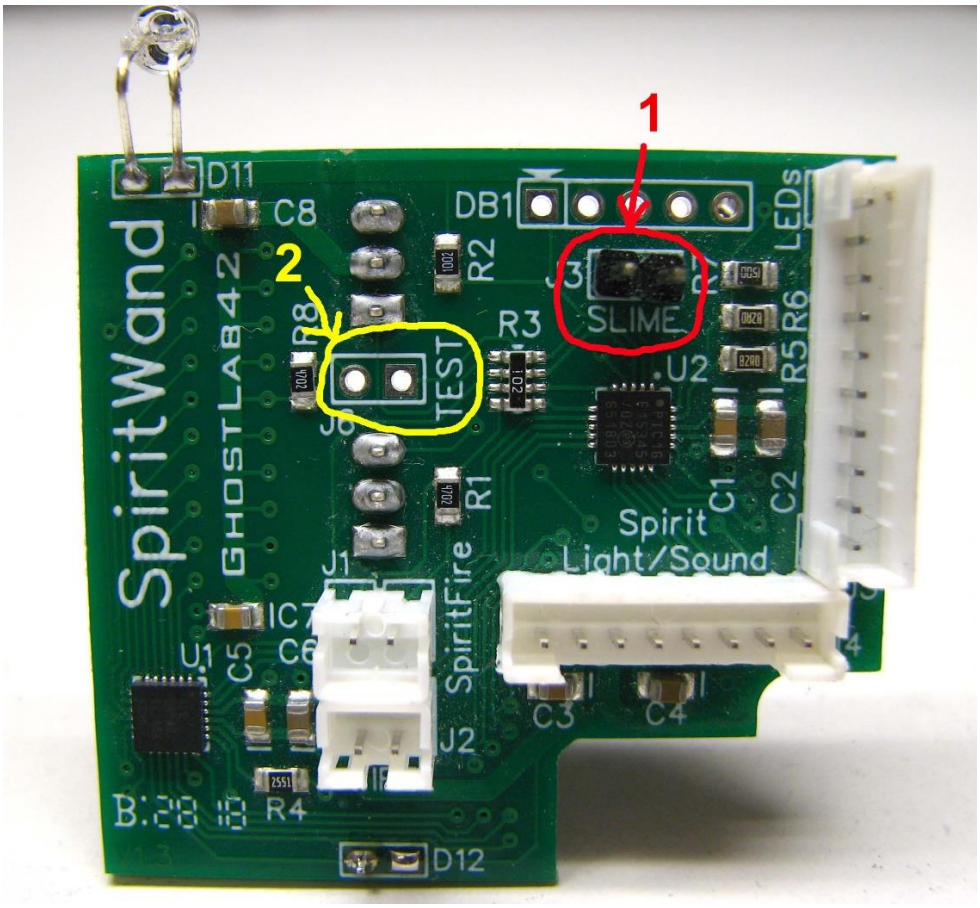
The Spirit WandLights Kit plugs in directly to the Spirit PackLights or the Spirit Blaster sound board and cannot be used stand-alone since there is no separate battery pack connection available. Two separate operating modes are available: Movie accurate mode that allows you to recreate the light sequences from several GB1 movie scenes and a dual pack mode that allows you to switch between a proton pack and a slime thrower pack. This Spirit WandLights Kit also supports other fun effects like overheating and venting. So many features packed into one low priced kit.

Spirit WandLights Kit features:

- 10 Segment LED Bar Graph display
- 2 Toggle switches
    - Vent Light / Slime Thrower selection
    - Power Up / Down selection
- 1 Pushbutton switch for Firing the wand
- 5 Wide angle LEDs
    - 1 Clear 3mm Red LED for SLO-BLO illumination
    - 1 Clear 3mm Green LED for Buried White illumination
    - 2 Clear 5mm White LEDs for Wand body indicators
    - 1 Clear 5mm White LED for Vent illumination
- 1 Clear 5mm RGB LED for the wand tip illumination
- Works with the Spirit PackLights and/or the Spirit Pack Blaster board and receives +5V and sends control signals to the connected board
- Can work with the original spirit pack electronics for Firing sound (if no new sound board is installed)
- Easy wiring with a single cable connection for power and control between boards
- LED and switch cables are keyed to only go in one direction
- Bar graph Bezel kit with laser cut clear cover and lenticular light spreader
- Multiple LED covers
- 82" long connection cable to reach the Spirit PackLights or the Spirit Blaster board mounted in the pack.

Operating Instructions

There are only two main selections on the board and these should only be changed when the board is powered off.



1) SLIME jumper, used to select between two different pack configuration modes
2) TEST pads, can be shorted together so that the board will enter a test mode

Pack Mode selection
There are two modes that the Spirit Wand Lights board can be configured to be:

1) **Single Pack Mode**
   The Single Pack Mode will always behave as a Proton pack and will enable recreating pack behavior based on several GB1 movie scenes.

   This mode is selected at powerup by removing the jumper from the SLIME jumper posts.

   This mode will work with the GBFans' Sound Blaster board, the GhostLab42's Spirit Blaster board and the original Spirit sound and lights board.

2) **Dual Pack Mode**
   The Dual Pack Mode will dynamically change between a Proton Pack and a Slime Thrower pack depending on the Vent Light switch position. The Vent Light switch becomes a SLIME thrower enable switch

Proton Pack Mode: SLIME Thrower switch OFF

The Vent Light in the Wand will be lit

The Wand Tip will start with a pulse of WHITE light then be mostly RED with occasional bursts of BLUE

SLIME Thrower Mode: SLIME Thrower switch ON

The Vent Light in the wand will be OFF

The Buried Milky White LED Lens will turn GREEN

The Wand Tip will fluctuate a GREEN color

This mode is selected at powerup by installing the jumper across the two SLIME jumper posts.

This is the mode is designed to work with the GhostLab42's Spirit Blaster board.

Single Pack Mode Operation Sequence

Powered Down: Both toggle switches in the down position (OFF)

SLO-BLO red indicator will occasionally flash to remind you that indicate that the battery is still connected and being slowly drained.

The Fire button does not do anything.

Standby: Move the upper toggle switch to the up position.

PU/PD Switch (lower toggle) is still in OFF position (down)

Fire pushbutton can be used to select between two configurations

Push and hold the Fire button for 1/2 second or more and the configuration selection will change when the Fire button is released

A short tap of the Fire button may surprise you if you have a sound board attached…

Configuration 1:

The SLO-BLO red LED will be illuminated

The Clear White Lens LED will blink

The bar graph display will not be illuminated

Configuration 2:

The SLO-BLO red LED will be illuminated

The Clear White Lens LED will blink

The Milky White Lens LED will blink

The bar graph display will continually cycle through the regular sequence

Powered UP: Move the PU/PD Switch (lower toggle) to the ON position (up)

Vent Light Switch (upper toggle) can be in either position

Vent Light switch is ON (up)

Wand body Vent Light LED will be ON

Unlimited firing ability, will not vent

Vent Light Switch is OFF (down)

Wand body Vent Light LED will be OFF
Firing will cause the bar graph display to increase in speed
Continual Firing will lead to an Auto-Vent sequence being triggered

For the SpiritFire connection, there is some possibility that the Spirit Pack's firing sound will continue even though the Fire button has been released. This can be correct with a very short tap of the Fire button.

Powered Down: Move the lower toggle switch to the down position
The upper toggle switch must also be off, or you will transition back to the Standby mode.
A shutdown sequence will show on the bar graph display.
The SLO BLO red indicator light will occasionally flash to remind you that the battery is still connected and being slowly drained.

Dual Pack Mode Operation Sequence

Powered Down: The lower toggle switch is in the down position
The SLO BLO red indicator light will occasionally flash to remind you that the battery is still connected and being slowly drained.
Pressing the Fire button may surprise you if you have a sound board attached…

Power Up: Move the lower toggle switch to the up position
The bar graph will display a power up sequence then begin continuously cycling.
Pack Selection and Fire buttons are described below.

Slime thrower selection toggle switch (top toggle switch) will allow dynamic selection between the two pack modes
Move the top toggle switch to the down position for Proton pack mode
Move the top toggle switch to the up position for Slime thrower mode

Fire push button
Press the Fire button to activate the appropriate Firing sound.

Proton Pack: Pressing the Fire button for a long time will activate an Auto-Vent sequence

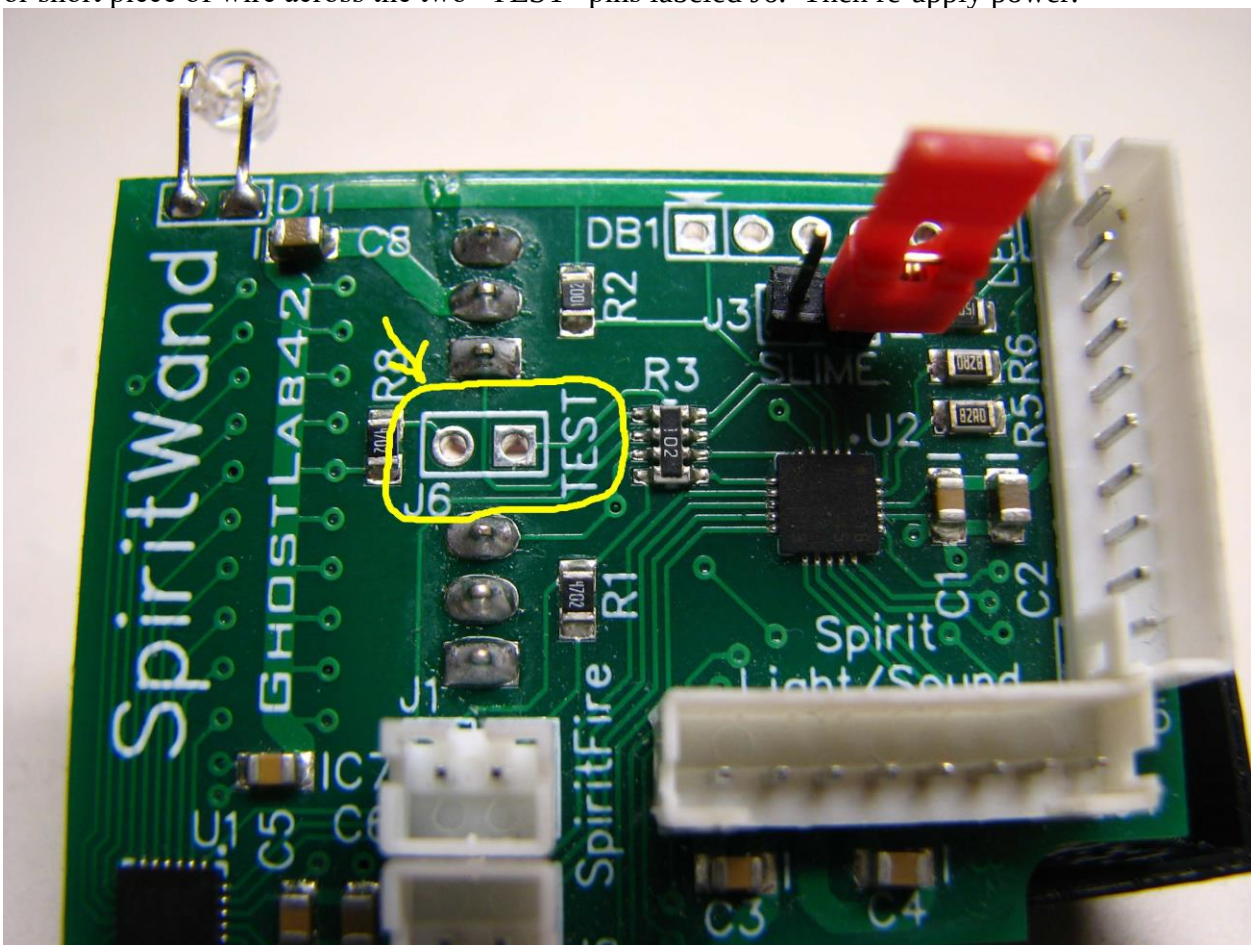
Slime Pack: Pressing the Fire button for a long time will activate a longer end-of-slime stream sound. No venting will occur.

For the SpiritFire connection, there is some possibility that the Spirit Pack's firing sound will continue even though the Fire button has been released. This can be correct with a very short tap of the Fire button.

Powered Down: Move the lower toggle switch to the down position
A shutdown sequence will show on the bar graph display.
The SLO BLO red indicator light will occasionally flash to remind you that the battery is still connected and being slowly drained.

Test mode instruction

To place the board in test mode, first remove power from the board. Then hold a shorting jumper or short piece of wire across the two “TEST” pins labeled J6. Then re-apply power.



Note: In the above image, the SLIME jumper is only attached to a single pin. This is so you do not lose it – it is NOT shorting the two SLIME pins together in this position.

Test mode operation:

When first started:

The Version number will be displayed on the bar graph
All 5 Wand Body single color LEDs will be lit up

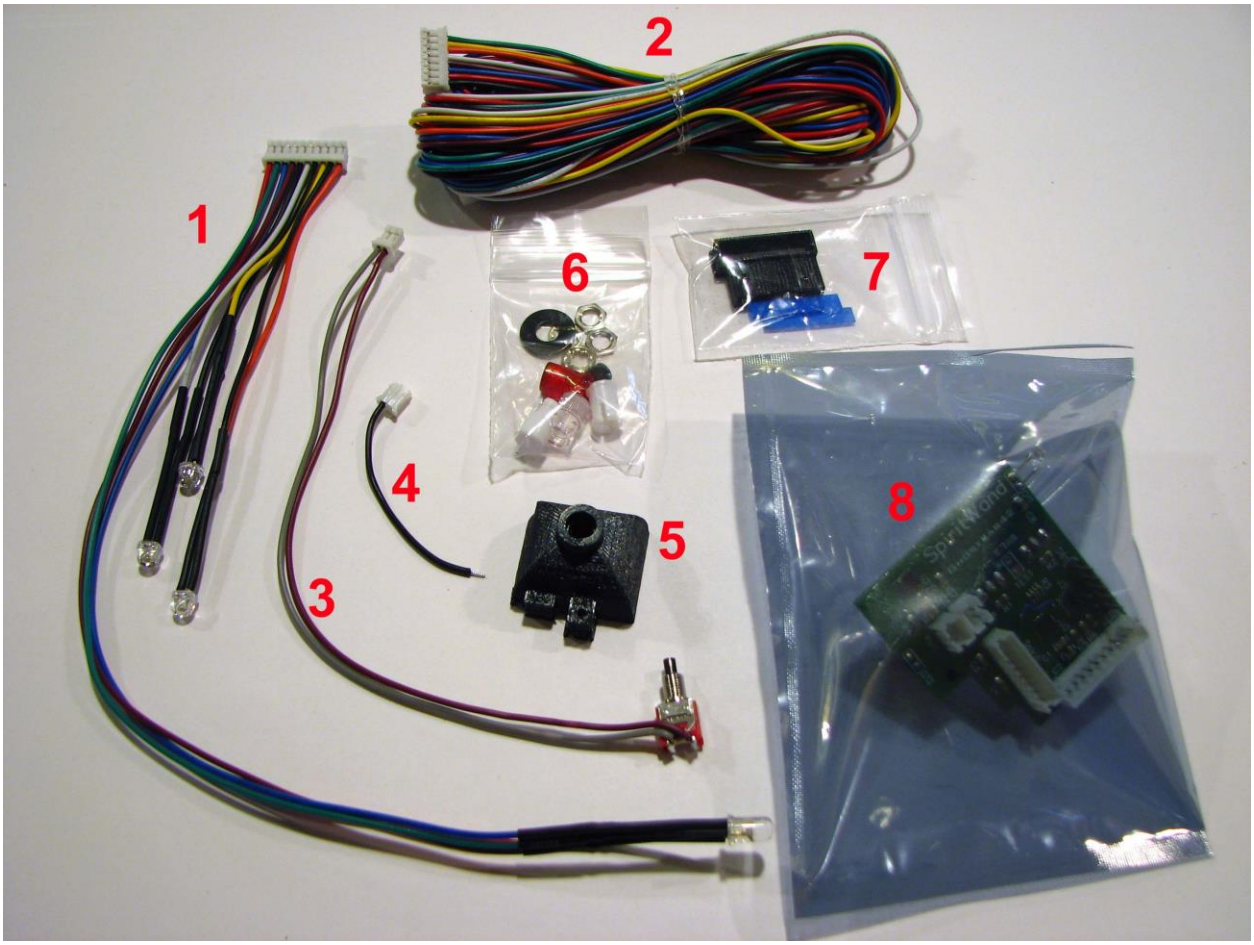
Then several lights will sequence or be controlled by switches:

The wand tip will continually cycle R, G, B, off
The bar graph display will have a single segment turn off and walk through the display from top to bottom.
The lower toggle switch will control the SLO BLO red LED
The upper toggle switch will control the Clear Lens white LED
The Fire button will control the white Vent Light
The SLIME jumper will control the Milky Lens white LED

The four signal outputs will cycle in a pattern, though that may be difficult to observe.

Installation in the Spirit Wand

Parts Identification:
The first step is to remove the components form the bag and make sure you know where each item is located.



The Spirit Wand Lights kit contains multiple parts to be installed in the Spirit wand.

1) LED Light cable
2) Spirit Light/Sound connection cable
3) Fire Pushbutton switch
4) Spirit Fire Switch connection (only if you want to control the original spirit sound board)
5) Vent Light Reflector
6) LED covers and switch Hardware
7) Bar graph bezel parts
8) Spirit Wand Lights board in ESD bag

Two bonus parts:

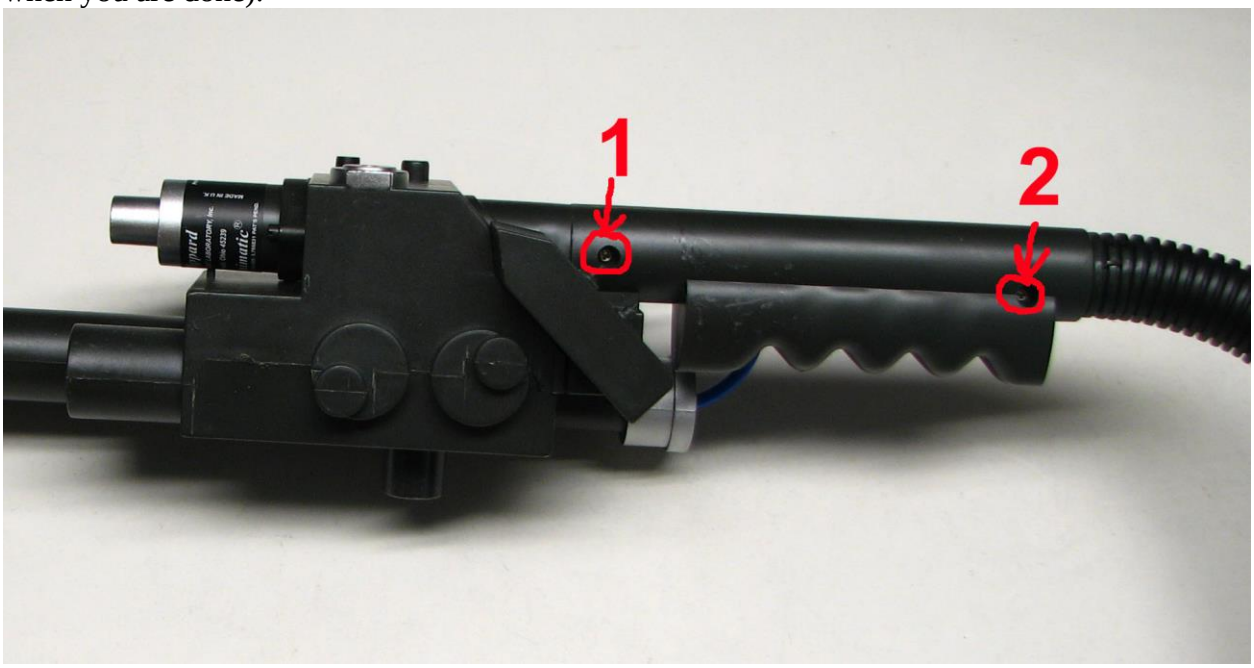
9) The Silver part is a cap to go over the wand's knob next to the vent slots on the top of the wand body. Remove the screw then remove the internal 3D supports and it will fit over the knob and then can be screwed in and have a real screw head still visible.

10) A black "coupler" to go from around the handle to over the loom to cover the glue/staple/etc used to hold those two together. It should slide over the loom and then slide it back up after the loom is securely attached to the handle.



Getting started:
The first step is to open up the wand to access the wires, switches and LEDs from the original electronics. You can open up the handle first, or second. The order is not very important.

Opening the handle:
There are two Philips head screws to remove (and do not lose since they will need to be put back when you are done).



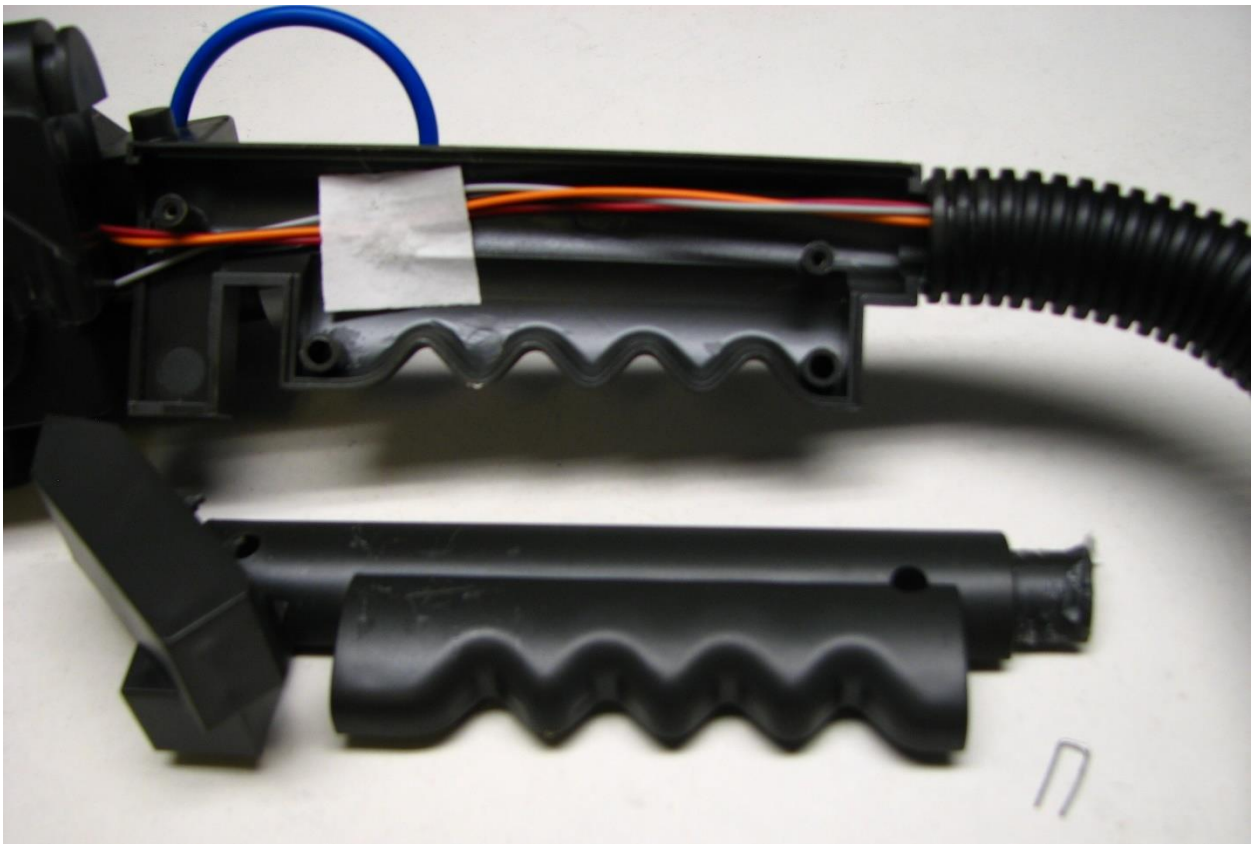
The handle half that is shown here with the trigger box will need to be removed, but it is currently stapled and glued in place so we need to work on this a bit. First remove the long staple (how do they know they did not pierce the wires?). I used a tiny flat jeweler's screwdriver to pry the staple out.



