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Wednesday, 04 January 2012

How to 'Scan' Film with a Camera—Well (Part 1)

By **Ctein**

Two weeks back I wrote about the gradual demise of dedicated film scanners and how, in the future, that is going to make it increasingly difficult, if not impossible, to conveniently scan film positives and negatives for digital printing. Many readers expressed interest in the idea of using a good digital camera in lieu of a dedicated film scanner; a few had even tried.

This is not an impossible approach. Doing it well requires knowledge and skill. I think it may prove an entirely workable alternative to film scanners in the future, so long as people remember it is a skilled craft, very much the same way good enlarging in the darkroom is. It's something you can do well and reliably with the right equipment and with practice, not without.

Now, if you don't care about doing it really well, and many of you don't (for good reasons; I do understand) then don't even bother with this approach. A flatbed scanner, even one a generation old, is going to do this better and a lot more conveniently. Alternatively, there are plenty of mail-order outfits that charge circa a dollar a scan that will easily beat a thrown-together rig.

That's my most basic recommendation—either do camera captures well or don't do them at all.

(A slight pause, while half the class gets up and leaves the room.)

First, uniformity of illumination is important. It's not as easy to achieve as one might imagine. The best way to get a really uniform and controllable light source with good off-axis characteristics is to buy a used diffusion color enlarger head. They're cheap these days. Turn it upside down and it becomes your light table. Problem solved.

Color accuracy and tonal range are not major problems if you're working from negatives. Even a very contrasty color or black and white negative rarely hits a density range of 2.4 (8 stops). Any digital camera you have that you consider of high enough quality for this work will have more than sufficient exposure range at its base ISO.

Slides are a more difficult problem. At a minimum you're dealing with density ranges of 3.0 and the most contrasty of them go above 4.0 (10–13 stops). At the low end of that scale, quite a few cameras are satisfactory; at the high-end, very few. HDR *might* be the solution, but it's rarely invoked to produce a perfectly linear tone scale, and that's an absolute must for accurate film scanning (in case it's not obvious, you better be working in Raw when you scan film). I don't know if the HDR converters out there are capable of doing this, but I'll bet one of our readers does.

Then there's resolution. That's the real hard part. There are four major components to that: film flatness, camera/lens/film alignment, camera resolution, and lens quality. I'll talk about the first two now; the second two will have to wait until next week.

No matter how good your camera and lens are, they aren't going to perform very well if the film isn't actually in the plane of focus. Film flatness is the first issue. At 2400 PPI, 1:1 magnification, your depth of field is really, really tiny. A tenth of a millimeter matters. Film usually doesn't stay that flat without some kind of tensioning mount or glass mount. Anyone who's done film scanning knows how much difference in sharpness there is between a scan done using a glass carrier versus an open one. The same thing is going to happen on your copy rig.

That 0.1 mm tolerance doesn't apply just to film flexure, it also applies to the alignment of the film plane. Your camera's sensor, the lens, and the film need to be really, really parallel. I mean *really* parallel. You've got about a quarter degree of slop, that's it. Any more than that and you're going to notice in your photos that one side of the frame or the other, or both, are less sharp than the center.

So how do you tell if you've got an alignment problem, as opposed to a curvature of field or edge sharpness problem in your lens? If it's a problem with the lens, the lack of sharpness will be roughly radially symmetric; all four corners will be similarly unsharp. If your unsharpness is caused by your film plane being tilted, there will be a line at some angle where the image is uniformly sharp, edge to edge, and it will be maximally unsharp at the edges at right angles to that.

Next week I'll wrap this up with the camera and lens discussion.

Ctein

Ctein's weekly photo-tech column appears on TOP on Wednesdays.

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ADDENDUM from Ctein: *OK, I thought my position on this was pretty clear from my articles and comments over the last two columns. Apparently not. So here it is, with no minced words:*

I think digitizing film positives and negatives by photographing them with a digital camera is a bad idea. Most people will get worse results than they would with a reasonably-priced flatbed scanner. Ninety-nine-plus percent of them will get worse results than they would with a decent film scanner or with sending their film to a dollar-a-scan service. I have not been encouraging anyone to do this. Quite the opposite. My hope is to discourage people from wasting their time even trying.

I'm writing this two-part article because (a) a lot of people seemed interested in trying this approach and (b) I want to let them know exactly what they're in for and how much work they'll have. I am hoping this will dissuade many from even trying. For the rest, I'm hoping it will dispel any illusions that (to be blunt) half-assed results can compare in any way to doing this with a scanner or a service.

Featured Comment by **Hugh Crawford:** "The dead simple way to align an SLR camera and the work is to put a mirror where the work is. If the reflection of the camera lens is in the center of the image, then the work, lens, and camera are aligned. (Assuming that the lens and sensor are aligned. View cameras have a whole other layer of stuff to mess with.) Perhaps the reflection of the lens in the film or carrier glass might serve as well as a reflection in the mirror ?

"The mirror thing always seemed obvious to me but some people I do copy work for seem surprised.

"Additionally, I find that longer focal length lenses are much more forgiving of issues of film flatness.

