

DIGITAL WORKFLOW – Making Great Pictures Is Still The BIG Picture.

New technology has a way of creating its own mystique. For pro lab owners and professional photographers, the transition to a digital workflow has created tremendous excitement and anticipation matched only by the level of fear and anxiety that accompanies the unknown.

Labs that have customized and optimized their optical infrastructures tend to view digital workflows as either a threat to the comfortable and profitable status quo – or an opportunity to improve workflow efficiencies, increase product offerings and boost sales.

The fact is, both points of view are valid. In the end, proper planning and implementation will determine the ultimate risks or rewards for labs and photographers. In short, photographer expectations must still be met regardless of workflow.

“We used to be a regional professional lab; now we operate as an international service provider. KODAK PROFESSIONAL Modular Digital Workflow Products made it possible.”

- LustreColor



■ First Things First.

Anyone who's ever been caught up in rush-hour traffic intuitively understands the first problem labs encounter in adopting a digital workflow. Just as many road systems lacked the capacity to handle the additional traffic that accompanied population growth, labs can't expect their current telecommunications and computer

infrastructures to accommodate the electronic distribution, manipulation and storage of high volume, high-resolution image files unless they properly planned for it.

For starters, computer, storage and networking issues must be addressed even before an imaging architecture is built. It must be done with an eye for future business expansion, to avoid the kind of digital gridlock that can virtually eliminate the inherent productivity advantages of the workflow. (See Networking section.)

■ Digital Workflow Advantages – The Proof Is In The Proofs.

The numbers are compelling. By 2005, Kodak business research projects a majority of all portrait and social photographers will be using a digital camera in their professional work, while up to 40% of their images will be digitally captured.



With these trends in mind, it would only seem logical that the increasing use of digital photography among pro shooters is the only driver of digital workflows in pro labs. Yet, that's not necessarily the case.

While labs must accommodate the growing need to accept digital files into their workflows, it's the promise of enhanced productivity, efficiencies and customer satisfaction – as well as increased sales and lower operating costs – that inspires management's willingness to invest in digital production in their labs. This would be the case even if no photographer used a digital camera.

That's because both labs and photographers have the ability to view (and manipulate) scanned images as "soft copy" proofs on PC monitors, dramatically reducing turnaround time for consumers to make their final purchase decisions.

Soft copy proofing, in conjunction with available image and data management software, gives photographers a powerful sales presentation tool to motivate customers and build their businesses. Working together, photographers and their customers can electronically prepare the order – specifying image selection, cropping, quantity, specialty products and templates, and special instructions. In turn, photographers can place their orders to a File Transfer Protocol (FTP) Internet Web site that the lab establishes. Since all transactional and image data accompanies the digital upload to the FTP site, additional data entry or file/image manipulation should not be required, helping to speed the final order through production.

■ Digital Workflows – What Changes, What Remains The Same.

Some digital workflows are modular by design, giving labs the ability to add additional hardware and software components, infrastructure and personnel resources in an open environment as business requirements change. Other digital workflow systems are closed systems and do not offer this flexibility.

It's important to note that both the front end and back end of digital and optical workflows are virtually identical when images are captured on film. (The following broad workflow description assumes that all analyzers, film processors and paper processors within the lab are properly calibrated and in tight control.)

Front End

- Exposed film rolls and accompanying order information are entered into the system.
- Film is processed and prepared for analysis (for color and density) in long rolls and film strips.
- Analyzer must be properly set up and balanced to match the optical printers in the lab.

Back End

- Printer/processor calibration is performed.
- Prints are produced, inspected, finished, packaged and shipped.

Digital workflows differ from traditional production primarily in the way that proofs are created and returned to the photographer, as well as the method by which images are stored and retrieved for final print orders. In addition, finished prints can be embellished with the help of innovative graphic applications in ways either not possible through traditional means, or very difficult because of cost considerations.

Generally speaking, the scanning operation in digital workflows can be classified as either a one-pass or two-pass system, referring to the number of times the processed film is required to be scanned. In either case, film must still be analyzed to make proper exposure determinations – either through a traditional video analyzer before it's run through a high-speed scanner, or through a high-speed film scanner that incorporates scene balance algorithms (SBA). Some labs elect to do both. Tools are available to adjust SBA-driven scanner film terms to allow labs to improve their first-time yield.

