Smaller UVC System
By BCPLemanski, AlbanyNYPPE.
Posted on 1/27/21

DISCLAIMER: This UVC system is a homemade device that is being utilized to help mitigate the risk of COVID19 in office spaces. I built these because comparable systems took too long to be received (wait time of most UVC manufacturing plants at the time of this writing is greater than 10 weeks). Additionally, some businesses cannot afford those UVC systems from those other companies. As such, an affordable and quickly buildable UVC system was needed. You should note that COVID19 has not been explicitly shown to be killed by UVC. This is because research has not been conducted on this yet. However, surrogates of COVID19, such as the original SARS virus, have been shown to be inactivated by UVC energy.

The UVC lamps installed in this unit are comparable to a unit that passes the same CFMs through it. UVC energy is DANGEROUS to your health, skin, eyes etc and should be treated with respect. Do NOT install these units below a height of 7 feet. Also, ensure that the openings of the unit are away from any individuals, pets, plants, etc. If you want to be doubly sure that there is no UVC exposure to you or anyone else, invest your money and get a UVC meter.

I do not make any claims about the safety of this device with regards to upper air treatment nor do I make any claims of safety (although I am a safety freak, I encourage you to validate my work to ensure that it works to your satisfaction.

The last thing you should know is that UVC damages plastics. It is estimated that plastics lose about 10% of their life expectancy with UVC exposure. So, if you have any plastics in the way of the UVC device, you have been warned.

On a final note, this build assembly is being published after 1 month of observation on the performance of our UVC systems. While this should not be used to imply reliability, I did not want to just make something and then throw it online immediately.

Component cost: Approx 150-160 USD as of 1/27/2021 (excludes tools/fasteners)
Air volumes treated: 265-280 CFM on 100% with louvered baffle in place; 380-410 CFM without baffle in place. Note: Using a louvered baffle plate helps to prevent UVC from escaping the tube.

Continue to the next page →

** Denotes optional component

- 8 inch x 5 feet duct (13 USD): https://tinyurl.com/y6ofgyt9
- 8 inch hose clamps, pack of 8 (14 USD): https://tinyurl.com/y5sktyju
- 8 inch stainless steel louvered vent (15 USD): https://tinyurl.com/y3mtwqtn
- 8 inch duct fan (30 USD): https://tinyurl.com/y2lbrzh4
- 4 foot, dual T8 light kit (31 USD): https://tinyurl.com/yxmw2jdc
- AU-G36T8 36 watt T8 UVC bulb (17 USD per bulb as of 1/27/21. You will want to get a minimum of 2 per unit, but I would recommend you get extras) https://tinyurl.com/y235loa3

- **½ inch Plain Sight Glass (11 USD): https://tinyurl.com/y4ggt32u

You will also need the following tools / fasteners if you do not already have something comparable:

** Denotes optional component

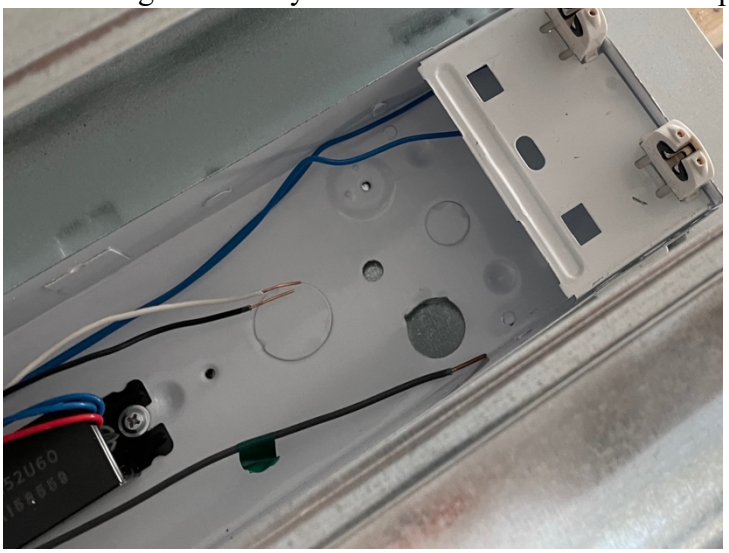
- 7 Inch Wire Strippers (12 USD): https://thd.co/2YivoOL
- Stepped Bit Set (30 USD): https://tinyurl.com/y6cuxgfl
- #8 x ½ inch self tapping screws (100 pieces for 6 USD): https://tinyurl.com/yxnosac3
- 10 foot 18 gauge 3 prong computer cable (7 USD): https://tinyurl.com/y2anm8r8
- 1/2 in. 2 Screw AC/MC/MCI-A/NM Connectors, 100-Pack (75 USD – you don't need 100, just a few): https://tinyurl.com/y5myptzx