"If you live in the big city, you have the choice of mounting your copy rig on something really heavy like say a cubic yard of concrete or using strobes as the light source. I find that no matter how rigid I have things, strobe lighting is sharper, and a little short-duration shoe flash is sharper than a long-duration studio flash.

"Also, you should consider that an older color head dissipates a lot of heat either by convection or with fans, usually through vents on the top. A lot of the old color heads used gravity to keep the mixing box in place, or to make the filters follow the cams. I don't think old Beseler Dicro head would work upside down, and I'm pretty sure my Durst would catch on fire if I left it on for more than a half hour upside down. For what it's worth, I tried using an old Aristo Graphlarger cold light head as a light source for copying negatives, but the tubes flicker at 120Hz and as a result I got stripes if I was shooting faster than 1/60th of a second.

"The little Omega and Beseler enlargers for 120 film were both advertised as being suitable for turning into copy cameras*. I even have an attachment to bolt a T adapter in place of the negative carrier on a B66 around here somewhere, so maybe their heads would work."

[**Several of the Saunders/LPLs, too —Mike*]

Featured Comment by **Bob Rosinsky:** "I use a 39-MP multi-shot back, a 26mm tube, a 120mm macro lens, and a backlit film stage (illuminated with an Elinchrom Quadra) for copy work. At *f*/16, I am able to see sharp grain across the field (35mm up to 4x5-inch negs). I use negative carriers from an ancient Omega enlarger to hold the film in place. I avoid glass. I think it introduces too many problems."

Featured Comment by **Andrew Molitor:** "I use the monitor of my iMac as a light source. Set the desktop background to pure white, clear the icons off a sufficiently large area of it, and go from there. I make sure it's well back from the focal plane, which should cover any minor variations (I hope). The results are at least OK, probably pretty close to the camera limits (which isn't saying much—it's crop sensor, and I use a medium good macro lens)."

Featured Comment by **jz:** "Your column might end up being the inspiration I needed to get out the old Beseler slide duplicator with a Rodenstock Apo-Rodagon R 75mm lens. I should have figured this out a long time ago."

Featured Comment by **Aaron Campbell:** "For 35mm scans simply get a Plustek 7600 and forget about do-it-yourself solutions. [*Plustek in introducing a new 120 scanner too, according to this link (supplied by mani in an earlier comment). —Ed.*] It also doesn't make sense to complain about film scanners disappearing and then not even buying one that is in production and delivering pretty good results. [*The question was just, 'IF you were going to do that, how would you?' It's not a recommended technique* per se. —*Ed.*] I recommend the Plustek 7600 for any 35mm photographer. (The only thing that sucks about it is manual frame advance. But then, also one less part to break so maybe a good thing in the end....)"

Featured Comment by **Sara Piazza:** "I recently was able to get my (15 year-old) Nikon CoolScan up and running again via a special Firewire I had to purchase to replace the original SCSI connection, and by installing VueScan (which makes the scanner compatible with newer OSs). I'm excited to be scanning old B&W negs, some of which I never got around to making contact sheets for, seeing some of these images for the first time—many great B&Ws of my young family. Very interesting post. Thank you."

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Featured Comment by **Kristian:** "Here is my solution for scanning 6x6:

"I have since then flipped the box up, and put the negatives between glass to obtain a flat negative. So what is it? Cardboard box coated inside with a sort of glossy white paper, and a flash attached. Tried regular paper at first, but then the papers fibers would shine through and transfer to the inage in some way. It may not be perfect, but works fine for those few times I develop meduim format. Here's an example:

Question from **davide:** "Can anyone recommend a resource to explain the relationship between density range and dynamic range? Ctein said that B&W/color negatives had a density range of around 8 stops while slides were 10–13. I had been of the impression that negatives had a wider dynamic range than slides in general and that some had a much wider dynamic range than 8 stops in particular. Any explanation would be appreciated."

Ctein replies: *Density range is the brightness range in the film. It is usually expressed in log units—a density range of 1.0 equals a factor of ten. A density range of 0.3 equals a factor of two. The camera's exposure range, usually expressed in stops (factors of two) has to be large enough to be able to capture the density range of the film. The exposure range of the film (the range of subject brightnesses it can record) has nothing to do with its density range, so you don't have to worry about that. Hope this cleared things up.*

Posted on Wednesday, 04 January 2012 at 01:30 AM | Permalink

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Comments

I have so few *good* color slides from the old days that I'm willing to send them out; but I have thousands of b&w negatives, and this approach fills me with hope.
Please go on....

Posted by: Paris | Wednesday, 04 January 2012 at 01:45 AM

This will maybe not meet Ctein's high standards, but here is what an online friend of mine does, mainly for convenience as he says:

http://derscheuch.wordpress.com/2009/12/22/wie-krieg-ich-das-denn-nu-in-den-rechner-rein-teil-eins/
http://derscheuch.wordpress.com/2009/12/28/wie-krieg-ich-das-denn-nu-in-den-rechner-rein-teil-zwei/
http://derscheuch.wordpress.com/2010/01/06/wie-krieg-ich-das-denn-nu-in-den-rechner-rein-teil-drei/

It is in German, but you can see the setup in part two and the result in part three. He uses a Sony Alpha 900 (not the camera in the pictures) and a 100mm macro lens, the light comes from a transparency unit. The final result links to his flickr stream, which contains many more examples.

