Publishing Book-on-Demand

by Don Lancaster

Thanks to the magic of that new PostScript page description language and today's low cost desktop laser printers, the economics of low end book publishing are seeing a dramatic turnaround. It can now be cheaper to produce books in *smaller* quantities than in larger ones. Besides being far faster and more flexible.

It is possible today to produce top quality books, *one book at a time*, on your kitchen table. And often do so at much lower costs, with far less risk, and with many other major advantages over the usual printing routes. And while today's results are "useful" and "acceptable," this newer approach to *Book-on-demand* publishing is about to get very much better in a very big way. Oppornockity tunes but once.

"Old Way" Publishing Problems

Some background on just how I got here. Over the years, there was this certain publisher for whom I have personally generated the equivalent of twelve million dollars in gross retail book sales. It seems they went through a merger or two and ended up deciding to treat me as so much dogmeat. MPS chunks. It became obvious to me that, even if I did give them another twelve mil, they wouldn't spend any of it on the sorely needed therapy for the acute recto-cranial inversion syndromes I found endemic to their hired help.

I checked into this further, and I found that lots of other things were going radically wrong with traditional technical publishing. Those days of sending a tech book in and having it automatically, unquestionably, and promptly published and then selling forever seemed to be over. In fact, it seemed to me that all the traditional tech book publishing was going to hell in a handbasket in a very big hurry.

First, we saw all those mergers that left fewer and fewer places to send a book. Then we had all of the chain bookstores drive out the mom-and-pop operations. All those mom and pops typically stocked 60,000 titles, but the chains often stock ten copies each of a mere 6000 titles. And those chains will typically pull a book after 22 weeks on the shelf, unless its sales record is absolutely outstanding.

The very concept of what a book is and what it is supposed to do is changing dramatically.

The chains also started returning unsold books for credit. Years ago, a technical book would remain on the shelf until it eventually sold. Today, an author could find all his later returns chomping into as much as half of his royalties. Sometimes much more.

After this came the *new machine syndrome*. Here an unknown author would receive their two zillion dollar advance and get locked up in some motel room for 24 hours to write the "definitive" book on a new computer yet to be introduced. Sometimes, the author was even allowed a full twenty minutes of hands-on experience on a dummy mockup of the non-working pre-release of the new machine. All of these insanities immediately gave the entire tech book market a bad name, since 99 titles out of 100 ended up as totally incompetent and unbelievably inane puffery.

After that came the rise of those infamous new *publisher's committees*. Instead of believing that the author might know exactly who his readers are, we have this motley crew sitting on a submission for fourteen months and then rejecting it because the topic is "not timely."

And those very same publisher's committes also honed triage into a fine art. If there were any other books on your topic, the market was "saturated." If not, it instead became "unproven." Should you print up a few copies on your own to verify your market was viable, then you become guilty of the unpardonable and unconscionable sin of "skimming."

All of these problems were utterly negligible compared to that monkey wrench the IRS threw into the works. Believe it or don't, the IRS now *pays publishers to shred books*, in just the same way that some other goverment agencies pay farmers not to grow any crops. More books have recently been shredded to please the IRS than were destroyed in all of the dark ages.

It used to be that unsold copies of a book were simply stacked up onto old skids in the warehouse, thus creating a backlist that would go on forever. The publishers carried these leftovers on their books at their scrap value. The IRS decided this was a no-no and that all copies, regardless of their age or popularity, must be carried at their full "as published" value.

The result of this stupidity was the virtual elimination of backlists. If a title drops a notch or two on their best-seller lists, all of the remaining copies get promptly shredded. And that's all she wrote. Literally.

There always have been book titles that are pretty much unpublishable by the traditional method. Examples are grandma's memoirs, new age books, religious tracts, family genealogies, the alternate education stuff, poetry, and various get-rich-quick scams.

Add to these the books of interest to a very few specialists. Things such as a definitive illustrated reference

for carbide lamp collecting, or certain esoteric scientific specialties.

Finally, the very concept of what a book is and what it is supposed to do is changing dramatically. We used to have this stand-alone bunch of pages bound together with words on them. Viewed from front to back in a strict sequential order. And that was it.

Today, a book is much more likely to be some small portion of a larger package that could include software, floppy disks, CD-ROM "shovelware," game pieces, stacks, other hypermedia, templates, videotapes, voice helplines, steam calliopes, or even soft ice cream dispensers.

The Book-on-demand Concept

As an experiment, I've decided to self-publish several titles by applying what I refer to as *Book-on-demand* publishing. Each copy gets printed up one volume at a time by use of a PostScript speaking laser printer.

Surprisingly, the costs turned out to be significantly *lower* than when jiffy printing. A thousand copies of a book jiffy printed at a walk-in franchise will set you back around $7000, after you include such things as the collating, covers, and a binding. The same 200 page volume Book-on-demand laser printed could cost you around $5000 for a thousand copies, including printer amortization.

Note that all of your jiffy printing expenses are non-refundable. If you only sell one-third of your books, then your costs skyrocket to an intolerable $21 each. Or worse.

Since you only print the books you need when you really need them, you eliminate the front end risk factors of traditional publishing.

Authors can now be paid a living wage, say 50 percent of that book's final selling price. Your printing is self-collating. Only the needed books are produced when and as wanted, so there are zero remainders, damaged, returns, or shopworn copies.

Changes, updates, and corrections can get handled at any time. Each customer 's name can be imprinted in gold on the cover. For that matter, the content can be adjusted to exactly suit each user's personal needs.

Since there is no inventory, there are no tax penalties. Your backlist goes on forever, and you can profitably sell a single volume ten years from now. The time from an author's submission to production takes hours, rather than years. You do end up with far more control over your work. Especially in putting the book figures exactly where you want them. You now get to make all of your own mistakes, instead of paying others to make them for you.

Some Key Secrets

If I were to cram several year's worth of my discoveries into a few key Book-on-demand rules, they might go something like this:

1. Use a fast PostScript printer.
PostScript is the only way to go for all of your Book-on-demand publishing. Really important advantages include the literally infinite font selections in any size and all directions; the freedom to mix the text and graphics in any combination; the complete elimination of any pasteup; beautiful grays and sweeping curves; and a total host and printer independence.

2. Use a local SCSI hard disk.
By placing all of your book chapters, fonts, and font caches on a hard disk locally accessed by your printer, all comm times get minimized.

3. Do all your own repair work.
Have the needed manuals on hand and use them. Ordinary laser printers are easily nursed beyond half a million copies each following some simple preventive maintenance. Keep bolting on parts and they will run forever.

4. Refill your own toner cartridges.
Book-on-demand publishing will work only if you can get your toner costs under 0.3 cents for each page. Doing your own refilling is the only way to reach this cost level.

5. Use a duplex (double sided) printer.
Hassles that include second-side paper jams, curling, mis-registrations, and any unwanted toner transfers can be eliminated by going to a machine that prints the front and back on a single pass. Labor is also far less.

6. Compile your PostScript code.
Use host recording to save only the essential run-time information needed by any file. When properly compiled, most any text page should makeready in under four seconds, including a simple figure or two. Full compiling details in my *Ask the Guru II*.

7. Work directly in "raw" PostScript.
Do all of your figures and artwork directly in raw PostScript, rather than importing foreign images with their horrendous file sizes and inexcusable execution times. Your total file length for a typical 6000 character, two figure page should never exceed 14K max.

8. Edit AFTER typesetting, not before.
Always treat all your typeset pages as rough drafts. Use a *post-justification editing* to get the finest possible visual results on the page. In general, slightly wordy and slightly jarring text reset to the the best tightness and shading will read better and be retained longer.

9. Use "second pass" figure compiling.
Various custom tricks could speed up figures to minimize their makeready times on repeated printings. One very powerful technique is to rework slow code into cached characters in a font, then returning the cache to the host as a recordable bitmap.

10. Avoid paper jams.
Use the straight through paper path. Keep paper stock wrapped and flat on steel shelving. Set humidity to 20 to 45 percent. Use a dehumidifier if needed.

11. Keep it simple.
You do not really need any of those fancy programs, application packages or costly host machines if you work directly in PostScript. A plain old word processor can serve you just fine. At Book-on-demand print time, even a yard

sale *Commodore 64* would be overkill. While a hand crafting takes longer, it can beat any of the power packages at their own game.

An Example

Of my 26 books to date, including the two million sellers, six are being Book-on-demand published. These are my *Ask The Guru* reprints, volumes I and II, my *Hardware Hacker* reprints, my *PostScript Beginner Stuff*, a Bee weaving book, and my *LaserWriter Secrets* book/disk combo.

As an example, my *Ask The Guru II* gets printed one self-collating book at a time by using my *LaserWriter NTX* PostScript printer, helped along with a 20 Meg hard disk. Each book copy currently takes 35 minutes from start to finish. I intend to at least double that speed in the next few months.

Note that 30 minutes per printing translates roughly into half a million dollars in books per year per printer.

I overwhelmingly prefer to do all my work in "raw" PostScript on an Apple IIe, rather than using any of the fancier machines or applications packages. I find this gives me far better control and higher quality justification.

I do all of my own toner cartridge refilling, getting my per-page toner costs well under the 0.3 cents per page magic figure.

A typical book page gets made up of 6000 characters, the header, a footer, and one or two figures. By using my raw PostScript out of AppleWriter and a IIe, and by doing a precompiling, each page averages around 14K in file length and needs only four seconds or less for makeready.

I use a vellum *Simpson* offset for the inside pages. Covers are a heavy tan parchment. A *Unibind* binding is used. Their clear vinyl overlay protects the parchment and the toner inside cover. My other cover options could include *Kroy Color* and a plastic lamination overlay. The trimming is with a big paper cutter.

