

# Insider Research Secrets

**S**itting around and dreaming up new ideas all day long is a thankless task, but someone's got to do it. The key secret to positively brilliant new products is to develop a thousand of them at a time, and then throw away the 998 that don't meet spec.

There are some strong points that can be made for solo research. For soloing is doing everything from square one originally and by yourself. This could give you a different perspective and lets you ignore preconceived notions of others. It lets you head out in non-obvious directions. It lets you do your things the way you want to.

On the other hand, finding out what others have done before you can save you a lot of grief. There might be ideas you simply haven't thought of. Or fundamental physical laws which just can't be ignored. Or societal and political restrictions. Or going heads-up against an existing strong competitor. Worse yet, your great new product may already be scrounging lost and forgotten under the bargain counter of [Vinnie's Surplus and Distress](#).

A long ago ferinstance or two: Back in the early sixties, counting flip flops at long last became available at a mere four bucks each. I wanted to do some pitch reference stuff with these and needed to answer the question "What is the minimum number of flip flops you need for an acceptable musical accuracy? This question is not trivial, since the frequencies are irrational numbers as related by the twelfth root of two for equal temperament.

So, I spent several long months using a humongously klutzy Olivetti programmable calculator and I eventually found the answer that (1) eight bits is enough, but (2) only when you use the wondrously magic sequence of 116, 123 ... 232. Full details are found in my [CMOS Cookbook](#).

Had I just looked around a little first, I would have found this magic sequence already published years before in the *Journal of the Audio Engineering Society*. While it sure was a lot of fun, I could have saved two months of work just by asking "Has anyone think about this before now?"

And I assembled my Pitch Reference and published it. And just before I was about to release it, I talked to a piano tuner person, and found several fatal flaws in the product. It turned out that these pitch tones must *always* be pure sinewaves, or the ear gets confused. And the high and low notes of a piano are *never* tuned to their correct pitch. Instead, your keyboard gets "stretched" to allow for the nonharmonic overtones of real strings.

Had I instead bothered to read the 1946 book *Piano Tuning and Allied Arts*, I would have easily found this out.

And saved bunches of time and effort in the process.

The odds are overwhelming that your "new" idea is not new at all and that many hundreds of people have done similar work before you. It is almost a certainty that you're overlooking something totally obvious any time you try to develop anything new.

So it always pays to research what has gone before you. Let us do a quick rundown of my key insider secrets to quickly, accurately, and cheaply researching just about any topic, technical or otherwise...

## The Research Continuum

First and foremost, research is something that you do continuously on a total lifestyle basis. You do not turn your research activities on and off. You *always* should be busy studying something.

The process of getting and piling up useful info should go on day in and day out. Then, when you really need some crucial info in a hurry, your research gathering skills will be honed sharp enough to quickly get useful results.

Some of the stuff I'm currently researching includes spread spectrum comm, toner release coatings, *Lepcon* solar energy, GPS satellite standards, shared SCSI laser printing, fuzzy data [curve fitting](#), telephone caller ID, cheap small scale [book production equipment](#), new VCR programming formats, and, of course, [tinaja questing](#). Give me a call if you can help along with any of these.

## The Greatest Resource

By far the single most useful and powerful research tool anywhere ever is a magic book on the reference shelf of your local library. You probably never even heard of it. It is called *Uhlrich's Periodicals Dictionary*.

Uhlrich's lists some 50,000 or so magazines. Many of these are called *trade journals*. And trade journals are where all the action comes down in any field. Trade journals are insider's secret resource sources. Since they cover only the newest, the hottest, and the best.

Directly, trade journals give you technical articles, the names-and-numbers lists, bingo-cardable ads, and annual directories. Indirectly, they lead you to reference materials, data books, ap notes, free samples, seminars, trade shows, consultants, and great heaping bunches more.

Examples of electronic trade journals include *E.E. Times*, *EDN*, *Electronic Design*, *Electronic Products*, *Electronic Components News*, *Electronics*, *RF Circuit Design*, and many hundreds more. The mechanical examples include *Machine*

Design and P.T. Design, and Design News.

