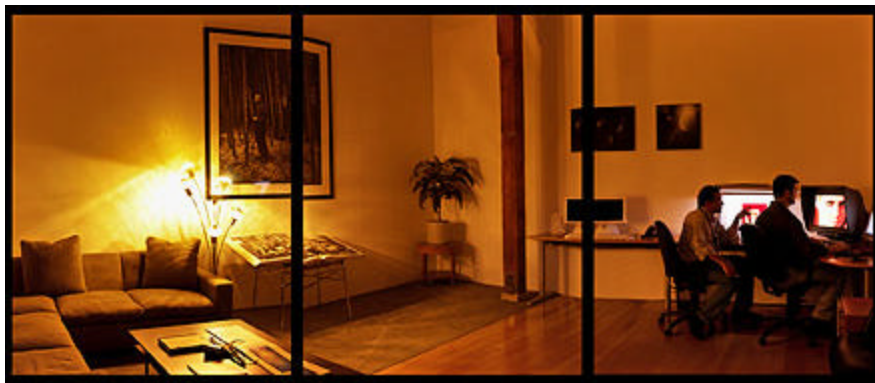# DigitalFusion
The Future of Pro Digital Photography

By Dustin Driver

Film is portable, durable, versatile. But its arcane chemistry is going out of style. Magazines, ad agencies and newspapers want their photographers to go digital — it's cleaner, faster, cheaper. Digitizing a photographer, however, is no easy task. The pros have tinkered with film for ages and they know how to get a great shot. They know how a perfect print is coaxed from a piece of photo paper. Digital is different. There are no chemicals, darkrooms or negatives. Contact sheets are composed on computers, not cut and pasted on paper.

DigitalFusion editing suites are modeled after high-end movie postproduction facilities. Photographers meet with DigitalFusion retouchers to fine-tune their shots.

Offering a new concept in pro photography, the Los Angeles-based DigitalFusion leads professional film photographers into the realm of digital photography and postproduction. "We could see that our clients were going to need digital experts," says the company's co-founder Jon Moeller. "We had to ask ourselves, 'How do we make sure a shooter can go in, design and execute his vision and still not change what he's done in his career for 20 years?' We decided to get out in front of the technology, test everything and show them the path."

> **"We were able to fly in and help an industry that was over 100 years old make the transition from analog to digital."**

Moeller and darkroom master Hugh Milstein came up with a formula that gives photographers everything they need to go digital: Rent out custom carts — called the FuseBox™ — loaded with Hasselblad SLR cameras sporting 22-megapixel digital backs, Apple Cinema Displays, Power Mac G5s and batteries. They can be shipped almost anywhere and come complete with technicians who manage all the gear. When the raw files from a shoot hit DigitalFusion, they're color-corrected and processed, then archived on a colossal 40-terabyte Xserve RAID and ripped into DFStudio™, a custom online application, for viewing. From there, photographers can edit their shoot and deliver digital proof sheets to their clients.

"We were able to fly in and help an industry that was over 100 years old make the transition from analog to digital," says Moeller.

Good Chemistry

DigitalFusion began in a garage in Venice Beach, Calfornia, in 1999. Moeller was running Apple servers and building websites for Sony Pictures and Milstein was cooking up prints for Hollywood movie moguls. "I really studied the medium of film," says Milstein. "You could give me exposure readings and I could give you a depth of field calculation. It was the science of the stuff that I really dug."

On the Web

DigitalFusion.

Equipment List
Hardware
- Power Mac G5
- Xserve G5
- Xserve RAID
- Exabyte tape storage library
- iMac G5
- 15-inch PowerBooks
- Apple Cinema Displays
- Sony Artisan monitors
- HardFilm™
- Q-Logic fiber channel switches
- APC infrastructure backup systems
- Hasselblad H1 SLR
- Imacon 22-megapixel digital back
- BetterLight scanning back
- Creo Eversmart Supreme scanner
- Imacon Flextight949 Scanner
- Epson 10000/9600/9000/4000
- Fujix 4000II
- Just Normlicht 5000K Lightbox

Software
- DFStudio™
- Imacon FlexColor
- Adobe Photoshop CS
- Xsan
- Mac OS X Server
- AppleScript
- Mail
- MYOB AccountEdge
- Now Up-to-Date/Contact
- Transmit
- Keynote
- Roxio Toast
- ColorByte ImagePrint
- ColorVision Monitor Spyder

A veteran Mac user, Milstein knew there was potential in digital scanning, color correction and printing. "My professional life has always evolved around photography and the Mac," he says. "I was waiting for those two technologies to converge so I could make a career out of it. Once the Mac got us to a place where we could scan and retouch the stuff, we just had to wait for the photo printers to come out and when that happened, man, this whole thing took off."

