Capturing & Rescanning Analog Video

How to get your analog video signal into the digital realm. This is a community wiki. Anyone with a Polyphase account can edit or add to it if they feel so inspired.

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ℹ Overview

The purpose of this wiki is to help you take an analog video signal and make it into a digital file.

There are a few different types of analog video signals. This wiki will focus on **Composite** or CVBS (NTSC or PAL depending on your region), **S-video** (Y/C), and **Component** (Y/pB/pR).

The two main methods we will cover are **Rescanning**, which involves pointing a digital camera at a screen displaying the analog signal, and **Direct Input Capture**, which uses a specialized analog-to-digital converter device to take in the video signal and record it or send it into a computer.

Both of these methods can yield high quality results, both require some effort and knowledge to set up, and both can be done with a low or high budget. Here are some things to consider that may help you decide which one is right for your project.

	Pros	**Cons**
Rescanning	• When working with a CRT, rescanning can allow you to capture glitchy or unstable signals that would drop or display differently in a digital capture • Captures the color and texture of your video monitor for a more natural effect • Built-in upscaling if you use an HD camera	• Requires a more controlled environment • Requires some knowledge of camera settings and techniques for best results • Requires a decent video monitor/display
Direct Input Capture	• Many capture devices can work as live video inputs for livestreaming or processing your video feed in software • Results will likely be more consistent across multiple sessions	• Requires specialized capture device, higher end options can be expensive • If using a computer-connected capture device, requires working with drivers and researching compatibility with operating systems and updates • Can be less accessible for people just starting out

□□→□□ Rescanning

Rescanning is a capture method where you simply point a digital video camera at a screen that is displaying your analog video signal.

Cameras

It is important to have manual control over at least the shutter speed, exposure, and focus of the camera you're using to rescan. If you don't have a digital camera available with manual settings, there are now many smartphone apps that allow you to manually control these settings on a phone camera. Many smartphones now have very OK cameras in them so this can actually yield very good results, especially if it is also possible to record without compression. It can be helpful to use an adapter that lets you mount the phone on a tripod.

Here are some manual camera phone apps that we have heard about (availability & price may vary by OS):

- Pro Shot
- ProCam
- Filmic Pro (subscription-based)
- Blackmagic Cam

If you do have a dedicated camera available, DSLRs and good digital camcorders will offer manual controls as well.

You will most likely want to lock the focus, exposure, and other image settings such as white balance, so that the camera will not automatically change these during your recording.

Screens

The two main types of screens you will find are **CRTs** and **digital screens** (including LCDs, plasma, and OLED.)

When working with CRTs, it is important to lock your shutter speed to 1/60 for NTSC, or 1/50 for PAL, to make sure that each frame of your camera's recording will contain one full frame of your analog video signal. If you see slices of the screen as dark on the camera, but the image on the screen looks normal to your eyes, you are probably not shooting at 1/60.

LCDs and other digital displays have to digitize each frame of your signal as it appears on the screen. This means that they will be less forgiving of a glitchy or unstable signal than CRTs. Some HD screens will upscale an analog signal before it is displayed, which can change its visual

qualities. Whether you like the way a given screen renders your signal is a matter of preference. Be sure to familiarize yourself with the settings available on your monitor if you want maximum control over the appearance of your image.

Also be aware of aspect ratio. Many screens have options for either 4:3 or 16:9. You can use whichever you prefer or feel looks best for your image. If you are capturing a 4:3 image but your camera does not have that as an option, you may want to crop the video in an editor.

Tips

Lighting

Generally, it can be helpful to try to work in a darkened room to prevent accidental reflections and screen glare. If you can't control the lighting in the room, you can also build a "hood" just around the camera and the screen to keep the light out. As examples, this could be made out of cardboard, wood, or a frame draped with blackout fabric.

Camera position

Unless you want to play with angle and perspective, you probably want the camera to be positioned so it is pointing squarely at the screen. (If you are also working with an analog camera for feedback, it can be helpful to use a separate monitor for rescanning so that both cameras can be pointing directly at the screen without getting in the way of each other.)

Usually it is preferred to have the image of the screen centered in the frame of the camera. It is up to you if you want to zoom in so that the analog video fills the camera's view, or stay a bit more zoomed out to keep the edges visible (for example, if you are rescanning a CRT with nice rounded edges and you want to preserve that effect).

Note: you can always crop in an editing program later, but you can not zoom out.

