

Supplemental PDF: An Overview of Equipment

In the segment titled *An Overview of Equipment*, we looked at the hardware requirements for digitizing vintage media. This document provides an expanded view on some of the options available to you, depending on your budget and needs—particularly for scanning transparencies and transferring film-based home movies.

First, I'll discuss dedicated scanners for transparencies (slides and negatives), then several options for transferring film-based home movies.

Transparency Scanners

Using a multi-purpose flatbed scanner is an economical method of digitizing photographs and transparencies. Of course, all-in-one devices (printer/scanner combination units) are everywhere these days, so you may already have a flatbed scanner. Although they scan documents and photographic prints, most models don't scan transparencies—and the ones that do are rather expensive.

If this is your situation, there are dedicated film scanners available (Figure 1). They range in price from under \$100 to well over \$1500, depending on the output quality and features offered. Some of the least expensive models work as stand-alone units; they scan the media and store the digitized images to a memory card without the need for connecting to a computer. Although convenient in some respects, the image quality may be marginal at best. Also, slides usually have to be handled one at a time, making your project a slow process.



Figure 1. A dedicated film scanner.

Higher-end models connect to a computer via USB cable, and are usually bundled with the driver (software that lets your computer communicate with the scanner) and basic photo editing software. Some models can batch-scan slides (saving you a lot of tedious work) and cost several hundred dollars. Models such as these may be worth the price if you're scanning hundreds (or even thousands) of slides, and image quality is an issue.

Dedicated film scanners can be found on Ebay, Amazon, or online photographic suppliers.

Home Movie Film Transfer Systems

A home movie film transfer system consists of multiple components such as a projector, screen or optical device, video camera, and computer with a video capture card/device working together to convert the film footage into a video signal.

If so equipped, the footage can be captured to the camera's memory card or hard drive, and then imported into Adobe Premier Elements.

Front Screen System

The simplest and most cost effective system consists of a projector, a white screen (a sheet of matte inkjet photo paper works well), and a video camera. The camera can either capture the footage to a memory card or built-in hard drive, or route the video through a video capture device to the computer.

The placement of the video camera in relation to the projector requires some experimentation. The camera is placed at a slight angle, which results in the image being distorted into a trapezoid shape (this effect is called keystoneing). This can be minimized by zooming in just enough to crop the image edges out.

Figure 2 shows an overhead view of this type of system.

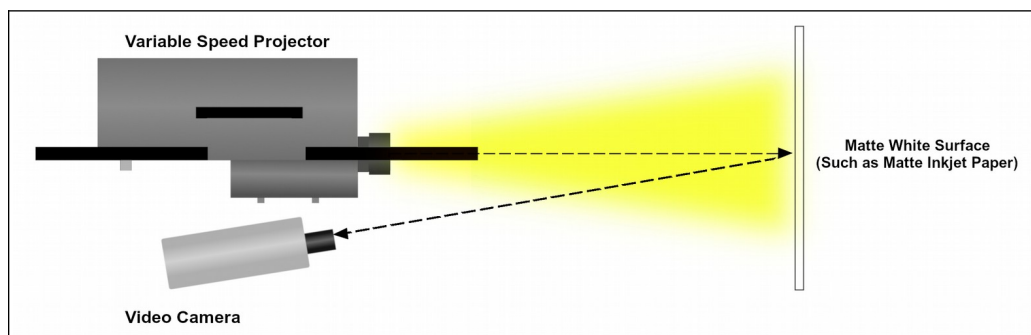


Figure 2. Overhead view of a simple film transfer system using matte inkjet paper as a screen.

Pros:

- Fairly easy to set up.
- Generally the least expensive option.

Cons:

- Image may become slightly distorted—requires zooming in to minimize effect (this crops the image some).
- Room must be dark for best results.

Rear Projection Screen System

Another type of film transfer system (which is used in Segment 9) uses a film-to-video converter. This device uses a translucent rear projection screen, which reverses the image. A front surface mirror (meaning the silver coating is on the front of the mirror) corrects the image orientation. This allows the camera to be placed at a right angle relative to the projector, eliminating the keystone effect. The camera port usually has a lens to magnify the image (not necessary for modern video cameras, but it doesn't impede the transfer process either).