To give you an idea of the incredible variety of trade journals out there, a few of the several hundred that I personally subscribe to do include *Fire Engineering*, *Food Service Product News* (a great diet magazine - just read it before every meal), that *Paper, Film, and Foil Converter*, *Pollution Equipment News*, *Textile World*, *Powder and Bulk Solids* (how is this gem for obscure?), *Quick Printing*, *Horse trader*, *Motion*, *HVAC News*, the *Medical Equipment Designer*, *Signcraft*, *Research and Development*, *NASA Tech Briefs*, *Hydraulics and Pneumatics*, *Tinaja Quester's New Product Digest*, *Appliance*, and *Speleonics*.

Sadly, *WET - The magazine of gourmet bathing* has long ago ceased publication.

Trade journals are never offered on newsstands and only rarely appear in libraries. These are *controlled circulation* magazines specially set up to qualify for the special postal rate. Subscriptions to most trade journals are free if you can create the illusion of appearing to be an industry insider and potential volume buyer for their paying advertisers. To qualify, you request a subscription qualification card and then tell them what they want to hear.

You'll have the best luck if you act professional. With a registered trade name, a logo, your formally answered telephone, and a laser printed business letterhead.

The SCAR technique is one useful ploy that can get you a copy of just about any magazine. Just call or write their ad department and request a Sample Copy and Ad Rates. Sometimes, this can also get you a free subscription.

Most trade journal publishers have dozens of titles in as many fields. So, it pays to get a complete list of everything they offer. Once you receive any one trade journal, the competitors will usually glomp on to you as well.

### Other Library Stuff

A lot of library work often ends up as a frustrating and monumental waste of time. But there are several other obscure library resources that cannot be ignored. One of these is the *Encyclopedia of Associations*. Just about any field has its insider clubs and professional organizations. Who offer meetings, contacts, tutorials, directories, shows, seminars, and specialty book sales.

Although that humongously big old *Thomas Registry of Manufacturers* now indexes just about anybody who makes anything, they tend to be out of date in any fast changing field. They also miss small hi-tech startups.

Another library reference that is almost magic is the *Science Citations Index*. Unlike other compendiums, this one lets you move forward through time. Anytime someone references something else in a bibliography, it goes into the index. Just start with the "horses mouth" docs for any field and follow them forward through time. Eventually newer authors will start repeating. You then use the *avalanche effect* to completely cover the subject area.

More details on other library research secrets appear in my newly revised *Incredible Secret Money Machine II*.

### The Dialog Information Service

Behind Uhlricht's, the second most important resource tool in the world is the *Dialog Information Service*. This is an online searching service that presents key abstracts and full text papers of just about anything from anywhere.

One tiny corner of Dialog is called *INSPEC*. This gives you some fifteen million or so on-line abstracts to anything that involves electronics, computers, or physics. There are many hundreds of other data bases instantly available from them.

At \$2 per minute, Dialog sounds expensive. But I've found it to be far and away the fastest and cheapest way to pick up technical info. Especially in any field you know nothing about. Dialog is the *only* on-line or BBS service that I willingly and gladly pay for.

While you can subscribe to Dialog yourself, it is usually best to work with your local librarian. They can do things much faster and better. And the price (and size) of a total Dialog reference manual set is outrageous.

### Getting Reprints

I keep getting these strange letters and helpline calls from people that live in "such a remote area" that they "just can't find" any reprints on anything. Since two of these "remote areas" have included Cambridge MA and Palo Alto CA, I've reluctantly concluded there are those of you out there who could not find a pig in a dishpan.

Well, here I am sitting on my sand dune in the middle of the Upper Sonoran Desert. I have never had any serious problems getting technical reprints on anything. Even on fire towers or when doing underground cave research by carbide light. So don't give me any "remote" bull.

In reality, you'll find three easy routes to technical reprints. The first of these is the *Interlibrary Loan Service*, which is available at any library just for the asking. This service is usually free or very low in cost. On the other hand, it can take a long time. And you sometimes will have to be persistent to get useful results.

The "standard" M1A1 Rev 0 reprint source is *UMI*, who used to call themselves *University Microfilms*. They have one each of everything in stock. All you have to tell them is the exact journal, author, and page numbers. Charges vary with the number of pages and the service speed.

Finally, Dialog offers full text reprints of many of their references, on line, by FAX, or by mail. This is usually your fastest route to a reprint, but it often costs much more.

### Technical Books

For serious research, technical books place a distant third behind trade journals and Dialog. As you may have found out, mall storefronts with a "bookstore" sign in front of them often end up less than useless. Libraries have a bias against technical paperbacks. And what you need may be on reserve or in circulation.

