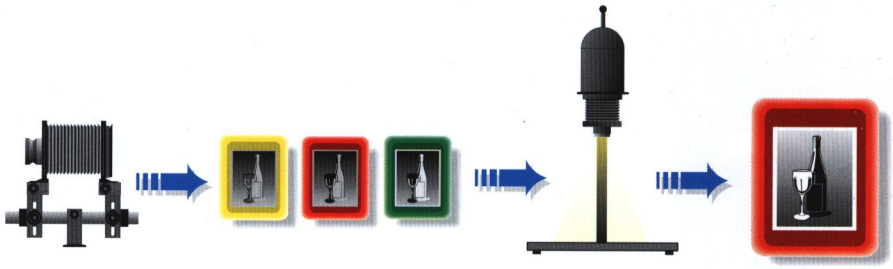
sinar

INFO 45

Workflows

The Processing Chain of an Art Photographer



Most studio photographs are created for publication in color printed media. By means of publications (Sinar Info 30), courses and convenient TTL metering probes, Sinar has made significant contributions to the understanding of the relationship between light distribution and the printed result. Today, with precise contrast management by means of a metering probe at the film plane, quite a few photographers exercise a direct positive influence on the quality of the printed image. In this Info we will have a look at some different workflows leading from the subject to the printed result.

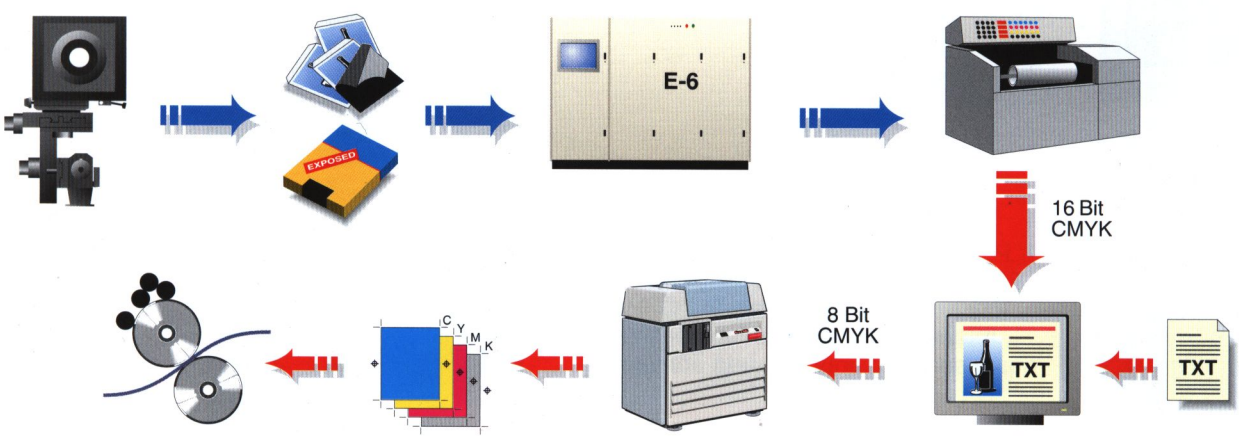
During the heydays of black-and-white film, artists, such as Ansel Adams and Edward Weston, were able to enjoy the privilege of controlling the entire sequence from the original picture idea all the way to the final result. They spent long hours in the darkroom calibrating the relatively simple developing and black-and-white printing process in order to be able to present their visions to interested viewers without any loss of visual impact. The exposure of the photographic paper was guided by the artist's skill, by the unrestricted "set of data" that was contained in the optimally exposed and processed negative.