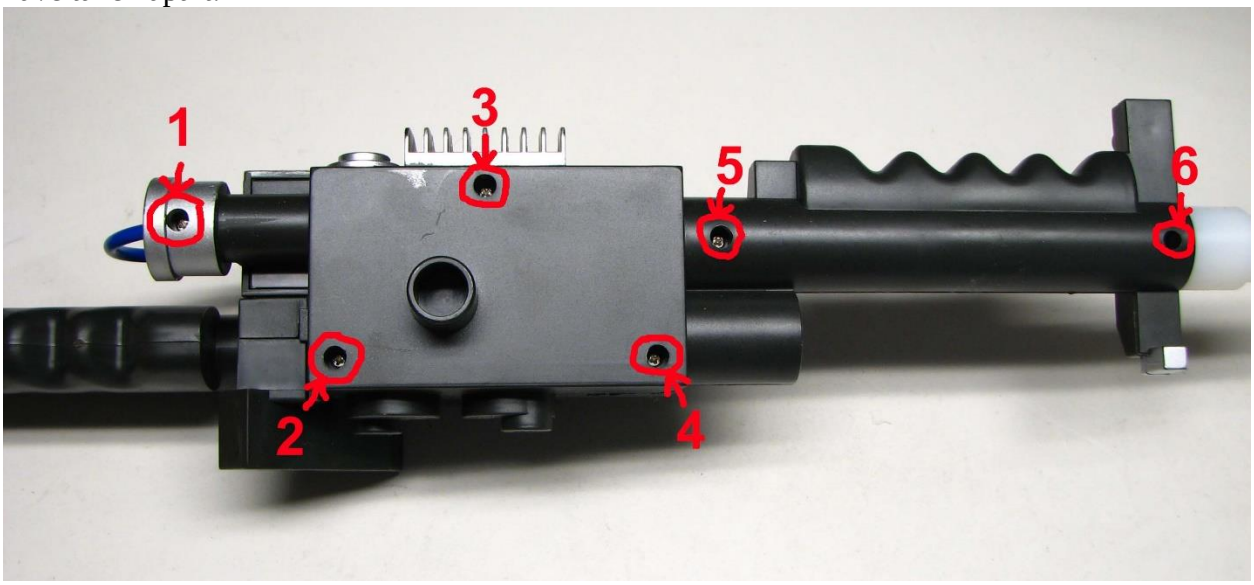
Once the staple has been removed, the handle needs to be separated from the main wand by pulling the ends near the wand apart. Then ends in the black loom that was stapled together are also glued, so gentle rocking back and forth and moving the wand half up and down can help separate the handle from the loom that it is glued to. Leave the other half of the handle glued to the look as we do not have to separate those two parts.

Here is the handle half once it has been removed:



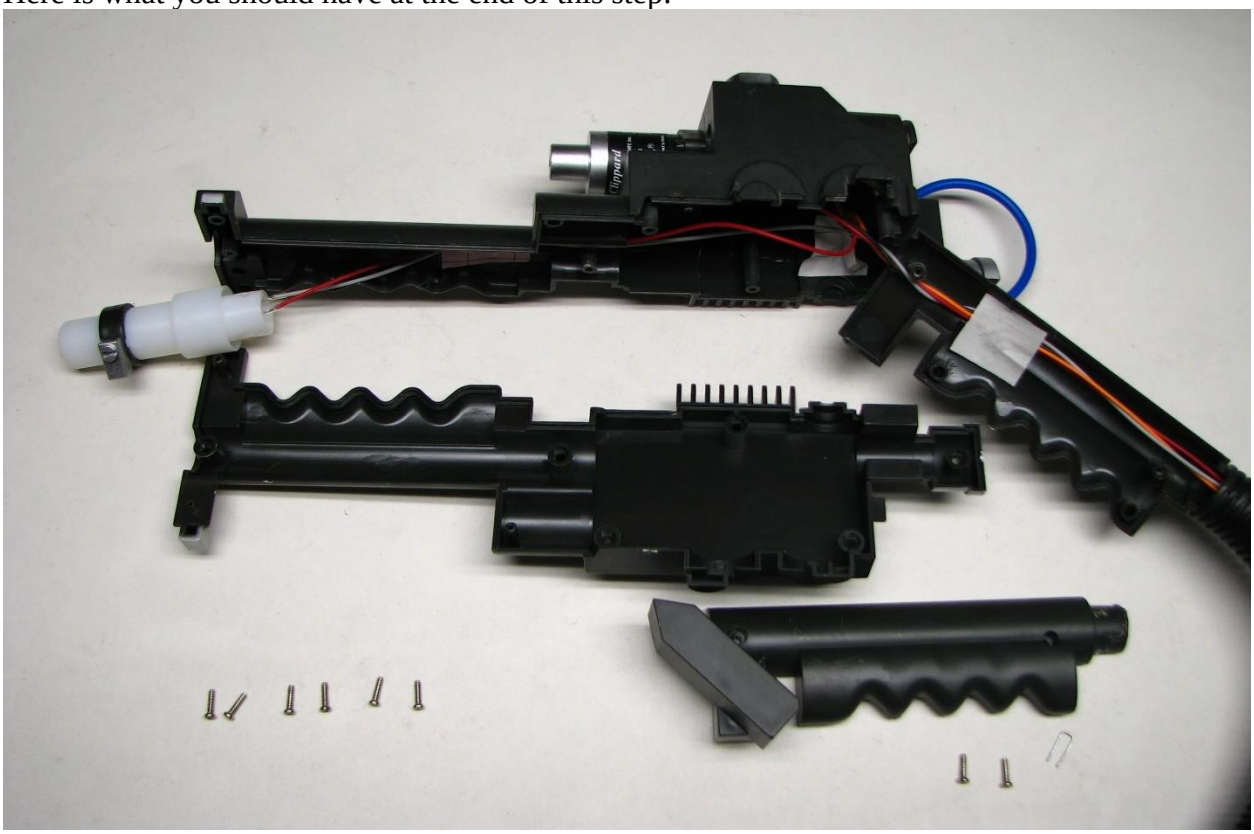


Opening the main wand body:
There are six Philips head screws to remove (and do not lose since they will need to be put back when you are done). These screws were the same as the ones used in the handle on the wands I have taken apart.



You can now separate the bottom of the wand from the main wand. The front pieces fit tightly around the front white plastic wand tip. Take care in separating the parts so that you do not stress that front mechanical connection. The white plastic part can be easily cracked, though that may not have a big impact on the tip. I used a tiny flat screwdriver to carefully pry the two halves apart up near the ear piece at the end of the front handle. Once open, carefully remove the white wandtip part from the other half, again taking care not to stress the part near the holes cut for the posts used to screw the wand body parts together.

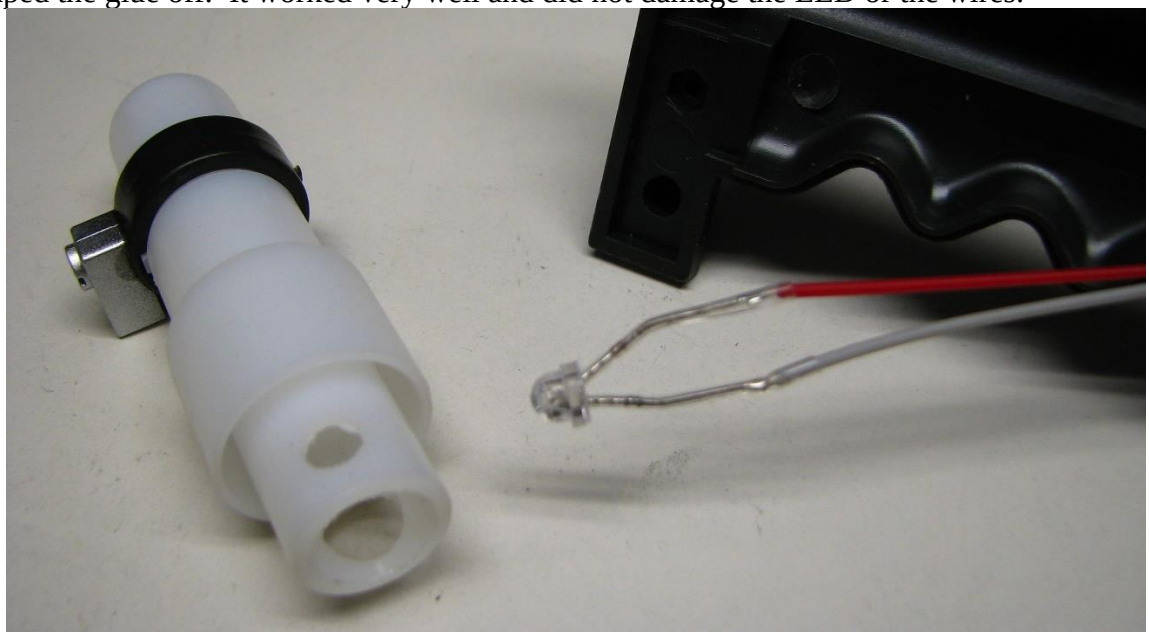
Here is what you should have at the end of this step:



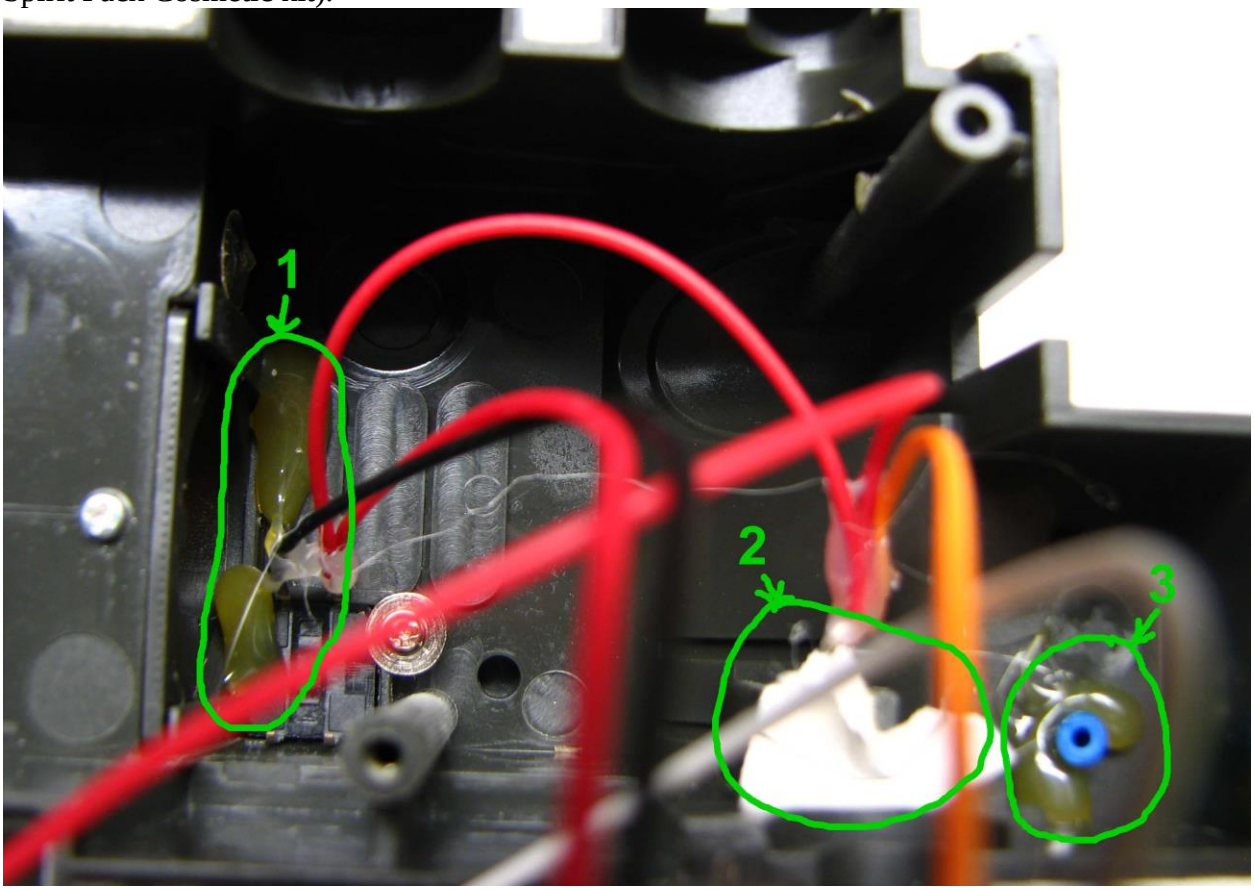
Removing the wand tip LED:
Next, we need to remove the want tip LED from the front plastic wand tip. It is glued in place, but so far the glue has been easy to remove. I used a tiny flat jeweler's screwdriver to scrape the glue from around the LED. The glue is a bit darker than the white plastic and can be seen in this image:



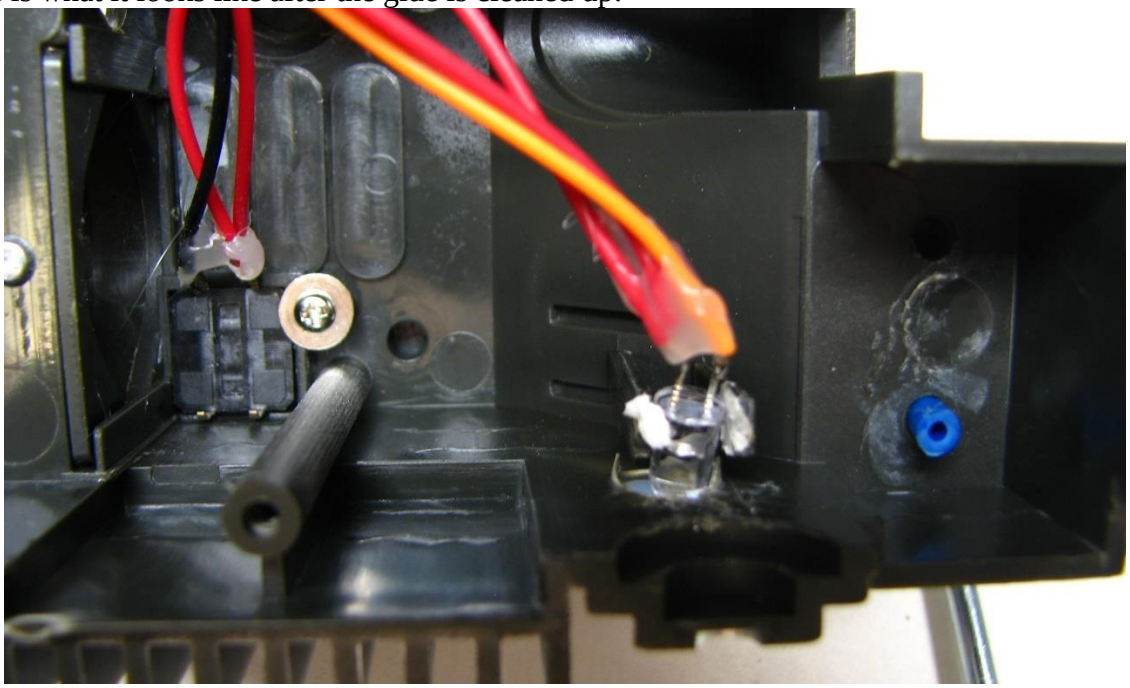
After scraping the glue off, the LED was still snug. I tried pushing it our from the other side, but it didn't budge for me. I then used the screwdriver to pry the LED out from the side we just scraped the glue off. It worked very well and did not damage the LED or the wires:



Preparing the main wand body:
There are three items glued in place in the main body. I used a small flat screwdriver to pry off the globs of glue. Areas 1 and 2 do need to be removed. I also removed are 3 since I will be replacing the blue tubing with green tubing (not included in this kit, but it is included in the Spirit Pack Cosmetic kit).

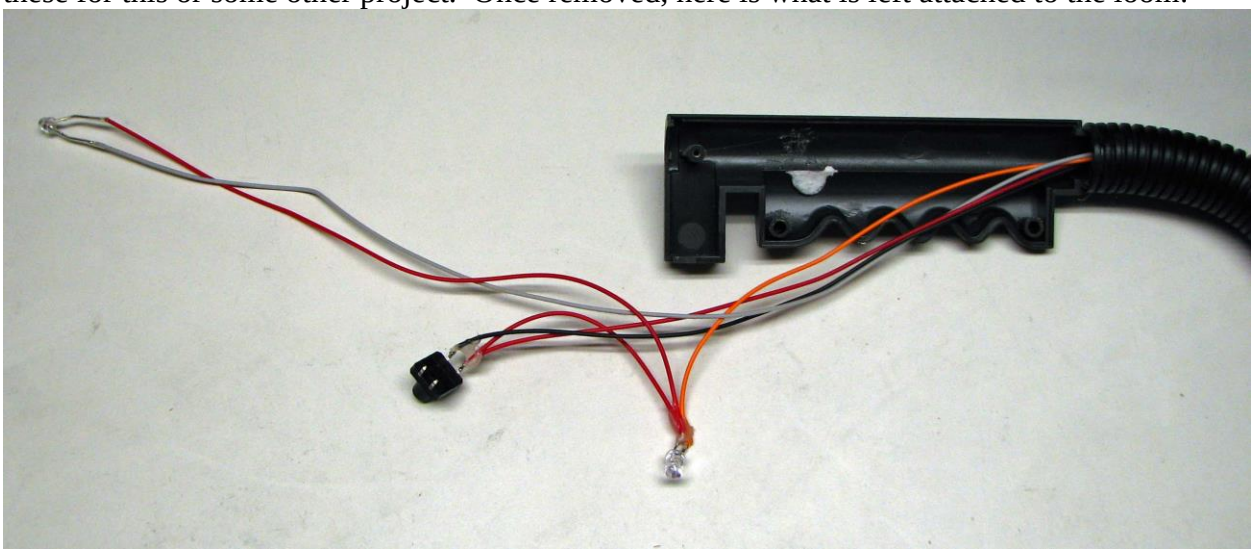


Here is what it looks like after the glue is cleaned up:

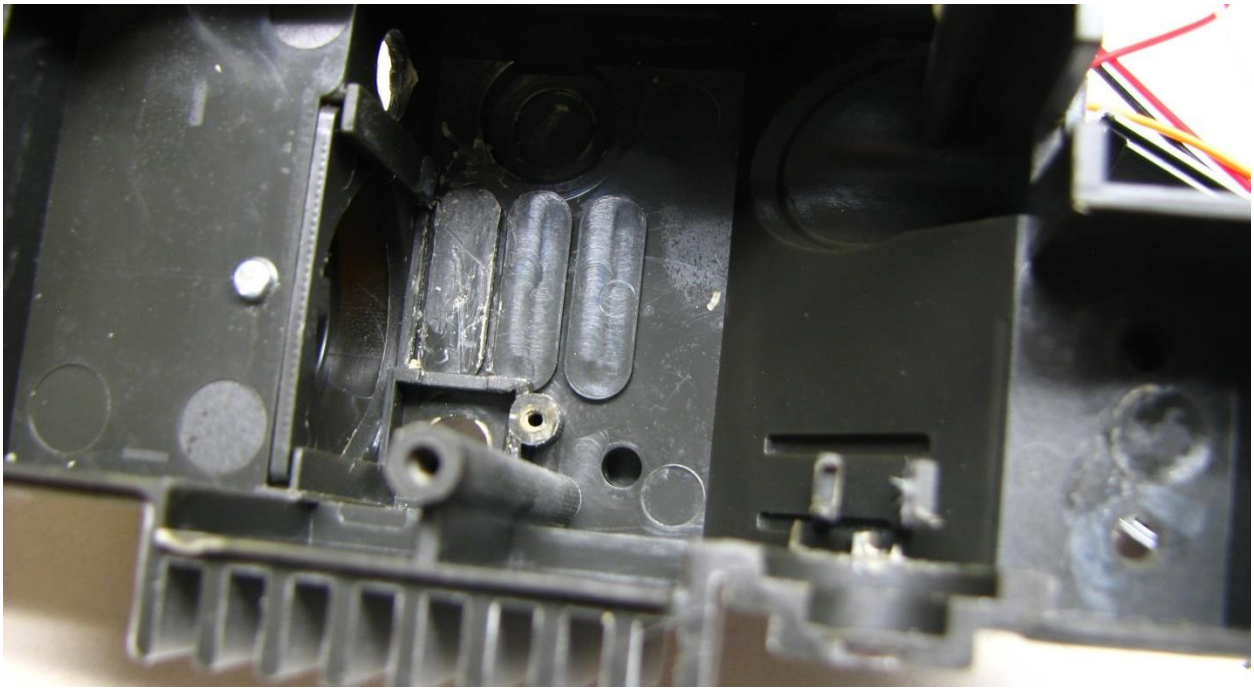


Now you can remove the screw w/washer to release the ON/OFF pushbutton, the side LED and the blue tubing (if you are changing the tubing!).

I also removed the paper pressed on the glue globs holding the wiring in the two pieces of the wand (front top and back handle. Take care to not damage the wires as you may want to use these for this or some other project. Once removed, here is what is left attached to the loom:



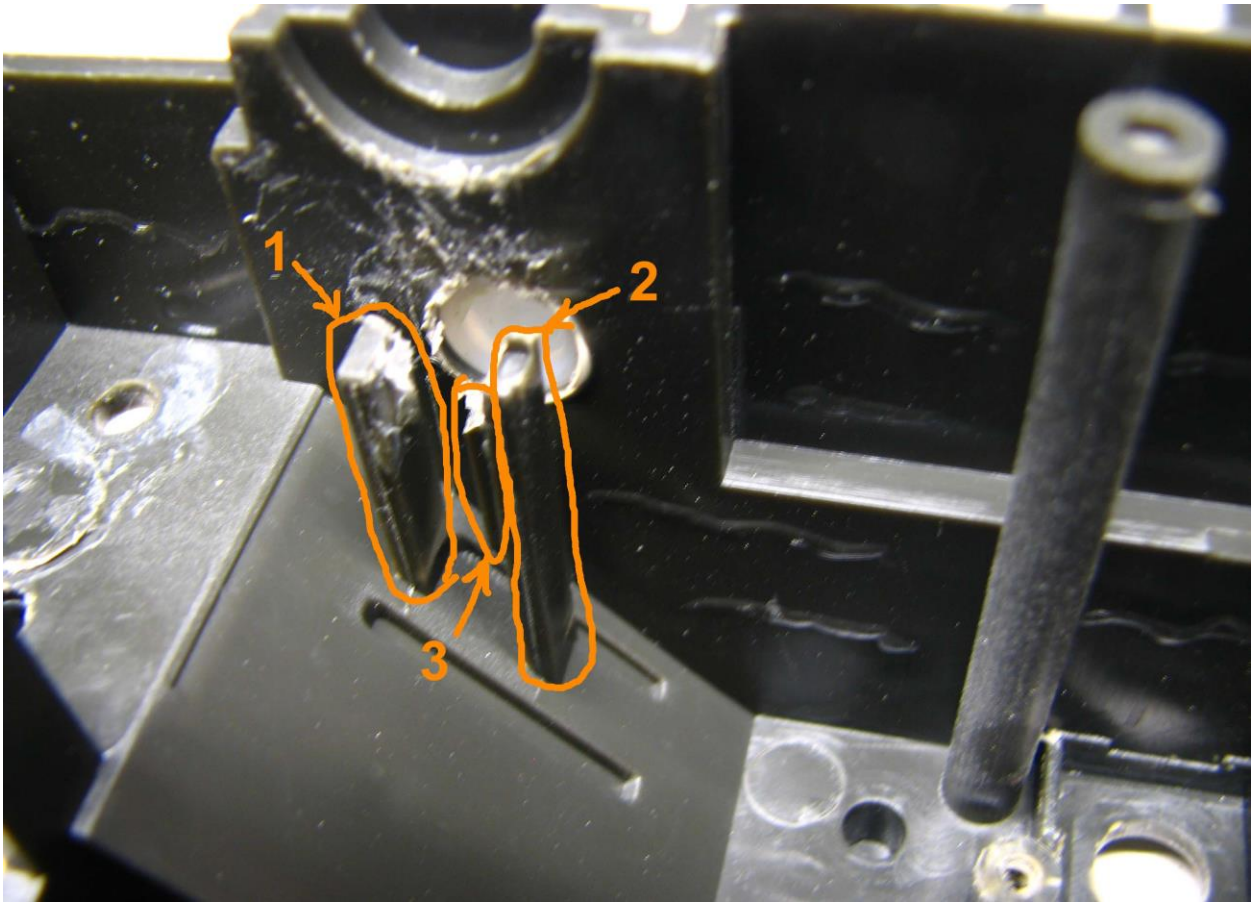
Here is a picture of the cleaned-up wand that is now separated from all of the wiring and ready to be modified!



It is important to remove the glue – I didn't on my first conversion and when I went to grind out a portion of the inside the glue gummed up EVERYTHING! It was a mess. Just best to remove as much of that glue now before you start modifying the body.

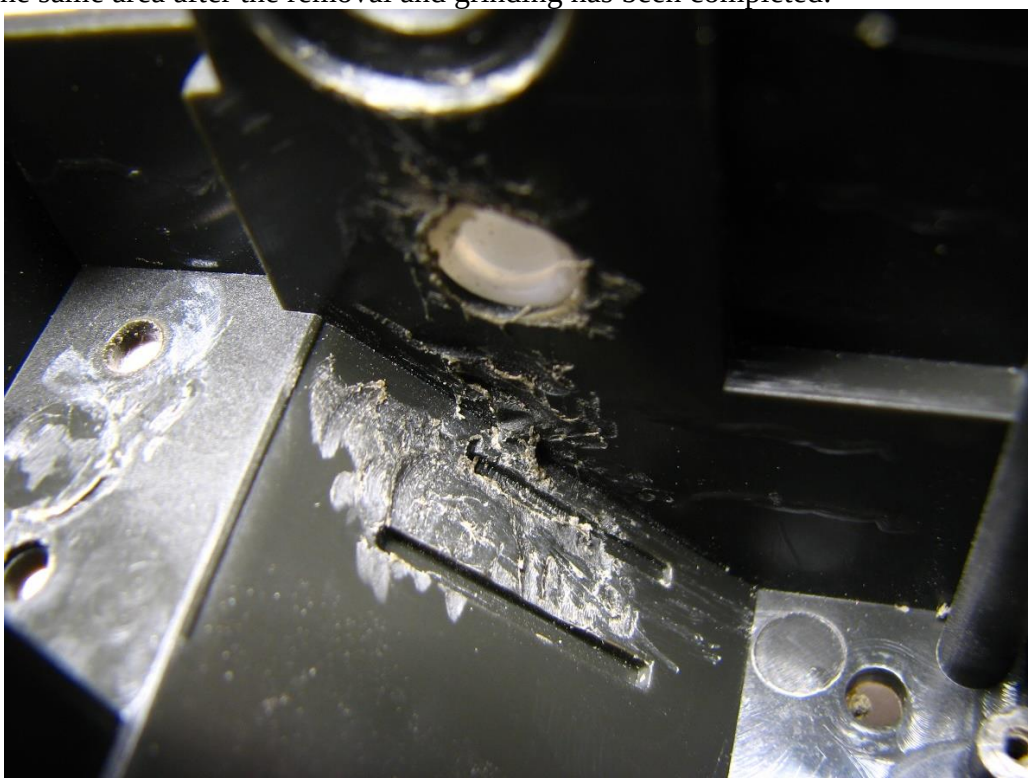
Modifying the main wand body:
There are multiple new holes and slots that need to be added to the wand body to allow switches and LEDs to shine through and light up your surroundings. A Dremel (or other small motor tool) with various grinder bits, blades and drill bits for most of the initial work and then follow-up with small files to clean up edges.

