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QRP Quarterly

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Summer 2004
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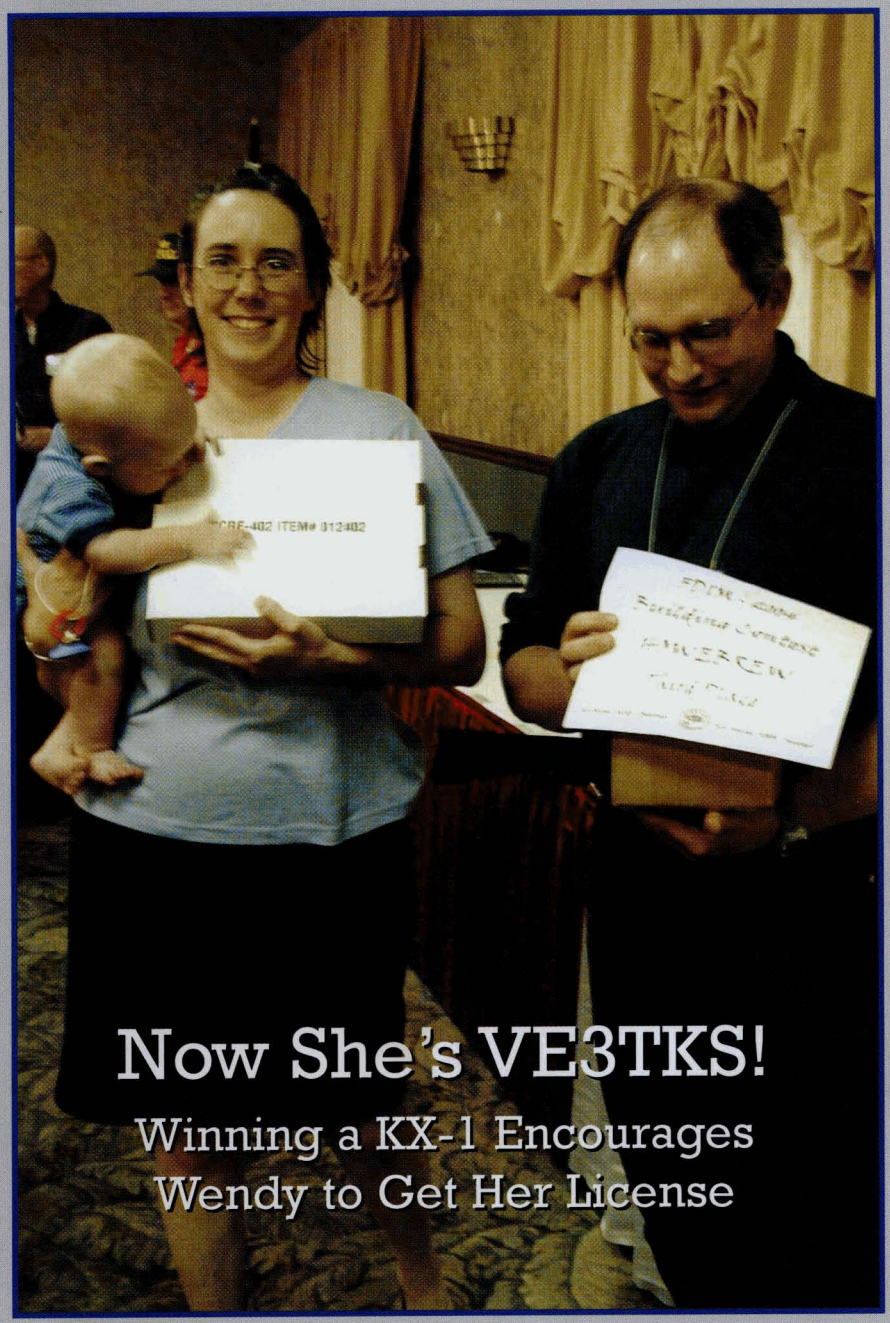
Journal of the QRP Amateur Radio Club International



Now She's VE3TKS!

Winning a KX-1 Encourages Wendy to Get Her License

- FDIM Recap—Lots of Photos and Stories
- G3ROO, N8ET and KD1JV Inducted into the QRP Hall of Fame
- QRV?—Build A QRP Homebrewer's VFO
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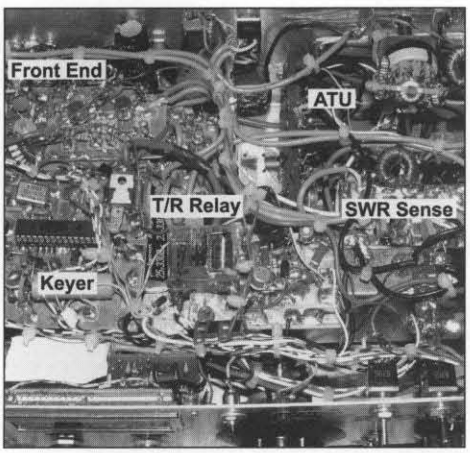

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Technical Articles

The Joy of QRP

The World of QRP ARCI

From the Editor's Desk

Mike Boatright, KO4WX—Editor ko4wx@mindspring.com

Most of the people that I work with spend their vacations in exotic places like Aruba or Las Vegas. They just don't seem to understand why I prefer to take mine during the rainy season in Dayton, Ohio. My boss just never seems to understand how important it is to drive 500 miles so that I can spend a few days catching up with my buddies from around the world and learning about the psychology of the QRPer.

And he is equally clueless as to why I would lug a bunch of radio gear up to a farm, get a sunburn while setting up antennas and then get no sleep playing radio all weekend. He just doesn't seem to care that for several days in June, I have this ringing in my ears vaguely akin to the letters "QRZ?" in Morse and that I found it necessary to greet him in the morning with "TU UR 2A GA."

Well, we may be an odd lot, but by golly, we sure do seem to have a lot of fun, don't we? If you missed Four Days In May, well—it is never too early to start planning for next year's FDIM, which will be QRP ARCI's 10th anniversary of the event. For those of you who were there, we've got lots of FDIM coverage in this issue just to keep the memory green.

Just two days after returning from FDIM and still recovering from the ensuing post-partum depression, I was asked by the Georgia Emergency Management Agency if our ARES organization could forward deploy with GEMA to St. Simons Island, the site of all of the security, logistics, command and control for the G8 Conference.

For eight days in June, a handful of us operated "field day" from the public, but very well protected St. Simons Airport. I say well protected, because we were defended by Secret Service snipers, a National Guard infantry brigade, SAM missiles, bomb-sniffing dogs and constant helicopter surveillance. Imagine all that at your Field Day site!

I'd love to say that we did a lot of QRP operating from the G8, however, though things went pretty quietly, we were very busy. I did get to operate in the Spartan Sprint, using our special call, K8G—that was fun, even under lousy band conditions.

What I did do, however, was use a lot of tools and techniques that I have learned and honed as a result of QRP operations such as ARCI's Milliwatt Field Day and other to-the-field events. Our communications vehicle ("MCV") was parked right next to the National Guard Battle Command truck. Even though they had millions of dollars worth of the latest communications gear, the guys kept coming over to our van to chat and take tours—"now this is real radio" they said. What they were observing, of course, was that radio amateurs know radio, and that skill transcends power.

If you heard Ed Hare, W1RFI's, talk during the FDIM Symposium, you should be very scared about the threat that BPL presents to amateur radio, and to QRP in particular. What strikes me as odd, however, is that it seems that many of us are more interested in arguing about the "dumbing down" of amateur radio than in asking ourselves "how can we increase the skill of new hams coming into amateur radio?"

I learned to operate 20 WPM CW not because it was required by the FCC, but because I watched guys operating CW all night during Field Day and dreamed that one day I could, too.

If there is anything that will save us from BPL, it will be our skill as radio operators. Things don't look so good right now in the fight to make BPL "go away." So it may be time to start figuring out new ways that we as QRPers can live and operate in a BPL world.

Now that may take some real skill!

—72 de Mike, KO4WX

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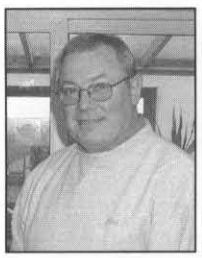
From the President

Dick Pascoe—GØBPS president@qrparci.org



WOW, what a great Four Days in May we had at Dayton! Not only did we get frightened to death about the potential threats to our bands, but the adrenalin levels hit the roof with a 20 year potted history of George, G3RJV's visits to the USA.

As I walked out Thursday morning at 8 a.m. to look at the sea of faces to welcome everyone, I could feel the aura around the room as everyone was waiting for me to finish—shut up and let the symposium start. I concurred with their silent request and kept my bit short and that was when the horror story started.

If you weren't there you should have been. Our very own ARRL mole Ed Hare, W1RFI, gave a presentation on Broadband over Power Lines and if you feel complacent about this—don't. It has a horrendous potential for causing us serious problems not only for US readers, but for ALL hams in every country. If you get the chance-make your feelings known to those that need to be told.

The workload of the worker bees setting up something like FDIM is enormous. They have to get this right as well as do their normal everyday job and look after the family. I stress to them every chance I get that work and the family come first, ARCI comes a little (but only a little) lower down the list. Yet again they pulled it all off with style and a panache that I envy.

The Board of Directors met at Dayton again this year despite the charges that it would become a free-for-all fight between directors. The meeting last year had proven that we could act like adults (only just) and this year proved that conclusively. We chewed the cud over several matters and agreed on a few. Suffice it to say that we did manage to agree a few points with a fight. Among the items agreed upon was that we would not yet offer life membership—the low interest in this does not justify the expense. Also, it was decided that various hamfests would see our presence with a new banner and even more in the toy store. I can confidently say that YOUR BOD is on top of things.

The booth at the Hara Arena was busy and a lot of the toy store found a new home. The BOD members and others who gave their time instead of roaming the hamfest had a ball, the interest from the passers by just keeps getting better. The couple of talks at the Arena went down well and we even more than covered our costs again this year!

You will have heard/read about the new HOF inductees by now and we (the BOD) had a ball on this front. Neither Ian, G3ROO, nor Bill, N8ET, knew of their induction and the look on their faces as I announced their names was a wonderful sight. (For more details, go to page 6.)

The highlight of the banquet was the multitude of quality prizes given away; this included a superb new Argosy rig, a K1 as well as several other prime offerings. I even managed to walk off with a mini paddle!

The Argonaut had been a separate raffle where tickets were sold during the FDIM and at the arena. This was so successful that we quickly paid for the rig. The FDIM team agreed that the excess monies should be used to purchase extra prizes for the raffle and banquet. Needless to say we shall be doing this again and have another major rig to raffle at FDIM 2005.

Now is the time for all of you to book your flights, rides, charge the cars and book your room at Dayton. FDIM will be 10 years old and we WILL be celebrating our tenth anniversary with some fabulous stuff for you all. You will have to be there to find out all about it.

A cry for help: The organization of FDIM takes a small group of people quite some time to put together and sooner or later they will want to take a break. We need understudies to help them and eventually take over. We also need help on various fronts throughout the year; it might just be help in answering an email or going to your local hamfest and working the booth for a couple of hours. YOU may just have an expertise that we need perhaps just once a year. Take this opportunity to offer a little back to your club and join our Action Team. This team is run by Past President, Jim Stafford, W4QO, if you would be able and willing to join the Action Team and offer to help at any level email Jim at jim@w4qo.com or to me at g0bps@trickie.com.

Finally I would like to put in writing my sincere thanks to Tom Dooley, K4TJD, and his team of helpers for making FDIM such a huge success.

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Correspondence

To the Editor:

Hello from an old QRPer (#8). I assume the club is still active from what I found on the internet. Believe you activated Harry's old call K6JSS (#1) which is sure a tribute to the "Old Man." I visited him at the Veteran's Hospital in the San Jose area many years ago.

A coincidence—my Costa Rican call was TI2WX for many years—worked many a QRP Contest from there. No longer an active ham; sold all my old gear and am an active genealogist since retirement 7 years ago to Nevada.

Guess I held about every office in QRP, from General Secretary to Awards Manager to President. Gee, that was a long time ago!

Like to hear from you and find out about the present Club.

73, Jim Perry
495 Pine Trace Ct.
Henderson, NV 89012

Jim,

Thanks for the nice note. Yes, I did activate K6JSS for the QRP to the Field contest. It was a lot of fun and even more fun telling folks the history (at least as I know it) of the call and Harry's significance to QRP ARCI.

The present club is quite strong. In fact, we're holding our annual "Four Days In May" (FDIM) this week in Dayton, OH. Thursday's QRP Symposium has one of the largest pre-registrations ever. Amazing that over 200 QRPers will show up from

all over the world for a QRP symposium the day BEFORE the Dayton Hamvention!

The *QRP Quarterly* remains the premier international journal of the QRP community. We're quite proud of it, and as editor, I am extremely proud of my staff.

Very much appreciate hearing from you and hope you enjoy.

72 de Mike, KO4WX
Editor, *QRP Quarterly* magazine &
Member, QRP ARCI Board of Directors

Hello again, Mike, from QRPer #8:

Please pass on to Hank K8DD, my sincerest thanks for the four *Quarterlies*. They were a far cry from the first attempts of a newsletter which I published long ago. I used a spirit machine (much like a mimeograph) to produce a quarterly. That was back in the early 1960s. As I remember, it was 4-8 pages with the main goal of keeping the gang advised of new members. We had some construction articles, and award info, with a section on correspondence from members. It was a rather pitiful attempt to keep everyone informed of our growing pains.

I believe I have some copies of the first few newsletters somewhere filed away. If I can stand the heat in the garage (105 degrees today) I will search them out and send them to you. I do have copies of the first awards put out by the Club, if you would like them. They're my old certificates. They are in a scrapbook where I stashed all my old framed awards. I know where that is.

You have really brought back some of the memories of the '60s. I remember searching the bands for "CQ QRP" on the same frequencies you still use. I had a Hallicrafter S-85 and DX-20, XTAL controlled, and a TA33Jr. Big rig!

Again please thank K8DD for his thoughtfulness. I certainly wish QRP ARCI the best.

73, Jim K4WVX, QRP #8

To the Editor:

Subject: Life membership—Count me in along with Larry Jones in his correspondence to the editor in the Spring 2004 *QRP Quarterly*. I've asked about this before, and I'm asking again. I'd like to see something come out of this. Thanks,

Chuck Tankersley
KC4CC
Stone Mountain, GA

To the Editor:

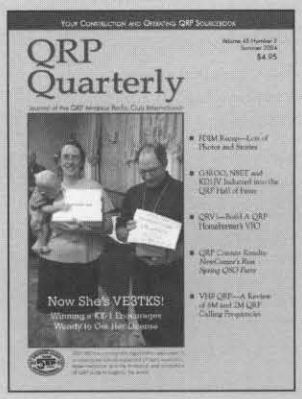
Mike, I had to tell somebody—I got my SA running a few minutes ago! I'll have it at Dayton—CU there!

73 - Bill - N8ET
Kanga US
kanga@bright.net

Bill Kelsey, N8ET, is the proprietor of Kanga US, a member of the QRP ARCI Board of Directors and was inducted into the QRP Hall of Fame at the 2004 FDIM. Those of us who have built the W7ZOI Spectrum Analyzer kit (sold by Kanga) can understand his excitement, so we decided to share his happy dance with all QRP Quarterly readers. He sent along the photograph above—always interesting to see another guy's bench, isn't it? —*Editor.*

Something on your mind? Send your "letter to the editor" by e-mail to QQ Editor, Mike Boatright, KO4WX at: ko4wx@mindspring.com ●●

On the Cover



When Wendy Hetherington, VE3TKS (left), won the KX1 (donated by Elecraft and QRP ARCI) at the FDIM Banquet, her husband Jeff, VA3JFF (right), said "Now she has to get her license so she can build and operate it!" Your editor told her that if she earned her license before this issue went to press, we would put her on the cover. That was the incentive she needed and she passed her exam on June 11. Chomping at the bit to get started with construction is son Ian (no call yet), but it is clear he has a particular enthusiasm for radio construction! Jeff also took third place in the Homebrew Construction Contest. (FDIM coverage starts on page 40.)

Bill Kelsey, N8ET's W7ZOI Spectrum Analyzer, on his construction bench.

QRP ARCI CLUB NEWS:

See W4DU's article on this year's inductees into the QRP Hall of Fame on page 6 (next page) of this issue

2004 QRP Hall of Fame

Ken Evans—W4DU

vp@qrparci.org

Each year, the QRP community is given the opportunity to nominate people for induction into the QRP Hall of Fame. Nominees should be QRPers who have made significant contributions to QRP in one or more areas, and preferably things benefiting a large number of people. Long-term contributions carry more weight than limited, short term ones. Nominees are people that have been actively serving the QRP community for an extended period of time, i.e., several years.

As always, each nominee is judged on his/her merits; this is not a competition to choose the top two or three or whatever. There are no quotas and no limits. If the voting body concludes that none of the nominees truly deserve the honor in a given year, none will be inducted. On the other hand, if there are a dozen nominees and all are judged worthy, all will be inducted.

The voting body consists of the President and Board of Directors of QRP ARCI and all people inducted into the QRP Hall of Fame during the previous two years. A two-thirds majority of the voting body is required for a nominee to be inducted into the QRP Hall of Fame.

This year, the voting body selected three worthy QRPers for induction in the QRP Hall of Fame. They have been inducted for the reasons listed below and many others that are not reflected in these brief descriptions.

Bill Kelsey, N8ET (left) and Ian Keyser, G3ROO (right), after being inducted into the QRP Hall of Fame at the 2004 FDIM Banquet.

Bill Kelsey, N8ET

Bill Kelsey, N8ET, was first licensed in 1962 as WN2FGA while growing up in upstate New York. His first rig was a Heath AR-3 and a homebrew transmitter. He remained active through his college days at Cornell University. After college he developed an interest in contesting (which he still maintains today). He also started his 26-year career with Marathon Oil, which included an assignment in the UK from 1978 through 1983. It was there he developed his interest in QRP—at first as a method to avoid RFI problems with the close in British neighborhoods. Bill Kelsey has been a fervent QRPer ever since.

Although he is a QRP equipment dealer (Kanga US), he supports all the activities, and is always there when someone needs help. He has been a part of FDIM for as long as it has been running and he is always very generous with prizes. He is an active participant in many of the QRP contests.

Bill has been the G-QRP Club US representative for some 20 years, handling the interests, subscriptions and inquiries of US members. During this time Bill has been "the face of the G-QRP Club"" in the USA forging excellent links between the club and QRPers in the US. Not least in this work has been Bill's assistance in the G-QRP Club presence at Dayton and in the Four Days in May event. A "little corner of England" exists in Bill's basement, where the materials and equipment for the G-QRP Club at Dayton have been stored for many years. In his own quiet way, behind the scenes, Bill has done more to link QRPers in the UK and the USA than anyone. He is a true promoter of international QRP.

Bill has also been an enthusiastic champion of the home construction of QRP equipment. Originally founding Kanga-US to sell the UK Kanga Kits in the USA, Bill later added Hands Electronics Kits, KK7B and W7ZOI projects to the range he made available to US hams. This may appear to be merely a commercial enterprise, but anyone who knows about QRP kits also knows that little money can be made from selling the smaller and simpler QRP kits. It is a venture of love and interest in spreading QRP rather than commercial shrewdness.

Bill is well known for his very personal back up and advice to all who obtain kits from Kanga-US. His kit buyers get value above their money in terms of Bill's personal guidance. Bill is a long-time servant of QRP both in the US and the UK.

Ian Keyser, G3ROO

Ian Keyser, G3ROO, has been interested in radio since age 8 when he built a regenerative receiver. He passed his Radio Amateur Exam in 1960 aged 16 but did not pass the Morse exam until 1962—it was

13th November at 1300 in Room 13 and he passed!!

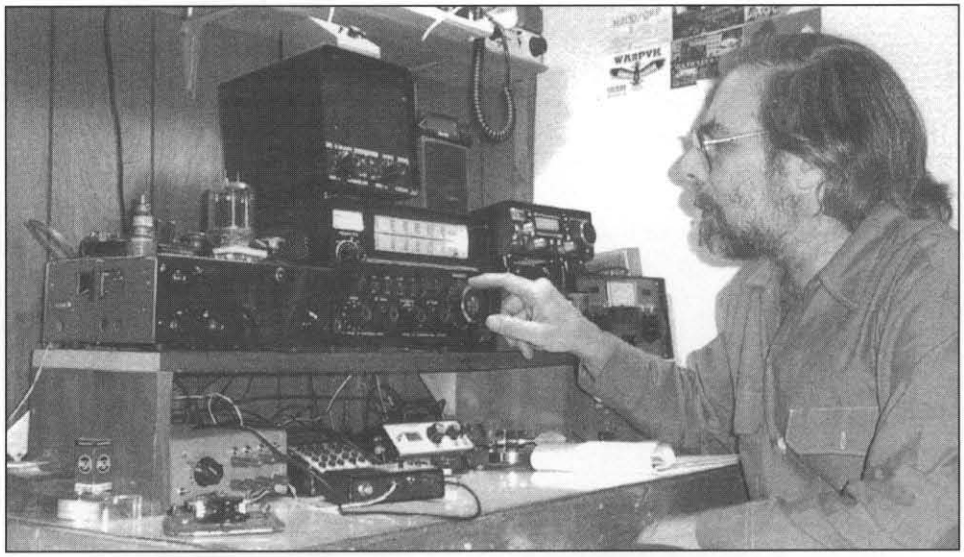
Ian went to sea as a Radio Officer in the Merchant Marine. After three years at sea, he married Margaret and they moved to Dover, England as a radio officer on ferries to and from France. His hobbies at that time were radio and scuba diving. A diving accident—caused by a micro bubble that destroyed part of his brain stem and sense of balance along with it—forced his retirement in 1984 at the grand old age of 40.

Ian's passion for CW meant that he tutored amateurs for the Morse test, and when the RSGB took over testing he was made Senior Examiner for Kent. This continued until last year when the Morse test service was disbanded. He is now in the process of setting up a Morse Proficiency Program for the RSGB, which will include training as well as testing.

Ian is the consummate QRPer and builder. To walk into Ian's ham shack is like walking into a museum, and his enthusiasm for the hobby knows no bounds. Asking a simple question about any one of the thousands of pieces of gear—much of which he has built by hand, and all of which he has operated and loved for years—will lead to the most fascinating learning experience.

G3ROO is the Roo of Kanga UK, which he started in 1979 selling VFO kits and modifications for the FT707 (FM and 160m). The company flourished for many years in both the US and the UK. Ian has designed many radio projects and contributed numerous articles to the G-QRP *SPRAT*, *Practical Wireless*, RSGB *RADCOM*, and the *QRP Quarterly*, among others.

Ian serves in the capacity of "Circuit Construction Advice" role for the G-QRP and is often found giving advice to newcomers as to how to get on the air. Ian's expert advice can be found most any day on the G-QRP list as he often responds to questions posted to the list. His antenna expertise is well known and has assisted many in getting into portable operation with a well-designed and functional antenna. Many have found Ian on the air while "pedestrian mobile" while testing his small portable antennas.



Steve Weber, KD1JV, designer, Elmer and author, was hiking on the Appalachian Trail during the 2004 FDIM when he was inducted into the QRP Hall of Fame.

Steve Weber, KD1JV

Steve Weber, KD1JV, was born and raised in South Plainfield, NJ where he was first licensed in 1968. His early logs reflect a 1969 cross-town QSO on 40 meters using a two-transistor homebrew transmitter. Most of his early operating was on 2 meter AM using a two-tube transmitter built from a design in the *ARRL Handbook*. After a stint at Lowell Technological Institute, Steve took a job with a "start-up company" where his electronic skills were honed and expanded. After 10 years, Steve left the job and spent a number of years hiking the Appalachian Trail while working as a caretaker for many of the camps. Eventually, he settled into the small town of Berlin, NH where he has a TV repair shop and also develops his fine designs for QRPers.

Steve's outstanding technical contributions include numerous articles in *QRP Quarterly*, the *Homebrewer*, as well as his superb designs and kits for QRPers. Readers of the *QRP Quarterly* from 1996 to present can attest to Steve's technical contributions. Steve's support of QRP organizations is exemplified by his donation of the rights to the "Tenna Dipper" kit to 4SQrp Radio Club. Proceeds from this donation helped to finance Ozarkcon and further spread the QRP message.

Steve's fame in terms of his limited production kits and the high quality of those kits is legendary. As seen on QRP-L there have been numerous emails looking to get hold of his AT Sprint and the AT Sprint II. The premium that these kits have commanded on E-bay further highlights their quality.

Steve is also known for his Elmering of QRPers. One individual purchased one of Steve's "AT Sprint" kits from another ham. The purchaser lifted some traces on the circuit board installing the DDS chip. When asked for help, Steve said "Send it to me and I'll see what I can do." Instead of returning it with a "Sorry, it's dead," Steve took a partially completed AT Sprint he had, and added parts from the DOA board, providing the ham with opportunity to have a working AT Sprint.

Steve is also an Elmer to subscribers of QRP-L. He has answered numerous technical questions and provided his insight on many of the threads on QRP-L.

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QRP Hall of Fame Nominations

Persons wishing to nominate a prominent QRPer for the QRP Hall of Fame should contact one of the QRP ARCI officers or Board of Directors members. See page 64 for a list of these people and their contact information.

Formal guidelines are also published from time-to-time as an official "Call for Nominatons," and appear in *QRP Quarterly* and online at www.qrparci.org.

Idea Exchange

Technical Tidbits for the QRPer

Mike Czuhajewski—WA8MCQ wa8mcq@comcast.net

In this edition of the Idea Exchange

Years ago, QRP Hall of Fame member Joe Everhart, N2CX, promised me an endless string of his Technical Quickies if I wanted to run them. With this issue he hits a major milestone, the half century mark. I never really thought I'd see this when he started up over ten years ago, but here's Quickie #50.

Quickie #50—Current Test Adapter and a New QRP LED Light

Every time I go into camping stores and WalMarts I always check for new LED flashlights. Once or twice a year I'm rewarded with novel products and sometimes even useful ones. I recently ran across one in my local Wally World. It's an Energizer combination LED flashlight and fluorescent light. More about the light itself later.

One thing that caught my eye in the packaging (clever way to draw attention to a new product) was a "push here to check it out" button. Sure enough when I pressed, the lamp lit up. A cursory scan of its features convinced me to part with the paltry $13 or so it cost.

Like a child who enjoys a toy's box more than the toy itself, I was curious to see how Energizer managed to parallel a zero cost switch for the instant gratification "push here" feature. As you might imagine it is both cheap and clever. Figure 1 shows the guts.

The switch itself is simply two springy copper strips separated by a couple pieces of Styrofoam. The package was arranged so that pressing the proper spot pressed the copper strips together. Connection to the flashlight was made by wires connected to a square of .016 or so thick double-sided PC board. Wires connected the two faces to the makeshift push switch.

It's rather obvious how this turned on the flashlight. The PC board was slipped into the flashlight battery pack between one of its AA cells and the corresponding spring connector. With the push switch open, the cell was insulated from the spring connector and with the contacts closed, the electrical connection was completed. The flashlight slide switch was set to the "ON" position before packaging so that the flashlight lights up for the prospective consumer.

While that's neat in itself, it reminds me of a trick I learned long ago for non-intrusive power measurements. QRPers and homebrewers often have a need to measure the power consumption of a battery powered device. Something that is breadboarded is no problem. All you have to do is open up one of the power leads and put an ammeter in series. However with something already built and in a case, it's messy to have to cut a power lead for the measurement and then restore it when you're done.

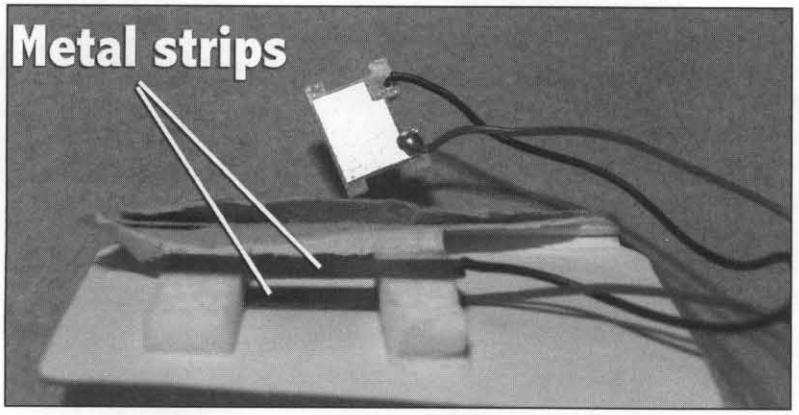

Figure 1—The low cost "try it now" switch.

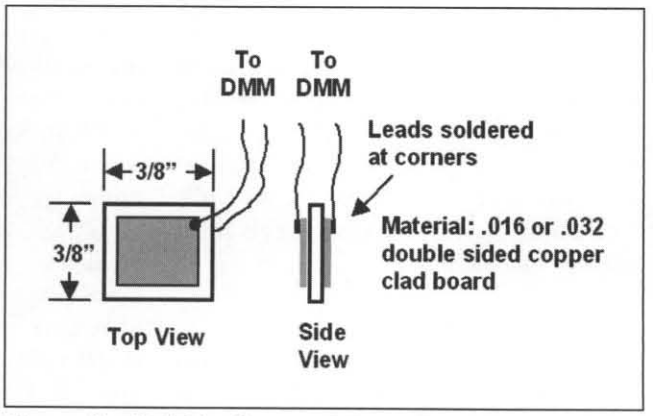

Figure 2—Quickie Current Measuring Adaptor.

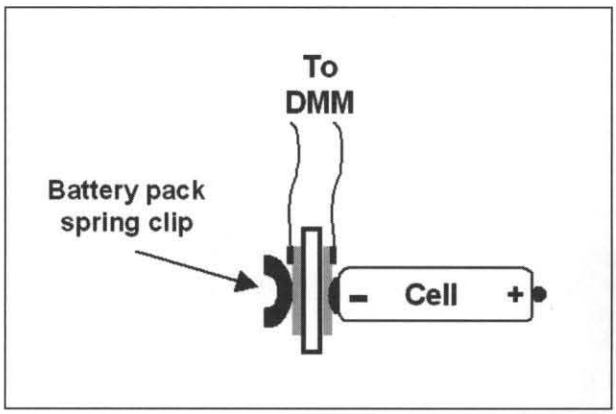

Figure 3—Adapter between cell and contact spring.

Figure 4—Side view of the light.

There's often a handy fix if the unit has a battery pack with individual cells. You simply make up a thin piece of PC board material similar to one used in the Energizer switch described above but instead of connecting it to a switch you connect an ammeter between the two sides (Figure 2). So when you slip it between a contact spring and cell in a battery pack, you put the ammeter in series with the power source (Figure 3). When you are done, you simply remove the current measuring adaptor. It's neat and simple without the need to make any wiring modifications.

Now back to the flashlight. It's a handheld device that runs from four AA cells. The "business end" uses a single, rather bright white LED as a standard flashlight. What's unusual about it is that while it uses a standard reflector, there is a lens area in the center of the clear plastic bulb cover. The net result is that the center of the beam is much brighter than the rest of the beam and when it is shined on a distant surface it has a distinct bulls-eye pattern.

In addition to the usual flashlight function, the device also has a fluorescent light on the top surface of its handle for area lighting. It's not bright enough to light up a room though it is fine for the inside of a small tent or perhaps a Field Day operating position. It will get a tryout during Field Day 2004. A side view of the light is shown in Figure 4.

The package claims 100 hours operating time for the LED light with a single set of alkaline AA cells. An on-line users group rated the battery life at about 10 hours for the fluorescent. To close the loop so to speak, I measured battery current in both modes using the original external switch mechanism as a current measuring adaptor. With fresh batteries, current drain for the LED mode was about 70 mA and about 250 mA in the fluorescent mode. I've not measured the operating life but the estimates seem rather optimistic.

P.S.—The one I bought in the camping section of WalMart was called the Energizer Trailfinder LED and was gray in color. My local Lowe's has a similar looking red one in the "impulse purchase" area by the checkout counters called the Energizer Double Bright. The latter model appears on The Energizer web site at http://www.energizer.com/products/flashlights/flashlight.asp?cat=1&id=2.

Don't be fooled by the similar looking ivory colored "Arc White" that has the same fluorescent feature but a very power hungry (though much brighter) Halogen flashlight bulb.

—de N2CX

Spurious Emission Limits changed

Ed Hare, W1RFI, a member of the ARRL staff and well known QRPer (as well as a member of the QRP ARCI Board of Directors) posted this information in May about the new FCC requirements—

The most extensive and substantive Amateur Radio rule change involves §97.307, emission standards. The FCC has revised the wording of §97.307(d), which defines spurious emissions. The updated language imposes a slightly higher standard on newer transmitters or amplifiers of any power level. Starting June 1, the rule will require that:

- The mean power of any spurious emission from HF transmitters or external RF power amplifiers installed after January 1, 2003, must be at least 43 dB below the mean power of the fundamental emission.
- The mean power of any spurious emission from HF transmitters or external RF power amplifiers installed on or before January 1, 2003, must not exceed 50 mW and must be at least 40 dB below the mean power of the fundamental emission. If the mean power output of such as transmitter is less than 5 W, the attenuation must be at least 30 dB.

Still exempt from the provisions of §97.307(d) are transmitters built before April 15, 1977, or those first marketed before January 1, 1978.

Note that this change to the rules is retroactive to 1/1/2003 and covers any transmitter INSTALLED after that date. If you build an old Heathkit transmitter after 1/1/2003, if it was not exempt as described above, it needs to meet the –43 dB standard.

This is a 13 dB change from the present rules for QRP transmitters. Most rigs will meet this, although if memory serves, some of the kits may not. You can probably meet the requirements with a simple bandpass or low-pass filter.

I just wanted to give the QRP community a heads up on this one.

WA8MCQ note—This information also appears in the July issue of *QST*. While some people seem to think this is a sudden development, many of us knew it was coming sooner or later since it was first announced publicly a couple of years back. (It didn't get a lot of attention at the time.)

—de W1RFI

Intermittent Contacts on Paddles and Bugs

Intermittent contact can be a problem with any Morse keying device. Depending on the design, those can be "real" silver

contacts, or something fabricated from stainless steel, brass, or perhaps even an ordinary steel screw. The surface condition can vary dramatically over time, resulting in intermittent operation.

And it's not limited to what we usually think of when someone says "contacts." The signal path also includes the circuit back to ground, which, depending on the design, can be through a moving metal shaft which is mated with a stationary metal support block of some sort. (The latter would more than likely include some sort of threaded piece to adjust tension on the joint.) That junction can also become intermittent electrically. Regardless of what part of the circuit is causing the problem, whether the "real" contacts or something else in the return path, here's some good info from the Elecraft mail reflector, Elecraft@mailman.qth.net:

Paul, VA7NT, posted this—I have a set of G4ZPY miniature paddles that I keep in my portable case with my Elecraft K2 when I travel with it. I have noticed that the brass contacts can be intermittent, causing real frustration. I have tried contact cleaner on the relevant parts, but the relief is only temporary. Anyone know of a better way of making brass contacts more reliable?

Ron, AC7AC, had this reply—For years I fought intermittents with the contacts on my Speed-X bug (a real, 50 year-old mechanical semi-automatic key). Modern rigs don't run enough current through the contacts for self-cleaning action.

I had to burnish my contacts with a piece of paper every few days when the dits became intermittent during a QSO. I tried all sorts of contact cleaner without success.

Then I tried a drop of DeoxIT on the contacts. I let it sit in the gap for a few minutes, then daubed the excess out with a bit of paper. It's been more than a month since I did that and the contacts still work fine. It never went more than several days before, certainly less than a week.

It seems to me that DeoxIT leaves some sort of film on the surface of the contacts that keeps them from oxidizing. It certainly works better than anything else I've seen—short of 100 mA at 200 VDC across the key.

From Vic, K2VCO—I take it that you are not referring to the contacts that make the dots and dashes, but rather to contact between the arms and the base. If it's possible to bypass them with a small wire, that would do it. But you have probably already thought of this! Other than having the parts gold or silver-plated, I suggest using Caig DeoxIT as a cleaner. It is much better than ordinary contact cleaners.

[*WA8MCQ note*—I have an old Vibroplex bug that I bought used in the late '60s and it has a small piece of wire braid connecting the moving arm and the base. The Vibroplex paddles I bought in the late '80s do not have one, nor does my old E. F. Johnson bug.]

rom Mike Neverdosky, N6CHV (a QRP-L regular)—Try silver or gold plate. Silver conducts better, while gold resists corrosion better. Look for gold or silver plating at auto detailers as they replate badges and emblems on fancy cars with regularity.

Leo, PA5LS, had this comment—Try a bit of paper: squeeze it between the contacts and then rub. [*WA8MCQ comment*—when I was in the Air Force, it was common practice to use a (US) dollar bill to clean contacts.]

Paul responded with—Unfortunately that will not work with these as the connection in question is between a post with a rounded end, and a small indentation drilled into another brass piece. This provides the ground connection for each paddle arm.

WA8MCQ note—DeoxIT products from Caig are available at Newark Electronics (which now calls itself Newark in One), www.newark.com. They can also be found at MCM Electronics, www.mcm-electronics.com. (DigiKey and Mouser don't seem to have them, according to an online search.)

A few months later, on QRP-L, Tom McCulloch, WB2QDG, asked for help with his own contact problem:

I have the "NorCal Paddles" and I really enjoy them but seem to have a problem with lack of continuity occasionally when the contacts are closed. As a matter of fact someone was kind enough to send me several silver contacts which would help alleviate the problem; I wasn't sure how to mount those so I never did.

