

Color Business Report

Color, Computers, and Reprographics

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HP's Product Line Overhaul Begins at the Bottom

On June 25, 2002, **Hewlett-Packard Company** (Palo Alto, CA) announced that a three-year, \$1.2 billion investment in its printer and imaging business will result in 50 new products by early 2003. The first three products—the Deskjet 5550, 3820, and 3420, were announced on June 25, 2002. These three products and others to follow will represent a “roll of the entire product line,” as HP’s James Bailey put it. Not all of the 50 products are printers. We can expect new digital cameras, scanners, ink cartridges, and media, also.

With the product roll-over come two important changes to HP’s long-standing product introduction strategy. HP’s previous practice has been to introduce new technology at the top end of its line. Now, according to Bailey, “We are taking leaps in technology down to mass-market price points.” The other important change in the product introduction strategy is that HP will maintain a much more populated product grid, meaning that HP wants to have specific products to satisfy as many consumer and business needs as possible.

There are several factors prompting the shift in HP’s strategy:

- With increased competitive pressure, HP has increased the number of product configurations to thwart defections;
- Product performance distinctions are harder to come by and harder to



Two of HP's new low-end products, including the 5550, use new print head technology.

Source: Hewlett-Packard Company

communicate, so even “low-end” products have to offer good performance;

- The market is reaching saturation, meaning that there will be fewer new-product placement opportunities, and a higher proportion of buyers who have a good idea of what features they need.

(continued on page 2)

This month in *Color Business Report* (see page 2 for contents):

HP Shifts Technology Introduction Strategy

Learn why HP now is offering brand-new printing technology at the bottom of its line, instead of its previous practice of pushing older print heads to the lowest-cost products **1**

Xerox 6060 Extend Media Performance Xerox's new 6060 delivers two key benefits. First, print speeds are maintained (or optimized) while printing on most heavy stocks, even when duplexing. Second, the printer can pick from any of up to four input trays, allowing up to four paper types per print job **4**

Xerox EA Toner Comes to the US With the DocuColor 2240, Xerox has finally brought its EA toner to the U.S. market.

The printer, which is based on the print engine used in the Phaser 7700 color laser printer, has already sold 20,000 units in Japan **6**

Life on the Edge with a Top Large-Format Printing Service

10-year-old Castle Graphics thrives in the unforgiving large-format service business. Learn how the promise of productivity improvements helped allay the risks involved in making huge capital investments in new technology such as the NUR Fresco. Castle Graphics' David King is optimistic about the large-format industry's future, since he predicts that improved technology and lower price points will greatly expand the number of outlets offering high-end large-format output services **15**

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Why Re-vamp the Whole Line?

Image permanence (lightfastness) and photo quality have become competitive requirements in many printer segments. Most of the time, enhancing image permanence requires a change to the media and ink. Since ink, the writing system (nozzles) and media are usually designed as a system, increasing lightfastness

requires a re-designed ink cartridge. We suggest that HP could not restrict the newer cartridges to the top of its line as it has before because the consumer segment that had been purchasing "low-end" products needs high-quality imaging, too. If HP offers high-quality imaging at the *bottom* of its line, it must offer high-quality imaging *throughout* the line. Therefore, the entire line must be re-vamped. (That said, toward the

Product Specifications: HP Deskjet 5550

Nozzle Configuration	100 nozzles per color, 300 per tri-color head, in a .33" swath. 416 nozzles on black cartridge, in a .33" swath.
Drop Volume	5 pl color, 17 pl black
Resolution	Black: up to 1200 dpi Color: 4800- by 1200-dpi addressable, with 1200-dpi input and special paper.
Print Speed	
Black, plain paper	17 ppm fast, 6 ppm normal, 2 ppm best
Color, photo paper	.6 ppm fast, .3 ppm normal, .2 ppm best
Color, text/graphics	12 ppm fast, 4 ppm normal, .5 ppm best
Color, 4" by 6" photo	.75 ppm fast, .7 ppm normal, .5 ppm best
Interfaces	USB, IEEE-1284. wp110 wireless optional.
Printer Languages	HP PCL 3
Memory	8 MB
Paper Capacity	100 sheets
Output Tray Capacity	50 sheets
Paper Size Range	3" by 5" to 8 1/2" by 14" or A5
Paper Weights	16 to 24 lb. Card stock to 110 lb. (0.012").
Duty Cycle	3,000 pages per month
Dimensions	17.9" W by 6.2" H by 15.2" D
Weight	11.6 lb.
Street Price	\$149

HP Deskjet 5550: Supplies and Accessories

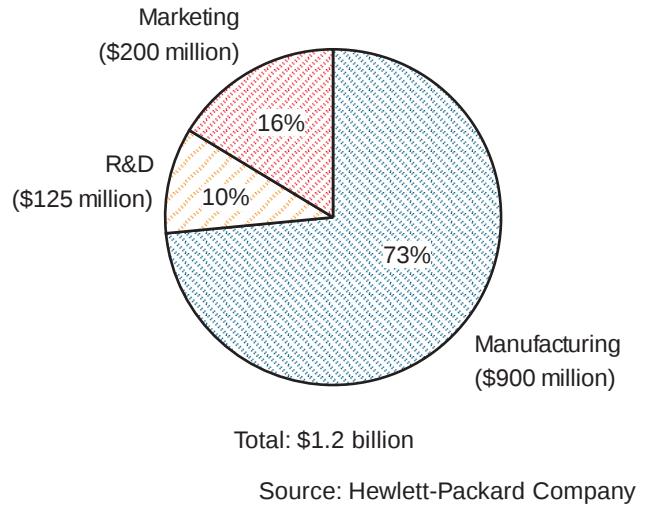
#56 19-ml black ink cartridge (C6656A)	\$19.99
#57 17-ml tri-color ink cartridge (C6657A)	\$34.99
#58 16-ml tri-color photo cartridge(C6658A)	\$24.99
Duplex accessory (C8955A)	\$79.00
Wireless print server wp110 (802.11b)	\$299.00
HP Jetdirect 175x	\$199.00
HP Jetdirect 170x	\$143.99

Source: Hewlett-Packard Company

bottom of its line, HP still uses "old" technology in new products. The \$79 Deskjet 3820 uses existing #15 and #78 cartridges.)

Underlying HP's product configuration decisions, at least with HP's "consumer" (Deskjet and PhotoSmart) lines, is the assumption that accompanying the increase in consumer use of digital cameras will be an increase in the number of images shared. With more images shared, there will be more images printed. Last month, we reported on HP's Instant Share image sharing system, which was introduced with the Photosmart 812

HP's Three-year Investments in Printing and Imaging



digital camera. In fact, there is no fee associated with Instant Share. "This is not a service that people will be asked to pay for," said John Solomon, Printer Category Manager for HP's Imaging and Printing Group. "It will pay for itself by greatly enabling sharing." HP's Director of Marketing for Digital Imaging Solutions Ken Flemming added, "The more people view and share, the more people want to print."

In developing new products, HP focused on delivering print quality that rivals silver halide, with no compromises. With some of its new products, HP is introducing PhotoRET IV, which extends HP's "layering" technology to six-color printing, with the result of being able to print one of 1.2 million colors at a given pixel location. The benefit, we were told, would be more realistic blending in shadow areas. All products in HP's ink jet line selling for \$149 or more will be capable of "4800-optimized-dots-per-inch" printing, which HP introduced with much fanfare in March 2002. HP has softened its initial stance that 4800 dpi is a great technology breakthrough, and now acknowledges that the principal benefit of 4800-dpi optimized printing is that it helps the company communicate quality. "Customers have come to use DPI as a proxy for image quality," said Rory Hanson, Product Quality Specialist for HP's Printing and Imaging Group.