Technical books traditionally have taken a long time to publish, and often are horribly out of date before the ink is even dry. Many publishers push their own second rate titles, rather than letting you know about the real leaders in the field. And technical book clubs are usually set up to flush remainders and unselling dogs.

Nonetheless, for the fundamentals of any field, a solid tech book by a well known name-brand author can be a tremendous research help. Where can you go to get books if they aren't in libraries or mall bookstores?

Instead, watch out for *specialty direct mail booksellers* who have a vested interest in stocking only the very best titles in any field. I've covered hundreds of these in my

## SOME RESEARCH RESOURCES

**CompuServe**  
5000 Arlington Center Blvd.  
Columbus, OH 43220  
(800) 848-8199

**Computer Literacy**  
2590 North First Street  
San Jose, CA 95131  
(408) 435-1118

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

**GENie**  
401 N. Washington St.  
Rockville, MD 20850  
(800) 638-9636

**Heathkit**  
P.O. Box 1288  
Benton Harbor, MI 49022  
(616) 982-3200

**Hewlett-Packard Manuals**  
19310 Pruneridge Ave.  
Cupertino, CA 94014  
(800) 752-0900

**Lindsay Publications**  
P.O. Box 583  
Manteno, IL 60950  
(815) 468-3668

**MIX Bookshelf**  
6400 Hollis St. Ste. 12  
Emeryville, CA 94608  
(800) 233-9604

**Nuts & Volts**  
P.O. Box 1111  
Placentia, CA 92670  
(714) 632-7721

**OpAmp Technical Books**  
1033 North Sycamore  
Los Angeles, CA 90038  
(800) 468-4322

**Radio-Electronics**  
500-B Bi-County Blvd.  
Farmingdale, NY 11735  
(516) 293-300

**Stanford Bookstore**  
135 University Avenue  
Palo Alto, CA 94305  
(800) 533-2670

**Synergetics**  
P.O. Box 809  
Thatcher, AZ 85552  
(520) 428-4073

**Thomas Registry of Mfrs.**  
1 Penn Plaza  
New York City, NY 10119  
(800) 222-7900

**Uhlrich's Periodicals**  
1180 Americas Avenue  
New York City, NY 10016  
(212) 916-1600

**University Microfilms**  
300 N. Zeeb Road  
Ann Arbor, MI 48106  
(800) 521-3044

**The Well**  
27 Gate Five Road  
Sausalito, CA 94965  
(415) 332-4355

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

other columns and, especially, in my [Ask the Guru](#) and *Hardware Hacker* reprints. But two examples of note are *Lindsay Publications* for machine shop, early radio, and home science titles; and the *MIX Bookshelf* for electronic music and video production books.

Good technical walk-in bookstores are rather hard to find. Several outstanding West Coast examples seem to include *Computer Literacy*, *OpAmp*, and *Stanford Bookstore*.

If you have some favorite specialty book sources, please let me know via the helpline so we can pass them on. I would like to compile a country-wide list.

### What about patents?

As you may have noticed, I am very much down on patents and the patent process. Especially for *Midnight Engineers* and other small scale startups. Mainly because of the deeply ingrained and ludicrously absurd popular myths surrounding patenting. And secondly because patents are usually a monumental waste of time, energy, money, and sanity. See [BLAT06.PDF](#) or else my [Blatant Opportunist](#) reprints for more details.

At any rate, I have consistently found Dave Berg's stories in *MAD* magazine to have far better inventions and ideas in them than have ever appeared in the *Patent Gazette*. Most patents are pointless and dumb. Not to mention usually being highly unprofitable.

In three decades of research, I've only rarely found any time or place where reading a patent was of very much use to me. I strongly do feel that the signal-to-noise ratio of studying patents is ludicrously low and usually is flat out not worth the effort. At least most of the time.

Should you feel otherwise, patents appear in the *Patent Gazette*, in patent repositories in many larger libraries, and are narrowly reviewed in certain trade journals. Individual patent copies are available at low cost. [And free online](#)

One thing that could help bunches would be patents on CD ROM with a total fuzzy logic text searching ability. That could increase the signal-to-noise ratio enough to make the time spent worthwhile.

### Service and Repair Manuals

Some companies positively refuse to ever let an outsider anywhere near their service literature. Others are much more reasonable. Obviously, service and repair info can give you lots of useful clues to just how others are solving problems similar to yours.