The two longtime friends — they met in high school in Phoenix — decided to stir their skills into a unified digital photography solution. Milstein craved a slick, efficient digital photo lab and Moeller wanted to mimic movie editing and production workflow. They modeled their new enterprise on high-end postproduction houses.

Hugh Milstein (left) and Jon Moeller started DigitalFusion, a digital scanning, retouching and printing business, in a Venice Beach, California, garage. Now the company provides a complete solution for professional digital photographers. Photo: Art Streiber.

Photographers would meet with Milstein to scan and fine-tune their shots before making prints.

Whereas in a photo lab photographers would drop their negatives off to a customer service rep and come back three days later to look at a print, "we actually started with a different idea," says Milstein. "Set up an appointment just like in a doctor's office. Come in and sit with your custom printer. Make your decisions right there on the screen and leave with your prints. It turned the idea of drop-it-off-and-leave on its ear."

"It was a very, very powerful change," adds Moeller. "The film and TV business had done that with their editing suites — it's the way directors edit their movies. But it was a very new experience for photographers. It took a while to get used to. They liked it, but it took a while."

During the next few years, DigitalFusion outgrew its Venice Beach garage and two more offices. Moeller and Milstein gathered an elite group of digital artists and scanning specialists as well as a loyal following of top-notch photographers, including Art Streiber, James White, Dewey Nicks, Jeff Lipsky, Anthony Mandler and Mark Liddell. The shots they scanned and retouched were featured on the covers and in the pages of such magazines as "Vanity Fair," "Flaunt," "GQ," "Glamour," "Entertainment Weekly," "Esquire" and "Marie Claire."

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DigitalFusion
Photo on the Go

The DigitalFusion FuseBox™ is a mobile digital capture unit loaded with Hasselblad SLR cameras sporting 22-megapixel digital backs, Apple Cinema Displays, Power Macs and batteries. The kit can be shipped almost anywhere and comes complete with a technician to run all the equipment.

What do you get when you cross a Swiss Army knife with a digital photography service? The DigitalFusion FuseBox™. Moeller and Millstein's scanning and retouching business was boiling over, but the duo had a hard time convincing old-school pro photographers to jump on digital. They would need a simple, shiny all-in-one device to lure their clients into the future.

"We knew that we were going to be standing in the desert some day next to a photographer with FireWire cables and digital backs and batteries and generators," says Moeller. "He's going to have to use a full complement of computerized gear to do what he used to do with a camera and a roll of film. We started to think about how we were going to mitigate the risks of taking computers from our nice controlled editing suite environment to a rough location where they're shooting the new Mustang for a billboard or a celebrity for 'Vanity Fair' in a swimming pool."

> **"That's the beauty of a lot of the Apple technology. It's simple and it's extremely well designed and we know what it takes to run it."**

The team mulled the problem for almost two years before they found an answer. In 2003, the FuseBox™ was born. Moeller and Milstein packed a full array of digital photography and computer equipment into a durable aluminum container the size of a typical tool chest. They designed the unit themselves with reliability and versatility in mind.

They mounted an LCD monitor on a swing-out arm, included a PowerBook as a backup CPU/break-away capture station and stacked a mirrored hard drive system into the box to prevent accidental data loss. They outfitted it with enough batteries to run for up to 10 hours. Technicians could preview photos and tweak studio setups and camera settings to get perfect shots. Photographers could use the FuseBox™ to capture thousands of frames without worrying about computer equipment or changing the way they took pictures. The FuseBox™ served up the security of analog film and the speed of digital.

