by Don Lancaster

Emerging Technical Opportunities V

It seems like it is once again time to review some new ploys to make a buck on upcoming technology. Only on this go-round, I thought I might stay a tad closer to my home turf. Focusing on some projects around here that I am actually working on. More or less. And around which there is plenty of room for others to participate. Especially on a small scale or startup basis.

Those web links refer to files you can find on my *Guru's Lair* at *www.tinaja.com* Earlier tech opportunities include EMERGOP1.PDF, EMERGOP2.PDF, my EMERGOP3.PDF, and, yup – you guessed it, EMERGOP4.PDF. An update on many of these concepts is found in RESBN63.PDF

Here's my current choice of possibilities…

Those new Baby PIC's

The PIC microprocessor from *Microchip*, of course, is *the* chip of the decade. Totally blowing all the competition away with 3X speed and 3X code length advantages. While clearly eliminating any need to ever again use a 555 timer or similar "bits and pieces" kludge circuits.

Such products as the *Basic Stamp* or the *Scott Edwards Utilities* are your obvious places to start getting yourself PIC literate. Also see RESBN54.PDF on the *Pic a Peck of Pic's* library shelf for a tutorial intro.

And the *Pic Websites* page for lots of links.

But I do believe in *elegant simplicity*. I loathe to see any bloated computer system as horrendously complex and as overblown as a Basic Stamp end up as gross overkill for all of those *really* low end applications. Places where smarts have never dared go before.

Enter Microchip's new baby PIC's. Complete computers priced under a dollar and needing *zero* external support. All in an eight pin minidip package. And up to *seven* of those pins can be inputs or outputs!

A few chips in the rapidly expanding series even include internal A/D converters. But note one gotcha: The supply pins are unusual. Pin eight is *grounded*. Pin one is your *positive* supply of 3.5 or 5 volts. More in RESBN59.PDF.

Bodaciously Better BOD Bindings

Home or smaller scale *Book-on-demand* publishing has finally become a reality. Where books are produced only as they are ordered. With quality and appearance levels that now can *exceed* commercial publishing.

Along with newly unbeatable economics.

The majority of the needed tools and materials are at long last in place. The HP 5M+ is an acceptable production printer, while the heavier 5SiMX can be a nearly ideal one. Providing genuine PostScript level II, duplexing, enhanced 600 DPI, internal hard drive, low toner refill costs, high speed, and even an 11 x 17 capability.

Improved halftoning, digital cameras, and video capture cards have finally "solved" the photo hassles. While the *Capture* feature of *Adobe Acrobat* eliminates rekeying and relayout for most older printed material. That brand new MD-2010 is an unbelievably low cost ($390 street) dye sub printer from *Alps* which nicely (but slowly) does superb full color covers. Even foil effects.

The only tiny oint in the flyment is the ongoing lack of a simple, cheap, and effective binding system. Giving you a true perfect bind, printed spines and infinite flexibility in cover material choices and colors. And indistinguishable from the "real" binding of a "real" book.

Obvious alternatives here include that non-perfect and not-quite-professional *Personal Velobinder*; those thermal glue *Unibind* covers; the *Pelsar* and *Pentabind* glue insert systems again from *Unibind*, or biting the bullet and going with a pricey printshop *BindFast 5* from *Standard*.

Planax has some very interesting and innovative partial BOD binding solutions. But only with ridiculously high "slipped a decimal point" prices. For instance, they have a very strong cold glue process which rapidly sets up (half a minute) through a dewatering-under-pressure chemical reaction. They have got intriguing peel-and-stick hot glue strips. And resell the *Otabind* lay-flat system. But their *Otabind* license costs thousands of dollars.

Instead, how about this simple and devastatingly useful BOD product: Take a release sheet and apply a very wimpy temporary adhesive to it. In the *Post-it* class. Then put down a thicker layer of a good hot glue suitable for normal bookbinding. Then perforate the glue into one-eighth inch wide strips. Retail it for a nickel a strip or $3.50 a sheet. Not a bad markup for a dime or two worth of materials.

Or maybe provide the two-component glue on rolls in several widths. Scotch tape style.

Next, pick a suitable cover material and run it through the Alps printer. Laying down full colors and foil effects as needed. The Alps printer easily handles ten mil thick stock. Alternately, print thinner and fancier stock and apply white peel-and-stick label stock to thicken it.