I guess I have concentrated mostly on the technical accuracy and a high quality text justification on all of my earlier Book-on-demand titles. The original form of the reprint volumes severely restricted what could be done in the way of creative layout. Style and readability will improve one title at a time as I go along.

The Future

At least for me, the Book-on-demand scam works and works well. The next generation of PostScript speaking laser printers promises bunches of advances that should make the new advantages of Book-on-demand publishing totally overwhelming.

We might shortly expect 400 DPI resolution, with a dual-mode 400/800 DPI on halftones. Which should result in modestly improved typography and stunningly better photo halftones.

Duplex printing should become available which prints both sides on a single pass, eliminating all of those second-pass paper jams, curling, and feeding problems. Hopefully, this will be combined with several large paper trays to allow an unattended overnight operation. And those 11 x 17 formats should become available as machine options, allowing single piece covers.

Speeds of the new machines are projected to be much faster, which might even eliminate a need for the intermediate precompiling steps. And, hard recoated drums with an "infinite" life should further drive toner costs down into the quarter cent per page range where they rightfully belong. Things should really take off when the toner costs less than printer's ink.

We can also expect new solutions to binding and shearing hassles, possibly based on a new cold glue technology. There's lots of new opportunities here as well. More on this whenever.

Some great things are waiting in the wings with new PostScript level II.

And, how about a zillion first quality and fully hinted fonts, all provided on a single SCSI compatible CD-ROM disk? Expect this one "real soon now."

I can hardly wait. ✦

Microcomputer pioneer and guru Don Lancaster is the author of 26 books and countless articles. Don now maintains a no-charge technical help- line you will find at (602) 428-4073, besides offering all of his own books, reprints, and various services. He also has a free brochure chock full of his new insider desktop publishing secrets waiting just for you. Your best calling times are 8-5 on weekdays, Mountain Standard Time. Or you can reach Don by way of his Synergetics, *at Box 809, Thatcher, AZ 85552.*

Stupendous Stuff Sources

by Don Lancaster

Three centermost key secrets to your personal technical, craft or art venture are (1) Becoming and keeping informed; (2) Not trying to reinvent the wheel; and (3) Not getting ripped off by your suppliers.

What I thought I'd do this month is reach way down into my super-secret personal resource file, and pull out the finest of the good guys for you…

Advance Process Supply
400 North Noble Street
Chicago, IL 60622
(312) 829-1400

Stocks a rather wide variety of silk screen materials and supplies, both for electronic and sign purposes. Their "fuzzy" self-flocking plastasol inks are rather unique.

AIN Plastics
249 East Sandford Blvd.
Mount Vernon, NY 10550
(914) 668-6800

This plastics wholesaler has an in-depth selection of the engineering and commercial materials. Rigid vinyl is often a good and low cost choice for modelmaking uses.

APDA
20525 Mariani Avenue Bldg 33G
Cupertino, CA 95014
(800) 282-2732

The Apple Programmer's and Developer's Association was cheaper and better when it was independent, but this is your best source for insider technical info and software on all Apple and Macintosh products. Their $25 yearly membership remains a bargain.

Association of Energy Engineers
Box 1026
Lilburn, GA 30226
(404) 925-9558

Professional and technical info on solar and wind energy is getting very hard to pin down, with practically all of the trade journals having folded. This one remains as a useful, although totally establishment, source. Also heavy into co-generation, and efficient appliances.

Dick Blick
Box 1267
Galesburg, IL 61401
(800) 447-8192

A good direct mail art supply house, also heavy into silk screen and signmaking stuff. Lots of interesting materials available in small lots without staggering minimum orders.

BMUG
1442A Walnut Street #153
Berkeley, CA 94709
(415) 849-9114

Probably the best all-around Macintosh user's group. Outstanding bound newsletters, public domain software, and shareware. Loosely associated with Farallon Computing.

C & H Sales
Box 5356
Pasadena, CA 91107
(800) 325-9465

Here's where you go for surplus "big mutha" raw iron. Motors, instruments, hydraulics, steppers, valves, controls. Most at outstanding prices but limited availability.

Circuit Cellar Ink
4 Park Street Suite 20
Vernon, CT 06066
(203) 875-2751

Steve Ciarcia's hands-on answer to my Hardware Hacking columns. Very heavy into computer applications, especially embedded microcontrollers. His other emphasis areas include security, machine vision, remote controls, and telecommunications.

Coburn
1650 Corporate Road
Lakewood, NJ 08701
(201) 367-5511

Makes highly unusual and decorative sheet materials, including prismatics, foils, glow-in-the-darks, diffraction gratings, glitters. Some are laser printable; others are not. Sample evaluation packages available.

Constantine
2050 Eastchester Road
Bronx, NY 10461
(212) 792-1600

A woodworker's supply catalog. Heavy into exotic woods and veneers, unusual and quality tools. Free catalogs available.

Dialog Information Services
3460 Hillview Avenue
Palo Alto, CA 94304
(415) 858-2700

Hundreds of millions of technical references spread out over several hundred instantly accessible data bases. Far and away the best way to research any subject. Hint: use your local librarian. They can dramatically reduce costs. Typical price for 50 key abstracts in a field is around $25.

Die-O-Perf
1721 East Pioneer Drive
Irving, TX 75061
(800) 843-2807

Has low cost die cut goodies that laser print beautifully. Stuff like perforated self-mailers, coupon sheets, rolodex cards, tickets, tags. Usual cost is a nickel a sheet.

ECG/Phillips
70 Empire Drive
West Seneca, NY 14224
(716) 325-2620

One of the two leading sources of repair, replacement, hacker, and educational semiconductors. Has outstanding cross references and technical mini-manuals. The competition includes NTE Electronics.

EDLCO
PO Box 5373
Asheville, NC 28813
(704) 255-8765

The name is short for Educational Lumber Company. Has all varieties of Appalachian hardwoods and exotic imports. Nothing like cocobolo or wenge to liven up your products. Reasonable prices, good delivery.

Edmund Scientific
101 East Gloucester Pike
Barrington, NJ 08007
(609) 573-6250

The yuppie reign of terror here has at long last ended, and the Perrier-filled birdbaths are no more. Edmund is once again a good source of optics, electronic surplus, and scientific stuff. Now has superconductivity kits.

Evergreen Scale Models
12808 Northeast 125th Way
Kirkland, WA 98034
(206) 823-0458

Precut white styrene for modelmaking uses, especially in the sizes favored by architects, model railroaders, and dollhouse builders. Stocked by some larger hobby shops.

Fair Radio Sales
Box 1105
Lima, OH 45802
(419) 227-6573

The oldest of the old line surplus houses, still stocking original World War II electronic gear. Particularly handy for older and higher voltage components, hard-to-get technical info. One of my favorites, I've bought everything from altimeters to servos from them.

Fomebords
2211 North Elston Avenue
Chicago, IL 60614
(312) 278-9200

Cardboard used to be cardboard and posterboard used to be posterboard, but today there are dozens of hi-tech materials available for architectural studies, models, and exhibits. Great stock selection.

Grainger
2738 Fulton Street
Chicago, IL 60612
(312) 638-0536

A major wholesale source for motors, air conditioners, electrical tools, and such. In most larger cities. Some locations actually try to enforce their wholesale-only policy, so you may need a letterhead and a tax stamp.

Heath Company
PO Box 1288
Benton Harbor, MI 49022
(616) 982-3200

The largest manufacturer of electronic kits in the world. Their self-study educational electronic courses are far better than any of the mail-order trade schools. Outstanding reputation and unconditional guarantees. No matter how much a mess you make of their products, they will fix them for free.

Home Power
PO Box 130
Hornbrook, CA 96044
(916) 475-3179

Appears to be the last remaining user-oriented alternate energy publication. $10 per year. Full of ads and tech articles on solar power, low voltage appliances, and windmills.

Hygenic Manufacturing
1245 Home Avenue
Akron, OH 44310
(216) 633-8460

A great and very low priced source of rubber tubing and sheeting, as well as doing custom die-cutting. Far cheaper than most electronic materials sources.

Jerryco
601 Linden Place
Evanston, IL 60202
(708) 475-8440

The finest mail order surplus store in the world. Period. Where else can you get a matched set of 24 US Army urine specimen bottles for use as wedding presents? Insanely low prices on many items. Unusual materials for unusual uses. This one is a "must have".

K & S Engineering
6917 West 59th Street
Chicago, IL 60638
(312) 586-8503

Good source of modelmaking aluminum, stainless, and brass sheet and tubing in small sizes. Has racks in larger hobby shops.

Kepro Circuit Systems
630 Axminister Drive
Fenton, MO 63026
(314) 343-1630

Probably the best source for small quantity experimenter printed circuit materials and supplies. Use the dry resist pre-coated boards and their ammonium persulfate etchant for the best results.

Lazer Products
12741 East Caley Suite 130
Englewood, CO 80155
(303) 792-5277

Supplies for copier and laser toner cartridge reloading that can reduce your page costs by 15:1 or higher. Also hard recoats drums for extended life.

Lindsay Publications
PO Box 583
Manteno, IL 60950
(815) 468-3668

A unique direct mail book store that specializes in reprinting old machine shop and antique electronics texts. Hundreds of hands-on titles on everything from stained glass to perpetual motion machines. Request both of their free machine shop and electronic catalogs. Get on their mailing list.

Machine Design
1100 Superior Avenue
Cleveland, OH 44144
(216) 696-7000

A very good mechanical engineering trade journal. They are fussy about their free subscriptions, so sound like a real engineer when you fill out your qualification card.

