

BASEMENT TECHIE

NUMBER 3

POOR BOY ✂ LONE WOLF
ISSUE

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You don't need a lot of

money to become a Basement Techie. Indeed, many of us were lucky having two nickels to rub together when we started out. These days it is fortunate that there are a number of places where those of you with limited funds can put a lab together.



In Connecticut, we have the following cheap sources that are useful for the Basement Techie putting together their secret laboratory:

- [Army/Navy](#) (military surplus) stores
- [Benny's](#)
- [Big Lots](#)
- [Dollar Tree](#) (and other \$1 stores)
- Dumpster diving/curbside scrounging
- [Goodwill](#)
- [Harbor Freight](#)
- [Home Depot](#)
- [Ocean State Job Lot](#)
- [Savers](#)
- Tag sales & flea markets
- [Wal-Mart](#)

Other states will have similar, if not the same, places for you to outfit yourself. If you are especially lucky, like the Basement Techies around Kingston, NY and Manchester, NH, there might be a store nearby that deals in electronic surplus. In Connecticut, Pratt and Whitney used to have a nice walk-in surplus store in East Hartford at Rentschler Field. The place was closed down a while ago, but a Cabela's is there now.

The picture on the upper right hand side of the page is my friend Wildflower's "remote" secret laboratory that is not only located in a genuine New England fieldstone basement, but is also stocked solely with stuff picked up from those very same places I just mentioned earlier.

Believe it or not, everything in that Basement Techie's secret lab was acquired via the very same sources I just described earlier. This lab is used for electronics, chemistry, and light mechanical work. We have constructed crystal sets, experimented with liquid rectifiers, and made simple test equipment like an electrical continuity tester on this bench.

In this particular instance, the workbench is a cheap folding table from Ocean State Job Lot. The bench to the right of it was made from scrap lumber. Most of us curbside scrounge or dumpster dive an old door from somewhere, and use cinder blocks or old filing cabinets as the legs. The shelf is also scrounged wood and plastic crates. Or we find an old sturdy table or desk at Goodwill, and use that as the basis for our workbench.

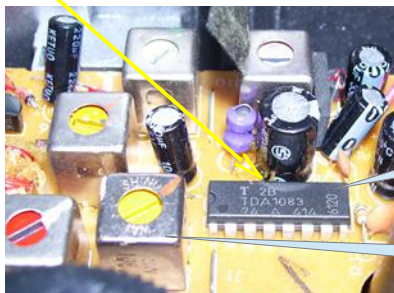
For parts storage, you see shoebox-sized plastic storage boxes from the dollar store. They are very popular amongst Basement Techies. The flat multiple compartment parts boxes are from Big Lots and Ocean State Job Lot. You find them in either the hardware or sporting goods (fishing) departments. The plastic and glass jars are re-purposed food containers (free!). I hear the glass ones are great for building your own capacitors. The re-purposed cat litter jugs are used as bins for storing larger items. The small storage tins, useful for their intended purpose or as project boxes, are a dollar from any number of places.

Tools can be had cheap from most of those places on the list. This 15 piece wrench and pliers set was \$20 from the local Home Depot, and is a good beginner's value for the price. I've seen similar brand/type tools for \$2-\$3 each at the local job lot/odd lot stores. I have this set as part of my secondary tool kit. The quality is very good for the price, and replacements are inexpensive and available right down the road.



My favorite tool sources are tag sales and flea markets. You can find older, quality, American-made tools dirt cheap at them. I just received an email from my friend Gary, a fellow Basement Techie. At one recent tag sale he came across a World War II vintage Cattaraugus 225Q sheath knife for \$5! Who knows what you will discover at your local tag sales? Only one way to find out!

Both the police scanner and the AM/FM radio were found for a few bucks each at local Goodwill stores. While it would be a sin to gut an old working Zenith or other All-American Five radio for parts, I have no issues with deconstructing late model solid-state boomboxes down to their essential elements. Keep your eyes open for that TDA1083 IC. They are useful to have around.