Bob Bruner, W9TAJ, suggested DeOxit and had these comments—

DeOxit in the red can is excellent for cleaning most metal contacts and keeping them working. It's too aggressive for plastic volume controls, though, so don't use it there. They make another DeoxIT in a blue can for that, which is also very good. There is another liquid for treating contacts after they have been cleaned with the red can contents, and another optimized for gold contacts. MCM Electronics sells most forms of it in the spray cans. It's also available undiluted in bulk and in larger cans as well as those little vials they sell to audiophiles

From Bill, K3UJ—DeoxIT will enhance any contact that you can apply it to. I got mine at a high end audio store; audiophiles use it on interconnects for better sound. I have a set of iambic paddles that used to drive me crazy, needing contact cleaning after every few QSOs. The keyer in my Kenwood puts such a small current through the key contacts as to offer no self cleaning at all. After using DeoxIT, the paddles have gone a year without the need for cleaning. The small $5 tube is probably a lifetime supply.

Bob Patten, N4BP, had these comments—In some (perhaps most) cases, the problem is not the contacts at all, but rather the bearings. When I built two of these paddles back when they were initially offered, both exhibited the "intermittent contacts" syndrome. As soon as I heard about them, I ordered and installed the silvered relay contacts in both paddles, but they continued to show the same symptoms.

The Arizona ScQRPions apparently experienced the same problem with the NorCal paddle and incorporated a fix in the offering of their own paddle kit. I built one of their paddles and found that the contacts were 100% reliable. Shortly thereafter, I "borrowed" their idea and used it on the NorCal paddle. I drilled two small holes through the base, directly behind the bearings. I soldered single strands from stranded hookup wire to the underside of each arm in line with the newly drilled holes. The wires are fed through the holes, the arms are re-mounted on their bearings, and the other ends of the wires are soldered to the ground lug on the underside of the base. This completely solved my "intermittent contacts" problem!

More recently, my friend W4OV managed to find an unbuilt NorCal kit and put it together. He found he was having the

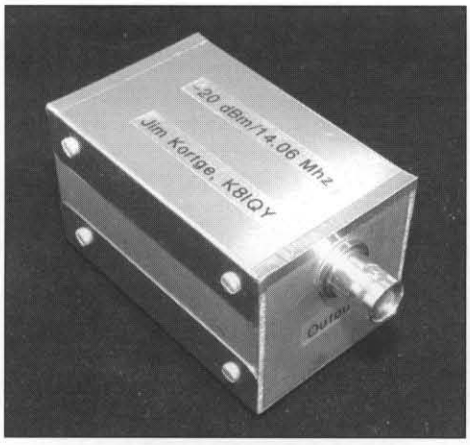

Figure 5—The K8IQY -20 dBm signal source for receiver MDS and dynamic range testing.

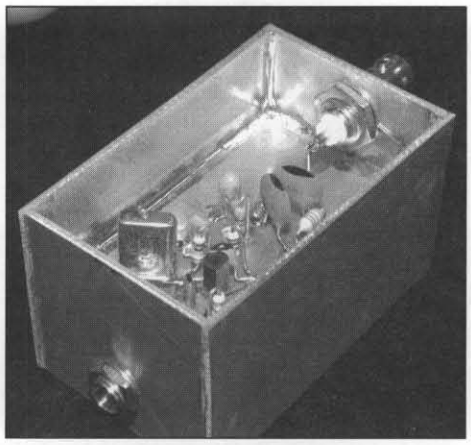

Figure 6—Under the cover of the source. Power comes from the other side, below the floor.

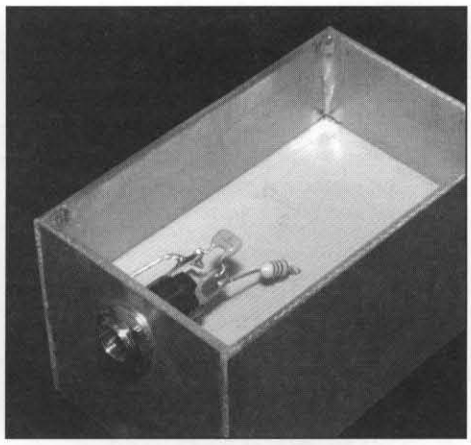

Figure 7—Underside of the source. DC power comes in here and gets decoupled a bit before being fed to the circuitry on the other side.

same problem with the contacts. He also ordered a set of the silvered relay contacts, but has yet to install them. But he did do the mod I described above, and it also cured his problem.

WA8MCQ comments—As mentioned earlier, my old Vibroplex bug has a piece of small gauge copper braid grounding the arm. That would be less likely to get accidentally broken than a single strand of wire. You could strip the braid off a piece of small coax like RG-174, or use a bit of desoldering braid (Solder Wick). At work we have it in several sizes, usually bought at Techni-Tool, some as small as 0.025" wide. If the braid is coated with flux, wash it out with some alcohol before using it.

Although paddles and bugs were mentioned, all of the above also applies to straight keys.

A –20 dBm Signal Source for Receiver Testing

I ran into QRP Hall of Fame member Jim Kortge, K8IQY, again at Atlanticon in Baltimore in 2004. I am a sucker for neat little thingies in small boxes, and I was intrigued by one that he had on display at his table. When asked where he had submitted it for publication he indicated that he had just built it and that it was up for grabs. I quickly extracted a promise to send a schematic and some better pictures than the ones I took and here it is. This isn't something that everyone will necessarily want to build, but it's a must for the serious homebrewer. — *WA8MCQ*

As many of you know, measuring most receiver parameters requires using two sources, usually offset by 5, 10 or 20 kHz. While one might have a good signal generating source in the home lab, having two of them is often prohibitive from a cost stand point. This –20 dBm source can be built for any frequency. However, for my use in measuring the receive strip of my new 2N2/20 transceiver, a second signal source on 20 meters was needed. Since readily available crystals are available from NorCal, and other suppliers, that hardest-to-find of the parts is quite easy to acquire.

This source can be used in many ways. When used with a precision attenuator, one can measure a receiver's Minimum Discernable Signal, or MDS. Another measurement that can be made with this combination is opposite sideband suppression or rejection.

When used with another signal generator having an adjustable output level, and a 3 dB splitter/combiner, one can measure the other parameters that characterize receiver performance such as Blocking Dynamic Range, Intermod Dynamic Range, and 2nd and 3rd Order Intercept points. Details of how to perform these measurements can be found on the ARRL website, and in numerous technical journals.

Three attributes are important in a signal source used for receiver measurements. They include frequency stability, amplitude accuracy, and signal purity. The circuit used for this source provides two of the three, and the packaging approach provides the remainder.

Frequency stability is achieved through the use of a crystal, and operating it at a very low excitation level. This approach minimizes crystal heating, and heating within the feedback capacitors and other circuit components. The crystal itself provides most of the frequency stability. However, crystal heating detracts from frequency stability. Capacitor heating primarily affects amplitude (output level) accuracy.

Signal purity is assured by extensive shielding of the active circuitry in the top part of the housing, and also minimizing leakage into the housing by outside sources, such as nearby commercial radio stations. The shielding provided by the enclosure design is on the order of 100 dB. Figures 5, 6 and 7 show the unit.

The circuit itself, shown in Figure 8, is a common Colpitts configuration, but with some important changes over the circuits one normally sees. First is the collector supply, which is regulated at a very low value, using a 1.8 volt LED. This is the first step in assuring low power circuit operation. The second circuit change is the use of a large emitter resistor, 3.9k, to limit circuit current. These two circuit features, along with relatively small feedback capacitors, provide the required frequency stability and amplitude accuracy desired. The output impedance of the source is 51 ohms, determined by the collector resistor. A 3-pole, half-wave output filter removes harmonic content, so that the output purity is acceptable. Spurious signals are –35 dBc or greater.

The same topology can be used for

building a signal source on other ham bands, or any frequency for which a crystal is available.

WA8MCQ notes: The NorCal crystals are available through the AmQRP web site. Go to www.amqrp.org, click on the "kits" button, scroll down to NorCal QRP Club Kits, and under "Active Kits — Available for ordering," click on "NorCal Crystals."

QRP Hall of Fame member Doug Hendricks (KI6DS) and NorCal have been offering some small, wire leaded crystals for QRP frequencies for over ten years, at a good price, and it's a very valuable service. I have several of them around the house and they are very handy for building.

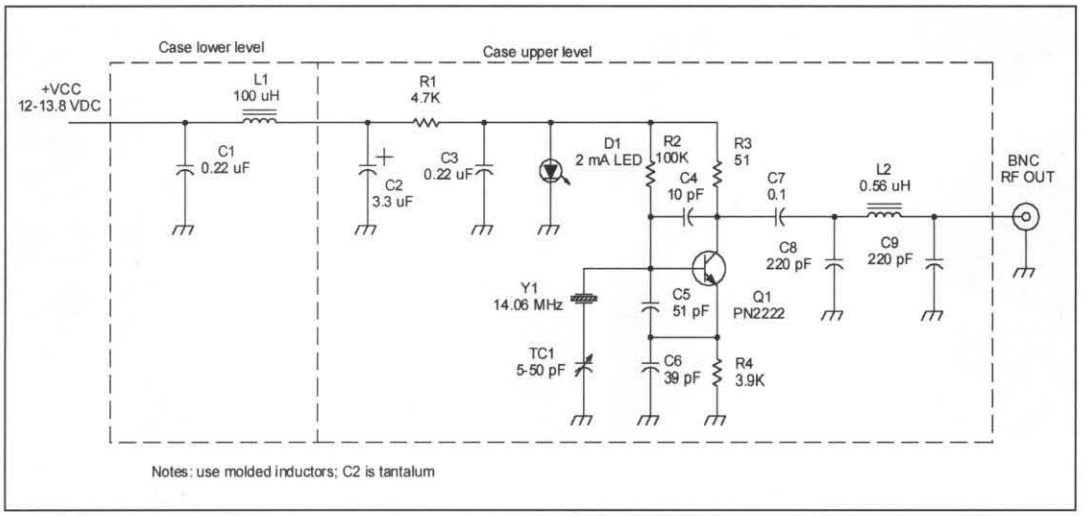

Figure 8—Schematic of the K8IQY –20 dBm signal source.

According to the web page in June, they currently have them available for 3.579 MHz, 7.040 MHz, 10.116 MHz, and 14.060 MHz. Except for 3579, they are $3 each. The color burst crystals are 25 cents each, although you have to order those in quantities of 4. They also offer a price break if you order 10 or more of the $3 crystals, and you can mix and match frequencies.

—de K8IQY

Erecting Antennas with Fruit

QRP ARCI president and QRP Hall of Fame member Dick Pascoe, GØBPS, sent along this antenna tip:

During my spell as contest manager of the local radio club we had great fun getting wires up into trees. Some of the trees in one of the parks were over 100 feet tall and not even the strongest could throw a weight over these guys. We tried catapults, arrows and lots of daft things but only one thing worked every time and that was the fishing rod and line.

In the early days we used a 4 ounce weight to heave the line over the tree when the area was clear but after one near miss we agreed to change this. The damage that a lead weight of this size can do to a human skull is quite considerable! The resultant headache is the least of your worries.

However, have you ever been hit by an apple or orange? The damage caused is minute in comparison with the lead and you can share it out afterwards. We tended to use oranges as the line wrapped around this didn't cut the fruit too fast and allowed several attempts to get over that really high branch in the tree.

Practice makes for accurate casting of the fruit and after a few tries I could get over a branch of choice in a minute or two, let the fruit fall to earth and connect the antenna wire and reel her in.

If you plan to use several trees for this, start with the last tree. Yes, I know this sounds silly, but start at the tree that will hold the end of the wire furthest from the station. Throw over the line and reel it in. Do the same over the next one until you reel in at the station and have the end of your long wire at the ATU. For doublets or dipoles, adjust the selection of trees to match.

A word of warning; one guy in our early days tied a heavy weight at the end of the long wire. He held the wire in his left hand and swung the weight around at speed in his right until he could throw it over the tree. This worked well except that he fed the wire through the fingers of his left hand as it sped out in the air.

The doctor at the hospital said he was quite lucky to have kept his fingers and the dry cleaner said the blood should come out of his shirt and trousers with a couple of cleans. One good thing though, we found that dried blood doesn't detract from the use of the wire as an antenna!

—de GØBPS

Shrink Wrap for Battery Packs

Someone on QRP-L asked where to find large heat shrink tubing that could be used to secure a handful of cells into a battery pack. Michael Melland, W9WIS, responded with this—

I located the large size battery pack shrink wrap at very reasonable prices and in small quantities. I found the best selection of large shrink wrap tubes on an electric model aircraft site. They are easy to work with and have clear tubes up to 7" in diameter!

http://nyblimp.com/main.htm

WA8MCQ comments—At the home page, scroll down to Products, look under Electrical Stuff, and click on CS Shrink.

—de W9WIS

Longer Shafts on Miniature Potentiometers Update

The last issue contained an item by Jim Sheldon, WØEB, on this topic. Screwdriver adjustable pots (and capacitors) have long threaded mounting bushings with a little bit of shaft exposed, which is usually nowhere near enough to put a knob on. The idea is to carefully cut away part of the bushing, exposing enough shaft to allow a knob. (Be sure to leave enough thread for mounting!) I made up an illustration and sent it in after I had submitted my column, but it didn't make it into the issue. Here it is, Figure 9.

Drilling Small Holes in Sheet Metal

Someone on QRP-L asked about this subject, prompting several replies.

From Charlie, NØTT—I wanted to drill some holes in thin metal and also plastic. I found some small hole saws that are made for sheet metal called "Slugger

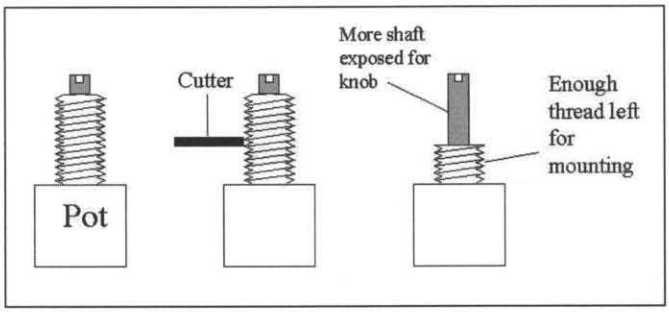

Figure 9—Left, pot with hardware removed from bushing; center, carefully cut part of bushing with a Dremel tool, hack saw, etc; right, enough shaft is exposed to add a knob, and enough thread is left to mount to a panel.

sheet metal cutters." Their cost is a bit pricey, but they are high quality tools made in the USA, in Davenport, Iowa by the Jancy Engineering Company. They are sold on the Internet by another company also in Iowa. My set was #SMS000.

I bought the smaller sized set, which covers 5/16" thru 3/4" in 7 sizes. Individual sizes are also available, but you'll also have to have the arbor, pilot and Allen wrench.

I don't have the URL where I purchased the cutters, but the URL for Jancy is www.jancyslugger.com; they might sell direct.

From Mike W in the UK (no call sign indicated)—I use a couple of thin bits of plywood as clamps. Using a small G clamp, secure the sheet steel between the sheets of scrap plywood then carefully drill the hole through the plywood. Big holes are probably better done with a hole punch on a cobblers last or similar base. The hole punch could be the type of thing used by leather workers to punch holes in the leather.

From Steve Smith, WB6TNL—When drilling mint tins, etc. I use brad point wood bits. Yep, wood bits. The brad point keeps the bit centered during the initial punch-through and the outer spurs slice the metal without flaring it. I spin the bit slowly and with light pressure to keep it from grabbing the sheet metal. I don't drill tin very often so a set of cheap bits has lasted a long time for me. They're generally available at any halfway decent tool supply or hardware store in sizes of 1/8" on up (metric too!).

I have thought about turning down the brad points to a very small diameter and using the bits to cut isolated pads in copper clad board but that's as far as it's gone as I don't have ready access to a lathe.

From John Seilke, W2AGN—It was NOT my original idea. I don't remember where I saw it, but I have been able to drill my Altoids tins with holes up to 3/8" by simply filling the tin with water, freezing it, then drilling the tin. It works just like drilling a block of wood.

WB6TNL later followed up with this—I forgot to mention a punch set I bought that I like. Although I own a bunch of Greenlee chassis punches, I bought a Philmore 5 piece chassis punch set from Edlie Electronics (remember them?). It's on page 21 of their .PDF catalog.

http://www.edlieelectronics.com

The set includes punches for 1/2, 5/8, 3/4, 1 and 1-1/8 inch holes and includes a T-handle tapered reamer for hogging out a hole in order to fit the arbor bolt. It also comes with a nice fake leather storage pouch.

The Greenlees are great for punching holes in heavy gauge steel sheet but for (GASP! Cover your eyes, kids!) tube socket holes and such in tin and aluminum I prefer using the Philmore. To me it just seems to be easier to handle than the massive Greenlees. The complete Philmore set is about 45 bucks plus shipping.

From Dale Parfitt, W4OP—I still have my set of Philmores I bought back in the '60s—for tube sockets back then. I too have a pile of Greenlees, but the Philmores get a good work out. On another front, if any of you are looking into buying a drill press, you might think about throwing some extra money at the project and buying a small milling machine instead. I am fortunate to own a large Clausing, and more recently a Micro-Mark mini mill:

http://www.ares-server.com/Ares/Ares.asp?MerchantID=RET01229&Action=Catalog&
Type=Product&ID=82573

and I added digital readout to the X-Y table: http://www.zietlowdesign.com/products/products.htm

As with mills and lathes, you can spend as much on tooling as you can the machine. But you can do so much more. As the saying goes, having the right tool is everything.

Short of buying a mill, Micro-Mark and others have precision X-Y tables that can be added to a drill press to allow for precision drilling and routing (like circuit boards). Center cutting end mills can cut perfect holes in the thinnest of materials.

WA8MCQ comments—Now that we're talking about end mills and such, here's a plug for one of my favorite supply houses that we use a lot at work, MSC Industrial Supply Company. Their paper catalog weighs several pounds, is somewhere over four thousand pages long, several inches thick even with thin paper, and they carry a wide variety of tools and such that are used in machine shops, etc. Since the paper catalog is quite a monster, you might want to look at their web page instead, www.mscdirect.com.

Removing Resistor Packs from PCBs

Bill Tippett, W4ZV, posted this to the Elecraft mail reflector—

I just made my first major mistake! [When building my Elecraft kit] I installed resistor pack RP2 in the RP3 slot which is unused but in the same area and also marked as a 10k on the RF board. I've removed solder from the bottom holes such that I can see the pins through the holes, but the pack will not budge as I heat pins from the outside edge in and gently pull the pack from the top. I believe the problem is solder on the top side underneath the pack body which I cannot remove. Before I clip the pack off, remove the pins and order a replacement, has anyone had success removing resistor packs? I only have solder wick and a hand-held solder sucker so please don't get fancy on me!

Don Brown, KD5NDB, replied with words of great wisdom:

You want to save the board at all costs. While these SIP [single inline package] resistors can be removed with a power desoldering iron like a Hakko 808, removing them with solder wick is difficult. I would just bend it back and forth until it breaks, remove the leads one at a time, and order a replacement.

WA8MCQ comments—This replies not only to resistor packs but any through-hole component with multiple leads. While it is possible to remove them safely with the proper tools and equipment, it may not be worth the risk to the PCB they are mounted on. A botched removal job can cause serious damage to the board, requiring significant rework of the local area to get things working again. A single or double sided board is bad enough, but if it's a multilayer board, with internal traces connected to some of the component leads, the risk is greater.

The temptation to remove something intact so it can be reused can be strong, especially if getting a new one would require spending a fair amount of money or take longer than you're willing to wait. But sometimes it's best to just consider it "toast" and remove it destructively, avoiding the risk to the circuit board. (Of course the decision will be simpler if it's a fairly expensive part on a simple PCB. A cheap part on a large, complicated board like an Elecraft K2 is a different matter.)

Things get more complicated when you suspect a component is bad but don't know for sure. If you destroy the part to get it out and replace it with a new one that doesn't fix the problem, you've spent money, still have a broken device and don't even have an extra part to show for it. The temptation to attempt a difficult and possibly risky removal can be great. Choose wisely, Grasshopper!

Mounting ICs without Predrilled Holes

Jason Hsu, AG4DG, tossed this out on QRP-L—So far, I have been using only breadboards and PC boards from Radio Shack, with the copper traces and holes already in place. I know that many of you etch your own traces in PC boards. This allows for more flexibility in the configuration. I'm not familiar with all the details, but I know that a very strong acid is used in the process.

How do you drill all those holes for the IC leads? The holes all have to be drilled in PRECISELY the correct location. This means that 8, 10, 14, 18, or even more holes ALL have to be drilled in precisely the right place relative to each other. How do you do this?

QRP Hall of Fame member Tony Fishpool, G4WIF, had this to say—I run a drill through a small piece of Veroboard to get the holes in the right place for ICs.

Dan Puckett, WD8AAU, does the same thing, saying that he uses a Radio Shack proto board as a template.

From Paul, GØODP—I'm a glutton for punishment and go about it as follows:

I either design a board layout using CirCad (free for download) or scan/photocopy an existing one. I then print it out, ensuring that the printed copy is to scale.

I cut out the 3 cm by 4 cm (or whatever) board layout and use some 'school glue' to temporarily secure it to the copper board. Then drill through the holes; in reality, tolerances don't have to be that great.

Unpeel the paper and clean up the copper board. Paint the track using a fine brush and some enamel modeling paint (1 British Pound per small can over here, bright yellow is good!), going from hole to hole and using a good copy of the original board layout as a master. A bench magnifying lens/light helps here. Painting takes a while but it's therapeutic. Etch and away you go!

Nick Kennedy, WA5BDU, had this to say—For 0.1 inch DIPs, I'd use perf board as a template. But it was too easy to lose my place in that grid of holes, so I used the perf board to make DIP drilling templates from clear pieces of Lucite, or whatever. But I got sick of drilling holes and now use dead bug, Manhattan, and ugly styles. That won't work with small pitch SMT parts, so I'm soon to embark on the photosensitive board making process.

For etching, "strong acid" isn't required; bases work too. Lots of things will work, but the ferric chloride sold in Radio Shack and elsewhere is probably the most benign.

From QRP Hall of Fame member Steve "Melt Solder" Weber, KD1JV—

You use ferric chloride, available at Radio Shack. It's a mild acid, but stains most everything it gets in contact with and eats aluminum very well. Use a plastic or glass tray to etch in. I know of people who etch in zip lock bags.

[That's what I've been doing since the 80s; much cleaner and neater! I got the idea from some company that sold a little PCB etching kit. It included a zip lock bag with ferric chloride powder; you were supposed to add water to dissolve it and then toss in the circuit board for etching. And holding the bag under running hot water speeds up the etching a lot.—*WA8MCQ*]

Next, we'll address the question, "How do you drill all those holes for the IC leads? The holes all have to be drilled in PRECISELY the correct location."

They don't have to be all that precise. Close yes, but leads bend easily enough if you get a couple out of whack. When I print a board, I set my hole size on all the parts to 20 mils. Most pads are at least 60 or more mils in diameter. When you etch the board, this puts a little hole in the middle of the pad which you use as a guide to drill the hole. The drill tends to center itself in the hole.

I use a Dremel tool in a drill press holder and [tungsten] carbide bits. High speed steel bits burn up after drilling not too many holes in fiberglass board. Used or resharpened carbide drill bits are reasonably easy to come by and not all that expensive. They are brittle though, so one needs to be careful about sideways torque, which is why using a drill press is important. I can drill a moderately complex board with 100 holes in less than 10 minutes.

The main trick is how to transfer the circuit pattern onto the copper, but that's a lesson for another day.

From Bob Okas, W3CD—Here's a quick study in making PC boards:

Selecting the proper drill bit is important, and it has a lot to do with the board material. The current crop of copper clad fiberglass boards uses a substrate of a material called FR-4 (fire retardant 4). I'm sure there is a good supply of older "G-10" material out there as well. It's also made of fiberglass, but the binder can become flammable under the right conditions. Lastly, the economy class of boards uses a phenolic material as a substrate.

It's easy to identify which substrate material you're dealing with. The substrate on fiberglass boards has a light green tint; phenolic tends to be various shades of brown. Fiberglass is very abrasive to drill bits. Phenolic is softer, so there's less wear.

[Phenolic does have a drawback, at least when you machine or drill large quantities, releasing a lot of dust. Anyone who has ever done this knows what I mean! In sufficient quantities the smell can become very irritating and overpowering. —*WA8MCQ*]

Having said all that, get carbide drill bits. They are the most durable by far and last a long time. The caveat is that they're

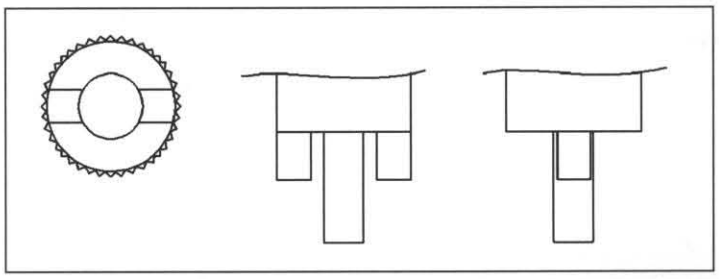

Figure 10—Knurled phone jack nut (left) and the business end of the matching tool (two views, rotated 90 degrees).

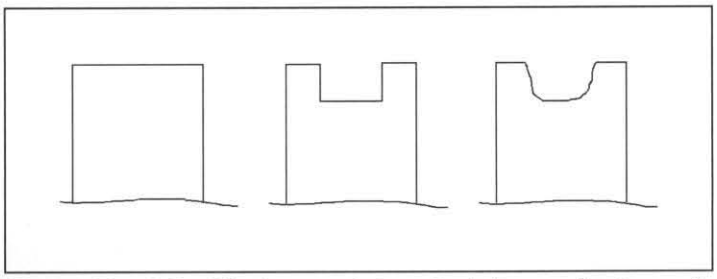

Figure 12—A flat blade screwdriver tip, left, can also be modified to make the tool, center. Mine looks more like the one on the right but it works.

also brittle. PC board drill bits differ from your standard Craftsman drill set. They typically have a shank that's about 1/8" in diameter and it tapers down to the desired hole diameter. When I lived back East, I bought up a bunch of such drill bits at hamfests. I just checked eBay and found a set for a very reasonable price, so they are out there for anyone to buy.

When drilling boards, I've always used a variable speed Dremel tool. I've had some success by free-handing the tool, but bits tend to break easily that way. It's far better to get the Dremel press stand and bore into the board at a constant angle. Apply firm pressure, but not too hard. The bits bend and break with no warning. ALWAYS wear eye protection!!!

When you lay out your boards, make sure the component pads have a small hole in the center that will get etched away. These make great targets to line up your bit when drilling. That's an important step in getting the holes to line up on ICs. Don't worry if you're a little off.

Now, what size bit to use? If you're willing to invest some money, get a dial (or even a digital) caliper. You want to measure the lead diameters of the components you're going to use. Alternatively, you can use manufacturer's data, which specifies the physical dimensions of the part. Now add some clearance for the hole. This is a judgment call. If the lead diameter is, say .01", select a drill that's .015" to provide ample wiggle room. You will find that component lead diameters vary to some degree.

You can take a shortcut or two by selecting a drill size that will satisfy several hole sizes. Don't make them too tight or too loose. Experience is the best teacher in this area. Drill bits may be numbered, or they may have their diameter stamped on the shank. In either case, you'll be able to figure out the drill diameter.

So, that's a quick summary on the back end of making PC boards. The middle ground is exposing and etching a layout. The front end is laying out your circuit. I'll save both of these for later posts.

Tool For Knurled Nuts on Phone Jacks

Here's another of those things that get rediscovered every few years and are well worth bringing up every now and then. I mentioned this around ten years ago in the Idea Exchange, and someone brought up the topic recently on the Elecraft mail reflector. Everyone knows what these nuts are and there has to be a better way to tighten or remove them than using a pair of pliers and risking damage to the panel. The solution has been around for quite a while.

From Phil Westover, WA7URV—I was hoping someone may be able to point me in the direction of a source for a special tool that would be used for tightening the small knurled nuts on 1/8" phone jacks. I think you know the type I'm talking about. They are round, knurled nuts, with a two very small key slots, one on each side. I imagine that there would be a tool for this that would reduce the chances of slipping out and damaging the panel or stripping the little key slots, etc. Got any ideas?

Steve Uhrig, WA3SWS, had this answer—These are, as you state, knurled nut tools. Some years ago I bought a pair from Mouser. They are shaped like nutdrivers. They have a guide pin to go in the center hole of the jack, and two points on a round collar to engage the slots like a spanner.

One tool was for subminiature (2.5 mm) jacks and the other for miniature ones (3.5 mm). They were cheap and whenever I'm installing these jacks I use the tool. It keeps from scratching the front panel. The manufacturer is Eagle Plastic Devices.

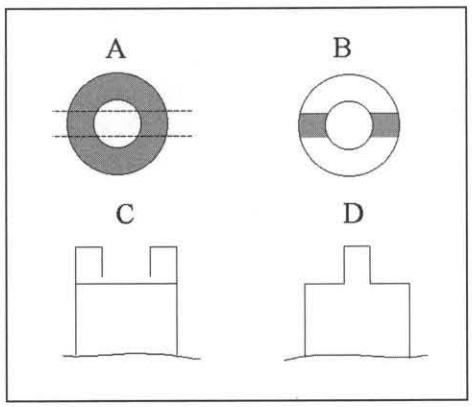

Figure 11—Making a tool from tubing: Make two cuts along the dashed lines (A), leaving two prongs to fit the slots in the nuts. B shows an end view, and C and D are different side views.

Mouser part number 382-0004 is for 4 mm knurled nuts; this would be for 2.5 mm subminiature jacks. Mouser part number 382-0006 is for 6 mm knurled nuts, for 3.5 mm miniature jacks. Each costs USD $5.94. [According to a web search in mid June, they are on page 1257 of the catalog. —*WA8MCQ*]

Michael Neverdosky, N6CHV, said this—A substitute for the best tool is to use a pair of snap ring pliers. I have done this many times when I didn't have the right size of the real driver. But then, having been an industrial mechanic I have several snap ring pliers.

WA8MCQ notes: Figure 10 shows one of the nuts and what the business end of the tool looks like. The guide pin goes into the hole in the jack to keep the tool in place so it doesn't slip and scratch something. If you're an old cheapskate like me, and don't mind giving up that little added safety feature, you can make a reasonable substitute easily enough. You could take a piece of metal tubing or rod of appropriate diameter and make a couple of cuts across

the end with a milling machine or file. Figure 11 shows it with tubing; if using a solid rod instead, you'll also have to cut the center away.

Go to the junkbox and dig up a knob that's too old and dirty to use on a project and put it on the end for a handle. (If you're like me, you probably have a lot of those.) The result probably won't be pretty, but it will work. Since there is no guide pin in the center you'll have to be careful to not let it slip during use and mar the panel.

Another option, which is what I did, is to take an old and funky flat blade screwdriver that's not very good any more but somehow never got thrown out. (You probably have a few of those, too.) File a notch in the end to produce the tabs; make sure the cutout is wide and deep enough to clear the threaded part of the jacks. The center of Figure 12 shows what the result should look like, but in the real world it's probably going to be more like the right. (Mine is even worse, but it does work.) Like the other homebrew tool, you'll have to use a bit of caution to make sure it doesn't slip and scratch something.

Paperless Logging in a Pinch

Here's a simple but brilliant idea that QRP Hall of Fame member Wayne Burdick, N6KR, posted on QRP-L recently. It's not limited to the rig he used, of course; it will work with anything having a keyer with a memory function. (PS—Wayne is the designer of the KX1.)

Suppose you're operating in the field, or mobile, and don't have a log book or writing instrument. You then snag a new state or country and want to remember the call, etc. What to do?

This happened to me while walking around with my Elecraft KX1. I worked AA5AE in New Mexico using 1.5 watts and a 4-foot whip—a new state for my pedestrian-mobile effort. Not trusting my memory (for the time, call, QTH, name, and RST), I used one of the KX1's two CW message buffers to log the QSO. On arriving home, I played back the buffer (in P=0 playback mode) and logged the QSO.

—de N6KR

Comments on Isotron Antennas

K6ATT had this question on the Elecraft mail reflector—

In my continuing effort to learn about antennas for the Elecraft K1 and K2, what is your view of Isotron antennas? Have you had experience with them? I have yet to buy an antenna (dipole, vertical, Isotron, otherwise) for 40 meters.

W2AGN, John Seilke, had these comments—

Well, I bought a 20M and a 40M Isotron, just to try them out. Totally unscientific tests; all you EE PhDs can cringe.

1. Mounted 20M Isotron on 20' Aluminum mast. Tuned it for 1:1 SWR with no problem. Compared to bumper mounted Hamstik on 1981 VW Rabbit. Hamstik was at least 1 S unit better every time.

2. Mounted 40M Isotron on leg of tower at 30' level. Tuned for 1:1 SWR, no problem. Stations that were S7 or less on my 35' high trap dipole were inaudible on the Isotron. I made 1 QSO with the dipole, 589 RST, switched to the Isotron and he could barely hear me.

Conclusion: Isotron makes an excellent dummy load.

K2VCO, Vic Rosenthal, had these comments—You will hear a lot of stuff pro and con. Despite what some people suggest, there's no magic involved in antennas and small ones (like Isotrons, BH antennas, etc.) will perform more poorly than larger ones (like dipoles or reasonably sized verticals or even random wires). Isotrons are VERY small. In addition, clever small antennas are much more expensive than homemade dipoles, verticals, or random wires.

So my advice is: especially for QRP where every dB counts, use as close to a full size antenna that you can install.

From Ron D'Eau Claire, AC7AC—The Isotron will work almost as well as a hunk of wire thrown across the floor.

No one has yet re-written the laws of physics. Until we have room-temperature superconductors, the efficiency of an antenna will drop dramatically with its size relative to a wavelength as it becomes really small. A half wavelength is ideal. One quarter wavelength works as well if there is a good, low loss RF ground available. The wisdom of the ancients says 120 radials, 0.2 wavelengths long, arranged in a circle below a 1/4 wavelength vertical is about as good as it gets. Hams have found that one or two radials will produce fair results, especially if they are elevated. What's "fair"? We can't be sure, but probably efficiencies of less than 50%.

Below one-quarter wavelength in overall size, the efficiency drops like a wrench from the top of a tower. The problem is that the radiation resistance, that value of "resistance" that represents the power radiated from the antenna for others to hear, drops to very small levels. Low resistance means relatively high RF currents. Higher RF currents mean higher ohmic losses in the conductors. The best silver or gold conductor has far more ohmic losses converting RF into heat than can be radiated. And most of us can't afford to build our antenna out of silver or gold. Copper or aluminum start to look like very dismal conductors.

Think of the radiation resistance (the part of the power that is radiated) and the ohmic resistance (the resistance in the conductors that turns RF into heat) as being in series. When the radiation resistance is 50 or 100 or 1000 ohms and the conductor resistance is 5 ohms, very little is burned up as heat in the 5 ohms. But when the antenna is very short and shows a radiation resistance of, say, 0.2 ohms and the conductor has a resistance of 5 ohms, almost all the RF becomes heat and very little is radiated.

There is no antenna that gets around this basic rule. When we make antennas shorter than "full size" (1/4 wave if working against a ground or 1/2 wave long if not) we lose efficiency. All the various designs that are less than full size are compromises trying to get a little better efficiency for a given size. They use loading schemes to try to make them look "electrically" bigger than they are physically, but those schemes are all lossy. It's just that some are more lossy than others.

The dedicated QRP gang has proven again and again that even a few milliwatts can span huge distances at times. That's great news for the manufacturers of tiny antennas who want to suggest that they work like a much larger antenna. Look at the data and you'll see not a single number giving you their overall efficiency compared to a full size antenna (some try to say they have efficient loading coils, etc, but don't talk about the antenna system and that's what counts). What they do is print testimonials that so-and-so worked DXCC with their antenna, or some other hopeful "puffery." It may be true. Put 100 watts in to a tiny antenna and you will probably radiate a few milli-

watts. And under the right conditions that can do what the ad says.

[*WA8MCQ comment*—I remember an antenna ad in the late 60s or early 70s for something called a Joystick, I think it was. It was basically a six foot long, helically loaded vertical. But someone set major miles per watt record with one, over a billion I believe, and boy, did the company push THAT fact in their ads!]

That takes us back to the basic rule of antennas: put up as much antenna as you can. The old saying that "if your antenna didn't fall down last winter it wasn't big enough" is just a humorous way of putting it. If you are going to put up a horizontally-polarized antenna and want to work DX, get it 1/2 wave up in the sky. If it's down near 1/4 wave up or less, you'll probably do better with a vertical. That's just because of the way the reflected wave from the earth interacts with the radiation from the antenna. Low horizontal antennas are GREAT for short-haul communications, though, because most of the signal is concentrated on the first 500 to 1000 miles from your QTH.

If an Isotron is all you can put up, save your money and build an Elecraft ATU and use it to load a ten-foot hunk of wire. You'll be ahead overall. And if you can make it a longer piece of wire and put it outside up in the clear, it'll be far, far better.

Improving Solder Suckers

A couple of tips from the Elecraft mail reflector—

From Mark Volstad, AI4BJ—One trick I learned long ago is to cut a small "v" notch in the plastic tip of my handheld solder sucker, just large enough to accommodate the tip of my soldering iron. This allows me to form a tighter seal with the circuit board. Also, it sometimes helps to add a bit of extra solder to each of the joints before attempting to desolder. This can help to transfer heat to the other side of the plated-through hole.