McMaster-Carr
Box 54960
Los Angeles, CA 90054
(213) 692-5911

The super hardware stores that industry shops at. Branches in all larger cities. Try to cop one of their humongous 2400 page catalogs. Stocks at least one each of everything, but does not discount.

Robert A. Main & Sons
555 Goffle Road
Wyckoff, NJ 07481
(201) 447-3700

Makes a bewildering array of hooks, points, and pins. Not that they are at all old line or anything, but they still offer several different styles of 78 RPM phono needles. All the items in their catalog scream "Use me!".

Maxim
120 San Gabriel Drive
Sunnyvale, CA 94086
(408) 737-7600

Innovative smaller microchip manufacturer. Unique and low cost products include video switches, micropower regulators, supervisors, A/D & D/A, power op-amps, lots more. Chips that cry to be used.

Measurement and Control
2994 West Liberty Avenue
Pittsburgh, PA 15216
(412) 343-9666

A free trade journal with extensive ads and advertiser-written technical articles for sensors, transducers, and other industrial instrumentation. They also publish the Pollution Equipment News magazine.

Meredith Instruments
6403 North 59th Avenue
Glendale, AZ 85301
(602) 934-9387

The best hacker source for surplus lasers and related optics. Prices start around $25. Also has a light show BBS up at (602) 867-7258.

Metalphoto
18531 South Miles Road
Cleveland, OH 44128
(216) 475-0555

Manufactures photosensitized and partially anodized aluminum plates. You expose these, develop them, and boil them in sealing glop to make very durable nameplates, front panels, or vandal-resistant interpretive signs.

MIX Bookshelf
6400 Hollis Street Suite 12
Emeryville, CA 94608
(800) 233-9604

Probably the largest collection in the world on audio, electronic music, television, and video production books and software. Associated with both MIX Magazine (audio production) and Electronic Musician (synthesizers, etc.).

Model Railroader
1027 North 7th Street
Milwaukee, WI 53233
(414) 272-2060

Besides unusual tools and techniques, this hobby magazine has far and away the finest technical writing and technical illustration of any publication anywhere ever. Use it as a style and layout manual, and hope to someday be able to communicate that well. Should be required reading for any tech writer.

Motion Magazine
Box 6430
Orange, CA 92613
(714) 974-0200

Free trade journal that covers steppers, servo motors, linear actuators, the power control semiconductors, and general robotics stuff. Pricey products but full of good technical ideas and resources.

Mouser Electronics
11433 Woodside Avenue
Santee, CA 92071
(800) 346-6873

Electronic distributor with low minimums, low pricing, and extensive stock. Very hacker friendly. Carries semiconductors, ic's, relays, resistors, capacitors, inductors, hardware, and all the usual goodies. Largely imports.

Northeastern Scale Models
PO Box 727
Methuen, MA 01844
(508) 688-6019

Precision precut wood shapes in the sizes used by architects, model railroaders, and dollhouse builders. Think of them as a miniature lumberyard.

NTE Electronics
44 Farrand Street
Bloomfield, NJ 07003
(201) 748-5089

The second major source of semiconductors for replacement, service, education, and hacker experimenting. A virtual carbon copy of ECG, they also have lots of good cross reference and technical data books available.

Nuts and Volts
Box 1111
Placentia, CA 92670
(714) 632-7721

An all-ads mail order shopper specifically for hardware hackers, ham radio operators, CB folks, computer users, and satellite pirates. Their low-price ads are attractive for most shoestring technical startups.

PaperPlus
300 Oceangate #800
Long Beach, CA 90802
(800) 272-7377

If you've ever tried buying paper from an old line source, you know the hassles. Instead, try these walk-in paper supermarkets now in most states. Especially useful for book-on-demand publishers. Also stocks certificates, bumper sticker stock, acetates and polyesters.

PCIM
2472 Eastman Avenue
Ventura, CA 93003
(805) 658-0933

Used to be called Power Conversion and Intelligent Motion. Another free trade journal for the robotics crowd. Covers steppers, servos, motors, linear actuators, and their electronic control components.

Player Piano Company
704 East Douglas
Wichita, KS 67202
(316) 263-3241

Well, just because it is there, I guess. Unusual source for very unusual tools, materials, and techniques. Has hobby robotics potential, especially for low pressure pneumatics.

Printer's Shopper
PO Drawer 1056
Chula Vista, CA 92012
(800) 854-2911

Not really a shopper, but a monthly mail-order catalog for a major printing equipment tools, materials, inks, and supplies house. Many hundreds of items listed. Their prices are usually better than buying locally.

Quick Printing
1680 Southwest Bayshore Blvd
Port Saint Lucie, FL 34984
(407) 879-6666

Probably the best of the instant printer trade journals. Full of ads for papers, materials, tools, supplies, badges, bumperstickers, menus, and tags. Usually gives you several free copies and then will hit you up for an overpriced subscription.

Quill Office Products
Box 4700
Lincolnshire, IL 60197
(312) 634-4800

Traditionally a leading mail-order discounter of office products. These days, though, the local office supply superstores are giving them a run for the money. Wait for Quill's sales; they are often genuine loss leaders.

Radio-Electronics
500-B Bi-County Blvd
Farmingdale, NY 11735
(516) 293-3000

Yeah, I write for them. Even so, they are just about the best newstand electronic mag. They also publish Popular Electronics, which is really the old name wrapped around their own Hands-On Electronics.

Real Goods
966 Mazzoni Street
Ukiah, CA 95482
(800) 762-7325

A major direct-mail supplier of alternate lifestyle products, including home power, home business, home craft type of goodies. One of the last of a vanishing breed.

Rohm Corporation
8 Whatney
Irvine, CA 92713
(714) 855-0819

US distributor of unique integrated circuits including FM wireless stereo broadcasters, melody chips, plus bunches of similiar consumer electronic goodies. Free catalogs and often free samples. Very low prices.

SAE
400 Commonwealth Drive
Warrendale, PA 15096
(412) 776-4840

Used to be the Society for Automotive Engineers. This one is about as establishment as you can get, but they do stock a wide variety of books and monographs on car electronics, unusual engines, and vehicular technology in general.

Samsung Semiconductor
3725 North First Street
San Jose, CA 95134
(408) 434-5400

Distributor of a mind-blowing variety of Korean microcircuits. To any hardware hacker, their data books (especially Linear, Volume I) reads like a page-turning pulp novel. Their low cost chips are all "gottahaves".

SignCraft
1938 Hill Avenue
Fort Myers, FL 33906
(813) 939-4644

The very best magazine for the sign painting trade. Their competitors are too hung up on snotty billboard politics. Signcraft can be an excellent idea source, besides containing ads for unusual tools and materials.

Small Parts
Box 381966
Miami, FL 33238
(305) 751-0856

The greatest robotics store in the world, only they don't know it. Besides their stocking everything your hardware store never heard of, they custom cut smaller quantities of aluminum, brass, and plastic sheet, rod, or extrusions for you. Small orders welcome.

Southern Sign Supply
127 Roesler Road
Glen Burnie, MD 21061
(301) 768-8600

A competitor to Advance, these folks also stock silk screen materials and specialized tools for printed circuit and commercial use. Big fat catalog. Reasonable prices.

Speleonics
Box 5283
Bloomington, IN 47402
(812) 339-7305

One of my favorite examples of an extremely well done "labor of love" technical newsletter, this one covers technical stuff of interest to cavers. Covers the very low frequency radio communications, direction finding, altimeters, improved light sources, more.

Surplus Traders
Winters Lane Box 276
Alburg, VT 05440
(514) 739-9328

The old ETCO operation set up for direct mail surplus electronics. Ridiculously low prices on many items. As with all electronic surplus, availability is on a catch-as-catch-can basis.

Synergetics
Box 809
Thatcher, AZ 85552
(602) 428-4073

Sneaky, huh? Synergetics is me, stocking lots of classic books on hardware hacking, as well as the ongoing book-on-demand published reprints from my columns. PostScript, too.

Thompson and Thompson
23072 Lake Center Drive #100
El Toro, CA 92630
(714) 855-3838

Has very good pricing on modified and rebuilt PostScript laser printers. Manufactures those glompenstractors and other essential tools for toner cartridge reloading. Has a free helpline.

3M Scotch Color Key
3M Center B 223-2N-01
Saint Paul, MN 55144
(800) 328-1186

Color Key is an unusual photographic material intended for color proofing. But it has zillions of other uses, for anyplace you'd want to (1) reverse a photographic image, or (2) create an image using clear and colored areas on a plastic sheet. No darkroom needed. You contact print in the sun and develop by wiping on glop. Be sure to check out their related do-it-yourself Scotchcal dialplates.

Transfer Print Foils
Box 518
East Brunswick, NJ 08816
(201) 238-1800

One of the leading suppliers of foils for hot stamping and custom printing. And, their free Foiled Again newsletter is something you gotta get on its name alone.

U&lc
2 Dag Hammarskjold Plaza
New York, NY 10017
(212) 371-0699

One of the most bizarre free trade journals in the world, U&lc covers Upper and Lower Case typography. Free alphabets and off-the-wall layout ideas with each oversize issue. Be sure to sound like an ad agency art director when requesting your free sub.

Uhlricht's Periodicals Dictionary
1180 Avenue of the Americas
New York, NY 10016
(212) 916-1600

Herein lie the keys to the kingdom. Found on the reference shelf at your local library, this gem lists over 50,000 trade journals, many of them free. If I were to shorten this resource directory to a single entry, Uhlricht's would be it, hands down. No contest.

UMI
300 North Zeeb Road
Ann Arbor, MI 48106
(800) 521-3044

They used to be called University Microfilms International. They can get you a reprint of most anything printed anywhere. Faster than interlibrary loan, and cheaper than Dialog. You do have to know exactly what you want.