HP's new print drivers include a set of easy-to-use image enhancement tools that HP has been working into its line over the years, including SmartFocus sharpening, Digital Flash contrast adjustment, and smoothing. HP has also introduced a "reserve" mode of printing, which will continue to print with the black cartridge if a color runs out. If the black cartridge runs

(continued on page 4)

Product Specifications: HP Deskjet 3820

Nozzle Configuration	136 nozzles per color (C, M, Y.) 300 nozzles for black.
Resolution	Black: 600 dpi Color: 4800- by 1200-dpi addressable, with 1200-dpi input and special paper.
Print Speed	
Black	12 ppm fast, 6 ppm normal, 2.5 ppm best
Color	3 ppm fast, .8 ppm normal, .25 ppm best
Color, text/graphics	10 ppm fast, 4.5 ppm normal, 1 ppm best
Color, 4" by 6" photo	.3 ppm normal, .15 ppm best (No fast mode when printing on photo paper.)
Interfaces	USB, IEEE-1284
Printer Languages	HP PCL 3
Memory	2 MB
Paper Capacity	100 sheets
Output Tray Capacity	50 sheets
Paper Size Range	3" by 5" to 8 1/2" by 14" or A5
Paper Weights	16 to 24 lb. Card stock to 110 lb. (0.012")
Duty Cycle	1,000 pages per month
Dimensions	17.5" W by 7.8" H by 10.1" D
Weight	12.7 lb.
Street Price	\$99

HP Deskjet 3820: Supplies and Accessories

#15 25-ml black ink cartridge (C6615D)	\$29.99
#78 38-ml tri-color ink cartridge (C6578A)	\$54.99
#78 19-ml tri-color ink cartridge (C6578D)	\$34.99
Wireless print server wp110 (802.11b)	\$299.00

Source: Hewlett-Packard Company

Product Specifications: HP Deskjet 3420

Nozzle Configuration	100 nozzles per color, 300 per tri-color head, in a .33" swath. 416 nozzles on black cartridge, in a .33" swath.
Drop Volume	5 pl color, 17 pl black
Resolution	Black: 600 dpi Color: 2400- by 1200-dpi addressable, with special paper.
Print Speed	
Black	10 ppm fast, 7 ppm normal, 1.5 ppm best
Color	3 ppm fast, .1 ppm normal, .5 ppm best
Color, text/graphics	8 ppm fast, 3.5 ppm normal, 1 ppm best
Color, 4" by 6" photo	.5 ppm best (No fast or normal modes when printing on photo paper.)
Interfaces	USB
Printer Languages	Lightweight Imaging Device Interface
Memory	768 KB buffer
Paper Capacity	100 sheets
Output Tray Capacity	50 sheets
Paper Size Range	3" by 5" to 8 1/2" by 14"
Paper Weights	20 to 24 lb. Card stock to 110 lb.
Duty Cycle	500 pages per month
Dimensions	16.6" W by 5.6" H by 7.2" D
Weight	4.5 lb.
Street Price	\$79.00

HP Deskjet 3420: Supplies and Accessories

#27 10-ml black ink cartridge (C8727AN)	\$17.99
#28 8-ml tri-color ink cartridge (C8728AN)	\$21.99

Source: Hewlett-Packard Company

out mid-print, the printer will finish the job with three-color composite black.

\$150 and below

HP's new products include the Deskjet 5550, which is six-color-capable by swapping out the black cartridge with an optional photo cartridge. Mixed color and text pages print as fast as 4 ppm in normal mode. The printer uses new ink cartridges.

Also among the new products is the \$99 Deskjet 3820, which uses the venerable #15 black and #78 color cartridges that HP introduced with the DeskJet 970 in August 1999. (The DeskJet 970 used the #45 black cartridge. The black cartridge used in the Deskjet 3820 is the same cartridge used in the DeskJet 810.) The 3820 prints text and graphics pages in color as fast as 4.5 ppm.

HP also introduced the diminutive Deskjet 3420,

which uses new low-capacity cartridges. The #27 black cartridge holds 10 ml of ink. The #28 tri-color cartridge tops out at 8 ml, divided between three colors. The Deskjet 3420 uses a new operating-system dependent language called Lightweight Imaging Device Language. The new language sends pre-rasterized data in a device/print cartridge-specific format to the printer. The Deskjet 3420 weighs a mere 4.5 lbs, and costs \$79.9

Printers

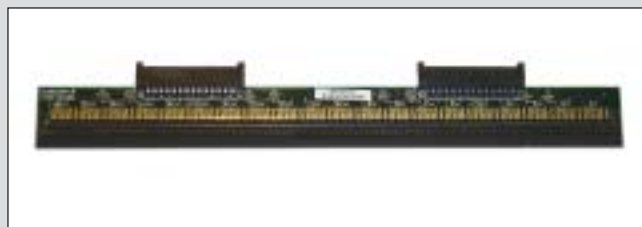
On July 1, 2002, **Xerox Corporation** (Rochester, NY) announced the DocuColor 6060 Digital Color Press, a 60-ppm, 8-bit, 600-dpi printer that Xerox expects will build on the success of the "2000" series of DocuColor printers. (The DocuColor 2045 and 2060 will remain in

Corrections and Amplifications

When we wrote about Xerox's XEScan large-format scanner last month, we assumed that Xerox's CMOS sensor traveled back and forth across the page just like a shuttling print head. A product manager corrected us before we went to press, but we didn't modify our coverage correctly. The XEScan uses a stationary 400 dpi CMOS head which is 37.2" wide.

The scan head uses three of the same CMOS image sensor technology used in the monochrome production scanners incorporated into the Xerox DocuTech products and Document Centre products such as the 460 and 470. Xerox says that using a single image sensor array eliminates mechanical adjustment issues encountered in scanners using multiple cameras. The tri-linear sensors themselves are about 2/3", and are glued or butted together. To scan letter-sized originals, Xerox fabricates 12.4" bars. Three such bars are attached end-to-end to make the wide-format scanner. The bar of CMOS sensors is topped with a SELFOC lens, which delivers a 1:1 image to the sensor. (An explanation of the SELFOC lens can be found on NSG Europe's web site: http://www.nsgeurope.com/grin_selfoc.shtml).

Tight coupling of the lens to the CMOS sensor bar produces a rugged component that can move or remain stationary, as the application requires. Xerox has been conducting CMOS research since the late 1980s. The CMOS sensors are manufactured for Xerox by a third



Xerox has produced a 37" color scan bar by butting nearly 60 2/3" CMOS sensor elements together.

Source: Xerox Corporation

party, but the arrays themselves are manufactured by Xerox in Rochester, NY. Because CMOS sensors can be easily interfaced to standard digital ASICs, Xerox can perform image processing steps concurrent with image acquisition. For instance, on recognizing a continuous-tone image in the original, image processing algorithms can enhance details, adjust tones, and select halftone screening algorithms. When the scanner detects a dither pattern in an original, it can remove halftone screening. Finally, the edges of text and line art can be enhanced. In the production scanners, every single pixel on a letter-sized page can be examined and processed in 1.1 seconds. CMOS-based scanners can acquire information at about 15" per second, faster than today's technology can process it, so present scan rates in the 50-page-per-minute neighborhood can be exceeded as soon as processing power allows.

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the line. Xerox reports that over 5,200 DocuColor 2000 printers have been sold since the products were introduced in March 2000.) Nearly 35% of the 6060's system components and engineering are new. Even the frame and footprint are different from the 2000 series that provided the technology foundation for the 6060.

In developing the DocuColor 6060, Xerox wanted to deliver the ability to run at full speed on a broad range of stocks. The 6060 can handle coated and uncoated paper weights from 18 lb. bond to 110 lb. cover (64 gsm to 300 gsm). Pages from 75 gsm to 135 gsm will run at rated speed. The printer also minimizes performance drain when printing two-sided. In the 80-gsm to 136-gsm range, duplex pages are produced at 60 images (30 two-sided pages) per minute. Xerox says duplex speeds with sheets weighing between 136 gsm and 220 gsm are printed at 45 images per minute, compared to 30 images per minute on Xerox's 2060, and about 12 images per minute on the Canon CLC 5000.

The new printer uses triple-charged developer, which is cycled through the system on an ongoing basis. The developer lasts longer, and improves the
(continued on page 6)



The 60-ppm DocuColor 6060 extends the range of stocks that will run at full speed. Source: Xerox Corporation

consistency of prints. Customers can replenish toner without shutting the printer down. With the toner supply removed, enough toner remains in the system to print 5,000 pages. The printer can be set up with four identical load-while-running all-purpose trays (two standard, two optional—\$8,000), all of which handle the full range of paper weights. With four trays installed, paper capacity is a whopping 8,000 pages of 24-lb. paper. Print jobs can use paper in any installed tray, meaning that jobs with four types of paper can be run.

The printer is equipped with a 500-sheet offset stacking output tray. Users who need more than a 500-sheet output capacity can acquire an optional 3,750-sheet stacker (\$15,500) or a 2,250-sheet stapler/stacker (\$10,000). The DocuColor 6060 can be connected to in-line finishing equipment such as the ColorWorks 2000 BookletMaker (\$42,410), or the Xerox DB 120-D Document Binder (\$15,000). By attaching an optional scanner (\$16,000), the printer can perform image capture and copying functions.

The DocuColor 6060 can be driven by Xerox's DocuSP 6000XC server (\$53,000), a Creo CXP6000 server (\$55,000), or an EFI EXP6000 server (\$53,000). The base printer lists for \$139,000. The DocuColor 6060 will be available in August 2002.

