



Spin doctor

It can capture eight-bit TIFF files of 1.7GB, sweeping through 360° scenes in less than a couple of seconds. Introducing the Seitz D3 Roundshot – the digital panoramic camera that Adam Woolfitt has been waiting for



I count myself among the happy band of the Seitz faithful who have waited long and patiently for a digital Roundshot camera. Rumours circulated many Photokinas ago, and a concept model came and went, but in Cologne last year, there it was, the D3 Digital Roundshot – and it worked.

Prior to Photokina, Seitz launched a press blitzkrieg with fantastic pictures of a groundbreaking 6x17 camera powered by its new modular digital back. This zoomed up and down the focal plane, capturing 300MB of data in a second, at incredible exposure times and ISO speeds, to deliver astonishing file sizes. This roundabout digital back housed a new bespoke sensor 6cm high, manufactured by Dalsa – and

exclusively available to Seitz for a while. This back and its sensor form the core of the Seitz D3 Roundshot, the subject of this overview, and of the 6x17 camera, which I hope to review when the first production units become available later this year.

'The high performance image sensors, which are based on DALSA's "Time Delay and Integration" (TDI) technology, allow the Seitz cameras to take highly detailed medium format, 6x17 panoramic, and 360° panoramic images, all at record breaking speeds and exceptionally high light sensitivity,' claimed DALSA at the launch. 'The Seitz 6x17 Digital, one of several models being launched at Photokina, can capture a stunning 160m pixel, 16-bit, panoramic image in just

one second, with an equivalent ISO rating of 500 to 10,000.'

A single glance was enough to confirm that the Seitz bloodline runs true in the new D3. Superb Swiss engineering allied to faultless design and ergonomics extends the tradition of this small family business, which has been making rotational panoramic cameras since Hermann Seitz went on holiday in Tuscany in 1955 and couldn't quite capture the landscapes he wanted.

The very first panoramic cameras developed by Seitz senior (father to the present makers) used 16mm cine and 35mm film, and had lenses with focal lengths of 28, 35 and 50mm. Since that time Roundshot models have been produced to take five inch aero film, 70mm cine



stock, 220 and 120 rollfilm, and finally no film at all – ie digital. And over the years the cameras have accepted lenses from 8mm fisheyes to 300mm teles.

Panoramic rebirth

But what's the point of a panoramic image right now? Beyond the obvious commercial and aesthetic use for landscapes and site progress photography, interiors like hotels and exhibition venues, surveillance and mapping, lies the brave new world of 3D modelling. With the rapid advance of 3D software to demonstrate an increasing range of products from cars to bottles to furniture, the 360x360° High Dynamic Range (HDR) mapping of lighting in an environment enables a 3D programme to do a truly 'photographic' job for print advertising, and 'illustrate' products that don't even have to exist. Lighting combined with CGI data now equals photography. If you have recently seen *Ratatouille* or *Stardust* you may wonder, as I do, if real photography is headed for the sewers.

Currently, the Seitz D3 firmware and software is in the final stages of being calibrated for multi-scan HDR imaging, where a bracket of exposures are



blended together to capture every nuance of the lighting from the brightest specular highlight to deepest shadow, ready for transfer to a 3D render. And the 60mm long sensor in the D3 enables the use of Medium format lenses, with the Mamiya Sekor 24mm fisheye amongst them.

Real test

Recently, I was able to borrow the new D3 Roundshot camera from Teamwork, the UK importer. I was also able to borrow Lawrence Wiles, Teamwork's Seitz specialist, to show me how it all worked and shoot a test in a wonderful shop interior near my

Above: This dark shop interior was a real challenge for the D3 – which it passed with flying colours, as the 100% detail, left, proves. All illustrative images © Adam Woolfitt.

home. I had chosen Martyns, founded by the present owner's great grandfather in 1897 – which started out as a general grocery store, selling basic household goods – because it has deliberately maintained its dark Victorian interior, huge lacquered tin tea caddies and sacks of coffee beans on the floor. If it wasn't a thriving speciality store it might well belong to The National Trust.

The lens on Teamwork's D3 was the mouth watering 28mm Rodenstock/Linos APO Sironar digital HR, which covers the full height of the 60mm sensor with some elbow room to spare (± 5 mm of rise or fall). This was perfect for the long and narrow shop, lit by a drab grey light coming through a drawn roller blind and some coloured neon tubes way up in the ceiling. With 2kw of tungsten from a trusty Hedler lamp bounced off a large white umbrella positioned directly above the camera and another

kilowatt concealed behind the counters, I made a base exposure of 1/5s at f/16 at ISO200.

TDI tricks

The Dalsa sensor does not have just three vertical lines of 7500 pixels – one for each RGB colour – but many. In other words, a wide surface is exposed, not just three lines of 7500 pixels. By a process proprietary to Dalsa (the aforementioned TDI), the information from a single image point sweeping across these multiple eight micron pixels can be integrated to produce a single signal (for that image point) but with a much higher ISO sensitivity. This avoids relying on 'electronic gain' to raise sensitivity, the standard technique that inevitably raises noise levels in a digital file. In addition, the total luminous input across groups of adjacent pixels (3x3, 6x6, 9x9, 12x12) can also be integrated to deliver a file, still with the full image height of 60mm, but at a reduced resolution. The user can therefore choose to shoot with a vertical resolution of 7500 pixels (the maximum), 2500 pixels, 1250 pixels, 833 pixels, or 625 pixels (the minimum). Reduced resolution files have a proportionately reduced length as well.

