

Low priced printed circuit drill
Fun with water soluble plastics
More on scanned "photographs"
Selected GPS Navigation books
Postscript stepper motor control

As I might have mentioned a time or two before, I am utterly fascinated by all the web's bizarre "free energy" sites. Weirdness reigns supreme.

Such as Jerry Decker's *KeelyNet Mail List* up at keelynet.com/interact/archive/date.htm. Or try Bill Beaty's *Freenrg-1* mailing list at www.eskim.com/~bilb/freenrg/fnrga

Once you get past all of the scams, urban lore, or wishful thinking, most of pseudoscience quickly classifies itself into *labwork so mesmerizingly awful that it is not even wrong*. Or an utter disdain for scientific principles not even hopeful of working up to total cluelessness. Or simply being part of a large medical problem (such as acute recto-crainial inversion) or having some other hidden agenda.

I strongly believe that finding a new source of unlimited free energy would be one of the most heinous imaginable crimes against humanity. For the binge that is sure to result clearly would turn the planet into a cinder. Fortunately, this flat out ain't gonna happen.

Further, it appears to me the key point these folks all completely miss about free energy is simply this: The conservation of energy and thermo "laws" are much more than "laws".

They are also *theorems*.

It turns out that a *theorem* is an *unavoidable consequence* of initial principles. As such, the thermo and related "laws" *absolutely guarantee* us that there is *no possible* overunity combination of ordinary motors and magnets. Nor from any mechanical arrangement of balls, wheels, slides, weights, or levers.

Nor from any fully accounted heat pump. Nor from miracle carburetors. Nor will anything special happen to a wire if you happen to make it a lot longer than usual.

Outside of needing to understand fancier math.

Thankfully, these theorems free us up to spend all our time researching more useful stuff. Two key points are that *an hour in the library is worth a*

month in the lab. And also that "real science" progresses by *standing on the shoulders of giants*.

Plus, of course, that extraordinary claims demand extraordinary proof.

Now, yes, those fundamental first principles could be challenged. But because they're reverified in zillions of ways each day, any exceptions are likely to be at extremes of pressure, size, temperature, or time.

The whole trick when evaluating pseudoscience is to carefully separate the useful adjuncts towards porcine whole body cleanliness from the total hogwash. Lots more on this is up at www.tinaja.com/pseudo01.html

A New Printed Circuit Drill

Gordon Robineau has developed an ultra low cost way to plot and drill hobby and prototype printed circuit boards. He offers PCD100 systems, kits, and consulting. Prices start at \$200. While not particularly rugged, fast, or very precise, these solutions certainly are exceptionally innovative and elegantly simple.

Figure one shows us his general scheme. Gravity plays a big role! The concept works by leaving the pen or drill centered and stationary while moving the printed circuit board in suitable X and Y directions.

