

DIY Version for HoloKit -- Acrylic version 1.0

Introduction

Unlike the cardboard version, the Acrylic version is something more like a DIY stuffs, a maker culture-based, more rough, but still works, and might be more robust version.

Do you still remember your first feeling when you tried the Cardboard VR? It is amazing, and immersive, right? But do you still remember where is your first cardboard? I believe in most case, it broken quickly, and you might discard him since it is so cheap.

The reason for the Acrylic version design is simple: we want to give you a version can be lasted a little bit more longer, meanwhile, we hope this version is still a maker version: you can buy all the parts in your local store or online, you fabricate, you do it yourself, and you get something really cool. Isn't it great?

Pros and Cons

Basically speaking, the benefits of the acrylic design can be concluded into the points below:

1. Fully DIY, means you can get all the materials from internet
2. No 3-D printing requirement, but you may need to ask your local store to make a Laser cut, or you can cut necessary parts by yourself
3. More robust structure, since Acrylic is something more strong than cardboard, it can last more longer than cardboard, and actually looks more beautiful if you choose the right color
4. Easy to be replace for several units.

However, everything will have its disadvantage. For the Acrylic version , the disadvantages are:

1. A little bit more expensive than the cardboard version
2. Laser cut requirement, which means you need to know where to ask for that services
3. A little bit narrowed Field of View. That is because I provide a cheap but works piece available on internet. If you want to get something by yourself, that points can be treated into no limitation.

Bill of Materials and requirement

The .AI file can be downloaded here(a link), please notice that since our structure is easy, we put them into the same file. But actually they have three different kind of units, including:

Structure Acrylic(Marked as 1)

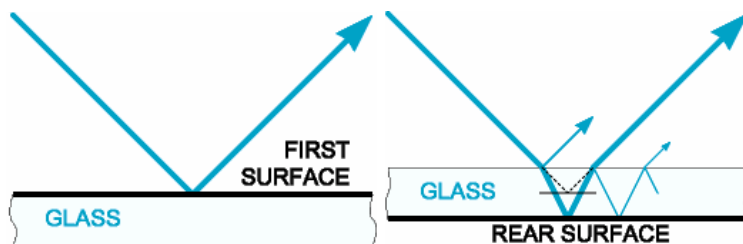
For these piece of Acrylic, we recommend our user to use $\frac{1}{8}$ inches (~3mm) boards. For better optic performance, we recommend our user to take usage of P95 Matte black acrylic pieces. For one unit, the minimum size requirement will be 6 inch * 12 inch for cutting. One possible link can be [here](#).



P95 Matte black acrylic Sample, which at least one side is rough and not reflective
Notice that for the structure parts, this is not rely on the Acrylic, you can find any kind of substitute materials to make this. Just make sure the materials are strong enough, and **not** reflective at one face.

First Surface Mirror Acrylic(Marked as 2)

The above parts of the design is the first surface mirror acrylic. The reason for the choose of the first surface mirror to reduce the ghosting image(picture below), which will cause a serious problem if you choose normal mirrors.



Reason for ghosting image and what the ghosting image looks like

The reason for an acrylic mirror, rather than a glass mirror is for the possibility of fabrication. As far as we know, to cut a glass is more difficult than cut a piece of acrylic. However, if you have the proper tools for that, you can also make this surface with glass.

The version we recommended here is 1/8 inch version. You can order [here](#), and the minimum size for this part is 5.7 inch * 4.2 inch

See Through Mirror Acrylic(Marked as 3)

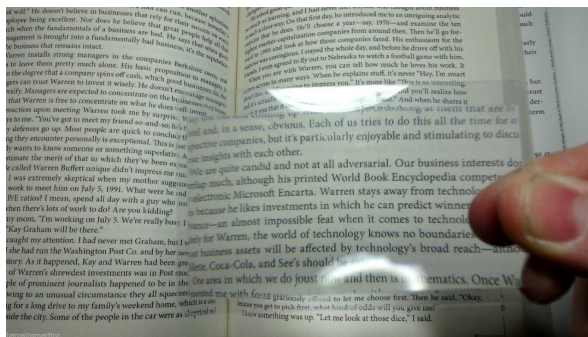
The see through mirror is the part to guarantee you to see both the world and the virtual objects at same time. Like the first surface mirror, once you make the order, make sure at least that piece of acrylic make the reflective materials in one surface, but not in the middle layer.