Then score the stock and then laminate it with some non-gloss and lay-flat material. Scoring could get done by hand, with a *LithoPerf* strip, or by cloning one of those manual scoring machines you'll find at *Computer Shopper*

or over in *Quick Printing* magazine.

Peel off enough "eighths" of glue from your strip and stick them to the proper position inside your cover. Place the text inside the cover. Crease it along the score lines. Pop the whole thing into a Unibind toaster. Wait thirty seconds. Whomp the book square. And you are home free.

This entire "bind a book for a buck" market is up for grabs. Nobody, but nobody, is yet addressing this crucial and crying need. Useful printshop resources here include *Printer's Hotline*, *Printer's Shareware*, *Horsetrader*, and *California Printer*. Much on this in my *Book-on-demand* resource kit and on the *BOD* library shelf.

Linearized Phase Controls

What could you do with a cheap, very efficient and gain stable 60 Hertz linear power amplifier? Well, for openers, servos, motion controls, and psychedelic lighting. Along with whole new worlds of energy conservation apps.

Except for one tiny detail, any plain old lamp dimmer can come close. Take a triac or other ac switch and turn it on someplace in each ac half cycle. Hit it late in the cycle and you'll get low power. Mid cycle gives you half power. While early triggering gives you nearly full power. The *phase shift* from each zero crossing sets output power.

The only problem is that the phase angle versus power current curve is highly nonlinear. Owing to there being far less energy in the "corners" of a half sinewave than at its peak. But these days, this is easy to fix. Simply use *table lookup* to digitally *correct* the phase delay.

A trivial task for a baby PIC.

Ferinstance, table lookup might give you linear *current* versus your input voltage. For psychedelic light apps or motion control. A different table can give you linear *power* versus input voltage. Perhaps to conveniently dial in the wattage of a soldering iron. Specialized tables can also correct for load nonlinearities (such as low lamp brightness at low current), or even do pseudorandom effects that can simulate a candle flame.

Another largely unexplored possibility is to let the phase be controlled and corrected over an *entire* cycle, giving you a linear and bipolar variable voltage power source.

More on these concepts are found in MUSE108.PDF and MUSE109.PDF.

Three Phase Magic Sinewaves

Magic sinewaves are my recently discovered ultra-long sequences of repeating ones and zeros. They are used to synthesize high power sinewaves for induction motor speed controls, for electric autos, solar panels, inverters, power quality, and for home energy efficiency improvers. Magic sinewaves can offer astoundingly low distortions combined with precisely controllable amplitudes.

Compared to older PWM methods, magic sinewaves are more efficient, far more microcontroller friendly, and run much cooler. Because of far fewer switching events and significantly less high frequency energy.

In general, three phase power systems are preferred for heavier industrial loads. Owing to their continuous power, simple reversibility, lower vibration, and easy rectification. Any magic sinewave you can use for single phase loads can also be used for three phase systems. But *only* when you are willing to use six half drivers and individually access each end of each phase winding.

Both of which are real world no-no's.

So, a special class of three phase magic sinewaves is needed. Ones which let you use normal delta or wye loads. Needing only three access points. And three half drivers.

It turns out that *any magic sinewave that has a precisely zero third harmonic will end up three phase friendly*. There thus are far fewer (trillions instead of zillons) delta friendly magic sinewaves. These are much harder to find and have other minor restrictions. But they definitely do exist. And can offer outstanding efficiencies.

More on the *Magic Sinewave* shelf of *www.tinaja.com*. Especially MSINPROP.PDF. And for an introduction to the three phase magic sinewaves, see MUSE101.PDF. Seminars and consulting are also offered by *Synergetics*.

New Directions for PostScript

Needless to say, I've long been a fan of PostScript. First and foremost, as a really fine general purpose computing language. And secondarily to dirty up otherwise clean sheets of paper. Usually as a minor afterthought. There's some incredibly exciting new things coming down in the PostScript arena today.

Ferinstance, we now have got *Adobe Acrobat 3.0*. An extremely net-friendly way to distribute online documents. One that gives you precise control of exactly what your end viewer will see. In a virtually unlimited variety of fonts, artwork, text, photos, animation, movies, sound, and hot links. And including such bells and whistles as ultra-legible text smoothing, byte range retrieval that quickly gives you one page of a lengthy doc, video wipes or fades, and even an instant magnifier. While producing hard copy on just about any printer. Using free readers.