On June 25, 2002, **Xerox Corporation** (Stamford, CT) introduced two color copier/printers, the DocuColor 2240 and DocuColor 1632. Xerox's first products to use Emulsion Aggregation (EA) toner in the North American market (the Japanese market version of the DocuColor 12 has used EA toner for some time), the new copiers are designed for corporate users. They are based on the same Fuji-Xerox print engine used by the Phaser 7700, sold by Xerox's Office Printing Business unit. The DocuColor 2240 prints and copies 22 ppm in color and 40 ppm in monochrome, while the DocuColor 1632 outputs 16 ppm in color and 32 ppm in black and white.

The EA toner used in the DocuColor 2240 and 1632 is chemically grown (see *Color Business Report*, August

Product Specifications: Xerox DocuColor 2240/1632

Print Resolution Modes	1200 dpi 600 by 1200 dpi 600 dpi
Copy Resolution	600 dpi
Scan Resolution Modes	600 dpi, 400 dpi, 300 dpi, 200 dpi
Print Speed	<i>Color</i> <i>Black & White</i>
DocuColor 2240	22 ppm 40 ppm
DocuColor 1632	16 ppm 32 ppm
Duty Cycle	135,000 pages/month
Processor	400 MHz Power PC
Memory	512 MB 10 GB hard disk
Software Compatibility	Adobe PostScript 3, PCL 5e, PCL 6
Networking	10/100BaseT Ethernet
Automatic Duplexing	Standard
Paper Handling	Tray 1: 520 sheets Tray 2: 520 sheets Tray 3+4: 2,000 sheets Manual feed: 100 sheets
Paper Weights	Trays 1 to 4: 16 to 24 lb. Manual feed: 16 to 110 lb.
Maximum Paper Size	12" by 19"
Maximum Image Size	11.7" by 18.8"
Size	26.2"W by 45.1"H by 30.7"D
Weight	383 lb.
Price	
DocuColor 2240	\$19,900
DocuColor 1632	\$17,900

Source: Xerox Corporation

2001). Xerox claims that because the size and shape of the toner particles can be precisely controlled, color consistency and image quality are superior to that of conventional milled toner. In addition, less toner is required to print a page. Xerox told us that the cost per color page on the DocuColor 2240 and 1632 is \$0.129; black pages cost \$0.089. By comparison, page cost on Xerox's 5700 series color copiers (which the DocuColor 2240 and 1632 will replace) ranged from \$0.200 to \$0.300 for color pages and \$0.020 to \$0.050 for black pages.

Xerox developed its own controller for the DocuColor 2240 and 1632. The embedded controller has a 400 MHz PowerPC processor, 512 MB of RAM, and a 10 GB hard disk. It supports Adobe PostScript 3, PCL 5e, and PCL 6. Network connectivity is standard; the controller integrates a 10/100BaseT Ethernet interface. The controller also supports simultaneous printing and RIPing, and electronic pre-collation.



The DocuColor 2240 uses the Phaser 7700 print engine, but prints with EA toner.

Source: Xerox Corporation

Depending on their quality or production requirements, users can select between three print resolution modes on the DocuColor 2240 and 1632: 1200 dpi, 1200 by 600 dpi, or 600 dpi (the printer is a one-bit machine.) The DocuColor 2240 and 1632 have several versatile copying features, including book mode, which copies both pages of a book laid flat on the glass, booklet creation mode, auto rotation, and poster mode. Copy resolution is 600 dpi. Users can scan documents or images at 200, 300, 400, or 600 dpi, storing them on the network as JPEG or TIFF files.

The DocuColor 2240 and 1632 are well equipped to handle production printing in the office. Standard paper capacity is 3,140 sheets, fed by two 520-sheet trays, two 1,000-sheet trays, and a 100-sheet manual feed. Automatic "trayless" duplexing is standard. The machines feature automatic tray switching, and allow users to replenish the paper supply during printing. Additionally, the DocuColor 2240 and 1632 can print on up to 12" by 19" sheets, if desired. Users can load paper cassettes with paper as heavy as 28 lb., while the manual feed can handle up to 110-lb. index stock.

Xerox is marketing the DocuColor 2240 and 1632 to corporate users, focusing on office workgroups and in-plant print shops, but will also target the print-for-pay and quick print markets. The machines have been available in Japan since last fall, where 20,000 units have been sold to date. The DocuColor 2240 is available for a list price of \$19,900; the DocuColor 1632 costs \$17,900. A 1,000-sheet finisher/stapler is available for \$2,000. Black toner cartridges cost \$150 each, while color cartridges are available for \$175 per color (cyan,

magenta, yellow). The DocuColor 2240 and 1632 will complement the DocuColor 12 and Document Centre Color Series 50 in Xerox's color copier line—Xerox hinted that it may soon lower prices on the older 12-ppm models.p

On June 25, 2002, **Panasonic Digital Imaging Solutions Company** (Secaucus, NJ) introduced the WORKiO CL500 and CL510 single-pass 1200-dpi color laser printers. The CL500 and CL510, developed by Panasonic's parent company Matsushita, print on letter- and legal-sized sheets. Print speed on the CL500 and CL510 is 17 ppm in color and 21 ppm in monochrome. The CL500 is a PCL 5C printer, and ships with 64 MB of RAM. The CL510, designed for more graphics-intensive applications, prints in both PCL 5C and Adobe PostScript 3. For handling larger print files, the CL510 has 128 MB of RAM. Both printers feature network connectivity, via a 10/100BaseTX Ethernet interface.

The CL500 and CL510 ship with a 530-sheet paper cassette. The manual feed tray on each printer can hold
(continued on page 8)

Product Specifications: Panasonic CL500/CL510

Resolution Modes	1200 dpi 600 dpi	
Print Speed	<i>600 dpi</i>	<i>1200 dpi</i>
	Color	17 ppm
	Black & White	21 ppm
Memory	64 MB (128 MB on CL510), expandable to 256 MB	
Processor	360 MHz Motorola PowerPC	
Software Compatibility	PCL 5 (Adobe PostScript 3 on CL510)	
Interface	IEEE-1284	
Networking	10/100BaseTX Ethernet	
Automatic Duplexing	Optional	
Paper Handling	Cassette: 530 sheets	
	Manual Feed: 100 sheets	
	Output Tray: 250 sheets	
Paper Sizes	Minimum: 3.6" by 5.9".	
	Maximum: 8.5" by 14". Letter,	
	A4, Legal, B5, Executive	
Paper Types	Cassette: Plain, bond, recycled	
	Manual Feed: Labels,	
	envelopes, coated papers, card stock, transparencies	
Paper Weights	Cassette: 16 to 28 lb.	
	Manual Feed: 16 to 80 lb.	
Duty Cycle	50,000 pages/month	
Size	16.5"W by 21.1"H by 15.5"D	
Weight	65.7 lb.	

Source: Panasonic Digital Imaging Solutions Company



The 17-ppm Panasonic WORKiO CL500 may be a viable alternative to the HP 4600. Source: Panasonic

up to 100 sheets. Users with higher print volumes can add two 530-sheet trays, increasing total paper capacity to 1,690 sheets. An automatic duplex unit is available as an option on both printers.

The machines have a remote diagnostic and maintenance utility, allowing Panasonic service technicians to troubleshoot and correct printer problems. Other network printer management utilities include an embedded web server, remote printing, error notification via e-mail, and a usage analysis tool.

Retail pricing for the CL500 and CL510 printers starts at "under \$2,000." (Panasonic is still tweaking prices for the printers and their consumables.) At that purchase price, the new printers will be competitive with

the newly introduced HP Color LaserJet 4600 (see *Color Business Report*, June 2002). Considering their slightly higher performance specs (the HP 4600 prints only 17 ppm in monochrome, and has a maximum resolution of 600 dpi), the Panasonic CL500 and CL510 may offer users a compelling alternative to HP the next time they shop around for a color laser printer. The CL500 and CL510 will ship in late summer 2002.

On June 25, 2002, **Lexmark International, Inc.** (Lexington, KY) introduced two multifunction ink jet printers, the X125 All-in-One Office Center, designed for small- and home-office users, and the PrinTrio, an MFP intended for home users. The X125 uses Lexmark's 15M0120 color and 12A19970 black ink cartridges, and prints up to 8 ppm in color and 16 ppm in monochrome. Like most of Lexmark's ink jet line, the X125 can print at resolutions up to 2400- by 1200-dpi. It supports monochrome and color standalone faxing (without requiring a PC), and can store up to 80 pages in memory. Using the machine's copy function (also standalone), users can make up to 99 copies, and can make reductions or enlargements from 25% to 200%. Copy speed on the X125 is 12 cpm in monochrome and 5 ppm in color; scan resolution is 600 by 1200 dpi. The X125's software bundle includes ViewAhead photo editing software and ABBYY Fine Reader Sprint optical character recognition software. The X125, available for a street price of \$179, is carried at several retail chains, including Best Buy, CompUSA, Costco, Staples, Target, and Wal-mart.