The Hybrid Workflow in Commercial Photography

In the time- and cost-sensitive field of commercial photography, however, with the significantly more demanding transparency material and offset printing processes, it is necessary to delegate the processing sequence to an optimally equipped specialist in order prevent any drain on efficiency and/or image quality. Every step in the processing sequence, from the photograph to its development, from scanning to color separations, requires a great deal of specialized knowledge and usually expensive equipment in order to preserve the bandwidth and the continuity of picture information throughout the various processing steps. With drum scanners, which yield great color depth (up to 14 bit, i.e. 16'384 tonal gradations per primary color), the entire wealth of tonal gradations can be passed on to the prepress stage, where professional color separation software can further process the color information in up to 16 bit, i.e. 65'535 tonal gradations per primary color.

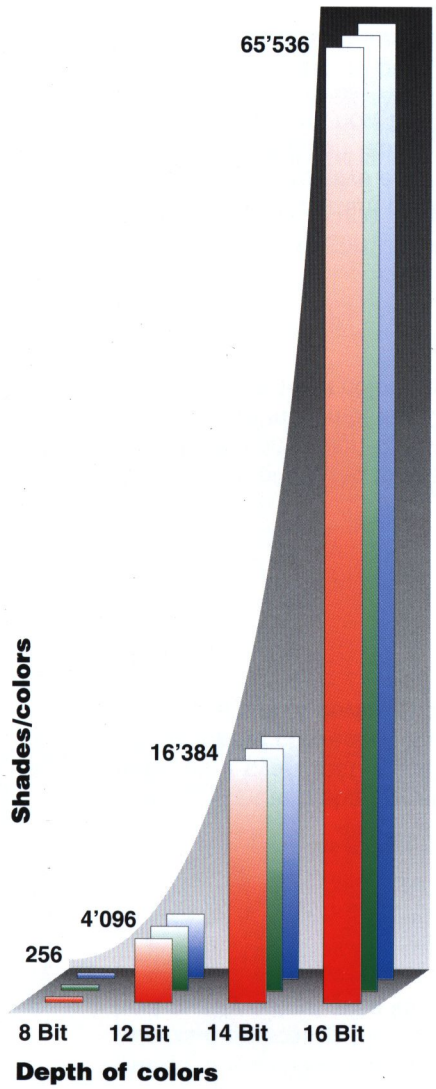
This is in contrast to low-end, inexpensive scanners, in which a significant portion of the picture information is already lost during the scanning process itself. The quality of a scanned image depends a great deal on the quality of the scanner, it is not the same for every type of scanner.

Finer gradations enable the digital lithographer to work with the full richness of information contained in the original transparency, to compress them to fit the printing parameters. Only at the very end are the precise 8 bit extracted from that abundance of information, which are needed for the exposure of the litho films and for the production of the printed pictures (a brightness range of maximum 1:32 in the subject; or 5 f-stops in the processed transparency). Thus it is not surprising that color separations and image manipulations that are very satisfactory to the client can be produced in this manner. If the photographer wants to stay in control by ensuring that the maximum of the original mood in the scene is maintained (contrast rendering, color saturation) he has to adjust the studio lighting to a maximum brightness range of the subject of 1:16 (4 f-stops) in the film plane to match the printing window. To achieve this light, fill-in lights and reflectors are used in the scene and a metering probe is used to accurately monitor the results of the changes in light. In such for printing optimally exposed transparencies, the color separator does not have to change the contrast electronically, thus changing the mood of the original scene, in order to match the restricted printing parameters. In serial shots , this method offers thanks to its accuracy image consistency. See also Sinar Info 36.



Depth of Color

Depth of color in a digital image is described in terms of the number of bits per primary color. The higher the number of bits, the greater the reproducible contrast range of the image. 14 bits per primary color correspond to a contrast range of more than 10 aperture stops. 12 bits still result in a contrast range of more than 8 aperture stops, a range that is two stops greater than a conventional transparency film can achieve. If the picture is to be reproduced in print, a selection of 8 bits per primary color is needed from the raw data of the image. In order to reach those 8 bits, the original amount of data has to be reduced by the software of the imaging device. The required contrast and brightness parameters can be input during that step in order to influence effect of the final picture.

