

# Phase One's Achromatic+

## Medium Format Digital Back

Peter Eastway takes Phase One's black and white only digital back for a tour through Australia's Red Centre.

If you lament the loss of pure black and white photography, then Phase One's Achromatic+ medium format digital back should have you salivating once again, as in many ways it can surpass anything we could do with a film camera, at least up to 4x5" large format.

In the halcyon black and white days, to retain the incredible detail provided by film required lots of darkroom tricks and special chemistry, whereas now the huge dynamic range of the Achromatic+ 39-megapixel back makes it almost too easy to control and manipulate your tonal range.

### Why Achromatic?

Photographers who read magazines like *Better Photography* aren't the only people who use digital cameras. People in science, research, replication and archiving also have needs for high resolution image capture.

Now, when it comes to colour images, there's nothing wrong with the standard Phase One P45+ back (on which the Achromatic+ is based), but it is designed for colour. This means that the sensor has a grid of red, green and blue filters placed over the top, one tiny filter per pixel site, in what is called a Bayer pattern. Of course, this isn't something that's unique to Phase One digital backs as nearly all digital cameras made today employ the same basic approach.

When you capture a raw file, the light reaching each pixel site is recorded. It is our raw processing software (such as Capture One or Adobe Camera Raw) that determines whether the pixel is red, green or blue, and then estimates the missing two colour values based on the surrounding pixels. The algorithms are incredibly complicated and the results are incredibly good.

So what happens if you want a black and white image? The answer is easy: desaturate the colour file so it's just black and white, or use one of a dozen conversion methods to not only remove the colour, but control the tonal distribution across the image as well. There are many advantages for black and white

photographers starting with a colour file.

And there are some disadvantages too, but admittedly they are fewer for pictorial and landscape photographers.

### Resolution and Wavelength

If you want a black and white image with maximum resolution, you're better off without the Bayer matrix filters. Image quality is slightly softer when a Bayer filter is used, but to be honest, you'd be hard pressed to tell the difference between the Achromatic+ and the colourful P45+. Most people are so blown away by the quality of a 39-megapixel sensor that they don't look for an extra 10 percent. However, other users of digital backs are interested in as much image clarity as possible and so a sensor unhindered by a colour filter array is an advantage.

Another desire that scientific and industrial types have is to either precisely control which wavelengths are recorded, or at the other extreme, capture all of them. A normal colour digital camera includes an IR filter to reduce the amount of infrared light that would otherwise affect the exposure. For general photography, we don't want to be influenced by either infrared or ultraviolet radiation.

On the other hand, if we did want to capture these wavelengths, then a digital back without an infrared filter would be an advantage and this is another reason for introducing the Achromatic+. It's possible to order the Achromatic+ without any filters in front of the sensor, so the back can be adapted to record specific wavelengths by using blocking or passing filters over the lens.

Of course, not all infrared radiation is unwanted. Pictorial and landscape photographers have had a love affair with infrared photography in the past. It's still possible with

*Opposite: Desert Oak. This image uses the Achromatic+ back without any sensor filter, but with an infrared filter over the lens.*







*Just up the road from Glen Helen Gorge in the Western Macdonnell Ranges, Bruce Pottinger is bunkering down behind a rocky outcrop. He is bracing for the oncoming storm which is just about to sweep through. Large raindrops are already falling on me and my camera, but it's around 40°C, so the cool rain is very welcome. I've just attached the Achromatic+ back to my camera and I'm precariously balanced on a rock. Bruce is concerned I will drop the camera – well, he's probably not so worried about the camera which is mine, as the Achromatic+ back which is his. Well, sort of. It's a review unit provided by Phase One and Bruce is Australia's Phase One dealer. Alpa TC with 23mm Rodenstock Digaron lens, Phase One Achromatic+ digital back, f5.6 @ 1/60 second, ISO 50, no filter.*

standard digital cameras, and there are even companies that will remove the infrared filter from some cameras (as a special third-party service which definitely voids your warranty!)

With the Achromatic+, it is ready to capture infrared images as never before. Just screw in an infrared filter to the front of your lens and you will produce the most amazing black and white infrareds, and without the halation we used to get with Kodak's wonderful film (we can always put that halation back in using Photoshop with some Gaussian blur and a soft light blend mode if we want to).

### Two Models

Technically, the Achromatic+ back is very similar to the P45+, except it's not colour. It has a 49.1x36.9 mm sensor holding 39 million pixels, each with a 6.9 micron pitch. Exposure times are from 1/10,000 second out to one full hour and the sensitivity is from ISO 50 to 800. Of course, the beauty of the medium format system is that it offers a dynamic range of around 12 f-stops (compared to the seven or so with a DSLR) and,

without an anti-aliasing filter, lenses can resolve simply superb results.