- **Duct crimpers (31 USD): https://tinyurl.com/y5kxsfjd
- **Straight cut tin snips (15 USD) : https://tinyurl.com/yyklymq9
- **HVAC Anemometer (57 USD): https://tinyurl.com/y324ar8e
- **GeneralTools UV512C UVC Meter, 220-275nm (470 USD): https://tinyurl.com/yxtl35fr
- **Cordless power drill and associated drill bits (60 USD): https://tinyurl.com/yyzy7j9d

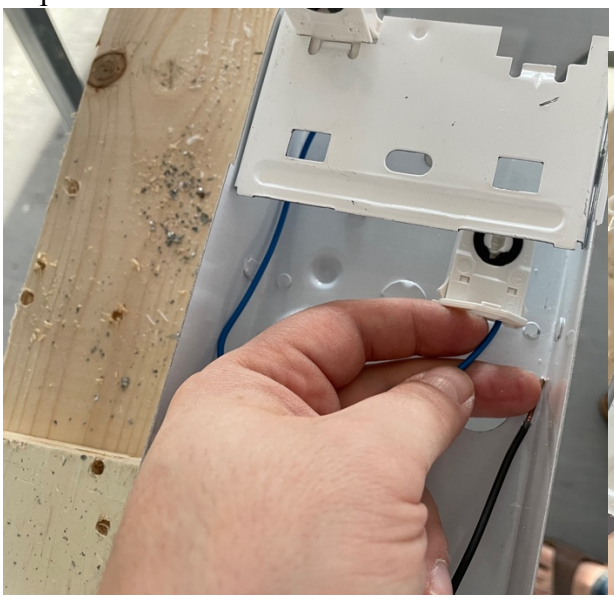
Continue to the next page →

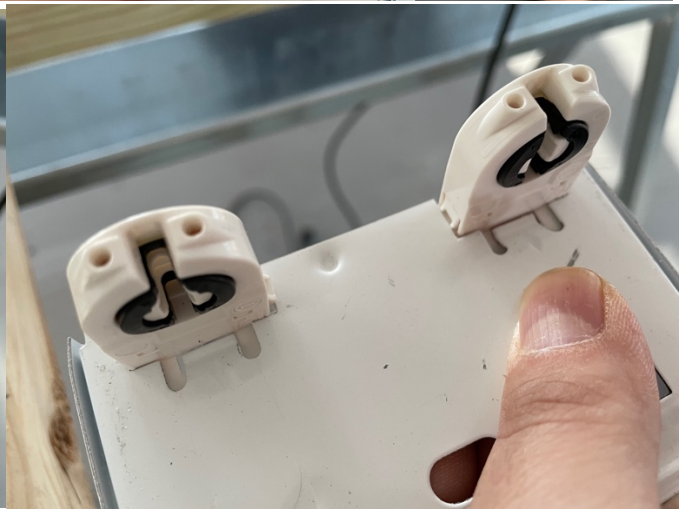
Instructions for constructions:

1) Layout air duct and light assembly on a workspace / table.
2) Turn the light assembly over and knock out one of the appropriately sized knockouts as shown