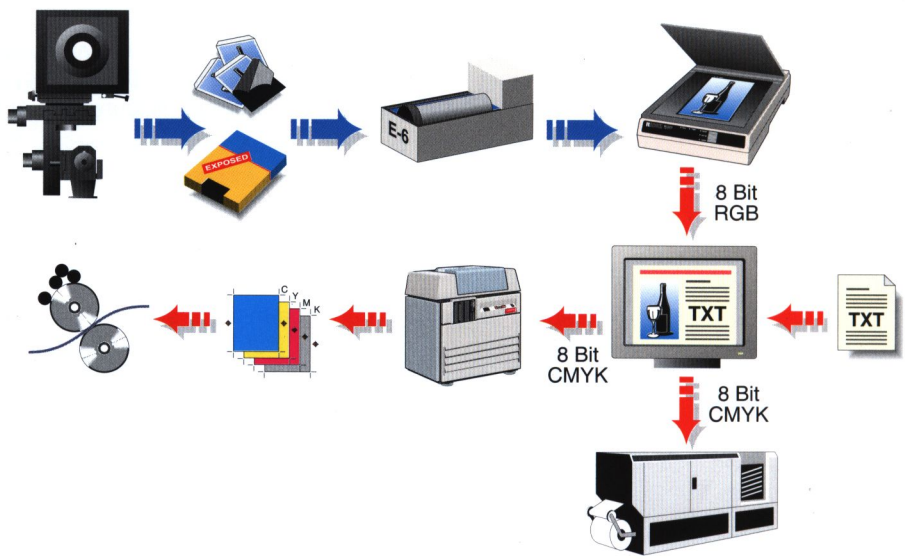


The greater the color depth of a system, the more accurately can individual tones be rendered. The greater the respective color depth, the smaller the effects of rounding-off errors during the various steps of image manipulation.

Quality of the Digital Image: Quality before Quantity

- Optimal composition
- Correct camera settings
- Right exposure
- Subject lit with the right contrast
- High depth of color (exposure latitude)
- Clean RGB information
- Highly competent operator for the print preparation (sizing, sharpening, CMYK conversion, etc.)
- Manipulation of the image in the highest possible color depth (little rounding-off errors)
- 8 bit output only just before the final exposure

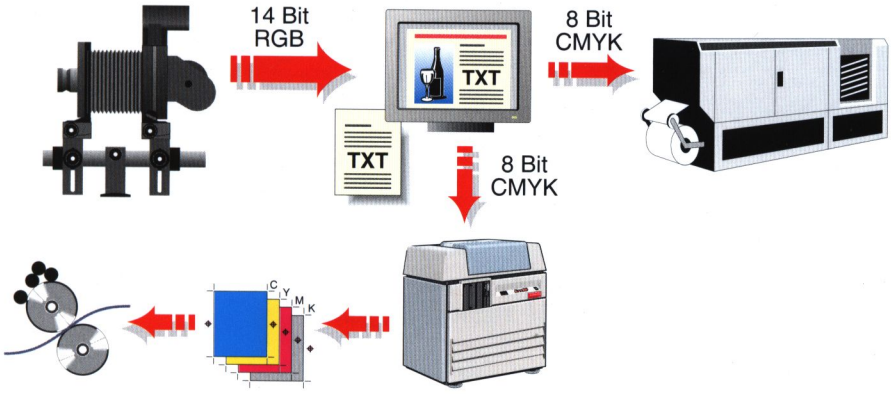
The Low End DTP Processing Chain



When inexpensive desktop publishing equipment became available, a few individual specialists in the conventional workflow attempted to set themselves up as full-service suppliers in the imaging field. Even though this idea was indicative of things to come, the grouping of demanding disciplines from the conventional workflow at bargain rates could only be accomplished by making compromises: the fully automatic E6 processor of a specialized professional laboratory was replaced by a semi-manual home darkroom lab, and the professional drum scanner and the image manipulation workstation in the prepress room gave way to a low-cost desktop scanner with standard software procured from a mail-order house. That meant that the image was already deprived of much of its wealth of information when the picture was digitized. Compared to their "big brothers" in a litho house, semi-professional desktop scanners with the respective image manipulation software only provide a color depth for the monitor screen resolution of 256 gradations per primary color (8 bit) in the functions that are relevant for making separations.