"That's the beauty of a lot of the Apple technology," says Moeller. "It's simple and it's extremely well designed and we know what it takes to run it."

The FuseBox™ was first deployed for a CBS promo shoot. DigitalFusion and a photographer secured about 3,500 shots with no hang-ups, lost data or delays. Since that shoot, entertainment companies and corporate clients have booked the system non-stop, including CBS, Paramount, Warner Brothers, FOX Broadcasting, Universal Pictures, NBC/Universal, ABC and HBO.

Pro/Photo

DigitalFusion:

HardFilm

When you've got to send 60 gigabytes of data from Paris to Los Angeles, the fastest bandwidth is a FedEx box. The guys at DigitalFusion send all their big digital photo jobs via cassette-sized, aluminum-armored hard drives called HardFilm™. The drives were originally developed for the military to shuttle important data to and from the front lines. "They were putting them in planes and tanks and military vehicles because they were shock-mounted and shock-rated," says Jon Moeller. The military drives were perfect for sending data to and from remote photo shoots.

The DigitalFusion team reworked the drives, equipped them with 7,200-RPM laptop drives and multi-pin connectors that can be used with USB or FireWire. Now the drives are an integral part of the DigitalFusion workflow.

Catch and Release

When DigitalFusion catches a snapshot — either with a digital camera or a negative scanner — it's held in two places. One copy is detained on a DigitalFusion server and another is locked up in a portable hard drive. Photographers get to visit their imprisoned shots in luxurious editing suites that feature comfy couches and iMac workstations. There they can meet with photo retouchers, browse the Internet and catch up on correspondence or simply lounge until their photos are processed.

"When Hugh sits with a client, he can speak in photography terms — one stop, two stop, burn, dodge, darken, lighten, different paper stocks, film effects, cross processing," says Moeller. "Hugh is the translator between that and a new layer mask in Photoshop, a new curves adjustment in Photoshop."

Once a photographer decides on a particular look for the job, Milstein or another technician divvies up the processing work among several Xserves. The company is experimenting with Xsan, Xgrid and cluster processing, and currently runs batch-processing software on several machines at once. "In a traditional film lab, if you brought me 100 rolls or 10,000 rolls of regular film, they'd all be done at the same time," says Moeller. "Our clients want that same level of service, only faster, because now it's digital."

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DigitalFusion
A Complete Solution

From left to right: Christina Olsen, production administration; Ronn Brown, rentals/sales; Anna Bolek, retoucher; Leighton Dancy, production administration; Melissa Hackett, retoucher; Joe Puleio, retoucher; Jon Moeller, co-founder; Hugh Milstein, co-founder; Juliana Paciulli, production administration; Peak Scott, scanning; Jose Trejos, scanning; Kathy Washburn, scanning; Danny Abromovitz, printing. Photo: Art Streiber

Most jobs are processed in a matter of hours or overnight. When the job is done, the client is handed a cassette-sized, aluminum-armored, 20-to-100-gigabyte hard drive — called HardFilm™ — loaded with her photos. Backup files are stored on DigitalFusion servers for one year. After that, clients can extend their files' stay for a modest fee.

"Now we can deliver these perfect files to our clients," says Milstein. "The end points are set right, the color, the contrast, everything is great. They're like perfect little prints."

> "We're at the point where any one server can go down and it can be replaced in a matter of two or three minutes; it will never take down the entire house. It's a pretty far leap from where we began to where we've ended up."

All those perfect little prints take up a lot of server space. DigitalFusion has 40 terabytes of Xserve RAID storage. When the company needs more room, adding more Xserves or Xserve RAIDs won't be a problem. Moeller configured most of the Xserve and Xsan system himself, including e-mail and web servers, so he's more than up to the task of adding on to it. "We've never had a full-time IT staff," he says. "It's always been myself and Hugh and an occasional part-time consultant."

If a server ever fails, Moeller can have a new one up and running in a matter of minutes. "We're at the point where any one server can go down and it can be replaced in a matter of two or three minutes; it will never take down the entire house," he says. "It's a pretty far leap from where we began to where we've ended up."

