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breaking out of a Rectangular World

Digital contour cutting is impacting the market.

Producing eye-catching graphics—graphics that grab the viewer's attention and allow the marketing message to be absorbed—takes not only an original design, but also world-class execution with a flawless finish. The graphic itself is important, but the finishing can prove to be the icing on the cake. After all, would you remember—or think great—these classics if they included a not-so-great “finish?” The *Mona Lisa* in a dollar-store frame? High-jumper Dick Fosbury without his famous flop? Elvis with no pelvis? Or an elegant seven-course meal with a Twinkie for dessert?

In this age of electronic digital displays and multimedia communication, the provider of printed graphics has to ensure that his product manages to stand out in the crowd. Customers recognize this as well: They are looking for something more than the same-old sign or in-store graphic. They want an instantly memorable image, and are demanding more creative and interactive signage.

One way to provide an image with more visual oomph is to produce 3-D graphics. Yes, a graphic that's cut in the tried-and-true rectangular shape may serve to “do the job,” but does it really stand out? If you're creating an image of Marilyn Monroe, for instance, consider how much more impact a contour cut-out of the Hollywood icon will have.

And although the production of 3-D graphics was once looked upon with fear and trepidation by many shops, digital-cutting technology and optical vision-registration systems—coupled with the advent of flatbed printers—now enable print providers to finish rigid graphics with that extra something to make them stand out from the crowd.

No more manual nightmare

In the “old” days (less than a decade ago), if a job called for a short run of odd-shaped rigid P-O-P displays, production was a three-step process: The shop first imaged the graphic onto flexible media, mounted it onto rigid media, then hand-cut the image—hoping that the employee had a steady and accurate hand. If a mistake in cutting ruined the print, the process began all over again. The procedure was time- and labor-intensive.

Then came XY cutters—vinyl plotters for flexible media and CNC cutters for rigid. These machines cut printed media via computerized input. The cut files spell out exactly where the cut lines are, and, hopefully, the printed graphics are exactly where they should be. The main problem with XY cutters, however, is that they cannot accommodate changes in the media that may occur

during or after imaging; skewed placement on the cutter also poses a problem for XY cutters.

Enter today's optical vision-registration systems, now paired with the aforementioned digital contour cutters. Designed to flow seamlessly with flatbed printers and inkjet-printed flexible and rigid media as well as streamline the contour-cutting step, these vision systems comprise hardware and software. The software reads and evaluates registration marks as well as inputs the cutting file produced on the front-end by the graphic designer, while camera hardware acts as the system's "eyes." When combined with the digital cutters, the merged systems are more accurate, faster, and more cost effective than their predecessors.

Using these systems, the designer indicates exactly where the graphic should be cut—indicating the path with registration marks (dots). After printing and lamination, the graphic is loaded onto the digital cutter and the machine reads the registration marks, "remembering" the correct cut path and executing it. The advantage these new optical-vision registration systems have is that when the cutter reads the registration marks, the machine can determine if the graphic is somewhat skewed or out-of-place, and will accommodate the cutting outline to match the new graphic placement.

Matching wide-format digital printers with automated contour cutters armed with a vision-registration system has led to a tremendous growth in sales of these cutting systems. "A lot of the growth has to be attributed to advancements in digital printing, as the two go hand-in-hand," says Don Skenderian, EskoArtwork vice president for direct sales. "And as digital printing onto a number of substrates has exploded, so has the need for using digital cutting to cut out the print to register."

Benefits of the systems range beyond simply faster cutting—shop workflow and the bottom line are also impacted. "The payback on the optical vision systems is so enormous, that not only does the cutter decrease costs dramatically, but the available workflows make finishing a natural part of the digital processes already in place, instead of a manual nightmare," says Steve Aranoff, director of business development at Mikkelsen Graphic Engineering (MGE).

Advantages and flexibility

Today's systems offer print providers a number of benefits and when married with the speed and accuracy of digital printing, these benefits can become primary drivers in a shop's success. Advantages include: increased cutting speed and accuracy, flexibility, automation of cutting workflow, reduced costs/additional revenue stream, and new product offerings. Let's take a closer look at each:

Evaluating ROI

When you're considering adding a new system—digital cutting or any other kind of equipment—it's best to get real numbers from real shops: How much money did the machine bring in during the first year? Did it decrease spoilage and do-overs? How fast was its ROI? What was the bottom line on this system?

Consider the following numbers from BrandBoxx Display Graphics (www.brandboxx.com) in McFarland, Wisconsin, which added a Kongsberg i-XL system in 2006. Keep in mind that these types of numbers will obviously vary from shop to shop, depending upon hardware, digital-printing capabilities, the volume of business, and a host of other factors.