The PrinTrio is a consumer-oriented device, designed for home users who may need the functionality of an MFP, but not a device that is difficult to use. According to Lexmark, the PrinTrio's simplicity of

Printers

Vendor/Product Model	Date	Price	Comments
Epson introduces Stylus C42UX for bundles	7/15/2002	\$79	Street price for color ink jet printer, designed to be included in PC bundles. The C42UX prints at 2880- by 720-dpi, at speeds up to 5.5 ppm in color and 12 ppm in black.
Epson introduces Stylus Photo 960	7/17/2002	\$349	Street price for 2880- by 1440-dpi six-color ink jet photo printer. Prints an 8" by 10" photo in two minutes (720 dpi). Replaces the Stylus Photo 890 in Epson's product line.
Lanier introduces AP206 color laser	6/17/2002	\$1,599	Retail price for 1200- by 600-dpi color laser printer, based on the Ricoh AP206. Prints 6 ppm in color and 24 ppm in monochrome.
Lanier introduces 2138E color laser	7/8/2002	\$8,695	Retail price for multi-engine color laser printer, Lanier's version of the Ricoh AP3850C. Prints 28 ppm in color and 38 ppm in black, and is driven by an EFI Fiery X3e embedded controller.

design and its intuitive graphical user interface (users access print, copy, and scan functions through “drill-down” menus) helps to streamline common tasks. The PrinTrio prints up to 11 ppm in black and 6 ppm in color, at resolutions up to 2400- by 1200-dpi. Users can copy documents at 4 cpm in color and 9 cpm in black, within a reduction/enlargement range of 25% to 400%. The PrinTrio offers 600- by 1200-dpi scan resolution. Unlike the X125, the PrinTrio's fax function requires a PC connection. The PrinTrio ships with BVRP Fax Tools software and ABBYY FineReader OCR software. The PrinTrio is available for a street price of \$149.p

On July 15, 2002, **Canon USA, Inc.** (Lake Success, NY) introduced three ink jet printers, the S530D, S830D, and S330. The S530D and S830D are photo printers, capable of printing images directly from digital camera media cards, while the S330 is designed for office printing. All three models use Canon's ThinkTank individual ink cartridge system, and can print at 2400- by 1200-dpi.

The S830D and S530D photo printers support direct printing of digital camera images, via slots that accept digital camera media, including SmartMedia cards, Sony Memory Sticks, and Secure Digital Cards. Canon digital camera users can also plug their cameras into the printer's front USB port. The S830D and S530D support several Canon PowerShot digital camera models, including the S30, S40, G2, S200, and S330.

The S830D prints in six colors (cyan, magenta, yellow, black, light cyan, and light magenta). It can print a 4" by 6" photo in one minute and an 8.5" by 11" photo in two minutes. The four-color S530D can produce a 4" by 6" in 47 seconds, and an 8.5" by 11" photo in 90 seconds. The S830D will be available in August 2002 for a retail price of \$399, and the S530D, also available in August, will cost \$249. The S330, an entry-level ink jet, will replace the S300 in Canon's ink jet product line. It can print up to 14 ppm in black and 10 ppm in color. The S330 is available for a retail price of \$99.p

On June 17, 2002, **Olympus America, Inc.** (Melville, NY) began shipping the Olympus CAMEDIA TruePrint photo kiosk, a photo printing kiosk designed for retail environments. With the TruePrint kiosk, customers can make photo prints from their floppy disks, photo CDs, or digital camera removable media (the system supports SmartMedia, CompactFlash cards, and Memory Sticks). Users can also make prints from their family photo archives, thanks to the kiosk's optional flatbed scanner. The TruePrint kiosk has a touchscreen interface, and uses two dye-sub photo printers: an Olympus P-400 (for 8" by 10" prints) and a Mitsubishi CP8000 (for 4" by 6" photos). According to Olympus, the printers are not enclosed in the kiosk's



Olympus's TruePrint kiosk, ready to receive your orders for digital photo prints. Source: Olympus America, Inc.

housing, but are instead placed behind a store's photo counter, reducing “customer traffic jams” caused by people waiting for their prints to come out. The TruePrint kiosk is available in countertop and floor models, with or without an Epson Perfection 1650 flatbed scanner. Pricing ranges from \$11,499 to \$15,499.p

Scanners and Image Capture

On July 1, 2002, **FotoWire** (Menlo Park, CA), a provider of Internet photofinishing technology, announced its participation in the **International Imaging Industry Association's** (I3A) Common Picture eXchange Environment initiative, which seeks to enable the universal adoption of web-based digital imaging and printing services by digital camera users.

The I3A, based in San Juan Capistrano, CA, is a non-profit standards organization, the offspring of a merger between the Digital Imaging Group and the Photographic and Imaging Manufacturers Association. The Common Picture eXchange (CPXe) initiative will

(continued on page 10)

provide a common software interface that digital camera manufacturers, software publishers, image-hosting web sites, and digital print providers can integrate into their products. Another component of the initiative will be a web-based service directory, which will allow customers to find convenient digital photo fulfillment services.

The I3A believes that standardizing the transfer and ordering process is crucial to the success of the digital photo printing market. "We expect that the CPXe will make digital print ordering as easy as ordering conventional film prints," explained Lisa Walker, Co-Executive Director and Chief Marketing Officer of the I3A. Until now, Walker explained, the industry's approach has been fragmented and uncoordinated, at best. "Everybody's making their own system," she said. "Now, digital camera vendors have to write their own interface, and customize it for the various retail photofinishers."

Indeed, many vendors have attempted to put their own print ordering systems and standards in place, most notably Kodak, with its EasyShare system for digital cameras, Image Access Standard, Digital Print Order Format, and Customer Order Specification. Phogenix, Kodak's joint venture with HP, stands poised to put a digital photo printing infrastructure in place with its

DFX photofinishing system (see *Color Business Report*, February 2002). Although much independent work has been done, many industry leaders are members of the I3A (see chart). Kodak, for example, chairs the standards committee, and is heavily involved in the development of the CPXe. In what it bills as a precursor to the CPXe system, Kodak announced on June 19, 2002 that several major retail photofinishers have pledged their support for the EasyShare system. Users of Kodak EasyShare cameras will be able to order prints of their digital pictures at home, and have them printed at their local CVS Pharmacy, Rite-Aid, Ritz Camera, or Target location.

The I3A expects to give a technology demonstration of the CPXe later this year. The service will be up and running during 2003. The I3A offers three classes of membership. Strategic members, at the highest level, have the opportunity to sit on the board of the organization, and have the most input on standards. They are guaranteed seats on the various working committees. Participating members merely have access to committee activities, while Associate members must remain content with learning about committee activities after the fact. More information is available on the I3A's web site at www.i3a.org.

I3A Member List as of June 24, 2002

Strategic Members

Agfa Corporation
Agfa-Gevaert N.V.
Digimarc Corporation
Eastman Kodak Company
Ferrania Imaging Technologies
Fuji Photo Film Co., Ltd.
Fuji Photo Film U.S.A., Inc.
Hewlett-Packard Company
Konica Corporation
NETIMAGE

Participating Members

Adobe Systems Incorporated
Applied Science Fiction
AXS Technologies
Canon USA
Felix Schoeller GmbH
FotoWire Development SA
Fratelli Alinari Photo Archives
IBM Corp.
Konica Graphic Imaging U.S.A., Inc.
Olympus America, Inc.
OpenGraphics Corporation
Pixology Limited
SKW Gelatine & Specialities
TrueSpectra, Inc.

Associate Members

Academy Corporation
ACD Systems
Apple Computer Inc.
Canto Software
Charkit Chemical Corp.
Colex Imaging, Inc.
Concord Camera Corp.
Foveon Corporation
Fuji Hunt Photographic Chemicals, Inc.
Future Image
Gretag Imaging Inc.
Ilford Imaging Group
InfoTrends Research Group, Inc.
JASC Software, Inc.
Kind & Knox Gelatine, Inc.
Kodak Polychrome Graphics
Konica Manufacturing U.S.A., Inc.
Kowa Company, Ltd.
LightSurf Technologies, Inc.
Lumero, Inc.
Mamiya America Corporation
Philips Medical System (Marconi Medical Systems)
Pixel Magic Imaging, Inc.
Societe des Auteurs et Compositeurs Dramatiques
Sonoco Products Company - IPD
Sony Electronics Inc.
Source Two Inc.
Universita' Di Firenze

Source: International Imaging Industry Association

Some users, apparently, can afford to wait for their digital photos to be printed. On June 25, 2002, **PhotoWorks** (Seattle, WA), a traditional mail-order photofinisher, introduced a mail-in "digital developing" service for digital camera users. With the service, digital camera users will be able to mail their camera memory cards to PhotoWorks to have photo prints made. Two to five business days later, their prints and memory card return via mail. Under an introductory offer, 4" by 6" prints will cost only \$0.19 each until the end of August 2002.p

On June 25, 2002, **Delkin Devices, Inc.** (Poway, CA) introduced the eFilm PicturePAD, a portable storage device designed for digital photographers working on location. The PicturePAD, which is approximately the size of a Palm Pilot, stores digital images from a digital camera's removable media card. The PicturePAD supports CompactFlash cards, and adapters are available for other media types. Once images are uploaded to the PicturePAD, users can view and organize them on the unit's 1.8" LCD color display. The device can also be connected to a television or video monitor, if desired.

