

The Virtues of Old-Tech

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"High color" and "true color" are rapidly becoming the sine qua non of Windows-based graphics. "High color" is video- or slightly better color; "true color" covers a range that is "photo-realistic"; both offer access to more colors than most images in computer-created or -processed images commonly contain. The adapters that deliver all the colors can do so at useful resolutions -- minimally 800x600, and commonly 1024x768 or better pixel resolution.

That means we "lunatic fringe" types (sic one high-end graphics-adapter maker) who use Corel Draw and other high-end computer-picture-making tools (like paint programs and image-editing software) can do more elegant things. But seeing the result in "hardcopy" format becomes a problem.

Eight-bit color hardcopy -- most of us have been using that for years -- is not difficult: Even a lowly Hewlett-Packard PaintJet will do for a quick check. In fact, one Corel Draw strong point is how well its PaintJet output matches real process-color printing.

True-color printers, however, are pretty much limited to dye-sublimation devices -- and the price-tag on those babies can cause apoplexy! Figure at least \$10,000 as the buy-in price (Mitsubishi's 150dpi); for the really fine quality dye-sub devices (like DuPont's), the price soars something like five times.

Enter the tried and true film recorder: Desktop film recorders start below \$4,000 and top out at \$10,000; the real price for a good true-color hardcopy system -- with all you need to get prints and transparencies in a couple different formats -- is between \$6,000 and \$9,000. It's a simple, cost-effective choice for the graphics-boutique and the small office (especially if lots of color graphics and presentation graphics are central to the business). This part of the capital investment in the new high-color/true-color graphics world pays off in better through-put at higher per-hour charges, resulting in lower per-job charges to the client at the same time. A win-win situation -- and all that business-lingo kind of thing.

Implementing a film-recorder hardcopy solution is not without some interesting fillips, however.

First, there is the choice of film recorder. Most graphics users are familiar with them as service-bureau devices. Commonly, service bureaux use fast, top-line devices -- Management Graphics's Solitaires and Agfa Fortés compete in this class. These high-end film recorders can do 8,000-line output, to just about any kind of film, up to 8"x10". They cost in the substantial five-figure range and require serious support.

Desktop film recorders are intended for less intensive use. They are more limited in resolution -- 4,000 lines is the current norm. They deliver film in 35mm format, 3"x4" transparency format and, commonly, Polaroid print format, using either the automatic or manual Polaroid film-pack back. These film recorders are smaller; they need a couple running feet of shelf- or desk-space, or a couple square feet of floor space.

The desktop players are more numerous: Agfa offers two film recorders in this category, the Procolor Premier and the PCR II, both commonly supplied as floor-standing units at different price-points. Agfa is the current name for Matrix, and under one name or the other, has dominated the film recorder business for the best part of

a decade. These film recorders are greatly enhanced new versions of tried and true winners. They connect through a GPIB board or Agfa's MVP hardware rasterizer, both of which are extra-cost options.

Presentation Technologies sells its Montage FR2; aimed originally at Macintosh users, this SCSI film recorder comes with a bundled SCSI adapter in its PC incarnation. At \$7,000, this machine claims true 32-bit color support (something like 67 billion colors in the palette) and complete ready-to-go capability.

Lasergraphics markets its LFR device. Based on a Polaroid Digital Palette shell, Lasergraphics comes from a family business that has father-and-son Ph.D.s figuring out how to make the print-to-film business fast. Their solution is the RISC Rascol, a standalone rasterizing processor sitting between the design workstation and the film recorder. This add-on adds about \$5,000 to the price of the basic LFR (the list price of which is as close to \$9,000 as makes no difference). If you choose not to pay the extra five G's, Lasergraphics comes with a special adapter board for direct host-to-camera connection.

The bargain in the film recorder marketplace has got to be Polaroid's Digital Palette CI-5000. This 4,000-line machine comes fully equipped with both 35mm and instant-film camera backs. To make things really complete, Polaroid also includes the automatic processing machine for its own brand of instant 35mm film (the camera shoots all the usual brands as well), and a deluxe slide-mounter (lighted, with a magnifier; slide the film through, measure to fit, slice and snap the mount closed). Connection to the host computer is simple: plug it into a parallel port, just like a printer. Placing the camera is no problem; it's the size of a big shoe box (the kind cowboy boots come in) and fits handily in about two feet of bookshelf space. At \$6,000, list price complete, the Digital Palette is a virtual plug-and-play solution for people doing computer graphics on PC-family machines. All the test slides and illustrations created as part of this story were imaged to the CI-5000.