Start by removing the two LED supports and an adjacent side brace from where the LED was attached:

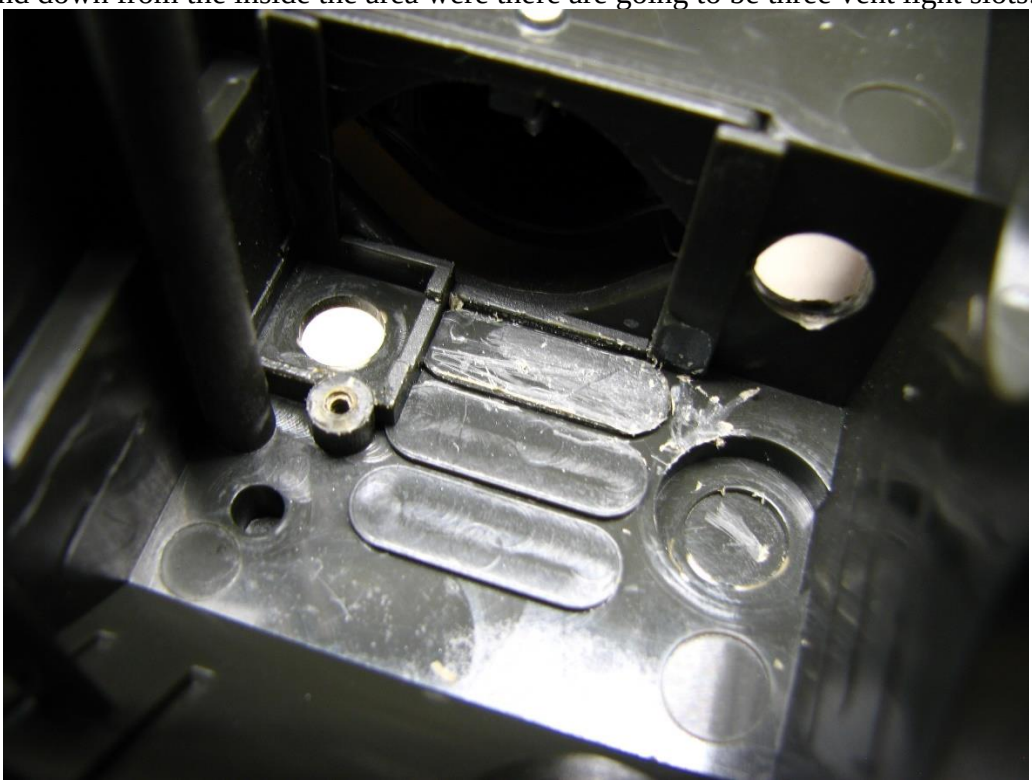


Posts 1 and 2 can be snapped off, but the ledge attached to the side wall (3) needs to be ground down. I ground down the nubbins left by snapping off the posts since they may get in the way for a later step. I did grind down the side wall (3), but it may not have been an issue. You can probably leave this on the side and only remove it if it interferes with the circuit board. You can't test fit the circuit board until more holes have been drilled.

Here is the same area after the removal and grinding has been completed:

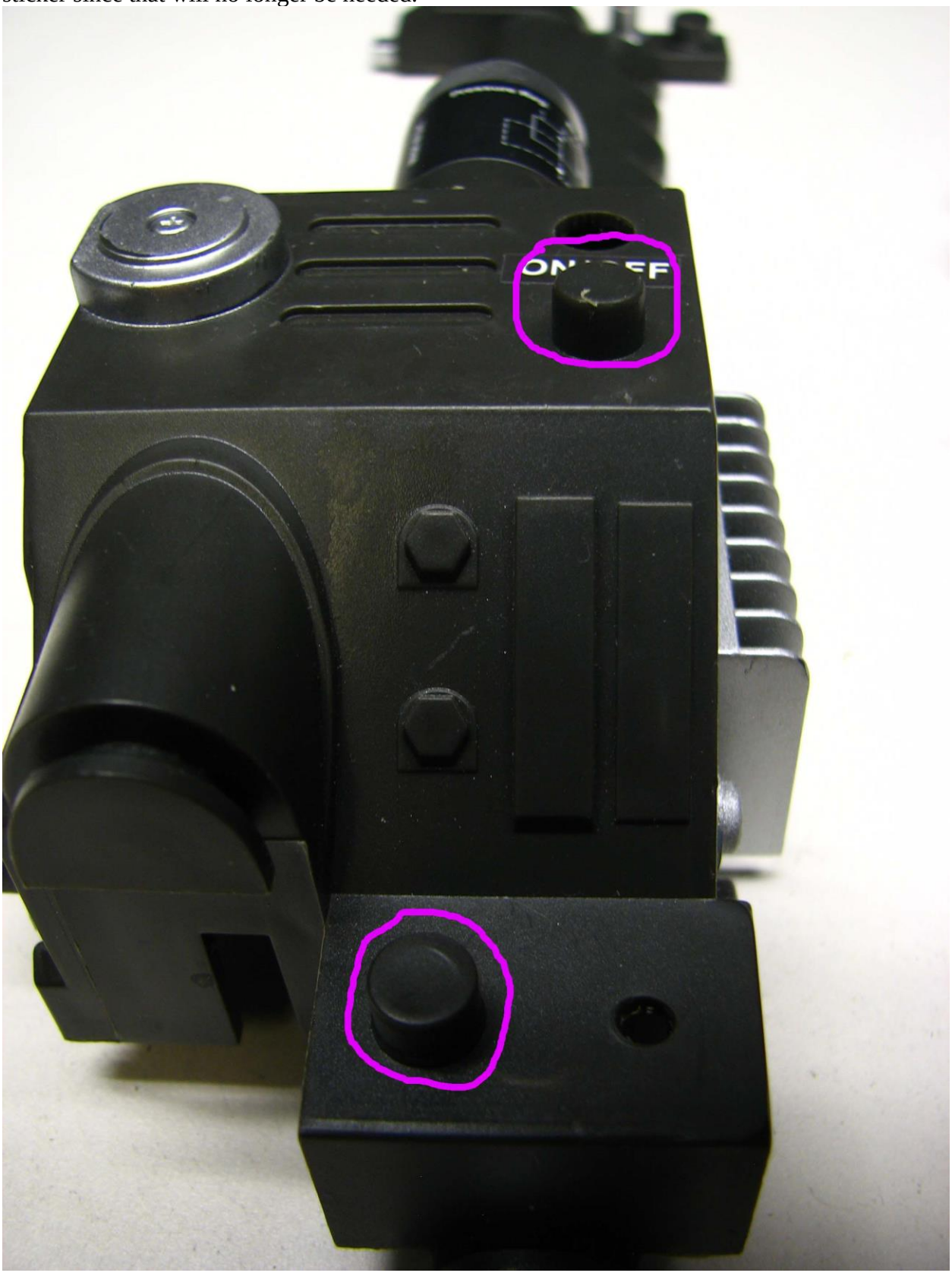


Next grind down from the inside the area were there are going to be three vent light slots:

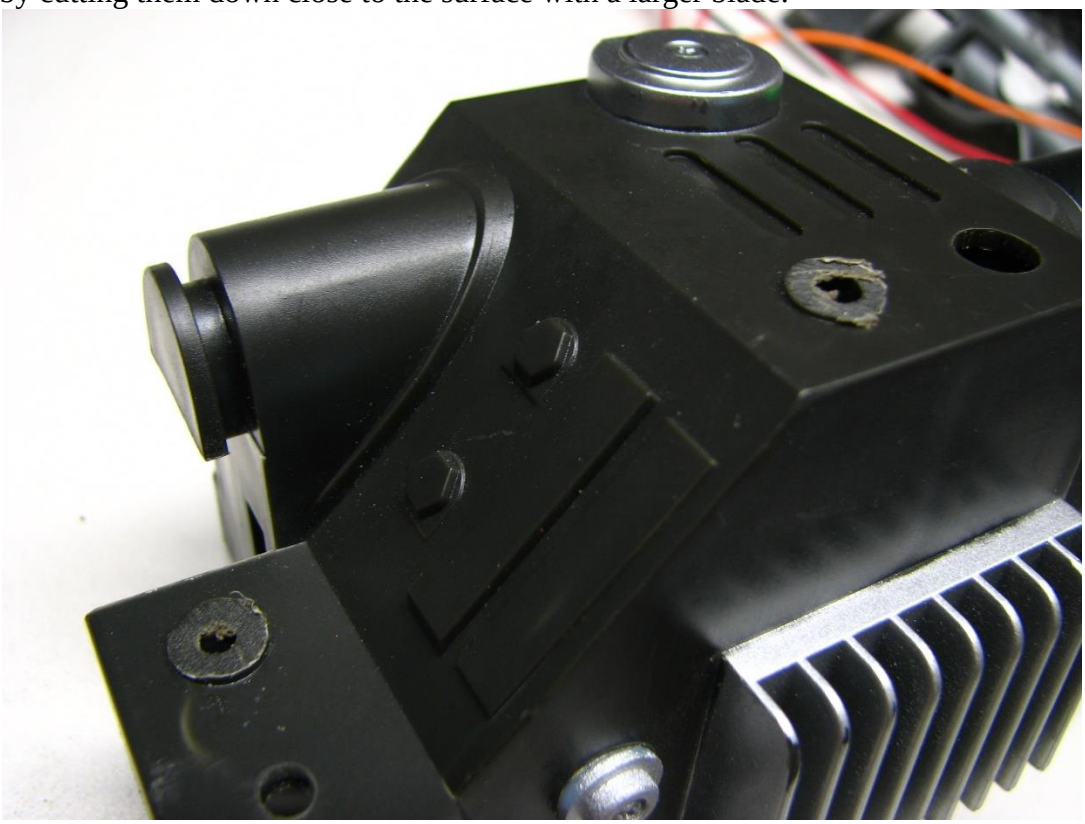


I used a smaller flat top grinding bit and try and level out the area but did not get a picture of that. Just want it a bit thinner so that cutting the slots out will be easier. One note of caution: the grinding may heat up the area too much and warp the surface on the outside. Do not grind too long and allow some time to cool between little bits of grinding.

Next two molded in “fake” LED holders need to be removed so we can put real ones in their place. Here are where the two nubs are located. You can also now remove the “ON/OFF” sticker since that will no longer be needed.



I start by cutting them down close to the surface with a larger blade:



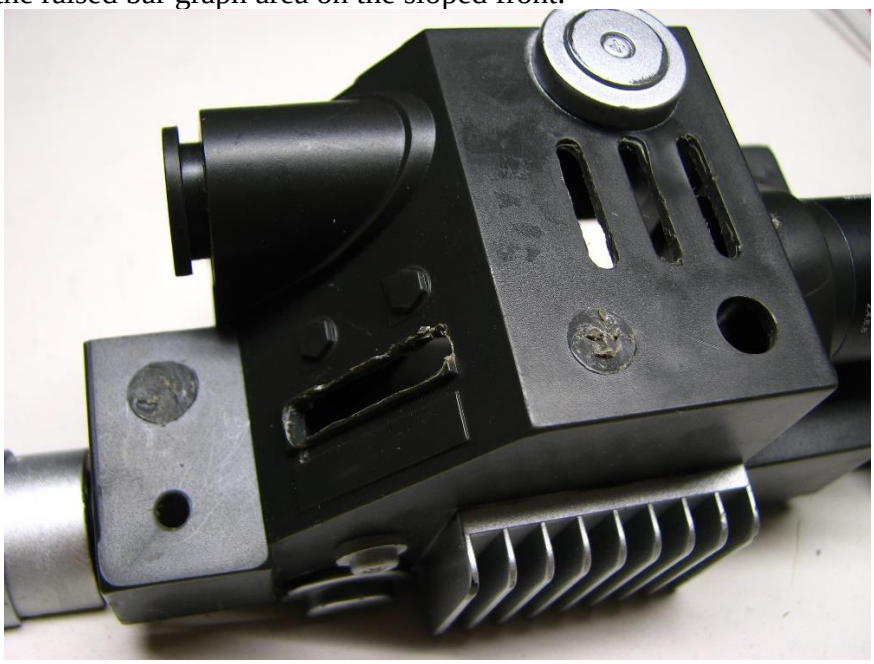
Then use a small flat top grinding bit and carefully go around the raised edges. Next, I use a smaller cutting blade and cut through the 4 areas that will be cut out into more open slots next. Here is what it looks like after the initial cuts:



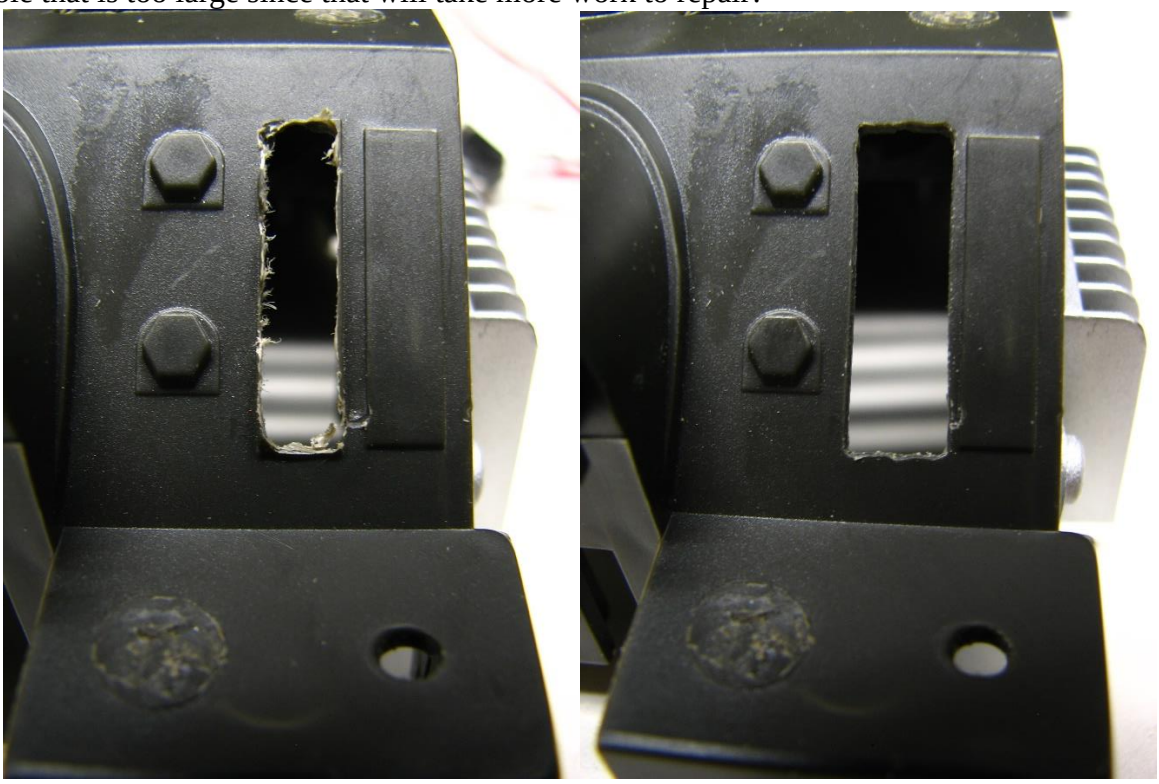

Pressure Reg.



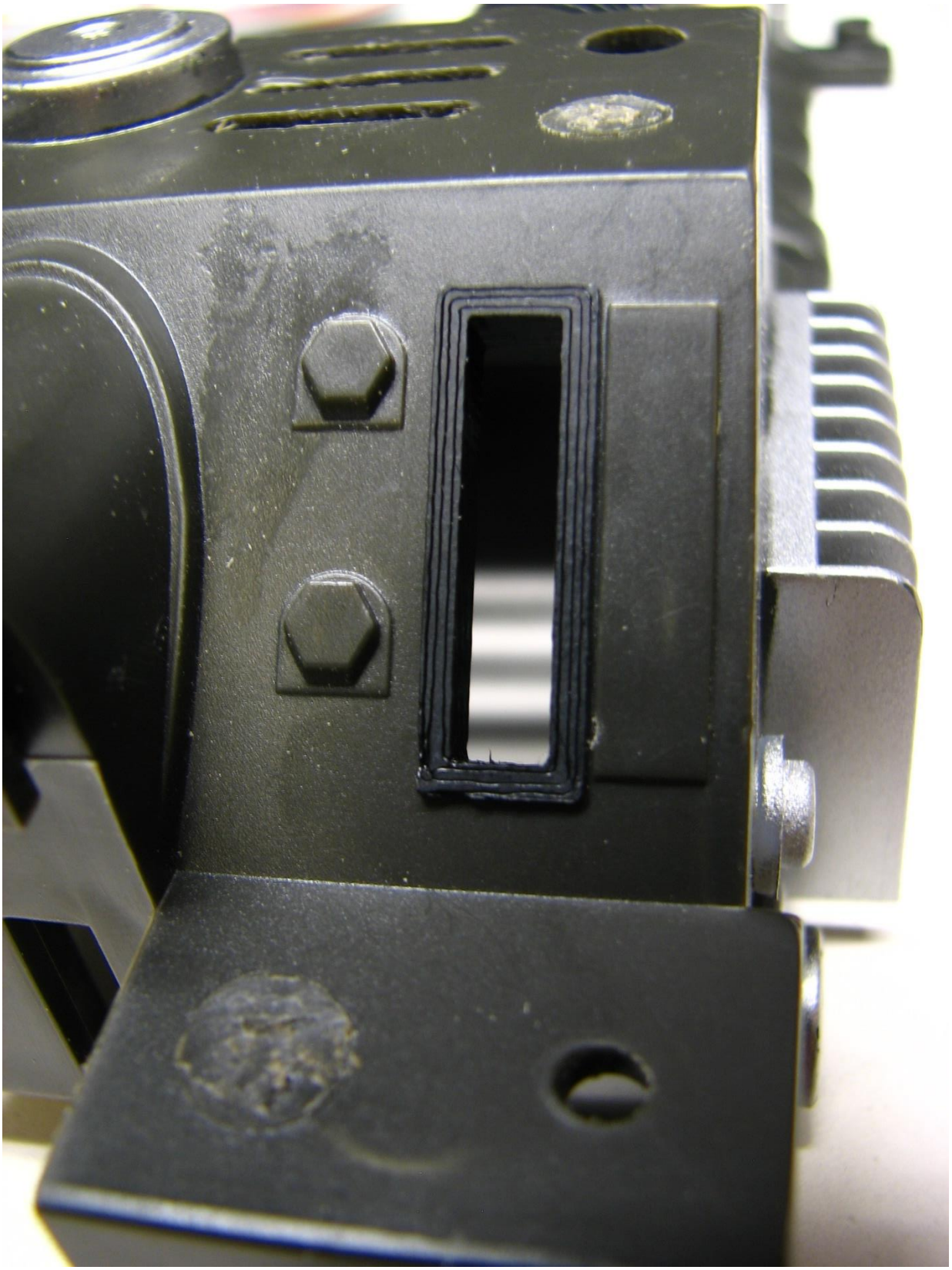
Next, the three vent slots are drilled out – I use a 5/64” drill bit in the Dremel. It is smaller than the slots, so I go down the middle then work on each rounded end and finally each side wall. For the front bar graph opening I use the same drill bit and move around to get the side walls as this as possible in the raised bar graph area on the sloped front.



Next I use hand file with small flat and round files to clean up the top vent slots and flat and triangle files to clean up the edges of the front bar graph slot. The bar graph slot is a bit tricky since it needs to be the correct size for the 3D printed Bezel. Pull out the largest 3D printed bezel part from item #7, the bar graph bezel parts bag and use that to verify just how large of a hole will be needed. Just make the hole a bit larger and try the fit, then repeat. You do not want a hole that is too large since that will take more work to repair!



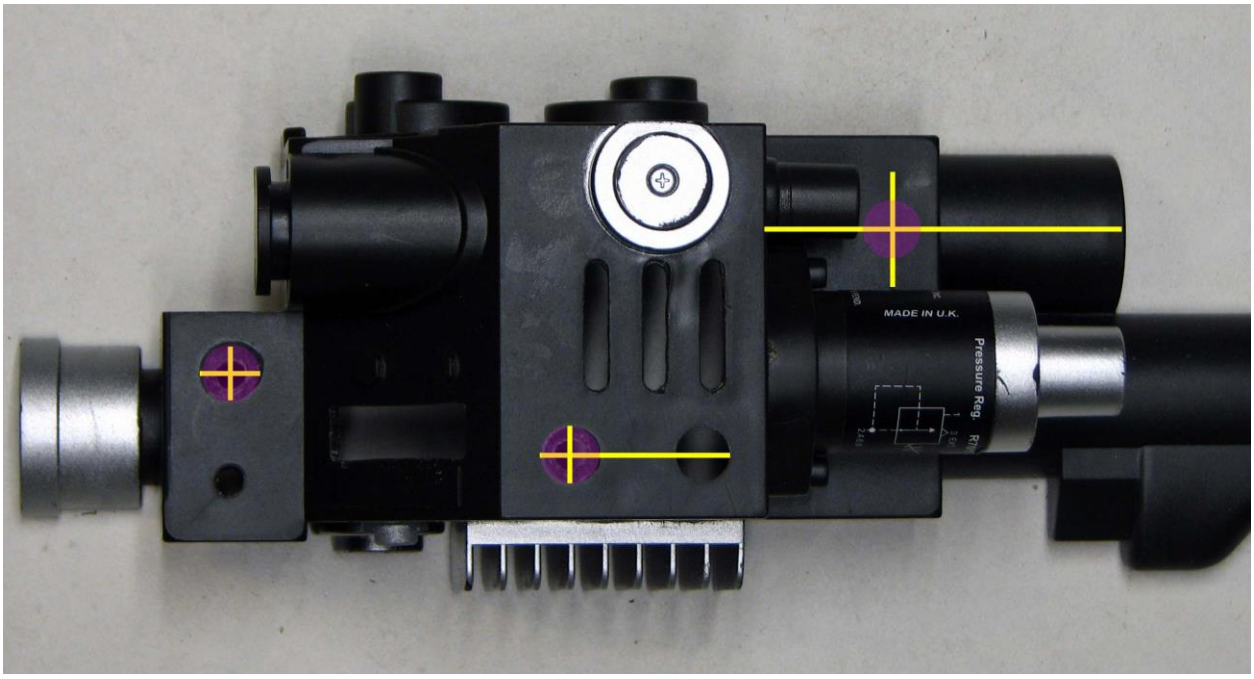
When you are done filing and test fitting, put the 3D printed bezel back in the bag with the other parts so you can find them all later. Here is a picture of the finished holes after lots of filing and test fitting.



Drilling holes for the LED holders.

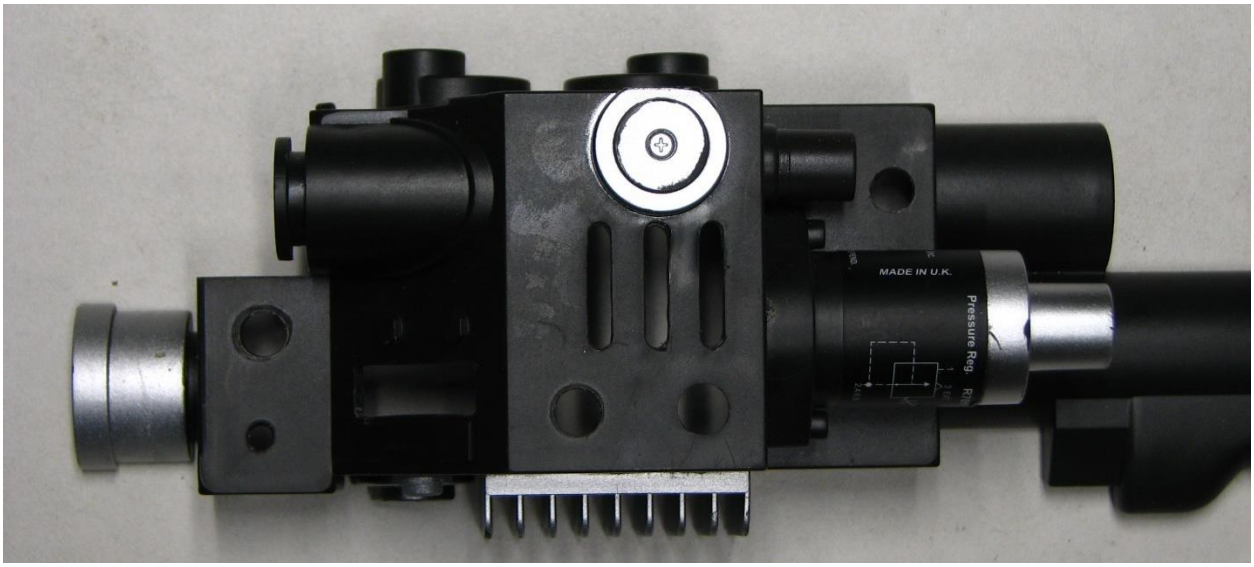
I think on my next few conversions I may try drilling the holes after I cut down the posts and before I sand them flat. It is hard to tell where the hole center is after I have ground them down.