We now do have reasonable methods for running display PostScript or PostScript-as-langauge on a PC host. One is to use the public domain *GhostScript* shareware. A second and elegant method is to use Adobe's own *Distiller* as a general purpose and host based computer. The Distiller is included in the commercial Acrobat package.

Distiller 3.0 can be used as a general purpose PostScript computer in many ways: To generate printable .PDF files. To return data values and such to .LOG files. To directly read, modify, or write disk files. To output comm data. Or to perform other computer control tasks.

Some examples of the type of computation that Distiller does extremely well are web site analysis (WEBSITAN.PS); rms power calculations (FINDRMS.PS); font format shifts (PFA2PFB.PS) or (PFB2PFA.PS); linear equation solution (LINEAREQ.PS); Fourier Series analysis (FINDFOUR.PS); url embedment (URLINDOC.PS); generating microwave Smith Charts (SMITHCHT.PS), or even performing a fully automatic document colorization (COLORIZ2.PS).

Adobe is now addressing the needs of the disabled with their *Access* program. By using Acrobat threads to extract content for oversize text or speech conversion.

PostScript now edits video beautifully. One pioneer in this area is *Videonics* with their new *PowerScript* PS-1000. Which turns those incredible tools, outstanding fonts, and raw power of PostScript loose in an animated character generator. PostScript traditionally has lacked the crucial *alpha* or *transparency* channel. Videonics' brilliant new workaround is to use PostScript's CMYK space and simply

EMERGING RESOURCE TOOLS

Adobe Acrobat System
1585 Charleston Rd
Mountain View CA 94039
(800) 833-6687

Alps Electric
3553 North First Street
San Jose CA 95134
(408) 432-6000

California Printers
PO Box 11766
Santa Ana CA 92711
(714) 838-9401

Scott Edwards
964 Cactus Wren Lane
Sierra Vista AZ 85635
(520) 459-4802

Horsetrader
PO Box 11712
Santa Ana CA 92711
(714) 734-8400

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

Microchip Technology
2355 W Chandler Blvd
Chandler AZ 85224
(602) 786-7200

Parallax Basic Stamp
3805 Atherton Rd #102
Rocklin CA 95765
(916) 624-8333

Planax North America
15 E 26th St #1908
New York NY 10010
(212) 532-1988

Printer's Hot Line
PO Box 1709
Fort Dodge IA 50501
(800) 950-7746

Printer's Shareware
5019 W Lovers Ln
Dallas TX 75209
(214) 350-1902

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

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

Standard Bind-Fast
10 Connector Rd
Andover MA 01810
(800) 526-4774

Synergetics
Box 809
Thatcher AZ 85552
(520) 428-4073

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

Velo-Bind
650 Almanor Ave
Sunnyvale CA 94086
(800) 538-1798

Videonics
1370 Dell Avenue
Campbell CA 95008
(408) 866-8300

redefine "K" as transparency, rather than black.

See MUSE110.PDF for details.

Ah yes, robotics. I like to call a *flutterwumper* most any machine that moves while chomping or spitting. Anything from a Santa Claus machine to a pc drill to an embroidery setup to an animation stand to a laser cutter to a signmaker. Host-based PostScript can ridiculously simplify all these devices. Simply convert PostScript output to any ultra low level stepping language, and the amount of smarts needed in your machine reduces to zilch. And is easily crammed into any old PIC. Full details appear in FLUTWUMP.PDF and FLUTOOLS.PS.

More info on these PostScript opporknockities are on the *Acrobat*, *Flutterwumper,* and *PostScript* library shelves of *www.tinaja.com* Key PostScript books appear in my nearby *Synergetics* ad. Let's hear from you. ✦

Microcomputer pioneer and guru Don Lancaster is the author of 33 books and countless articles. Don maintains a US technical helpline you'll find at (520) 428-4073, besides offering all his own books, reprints and various services.

Don has a free new catalog crammed full of his latest insider secrets waiting for you. Your best calling times are 8-5 weekdays, Mountain Standard Time.

Don is also the webmaster of www.tinaja.com where a special area has been set aside for Midnight Engineering readers. You can also reach Don at his Synergetics, Box 809, Thatcher, AZ 85552. Or email don@tinaja.com