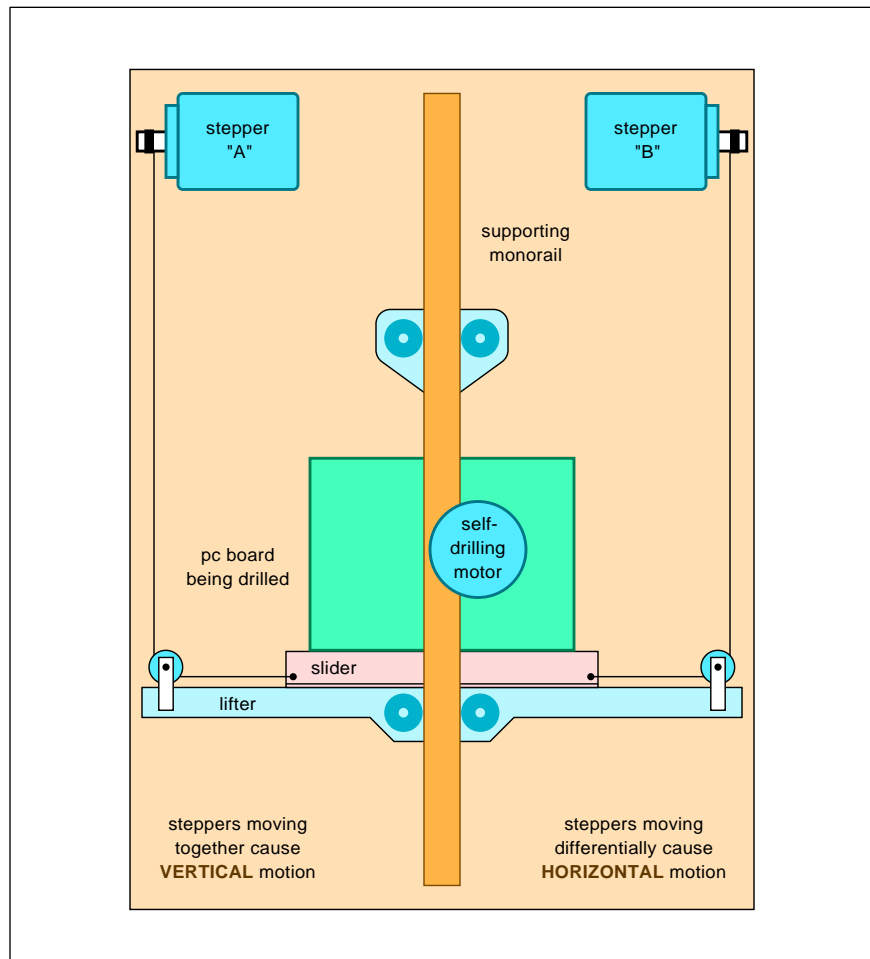


Fig. 1 – THIS NEW PCD100 PRINTED CIRCUIT DRILL is largely gravity powered! Differential stepper motions move your pc board under a fixed self-advancing drill or a plotting pen.

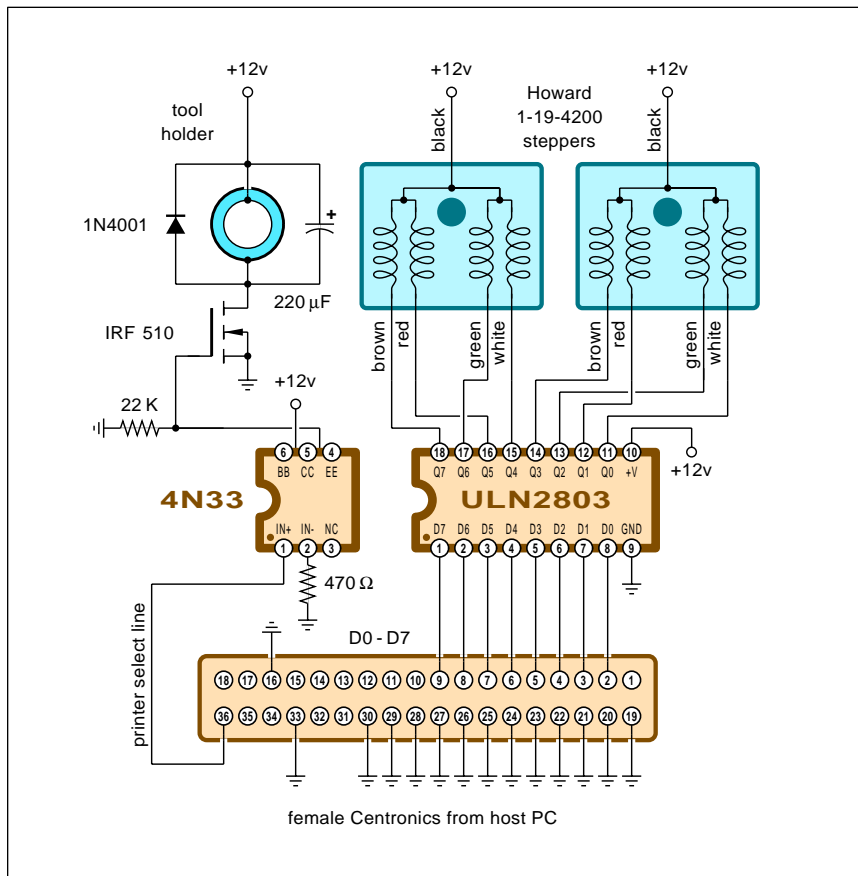


Fig. 2 – THE ELECTRICAL INTERFACE for the PCD100. A parallel port and DOS software is currently used.

A solid base gets supported on a steep 60 degree angle. There is one single brass tube "monorail" going down the board center.

This monorail supports a *fixed* combination pen and drill holder. The custom electric drill is miniature and self-advances on power; the pens also "pen down" on applied power. A plain old relay contact replaces any need for a solenoid.

A full width horizontal aluminum bar then rides up and down under the monorail. A smaller slider goes back and forth on this horizontal bar. The printed circuit board gets taped to this slider. The X board motion gets done by sliding back and forth. The Y board motion gets done by lifting or lowering the horizontal bar.

Two smallish steppers control the motions by way of plain old fishing line strings, while gravity keeps the needed tension on everything. The strings go through end rollers on the horizontal bar and connect to slider ends. The steppers always will work

together. When both step in the *same* direction, the board raises or lowers.

Should both step in the *opposite* direction, the board moves left or right. Combined motions are easily done by selecting the needed number of *differential* steps.

Figure two shows the schematic of the interface. All the hard work gets done by the PC host. The interface is about as simple and as dumb as you can get. One chip "amplifies" the parallel port signals to control your stepper phases. A power supply and NMOS driver transistor controls the self-advancing drill motor or the pen up-down Z motion.

