

Digital copying of negatives

The following introduction is based on the digital duplication of 35mm originals although the same technique could be adapted to larger formats.

In the 21st century even amongst photographers, access to a 'wet' darkroom is becoming less common. However those of us that have been working for a number of years will have accumulated hundreds or perhaps thousands of negatives. In my case over 100,000.

Without a darkroom facility or a means of digitising them, these will remain stored and unseen.

The 'traditional' way of digitising negatives has been to scan them or have them scanned, preferably on a dedicated film scanner. As the use of film to capture images has all but become a thing of the past so camera manufacturers have stopped producing film based cameras and also stopped making film scanners. The only way to buy a Nikon, Minolta or Canon film scanner now is to look for a second user model in good condition. As supply and demand laws dictate, where there is still a demand and where supply has ceased, so the price of the available equipment rises. So a dedicated film scanner will now cost a considerable amount.



It has been the increase in the quality of images produced by digital cameras that has in part led to the demise of film capture, but this in turn creates the possibility for us to recapture the images on our negatives with a digital camera.

Photographing a negative will require specialist equipment.

To achieve good results you will need:

A digital S.L.R (or mirrorless) camera with interchangeable lenses.

A lens designed for close-up work and possibly a set of extension tubes or bellows.

Many lenses have the word macro on them but few are true macro lenses. To qualify, a macro lens should be able to focus on an area no more than twice the size of the camera sensor and be optimised for flat field, close-up work. Such a lens combined with an extension tube will focus close enough to cover the area of a 35mm negative.

Copying a piece of 35mm film accurately is a precision piece of photography and a number of considerations need to be taken into account. Focussing through the camera has to be exact and alignment of camera and film has to be perfect. The negative must be held flat and the lighting has to be even.

There are a number of way of achieving this, this article will explain one of them.

In this example I am using a D.S.L.R. camera with a 50mm macro lens and an extension tube between the lens and the camera. The camera is firmly mounted vertically on a copy stand and the negative to be copied is placed on a lightbox below. The distance between the camera and the film can be adjusted to either capture the whole negative or a slight crop if required.



The negative is held in place using a negative carrier from an enlarger, although a custom film holder could be constructed from two pieces of metal or plastic. The important thing is it holds the film flat.

The light source in this example is a small L.E.D. floodlight mounted pointing up as shown below. L.E.D. lights are virtually heat free so can be safely used for long periods if required.



A hole has been cut in the top of the box used to house the light. The aperture is slightly larger than a 35mm negative to allow for adjustment. Below the hole and spaced approximately $\frac{1}{2}$ " away is a piece of photo quality opal perspex, the kind used for photographic lightboxes traditionally used for viewing transparencies and negatives, this diffuses the light. The reason it is placed at distance from the negative is to minimise any small blemishes on the surface of the perspex from being recorded when the film is photographed. A second piece of perspex is placed near to the light to further aid diffusion.

I have found with my set-up that using 125 iso will give an exposure of approx 60th of a second varying with the density of the negative, at an aperture of F6.3 which is where my lens is at its sharpest. With digital cameras the accepted rule is that a lens aperture around the middle of the range or wider will give the best results. I use the camera's auto focus.

The best exposure will be found through experimentation, I have found that over exposing 1 stop gives the best images to work on. I shoot raw files and have a custom profile I use to 'develop' the images in Rawtherapee prior to any adjustment, although you could use Photoshop. Raw camera files are inherently soft and will need to be sharpened at some stage, this can be achieved in some raw converters or can be carried out at a later stage in your image manipulation software.

Copying black and white negatives is reasonably easy because colour plays no part, so white balance is not an issue and images can be converted to monochrome or desaturated during raw conversion.



Images need to have the 'colour' (not the value) inverted to create a positive.

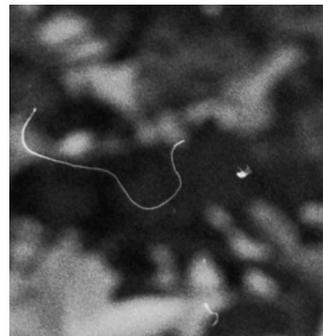
When copying colour negatives things get a bit harder.

The colour temperature of the light comes into play, but the biggest problem is the mask on colour negative film. Whilst colour transparencies or slides can be copied using auto white balance in the camera or corrected in the same way in an image manipulation programme, with negatives this does not work. The film base is orange and this tends to give the inverted image a cyan colour cast.

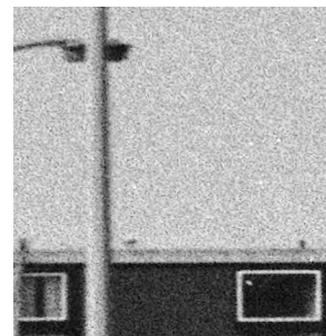


I have found that through trial and error that the best option seems to be to use a custom white balance during raw conversion and then invert the colours and make final adjustments. You may find a better method.

Dust and damage to the negatives are problems. Loose dust can be cleaned off using a blower or blower-brush, other issues will require a clean-up in an image manipulation programme of your choice.



With a good copy, the film structure (grain) should be visible, depending on the film, its age and speed this may be subtle or very noticeable.



There are many other ways of copying with a digital camera and every set-up will require different adjustments to be made and the process will be a learning curve.

A good slide scanner will remain the easiest and arguably the best option, but using a D.S.L.R. seems to give a higher quality image than those obtained using a flat-bed scanner.

The size of the image you capture will depend on the camera used and the pixel count. The quality will depend of the lens used, the accuracy of the alignment of your set-up, your lighting and the care you take. You will need to learn how to work with the digital negative files which have different characteristics from those usually captured in non-copy work. You will also need find what is the best work flow for your needs.