To print proofs of their digital images, users can acquire an optional Printer Accessory to connect their PicturePAD to an ink jet printer. The device supports ink jet photo printers from HP and Epson. A PicturePAD with a 20 GB memory capacity is available for a retail price of \$549, while the 30-GB model costs \$649. The Printer Accessory, which is currently undergoing testing, will be

available for under \$100. Adapters to allow the PicturePAD to read SmartMedia cards, Memory Sticks, and MultiMedia cards are available for \$49 each.p

On June 24, 2002, **Visioneer, Inc.** (Pleasanton, CA) introduced the PhotoPort TV 100, a digital imaging appliance that allows users to view digital camera photos on their television sets. The device, which includes a wireless keyboard, remote control, and digital camera media card reader, connects to the TV's video input. Users can prepare a slide show of their images, create videotapes, or copy the images to SmartMedia or CompactFlash cards. With the keyboard and remote control, users can add captions or perform basic editing functions such as changing the order of photos in a slide show or rotating and cropping photos. The PhotoPort TV 100 is available for a retail price of \$99.99.p

On June 20, 2002, **Epson America, Inc.** (Long Beach, CA) introduced PRINT Image Matching II, an enhanced version of its PRINT Image Matching technology. First introduced in February 2001, PRINT Image Matching automatically optimizes digital camera images, adjusting parameters such as gamma level, color space, contrast, sharpness, and brightness to achieve optimum image quality when the file is printed. With Version II, Epson has added two adjustment parameters: noise reduction control and custom scene settings. The new version also supports TIFF files, in addition to the JPEG format. Epson's entire line of photo

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Digital camera users on the go can store up to 30 GB of image on the Delkin eFilm PicturePAD.

Source: Delkin Devices, Inc.

PRINT Image Matching Adjustment Parameters

Parameter	Version 1	Version 2
Gamma Set	✓	✓
sRGB Range Control	✓	✓
Color Space Matrix	✓	✓
Shadow Offset	✓	✓
Highlight Offset	✓	✓
Contrast	✓	✓
Lightness	✓	✓
RGB Color Balance	✓	✓
Chroma	✓	✓
Sharpness	✓	✓
Color Memory Adjustment	✓	✓
Specify Noise Reduction		✓
Scene Select	✓	✓
Scene Control Level	✓	✓
Scene Custom		✓
White Balance Mode		✓
Exposure Mode		✓
Flash		✓
Exposure Time		✓

Source: Epson America, Inc.

ink jet printers supports PRINT Image Matching II. A host of digital cameras also support the technology, including the Minolta DiIMAGE 7i and DiIMAGE F100, Pentax Optio 330RS and Optio 430RS, and Casio EXILM EX-S1 and EX-M1. A PRINT Image Matching II plug-in for Adobe PhotoShop 6.0 and 7.0 will be available in late summer 2002.p

PDLs/Interpreters

On June 3, 2002, **Best GmbH** (Krefeld, Germany) introduced Best eSprint, a print driver for HP DesignJet 10PS, 20PS, and 50PS ink jet proofers. Best eSprint is designed specifically for users of Apple's Macintosh OS X operating system, who, until now, had no driver for the HP proofers available to them. It can be downloaded for free from Best's web site at www.bestcolor.com/esprint.p

Calibration/Color Management

On July 8, 2002, **X-Rite, Incorporated** (Grandville, MI) introduced the X-RiteColor Premier 8000 series benchtop spherical spectrophotometer for industrial applications. The Premier 8000 is designed to obtain color measurements from objects such as glass, liquid, or food that are placed inside its measurement chamber. According to X-Rite, the 8000 integrates a digital capture device, which enables users to actually see the object being measured, and to take several measurements from different parts of a sample. Measurements can be made at the top, middle, and bottom on a vial of liquid, for example. The Premier 8000 uses a Xenon light source to illuminate samples, and takes CIE L*a*b* and CIE XYZ measurements. The X-RiteColor Premier 8000 series spectrophotometer will ship during the fall of 2002. Two models will be available—the 8200 base model, and the 8400, which ships



The X-RiteColor Premier 8000 can measure color on three-dimensional objects. Source: X-Rite, Inc.

with a UV exclusion filter and illuminant A filters. Pricing has not been finalized, but we were told that, at retail, the devices will cost between \$13,900 and \$18,900.p

Large Format

On July 1, 2002, **NUR Macroprinters** (Lod, Israel) launched its Fresco Challenge program, giving sales prospects the opportunity to test the capabilities of its Fresco HiQ 8C large-format eight-color ink jet printer, in person, at NUR facilities in the U.S., Belgium, or China. NUR invites large-format service providers to bring print

Price Changes

Vendor/Product Model	Date	Old Price	New Price	Comments
Lexmark reduces price of C750 color laser printer	6/17/2002	\$2,999	\$1,999	Street price for 20-ppm color laser printer.
Lexmark reduces price of X750e MFP	6/17/2002	\$11,799	\$9,499	Street price for 20-ppm multifunction color laser.
Olympus reduces price of D-40 digital camera	7/9/2002	\$699	\$599	Street price for 2272- by 1704-dpi digital camera.
Olympus reduces price of E-10 digital camera	7/9/2002	\$1,499	\$1,299	Street price for 4-megapixel digital SLR camera.
Olympus reduces price of E-20N digital camera	7/9/2002	\$1,999	\$1,699	Street price for 5-megapixel digital SLR camera.

Scanners & Image Capture

Vendor/Product Model	Date	Price	Comments
Argus introduces DC3510 digital camera	7/8/2002	\$179	Retail price for 2.1-megapixel digital camera. Features include 2X digital zoom, two- or five-shot burst mode, macro focus, built-in flash, and a 1.5" LCD display.
Canon introduces CanoScan LiDE 20 scanner	7/15/2002	\$79	Retail price for 600- by 1200-dpi flatbed scanner. Features Canon's Z-Lid expansion top, which allows users to scan thick originals such as books
Canon introduces CanoScan LiDE 30 scanner	7/15/2002	\$99	Retail price for 1200- by 2400-dpi flatbed scanner, featuring Canon's Z-Lid expansion top.
Casio introduces QV-R4 digital camera	6/25/2002	\$499	Retail price for 4-megapixel digital camera with 3X optical zoom lens. A tiny camera, the QV-R4 measures 3.5" W by 2.5" H by 1.2" D, slightly larger than a business card when viewed from the front. A 3-megapixel version, the QV-R3, is available for \$399.
Epson introduces Perfection 1260 PHOTO scanner	6/25/2002	\$129	Street price for 1200- by 2400-dpi with built-in 35 mm slide adapter for slide scanning. A model without the slide adapter is available for \$99.
Epson introduces Perfection 1660 PHOTO scanner	6/25/2002	\$179	Street price for 1600- by 3200-dpi flatbed scanner with built-in 35 mm filmstrip adapter for slide scanning.
Epson introduces Perfection 2400 PHOTO scanner	6/25/2002	\$229	Street price for 2400- by 4800-dpi flatbed scanner. Uses Epson's Micro Step Drive technology, and Epson's ColorTrue II image processing technology to ensure accurate color reproduction. Available in August 2002.
HP introduces ScanJet 3570c scanner	6/25/2002	\$149	Street price for 1200-dpi flatbed scanner. Features a built-in 35 mm negative/slide adapter. The ScanJet 3500c, which does not include the transparency adapter, is available for \$99.
Olympus introduces C-4000 ZOOM digital camera	7/8/2002	\$499	Street price for 4-megapixel digital camera. Features include 3X optical zoom lens, 3.3X digital zoom, multi-point spot metering, automatic shooting modes, and macro focus.
SmartDisk introduces SmartScan 2700 film scanner	7/17/2002	\$249	Retail price for 2700-dpi film scanner. Scans 35 mm slides and negatives. Ships with Adobe PhotoShop Elements and Applied Science Fiction's Digital SHO and Digital ROC image enhancement software packages.
SmartDisk introduces SmartScan 3600 film scanner	7/17/2002	\$499	Retail price for 3600-dpi film scanner. Scans 35 mm slides and negatives. Features include batch scanning, automatic film loading, and auto focus. Software bundle includes Adobe PhotoShop Elements and Applied Science Fiction's Digital SHO and Digital ROC.