From Bob Baxter AA7EQ—I have one of the government surplus Weller WTCP soldering irons sold by Fair Radio a few years ago with a de-soldering attachment. I threw the rubber bulb away and connected a solder sucker to it (Soldapullt by Edsyn) with a piece of oxygen mask plastic hose. It works pretty well. I can't take credit for the idea as it was posted on QRP-L a couple years ago.

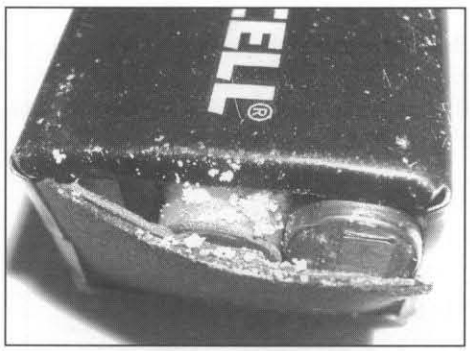

Figure 13—The exploding battery, with bottom plate blown open.

Mystery of the Exploding Battery

Terry Fletcher, WAØITP, reported a mishap on QRP-L, with this subject line: '9 Volt Battery Explosion' —

Well, explosion is a little strong. I was just sitting at the computer desk when I heard a hard, loud, POP and the Tenna Dipper [antenna tuning accessory] on the desk top did a Mexican Jumping Bean imitation. About 10 seconds later another POP and jump. I was a little apprehensive about opening up the top of the Whitman's tin to see what had happened.

The bottom of the 9V Duracell battery had blown out on one side, exposing the cells inside the case. The dipper wasn't turned on and no current would have been flowing. It was unusually warm that night in Radar O'Riley's home town (Ottumwa, IA), but not THAT warm.

Has anyone else had a similar experience? Should the batteries be removed from the devices they power until use? What do you think? (PS—the Dipper was uninjured.)

Bruce Muscolino, W6TOY, had this reply—Battery explosions of the type you experienced are usually caused by blocked vents for internal gasses given off by the cells. I think these gasses are the result of charging or discharging of the individual cells. With a 9 volt battery you have a stack of button cells inside another container. What apparently let go was the outside container. Messy, but probably no electrolyte got out.

I would carefully clean up the innards where the battery mounts. You might want to use a paste made from baking soda mixed with a little water to neutralize any electrolyte that might have escaped. Before you reinstall a new battery you might want to check your circuit for any sneak current paths. In fact, you might go so far as to disconnect one side of the battery to put a milliamp meter in series to ensure that OFF is really OFF!

Battery currents are usually caused by external things. They can be caused by internal things like manufacturing errors, but I'd want to be sure.

David Willmore followed up with this—He said it was a Duracell, right? Then it's composed of 6 AAAA cells wired in series with a set of plates on the top and bottom. The only time Ive seen cells outgas this much was when they were extremely discharged (or massively overcharged, but that doesnt seem likely). Even then, they outgas so slowly that it doesnt tend to build up unless theyre in an enclosed space—like a gas tight flashlight.

Could it be that the battery had been dead and that the Tenna Dipper was on and discharging it even more? That might lead to an extreme discharge state. Maybe some flaw in the battery construction lead to a blocked vent. Strange.

In his original post, Terry had offered to e-mail a picture to anyone interested but it turned out to be a bit fuzzy. He later sent me the battery so I could take a better picture, and you can see it in Figure 13. As David said, it consists of several AAAA cells in series. Other 9V batteries I've disassembled have a set of 6 tiny "bricks" stacked on top of each other.

The bottom plate was pushed out, some of the cells stick out a bit, and there are numerous white flakes scattered about. Fortunately it simply popped the container open and did not result in shrapnel. (Other types of batteries can be less forgiving when they blow.)

When I asked Terry if he had finally figured out what caused it and if there was any evidence of a short, he e-mailed these comments—

I was baffled. The Dipper was built stock, inserted into a Whitman's tin with the board spaced up from the bottom, and the power jumper (switch) wasn't installed. I couldn't determine any way that current could have been drawn from the battery. After removing the battery, an ohmmeter check between the connector terminals showed no shunt path. The only Dipper-based explanation may be that the tin may have flexed a little and shorted some solder joints on the bottom of the

board. But I couldn't recreate that situation. It's still a mystery to me.

Battery Info Source on the Internet

Ron McConnell, W2IOL, posted this URL to QRP-L—

http://www.batteryuniversity.com/index.htm

He indicated that it was first posted on the alt.satellite.gps and sci.geo.satellte-nav newsgroups by someone identified as "Avi, The Aircraft Mechanic in Tampa," and that it looked very promising after skimming it briefly.

I also took a quick look at it, and it is indeed a very good resource. Sponsored by a company in Vancouver, BC, which is affiliated with the battery industry, it contains a lot of useful and interesting information. From the introduction on the home page:

"Battery University is an institution that provides practical battery knowledge for engineers, educators, students and battery users alike. The papers address battery chemistries, best battery choices and ways to make your battery last longer.

"The presentations are easy-to-read and are limited to about 1000 words. The material is based on the book *Batteries in a Portable World*—a handbook on rechargeable batteries for non-engineers, and is written in condensed form. The 300-page book and a library of battery articles are available on www.buchmann.ca. Battery service products are shown on www.cadex.com.

"Battery University is sponsored by Cadex Electronics Inc., a manufacturer of battery analyzers and chargers. The material is free of charge for the benefit of all battery users and cannot be used for profit. If intended for publishing or educational purposes, please obtain permission from Isidor.Buchmann@cadex.com."

Some of the topics in Part 1 ("Basics every battery user should know") are Battery chemistries, Packaging and safety, Charging, Discharging, Internal resistance, Intelligent battery, Storing and recycling, and a Summary Table of "do and don't" information on nickel cadmium, nickel metal hydride, lithium ion and lead acid batteries.

Part 2, Getting the most from your batteries, has sections named Prolonging battery life, Battery applications (info on choosing the right type for various uses), Battery service (testing, maintenance, etc), Battery behavior, Comparisons, and Things to Come.

Making Transparencies for Etching Circuit Boards with an Inkjet Printer

Ron White, WAØMWW, sent this along—

For the past year or so my friend Terry, WAØITP, and I have been trying to make our own circuit boards from artwork others have done. The process has not been without flaws and errors for one reason or another, but we have learned from our mistakes.

We used the laser printer at our local library and sometimes we would get good looking boards and sometimes it was a disaster. I don't think it was the transparencies that caused the problem, but a variety of other things. It was inconvenient to use the library printer because in our small town the library is only open for about 3 hours two afternoons a week.

We tried [printing on] PnP Blue, which was a complete flop.

I read somewhere on the net that you could make transparencies using an inkjet printer and that sounded like an excellent way to go because neither of us has a laser printer which is the one almost always recommended for this type of work.

I have a Hewlett Packard 940C DeskJet printer so I went to our local office supply store and asked for Hewlett Packard transparencies for an inkjet printer. The lady brought out some HP C3834A transparencies, which are made for their printers.

I tried one of the sheets and printed it using the best quality print setting. The transparency didn't look like it would be dark enough to block all the light so I ran it through again. I didn't want to do too much experimenting with the transparency itself at $1.00 a sheet, but the only way to know for sure if it works is to try it. It came out looking about as sharp as it did from a laser printer we had used at the local library and it was quite a bit darker than with one pass.

I did most of the experimenting with paper after I made the first transparency because of the cost. After some more experimentation I discovered that you had to make sure the paper (or transparency) was lined up exactly each time I ran it through. By putting the paper in until it hits the stop and pushing it to the right to make sure it is lined up horizontally seemed to work pretty well. Another thing I learned from trying different settings of print quality is that two or three runs at draft quality are better than any other quality settings. It keeps the lines sharper and makes the black areas more opaque. One thing is a must and that is to let the paper or transparency dry for at least a half-hour before running it through again. I don't know if other inkjet printers will work the same way mine does or not, but it's sure worth a try if you don't have a laser printer.

This has nothing to do with making transparencies, but I did stumble across something which works well developing, etching and tinning circuit boards. I use an old electric skillet with a thermostat control for heating the chemicals. I put about an inch of water in the skillet and set an 8" x 8" Pyrex dish in the skillet to hold the chemicals and circuit board. I use a candy thermometer to be able to keep the chemicals at the correct temperature.

I have a DELL Dimension 4100 running Windows XP. I used Microsoft publisher and Paint to print out the transparencies and both seemed to do a nice job.

—de WAØMWW

Improved Spectral Purity for the Rock-Mite

The popular Rock-Mite transceiver from Small Wonder Labs (which also appeared in QST in April 2003) does not comply with the new FCC rules on spectral purity that went into effect recently. The Rock-Mite discussion group (on yahoo.com) had some info on a simple modification to bring it in line.

Chuck Carpenter, W5USJ, is one of the regulars on the group. He asked Dave Benson, K1SWL, about it and he responded with this info. (Dave is the owner of Small Wonder Labs, designer of the Rock-Mite, and a member of the QRP Hall of Fame.)

In his post to the group, Dave said—To bring the Rock-Mite into compliance with the new FCC spectral purity requirements (effective June 1, 2004 and retroactive to Jan 1, 2003), a series L-C circuit is added between the board antenna connection and the antenna jack.

These are the component values by band; all are 5% tolerance"

20M: 82 pF NPO cap and 1.5 uH RF choke

40M: 150 pF NPO cap and 3.3 uH RF choke

If the Rock-Mite is already installed in a Mitybox, there's no need to remove the board from that enclosure. Snip the wire from the board to the antenna jack center conductor, and add the two components in series between those two points.

[It wasn't clear from the post who made the following comment, but I believe it was Chuck.] I cut one lead of the RF choke short and soldered that choke lead to the top side of the board. The capacitor then bridges the gap from that upright choke to the (BNC) connector center pin.

Chuck followed up with this info, including data for using toroids instead of encapsulated RF chokes—

Using Dave's values with standard parts, you can extend the bands to 30 meters.

40M: Approx 3.3 uH, 33t #28 T37-6 (yellow) or 29t #28 T37-2 (red)

30M: Approx 2.2 uH, 27t #28 T37-6 or 23t #28 T37-2

20M: Approx 1.5 uH, 22t #26 T37-6 or 19t #26 T37-2

Use a 100 pF NPO cap for the 30 meter circuit.

The result is a series resonant circuit close to the R-M operating frequency. Series resonance, being low impedance, will tend to reject spurious signals.

I verified the values using the AADE LC meter. Using a small ceramic trimmer capacitor would allow you to tune the circuit to the exact frequency of your R-M for max available power output. I found some at Jameco with a range of approximately 8 to 150 pF. Add a turn on the toroid for 40 to provide some additional L for tuning.

Does the Rock-Mite really need to be modified? Ed Hare, W1RFI, had posted this info, which is part of the new rules—

"...the mean power of any spurious emission from HF transmitters or external RF power amplifiers installed on or before January 1, 2003, must not exceed 50 mW and must be at least 40 dB below the mean power of the fundamental emission. If the mean power output of such a transmitter is less than 5 W, the attenuation must be at least 30 dB."

At first, Chuck said that it appeared that the Rock-Mite was not affected by the rule change due to the power level, which is well under 5 watts, but clarification from Ed changed his mind:

"The Rock-Mites need to be upgraded. No power level is exempt. Transmitters [under 5 watts] that were put into service prior to 1/1/2003 can meet the –30 dB standard. Transmitters placed into service after 1/1/2003 have to meet the new standards."

Dave pointed out that while the Rock-Mite met FCC requirements as of the publication date in *QST* in April 2003, the new requirements are retroactive to 1 January 2003 and thus most Rock-Mites in use will have to be modified to remain in legal use. The operative phrase is "put into service prior to."

PS—the rules cover all spurious emissions, not just harmonics. That means that if there are any subharmonics or other spurs on the signal, whether harmonically related or not, whether above or below the signal, they must be within the 40 dB limits. If you've ever looked at the output of an HW-8 on a spectrum analyzer while it's transmitting on 15 meters you'll see a good example of a not-so-clean signal, and the harmonics are the least of the worries. (At first I thought it was just a bad unit that I was testing, but later heard the same comments from others.)

If you're a Rock-Mite fan, you can join an Internet discussion group dedicated to it. Go to www.yahoogroups.com, log in and sign up for it. (If not already a Yahoo member, you'll have to sign up for that first. If you do, be sure to edit your profile and carefully set your "marketing preferences" so you don't get a lot of undesired e-mail.)

While on the home page you can use the search function to look up QRP. I tried that recently and found 77 Yahoo groups related to QRP in some way. Most are what you think QRP is, but one is not. It's "qrp-gloves" and is actually sponsored by QRP Incorporated, a maker of rubber gloves and finger cots (which cover just the fingertips). They used to be known as Quality Rubber Products, and I've known about them through work for years. Hint—this one has zero ham radio QRP content!

Can't Hear the On-Board Speaker

A number of kits use very tiny speakers, frequently mounted directly on the circuit board, and they can be hard to hear sometimes. There was some online discussion about this on two different occasions. While two particular projects were mentioned, this applies to anything using a very small speaker.

Karl Larsen, K5DI, posted this on QRP-L—My hearing has been in steady decline since I passed 68 years of age. I have the AmQRP Club PIC-EL kit that has a tiny speaker you mount on the PC board. I found I could almost hear it with my head very close to the board.

I have to build my Tenna Dipper kit and with this problem it will not work for me. So I now have capacitors and earphones on my desk and I'm using the PIC-EL as my test device. I have the test program loaded and I de-mounted the tiny speaker and put it on wires 3 feet long. I put the speaker in one of my ears and turned on the board. I heard, for the first time, tones as each test started. Then came the test of the speaker. It almost blew it out of my ear!

My fix will be to remote the speaker so I can hear the tones from all my kits from now on. If you have a problem like this, you need to do that.

Michael Harnage, W1MT, had this suggestion—Try putting your finger over the hole of the mini speaker. A piece of tape works fine, too. It really kicks up the volume a nice amount.

From Mike Caughran, KL7R—I replaced the little speaker with a transistor radio speaker and have lots of volume now. Now to debug the rest...

Lloyd Lachow, K3ESE said this (com-

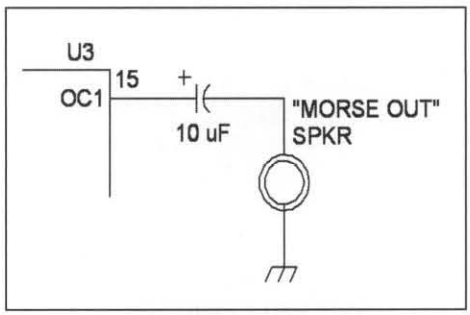

Figure 14—Partial schematic of the Elsie, showing the audio output. The capacitor, which many recommend, appears in the enhanced schematic on the web site; the basic schematic does not have it.

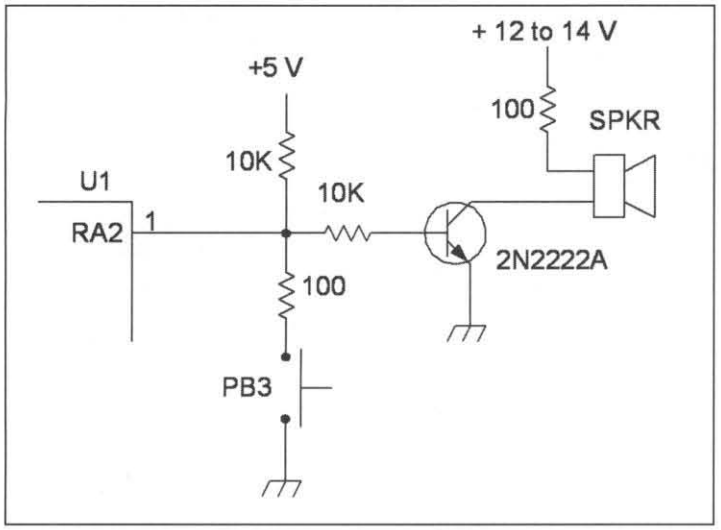

Figure 15—Partial schematic of the PIC-EL from the AmQRP web site, showing the audio output portion.

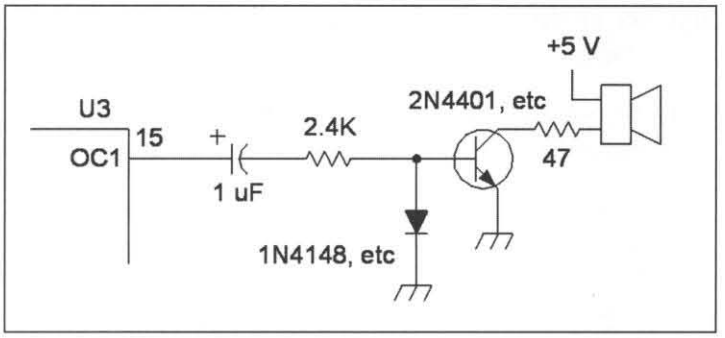

Figure 16—Simple one-transistor audio amp added to the Elsie by WØUFO

piled from two posts)—I built the basic ELSIE, the Atlanticon kit L-C Meter, and, after finally putting in all the little thingies on the schematic, it gave forth with the Morse readouts expected. But they were very, very quiet, soft tones.

At the recommendation of 'Mr. Fixit,' Bob, WA1FXT, I added the 10 uF electrolytic cap in series with the speaker, as seen on the Enhanced ELSIE schematic [on the AmQRP web site], and increased the volume out by about twice. Now it's just very quiet.

Since my kit was already installed in an enclosure, and I needed another pad for this cap, I took a sharp tool and dug a small, square trench in the copper, creating a small, square island—and it worked. Nice technique in a pinch, but I wouldn't want to try making a whole board that way!

Many had adequate volume, as I heard for myself at Atlanticon; I don't know why some don't. I'm going to try a piezo speaker from Radio Shack in there.

From QRP Hall of Fame member George Heron, N2APB—Low volume from the piezo/speaker device in the Elsie can come about from several sources such as a bad device, or applying too much heat during assembly and semi-melting the plastic holding the internal wires/elements, or your own ears.

I thought the tone was low too during the development of the PIC-EL project, but my family clearly heard the incessant and repetitive beeping tones during the many weeks of development—a whole two floors up from my workroom! I since got some hearing aids <gasp> and now I think the tones are too loud. Anyway, one man's "loud" is another's whisper.

As for the physical causes, however, you can try the "tape across the little hole idea," which only works on some devices with open bottoms. The sealed units nearly turn off with this tape on.

Some have reported better volume by adding a 10 uF cap in series with the piezo element/speaker of the Elsie. (Put the positive side to the Atmel chip as shown in Figure 14.) I have only seen better DC results with this, not increased tone volume.

The tiny speakers are cheap at Digi-Key (search for p/n 433-1020-ND) in case you wanted to order some to play with.

Lastly, you could add a simple one-transistor amplifier like Craig, AAØZZ used for the PIC-EL project. See that schematic on the PIC-EL section of the AmQRP website to see what we did (shown partially in Figure 15). By hooking the piezo to +12V and using the PIC to turn current on/off to it through a transistor buffer, I think we got about double the volume. (Now THAT volume gets the cicadas singing out in the backyard trees! I live in Baltimore, home of the 17-year cycle of cicadas.)

From Merton Nellis, WØUFO—I have decided to automatically add one transistor and a 1.5" (or so) speaker to any kit with those thimble-sized speakers. On the Elsie I added 1 uF in series with a 2.4k resistor from the micro to the base of a 2N4401 (or 2N2222, etc) and a diode (1N4148) from the base to ground. Then from the collector lead of the 2N4401 goes a 47 ohm resistor in series with a 1.5 inch 8 ohm speaker to the +5 VDC source. Get the picture? (See Figure 16) Lots of volume from that; I can hear it in a crowded room. Hears lovely CW, too!

Finding the QRP-L Archives

QRP-L is the Internet QRP mail reflector started up by QRP Hall of Fame member Chuck Adams (K5FO then, K7QO now) back in April of 1993. It has gone through several homes during that time. It started out at think.com, but had to move when Thinking Machines went into Chapter 11 bankruptcy and raised doubt about the future of QRP-L. It moved to netcom.com for a while, but that server had the significant drawback of not having a daily digest mode.

(Subscribers got all of the postings in real time, and a number unsubscribed—many quite vocally—because they couldn't keep up with the flow of traffic cluttering up their mailboxes. How times have changed! Back in those days, an unusually busy day for QRP-L might be 40 postings. In the last few years it was common for it to have close to, and frequently over, a hundred per day!)

Things took a change for the better when Jim Eshleman (not a ham at the time but now N3VXI) offered his services and those of lehigh.edu to host QRP-L. (That's Lehigh University in PA.) For one thing, it had the daily digest option, letting subscribers get an entire days worth of posts bundled in a single mail with index at the top. That let people reduce the clutter in their inboxes. It also made all old traffic available in the archives, so newcomers could read everything since Day One of QRP-L.

Finally, it added the HTML Archives,

which was really handy. That was a web based tool that let you scan through a listing of the postings from the last several days and click on those you wanted to read. (It's similar to the forum format used by QRP-F; see the end of the column for info on that.)

Jim finally pulled the plug on QRP-L@lehigh.edu early this year, and it moved to QTH.net. (You can find the information and sign-up page at http://mailman.qth.net/mailman/listinfo/qrp-l.) Unfortunately, QTH.net and it's brother, QSL.net, are a much smaller operation and don't have the resources of a major university behind them. There have been several system crashes since being hosted there. As a result, while it does have some archives available, most have been lost. For instance, at the time of writing on the 18th of June, archives are only available for 9 May 2004 and 28 May 2004 onward.

Fortunately, there is still a source of all QRP-L archives since Day One, maintained by a third party: http://www.kkn.net/archives/html/QRP-L/

This is a great resource! It has all of the QRP-L postings since Day One in 1993, even though the list is currently on it's 4th host. You can get all of the posts for any selected month in either date or thread order, and you can also search the entire archives by keyword. (PS—QRP-L really did start in April 1993; don't pay any attention to the few postings with earlier dates. Those are probably the result of someone having the date set incorrectly on their computer when they sent them.)

QRP Online

The Internet continues to be a valuable QRP resource, as it has been for years. Here are some of the online forums available.

QRP-L, which I call the "QRP Daily," is the online QRP discussion forum started in 1993 by QRP Hall of Fame member Chuck Adams, K7QO (K5FO at the time). It recently moved to a new host, as described in the last issue. Although the address is different, it continues to run several dozen postings per day on a variety of topics related to QRP.

QRP-F is an alternative QRP forum started by the QRP ARCI in October 1999 to take some of the load off QRP-L. The activity is much lower than on QRP-L, but so is the noise level.

While not specifically a QRP list, the Elecraft reflector is dedicated to owners of those products, most of which are QRP. Even non-owners may find it interesting since they cover a number of homebrew topics. The Rock-Mite also has it's own forum.

To check out the online QRP world, go to these URLs:

QRP-L: go to http://mailman.qth.net/mailman/listinfo/qrp-l (note the new address) and you're at the home page where you can sign up, read the archives, etc.

QRP-F: go to http://www.qrparci.org/ and click to enter the site, then click on QRP-F on the menu at the top.

Elecraft: http://mailman.qth.net/mailman/listinfo/Elecraft to subscribe; home page at http://www.elecraft.com/

Rock-Mite: go to www.yahoogroups.com, log in and join the Rock-Mite group. (If not a Yahoo member, you'll have to register first.)

And while you're online, don't forget to keep an eye on the page of the new American QRP Club, www.amqrp.org.

Of course, you already stay abreast of QRP ARCI activities and resources at the club web site: http://www.qrparci.org!

The fine print

A great deal of what I use comes from online sources, but you're free to send me anything directly, whether by e-mail, snail mail, etc. I even accept manuscripts and floppy disks at hamfests! And don't worry if it's not polished or if you have hand drawn schematics. I take care of all of that. Just get it to Severn one way or the other and sit back and wait for an issue or two to see it in print.

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Jim Cates, WA6GER, Silent Key

Doug Hendricks, KI6DS, posted some sad news to QRP-L on the 17th of April, announcing that Jim Cates had passed away the day before from cancer.

Along with Doug, Jim was a cofounder of the Northern California QRP Club (NorCal). He kept a lower profile, but was very much involved in the success of the group that quickly became one of the dominant forces in QRP in this country. Among other things, he was an active and integral part in the club's long and hugely successful run of QRP kits, with all of them passing through his hands over the years. (He collected orders and did the shipping.) As James "Dr. Megacycle" Duffey, KK6MC/5, said about him on QRP-L after his passing, "If you have a NorCal kit, it has Jim's fingerprints on it."

Inducted into the QRP Hall of Fame in 1998, Jim was known as a true gentleman by all who crossed his path. I swapped quite a few e-mails with him over the years and had the privilege of meeting him in person a few times. It was always a pleasure.

When Doug was inducted into the HoF the year prior, he said he would not hang his plaque on the wall until Jim was inducted as well. That's how important Jim was to the group, and how much he meant to Doug. The amount of work he did for NorCal over the years is staggering, and the dedication unbelievable. And it goes far beyond simply shipping, quite literally, a few tens of thousands of kits.

I never saw his collection of QRP rigs in person, although I did see a picture of it once. If ever there was an Ultimate QRP Rig Museum, it was at his house. Basically, if a QRP rig had ever been described in a magazine or made available as a kit or a commercial product, he had it. It wouldn't be out of line to call it a Wall of QRP.

When the news was announced I made a posting to QRP-L about it, along with quite a few other people. I also sent some private e-mail to KI6DS, which pretty well sums it all up: "We lost one of the good ones. I only met him in person a few times, but that was more than enough to get a good feel for what he was. Most of the time when someone dies that I knew or heard of, the reaction is a brief moment of sorrow followed immediately by getting on with my life. This one's going to linger for a few days."

I was right about my prediction, although, as it turned out, I should have said "Quite a few." Rest in peace, Jim.

—WA8MCQ

The "Bosca 40"

A Complete Amateur Radion Station in a Box

Tony Breathnach—EI5EM

ei5em@eircom.net

Having built many CW QRP rigs in the past, I decided to design and build a complete 40 meter CW QRP station contained within one cabinet. I named the result "The Bosca 40" (see Figure 1) after the Gaelic word *bosca,* which means *box.*

Figure 1—EI5EM's Bosca 40, a one-box 40M QRP station.

This rig is based on several designs by others, however, the finished project is quite unique. The receiver is based on the 40-40 by David Benson, NN1G [now K1SWL—*ed.*]. The original design was published in *QST* (November 1994). This design is also described in the current ARRL publication *QRP POWER.* The transmit driver is based on the PW Severn by George Dobbs, G3RJV of the G-QRP Club. The original article was published in *Practical Wireless* in July 1983. The 5 watt transmit power amplifier is based on the Wayne McFee's (NB6M) Miniboots design.

Construction, modification and optimization of the Bosca 40 took about 18 months from inception to completion. Many modifications and redesigns took place along the way. The finished product probably cost more than it would have cost to buy an all-singing, all-dancing commercial black box. Many experimental circuits were substituted, tried and evaluated before being consigned to the overflowing junk box. Successful experimental circuits were incorporated, with the final design being arrived at by trial and error. This took up much time and effort. However, the satisfaction derived from construction and operation was well worth the time, effort and outlay.

Features

I tried to squeeze as much as I could into the aluminum box which I purchased from Maplin's. The rig incorporates the following features within that enclosure:

- Antenna Tuning Unit
- SWR meters (front and back)
- Digital Signal Processor (ADSP2)
- Digital Frequency Display
- Programmable Iambic Keyer with 500 character non-volatile memory.

Technical Description

The VFO is housed in a sturdy metal box for shielding. The VFO voltage is regulator controlled for stability. It is followed by a buffer amplifier to avoid loading and thus drifting. Variable capacitors are used for main and RIT tuning. A relay inhibits the RIT during transmit. The VFO tunes between 2.995 and 3.062 MHz.

The receiver section (Figure 2) is a single conversion superhet with an IF of 4 MHz. The original receiver had no RIT feature and the Local Oscillator was varicap tuned (2.999 to 3.062 MHz approximately). From experience, I have found that unless an expensive tuning potentiometer is used, the VFO can become unstable after long use as the carbon track becomes worn and noisy. I prefer instead to use variable capacitors for my VFOs as well as housing them in a dedicated secure solid box. So I designed a suitable VFO and buffer with a main tuning capacitor and an RIT capacitor.

I fitted a small relay inside the oscillator to disable the RIT during TX. The RIT swings about 2 kHz either side of the TX frequency. The RIT can also be disabled from the front panel if desired. A small yellow LED above the RIT knob lights when RIT is enabled. I worked on the oscillator until I could get about 60 kHz coverage. I just kept removing vanes from the main tuning capacitor until the 60 kHz coverage was achieved. The RIT capacitor was reduced to only one fixed and one moving vane. I altered the spacing between these until I got the required 2 kHz up and down shift.

During transmit (Figure 3), the VFO frequency mixes with the output of a 4 MHz crystal oscillator. This takes place in an NE612 mixer IC. The filtered summation product is then amplified. The transmit driver is a BFY51 transistor. This drives a 5 watt amplifier using an IRF510. This output signal is sampled by the SWR detector head before meeting the T-circuit of the ATU and the antenna. The ATU toroids can be seen soldered to the switch in the lower left of Figure 4. The single toroid of the SWR sense sampler can be seen just above them.

While not a great image, Figure 4 does show some of the internal detail of the rig. The bottom left shows the transmit section as well as the variable capacitors and toroid coils used in the ATU. The receive front end is bottom right. Top right shows the keyer and memory board. This covers the receiver and audio section which is constructed on stacked PCBs below the keyer board. The audio chain consists of a 741 op-amp preamplifier followed by an LM386 PA. The SWR board toroid sampling transformer can be seen in the center left of the picture. You can also see the changeover relay and its control board in the middle of the picture.

Construction

A plain aluminum cabinet was purchased from a commercial source. This was drilled to accommodate all dials, indicators, switches, etc. As no workshop facilities were available, hand-drilling and filing was the method used.

All PCBs were hand drawn before etching. Rather than build the whole transceiver on a single PCB, I built modular style. This allowed me to test each section in isolation before wiring all the PCBs together. For many years I have been in the

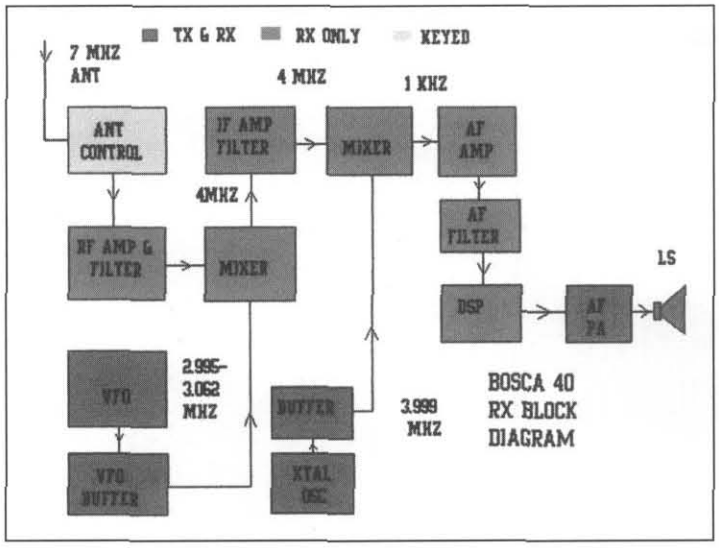

Figure 2—Receiver block diagram.

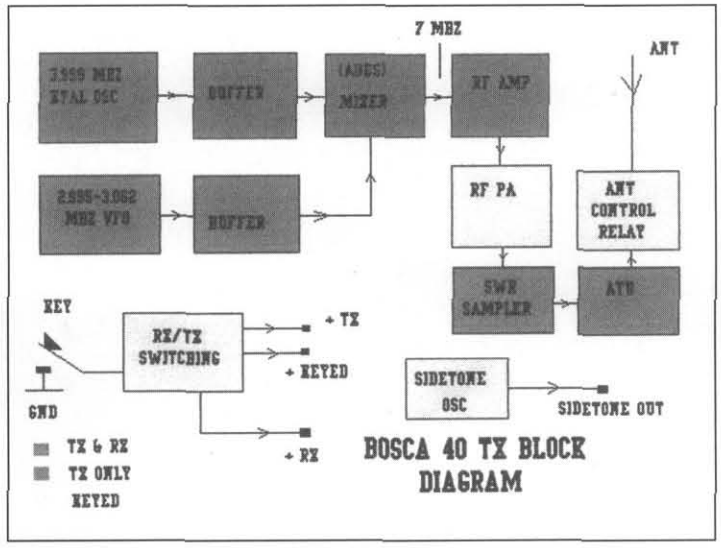

Figure 3—Transmitter block diagram.

habit of soldering the components directly onto the copper tracks. This allows me to use impact adhesive to mount the boards. It also does away with the need to drill holes for components and fault finding is made a whole lot easier.

Very few nuts or bolts were used. There was no great forethought given to layout. The design/construction basically took on a life of its own. All PCB modules were accommodated wherever was most convenient at the particular time. This allowed for modifications and alterations to be accommodated without major engineering concerns. Internal shelving panels are made from tinplate cut to size and soldered in place.

On completion of the transmit section I found that the 1 watt RF output signal was not as clean as I would have liked. I increased the 7 MHz level from the TX NE602 mixer by adding a FET buffer ahead of the bandpass filter feeding the driver circuit. This resulted in a beautiful 1 watt sine wave output signal.

I also boosted the audio output adding the old reliable LM386 audio chip. Since the feature in SPRAT and RadCom, I have also added the low power ADSP2 board from SGC ahead of the second half of the NE5532 audio amplifier/AF filter. Inserting it just before the LM386 led to AF overload and distortion. The ADSP2 totally transformed the RX beyond belief. However, on adding the ADSP2 I found that I also had to remove a front-end RF pre-amp which I had added, as the audio was overloading the LM386. This proved to me the long preached theory that RF pre-amps are normally not required below 14 MHz. I have also incorporated a 0/10/20dB front end pi attenuator. The attenuator switch is the unmarked switch above the PHONES socket.

The Digital Frequency Display was one which I built many years ago as a stand alone counter. The unit was built from a kit called the DFD1 [available from Almost All Digital Electronics, http://www.aade.com/dfd1.htm —*ed.*]

The receive performance of this rig now far exceeds that of my FT100D, albeit only a single-bander. However, it shows what can be achieved by optimizing a rig for a single band. Previous to adding the ADSP2 I had found that the rig would not resolve SSB as the crystal filtering was so narrow. I had added two extra crystals to the filter. I was not upset about SSB as the rig was optimized for CW. However the audio channel became so narrow on adding the ADSP2, that I had to revert to the original two crystal format. Only then did the ADSP2 come into its own. The two red push-buttons control the ADSP2 filter.

I omitted the original transistor keying switch and the diode antenna switch, preferring instead relay switching with adjustable time delay. I prefer this method of operating despite the lack of QSK. I also did away with the described method of

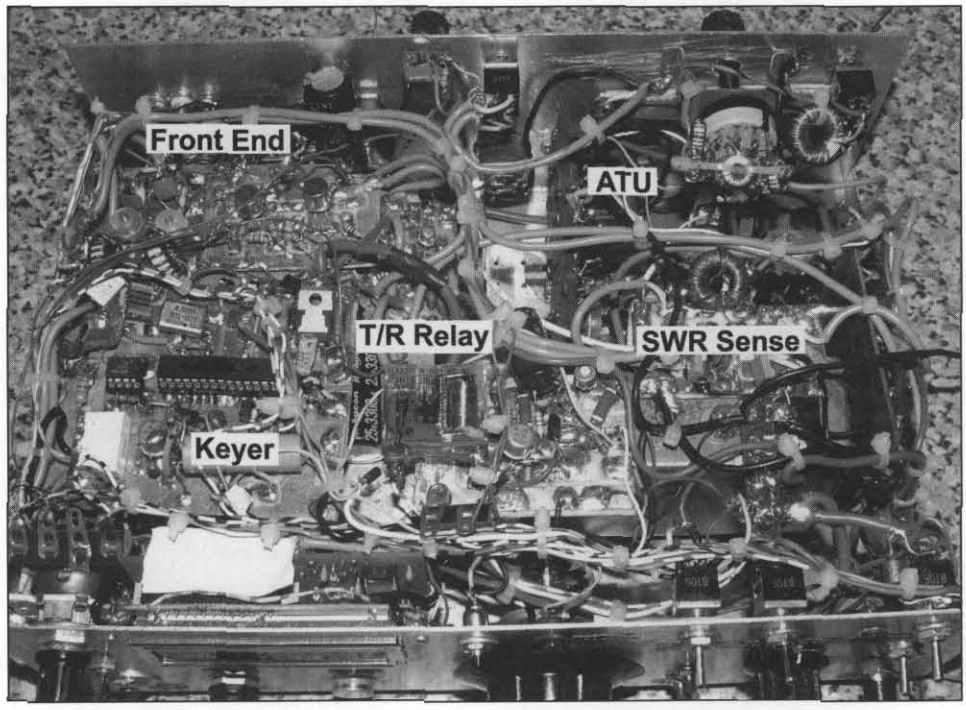

Figure 4—Interior view of the Bosca 40.

Figure 5—Rear view of the Bosca 40.

sidetone generation, using instead the tone generated from the Curtis 8045 circuit which I incorporated in the rig along with a Breune SWR circuit and T-circuit ATU as extras. The ATU and SWR meter can be seen on rear of the rig (see Figure 5). The inductances of the ATU were made by winding eleven 1.0 uH toroids and one 11 uH toroid. Any value between 0 and 22 uH can be selected in 1 uH increments. A small circular tape recorder audio level meter was installed on the panel to give an extra indication of SWR.