Posted by: Carsten S | Wednesday, 04 January 2012 at 04:06 AM

This is something I've started experimenting with - my first attempt exposed the discontinuous spectrum of the energy saving light bulbs in my lamps resulting in loss of some colours; later experiments involved taping slides & negative strips to the windows, which brought me to the alignment issues. That is as far as I got, so any hints.....

Posted by: Chris Crowe | Wednesday, 04 January 2012 at 04:53 AM

Good Stuff Ctein. One ancient photo I've recently printed for a client arrived as a scan from a negative, (possibly a plate) and has astonishing tonal range and sharpness which left me quite breathless. Exif data indicates it was done with - wait for it - a Phase One P65+. All things are possible....

Posted by: Ger Lawlor | Wednesday, 04 January 2012 at 05:00 AM

I think I will have puffed out my second wind of film photography if it ever comes to this. If it was this difficult and you could get a better result then maybe, but sounds too hard to get just ok.

Posted by: The Lazy Aussie | Wednesday, 04 January 2012 at 05:33 AM

"At 2400 PPI, 1:1 magnification, your depth of field is really, really tiny."

Does dropping down scanning resolution and/or magnification increase effective depth of field? My coffee-brain says, "no" because the optical distance hasn't changed with scan settings. But maybe you're meaning effective or *resolvable* depth of field?

Overall I'm wondering if sacrificing scan res (or camera sensor size?) could be somewhat overcome later with a wee bit of Unsharp Mask such that the overall result is clearer than it would have been when scanned higher (within the limitations of the print size etc.)

Or will the next installment reveal that critical alignment is easily achievable with the right gadget, rendering my question moot? Thanks!

Posted by: David | Wednesday, 04 January 2012 at 07:45 AM

If you have thousands of negatives, and they are 120 or smaller, go to BH and buy a film scanner. It will do a better job, you will help keep the manufacturers making them, and you will not go crazy. Mike can put up some links.

Posted by: Edward Richards | Wednesday, 04 January 2012 at 08:00 AM

I'm looking forward to side-by-side results of this technique compared to a flat-bed scanner. We've scanned thousands of slides in our office with an Epson V750 Pro with good results. Like so many other instrumentation decisions, it boils down to "good enough" vs. "good" vs. "great", and the time required to achieve it.

Posted by: John from Macro Photography For All | Wednesday, 04 January 2012 at 08:43 AM

Waiting breathlessly for part two.

John, (sitting here with thousands of 35mm half frame negs)

Posted by: John Robison | Wednesday, 04 January 2012 at 09:00 AM

There is a long discussion of scanning large format negatives with a camera at the Large Format Photography Forum: http://www.largeformatphotography.info/forum/showthread.php?t=84769.

Posted by: Dave Karp | Wednesday, 04 January 2012 at 10:02 AM

How about using a trans light approach by putting the negatives on a light table? Obviously would have to set the exposure manually and cover the light table around the borders of the negative to avoid flare.

Posted by: Bernd Reinhardt | Wednesday, 04 January 2012 at 10:04 AM

William Blackwell has written a nice article detailing his investigations into "camera scanning" at The Agnostic Print. Quote: "I've recently built such a system for the University of Vermont Slide Library. [...] we hope to digitize our 150,000 slides in under three months (pre metadata inclusion) with only $3400 in equipment."

Posted by: Johnwhitley | Wednesday, 04 January 2012 at 10:08 AM

After many hours of frustration trying to get good scans from my B&W negatives while utilizing flatbed scanners I gave up. The problem was not sharpness or tonal range, but excessive grain. One of the owners of a local camera store suggested I use my light table, Nikon D700 and 60mm macro lens. To achieve film flatness

I use an old Beseler negative carrier that clamps the negs in place. Once I got everything dialed in the results have been better than I could ever have gotten from a flatbed. The only thing I might try different is trying a longer macro lens as I think I am getting slight barrel distortion with my 60mm Nikkor.

It goes without saying that I use a VERY sturdy tripod. I might try locking the mirror up to see if there is any real difference in sharpness.

Posted by: Eric Rose | Wednesday, 04 January 2012 at 10:15 AM

Ctein,

I'm currently scanning negatives with a Nikon Coolscan and I had a broken computer monitor (bad lcd, good backlight) that I converted into a light table to preview the negatives. Would this serve as a good light source for photographing negatives? It seems to me that if it's good enough to view scanned negatives on a computer it should be good enough to backlight negatives for re-photographing, but I'd like to hear your opinion.

Posted by: Jack Nelson | Wednesday, 04 January 2012 at 10:16 AM

I recently have been exploring how to shoot 35mm B&W negatives and have used a LED video light as lightsource. My old Durst enlarger provided me with a lightbox which I put over the LED light to diffuse the light even more.

The film holder of the Durst keeps the film pretty flat without the use of the glass plates. The planparallel position of camera sensor and film are the hardest part for which I do not have a good solution yet.
Testshots with the GH2 + 45mm macro lens look promising with regards to the lighting.