Sadly, the software is DOS based. Their included floppy disk software accepts simplified *Gerber* or *HPGL* files and converts them into needed stepper, drill, or pen motions. A slide down "boresight" alignment target automatically does alignment to take care of a board edge not being truly parallel to the desired foil pattern.

A seventy cent baby PIC added to

the interface sure would add bunches for independence and compatibility with newer operating systems.

Now, Make it Speak PostScript

Sure thing. Trivial even. While PC drills and such can use *Gerber* file formats or *Hewlett-Packard* HPGL plotting languages, I've found that PostScript is far more flexible and way more powerful. Particularly if lots of fancy fonts are involved.

Or exotic transformations.

The trick is to send your PostScript code to a special utility that is sent to Adobe *Acrobat* or *GhostScript*. This utility accepts the normal PostScript vector commands and reduces them to elemental horizontal and vertical steps. By using PostScript's powerful *pathforall* and *flattenpath* procs.

Your output can be a simple and elemental *meta language*. Such as the ASCII numerals "0" through "7" for east through northeast on through southeast, "H" for home, "U" for pen up, "D" for pen down, "X" for your debugging break, and "Q" for quit.

Modifications to this utility can directly generate PCD100 commands.

Uh, figure three shows us what a possible three inch circle might look like. Full source code, tutorials, and other insider details can be found at www.tinaja.com/flut01.html More on PostScript is downloadable from my www.tinaja.com/post01.html.

Consulting services are offered per www.tinaja.com/consul01.html or at www.tinaja.com/info01.html.

More on Scanner "Photographs"

Last month, we saw how creative use of a better quality scanner can give you ridiculously better "photos" than a digital camera. Resolution can be *hundreds* of times higher. To do this, you carefully support and align an object, scan it, and then "airbrush" edit it using *Paint* or *PhotoShop*.

Complete details are now found in www.tinaja.com/blat01.html and in my <http://www.tinaja.com/glib/imagi mag.pdf> Dozens of astounding results can now be viewed by going to my www.tinaja.com/barg01.html Your only tiny downside is that the process is incredibly addictive. After playing with these techniques for a while, I've come up with several additional insider secrets...

RECOMMENDED GPS NAVIGATION BOOKS

Aviator's Guide to GPS... (Bill Clarke)
GPS for Everyone: How the Global Positioning... (L. Larijani)
GPS for Geodesy (Peter J. G. Teunissen)
GPS for Land Surveyors (Jan Van Sickle)
GPS Instant Navigation : A Practical... (Kevin Monahan)
GPS Land Navigation; A Complete Guidebook... (M. Ferguson)
GPS Made Easy : Using Global Positioning ... (Lawrence Letham)
GPS Satellite Surveying (Alfred Leick)
Simple GPS Navigation; Sea, Air, Land... (Mik Chinery)
Understanding GPS: Principles and Applications (Elliott D. Kaplan)
Using GPS (Conrad Dixon)
Using GPS: Finding Your Way With the... (Bruce Grubbs)
Wilderness Navigation : Finding Your Way... (Bob Burns)
Yachtsman's GPS Handbook... (Colin Jones)

For more details, see www.tinaja.com/amlink01.html

sharpened as an overlay. If removing knobs takes you closer to the glass, do so. Then scan the knobs later.

Use symmetry and repetition– Once you have got one corner of an object looking the way you want it to, flip it horizontally and then vertically to take care of the other three. If your lighting on something cylindrical is poor, expand the "good" side of the best lines, duplicate them vertically, and then mirror the entire result.

Experiment on the side– The greatest ideas have a way of turning sour, so always tow a copy of any detail you are working on to a background area, improve it, and tow it back. Be sure to resave often, preferably to a CD ROM. Save any details that you can reuse, such as screws, knobs, line cords, other fasteners, fuses, or feet.

Avoid the "Barney Olfield" Effect– Early photos of moving race cars had elliptical wheels. Caused by their camera's focal plane shutter seeing the top of the wheel after the bottom. Moving scanners could also have a disconcerting habit of showing only one "side" of a knob or support or whatever. Get around this by taking the good "half" of the knob, mirror copy it, and make it "straight on".

Watch shadow directions– Similarly, scanners tend to "throw" shadows on only one side of knobs or supports. Pick your scanning direction so the shadows all stay out of the lettering.

But the ultimate key test of your airbrush work is that *it should seem to vanish without a trace*. Leaving you with appropriate and "accurate" results that do not in any manner call attention to themselves. Your whole goal here is *not* to be noticed! I've summarized some of these guidelines for you in figure four.