While I have made many contacts using this rig barefoot at 1 watt, I decided to add the 5 watt RF amplifier to work up to maximum QRP power. Initially I used the well-tried MRF449A circuit from *Solid State Design for the Radio Amateur*. However, I found that if the SWR was above about 1.5:1 that the whole PA went into oscillation. As a result it became very difficult to adjust the ATU for low SWR. A trawl on the internet led me to the nifty Miniboots 5 watt PA by Wayne McFee, NB6M, using the IRF510 MOSFET.

Whereas the MRF449A cost me $50, the MOSFET only cost me the equivalent of $2. The designer of the Miniboots claims that the circuit is almost indestructible. The main advantage to me was that it was stable under all load conditions, allowing easy SWR adjustment.

When building the internal Curtis iambic keyer I also added a non-volatile memory IC. This allows storage of over 400 characters. This can be programmed from the front of the rig (above main tuning)in conjunction with twin paddles. It saves when sending CQs as I have it programmed to send a string of CQs followed by my callsign. The Curtis keyer has a speed adjustment on the front panel. It can accommodate sending from painfully slow to far above what I would ever hope to copy at.

I have had great fun with this all-inclusive rig. It's a pity that I ran out room to accommodate a 12-volt battery and charger. Ah well, such is life! The VFO seems to be rock-steady and the output into a 50 ohm load looks great on the scope.

On the Air

The Bosca 40 was the sole HF rig used for the Lee de Forest special event station, EI4LDF, which operated from the Martello Tower in Howth towards the end of last year. I have had many hundreds of enjoyable QSOs with this rig, including with many EIs and GIs. I have to thank some of my reliable EI friends who put up with my ongoing requests for reports on my test transmissions, especially EI7HX, EI6BQB, EI4FV and EI2CHB.

Figure 6—Sean Donelan, EI4GK, President of Irish Radio Transmitters Society presents the author with the Professor Folan (EI6K, SK) Shield, awarded "For New Techniques and Advanced Constructional Work."

Since completing this project, I entered it for the IRTS (Ireland's IARU national society) construction award. I had the satisfaction to come away with the Professor Folan (EI6K, SK) Shield, awarded "For New Techniques and Advanced Constructional Work" (see Figure 6). This award made it all worthwhile.

Now for the next project! I hope to dip my toe in valve (tube) technology and build a valve (tube) QRP rig. I have been gathering up the bits and pieces at Dayton and on eBay these last few months. However, I must first firmware upgrade my K2 and I also have a KX1 to build. If only there were more hours in the day!

Specifications

- Supply voltage 12 to 15 volts at 2 amperes
- Band coverage from 6.975 MHz to 7.062 MHz
- VFO running at 2.975 MHz to 3.062 MHz
- Superhet RX with 4 MHz intermediate frequency (IF)
- Crystal controlled 4 MHz oscillator mixing with VFO in NE612 chip for transmit frequency generation
- Selectable RIT + or – 2 kHz from TX frequency
- 4-pole front end bandpass receiver filtering
- A 4 inch good quality 8 ohm speaker is secured to the base of the enclosure
- 9:1 reduction drive on VFO tuning shaft
- LCD frequency counter accurate to nearest 10 Hz
- Small SWR indicator on front panel
- T Match ATU with two 500 pF variable capacitors and switchable variable inductance. The ATU controls are mounted on the rear panel
- Digital Signal Processing (DSP) using SGC ADSP2 low power audio filter
- Iambic keyer using Curtis CK8045 chip
- Variable iambic keyer speed to 70 WPM
- Programmable 500 character non-volatile keyer memory
- Pure sine wave sidetone generation by CK8045 chip
- Manual RF gain control
- 0.25 watt LM386 audio power amplifier
- 5 watts RMS RF output using IRF510 FET
- Automatic relay change over from TX to RX with adjustable timing.

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The QRP Home Companion

Anthony A. Luscre—K8ZT k8zt@arrl.net

Recently, at the Dayton Hamvention, I overheard two different conversations between two pairs of hams. The first pair was discussing the approaching sunspot minimum. With gloom and doom in their voices they commiserated about the lean days ahead for DX. One even said, "I probably should sell off most of my HF equipment before the used prices fall too far."

The second pair of hams were seasoned DXers, you know the type, 'Top of the Honor Rollers.' Again the topic was full of gloom and doom. The first one said, "there is not much reason for me to get on the air anymore. I have them all confirmed except three. Those damn islands have not been on the air in years and probably will not be on soon if ever again." His friend replied, "You can say that again. All there is to do is read the DX tips sheets and watch the DX cluster. Turning on the radio is a total waste of time!"

Anthony, K8ZT, and XYL Linda, KA8ODP, enjoying the 2004 FDIM Banquet.

What's Wrong Here?

First, amateur radio is supposed to be fun. Second, our speakers talk as if they have done everything there is to do in ham radio when in fact they are focusing on only a very narrow niche. When their focus is only on a narrow niche it does appear that they have done everything there is to do. But, magically the whole picture changes if we only take a short step back and look again. With our view no longer confined to a very narrow point, we quickly see a vast number of new things. It then quickly becomes clear that there are still many things to do and goals to accomplish.

"I can see clearly now..."

When we step back, the view sure does expand. But what we choose to see and the opportunities it presents are what really make the difference. There are actually two very positive paths we can take to increase our enjoyment of ham radio. The first is to try something new. Try a new operating mode, a new band, a new operating style (QRP, contesting, DXing, etc.), a new activity (home brewing, kit building, restoring boat anchors, fox hunting, APRS, etc.), a new public service (ARES, RACES, traffic handling, etc.) or a new ancillary activity (teaching ham classes, elmering, radio club officer, ARRL appointment, writing articles, etc.). There are many new possibilities and I hope you try many of them. In fact, many of you may have ended up here by deciding to try that QRP thing after burning out with QRO.

The second path is to expand on something you already enjoy but with new goals and enthusiasm. I will describe this second path as filling in the holes.

Filling In the Holes

Let's use those seasoned DXers as our first example of filling in the holes. Sure, he has almost all of them worked and confirmed, but probably not on all bands or modes! So a very easy way to renew the enthusiasm of the DX hunt for a new one is to add new bands and/or modes for the ones he already has. Now with a new challenge at hand, there is a good reason to turn on that radio.

Computerized logging makes it easy to know what DX band/mode entities are needed. For information on computerized logging and software that can benefit the QRPer, you may want to read my ARRL Web column: Software for the QRP Shack.

What about our declining sunspot doomsayers? When the sunspots decline and 10 and 15 meters are mostly dead, how about trying the lower bands (30 to 160 meters). 30 and 40 meters are already very popular with QRPers so there is little need to persuade their use. But, many QRPers are afraid that their low power signal will be useless on 80 and especially 160 meters. Surprisingly even a modest vertical antenna (I use a Butternut HF2V) on a small suburban lot can allow the QRPer to work both 80 and 160 meters. So give the lowest bands a try. You will probably have much better luck communicating with your QRP signal during the lower atmospheric noise seasons of late autumn through early spring. So now, during the summer months, is the time to plant some antennas for low band use this fall. I also have a recent article on the web: Low Power Visits the Low Bands.

In addition to DXing, there are plenty of other opportunities to fill in the blanks. One of the most common and accessible is QRP WAS on multiple bands. A little planning and scheduling can pay big dividends when filling in the holes in WAS. State QSO Parties are a good source of both states and counties within those states. Field Day is another good opportunity to rack up the states, operate QRP from the field and prepare for emergency communications all in one event. The ARRL Sweepstakes contests (CW and SSB) in November are also excellent times to work states. Being scheduled in late fall, this is also an especially good time to work states on 80 and 160 meters. In fact, I am hoping to complete my own 80M QRP WAS this fall.

Worked all states and need another challenge? QRP USA-CA (worked all USA Counties Award) requires confirmed QSOs with all 3076 US counties. This award can keep even a busy QRPer occupied for a while!

With all this talk of awards, don't forget to checkout the excellent awards offered by our QRP-ARCI (http://www.qrparci.org/arciawds.html).

Until next time, why not try filling in some holes. I think you will have a very good time.

Note: For links to columns visit my web site http:// www.qsl.net/k8zt/qrp-com.html ●●

QRP World News

Oleg Borodin—RV3GM

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Hello, dear QRPers! Both my QRP-dog, Alpha and I welcome you to the QRP World News column!

No doubt, the summer is a very interesting season for radio amateurs with its opportunities to go out in nature with a QRP station and to have the double pleasure of rest and operation in the clean air, free of urban radio interference. Certainly, for QRPers this is all much easier than for ham's with QRO equipment.

It is easier, mainly, due to the small overall dimensions of both the weight of the radio and the power supply. For example, in a simple "hand-case" it is possible to place a QRP radio such as FT-817, Elecraft K2 or self-made one, a small-sized 12 V @ 2-3 AH battery and a simple wire antenna such as a long wire, dipole or inverted-V. There may even be a place for the solar panel, which can be used for recharge the battery, telegraph key, microphone, earphones, log book and notebook. Take the car or bicycle and get away to have a fun and health!

News from Hawaii

Dean, KH6B, told me about his "QRP TTF" (QRP To The Field). He wrote: "The contest was not too good. Max, KH6ZM, and myself operated as ALØHA. We made 12 QSOs between 18.00 and 24.00 UTC. All on or near 21.060 kHz. That was the only band open for us during that period of time. We worked mainland USA, KH6, JA and HL. This annual Moku Ola Island DXxpedition is on an island in Hilo Bay. All equipment, food and supplies must be carried from a parking lot in Hilo over a foot bridge to the island. Fun? (*O.B.*—I think, it isn't). In Hilo, our group is getting ready for the ARRL Field Day and QRP ARCI MilliWatt Field Day June 26-27. We expect to operate both SSB and CW with QRP 5 Watts on 80, 40, 20, 15 and 10 meters. We will use a Mosley 3-element 20-15-10m Yagi and an 80m horizontal half wave which is also usable as two half waves in phase on 40m."

I received e-mail from Jack DL/KH6KT, now at Hanover, Germany. He said that he expects to be on the air in June. Jack expects to leave Germany at the end of June. He may visit relatives and friends in Arizona and California before returning to Hilo, Hawaii.

QRP DXing from the USA

I asked avid DXer, Bob Nielsen, N7XY, to tell me about his QRP setup. Bob wrote, "Well, I don't have any real secrets and certainly it would be easier if I had a better antenna setup. I am using a Hy-Gain AV-640 vertical, which is sort of like a R-8, except it doesn't use traps, mounted about 4 meters above ground. My location seems to help a bit (I am located about 150 meters from Puget Sound in the Seattle, WA area). This is currently my only antenna, so I don't really make competitive contest scores, but the difference compared to most other stations is probably less on 40 meters than on the higher bands where many stations have Yagis or Quads. I am using a K2 as my transceiver. With this setup I have worked a total of about 125 countries QRP (20 of which are on 40 meters) and am sure that many more are within my reach. I didn't spend a lot of time on 40 meters in the ARRL CW contest (I also operated on 10, 15 and 20 meters) and made the following 40 meter contacts: 8P9JA, PJ2T, V26G, V31DJ, P4ØY, KH7X, PJ4R, FS5UQ, D4B, FM5BH, WP3R, ZD8Z, VR2BG plus 9 JA stations. I hope to put up another antenna soon to cover 80 meters and hopefully have a bit more gain on 40. Maybe I will finally get a QRP contact with EU on 40 or even 80!"

Don't think that QRP DX'ing is only possible using CW. A nice QRP DX example is Bill, N4QA who uses RTTY to work DX, "So, there I was calling CQ on 14088 kHz RTTY with the DSW-MULTI project, figuring on a possible reply from Volusia County, Florida. Have worked into that part of the country several times lately. But, this time, my 1.5 watt DSW-20-RTTY CQ was answered by Daniel, ZP5DBC, in Asuncion, Paraguay! I have more than 150 DSW-20-RTTY QSOs and counting. In WPX RTTY Contest afternoon and evening have worked ZF2NT, ZX2B, PY2NY, VE2RYY, VE3GSI, VE5RI and a host of stateside stations. DSW-20-RTTY rig putting out 1.5 watts to the end-fed wire (four wavelengths on 20)." Nice work, Bill!

Had a report of a nice contact by W2LJ (op. Larry), "It was a good day for DX with my K1, also. I worked YN4SU night on 30 meters. 4 watts from NJ to Nicaragua—not bad!" Truly, not bad, Larry. Congrats!

Slinky in the EU

Darren, GW7HOC/MW5HOC, has been experimenting with Slinky dipoles. He writes, "A standard Slinky contains 66 feet of coiled wire in it. Two used together, either balanced or unbalanced (balanced is better) will work wonders in a loft space. I have used Slinkies for years and they always amaze me. You can stretch them out to fit whatever space you have and with a tuner they will work on most bands.

Photo 1—Darren, GW7HOC, has this "Slinky" 40 meter antenna.

Photo 2—DL-QRP-AG's "Speaky" transceiver project.

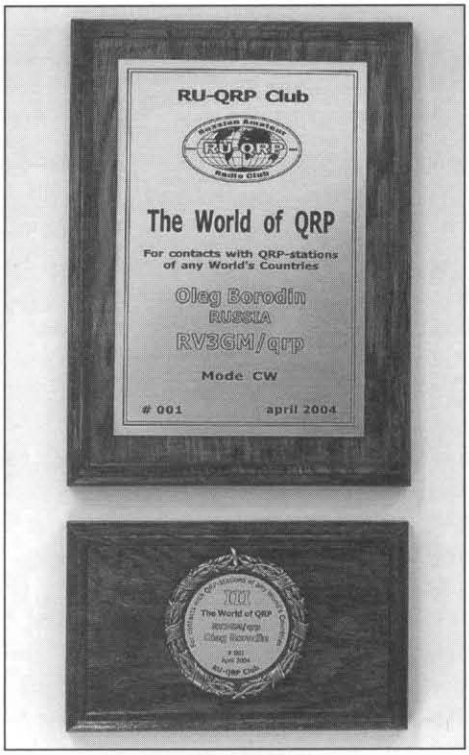

Photo 3—World of QRP Award.

The longer the stretch the better, but I've used mine with just an 8 foot spread. If you have the space, use 4 slinkies, two each side. This will get you on 80m quite nicely, though I have worked 80m with just a 2 slinky dipole. To see what one looks like go to my Web-site http://www.mw5hoc.4t.com or have a search on the Internet. There's a lot of slinky stuff about. I use mine balanced fed with slotted feeder via my ATU (MFJ-971) with a built in 4:1 balun (see Photo 1). This works a treat. My friend uses his unbalanced fed with coax and he loves his Slinky."

George Burt, GM3OXX, for many years has operated only CW running one watt. He has confirmed more 200 DXCC countries. Recently, George worked Peter, VK4QC, who was running 450 mW to a 2-element Quad, using a RockMite micro-transceiver on 14060 kHz. RST was 359 both way. Remarkable 2-way QRPp QSO!

Bob, N7XY, recently returned from 18 days in England and France. He did not operate from England, but made several 20 meter QRP contacts from Tourcoing, France, including the WPX CW contest. Bob was using an Elecraft K2 and MP-1 vertical from his hotel room on the sixth floor, but there was a much taller building to the Northwest, so he didn't have a path to the US. The best DX (and only non-EU) contacts Bob made were 3V8BB and A61AJ in the contest.

News for Homebrewers

There are two exciting new kits on the QRP-market. The first is DL-QRP-AG's "Speaky" transceiver project (see Photo 2). Peter Zenker, DL2FI, says that it is a 5-HF band, SSB/PSK/CW transceiver with DDS, CW/SSB filters, and 10 watts PA. The receiver has a built in preselector and more than 90 dB AGC. It also features a 15:1 speech processor. More details, schematic and manual (in English) on the web at http://www.qrpproject.de/UK/Speaky2.htm.

The PSK mode is gaining more and more popularity among QRPers. For boosting PSK activity, Russian QRP Club developed and produced "PSK-mini" transceiver kit. Output is 4 watts on 14070 kHz, RX sensitivity is 0.5 uV, it features a 4-pole crystal filter with 2.2 kHz bandwidth all on a 110 mm x 120 mm PC board. There are two variants: a kit of parts (includes PCB, all components, 3.5" diskette with assembled manual and DigiPan software) and ready build and tuned transceiver (without cabinet) with manual diskette. Details on Web http://ruqrp.narod.ru/kits.htm

News for Trophy Hunters

Radio amateurs, over the years are taking a great interest in QRP. Many have a rich DX QSL collection, but award programs available now (QRP DXCC for example) do not meet interests of some serious QRP operators. Since the number of active QRP stations in the world is smaller than for QRO stations, there seems little chance to receive QSLs for 2-way QRP QSOs from 100 different countries (unless you specificly ask the correspondents to reduce their power). Also, it is not very realistic to dream about a "5 Band DXCC 2xQRP" award!

The RU-QRP Club has decided to develop an award program, which not only raise the interest of the QRP Amateur, but also encouraged QRO operators and SWLs to use their skills to receive weak signals.

To hear 300 countries is not that difficult, and has been done for a couple of years, because DX in overwhelming majority cases can be heard quite tolerably, and DX Cluster at the majority DX Hunters gives the needed help. As QRP stations initially have a weak signal, it is necessary to affix significant diligence and patience for a successful result.

The awards program "The World of QRP" (see Photo 3) is directed towards finding opportunities for an operator to listen and to "feel the ether." Details of this program are available on the Web: http://ruqrp.narod.ru/awards_e.htm

For the Final

We just received a RU-QRP Club special call license—UE3QRP. This callsign will used on Club QRP expeditions and other Club events. In July you can listen UE3QRP/mm from Rybinsk Sea (an artificial sea). QSL via RV3GM (very nice artwork!).

I wish everybody QRPers all the best and good contacts!

—72! from RV3GM/UE3QRP

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D-Day, 60 Years On

Ian Keyser—G3ROO/KI4FQC ian.keyser@btopenworld.com

In March, the Dover Radio Club (UK) decided that we needed to do something for "D-Day"—like putting on a station to work any stations that went over to France to set-up on the beaches there. One of our occasional members had an operational T1154/R1155 set-up which was complete and operating (these were used in the Lancaster bombers during the war). Over the next few months little was heard from him so I decided that I would obtain some gear and get my own station up and running.

Little did I realise how much fun I would have! I decided that I would like to have a 19 set as I had owned many as a kid and enjoyed them enormously. The 19s were used extensively in Tanks, APVs and Jeeps. I understand that one was even fitted into an aircraft! They covered 2 MHz to 9 MHz in two bands and could be used on both CW and AM. They were a true transceiver so the operator only had to tune into the received station to be on frequency. The biggest drawback was on CW where you had to plug the key in to go on TX and pull it out to receive-hard work!

I recalled that a pal had a complete set up in his roof, and although I had not seen him for some time, I phoned him, only to find that he had wanted to phone me for a favour on his boat radio system. He hadn't liked to ring after so long asking for help...we can be such fools can't we?

Anyway, I fixed his radio and he sold me his 19 set-up. I had helped him put it in his roof some 20 years before and so I knew I would have a lot of work to do on it. It comprised of the complete system from battery terminals to aerial wire including the high power amplifier (see Photos 1 and 2). When I went to pick it up he also gave me a complete 38! The 38 was a man-pack with a 12 foot whip. Ideal for telling the enemy just where you were so he could shoot at you! They were a self-netted (well almost netted) transceiver with an output of 200 mW between 7.4 MHz and 9 MHz

A month later, I had the system running, but on a mains PSU as the rotary generator was so inefficient and noisy. We would have a generator at the site so that could be used there, also as I had built it into an old 19 set PSU case; it still all looked authentic.

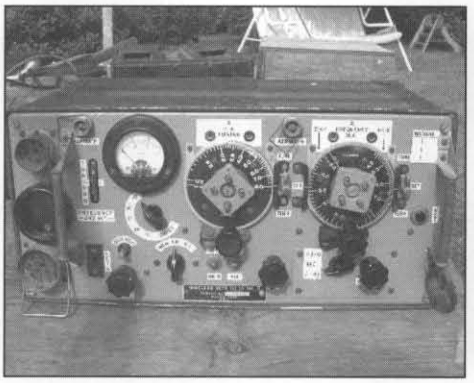

Photo 1—19 Set (used primarily in Tanks, APVs and Jeeps).

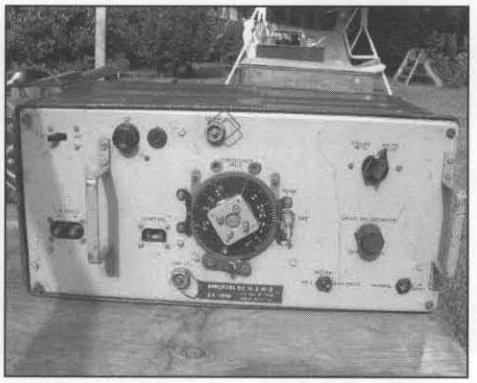

Photo 2—19 Set power amplifier.

I then decided that an RCA AR88 would look good—another set from my past that I wanted to play with. These superb receivers can still hold their own on the modern HF bands. There are several versions and I located an AR88F (see Photo 4) and although not a common model, it was all the more interesting. A few days work got the set going. Most of the time being spent on removing a modification to the bandwidth switching where the previous owner had tried (unsuccessfully) to include a mechanical filter. The biggest problem was that it was in terrible condition externally. I first scrubbed it with soapy water and got it back to black crackle. Having done this the front panel was not too bad and black felt tipped pens came to the rescue to make it look very reasonable. The case however was very pitted. I wire-brushed it and then sprayed it mat black and it looked very good—from a distance!

Photo 3—RCA AR88F receiver.

Then I located an HRO (see Photo 4) and spent time getting that going... so now I had a reasonable station. The HRO still has a following but I was never among them. They were not as easy to drive as the AR88 although they were a good receiver. The biggest drawback was that the dial used a logging scale and the received frequency was found by reference to a graph. The second big drawback was that the VFO was really powerful and when the set was tuned to 15 metres it was possible to get TVI to the 1950s sets on 45 MHz!

Finally, I turned my attention to the 38 set. I retuned this to 7 MHz and spent a small fortune making up a rechargeable NiMh battery from 112 AAA cells. I then located a second 38 set on which I had to do a complete rebuild. All the major components were there except few Rs and Cs!

I decided that it was not sufficient that we relied totally on the 19 set, after all they were unreliable during the war. What could they be like 60 years on? I saw an advert for a GRC9 with two amplifiers and two

Photo 4—HRO receiver.

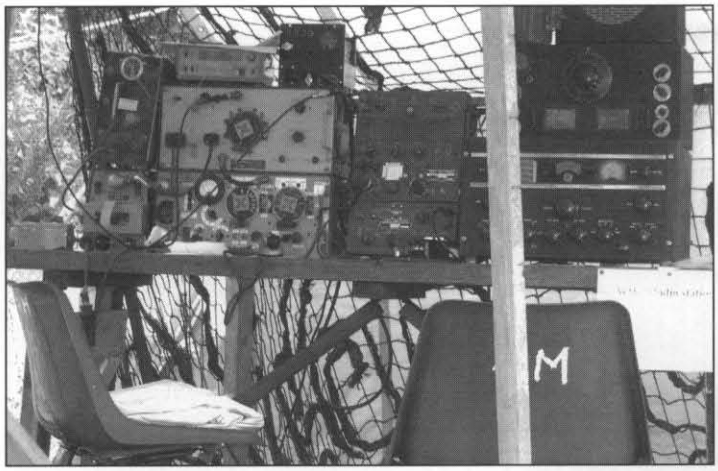

Photo 5—D-Day event operating position with WWII-vintage equipment.

Photo 6—Shirley, M3VMO (in RAF Uniform) in front of the lovely G3ROO trailer.

Photo 7—G3ROO (left) and friends enjoy operating from the D-Day station.

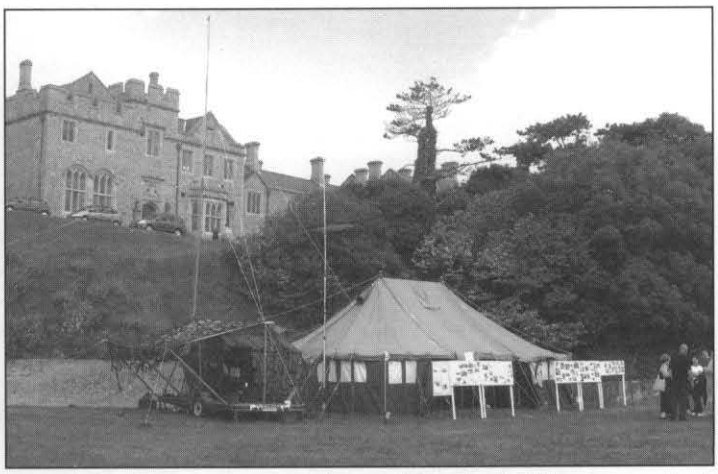

Photo 8—Our station was located by the "officers mess" at Dover Castle.

PSUs but in only half working condition. The GCR9 set (to the left of the post in Photo 5) is a post war set and is great fun to use. It uses miniature valves and without the amplifier will give up to 9 watts of CW and AM. It can load into whips, wires or dipoles making it a very versatile set. It has a lovely chirp on CW which really makes you stand out on a crowded band. For radios that have free running VFOs, the stability on both RX and TX is good. The TX and RX are separate, covering 2 to 12 MHz in three bands, so the operator does have to net the TX to the RX but that adds to the fun!

The price was right at £200 so I phoned the seller. While chatting to him he kept saying… "Oh, you can have" … "Oh and yes, that can go as well!!!" In the end it turned out to be a car full of gear. How much?—well he said "Oh, give me £150!"

More work ensued, but at least the components were large enough to see without using a glass! Two days later I had the set up and running and had constructed a mains PSU for it.

In early May, just before Dayton, we were putting on a station for "Mills on the Air." This is an annual get together on-air where stations are set up in windmill and watermills all over the country It gives the public a chance of seeing our stations and learning about amateur radio.

One member of the public told me that a neighbour had four ex-army sets in his garage. Later that evening I phoned the chap asking if I could borrow them for our display…. "Certainly we could!" We were now getting a bit "over the top" with gear!

While all this repair work was going on I also built a 12 x 6 ft trailer to set up the gear on—with camouflage netting it was starting to look quite reasonable (see Photos 6 and 7). I had also added a tilt over 35 ft pole on the front so that the aerial could be erected quickly. The aerial consisted of trapped dipole on 80m, 60m and 40m. I had been issued with a forces callsign of "42" so 60m was required. This enabled us to work on selected military frequencies in the range of 2 to 8 MHz. 5 MHz was the obvious choice for the 200-mile path that most UK stations would have to cover, but we did have some higher frequencies that we could use for the Scottish stations. There was too much fun to be had on 80m so I didn't use those frequencies too much!

I was not the only radio station there. We also had an old army 30 x 20 tent that (see Photo 8) included an SSB station on 40 and 20 using the three-band vertical outlined in my book (1). They managed 250 QSOs in 27 countries including W and VE.

The T1154/R1155 (see Photo 9) also

Photo 9—T1154 top and R1155 below.

Photo 10—An interesting collection of Spy Sets.

arrived and I tried to operate that. The problem with that set is that the netting is very crude. You cannot net the station properly. You use the 'magic eye' tuning indicator on the receiver... totally impractical for CW and difficult for AM!! In the end, the 'Army Station' managed 36 QSOs, 20 on CW and 16 on AM. We worked three of the four "beaches" so we came away very happy.

We also ha a superb display of WW2 spy equipment including B2s Suitcase transmitters (see Photo 10) and an Enigma machine (see Photo 11)... Stunning, but my photos do not do it justice! The big lesson we learned during the day is that we had the venue wrong. We held it in Dover Castle grounds, very spectacular but limited in visitors. Town people very rarely visit the castle due to the entrance fee of £8 per person (even kids!). It is far too expensive. If we could have got permission from the council we would have been far better setting the station up on Dover seafront. I expect though, that we would have had to apply in triplicate three years in advance!

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Photo 11—The famous Enigma Machine for encrypted messages.

QRV? A Homebrew QRPer's VFO

Steve Hudson—AA4BW sdhudson@reedbusiness.com

Here's how to build a homebrew VFO for 40 meters. As my kids would say, it rocks—and we're not talking about quartz crystals!

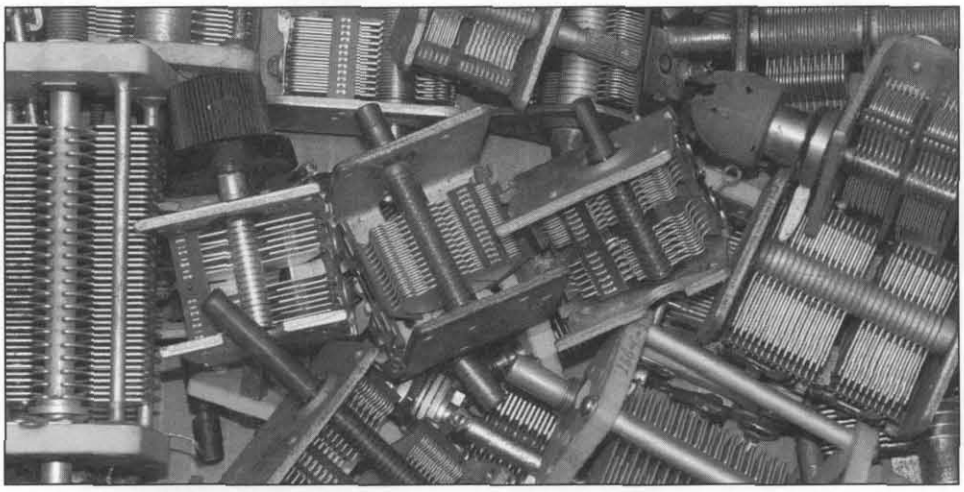


Figure 1—"What about that air variable?" Just about any capacitor in your junk box can be used to build a working VFO.

The Matter of Stability

A couple of issues ago we talked about something that generated a surprising amount of interest-the topic of grinding crystals to move them to a specific (but of course fixed) frequency. Crystals, it seems, are the most-used frequency determiner for homebrew QRP transmitters, and there's a good reason for that—when it comes to frequency stability, a crystal is generally going to "stay where it's at."

But there's a problem with crystals—not the least of which is that new ones can have an adverse impact on the thickness of your wallet! True, relatively inexpensive crystals are available for a limited number of QRP frequencies, but as you know if you've spent much time camped out on 7040 or 3579, you'll likely share those frequencies with hundreds of your closest friends.

One solution is to buy a bunch of crystals. That works, but it's expensive.

Another solution is to build a VXO—a variable crystal oscillator—to get a few kilohertz of frequency swing for the crystals you do have. With a good VXO design, you'll get good stability. But unless you get a bunch of crystals to use in the VXO, it still won't give you the whole band.

Hmmm...how about option three? Why not build a VFO instead?

Good question. For some reason, many builders shy away from constructing homebrew VFOs, perhaps for fear that they're too complicated. Yes, they'll have a few more parts than a simple crystal oscillator, but the payoff is all the frequency coverage you desire.

How about stability? Not to worry, because the fact is that a well-built homebrew VFO can give you a signal as stable as any you'll find.

What about the matter of tuning? In today's VFOs, frequency is usually set either by a frequency synthesizer, by a varicap (that is, a voltage-variable capacitor) or by an air-dielectric variable capacitor. The synthesizers work great, but they're a little complicated to build. Varicap tuning schemes work well, too, and have the added advantage of allowing you to use an inexpensive potentiometer for tuning.

Back in the old days, the way that most folks tuned a VFO was with an "air variable," a variable capacitor with air as the dielectric. Such VFOs can be remarkably stable, especially if you give a little care to picking the right variable.

So, since I'm feeling a little nostalgic today, that's what we'll do here. We'll build an air-variable-controlled VFO!

"But wait!" you're saying. "Air variables are hard to find and expensive! Do we really want to tackle an air-variable design?"

Well, let's see.

What follows is a QRPer's approach to building a 40-meter VFO using a well-known and time-proven design incorporating common passive component values, three common transistors (two NPNs and one FET) and coils wound on common, easy-to-get toroid cores.

I don't make any claim to coming up with the design; it's been around for many years in many different iterations, and I've built it in a bunch of different forms over the years with good results every time. It requires no magic to get it going. Additionally, it's often seen with some sort of offset circuitry, which allows its frequency to be shifted as desired between "transmit" and "receive" periods. For example, the frequency can be offset during receive to eliminate problems with VFO interference during QSOs; similarly, if the offset is suitably chosen, it can be used as a dandy VFO for a direct-conversion transceiver. Suitable control circuitry is not covered here, but it's easy to implement and will be covered in a future article.

This VFO is built as a stand-along module. Can you say, "future possibilities?"

You could, but instead you're probably still saying, "But what about that air variable?"

Glad you asked. One of the neatest things about the VFO building approach that is outlined here is the fact that it allows you use just about any air variable for tuning. When building a VFO, if you happen to have the capacitor specified, then that's fine. But if all you've got is that anonymous air variable that's been sitting in your junk box for the last ten years (see Figure 1), then odds are that you're still in great shape. In fact, learning how to adapt such circuits to use the variable cap you have on hand may well be the most important thing you learn from tackling a project like this.

So dig out the junk box, plug in the soldering iron, and get ready to go!

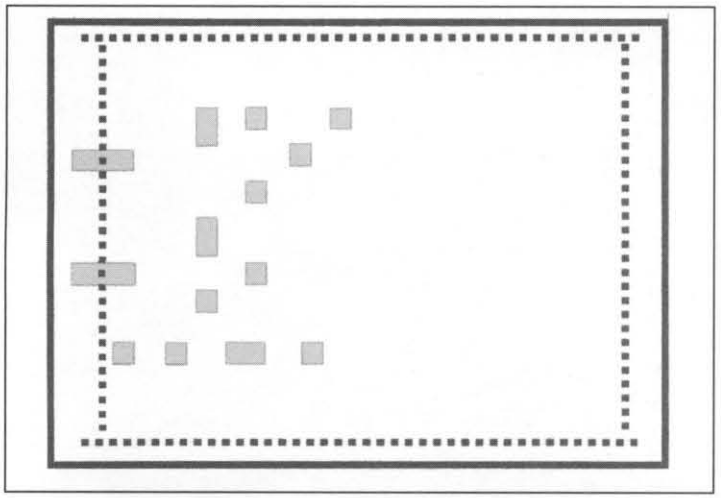


Figure 2—Approximate size and placement for Manhattan-style construction pads; the dashed lines represent the location of the side walls. Note that two pads on the left had side go under notches in the left side wall.

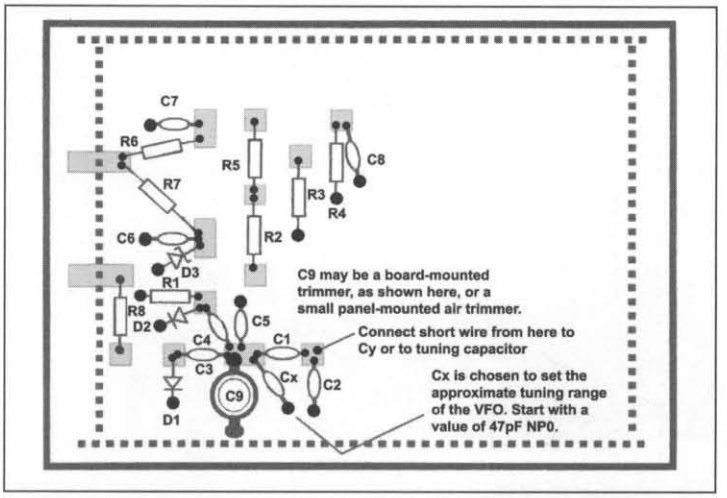


Figure 3—Construction Part 1: Placement of resistors, diodes and capacitors.

The Manhattan Approach

Our version of the VFO will be built Manhattan-style, a technique in which isolated "islands" or "pads" of copper-clad PC board material are cemented to a copper ground plane (actually, a large piece of copper-clad board) with components soldered to the pads or to the groundplane as dictated by the design. It's a favorite and easy-to-duplicate approach used by QRPers, and (best of all) it gives you a great deal of flexibility in how and where you mount the parts.

Most of the pads are "medium" size, though several "large" pads are also used. Two "wide" pads are used at the main 12-volt connection and offset control points. Pad size is not critical, within reason; as long as it gives you room to work. Many people use tin snips or some similar tool to cut out the small pads.

Initially, I wondered if the use of Manhattan pads in the VFO would degrade stability as a result of the tiny capacitances formed between the pad foil and the groundplane. A look at the literature suggested that a this approach was considered a no-no for VFO construction—"bad, bad, bad!' they said-but being the experimentally inclined sort that I am I decided to throw together a preliminary prototype and see for myself. After all, that's part of the fun of homebrewing!

For that first version of the VFO, I used some pretty large pads in the interest of easy assembly (and, truth be told, to see just how bad "bad" could be). I finished it up, let it cool down from soldering, fired it up and hooked up the frequency counter.

The result? To my surprise, the resulting VFO had great stability. I let it run for hours, and after a very short initial period of drift (just a few minutes while the effects of heating in components settled down) it just sat there stable as could be for hours at a time. Admittedly, this was in an indoor environment where the temperature and humidity are relatively stable. But that's where I planned to use the finished project anyway, so the experiment was declared a success—and I moved on to cleaning up the layout for a "final" version!

The pad layout is shown in Figure 2, along with approximate pad sizes. Remember that there's nothing critical about the sizes of the Manhattan pads, as long as you stay within reason.

Preparing The Board

Begin by preparing the groundplane board and mounting the pads. Here are the steps to follow to get the basic board ready for construction:

___ Mark the pad positions on the main groundplane board. You may want to photocopy the pad layout and use it as a template, perhaps marking each pad location on the groundplane board using a small dot of indelible ink (think "Sharpie" type pens).