The greatest source of this sort of stuff, of course, is *Heathkit*. For years, you could buy the assembly manual and schematic for any simple electronic project for five bucks or so. Their real heavy duty projects did cost a tad more, but certainly were worth the price.

There are some "reverse engineering" outfits of varying quality that offer schematics of just about anything. These folks often will advertise in *Radio-Electronics* and *Nuts and Volts* magazines.

Until recently, *Hewlett-Packard* has been a great source of laser printer repair manuals. Since HP and Apple share the same *Canon* engines, pretty near everything in those HP manuals applies to the similar Apple machines. And Apple manuals are impossibly difficult to latch on to. Besides being poorer than the comparable HP manual in the first place. Details in the [Ask the Guru](#) reprints.

Sadly, HP has recently tripled the price of their laser printer manuals up into the hundred dollar range. You know how it goes when you sell lots of something. You have to add shifts and hire new people for the shipping room. And there's all those extra annual reports to print up. After all, those new employees have to be paid.

Be sure to check all the possible sources of a competitive product for service and repair info. Chances are that one source is a lot looser than most.

To me, it is monumentally stupid not to fully publish your schematics, service information, or ROM listings. Or, for that matter, making your source code listings available at reasonable cost. Failing to do this has caused Apple to go downhill ever since the original red book. Lack of Mac schematics and service info is just plain dumb.

### Networking

Networking is simply asking others for help. These can be real people in the case of community college courses, work associates, ham radio clubs, computer user groups, or technical hotlines.

Or you can go the electronic BBS route. There are many tens of thousands of electronic bulletin boards up today. With general or special interests that apply to just about anything or anyone. These are by far the fastest and the cheapest way of linking yourself up with experts in just

about any field, technical or otherwise.

There are four electronic boards which are head and shoulders above the rest. The first two of these are *GENie* (800) 638-9636 and *CompuServe* at (800) 848-8199. *GENie* alone has nearly 125,000 files and programs available for your immediate downloading at costs averaging around twenty one cents each.

Besides my very own PSRT RoundTable on *GENie*, other RoundTables here that you will find of more than passing interest do include *MAC*, *IBM*, *RADIO* (incredibly great technical downloads), *HOSB* (for home office and small business) and *DTP* (for desktop publishing). There are, of course many hundreds more.

The third truly great BBS is *The Well* at (415) 332-4355. This online Whole Earth service is very heavy in the areas of alternate energy and small-is-beautiful topics.

The Well people also publish the *Whole Earth Review*, a magazine I do find indispensable for serious research on working tools and source of supply. These are the *Whole Earth Catalog* folks at the same old stall after all these years. Uniquely doing what they do best.

And finally there is *UseNet*, the greatest piracy cove in the known universe. The time from when someone decides to keep some code a secret till the greatly improved version appears on *UseNet* is usually measured in nanoseconds. In several cases, the response time clearly has exceeded the speed of light. For free *UseNet* access, you'll have to ask around at your local university.

The UNIX-based *UseNet* is also known as *Anarchy 101* among its denizens. Strange but useful folks fer sure.

### Consultant Referrals

I'm in the process of more or less legitimizing our highly informal *consultant's network* that has grown up around my no-charge technical helpline. There's now a stable of some several hundred *Midnight Engineers* who, for a reasonable fee, can solve problems for you.

Fields currently covered include electronics, publishing, kits, PostScript, cable tv, vacuum technology, chemistry, programming, electronic speech, video, mechanical design, and agricultural stuff. Plus, of course, *tinaja questing*.

There is no charge for referral to one or more of these consultants. The consultants themselves are expected to pay a five percent finder's fee when work is completed.

If you need a *Midnight Engineering* consultant, just give me a call on the helpline below. Should you wish to join my *Synergetics* consultant's net, just prove to me who you are and why you deserve to be on the list. ♦

UPDATE: I left this pretty much as it was for historical accuracy. *GENie* is gone. *Oxbridge* is cheaper than *Ulrich's*. See [www.tinaja.com](http://www.tinaja.com) for newer web-based research tools.

*Microcomputer pioneer and guru Don Lancaster is the author of 35 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 consulting 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](http://www.tinaja.com) You can also reach Don at Synergetics, Box 809, Thatcher, AZ 85552. Or you can use email via [don@tinaja.com](mailto:don@tinaja.com)*

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