

NEW
SERIES

Mono Infrared

WORDS & IMAGES LEE FROST

Upgraded your digital SLR recently and not sure what to do with the old one? Lee Frost has the answer – have it converted to record infrared light and explore a whole new world of creative photography

LIGHT IS THE RAW INGREDIENT OF PHOTOGRAPHY, but the light we actually use to record photographic images covers a very limited range – outside which exists a vast, mysterious world of ultra-violet light, infrared radiation, X-rays, gamma rays and others that we will never be able to see with the naked eye.

However, there is one part of the invisible spectrum that photographers using the right equipment can explore – infrared. The earliest infrared photographs were published in 1910 and during World War I, infrared-sensitive film was used for aerial surveillance; but it was in the '60s that it took off as an artistic medium, as its psychedelic effects suited the decade perfectly!

I jumped on the infrared bandwagon in the early 1990s, and over the years I've shot hundreds, if not thousands, of images using infrared films such as Kodak HIE and Konica 750 infrared.

The problem with infrared film is that it's tricky to work with. There's a high risk of fogging by visible light so careful handling is essential; the effective ISO rating varies according to the light and weather conditions you use it in, so bracketing is essential; you must shoot through a deep red or opaque filter to record a strong infrared effect and the negatives require very careful printing to get the best results. I should know. I've spent many a night locked away in my darkroom trying to tease successful images from dense infrared negatives. I also know that the complications of using and printing infrared film have been enough to put many photographers off ever bothering to try.

It's now possible to shoot infrared using a modified DSLR and produce stunning images in a matter of minutes, with far fewer obstacles than with film. So if you were put off exploring the fascinating world of infrared photography in the past because it seemed difficult, now's your chance to change all that.

I had an old Nikon D70 modified to record infrared light back in April this year, and from my first outing with it, I was hooked!

Compared to shooting on infrared film, digital infrared photography is a doddle. The results are every bit as good as film images (and better, in many respects), but so much easier and quicker to achieve. It used to take me hours to print just a handful of infrared negatives, whereas I can download and process dozens of digital infrared images in the same amount of time, without being up to my elbows in smelly chemicals.

Modern modifications (see panel) are done in such a way that you don't need to bother putting a deep red or infrared-transmitting filter on the lens (as was necessary when working with infrared film). Nor do you need to worry about the fact that infrared light focuses on a different point to visible light and adjust focus accordingly, because the camera's focusing system is adjusted internally to compensate. In practise, what this means is that you can use an infrared-modified digital camera like any digital camera – the exposure times hardly even differ.