Contact

Various D3 kits are available via UK retailer Teamwork Photographic, starting at around £19,000 + VAT. Daily rental is priced around £500. Visit www.teamworkphoto.com. For further information visit www.roundshot.ch.

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Dalsa's very clever TDI tricks lie at the heart of the new technology and make the D3 back about 100 times faster than its competitors – and hence much more flexible in use.

The size of full resolution files from the D3 are pretty scary. At the highest possible resolution, using a single TDI stage and a 50mm MF lens, a 360° image is 7500x39,270 pixels. That's a raw .dng file of 568MB, or an 8-bit TIFF of 1.7GB. If light levels permit using the shortest exposure time, such an image will be captured in two seconds. This in turn brings huge problems because Photoshop (CS3) currently sets a limit of 30,000 pixels on the length of a file, which the D3 can easily exceed with many combinations of lens and degrees of rotation. Seitz is in active discussion with Adobe about this.

On the engineering front it must be mentioned that the example quoted above requires the construction of a stepper motor capable of 39,270 absolutely precise, distinct steps, in a second – no mean feat!

Set up

But the whole system is a complete doddle to set up. It took perhaps five minutes including levelling the tripod and starting up Windows XP for us to produce the first preview to judge our lighting, focus and exposure. The camera runs from its own rechargeable heavy-duty battery (or mains) and is connected to the Motion Computing tablet PC LE 1600, via a gigabit Ethernet cable to allow the transfer of up to 300MB of image data per second. The PC runs from an internal battery (and/or mains), so shooting in the field is possible, and remote from mains power is entirely possible.

The motor and battery of the new camera body have a slightly soft rubberised coating that makes for safe and confident handling, but attracts paw prints and dust quite easily. It will need sponging with a clean, damp cloth occasionally. Mechanical



Above: This 180° image, captured with a Mamiya Sekor 35mm lens with 15mm rise at 1/10s, aperture f/11, was processed as a single HDR file, delivering a 283MB raw file. It manages to retain sky highlights and shadow details, the latter of which can be seen from the 100% detail of the area under an awning.

and cable fittings between motor case and battery are probably tough enough for the SAS. The camera head is connected to the body by a short power cable and the second short gigabit Ethernet cable carries the data to the computer. A horribly inflexible 2m gigabit Ethernet cable takes data from the rear of the motor to the PC.

The motor itself is turned on with a simple press button and a green light blinks to indicate what is happening. The camera can also be fired from this button, which saves inelegant crouching under the tripod when making 360s.

As a certified Mac addict, I was in fear of the PC tablet computer at first. But the pre-installed Seitz software proved to be absolutely foolproof and utterly simple. The design of the interface and the way that all the functions and menus are accessed using the tablet's stylus are a pleasure to use. The only downside is the time it takes the PC to start Windows XP, and the frequency with which it drifts into narcolepsy to conserve battery power. Despite this over-careful husbandry, the battery life of the PC proved a great deal shorter than that of the camera.

Shoot modes

Several critical values and functions must be set to configure

the camera for a shot, starting with the lens in use. In the PC software there is a lengthy table prepared by Seitz listing many lenses that can be used with the camera. These include precise focal lengths for eight Rodenstock/Linos lenses, 19 Schneider optics (including APO Digitars) and 15 Mamiya 645 MF lenses, one of which is a fisheye. Adapters to use Nikon or Leitz 35mm lenses (with reduced height images) will follow. More MF lenses are being constantly analysed and added to the database, the most recent being well over 70 Hassleblad lenses from all epochs of that system.

To take a shot, the shutter is first locked open on 'T' and the required distance is set on the focusing helical lens mount. A software focusing aid can be positioned over the first preview and works best if the lens is fully open. This aid determines maximum contrast at a given point in the image and offers real time information on a bar graph as the focussed distance is altered.

Once the lens parameters and focused distance are entered (and the working aperture set) the software delivers the critical 'B' value, so that the camera may be positioned on the rails with the nodal point exactly above the point of rotation. This is the core 'black art' of precise rotational panoramics, and if you ignore this you will never get sharp images.

The exposure menu lists a range of preset times that are directly related to the chosen resolution and the number of TDI stages over which the image will be exposed. The available TDI stages are 1x, 2.5x, 5x, 10x and 20x, and can be considered as a way of either increasing ISO sensitivity or extending the range of available shutter speeds to handle lower light levels. In practice

(and I suspect after lots of practice), the ideal combination of TDI stages, ISO, aperture and shutter speed would become second nature to the user. With ISO speeds from 100 to 400, five TDI stages, a wide range of digital shutter speeds and the usual six or seven f-stop openings to choose from, it can all get a bit confusing. But, unlike rotational film cameras, Seitz reports that stopping any lens down on a D3 allows the normal laws of optics to prevail, and both depth-of-field and sharpness will then increase.

A facility which Seitz calls 'single shot HDR' allows the software to process the raw file by considering every pixel in the image, relative to its neighbours, and then tone-map the data with an idealised 'S' curve.

The improvement in both shadows and highlights is very noticeable. The only danger is that very deep shadows where the original file had insufficient data can show noise. A well balanced exposure is a critical necessity.

A major upgrade of the D3 software is due very soon which promises a complete re-mapping of the demosaicing function to eliminate some colour fringing issues, a multi-scan facility to yield true HDR lighting maps for 3D rendering, and the addition of 800 and 1600 ISO ratings. With those upgrades finally in place this should be the most competent digital panoramic camera you can buy – at any price. **BJP**

Special thanks...

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