Use a **1/4" drill bit** to drill out the three holes:



The hole in the upper right is a tough one to place. If you center on the protruding part, the hole will interfere with the mounting screw, so it needs to go more towards the handle. Still approx. centered between the protruding part and the nearest edge of the platform. Do not get too close to the edge of the platform or the clip will not sit well. The protruding part next to the Clippard valve may not be secured well. I have at least one wand where it was missing and another that was loose. I used gel superglue and reattached the one on this wand.

After the holes are drilled:

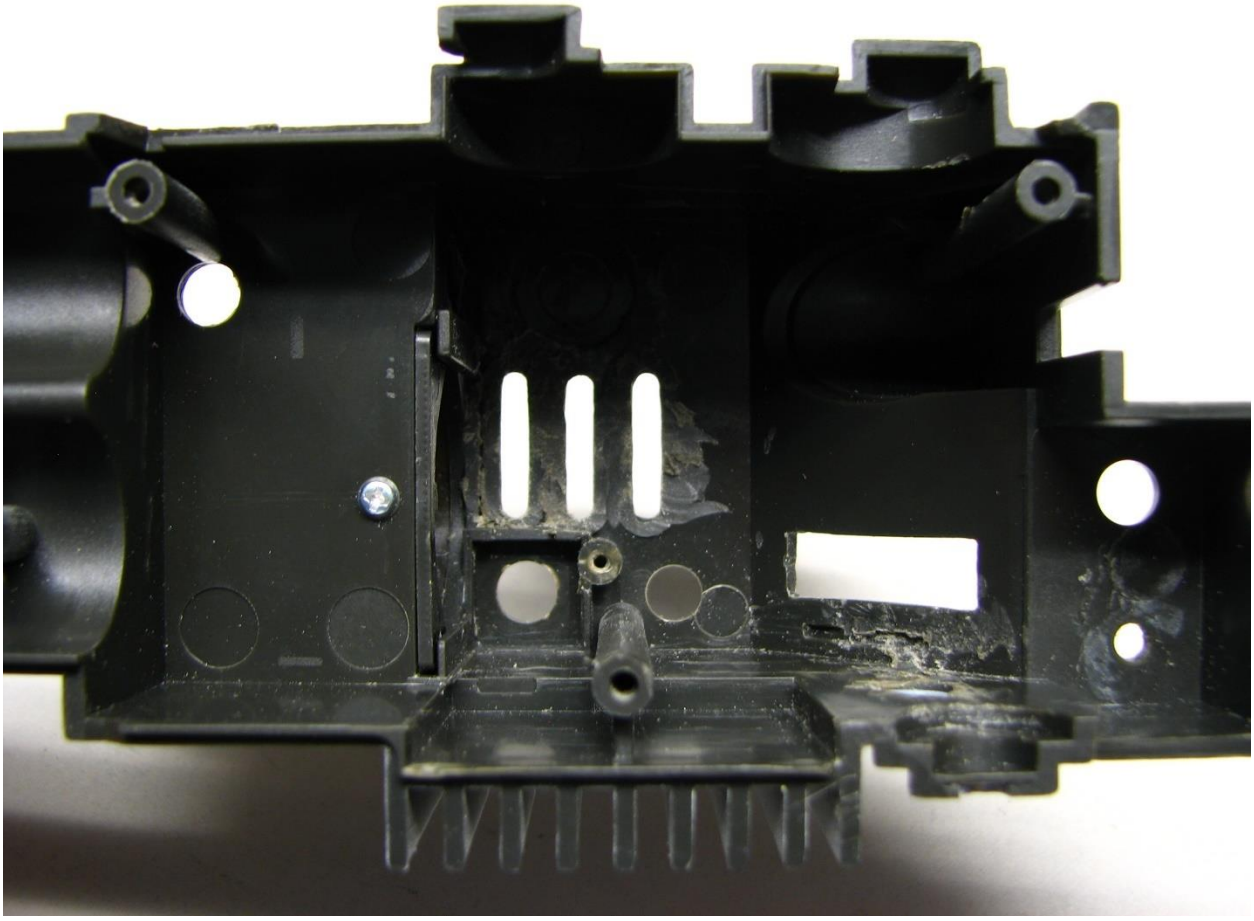


Next, the two holes for the toggle switches on the circuit board are drilled with a **3/16” drill bit**.



Center the holes on the “hex head” pattern as shown.

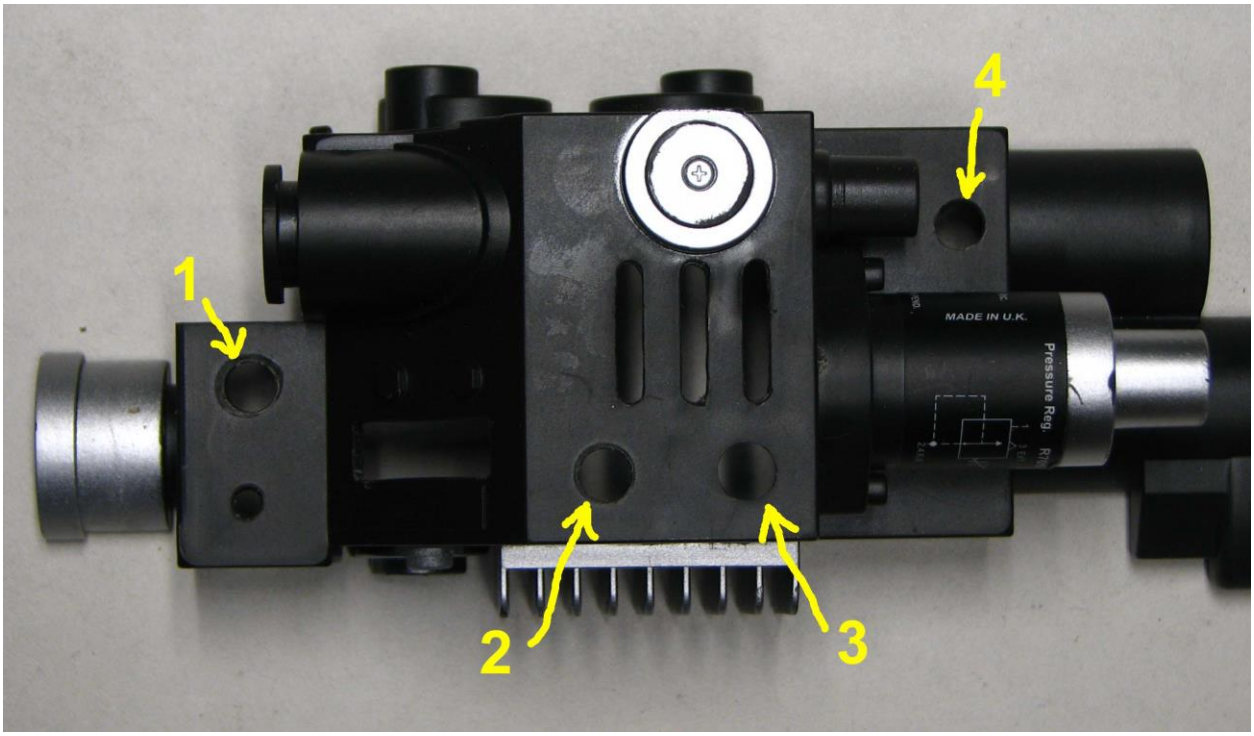
Here is the view from the inside of the wand body with the various holes and slots that were added (oops, before I drilled out the two toggle switch mounting holes):



Installing the lenses in the main body.

You will need to get the 4 lenses that are in the bag (6) of parts. At least one of the lenses needs to be permanently mounted, so if you are planning on painting the wand body, either do it now or be prepared to tape over the lenses prior to painting.

Here is where the 4 lenses will be placed:



1) Red lens with good fit in hole
2) Milky White lens that mounts flush won't fall out, but is loose
3) Clear lens, hole is too large (the way it came with the Spirit Wand!), so can easily fall out or inside. I like partially setting the lens in the hole so it still stands up, but is more snug than mounting it all the way out like 1) and 4).
4) Milky White lens with good fit

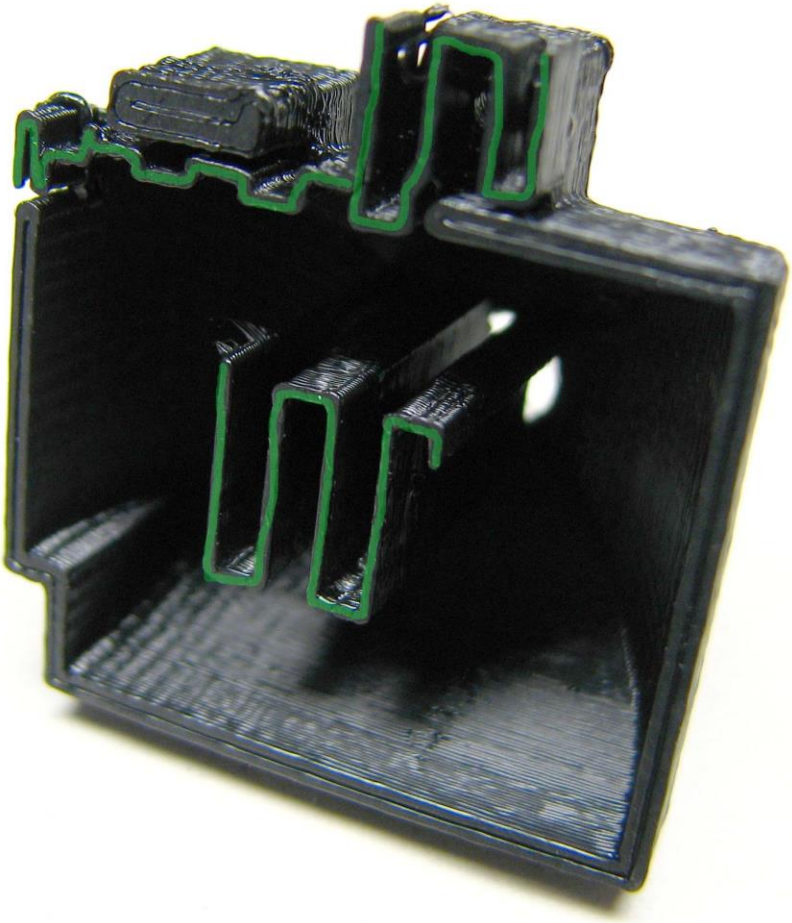
Since 2) and 3) need to be glued in anyway, I just glued in all 4 of the lenses using a gel superglue from the inside of the wand body.

I got sloppy with the glue around the Milky White lens that mounts flush – I may need to paint this wand body after all.



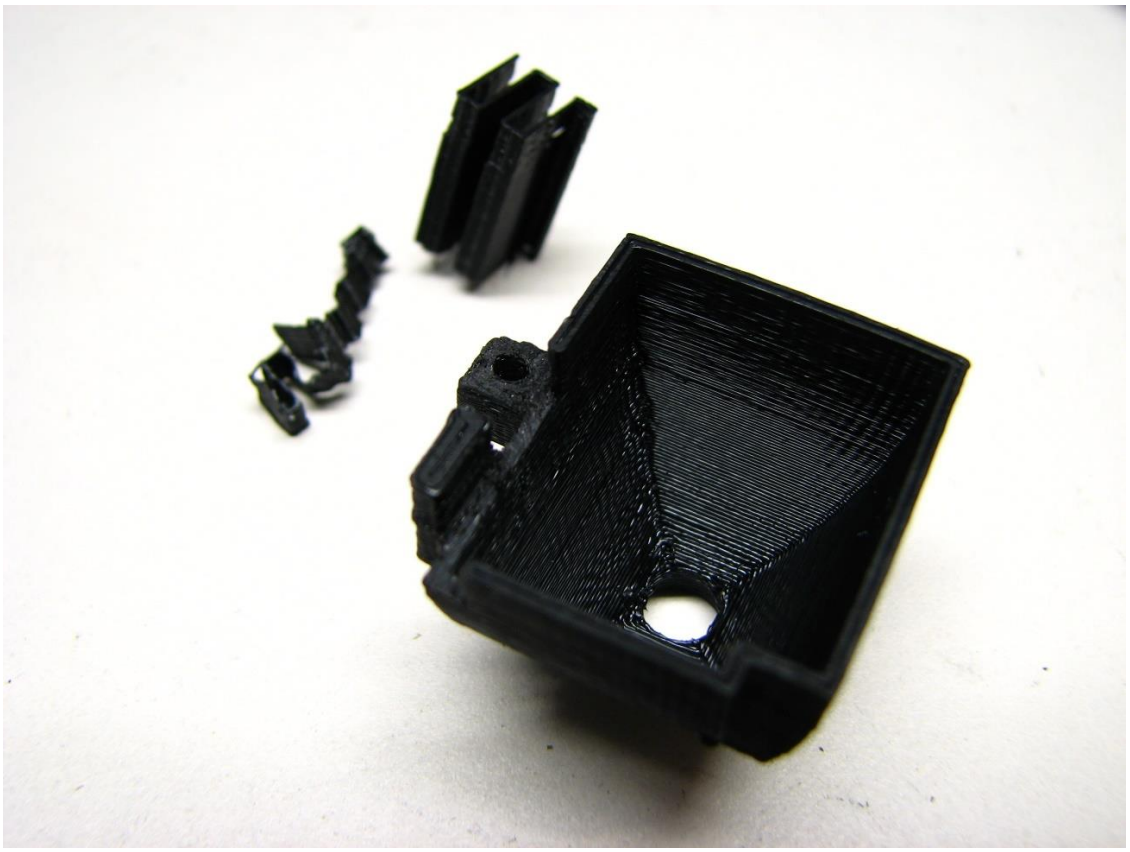
Installing the vent reflector:

Grab the black #D printed reflector and it will probably need a bit of cleanup before it is installed. There are several support structures on the part, though some may have fallen off during packaging or handling of the part. Here is an image of the part with the support structures still attached (the supports are the snake like parts, highlighted in green):

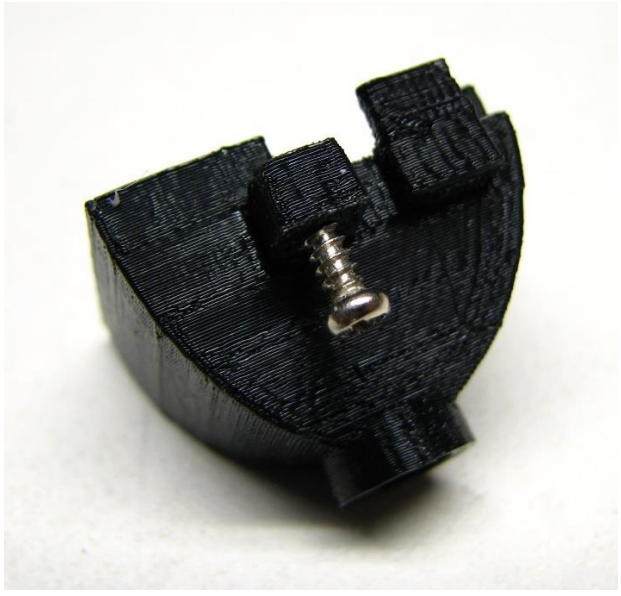


Gently remove the support structures – they should not be attached strongly to the part and can be taken off with just your fingers. You could use needle nose pliers, but make sure you are only grabbing the support structures and not the actual part. (see next image).

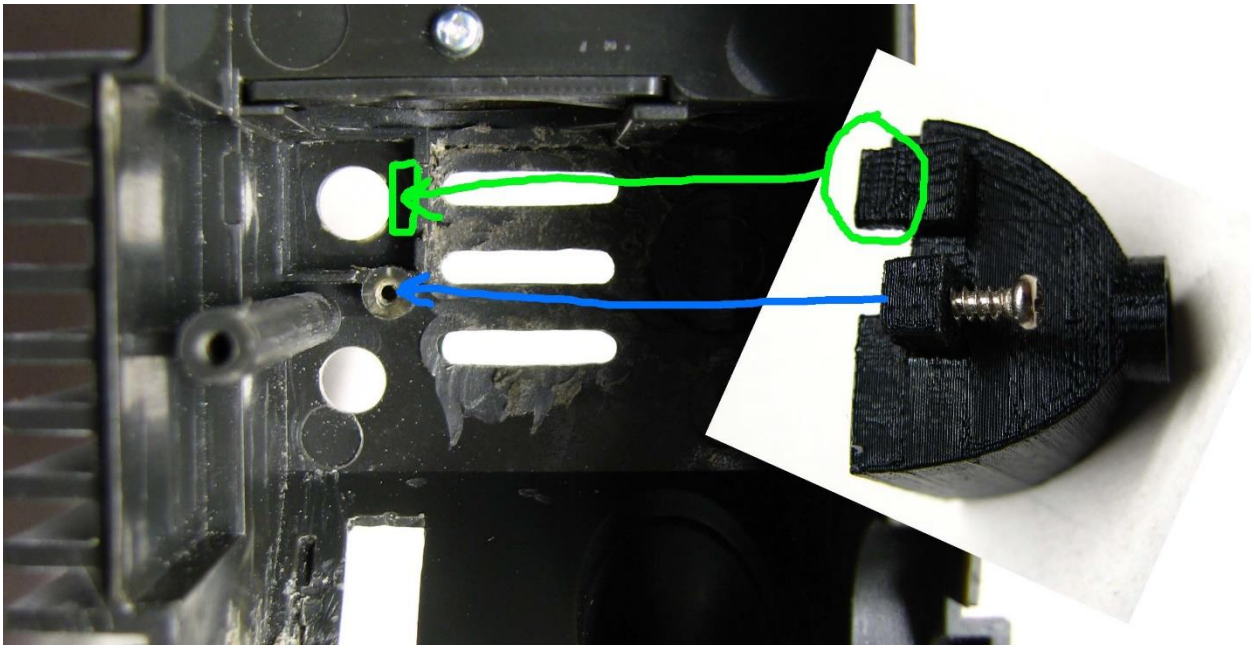
Here is the part after the support structures are removed. I use a tiny file to smooth out the surfaces that the upper support structure was attached to the reflector. The main inside of the reflector should not need any sanding. You can also see the removed support structures behind the part:



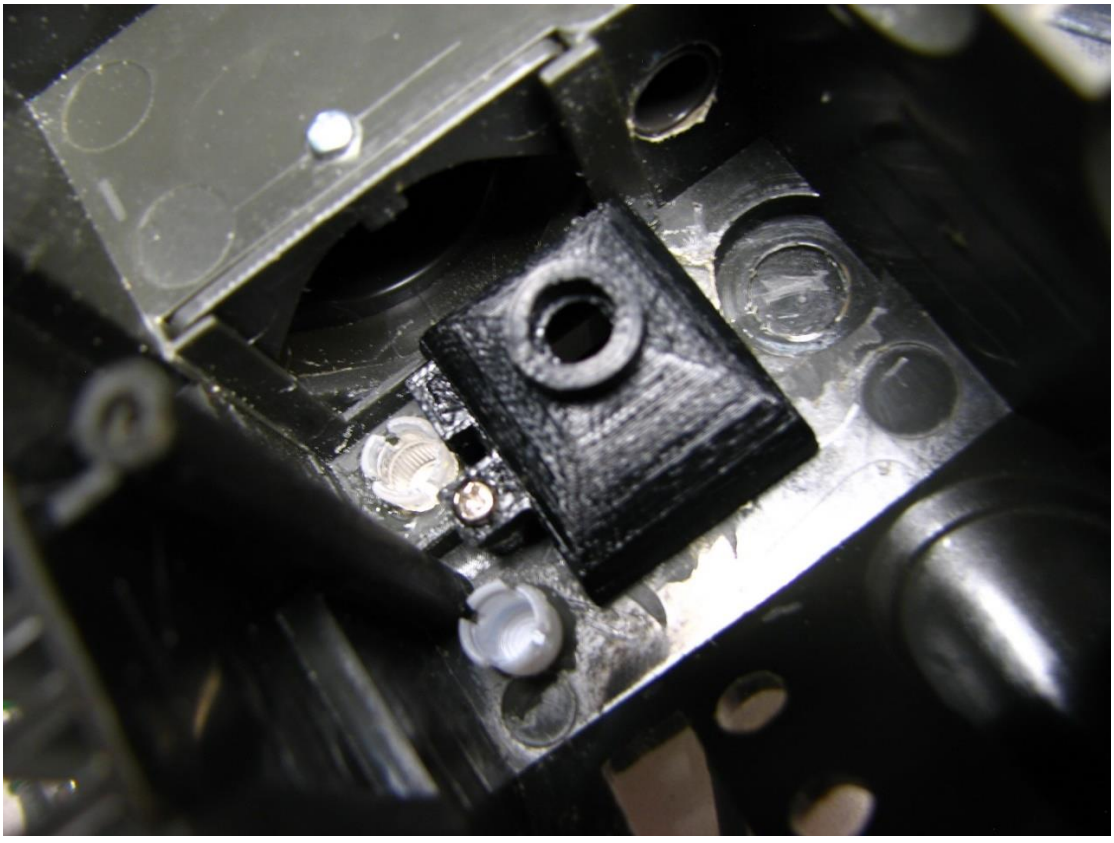
To attach the part to the wand, you will need a screw from the bag of Lenses and Hardware (6). This screw is very similar to the screws that are used to hold the wand together. I found it easiest to first screw in the screw to the reflector mounting structure so that the bottom of the screw is flush with the mounting structure before you place the reflector in the wand:



Place the black 3D printed vent reflector inside the wand body and orient it so that it can be screwed into the existing screw mount that was previously used to hold in the ON/OFF pushbutton that was removed earlier. This tab will fit between the Clear lens and the surrounding wall edge in the inside of the wand body:

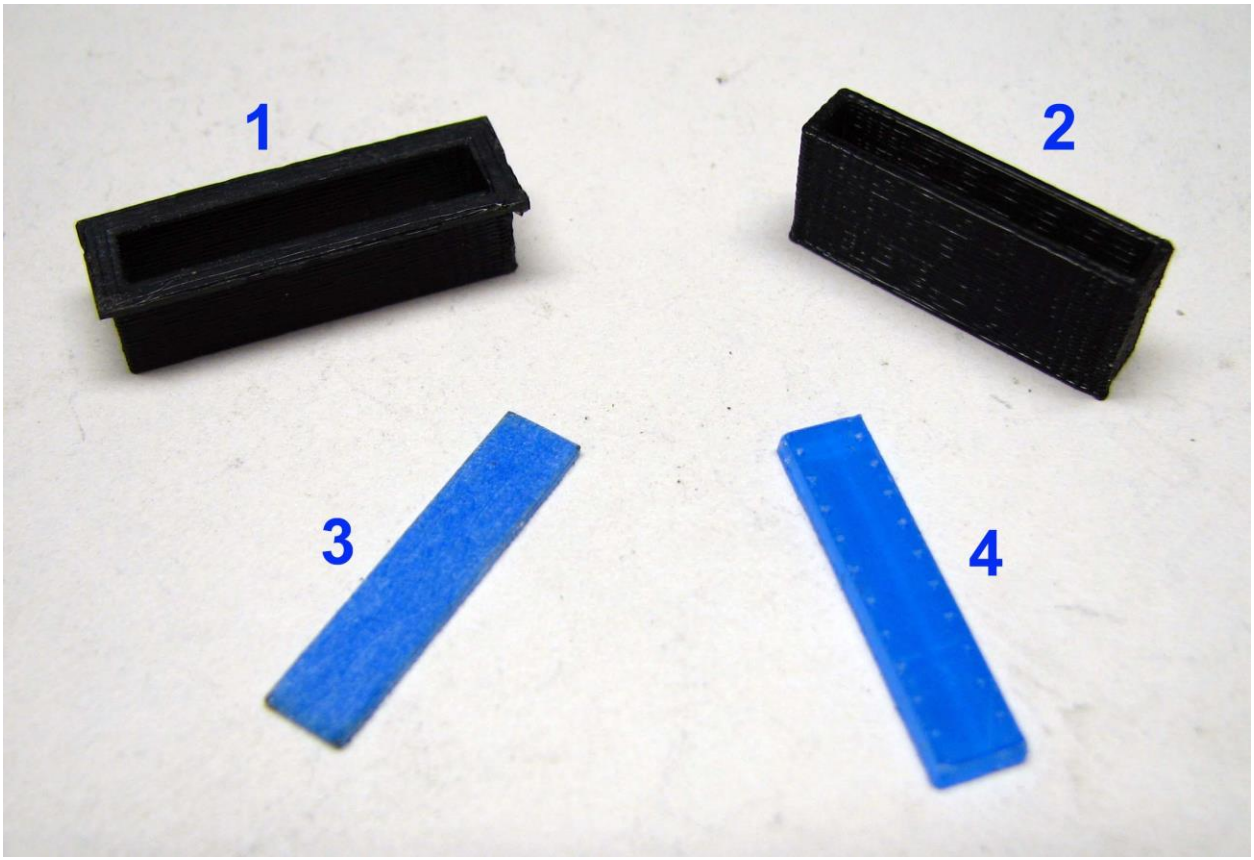


First place the part and make sure it is seated flat on the inside surface of the wand. The mounting tab with partially screwed screw should be setting flat on the wand screw mount. After Making sure the part is sitting well, fully screw in the mounting screw.



