<u>Manufacturing Manual</u>

Goal: Open Source
To include:
- Bill of Materials
- Estimated Costs
- Step by Step instructions (visuals + text)
- Attach CAD file
- DFM plan (design considerations for other manufacturing methods–i.e. injection molding)

Product Overview

The Dust Remover is an open source 3D printed solution to removing dust from 3D printing filament just before it is extruded. The body of it is to be entirely 3D printed and friction fit, eliminating complex in-house manufacturing processes like gluing or stopping the print halfway to fit magnets in. It also requires two extra non-printed parts that are easy to find or buy: a microfiber cloth and a zip tie. The product currently interfaces with Re:3D's FDU (filament detection unit), but it can be used apart from it as well.

Bill of Materials

The following bill of materials is for one device, not including the FDU components.

Material	Cost per unit	Amount used per unit
3D printer filament, PLA or PETG	$0.45	22.4g of filament
Microfiber Cloth	About $0.20	4x3" piece of cloth
Zip tie, plastic (one time use) *or velcro (reusable)*	<$0.05 *or $0.18*	1 zip tie

Assembly Instructions
1. Print the cloth housing unit (HU) on a 3D printer with at least a 10% infill and 1.5 mm wall thickness. Place the unit on the printer bed with the flat face of the cylinder on the bed and the lipped end on top. Add supports around the lip and print with a brim to reduce the chance of the print warping off the bed. See Figure 1 for how this should look on a Prusa Slicer software.
2. Print the filament detection unit (FDU) on a 3D printer with at least 10% infill and 1.5 mm wall thickness. Place the unit on the printer bed as shown in Figure 2. Print with no supports.
3. Cut the microfiber cloth into a 4x3" rectangle with scissors. The rectangle does not need to be very precise.
4. The cut microfiber cloth may have bits of fluff that fall off the edges after it's cut. Pull at the edges of the cut microfiber cloth by hand until no more small bits of the cloth come off.
5. Take the end of the filament that you are about to put in the extruder and wrap the cloth around it, with the 4" longer end lined up with the filament.

6. Push the wrapped filament into the lipped end of the housing unit as far as you can. Push the filament through until it sticks out the small hole on the opposite end of the housing unit.
7. Peel the cloth that is sticking out above the lip down and around the sides of the lip.
8. Take the zip tie (plastic or velcro) and wrap it around the cloth that you peeled down, just below the housing unit's lip.
9. Tighten the zip tie to secure the cloth to the housing unit.
10. If using an FDU, fit the smaller non-lipped end of the housing unit into the mouth of the FDU. It is friction fit, so a small amount of force will be needed to push it in.
11. Push/pull the filament through until it sticks out of the FDU. Now, you can feed the filament through the extruder. The device should now be actively cleaning the filament as the printer extrudes.
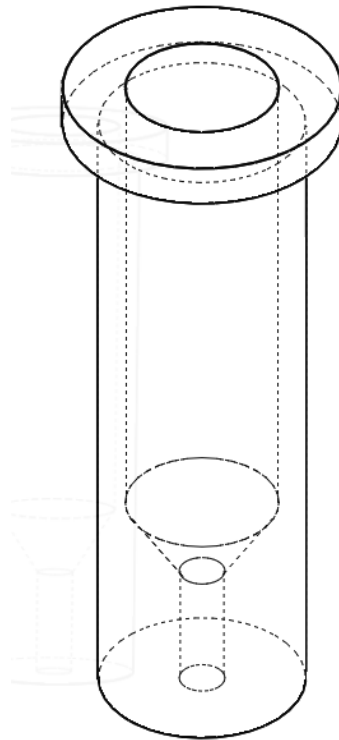
CAD Images

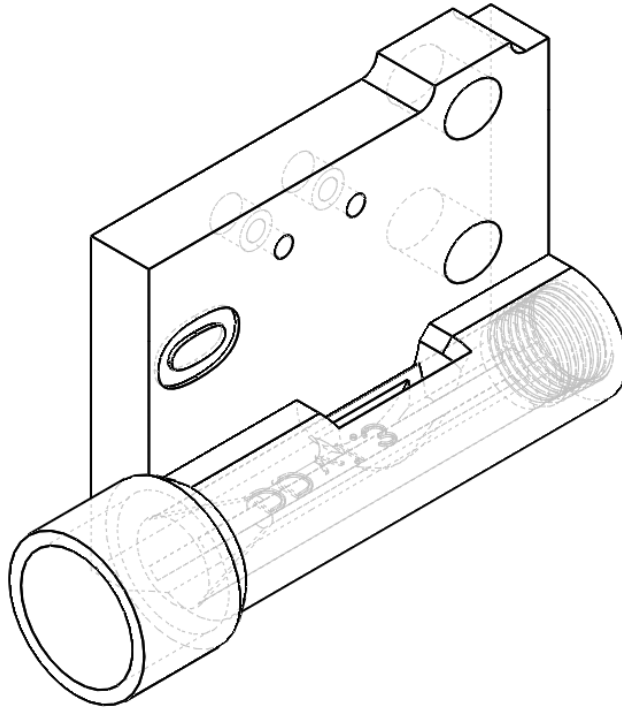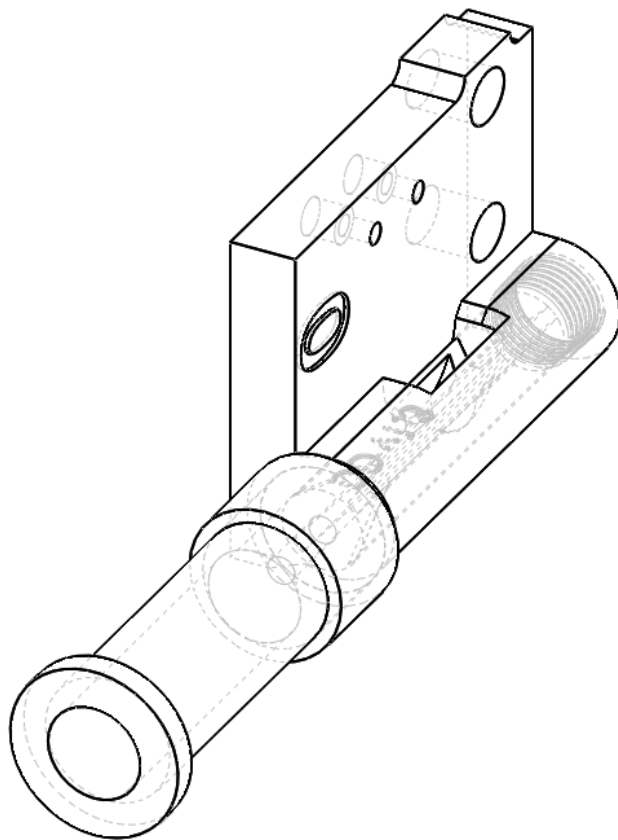*Figure 1: 3D printed housing unit structure with internal structure illustrated*

Figure 2: 3D printed FDU

Figure 3: Housing unit and FDU assembly