Training and consulting services are available for this exciting new technique. For ongoing details, refer to www.tinaja.com/info01.html

Water Soluble Plastics

In my surplus wanderings, I have come across a great heaping pile of *water soluble* plastic film. These are intended for hospital laundry bags and are resold by *M.D. Industries*. They are easily cut with scissors or a paper cutter and are "somewhat" heat sealable. They are mildly translucent. You can tell roughly what is in them but cannot read fine print.

NEED HELP?

Phone or email all your US Tech Musings questions to:

Don Lancaster
Synergetics
Box 809-EN
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(520) 428-4073

US email: don@tinaja.com
Web page: www.tinaja.com

Thickness is a mil or two. They are "heavy duty" style and are made from a polyvinyl alcohol. They dissolve in cold water above 40 degrees Fahrenheit.

These cry out for all sorts of oddly unintended uses. Hot tub guest swim suits, ferinstance. Or tie some around a microswitch for a flood alarm or a rain detector. Or perhaps as packages for bath salts or some dye.

Any of a dozen or more "magic" tricks come to mind. Maybe a few possible greenhouse or other ag uses. Or other places where you don't want to handle something. I'm not sure if you can dissolve the films and then reuse the solution somehow.

Cost is quite low, especially when you only use a few square inches.

What uses can you think up for these that give new depth of meaning to "diabolically fiendish"? Email me at don@tinaja.com should you want to play with any of this neat stuff. Or see www.tinaja.com/bargos01.html

Some GPS Books

GPS is an acronym for the *Global Positioning Satellites*, a collection of 24 wandering satellites which give you navigation, altitude, time, and speed info. Anywhere in the world. To eighty foot accuracy with lower cost techniques. Fancier schemes let you hit aircraft landing precision and sub-centimeter surveyor accuracy.

I've gathered together a listing of some of the better GPS books for you as this month's resource sidebar.

Tutorials on GPS can be found in www.tinaja.com/resbn01.html and at www.tinaja.com/glib/resbn90.pdf

New Tech Lit

From *Standard Microsystems*, a new CD ROM product catalog. That focuses on local area networking, data comm, and I/O controllers. From *Hewlett Packard*, their latest *Test and Measurement* catalog. From *Physik Instrumente*, a catalog on piezo and other micropositioning mechanisms. From *Pericom*, application notes on their bus switches, with emphasis on video switching apps.

USGS topo maps are finally free online. At greenwood.cr.usgs.gov Many of these are newly available in Acrobat PDF format. While low cost collections of maps on CD ROM are

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offered by Tom Oliver's *Map One* at, of all places www.mapone.com

From *SiRF Technology*, a white paper on their new GPS technology that seems to effectively solve certain "urban canyon" problems.

By way of Dan Michael's *Oricom Technologies*, an assortment of *One Hour Protoboards*. These seem well suited for most PIC and similar size projects. A number of ready-to-go designs are also available on their www.sni.net/~oricom website.

The SETI at home project seems to be smashing most records lately for

distributed computing. Uh, as of this writing, *twenty millennia* (!) of prime computing time has been devoted to this project. As we saw last month, you can participate or pick up details at setiathome.ssl.berkeley.edu/stats/otals.html

A curious update to last month's column on hot tub economics: Most conventional hot tub thermometers have a large thermal slug in them. To prevent their temperature changing much while you're reading them.

The fifteen minute or so delay can cause underreporting during warmup.

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Tech Musings

If you do not allow for this, the tub may appear to do its last few degrees of heating much faster than you'd expect. And may overheat.

Free samples of sleeving and heat shrinkable tubing are offered from *Insul Tab*. A free graphic instrument programming *LabView Evaluation Package* from *National Instruments*.

Our featured trade journals include *Security Systems Integration* plus *Vacuum & Thin Film*.

The latest "new-old" books from *Lindsay Publications* include *Early Die Casting* and *Hot Air Engines Vol 2*. For fast access, click the banner on

my website. A new engineering book catalog by *Butterworth Heinemann*.

Instant info on bunches of books that I've personally recommended at www.tinaja.com/amlink01.html

For all the fundamentals of digital integrated circuits, do check into my *CMOS* and *TTL Cookbooks*. Either by themselves or as part of my bargain priced *Lancaster Classics Library*.

Per my nearby *Synergetics* ad.

Some of the really wild new stuff up at www.tinaja.com/barg01.html now includes hospital grade physical therapy machines, premium quality flags from odd countries you never

heard of, precision airflow meters, several superb pressure and humidity sensors, immersion thermocouples, and great heaping bunches more.

Catalogs about our products and services can be downloaded directly from www.tinaja.com/synlib01.html

As usual, most of the mentioned items are in our *Names & Numbers* or *GPS Books* sidebars. A no charge US technical helpline is offered per the nearby box. Be sure to include your email address if you expect a personal reply.

Let's hear from you. There sure are some exciting possibilities here. ♦

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