___ Mount the pads. Use your favorite "Superglue"-type adhesive. I tend to like the gel formulations, as they're a bit thicker and they are, for me at least, easier to control. In any case, for best adhesion, make sure the groundplane board and the pads are clean before you glue the pads into position. Fine sandpaper will do the job nicely. And be sure to use enough glue!

___ Tin the pads.

___ Check each pad for shorts to ground using an ohmmeter.

Now you're ready to begin installing the components. When doing so, refer not only to the parts layout diagram but also to the schematic. I find it helpful to use a highlighter to mark off each part on the schematic as it's installed. I look at the schematic to see what the part is connected to, then check the actual board to make sure that the proper connections are being made. This provides a double-check that you're putting the part in the right place.

Installing The Diodes...

When installing parts in the VFO area of the board, you may find it helpful to follow the order given here. This particular order eliminates installation conflicts. Refer to Figure 3 for placement of the parts in this section.

___ D1, 1N914 or 1N4148. Note orientation of banded end.

___ D2, 1N914 or 1N4148. Note orientation of banded end.

___ D3, 9.1 V zener, 1N757 or equivalent. Note orientation of banded end.

...And The Resistors...

When installing the resistors, double-check the color coding to be sure that you're installing the right one in each location. Again, refer to Figure 3.

___ R2, 10K (brn blk org)
___ R5, 27K (red pur org)
___ R3, 1K (brn blk red)
___ R4, 180 (brn gry brn)
___ R6, 47 (yel pur blk)
___ R7, 680 (blu gry brn)
___ R1, 1 meg (brn blk grn)
___ R8, 2.2K (red red red)

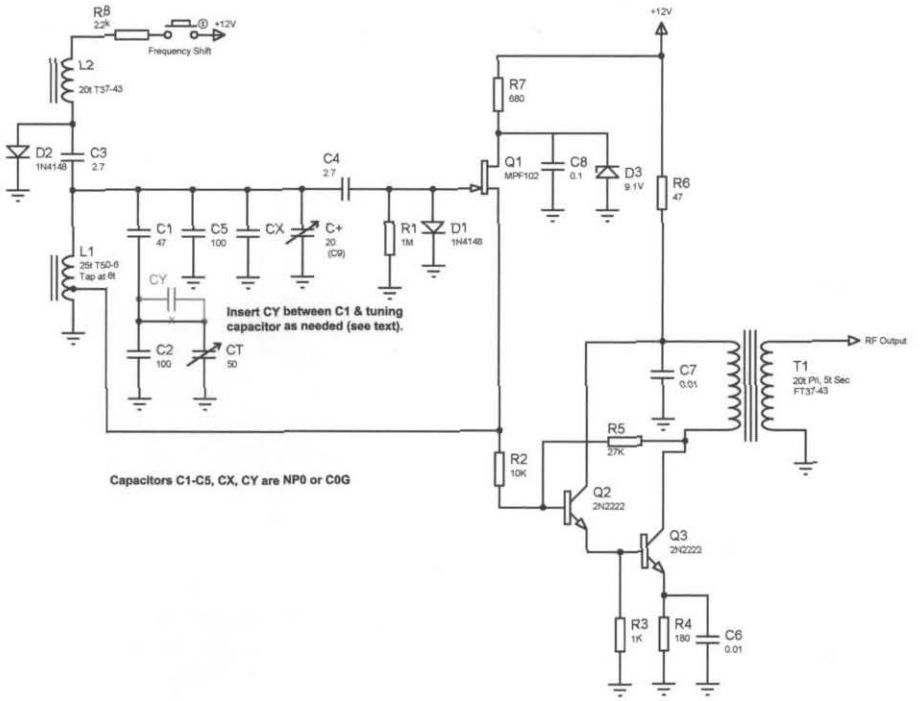
...And The Capacitors...

___ C3, typically 1 to 5 pF NP0 disk. This is the capacitor that determines VFO offset if offset circuitry is used. Smaller values mean less offset. If you simply want to move the VFO off the transmit frequency during receive periods, start with a value of 2 to 3 pF. In this application it's not critical.

If, on the other hand, you want to offset the VFO by a kilohertz or less for use as the VFO in a direct conversion receiver subsystem (for example, if you decided to build on the VFO to construct a transceiver) then the value will be less. In that case, C3 is best replaced with a small-value NP0 trimmer which is set for the desired offset.

For now, just use a value of 2 to 3 pF-whatever you have in your junkbox-to allow you to move the VFO off frequency when you're receiving. If you expand it to a transceiver later on, you'll simply need to change the capacitor.

___ C4, 2.7 pF disk, NP0
___ C1, 47 pF disk, NP0
___ C2, 100 pF disk, NP0
___ C5, 100 pF disk, NP0
___ C6, 0.1 (may be labeled "104"")
___ C7, 0.01 (may be labeled "103")
___ C8, 0.01 (may be labeled "103")
___ C9, trimmer. This capacitor is used to set the portion of the band that the VFO covers. It should be an NP0 capacitor with a maximum value somewhere in the 15 pF range...but the exact values are NOT critical. However, regardless of the value, make sure that the "shaft" side is grounded (to eliminate hand-capacity effects) during installation. This, by the way, is a good general practice when installing any variable cap—if you ground the control shaft, then the capacitance won't change



VFO Project: Parts List

Resistors

R1	1M
R2	10K
R3	1K
R4	180
R5	27K
R6	47
R7	680
R8	2.2K

Capacitors

C1	47 pF, NP0
C2	100 pF, NP0
C3	2 to 3 pF NP0 (determines offset)
C4	2.7 pF, NP0
C5	100 pF, NP0
C6	0.1 (may be labeled "104")
C7	0.01 (may be labeled "103")
C8	0.01 (may be labeled "103")
C9	NP0 trimmer, max value about 15 or 20 pF. May be a small air trimmer (panel mount is fine) or board-mount trimmer
CT	Air variable tuning capacitor. Use two small sections of Ocean State Part BC5G five-section variable, or another cap you have in your junk box as described in the text
CX	See text
CY	See text

Semiconductors

D1	1N4148 or equivalent
D2	1N4148 or equivalent
D3	9.1 volt Zener, 1N757 or equivalent
Q1	MPF102
Q2	2N2222 or equivalent
Q3	2N2222 or equivalent

Inductors

L1	25 turns on T-50-6 core, tapped 6 turns from the grounded end
L2	20 turns on FT-37-43 core
T1	Primary is 20 turns on an FT-37-43 core. Secondary is 5 turns

Board and Enclosure Parts

1 pc	Copper-clad board about 3.5 by 5 inches (main ground plane)
1 pc	Scrap copper-clad board from which to cut Manhattan pads
—	Several Pieces of copper-clad board from which to cut enclosure front, back and sides
1 ea	RCA or BNC jack for VFO output-builder's choice

Figure 4—40 meter VFO schematic and Parts List.

every time you approach or touch the adjustment shaft or screw with your hand or a tool.

Installing CX

In a VFO circuit such as this one, the operating frequency is determined by the total capacitance in the tuned circuit. To allow for setting of bandspread (that is, how wide a range the VFO will cover) and bandset (exactly where that tuning range is located), some of those capacitors will need to be adjustable. Thus, in practice, the total tuned-circuit capacitance in a VFO is made up from a combination of series and parallel capacitors, with two or more of those capacitors made variable for bandset adjustment and for actual tuning.

In this circuit, the "bandset" setting capacitor (that is, the capacitor that moves the entire VFO up or down in frequency) is a trimmer, C9. But because capacitors are rarely of the exact value marked, VFO builders often need an additional "fudge" capacitor to allow the trimmer to move the VFO to the desired frequency range. That "fudge" capacitor is CX.

In this circuit, if you're using a main-tuning variable with a max value of about 50 pF and a bandset trimmer with a maximum value of about 15 pF, then CX is probably going to need to be about 40 pF.

Thus, try starting with a CX value of 39 pF or 43 pF, which are standard values and easy to find. Remember to use an NP0 capacitor. Then get the VFO up and running, and see if that value allows you to achieve the desired frequency coverage range. If you can achieve the desired tuning range with those values, then that's good! If not, it's a simple matter to fine-tune the CX value as discussed in the "Capacitor Considerations" section further on in this article.

So the next step is...

___ Install CX, using an initial value of 39 pF or 43 pF. Make sure it's an NP0 capacitor.

What About CY?

CY, shown greyed out on schematic (in Figure 4) in series with the main tuning capacitor, is an optional capacitor that you'll need to use only if your main tuning capacitor has a maximum value that's much larger than about 50 pF.

Why not just use a 50 pF max value for the tuning capacitor and do away with CY? That's the preferred approach, if you have a suitable capacitor available (or if you use the part specified). But you may not have access to that particular cap, or you may prefer to use a cap you've already got on hand—and that's where CY can help.

Say you've got a really nice dual-bearing 365 pF broadcast-type air variable. It's been sitting on the shelf for a while waiting for just the right project—perhaps something like this VFO!

You could, of course, use the cap as-is. But if you do, instead of a tuning range of something like 5 to 50 pF (which in this circuit will give you a bandspread of about 50 kilohertz, plus or minus) you'll have a tuning range that's much, much broader-several hundred kilohertz or more—which may be a lot more than you want.

What you need is a way to reduce the maximum effective value of that variable-and the easy way to do it is by simply putting a capacitor in series with it. That series capacitor is CY on the alternate tuning circuit schematic, and it works like a champ.

How big should CY be? Recall that the formula for the total capacitance of two capacitors (we'll call them CA and CY) in series is the product of the values divided by the sum of the values. In other words, to get an effective capacitace of CE:

$$CE = (CA * CY) / (CA + CY)$$

If you want to use that 365 pF air variable (CA) to get an effective capacitance (CE) of 50 pF, just plug in the numbers and solve for CY. Here's every step—probably more detail than you wanted!—but it shows how to do the calculation. Warning: There's a little bit of math coming up, but only a little!

$$(365 * CY) / (365 + CY) = 50$$

$$(365 * CY) = 50 * (365 + CY)$$

$$(365 * CY) = (50 * 365) + (50 * CY)$$

$$(365 * CY) = 18250 + (50 * CY)$$

$$(365 * CY) - (50 * CY) = 18250$$

$$315 * CY = 18250$$

$$CY = 18250 / 315 = 57.9 \text{ pF}$$

Thus, CY in the case of a 365 pF air variable should have a value of 57.9 pF to yield an effective overall capacitance (CY and the tuning cap combined in series) of about 50 pF. In practice, 56 pF is a standard value and should be "close enough." You could also use a 47 pF capacitor for a slightly more restricted tuning range, or a 65 pF capacitor for a slightly expanded tuning range.

There—that wasn't so bad, was it!

A little more number crunching yields a generic formula for finding CY. If you have a tuning capacitor with a maximum value of CT pF, and want to find a CY value that can be put in series with CT to yield a max effective value of about 50 pF, use this formula:

$$CY = (50 * CT) / (CT - 50)$$

Using that formula, here are some suggested starting values for CY if you're using large-value variables for tuning:

- For a 100 pF capacitor,
  $CY = (50 * 100) / (100-50) = 100 \text{ pF}$
- For a 150 pF capacitor,
  $CY = (50 * 150) / (150-50) = 75 \text{ pF}$
- For a 200 pF capacitor,
  $CY = (50 * 200) / (200-50) = 66.7 \text{ pF}$
- For a 250 pF capacitor,
  $CY = (50 * 250) / (250-50) = 62.5 \text{ pF}$
- For a 300 pF capacitor,
  $CY = (50 * 300) / (300-50) = 60 \text{ pF}$
- And for that 365 pF broadcast variable,
  $CY = (50 * 365) / (365 - 50) = 57.9 \text{ pF}$

I could have just given you the numbers, of course, and that would have been easy. But now you know how to work it out on your own—and that will give you tremendous flexibility when you build future projects using air variable (or even varicap) tuning!

Note that these numbers represent calculated values. In practice, pick a standard value (remember to use NP0 type capacitors) and go from there. Note too that larger values will give you a wider total capacitance swing (which means more band coverage) while smaller values will give you a smaller swing. You can use that to further customize the coverage of your VFO.

Yes, it's also possible to calculate values for exact frequency swings, but that gets into some serious math and I'm out of

aspirin. For now, try these calculated values as starting points, check the actual frequency swing you get, and then adjust the CY value up or down to suit your individual bandspread preference.

Bottom line: If you're using a large air variable, you'll want to use CY (instead of a jumper) between the "hot" side of your tuning capacitor and the rest of the circuit (to connect the tuning capacitor to the rest of the circuit.

The beauty of using CX and (if appropriate) CY, of course, is that this approach lets you use just about any air variable (as long as it's mechanically suitable to the task) to tune your VFO. Clearly, since different variables will have different min-to-max capacitance ranges, you'll find that different-than-specified variables will yield different amounts of frequency spread. But if you can handle a little bandspread uncertainty (and you can even control bandspread, though it's more complicated) then knowing how to use fixed NP0 caps in various circuit positions can give you the variable-cap selection you've always desired.

As my teenager would say, "That rocks"—and hes not talking about crystals!

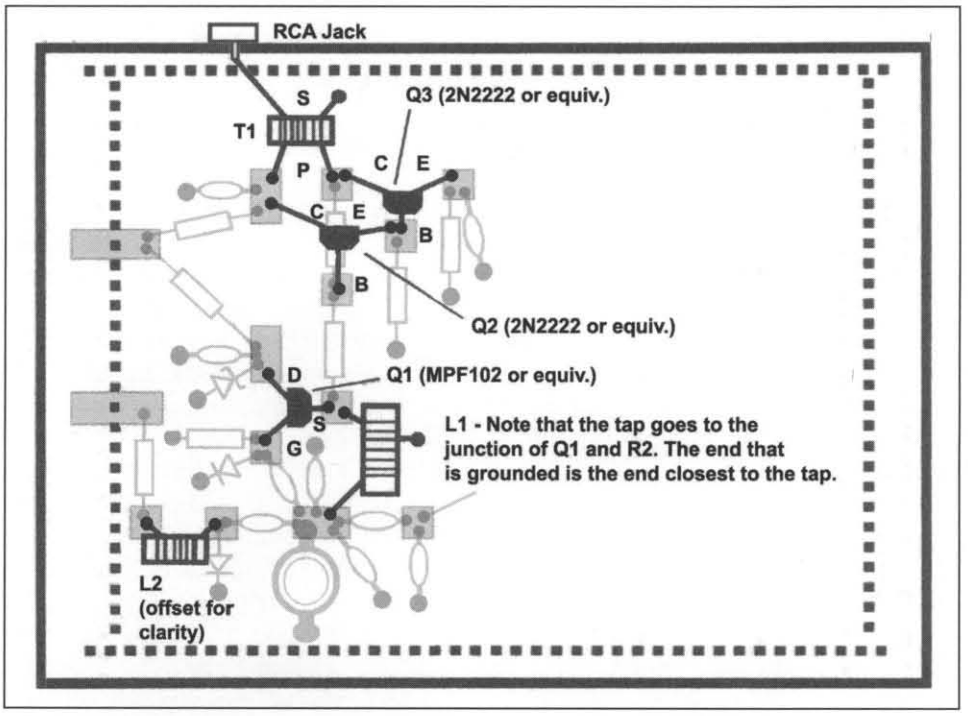


Figure 5—Construction Part 2-placement of transistors and inductors.

...And The Semiconductors...

There are three transistors in the VFO-two 2N2222s (or equivalent) and one MPF102 (or equivalent). Be sure that you put the right one in the right place!

Note that the transistors must be put in correctly. The diagram in Figure 5 shows them from the top. Be sure that you note the position of the flat side of each semiconductor.

Note, too, that one of the transistors—Q2, one of the 2N2222s—is mounted so that it straddles one of the resistors (R5).

___ Install Q1, a FET (MPF102 or eq.) as shown.
___ Install Q2, 2N2222 or equivalent. This transistor straddles R5.
___ Install Q3, 2N2222 or equivalent.
___ Double-check that you have put the right transistors in the right places.
___ Double-check that you have oriented each of the transistors properly

Winding And Installing The Toroids

Three toroidal inductors are used in the VFO. L1 is a tapped coil in the VFO tuning circuitry and is a primary frequency determining element. L2 serves as an RF choke in the VFO offset circuitry. T1, with two windings (four leads), is a broadband transformer which couples the VFO to whatever circuitry comes next. Refer to the detail sketches and to the parts list for winding details. They're not hard to wind-just remember that one pass through the center of the toroid counts as one turn.

___ Install L1, the large tapped coil wound on the large yellow core. The center tap goes to the junction of Q1 and R2, as shown. The coil end nearest the tap is soldered to the groundplane. The "high" end of the coil goes to the junction of C1 and C2.
___ Install L2, the single-winding coil wound on a dark gray FT-37-43 core. One lead goes to the junction of D1 and C3; the other goes to the long pad near the adjacent corner of the board (which connects to the keying circuitry).
___ Install T1, the transformer. The primary leads go to the pads shown; the secondary lead closest to Q3 is grounded and should be soldered to the ground plane. The remaining secondary lead delivers the signal from the VFO to the outside world.

This completes the basic assembly of the VFO. Double-check the placement of all parts, especially the transistors, and also double-check the installation of the inductors. Also, pay particular attention to checking proper installation of the fixed capacitors in the tuned-circuit portion of the board.

Now triple check the semiconductors, inductors and capacitors. Give the resistors another once-over, as well.

Initial Check

At this point, you're ready to test your creation. After checking the wiring one more time, proceed as follows:

___ Connect +12 volts to the +12 volts pad.
___ Connect the negative power supply lead to the groundplane.
___ Tack a 470-ohm resistor (not critical) across the secondary of the broadband output transformer.
___ Connect a frequency counter across the secondary.
___ Apply power and check for smoke, flames, or exploding components. If none are apparent, you can relax somewhat and check the frequency counter. You should see a stable frequency readout somewhere between 6 and 9 MHz.
___ Using an insulated tool, rotate the

trimmer capacitor through its range. The frequency should change by some amount. Set the trimmer near the middle of its range.

If this doesn't work, check the "In Case Of Difficulty" section for some ideas on how to proceed. Members of the NOGA group have built close to two dozen of these VFOs, and the suggestions included there reflect their experiences and may help you track down any problems you encounter. But if it passes the preliminary checks, then move on to installation of your air variable.

Installing The Air Variable

At this point you're ready to install the air variable. For the NOGA Building Day version of this project, we used a five-section variable available from a variety of sources, including Ocean State (their part number BC5G), putting two of the small sections in parallel for an effective total maximum capacitance in the neighborhood of 50 pF. We've already looked at the matter of using other max values in the discussion of CY above, so feel free to take that route too.

In any case, the next step is to...

___ Install the air variable. Then...
___ Connect the "hot" side of the variable to the junction of C1 and C2. If you're using a variable (either a single section or paralleled sections) with an effective max value of 50 pF or so, make this connection with a piece of large bare wire. However, if you're using a variable with a max value that's significantly larger, don't use the jumper but instead use CY, an NP0 capacitor, as discussed earlier.

Since one of the goals here is to encourage you to become comfortable with using various types of variable capacitors in such circuits, thus avoiding the paralysis that sometimes accompanies an unsuccessful search for just the right capacitor, it's impossible to give specific mounting instructions. Basically, though, mounting an air variable will involve securing the rotor plates (those that turn) to the groundplane board (or to a grounded front panel) and then connecting the "hot" terminal (the fixed, or stator, plates) to the active circuitry as noted above. The rotor plates are usually (but not always) electrically connected to the capacitor's frame, while the stator plates are brought out to a terminal somewhere. The exact arrangement for doing this will vary with almost every capacitor, so there's no way to spell out specifics.

But even if you're a beginning builder, it's not hard to figure out how to mount an air variable. Just study the schematic (don't you hate it when writers say that?), look at the part, think about how the rotor and stator plates are connected, and have at it. As long as you make the actual circuit connection to the proper pad, you won't hurt anything even if you manage to wire it up in a manner that's shorted or open. All you'll do if you put it in wrong is end up with a VFO that doesn't V but instead operates on some close-but-no-cigar frequency. That condition will become instantly apparent, and then you can revisit the wiring of the variable cap.

Now make the final operational checks as follows:

___ Double check to be sure you've installed the variable correctly.
___ Fully mesh the variable capacitor's plates.

Capacitor Considerations

For many builders, a major stumbling block in homebrewing projects such as this one is the matter of finding the "right" air variable. It's easy to understand why too-specific air variables can be hard to find, and—when found—can lead to severe cases of sticker shock.

What's a builder to do?

Well, first of all, you need to decide just what makes the "right" air variable "right."

What goes into a suitable air variable for a VFO? First, you need one with a smoothly rotating shaft. In practical terms, that means a "double bearing" capacitor, which is to say one where the rotor shaft is supported on each end. Most air-dielectric receiving-type tuning capacitors meet that requirement.

Secondly, you need a capacitor that covers a suitable range of capacitance. Variable capacitors tune a VFO by adding a variable amount of capacitance to the circuit; remember, the more capacitance added, the lower the VFO's frequency will be. In other words, when the variable capacitor is set to its maximum capacitance position (that is, with the plates fully meshed) the most capacitance will be added and the VFO will be operating at its lowest frequency. When the plates are wide open, the least capacitance will be added and the VFO will be operating at its highest frequency.Mounting schemes for air variables vary all over the map. Some caps mount with screws that pass through the front of the panel and into the front of the capacitor frame. Others mount with screws that secure into the bottom of the capacitor frame; these may be easier to use, since they allow the capacitor to be mounted directly to the groundplane board. In each case, remember to use lockwashers between the capacitor's metal frame and the copper of the groundplane or front panel.

Occasionally, you'll find suitable capacitors that mount, control-style, in a single hole. From a mounting point of view, those are easiest of all. However, they may be less stable mechanically, particularly if they're single-bearing types, and may need additional support at the rear.

Once in a while you'll even find one designed for direct solder-in mounting. These work well, too, but you'll need give the mounting arrangement a bit of pre-construction consideration.

In this project, the air variable specified is a nice one for VFO projects. It has five sections, and individual sections can be combined in various ways to yield a variety of capacity ranges. That's helpful, as it allows you a great deal of flexibility in using a single variable to get a variety of tuning ranges. Here, two sections are used in parallel for a total max capacitance of about 50 pF.

But don't feel like you have to use the exact part specified. You can easily use another air variable that you may have on hand. The techniques for doing this are discussed in the text, with particular reference to the section on using CY. Don't be afraid to experiment—that's half the fun!

___ Connect a 12-volt power source, being sure that polarity is correct.
___ Apply power.
___ Since you already know that the VFO is working, and since the only thing you've added is the tuning capacitor (and perhaps CY), then you should see a stable signal at a frequency somewhere in the 40-meter band. With the tuning capacitor plates fully meshed, adjust the trimmer to bring the frequency to the low end of the range you want to cover. Now turn the cap to its minimum capacitance (fully opened) position; the frequency will increase by 40 to 60 kilohertz.

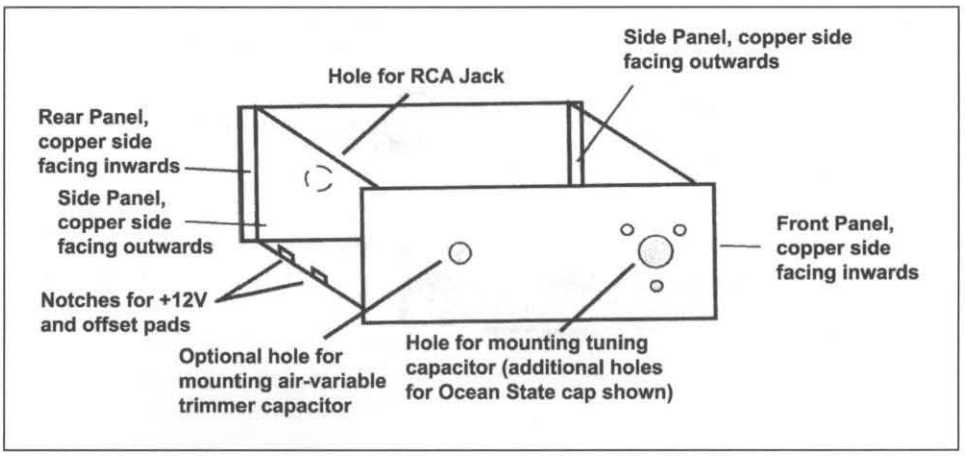


Figure 6—Sample enclosure construction.

To test the offset circuitry...

___ apply +12 volts to the offset pad (the large pad passing through the VFO left side shield, closest to the front of the VFO enclosure). The VFO frequency should shift by several dozen kilohertz; the exact swing depends on the size of C3. Removing the voltage should cause the VFO to return to its non-shifted frequency.

That's it. It works!

Enclosure

The last step in building your VFO module is to enclose it—and the easy way to do that is to assemble a suitable enclosure using pieces of PC board material, cut to suitable sizes and then soldered together (see Figure 6). Depending on the mounting configuration of your chosen air variable, you'll need to drill either the front panel or the groundplane to accept the mounting screws which you'll use to mount the variable capacitor frame. Mount the frame using lockwashers between the frame and the copper-clad side of the front panel or groundplane board.

You'll need to drill the front of the enclosure to clear the air variable's shaft. On the rear panel, you'll need to drill a hole and install an output jack (RCA, BNC, etc.). In this particular design the right side panel is undrilled; the left side panel is notched using a nibbling tool to clear the two long pads (one for +12 volts, the other for the offset voltage).

Note that the main groundplane extends a bit beyond the side panels of the enclosure. This provides a convenient area to drill for screws used to mount the VFO module to a suitable substrate which will be sized to be big enough to hold subsequent modules).

Soldering the enclosure parts will be much easier to do if you orient the pieces so that most of the soldering-together of the pieces takes place on the outside of the enclosure—another lesson learned the hard way! A completed enclosure is shown in Figure 7.

Finally, cut another piece of board to serve as a top cover to the enclosure. But (in a classic example of do-as-I-say-not-as-I-do) the fact is that I've never installed a top cover on my own final version of the VFO. I know, I know...adding the top cover will be an aid to temperature stability by isolating the innards from the temperature variations in the outside world. But the VFO is plenty stable without it—in fact, a very kind friend, who I QSOed the other day using a transmitter controlled by this circuit, described it as "sounding just like a K2."

You've got to be careful, or that kind of thing will go to your head.

In Case Of Difficulty

Isn't that what the kit manufacturers call this section? It's the one you turn to if

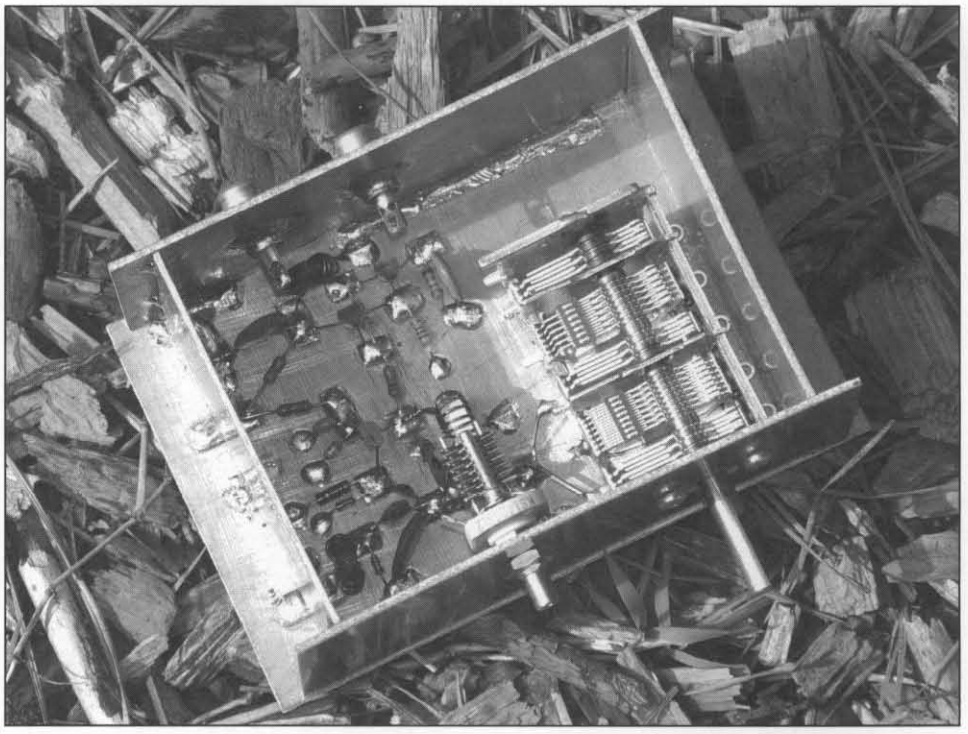


Figure 7—Completed 7 MHz VFO module; note Ocean State air variable used in this particular VFO; also note notches on left side for +12V (rear notch) and offset (front notch) pads.

it doesn't work. Of course, my own projects always work—and if you believe that, then there's that swampland thing I'd like to talk to you about!

In all seriousness, though, this VFO is generally easy to build. If you're careful with parts installation and soldering, it should work right off the bat.

If it doesn't, here are some things to look for, based on experience by various builders who constructed the circuit as part of a NOGA QRP Club Building Day.

Inductors can be confusing. Make sure you've wound them correctly, particularly the tapped coil in the VFO circuit, and that you've installed them correctly (especially the tapped coil in the VFO circuit). In the Building Day versions of the circuit, the most common problem had to do with improper installation of this coil, generally by connecting the "hot" lead to the wrong pad.

Resistors can get mixed up. For example, 10k (brown-black-orange) seems to be readily confused with 1k (brown-black-red), and 27k (red-violet-orange) seems readily confused with 2.7k (red-violet-red) or 4.7k (yellow-violet-red) or 47k (yellow-violet-orange)-especially if you're tired. It happens to all of us—and how do I know?

Capacitors, particularly in the tuned circuit portion of the VFO, can be connected to the wrong pads. You can greatly reduce the chances of trouble if you follow the installation sequence and mark off each part installation on the layout and the schematic (a great way to get a feel for a circuit, by the way), but some builders (could I possibly be talking about myself here?) sometimes consider instructions to be a hindrance and forge ahead on their own. Sometimes it works, but other times...

Semiconductors: Make sure they're installed correctly. Also, make sure they're good. You really can fry them with too much soldering heat (yes, it happens) and now and then there's even one that's bad right out of the box. If everything else looks good but things don't seem to be oscillating, try substituting another FET (first) or the 2N2222s in the buffer amplifier.

What Next?

Ahh-possibilities! Now that you have a working 40-meter VFO, can a transmitter be far behind? No, not far at all. In fact, that's what you can look forward to next time-details on how to build a transmitter module to turn your VFO into a really neat 40-meter transmitter.

Stay tuned!

●●

An L-Match Tuner for End-Fed Wires

Mert Nellis—WØUFO mertnellis@msn.com

In this tuner, a variable inductor made by mutual coupling between two coils of near equal inductance is used as the L match inductor. The object is to have a variable inductor with no taps or rollers.

These coupled coils, *L1* and *L2* are connected in series (see Figure 1) to get total inductance, *Lt*

$$Lt = L1 + L2 \pm 2M$$

M is the mutual inductance, where $M = K*SQR(L1*L2)$, which can be phased to either add or subtract. *K* is the coefficient of coupling and is about 0.8 for the assembly shown in Figure 2. See page 6.42 of the *2001 ARRL Handbook* for more information.

A reverse switch connects the two coils either for additive or subtractive *M* to accomplish a wide range of total *L*. With $L1 = L2 = 10$ uH and $K = 0.8$ the range is about 4 to 36 uH.

One coil is wound on the plastic case of a 12 ga *empty* shotgun shell and the other on a 20 ga empty shotgun shell (Figure 2). The winding is #23 magnet wire so that the outside diameter of the 20 ga coil slides nicely into the 12 ga shell to allow variable coupling by sliding the smaller coil in and out of the larger coil.

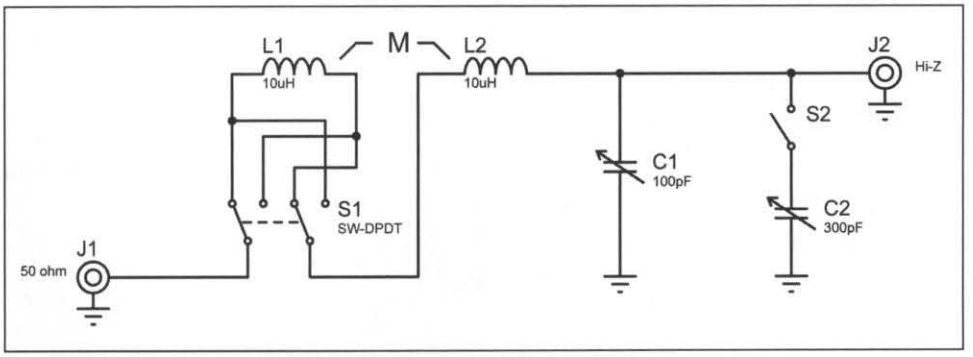


Figure 1—Schematic of the L-match tuner.

Coil Assembly

1. Use a low base 20 ga empty shotgun shell and drill out the primer end to clear a 1/4 inch screw.

2. Take a 1/4-20 nylon hex nut and glue it over the hole just drilled. This gives the shell a threaded nut that will run on a lead screw to move this coil in and out of the 12 ga shell.

3. In preparation for winding the coil cut off and discard about 3/8 inch of the crimped end of the 20 ga plastic so that a well formed coil form remains.

4. Locate and drill a 1/32-inch dia hole in the plastic about 1/4 inch from the end just prepared. This is for the start of the #23 magnet wire winding.

5. Locate and drill another 1/32" dia. hole in the plastic about 7/16 inch from the first hole toward the base. This allows 15 turns between the holes from start to finish, Drill a 1/8-inch hole close to the base that will serve to bring both ends of the winding out for connections clear of the sliding fit. See the sketch in Figure 3.

6. Wind 15 turns of #23 magnet wire between the two 1/32 dia holes. Start with one end into a 1/32 dia hole, into the shell and out the 1/8-inch hole. When 15 turns are on, put the end into the nearby 1/32-inch hole, down the center of the shell and out the 1/8-inch hole pulling the wire tightly to maintain tight turns. Apply some clear fingernail polish over the coil will

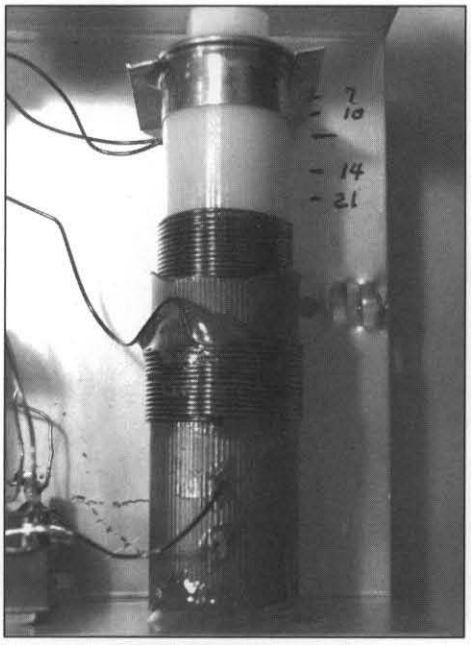


Figure 2—Coil assembly photo.

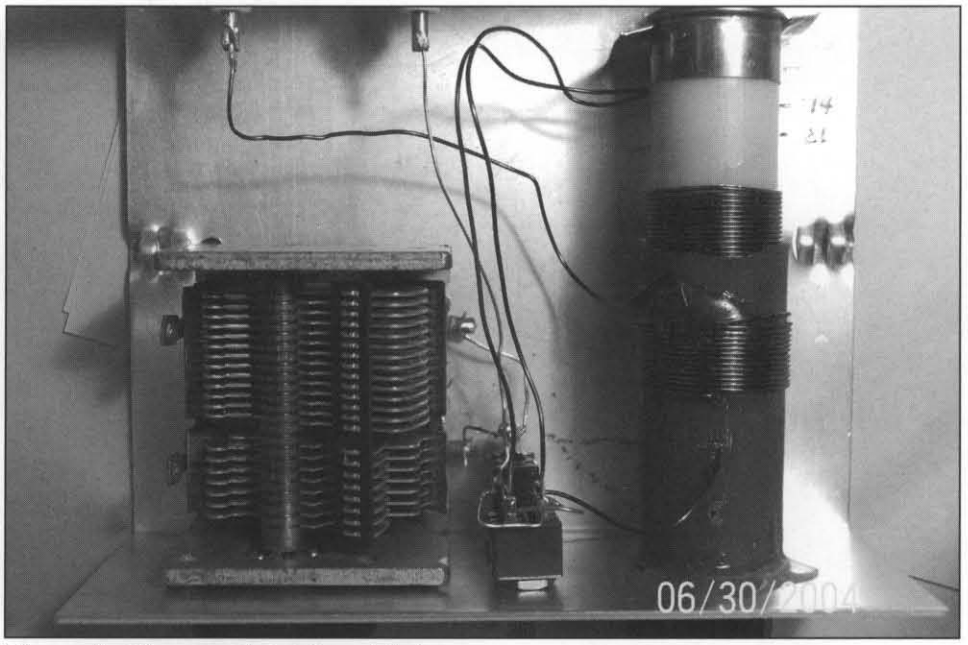


Figure 5—The completed L-match tuner.

help to hold it in place.

7. Take a 12 ga shell, cut the crimped end off to make a uniform coil form and wind on 13 turns of #23 magnet wire. No holes are used for the start and finish of the winding so tape must be used hold the winding and dress the leads. Clear fingernail polish may be useful as well.

8. A 1/4-20 x 2 inch nylon machine screw along with an extension of 1/4 inch wooden doweling is used to make the lead screw shown in the diagram in Figure 3.