Looking forward to the next episode of your column Ctein.

Posted by: Henk | Wednesday, 04 January 2012 at 10:31 AM

For anyone thinking of scanning film there have been a couple mid price Nikon film and slide scanners appear on fredmiranda.com in the past few months, including a Nikon Coolscan IV ED. I just took a draw and bought a LS-2000 for $115.00. Next week will test and see if it works. One has to be patient and check the listing frequently.
I am not related in any way to Fred Miranda or his site.

Posted by: al from chicago | Wednesday, 04 January 2012 at 10:56 AM

For linear HDR, ZeroNoise might be a (very) decent solution.
http://www.guillermoluijk.com/article/nonoise/index_en.htm

Posted by: NikoJorj | Wednesday, 04 January 2012 at 11:51 AM

Some background: For the past 20 years I have specialized in the field of photomicrography. Most of my subject matter has been glass mounted specimen slides. About 7 years ago I started scanning a collection of 4x5 and 5x7 black & white glass plates (dating from 1890 to roughly 1915) for our local museum. For the glass plates an Epson 4990 scanner was used. A few years ago we came across some 16mm film footage that we wanted to make fairly large prints of. Using a film scanner was out of the question since that would necessitate the cutting of the 16mm film. My solution was to use my photomacrography equipment as follows: I used a Nikon Multiphot system. With the Multiphot, the camera plane, lens plane, and the subject plane are all aligned well within a fraction of a degree of each other. For a camera body, at first used an older Leaf Lumina which could be dedicated to the set-up, but later changing to a Nikon D700. For a lens I first used a 35mm Micro Nikkor, later changing to 65mm Micro Nikkor which gave me a greater lens to subject distance. These lenses have T stops rather than f stops. Stopping down one T stop from maximum aperture worked best for me. For a light source I first used a small 4x5 inch Aristo light box but quickly switched to the collated light source of the Multiphot's condenser microscope like system which greatly increased the resolution and contrast of the images. I would say this is the ultimate film scanning system that accommodates 8mm to 4x5 inch film. Changing the lens, film holder, and condenser takes less than a minute. The Micro Nikkors (16mm, 35mm, 65mm, and 120mm) far out perform normal brand name Macro lenses. Zeiss Luminar lenses would be another option. The costs of these optics seem ridiculously high (look them up on EBay) until you use them and experience the superb images they produce. The Achilles heal of this whole set up is definitely the film holder. Very few, if any, photographic film holders adapted from darkroom enlargers have the "microscope" quality tolerances of the Multiphot. I ended up sandwiching the film, emulsion side down, under a piece of anti Newton glass.

Posted by: Greg | Wednesday, 04 January 2012 at 12:02 PM

I've had most of my color slides that were worthwhile scanned.

But I have at least a 1000 color photos that need to be scanned. These are mostly family pictures and not worth sending to a commercial service. I've thought about whether a light table and a good macro lens for my DSLR would be more useful than a slow film scanner.

Posted by: PS | Wednesday, 04 January 2012 at 12:12 PM

Someone should make a dedicated 'lens' which has a space to fit the film into, and is already perfectly focused.

Posted by: Nico Burns | Wednesday, 04 January 2012 at 12:55 PM

My second comment. I have been using an Epson flatbed V600 to do quick scans of older photos. The scans have been made quickly because my wife has to return albums to relatives. I have had good results with photos dating back to 1915, 1942 and the 1940s, but all B&W. The link below is to some of them, the oldest prints. I have to go back and clean them up a little, dust spots, alignment, etc. But for 2 minutes on each for family history the are adequate.

http://alan996.smugmug.com/Other/Babbette-family-old/20889607_XVL3fM

Posted by: al from chicago | Wednesday, 04 January 2012 at 01:16 PM

Dear David,

Depth of field ALWAYS involves resolution! It's right there in the equations. The more resolution you want, the smaller your depth of field. In the "macro" realm, which is where we're talking about working, it's proportional to the resolution.

Unsharp masking does nothing to improve resolution. Useless in this case.

pax / Ctein
==========
-- Ctein's Online Gallery http://ctein.com
-- Digital Restorations http://photo-repair.com
==========

Posted by: ctein | Wednesday, 04 January 2012 at 01:23 PM

Dear John,

Yup! An Epson 750 flatbed is going to run rings around the camera-copy approach unless the latter is done absolutely perfectly.

That's a no-brainer- no tests or examples needed (nor will any be provided).

pax / Ctein

Posted by: ctein | Wednesday, 04 January 2012 at 01:26 PM

Perhaps this is the time to go hunting for some long forgotten accessories such as Nikon's BP-6 bellows coupled with a PS-6 slide copier. These are aligned and the diffuser is build in. Twenty years ago I used similar equipment to do slide to slide copying. No easy task then. The two major problems were precise focus and colour temperature control. With today's digital equipment live-view would eliminate the first problem and colour casts are easy to correct in post processing.

Posted by: CMS | Wednesday, 04 January 2012 at 02:50 PM

I've been doing this for a while, using an ebay led movie light with milky plexiglas as a light source, an Omega neg carrier, and my D300 on a copy stand, and it's working great. The most unexpected thing I discovered was that no enlarging lens (I tried a bunch of good ones) worked as well as my 60/2.8 Micro-Nikkor at f/8.