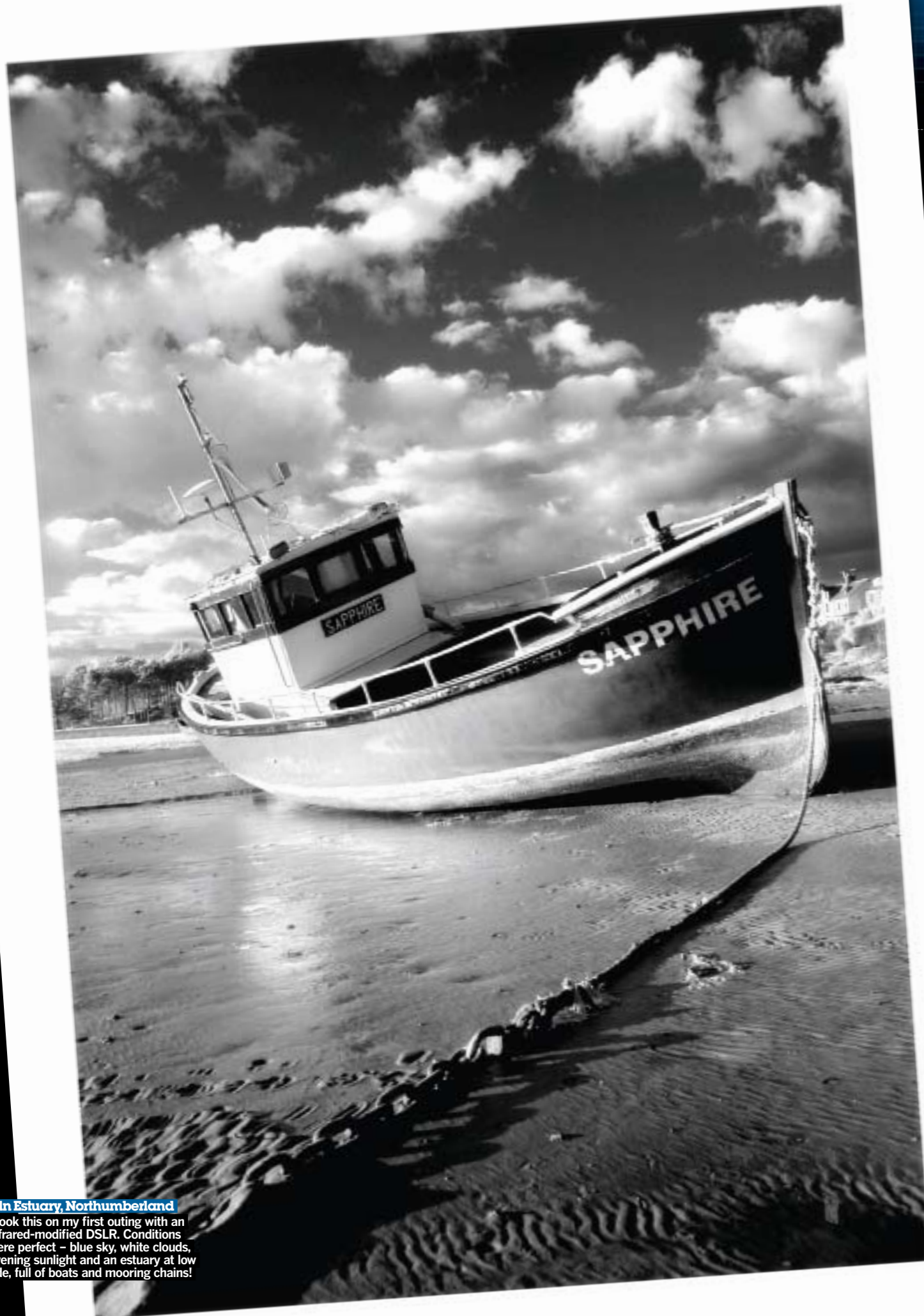
In the infrared spectrum, the way things appear depends on the amount of infrared radiation they reflect. Water and blue sky record as very dark tones – often black – because little infrared radiation is reflected, whereas foliage and grass reflect a lot of infrared light so record as a very pale, almost white tone. Similarly, if you shoot portraits with an infrared camera, skin tones record as a pale, ghost-like tone while eyes appear dark. Although this is a spooky combination, it can work very well.

Use an infrared-modified DSLR for interior shots, as I have done, and often it's hard to see any trace of an infrared effect. Similarly, if you shoot outdoors in bad weather and exclude anything from the frame that normally shows the infrared effect, such as foliage, the images will look just like dramatic black ▶



Near San Quirico
d'Orcia, Tuscany

Trees make great infrared subjects because the foliage records as a ghostly pale tone. This one contrasted well with the dark blue sky behind it.



Aln Estuary, Northumberland
I took this on my first outing with an infrared-modified DSLR. Conditions were perfect – blue sky, white clouds, evening sunlight and an estuary at low tide, full of boats and mooring chains!



Bamburgh Castle
The light on this evening was amazing. I wandered through the dunes, shooting handheld and trying to keep my shadow out of frame. Eventually, of course, the inevitable happened – the heavens opened and I got soaked.

& white photographs, but are easier to create than converting colour shots, as the camera does most of the hard work for you.

In terms of subject matter, anything goes really. Whenever I'm out shooting, I carry my infrared-modified Canon EOS 20D with me and if I see anything that might make an interesting infrared image, I'll shoot it. As I can shoot handheld, it's quick and easy to fire off a few frames, and if they don't work, I've lost nothing.