Unibind
4125 Prospect Drive
Carmichael, CA 95608
(916) 967-6401

Supplies the thermal perfect binding system I use for my book-on-demand publications. You jog your sheets, place them into a vinyl cover, and drop them in a toaster-style heater.

United States Plastics
1390 Neubrecht Road
Lima, OH 45801
(408) 559-7778

A good plastic wholesaler with a wide stock selection. Particularly strong on unusual fittings and adaptors you can't find locally.

Value Plastics
3350 Eastbrook Drive
Fort Collins, CO 80525
(303) 233-8306

The pneumatic components for low pressure robotics are often unreasonably expensive. These folks have lots of cheap connectors and connector systems, including a line of custom you-bond-it manifold kits.

Van Dyke's Restorers
Woonsocket, ND 57385
(800) 843-3320

Yet another unusual source for parts, tools, and ideas. These are aimed mostly at antique and restoration buffs. Has exotic woods.

Velo-Bind
650 Alamanor Avenue
Sunnyvale, CA 94086
(800) 538-1798

Their Personal Velobinder system is an attractive way of binding 30 or fewer sheets together in a non-perfect, but reasonably professional manner. You can pick your own cover materials, or else use theirs.

Roger Wagner Publishing
1050 Pioneer Way, Ste P
El Cajon, Ca 92020
(619) 442-0522

Roger's Hyperstudio is a mentor class product for the Apple IIgs. This Hypercard-style package provides excellent sound and full color graphics. It includes a microphone and all necessary hardware.

Guy Wicker
30437 Fairfax
Southfield, MI 48076
(313) 647-1820

Cold fusion is very much in the news these days. Apparently the excess heat production is real and seems to have an atomic origin. Guy offers very low cost experimenter's cold fusion kits and related products.

Whole Earth Review
27 Gate Five Road
Sausalito, CA 94965
(415) 332-1716

Still at the same old stall after all these years. The indispensible quarterly follow-up to the Whole Earth Catalog and progeny. Of the 437 magazines I subscribe to, this one is good old number two, and right up their behind MAD. Nothing else comes even remotely close. They are starting to publish on CD-ROM and also run The Well, a unique BBS system.

Woodworker's Store
21801 Industrial Blvd.
Rogers, MN 55374
(612) 428-2899

The last of our woodworking triad that also includes Constantine and Edelco. Unusual and exotic woods and veneers, specialty tools, idea books, router bits, whatever.

Xicor
1511 Buckeye Drive
Milpitas, CA 95035
(408) 432-8888

Their unique EEPOT products make fine low cost remote digital volume controls. Free samples on letterhead requests.

• • • • •

Well, that is sort of a sampler of several of my very favorite resources. My entire *Names and Numbers* directory appears in the appendix.✥

Microcomputer pioneer and guru Don Lancaster is the author of 26 books and countless articles. Don now maintains a no-charge technical helpline you will find at (602) 428-4073, besides offering all of his own books, reprints, and various services. He also has a free brochure chock full of his new insider desktop publishing secrets waiting just for you. Your best calling times are 8-5 on weekdays, Mountain Standard Time. Or you can reach Don by way of his Synergetics, *at Box 809, Thatcher, AZ 85552.*

Desktop Finishing Ideas

by Don Lancaster

Thanks to the magic of today's laser printers and that unique PostScript language, it is now trivially easy to grind out all styles of high quality custom text and graphics on your kitchen table. The only little trick remaining is converting the piles of pages into useful products.

Printers traditionally group nearly all of their post-printing operations into a *bindery*. Besides binding books, a bindery operation might include a collating (now obsolete thanks to my book-on-demand printing), die cutting, jogging, punching, drilling, trimming, hot stamping, shrink wrapping, saddle stitching, folding, scoring, perforating, and whatever else it takes to convert a stack of pages into out-the-door goods.

Unfortunately, all of the traditional bindery materials and machines are often outrageously overpriced. Worse still, they are usually marketed only through unbelievably incompetent and impossibly arrogant sales people.

Instead, desktop laser printing is a whole new ball game that needs brand new methods of handling all the traditional bindery operations. The three tier old-boy marketing structure that totally cripples both the availability and affordability of bindery materials absolutely has got to go. So does the sick mentality of insanely pricing all of those on-going single-sourced supplies and refills.

We need new ways to deliver bindery solutions directly to the zillions of new smaller scale end users at sane prices. Perhaps including kits or blister packed semi-kits which are priced in the $9 to $99 price range. Certainly nothing higher.

I will call this new approach to low end bindery *desktop finishing*. This new market is unquestionably there. I personally consult several firms who are desperately seeking out all of these products for aggressive marketing.

So, what I guess I'd like to do here is review some of today's major hassles in desktop finishing, to try and see just where we could be heading.

Your first step, of course, is to steal the plans. You could handle this by carefully studying all of the traditional bindery materials and supplies. Then you ask just how you might deliver essentially the same results directly to a cost-conscious, and low volume end user for less than one-tenth the going rate. Then you profit from it.

Our first sidebar gives you a listing of major printshop resources. Get them all. Most are free trade journals, with a supplier or two thrown in for effect. From this list, two free "must-haves" are that *Quick Printing* trade journal plus that *Printer's Shopper*, which is really only a catalog for a distributor. Should there be a subscription charge to any of those others, just request a sample copy and rate sheet through their sales manager instead. Naturally, you paint all of the bingo cards black before you send them in.

Our second sidebar gives you many names and numbers of the sources for possible low end solutions to desktop finishing problems.

The only little trick remaining is converting piles of pages into useful products.

Simple Slitters

Let us start off with a real simple project. A trivially easy first PostScript design might involve 12-up custom business cards. This is fundamental enough that I have seen my beginning students win company awards for their cards after a few hours of instruction. Additional details do appear in my new *PostScript Beginner Stuff* and on my *GEnie* PSRT BBS (800) 638-9636.

But chopping the cards up is a real pain. And the least mis-alignment on your paper cutter can give you useless results. What we need here is a $9 user-retail mechanism that quickly and accurately can chomp up your cards. Possibly something that is a cross between the *Badge-A-Minit* circle cutter and the old "two razorblades in a plastic box" slitter that was used for lettering trim on those old and now obsolete *Varityper Headliners*.

One source which appears to be the key to a simple business card slitter is the *American Safety Razor Company.* A sharp outfit fer sure. These folks have zillions of different varieties of low price blades, including humongous eighteen inchers at $4 each.

While it would be best to cut all of the cards in a single whump, a process that cuts strips first and then breaks the strips into individual cards might be far simpler and cheaper. Can do?

The Omnicrom Fiasco

Wouldn't it be great to instantly convert a plain old black toner into any color you liked? This was the failed promise of *Omnicrom*. Omnicrom was a British outfit that came up with a unique idea. Take a variation on a standard hot stamping foil and add a carrier sheet under it. Slide a toner original between the foil and the carrier. Then, you apply heat and pressure.

Since toner is really a mixture of black stuff and hot glue, you can think of a toner page as a sheet that already has some hot glue selectively applied exactly where you

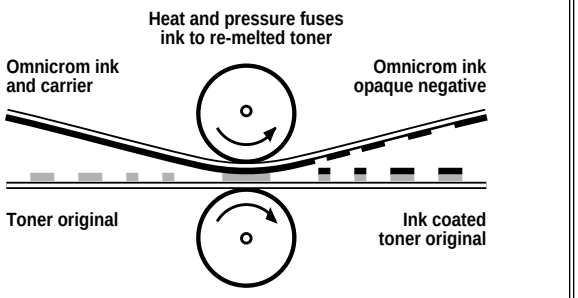

Fig. 1 – How Omnicrom works.

want it to go. When heat and pressure do get applied, your toner would melt and grab the "real ink" off the Omnicrom carrier.

Figure one shows details. Presto. Instant colors by the dozens. Including some brilliant metallics, pastels, golds, silvers, plain old gloss, and even a nice laminating overlay useful for menus and book covers. While all their early products seemed disappointing, later improvements combined with the SX PostScript laser printers did give some outstanding results.

What went wrong? First, their product was outrageously overpriced, owing to the three-tiered import and distribution scheme. Typical pricing was nearly one dollar per sheet, and even higher when you allowed for scrap and trial runs.

Second, the Omnicrom people were Brits, and monumentally mis-managed their marketing efforts in the colonies. A case could be made that Omnicrom had the second worst marketing department in the galaxy.

To cure this, they recently sold out to a company which owns the worst marketing department in the known universe. I don't see this helping.

Earlier, the *Kroy Sign Systems* folks became an Omnicrom licensee, and have marketed a similar product called *Kroy Color*. Now Kroy is the yuppiest of yuppy outfits. They even supply Perrier in all their company birdbaths. Their dealers and distribution setup is strictly Upper Crudney on the Thames, and they wouldn't know a low cost product if Biff and Mitzi ran over one with their BMW. Several very creative people have recently left Kroy Color, further clouding the issue.

What we appear to have here is an outstanding desktop finishing product that seems both obscenely overpriced and incredibly difficult to find.

What we really need are substitutes for Kroy Color and laminates, sold by direct mail, by toner refillers, and by warehouse office discounters directly to the end user. At one nickel per sheet absolute maximum price.

Six major suppliers for industrial strength hot foils do include *Bind-It, Hoechst, Identicolor, Lamart, Maple Roll Leaf,* and *Transfer Print Foils*. The latter offers a unique and free *Foiled Again* newsletter. Other transfer foil sources do advertise regularly in *Converting* and in *Paper, Film, and Foil Converter* magazines.