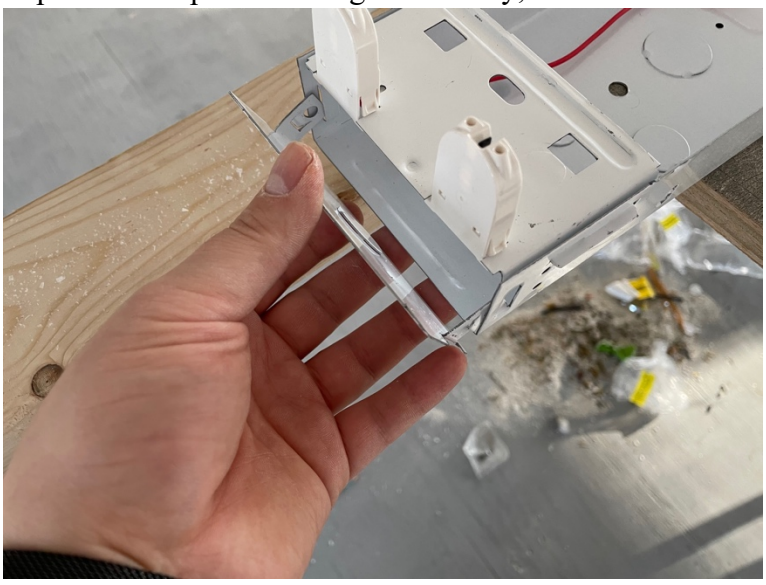


3) Assemble any remaining tombstones on the light assembly by pushing the tombstones into their respective slots. Make sure the tombstones click into position.