Landscapes are an obvious choice. Any scene containing foliage and plant life will exhibit strong infrared characteristics. Woodland, especially when lush and green in spring, records like snowflakes. I also enjoy shooting old buildings such as deserted cottages, crumbling castles and monuments, as the haunting look of infrared suits them perfectly – especially when there's ivy around the doors and windows. In towns and cities, modern architecture, bridges and sculpture work well – anything that's graphic really.

Bright sunlight provides the best conditions for infrared photography because the light is crisper, contrast is high and there's a greater concentration of infrared radiation for your camera to record so the effect is stronger. Actually, one of the great things about infrared photography is that you tend to get the best results around the middle of the day when the light is harsh – which happens to be the worst time of the day for colour landscape photography. Consequently, you can pack your 'normal' camera away and shoot infrared images instead, thus minimising any 'down time' due to a fall off in light quality. The same applies in bad weather. If the light is flat and the landscape appears grey and lifeless, don't pack up and head home – just reach for your infrared

What is infrared light?

Light is created from wavelengths of electromagnetic energy. The light we can see falls within the visible spectrum, consisting of wavelengths that vary in colour from red to purple. Basically, the visible spectrum looks like a rainbow's bands of colours. Outside this lies invisible light. At the cooler end of the electromagnetic spectrum, we find ultra-violet light and beyond that, X-rays, gamma rays and cosmic rays. At the warmer end of the electromagnetic spectrum, we find near-infrared, then far-infrared, heat, radar waves and radio waves. We're interested in the infrared spectrum. Wavelengths of light are measured in nanometres (nm). One nm = a thousand millionth of a metre. Light in the visible spectrum covers a range of about 400nm at the cool end to 700nm at the red end. Infrared light covers 700-1200nm, and an infrared-modified DSLR cuts-off at around 850nm – far enough in to create otherworldly images.

camera. The images may not be obviously infrared, but as dramatic black & white photographs they will work a treat and you will have made the most of an unpromising situation.

The effects you get are influenced to a degree by the camera you use. I started out with a Nikon D70 and got on well with it from day one. The images were crisp and contrasty, noise wasn't an issue and the false colour effects were subtle. A couple of months later I switched to an infrared-modified Canon EOS 20D. I'm happy with the results, but they're softer and less dramatic than the Nikon's images, even though I'm using top-grade lenses. Noise in the sky is also a regular problem that I wasn't expecting. ▶



Capella di Vitaleta, Tuscany
It's hard not to take great pictures with an infrared-modified camera, though an interesting scene with strong light undoubtedly helps.

Could I use an unmodified camera?

If you don't want to modify a camera for infrared photography, you can test your unmodified DSLR to see if it's already sensitive to the infrared spectrum. (Some are, some aren't.) Just point a TV remote control towards it and take a shot while pressing any button on the remote. If you can see the beam being emitted, or any trace of it on the image, then your DSLR is capable of recording infrared light and needn't be modified. All you need to do is to fit an infrared-transmitting on the lens, which blocks out most visible light and only admits light at the red and infrared end of the spectrum. Suitable filters include the Hoya R72 and the B+W 092 or 093. The downside is that because they block out visible light, you can't see through them and exposure times are long (several seconds, even in bright sunlight). This means you must use a tripod, compose the scene without the filter on the lens, focus manually and only then attach the filter, at which point you won't see through the viewfinder.



Switching from shooting in JPEG to Raw format has helped a little, along with exposing more to the right, but the problem hasn't gone away completely. Whichever camera you use, bracketing exposures in small increments is advised as slight changes make a big difference to the look of the image and how easily you can bring out the infrared effect.

I often find that images exposed at anything from +1 to +2 stops are the easiest to work on, so I tend to take one shot with a metered exposure (using aperture-priority and multi-zone metering), check the preview image and histogram and work from there. Depending on the subject and lighting, I may find that it's necessary to start shooting at +1 stop then bracket to +2, or start at the metered exposure and bracket to +1 stop.