Few, if any of these devices are currently being manufactured, but they are still fairly plentiful on large online auctions sites, and easy to obtain. They can sometimes be found in thrift stores and yard sales. The best quality film-to-video converters usually have a metal enclosure and quality optical components. A screen that measures approximately 70mm x 90mm (2.75" x 3.5") is ideal.

Figure 3 shows an overhead view of the type of transfer system used in Segment 9, utilizing a film-to-video converter.

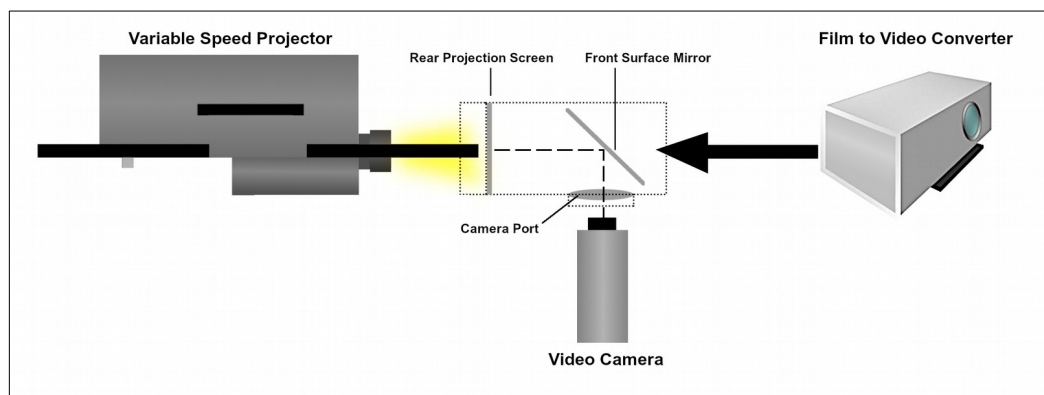


Figure 2. Overhead view of a film transfer system utilizing a film-to-video converter.

Pros:

- Easy to set up
- Eliminates keystone effect
- Can be used in a partially lit room
- Better made units yield reasonably good image quality

Cons:

- Image quality may be marginal on cheaply made plastic units

Aerial Image System

Instead of a screen, this system uses a lens and mirror assembly that focuses the film's image directly into the video camera's imaging sensor. This system results in an *aerial image*, because the picture seems to be suspended in air when viewed through the lens. Because there is no screen, this method of film transfer results in high image quality.

Figure 4 shows an overhead view of an aerial image transfer system.

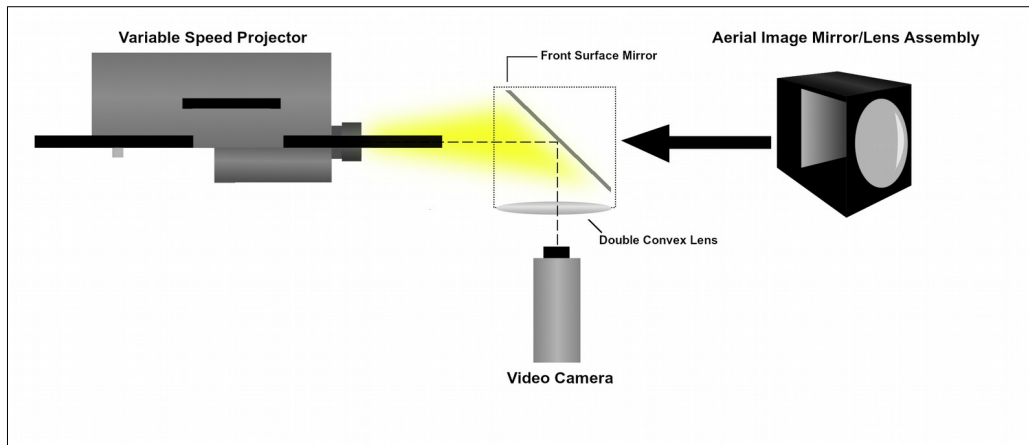


Figure 4. Overhead view of an aerial image film transfer system.