This is what the inside of a portable stereo looks like. The TDA1083 chip looks like this.

You should also salvage these.

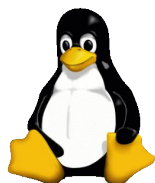
Police scanners make great VHF/UHF test receivers, and are still useful in many places for keeping an ear on the locals. At the very least you can use them to monitor the 160 MHz. NOAA Weather Radio channels. The last police scanner I bought at Goodwill (for \$5!) had the NOAA weather alert feature so you can keep it on standby and get notified when heavy weather is heading your way. This is handy when you're working in a basement and can't see the sky.

If you are lucky, you may have within listening range a cool FM pirate or college radio station that does not play regurgitated shit. The AM broadcast band comes into its own late at night, when many Basement Techies cruise the electromagnetic aether seeking A Certain Truth. In [Cybertek](#) #9, there is an article called "*Doing a Radio!*" that shows you how to convert a Walkman-style radio for shortwave reception.

Computers are everywhere. Just check out local tag sales, flea markets, and thrift stores for late model working machines and parts. Those of you in Southern New England are especially lucky as you are withing driving distance of the famous MIT Flea, a combination hamfest/electronics flea market held every third Sunday from April to October. You can find all sorts of interesting stuff there, and cheap used computer equipment.

Open source software is the choice of the Basement Techie. Forget about Microsoft Windows. Install Linux or BSD on your machine and you are good to go. You can download these OSES for free off the Internet, or find a local user group or hackerspace. Someone there will have their distro of choice, and be more than happy to help you. Open Source operating systems are a religion of their own. Every OS has its devotees and detractors, and much time is spent debating the merits of one OS over the other. For what it's worth (admittedly, not much), I've found Ubuntu to be very easy to get running, and non-computer people seem to take well to it. I also like Knoppix, and for older hardware, Puppy Linux and Damn Small Linux. If you are just starting out, your best course of action at first is to run what the local Linux gurus prefer. Once you get some experience under your belt then you can branch out into something else if you'd like. Then eventually you'll become the Guru, and be able to help others.

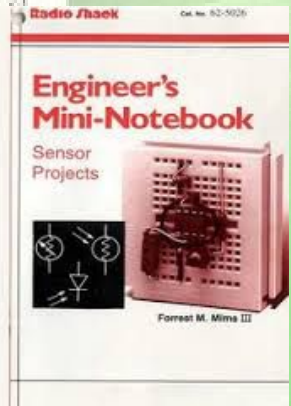
Possibilities are almost unlimited with the cheap (sometimes free) availability of cast-away hardware and open source software. Just about any "obsolete" computer you care to get up and running is still a hell of a lot more powerful than the computers that sent us to the Moon.



Electronics was my first foray into the realm of technological experimentation. Many Basement Techies start out this way because it's cheap, easy, and doesn't take up much space until you get that first 19 inch rack full of test equipment.

There is a lot of information about electronics on the Internet. So much info that people have a hard time with it all. I've mentioned the Navy Electricity and Electronics Training Series (NEETS) many times before. It's a free download, and very good. However it doesn't show you how to go and do stuff. There are a lot of websites that have electronics projects, but you are left wondering what's going on. A lot of Arduino stuff is like that, but then again the Arduino, as good as it is, was designed for hipster artist types with little electronics background to incorporate tech into their art projects. It's all good if that's your gig, but for those of you who really want to get your hands dirty there's always the left-handed path.

When we started learning about electronics back in the day, we went down to our friendly local Radio Shack and picked up Forrest M. Mims III's book Getting Started In Electronics. It was only 128 pages long, but it not only taught you electronics, but also showed you schematics of various circuits you could build, most of which were interesting and useful. We also bought all the volumes of his Engineer's Mini-Notebook series. Plenty in those books to get in trouble with! Radio Shack still sells these books, and they are the best for learning about electronics and building useful gadgets.