In-camera sharpening turned out to be a bad idea, accentuating grain (aliasing?) without gaining sharpness. Once I got things set up right, autofocus is working very well for the final focus, too!

Using the mirror for parallel setting is a great idea. That was my final hurdle.

Posted by: Michael D | Wednesday, 04 January 2012 at 02:57 PM

New dedicated film scanners are still being made - someone over on LUF just posted this link:
http://www.geardiary.com/2012/01/04/plustek-to-unveil-new-line-of-scanners-at-ces/
As someone else mentioned, the sensible way to keep film scanners available is simple: buy them. Must say I'm disappointed to see the Heath Robinson DIY approach being used, when perfectly good film scanners can still be bought new. Surely we should wait with these desperate measures until the time we have no option.

Posted by: mani | Wednesday, 04 January 2012 at 03:11 PM

One thing you haven't mentioned in this article (and perhaps might have covered in the next section) is the speed of using a digital camera for scanning. I've got a Canon Canoscan FS4000US and it takes anywhere from 5-10 minutes to scan one frame. This doesn't include pre and post scanning adjustments from within the TWAIN module. It takes me at least 4 hours to scan a roll of 36 exposures properly.

The DSLR solution seems to have the potential to be a time saver and provide usable files. I'm looking forward to reading your concluding article.

Posted by: Kelvin | Wednesday, 04 January 2012 at 03:17 PM

As Greg has pointed out, there is equipment already designed and made for just this purpose. At a slightly less flexible and much less expensive level, there is equipment designed for making copies of 35 mm film in the pre digital days.

I've experimented with this with reasonable success using just such purpose designed equipment. I used Olympus equipment because it's good and because I already had it.

I used a setup like that shown here,
except with a Canon 5D in place of the OM film body.

The Oly Auto Bellows and slide copier are well made and connect to each other so that parallelism is maintained without any fancy fussing.

The Slide Copier is quite well designed, with separate provisions for holding slides and short strips of bare film. The Roll Film Adapter does what its name implies.

The copier has its own piece of diffusion glass built-in. I used it with a 4x5 in. light 'table', but flash could easily be used, as well.

The Olympus 80/4 bellows lens is corrected for 1:1, very flat field and high resolution - exactly for this purpose.

The 5D gives a theoretical resolution of 3600 dpi. The Bayer array design reduces that, although I have no way to really measure how much.

As I was interested in 'scanning' a bunch of old slides, that's what I

tested on. On some 1930s Kodachromes, 5D copies and 4000 dpi scans on a Canon FS4000 were close to indistinguishable. There were subtle differences at 100%, but I couldn't say one was better than the other.

That's not a real test of the system, as film and lens seem to give no more than maybe 2400 dpi to resolve.

With slides, focus check is probably needed at least for each change of mount from different processing batches, if not more often. With bare film in strips or rolls, it probably isn't necessary.

DOF didn't seem to be a problem, but I didn't try shooting a slide in standard mount, then putting it bare or in a glass mount. Glass mounts are problematic, as anti Newton Ring glass reduces resolution.
Getting a bare single frame in any holder centered, square and flat is difficult.

I came to the conclusion that the whole process wasn't useful for me. It's slow, as each frame has to be hand set and hand exposed, and no better than using a good flatbed, like the Epson V series or the Canon 9950F I have. Setting 12 slides into the scanner is quick and easy. Inserting 5 strips of film is only slightly fussier. Scanning can then be automatic.

The CanoScan software had problems with DR. Using VueScan, results are almost as good at a nominal 4800 dpi as the pure film scanner at 4000 dpi. For most of my older film, and the slides inherited from my father, there just isn't anything to be gained with the film scanner.

Even the film scanner, which will automatically handle strips of 6 frames or 4 slides at a time, is less bother than the slide copier set-up.

Moose

Posted by: Moose | Wednesday, 04 January 2012 at 04:38 PM

I have had good results using a Beseler color head enlarger with the neg or slide in the neg holder shining onto the base and then using a Minolta A2 on it's back on the base. Results were very good using 35mm and even better using 6X6 or6X7 negs.

Posted by: Bill Symmons | Wednesday, 04 January 2012 at 05:34 PM

The classic two-mirror enlarger alignment method sounds like it will work for aligning the lens to the film holder in this kind of a setup.

For extreme dynamic range, some kind of compendium shade might also be worth while; at least be very careful masking off any part of the lighted surface that the film being imaged doesn't cover.

Given a well-built set of hacks, the actual "scanning" can be MUCH faster this way than in a scanner. But it does take personal attention; can't just dump a batch of slides (sorted for similar exposure) into the feeder. On the third hand, given a well-built set of hacks you might well be able to find a cheap teenager who could then run images through the rig pretty fast.

One obvious loss is you don't have the ICE defect elimination. Depending how much this is your good work vs. your snapshots, that may or may not matter much (presumably the "good" work has been well taken care of, right?).

Posted by: David Dyer-Bennet | Wednesday, 04 January 2012 at 05:36 PM

Anybody got an old Spiratone Dupliscope?