Final Assembly

The drive assembly diagram (Figure 3) shows how the two shafts must be coupled together to form the complete drive mechanism. A frame or chassis must be provided to hold the drive screw assembly. The drive must hold the coils away from the chassis far enough so that the magnetic coupling from the coils into the chassis is small. A minimum of one coil diameter is recommended.

The final assembly (Figure 4) requires that the nylon screw be put through a hole in the chassis, then the 20 ga coil assembly be threaded onto the screw, and the 12 ga coil assembly slipped over the 20 ga coil before it is coupled to the wood dowel that is fed through an opposing hole in the chassis. The restraining tab is a rectangular piece of 1/16-inch plastic or PC board glued to the 20 ga coil to keep it from rotating. The tab may be added last to make sure it fits properly. The coil should only slide in and out and not rotate.

A nylon 1/4-20 hex nut is used to couple the nylon screw to the wood dowel. When the coils are lined up to slip freely in and out then the 12 ga coil base is glued to the right hand end of the chassis. Rotating the knob should cause the 20 ga coil to slip in and out of the 12 ga coil. The travel should be sufficient to fully couple the coils when turned clockwise and to separate the coils at least one winding length when fully counter-clockwise. Figure 5 shows the final construction of the tuner.

This L-match circuit should work well for coupling your QRP rig to a half wave wire or any length that presents an impedance of 200 to 2000 ohms. *C1* may be around 100 pF and C2 300 pF to give a wide range of matches.

Have fun!

—73/72, Mert, WØUFO

●●

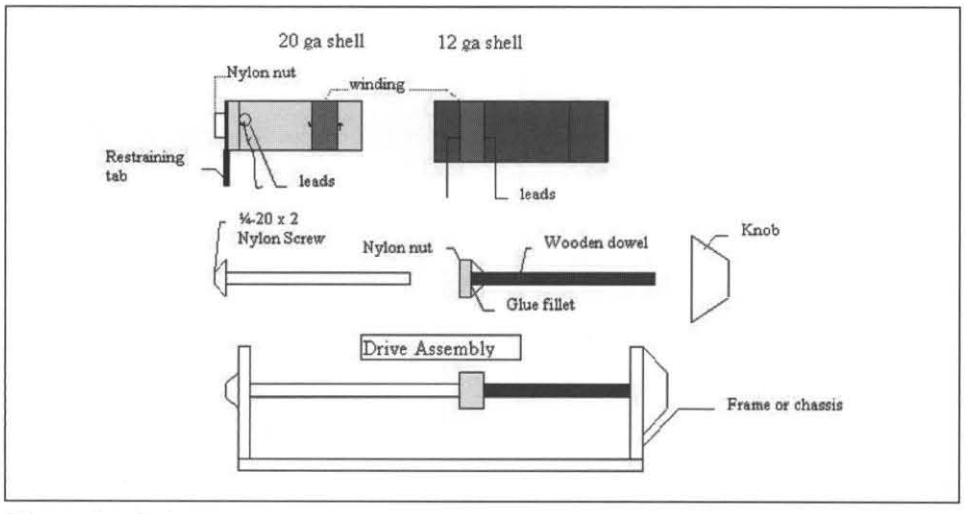


Figure 3—Coil assembly construction details.

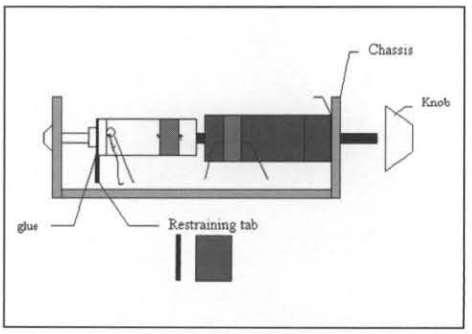


Figure 4—Coil assembly mounting in the tuner enclosure.

Four Days In May Technical Symposium

Tom Dooley—K4TJD tjdooley@comcast.net

The name "Four Days In May" was initially used in 1996; the first year that the Dayton (Ohio) Hamvention moved from its traditional April dates to a more "weather friendly" mid-May time period. Traditionally, the Dayton Hamvention takes place during the three days of Friday, Saturday and Sunday. To "remind" the QRP community that an extra day was going to be added to accommodate a full day Thursday QRP Symposium, the mime "FDIM" was brought to life. It is now a tradition for QRPers to relate their experience at the annual Dayton Hamvention as the Four Days In May.

The concept of Four Days In May was started back in the autumn of 1995 when Bob Gobrick, NØEB (SK) met with Bruce Muscolino, W6TOY/3 for a QRP eyeball in the rustic town of Reston, Virginia. After exchanging a lot of tales of hamming through the years, the conversation eventually moved to what two QRPers could do to pay back the many EImers that helped shaped their ham lives. Bruce and Bob came to the conclusion that a QRP Technical Conference would be a wonderful way to gather up some of the best QRP EImers in the world and have them share their knowledge with as many QRPers that would attend. The Dayton Hamvention was the choice to host such an event, since the QRP Amateur Radio Club International (QRP ARCI) had previously begun a tradition of Dayton evening QRP socials.

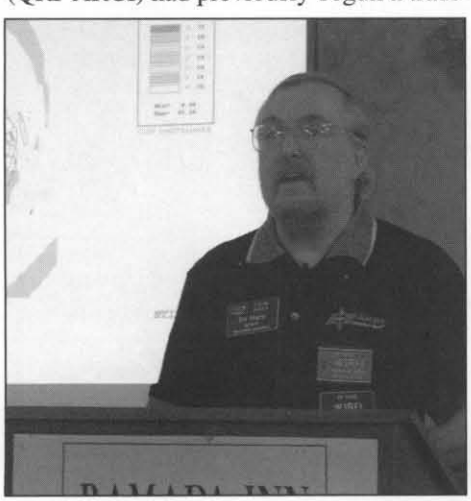
QRP ARCI President Dick Pascoe, GØBPS, welcomed an enthusiastic crowd of QRPers to the 2004 FDIM Symposium.

It became obvious that trying to squeeze a full day of technical talks in during the three-day Hamvention would not work. What was needed was an extra day for QRP. With earnest, a committee was formed for what was to become, the first annual Four Days In May QRP Conference. The committee made plans for a registration of 50 people. The final tally was an unbelievable 100 plus enthusiastic QRPers. You can only attribute that size crowd to the great slate of QRP Elmer presenters that contributed to this inaugural event. A QRP tradition was born!

The tradition continued as a private effort with the financial backing of QRP ARCI until 1998. At that time, QRP ARCI Board of Directors voted to have QRP ARCI officially assume administration for all future FDIM activities, including the QRP Symposium. Under the leadership of QRP ARCI President Mike Czuhajewski, WA8MCQ, and Vice President Jim Stafford, W4QO, the FDIM reins were officially transferred from Bruce, W6TOY, and Bob, NØEB, the two original founders of FDIM.

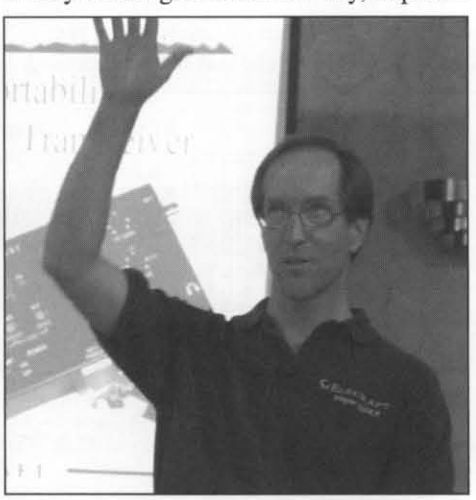
The FDIM Team for 2004 included: Tom Dooley, K4TJD, FDIM Chairman; Hank Kohl, K8DD, FDIM Guest Room Reservations; John P. "Pickett" Cummins, AD4S, FDIM QRP Proceedings Editor and Ken Evans, W4DU, FDIM Special Events.

The FDIM Team wants to especially thank the presenters for their talks and the contribution of the papers that were presented and those in the Proceedings. The donation of their time and their willingness to continue the Elmer tradition is what makes our QRP community so special. We once again have extra material in the Proceedings from L. B. Cebik, W4RNL. LB continues to share his knowledge and is truly a class gentleman. Finally, a special



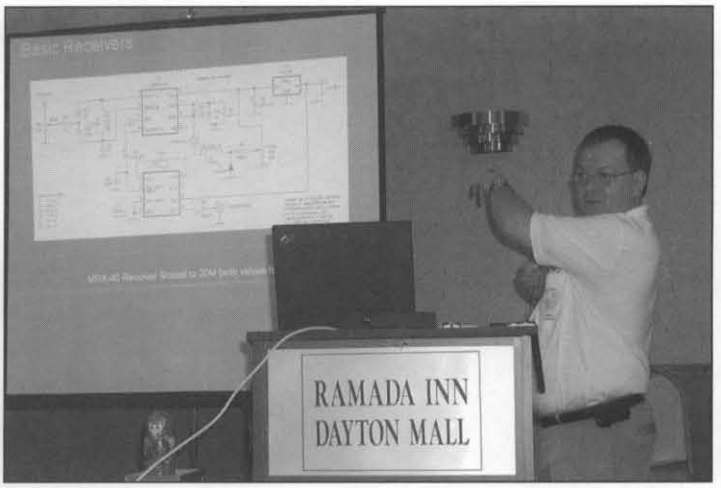
QRP ARCI Board Member, and ARRL Staff Member, Ed Hare, W1RFI, with the facts behind the gloom and doom of Broadband over Power Lines.

Newest Hall of Famer, Ian Keyser, G3ROO, speaking about portable aerials; his antenna won the outdoor antenna category in the Building Contest.



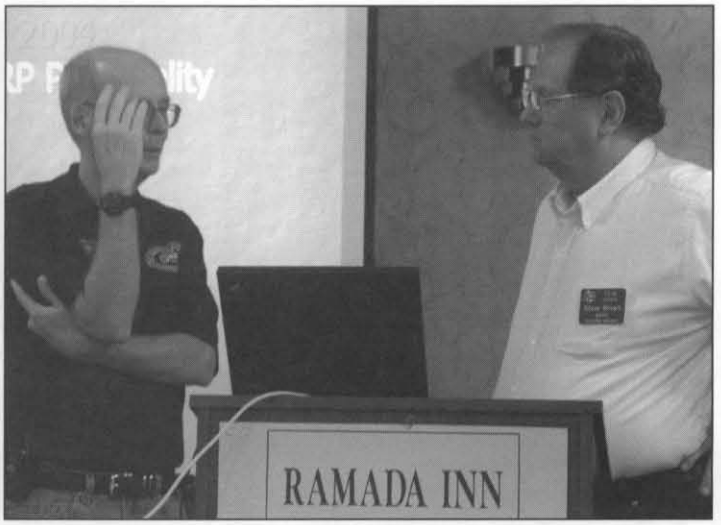
Wayne Burdick, N6KR, describing the inspiration behind the KX1 portable transceiver.

More than 150 QRPers pre-registered for the FDIM QRP Symposium.



Mike Boatright, KO4WX, and Matryoshka (representing Oleg Borodin, RV3GM) showing how it is possible to build simple equipment that still yields plenty of reliable QRP contacts.

The Rev. George Dobbs—then and now—celebrating 20 years of attending ham radio events in the USA with 20 simple QRP projects.



Stephen Brown, W9HC, examining the psychology of FDIM Chairman Tom Dooley, K4TJD's QRP Mind...

thanks goes to all of the QRP vendors that donated prizes to the event. Their generosity is appreciated and helped to make the four days even more exciting.

—72/73, Tom Dooley, K4TJD
Chairman, FDIM 2004

2004 FDIM Symposium Proceedings

The *2004 FDIM Symposium Proceedings* were edited and prepared by J. Pickett Cummins, AD4S. With the exception of the presentation on Broadband over Power Lines by Ed Hare, W1RFI, all of the presenter's papers are included in these proceedings. In addition, L.B. Cebik, W4RNL, submitted a paper titled, "My Top Five Backyard Multi-Band Wire HF Antennas," but he was unable to present it at the symposium.

Copies of the *2004 FDIM Symposium Proceedings* can be purchased from the QRP ARCI Toy Store, linked off of the QRP ARCI website at www.qrparci.org.

An Overview of the Elecraft KX1 Multiband CW Transceiver

Wayne Burdick, N6KR

The Elecraft KX1 is a compact, multiband CW transceiver, optimized for backpacking and travel use. With internal battery, internal automatic antenna tuner, logbook lamp, and plug-in keyer paddle, it offers a high level of integration. This article briefly describes the ergonomic and operating features of the KX1, as well as its electrical design.

20 - 20 Twenty Project Using Twenty Parts ... or Less

Rev. George Dobbs G3RJV

I have been a radio amateur for over 40 years and have been attending radio events in the USA for 20 of those years. I cannot claim 20 unbroken years at the Dayton Hamvention. Some have been other events, notably HamCom in Texas, but the majority of my American forays have been to Dayton. Half them have been centered on QRP.

By way of a meager celebration of 20 years of sharing in QRP activities in the USA, I am offering a little collection of

Mike Bryce, WB9VGE's talk went over like a lead balloon—well, actually a lead battery, and thrilled the crowd with the final presentation of the day.

To close out the 2004 FDIM Symposium, Ken LaRose, VE3ELA (left) presents the award the Clean Sweep Award for the 2004 Winter QRP Foxhunt to the QRP Cheeseheads. Left to right: Ken, VE3ELA, Jerry, N9AW; Rick, NK9G; and Lon, W9XU. Missing from the team presentation was Gary, W9XT. (Photo by Dick Pascoe, GØBPS)

projects for the casual constructor—20 projects, all of which use 20 parts or less. All of them follow that formula that many QRPers like. The don't cost much—they can be built in an evening...and the will probably work first time. As with Pooh Bear (there was a moment before you began which was better than when you were) time constraints have resulted in me using some old and borrowed ideas.

My top Five Backyard Multi-Band Wire HF Antennas

L. B. Cebik, W4RNL

2004 marks my fifth full decade as a licensed radio amateur. So my offering to FDIM 9 will also be a matter of 5: my personal selection of the top 5 HF wire antennas for the backyard and for multi-band operation. Being a personal selection, there is no reason why your list should not be different from mine. But along the way, I shall explain why I selected the 5 antenna types that I am including, giving you my views on both their advantages and their limitations.

Portable Operation

Ian Keyser, G3ROO

The subject that I have been asked to talk about is oriented towards portable aerial systems...excuse me for using the word "aerial" but being British, we must accept that we are divided by our common language! In the past, I have done a considerable amount of portable and mobile operating, but not so much portable operation these days due to increases in aches and pains! Mobile operation now counts for well over 50% of my operating time.

Experimental Methods in Simple Equipment for QRP Communication

Oleg V. Borodin, GV3GM and Mike Boatright, KO4WX

The purpose of this paper is to show that it is quite possible to build very simple equipment and yet make plenty of reliable QRP contacts. This may be of interest to the beginning amateur, who doesn't have a lot of experience in constructing more complex equipment, as well as to experienced amateurs to further their experiments with low-power communication. Those who have high quality equipment may find pleasure in experimenting with very simple equipment. We also have experienced that the skills gained by experimenting with simple-class equipment will help you in other aspects of QRP communications.

The QRP Personality

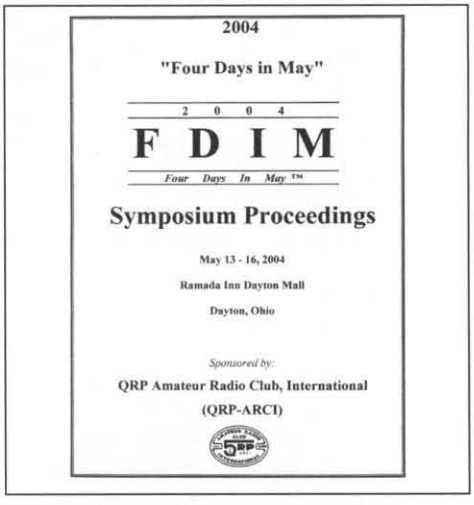
Stephen Brown, W9HC

There is, in the literature of radio communication, little or no scholarly writing on the subject of minimalist psychology and the use of radio. Ultimately, this rambling narrative might not turn out to be very scholarly, either. I'm dedicated today to being interesting rather than being absolutely and universally right. This is an opinion piece, not a news report.

Holding Volts

Mike Bryce, WA8VGE

Having a source of dependable backup power means batteries. The best bet has been the old lead-acid battery. Invented before the turn of the century, the lead-acid battery is ideal for supplying back up power for your ham shack or repeater site. Even today, it's the best dollar per amp hour of storage of any other type of battery. ●●



Copies of the 2004 FDIM Symposium Proceedings can be purchased from the QRP ARCI Toy Store by visiting the club website at http://www.qrparci.org.

Smart QRP Dummy Load

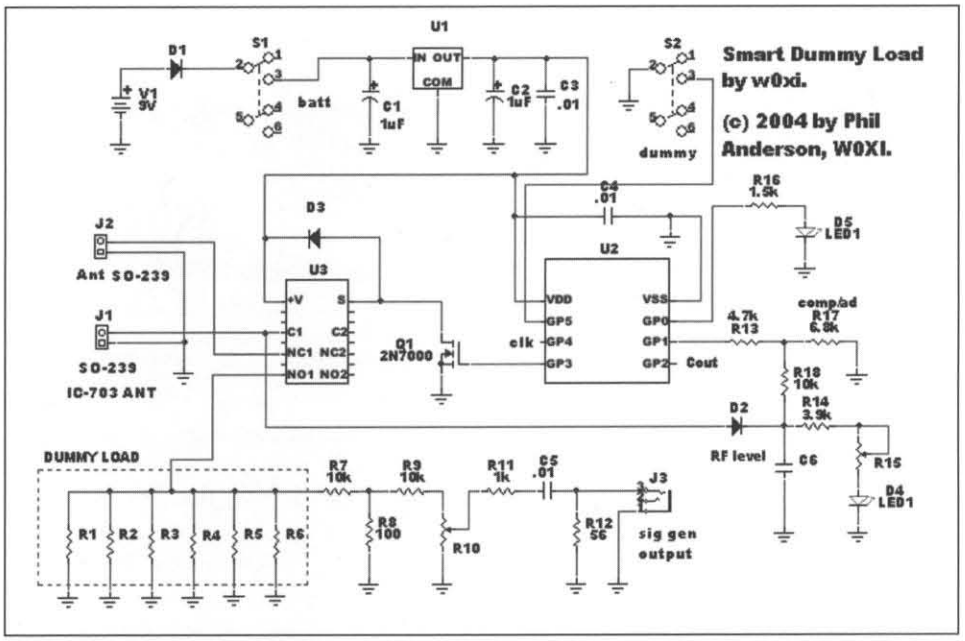
Phil Anderson—WØXI w0xi@aldenmcduffie.com

After attending the Friday "Vendor Night," at the FDIM at Dayton this year, I purchased an ICOM-703 from AES. Got home and had fun playing with the rig. I must say that I do like it. It's gotten me juiced up to design some more stuff, and it's been a long time since I designed my last QRP rig, called the ROCK HOUND, circa ~1978.

I was happy to see that the rig had adjustable output power, continuous from about 50 milli-watts to 10 watts. You set the maximum during initialization at 0.5, 1, 2.5, 5, or 10 watts. I noticed after that that the meter on the LCD does not give you a clue—several days later—as to absolute power out; that is, you can't tell what you had previously set the MAX TX to. The meter just reads max for the level set. I got caught several times calling CQ only to remember that I'd set it down to less than 1/2 watt to use the rig as a signal generator! So, with that, I decided to design/build a smart in-line dummy load that would give me an LED indication of approximate power output, include the coaxial switch, allow me to use the rig as a signal generator for QRP experimentation and, of course, have the dummy load available to compare against antennas, etc.

The circuit is shown in Figure 1. The TX signal from the rig enters at J1 via an SO-239 connector. It's then routed to either the antenna, J2, or to the dummy load via the Aromat relay. Microstrip lines, ~128 mils wide, are used in an attempt to keep the line impedance constant. Without the 9 V battery connected via S1 or simply left out, the antenna—attached to the normally closed contacts—is connected. When switch S1 is closed it connects the 9V battery to the +5 volt regulator which in turn is connected to the high side of the relay coil and to the 12F629 PIC processor.

When the operator presses the "dummy load" switch, S2, the PIC supervises and latches the relay on via the FET "IF AND ONLY IF" there is no RF power present from the rig, detected via the diode peak detector, D2. If the operator tries to return to the antenna from the dummy with RF present, the PIC will not allow it. The reason for this is to safeguard the contacts of the relay; it's a design rule-of-thumb to NOT switch the contacts in the presence of RF! Once the dummy load is receiving power as indicated by LED D4, the voltage is also available via an attenuator for test purposes via jack J3.



Schematic diagram of the Smart Dummy Load designed by WØXI.

So why the PIC for just that? But wait-it does more! The 12F629 has a comparator built in and a V_{ref} register. It also has pull-up resistors inside for each pin, so external resistors on the pins are not needed. There is also an A-to-D on board but I decided to use the comparator instead to tell the program to assume there is RF power if the comparator input goes above about 1 V at pin GP1. R18 and R17 serve as a divider so that a maximum of +13 V from the peak detector will not exceed the +5 V operation of the PIC at the comparator input.

So what's the LED, D4, for? It's my poor man's wattmeter. The LED is a 2 mA low power type, and R15 is adjusted so that 2 mA flows through the LED, giving full brightness, when I set my ICOM-703 to full five watts output. Adjusting to lower power dims the LED and it is easily discerned. It is true that I could have built a level shifter instead of using the internal comparator with some Rs and an NPN and a PNP or used an outboard comparator. In that case I would also have had to include a CMOS NAND gate IC to produce the logic to prevent the relay from coming on when RF was present. By using the PIC, I cut down the parts count and can add features later—in the form of programming.

—73s, and happy QRPing, WØXI

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2004 FDIM Vendor Night-a hamfest unto itself! (Photo by KO4WX).

QRP Clubhouse

Mike Czuhajewski—WA8MCQ wa8mcq@comcast.net

The East Central Indiana QRPers

Reported by Jeff Davis, KE9V

Saturday, April 17, 2004 was the date for the very first meeting of several East Central Indiana QRPers in Muncie, Indiana. There was no way to know just how many amateur radio enthusiasts would show up—it was a sunny and warm afternoon that had most folks working in the yard or just enjoying the 78 degree weather. But that didn't keep eight hearty souls from getting together to chew the rag.

There was a lot to see; an Elecraft K2, Red Hot 20, a Rock Mite, and even a crystal controlled homebrew transmitter built in 1973. There was a bicycle mobile complete with a Yaesu FT-817, auto-tuner and a Hamstick antenna. We enjoyed coffee, soda pop and several door prizes. See what all you missed by staying home?

From the response, I don't think there's any doubt that we will have another meeting in the not-too-distant future. Discussions included alternate meeting locations, an ECI QRP Field Day effort, at least one if not two group outings this summer, and then a group kit building project when the weather turns cold later this year.

We scheduled the 2nd gathering of East Central Indiana QRPers for Saturday, June 12, 2004. That date was chosen to try and steer clear of the ARRL Field Day event. Believe it or not, some XYLs don't appreciate ham radio events taking up consecutive weekends. Given that, we didn't have high expectations for a good turnout. Boy, were we ever surprised!

This time we met at the Maring-Hunt Branch library and enjoyed a beautiful meeting room. I am just knocked out that such a fine facility can be scheduled for events like this at no cost. Although we didn't use it, there was a full complement of audio-visual equipment. There was plenty of comfortable seating and lots of nice tables and we did make use of the small kitchen for coffee, soft drinks and cookies.

The room was scheduled for 1 to 4 PM but by noon I heard Noel Taylor, N9CJT and his XYL Barb, N9DZX on the local repeater. They were driving up from Columbus, Indiana and verifying directions. I was happy to hear that since it meant I wouldn't be the only one there. Arriving 30 minutes early to get things set up, I was surprised to see Rich Meiss, WB9LPU and his XYL, Lin waiting in the parking lot. They had made the drive from Speedway.

John Strain, W9MIU was a welcome sight from Richmond. He arrived about the same time as Neal Thomison, KB9RXE from Cicero, IN. Then Tony Parks, KB9YIG from Springport walked in carrying a large box of goodies, including the AT-2 that everyone crowded to see. I mentioned to someone that Ned Newlin, W8VFM might be making the drive down from Sand Hook, Michigan when a voice behind me said, "I am here!" I can't believe that Ned made the three hour plus drive to join us, but we were all glad that he did.

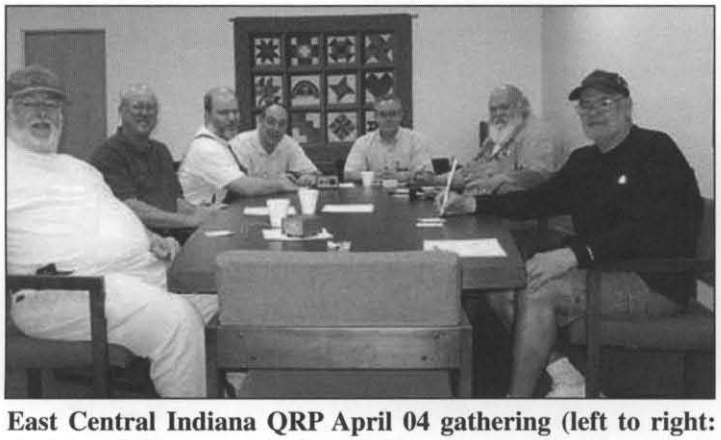
There was just so much to see ... one fellow said that he "saw more today than he saw at the Dayton Hamvention." In no particular order we saw: a bicycle equipped with a fully functional FT-817 and a set of CW paddles strapped to it, an AT Sprint-II, an Elecraft KX1, two homebrewed XTAL controlled QRP transmitters and the SDR-1000 software defined radio. There were several beautiful WB9LPU paddles to play with (sorry for the drool on them, Rich) and of course, there was a magnetic loop antenna connected to an IC-703.

Jeff Imel, KB9ZUR told us all about his experiments with magnetic loop antennas. Everyone in attendance got a copy of his presentation and you can view it online at http://qrp.ke9v.net/magloops.html.

After the presentation, there was just enough time to draw a few door prizes. Three QRP-ARCI coffee mugs, KU7Y, Ron Stark's new book, *HOW TO ACHIEVE 20 WPM CW With No Effort On Your Part*, two rolls of copper tubing suitable for building loop antennas, a QRP-L archive CD and a few other small goodies were sent along.

Three hours passed too quickly and it was soon time to close up shop until the next time. I'm pretty certain that everyone had a good time. You can usually tell how things like this have gone by how fast folks beat a path to the exit, and on this day, we all loitered around hoping that it wouldn't end too soon. Good friends, good fellowship, and lots of QRP fun mixed together on a Saturday afternoon in East Central Indiana sure made for a nice day.

I'd like to thank all the ECI-QRPers who made the trip to Muncie for this gathering. Ned, Noel, Barb, Rich, Lin, John, Neal, Tony—you guys know who you



East Central Indiana QRP April 04 gathering (left to right: Jack, N9TG; Gerald, WA9AGG; Gary, KB9ZUV; Jeff, KB9ZUR; Don, WA9TGT; Jon, KB9RPX; Larry, WA9OAO).

East Central Indiana QRP June 04 gathering (left to right: Ned, W8VFM; Larry, WA9OAO; Gary, KB9ZUV; Don, WA9TGT; Jeff, KB9ZUR; John, W9MIU; Rich, WB9LPU; Noel, N9CJT; Tony, KB9YIG; Neal, KB9RXE).

Jeff Imel, KB9ZUR explains his construction of the magnetic loop antenna. Wonder if I can get another cookie without anyone noticing?

Station	# Ptarmigan	Station	# Ptarmigan	Ptarmigan	# Hunters
KL7V/5	9 (all of them!)	KØEVZ	2	KL7CC	15
K6IA	8	K5OI	2	AL7FS	14
NK6A	7	VE6BGH	1	AL1G	7
W6AZ	7	KB9UWU	1	WL7CDC	7
VE5RC	5	WØKQC	1	KL7RHJ	7
VA6NJ	5	AAØVE	1	KL7GN	5
K7OZN	4	W5KDJ	1	KL7R	4
AI7W	3	KE7AMS	1	AL7N	3
K7SBK	2	N7QT/M	1	KLØWN	2
AA1MY	2	K7BFL	1		

Table 1—Results of the Great Alaska Ptarmigan (GAP) Hunt held on Sunday, May 9, 2004. Hunter's results are in the left two columns; Ptarmigan's results are in the right column.

are—it was our pleasure to have you join us in Muncie, and I hope we see you back here for the next one. Thanks!

To the local QRPers, thanks for all you do to make these events as much fun as they are. Donnie, Jeff Imel, Gary, and Larry—it's always a pleasure to get to spend time with you too. And Larry, thanks a bunch for going out of your way to bring your bicycle mobile along again. Ned Newlin, W8VFM was going to have a hard time convincing his wife that it was worth the drive if he came back without a picture of your bike!

The Great Alaska Ptarmigan (GAP) Hunt
Reported by Jim Larsen, AL7FS

The Great Alaska Ptarmigan (GAP) Hunt is a 20M on-the-air operating activity similar to the QRP-L fox hunts, but this one features hams in Alaska as the quarry. Sponsored by the Alaska QRP Club, the first one was held in November 2003. (You can find details online at http://www.qsl.net/al7fs/ThePtarmiganHunt.htm.) In their hunt, you search for "ptarmigan," a variety of grouse. (The willow ptarmigan is the Alaska state bird.)

Jim Larson, AL7FS, operating during the May, 2004, Great Alaska Ptarmigan Hunt (GAP).

Table 1 is a list of the stations that were able to participate in the Great Alaska Ptarmigan (GAP) Hunt held on Sunday, May 9, 2004. Propagation prevented many others from participating and bagging a GAP contact but we all thank you for trying. One never knows when the propagation gods will smile on us.

One of the reasons for picking the day we did was that our research showed the propagation numbers should be good on Sunday ...and they were:

- Solar flux index 93
- A index 8
- K index 1 (9 nT) 2100 09 May
- Forecast: no solar weather storms expected during the next 24 hours.
- No solar weather storms were observed during the last 24 hours
- Smoothed sunspot number: 37 (05/08/2004)
- Au: 4 (even the aurora number was low)
- Global HF Propagation Conditions for 2000Z on 09 May, 2004: low atitude, normal; mid latitude, normal; high latitude, normal (this is a rare thing to see and we had it).

But as always, there was a fly in the ointment. One GAP who was frustrated went to the HAARP site and found out a bit more. He writes, "I had been hearing Sri Lanka and Portugal just before the GAP but looking at the HAARP site we got hit with some absorption which peaked right during the GAP. One of these times it will work out perfect for us..."

Check out Sundays data (May 10, 2004, 0000z-0200z) from the HAARP site (http://137.229.36.30/cgi-bin/riometer/riom_sel.cgi).

The absorption at lower frequencies in the HF band is usually much higher than the level observed at 30 MHz. For my observations I would say the absorption event effect was pronounced. For me, the band was sort of open the 1st half hour and the last but not in between. When it reopened, it was like flipping a switch. Take another look at HAARP and you will see the steep end of the absorption event.

[HAARP is the federal government sponsored High Frequency Active Auroral Research Program and the home page can be found at http://www.haarp.alaska.edu/. The Purposes and Objectives section says, "HAARP is a scientific endeavor aimed at studying the properties and behavior of the ionosphere, with particular emphasis on being able to understand and use it to enhance communications and surveillance systems for both civilian and defense purposes." It is located near Gakona, Alaska, at 62 degrees north. —*WA8MCQ*]

The Alaska QRPers who participated in the GAP hunts are enjoying them and I expect we will continue to run the hunts about every six months.

We hope you enjoy the Great Alaska Ptarmigan Hunts and we are pleased that you give it your time and effort even knowing how fickle propagation can be out of Alaska. ●●

Editor's note—QRP Quarterly is in need of a "QRP Clubhouse" columnist to report on local and regional QRP club activities. Mike Czuhajewski, WA8MCQ graciously gave some extra time to write this column, but this will be the last QRP Clubhouse column unless YOU volunteer!

—72 de Mike, KO4WX
ko4wx@mindspring.com

QRP Reflections

Rich Arland—K7SZ

richard.arland@verizon.net

This issue we are going to cover "QRP-on-the-go." No, this is not another I-grabbed-my-QRP-rig-and-tent-and-went-out-into-the-wilderness-and-had-a-ball-type article. There are enough of those floating around. In this installment we are going to look at the pros and cons of taking your radio gear on vacation using public transportation (i.e., planes, trains, and cruise ships).

With the earth shattering terrorist attacks of 9-11-01, coupled with the on-going terrorist bombings around the world, those of us who desire to bring our radio gear along on vacation need to be aware of a few things that we took very much for granted in the pre-9-11 era.

For one thing, the attitude of most world governments today is now focused on preventing terror attacks. One needs to look no further than the crash of PanAm Flight 103 on December 12, 1988 over Lockerbie, Scotland that killed 259 passengers and 11 people on the ground. Allegedly the bomb that brought down that aircraft was composed of between two and four pounds of Semtex (a plastic explosive) that was planted in a "boom-box" portable stereo which was then placed aboard the ill fated aircraft. Now you can see why any type of electronic gear is suspect, most especially communications equipment.

I know we've all heard horror stories about some hapless radio hobbyist being stopped at airport security and grilled and hassled relentlessly about the equipment he/she was attempting to carry aboard an aircraft. To put it mildly, security at most airports, both here in the states and overseas, is no joke. It's real and we, as radio hobbyists, must deal with it head on, if we plan to take any radio gear with us on vacation or business trips.

The very first thing you should do, as a license radio amateur, is keep a photocopy of your ham license on your person and also with your equipment at all times. Personally, I have a photocopy of both the large station license and the smaller wallet sized copy of the license tucked right into the side pocket of the bag that houses my FT-817 and accessories. Since I also have a General Radiotelephone Operators

License (GROL...it use to be called the old FCC "First Phone" commercial license), I keep a copy of that, too, tucked right next to the ham ticket. Why? Simply because it provides extra proof that I am duly licensed by the FCC and the commercial license might just swing the scales in my direction, if challenged by security personnel. True, neither of these federal licenses have my photograph on them, but they can check with the issuing authority (namely the FCC) and confirm that I am duly licensed both in the amateur and professional areas.

Since I am affiliated with my local RACES/ARES and/or REACT emergency response agencies (you ARE affiliated with one of these agencies, aren't you?), I keep my current ARES and Luzerne County EMA photo IDs in the equipment bag along with the ham and GROL licenses. The Amateur Radio Emergency Communications Courses (ARECC) offered by the ARRL (to both members and non-members alike) issue a photo ID upon successful completion of each course (you have to provide the photo and do the lamination yourself). These IDs have an area on the back to list any additional training you may have received as an emergency responder like First Aid, CPR, and any FEMA emergency preparedness courses you might have taken in the past. This ARECC ID is a handy piece of plastic since it not only establishes the fact that you are a trained emergency communicator but it is also functions as a photo ID that is accepted by most emergency response agencies. Obviously my ARECC photo ID is tucked in the gear bag right next to my ham ticket, the GROL license, and my ARES ID.

My objective here is to prove I am who I say I am and that I am a trained emergency communicator who is duly registered with the ARRL and a local served agency (in my case the Luzerne County Emergency Management Agency). OK, some might say that I have indulged in a little overkill, but personally, the more information I can provide these security folks the easier time I am going to have getting my radio gear and accessories through the scanners at the terminal.

As for the actual radio gear itself, I recommend hand carrying it as carry-on baggage as opposed to checking the gear in for hold baggage. If you carry your gear on board the aircraft, train, or ship, you will control its destiny, not some knuckle dragging Neanderthal who gets paid $5.25/hour to "handle" your luggage in the checked baggage section of the terminal.

In order to go through the security checkpoint(s) at the terminal in a timely manner, you must have your gear packed so it can be easily accessed and inspected by the security personnel. Without a doubt, once the scanner operator sees a jumble of wires, batteries, and suspicious electronics in your gear bag, you will be asked to open things up and explain exactly what these devices are, what they do and why you need them. Don't feel singled out for special treatment, that's the security folks' job. If you want to fly or sail on their vessels, then you better be prepared to explain what this gaggle of gear is and why you need it. Be patient and remember you aren't dealing with rocket scientists!

I have personally talked with many QRPers and scannists (scanner enthusiasts) who have successfully run the gauntlet of terminal security personnel and emerged unscathed, with their gear intact and no handcuffs were involved. The absolute worst thing you can do is get belligerent with the security staff. I will guarantee you that this is a great way to miss your flight/cruise/train, because the more "cranked around the axle" you become the more entertainment you are for the security personnel. Believe me when I say that these folks have seen all kinds, and you aren't going to impress them one iota by

name dropping some local politician's name or the name of your lawyer. They have literally "heard it all." The best course of action is to take the time to explain who your are, briefly what the ham radio hobby is all about and show them your federal licenses. Demonstrate any of your gear that they want turned on. Don't be a show off and what ever else you do, don't get snotty! Just remember that the security personnel are there to insure the safety of everyone on the flight/cruise/train and they can detain you if they feel the need, and you will miss your flight/cruise/train and nobody but you will really care. Oh, yeah, you'll be out the money for the ticket, too. OOPS!