Applying Heat and Pressure

If you thought that Kroy Color or Omnicrom was expensive, wait until you see the prices of their hot fusion machines. These turkeys typically averaged $1000 to $1400 each. Yes, you could use your iron or a second trip through the laser printer instead, but only with unreliable results and a major waste of time and material.

But, let's go far beyond Kroy Color. What other desktop finishing uses can you think of for some powered hot rollers of a variable and precisely regulated temperature?

For openers, there is *Bakerizing*. Very few people realize that you can make toner images denser, glossy, and far more durable simply by placing the toner in contact with a one-half mil mylar sheet and then applying heat and pressure. You can easily sample this effect by opening your laser printer when a page is halfway out. The part under the rollers will Bakerize, and produce a durable gloss. Bakerizing is especially useful for business cards.

What happens here is a calendering, similar to that ferrotype drum used for photo finishing. Your toner melts and assumes the super-smooth surface of the mylar it is contacting.

Laminating is a second opportunity. There is a traditional thick laminating for awards, licenses, and cards; and the thin laminating useful for book covers and menus. Embedding your toner in plastic can dramatically improve both its scuff resistance and durability.

And I can think of all sorts of uses that can involve low-end printed circuit production. Ferinstance, you might directly laminate etch-resisting dry film photopolymer onto your own PC boards. Or, better yet, toner is a very good etch resist. Through the proper transfer film, you could print your artwork, transfer the toner directly to the bare board and instantly etch. This converts what usually is a six week process into a six minute one, and reduces your prototype costs from tens of dollars to dimes.

For that matter, transferring toner to any rigid substrate can have all sorts of great new uses.

A few years ago, *Canon* pulled a Henry Ford and sent to all of their dealers great heaping gobs of fusion machines that had no apparent use and no possible market. In theory, these machines had something to do with overhead transparency film. They all ended up as distress merchandise.

I played with one of their fusion machines for a while and found out that a one dollar modification could give you a variable yet stable temperature control. This converted these into excellent Kroy Color machines and could also perform Bakerizing, lamination, and even printed circuit bonding. I did publish the detailed instructions in my *Ask the Guru II* and *Hardware Hacker II* reprints.

Arlin Shepard of *Lazer Products* bought up all of the fusion machines he could find at the time. He modified and offered hundreds of these at bargain prices to Kroy Color end users. At this writing, they have no more in stock, but they are desperately seeking out suitable substitutes. You can contact Arlin directly for more details.

Canon apparently refuses to resell any new fusion machines in quantity at anything even remotely resembling a fair price.

Thus, there are lots of possible new desktop finishing uses for any sanely priced (under $149 built and tested or $79 as a kit) generic fusion machine. And more are bound

to develop once hackers can start playing with them. Especially if these units can be fed rigid materials up to 60 mils thick.

All we really need here is a fusion assembly from a laser printer, a $3 backgear motor from *Jerryco* or *C&H Sales*, plastic gears from *Stock Drive Products* and a simple controller based on the *Signetics* TDA 1023 chip.

Shear Nonsense

Besides cutting to the desired final size, a trimming of the edges of any book-on-demand published book will greatly improve the final appearance. Trimming and cutting is normally done using a beastie known as a *clamping guillotine cutter*. These can easily cut several inches of thickness at one time. A high pressure clamping stops page shifting during cutting.

Those cutter prices, of course, are totally unreal. They start at $900, and all of the low end manual models are purposely way overpriced to try and step you up to even costlier electric or hydraulic versions.

Now, people keep telling me that manual cutters are obsolete and are piling up as trade-ins in the printing supply warehouses, and that they are available for a name-your-price song. As far as I can tell, though, there is a free $44 army surplus jeep which has a 1000 mile per gallon carburetor included with each used manual cutter that actually gets sold.

Thus, one foremost goal for a line of desktop finishing products must be some $99 clamping guillotine cutter or cutter kit. Besides books, any step-and-repeat forms, notes, and pads will definitely need one of these.

Guillotine cutters are not really a true shear since there's never any real metal-to-metal contact. A rigid and ultra-sharp blade is lowered and slid forward at the same time, slicing through the clamped pages and eventually hitting an underlying plastic *cutting stick*. Thankfully, cutting sticks are both cheap and readily available from most sharpening services. Pricing is in the $2 range. You can even reuse them eight times by rotating them or turning them end for end. Each reuse is good for several hundred to several thousand actual cuts or even more.

The blade, of course, is the key problem to a build-it-yourself kit. The "real" paper cutter blades start at $100. These are available through such outfits as *International Knife and Saw*.

Is guillotine the only way to go? Possibly not. Other alternatives might be based on routers, upon radial arm saws, circular slitters, or maybe even a (sigh) waterknife. There is also a need for direct marketed plain old low-end paper trimmers and cutter kits, of both the chopper and rotary styles. Again, the current pricing is unreal here.✦

TRADITIONAL PRINTSHOP AND BINDERY RESOURCES

American Printer
29 North Wacker Drive
Chicago, IL 60606
(312) 726-2802

Business Forms
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Converting
301 Gibralter Drive
Morris Plains NJ 07950
(201) 292-5100

Direct Image Corp
1350 S Monterey Pass Road
Monterey Park, CA 91754
(213) 264-2000

Federal Graphics
120 Willow Street
North Andover, MA 01845
(508) 681-8578

Font & Function
PO Box 7900
Mountain View, CA 94039
(800) 833-6687

Form
433 East Monroe Avenue
Alexandria, VA 22301
(703) 836-6232

Forms Professional
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Graphic Arts Abstracts
4615 Forbes Avenue
Pittsburgh, PA 15213
(412) 621-6941

Graphic Art Lit. Abstracts
One Lomb Memorial Drive
Rochester, NY 14623
(716) 475-2549

Graphic Arts Monthly
875 Third Avenue
New York City, NY 10022
(212) 605-9400

Graphic Arts Product News
29 North Wacker Drive
Chicago, IL 60606
(312) 726-2802

High Volume Printing
Box 368
Northbrook IL, 60065
(708) 564-5940

Image World RIT
One Lomb Memorial Drive
Rochester, NY 14623
(716) 475-2549

In-Plant Printer
Box 368
Northbrook, IL 60065
(708) 564-5940

In Plant Reproductions
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Instant Printer
425 Huehl Rd, Bldg 11
Northbrook, IL 60065
(708) 564-5940

Modern Office Technology
1100 Superior Avenue
Cleveland, OH 44114
(216) 696-7000

NAPL
780 Palisade Avenue
Teaneck, NJ 07666
(201) 342-0700

Package & Converting
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Paper & Foil Converter
29 North Wacker Drive
Chicago, IL 60606
(312) 726-2802

Plan & Print
9931 Franklin Avenue
Franklin Park, IL 60131
(312) 671-5356

Print
355 Lexington Avenue
New York City, NY 10017
(212) 682-0830

Print Equipment News
Box 5540
Glendale, CA 91201
(818) 954-9495

The Printers Shopper
PO Drawer 1056
Chula Vista, CA 92012
(800) 854-2911

Printing Impressions
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Printing Journal
Box 91447
Pasadena, CA 91109
(818) 793-7901

Printing News
245 West 17th Street
New York City, NY 10011
(212) 463-6727

Publishing Executive
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

Quick Printing
1680 SW Bayshore Blvd
Port St Lucie, FL 34984
(407) 879-6666

Screen Printing
407 Gilbert Avenue
Cincinatti, OH 45202
(513) 421-2050

Southern Graphics
410 Verona Street
Kissimmee, FL 32742
(305) 846-2880

Target Marketing
401 North Broad Street
Philadelphia, PA 19108
(215) 238-5300

TypeWorld
1 Technology Park Drive
Westford, MA 01886
(508) 392-2157

U&lc
2 Hammarskjold Plaza
New York, NY 10017
(212) 371-0699

Emerging Technologies

by Don Lancaster

Many times in the past, I have managed to make a buck or two through second guessing which of the new technological breakthroughs are about to become really big winners. What you want to watch for is something that is soon to get dramatically cheaper or ridiculously better. Preferably a something that can be beat out on a brick in your backyard.

Then, you nudge things along by high profile offering the emerging idea or product *directly* to an entirely new group of end users at one-tenth of the going price or less. A direct mail kit linked to a construction project in a hobby or tech magazine is often a very good way to accomplish this.

As I see it, there are some excellent candidate technologies today crying to be used. Let's round up a few of these and see if you can relate to any of them. I'll also try and show you where to go for more info. Besides the *Names and Numbers* sidebar included here, you will find more detail through my *Hardware Hacker* reprints.

Visible Laser Diodes

The traditional gas laser people have had nearly three decades to get their collective act together, and they have failed miserably. They are now about to be completely shot out of the saddle by visible red laser diodes.

Compared to helium neon gas lasers, these new visible laser diodes are far cheaper; vastly more efficient; much smaller; last many times longer, are insanely more rugged; can easily get run from a penlight cell or two; and modulate simply and linearly.

While prototype diodes are still in the $80 range, production quantities in a year or two should be well under $5 each. Besides a diode, you will need some simple optics called a *collimating pen*, and a feedback regulator.

Leaders in the field include *Sharp*, *Toshiba*, and *Phillips*. Trade journals are the *Laser Focus World*, *Photonics Spectra*, and *Lasers and Optronics*. A pair of surplus sources are *Meredith Instruments* and *MWK Industries*.

Watch for something that is soon to get dramatically cheaper or ridiculously better.

Low Pressure Pneumatics

I continue to be amazed that there is a thirty cent three-way pneumatic air valve on the surplus market that has gone undiscovered and unused by you hackers for nearly twenty years now. It is called a TCS or a SCS valve, and is short for a *Transmission Controlled Spark* or *Speed Controlled Spark*.

