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Scanning Revisited

“DIGITAL OR FILM?” THAT’S HOW I STARTED MY FIRST ARTICLE ON SCANNING IN AUGUST 2003. We have come a long way since then, with affordable digital cameras in the 12MP range, not to mention their improved image quality.

No matter if you are still working with film, or if you have made the full switch to digital, chances are that you have drawers full of transparencies and negatives which need to be scanned. The option that gives the best quality - drum scanning - is not really an option, because of costs. The next best choice is a good CCD film scanner.

But then there is also a new breed of flatbed scanners in competition with dedicated film scanners. With optical resolutions of more than 4000 dpi and a Dmax of around 4.0, they stand where CCD film scanners were only 3 or 4 years ago. Are they really as good as the figures promise?

I had the opportunity of working with the latest Epson V700 Photo, a grandson of the Epson 3200 Photo which I evaluated almost three years ago. This is not a technical test, not even an accurate comparison between the scanners I used; the emphasis is on getting the settings right for best quality.

RESOLUTION AND DYNAMIC RANGE

Most people are familiar with the concept of resolution. The ‘optical’ resolution of a scanner, given by the manufacturer, is the number of CCD elements across the flatbed. However, the actual resolution is generally lower than the one given in the specifications. In the past, and as a general rule, flatbed scanners in the \$1000 range had a maximum useful resolution of around 1500-2000 dpi. The present Epson V700 sports a dual lens system that should give better results, although I am sceptical of Epson’s claim of 6400 dpi for film and 4800 dpi for reflective scanning.

There is no point in using a flatbed scanner at anything higher than 1000 dpi, unless you want to turn it into a microscope. Film is another story, but even here resolutions above 4000 dpi will just give larger grain. Only the finest film in combination with the sharpest lens would justify anything higher than 4000 dpi.

Another problem at these high magnifications is the tiny depth of field. The film needs to be kept absolutely flat and in focus - a big challenge for film holders trying to keep the film flat above the glass. Drum scanners, and also Imacon scanners with their ‘virtual drum’ concept, have a big advantage here.

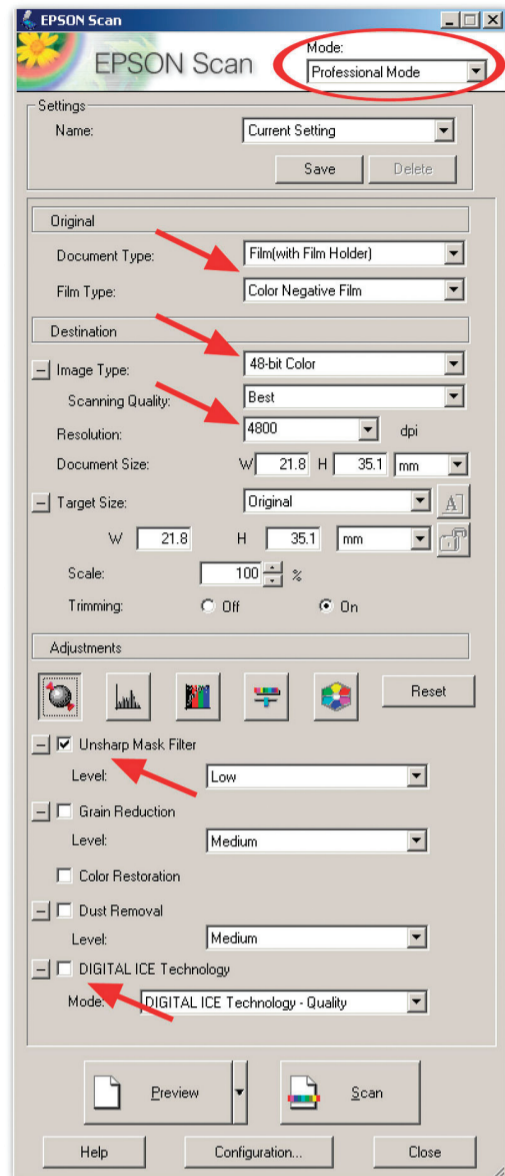
Things get even murkier when looking at the dynamic range and Dmax. This is because there is no single standard to nail down these important factors. Negative film has a density range (or dynamic range) of around 2.4, transparency film up to 3.4. Special high-contrast films and duplicate slides can approach 4.0. In comparison, printed material has a maximum (reflection) density of about 1.8 for glossy and 1.3 for matt paper.

The Epson V700 boasts a Dmax of 4.0, and this should comfortably cover the range of slide film. Well, just a few years back flatbeds had a Dmax of 3.4 and they were used for film. But keep in mind that the Dmax quoted by vendors is typically the point where the noise from the CCD overwhelms the weak signal making up the image. In practice you will find significant amount of noise in areas quite lighter than the Dmax.

THE SCANNER INTERFACE

The driver of the Epson V700 gives three options: Full Auto Mode, Home Mode and

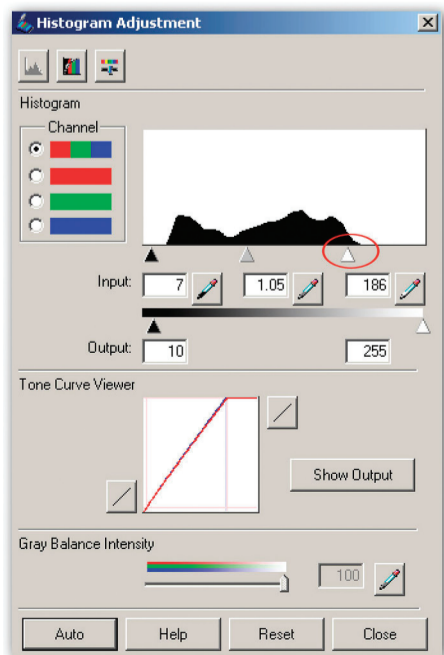
Professional Mode. The last one offers the most control:



Epson Scanner Interface

First select the document type, reflective or film (slide or negative). I recommend to always scan in high-bit mode, which is the 48-bit mode for colour. Then choose the scanning resolution from a list of pre-defined values, up to the maximum of 6400 dpi for film. The resolution can be set to the preferred printing resolution, say 300 dpi, and the document size changed, or set the scale in percent.