Assemble the bezel

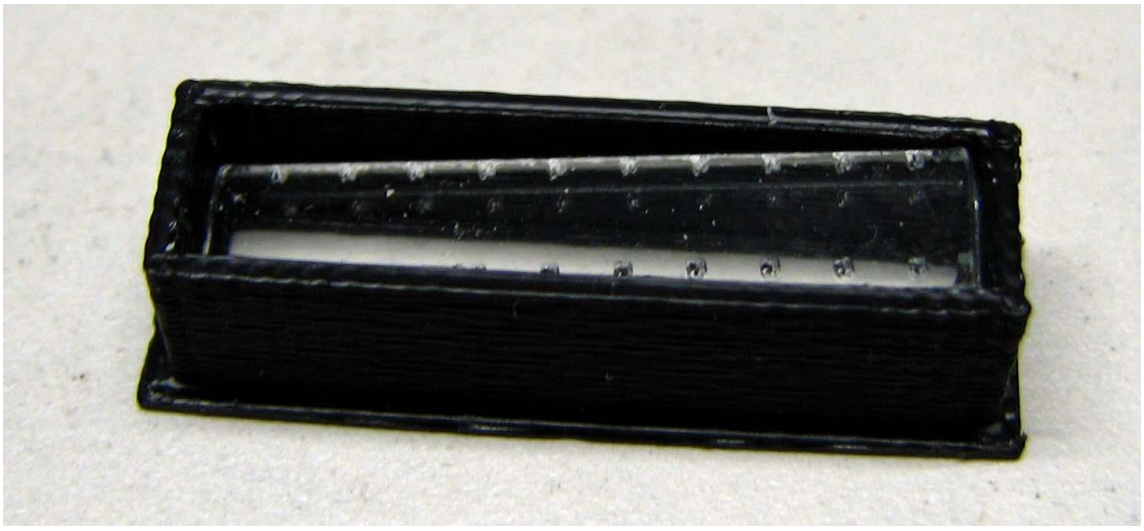
Get the 4 bezel parts out of the bag (7)

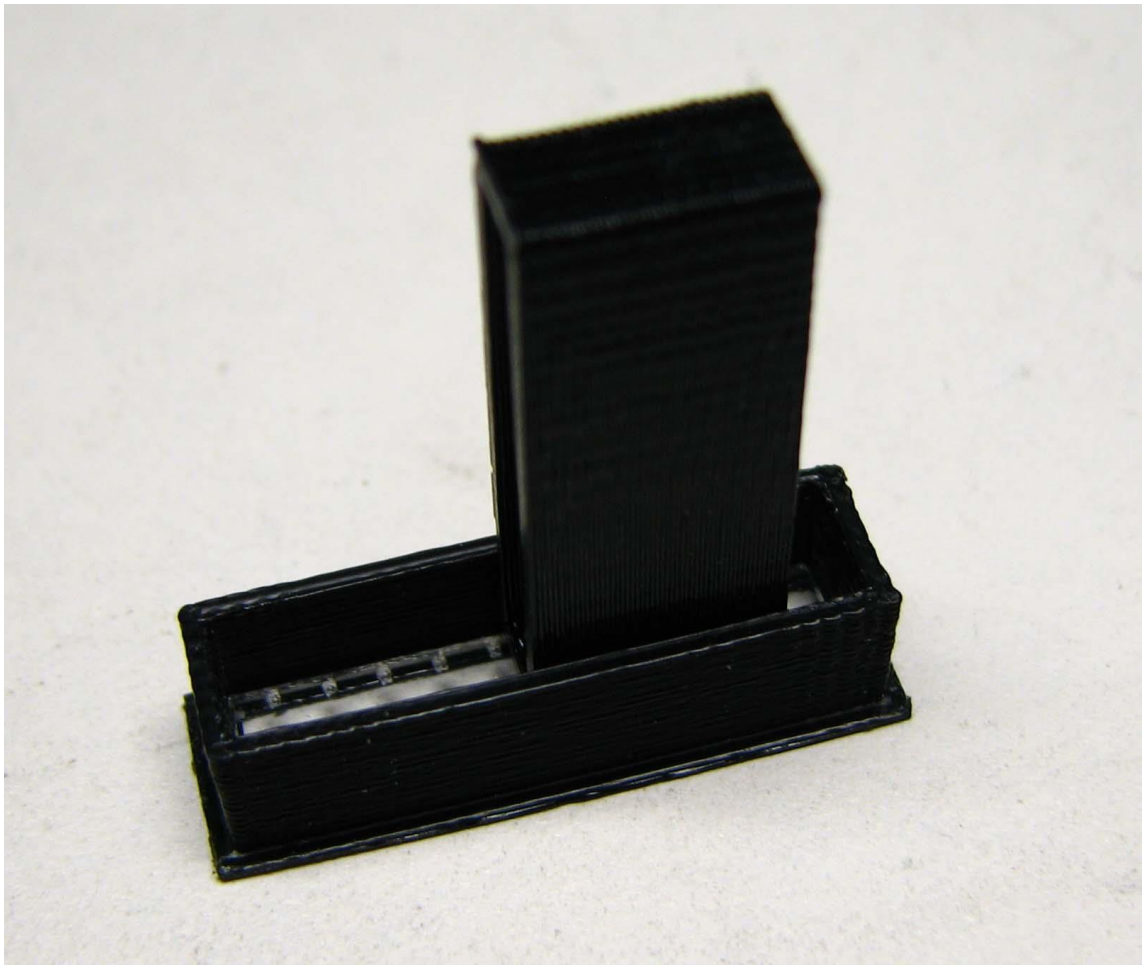


1) Bezel frame
2) Bezel back insert
3) Lenticular
4) Clear plate

Remove the Blue masking tape from the clear plate (4). Try and keep this part clean since fingerprints and dust and stray particles will be visible.

The clear plate part needs to go into the bezel and be pressed up against the front of the bezel frame from the inside of the bezel frame. First set the bezel frame (1) front side down and place the clear plate in the bezel frame such the laser etched dots are facing up so that the clean surface of the clear plate is facing down. This will be a tight fit. You may need to slightly sand the edges of the clear plate if it just won't go in. I start by placing the clear plate at an angle and then use the Bezel back insert (3) to press the clear plate into place:

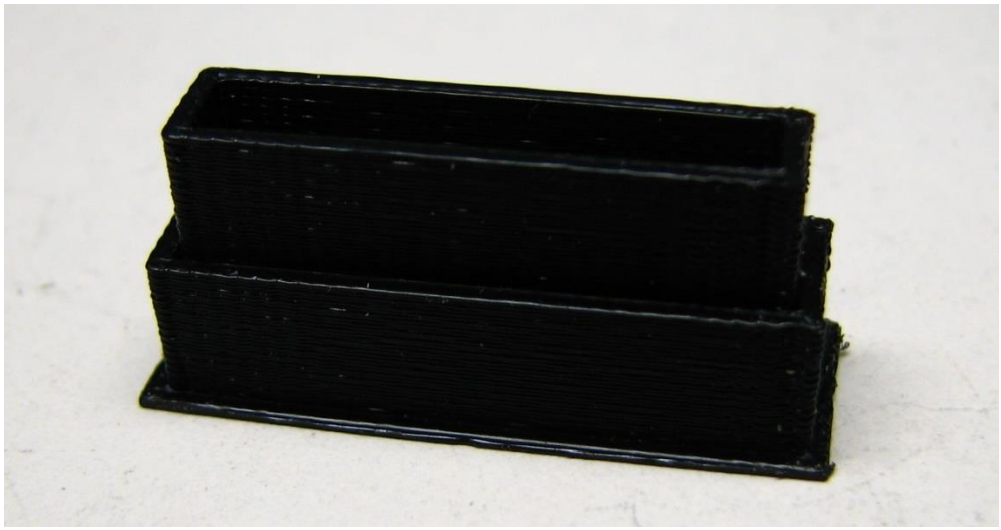




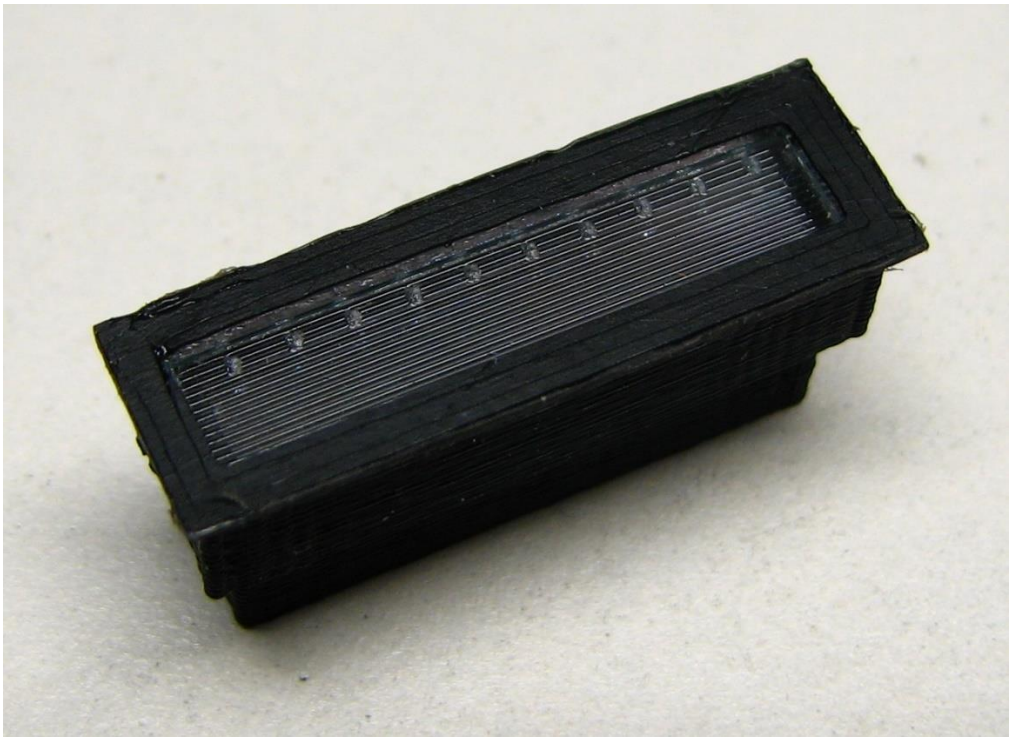
This is going to be the protecting part of the bezel and the laser cut “dots” go on the inside so the front facing surface is completely smooth.

Next remove the tape from the lenticular piece (3) and place it on top of the clear plate (4) such that the ribbed surface is touching the clear plate. This will give a nice texture to bezel when viewed from the front of the wand.

Next press the bezel back (2) insert into the bezel assembly (1, 3 and 4). This makes a “sandwich” of the parts and will both hold the clear plate and lenticular in place as well as provide a light shroud around the bar graph display that is built into the circuit board that will soon be mounted.



Flip over and ready to test fit in the wand body.



Test fit the Circuit board and bezel assembly

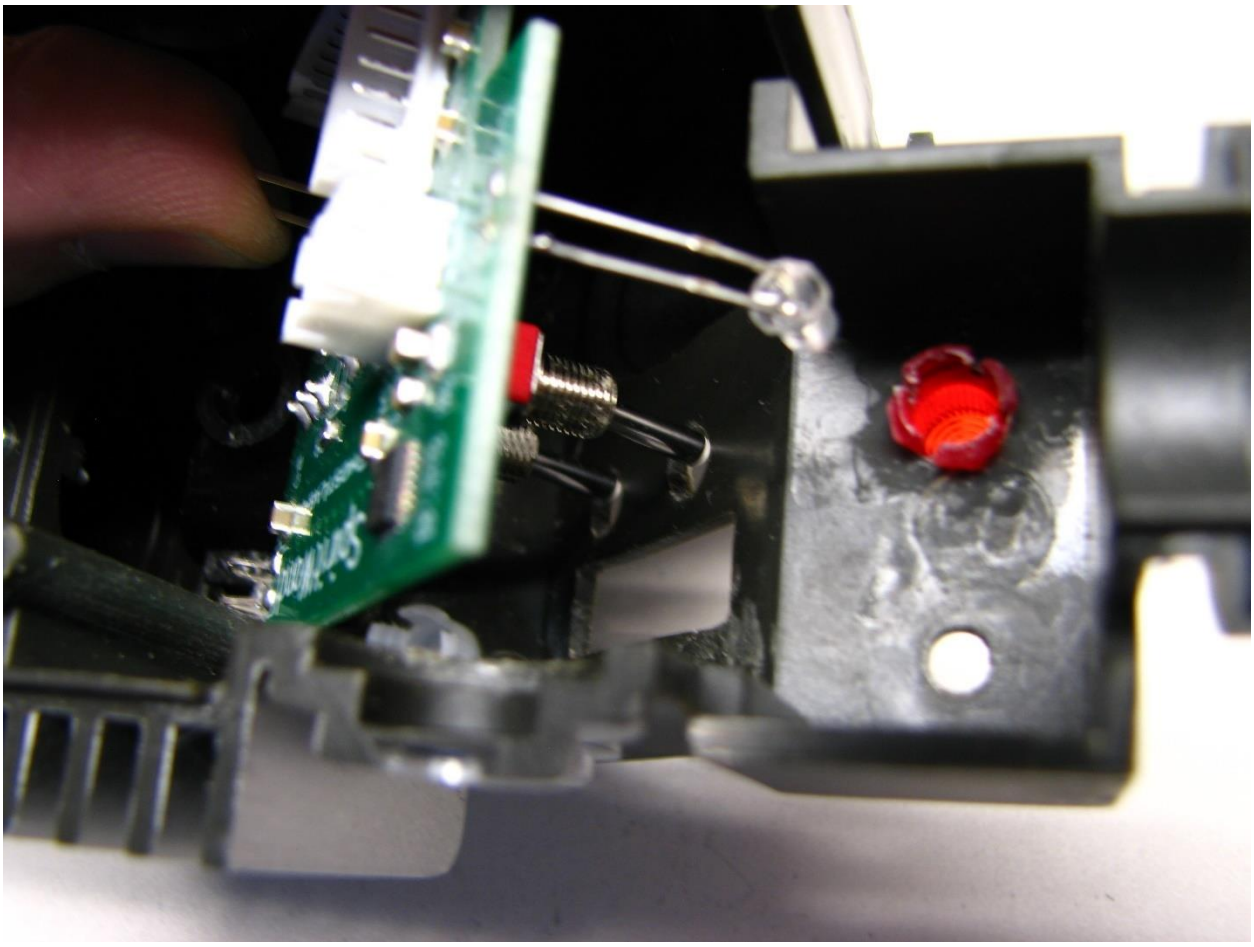
*** ESD ZAP WARNING!!! ***

When handling circuit boards, there is some danger of damaging the components on the board by "zapping" them. Ideally all work is done on a surface designed to provide charge removal and you should be wearing a grounding wrist strap that is tied to earth ground. But, most people do not have these so you should still take some precautions.

Keep circuit boards in ESD bags as long as possible. Only open when it is time to install or test.
Minimize walking around with the circuit boards exposed and being directly touched.
Don't let someone shuffle across carpet and sneak up on you to "zap" you from the static charge being built up.
If possible, touch some metal part of an appliance or tool that is connected to an AC outlet with a grounding plug prior to handling the board so that you can discharge any voltage buildup you may have acquired prior to grabbing the circuit board.

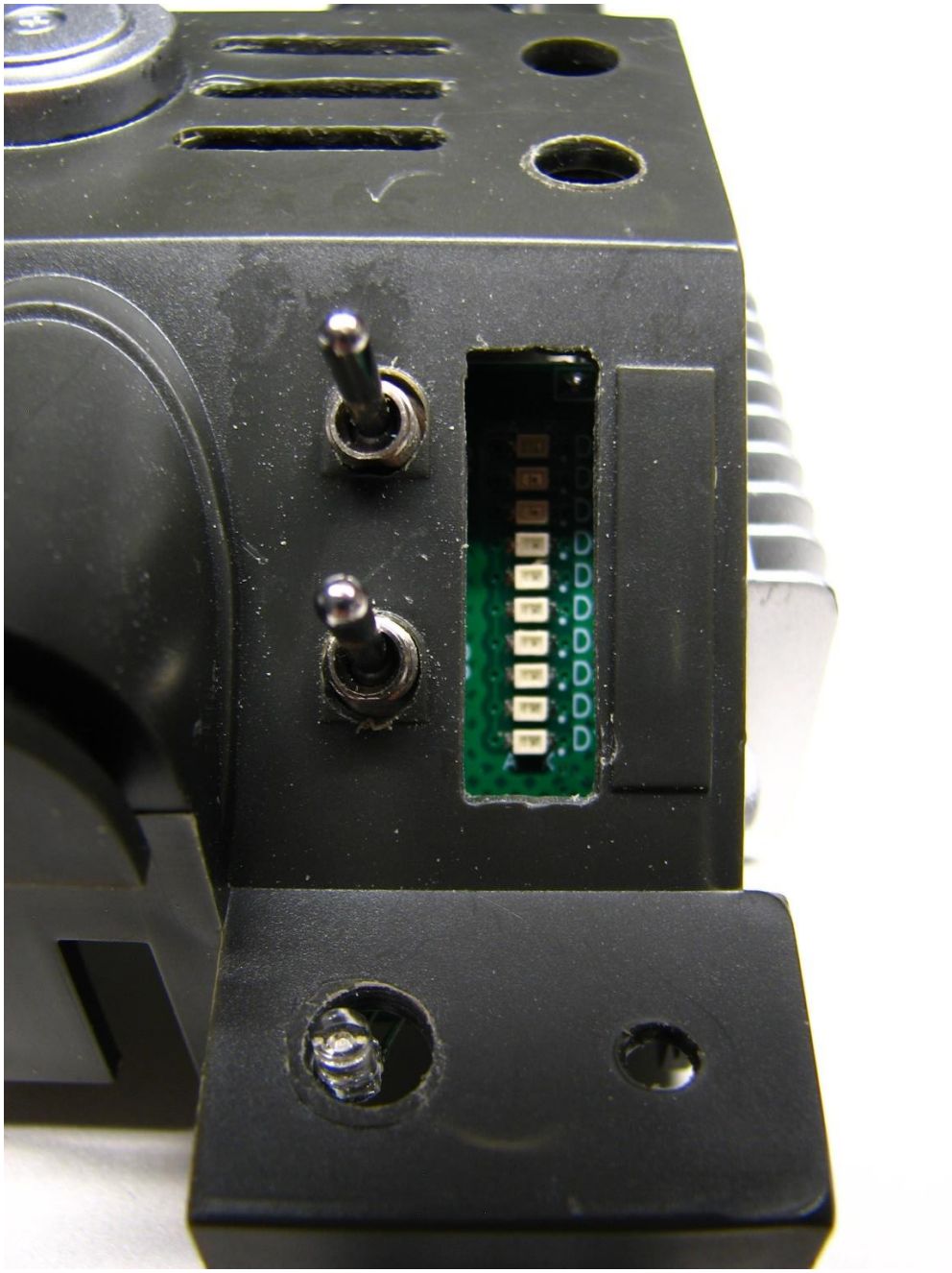
*** END of WANRING ***

Remove the circuit board from the ESD bag and test fit the front holes for the two toggle switches. To insert the board, first position the toggle switches to the UP position to make it easier to get the board installed.



Test fit the board and see if the holes are spaced apart ideally or need to be moved a small amount. On this board that I am using, the holes were a bit too wide apart, so I used a small round file (rat tail) and moved the bottom of the upper hole down to the edge of the rectangle, and the top of the lower hole was moved up to the edge of the circle. Just make small adjustments and keep test fitting so you do not remove too much material.

Here is a photo after I adjusted the holes and the board fit nicely:

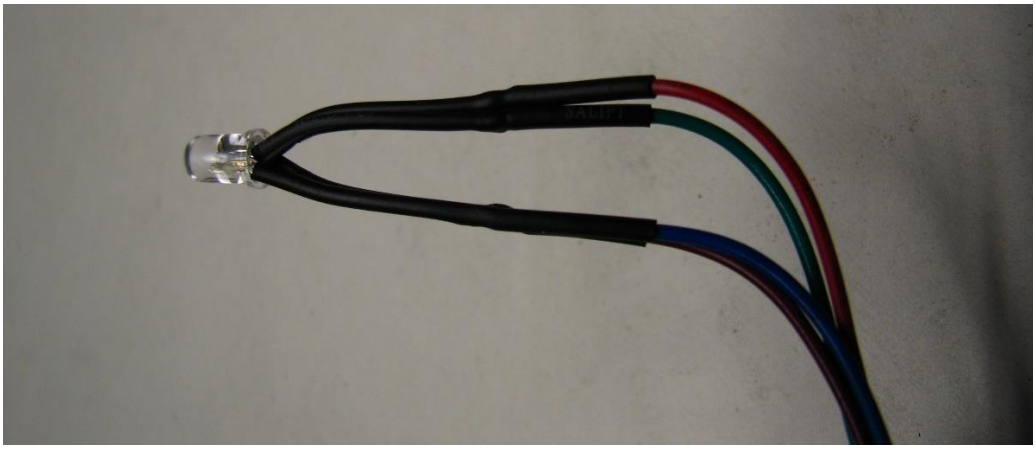


Once the board is mounted, set the Bezel assembly in the slot and make sure that it can set all of the way in and that the LEDs on the circuit board end up inside the bezel back insert. The Bezel should not push the circuit board out – the toggle switches should remain fully inserted and flush up against the sloped front panel of the wand body. The bezel should also not be pushed out and remain fully seated up against the sloped front panel.

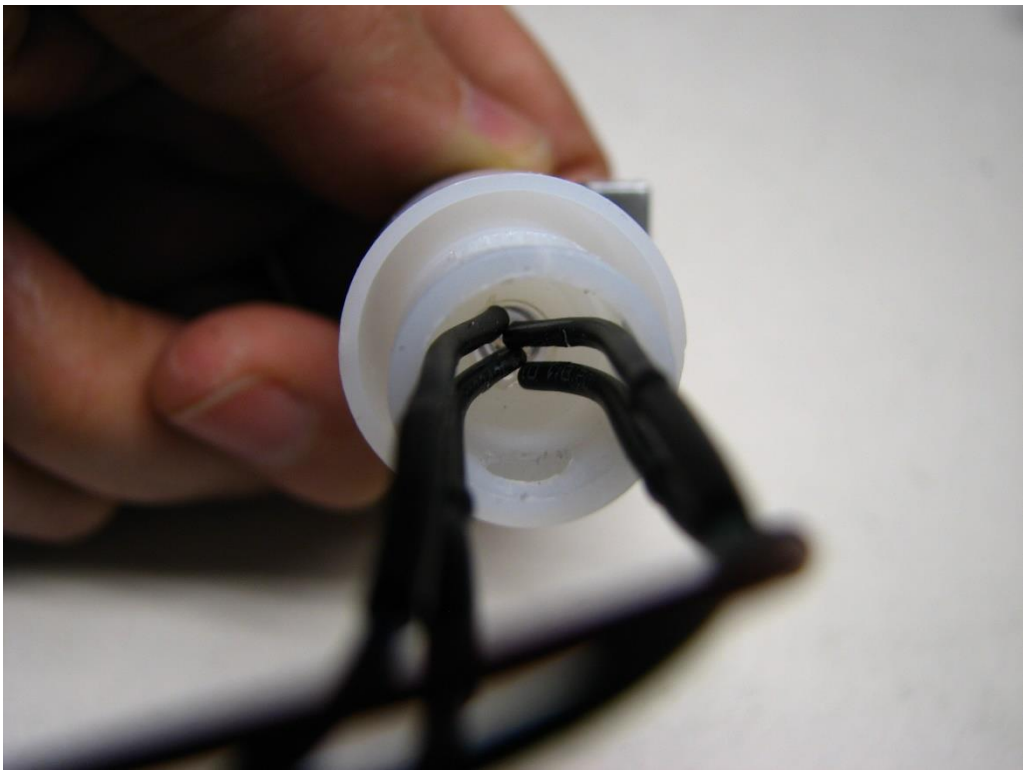
Installing the LED Lights

Now we are going to install the LED light cable (1) that has the RGB wand tip LED and three other 5mm LEDs to illuminate the body of the wand.

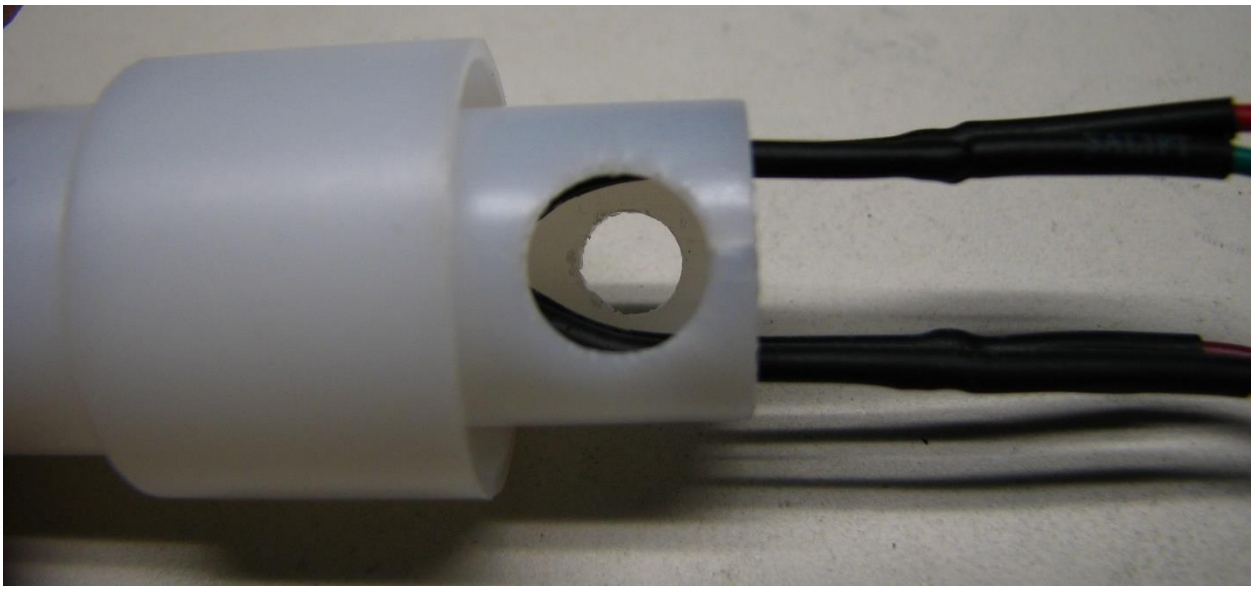
The RGB LED (four wire connections) need to have the leads dressed so that it can go into the wand tip and not get the wires crushed. Do this gently and slowly since we do not want to break any leads! Repeated bending and sharp bends will also be problematic, so do not adjust too much!



