

# Directions in Electronic Prepress

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## Abstract:

The satellite transmission of digital color images, direct digital color proofing, digital data exchange specifications, the merging of color and monotone systems, and optical disk storage technologies are converging in a large scale effort to propel digital imaging for the graphic arts into an age of unprecedented productivity. This is not the stuff of a futuristic Buck Rogers serial, but very real, very-large-scale market and technology directions with far reaching implications for our industry.

We're seeing the formation of the Mega-Vendors via acquisitions, mergers, and a variety of joint ventures. We're seeing the same phenomena occurring with the users.

This paper presents an analysis of these current industry trends and extrapolates this into a look at the future of graphic arts.

## The Growth of Color as a Market Driver

As we begin our discussion here it's important to point out that one of the important driving forces in our market today is the growth in color printing.

Even though we are, through the implementation and use of color electronic prepress systems™ (CEPS™), reducing the amount of film that is consumed during the production of any one image, this possible decline has been more than offset by the growth in the number of original pages, particularly color pages, that are produced each year. This has allowed for the continued growth in consumables during a period in which we have been reducing the consumption of film per production unit.

According to figures supplied by the U.S. Department of Commerce and a variety of graphic arts industry trade associations, color printing in the United States has been growing at a rate of three to four times the gross national product for the past 15 years.

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This growth has generated not only large profits but also a tremendous sense of optimism throughout our industry; from the consumables suppliers, to the equipment vendors, to the users, i.e., the color trade shops, printers, etc.

It's important to recognize, too, that this growth in color, and the profits thereby generated, is what assisted in minimizing some of the business problems we might otherwise have had during the initial transition years of incorporating electronic prepress. Because of the growth in the color market we were able to spend close to five years in mastering a very difficult technology from both a vendor and a user perspective. It is also by virtue of this growth of color printing, and the subsequent profits that were generated, that is now allowing many of our suppliers to make heavy investments in equipment development and acquisitions.

### **Acquisitions, Mergers & Expansion in Electronic Prepress**

During the past few years we've watched as our current electronic prepress vendors have been fairly aggressive in the area of assembling many of the various components necessary for electronic prepress production.

Hell bought Xenotron during the latter portion of 1986. Xenotron of course manufactures a display ad and page layout system oriented towards newspaper production. At the time that Hell bought Xenotron the latter already owned Ultron\*, which manufactures a low cost laser diode scanning system.

So Hell, which had previously been a color electronic prepress systems™ (CEPS™) manufacturer, has moved into the monotone segments of our industry via this acquisition. (Note: Hell provides monotone systems in the European, but not the North American or Japanese markets.)

Another predominant CEPS manufacturer, Crosfield, also recently made a series of acquisitions in the monotone and text segments of our industry with its purchase of CSI, Muirhead and Hastech. All of these companies are primarily text companies, with some text and graphics capabilities, and all are generally in the newspaper field.

Further, Crosfield recently announced its reorganization into "Strategic Business Units." The basic SBU's include: Commercial Color, Newspapers, Design, Press Controls, Communications, Laser Gravure and OEM optical components.

Systems Integrators Inc. (SII); a major competitor to Atex in the text composition, newspaper and magazine business; recently acquired Caddex. Caddex competes over in the technical documentation and corporate publishing markets. As a result SII, which had text and graphics ventures in the newspaper segment of the industry, is now building a division to enter the corporate publishing market.

We're also seeing equipment distributors in the U.S. jumping in here, as exemplified by Royal Zenith. They currently represent Itek; they bought Misomex which builds platemaking equipment and a business forms system; they bought Hazeltine which is a soft previewer for color scanners. So all in all, this distributor is beginning to assemble many of the pieces required for a full offering in the electronic prepress world.

### **The Consumable Suppliers Move In**

During the past 18 months our industry has witnessed the beginnings of a major and irrevocable trend which will continue to have significant ramifications within the prepress, printing and publishing industries for some time to come. Simply stated, this trend is that of the traditional graphic arts consumables suppliers entering the hardware market.