After a Preview and crop, take look at the tonal and colour settings. The ‘Auto Level’ command normally does a good job; I only found that the highlight clipping is a bit heavy-handed. It leaves you with a crisp scan, but in some cases highlight details can get lost:



Epson Histogram

Of course, this can be corrected manually. There are extensive controls for colour correction which I didn’t utilise in my tests. Firstly, the colours were always accurate, and secondly there are more tools later in Photoshop to do any fine tuning.

Further down is the familiar Unsharp Mask control. Unfortunately there are only three choices: low, medium and high. This is not good enough for a precise scan. I do like to have a bit of sharpening during the scanning stage, so I tend to leave the setting on ‘low’ and do most of the sharpening at a later stage in Photoshop.

Below the Unsharp Mask are four interesting controls: Grain reduction, Colour Restoration, Dust Removal and Digital ICE. Colour restoration can do a good job in getting faded film or photos back to life. Grain reduction works well, especially with fast negative films, but do watch out for fine image details, which tend to disappear. This also applies for the Dust Removal function, which is similar to the Dust & Scratch filter in Photoshop.

Much superior to the Dust Removal function is the Digital ICE. The scanning time goes up considerably, but dust and scratches are handled well without compromising the sharpness of the scan. I have been spoiled after six years of using Nikon film scanners; their ICE works superbly, but the Epson also does a good job. Keep in mind that ICE does not work with Kodachrome, nor with B&W films.

COMPARING SCANNERS

I still had the 6x17cm tranny from Grant Hunter which I used three years ago to compare four scanners: a top-of-the-line drum scanner, two dedicated film scanners (the Imacon 848 and the Nikon 8000) and the Epson 3200 Photo.

What an opportunity to see how the new V700 compares with its predecessor! This film is a particular challenge for any scanner:



Epson V700

very high contrast with lots of shadow detail, taken with an exceptionally sharp lens. The film was scanned at 2000 dpi and the crop shown is a tiny area below the Sky Tower (see below).

The improvement of the latest Epson in comparison to its predecessor is quite marked. The resolution of the older model was excellent, but shadow details were not resolved and washed out, whereas the V700 gets pretty close to the drum scan, keeping in mind that this was a particularly challenging scan. On the other hand, a 35mm film would have required a higher resolution, favouring again a dedicated film scanner.

The next comparison is a heavy crop from a 35mm transparency. The close-up of a parrot was scanned with an Imacon 848 (5000 dpi) and the Epson (4800 dpi) (see below).

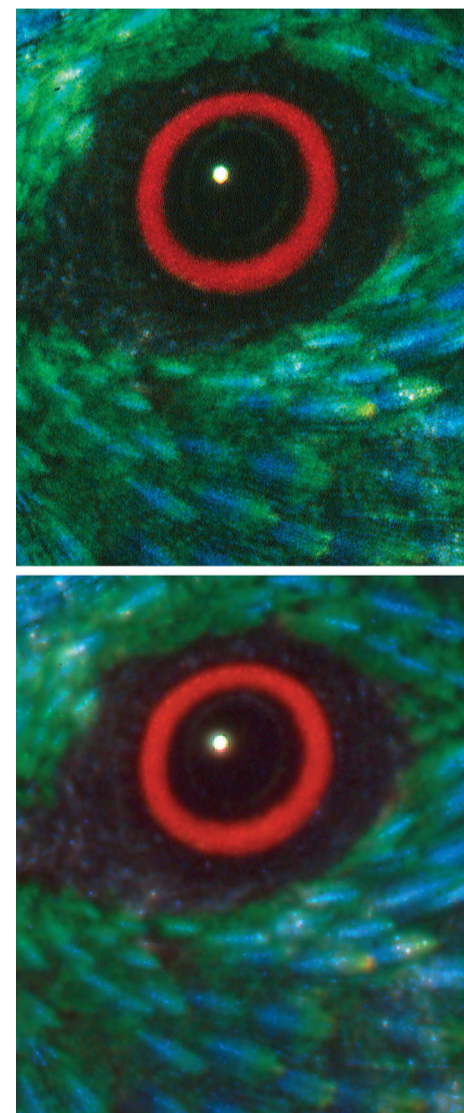
The resolution advantage of the Imacon is quite obvious when comparing the files at 100% on the monitor. I leave it to the reader to decide if it is still significant in an offset print.

Negative scanning was no problem on the Epson. Getting the colours right is always a challenge because of the orange mask. My recommendation is to ignore any negative film profiles and you’ll find that Auto-Levels or Auto-Colour later in Photoshop will give a good starting point for accurate colour.

Some people prefer to do all their optimisation during scanning. In that case you will value the bundled Silverfast software, famous for its excellent scanner control.



From top: Drum scanner, Epson V700, Epson 2400



Top: Imacon 848 @5000 dpi
Bottom: Epson V700 @ 4800 dpi