For the transparency here, we recommend you to choose the version around 20% transparency. But all the version between 10% - 30% should all work for your usage. One of the possible version can be ordered [here](#), the minimum size for this part is 5.7 inch * 4.2 inch

Fresnel Lens

This is the most important parts in this design. If you order a well fabricated fresnel lens, it will be very expensive(like the store [here](#)) since mostly it is not needed for the customers and not on the massive fabrication.

Fortunately, we found a very cheap substitute product [here](#), which is used for people to magnify words while reading. It is cheap, easy to get, and most important, occasionally satisfy our requirement if we pile two piece of fresnel lens together (~85mm focal length).

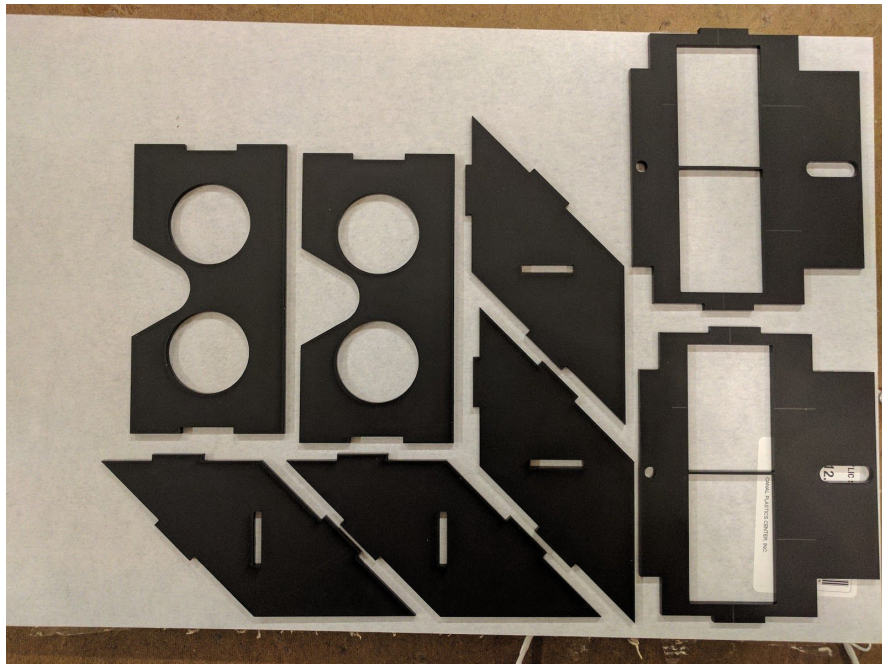


Fresnel Lens as reading magnifier

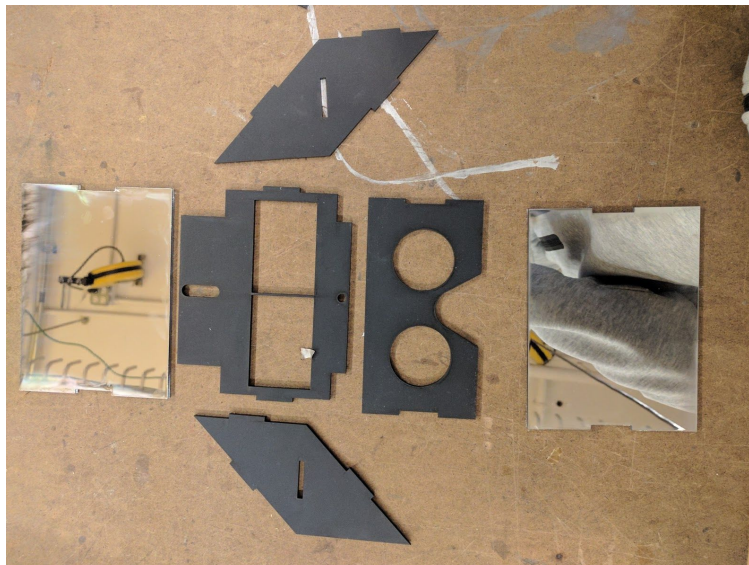
The version you should get is the 3X magnifier. Which here the 3X means nothing, but just occasionally have a capability once you pile two piece together, it will give you a focal length around 85mm.