samples from their own shops, along with the files used to print them. At the NUR demonstration site, the files will be run on the Fresco, and the prospects will be able to make a side-by-side comparison of the Fresco's output to prints from their own large-format gear. If the performance and print quality on the Fresco does not compare favorably, NUR promises a credit of \$500 toward the purchase of NUR OEM ink jet inks and large-format media, along with reimbursement for travel and lodging expenses. Naturally, NUR expects that few prospects will be dissatisfied with the Fresco. Those that are satisfied and ultimately buy the machine will be ensuring that the expensive printer (pricing ranges from \$329,000 to

\$459,000) they are purchasing meets their expectations, rather than buying it sight-unseen.p

Wireless Printing

On June 17, 2002, **Toshiba America Information Systems Inc.** (Irvine, CA) introduced the Bluetooth Secure Digital card, which enables users of pocket PCs and personal digital assistants to connect via wireless to other Bluetooth-enabled devices, such as printers, laptop computers, and cellular telephones. According
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to Toshiba, the Bluetooth Secure Digital card is roughly the size of a postage stamp, and fits into a portable device's expansion slot. The Toshiba Bluetooth Secure Digital card is available for \$149, and is sold on Toshiba's web site at www.shoptoshiba.com.jp

Monitors

On July 1, 2002, **E Ink Corporation** (Cambridge, MA) demonstrated a prototype of an active-matrix electronic ink color display. E Ink developed the display in cooperation with **Toppan Printing, Ltd.** (Tokyo, Japan) and **Royal Philips Electronics**. Toppan



E Ink's prototype electronic ink display can be viewed under all lighting conditions. Source: E Ink Corp.

developed the color filter array, while Philips contributed the active-matrix backplane. The prototype, which measures 5" diagonal, has a resolution of 80 pixels per inch, with an aspect ratio of 320 by 234 pixels. Key advantages of the E Ink display are low power consumption and readability under all lighting conditions, from any angle. In 2003, Philips will introduce monochrome and greyscale E Ink displays for use in handheld devices. E Ink expects that full-color displays will be available sometime in 2004.

Supplies

On July 15, 2002, **Canon USA, Inc.** (Lake Success, NY) introduced Photo Paper Plus Glossy, a high-gloss photo paper designed for use in Canon ink jet printers. Photo Paper Plus Glossy is 10.5 mils thick. Canon claims that the paper has the "look and feel" of traditional silver halide prints. Photo Paper Plus Glossy will be available in August 2002, in 4" by 6" and 8-1/2" by 11" sheet sizes. A 20-sheet pack of 4" by 6" sheets will cost \$5.99 at retail, while 20 sheets of 8-1/2" by 11" sheets will be available for \$12.99.

Also on July 15, 2002, Canon introduced Matte Photo Paper, an 8.5-mil matte-coated photo paper. Canon claims that the letter-sized paper's matte finish helps to reduce glare when prints are viewed at an angle, giving users many display options, such as framing, mounting, or "other dynamic means of presentation." Canon Matte Photo Paper will be available in 50-sheet packages for a retail price of \$9.99. The paper will ship in September 2002.

Distribution Notes

	Date	Comments
E Ink signs up distributors for E Ink displays	6/25/2002	E Ink, developer of electronic ink displays, to add eight companies to its Ink-in-Motion distribution program. The companies, largely point-of-purchase display designers, include Impact Displays, Masters of Branding, and Americhip. Overseas partners include Visual Data (Germany), Gruppo Morronkonkoy (Columbia), and SoonStar (Malaysia).
European quick printers offer EFI PrintMe service	6/19/2002	EFI's PrintMe Networks remote-printing service to be offered by several European quick print chains, including MultiCopy (a Sir Speedy company) and Organisation Deb's, a French digital printing services provider.
HP to bundle Corel Photo-Paint with scanners	7/15/2002	HP to bundle Corel Photo-Paint (Mac OS X versions) with its ScanJet 7400 series flatbed scanners. CorelDRAW will be included with the top-of-the-line ScanJet 7490c.
TigerDirect to sell the HP Digital Sender 8100C	6/21/2002	Online and catalog retailer TigerDirect to distribute HP's Digital Sender 8100C
Toshiba to offer EFI Fiery System 5 software	7/1/2002	Toshiba to offer EFI's Fiery System 5 software with its e-STUDIO210c and e-STUDIO310c color copier/printers.
Xerox to offer EFI Velocity software	7/12/2002	Xerox to sell EFI's Velocity Workflow software, which features load balancing and cluster printing, with its DocuColor digital color printers.
Xerox to offer EFI's PrintMe system	6/24/2002	Xerox to offer EFI's PrintMe Networks remote printing service.

Application Profile

Castle Graphics Uses New Technology to Open New Markets

Although virtually every aspect of visual communication has been affected by digital technology, perhaps the venue where the ability to make a run of one makes the most dramatic impact is the large-format print industry. If color graphics add excitement, *big* color graphics provide big excitement. From its birth as an extension of the pen plotter business, large-format product development has followed two principal branches. Some vendors continued with the HP-style drop-on-demand print head. For example, LaserMaster (now McDermind ColorSpan) combined aggressive marketing and clever technology enhancements to squeeze a remarkable amount of performance out of little HP DeskJet print cartridges. The large-format engineering document reproduction industry followed another path, enhancing liquid-toner electrostatic technology.

Print head designers, materials specialists, and ink chemists have greatly extended the range of materials that can be used for large-format printing. Commercial-grade large-format printers are often used in production or manufacturing environments, shops that can safely handle solvent-based inks. Service companies in the sign and banner industry produce posters, banners, signs, vehicle graphics, and a host of other one-off and short-run large-format prints. Some of this work, such as trade show graphics, has migrated to digital technology from conventional analog production methods. Other work, like hard-to-miss transit graphics and building wraps, have emerged with the large-format technology, and represent new business categories.

Does the Equipment List Define the Capabilities?

As is the case in many graphics-related service industries, almost all of the work of large-format service companies is custom work. Even though every job is different, jobs share some common characteristics because they are produced on a very specialized set of equipment. The products that a given shop offers may be defined by the size or basic technology of the printers it operates, or the set of finishing equipment on site. We visited Castle Graphics (Concord, MA), a company with a track record of using new large-format technologies to increase productivity and shorten turnaround times. One of Castle Graphics' newer printers is an NUR Fresco 1800 6.5-foot printer, which

sells for around \$350,000. We wondered how a relatively small company in a highly competitive field could take what appears to be such a high-stakes risk.

Yes, making a commitment to a largely untried, costly new technology is risky. But mastering the factors for doing business can reduce and help manage the risk. Castle Graphics' Director of Operations David King spelled out some of the rules for doing business at the high end of the large-format printing industry. Castle Graphics was founded in 1992 as a graphic arts and design firm. The company added large-format printing the next year, acquiring the first in a series of Encad NovaJet printers. David King has studied the cost and time factors involved in producing client work. That knowledge has become the foundation of the company's quoting system. Job-by-job post-sale analysis ensures that the factors remain current, and that the numbers that are the foundation for profit are enhanced when needed. Said King, "The biggest downfall for most businesses is quoting and making sure you make money on the work."

From the inside, the risk of costly new technology can be examined, understood, and managed. But external risk factors are less predictable and therefore less manageable. New products—especially never-tried, high-performance production machines like the NUR Fresco—do not always work right. "We bought the second NUR machine in North America," King said, "which was a huge mistake. NUR should have kept working on it. It took them 17 months to get it running consistently and reliably. Some days it worked, some days it didn't. But every month, we still had to make that [lease] payment. Now it runs like a top, and it just absolutely screams."

Cost and Time Factors

When printing large-format images for sale, one must be aware of several cost factors.

- First, there is an element of time, making sure that the materials submitted (files) are workable.
- Then, there is production time, which can be split into operator and machine time.
- Finally, once a file leaves the printer, some sort of post-processing almost always is required. Post-processing is often labor-intensive, and often requires special equipment.

With a mixture of printer time, finishing equipment time, and staff time, one can see that work-load balancing is one of the arts that those in large-format

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For Vehicles, Preparation is Key

Almost at every turn, large-format graphics present challenges that are simply not factors in the print-on-paper world. For those who feel they want to be successful in large-format digital printing, David King has produced a three-part series of video tapes titled *Making It Big: The Complete Guide to Large Format Graphics*. There are three tapes in the series: *Inkjet Printing*, *Fabulous DyeFabs*, and *Digital Vinyl*. We watched *Digital Vinyl*. In the tape, King provides a step-by-step approach to printing vinyl vehicle graphics, preparing vehicles to receive the covering, and the application itself. The tapes are loaded with business advice and practical operational tips. Don't start the clock (for job delivery) until all incoming files have been checked, King warns. "You make money off of printing, and you make money off of installation, but you make very little money on front-end design." That said, preparing vehicle graphics is not a layman's task. For instance, the design must accommodate door handles, wheel wells, windows, and other aspects of the structure of the vehicle. King uses vehicle templates provided by Digital Auto Library (Greeley, Ontario, Canada).