With this approach, rounding-up errors are knowingly tolerated in the conversions. No wonder then, by compromising the hybrid workflow on critical interfaces lead to doubts on the quality of the "digital" workflow.

The Consequent Digital Workflow



An efficient digital workflow, surprisingly, is a blend of the classic and the hybrid workflow. A well-organized digital workflow provides the photographer with perfect control from image creation to the final result. The instant availability of accurate digital data provides the photographer with an ideal tool to directly optimize the lighting of the scene to create an ideal raw file for further usage. Lighting is as critical as in chemical photography. Correct exposure of the CCD leads to saturated colors in the important parts of the image. As printed paper can – regardless of capturing technology – display only a restricted contrast range, it is crucial to light the subject in such a manner, that the visual characteristics of the actual scene are maintained. The photographer is adjusting the lights according to the overview image and the precise exposure readings provided for any part of the image to match the light of the scene to the printing requirements. Similar to working with the probe, the photographer can now measure the light pixel by pixel and adjust the light accordingly. The standard position of the dark tone, mid tone and light tone, optimal for printing needs to be determined in tests. Usually a set of three such standard positions (curves) are determined; one for low key, one for regular and one for high key subjects. This method ensures optimum color saturation thanks to correct exposure and accurate rendering of the scene in the printed image, as the shadow, mid tone and highlight selected by the photographer through his lighting does not require any electronic adjustments through modification of the image contrast.

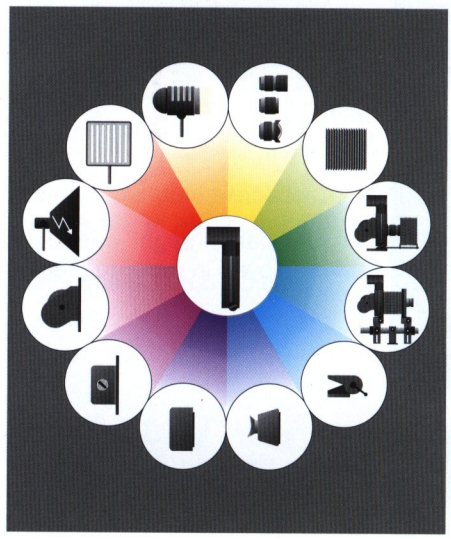
The 14 bit color depth of the Leaf DCB on a Sinarcam makes digital photography very versatile, as this unique color depth offers exposure latitude unseen in film. Especially when the contrast in the actual scene could not be controlled through lighting, different processing can optimize the image with a minor quality loss. A picture taken in that color depth can be "push" or "pull" processed within seconds and show shadow or highlight detail that might have been lost if taken on film or on an other digital format (8 or 12 bit). The unique internal cooling system makes the recording of such a wealth without noise possible at all. This is a useful feature, as a stored image can be processed in several ways to achieve the wanted effect in a very efficient way.

Using the Color Shop software, it is possible to use the full 14 bits of information, to perform sharpening, scaling and professional color conversion into CMYK. In that software, actually the transformation of data is done in the 16 bit format, which allows very fine adjustment. This way the image quality chain is maintained from capture to separation.