Low pressure pneumatics in the 3 to 5 PSI range has several outstanding advantages. First and foremost, air can amplify. Most of your force can come from a cheap aquarium pump or even a truck tire. Several milliwatts at your valve controls many tens of watts.

Air goes around corners quite well, especially robotic elbows. Your air actuators can be very linear, compared to the extreme nonlinearity you get with a solenoid. Air systems are also explosion proof, low noise, and shock free. The millisecond response times can be better than mechanical stuff.

One key secret I've learned with low pressure pneumatics is to *never have a seal that moves*. Thus, your best types of actuators will be balloons, rolling diaphrams, or bellows shaped devices. You will also want a regulator and a small accumulator (A toilet bowl tank float works fine) between your pump and the rest of your pneumatics.

Surplus sources for the TCS valves, as originally manufactured by *Carter Carburetor*, include *Edmund Scientific*, *C&H Sales*, *Jerryco*, or your local junkyard. Try *Hygenic Manufacturing* for cheap tubing, and *Value Plastics* for low cost connectors. As a very off-the-wall source, the *Player Piano Company* stocks all sorts of unusual tools and techniques. Both *Sprague* and *SGS* do offer useful computer interface power drivers. The *Clippard Minimatic* people are good for ideas, but their stuff costs too much.

Direct Toner Printed Circuits

There is absolutely no reason whatsoever why any one-of-a-kind printed circuit prototype should take you more than seven minutes or cost you more than fifty cents. It's certainly nothing you would want to send out for or pay somebody else to do.

These days, the layout portion of your pc prototyping is utterly trivial, thanks to the new PostScript language, which totally blows away all of the earlier circuit layout methods.

But what is not well known is that toner makes an excellent etch resist. *Xerox* proved this in the mid-sixties when they foisted off zillions of arcanely ancient copy machines onto unsuspecting aerospace companies as instant pc prototyping machines.

Today, we are in a "pretty nigh but not plumb" situation involving reliably getting toner on a board. Sometimes you win and sometimes you lose.

What is needed is some specially formulated toner; one magic transfer sheet that is dimensionally stable at high temperatures and only loosely holds toner; and a *Kroy Color* style laminating machine that reliably transfers the

toner to the pc board. Or else a laser printer modified to print directly onto 1/16th inch copper clad.

I've found that a few seconds of pre-etch helps bunches, as does preheating the board so it does not act as a giant heat sink. A post-transfer bake also helps. Trying to use an ordinary iron is an outright joke.

I currently use a *Kapton* film from *Dupont* that I've coated with a high temperature mold release from *Miller-Stephenson*. A commercial toner transfer product called *Meadowlake* works for some people some of the time. Fake *Kroy Color* machines and toners are found at *Lazer Products*. Two other toner sources are *Black Lightning* and *Don Thompson*.

Two fine trade journals on printed circuits are *Circuits Manufacturing* and *Electronic Packaging and Production*, while your best hacker source for pc boards and etchants is *Kepro*. A low price, low end printed circuit layout package is included in my *PostScript Show and Tell* from *Synergetics*.

The Navicube

What the world really needs is a good $10 inertial navigation system. And it is only a matter of time before some kids in a garage or a Korean toy designer comes up with one. One thing fer sure – it certainly will not be any existing aerospace supplier!

I visualize the *Navicube* as a three inch cube that always knows exactly where it is and which way it is pointed. Either on an absolute basis or since it was last reset.

Among its zillions of other uses, you could map a cave by putting one of these in a ball and bouncing it off the walls and ceiling. Or, to show someone where you live, just reset and then mail the Navicube to them. When all three readouts are zero, they've found you.

The dramatic drop in the price of precision accelerometers makes the Navicube possible. Chips, design data, and ap notes are available from *NovaSensor*, *SenSym*, or *IC Sensors*.

Since the error of an accelerometer goes up as time squared, you'd want to back these up with a cheap laser gyroscope or some GPS position info.

Radial Arm Waterknives

One of the more obvious properties of a 65,000 PSI water stream is that it doesn't pay much attention to anything you put in front of it. Thus a waterknife can cut just about anything. Cheaply, cooly, cleanly. And distortionless.

One of the better done waterknife demos consists of a large and gooey chocolate cake sitting on a two inch thick slab of high strength steel. The waterknife cleanly chomps on through both of them at the same time.

Unfortunately, most waterknives are being built by the wrong people for the wrong markets, so these are priced in the $80,000 to $200,000 range.

Instead, what we really need is a $300 home shop radial arm waterknife. Besides all of that usual artsy-craftsy stuff, you could use this for precision woodworking, dressmaking, for pizza slicing, ice carving, paper trimming, gopher control, fudge making, or even for lawn edging.

The top waterknife manufacturer is *Flow International*, while *Haskel* is one source of the oil-over-air high pressure pumps normally used. Additional info on waterknives and

EMERGING TECHNOLOGIES NAMES AND NUMBERS

Adobe PostScript
1585 Charleston Road
Mountain View, CA 94039
(415) 961-4400

Black Lightning
RR 1-87 Depot Road
Hartland, VT 05048
(800) BLACK99

C & H Sales
Box 5356
Pasadena, CA 91107
(800) 325-9465

Carter Carburetor
9666 Olive Road
St. Louis, MO 63132
(314) 997-7400

Clippard Minimatic
7390 Colerain Road
Cincinatti, OH 45239
(513) 521-4261

Dialog Information Service
3460 Hillview Avenue
Palo Alto, CA 94304
(415) 858-2700

DTM Systems
1611 Headway Circle, B2
Austin, TX 78754
(512) 339-2922

Dupont Kapton
1007 Market Street
Wilmington, DE 19898
(302) 774-1000

Edmund Scientific
101 East Gloucester Pike
Barrington, NJ 08007
(609) 573-6250

Exair
1250 Century Circle North
Cincinnati, OH 45246
(513) 671-3322

Flow International
21440 68th Avenue South
Kent, WA 98032
(206) 872-4900

Haskell
100 East Graham Place
Burbank, CA 91502
(818) 843-4000

Hygenic Manufacturing
1245 Home Avenue
Akron, OH 44310
(216) 633-8460

Jerryco
601 Linden Place
Evanston, IL 60202
(312) 475-8440

Kepro
630 Axminister Drive
Fenton, MO 63026
(314) 343-1630

Kroy Sign Systems
14555 North Hayden Road
Scottsdale, AZ 85260
(800) 521-4997

Lazer Products
12741 East Caley #130
Englewood, CO 80155
(303) 792-5277

MasterCAM
2101 Jericho Turnpike
New Hyde Park, NY 11040
(516) 328-3970

Meadowlake
25 Blanchard Drive
Northport, NY 11768
(516) 757-3385

Meredith Instrument
6401 North 59th Avenue
Glendale, AZ 85301
(602) 934-9387

Miller-Stephenson
George Washington Hwy
Danbury, CT 06810
(203) 743-4447

MWK Industries
1440 S. College Blvd #3B
Anaheim, CA 92806
(800) 356-7714

Phillips
2001 W Blue Heron Blvd
Riveria Beach, FL 33404
(407) 881-3200

Player Piano Co
704 East Douglas
Wichita, KS 67202
(316) 263-3241

Roland Digital
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141

SGS-Thompson
1000 East Bell Road
Phoenix, AZ 85022
(602) 867-6259

Sharp
Sharp Plaza
Mahwah, NJ 07430
(201) 529-8757

Sprague
70 Pembroke Road
Concord, NH 03301
(603) 224-1961

Synergetics
Box 809
Thatcher, AZ 85552
(602) 428-4073

Technical Insights
PO Box 1304
Fort Lee, NJ 07024
(201) 568-4744

Don Thompson
23072 Lake Center #100
El Toro, CA 92630
(714) 855-3838

3-D Systems
26081 Avenue Hall
Valencia, CA 91355
(805) 295-5600

Toshiba
1220 Midas Way
Sunnyvale, CA 94086
(800) 321-1718

Value Plastics
3350 Eastbrook Drive
Fort Collins, CO 80525
(303) 233-8306

Vortec
10125 Carver Road
Cincinnati, OH 45242
(800) 441-7475

Whole Earth Review
27 Gate Five Road
Sausalito, CA 94964
(415) 332-1716

all their suppliers often appears in *Machine Design* and *Design News* magazines.

Magnetic Refrigeration

Solid state cooling using the *Peltier* effect is dead in the water, owing to its ludicrously low efficiency. And all the regular mechanical air conditioners are now scrambling to come up with some acceptable Freon substitute.

While no-moving-parts air vortex coolers, such as those from *Vortec* or *Exair*, certainly are cute, can get super cold, and seem to blatantly defy the laws of thermodynamics (they don't really), these are limited in what they can do and where they can be used.

But I just got wind of a brand new way of cooling things that just might run away with a rather large bag of marbles. This is a *Magnetic Refrigeration*, using the *magnetocaloric effect*. Apparently certain materials heat in the presence of a magnetic field and release that heat otherwise.

Figures such as a 40 times efficiency improvement and much lower costs than traditional mechanical systems have been bandied about. While lots of the excitement currently centers on ultra-low temperatures, apparently the effect is usable for ordinary air conditioning and heat pumps as well. One material involved is Gadolinium.

I haven't had time to chase this one down fully. An obvious starting point is the *Dialog Information Service*. But stay tuned. An expensive "executive" report on this emerging field, is now available from *Technical Insights*.

Dildonics

Virtual Reality is an oxymoron that has already been ground into dust by far too many marketing sleezoids. I much prefer the more accurate and more honest *Dildonics* term.

What you have here is one super simulator that combines a total visual display, power gloves, a treadmill, and tactile sensors or whatever to create a controlled artificial environment.

