

Public Lab

# Desktop Spectrometry Kit

Full assembly instructions can be found at:

[PublicLaboratory.org/wiki/dsk](http://PublicLaboratory.org/wiki/dsk)

Once you are ready to begin using your device, visit:

[SpectralWorkbench.org](http://SpectralWorkbench.org)

## Parts list

This kit includes the following parts:

- 1 Type LB conduit box (1")
- 1 HD USB web cam
- 1 mini-USB cable
- 1 4"x6" black card
- 1 fragment of DVD-R
- 3 double-sided foam tape squares

## Support and Troubleshooting

Public Lab is an open community where we all help each other out; if you need support, please visit the [PublicLaboratory.org](http://PublicLaboratory.org) website and/or consider joining the "plots-spectrometry" mailing list when you register. You can also find help at the [SpectralWorkbench.org](http://SpectralWorkbench.org) website.

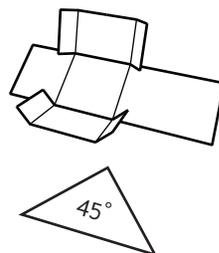
## Assembly

Assembly should take 15-20 minutes. You will need:

- a screwdriver
- scissors or a box knife

### Step 1: cut out the insert

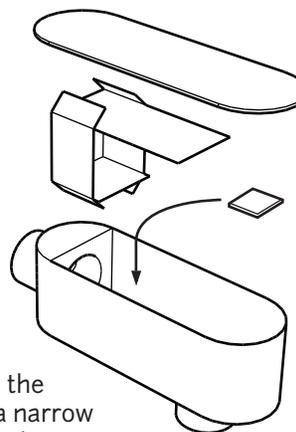
Cut out the insert printed on the card. Crease and fold as shown:



Now, cut out the triangle marked 45°. You will use this as a guide to position the webcam.

### Step 2: place the insert

Open the conduit box. Keeping the longer tab on top, lower the insert into the box, and press the imaging slit against the hole in the box as shown.



Fix it in place by placing one of the foam tape squares on the bottom. The slit allows only a narrow beam of light to enter the device.

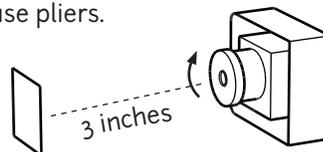
### Step 3: prepare the camera

Snap the camera in 2 and discard the empty half.



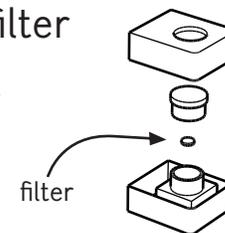
Pry open the remaining half, plug it in, and twist the lens to refocus the camera to ~3" away while looking through it with a webcam program. Heating the lens with a hair dryer makes it easier to turn, and you may need to use pliers.

Use fine text or a barcode to test the focus.



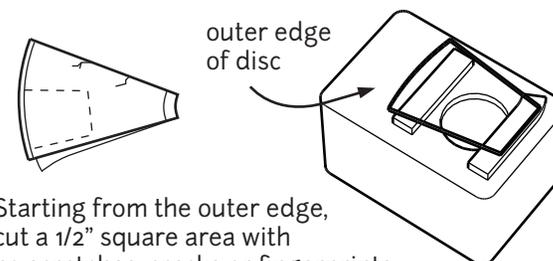
### Step 4: remove IR filter

(optional) To capture infrared data, you can remove the glass filter from under the lens. Do this before refocusing.



### Step 5: trim and attach the DVD

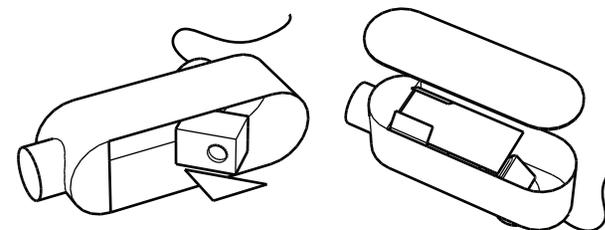
Close up the camera. We'll use a fragment of a DVD-R as a cheap and excellent diffraction grating. Peel apart the disc and discard the opaque layer.



Starting from the outer edge, cut a 1/2" square area with no scratches, cracks or fingerprints, and tape it in front of the lens with two narrow strips of foam tape. Be sure to keep the outer edge vertical with regard to the webcam's image.

### Step 6: install the camera

Using the 45° angle as a guide, foam-tape the camera to the wall of the box. It should not point straight at the hole, as light will be bent by the DVD.



Be sure the USB cable can fit and let it trail out the hole behind the camera. Discard the triangle and close the box. Tape the loose USB cable to the box to prevent it from tugging on the camera, which could affect your readings.

Now you're ready to calibrate and start using your spectrometer. Go to:

<http://SpectralWorkbench.org>

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### [PublicLaboratory.org/tool/spectrometer](http://PublicLaboratory.org/tool/spectrometer)

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