Solid Proof
Organizing thousands of photographs is a chore, to say the least. Traditionally, photographers thumbed through stacks of proof sheets to find the good shots. They sliced up the sheets and pasted their top picks into one hybrid proof sheet for their clients. "We've done the same thing, but electronically," says Milstein. "It's

Safe and Sound
The guys at DigitalFusion are experts at scanning, restoring and archiving old photos and negatives, but they can also handle artwork. You can't fit a painting in a flatbed scanner, so the crew at DigitalFusion had to invest in a museum scanning system. They mounted a large-format 4X5 camera with a Betterlight digital back on a horizontal arm. The camera makes several passes across a painting or print, snaring up to 500 megabytes of high-resolution data. Full-size reproductions can be printed on any flavor of paper or canvas.

"We're one of the few shops in the country that has a museum-grade copy system," says Hugh Milstein. "Because of that we get very select and very interesting jobs. You can't go to a museum and order something, but you can come here and get it done." Rock star and artist Marilyn Manson recently asked DigitalFusion to scan and reproduce one of his watercolors. The reproduction was so good that Manson confused it with the original. "The quality and detail is outstanding," says Milstein.

Not Lost — DFStudio™ in Action
When DigitalFusion was recently hired to work with Art Streiber on promo shots of the television show "Lost" on the north shore of Oahu, Moeller and Milstein couldn't say no. The duo took a special, ultra-portable version of the FuseBox™ consisting of several Apple laptops to the beach. The photographer took more than a thousand pictures, which were sent to LA for color correction and processing. The whole job was finished and uploaded to the photographer's DFStudio™ account in few days. The photographer moved onto his next job after posting his initial edit.

"A few weeks later he gets a call from the client, who says he needs to see the first select edit of the 'Lost' show —

significantly faster and it's also much sexier."

Moeller and Milstein asked software designer John Supra to write an online application for digital photo management. The end result: DFStudio™. When a job is processed, it's dumped into DFStudio™. Photographers can log in to their DFStudio™ account through any browser to view and organize their photos, selecting first picks, second picks and kills. Once they've made their selections, DFStudio™ can generate an online proof sheet that can be sent to the client via a secure e-mail link or printed out.

DFStudio™ doesn't stop at proof sheets. Photographers can attach notes and keywords to each frame for future searches. They can also log expenses and keep track of contacts — from producers to stylists — for each job. "We want to get the professional photographer using this system daily because it's so much more than just doing an edit," says Milstein. "You can track expenses and contacts. It really becomes this incredible organizing tool of not just your images, but the data that goes along with the images," says Milstein.

Digital Franchise
Moeller and Milstein may have the secret formula for complete digital capture and processing, but they're willing to share. They've already sold a copy of their system (servers and the DFStudio™ web application) to FOX Broadcasting. In the future, the DigitalFusion FuseBox™ and DFStudio™ could be sold off the shelf. "The FuseBox™ is on the track to become a real product, to become something the outside guy can buy that's fully equipped, ready to go," says Moeller. "He just rolls it into a studio and starts taking pictures."

The next generation FuseBox™ is on the drawing board. It could feature several rack-mounted Xserves, Bluetooth and an Airport Extreme network. The second version of DFStudio™ is being beta tested and will feature support for "flash-scanned" contact sheets. Photographers usually store mountains of contact sheets. DigitalFusion is ready to shoot each sheet with a 35mm digital camera, then dump the data into DFStudio™, where it can be organized and archived.

In the coming years, photographers and printmakers may be able to open up their own shop based on the DigitalFusion formula. "We now have the digital workflow solution," says Milstein. "We get questions like 'Hey, we'd like you guys to open up in San Francisco, New York and Chicago.' The professional photo market is dying for this."

he was never sent the proof sheets," says Milstein. At the time, the photographer was in New York with Moeller and Milstein. "The photographer looked at us and we said, 'All we need to do is duck into a Starbucks and use DFStudio™ to do your edit and send it immediately.' He would have had to fly back to LA, get the proofs, cut them up, paste them up and FedEx them. Instead we did it in 10 minutes."

DigitalFusion used its high-resolution, museum-quality scanner to reproduce Marilyn Manson's watercolor "Experience Is the Mistress of Fools."