In a two-pass system, film is scanned at a lower resolution to produce soft- and/or hard-copy proofs for the consumer's review. Once the final print order is

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returned to the lab, selected images are re-scanned at high resolution to make the final prints.

In a one-pass system, film is scanned at a resolution that's high enough to output all required print sizes. Both proofs and prints are produced from this single scan.

The decision to adopt a one-pass or two-pass workflow is based on a lab's preference. This preference is primarily driven by digital storage capacity and infrastructure. Naturally, high-resolution files take up significantly more storage space than their low-resolution (or compressed) counterparts. However, some labs are discovering that the productivity gains achieved through a one-pass system more than pay for the initial investment in short-term and long-term storage technology and media.

Since a two-pass system may be considered more complex, the opportunity for human error is commensurately higher, creating the potential for additional workflow issues. However, it can be less expensive to implement. Ultimately, the lab must make the decision based on their capital investment strategy.

Once the film has been scanned, labs have the ability to enhance images through options such as retouching/manipulating (templates and borders) and create special packages at a desktop workstation using available software applications designed for this intended purpose. Image enhancement and electronic retouching normally take place in response to instructions provided by the photographer once the proofs have been examined, and the final order has been placed.

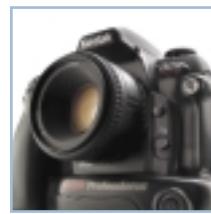
As labs become more experienced and comfortable in relying on scanner software to determine and adjust exposure parameters, it is expected that video analysis will play less of a role in the digital workflow.

Digital analyzer workstations from Kodak are available. They make fast exposure and color corrections using a high-speed editing tool. These versatile devices are designed to easily inspect and adjust density, RGB, contrast, gamma and saturation parameters. Stored correction values can subsequently be applied to single or multiple images – or to an entire order simultaneously.

■ **The Advantage Of Soft-Copy Proofs.**

In a digital workflow, electronic proofs can be returned to the photographer in significantly less time than it takes for hard-copy proofs. Labs have the option to provide soft-copy proofs via e-mail (uploaded to a FTP site) or CD. Images can also be posted to a secure Web site that can be directly accessed by consumers. Online access provides convenience as well as the additional opportunity for friends and families to view images and place orders. It also provides a business growth opportunity for both photographers and labs.

■ **Digital Capture Speeds Order Fulfillment.**



Digital workflows can be further simplified when photographers shoot digitally, and provide properly exposed image files to the lab via the Internet or CD in a lab-approved file format. Digital capture eliminates the need for film processing and scanning. However, for the workflow to be effective, labs and photographers must be in-synch with each other to facilitate the handling of files. For example, the need exists to know what color profiles should be used, and what the final image will look like. In this regard, both parties need to know if the photographer's monitor will match what is being output from the lab's printer.

Files can be directly sent to the workstation for review and enhancement prior to final production. (Keep in mind the photographer captured soft-copy proofs but still may request hard-copy proofs which may be sold to the consumer.) With digital capture, the same order fulfilled in a traditional workflow over weeks can now be delivered in a matter of days. Similar productivity gains are available in a hybrid workflow where negatives are scanned and digitally printed.

■ Software Requirements In A Digital Workflow.

In most cases, software decisions in a digital workflow must also take into account legacy systems from the optical production environment that are being integrated or replaced. This often will require some degree of customization of the software applications to meet the specific needs of the lab. In a simplistic overview, software that resides in a current optical workflow may include:

Production System Software

- Interfaces with the video analyzer, integrating customer information with the frame's Density, Red, Green and Blue (DRGB) data
- Interfaces with the printer sending Order Roll Frame (ORF) and DRGB, as well as other information such as customer preferences and studio copyright data to the printer controller when the negative is sent to the printer
- Interfaces with the business system, integrating customer information from the Order Entry (OE) station with the customer profile
- Enables order tracking throughout the lab

Business System Software

- Integrates customer information from the OE station with customer profile information (payments, discounts, shipping preferences, etc.) to create the appropriate invoices
- Billing (with appropriate lab pricing structures)
- Customer color preferences (feeds the production system)