Either way, I keep increasing the exposure until the highlights are clipped, and then, once the images are downloaded to my Apple Mac, I'll choose the frame in which the highlights are on the edge of blowing. This approach is similar to how I worked with infrared film – making three exposures at metered, +1 and +2 stops and often finding that the last one, though technically overexposed, gave me the best negative.

One area that you need to take care with is the White Balance. Shoot with your DSLR set to AWB and chances are the images will appear bright red. This is because the red pixels in the sensor are the most receptive to infrared light. To get rid of this you need to create a custom White Balance using a grey card or white sheet of paper under the same lighting conditions as your subject – refer to your DSLR's instructions to find out how. By creating a custom WB setting, the images you record will go from being bright red to mainly monochromatic, though the sensor will still record some colour – known as 'false colour' (see panel on p96).

I favour wide-angle over telephoto lenses for infrared work. This could be a throwback to my film days when wide-angles were better suited to infrared photography, because the depth-of-field took care of any focus differential between visible and infrared light, but I also find wide lenses better for dramatic compositions.

My favourite lens for the Nikon D70 was a Sigma 10-20mm zoom that I bought secondhand from contributor Ross Hoddinott. With the 1.5x magnification factor of the D70, it equated to a 15-30mm lens, and I found the range ideal for exploiting foreground interest, distorting perspective and scale and creating

eye-catching images out of literally nothing. Now I've switched to the Canon EOS 20D, my widest lens is a Canon 16-35mm f/2.8L; a fantastic piece of kit, but 16mm with an APS-C sensor equates to the same as 24mm on full-frame, which I often find isn't wide enough. Time to splash out on something wider, methinks!

The only thing you need to be aware of with ultra-wide zooms in the 10-20mm or 12-24mm range is that due to the optical configuration of the lens, image sharpness nosedives with some infrared-modified DSLRs. One solution is to have the camera adjusted to suit the lens – but then you'll have problems with any other lens you use on the camera. The other is to make sure you always shoot at f/16 or f/22. I experienced this problem with the D70 and Sigma 10-20mm but if I stopped right down it went away.

I've only been shooting digital infrared for a few months, but I already have dozens of great images, as wherever I go, and whatever the weather, there's a good infrared shot to be taken!

So, if you've recently upgraded your digital SLR and were wondering what to do with its predecessor, now you know – instead of selling it on eBay for peanuts, send it off for infrared modification and breathe new life into your photography. ▶

Fishermen's huts

These unusual fishermen's huts on Holy Island look like something out of a weird sci-fi movie, thanks to the infrared effect. The man appeared by chance for a few seconds, but makes all the difference to the composition.



Farm track

I find wide-angle lenses and zooms to be the most effective for shooting infrared images, because the dramatic perspective adds impact and helps to emphasise the extreme tonal contrast in a scene.

Mono infrared: Step-by-step guide

The images recorded by an infrared-modified camera require serious tweaks to pull out the drama and detail, in the same way that infrared negatives needed to be printed on a hard contrast grade and required dodging and burning. Because I spent years shooting and printing infrared film, when I switched over to digital infrared, I had a clear idea of what the final images should look like, making it much easier to achieve the end result. Here's a step-by-step guide to show you how I get from the original Raw file captured in-camera to the final image. As you can see, the transformation is dramatic!



False colour - Kill it or keep it?

Once you create a custom White Balance setting for your digital SLR, the images it records will be mainly monochromatic. However, there will usually be some colour showing. This is known as 'false colour' as it's not a realistic record of the colours in the scene, but a reaction of some pixels to the infrared radiation.

The amount of false colour recorded depends on the camera you're using, the subject you're shooting, and the light and weather conditions. Sometimes you may simply get a tone in the sky, but I've taken shots where most of the scene showed false colour, as though it had been selectively coloured.

More often than not I remove all traces of colour, as I find that infrared images work best in stark black & white, but I have taken shots in which the false colour looks amazing, so I've kept it. The colours themselves can also be changed using the Hue slider in Photoshop or by swapping RGB channels.