Besides the obvious uses involving mind-blowing interactive multi-person video gaming and advanced military flight simulators, Dildonics is already being used today for such things as an architectural client "walk through" of a future building mockup. Ultimately, Dildonics will impact everything from model railroading to microprocessor controlled party dolls. Although I can foresee some quite interesting product liability suits involving programming glitches on the latter.

A good summary of Dildonics has appeared in the Summer 1990 *Whole Earth Review* on pages 80-87. Other useful resources include the *Computer Graphics Review* plus the *Advanced Imaging* trade journals, as well as the yearly *Siggraph* graphics shows.

Santa Claus Machines

The science fiction authors have had them for years, but we are just starting to see expensive and primitive versions of Santa Claus Machines showing up today. Another name for this emerging field is *desktop prototyping*.

What you have here is any scheme to quickly and cheaply convert any word processor file into a three dimensional solid object. You can use the object as is, or else use it as a mold or lost-wax casting for conversion.

The intent here is to create your prototypes in minutes rather than in months, and for pennies instead of tens of thousands of dollars. The only little problem is that the current machines are obscenely overpriced. There is no reason why any Santa Claus machine should have to cost over $200.

While many methods are emerging, the three most prominent at the present time are *direct machining*, *stereo lithography*, and *powder sintering*.

Direct machining simply uses some small stepper-motor controlled lathe or milling machine. Two pricey sources are *MasterCAM* and *Roland Digital*. Several others advertise in *Industrial Education* and *School Shop*.

Stereo lithography takes a tank of a liquid uv-curing photopolymer and then uses a laser beam to selectively harden a solid object out of it. The leader here is *3-D Systems*.

Powder sintering makes a lot more sense to me than the use of uv-curing photopolymers. You spread out a thin layer of a sinterable plastic or wax granules. Then you selectively laser heat the granules to fuse them together. Drop the assembly a tad, and repeat the process layer by layer. One pioneer in this new field is *DTM Systems*.

Besides shattering the cost barriers on Santa Claus machines, there's all sorts of opportunities here involving new service bureaus that rent instant prototyping time on existing machines. Oppornockity tunes but once.

Brain Parity

Depending upon who is doing the counting, the human brain contains from 4 to 35 billion neurons. Putting this into perspective, we are talking around ten CD ROM disks here, or perhaps a dozen of the 256 Meg x 17 SIMM strips which several Japanese manufacturers have already committed to a 1997 volume production.

And, no, I don't buy this bull that we don't have the algorithms yet. If the electronic memory is big enough and fast enough and cheap enough, all else inevitably will follow.

Thus, within one decade, machines will definitely be smarter than people. Which should create changes more profound than the agricultural revolution or the first industrial revolution. Yet, everyone appears to be either ignoring this near term inevitability or outright denying it.

Possibly they will keep us around for a while as pets, but I'd guess that they will tire of us rather quickly. So much for the opposable thumb. Sigh.

I'm not too sure just how to tap this inevitability and profit from it. Surely one prerequisite is keeping informed. One source for the memory and neuron computing happenings is *E.E. Times*. See *Uhlrichts Periodicals Dictionary* for this and all the other trade journals I've mentioned here. ✦

Microcomputer pioneer and guru Don Lancaster is the author of 26 books and countless articles. Don now maintains a no-charge technical helpline you will find at (602) 428-4073, besides offering all of his own books, reprints, and various services. He also has a free brochure chock full of his new insider desktop publishing secrets waiting just for you. Your best calling times are 8-5 on weekdays, Mountain Standard Time.

Son of Desktop Finishing

by Don Lancaster

There sure were lots of helpline calls over *Blatant Opportunist #3* where we looked at some new opportunities in desktop finishing systems. As we have seen, there is a crying need for low cost, low end tools, machinery, and techniques to meet the needs of the home and smaller scale desktop publisher.

So, this month, I thought we'd pick up where we left off and look at several more desktop finishing possibilities, along with a roundup of useful names and numbers.

I have got a new PostScript RoundTable up on *GEnie* at (800) 535-9636. There's also some *Blatant Opportunist* downloads waiting here for you.

We return you now to our column already in progress…

Bound and Determined

It appears there are two types of binding systems available today. There are those that are designed to make a large and ongoing profit for an office products dealer, and those designed to produce an even more obscene profit for printing equipment salesmen. As far as I can tell, there is no binding system available anywhere whose primary goal is to allow the low volume end user to attractively and cheaply hold sheets of paper together.

Of the hundreds of binding systems I've personally tested, a mere three have ended up even marginally useful for my desktop finishing uses. These are that *Personal Velobinder*, a wire binding, and the *Unibind* system.

The *Personal Velobinder* punch now costs around $30 when it goes on sale. The magic plastic strips cost around a quarter, and their optional (but laser unprintable) coversets go for a buck or more in various flavors. Instead, I will laser print my parchment covers from *Paper Plus*, and protect them with an acetate or polyester overlay sheet.

The result is *not* perfect bound, and does have a limit of thirty or so pages. This binding system is well suited when "not quite" professional results will do. Products such as the annual report for a volunteer fire department or a low budget proposal.

One big hint: Use *four* hands when punching! It's very easy to misalign all your pages. And, because of the tiny holes very close to the edge, you get only one chance per page.

Velobind does provide thicker and larger systems, but these seem to be a gruesome joke.

We can dismiss those plastic comb bindings outright, since these are such a gross insult to all your customers. You can get the same effect much more cheaply by stapling a used diaper to your text cover. At any rate, a highly overpriced source of the plastic comb bindings is *GBC*, while a somewhat cheaper one is *HOP Industries*.

Wire binding is a variation on comb binding which is useful for service manuals and such which are used often and must lie flat. Some wire bindings require special punch patterns, while others use the plastic punches.

Two sources of wire binding include *Wire-O* and *Specialties Bindery*. The latter has a freebie video. One lower priced manual publisher that provides these bindings is *Omnipress*.

I presently do prefer that *Unibind* thermal binding system for all my own book-on-demand publishing. These are a system of coversets that have hot glue preapplied to the spines. You pop your text and cover into the Unibind toaster and heat them for half a minute or so. Then you whomp the book onto a forming and cooling plate. Coversets are a dollar each; the $200 toaster is free if you buy enough covers.

Most of my book-on-demand titles now use the transparent covers. These get used with a laser-printed parchment cover stock, thus protecting the toner against scuffing.

While the Unibind system works, it does have problems. I use a jogger, and we add extra hot glue from my glue gun to both ends of the glue channel. We are shortly going to start notching the spine side of text for improved adhesion. Bindings are triply inspected for adhesion before shipping.

I have found no useful way to letter the spines. We also have had problems with the transparent covers cracking as they are being trimmed on the shear. Possibly this is old stock or caused by temperature and the humidity problems unique here to the desert southwest. Padding the shear with scrap stock and preconditioning the covers in a high humidity seems to help. Hot tubs are great for this.

There is a crying need for low cost, low end tools to meet the needs of the small scale desktop publisher.

Unibind has introduced a new product that is certainly a major step in the right direction. These are known as *Pelsaer* covers, and are shown you in figure two.

The Pelsaer cover consists of one self-supporting hot glue channel which has two temporary flysheets attached by way of a release coating. You wrap this around your text, and then use any cover of your choice. After that usual trip through your toaster, you end up with a securely bound custom cover. Spine lettering is trivial, and you can laser print covers up to 6-3/4 by 8-1/4 simply by using legal size stock.

Cost of the Pelsaer inner liners are about fifty cents. Not

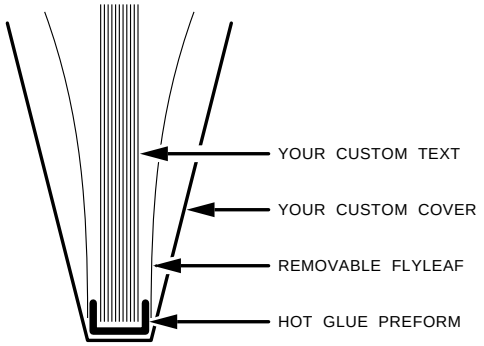

Fig. 1 — The Pelsaer binding process.

bad at all, except for the fact that the materials cost here is under a penny. Seems to me you could offer the glue strips themselves for less than a dime each.

By the way, one reasonably priced source of acetate and polyester sheets in larger quantities is *Catalina Plastics*. Other superbly unique material sources do include *REL Graphics*, *Coburn*, and the fuzzy hot split plastisol stuff from the *Gerber Scientific* folks.

Contrary to popular belief, cold glue bookbinding gives much better results than use of a hot glue system. The pages stick better and the results are both more flexible and vastly more permanent. Cold glue is also less tasty to roaches. The only negatives of cold glue are its longer cycle time and its shorter pot life.

The *Planax North America* people have come up with an interesting new variation on cold glue bookbinding. Applying pressure drives the water out of their compound, causing a partial set-up in as little as half a minute. Unfortunately, the pricing on all their machines is ludicrously absurd.

Many cold glues and other binding supplies are available from *Gane Bros*. Sadly, I have found it nearly impossible to get any pricing or data from these people, despite my numerous attempts. Good luck.

As I see it, what we really need now for desktop finishing is a quick and simple hot or (preferably) a cold glue binding which lets you use any and all cover materials; allows all the custom spine lettering, requires less than $99 in specialized machinery, precisely handles *any* stack thickness, costs less than a quarter per whack, holds all pages securely, and cycles in under one minute per document.

Anaerobic Jogging

A *jogger* is basically a way to shake sheets into alignment. While rather handy for gathering and punching, the jogger can get essential real fast like whenever you are binding or padding. As usual, a traditional jogger from an old-line source can cost nearly $400.