When you arrive at your destination it's time to set up your station. Having traveled across the country using both personal automobile and commercial transportation, the frustrations you encounter at the local motel are daunting. Most new hotels/motels/condos do not have ready access to the world outside you room. I have encountered windows that a either won't open at all or open about two inches for ventilation. You may have to contend with non-removal screens, or in the worst case, windows that do not open at all. I have been tempted to take along a small battery powered drill and a drill bit and punch a hole in the window frame that would facilitate snaking a wire out of the window to the outside. This is a bad idea [*and will get probably get confiscated by airport security anyway—ed.*]. If there is no ready access to the outside, you are left with few alternatives when it comes to erecting an antenna.

One method I have used with mixed success is to erect a 20 meter dipole around the inside walls of the room and feed it with twinlead (300 ohm twinlead used for TV antennas purchased from Radio Shack) terminated in a balanced line tuner or 4:1 balun which terminates in a tuner. This works, but it is hardly optimal. One other idea is to take along some kind of short vertical antenna like the Miracle Whip™ or MP-1 Super Antenna and erect it close to the window putting the radials around the edges of the room. Again, this works but it is far from optimal.

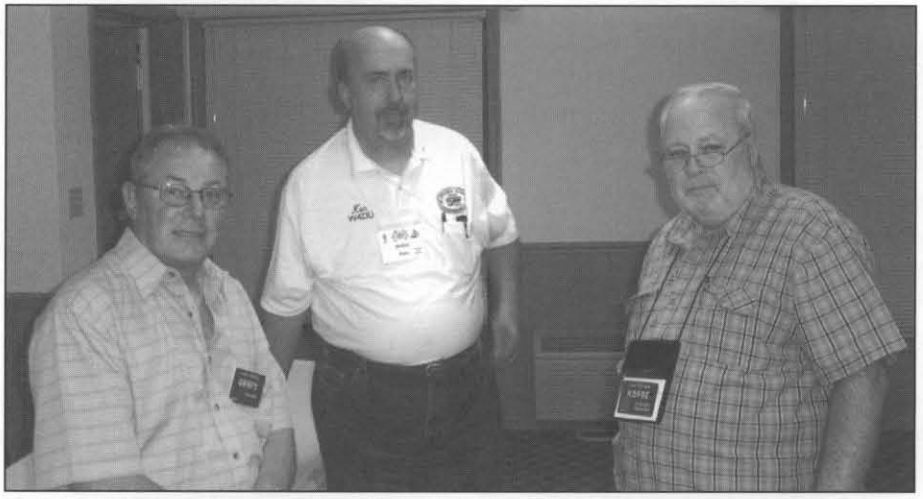
The best choice if possible, is to get an end-fed wire or dipole fed with RG-174 50 ohm coaxial cable out into the courtyard or back yard of the motel/hotel. Try to be innocuous when doing this, as you will definitely attract attention. Not long ago, after 9-11, one QRPer, who was trying to operate from the Appalachian Trail was detained and questioned by some federal officials because other hikers saw him erecting his antennas and operating his radio gear. Apparently these hikers thought that our hapless QRPer was a terrorist and reported his activities. Attention like this you don't need.

Obviously, if anyone should ask what you are doing, take the time to explain to them about ham radio and your QRP hobby. This should eliminate any fears non-ham onlookers might have as to your motives.

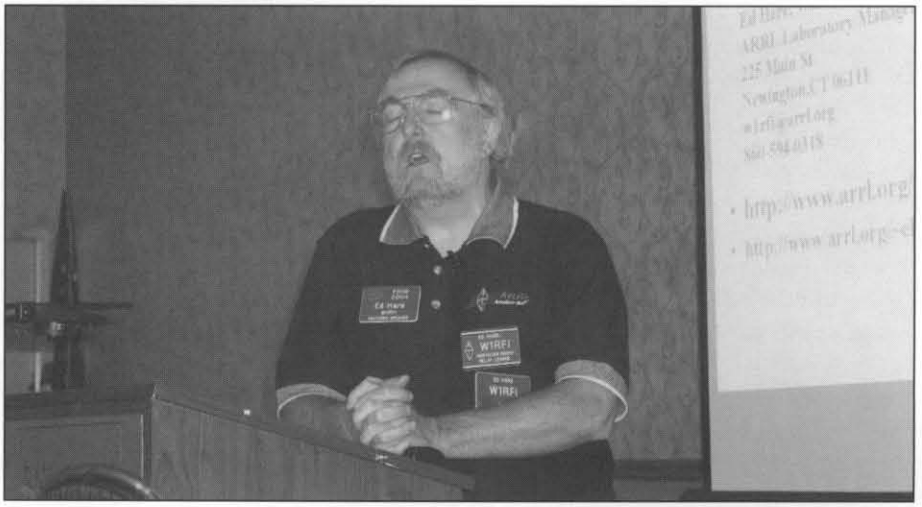
Let's review. ID: the more the better. Be sure that you have several photo IDs which will go a long way toward establishing your credibility. Attitude: Be calm, non-belligerent and take the time to explain (some times more than once) about the ham radio hobby, QRP and what you are doing with all that electronic gear. Plan ahead and secure any reciprocal licenses well in advance of your departure. Be discrete when erecting antennas and operating. Not everyone knows (or cares) about ham radio and few people like to listen to the "beeps and boops" of CW blaring from the speaker of your gear. In a word: stealth.

Here's hoping you enjoy the summer and have a great time pursuing your QRP hobby with minimal hassles. ●●

Who's Who in QRP — Photos from FDIM 2004



QRP ARCI President, Dick, GØBPS (left), Vice President Ken, W4DU, and Treasurer, Jack, K5FSE enjoy a quiet moment during the 2004 FDIM (Photo courtesy of GØBPS).



QRP ARCI Board member, Ed, W1RFI, has spoken so often about BPL, he can do it in his sleep! (Photo by G4WIF).

VHF QRP: VHF Calling Frequencies

Bob Witte—KØNR k0nr@arrl.net

I recently received an email from Chuck Carpenter, W5USJ, pointing out some issues with published QRP calling frequencies above 50 MHz. Chuck also provided a detailed picture of common usage of the 6-meter band. As I investigated further, I came to agree with Chuck's assessment that things weren't quite right with published VHF QRP calling frequencies. This article will explore these issues and propose some potential changes.

Here is the e-mail received from Chuck Carpenter, W5USJ (w5usj@9plus.net):

Bob,

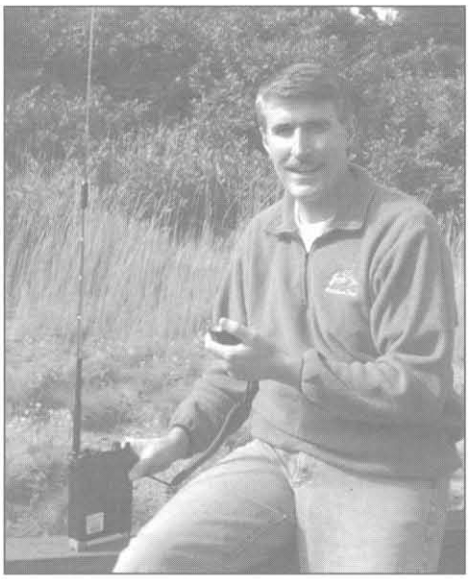
I posted a message on the 6 meter and VHF reflectors a while ago and asked the question about QRP calling frequencies. Also Ev, W2EV, did a poll for 6 meters and I contributed my inputs. The summary is below.

First for 2 meters, the general theme of the comments about the use of 144.060 was a "No, Don't Do It" sort of thing. All the weak signal VHF including EME and FSK 441 (WSJT) takes place up to around 144.170/190 or so. I'm not sure where the FSK441 frequencies are. Most suggested just calling with CW or SSB around 144.2, the US calling frequency. That's what I do and it seems to work OK.

From my query and EV's, this is pretty much my understanding of 6 meter band usage at this time. As you may know, there is still a push by some of the VHF organizations to move the US calling frequency to 50.2. This list closely conforms to the ARRL band plan too. I've proposed that the QRP CW calling frequency be 50.096. The present 50.060 suggested QRP frequency is in the CW beacon subband. Below 50.060, are beacons outside the US. It's legal to operate in the beacon subband but it would not be reasonable to do so. I'm sure you'll still find folks who will take exception to this list, regardless.

Let me be clear that this column does not represent official QRP ARCI policy. It is just my personal opinion after looking into the situation.

I started my investigation by visiting the QRP ARCI web site and going to the



"QRP Calling Frequencies" page at http://www.qrparci.org/qrp_freqs.html. The frequencies shown there cover all amateur bands from 160 meters to 2 meters and are "Courtesy of the NJ QRP Club – http://www.njqrp.org." The VHF QRP frequencies are shown in Table 1.

I am not sure how these frequencies were selected but I did notice some general consistency across the bands. There seems to be a general theme of "xx.060 MHz" for the CW calling frequency (e.g., 14.060 MHz, 21.060 MHz, 28.060 MHz). But this rule doesn't work on every band, so we also see 10.106 MHz, 18.096 MHz and 24.906 MHz listed as CW QRP calling frequencies. Running the 60 kHz algorithm on 6 meters and 2 meters gives us 50.060 MHz and 144.060 MHz, as shown in the table. The SSB theme seems to be xx.285 MHz (at least for 7.285 MHz and 14.285 MHz). But we also see 21.385 MHz and 28.885 MHz listed as SSB calling frequencies. On the VHF bands, we have 144.285 MHz on 2 Meters but 50.885 MHz on 6 Meters. However, the Europe SSB calling frequency follows the 285 kHz convention with 50.285 MHz.

Any QRP calling frequency should be compatible with the appropriate band plan. In general, there are more modes and types of operation on the VHF bands, as compared to HF. For example, above 50 MHz, in addition to CW and SSB operation, we have FM simplex and FM repeaters, OSCAR satellites, EME, PSK31, APRS, AX.25 packet and other modes. These types of radio operation are generally incompatible, so the VHF bands tend to have complicated band plans to keep the diversity of operation organized.

ARRL and RAC Band Plans

I went to the ARRL and the RAC (Radio Amateurs of Canada) web sites for the North American band plans for 6 meters and 2 meters. (VHF and up operation is regional in nature and I do admit to a North American bias here. I am always interested in feedback from *QQ* readers in other regions.) The first order of business is to understand what the ARRL and RAC say about calling frequencies. The ARRL band plan shows the generally accepted SSB calling frequencies of 50.125 MHz and 144.200 MHz. There are no CW calling frequencies listed and no specific reference to QRP operation. The RAC web site shows 50.100 MHz and 144.100 MHz as the CW calling frequencies and 50.125 MHz and 144.200 MHz as the SSB calling frequencies.

There has been a movement to change the 50.125 MHz SSB calling frequency to 50.200 MHz. As I surfed the web, I found a number of sites that show 50.200 MHz as the SSB calling frequency. Others show 50.125 MHz and some sites show both 50.125 MHz and 50.200 MHz. I have to conclude that this proposal has not seen consistent adoption by the amateur radio community.

One approach to calling on VHF using QRP is to simply use the general VHF calling frequencies. Even with that approach, we have some confusion as the RAC calls out 50.100 MHz and 144.100 MHz as CW calling frequencies, while the ARRL band plan does not. One thing I should point out is that CW and SSB often occur on the same frequency on the VHF bands. Weak-signal operators are used to digging the signal out of the noise. If they have trouble completing a contact on SSB, they may switch to CW to gain the edge on getting the signal through. Rather than move to a different part of the band, the QSO just continues on the same frequency.

Let's examine how the published QRP frequencies fit into the band plans.

50 MHz

As Chuck, W5USJ, points out, there are a number of problems with the published 50 MHz calling frequencies. For starters, the QRP CW calling frequency of 50.060 MHz is at the edge of the beacon segment (50.060-50.080 MHz). Since radio operators will tend to spread out around the calling frequency, having a calling frequency in the beacon segment (even at the edge) is poor band planning and will cause problems. Beacon operation is inherently fixed in frequency and needs to be protected to be effective at indicating favorable propagation.

The SSB QRP frequency of 50.885 MHz is an even more serious problem, as it falls in the "Radio Control" segment of 50.80 to 50.98 MHz. At first, the European SSB frequency of 50.285 MHz looks attractive, as it falls into the ARRL band plan "SSB, CW" segment from 50.1 to 50.3 MHz. However, Chuck's email shows that there is FSK441 activity at 50.285 MHz.

144 MHz

The QRP CW Calling Frequency of 144.060 MHz falls into the 144.050-144.100 MHz segment shown as "General CW and weak signals" (kind of sounds like QRP) on the ARRL band plan. Chuck, W5USJ, received lots of comments from the weak signal VHF crowd that objected to the use of 144.060 MHz because EME operation extends from 144.00 up to almost 144.200 MHz. The ARRL band plan does show the segment 144.100 to 144.200 MHz as "EME and weak-signal SSB" and WSJT (the popular digital EME mode) is used there.

A bigger issue is the 2 meter SSB QRP frequency of 144.285 MHz, which falls into the beacon segment. Again, beacons are inherently fixed in frequency and use CW emissions, so dropping SSB operation into this segment is a problem.

The QRP 2M FM frequency is listed as 144.585 MHz, which falls into the "Linear Translator Inputs" segment of the ARRL band plan. A linear translator is essentially a repeater that supports linear modes such as SSB and CW. Running FM simplex on the input to a linear translator is probably not a good idea. On the other hand, I can't recall a single linear translator that is in operation, so practically speaking, the potential for interference may not be very high. (I suspect that there are linear translators in operation and I am just not aware of them.)

Choosing an FM simplex frequency that works across North America is a real challenge. Unlike CW and SSB, FM operation is channelized in nature, so any frequency chosen needs to land on the right channel spacing. Unfortunately, North America has a mix of 15 kHz channels and 20 kHz channels, which creates a couple different and largely incompatible channel plans. These channels line up on the national FM simplex frequency of 146.52 MHz and a few other frequencies.

Of course, some of you reading this are thinking "Why even bother with a QRP FM frequency? QRP is mostly about CW, some SSB and rarely FM."

Band	CW	SSB	FM
6 M	50.060 MHz	50.885 MHz 50.285 MHz Europe	---
2 M	144.060 MHz	144.285 MHz	144.585 MHz

Table 1—VHF QRP frequencies from http:// www.qrparci.org/qrp_freqs.html.

Frequency Range	Suggested Use
50.060-50.080	CW Beacons (unattended sub-band) See: http://www.keele.ac.uk/depts/por/50.htm
50.080-50.100	CW QSOs
50.100-50.125	DX Window
50.110	DX Calling Frequency
50.125	North American SSB Calling Frequency
50.133-50.430	Voice Nets see: http://6mt.com/nets.htm
50.255	FSK441 CQ D## lower practical limit for most QSOs
50.270	FSK441 Calling Frequency
50.285	FSK441 CQ U## upper practical limit for most QSOs
50.290	PSK31
50.291	BEACONet^31 (with +1500 Hz PSK audio)
50.300	FM Simplex on West Coast
50.360-50.550	AM Voice See also: http://vhfradiobuff.tripod.com/amnet6m.htm
50.400	National AM Calling Frequency
50.550	BEACONet.25 USB (experimental)
50.600	DX Packet Cluster Links (California)
50.620	National AX.25 Packet Calling Frequency (some APRS)
50.740	2400 baud AX.25 Links in Minnesota
50.800-50.980	Radio Control every 20 kHz

Table 2—Portion of the ARRL 6 meter band plan.

Frequency Range	Suggested Use
144.00 - 144.05	EME (CW)
144.05 - 144.10	General CW and weak signals
144.10 - 144.20	EME and weak-signal SSB
144.200	National Calling Frequency
144.200 - 144.275	General SSB Operation
144.275 - 144.300	Propagation beacons

Table 3—Portion of the ARRL 2 meter band plan.

A Proposal

I've taken us through a tour of the existing QRP frequencies, commenting on some problems associated with the chosen frequencies relative to North American band plans. I think it is only fair and appropriate to propose an alternative set of frequencies. It is easy to find fault with the existing situation but it is more difficult to offer a solution that is better. In the spirit of moving this discussion forward, I'll propose something that will either be accepted as sheer brilliance or shot to pieces as utter rubbish. Or perhaps it will stimulate some constructive debate.

Referring back to an earlier comment, our best approach may be to abandon specific QRP calling frequencies and just use the standard VHF calling frequencies. The idea has merit. However, I am setting that argument aside for now and take the approach of trying to improve the list of QRP calling frequencies.

The 6-meter CW frequency needs to move away from the beacon sub-band. Chuck proposes 50.096 MHz, which seems reasonable to me. The 6-meter SSB frequency needs to move out of the radio control segment and also not interfere with FSK441 operation. I chose a frequency just below the FSK441 activity: 50.245 MHz. I've assumed that the European frequency is OK. I am not sure what to do with the 2-meter CW frequency, so I am left it unchanged. (Recall that it appears to comply with the ARRL band plan.) The 2M SSB frequency needs to move down out of the beacon sub-band, so I am proposing 144.265 MHz. Finally, for the 2-meter FM frequency, we could try to find a standard FM frequency that fits the channelization across North America. Or we could just drop the concept of an FM QRP frequency and just use 146.52 MHz and the regional set of FM simplex channels.

Band / Mode	Existing Frequency	Proposed Frequency
6M CW	50.060	50.096
6M SSB	50.88550.285 (Europe)	50.24550.285 (Europe)
6M PSK31		50.290 MHz
2M CW	144.060	144.060
2M SSB	144.285	144.265
2M FM	144.585	Deleted
2M PSK31		144.150 MHz

Table 4—Proposed VHF QRP calling frequencies.

Of the newer digital modes, PSK31 is a direct hit on QRP operation, so I'd propose that the common PSK31 frequencies be included in the list: 50.290 and 144.150 MHz. These frequencies are taken from the "Digital Band Plan for VHF/UHF" published by the PSK_VHF_UHF_HAMRADIO Yahoo group.

Summary

I hope I've at least put this issue on the table for discussion and review. Topics such as band plans and calling frequencies can be controversial and sometimes turn into religious debates. While I believe there are problems to be solved here, I don't claim to have the ultimate solution. Your feedback and good ideas are welcome. Special thanks to Chuck, W5USJ, for his contributions to this article.

—72 & 73, Bob, KØNR

References

1. ARRL Band Plans: http://www2.arrl.org/FandES/field/regulations/bandplan.html

2. The RAC 2 Meter Band Plan: http://www.rac.ca/opsinfo/2mplan.htm

3. The RAC 6 meterBand Plan: http://www.rac.ca/opsinfo/6mplan.htm

4. Yahoo Group for PSK/Digital Modes on VHF: http://groups.yahoo.com/group/PSK_VHF_UHF_HAMRADIO

5. Yahoo Group for VHF QRP: http://groups.yahoo.com/group/vhfqrp

The QRP ARCI Hall of Fame

Chuck Adams, K5FO (1998)
Brice Anderson, W9PNE (1996)
Rich Arland, K7SZ (2002)
Dave Benson, NN1G (1999)
Michael Bryce WB8VGE (2000)
Wayne Burdick, N6KR (1998)
George Burt, GM3OXX (1996)
Jim Cates, WA6GER (1998) (SK)
L. B. Cebik, W4RNL (1999)
Arnold (Arnie) Coro, CO2KK (2003)
Mike Czuhajewski, WA8MCQ (1997)
Tom Davis, K8IF (1996)
Doug DeMaw, W1FB (1992) (SK)
Rev. George Dobbs, G3RJV (1992)
Joe Everhart, N2CX (2000)
Graham Firth, G3MFJ (2003)
Tony Fishpool, G4WIF (2003)
Paul Harden, NA5N (1999)
Wes Hayward, W7ZOI (1996)
Doug Hendricks, KI6DS (1997)
George Heron, N2APB (2001)
Bill Kelsey, N8ET (2004)
Ian Keyser, G3ROO (2004)
Jim Kortge, K8IQY (2002)
Roy Llewellyn, W7EL (1992)
Rick Littlefield, K1BQT (1996)
Dick Pascoe, GØBPS (1997)
Randy Rand, AA2U (1992)
C. F. Rockey, W9SCH (1996)
Gus Taylor, G8PG (1998)
Steve Weber, KD1JV (2004)
Adrian Weiss, WØRSP (1996)
Peter Zenker, DL2FI (2001)

QRP Expedition to Kipahulu

Joe Gerry—KH6/W3GW jliving2001@yahoo.com

This past summer found my XYL, Maria and I eager to strike out and explore our new island home, Maui, one of the larger of the over 150 islands that make up the Hawaiian Archipelago that stretches from the Big Island of Hawaii to Kure Atoll some 1500 miles to the northwest. A chance of a lifetime job opportunity had presented itself, the kids were grown, and so our decision to move from Covington, Louisiana, to Wailuku, Maui, was made without much procrastination. Adding in the opportunity to operate full time from a beautiful island in the middle of the Pacific Ocean cinched the move for me.

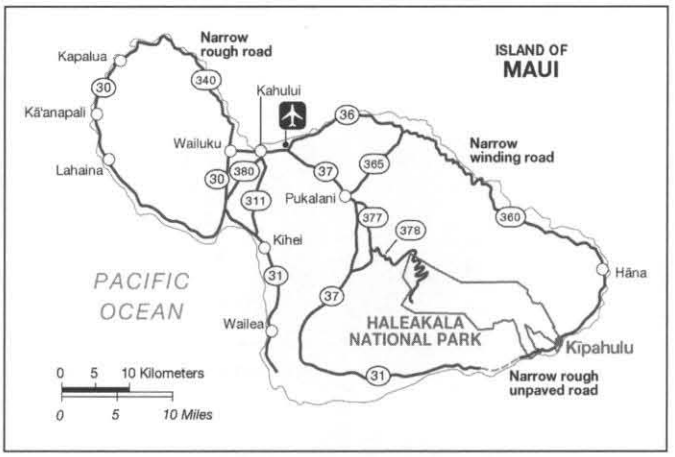


Figure 1—Island of Maui where KH6/W3GW had his QRP Expedition to Kipahulu (map courtesy of US Park Service).

Maria's love of camping and my itch to fire up my portable QRP rig prompted our plans to visit Haleakala National Park at Kipahulu just past the town of Hana on the eastern edge of Maui. We started out from Wailuku heading for Route 360 (see map in Figure 1). Taking Route 360 would involve two to three hours of slow travel over a tortuous, often one lane road cut into the slopes of the volcano Haleakala. Narrow one lane bridges, rain forests sloping to the Pacific below, and waterfalls made for a memorable trip but kept myself, the driver, constantly at risk of leaving the road and becoming part of the scenery! We passed through the town of Hana, finally arriving at the Kipahulu campgrounds at dusk.

Upon arrival, I made a quick reconnaissance of the area, finally settling on a spot shaded by tall palm trees facing southeast across a gentle slope to a cliff that led down to the Pacific Ocean. By this time the sun was behind Haleakala to the west and dusk was rapidly turning into night. A quick set up of our tent left me with just minutes to get the portable antenna in the air.

Lately my long path through amateur radio has taken me to the world of QRP operating. Small size, low power drain, and ease of transporting make QRP rigs ideal for traveling. My latest travel rig is a Sierra by Wilderness Radio. This small transceiver runs two watts out coupled with a surprisingly selective superhet. Plug-in band modules provide for band switching. A separate Z-match tuner does the impedance matching. A short length of coax, my straight key for simplicity (more about this later), a hundred or so feet of Radio Shack hookup wire on a spool, slingshot, 12-pound nylon fishing line, and a few 1-ounce lead sinkers round out the my portable station. It all fits nicely into a small tool box kept in a corner of our car's trunk.

My QRP operating adventures over the years have taught me one truth-the antenna makes or breaks the trip. I have found that a Walmart slingshot is ideal for getting fishing line and a lead sinker up over tree limbs. Of course, safety is a paramount concern. Remember the weight can break loose and travel a surprising distance. A recent effort at making the operation safer involved a fishing rod, line, and an apple substituting for the lead weight! Safer maybe but not all that successful I'll admit.

Over the years, I have tried loading up anything that I thought would radiate; the previously mentioned wire in a tree in a variety of configurations, rainspouts, fire escapes, even trees alone with wire wrapped around the trunk as a form of link coupling! My final analysis of all my efforts has the full-wave loop taking the prize as the best performer in the field. A vertical Delta Loop is easiest to get up but

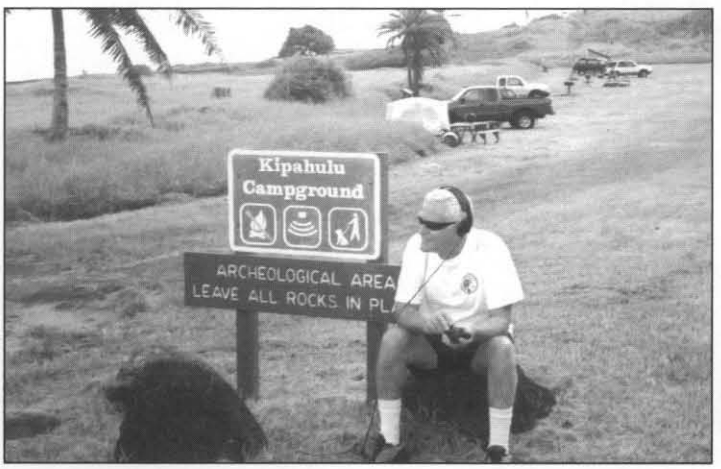


Figure 2—Joe, KH6/W3GW in the Kipahulu National Park on Maui, Hawaii.

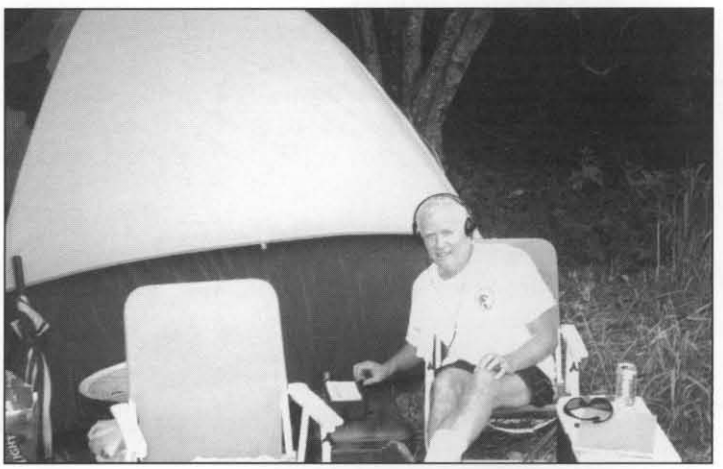


Figure 3—Joe operates his Sierra "tent portable" at the Kipahulu campsite.

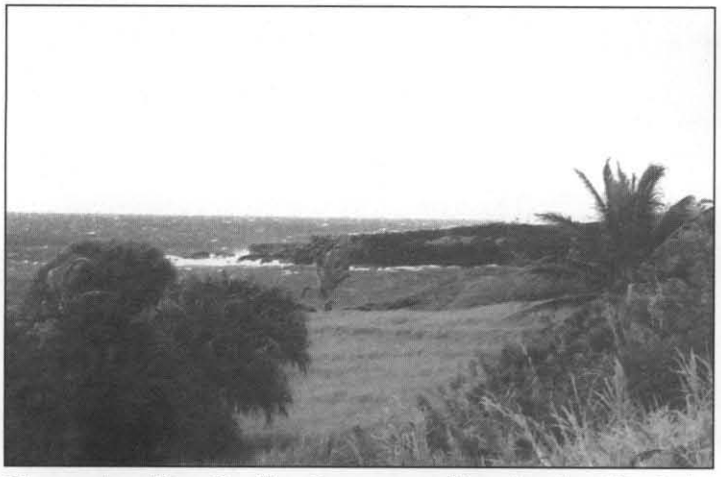


Figure 4— The Pacific Ocean coastline in the Kipahulu National Park, on Maui, Hawaii.

Figure 5—Joe, KH6/W3GW and XYL Maria at their Kipahulu campsite.

even a horizontal loop with as much wire in the air as possible works. I tie the sinker to the fishing line, fire the sinker over the nearest tree, and pull the hook-up wire over the limb and down the tree trunk and than back to the operating position to form a diamond or delta shape. I try to get as much wire as high in the air as I can, aiming for at least a wavelength of wire at the lowest frequency in use, with the return at least ten feet off the ground to avoid snagging local campers.

Using this scheme, I just managed to get my loop up and connected to my Z-match before the sun set behind Haleakala. A quick tune up using the LED tuning indicator built into the Z-match and I was ready to meet the world on 20 meters! As the sun set on the west slope of Haleakala 20 meters came alive! Before our trip, I'd done some homework with the W6EL propagation program (available on the internet at http://www.qsl.net.w6elprop/). The solar flux prediction for August 8 was 130 with a K index of approximately 3. W6EL predicted an MUF near 14 MHz at 0500z for the west coast which would be around dusk Hawaiian time. This worked out well as I only had the Sierra band module for 20 meters. As I tuned across 20 meters the first signal I came across was Stan, ZL2BLQ, in Greytown some 7511 km away. Well I might as well warm up with a practice call. What a thrill it was to hear Stan return my call and give me a charitable S-2! As my evening progressed the West Coast popped in as W6EL predicted with Rick, WA7ND, in Bend, Oregon, giving me a 569 followed by Dick, K6VL, in Fremont, California. Twenty began to fade around 2100 hours our time but not before a quick chat with Charles, K7JA/KHØ, in the Marianas and finally my neighbor Jack, KH6CC, just across the water in Hilo. The western US, the Marianas, New Zealand, and my next door neighbor, not a bad evenings work for my two watt Sierra and a random loop shot over a palm tree with my trusty sling shot!

As with any endeavor, one brings home lessons learned. Interestingly, the only equipment failure was my telegraph key! I had avoided bringing a keyer to keep it simple but Murphy found a way to throw a wrench into the works. My key had gotten damp during a brief shower and when I plugged it into the Sierra key jack the side-tone came on without my depressing the key. The power train of the transmitter wouldn't key until I unhooked the key and touched the key lugs together.

After taking the key apart and drying the parts, I had my key back. The wet key was acting as a resistor with a finite value that keyed the side-tone, but not the rest of the transmitter. I've seen this before using my assortment of old straight keys and bugs with my solid-state rigs. Corrosion affecting the resistance of the contacts, lugs, and straps of the old keys and bugs that would not faze a vacuum tube boat anchor can play havoc with proper keying of solid-state rigs.

We broke camp the next day. A quick listen revealed 20 meters to be as quiet as a tomb. On the long drive home I resolved to keep my key clean, send off for a 15 meter band module for my Sierra, and put up a bigger antenna next time. Who knows, maybe a V-beam in the bush would let me raise my buddy Ben, N6SL/5, in New Orleans. Aloha!

●●

What's Your QRP Adventure...

A QRP DX pedition to a rare country, county or IOTA island?

A contest operation from a great QTH or rare state/section?

Backpacking into the wilderness or kayaking to a remote island?

Or just taking a rig, antenna and accessories somewhere fun?

Tell your QRP ARCI colleagues about it!

Send a note to *QRP Quarterly* Editor, Mike, KO4WX and explain what you did (attach a photo or two)—He will let you know if it's a good story for *QQ*. Who knows? Your "fun" expedition might be even more fun shared with a couple thousand of your pals!

QRP Contests

Tom Owens—WB5KHC wb5khc@2hams.net

The Spring QSO Party results are in and the first ever NewComer's Run is close enough to call. The results and soapbox comments from fellow QRPers for these contests are later in this article.

Updated Contest Submission Rules

The only major change in the ARCI contesting arena is a firming up of the rules for contest submissions. In the past, the rules for contest submissions have been extremely flexible. Every entry submitted for the past four contests was in some different format on different forms (some never seen before) with varying amounts of information resulting in many hours of tedious work assimilating the information into a common format that could be used to compare performance and determine winners.

I have tried to slowly initiate change over the past couple months so the final change would not be traumatic. With suggestions from some and after much deliberation, the contest submission rules have been altered. The contest website has been updated and will help guide you through the simplified entry process.

For those who use ARCI-aware contest logging software; the changes are minimal. Merely complete the online form after the contest to submit your entry then email the log and summary files exported by your software.

Those using NA software need to be aware of the need to change your points score as NA includes the multiplier value within the points score. The end result is the numbers don't multiply out properly.

For those contesters who do not use ARCI-aware contest logging software; there are a few changes. Not dramatic, but different. Complete the online form after the contest to submit your entry. Print either the PDF or HTML form for S/P/C calculation or obtain it from a copy of page 60 of the Spring issue of *QQ*. Complete this form which aids you in calculating your score and your S/P/C totals then use the U.S. Post Office mail to send your contest log sheets and the S/P/C form to the contest manager. Contest entries are accepted when postmarked within 30 days of the last day of the contest.

Upcoming Contests - Mark your Calendars

Date/Time	*Contest*	*Mode(s)*
Sep 12, 2000Z to 2400Z	End of Summer PSK31 Sprint	PSK31
Oct 30, 1200Z to Oct 31 2400Z	Fall QSO Party	CW
Dec 2, 0000Z to 0600Z	Topband Sprint	CW & SSB
Dec 5, 2000Z to 2400Z	Holiday Spirits Homebrew Sprint	CW

For those without internet access, copy and complete pages 59 and 60 of the Spring issue of *QQ* and mail them and your log sheets to the contest manager. If you don't save the past issues of *QQ*, a postcard to the contest manager will obtain the two forms. The address is in all issues of *QQ* since January 2004.

For some this change will be of little consequence. For others it will put a bit of the burden on you to print and complete the form(s) which must be mailed to complete your entry. This change is necessary to reduce the workload on this end.

Entries that don't adhere to the new rules will be used as check logs, will not be published on the contest results page and will not be eligible for certificates.

On a different note, a suggestion was recently made by a couple contesters that perhaps we should distribute winning certificates as PDF documents emailed to the winner or as a download from the contest website. After much thought and with helpful input of our Awards Chairman, Thom Durfee, WI8W; and other members of ARCI Management Team; it has been determined that this idea is a poor idea for a variety of reasons. ARCI contest certificates will always arrive at your home pristine, already printed in color on nice certificate stock protected by a heavy brown envelope within a manila folder! I hope you enjoy showing your friends your QRP contests accomplishments by framing them or displaying them in a presentation binder.

Is there a gregarious fellow contester who would be willing to help me promote our contests via the various listservers, newsgroups and ham related forums available on the internet? Someone who is already a member of various outlets who would be willing to help increase the participation in our contests by frequently making mention of upcoming dates and adding enthusiastic support for ARCI contests? Several hams come to mind whom I think would make excellent emissaries for ARCI—would anyone be willing to help me? There are just not enough hours free monthly to do the job alone, and do it properly.

My last thought for this issue is towards another new contest, one not tried before. Would there be interest in a vintage QRP contest say in September or October this year where bonus points would be allowed for using equipment older than perhaps 20 years? Perhaps a short sprint of 2 hours? This idea was originated by our fellow contester of some merit, John Sielke, W2AGN. Input and suggestions via email are requested to make this a viable contest in the short amount of time we have between now and a possible contest date. The number of e-mails will determine whether this contest idea becomes a reality.

NewComer's Run

Top 3 finishers—

Wayne Rogers, W5KDJ: 7400 pts
Larry Mergen, KØLWV: 3591 pts
Ken Stovesand, N4OI: 1980 pts

Soapbox Comments—NewComer's Run

Let's have this a regular event, please! Signals really weak on 20m.—**Larry Mergen, KØLWV, ARCI 8357**. Jim Stafford, W4QO and Llloyd, K3ESE operated 40 and 20 from Dayton. They did not make a single contact! Condx were terrible and Dayton was covered in rain storms all

NEWCOMER'S RUN											
Call	QTH	Score	QSOs	Power	PTS	S/P/C	Bonus	Time	Bands	Rig	Antenna
W5KDJ	TX	7400	10	LT55	37	10	0	2	20	K1-4, 50mW	Mosley 7 EL @ 50'
KØLWV	MO	3591	12	5	57	9	0	1.33	40,20	TS520	20m & 40m dipoles @ 20'
N40I	NC	1980	4	LT5	70	2	1000	0.75	20	SWL-DSWZ	20m Inv-V on fishing pole
W2AGN	NJ	1462	4	5	22	3	1000	1.5	20	K9AY XCVR	NORCAL doublet
KI4DEF	NC	1300	1	LT250	20	1	1000	1.45	20	ROCKMITE	Wire in trees

afternoon. They made contacts later, but not during the run.—**Ken Evans, W4DU, Vice President, QRP ARCI #696**. Not much activity on 20 meters. 5 QSOs on 40 meters running a K-1 at 5 W into an Inverted L. 73—**Jeff Imel, KB9ZUR**. 10 QSOs, 7 states, all on 40 running an AT Sprint II at 5W to a dipole. There sure was lots of QSB 73/72—**Mike Pechura, WA8BXN, ARCI 10830**. Not a bad day here in MO. Several signals heard but most were just working QSOs. 11 contacts with 7 "new" 2 "elmer" and 2 non-members. 8 states and a mult of 7 for power and I have a total of 8960 points. Not bad for starting 30 minutes late. It was a good warm up for the Run For The Bacon sprint tomorrow evening. 72 to all—**Jerry Ford, NØJRN ARCI 11049**. Few newcomers, but nice excuse to sit outside and play radio for awhile.—**John Sielke, W2AGN, ARCI #9328**. More stations showed up than I thought would. Band went bad 1900-1925z but came back up. 50mw, 10 QSOs, 6 SPCs Called NØJRN & K6JSS many times but nil sigs.—**Wayne Rogers, W5KDJ ARCI 11325**. In terms of number of QSOs, I did not have a good day. Only one (although it was a nice QSO—tnx, Carl). But in terms of what I accomplished and learned, and the portable milliwatting experience I gained, I had a GREAT day. So I am proud to submit these results single band, single op, pwr 200 mW.