Posted by: Bob F | Wednesday, 04 January 2012 at 05:39 PM

I was just wondering something. I wonder if it's possible to do the digital equivalent of a contact print. Lay a 35 mm negative (or slide) directly onto the surface of a digital sensor then shine a light through it somehow. It would not exactly be a simple DIY project though, seems like it would need some custom electronics, but maybe there's a skunkworks team at one of the sensor makers who have tried this with discarded sensors. Be fun to try.

Posted by: Robert Roaldi | Wednesday, 04 January 2012 at 05:46 PM

One word of warning for those considering using an enlarger head upside down: most of them were designed to ventilate by convection in a normal non-upside down position!
Put them upside down and you got a sure fire recipe for burned out lamps, at best.

Doesn't mean it can't be done: just make sure you rig some form of forced ventilation to ensure it happens. Doesn't need to be a hurricane-force breeze, either! :-)

Posted by: Noons | Wednesday, 04 January 2012 at 06:12 PM

Do go on ...

This could be the justification for purchasing a Pentax 645D that I, and possibly others, have been waiting for. It scans slides and negatives, and it takes pictures as well!

I'll be sorely disappointed if you tell me that my lowly D700 is sufficient.

Posted by: Kent | Wednesday, 04 January 2012 at 06:56 PM

Can anyone recommend a resource to explain the relationship between density range and dynamic range? Ctein said that BW/color negatives had a density range of around 8 stops while slides were 10-13. I had been of the impression that negatives had a wider dynamic range than slides in general and that some had a much wider dynamic range than 8 stops in particular.

Any explanation would be appreciated.

Posted by: davide | Wednesday, 04 January 2012 at 07:41 PM

I have a lot of 35mm color slides, with only a small proportion that should be scanned really well, in my opinion. My little brain didn't even THINK about sending them out, so I will do that - doh! I've tried with the flatbed, and it fails on 35mm. It does very well with medium format when everything goes right, and since I love the actions and mechanisms of shooting film, I shoot only medium format now. I'm getting sellable 20x24s fairly consistently from the V700 scanner. I don't like, or want, to sell any print that is less than very good to excellent, and this is working, thank goodness. All of my 35mm equipment is going away slowly, through auctions and other sites. I always thought that when I reached my older years (I'm 63), I would have more time - yeah, sure! So, I'll finally whittle down to the medium format camera and one digital camera.

Posted by: Laurence | Wednesday, 04 January 2012 at 07:44 PM

"Unsharp masking does nothing to improve resolution."

True - and yet ...

What most people mean, most of the time, when they toss about comments on resolution is **not** resolution, but sharpness.

Where resolution is a fairly clearly definable factor. Sharpness, however, is a subjective mix of resolution and contrast. It didn't matter so much in the film era. In the digital era, it matters quite a **lot**.

Imagine an 8 bit image file of alternating pixels of values 127 and 128. Even at 100%, it's going to look like continuous 50% gray. Boost the contrast way up, and suddenly it is clear that resolution is very high.

Unsharp Mask, both as edge enhancer and for LCE, has a similar effect on apparent sharpness. As such, often together with contrast, curves and/or levels, it can greatly enhance the *visibility* of resolution otherwise not apparent to the eye.

- and yet ...

Deconvolution algorithms are capable of actually increasing the resolution of an image. One can only imagine the extent to which this might be the case with a custom algorithm for a specific lens and repro ratio. Still, even the generalized solutions can make a significant difference.

Yes, every effort should be made to get it as good as possible in the initial capture, but to dismiss so lightly software that can improve the result seems short sighted to me.

If I were faced with the choice between more contrast at edges and more resolution with less edge contrast, I probably would have chosen the former for film copies of slides. I would likely choose the latter for digital copies today.

Moose

Posted by: Moose | Wednesday, 04 January 2012 at 09:45 PM

About 30 years ago I wanted some 35 mm positives from negatives for projection. After some thought and Rube Goldberg construction, I projected the image with my enlarger on flat white paper at about 11x14" and copied those images with a 35mm camera. The camera was quite close to the enlarger so the distortion was minimal and depth of field was ok for sharpness.
I also tried a projector but the Kodak Carousel optics were not adequate.
Later I found a gadget at Porters for copying slides that had a built-in lens but never tried it.
Today, I would try back projection or a 45 deg partially silvered beam splitter.
Caveat:good enough!
All this seems much less critical than macro.

Posted by: JH | Thursday, 05 January 2012 at 12:50 AM

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http://specialtyphotographic.com/
The slide/negative copiers are still available.
Again - the "good enough?" caveat.

Posted by: JH | Thursday, 05 January 2012 at 01:20 AM

Dear Al,

Yeah, old print scanning is a LOT easier, and a very modest scanner can do a very good job.

I talk about scanning prints a lot in DIGITAL RESTORATION (http://photo-repair.com/DigiRestBook.htm). It's pretty easy to do once you learn the right approach.

pax / Ctein

Posted by: ctein | Thursday, 05 January 2012 at 02:07 AM

Nico

"Someone should make a dedicated 'lens' which has a space to fit the film into, and is already perfectly focused."

