



HiFi Color Growing Slowly

*A summary of HiFi color printing written for the 1999 GATF Technology Forecast
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Despite a splashy introduction in the early 1990's, HiFi¹ color printing has grown very little in the last five years. When I last wrote about the subject (GATFWorld, Nov/Dec 1995) it was a hot topic. Surveys indicated that a relatively high percentage (2-5%) of printers and designers were ready to use some form of HiFi color. Instead the market became confused and interest waned when no clearly superior method emerged that was simple and affordable enough for common use.

But the topic hasn't gone away. The promise of wider color gamut and greater visual impact remains as alluring as ever for printers and designers who yearn to escape the chromatic limitations of four-color lithography.

What Is HiFi Printing?

HiFi printing can be defined as any technology that raises printing quality above the accepted limitations of normal four-color offset. This implies some alteration or addition to the standard four-color process ink set, which allows the press to print a wider range of colors. The fundamental purpose of HiFi is to achieve greater visual impact and better reproduction accuracy.

A classic example of HiFi printing is the addition of a fifth color or 'bump plate' to reinforce a specific area or color in an otherwise normal set of CMYK separations. Bump plates are traditionally created by hand, but several automated processes have been developed to take advantage of custom five, six, seven or eight-color 'HiFi' ink sets. The best known system is Pantone®'s Hexachrome™, which uses six

inks, but there are at least two other viable HiFi systems, each of which uses a different custom ink set (see *Commercial HiFi Systems*.)

Pros and Cons

Some of the benefits of, and motivations behind HiFi printing include the following.

- HiFi helps printers differentiate their work from run-of-the-mill four-color.
- HiFi's expanded palette lets designers produce more powerful layouts with greater eye-appeal.
- Consumer packages printed in HiFi sell more of what's in them because they catch the consumers' eye more effectively
- A HiFi ad or magazine cover is more likely to capture reader attention than one in four-colors.
- Fine art printers come closer to matching difficult originals with bright, saturated colors.

But HiFi is no free lunch. It is more difficult and expensive to produce than four-color printing, due to the need for extra plates and/or more exotic inks. Consequently, HiFi printers are scarce and the market for HiFi printing remains small. Nevertheless, the visual appeal of HiFi color is inescapable, making it a common tool in consumer packaging and point-of-sale applications.

Who's using it?

The total percentage of HiFi printing is impossible to calculate but if you think it's a rarity, think again. A quick walk through any supermarket suggests that 90% of all consumer packages use some form of special ink set. Browse any newsstand and you'll notice a large percentage of magazine covers use at least five colors. Pick up a handful of car brochures and count how often

¹ The term 'HiFi Color' was coined by Don Carli and is a trademark of Mills Davis.

an extra red or blue is used to intensify a glossy paint job. And just try to buy a quality greeting card that doesn't use special inks.

But which process do these jobs use? Richard Herbert, senior vice president of Pantone® Inc., www.pantone.com estimates several hundred printers worldwide have tried, or are using, Hexachrome. Popularity seems greatest in England, but how much Hexachrome work is actually produced is hard to gauge.

Mark Tennant, Electronic Imaging Manager at Anderson Lithograph www.andlitho.com says they use Hexachrome if the customer requests it, but most of their HiFi work involves custom inks and manually-created bump plates.

Hallmark Cards Inc. use their own special brew of custom inks and a separation process they developed over forty years ago. The process is now streamlined by profiles created in Kodak's HiFi software.

David Reynolds, Prepress Supervisor at Litho-Krome Co., www.lithokrome.com (Hallmark's fine art division,) says they often add multiple touch plates with custom-blended inks, to fine-tune a painting's reproduction. He is currently searching for an automated, ColorSync²-based HiFi method that can improve reproduction accuracy with less need for manual corrections.

"There's a much bigger market for HiFi than most people realize," says Reynolds, "but Hexachrome only suits some work. We need a way to make HiFi separations for any inks."

In spite of automated HiFi systems like Hexachrome, the evidence indicates that most HiFi work produced today still uses manual separation methods and custom, job-specific inks.

HiFi Technologies

There are five main approaches to HiFi color, most of which require extra plates and colorants in addition to traditional CMYK inks. Each system improves the printable color gamut in different areas with different qualities and costs. The five methods are as follows.

- 1 Adding RGB inks to CMYK (Küppers or 'Extra-trinary'.)
- 2 Adding fluorescent orange and green inks to an enhanced CMYK set (Hexachrome™.)
- 3 Running more than one plate each of C, M, Y, and/or K (DuPont HyperColor™ & ColorBlind MaxCYM.)

- 4 Using special high-purity CMY inks, or running commercial inks to higher than normal densities.
- 5 Adding custom inks (for example brown or blue) to a conventional CMYK set.

Production issues

Regardless of the method used, the biggest headache with HiFi is how to produce a multi-color job in a four-color world. With ColorSync's eight-color capability, anyone with a HiFi press profile can create HiFi separations as easily as changing modes in Photoshop. But good separations, aren't enough. You still need to proof, paginate and RIP the job through hardware and software products based on the four-color premise.