The key is not going over-the-top. Subtle colours work well and can enhance an image, but garish hues should be avoided because they overpower the effect you've set out to capture.



Step 1 The Raw file is opened using Adobe Camera Raw (ACR) in Photoshop CS3. As you can see, it's a little on the light side as I exposed 'to the right' to minimise noise in the shadows.



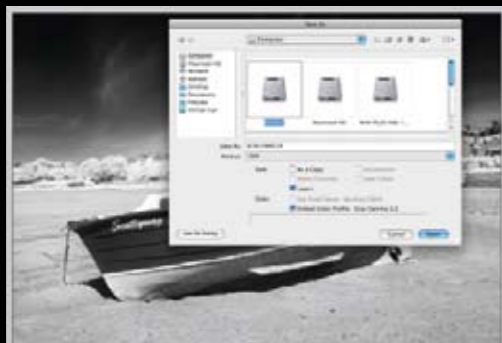
Step 2 Once the shot is open, the next step is to move the Exposure slider over to the left. This darkens the image, and gives me the density I'll need to get the best from my shot.



Step 3 Next I turn to contrast, further brightening the highlights and lighter tones, and darkening the mid-tones. This boosts the contrast of the image and creates a more infrared-looking effect.



Step 4 Now it's time to remove the false colour from the shot by desaturating the image. This is easy – all you have to do is drag the Saturation slider all the way over to the left.



Step 5 The next step is to open the image and save it. To preserve the maximum amount of detail and tonality possible, I'd recommend saving your infrared images as 16-bit TIFF files.



Step 6 In Photoshop, I make some selective adjustments to the Levels sliders. First, I select areas in the foreground and lighten them by dragging the centre triangle (mid-tones) to the left.



Final image

And here's the final image. The sky is nice and dark, the foliage is almost white and the addition of a little Diffuse Glow rounds off the infrared effect nicely. I'm happy with that, and it took no more than ten minutes to complete.



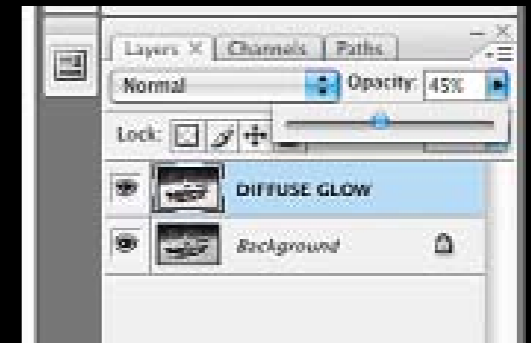
Step 7 Next, I select the sky using the Polygonal Lasso tool and a feathering of 100 pixels. Then I darken it by adjusting the left triangle for shadows. This can also be done with the Curves tool.



Step 8 I'm happy with the image so far, so I make a duplicate layer (Ctrl+J) and name it Diffuse Glow. Layers are a safe way of adjusting images, as the image underneath remains unaffected.



Step 9 Using Filter>Distort>Diffuse Glow, I apply a touch of Diffuse Glow to the duplicate layer. This adds a delicate glow, mainly to the highlights of the image, to add to the other-worldly effect.



Step 10 The Diffuse Glow overpowers the image, so I drag the opacity slider of the duplicate layer over to the left, essentially making the layer more transparent until the desired effect is achieved.



Get converted!

Only a limited number of firms offer infrared conversions. We'd recommend Advanced Camera Services (ACS) in Norfolk. Both Lee Frost and editor Daniel Lezano have had their DSLRs converted by ACS. They clean and service your DSLR and give it a full six-month warranty on work carried out. Prices start at around £295. All work is carried out by fully trained technicians and they can convert most DSLRs. For further details, phone: 01953 889324, visit: www.advancedcameraservices.co.uk or email: ACS_2005@BTconnect.com. The sensitivity of DSLRs to infrared varies from model to model, but in general, the older the camera, the better suited it is for conversion, so it's worth seeking out old six-megapixel DSLRs on the used market, such as the Pentax *ist D-series, Canon EOS 300D etc.