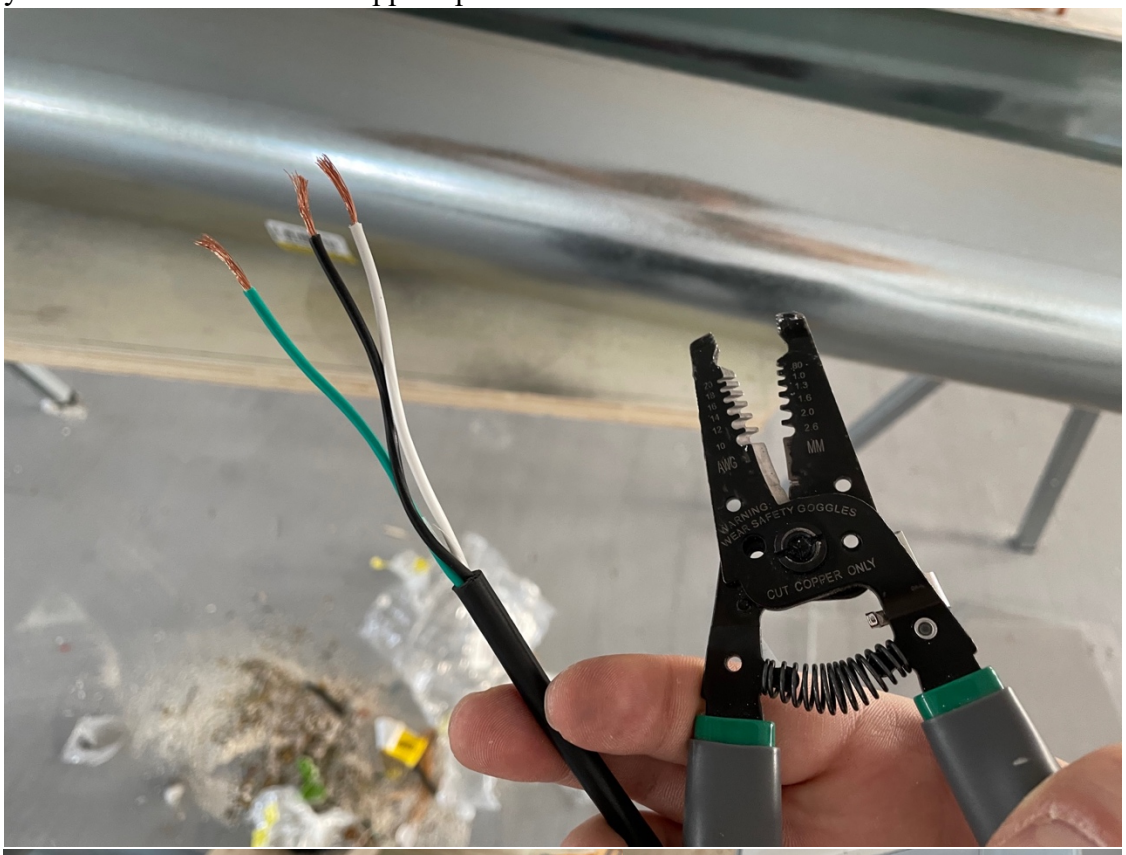


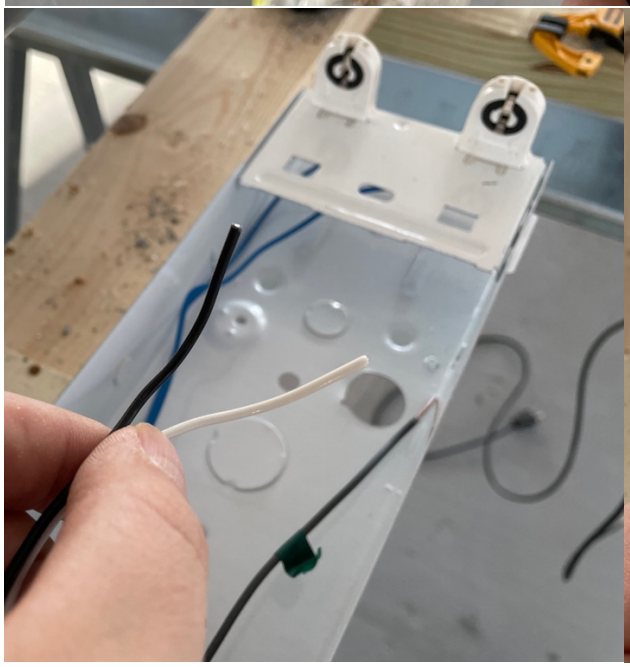



4) Tap the end caps into the light assembly, one on either side

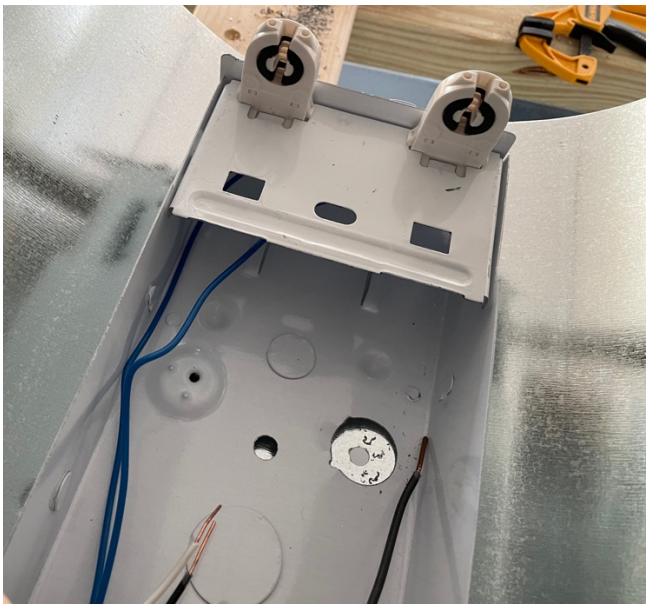


5) Cut the end off of one of the computer cords. Strip the ends using the wire strippers. Use the inner most part of the strippers to lightly score the wire so that the outer jacket can be removed. Then, strip the individual wires using the appropriately sized “teeth” of the stripper. Give yourself about an inch of stripped space on each line.





6) Insert the light assembly into the duct. Leave about 2.5-3 inches between the end of the duct and the light assembly. Use the side that has a clean edge. We will use the crimped side to attached the louvered vent assembly. Ensure that the light assembly is straight on in the duct. Then, using a 5/8ths inch drill bit, drill a pilot hole in the center of the knockout to mark the position of where the stepped bit will be used to enlarge the hole.