Proofing HiFi separations requires a pre-press proofing system, such as Agfa PressMatch™ or DuPont WaterProof™, with custom colors. A more flexible concept is to proof on a wide-gamut ink jet or electrostatic proofer loaded with high strength inks. Through ColorSync profiling, this approach offers more flexibility and accuracy than traditional laminate proofing. One properly profiled digital device can simulate any HiFi process whose ink gamut lies within that of the proofer.

Having made an acceptable proof, the next production bottleneck is pagination. Even today, creating and printing pages with more than four separations per image is hardly straight-forward. A Spartan work-around that's compatible with any workflow is to assemble the first four colors of each image and RIP the document, then substitute the extra color separations in each image and RIP again to get the extra plates. More sophisticated DCS-based workflows may be possible if your pagination software and RIP support them.

The final HiFi production headache is the press itself. Measuring and controlling some exotic inks can be a challenge, especially with fluorescent pigments. On the bright side, many people imagine that a seven color job needs a seven unit press but HiFi can be printed almost as economically in two passes through a four-color press. In fact printing in two passes helps the extra ink layers trap properly and can yield better results than seven or eight color wet-on-wet printing.

The Future of HiFi

Although growing more slowly than anticipated, the attraction of HiFi printing remains as large as ever. For it to have any real impact on four-color markets, however, HiFi techniques and workflow must become easier, the end product must show a more dramatic advantage, and production costs must come down. All these requirements may never be met and HiFi may

² ColorSync™ is Apple Computer's system-level automated color management technology.

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remain forever a niche market, but Apple ColorSync® promises at least to simplify the creation of good HiFi separations.

Perhaps the biggest factor limiting its wider adoption is confusion and the lack of a good source of HiFi information. To help meet this need GATF is considering a research project to investigate HiFi printing in all its current forms. The intent is to inform

the industry of the relative applications, benefits and drawbacks of each HiFi method, and to create a practical HiFi training course for printers, separators and designers.

For more information about HiFi Color, see *HiFi Color—Beyond CMYK*, GATFWorld, Nov/Dec 1995.

Commercial HiFi Systems

The three main HiFi processes available in 1995 were DuPont's HyperColor™, Linotype-Hell's Eder MCS and Pantone's Hexachrome™. Each used different ink sets (see HiFi technologies) and claimed different benefits. HyperColor and Eder MCS are no longer available but Hexachrome continues to be promoted - in fact for most people, Hexachrome is synonymous with HiFi color.

The following systems were commercially available at the time this article was written, December 1998.

Hexachrome (CMYK + OG) uses a custom six-color ink set based on modified CMYK inks plus fluorescent orange and green. Hexachrome inks are made under license to Pantone, as are proofing colors from Agfa, Fuji and DuPont. Pantone's Hexwrench™ is a Photoshop® plug-in that uses built-in six-color press profiles along with the user's own ICC³ scanner or monitor profile to produce Hexachrome separations. Hexachrome profiles can also be downloaded free from www.pantone.com and used to make separations in any ColorSync compatible software, such as ColorBlind™ Edit Adobe® PageMaker™ 6, and QuarkXpress™ 4.x. Expert users can create their own Hexachrome profiles with ColorBlind™ Professional or MonacoProfilier™, but self-profiling any HiFi system is not for the faint-hearted.

MaxCYM (CMYK + CMYK) is a generic name for any process that adds a second plate of cyan, magenta, yellow and/or black to regular CMYK. The MaxCYM approach was first automated in Royal Zenith (now ICG) scanners and is the basis for DuPont's HyperColor™ software. Today, five, six, seven or eight-color MaxCYM ICC profiles can be created in ColorBlind™ Professional.

Kodak Digital Science (custom colors) Kodak's Color Management Group has worked on HiFi profiling for the past five years and now provide a high end ICC-based profiling package customized to the particular needs of any HiFi printer. The first version of this software was licensed to Hallmark Cards Inc. for their proprietary five and six color printing process.

Opaltone™ (CMYK + RGB) is a new process from Australia, based on the Küppers principle. Currently available for Crosfield scanners, it requires a license between Opaltone and the scanner manufacturer. Küppers-style ColorSync profiles can also be created in ColorBlind.

About the author

Don Hutcheson has been seeking better offset printing since 1968 with inventions like the '5th color control' for Linotype (now Itek) scanners in 1982, DuPont's HyperColor™ software (1993) and ColorBlind's MaxCYM process (1996.) His New Jersey- based company, Hutcheson Consulting www.hutchcolor.com, designs and installs color management systems for high end separators, printers, publishers and software developers. Don also teaches color management at GATF and can be reached at (908) 689 7403 or don@hutchcolor.com.

³ The ICC (International Color Consortium) was formed in the early 1990's to define profile formats and other rules for an open, cross-platform color management system. Like Apple ColorSync, virtually all of today's color management systems are ICC-based.