Creative Requirements of a Digital Camera System

A professional digital camera system should not limit the photographer's creative freedom through constraints of lighting and lighting accessories. Conventional flash illumination has a multiple light output of even modern continuous light sources such as HMI. By using sufficient light for the exposure, also in the shadow area, the optimal sensitivity range of the CCD can be used and saturated colors in the image are the result (no noise in the dark areas due to underexposure). This is particularly important in close-up photographs of objects that have to be critically sharp, where a rather small apertures are necessary to obtain sharpness. A professional lens hood, as it can be used with the Sinarcam, prevents stray light from spoiling rich tones in the image and is therefore adding to strong saturated images. Another important factor is the ready availability of lenses ranging from extreme wide-angle lenses (such as one with a focal length of only 6 mm) all the way to extreme telephoto lenses (for instance a 2'000 mm lens). Sinarcam is the only digital camera which fits seamlessly into the versatile Sinar view camera system. This is important for photographs in which perspective and sharpness distribution is critical. A variety of other features, such as a large preview image on the computer for arranging and focusing and useful accessories allow the photographer to build the camera system needed for his specific job.

All images taken on Sinarcam and Sinar DCS 465 Digital Cameras.



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for the ultimate image

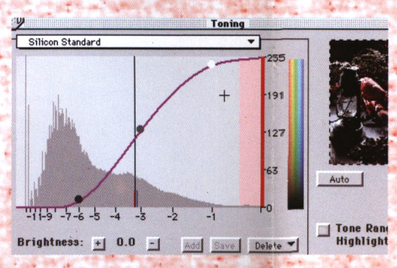
From Capture to Print in 110 minutes*

Capture

40 mins

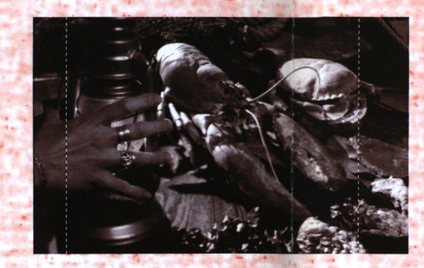
As the title shot of this Info, Mark Middlebrook, a director of Silicon Imaging, chose John Welburn to stage a moody seafood shot with his Sinarcam, so the participants of Sinar's third Digital Workflow meeting became aware of London's closeness to the ocean, John, himself a passionate fisherman when not in the studio, found the props easily in his collection. The rope has actually never seen the ocean up close it was a towing rope that has matured in London's rush hour traffic in the roof rack of John's Landrover.

Once the image has been composed, while adjusting the final position of the subjects in the live video window, a first test shot was taken to evaluate the lighting. With the Sinarcam also test shots have the full resolution and allow very accurate adjustments without long waiting periods.



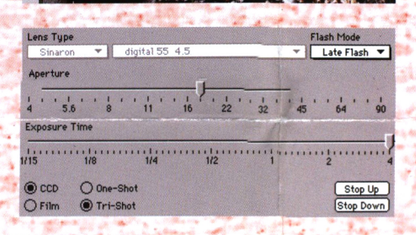
Together with Silicon Imaging's prepress staff, John has established a set of toning curves (comparable to push, pull and standard film processing to cope with different contrast situations). They ensure optimal exposure of the CCD chip taking advantages of the full range of sensitivity. Using his skills in lighting, John controls with the actual light in the scene the final image, rather than later adjustments of the contrast using software. This method results in absolutely clean RGB channels with virtually no unwanted grain in the shadows (electronic noise). These files allow subsequent enlargement up to 200 MBytes CMYK yielding excellent files for printing (see poster of Sinar Info 44).

It was obvious that the lobster and the crab required localized light to help the subject to spring from the page. Tiny mirrors to reflect the strobes were placed just outside of the subject in order to achieve the necessary visual effect.



The paraffin light was taken from the set and lit separately. Then the live video was employed in order to place the lamp back perfectly in its original position.

Using the live video focusing magnifier and the accurate on-screen axes of his "digitized" Sinar p2, John set a tilt on the lens standard for optimal sharpnes distribution. The rear standard was kept perpendicular in order to maintain the perspective of the lamp. The Sinaron Digital lens ensures no loss of image detail due to its optimized resolution.