The LED does need to go into the place where the spirit had located their LED. The hole may still have some glue in it, so you may need to use a small round (rat tail) file to clean out or slightly enlarge the hole. You do want this to be snug fit, and you may consider gluing it in after you test fit and make sure the wires are placed where you want them.

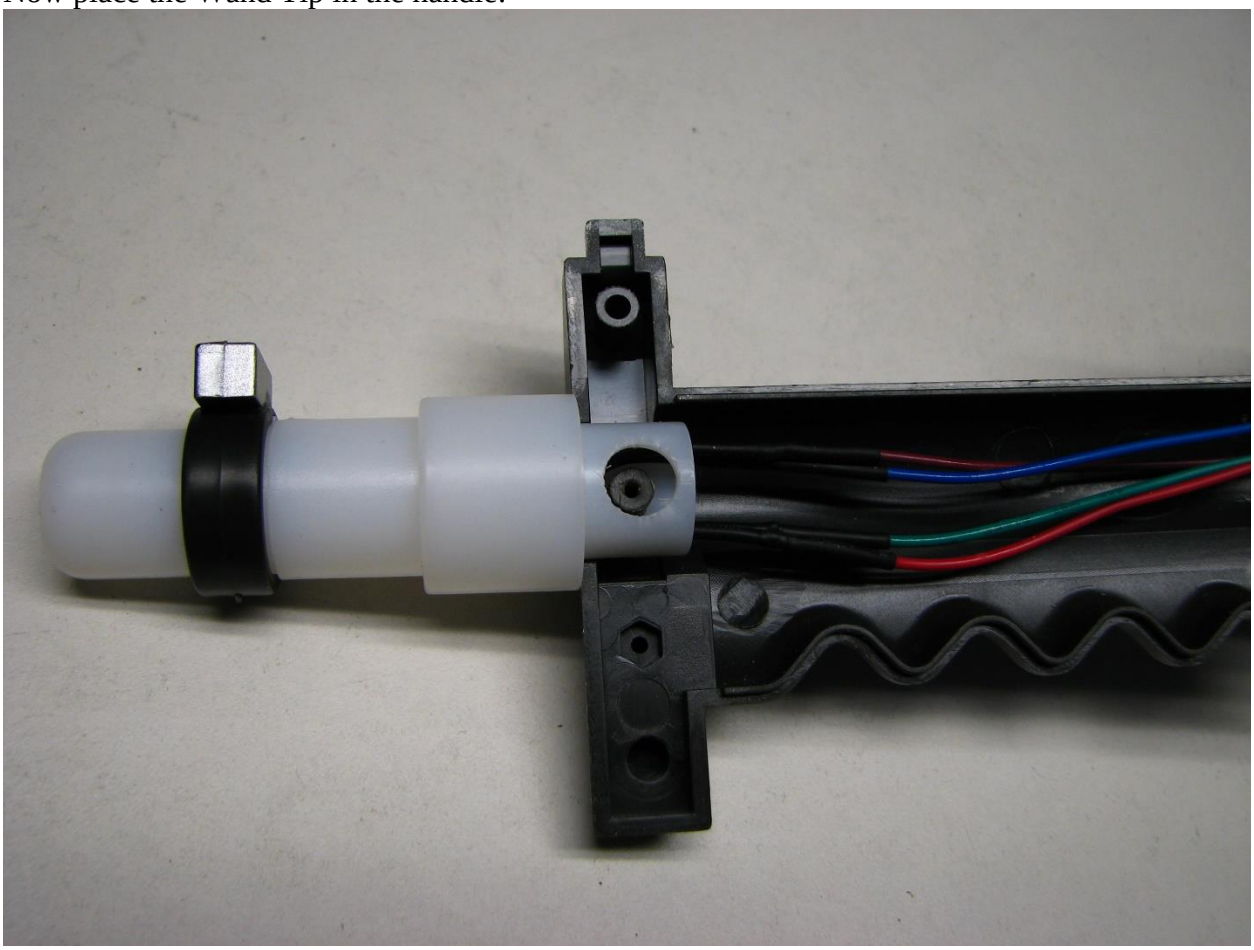


You need to only press on the plastic 5mm LED case, not the wires. Before pressing the LED in place, the LED should be rotated so that the wires will not block the holes and you should not press the wires.



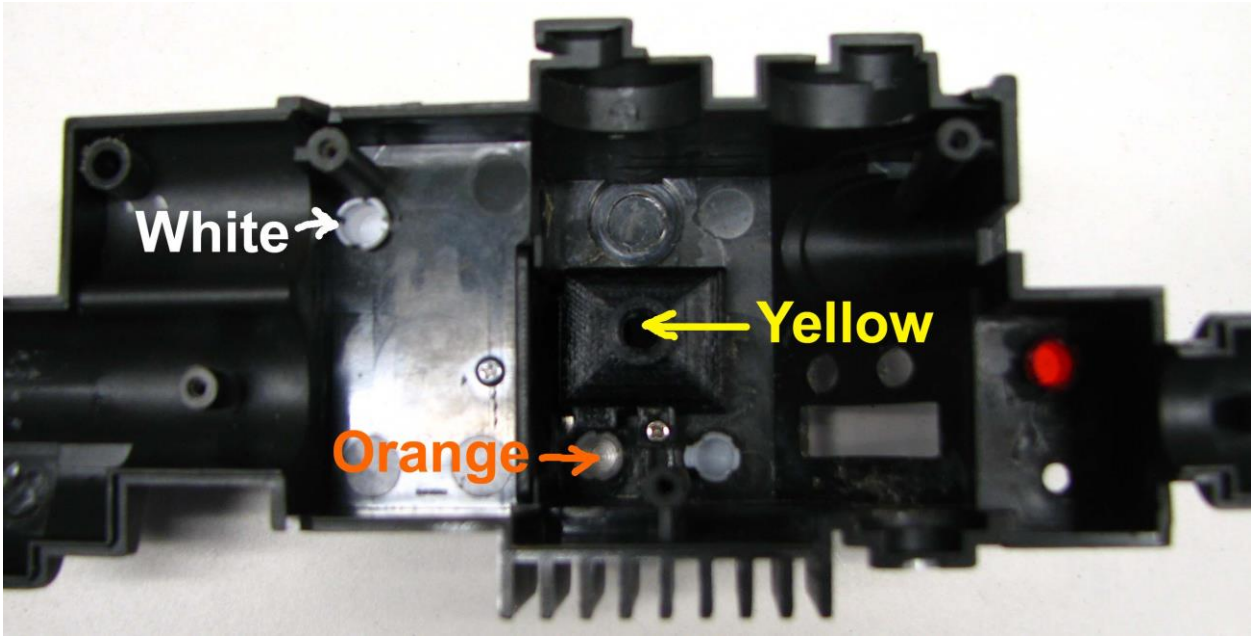


Now place the Wand Tip in the handle:

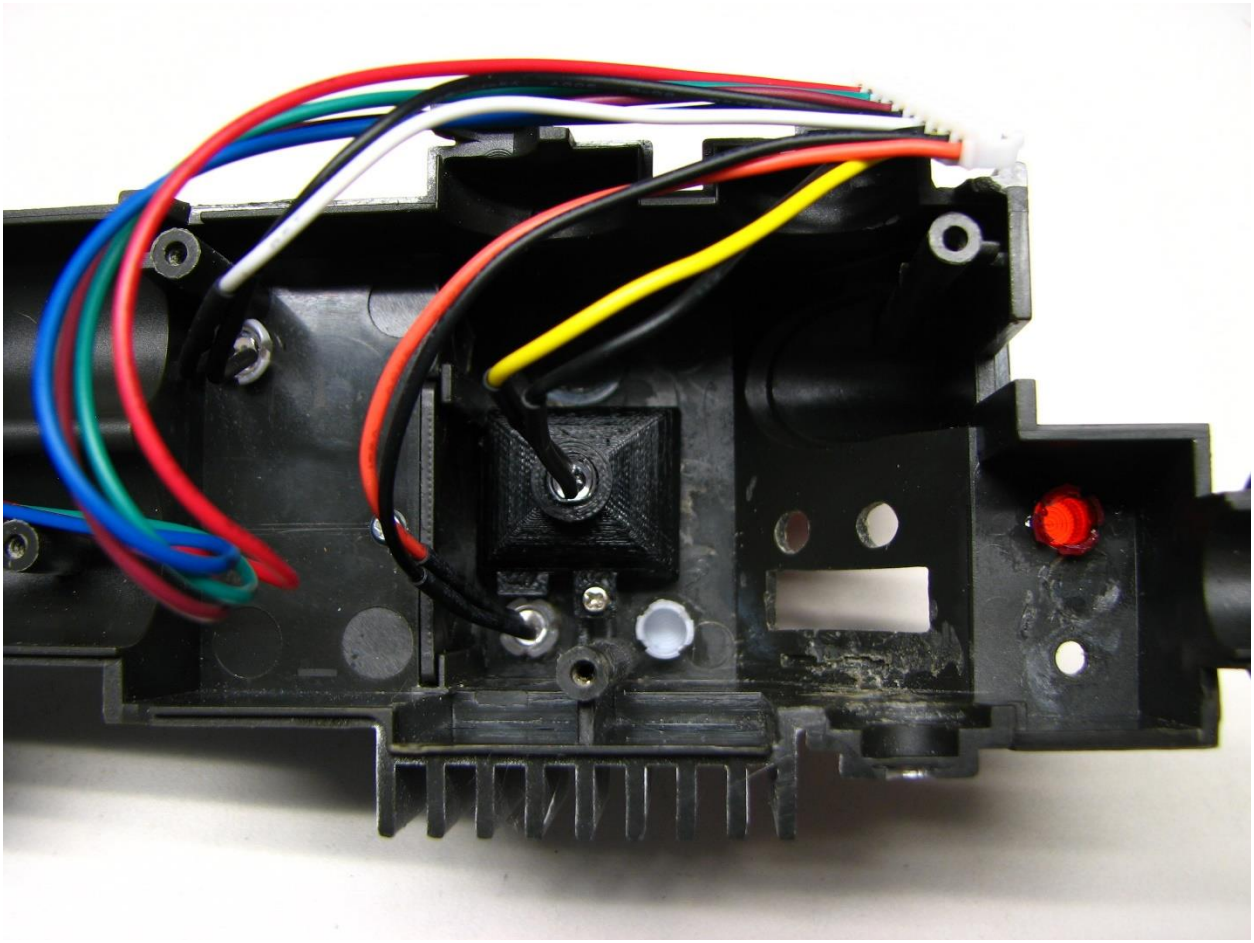


You may want to use masking tape to temporarily hold it in place while working on other parts.

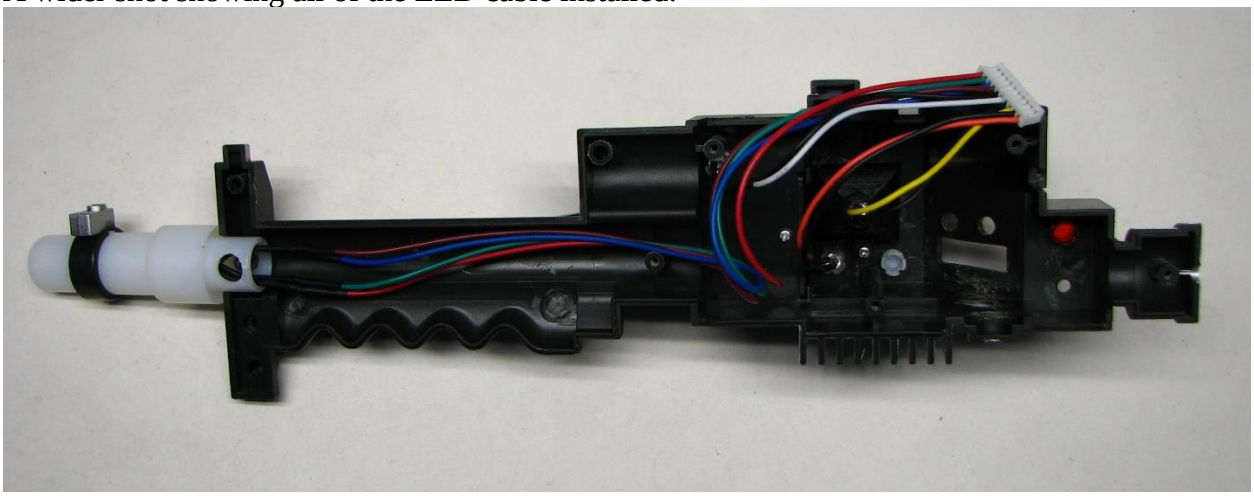
The three remaining LEDs will snap into the LED lenses. The diagram below shows where the LEDs are located by the color of the attached wires:



Here is the wand with the LEDs installed:



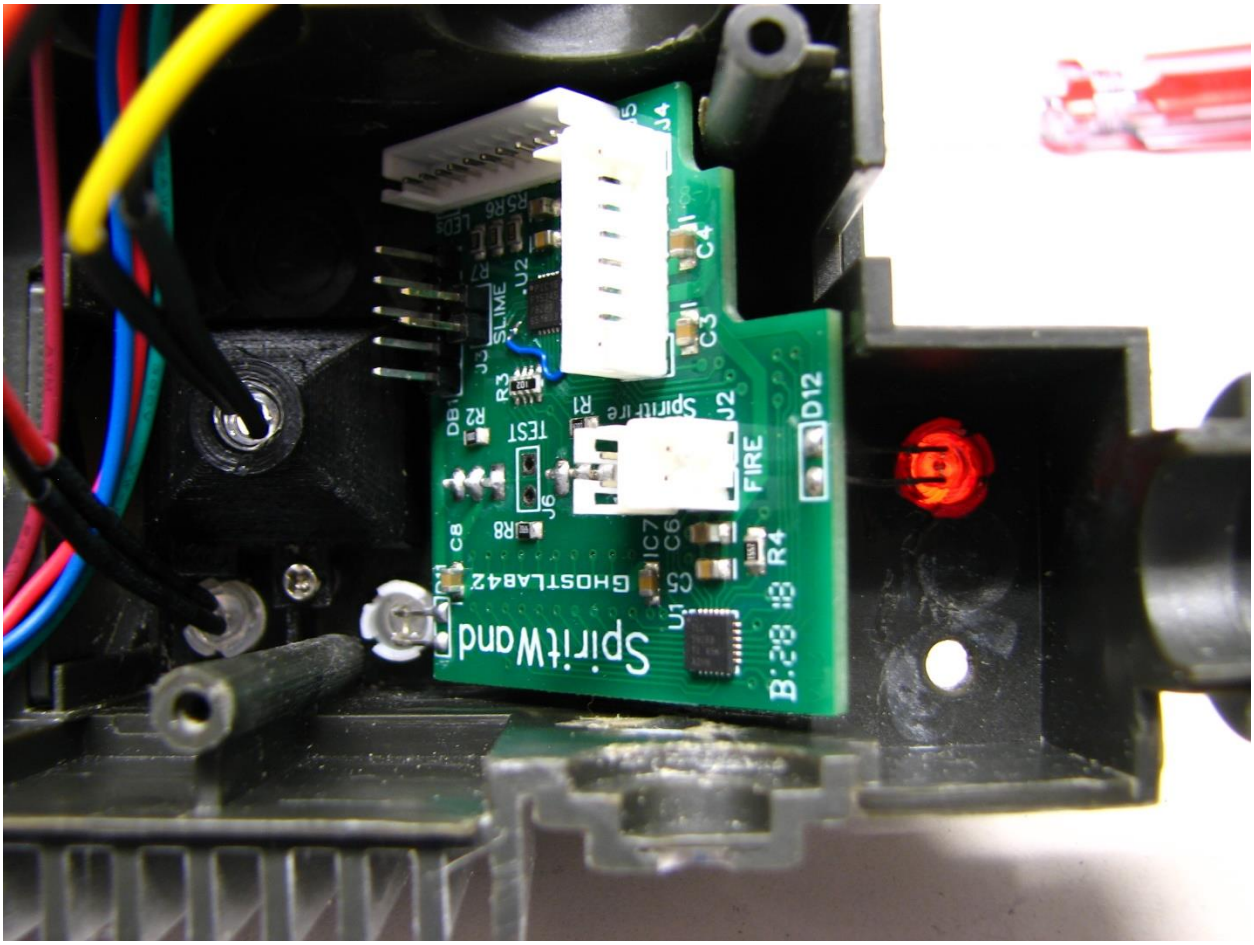
A wider shot showing all of the LED cable installed:



Installing the Circuit board (and Bezel assembly)

I first installed the circuit board and then glued in the bezel, but you could also glue the bezel in first if that works better for you.

Once the bezel and circuit board are in place, use two nuts from the LED lenses and Hardware bag (6) to securely attach the circuit board to the front face of the wand.
Also check to make sure the directly attached LEDs are positioned such that they are in the LED lenses before putting on the nuts since you may need to back the board out slightly to get the LEDs to go where they are needed.



If you want to use the lock washers you can, but I like the looks without them more than the benefit of having lock washers…





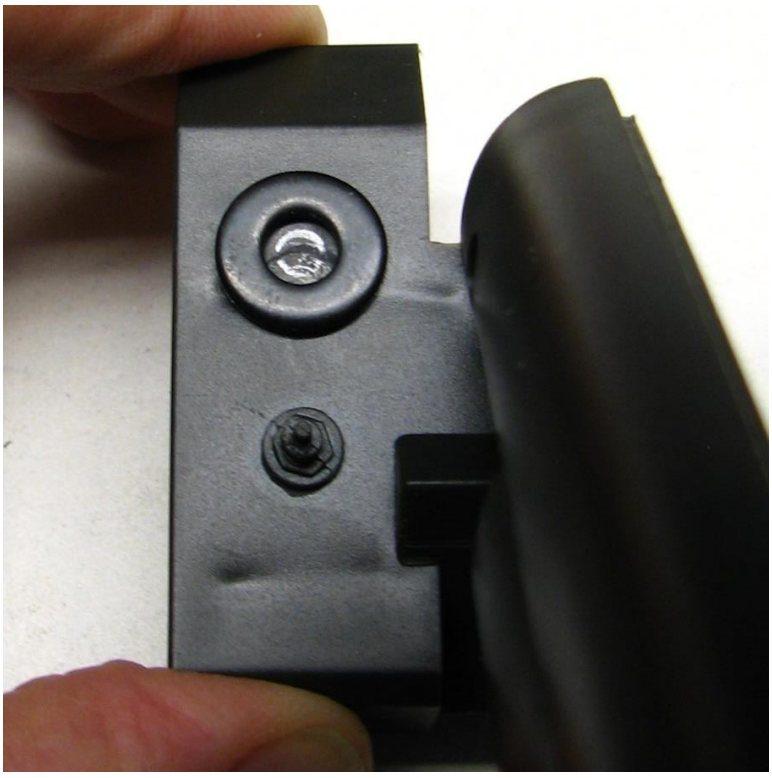
Installing the Trigger switch

First, we need to grind down the top molded button, so we have a flat surface to work on.





After that, use the black washer from the LED lenses and Hardware bag (6) to figure out where to center a hole as high as possible and still cover the grind marks. This is because we want to be above the area where there is internal bracing.



Drill the hole with a **3/16" drill bit**. This is nice, but the switch will not go in the small space, so we need to make the hole more of an oval. It must be smaller than the black washer or it will show, and we don't want that!

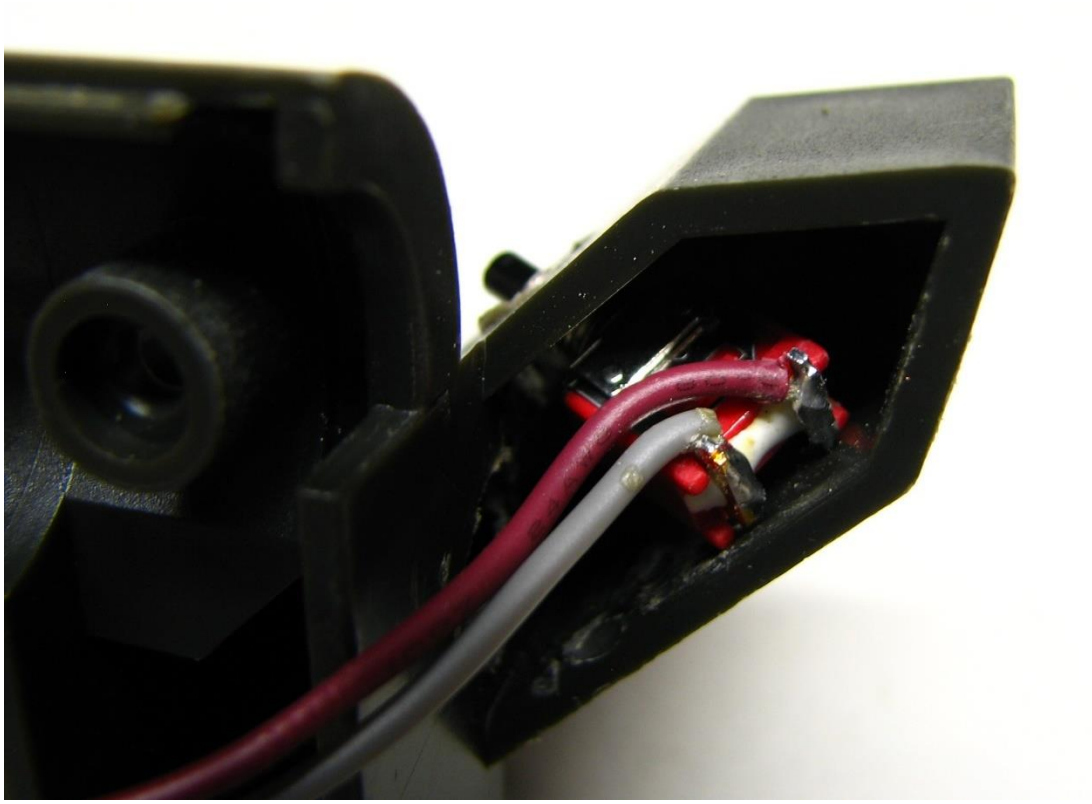
You could just drill a large hole in the backside to easily mount the switch, but I didn't want a new opening on the trigger box backside. If you want to do this, then you do not need to do the following steps that make an ugly hole we will cover with the black washer.

Here is the hole that easily allowed the switch to go in:

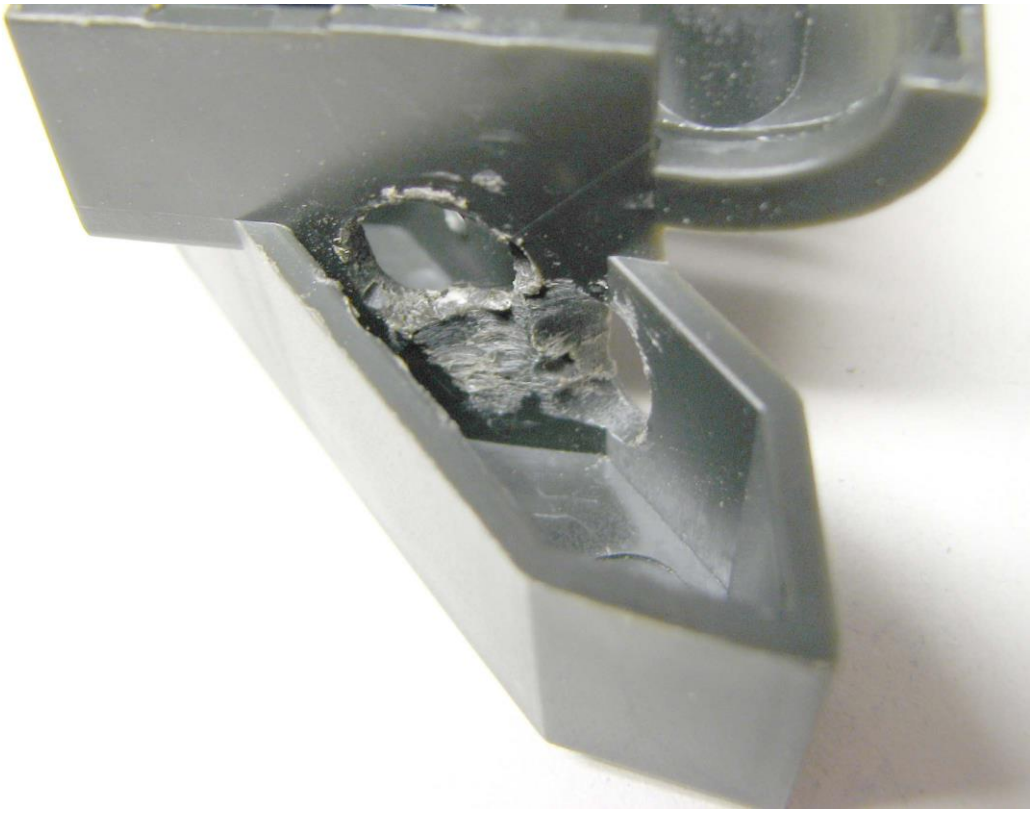


The hole on the right-hand side was not drilled straight, but at an angle to allow more material removed underneath the surface to the upper righ-thand side of this hole.