EBay is awash with them , they are called slide duplicators and the were popular in the 60s and 70s for duplicating slides. I still have one I got for $15 from Spiratone when I was in college. It made me really popular with art students who were always needing to dupe slides.

They work surprisingly well despite looking like pieces of junk. The only problem with them is that they are set to f16 or f22 at about 100mm extended to 200mm of course, so they show up any dirt you have on the sensor in great detail. I was never able to get my 1Ds clean enough to use it.

Oh and one more thing , they only work on full frame cameras , and they tend to crop the slide unless you take the whole thing apart and shorten the tube and refocus it.
Back then people were more upset by the cardboard mount getting in the picture than by losing some of the image.

I see someone is selling some polaroid branded gadgets that have a slide stage and a closeup lens that mounts on the lens of your camera. Sounds like just the think to give relatives and friends who are always asking for help scanning slides.

On the other hand , my daughter just sticks old slides into a 79 cent slide viewer and holds the eyepiece up to the webcam on her laptop and is perfectly happy with the results which are vastly better than most of the old photos you see on facebook

Posted by: hugh crawford | Thursday, 05 January 2012 at 03:57 AM

Obviously my comment on the Plustek 7600 didnt make it through. Why ever... Bad.

whydoyouneedmyemailadress@spam.com

[*Your original comment is published in the "Featured Comments" section of the original post. And if you had included a real email address, then I could have told you so privately. --Mike the Ed.*]

Posted by: Doesntmatter | Thursday, 05 January 2012 at 04:15 AM

I still have the old Bowens Illumitran 3 to "scan" old negatives and slides up to 4x5".

Posted by: Thomas | Thursday, 05 January 2012 at 04:33 AM

Very interesting reading. Some weeks ago I did a very simple comparison for a colleague. I own a flatbed scanner (Epson 3170) with which I have made a lot of scanning of framed slides and b/w negatives. It turned out to be sufficient for the Internet and prints up to 5" x 7". Some months ago I bought a plustek 7400 film scanner after reading the test of the plustek 7600 at luminous landscape. My largest print has a width of 20" and looks acceptable. And lately I tried the Olympus E-P2 adapted to the old OM 3.5/50 macro, a step down ring and an Olympus slide duplicator (named "digital film scanner") which I got on Ebay for 1€ plus shipping costs.

Comparing these setups with slides from the colleague showed the following results:
- Resolution was sufficient in all cases. This came as a surprise and I think is due to the high ISO slide film and the rather cheap Canon zoom from the eighties.
- As could be expected the dynamic range was critical with the flatbed scanner.
- Workflow seemed easiest with the flatbed scanner which is able to scan four framed slides or up to 12 uncut stripes at once.
- Color handling is critical and was best with plustek and Silverfast and the E-P2 and the Olympus raw converter.
- The files from the camera showed some pincussion distortion. Cropping was required in any case due to the change in format from 3:2 to 4:3.

Currently I use the flatbed scanner for bulks of slides and the plustek if I want to achieve high quality. Usage of the E-P2 is still under evaluation but seems to be a little bit cumbersome. Therefore I am looking forward to the upcoming parts of your posting. Before I owned the E-P2 I considered the usage of my Ricoh GRD, whose sun shade fits nicely across the frame of a slide and gives the correct distance for a copy. Of course this would require a professional light box instead of just a window on a cloudy day.

Posted by: Rolf Behrends | Thursday, 05 January 2012 at 08:00 AM

I used to work at Repro Images, a high end slide duping lab in Vienna Va. We mostly worked with stock agencies, they'd send us 1000's of slides and want anywhere from 10 to 100 dupes of each in both 35mm and what we called 70mm. The owner had gone to great lengths to get as good a dupe as possible while also making the high volume profitable. All of this was done optically, all analog, all the way. Some of it may apply to doing digital copies as well since the set up would be similar.

We ran a closed loop system. The color corrections and the lab were locked together. The e-6 process was tweaked slightly to help overcome the inherent increase of contrast when duping. If you ran your own slide film through the lab, it wouldn't look quite right...

The cameras we used were heavily modified Mitchell motion picture cameras. We had both 35mm and 65mm. All sorts of things were done to them. New lens mounts, new film gates, additional pin registration, the movement was totally overhauled, etc. we'd load up 1000' of duping film (the 65mm was a custome order from Kodak) in the magazines and let it roll for as many frames as needed. I estimate the frame rate at around half to 3/4 a frame per second.

The slide we were going to dupe was usually tensioned, but sometimes it was put between glass. Sometimes wet mounting in glass was necessary. I'm pretty sure we used 4x5 Omega dichroic heads as our light source. It was put on its side with the light facing us. The slide was mounted vertically, and it was on a heavy duty rig. The camera was on a massive pedastel and everything was connected directly to the foundations of the building (we were in the basement).