It is becoming apparent that there is a major battle shaping up between our industry's traditional equipment suppliers and traditional consumables suppliers. As the consumables suppliers move into the equipment business they will, of course, begin to directly compete with the traditional equipment vendors. As such it is highly likely that the dialogue that has developed between these two industry segments will become rather poor, possibly to the point of discontinuing. The net result of which may be that the development of new consumables, compatible with new technologies and products, may slow down considerably. This would naturally slow the acceptance of the affected technology or product in the marketplace.

We saw an example of how this occurs in the 1975 timeframe. At that time, several consumables suppliers were attempting to employ a strategy of developing highly proprietary film, photopaper and plate material for proprietary imaging devices. The motivation behind this being that if a particular consumables supplier could develop proprietary material then the suppliers could demand a very high price for the consumables. In retrospect this turned out not to be true, as we now have multiple suppliers of film, photopaper

and printing plates for both blue and red (moving to infrared) laser imaging devices. However, the market acceptance of the newer imaging devices was slowed by the consumables suppliers employing this strategy.

### **Technological Developments & Acquisitions by the Consumable Suppliers**

Kodak is one of our industry's dominant consumables suppliers of photopaper, film, proofing material, etc. They're keeping pace with the technology in that area (e.g., moving from the blue laser to the red laser to the infrared laser with their consumables products). But Kodak is also moving into all aspects of the hardware business. The company is currently showing electrophotographic color proofing, with offset quality, from the copier process; continuous tone imaging onto color reflection and transparency film; remote soft proofing terminals for the graphic arts industry; and high speed LED, instead of laser, printers for the computer and text and graphic market. It has also developed the KEEPS system for the corporate publishing market. In addition it acquired Atex, one of the larger text processing companies, along with Atex's own text and graphics systems for newspaper and magazines. Kodak recently merged Atex with Eikonix, manufacturer of color electronic prepress systems and black-and-white CCD cameras. Diconix, a manufacturer of black-and-white ink jet (with color soon to come) is also owned by Kodak. Kodak also has a major commitment to the development of optical disk memory that, as an industry, we need for our memory systems. Further, a recent reorganization at Kodak resulted in a division called Electronic Imaging that covers most of the aforementioned products.

Note that Kodak hasn't acquired a major typeface library, yet. Other than that, they have almost all of the pieces one needs to construct both commercial printing and publishing systems, as well as corporate text and graphics systems.

DuPont is also making its move into the equipment business. The electrophotographic color proofing systems (both analog and digital) that the company announced at DRUPA '86 are very interesting designs. Eventually they will be very sophisticated pieces of equipment. But this isn't the only area of equipment development underway at DuPont. It also has a joint venture with ImagiTex to develop a black-and-white CCD based electronic camera. A separate joint venture involves Linotype for the output device. The company also recently acquired Via Visuals, a developer and manufacturer of a digital paint system. In addition, DuPont recently entered into a

joint venture with Xerox Corp. in conjunction with the development of their digital color proofing system.

Other important areas of hardware development underway at DuPont include the ongoing effort to develop a prescan analyzer that will be used to analyze pictures prior to scanning in order to assist with scanner set-up. DuPont also has a heavy investment in optical disk media.

Finally, towards the end of 1986 DuPont went through a reorganization that resulted in the creation of its Electronic Imaging division.

Now, 3M is not to be left out of all of this. They, too, announced a sophisticated analog and digital color proofing system that can be laser exposed. They also announced laser exposed printing plates using visible photopolymers at DRUPA '86. At the same time, they are working on very high speed plates to be exposed in systems like Opti-Copy and Rachwal Systems for projection platemaking. They are working in areas such as red laser printing plates, such as their product called Onyx, which is doing very well in the United States particularly in the check printing market. At the 1986 *Lasers in Graphics Conference*, they introduced a color retouching terminal that sells for about \$140,000. The product, called Envision, is an accessory to a color scanner that allows for the color manipulation of images. This mini-subsystem from 3M in part came out of their acquisitions of Comtal back in 1983. And remember too that 3M is also in the optical disk business.