- The first year, the shop generated \$201,000 in gross profits—money that they would have paid out to their cutting vendor.
- System payback was less than a year.
- The shop saw a savings of \$115,000 and \$230,000 per year from reduction of spoiled work—approximately a 10% to 20% savings over the previous year's re-work costs.
- Addition of \$437,000 in top-line sales that the shop would not have secured without the system; this does not include the savings by doing the cutting themselves.

In fact, says Jim Sullivan, president and CEO of BrandBoxx, "It should be illegal to buy a flatbed printer without a vision-enabled flatbed cutter/router."

Increased cutting speed and accuracy: There's no comparison between hand-cutting and digital cutting—with the digital system, cutting is faster, and more intricate and accurate than even experienced finishers can achieve. In terms of the digital cutter's speed versus traditional CNC cutters and routers, "Older routers have more power, but they lack the speed and agility of the new digital-cutting devices," says EskoArtwork's Skenderian. "There is still a place for routers to serve a given task, but digital die cutters open the doors for more diverse applications."

Flexibility: The optical-registration cutting systems offer a level of performance over dedicated CNC routing systems or contour-cutting technologies—allowing them to finish a broad range of materials, both flat and flexible, says Marco Azzaretti, Gerber director of graphic solutions. These systems provide for accurate cutting of flexible decals, vehicle wraps, and window clings, as well as thick rigid signage and P-O-P graphics. And they also allow for flexibility in the actual cuts. Shops are no longer locked into using simple knives and routers; now, shops can match the tool to the job. Tools may include the drag knife, kiss-cut knife, oscillating knife, textile wheel knife, routers, and lasers, as well as reciprocating blades and tangential cutters, points out Pete Alsten, North American product manager for Zünd.

Automation of cutting workflow: The whole workflow of digital cutting is becoming faster (read: more throughput) with automated material-handling options such as conveyors, auto feeders, and robotic off-loaders for roll and sheet processing. Automation eliminates one of the labor-intensive aspects of any cutting job—loading in sheets and off-loading cut product. As new automation options come to market, since many new cutting systems are based on a modular concept, shops can upgrade systems with the latest technology as their workflow and demand increases.

Of course, the key to cutting automation is having the job's cut-parameters integrated into the prepress process. The front-end software must be compatible with design programs, as well as the cutting systems. MGE's i-cut optical vision-registration system, for example, is incorporated into various digital-cutting systems across the market. Its i-script workflow allows industry-standard RIPs and printers to work within a common workflow. Designers using Adobe Illustrator send cutting information to a RIP, which outputs essentially a fifth file that contains all of the cut-parameters for a print job (including barcode and register marks); the result is that the print and finishing instructions are forever tied together. This simplifies the job on the back-end because the finishing operator doesn't need to know much about the job to correctly cut it.

Another example is Zünd, which offers several vision registration front-end software choices, such as OptiScout, Touch & Cut, and the aforementioned i-cut as well. "Like a digital print, no one RIP can be used for all situations, the same can be said for vision-registration front-end software," says Alsten. Other manufacturers of digital cutting systems offer various name-brand and private-labeled front-end software and RIP plug-ins for use with their machines.

Reduced costs/additional revenue stream: Not only do digital vision-registration cutting systems offer significant reductions in the costs of graphics production, but they also provide shops the opportunity to sell additional products to customers. Drivers for return-on-purchasing these systems are three-fold, according to Gerber's Azzaretti: labor savings to automate finishing work that used to be performed manually; reduced cost of cutting dies, which were previously required to contour cut rigid jobs; and being able to deliver end-products to customers that print providers previously could not.

New product offerings: Once the digital contour-cutting system is integrated into your shop's workflow, your array of wide-format printers and the imagination of your sales staff may be the only limiting factors to the type of jobs you can print and finish. By combining a digital registration system with a CNC machine, companies are capable of expanding their business opportunities without sacrificing workflow, says Kris Hanch-

Growth Propellers

A number of factors are working to spur the growth of these new digital cutting systems across the marketplace, including:

- The impact of flatbed printers: "With flatbed printers growing significantly faster than the overall market and at roughly 2400 sold last year, a huge opportunity to add finishing has emerged," says MGE's Aranoff.
- Short runs and just-in-time manufacturing: "Most companies have the printing solution, but don't realize that digital-cutting systems can make them more productive with the printing technology they have today. In addition, we see customers demanding more creative shapes at larger volumes, and larger volumes of simple shapes," says Alsten of Zünd.
- Vertical-market demand: "The growth potential for digital-vision systems is propelled by the vertical-market demand in the print and sign industries" says MultiCam's Hanchette. "For example, the print-and-cut industries are going after vertical markets such as point-of-purchase, packaging, promotional materials, and other product-oriented manufacturing opportunities."
- The need to stay competitive: "We anticipate further growth fueled by the trend for shops to move from analog to digital pro-

cesses. Digital cutting is basically 'piggybacking' on this trend," says Skenderian with EskoArtwork.