Picking the film recorder is the biggest decision; there are others to be made as well.

Film recorders "paint" an image on film. A little TV screen in the camera (the bigger the screen, the better the image, so the common wisdom goes) sits behind a filter wheel. The film recorder rotates the red filter into position, then scans line by line along the TV screen, activating the red dots from the image. The same procedure is repeated for green and blue.

To do this, the film recorder must receive data already in raster (dot), RGB format. You need to choose how that raster image is made. There are two options: Do it in hardware, using a separate image processor. Or, do it in software, using host-computer resources.

The principal hardware rasterizers have already been mentioned: Agfa's current version of the MVP and Lasergraphics' RISC Rascol are aimed at these company's own film recorders and are marketed as part of a total solution. Each consists of a dedicated microprocessor and associated circuitry, and a lot of memory. The Agfa MVP goes in a standard host computer slot on the bus; the Lasergraphics RISC Rascol is a standalone device. Under software control, the host downloads a datafile to the peripheral processor system, which then creates a bitmap in memory and sends it at top speed to the film recorder.

No doubt about it, this is a fast solution. It can be particularly effective when dealing with certain classes of vector drawings (the kind of images Corel Draw produces). Agfa's MVP, with which I am more familiar (when I first started using computer graphics, and host computers were sluggish, this was not an option...), is particularly tuned to the SCODL image description language. That was a severe limitation in the past -- colors were limited, fonts were limited, and so on. Today's SCODL is much improved, and Agfa continues to fine-tune both the MVP and SCODL to today's imaging needs.

But hardware rasterization is not cheap; it's like buying a new computer. Today's fast Intel-based systems, with lots of memory and Windows 3.1's ability to effectively perform multiple tasks, makes doing the rasterization chore on the host computer using a software rasterizer viable -- and lots cheaper. Most of these desktop film recorders offer the option, most commonly using Zenographics SuperPrint with a custom SuperDriver. In the case of my "test engine," the Polaroid Digital Palette, SuperPrint can actually drive the film recorder in two different ways.

The standard, over-the-counter SuperPrint package includes a bitmap SuperDriver. The bitmap driver "prints" a variety of bitmap formats, including PCX/DCX, BMP, Targa and TIFF -- importantly, with anti-aliasing (no jaggies!). Polaroid's own ImagePrint software can image both Targa and TIFF files; the former format is a bit

more congenial, as it generates more compact files. This has some special advantages, tied to the fact that these are portable files in standard format.

SuperPrint also comes in a Polaroid-specific version -- as well as versions specific to the other film recorders listed. [A word of caution: The version of SuperPrint sent me by Polaroid was the older, Win3.0-compatible SuperPrint 2.0; be sure to insist that you get SuperPrint 2.2, which works with Win3.1. This exists -- I used it.] This is a direct-to-film-recorder device driver, supporting the specifics of the camera such as camera-back and film type, as well as resolution, anti-aliasing, details of image size and how data is sent. [Hint: You generally will want to set the system to buffer-to-disk and constant-exposure; a Corel Draw image can be enormous, so memory buffering will be useless, and constant exposure prevents glitches in the final picture due to breaks in the imaging process.]

Finally, SuperPrint is a very effective manager for printing. SuperPrint includes SuperQueue, effectively a Windows Print Manager replacement for use with SuperDrivers. Use the SuperDriver to make a "SuperMetafile," and SuperQueue takes over the printing process. It can direct the file to a local device, or importantly, across a network to another machine driving the film recorder.

Here's where things can be interesting. Imaging big bitmaps takes time; don't let the quick imaging times touted by film recorder dealers fool you. Some of the images created for this story involved processing six-megabyte bitmaps, using 20+ megabyte metafiles. Background processing is helpful; it is better to process this stuff somewhere else.

So, suppose you've just bought yourself a new 486 with a fancy display system, and you have your old(er) 386 just hanging around. Why not network the machines? The older machine becomes a useful utility machine -- a second seat for occasions when you bring in contract help, a scanning station, and of course, the host for the film recorder. This is not expensive: Artisoft Lantastic, using the company's proprietary cards (viable in small networks, up to six or eight stations), costs about \$200-\$250 per station, runs on telephone wire very nicely (I use extra pairs in the wall loop), and doesn't need a Novell Netware Certified Engineer to set up and manage. Because it is peer-to-peer networking, it is ideal for small offices and graphics boutiques -- no need for a dedicated server. I've been using Lantastic for some five years now, and this product has proven rock-solid.