Using a heavy tripod for extra stability can be helpful to prevent accidental bumps or vibrations from messing up the capture.

Moiré

Sometimes the grid of the pixels on your camera can interact strangely with the grid of pixels (or the pattern of the shadow mask) of your display. When this happens, it can be helpful to put your camera very slightly out-of-focus to soften the image.

It can also help to shoot in UHD/4k if possible so that the camera's pixels will be small enough to prevent this interference pattern.

□□→□□ Direct Input Capture

Direct Input Capture refers to methods of capturing an analog video signal using a specialized capture card.

Capture devices can either connect to a computer for recording or live processing of the signal, or they can be standalone units with onboard recording capabilities.

Two main options here are to obtain a capture card that supports capturing an analog video signal, or converting your signal to HDMI somehow, and using a capture device with an HDMI input. Analog capture cards are decreasing in availability and software support, so converting your signal to HDMI before capturing is becoming a more popular option. This method also allows you to include an upscaler in your chain if desired. However, capturing the analog signal directly can be simpler and require less gear if you don't already have a way to convert your signal to HDMI.

⚠ ***A note about external links to products:*** *the links and models are provided as examples, but if you are purchasing equipment it is important to do your own research. Product links can be modified by sellers to show different products, inventory can run out, and prices can change, so we can't make any guarantees or rely on pointing everyone to purchase the same items. Be patient and know that finding the right equipment for your analog video setup often involves some trial and error.*

Cheap Capture Cards

Small, generic capture cards can generally be obtained for under $20 USD. Generally, these cheaper USB2.0 devices convert your signal into a compressed h.264 stream. They usually show up the same as a webcam would on your computer and don't require any specialized drivers or software.

Here are some examples:

- Generic composite/s-video USB capture card (Amazon)
  - Captures Composite or S-video
  - Compressed format only
- UCEC composite/s-video USB capture card (Amazon)
  - Captures Composite or S-video
  - Compressed format only
- Generic HDMI USB capture card (Amazon)
  - Captures HDMI
  - Compressed format only

Expensive Capture Cards

There are a number of different options when it comes to higher-end analog capture cards. Many of these will support multiple input formats, such as Composite, S-video, Component, and HDMI. Many of them also support high quality or uncompressed video, allowing you more control over the quality and specs of your captured files. However, these devices can vary in what connections to a computer they support (USB3.0, Thunderbolt), many require special drivers or software, and some do not support all operating systems. It is important to do as much research as possible, and often a good idea to purchase from seller with a decent return policy.

With that in mind, here are a few of the options out there:

Blackmagic Intensity Shuttle

This model was a popular choice for a long time, but many people have noted that it was unreliable. Additionally, it is becoming **incompatible** with many newer computer models and operating systems. (At time of writing, plugging this device into my 2019 iMac running Sonoma causes it to crash and restart.)

- Deprecated
- Requires blackmagic software/drivers to be installed
- Supports Composite, Component, S-video, and HDMI input
- Options for USB3 or Thunderbolt editions
- NOT supported on M1 macs (Blackmagic says these devices are end-of-life and they will not be developing new drivers for them)

Magewell USB Capture DVI Plus

At time of writing I have not tested this one, but theoretically it should be a good option for both analog and digital capture.

- Drivers available for Windows, Mac, Ubuntu, and CentOS
- Supports Composite, Component, S-video, and HDMI input (via breakout cables)
- Link

Standalone Recorder Units

There are a number of different models of these available, both for analog and HDMI capture, but I have not personally used many of them. If you have a recommended model, get in touch, I would love to expand this wiki.

These types of devices can be helpful for documenting live performances, or capturing without the need for a computer. Some of them have a built-in screen so you can see what you are recording.

AJA Ki Pro

The one that looks like this. Not to be confused with the newer product of the same name. Seems to be only available used at this point.

- Supports component (and some HD formats), but not composite, so if your signal is composite you will need to use a converter
- Records to SSD

There is also the AJA Ki Pro Rack with dual SSD slots. That unit does support composite as well as component (and some HD formats).

PCIe Cards

For a more advanced computer capture option, you can get a PCIe card for a desktop computer. This is an advanced option for those looking to build a computer with video capture capabilities. Both Magewell and Blackmagic have a variety of models available.

Software

We suggest using OBS for both recording and streaming video on your computer. It's open source, supported on most operating systems, and offers a lot of control over video quality and format. It can also be used to mix or combine multiple video feeds together, among lots of other advanced features.