Fuji Photo Film is also becoming more active in the equipment market. They currently have a black-and-white camera, the Scan Art 30, which is an electronic camera for the monotone film market. They are also marketing their large format ink jet printer which is used primarily for design. In addition, Fuji Photo Film has entered the color proofing market; they're strong in the area of red and the infrared film and photopapers, and they're also a partner in Fuji Xerox. This has allowed them to announce a corporate publishing system via the Xerox route.

Agfa-Gevaert is in the office market with its LED printer at 400 dots per inch, and its 400 dots per inch CCD scanner. Both of these products are at the up-end of the office market, or the low-end of the graphic arts market. Agfa also bought Compugraphics, one of the world's largest typesetting company, and it is well rumored that an Agfa/Compugraphic joint development in the area of medium priced

CEPS is about to be announced.

At DRUPA '86, Agfa announced its entry into the color proofing business with an analog system.

We don't think there's any question that Dainippon Ink & Chemical (DIC) is intending to move further into electronic prepress. This company, which is now the world's largest ink manufacturer, also markets (in Japan) typesetters, CAD masking systems, and color electronic prepress systems (CEPS), in addition to other prepress equipment. DIC announced the availability of its CEPS product, the Pagematic, for the North American market at the 1986 *Lasers in Graphics Conference*.

Also, in Japan — Toyo Ink has a joint venture with Scitex known as Nihon Scitex. This puts yet another large ink company investing in the electronic prepress equipment business.

### **Value Added**

We're expecting that as these consumables suppliers begin to compete in the equipment business, they will bring to this a number of value added marketing services. First of all, they're accustomed to this approach to the market. Today, they already offer a variety of free services to the users of their consumables. If they bring this same approach to the equipment business, they are going to change the nature of the competition.

### **A Look at The User Group**

Acquisitions, mergers and joint ventures are also changing the nature of business within the electronic prepress user community. Further, users as exemplified by PPI and others are also jumping into equipment vendors roles. Major book publishers, such as Addison-Wesley, are also publishing and distributing software.

Major color trade shops and type trade shops are buying and selling companies with, what would be described on Wall Street as, active trading: Schawk Inc. recently purchased Litho Colorplate, PPI recently acquired Unicorn Graphics, etc.

### **What's Feeding the Frenzy?**

Here we see a classic example of what can occur when a service industry becomes capital intensive.

As an industry we, primarily the color trade shops, the typeset trade shops, the printers and to a lesser extent some of the highly specialized services that assist us, are becoming capital intensive, i.e., we are acquiring and using massive computerized systems. And typically when a company becomes capital intensive it tends to get larger. Now I'm not going to bore anyone with an extensive lecture on the economic ramifications of a trend of this nature. Let us suffice to say that a service industry (and we are a service industry) has roughly three options available to it to support its own capital intensive growth:

- It can do more of what it's already doing (increase productivity)
- It can expand its services into new market segments
- It can do both of the above

We note here that more than one or two well managed color trade shop, typeset trade shop and printing company has already figured this out. Hence, we see an interest on the part of many companies that are already capital intensive to acquire new and specialized peripherals to assist with their expansion into, and servicing of, new market segments. Further, we see a continued (and highly active) interest in the acquisition of peripherals that will make existing systems perform in a more efficient manner—read that “increased” productivity.”

## **New Markets**

In opening this discussion let's keep in mind that traditionally the trade shops (prepress) and the printers have received the creative designs and have been chartered with producing (or manufacturing if you will) these designs in print. One of the strongest trends we see being brought about by the capital intensive nature of color electronic prepress systems (CEPS™) is the extension of trade shops out into the non-traditional niche of assisting with the enhancement of (and sometimes even the development of) the creative design.