But *WalMart* appears to have these new *Black and Decker* orbital finishing sanders for $23.99 or so. It seems to me you could glomp on some simple pan and floating base snap-on kit to build up your own jogger for around $30.

Some others have suggested using surplus foot massage units to the same end. What other existing movers and shakers could you think of that could be diverted to build a low cost jogger?

Die Cutting and Perforating

Surprisingly, there already are quite a few fairly effective ways to handle die cutting on your laser printer. But even these methods could certainly be expanded and improved upon.

The *Die-O-Perf* folks do offer a new line of low cost pre-cut and pre-scored index stocks that laser print just fine. Besides tags, tickets, *Rolodex* cards, coupons, and doorknob hangers, I especially like all their perforated and scored self-mailers that go for under a nickel each. I will be more than happy to send you a free sample copy.

Punching, scoring, and perforating in very small quantities can be faked for a few dollars at your local *Tandy Leathercraft* store. Their many leather punches offer all sorts of cheap possibilities. And *JerryCo* has a pair of $3 airedale pruning shears that could be used to perforate tickets. Plus a few other oddball finishing goodies.

Two traditional sources of on-press perforating and slitting products are *Litho-Perf* and *Sandco*. These two are basically "glue-on" stainless steel dies. I could see all sorts of ways to adapt these. Finally, steel rule dies are not really all that expensive. *Atlas Steel Rule* is one leading source.

The Wet Dream

This one is pretty far out, but it could open some exciting new markets. Picture a magic machine that you feed toner images in one end, and have them come out the other end wet only where the toner image is.

Wet with what? How about a full color durable ink? Or, maybe wet to dust with a thermography powder for raised lettering. Or a Braille for the blind. Or wet with superglue. Or wet to dust with *DonJer* fuzzy flock. Or silk screen ink. Or etch resist.

Practical Supplies

If you haven't run into them already, the *Paper Plus* chain is a rather fine source for most smaller quantities of fine papers, announcement stocks, padding compound, tags, bumpersticker materials, award parchments, tickets, and just about anything else useful for desktop publishing and finishing. They have now got over six dozen stores in twenty states.

One really big laser printing hassle involves envelopes. The print quality here will range from atrocious at worst to just barely unacceptable at best.

The problem lies in the envelope design itself. Most envelopes seem puffy, double thickness, and have a third-layer diagonal flap which interferes directly with that return address imaging. One partial solution involves the *French Cut* envelope which has a horizontal, rather than an angled flap.

What is obviously needed here is a total redesign of your envelope so that those sender and sendee addresses are both laser printable on a single flat and unpuffy sheet that later folds over onto the remainder of the envelope.

Many adhesives do strange things when they are heated to the 375 degree temperatures of a laser printer's fusion rollers. They may bleed all over the place or else change

POTENTIAL NEW DESKTOP FINISHING RESOURCES

American Safety Razor
Razor Blade Lane
Verona, VA 24482
(703) 248-8000

Atlas Steel Rule
2000 Middlebury Street
Elkhart, IN 46516
(800) 255-8786

Avery Label
818 Oak Park Road
Covina, CA 91724
(818) 915-38512

Badge-A-Minit
384 N 30th Road
LaSalle, IL 61301
(815) 224-2090

Barton, Nelson Inc
3201 Gillham Plaza
Kansas City, MO 64109
(800) 821-6697

Basco
9351 De Soto Avenue
Chatsworth, CA 91311
(818) 718-1506

Bind-It
150 Commerce Drive
Hauppauge, NY 11788
(800) 645-5110

Black Lightning
RR 1-87 Depot Road
Hartland, VT 05048
(800) BLACK99

C & H Sales
Box 5356
Pasadena, CA 91107
(800) 325-9465

Catalina Plastics
23901 Calabasas Road
Calabasas, CA 91302
(800) 333-3136

Coburn Corporation
1650 Corporate Road West
Lakewood, NJ 08701
(201) 367-5511

Cycolor/Mead Imaging
3495 New Mark Drive
Miamisburg, OH 45342
(513) 495-9100

Die-O-Perf
1721 E. Pioneer Drive
Irving, TX 75061
(800) 843-2807

DonJer Products Co
Ilene Court Building 8
Belle Mead, NJ 08502
(800) 336-6537

Execufold/ADI
20505 E Valley Ste 104
Walnut, CA 91789
(714) 594-0097

Falcon Sales
35420 Stanley Drive
Sterling Heights, MI 48077
(313) 264-1141

Gane Brothers
1400 Greenleaf Avenue
Elk Grove Village, IL 60007
(800) 323-0596

General Binding Corp
1 GBC Plaza
Northbrook, IL 60062
(708) 272-3700

Gerber Scientific
83 Gerber Road
South Windsor, CT 06074
(203) 643-1515

Hoechst Corp
PO Box 1400
Greer, SC 29652
(803) 879-5000

HOP Industries
130 Commerce Road
Carlstadt, NJ 07072
(201) 939-6263

Identicolor
720 White Plains Road
Scarsdale, NY 10583
(914) 472-6640

Internationl Knife & Saw
Box 752006
Cincinnati, OH 45275
(800) 354-9872

Jerryco
601 Linden Place
Evanstan, IL 60202
(708) 475-8440

Kimoto
2915 182nd Street
Redondo Beach, CA 90278
(213) 370-7411

Kroy Sign Systems
14555 N Hayden Road
Scottsdale, AZ 85260
(602) 951-1593

Lamart
16 Richmond Street
Clifton, NJ 07015
(201) 772-6262

Lassco Products
485 Hague Street
Rochester, NY 14606
(716) 235-1991

Lazer Products
1271 E Caley Ave #130
Englewood, CO 80155
(303) 792-5277

Litho-Perf/HS Boyd
PO Box 581117
Tulsa, OK 74112
(918) 835-9359

Maple Roll Leaf
2285 Ambassador Drive
Windsor, CAN N9C 3R5
(519) 966-4721

PaperPlus
300 Oceangate #800
Long Beach, CA 90802
(800) 272-7377

Planax North America
15 E. 26th Street Ste 1908
New York NY 10010
(212) 532-1988

REL Graphnic Systems
218 N Clinton Street
Chicago, IL 60606
(800) 521-10809

Sandco
304 S Peoria
Tusla, OK 74120
(918) 584-2985

Signetics
Box 3409
Sunnyvale, CA 94088
(408) 991-2000

Specialties Bindery
4815 Lawrence Street
Hyattsville, MD 20781
(800) 638-LOOP

Stock Drive Products
2101 Jerico Turnpike
New Hyde Park, NY 11040
(516) 328-0200

Synergetics
Box 809
Thatcher, AZ 85552
(602) 428-4073

Tandy Leathercraft
PO Box 791
Ft Worth, TX 76101
(817) 551-9770

Transfer Print Foils
PO Box 518
E. Brunswick, NJ 08816
(201) 238-1800

Trend-lines
375 Beacham Street
Chelsea, MA 02150
(800) 343-3248

Unibind/Pelsaer
4125 Prospect Drive
Carmichael, CA 95608
(916) 967-6401

Varityper Headliner
11 Mt Pleasant Ave
East Honover, NJ 07936
(800) 631-8134

Wiro-O/JBI
205 Cottage Street
Poughkeepsie, NY 12602
(800) 431-4610

their stickability.

Avery is one source of suitable laser compatible adhesives for ordinary label use. But much better adhesives are needed for custom bumperstickers and peel-and-stick transparencies.

The toner cartridges themselves are getting a lot better, but much more is needed here. Those *Black Lightning* folks are a fine source of innovative toners. Besides several colors, they do have useful thermal transfer toners for T-shirt and fabric printing. The second generation of these really do look good and offer several simultaneous colors, but they are still pretty much limited to polyester and not cotton.

Toner makes an excellent etch resist for printed circuits. What is painfully needed, though, is a toner and carrier system that lets you reliably transfer the toner from the laser printer directly to the unetched board.

Yet another group of materials that do need improved are transfer masks. While *Etch-and-Peel* from *Kimoto* is a very promising and exciting new development, a photosensitive transfer mask which is re-adherable would revolutionize signmaking.

A Few Loose Ends

Let's see. What's left? We need a cheap corner rounder. *Lassco* is the only manufacturer I know of and they are far too expensive. We need a scheme for custom *Post-It* notes using some low-tack glue and roller system. Preferably automated, but even a manual setup would be very useful.

Those folders by *Execufold* and *Falcon* are fast and handy, but they are priced three times what they should be. Worse yet, the *execufold* is not programmable; you can only use it for a business letter three-fold.

There's a new *Cycolor* process that can give you brilliant full color and a perfect registration, but some epsilon minus in their sales department keeps on sending back that same old stupid brochure every time you ask for additional technical details.

And shrink wrapping and vacuum packing stuff could be improved. What we now need is something like a *Meals in Minutes* vacuum packer that uses a heavier plastic stock. All your products will look much better this way.

Padding presses used for temporary binding of notepads and calendars are fairly cheap, but many of these do not go on down to a single pad thickness. Simply recessing some mounting nuts would help bunches here.

Also needed is a simple manual coater that lets you apply a varnish or a uv-curing overlay. This can be faster and better looking than laminating. Coating very much improves the toner scuff resistance and durability.

We also do require a new low cost and jam-proof Jiffy Bag stapler that a 98 pound weakling can use.

Pad printing is another opportunity area. Pad printers are used to print on golf balls, pens, eggshells, keychains, ad specialties, whatever. But current machines from *Barton* or *Bassco* are totally unreal in cost. Good review articles on pad printing do appear every now and then in *Screen Printing* magazine. You can write or call me for a free list of the more interesting pad printing reprints.✦