Since I bought the Mini-Notebooks many years ago, Mims has consolidated the many volumes into a fewer number of larger books. The two best volumes in the current set are Electronic Sensor Circuits & Projects, and Science and Communication Circuits and Projects. If you are of a certain bent, you will find these two the most useful of the collection.

Getting Started in Electronics

WSNG - AM610 - Harwinton, CT



AM BCB Reception Experiments

The AM Broadcast Band (AM BCB) is an interesting place to experiment in. Equipment is cheap, and you can build a lot of stuff out of junk parts. I've played around with mineral detectors made from plumbing parts and a piece of Galena, and tuning coils wound by hand on an oatmeal box. This primitive homebrew gear actually performs comparably to the consumer electronics stuff.

My usual receiver for AM BCB reception and testing is a 20 year old Radio Shack DX-375 Portable. There's nothing special about it other than the fact that it was on clearance at the time, but it turns out that it is a fairly well-respected portable among the AM monitoring community.



After reading [W7OIL](#) Dan Peterson's article in the [2008-2009 Xtal Set Society Newsletter Collection](#), I went to the local Dollar store and bought a hula-hoop. It's a plastic tube about



1/2" thick and 30" diameter. Found a length of 16 ga. enamel wire and discovered that 9 turns would fit in the tube. That's roughly 70 feet of wire. The wire broke after the 6th or 7th turn, so there's actually two loops of wire in there.

I took my "experimenters tuner", an 80-1750pf air variable capacitor, and attached it in parallel to the loop. These large variable capacitors are getting hard to find, but if you check out your local hamfests you should come across one. The Velvet Vernier dial was also a hamfest find. While not absolutely necessary, it does make tuning a lot easier. The internal loopstick antenna on the DX-375 coupled nicely into the larger loop antenna assembly by placing the radio as shown.



In tuning around, I was able to receive a number of stations on the low end of the of the band. Reception on the antenna seemed to stop around 900-1000 KHz. By taking the smaller loop and wiring it in opposition to the larger loop, I was able to increase the top end to 1100-1200 KHz.

With this arrangement, you will know the antenna is tuned properly as you will get a definite "peak" in the audio of the received station when the capacitor is tuned to the right spot. This antenna is also bi-directional with the pattern broadside to the loop, and nicely nulls out signals off to the sides of its pattern.

Keep your eyes open. There's a lot going on that you should stay abreast of in the hobbyist scene. Here are a few things I'm working with and watching.


Radio receiver technology keeps getting less expensive. It started with the **FunCube Dongle** USB SDR, and its 64-1700 MHz. frequency coverage for under \$200. They now have a version with 150 KHz. to 1.9 GHz. Coverage for the same price. Then a guy named Eric Fry discovered that European DTV USB receivers with the RTL2832U demodulator can be turned into a wideband SDR. This will continue to open up new worlds of digital signal reception for communications monitoring hobbyists. SDRs are also being seen in the transmit side with inexpensive radios like the Flexradio **Flex-1500**. The nice thing about all this is that in addition to communications monitoring, all sorts of radio science observing becomes a lot easier.

A guy named Massimo Banzi developed an electronics prototyping system, actually a microcontroller system, called The **Arduino**. It's cheap, and people keep finding new amazing things to do with it every day. It was designed for non-techies and is very easy to implement projects with.

Finally we have the **Raspberry Pi**, a credit-card sized Linux computer for \$25. It's reminiscent of introductory computers like the Commodore VIC-20 and Timex/Sinclair 1000, only a lot more powerful. Much like the Arduino, people keep finding new and amazing things to do with it.

Imagination is the limit with all this stuff, and even someone on a budget can get involved. There is also a well developed community around it all to help you out, even if you are a lone wolf Basement Techie like most of us.

Freedom to create is in your hands. So jump in and get started. Pick up an RTDL SDR or a Funcube Dongle and a Raspberry Pi. Some folks have already done some work putting the two together Do a little prototyping with an Arduino, and learn to program interactivity. The sky is the limit!



WLAT - AM910
Farmington, CT