- Dropping prices: The digital-vision cutter market isn't just growing to service only the high-end flatbeds; it's growing in all price points. New CNC routers with vision capabilities are being introduced to cut graphics printed by middle-market flatbed printers—which opens these products to a large number of shops. Looking down the road, MultiCam's Hanchette predicts that: "As technology proliferates, the price will become more affordable to a larger audience. In turn, this technology will be adapted to meet greater demands, including different material types and application processes. Eventually, this evolutionary process may even lead to a whole new cutting methodology in the print-and-cut workflow."
- Additional applications: With the advent of the flatbed digital contour cutters with vision systems, the ability to cut rigid products into complex shapes has opened up new applications. In fact, Gerber's Azzaretti suggests that, "Finishing of the flatbed-printed rigid board substrates—while the [digital-cutting] machine is capable of much more—is often the leading driver for end-users to consider purchasing the machine."

ette, vice president and general manager for MultiCam LP. “In other words, operators can digitally cut products while still maintaining the capability to expand their business into other vertical markets, such as 3-D machining and product packaging. In terms of potential applications, the sky is the limit.”

Skenderian of EskoArtwork agrees: “New applications and equipment could be opening doors—for example, P-O-P and small-lot production of containers are products a packaging company used to make.”

Determining your best system

Okay, so you're interested. How do you then go about determining just which digital-cutting system best complements the wide-format printers used in your shop? Two criteria to consider: Determine how the new system impacts current jobs, then evaluate how it can expand your company's offerings and boost your bottom line.

In determining how a system could affect your shop's current jobs, consider these factors:

- Does your current set of wide-format printers support rigid printing? Does the design software and RIP support contour cutting and placement of registration marks?
- How many current jobs require a cutting system to finish them?
- How long are these print runs? Are there many one-offs/short runs? Or are there many longer runs that would be faster or more cost-effective to die cut?
- How are you finishing contour-cut rigid jobs now? Are you cutting by hand, utilizing die-cutting, or out-sourcing the project to a shop that owns a digital contour-cutting system?
- If cutting by hand, what is your percentage of re-dos of jobs ruined by an errant hand?
- Does waiting for a die delay time-sensitive jobs?
- Is outsourcing of the digital cutting of rigid graphics working, or does it mean jobs are often late, or profit margins are non-existent?
- What media is currently being cut? How thick is it? How dense is it? Is a router or knife generally needed?
- Is speed or accuracy more important for most jobs?
- Based on the price of a new digital-cut system, how long would it take your shop to recoup the equipment costs? (See sidebar on ROI)
- Look into your company's future and purchase cutting equipment that is flexible enough to be of use with your future equipment purchases and potential jobs.

Then, evaluate how such a system might serve to expand your company's offerings and boost your bottom line. For

instance, you could invest in a number of cutting blades and tools to expand your cutting options. You could train several current employees to use the machine and software rather than a single employee, which would allow for a broader use. The OEM or other vendors might be able to provide you with application ideas you had not previously considered (in fact, when approached with an idea or a new substrate your shop has not worked with before, check with your cutter OEM for the best way to handle finishing the product).

Be sure to test several different cutting systems before finalizing your decisions. Take a job file from your shop to the demo and try out the machine on a real job. Consider these questions in the evaluation stage:

- How long does system start-up take?
- How many people does it take to load/unload sheets?
- How fast can you load sheets—can several be loaded simultaneously? Are automatic loading/unloading options available?
- How easily does it change from cutting one material to another? How quickly can you change tools?
- Does the company provide a compatibility list, including suggested tools and speeds, based on types of specific rigid materials or applications?
- Ask about tech support and resources.

Making the cut

Keep in mind that the future of digital cutting with optical-registration is anything but stagnant. In fact, cutter OEMs report that they are working on a “wish list” of new features, including faster, larger, and more accurate systems; accounting integration; a lights-out operating system; and industrial-strength machines that can operate 24/7.

Whether you opt to wait for these future advances or choose to enter the wild-and-wooly world of contour cutting now, you'll find that a digital contour cutter with an optical vision-registration system, when paired with a wide-format inkjet printer, will allow you to finish jobs with flair—exceeding customer expectations. In the end, you can enhance not only a customer's marketing campaign with digitally cut 3-D graphics, but can also cement your relationship with print buyers by suggesting and delivering graphics that pop in every way.

Next time, listen carefully when one of your customers says, “Cut it out!” They don't mean stop—they mean: “No, really—cut out that graphic!” **BIG**

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