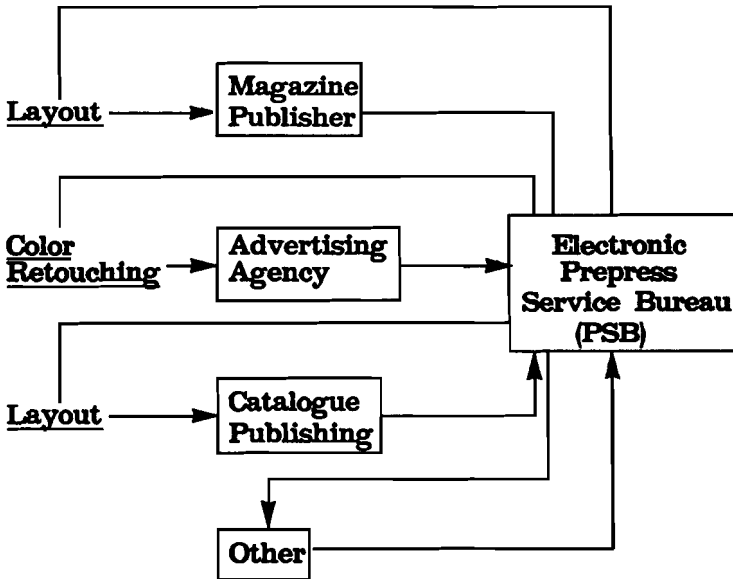
We are seeing the start of the color trade shop's expansion into providing creative retouching services of the continuous tone (contone) originals to the advertising agency; thus, competing with the less capital intensive and much smaller retouching and dye transfer trade shops, and thus, becoming part of the creative process. In addition, the digital data captured during this retouching process can (in theory if not as of yet in general practice) flow directly into the

CEPS.

We are also seeing the expansion of trade shops into the creative side of magazine publishing, assisting with the development of page layouts that can also then (again in theory if not common practice) be transmitted directly to the CEPS, (*figure 1*). This will become more common as designer workstations continue to evolve, and as Digital Data Exchange Specifications (DDES™) begin to be used.

Creative Functions

Prepress Functions

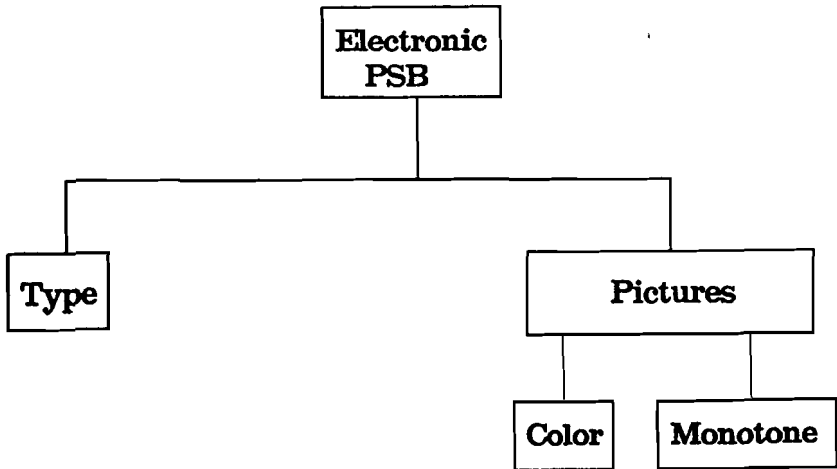


*Figure 1: Expanding Applications for the Electronic Prepress Service Bureau into Servicing Creative Functions*

As this transpires we see the mutual acquisition and merger of the color trade shop and the black-and-white (including typeset) trade shop as a logical scenario of the not too distant future.

This will be brought about by the continued desire to provide one's customers with a broader range of integrated prepress services, (*figure 2*).