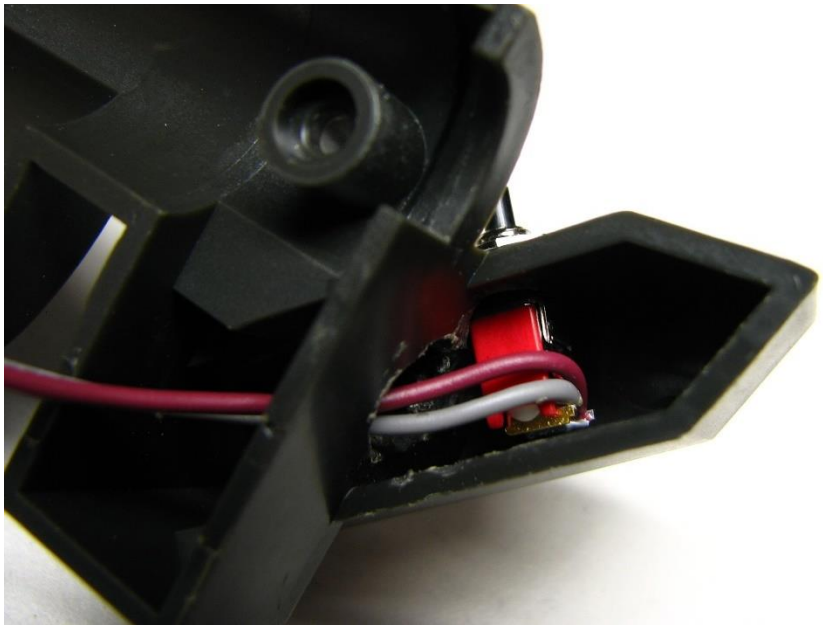
Now angling the switch (3) from the backside see if you can get the switch into the larger hole.



Once you can get the switch in (and out), we need to make a hole in the support so we can thread the wires through (image lightened so you can see the holes)



Now put the switch back in and then thread the wires through the new hole. Yes the hole I made was ugly, but it will be covered up!



You can not put the black washer and a nut from the LED lenses and Mechanical parts bag (6) and tighten down the nut to secure the pushbutton.



Shown is the small black button cap from the LED Lenses and Mechanical parts bag (6) that is to be pressed onto the push button switch after it is installed. If it was placed on the switch first, it would be even harder to squeeze it into the trigger box!

The installed fire button:



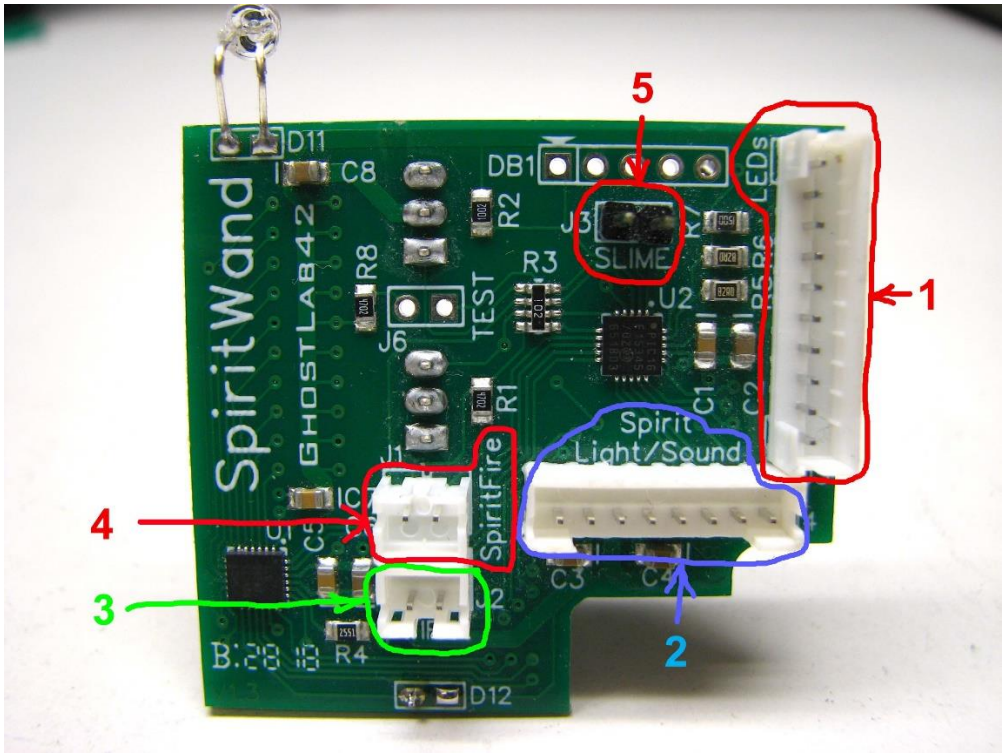
Plugging in cables

I though this was going to be easy, but apparently not! The other half of the handle may need to be removed from the loom. There was a HUGE glob of glue holding the original spirit wires in place about an 1nch and a half inside the cable. This had to be removed to get another cable through the loom. A flat screw driver worked for me, but had to be careful to not damage any wires.

Grab the main cable (2). Remove the pack motherboard unscrew the loom restraint inside the pack. This allows access to both sides of the loom. Fish tape would probably be ideal, but I didn't have any. Just fed a string through (weight on the end), then pulled the cable through after taping the connector flat and rotated 90 degrees to easily slide through the loom. Leave about 8" of the main cable coming out of the loom at the wand end.

Taping the wires down in the handle will make it easier to close, and also help ensure you do not pinch any wires where the two haves of the handle come together. Push the loom back on the base of the handle. So far this appears to hold well so no staple or glue is used. If there are problems with the loom coming off, I would try hot glue and would avoid the staple – just to easy to damage a wire!

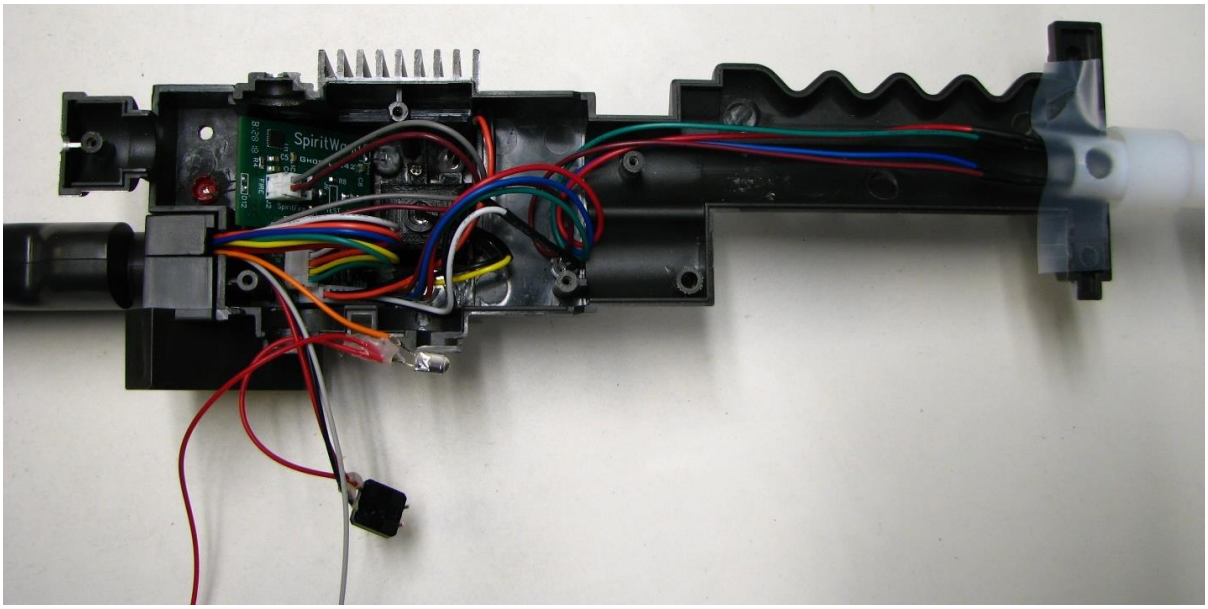
Printed Circuit board connections:

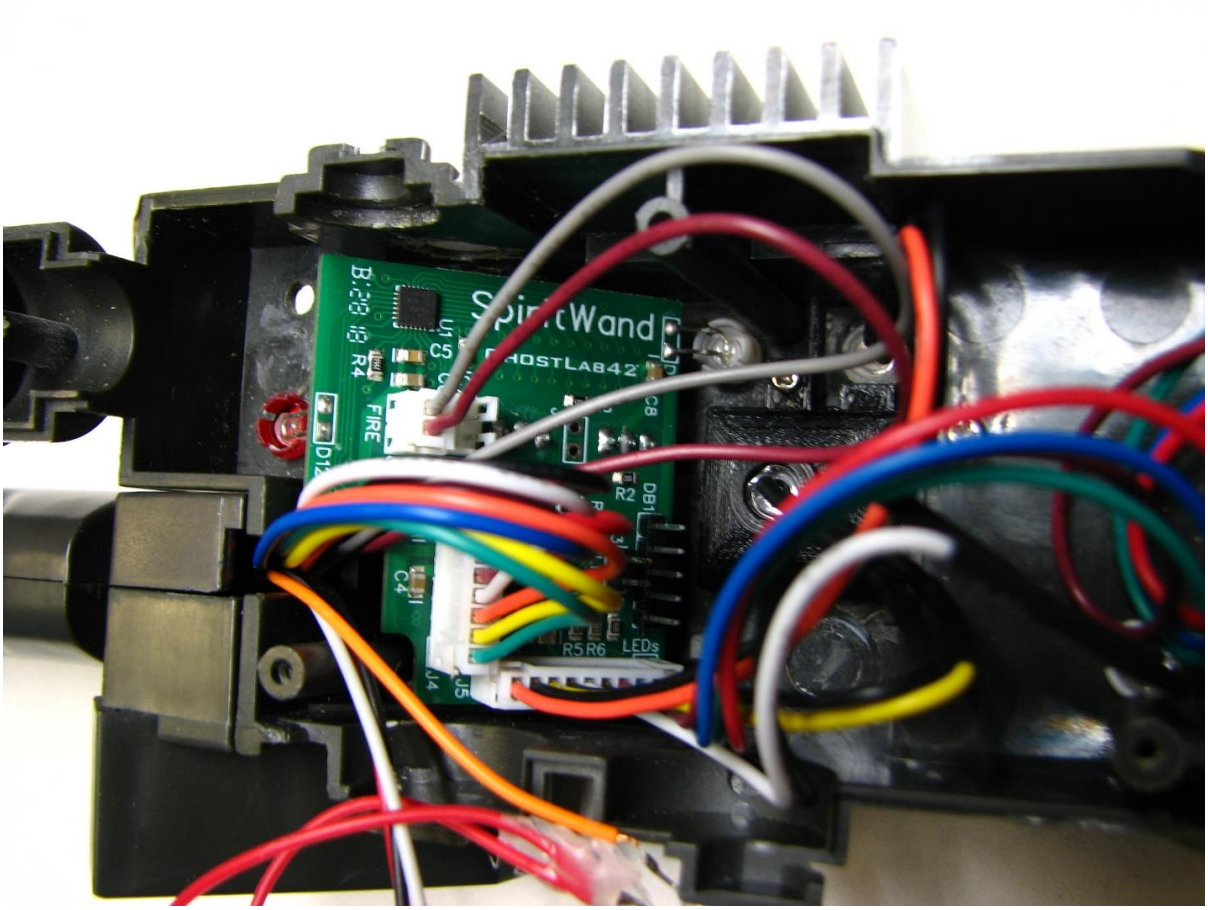


1) LED light cable (1) for RGB wandtip LED and other wand body lights
2) Spirit Light/Sound Cable for long connection to board inside the pack
3) Fire pushbutton connection
4) Optional connection to original SpiritFire ON/OFF button to control original spirit board sound generator
5) SLIME jumper – see operational guide, no wires to connect to this!

The bonus “coupler” part (#9) would need to be installed before or during the long cable and loom installation since the long cable that connects the wand electronics to the pack has to go through the coupler. The coupler is just cosmetic and can be used to cover the staple that was used to hold the loom in place.

Here is what the connections look like when plugged into the board.

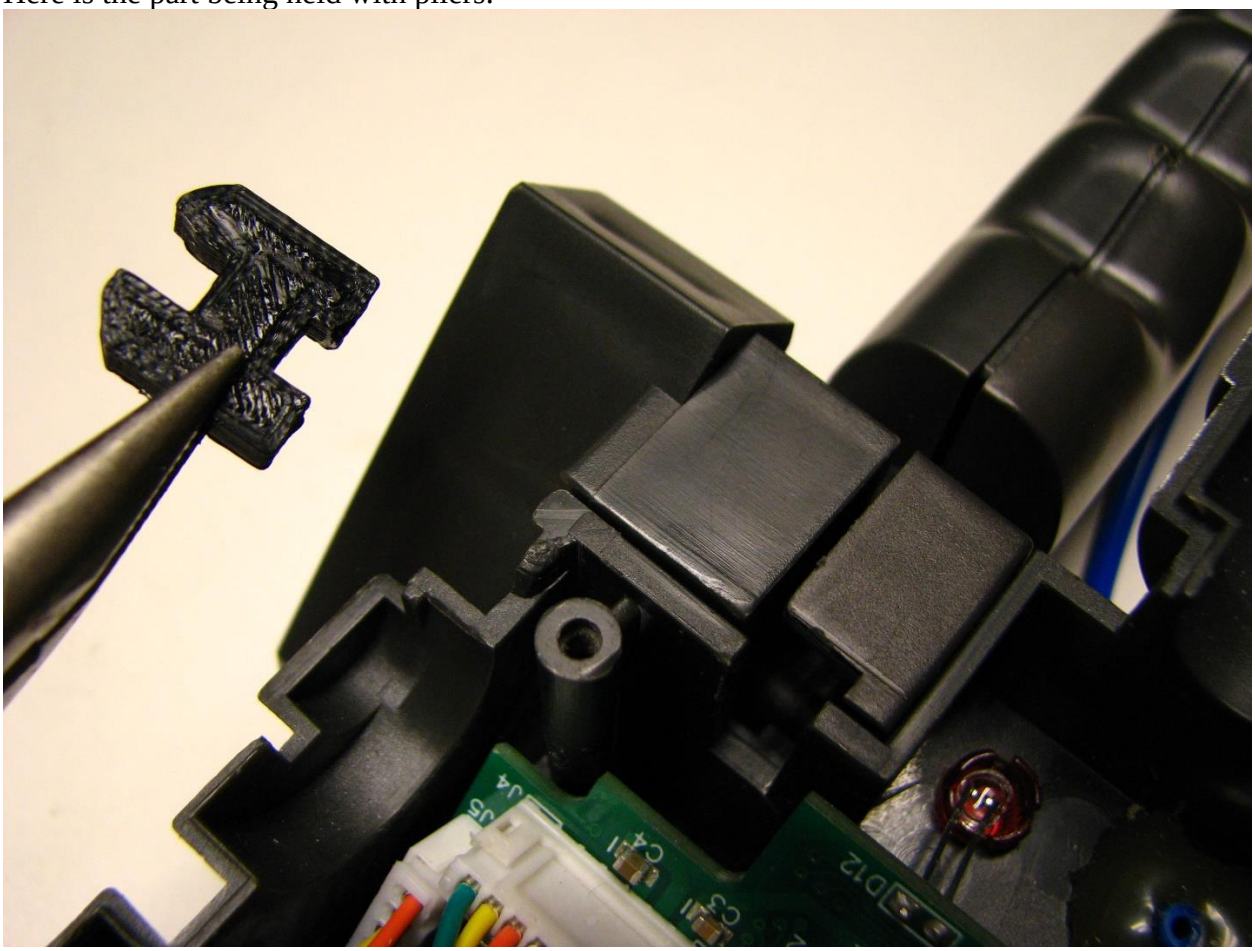




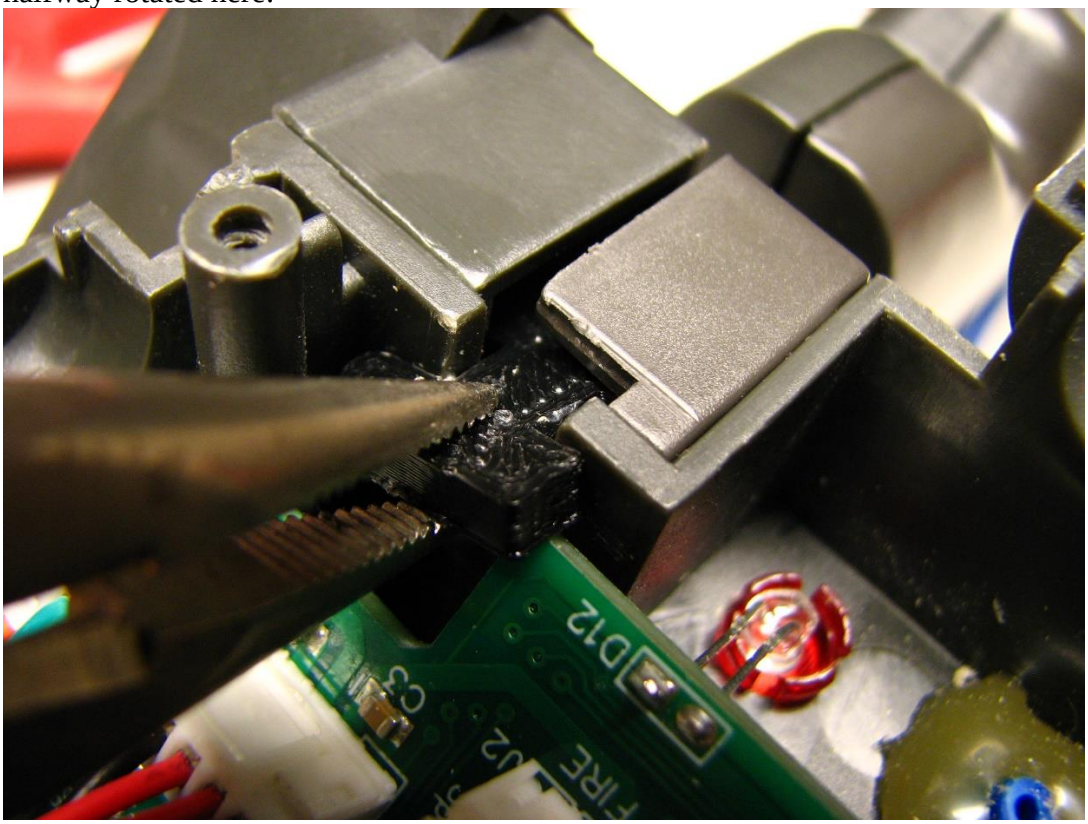
Wand / Handle Strengthening

A small flat “H” shaped part is included in the kit that can be used to make the wand handle/trigger/wand body connection stronger.

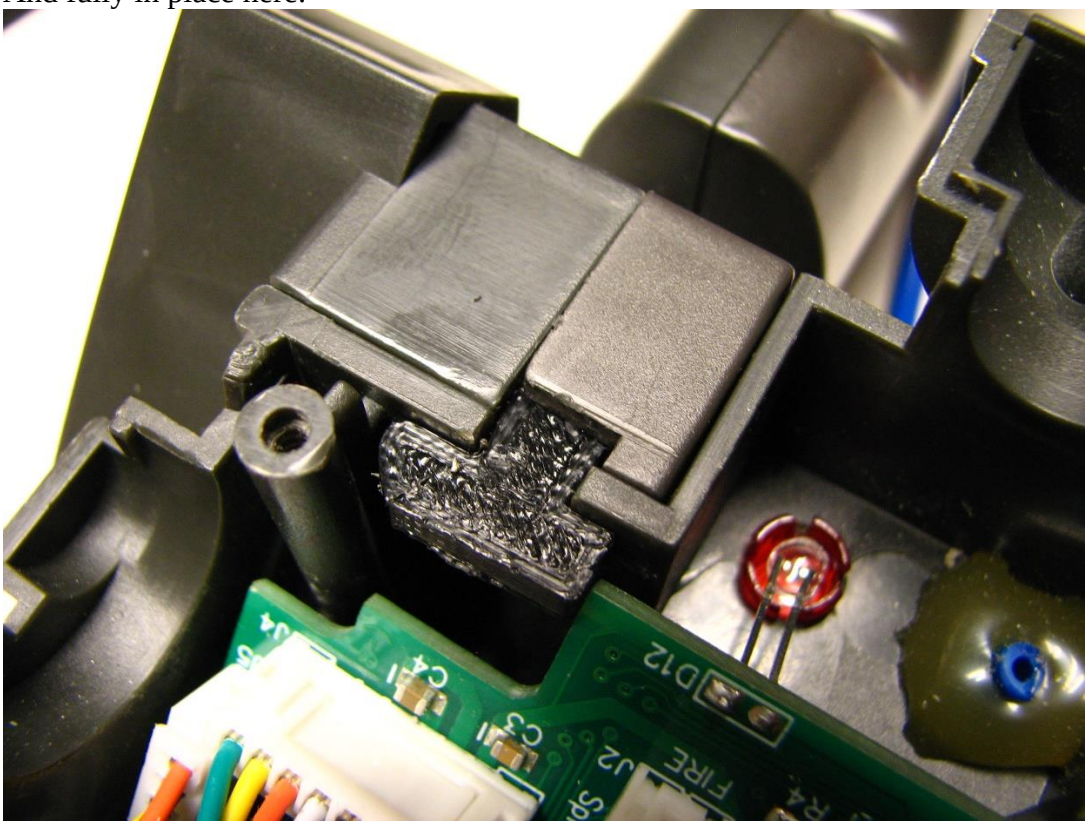
Here is the part being held with pliers:



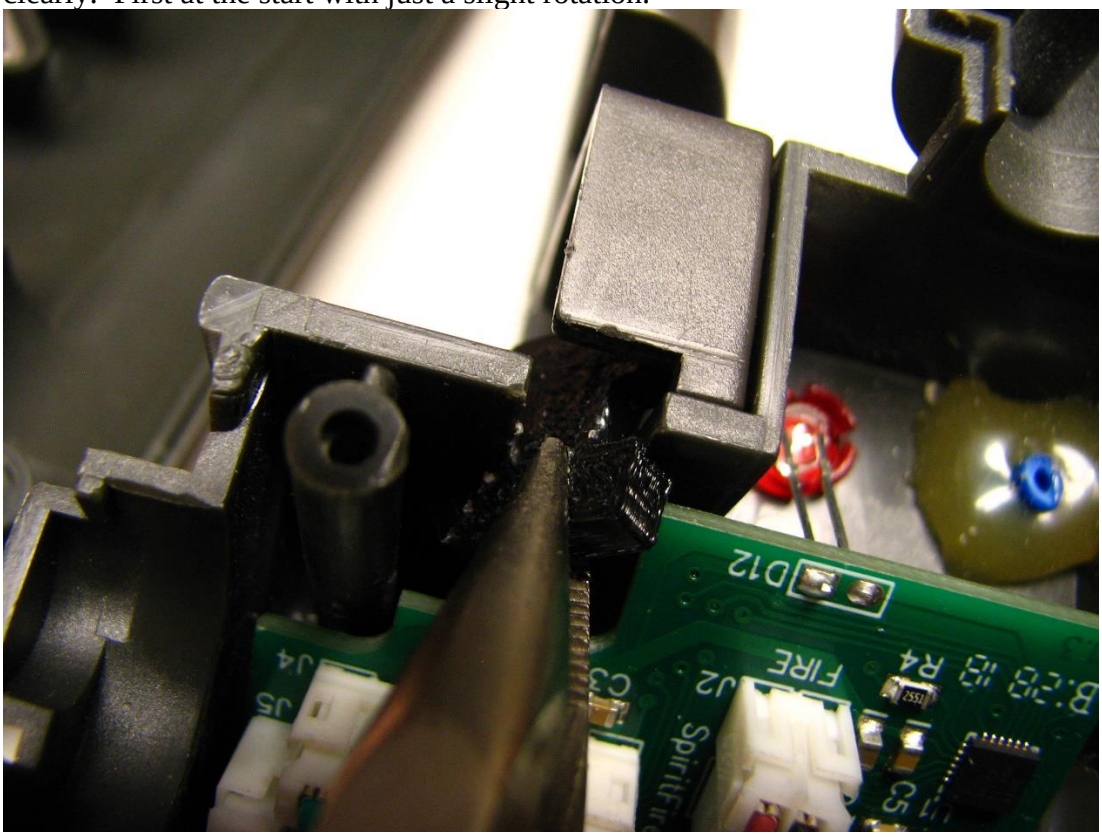
Then insert it into the opening (there will be wires in there also, just not in this picture…) in a more vertical orientation and then rotate the part to lock in all three parts together. Shown halfway rotated here:



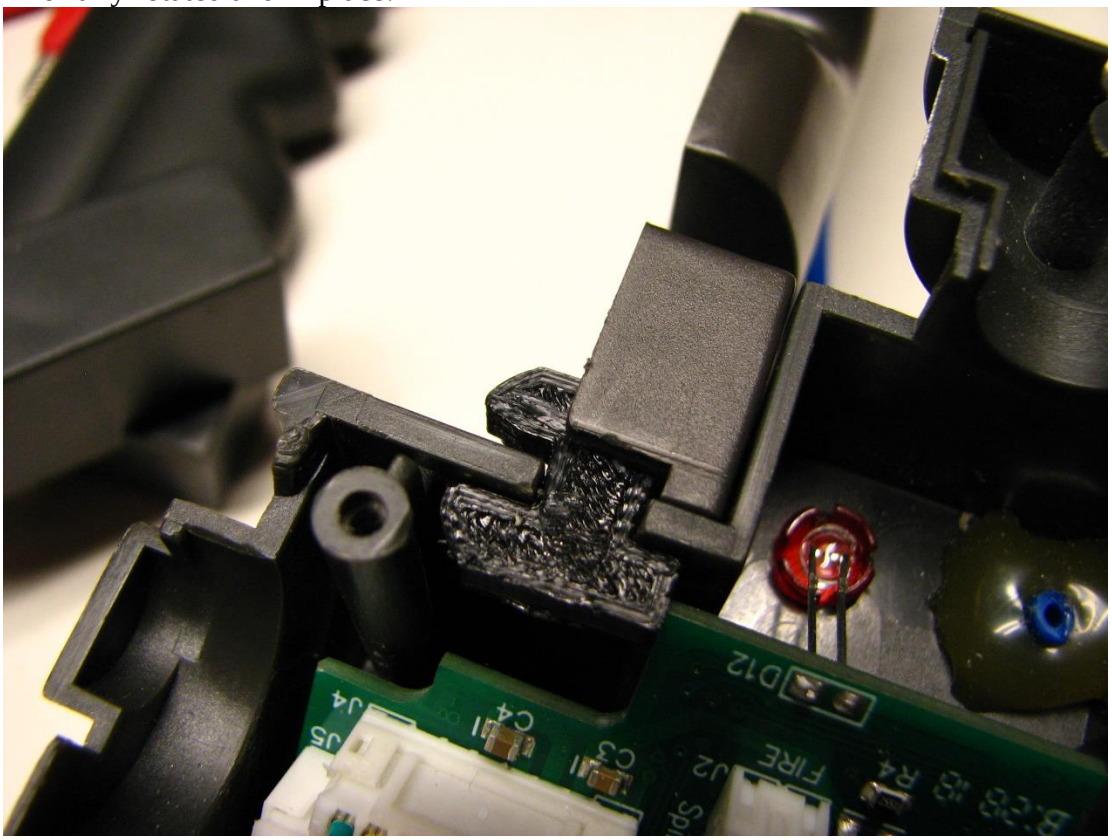
And fully in place here:



Here is what the part looks like without the trigger box in place so you can see the “H” part more clearly. First at the start with just a slight rotation:



And fully rotated and in place:

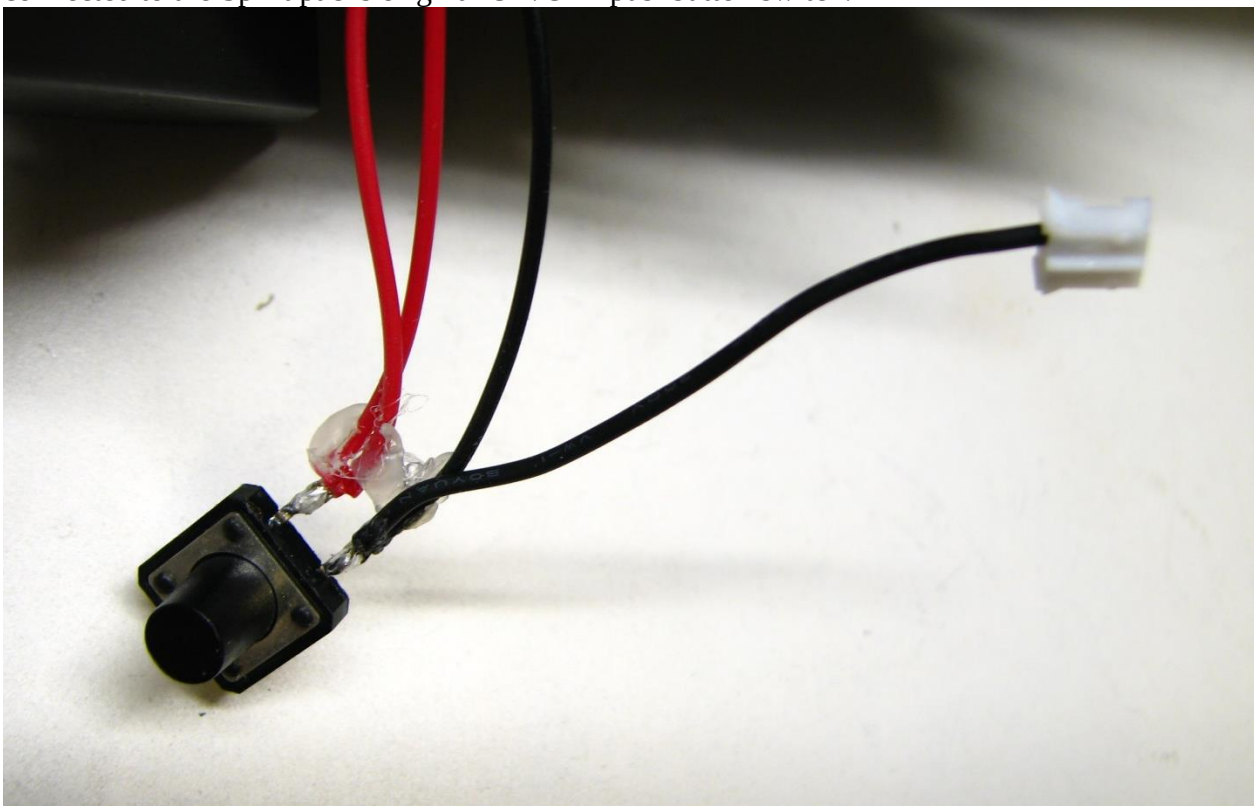


Optional Spirit Fire Control

If you do not plan on using the original Spirit Pack's sound and light board, then you can remove those and all of the associated original wires/

But if you do plan on keeping the original Spirit electronics and want to use them to produce the pack firing sound, then we need to add one connection to their switch and plug that into the printed circuit board connector (circuit board connector 4, "SpiritFire").

Get the single wire cable 4, and solder the end of the wire to the single BLACK wire is connected to the Spirit packs original ON/OFF pushbutton switch:



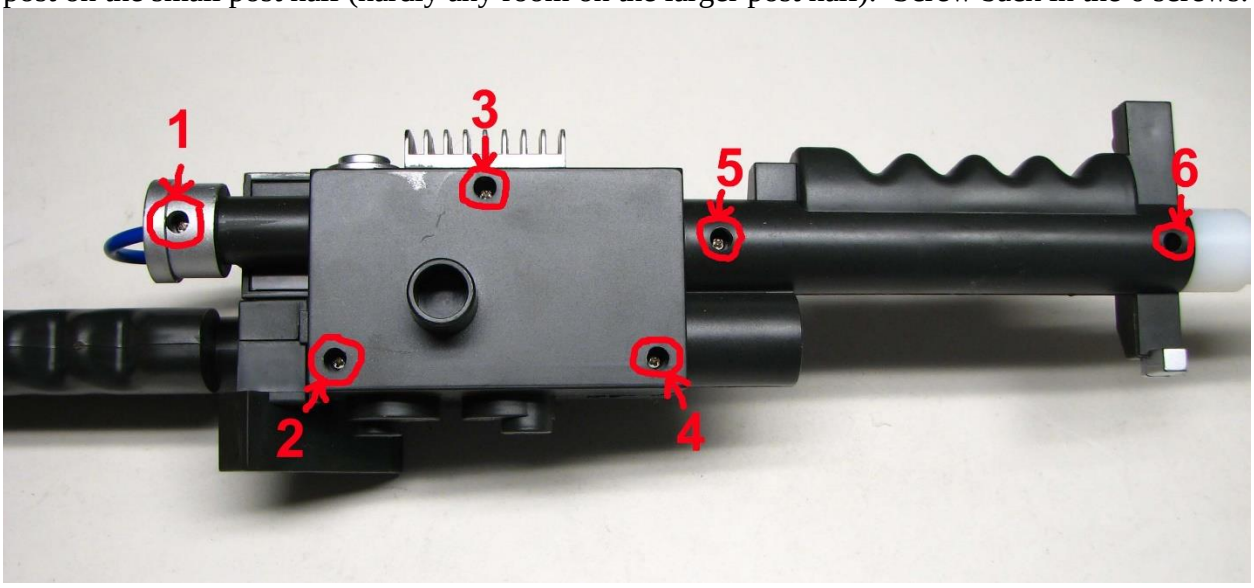
The 2-pin connecter (4) that was just added to the original ON/OFF switch would plug into the circuit board's "SpiritFire" two pin connector. This will allow the Spirit Wand Lights to decide when to make the original electronics play the wand fire sound.

You can cut off the button since it is no longer used.

Any spirit wires you leave dangling, and this includes the above pushbutton switch, should be wrapped with an insulator so it does not short to any of the new electronics. You can use electrical tape or heat shrink tubing to isolate those wires and parts.

Re-attach the bottom of the wand:

Take care not to squish or clamp any of the wires between the two outer wand body parts. Take special care with the Wandtip RGB LED since there are four wires that need to go around the post on the small post half (hardly any room on the larger post half). Screw back in the 6 screws:

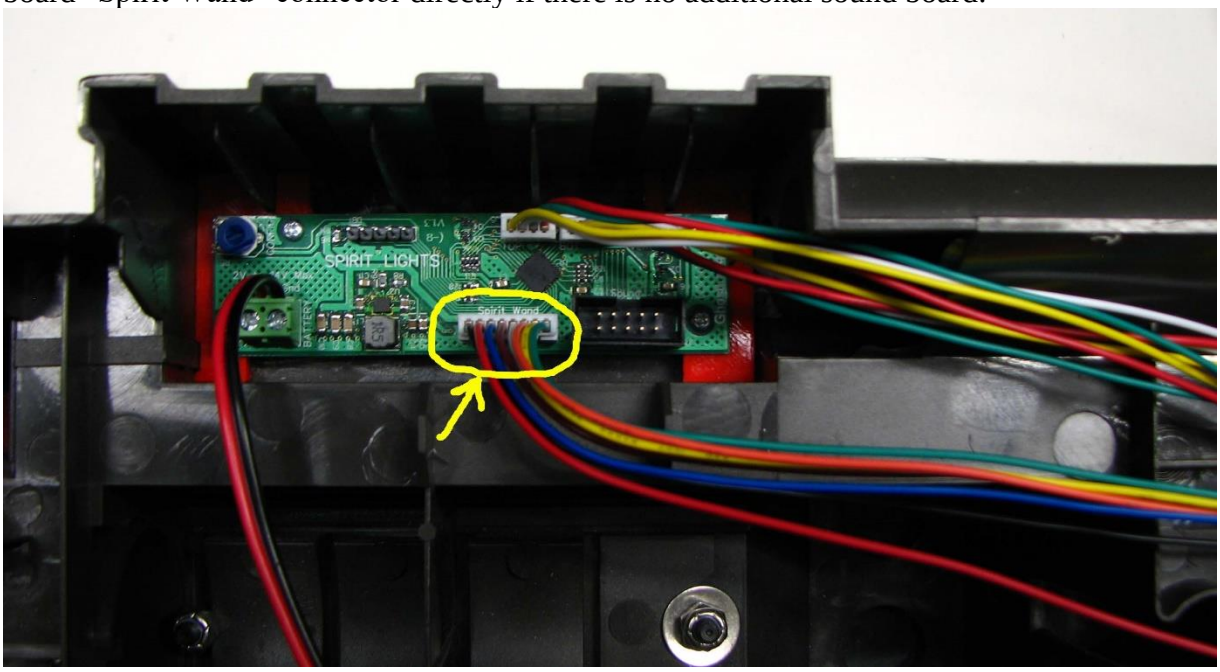




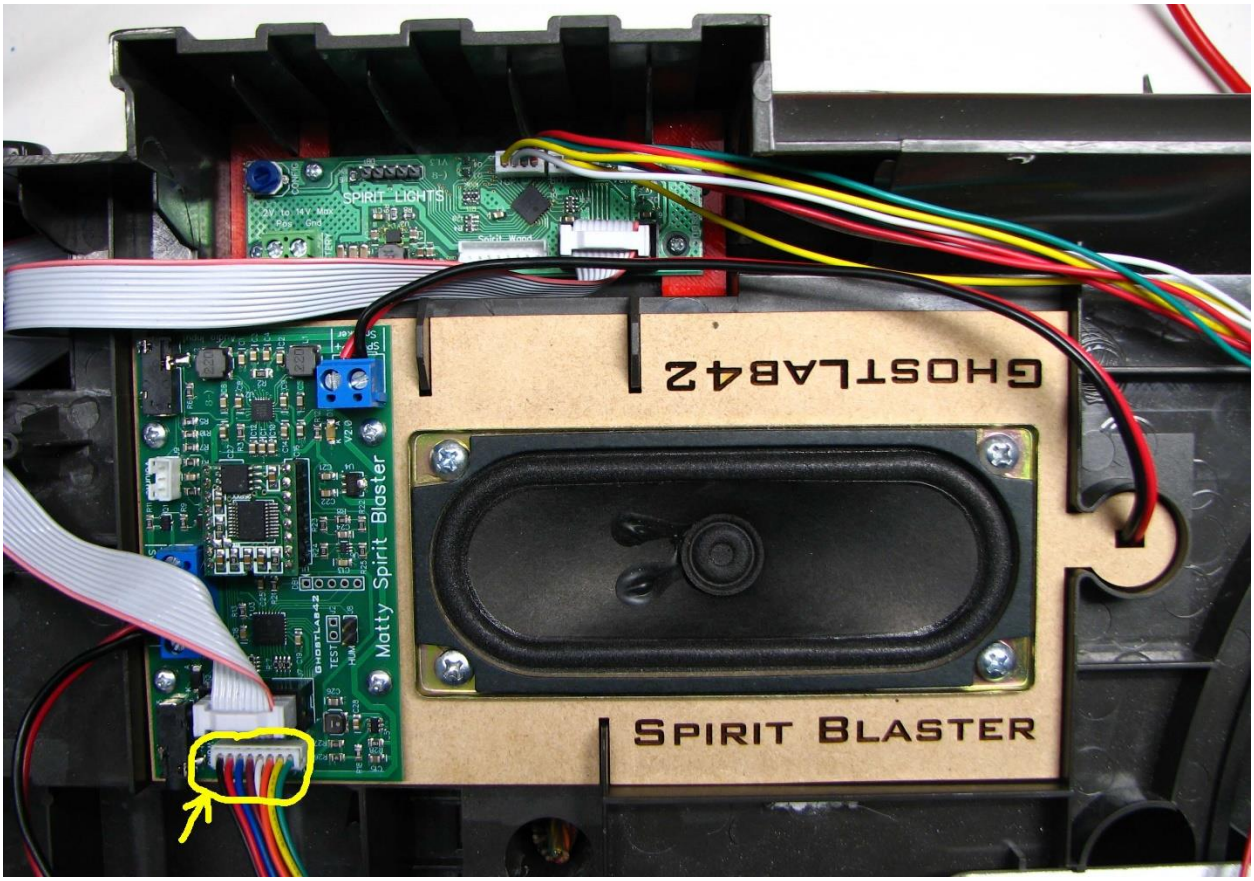
Now take a moment to admire your awesome new wand!

Connections inside the Spirit Pack

Inside the pack you will be connecting the 8-pin connector into either the Spirit Pack Lights board “Spirit Wand” connector directly if there is no additional sound board:



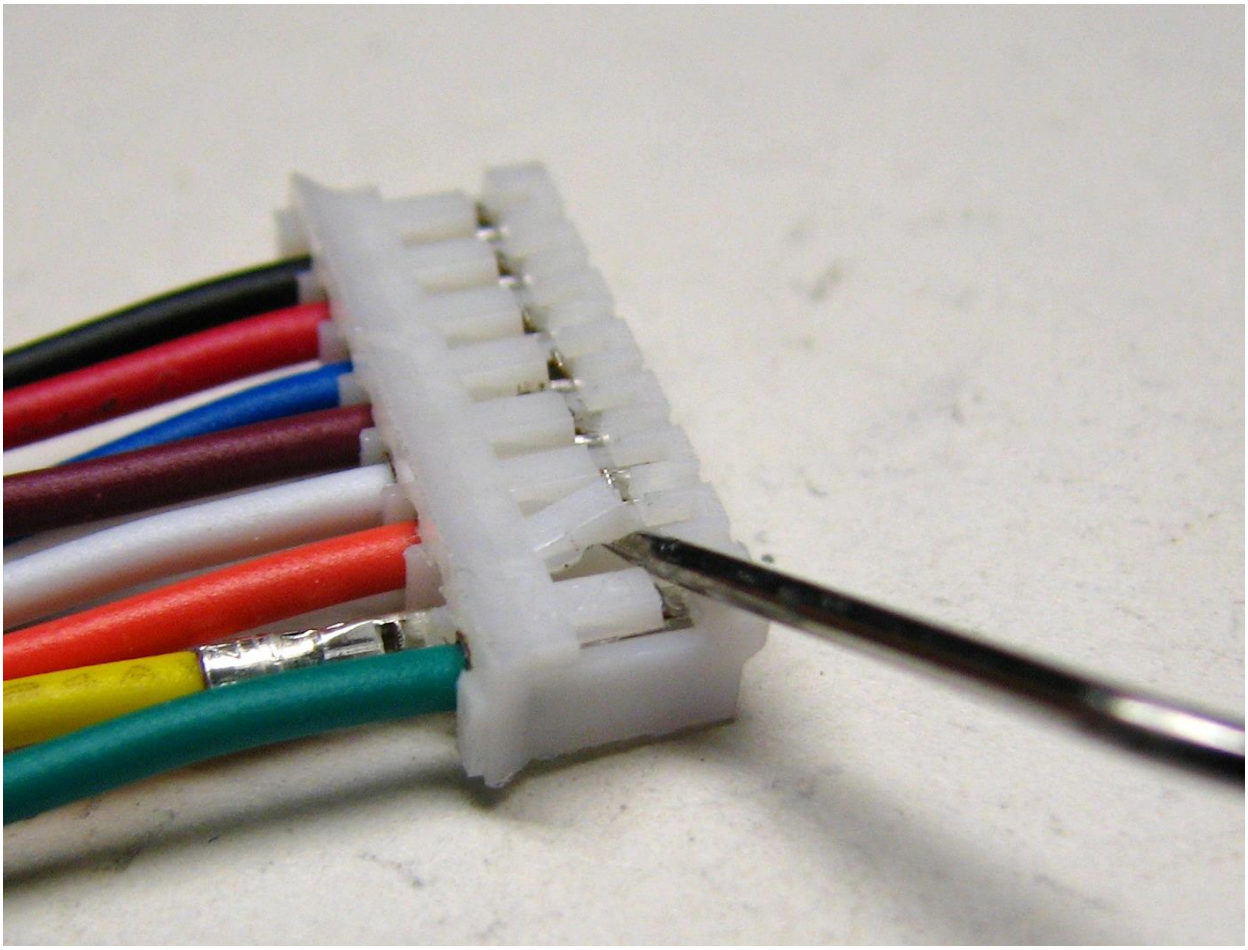
or the Spirit Blaster sound board’s “Spirit Wand Lights” connector if you added the Spirit Blaster sound board:



Or if you have the GBFans' Pack Blaster sound board, you need to modify the connector. The connector wires need to be separated to connect the control signals to the GBFans Pack Blaster sound board and get power from the Spirit Pack Lights board.

Use a small screw driver or dental pick to carefully lift up the small retaining tabs in the pack side connector and remove five of the wires to connect to the GBFans Pack Blaster sound board:

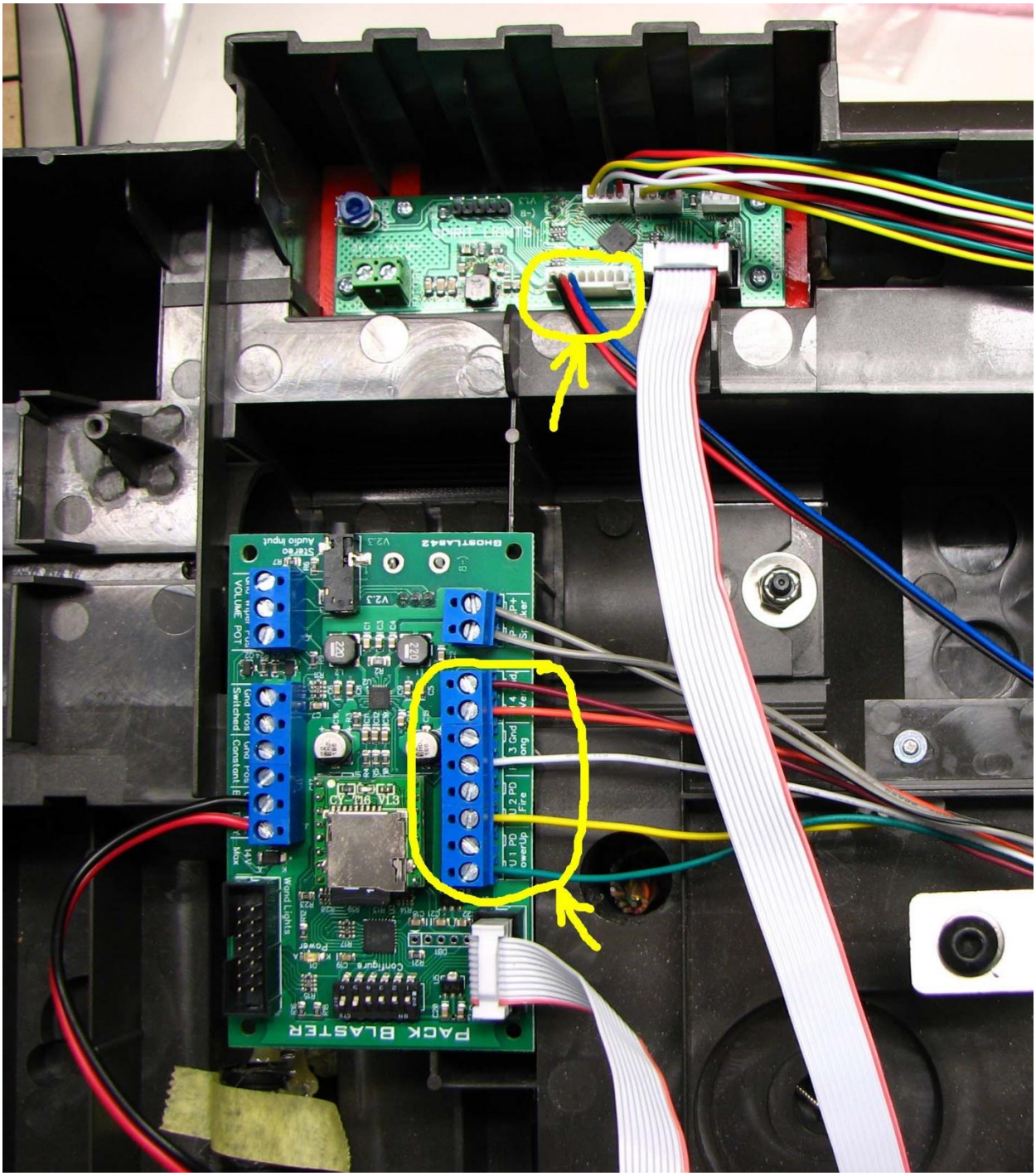
Cable Green: Pack Blaster PowerUp, PU
Cable Yellow: Pack Blaster Fire, PU
Cable Orange: Pack Blaster Vent, PU
Cable White: Pack Blaster Song, PU
Cable Brown: Pack Blaster Vent, Gnd



This will leave 3 wires (Black, Red and Blue) in the connector that will plug into the Spirit Pack Lights board.

Press the tabs back down so that they are flush and not sticking up or down into the connector housing.

Then insert the free end of these wires into the appropriate PackBlaster screw terminal and the connector with the remaining 3 wires still installed into the Spirit Pack Lights powercell board:



The wand lights and the sound board can get out-of-synch with one thinking it is time to vent and the other not agreeing. The Fire stream release for the Movie Pack sound is very short. Replacing that sound with a longer stream end sound will improve the alignment of the display sequences between the Spirit Pack Lights and The Spirit Wand Lights.

The recommended Configure DIP switch settings for the Pack Blaster are
Config 1 – ON
Config 2 – OFF
Config 3 – ON
Config 4 – OFF
Config 5 – ON (or OFF!)
Config 6 – ON or OFF (Idle Hum)

Spirit Light/Sound Connector and Cable Pinout

The following table describes the main connection cable and connector on the Spirit Wand Lights. “Spirit Light/Sound” 8 pin connector (2mm pitch) has pin 1 is next to the “J4” label.

Position #	Wire Color	Direction	Weak Pullup	Description
8	Black	Input	x	GND, Gnd or Ground
7	Red	Input	x	+5VDC
6	Blue	Input	x	+5VDC
5	Brown	Input	x	GND, Gnd or Ground
4	White	Output	Yes	Song / Slime (depends on jumper)
3	Orange	Output	Yes	Vent (Gnd = Vent)
2	Yellow	Output	Yes	Fire (Gnd = Fire)
1	Green	Output	Yes	Power UP/DN (Gnd = power down)

Warnings:
Do not exceed +5.25VDC or the board can be damaged.
Do not provide less than 4V or the board may not function properly.