There are two Achromatic+ models available. The first includes a permanently mounted IR cut-off filter, so the sensor records the visible spectrum. The second version is supplied with no IR cut-off filter and is capable of recording into the infrared and ultraviolet parts of the spectrum using interchangeable filters over the lens.

In practice, the back performs just like the other Phase One backs and can be attached to a range of cameras. I used the Achromatic+ on a Phase One 645DF body as well as an Alpa TC.

### Infrared Technique

As mentioned, without an IR cut-off filter, and with an infrared pass filter over the lens, the Achromatic+ becomes an amazing infrared camera. Black and white infrared landscape photography is characterised by deep black skies and almost white, luminescent foliage, assuming the sun is shining. Sunlight is needed to produce the light tones in leaves, grass and trees and the more sunlight the better.

There are a number of issues to consider when working with an infrared filter over the lens. B+W's version is called an IR 092 or an IR 093, while Hoya's are the R72 or RM90. The difference in the filters is how much radiation is passed – Hoya's R72 passes infrared rays above 720 nm, while the RM90 only passes rays above 900 nm, creating a purer infrared effect.

The main problem with using these filters is that you can't see through them. Hold one up to a bright light and you'll just see its deep red colouration and maybe the light bulb, but not much else. The solution is to use a tripod so you can frame your photograph and attach the filter prior to exposure.

Exposure is also tricky. Just because there's a lot of light, doesn't mean there's a lot of infrared radiation – and vice versa. Your camera's light meter isn't measuring IR radiation, so it really doesn't have a clue. Fortunately, it's an easy matter to take a few test exposures and check your histogram, and despite how dense the filters look, exposures are generally around 1/30 to 1/500 second at f5.6 to f8, depending on the amount of IR radiation.

A third issue is focusing. Infrared radiation has a different wavelength to visible light, so you need to adjust the focus setting on your lens. This will look out of focus in your viewfinder, but don't be alarmed!

Many lenses have a small red mark on the focusing scale, indicating the focusing adjustment required. Focus the lens normally with visible light, switch to manual focus mode if necessary, and then carefully move the focus setting to align with the IR mark. Using a small aperture (f11 to f22) will help hide small problems with depth-of-field, but focusing is more critical with telephoto lenses than ultra wide-angles.

### TG1 Filter

The Achromatic+ back will record wavelengths from high infrared through the visible spectrum and into the ultraviolet region. Without a filter, you have no control over which wavelengths are recorded and this can be a lot of fun. However, if you wish to restrict your image to the visible spectrum, Phase One has a TG1 filter which does just this.



No filter



TG1 filter (passes only the visible spectrum)



Infrared filter (passes only IR radiation)



Colour file converted to black and white.

So what's the difference? The differences will depend on what you're photographing and the quality of radiation that's running around.

In the example photographs accompanying this article, you can see some dramatic differences. Note how the sky changes from very light tones with no filter, to mid tones with the TG1 filter, to very dark with the IR pass filter. Similarly, the tree lightens up from no filter to the IR pass filter.

### Orders Please

So, does the Achromatic+ produce better black and whites than a colour back? Comparing the Achromatic+ black and white files with colour files taken on the higher resolution Phase One P65+, I couldn't see much difference. I could convince myself that there was slightly better resolution in the Achromatic+ back, but this could have been focusing or raw processing rather than the Achromatic+ back.

Technically speaking, the fact there are no filters over the sensor should allow extra resolving power, but to see it clearly, you need to be using high resolution lenses. Also, similar benefits can be found by using a higher resolution

back (60-megapixels compared to 39-megapixels will do it).

Comparing a normal colour file with a file from the Achromatic+ (say with no filter or with the TG1 filter), again there's not a huge difference and in fact, there's an argument that using the colour file gives you more options when it comes to converting the file into black and white.

However, where the Achromatic+ really shines is as an infrared camera. The infrared effect is magnificent. While you can put an IR pass filter onto a normal camera, it is fighting with the IR cut-off filter over the sensor, so even with the very long exposures, it's not giving you a pure IR effect.

In comparison, the Achromatic+ is superb, providing the wonderful effects that Kodak's High Speed Infrared film offered, but without the halation which eventually lost its novelty value.

The Achromatic+ medium format digital back for black and white photography will be a fun addition for the landscape photographer's gadget bag, but its real purpose is for more scientific and industrial purposes. Nevertheless, if you get a chance to play with one, you will have a ball!