The most interesting part of the tape for us was the preparation of the vehicle and application of the graphics. We always wondered how it was done, and now we know. Vehicle preparation means cleaning, and all of the nooks and crannies need careful attention. "Vehicle graphics never fail in the middle of a panel. They fail at the edge of a door or at the edge of a wheel rim or inside a door handle," King says. Here's a tip that will save first-timers a lot of agony: "Nothing sticks to rubber very well."

If you are in the vehicle graphics business, at some point, you have to walk up to a vehicle with a 51" by 66" piece of vinyl and make it stick without wrinkles, and without having to re-position it. King shows the tools and techniques to make this happen right. We can't explain King's technique of applying the top half first, then the bottom half. Watch the tape yourself and see why King says, "Gravity is your friend." The *Making It Big: The Complete Guide to Large Format Graphics* series of tapes is available from **Video Classroom**, Scranton, PA, www.video-classroom.com or 800-691-8047). p

imaging have to master. Naturally, one will strive for maximum utilization of high-ticket printer capacity. But labor can be the gating factor on revenue.

Large format printing is custom work, involving specialized equipment and skilled workers. Both resources—capital equipment and labor—require a stream of work, so an increase in outbound sales activity goes hand-in-hand with an increase in production capacity. Castle Graphics was able to benefit from the departure of two East-coast competitors, and increased its account list and its geographical coverage by hiring the top sales person from one of the failing companies. The company has five sales people, and sales offices in New Jersey and New Hampshire.

Direct Printing Saves Steps

For David King, the compelling capability of the NUR Fresco is direct printing. (High speed is appreciated, too.) Before the NUR Fresco was installed, outdoor graphics were printed on a Raster Graphics 5442 electrostatic printer. Images from electrostatic printers had to be transferred to another medium. From start to finish, electrostatic printing is a five-step process. "First, you print to special paper," said King. "Then we transfer the image onto vinyl. Then we run the print through a machine that uses water to take the paper off. Then we dry it, laminate it, and slit it." King explained that the Raster Graphics 5442 would run graphics for a tractor trailer in 15 hours. "When

you are finished," he said, "it would cost \$2.00 per square foot." Even at high resolution, the NUR printer produces the same graphics in just four hours. "If you want it fast, you can do it at lower resolution in two hours, and do it for under \$1.00 per square foot. I've cut my costs in half, and quadrupled my output." Savings from being able to skip the transfer, paper removal, and drying steps alone amount to \$60,000 per year in labor alone, King figures.

As a one-time job (as opposed to a recurring job for a frequent customer), covering the trailer portion of a tractor trailer can cost between \$5,000 and \$10,000. Small passenger vehicles cost less than \$2,900 to cover. Even though there may be efficiencies in operating a printer that is five times as fast, into a work flow that includes hand work, can manual parts of the process can be strained. The graphics to cover a truck can be produced in three hours, but it can take a team of two a whole day to apply. "Labor will become a bottleneck before the machine will," said King.

The speedy NUR printer enabled Castle Graphics to take on the unusual assignment of producing digital wallpaper for the inside of the 600-room ultra-trendy W New York—Times Square hotel. In all, Castle Graphics produced 285,000 square feet of wallpaper for Jolie Papier, who held the contract to provide the hotel's wallpaper. The job is a record-setter, of sorts: a digital print job that would cover over six acres! At times, the NUR was printing around the clock. The wallpaper-printing job was in Castle

Graphics' shop for 12 weeks. "I never bought the NUR with the intention of running wallpaper. I heard about the job, and we were the only company in the country that had the equipment to do the job, and willing to take on the task." Castle Graphics has signed on as the exclusive digital printer for RJF International (Fairlawn, OH), the largest wallpaper manufacturer in the U. S. "The NUR gives us another one of those things that you can now do with a digital printer that you couldn't do before," said King. To say that King is satisfied with the NUR printer is an understatement. "I can now do direct-print banners in seconds," he said. "I can run 5,500 square feet of banner material in one day. I couldn't have done that in a week with electrostatic. And the color is remarkable—vibrant, beautiful, fast, durable. It's everything you want it to be."

"...A Very Difficult Business."

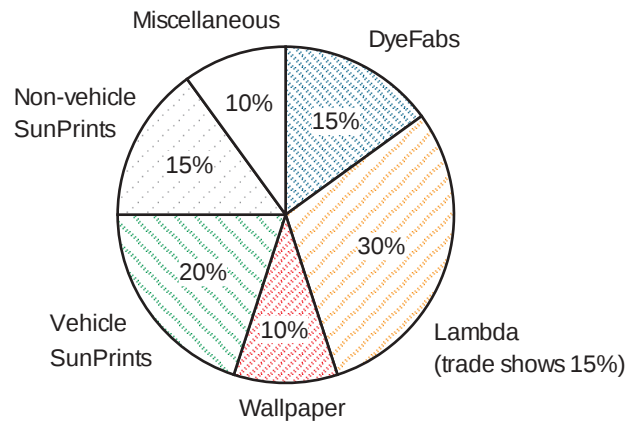
Although Castle Graphics has not been buried by their new technology, others who were not as deft have had problems. Referring to the NUR Fresco, King said, "That big machine back there cost \$500,000, including all that is needed to make large-format vinyl products. The Lambda cost \$350,000. The dye sublimation system cost \$125,000. If you take \$750,000 and try to pay for that over two years, then you have to pay for all of the employees to run all the equipment, and you have to sell all these prints....you eventually get to the point where you can't do it. You may get to the point where you are making money, but then you are forced to buy technology again." At the high end of the large-graphics service bureau business, merging is an alternative to bankruptcy for some. In June 2000, for instance, Massachusetts-based Invisuals was acquired by reprographics giant Charrette. (Invisuals was 3M Scotchprint-certified, allowing Invisuals an early position in transit graphics, enhancing their attractiveness as an acquisition target.) In May 2002, Digital Graphics of Burlington, MA, and the Invisuals division of Charrette merged into DG Invisuals, in an effort to cut costs and increase efficiencies. "This is a very difficult business," King said. "We've lost over 25% of our industry in the last 12 to 18 months. Ariston, at \$60 million, was the largest company in the country, and they went bankrupt four or five years ago."

Castle Graphics' Product Lines

Castle Graphics has divided its product offerings into four areas, generally broken out by imaging method. (Pictures of Castle Graphics' large-format work can be found on the company's web site: www.castlegraphics.net)

SunPrints are produced to be used outdoors. Products include highly visible fleet graphics and vehicle wraps,

Castle Graphics' Revenue Sources



Source: Castle Graphics

outdoor banners, and on-stage graphics of outdoor concerts. Most SunPrints are direct-printed on an NUR Fresco.

Lambda prints are high-resolution prints made on a Durst Lambda C-41 4000-dpi printer, usually used indoors. Trade show and event graphics such as posters and back-lit displays are printed on the Lambda.

DyeFabs include mostly fabrics produced with the dye sublimation process, using a Raster Graphics 5442. (Some fabrics are direct-printed.)

Concept, Design and Installation The installation department gives Castle Graphics control over the complete job. Castle Graphics employs a full-time team of installers, and has a truck bay large enough for full-sized trailers, so vehicle graphics can be installed year-round. Castle Graphics also offers design services, with a special emphasis on large-format and fleet graphics. "Our competitors don't offer graphic design," said David King. "They offer output services. They have guys that can open a file and fix it, but they don't have people who can look at a file and say, 'If you change this it will look a little better,' or create a complete set of graphics that answers the marketing needs for their clients. That's the difference customers are looking for."