Procedures

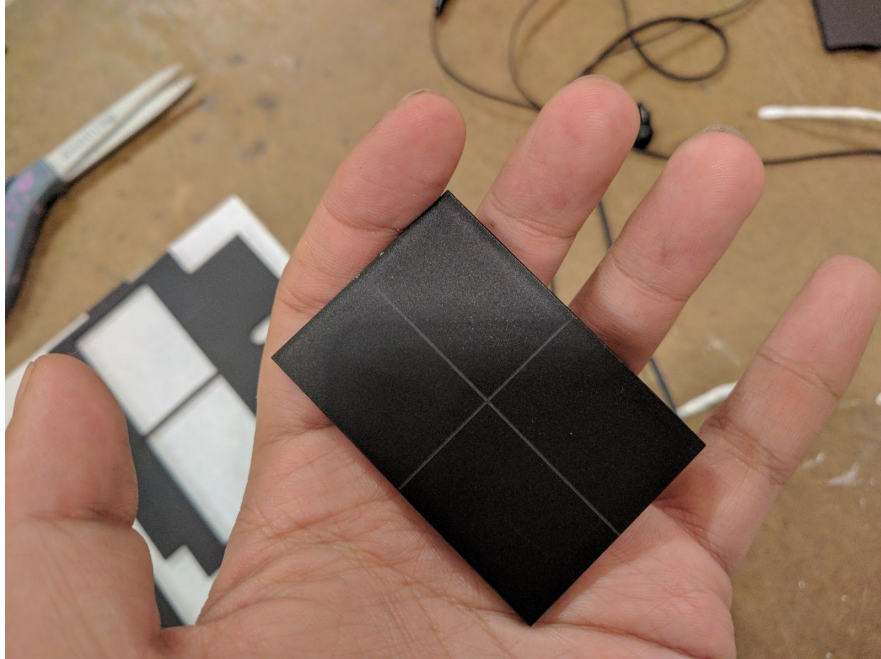
1. Cut down all the necessary parts. Here is two sets of necessary units.



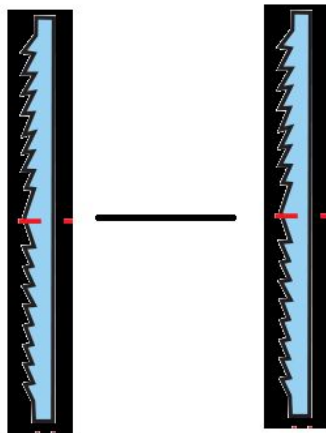
The distribution file should look like the picture below:



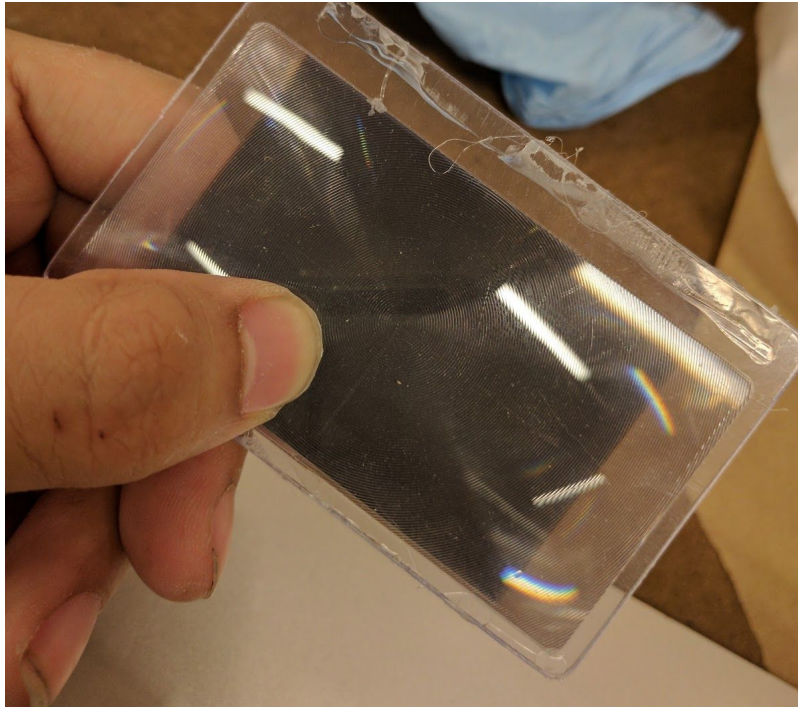
Notice that once you've cut, you should get two rectangle with lines. Don't throw it, this can be used as a marker line for align the fresnel lens



2. Gluing two pieces of fresnel lens together, if you ordered the magnifier version in Amazon. Make sure you make you glue them in the same direction, like the picture below described:



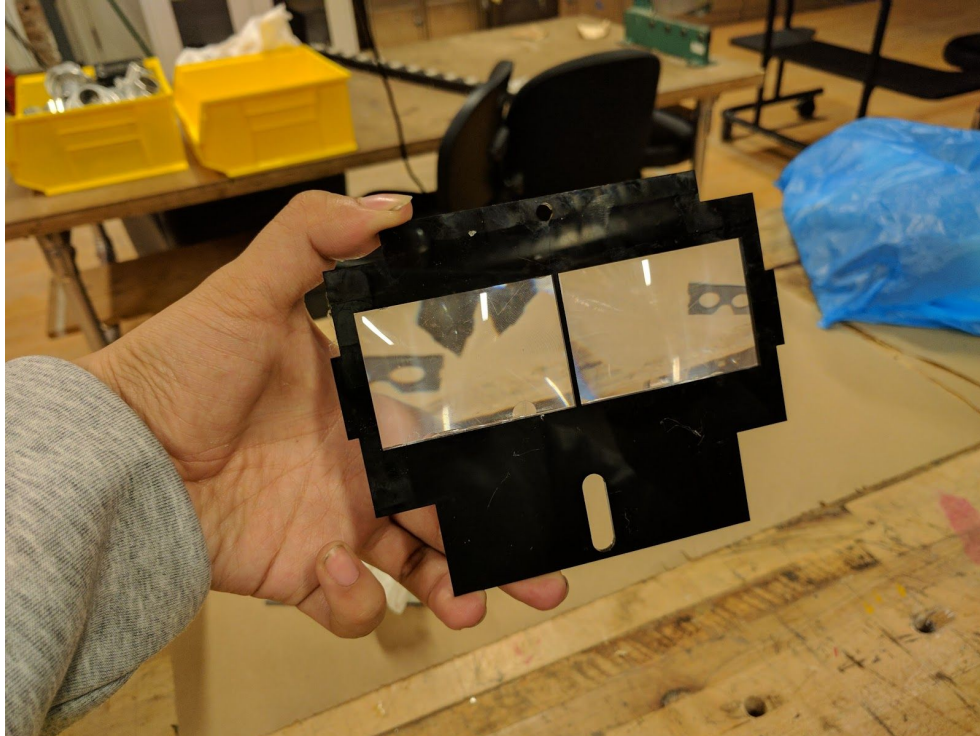
The direction to glue two piece of fresnel lens together, make sure it is paralleled
3. Cut down the unnecessary parts, which you can use the black rectangle as a reference



The cut reference. Please align the circle center along with the rectangle's center (with the white line which will be cutted in file)

Notice that please only cut the left and right and DO **NOT** cut the up and down edge

4. Glue the lens into the middle layer. Make sure you glue the fresnel lens in the bottom side, and make sure the rough layer is towards down



5. (optional). Before you make the gluing for other parts, we strongly recommend you to test if the middle layer is work. You can use this part as a cardboard VR glass, and testing with your mobile phone to see if this unit can focus properly

