Welcome to LightPainting with WIE & EARS!

You’ve been given a LightStick, with it you can draw pictures in thin air! You have access to a long-exposure camera which helps make this possible!

Hope you have a good time! – EARS

**Remember: If you have any questions, feel free to ask!**

**How to LightPaint With a LightStick?**

1. Find the Image you’d like to LightPaint.
   1. It can be any size, though the higher the resolution the better.
   2. It should preferably have a black background, or you’ll be dazzled when the stick turns on!
2. Drop it into the folder with “LightStick\_Generator.py” and Run the script.
3. Follow the instructions in the script to generate a “YourName-printme.lsk” file
4. Rename this to “printme.lsk” and drop it on the SD card. Put the SD card in the LightStick. The LightStick only looks for files named “printme.lsk”
5. Connect the battery to the LightStick. Itll start painting about 3 seconds. Hit the shutter button! Start walking.
   1. If you want to, wait for it to finish then hit the little “reset” button (labelled) to start the painting again.
   2. Time starting the painting with a friend pressing the shutter button on a camera, then start walking at a reasonable pace, keeping the stick as level and stable as you can.
6. Once the cycle completes, have a look at your (hopefully) lovely looking LightPainting!

**A selection of premade LSK files are available, if you’ve brought any images you’d like to try painting feel absolutely free to! If you need a hand converting them, we’ll give you a hand!**

**Tips and Tricks**

If you make edits to the Generator Script, make sure to process the Image with it again, and re-save it to the SD card!

If your pictures are coming out too bright, try decreasing the sensitivity on the camera slightly,

You can also experiment with the various parameters in the Generator Script to reduce the overall brightness (Decrease Brightness\_Factor)

If your pictures are coming out too dark, try increasing the sensitivity of the camera slightly.

You can also experiment with the various parameters in the Generator Script to increase the overall brightness (Increase Brightness\_Factor)

If your pictures are coming out stretched, try walking a little bit slower.

If your pictures are coming out compressed, try walking a little bit faster.

1. The estimated length of each painting is given by the Generator Script as well as the time it should take to paint it.

Quick bit of boring Health and Safety

Please *for the love of god* don’t be on fire, or act in a way that could make things on fire.

These sticks are *very bright*, they’re designed to be seen from large distances. Don’t stare at them.

Please don’t drop, eat, stand on, or otherwise do anything otherwise silly with the LiPos. When they pop, they mean business.

The sticks are fairly water resistant, but dont chance it. If they get wet, stop using them. (Esp if outside)

**A bit of technical info (for those that are curious)**

These LightSticks consist of 144 WS2812b, individually addressable RGB LEDS. That means there are 144 individual LEDs on each stick, which can be controlled independently to show any one of nearly 17 million colours. They can change colour faster than the eye can perceive (120 times per second).

The LEDs are all controlled by an Atmel AVR328p microcontroller, with software written on top of the Arduino framework. The software running this is available at my GitHub page (see below).

The LSK files you’ve been generating are a pure binary representation of the image, that is, loads of raw 1s and 0s that directly tell the controller which LEDs to light, how bright to light them and what colour. This is needed as the controller doesn’t have enough computing power to process the image itself, so needs spoon feeding somewhat.

This spoon feeding is what the Generator Script does; it performs all of the heavy lifting when converting the image. It scales the image to the size of the stick, using a Lanczos transform, then works out how long to display each colour for based on the colour of the pixels, and writes it to the SD file.

The Generator Script is written in Python, and is also available on my GitHub page.

If anything you’ve just read has you curious as to the weird and wonderful world of electronics, I invite you to join EARS. We host all kinds of courses, as well as run projects and have our own space where you can build pretty much anything you like!

**Useful Links:**

LightStick Software: github.com/SJ-Innovation/LightPainting\_Sticks

Join EARS: activity.ussu.co.uk/ears/get-involved

Email us directly with feedback: hello@surreyears.co.uk

Thanks for coming!

* EARS