What could be nicer for a service company to have than a fully depreciated asset that is still productive? Such is the case with Castle Graphic's HP 3000 ink jet printer, acquired in 1998. "We use it to produce 600 dpi photo-quality vinyl for small stickers and decals, and very high quality detailed work." The HP 3000

(continued on page 18)

Industry Notes

	Date	Comments
Conexant, Zing combine to form Pictos	7/9/2002	Semiconductor manufacturer Conexant and Zing, a developer of imaging software, to combine operations, forming Pictos Technologies. The new company will develop semiconductors and embedded software for digital cameras.
Creo to provide thermal imaging technology to KBA	7/2/2002	Creo to supply thermal imaging heads for Koenig & Bauer's (KBA) 74 Karat digital offset press.
DuPont, Creo to develop LCD display filters	6/26/2002	Creo to develop thermal imaging equipment to be used in the manufacture of color filters, which DuPont will market to LCD display vendors.
Flint Ink, Gebruder Schmidt complete merger	7/1/2002	Flint Ink completes its acquisition of German ink manufacturer Gebruder Schmidt.
Kodak to form manufacturing business unit	7/9/2002	Kodak to form a Global Manufacturing Services business unit, to manufacture such items as coated materials, chemicals, papers, polymers, and "nano-particulates" for third parties.
Litrex to manufacture LEP displays	6/6/2002	Litrex, a subsidiary of Cambridge Display Technology, to develop and manufacture light-emitting polymer displays under contract for the U.S. Display Consortium. Litrex will leverage its expertise in industrial ink jet technology (ink jet is used to apply polymers to the display material) to develop the LEP displays, subcontracting parts of the project to Spectra (an ink jet head manufacturer) and Avecia (a developer of light emitting diodes).
Olympus licenses Tensilica's Xtensa processor	6/17/2002	Olympus licenses Tensilica's Xtensa processor technology for use in future imaging products.
Rexam to become IntelliCoat Technologies	6/17/2002	Its sale to Sun Capital Partners complete, Rexam Image Products, a coated paper manufacturer, to change its name to IntelliCoat Technologies.
Ricoh to acquire copier dealer Copi-Quik	7/8/2002	Ricoh to acquire the assets of Copi-Quik, an authorized Ricoh dealer in Philadelphia.
Seiko Epson and CDT form LEP display joint venture	6/14/2002	Seiko Epson and Cambridge Display Technology to form a joint venture company, named Polyink, to manufacture light-emitting-polymer displays.
Sony Ericsson, TDK to develop Bluetooth products	6/12/2002	TDK and Sony Ericsson to collaborate on the development of Bluetooth-enabled products, mating TDK Bluetooth adapters to Sony Ericsson's cellular phones.
Spectra, Avecia sign R&D pact	6/21/2002	Spectra and Avecia to collaborate on the development of inks for use in Spectra ink jet print heads.
Standard Register to acquire PlanetPrint	7/15/2002	Standard Register to acquire PlanetPrint's print-on-demand software and consulting business.
TTP, Stork sign development pact	7/18/2002	The Technology Partnership (TTP) and Stork Industrial Components to collaborate on the development of products for digital printing, photofinishing, industrial automation, and pharmaceutical instruments.

produced graphics for 50 kiosks for the City of Lowell, MA, as well as for major museums in New England. Prints from the HP 3000 are used outside, too. "If you are looking for something that has to be durable enough to be outside, and withstand the elements, and stand up to Sharpie markers and bird crap, the HP 3000 is the machine. It's a very slow machine, though, and it's an expensive print. But the HP 3000 runs all day long. I would love to say it generates a huge amount of money

for us. It can run all day and generate \$1,000. But the NUR machine can run for an hour and generate \$1,000."

There is a good deal of cross-talk between product segments. For instance, 15% of Castle Graphics' business is from trade shows, but trade shows can use SunPrints for indoor/outdoor banners, and Lambda prints for booth displays, and DyeFabs to drape exhibit tables. (In fact, half of the Lambda's output consists of trade-show graphics.)



A Castle Graphics installer mounts a poster outside Boston's Museum of Science. Source: Castle Graphics

We Don't Do Windows

Even with a broad array of equipment and a facile staff, there are a few large-format assignments that Castle Graphics is not set up to do. Certain classes of window graphics remain the domain of screen printers, mainly, we were told, because screen printers can apply white colorant to a substrate, whereas digital printers rely on the substrate itself for white portions of the image. Window graphics seen at hamburger chains, for instance, are screen printed in reverse on clear film, with a white border around the imaged area. King can't understand why digital printers aren't equipped with a low resolution white-printing system for this very outlining function. (In fact, the HP/Indigo Omnius one-shot packaging printer has an optional white printing station.)

Printing billboards is highly specialized. With a standard size of 14' by 40', 10 1/2-foot-wide prints from the NUR Fresco would have to be tiled and assembled, adding an unattractive labor cost to a product that sells for \$650. Participating in the billboard business would require a scale that Castle Graphics simply does not have. Said David King, "By the time you assemble it and put the whole thing together, unless you have an operation that is running 24/7, with six or eight machines, you can't make any money doing [digital billboards]."

Although almost everything that Castle Graphics prints is large, using high-performance digital printers merely to make enlargements isn't economical, compared to low-tech alternatives offered by film labs. "The key is where digital starts and stops for people," said King. At the minimum, Castle Graphics would have to scan the negative or chrome and clean it to remove inevitable scratches. Before even clicking "file-print", the customer is up at around \$300. "A conventional camera and a conventional enlargement will be half the price," King said. However, once an image has been

digitized, it can become part of a graphics communication program, benefiting from functions such as image enhancement and document composition (laid-out text), which are *enabled* by digital technology. For example, a project for a museum involved scanning an image, then incorporating the image into posters used inside the museum, and SunPrints outside the museum.

Lonely at the Top

An ink jet printer is the large-format imaging entry point for service companies such as copy shops and sign makers. Castle Graphics has not felt the heat from a growing installed base of large-format ink jet printers. First, depending on material, prints from the NUR Fresco sell for about \$1.13 to \$10.00 per square foot. King figures it costs \$2.10 per square foot to run an ink jet printer. (Accounting for waste can balloon the ink jet printer's cost up to \$4.00 per square foot.)

Aside from operating at very different price (and profitability) points, the small-scale operator may not have customers enough to support more than the most basic of product offerings. It may be relatively easy to purchase a large-format ink jet printer, but acquiring the supplies and accessories needed to go beyond a modest range of offerings may be beyond the resources of most small-shop operators. "The machine that he wants to use for digital printing is going to cost \$15,000. And he has to buy a \$10,000 laminator, and inventory a significant amount of expensive media and ink to keep that machine running. It is about a \$40,000 investment."

Further, digital prints may not be compatible with sign-makers' product offerings. King explained that cut vinyl, the mainstay of the small sign-maker's business, costs only \$.20 to \$.25 per square foot to produce. Capital equipment costs are modest, too. "The cutter cost \$2,000, and he's had it forever," King said. A cut-vinyl sign can be produced in perhaps ten minutes, and will sell for about \$60. It could take over two hours to print the same sign on an ink jet printer, and cost \$35 in film, laminate, waste, and labor. "You have \$35 of cost into that sign, that you now have to sell for around four times that. You will have to charge maybe \$140 if it cost you \$35. The other sign may cost \$7, and can be sold for \$70."

Although the P & L may not look too favorable for small sign shops to get into large-format digital printing, having an ink jet printer may become a competitive requirement. "If they don't have that machine, the customers that come in and order one poster a month and 17 cut vinyl signs won't buy from them. They'll go somewhere else where there is a digital printer, and buy all their cut vinyl there, too."

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Even though David King sounds convinced that many small sign shops may have trouble operating large-format ink jet printers at a profit, he sees the small-shop operator as important to the future of the industry. Two principal factors give King optimism.

- First, gradual improvements in operating costs have brought the price of digital prints closer to the cost of cut vinyl, which, as a mature technology, has been relatively stable. Although cost parity may never be reached, the degree of migration from cut vinyl to digital will increase as digital operating costs drop.
- Improvements to ink and media which will allow direct printing on durable surfaces with inks that don't require lamination provide a second reason for optimism. Equipment price is the important factor here. Today, products such as Océ's Arizona printers (starting at about \$60,000) and the Mimaki line (with list prices ranging from \$13,995 to \$29,995) can print directly to vinyl, but the prints require lamination for durability, and the equipment price is out of reach for many small-shop sign makers. HP is said to be developing products that will provide direct-printing capabilities on

durable substrates that will be available at prices that are acceptable to small-shop operators.

King does not feel his business will be jeopardized when thousands of local service companies can acquire the same printing capability as he has for a fraction of the cost. King explained that there is a difference between the ability to print on media and being able to produce at very high speeds and very high volumes. "They are very different functions," he said.

It's a Matter of Scale

Castle Graphics enjoys one of the principal benefits of scale, which is that a steady and substantial flow of work can support a broader range of affiliated equipment, thus extending the range of capabilities offered. Building profit into every job, executing properly, and checking to see that each job contributes to profitability are success factors for any business. To these, Castle Graphics has added a willingness to invest to extend the overall level of operation. Castle Graphics has extended the scale of its operation by investing in highly productive equipment. And the new equipment enables Castle Graphics to offer technology-enabled products such as digital wallpaper, which, while somewhat unpredictable, have the exciting up-side of exclusivity in a price-insensitive market.

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