6. Gluing all the structure parts together:

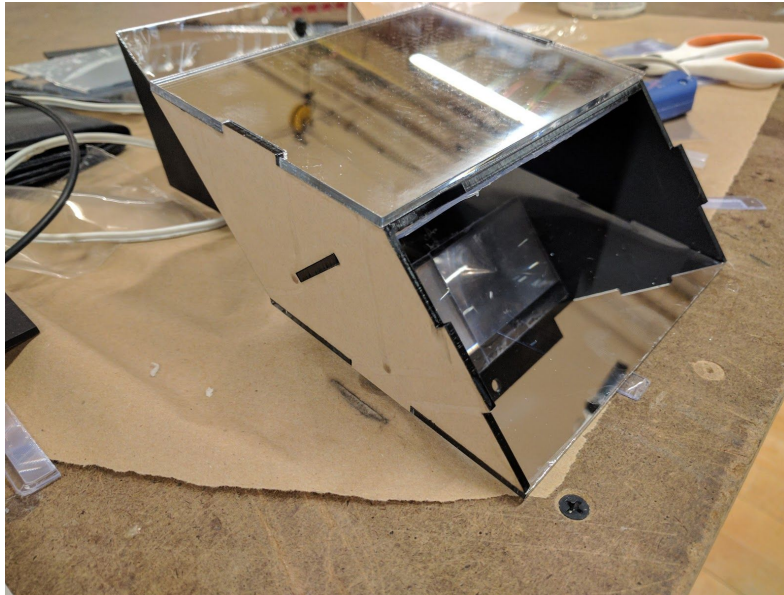


Make sure you make all the rough face towards inside

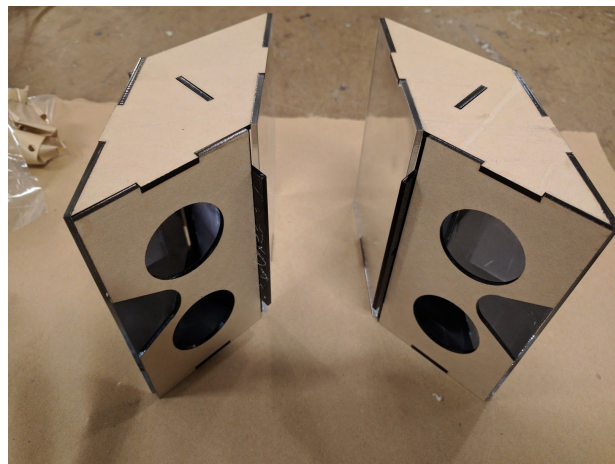
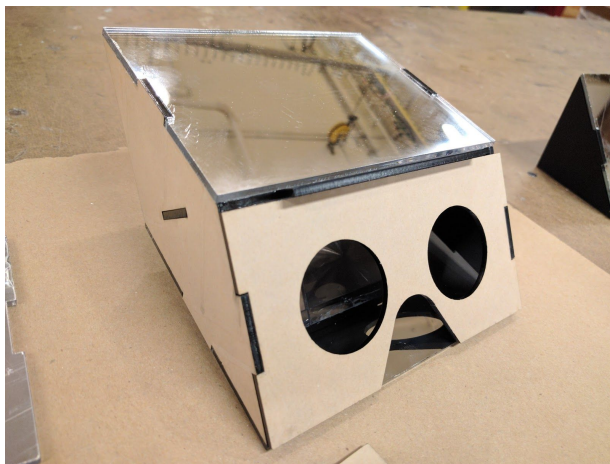
7. Gluing the mirror into the structure

Make sure you make the right way. This procedure is the one very easy to have something wrong. The principles are as :

- Make sure the electrodeposition side towards inside the structure
- Make sure the First Surface Mirror is on the top
- Make sure the See-through Mirror is on the bottom



8. Add the face layer, make it looks awesome

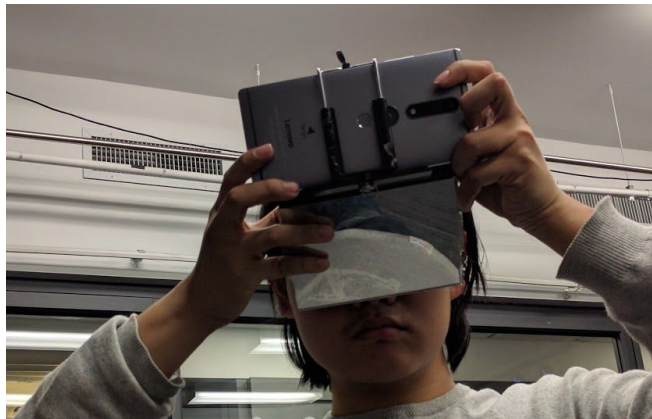


9. Have fun with your friends



Principle of Alternative Design

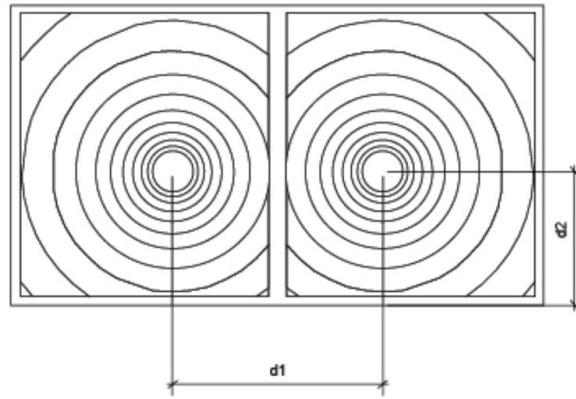
1. If you want to fix your mobile phone on the device, rather than use your hand to hold it, you can buy a mobile phone tripod adaptor, like [this](#), and we save the space in this design for you to put it in



The mobile phone adaptor for fixing the phone

2. As mentioned above, the structure parts can be replaced with any materials you want. Make sure if you change its thickness, remember to redraw the linkage joints with the desired thickness

3. If you can order bigger fresnel lens, do it. It will significantly expands its FOV. Remember to make the middle layer with enough space to show it up. The recommended focal length is 85mm, and some limitations of the geometric shape can be described here:



We recommended $d1 = 64\text{mm}$ and $d2 = 35\text{mm}$

4. If you have a big nose, please cut a big hole on the bottom board.