The lens/mirror enclosure is generally hand-assembled from acrylic sheeting or thin plywood. The internal optics consist of a large double convex lens and a front surface mirror. While the lens/mirror enclosure is sometimes available as a stand-alone unit, they are usually integrated with a modified projector mounted on a base (Figure 5). Some systems also include an integrated video camera.

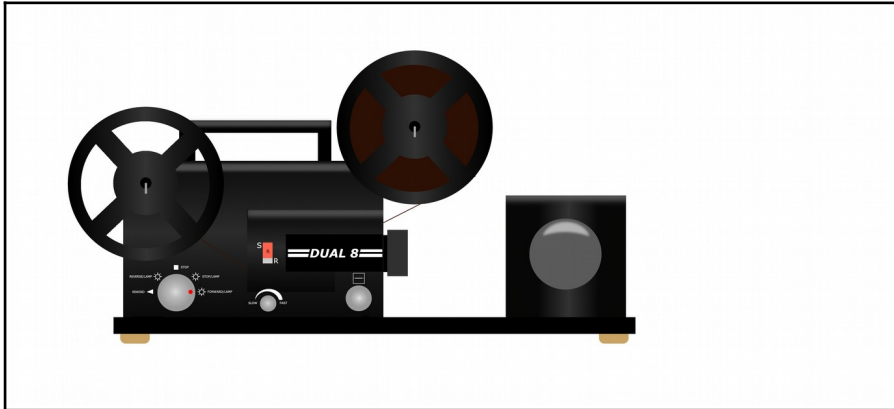


Figure 4. Integrated projector/lens assembly unit.

Some units transfer film footage in real time, others capture it frame-by-frame, and include special software to operate in conjunction with your computer. The software digitizes the image from each frame, then reintegrates them back together into a digital video.

Pros:

- Produces high quality image
- Suitable for professional use

Cons:

- Set up can be extremely difficult—camera must line up with the lens perfectly to properly frame the image properly.
- Projector must be modified with low-output light source and opal glass diffuser.
- Expensive—these units can cost several hundred of dollars or more.

Self Contained Film Scanners

In recent years, consumer grade film scanners (Figure 5) have become available from online photography suppliers. They handle both regular 8mm and super 8mm silent film. They are purpose-built machines, as opposed to equipment that has been modified for film transfer or systems requiring multiple components.

Film scanners capture the film footage frame-by-frame, so they run slower than standard projectors. The video is stored on an SD or SDHC card. The onboard control functions let you adjust exposure, color balance, playback, etc). There is also a video output jack to view the transfer on a small television monitor, and a USB port to output the video to computer. These devices typically start at just under \$400.

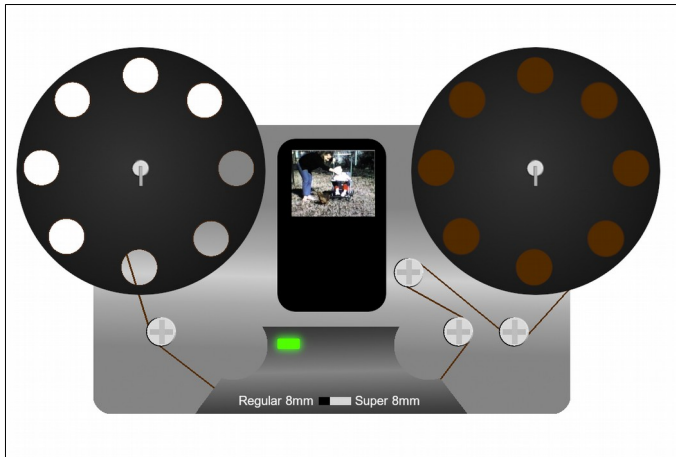


Figure 5. Self-contained movie film scanner.

Review

For those who own a flatbed scanner that only scans documents or photographic prints, there are dedicated film scanners starting at under \$100. Some models are stand-alone that don't require connection to a computer. More expensive models produce higher quality scans. Some can batch scan, saving the user work.

There are several options for digitizing your film, ranging from a simple front screen transfer system to self contained devices. Professional quality transfer systems are expensive, but produce high quality results.