The owner claimed that for the best results, having a lens that was not only optimized, but built for a single magnification factor was key to get the absolute best results, which what he was charging a premium for. For 35mm, he used what he called either duping or Repro nikkors. Apparently they were originally designed for motion picture labs for printing optical fx on film. They had no focussing mechanism. He claimed that they cost 5000 each back when he bought them in the mid 80's I believe. For the 70mm (actually 65mm stock) we used a Goertz "Imperial Magnar". It was made by Goertz USA and he claimed it cost 7 grand in 1978! In 1996, We did a comparison with a brand new APO RODAGON 150mm and found that there was too much contrast in the dupes and no advantage in "detail" so we kept using the older lens. I mentioned several times how nice it would be to use those lenses for regular photography but he claimed that there'd be little point, they were optimized for things that no one else did.

I gotta figure that between getting the sensor plane and the film plumb and the lens it's going to take quite a bit of doing to take images of film that are as good as, let alone better than, a good scan. Whenever you involve optics and distance between the sensor and object, things can get messed up really quickly. I'd be curious to see how well people do with this. I remember how much better our dupes were than even competent labs, let alone hacks. We had to go to outrageous lengths to get there, who will be willing to set something up to get as good as a decent scanner?

Posted by: Isaac crawford | Thursday, 05 January 2012 at 04:48 PM

Dear Kelvin,

Please see my Addendum above.

Dear Mani,
I don't have one tenth the influence on industry-wide sales you think. The reality and trend I see is that film scanners are disappearing from the market. The number of models becomes fewer and fewer every year. I expect that by the end of the decade it will NOT be an (affordable) option for most photographers. Maybe flatbeds will be good enough. Maybe not.

pax / Ctein
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-- Ctein's Online Gallery http://ctein.com
-- Digital Restorations http://photo-repair.com
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Posted by: ctein | Friday, 06 January 2012 at 02:25 AM

Density range (in processed film) is the difference in density between the most transparent area and the densest area in the processed film. This is important because your scanning/photographing method of digitizing the image has to be able to handle that entire range, or it will miss some of the picture.

The dynamic range we talk about is the difference between the minimum exposure that will produce a difference from no exposure, and the maximum exposure that will produce a difference from "infinite" exposure. This is relevant to your original film exposure -- if the brightness range of the scene fits within this, you can pick an exposure that captures all of it, whereas if the brightness range of the scene exceeds this you can't capture the full range in one shot, you have to decide to lose some highlights or shadows.

Generally, slides have a bigger density range, but negatives capture a bigger dynamic range.

Posted by: David Dyer-Bennet | Friday, 06 January 2012 at 08:48 AM

Dear Kelvin & others,

Remember that do-it-yourself scanning will not allow you to benefit from things like Digital ICE and similar very effective hardware-based dust-and-scratch elimination tools. They don't work perfectly, but they get 90+% of the crud.

You will spend at least as much time cleaning up your camera-scans as you saved making them.

Fact of life, unfortunately.

The good news is that, unlike spotting prints, you only have to spot a file ONCE. As someone who feels like he's spent the majority of his career spotting prints (dye transfer takes LOTS!!!) I feel this is still a big win. Just don't get to thinking you get off scott-free.

pax / Ctein

Posted by: ctein | Friday, 06 January 2012 at 02:42 PM

RE: ADDENDUM from Ctein;
A lot of people just want to preserve memories a little longer and in a more convenient medium. Even if it is "half assed" with reasonable instructions you will get a reasonable result. Perfection in reproductions is often in the mind of the person for whom you did the work. My collection of over 2000 digital copies of our late fathers body of work brought many happy memories to four people who miss him very much. Done with canon slr's the work is not half bad, to bad I had to teach myself.

Posted by: Bill OBrien | Friday, 06 January 2012 at 04:38 PM

David and Ctein, thank you for the explanation regarding density range and dynamic range. Up to this point I had thought that I needed a scanner with a very high Dmax (4 or above) to be able to record black and white negatives that had a wide exposure range.

Posted by: davide | Saturday, 07 January 2012 at 01:45 PM

I've got lots of slides, b&w negatives and many years of family photos on color negatives that I'd like to digitize so this discussion is very interesting.

Peter Krogh has been advocating camera scanning for a few years now. He's the author of "The DAM Book: Digital Asset Management for Photographers" which is an excellent book that I highly recommend for anyone thinking about digital workflow. Here's a link to a paper he gave at a 2008 conference on this topic: http://thedambook.com/downloads/Camera_Scanning_Krogh.pd
.

Peter has also been very involved with an ASMP project funded by the Library of Congress called dpBestflow. The goal is to help photographers, particularly professionals, to understand digital workflow for photography including metadata, backups, archiving, etc. This project has an extensive website that offers hours of video training in addition to lots of other resource. There's a page on this site about camera scanning:
http://www.dpbestflow.org/camera/camera-scanning

The topic of camera scanning has been discussed quite a bit in the online forums on Peter's web forum:
http://thedambook.com/smf/index.php.

Posted by: TonyM | Saturday, 07 January 2012 at 07:21 PM

Ctein,
You might be interested in the Large Format photography forum thread on this. Stitching macro shots of 4x5 and larger film is of great interest to these guys, even if Medium Format and smaller is impractical for all the reasons you mentioned. More importantly, they've begun testing prototype setups.

The thread was previously in the registered users area, but has been moved out into the open.

Posted by: Will Frostmill | Wednesday, 11 January 2012 at 01:34 PM

The comments to this entry are closed.