In my tests, I used the utility machine on my Lantastic network in two ways: I used SuperPrint's standard bitmap driver to create Targa files of images to be shot to film. The files were "printed" to a directory on the utility machine, across the network. Then I used Polaroid's ImagePrint software to batch the files to be printed, and went back to work on my other machine (which is right next to the utility machine). By the bye, this procedure will work well if the "utility machine" is an older 286-based computer, which might lack in memory or "oomph" -- ImagePrint is DOS software, and will do quite nicely (though more slowly) on more modest systems.

Another, all-SuperPrint way to do this is to have SuperPrint (especially, SuperQueue) working on both ends, workstation and utility machine. Have the SuperQueued SuperDriver on the workstation end print a supermetafile across the network to the directory on the utility machine where that SuperQueue installation looks for files (the details are documented, but not perfectly, in the SuperPrint manual). The utility machine SuperQueue will automatically pick up these files, and (depending on your settings) either hold them in a batch for your "go" command, or start sending them to the film recorder automatically. Both of these approaches work, and both free your workstation for productive labor very fast. The capital investment can be quite modest.

The mechanics to all this are not excessive; the æsthetics can be more of a problem. There is a real chance that the first pictures you pull from the film recorder will be disappointing -- the color values will seem wrong and the picture will be off-center. This is a calibration question; it is an artifact of the very nature of true-color output as we have it today; it is not a great problem to correct.

First, calibrate the film recorder. In the case of the Polaroid Digital Palette, this means using the DOS-based ImagePrint program to shoot the "calibration" image to the camera (you may also want to use the hardware image, to check that part of the setup -- but this is not likely to be an issue). As the sample shows, this image gives you the ability to check image-centering. Count the ticks, enter the values, store them in the configuration program -- all very simple.

The matter of color value is more complex. Different films produce different colors. The sample images with the

"DJC" monogram and crest (created in Corel Draw) were shot to two different films (process-yourself HC PolaChrome and lab-processed Presentation Chrome). The latter has a more "yellow" cast to my eye; the former has truer, but darker colors (I prefer the PolaChrome values, even if they are somewhat dark, and the film is somewhat less contrasty). How much of the difference is dependent on the film lab, is not clear. Print film, by the bye, has different characteristics, as does 3"x4" transparency film.

Here's the solution: Decide your normal options for films (mine would be PolaColor pack film for instant prints and PolaChrome for instant slides, say -- other options include a range of Kodak films for lab processing). Then shoot some fairly neutral test images. What you want is a set of pictures showing saturated red, green and blue in large visible patches. Film recorders "think" in RGB, and so do analogue monitors.

Now, balance your system for these colors. To do this, you want an NEC MultiSync FG-series monitor. NEC's accucolor may be marginal on 8-bit color systems; it seems it will be mandatory for use with high-color and true-color systems -- for just this kind of situation, making what-you-see match what-you-get. This could be done, program by program, in programs that offer monitor color-value ("gamma") adjustment, such as Micrografx's Picture Publisher. Such adjustments are not universal, and frankly, are less accurate to my eye than what I got after some careful trial-and-error work with the NEC hardware controls on my MultiSync 4FG. Moreover, I can switch between settings. I use the factory-defaults for work going out to service-bureaux or for local printing on the PaintJet (another network device, attached to my partner/wife's machine) or WinJet800-equipped laser printer. I use one of the two user-settings for print film, and the other user-setting is adjusted to PolaChrome. What I see is well within limits for what I get, this way.

What's intriguing about this to me, is how wrong I was. When I first started writing about computer graphics, film recorders were devices used to make slides for presentations; they are still used this way. I came to believe that these machines -- decidedly "old tech" -- were not likely to stick around. As I say, I was wrong. First, the high-end machines still cheerfully make slides. But Management Graphics Solitaires (especially) have become the darlings of the film industry -- a perfect way to image computer-created special effects to film. And the "low-end" machines -- from Polaroid, Agfa, Presentation Technologies and Lasergraphics, notably -- have come down in price while improving dramatically in performance. With the advent of more color in PC-family-based graphics, they've gotten a new glitziness.

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