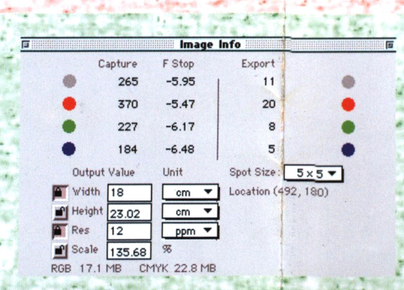


To create the blue background, a tungsten spotlight with a blue gel filter has been used. The 4 seconds exposure allowed the lamp's flame to cast a pleasant glow. Smiling, John asks his customers: "So, who said digital was not creative?"

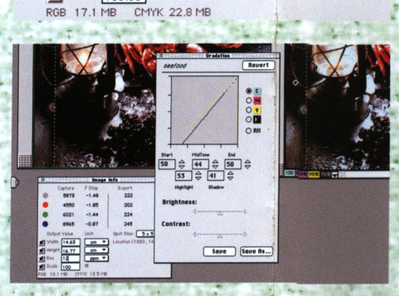
Conversion

15 mins

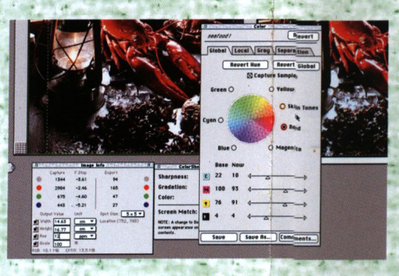
The image from the studio arrives in the production department. The operator converts the image, scaling for output size, specifying white and black values. The color values where then adjusted for the output device.



After cropping and setting the image neutral on a gray card in the Leaf camera software, the resolution and final print size is entered in the Image Info window. The software is then scaling the output accordingly, using the full 14 bit raw file to ensure the best quality output, also for very large final images.



The highlight and shadow area are checked for color casts. In this case, the operator removes a cyan cast in the white by changing the gradation of that color. The ideal values for the conversion have been determined through tests on the camera and the respective output device such as a printing process, simulated by an IRIS proofer.

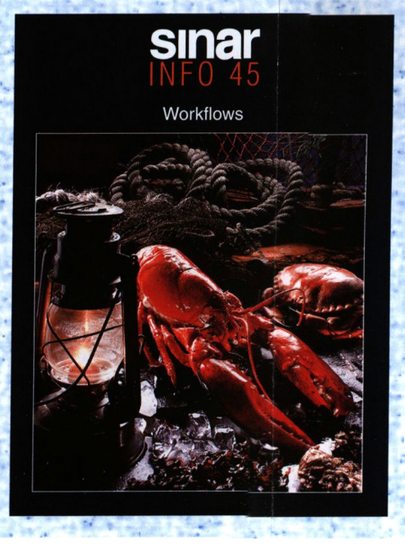


As the color of the red lobster is critical in that image, the operator makes sure, that in the CMYK conversion the strong red of the original subject is maintained. Using the global color function of the Color Shop software the adjustments on that hue are made in the precise 16 bit color depth.

Finally all the important parameters for this kind of image are set. The sharpening was adjusted to the relative enlargement to have the right effect and the values of the color tables and gradation tables have been saved as "seafood". Similar images for similar output devices can now be separated with these color tables without further manipulation.

Proof/Print

55 mins



After the pages had been completed with the images and the CMYK proof sheet of the Info has been accepted, the repro operator sends the pages digitally over the computer network to the raster image processor (RIP) of the digital printing machine, which then starts printing after having received the data in its format. The loss of quality inherent to the rather complicated conventional process has been minimized, as the image only changed media twice: when it traveled from the subject to the camera and when it was printed onto the paper. In between it has been entirely digital.

For higher volume printing, the data can also be sent to the image setter's RIP which will output the lithographic films for the conventional printing process.

** The Sinar Info 45 was produced on-line during the Sinar Digital Workflow meeting in London, UK, in the premises and with the facilities of Silicon Imaging Ltd.*