7) Using the largest stepped bit in the set, drill out the hole to ½ inch or a step up to fit the wire connector. Drill from both sides to ensure clean edges.

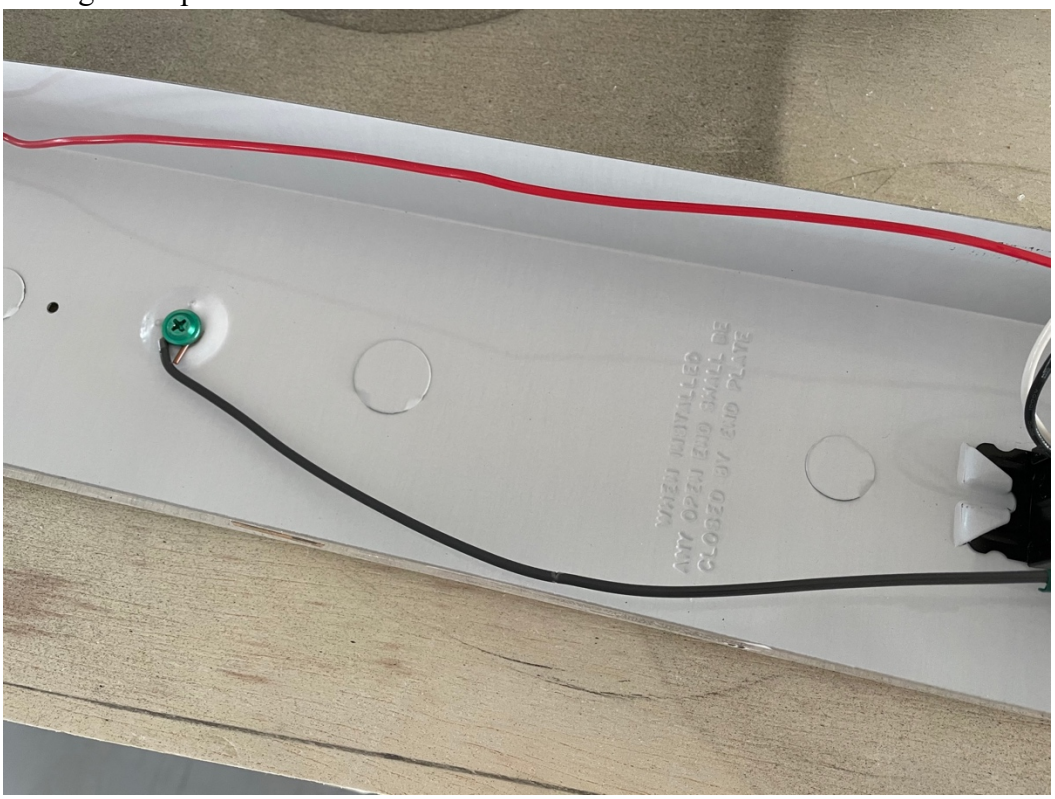
8) Insert the wire connector into the hole and tighten the nut using the wire stripper's jaws

9) Locate one of the attachment holes in the light fixture and, using a 5/32 inch drill bit or something of appropriate size, drill a hole in the attachment point. Pass a flathead nut through the hole and tighten the nut.

10) Now that the fixture is anchored in on one end, use the same drill bit and do the same thing on the other end of the fixture to lock the fixture into position.