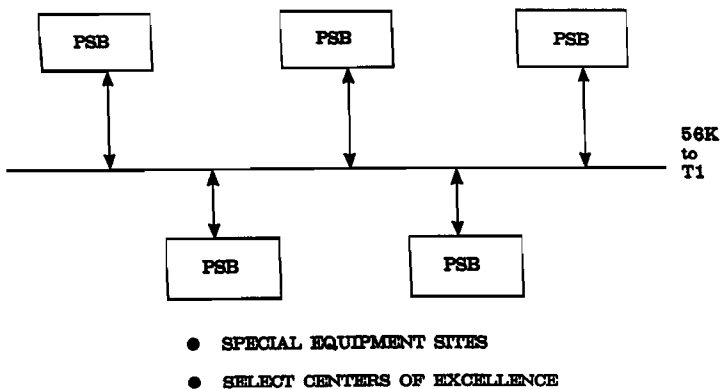




*Figure 2: Expanding Functionality of the Electronic Prepress Service Bureau*

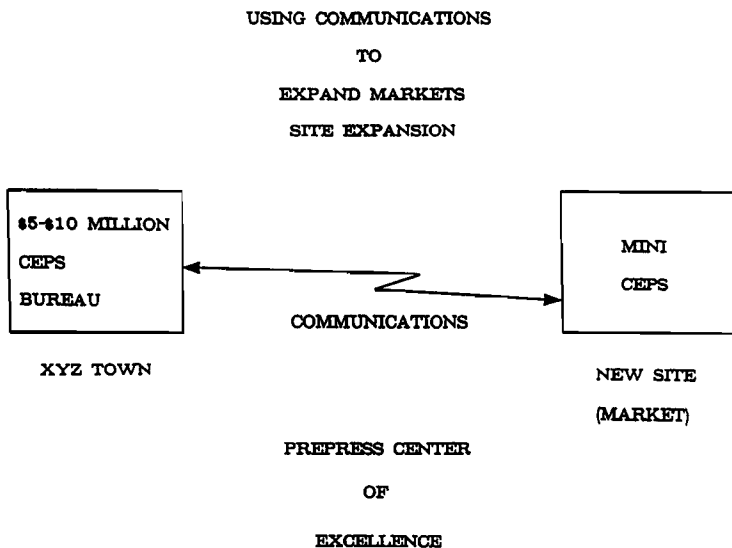
Further, we see the continued evolution and strengthening of the **Multi-Site Prepress Service Bureau (PSB)**. Here one will find production capabilities located at a number of different sites around the country.

Production projects will be transmitted back and forth between sites via communication links (*figure 3*) to optimize the production time of each site and system. Obviously, this is not a pie-in-the-sky scenario, as four organizations that we already know of are starting to do this.



*Figure 3: Expanding the Electronic Prepress Service Bureau via Multi-Site Locations*

Further, current single site PSB's will expand into new market regions by (a) acquisition of smaller CEPS trade shops, and (b) by the purchase of minimum equipment for a new site and high bandwidth communications to the existing mature CEPS site (*figure 4*).

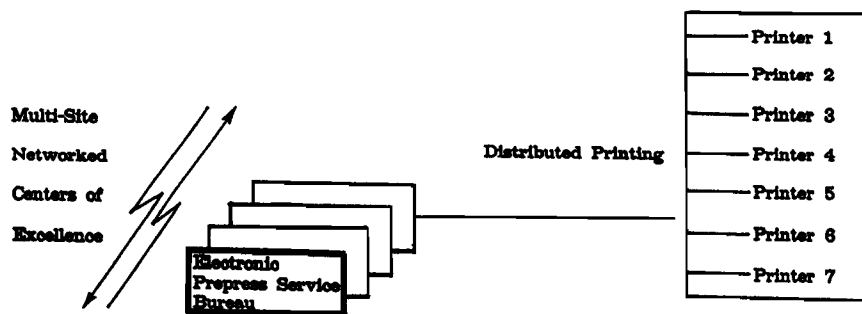


*Figure 4: Market Expansions to New Regions Through Communications*

**Centers of Excellence**

In addition to the continued emergence of multi-site electronic prepress service bureaus we are going to see the emergence of **Centers of Excellence**, or electronic prepress service bureaus that, through the acquisition and use of specialized peripherals, will begin to offer specialized services. Acting as part of an integrated chain of electronic prepress service bureaus these Center of Excellence will add expertise in a particular application to the overall offerings of a multi-site multi-functional trade shop chain thus, reducing the amount of the investment required to acquire redundant computer equipment at every site (refer to *figure 3*).

