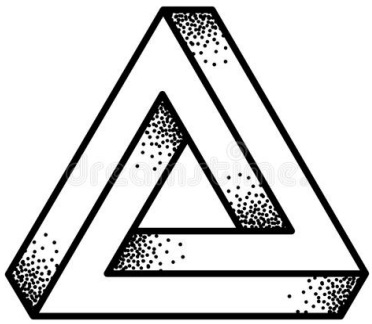
# Strange Loop

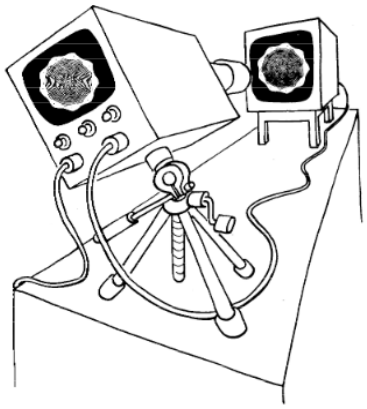


user
manual

# Introduction

A video feedback loop is not unlike the well-known audio feedback phenomenon that ensues when you put a microphone near a speaker.

When a speaker starts screeching due to feedback, often the instinctive response is to try to make it stop; but if one started playing around with it, he would soon discover that the screech can be altered in pitch by moving the microphone, for instance.



When the input of a system is connected to its output, the system starts resonating on itself, and generates a dynamic we can manipulate altering the system's parameters.

Sometimes feedback loops in the video world have been created by pointing a camera to a screen which is displaying its output, very similarly to our microphone and speaker example, and by moving the camera or changing the settings of the screen, the intrepid video-explorer has been able to visit various feedback “zones”.

Time to start exploring!

# Basic Operation

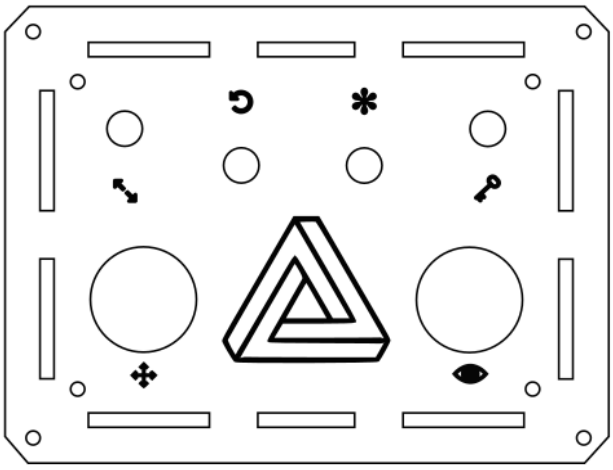
To turn on the device, **first** connect the capture card or the USB storage device containing your media in the USB port on the left side.

Then attach HDMI cable or the analog out breakout cable in the back.

When everything is connected you can insert the power cable and the device will start booting. Wait a little and it will then directly start reproducing your files or show your video capture.

To turn off the device just keep both joysticks clicked for a couple of seconds.

# Controls



The Strange Loop control interface is based around four knobs and two clickable joystick that you will use to navigate between the modes and videos.
Here's a reference with all the controls.

This knob regulates your window on the feedback world: it open and closes the Luma Key. At the center the key is off, on the left it will remove the white portion of the source image, and on the right the black ones. The threshold is regulated by how far the knob is moved.

This knob regulates how far or near the frame buffer will get redrawn; It acts like a sort of “zoom” on the feedback, and it will alter the dynamics of the system a lot.

This knob will rotate the frame buffer left or right. By default, the rotation in +/- 10 degrees. It may not seem like a lot but you need to remember that this rotation gets applied again and again once every frame to everything that re-enters the feedback loop.

This one is a bit weird: its effect depends on the shader that is loaded. In some shaders the changes can seem subtle at first but the more you play with it the more you will understand how it interacts with the other parameters.

The **left** analog joystick handles the position in which the frame buffer gets redrawn (or of the image in paint mode, more on that later).
-If you click it once, it will center itself.

-If you click it two times, it will skip to the next video (or next image in Paint Mode).

-If you have a powered USB hub, with three clicks you can switch between capture card and videos on the USB Key.

The **right** analog joystick changes Hue on its top/bottom axis and an internal feedback parameter on the left/right axis.
The Hue control is endless, meaning that it will continue to cycle if you keep holding the joystick up or down.
-If you click it once, it will reset its parameters and clear the frame buffer.

-If you click it two times, it will skip to the next feedback mode.

-If you click it three times, it will change from Video Mode to Paint Mode (if there's at least one image available on the USB storage).

## Feedback Modes

The Strange Loop comes with five feedback modes, which are Contrast, Hue Change, Negative, Pixelate and no effect.
  It is to note that the operations applied by these effects are done iteratively, meaning that they get applied to the image each time it re-enters the feedback loop; The resulting behavior is often surprising, just like in camera feedback loops.