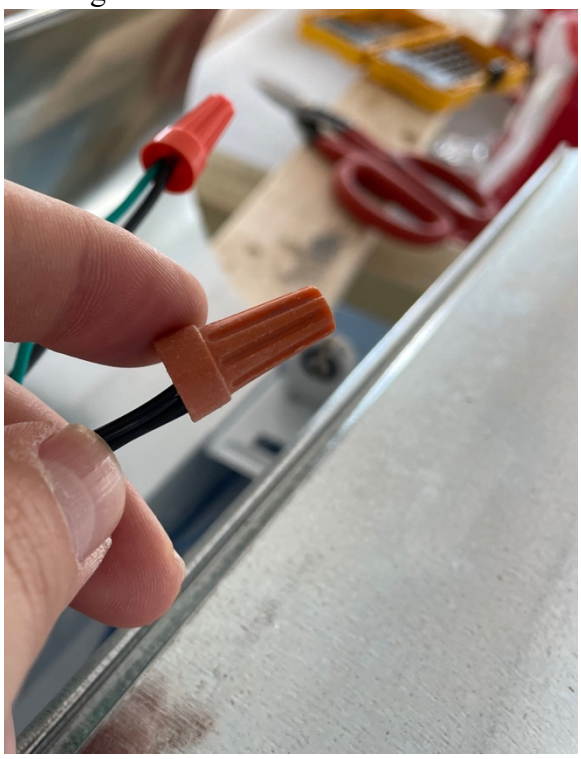
11) Pass the stripped wires through the wire connector. Tighten accordingly but do not crush the wires. It only needs to be tight enough to not slip through the connector.

12) Some of the light kits may not come with a ground wire. If they don't do not worry. Strip a wire back and use it as the ground wire. Make sure you keep track of which wire you make the ground wire. You will need to attach this ground wire to the green wire that you stripped earlier. A good idea is to use some green tape.



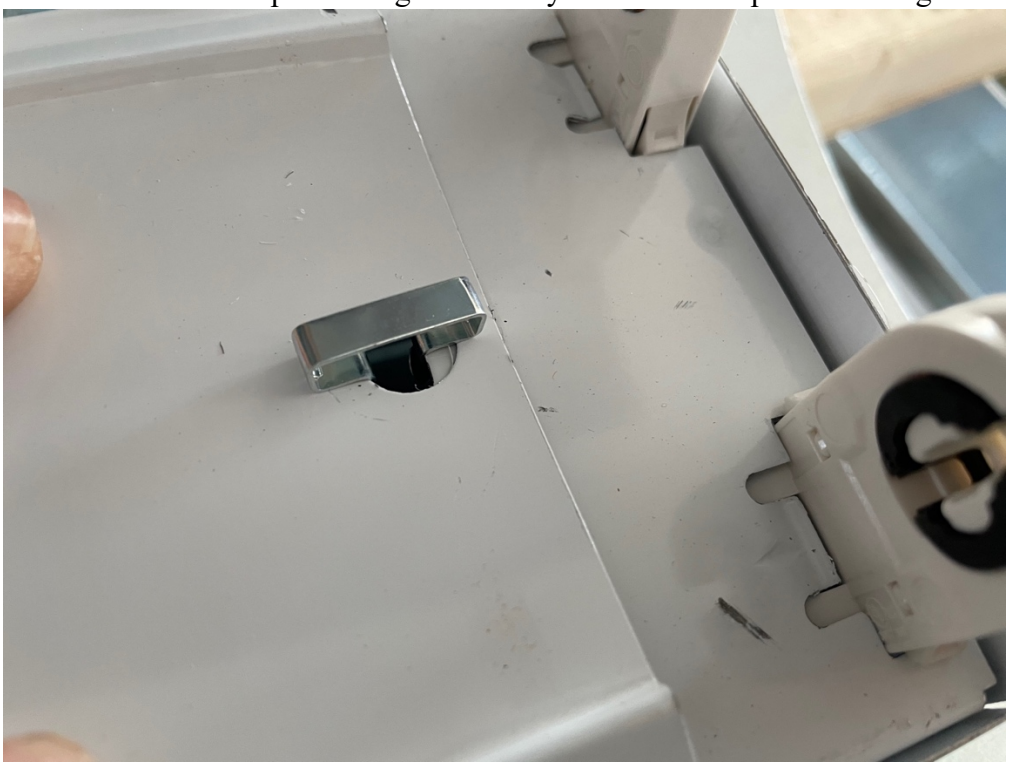
13) Now it's time to join the lighting wires to the stripped wire (the plug lead). Twist the two wires together and then place a wire nut on top. Twist the wire nut until it stops spinning. Do not overtighten. The wire

nut should not be spinning with “reasonable” hand strength.



