

POV Staff User Guide

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This document describes the use of the POV staff. It assumes you have already fully assembled it and uploaded the software. For more information, please check the description of the project on instructables.com: <https://www.instructables.com/Persistence-of-Vision-LED-Staff/>

Turning on/off

To turn the staff on and off, use the switch at one end of the staff. As soon as you have turned it on, it will show the battery voltage, by lighting part of the LED strips. The longer the strip, the higher the battery charge.

If you only see one or two LEDs light up, the battery charge is too low for use. You need to recharge the batteries as described below.

After using the staff, **make sure to turn it off!** If left on, LEDs will drain the battery rather fast - even if you are not using the staff. To remind you to turn it off, the staff will be blinking red LEDs once every 30 seconds while it is on and not being used.

Charging/recharging

To charge the staff, remove the endcap from the end opposite to the switch. Inside you will see a microcontroller with a micro-USB connector. Plug in a USB charger; for best results, use a charger that can provide at least 1A charging current.

For charging, the switch must be in ON position. Once you completed charging, remember to switch the staff off.

Full charge should take about 5 hrs.

Uploading images and creating image list

To upload images, make sure the switch is OFF and connect the staff to a computer. It should appear as an external USB drive - as if you had plugged in a USB flash drive. Just drag the images to the staff to upload. All images must be saved to the root directory of the staff drive - please do not create subdirectories.

Technical requirements for images:

- Images must be in bitmap (BMP) format, with 24 bit color depth. Use any software you like to convert images in other formats to bmp - e.g. you can use Microsoft Paint 3D.
- Maximal image size is 72x288 pixels. It is recommended to use images with width of 72 pixels - to match the number of LEDs on the staff
- Image filenames must be at most 30 symbols long and can only contain letters, numbers, dashes and underscores. No spaces or special symbols!

You can create your own images or search for existing ones. A good source for POV image patterns is [Visual POI Zone](#). When downloading images from there, make sure to choose *Visual poi V4 mini (72px)* option. You will also need to rotate images 90 degrees.

Please note that the same color (i.e. the same RGB values) can look quite different on the screen of your computer and on LED strip. Experiment with colors to get some feel for it.

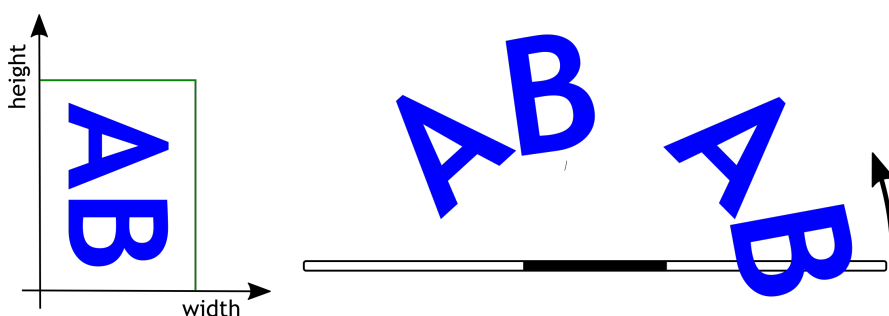
Once you have uploaded the images, you need to create a list showing in which order these images should be played during the show. Create the file `imagelist.txt` in the root directory of the POV staff (or open the file if it already exists) and put there the list of image files in the order you want to use them in your show, one filename per line, including `.bmp` extension. Optionally, you can also add how long the image should be shown, in seconds (whole numbers only!), separated from filename by one or more spaces

```
image1.bmp 20
image2.bmp 41
image5.bmp 10
image1.bmp
```

You can include some image file more than once, or not at all - it is your choice. The name of your image list must be `imagelist.txt`, all lower case.

Once you have saved the image list, eject the POV staff as you would normally do a USB flash drive, and unplug the cable.

To help you figure out correct rotation and orientation of images, the pictures below show the same image in BMP file and how it will look when using the POV staff.



Directory `images` in the (github repository)[<https://github.com/shurik179/povstaff>] contains some sample images and `imagelist.txt` file; to get started, you can just copy the contents of that directory to root directory of your staff.

Using the staff

Now we are finally ready to use the staff. Turn the switch ON; keep the staff (more or less) stationary and wait until it shows the voltage indicator. After that the staff will go blank waiting for you to start the show.

To start the show, just start rotating the staff. As soon as rotation speed is high enough, the staff will begin showing your first image, one line at a time, and will continue doing that as long as you are twirling the staff. It will adjust the interval between successive lines depending on the rotation speed, to keep the image ratio close to original regardless of how fast you are rotating the staff.

The staff will continue showing the image for the duration given in `imagelist.txt` file or until you pause the staff as described below, whatever comes first. If duration for a given image was not provided, the staff will continue showing this image until you pause.

To pause the show or move to the next image in the list, stop the staff **in horizontal position**. It will go blank; as soon as you start twirling it again, it will resume the show, moving to the next image. After reaching the last image in the list, it will loop over, starting again with the first image.

After you are done, do not forget to **turn the staff OFF**, to avoid draining the batteries.