The net result of this activity is logically going to be an increase in distributed printing where we'll see a further increase in regionalized ads (thus, tightening the loop with the desires of the marketing/creative customers of our industry) and a decrease in mailing/distribution costs (*figure 5*).



*Figure 5: Expansion into Increased Regionalized Printing*

Understanding the interplay of these dynamics is key to the selection and implementation of the capital equipment that is needed to achieve this goal.

Now that a portion of our industry has grappled with (and in many cases conquered) the issues involved with acquiring and using electronic prepress systems for its most rudimentary functionality, now we can begin thinking and moving beyond this first (albeit important) step. It's now time to get up and **running!**

### **Beginning to Run**

Now that we've explored our scenario for the future directions and expansion of the electronic prepress industry from a user perspective, let's take a look at the two most critical components currently required to realize this expansion and growth.

Up until now in this discussion we have been **assuming** the existence of functional **Digital Data Exchange Specifications DDES** and sufficient **Communications Technology**.

## **DDES**

In order to assist with the exchange of digital data between CEPS and a variety of peripherals, between CEPS developed by different vendors, and between CEPS located at different locations some form of common interchange for the digital data must exist. Because it is ultimately the users who will reap the substantial benefits of this activity, their continued involvement with an input to future developments are critical to DDES's continued evolution. **The National Printing Equipment and Supply Association (NPES)**, is currently acting as secretariat to the DDES activity through the American National Standards Institute (ANSI), Image Technology committee number eight (IT8).

## **Communications Technology**

In order to transport the text, line work and pictures back and forth between the electronic prepress service bureaus and its clients, between multi-site electronic prepress service bureau centers of excellence, and from electronic prepress service bureaus and the printers, some form of communications technology is obviously required. As a rule of thumb the closer one gets to transmitting to the printer, the more bandwidth is required of the communications technology used (*figure 6*).

Market Segments	Subdivisions	Communications Requirements
Creative	Concept Creation	9.6K bps
	Art Modification	56K bps and up
	Art Assembly (Layout)	9.6 to 56K bps
Production (Prepress)	Color Iteration (Getting It Right)	56K to T1 bps
	Composition and Register	56K bps
	Contract Proof	56K to T1 bps
Printing	Plate Ready Film	Partial to Full T1

*Figure 6: Market Segments' for Communications Requirements Within the Color Printing and Publishing Process*

**. . . On Into 1995**

In closing, we want to stress that what we as an industry have been recently watching is just the beginning of a mammoth industry restructuring that we believe will be ongoing for the next 15 years.

But now let us add one additional variable: During the early 1990's Dunn Technology, Inc. (DTI) also expects to see today's press manufacturers entering the prepress equipment marketplace. This will be driven by the press manufacturers' desire to further automate their presses. As they do so, they will begin to get more interested in what is done in prepress and they will want to integrate some of these prepress functions into their presses. This actually makes a lot of sense, especially in the area of color printing. So, as the press manufacturers move to a much more sophisticated form of automation, they will want direct digital interfaces to prepress. We believe that as this evolves, they will also move into segments of the prepress equipment arena. So, as we watch the current prepress equipment and consumables suppliers do battle, let's keep in mind that there will likely be yet another major combatant in the 1991-1992 timeframe.

On the user side one can only speculate how the current prototype direct digital color proofing systems (DDCPs) will be used. Though admittedly some of the designs do look a bit like printing presses. How lucrative do you suppose the short run color printing market is?