# Playing Videos, Capture
# &
# Paint Mode

## Playing Videos

To play videos, you just need to insert a USB stick with valid video files, and it will load them automatically in alphabetical order (uppercase comes before lowercase, so Untitled.mp4 will play before noname.mp4)

But what is a valid video file?
The device supports standard definition .mp4, .flv, .mov, .mkv, .avi files, but sometimes there will be codec issues.
The suggested compression format is as follows:

**Use MPEGStreamclip (HTTP://www.squared5.com/)**

**H.264**

**Quality 50%**

**PCM Audio (more compatible with HDMI)**

HD video might work but it often drops the framerate.

You can cycle trough the videos with a double click of the left analog.

## Capture

To use an external source with composite output, simply plug the included capture card (Fushicai UTV007) to the USB port before turning the device on, then plug your video output to the yellow connector.

The device will automatically boot to capture mode.

You can also try using other USB video devices (electronic microscopes, USB cams etc), however not all of them will be compatible right out of the box. Experiment!

## Paint Mode

By clicking three times the right joystick, you enter in paint mode.
When you're in paint mode instead of videos your Strange Loop will read images from your USB key. (again, in alphabetical order) Then the knobs that regulated the feedback motion will instead move, zoom and rotate the image you loaded.
The frame buffer will become like a psychedelic canvas for you to draw on.
You can skip trough the images, like you skipped trough the video, with two clicks of the left joystick and you can also change shader mode as usual.
To exit from paint mode, click again the right joystick three times.

# Troubleshooting

Here are listed some of the most common problems you can encounter.
If this doesn't help, try reflashing the SD card with the image found on the GitHub repo of the project or contact me on Etsy.

## -No video output, HDMI mode:

Be sure to connect the HDMI connector before you turn on the device. If you don't the device will only output composite until the next reboot.

## -No video output, analog out:

Are you using the original breakout cable? Camcorders mini jack to RCA splitter have a different pin out than the Raspberry running under the hood.
  Sometimes just trying the red or white connector instead of the yellow one will fix it, however sometimes camcorder breakout cables won't work at all.

The Raspberry standard is called CTIA while those are usually OMTP.
  If you lost it, you can find the CTIA replacement on mycablemart.com or adafruit.com, or you contact me on Etsy for replacements.

## -You need to switch to PAL/NTSC:

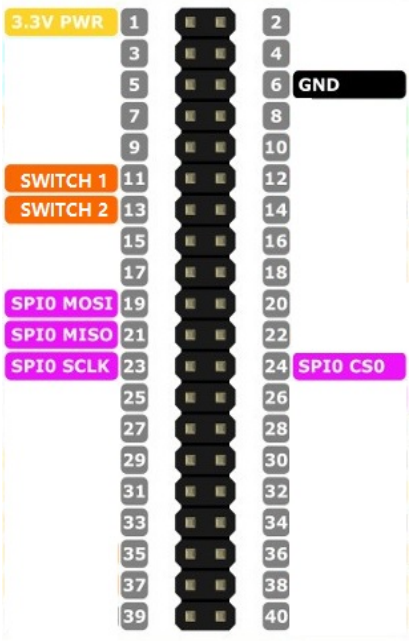
If you need to switch from PAL/NTSC, connect a keyboard like it's described in the "Going Beyond" section, then type

*sudo nano /boot/config.txt*

and scroll down until you see a comment about NTSC and PAL, then follow the instructions in the code.
Then hit "Ctr l + *X*" to exit, then "*Y*" to save and "*Enter*" to confirm.

## -You need to reconnect the board to the Raspberry

If the board got disconnected, reconnect it following this drawing;
The pin out of the board connector has the same positions of the Raspberry.
Pin 1 and 26 are marked on the top side of the board.
**Please be careful and double check when doing this because an incorrect wiring may permanently damage your device.**



The Strange Loop is a Raspberry Pi and openFrameworks based device that generates an internal video feedback loop by grabbing each frame and redrawing it on the successive one.

You get various control both on the position of the frame and on different shaders that get applied to the loop to further alter its dynamics.

# Going Beyond

If you want to explore the world of digital video feedback further and you have some experience in coding, you can modify the program that's running on the Raspberry Pi 3 A+ under the hood.

**Everything you do to device is at your own risk**, but most of the issues you might cause can be easily solved reflashing the SD card with a fresh image from the GitHub repo, and I'll be happy to help if something goes wrong.

I suggest to work remotely on your Pi.
To change the Wi-Fi country and connect to your network, boot mode, and various other stuff, just connect a USB Keyboard to your device, hit *Esc* after boot and type

*sudo raspi-config*

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The user and password are the default ones:
Login: **pi**
Password: **raspberry**
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You can find a more in-depth guide on the GitHub repo of the project.
Have fun!!

///melt_dream_2019