By the time you are done the wiring should look something like this:

14) Place the cover on top of the light assembly and affix into position using the lock tab



15) Now that the light assembly is in the tube and wired, we can install the bulbs.

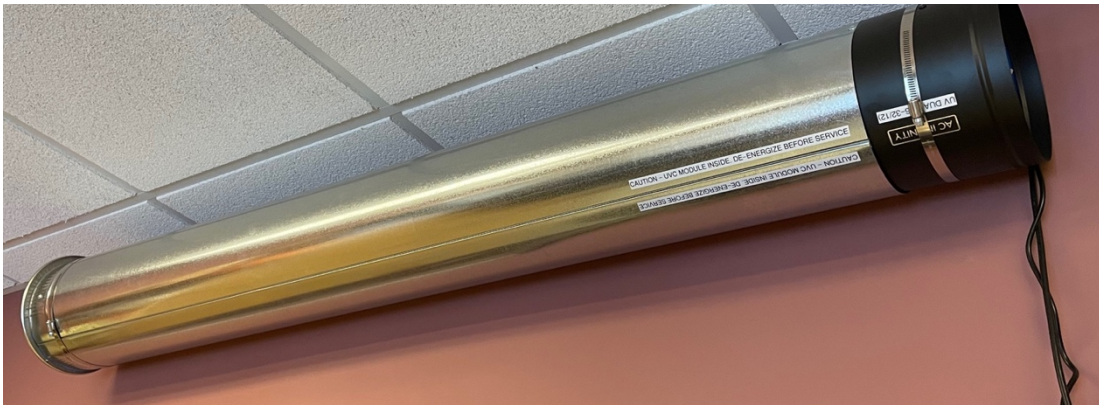
16) Take the fan assembly and insert it into the duct with the smooth end. Orient the fan such that it is blowing DOWN the tube. Take care not to install it backwards. You will want to orient the power connector of the fan to the bottom. The power connector of the fan should be in line with the power lead for the light troffer. Then use a self tapping screw, drill into the sides of the duct. Place a screw on either side. You only need two screws to hold the fan assembly to the duct.

17) Now it is time to make the wall brackets. The way this works is the hose clamps get attached to the walls and then the duct and fan assembly get placed into the hose clamps. To get the hose clamps to attach to the walls, we will need to drill a hole into them and then use a screw to attach the hose clamp to the wall. I would use a wall anchor if you cannot get the duct and fan assembly into a wall stud. However, you can also use nylon wall anchors, which will be more than sufficient to attach the fan and duct assembly to the wall – the entire unit weighs less than 12 pounds. Open the hose clamps and attach them to your work surface with some clamps. Do NOT try and do this by holding the hose clamps with your hand – you will most likely hurt yourself. Take a 5/32nd bit and strike the approximate center of the hose clamp as shown. This will put a dent into the metal that will allow you to drill that spot effectively.




18) The next part you'll want to do depends on how you wish to build the UV system. If you want to install the louvered vent, WAIT until you have installed the unit on the wall. When installing the louvered vent put it into the side of the duct that has the crimped end. Then fix the louvered vent to the duct using two self tapping screws.
19) We are now ready to hang the unit. IMPORTANT: ONLY HANG THE UNIT ABOVE HEIGHTS OF 7 FEET. KEEP IT AS CLOSE AS YOU CAN TO YOUR CEILING TO PREVENT UVC EXPOSURE. Template out where the two hose clamps will go up on the wall. Then, close one end of the hose clamp and leave the other side open. Insert the duct into the closed hose clamp so that you have part of the unit supported by the hose clamp attached to the wall. You can then walk the unit up on a ladder using your

shoulder. Then, using your other hand, lift the vent into the second open hose clamp. Tighten the hose clamp closed.



OPTIONAL: You can also install the unit vertically if the unit will be in a corner where no one will be potentially exposed to the UVC.

END OF INSTRUCTION