Hybrid Workflow and Digital Workflow

In addition to the software needed for an optical workflow, digital production software is needed to enable film scanning, printing, retouching, image rendering, and order tracking. To implement a fully-integrated digital workflow, additional required software applications may include:

- Photographer applications specific to event, wedding, sports, school, etc.
- Retouching software
- Production application (including tracking)
- Business application
- Sales tracking
- Archive/storage
- Color management
- Online application (viewing, albuming, etc.) integrated with your digital production system
- Web presence (ordering, tracking orders, marketing, customer service)

In selecting the optimal software packages, labs should consider both current and future needs to ensure its anticipated hardware infrastructure can fully be

supported by available software functionality. It's important for labs to think through the workflow to determine what may be of benefit internally, as well as for the customers they serve. A digital production system essentially becomes the "lab's digital enterprise software" which ties all of the lab's requirements together.

Labs using internal programming staff members to work on a customized workflow design are cautioned to make sure system design is flexible enough to implement changes over time. Labs that do not have internal resources for integrating their software systems are advised to seek out reputable vendors to supply the necessary integration services.

■ Optimizing The Lab – More Than Just The Digital Technology.

Professional labs looking to make the transition to a digital workflow invariably spend a lot of time and energy evaluating the pros and cons of a number of different hardware, software, storage and networking solutions. In doing so, labs are demanding hard and fast answers concerning the return on investment they can expect by "going digital." It's a question that is difficult to answer, although there is ample evidence to suggest that many labs are making the transition in a profitable manner.

“The first winter holiday season after we installed Modular Digital Workflow Products, we shipped twice as many orders as we did the year before – without adding any more products. ”

*- David Howard
President, LustreColor*

The fact is, ultimate productivity efficiencies are not strictly predicated on the performance characteristics of the lab's technological assets. Just as important are the human factors:

- Are employees adequately trained to work within a digital workflow?
- Are their skill sets refined over time in an optical environment transferable in a digital workflow?
- Is the lab willing to pay higher salaries to maintain a highly enabled workforce?
- Is there sufficient communication between the lab and photographers to create mutual expectations and standards for image file interchange?
- Does the lab maintain a well trained customer support staff to answer photographer concerns?
- Is there a marketing solution in place for labs and photographers to work in concert to develop incremental revenues from new digital products and services, no matter what the source of image capture?

The last point addresses a common misconception that a digital workflow is primarily required to accommodate professional photographers who have started to take pictures with digital cameras. That's just one element of the equation. Labs can not fully optimize their operations for a digital workflow until they learn to leverage the business building opportunities associated with soft proofing, online image access, and image enhancement (borders, templates, text). Only then can the lab begin to measure what impact the digital workflow has on its bottom line.

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In the process, both labs and photographers will have plenty of opportunities to reexamine their respective businesses – either as a outgrowth of their entrepreneurial spirit – or in direct response to competitive pressures.

In an analog environment, lab optimization could simply be measured in terms of image quality, accurate order fulfillment, and throughput for a very standardized and traditional set of products. In addition to these metrics, optimization in a digital environment encompasses the gamut of technological resources – properly configured and implemented in the lab – as well as a coordinated approach to building new revenue streams from the enabling hardware and software.

As in an optical workflow, media characteristics to consider in a new digital workflow system include image stability, color reproduction and saturation, flesh reproduction, overall color gamut, contrast, highlight and shadow neutrality, processing capabilities and effects of post process treatments (mounting, lamination, etc.).

For a complete description of Kodak Professional's portfolio of papers for the professional lab market please log on to www.kodak.com/go/ProfessionalMedia

A Word About Media.

As a leader in photographic paper manufacturing, Kodak Professional offers a wide variety of media (photographic paper and display materials) suited for both product and workflow requirements. When deciding on media it is important to understand what media digital printers can accept. For instance, most mid/small format digital writers do not allow for the use of any media other than photographic paper; they don't allow for backlit display.

Various technologies are used to build digital printers that expose photographic media. These technologies, and those of optical devices, all have different spectral responses. Working with a "family of papers" which perform well for optical and digital printing can positively affect a lab's efficiency and minimize inventory requirements.

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