I decided I would use the contest opportunity to try portable operation for the first time. My rig was a RockMite for 20m powered by a 9V battery. Antenna was a wire thrown up in a pine tree and tuned with an L-network. QTH was Dinah Landing, Goose Creek State Park, Beaufort County, NC (about 10 miles E of my home QTH). I set up under a beautiful old live oak by the edge of the creek, got the antenna up in a pine, and began operating about 1815Z. The antenna tuned up nicely (especially considering that it was the first time I ever used it), and I could hear lots of stations. But I was not able to raise anyone. Called CQ numerous times, but did not heard my call come back. As time dragged on without contact, I was beginning to wonder whether there was a problem with the setup. Finally, at 1955Z, there's a CQ from a K5 station. Hmm... I've worked several K5s before from home... LA, TX. I'll never reach him. Oh, well, give it a shot. Much to my amazement, I hear my call coming back, and it's Carl K5HK in Reno, NV (QRP ARCI #3464)! Reno, NV? I can't believe it! The furthest west I have ever reached, and done with a pea shooter feeding the proverbial wet noodle! And too boot, Carl's QRP at 2W, running his Icom 756Pro2 turned all the way down (probably more power going to the display than to the antenna).

The funny thing is that I had more or less given up on the contest at that point, and Carl wasn't even taking part, so we just had a nice QSO for 10 minutes or so. But if I may, I would like to submit that one QSO as my entry, since I *was* trying to work the contest, and it had been the contest that had led me to fix up that antenna and bring it out to the field to test with the RockMite in the first place.

Here's my scoring: 20 QSO pts (new to new) x 1 S/P/C x 15 (pwr multiplier) + 1,000 pt bonus (portable op with battery pwr and temp ant) = 1,300 pts. I am assuming Carl K5HK would count as an elmer (considering he's been a ham for 41 years), although I don't know and we didn't discuss it. [Actually, Carl is NEW because he has not earned an ARCI certificate in the last year so the score was modified by the Contest Manager]

I have been scratching my head trying to figure out how in the world I was able to do this. When I first built the RockMite, I made Dave Benson's suggested modifications to allow it to run off 9V, and for the first several months I operated, that was my only rig (and my only power source). I was able to have several QSOs with that setup from NC to MI, ME, NH and WI so I already knew the rig worked fine on 9V. But my home antenna is a wire dipole trimmed to resonance at 14060 and this was an end-fed half-wave wire. Wait a minute... it's not a half-wavelength after all... I cut it to be a half-wavelength on 40m (67 ft) not 20m, so that means it's a full wavelength on 20m. Aha! Different radiation pattern for one wavelength, eh? Wonder if that had anything to do with it? So now it's back to the antenna book to learn more. Or maybe it was just propagation conditions. Regardless, it makes me want to try it again... and again.

So, I had a great day: spent an afternoon with my son in the sun in a beautiful place, tried some new things and made a new friend. Those are some of the main things that drew me to amateur radio in the first place. Don't know what the scores say, but that spells the best possible outcome of the contest in my book. Tnx es 73—**Kevin Miller, KI4DEF, 11721**.

2004 Spring QSO Party

Top 3 finishers:

Bob Patten, N4BP: 1052100 pts
Arnold Olean KØZK: 723540 pts
Todd Fonstad, N9NE: 445550 pts

2004 Spring QSO Party

The All Time Top Scores for the Spring QSO Party had 5 modifications this year! John Watkins, NØEVH; Joe Mikuckis, K3CHP; David Teague, K5MQ, Alan Olean, KØZK; and Alan Kamman, W1SA all replaced the previous High Score Record holder for their state! Alan replaced himself with a higher score than he earned in 2002 even with poorer band propagation conditions! Congratulations fellows!

The Aluminum Kings Contest Team (KØFRP, K7RE, N4BP, N9NE & W4FMS) collectively scored 2,248,530 Points in the Spring QSO Party! We had two teams competing but the other team did not submit their results within the 30

2004 SPRING QSO PARTY

Call	QTH	Score	Power	QSOs	Points	S/P/C	Time	Bands	Rig	Antenna
N4BP	FL	1052100	LT1	300	1169	90	22.50	160.80.40.20.15.10	K2 @ 1W	TH7, 402BA, 40M DP, 160/80/40 DP
KØZK	ME	723540	LT1	193	778	93	16.25	80.40.20.15.10	K2	33' Vert over salt water
N9NE	WI	445550	1	159	665	67	14.75	80.40.20.15	K2 @ 900mW	Tribander, 40m rot. DP, 265' doublet
K7TQ	ID	336476	5	188	788	61	24.00	40.20.15	K2	C4S@ 50'
WØUFO	MN	267036	5	138	578	66	9.50	80.40.20.15.10	K2	TA-33, 40m Inv-V, 80m 120' wire
W2AGN	NJ	234710	LT1	109	479	49	15.00	80.40.20.15	2x K2	300' horiz loop, KT34A
K9PX*	IN	226086	5	200	769	42	13.00	40	K2	80m loop
K7RE*	SD	223850	LT1	151	605	37	13.00	20	K2 es DSP	2 & 3 element beams
WB8YYY	MD	214880	LT5	131	558	55	9.50	80.40.20	K2	Off-center fed dipole & R5
NØUR	MN	201600	LT5	113	480	60	5.00	80.40.20.15.10	K2	Yagi & wires
W4FMS	MI	176064	LT5	126	524	48	7.75	40.20	K2	Inv-V 20m, Inv-V 40m
W4DU	GA	157920	5	123	480	47	7.00	40.20.	Multi Pig Plus	Inv-V and tribander
W8TM	OH	157388	5	125	511	44	9.00	40.20.	K1	NORCAL ladder line 40m doublet
K3MD	PA	151984	LT5	118	472	46	12.00	40.20.	K2	20 & 40 mtr dipoles
K4UK	VA	142324	LT5	96	391	52	8.50	80.40.20.15.10	K2	160m DP, ladder line W/4:1 balun
NØSXX	CO	108199	LT5	91	377	41	6.00	80.40.20.15	K2 @ 4W	2EL quad & 88' doublet
W5KDJ	TX	103680	LT55	48	216	24	9.25	40.20.15	K1-4 w/pad	Yagi and doublet
NK6A	CA	95200	5	77	340	40	7.00	40.20.15	K2 @ 5W	C4S@ 50'
WA4DOU*	NC	92659	LT5	107	427	31	9.00	20	FT897 @ 5W	C3SS @ 53'
W4RYW	AL	89320	LT5	77	319	40	10.00	80.40.20.15	FT847 @ 3W	160m vert full wave loop w/tuner
KG8GW	WV	69580	5	64	284	35	3.75	80.40.20	FT100D @ 5W	
NØEVH	MO	67500	LT1	48	225	30	10.00	40.20.	K2	Dipoles @ 20'
K3CHP	DE	59220	5	56	235	36	10.00	80.40.20	FT817	HF-6V
W4WYD	TN	53900	5	50	220	35	7.50	40.20.	TS830 @5W	Carolina windom 80
K5MQ*	LA	52731	5	63	279	27	5.00	20	IC756PROII	C3E tribander
WA7LNW	UT	43904	5	52	224	28	2.50	20.15	K2	2el 5 band Hex Beam@ 70'
VA3DF	ONT	43890	4	46	209	30	22.00	80.40.20	K2 @ 4W	Doublet and vertical
WA7NCL	WA	38010	LT5	41	181	30	3.50	80.40.20	K2	Horizontal vee @ 50'
K1TG	CT	33775	5	49	193	25	6.50	40.20.	IC746PRO	3el tribander & 40m/80m Inv-V
W1SA	VT	23200	LT1	25	116	20	1.00	40.20.	K1	40m half square, TH6DXX
K9IUA	IA	18081	5	30	123	21	4.00	40.20.	SCOUT	55' Inv-V @ 24'
K9EW*	IL	16576	5	35	148	16	24.00	20	K1	Dipole up 20m
K7OU*	OR	15428	LT5	28	116	19	2.00	20	KX1 @ 3W	Sterba curtain
AL7FS	AK	8134	5	19	83	14	2.25	40.20.	K2	KT-34A, 80/40m trap dipole'
KCØPMH	KS	7826	5	19	86	13	4.25	40.20.	YAESU FT817	102' doublet
K5DP	OK	7280	1	16	80	13	3.00	40.20.	HW-9	40m horiz. loop
W1PID	NH	7154	5	18	73	14	4.50	80.40.20		
WØPWE*	IA	7080	LT250	13	59	12	2.00	40	HB XCVR	Hamstick on Honda minivan
K8ZFJ*	RI	3360	LT1	9	42	8	3.00	40	ARGO515	Quasi-horizontal loop
N7EIE*	WA	252	5	3	12	3	1.00	80	TS570D	80m dipole @ 20'

*Single-band entries; others are all-band entries

days time limit. Congratulations are in order for these five highly skilled contesters who are nearly always in the top five places of all our contests!

Soapbox comments—Spring QSO Party

Very few participants but enjoyed working regulars. 54 mW made it a contest for me!—**Wayne Rogers, W5KDJ.** Unfortunately, just a SINGLE QSO in the contest! Very little activity in Europe.—**Oleg V Borodin, RV3GM.** In the final hours of my drive home from Ozarkcon, I switched from 30m to 40m and discovered the contest. I made one QSO then had a ragchew downband. Came back to the contest when I entered Iowa and played the rest of the way home. That last hour of the drive sure went fast! Condx were great.—**Jerry Hall, WØPWE/M.** Activity kind of died 12 noon Easter Sunday.—**John W Thompson, MD, K3MD.** For the most part, tough conditions. 40 and 20 OK. Only 1Q on 15 and nil on 80. Thanks to ARCI for very enjoyable contest.—**Chuck Crandall, AF4PP.** Running QRPp is a lot tougher now than it was just a couple years back! Surprises included working AL7FS, 8P6BX (twice), W5KDJ at 55mW, and several other Idaho stations

besides K7TQ (big signal, Randy!). 80m was underused; it is a great place to pick up multipliers. AA1MY in Maine and I hooked up on 80 while it was still daylight here in Wisconsin.—**Todd Fonstad, N9NE**. Rig was Yaesu FT-897 xcvr, 5 watts into a 5-MHz OCF 28-ga insulated wire stealth antenna up 40 feet in trees next to I-75 in downtown Atlanta industrial area. SGC SG-237 Smartuner.—**Matt Lee, WB6BWZ.** Conditions were abysmal here for most of the contest. 10 and 15 meters never opened, and the static crashes from several storms really made 40 meters and lower mostly unusable, as the signals were very weak to begin with. This is probably the lowest score that I have ever posted in this contest for over 12 years of operating the QSO Parties. Several Easter Holiday events took their toll as well. High points were working Jim, AL7FS with a very fine signal, once I got the beam trained on him. Barbados and France were also added to the log, thankfully. I had hoped that Jim's FB signal would indicate a Pacific opening, but no JA or KH6 stations were ever heard. I decided to do a 0.9W 20M single band entry due to the conditions above. Rate never exceed 22, and most of the time, the rate meter was in single digits! Ouch! Looking forward to better condtions in the Fall ARCI QSO Party.—**Brian Kassel, K7RE**. A great deal of rapid QSB on both 40 and 20 meters. Somer sigs would go from Q5 and into the noise in the time for an exchange. Had lots of fun and worked some of the guys for the first time.—**Ken Evans, W4DU, QRP ARCI Vice President.** I was able to operate for a few hours using my new Sierra and had a good time.—**Hugh Maddocks, K3SS**. Fun time! Poor condx kept the scores down. Hope the Fall QSO Party has better conditions and more players.—**David Ek, NKØE**. Great fun in the limited time I had available to participate. N3FJP's QRPARCI contest logging software made it a lot easier to work and minimise errors, see y'all next time out.—**Wayne Dillon, KCØPMH**. Holiday contests are the worst... 'always fun tho—**Randy Jones, K8ZFJ**. No automatic 599s here, you have to EARN them.—**Ed Worst, K9EW**. Very slow contest. Had set up 2 K2s for rapid band change but speed was not needed. Everyone must have been at Ozarkcon.—**John Sielke, W2AGN**. Band conditions were poor at my QTH. Most signals were coming in very weak... Reminds me of my Novice days in the 60s; each contact was 'work.' I had help from AD7AV and KD7UBD with some of the contacts. It was still a lot of fun for me and hope to participate in the next QRP contest.—**Rich Patrick, AE7RW.** Many "honey-do's" interrupted the fun.—**Edwin Lappi, AE4EC**. Very slim pickings. Nothing heard on 15 or 10m. Conflict with Easter did not help.—**Joe Mikuckis, K3CHP.** Thanks to all for a fun contest! See you next time.—**Dan Alwin, KEØG**. 15 and 20 mtrs only bands good here in Texas.—**Charles Hornburg, K5IX**. I'm not an ARCI member, yet. But, I had fun with the Spring QSO Party and plan to be at FDIM next month. Not sure if non-members can enter results. Thanks.—**Dick McClain, N9XO**. I managed 19 contacts in about 2 hours and 15 minutes of operating but it was tough. The band opened just for a few minutes to each area and then moved on. Sometimes it came back, other times not. One had to be there to get the Q. It almost felt like a ribbon of aurora dancing about the sky and touching down for a short time it granted a QSO in each place, and then moved on. On 20 meters, I worked WI, CO, ME, ID, PA, SD, AK, MN, WA, IL, NM, CA, MI. The 0100-0130Z contacts were really tough due to, I think, aurora. Strong signals were hard to copy but I managed three, CA-ME-MI, during that time. On 40 meters, I worked CA only. Sunday was a lost cause with conditions shutting out Alaska at all times I listened. Of course, K7TQ, the clear channel, 5000 mW station from the wilds of Idaho was a beacon in the dark. Randy was there much of the time both days. 73,—**Jim Larsen, AL7FS**. My first ARCI contest; a lot of fun!—**Doug Ferris, VA3DF**. Fun contest! Conditions were a bit noisy but OK, wish there were more ops playing.—**Lloyd Lachow, K3ESE**. The family was camped out over the weekend at Knob Noster State Park, Missouri. A nearby old oak was my antenna support for both a 40 and 20 meter dipole. Ran the test at 900 mwatts and had great time with all who came out. Sorry I could not play down on 80, but local QRN in the midwest was tough. Many thanks for putting on the spring event.—**John Watkins, NØEVH**. This was my first attempt at QRPp. I ran 900 mW and worked as far as Idaho on 40mtrs. Pretty Cool! Thanks to all who pulled me out of the dust. Been awhile since I did a QRP contest. Had a great time using QRPp for the very first time! Best 72!—**Al Kamman, W1SA.** Thanks for all the fun.—**Greg Hollinger, VE3NXB**. I was running 5 watts in the contest, Tom. Man, this combination of severely impaired vision and medication really messed me up. I'm usually not this bad. BUT, I had FUN! 72—**Bill Marsh, K3AS**. First contact with K7RE was from my mobile, running 40 watts. Therefore scored as 'x1' multiplier. Was able to spend a few more hours on the air this QSO Party. So, made the best score to date. Conditions were fair, but only worked my local buddy, Riley, K4ORD on 15 and 10 Meters. Got a kick out of working VE3JC who was running mobile on a bicycle. And also working VE3GAN and N2EAB who were running Rock Mites. I thought about running my two Rock Mites in the QSO Party, but figured I'd get a better score running the K2 at 5 watts.—**Stan Reas, K4UK**. Busy family weekend so not much time for radio. Found conditions to be difficult. Was a nice break from a house full of company. Thanks Tom and the ARCI.—**Ronnie Zoerb, KIØII**. Activity down, conditions weren't good. No or little 20m propagation in eastern US (long skip). Did manage to work ZK, WL7, G & GW, & 8P. Let's come up with some ideas on awarding small prizes to stimulate more activity. Thanks to all for participating and for the QSOs.—**Roy Lincoln, WA4DOU**. Thanks for the contest. Lots of static and weak sigs. I think we should change the 7.040 QRP Freq. Too much other stuff there.—**Lawrence Mergen, KØLWV**. I just joined QRP ARCI last week and have not gotten my membership number yet. Had lots of fun anyway!—**Dave Teague, K5MQ**. Not a good weekend for me to work the contest.—**Jim Lageson, NØUR**. Very slim pickings. Nothing heard on 15m or 10m. Conflict with Easter did not help.—**Joe Mikuckis, K3CHP**. Conditions were poor here on the high bands also 80m & 40m heavy QRN at times but I still enjoy pulling the QRP stations out of the noise. HI Some signals on 80m were as strong as 20 dB over S9. Really getting into this QRP thing, lots of fun. See you next time. 73—**Riley, K4ORD**. My first real effort at an ARCI contest. Needed MT but never heard one. Bands were noisy in CT.—**Roger Kuchera, K1TG**. Only home

for three days plus Easter. Low turnout but probably due to the Easter holiday. 15m & 10m only yielded locals. 80m yielded only 8 Qs. Near the bottom of the cycle that's what we expect. I had to paper log cause NA would not load.—**Al Dawkins, KØFRP.** Condx were tough again this year but last year was MUCH worse. I had fun in spite of the conditions. Great contest.—**Bill Burrows, WA7NCL**. I operated sporadically between busy Easter weekend activities. 20m did not open well until final part of the event. Maybe in the future we can avoid Easter and Passover holidays?—**Curt Milton, WB8YYY**. Bands were very intermittent, but still had fun. Thanks to all the fine ops for their good ears and patience. See you next time.—**Chuck Boblenz, AD6GI**. 40m was terriblem QRN, QSB etc. What else is new?—**Hector Kessel, W2LHL**. Great Fun; not enough stations on all bands.—**Joseph Gay, W4RYW**. Had lots of fun, band conditions okay in everyone else's favor.—**Barry Fitchew, N6VOH**. Need more ops on 15m. My operating time was short sessions between other obligations. But fun. Thanks to all.—**Mert Nellis, WØUFO.** Operated off and on for about 4 hours before I just gave up. Glad I had 40m to add Qs and surprisingly some multipliers. Thanks for the contacts.—**Kevin L. Anderson, K9IUA**. 80m was not as busy as it was last year.—**Leroy C. Smith, N7EIE**. Great event! Wish my schedule allowed more operating time. See everyone in the Fall QSO Party!—**Jack Reed, WA7LNW**. WA7LNW "knocked the headphones off my head" with his 599+ signals into the Dallas, TX area Sunday morning! Thanks to all 22 who managed to pull my 2W, FT817 signal out on 40 and 20. I never heard a single signal on 15 or 10 mtrs. Called CQ awhile on 15mtrs then went back to S&P on 40 or 20. Heard K7TQ's CQ frequently—good signals, Randy! Plus I bagged him on both 20 & 40mtrs.—**Tom Owens, WB5KHC**.

Contest Announcements

2004 End of Summer PSK-31 Sprint

Date/Time:
September 12, 2004, 2000Z through 2400Z

Exchange:
Member—RST, State/Province/Country, ARCI member number
Non-member—RST, State/Province/Country, Power Output

QSO Points:
Member = 5 points
Non-member, Different Continent = 4 points
Non-member, Same Continent = 2 points

Multiplier:
SPC (State/Province/Country) total for all bands. The same station may be worked on multiple bands for QSO points and SPC credit.

Power Multiplier:
>5 W = x1
1 - 5 W = x7
250 mW - 1 W = x10
>55 mW - 250 mW = x15
55 mW or less = x20

Suggested Frequencies:
20M 14070.15 MHz

Score:
Final score = Points (total for all bands) x SPCs (total for all bands) x Power Multiplier.

Teams:
You may enter as a team with an unlimited number of operators as long as no more than 5 transmitters are on the air concurrently. You compete individually as well as on the team. Team members need not be in the same location. Team captains must send a list of members to the Contest Manager before the contest.

How to participate:
Get on 20M near the PSK-31 freq of 14070.15. Work as many stations calling CQ QRP or CQ TST as possible, or call CQ QRP or CQ TST yourself.

What to send:
Give a signal report and your state (for Americans), province (for Canadians), or country (for everyone else); and QRP ARCI member number if you have one, or your power if you don't have one.

Relative challenge:
Easy to Moderate. Gives you a reason to hone your skill on a digital mode.

Log submission:
See the contest website http://2hams.net/ARCI for the link to submit your contest results. Entries should be mailed to:

Tom Owens, WB5KHC
QRP ARCI Contest Manager
1916 Addington St
Irving, TX 75062-3505

2004 Fall QSO Party

Date/Time:
October 30, 2004, 1200 Z through October 31, 2004, 2400 Z. You may work a maximum of 24 hours of the 36 hour period.
HF CW only

Exchange:
Member—RST, State/Province/Country, ARCI member number
Non-member—RST, State/Province/Country, Power Out

QSO Points:
Member = 5 points
Non-member, Different Continent = 4 points
Non-member, Same Continent = 2 points

Multiplier:
SPC (State/Province/Country) total for all bands. The same station may be worked on multiple bands with QSO points and SPC credit for each band.

Power Multiplier:
>5 W = x1

....continued on next page

1 - 5 W = x7
250 mW - 1 W = x10
>55 mW - 250 mW = x15
55 mW or less = x20

Suggested Frequencies:

160M	1810 kHz
80M	3560 kHz
40M	7040 kHz
20M	14060 kHz
15M	21060 kHz
10M	28060 kHz

Score:

Points (total for all bands) x SPCs (total for all bands) x Power Multiplier.

Teams:

You may enter as a team with an unlimited number of operators as long as no more than 5 transmitters are on the air concurrently. You compete individually as well as on the team. Teams need not be in the same location. Team captains must send a list of members to the Contest Manager before the contest.

Entry Categories:

Entry may be All-band, Single-, High-, or Low-band.

How to participate:

Get on any of the HF bands except the WARC bands and hang out near the QRP frequencies of 3560, 7040, 14060, 21060, and 28060 kHz. Work as many stations calling CQ QRP or CQ TST as possible, or call CQ QRP or CQ TST yourself. You can work a station for credit again if on a different band.

What to send:

Give a signal report and your state (for Americans), province (for Canadians), or country (for everyone else), and QRP ARCI member number if you have one, or your power if you don't have one.

Best reason to participate:

This contest and the Spring QSO Party have the greatest participation of all QRP contests!

Relative challenge:

Easy to Moderate. (Slow CW speeds, long duration, large numbers of participants, QRP-only contest).

Log submission:

See the contest website http://2hams.net/ARCI for the link to submit your contest results. Entries should be mailed to:

Tom Owens, WB5KHC
QRP ARCI Contest Manager
1916 Addington St
Irving, TX 75062-3505

— CU in the QRP ARCI contests! —

QRP ARCI Quality Recognition Program 2004

Tony Fishpool—G4WIF g4wif_tony@btconnect.com

At this year's "Four Days in May" event the ARCI recognized three amateurs for their outstanding contributions toward QRP:

Jay Bromley, W5JAY

Conventions are undoubtedly one of the best ways to get people enthused about QRP. They involve enormous amounts of work to organise great speakers, organise a venue and a hotel. Perhaps most importantly you have to finance it all. Behind the scenes for the rest of the year there is even more work that needs to be done to generate the necessary funds by spending many hours making up and selling kits.

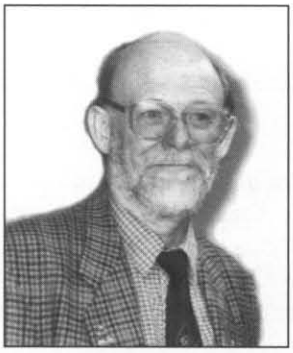
This award recognises Jay's contribution toward making Arkiecon an outstanding and successful QRP convention for the years between 1999 and 2003.

Jim Eshleman, N3VXI

Jim was the list manager of the hugely popular QRP-L for 9 years. Leveraging the internet, Jim helped turn a tool that some have said would destroy amateur radio, into a tool that actually served to increase the interests and aspirations of it's 2200 members around the world. Without Jim's efforts and generous contributions of time and resources over the many years, the QRP community could not have grown in the many dimensions as demonstrated by what we have today.

Because of Jim's efforts, people had available to them the resources of QRP-L including information on such topics as homebrewing, parts availability, operating tips and experiences, equipment reviews, contesting, Fox Hunts, events and everything in between. Jim's service and dedication to the QRP community has demonstrated the highest level of service to QRP and merits recognition for the high quality of service he provided.

John Leak, GØBXO



Successful QRP Clubs need good administrators. Some quietly do their jobs while rarely stepping into the limelight. For more than 10 years John GØBXO, has been Membership Secretary of the G-QRP Club. During all that time he has been a totally reliable club officer. Maintaining membership for several thousand members, co-ordinating overseas subscriptions, and dealing with queries about SPRAT and membership services. The award recognizes John's contribution toward the smooth running of one of the largest and successful QRP organizations in the world.

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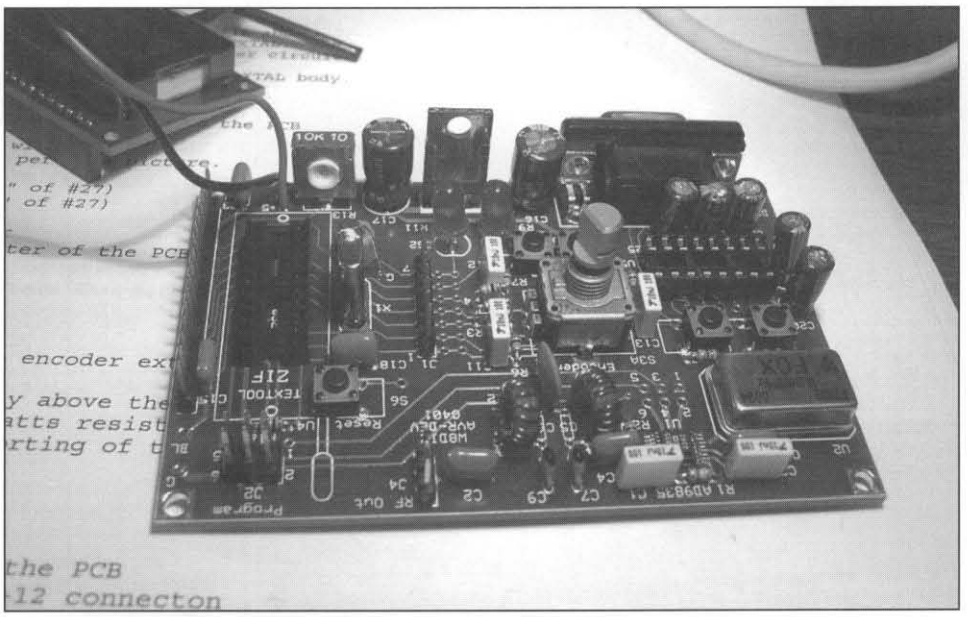
FDIM—Buildathon, Banquet and More

2004 FDIM Buildathon

The 2004 FDIM Buildathon was again hosted by the Flying Pigs QRP Club.

The project was a microcontroller development kit (photo at right) that includes an Analog Devices DDS chip. This kit was been designed by Diz Gentzow, W8DIZ, as a learning tool to better understand microcontrollers and the software that makes them work.

The buildathon consisted of a short overview of the operational details of Atmel AVR chips followed by the construction of the AVR-DEV printed circuit board. Upon completion of the kit, every participant had a device that is capable of generating RF from an AD9835 DDS chip (0 to 20 MHz) with an accuracy of better than 1 Hz. Full details of the kit is available at http://partsandkits.com/avr-dev.asp ●●

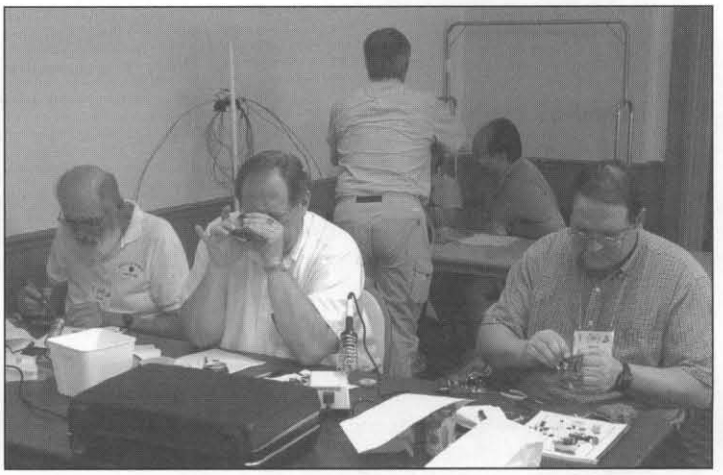


A completed AVR-DEV board (Photo by WD8AAU).

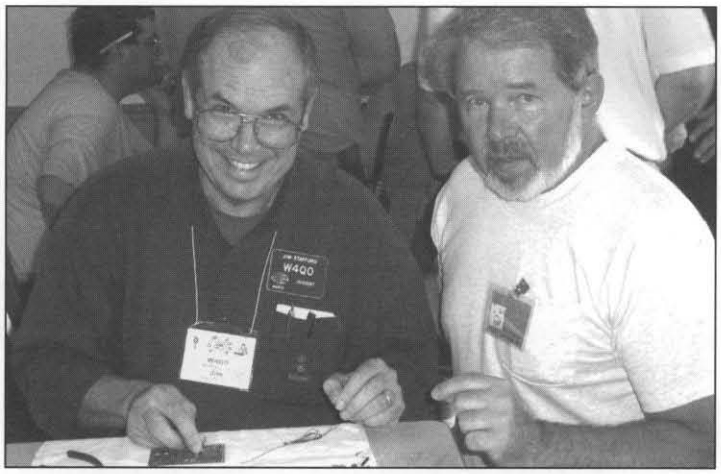
The Brits showed up en masse for the Flying Pigs Annual Buildathon. (Photo by W8DIZ)

The concentration was so great, you could almost hear a pin drop most of the time! (Photo by G8IFF)

Hmm... Let's see. Where is C1? (Photo by G8IFF)



Did I mention that I built a DSW-20? (Photo by G8IFF)



Diz, W8DIZ, gives Past ARCI President, Jim, W4QO some pointers. (Photo by GØBPS)

In some places, having this much fun would be considered illegal. (Photo by GØBPS)

The FDIM Buildathon is always a popular event. (Photo by KO4WX)

Matt, AA9YH, watches as niece, Katie, solders her first (of hopefully many) amateur radio project. (Photo by KO4WX)

Reflections on 2004 Four Days in May

Dave Yarnes—W7AQK w7aqk@cox.net

After 49 years in ham radio I finally found "Mecca." It's called Dayton. This is one fabulous hamfest! I need a bigger suitcase.

Some years ago I lived closer to Dayton (in Memphis), but then it was held in April. I was practicing public accounting then (tax season you know), so I could never make the trip. Later we moved back west (after a couple of years in New York City) around the time they moved the event to May. But Dayton seemed a little far, so I never got around to taking advantage of the switch.

This year my good friends Tony, G4WIF and Jay, W5JAY, coaxed me (badgered me) into making the trip. It really wasn't that hard to convince me. Now I'm kicking myself for having waited so long to do it.

I would like to pass on a few comments about this year's happenings in hopes that some of you may be interested in hearing them. I'll try to be brief, but there really is a lot that goes on around here so that's kind of hard.

First, let me say that the Ramada Inn (formerly the Days Inn South) is NOT such a bad place. Apparently Ramada put a few bucks into the facilities, and I think it is quite acceptable. It's not the Ritz, but it certainly is adequate. The staff has been pretty accommodating too.

ARCI did a great job on FDIM. The whole event was very well organized and enjoyable. The seminars were first rate. By the way, the compendium for the seminars was as good as I have seen.

Attendance was very good I thought. I don't know if it's up or down, but there were lots of people here. But there were lots of "MIAs." As Preston Douglas pointed out, notwithstanding the great attendance, there were lots of others we wish we could have seen and visited with, but sadly they couldn't make it.

The banquet on Saturday night was, of course, the big finale. In case you are interested, the food was pretty darn good. The highlight for me, though, was getting to see Jay Bromley, W5JAY, "squirm." Jay was given special recognition for his outstanding work in putting on Arkiecon for all those years. Now, if you know Jay, you

know he does not handle very well being fussed over. In fact, I think if Jay had an inkling that he was going to be given any kind of recognition, he might not have shown up. He just does good things and works his butt off in the process. There's more than a little "Jim Cates" in Jay Bromley. Anyway, ARCI was very gracious, and proud I am sure, to honor Jay in this way. Personally I am very appreciative that they did so (and I am also very grateful to a certain 49 year old "Brit" for getting the ball rolling on this) because I have been one of many beneficiaries of Jay's good work. A lot of us have. Even if you didn't go to Arkiecon, maybe you got one of the kits he (and his wife, Kathy, I might add) worked on so hard. But whether you benefited directly or not, QRP in general benefited greatly by having an event like Arkiecon because it did so much to further stimulate the interest in QRP.

Speaking of Jim Cates, there was a very special tribute to Jim during the banquet. What a stab in the heart of all of us it was to lose such a wonderful fellow.

Jay was sitting on my left, so I got to see him squirm firsthand. But I was incredibly lucky to be able to see the guy on my right do a little "squirming" too. That person was Ian Kersey, G3ROO. Ian was one of the three new inductees into the Hall of Fame. I had never met Ian before this week, but I did know him by reputation. He is an outstanding and dedicated QRPer. I know a lot of us on this side of the pond are perhaps not that familiar with all of the things Ian has done to benefit QRP, and I will leave it to others who know him better to express this in more detail. I know Dick Pascoe can give you mountains of info about Ian, as can many others. In any event, Ian is truly a most deserving recipient. But I also want to say what a wonderful individual he is. I got to spend a little time with Ian this week—a couple of outings for meals, etc.—and he's absolutely delightful to be around; really first class! And I wish you could have seen his face and his reaction when his name was announced for the Hall of Fame. He was genuinely humbled and overwhelmed by it, which says volumes about his character. I knew in an instant how richly he deserved this honor.

The pigs! You gotta love 'em! They were there in force, and having a ball. I can't tell you how much I envy the camaraderie they share. They have a great time with QRP and with each other. It's no wonder they are so prolific generating projects for our group.

I haven't even talked about the activities at the Arena, and I won't, except to say they are something to behold. You just have to do Dayton at least once. But if you are somewhat compulsive (as in buying), and your credit cards are full, you might want to stay home. Or, bring handcuffs so you can't reach around to your back pocket. There are irresistible bargains everywhere (an Icom 703 for $429 ain't bad!) This is the ham candy store of all ham candy stores.

Now where in the hell am I going to find a bigger damn suitcase before my plane leaves!

—Dave, W7AQK

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FDIM Banquet Photos and Prizes

...more on the next 3 pages!

QRP ARCI thanks all the donors of the many prizes given out at the 2004 FDIM Banquet. (Photo by KO4WX)

The banquet attendees congratulate Tom, K4TJD, and his staff on the conclusion of a fantastic FDIM (Photo by KO4WX).

The sign says it all—left to right, Diz, W8DIZ, Lloyd, K3ESE, and Matt, AA9YH. (Photo by G8IFF)

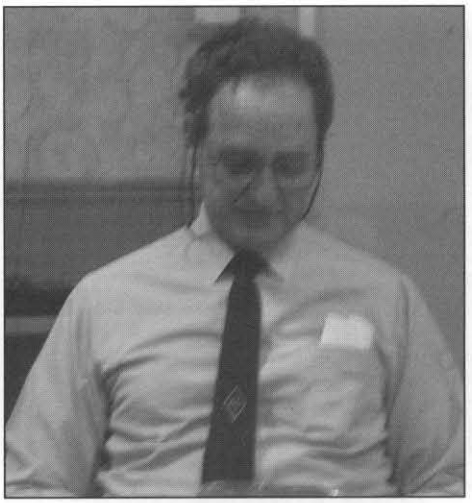
Jane, KC8TSG from Ludington, MI and Hank K8DD, QRP ARCI Board member. (Photo by W8BHK)

At the Elecraft table: Toshi, 7M1FCC/K1FCC; Shige, JA8CCL and Eric, WA6HHQ. (Photo by KO4WX)

FDIM 2004 Banquet Prize Winners

Prize:	Donor:	Winner:	Prize:	Donor:	Winner:
50 Years of ARRL	ARRL	W8BHK	Finger Dimple	K8FF & Finger Dimple	KC8SQM
Radio Freq Design	ARRL	G3WIF	Finger Dimple	K8FF & Finger Dimple	WJ2V
APRS	ARRL	WB8VGE	Finger Dimple	K8FF & Finger Dimple	W8WEB
More Wire Ant Classics	ARRL	N8MGU	Finger Dimple	K8FF & Finger Dimple	N4HY
802.11 Wireless Net	ARRL	N8IE	NOGA WATT	NOGA	N1EXQ
2003 HANDBOOK	ARRL	N4HY	NOGA Guppy	NOGA	NNØC
Vertical Ant Classics	ARRL	KC4IYD	NOGA Pig	NOGA	N5PR
802.11 Wireless Net	ARRL	G3PDL	NOGA Compendium	NOGA	JA8CCL
2003 Handbook	ARRL	WB9IPA	NOGA Guppy	NOGA	WØUFO
Experimental in RF Design	ARRL	W9RTP	One Year Sub World Radio	World Radio	WA6HHQ
802.11 Wireless Net	ARRL	KO4WX	One Year Sub World Radio	World Radio	K4TJD
RFI Book	ARRL	NØVI	One Year Sub World Radio	World Radio	WQ5T
Antenna Impedance Match	ARRL.	W8VQ	100 Custom QSLs		WB8ABE
W1FB QRP Notebook	ARRL	G3ROO	100 Custom QSLs		N8ET
RFI Book	ARRL	W8RIF	100 Custom QSLs		W5EMH
Hints & Kinks	ARRL	K3ESE	Assorted Parts	Thompson ARC	K1TV
Ham Radio Test Equip	CQ & QRP ARCI	N6CM	Freq Counter	Kits & Parts	NC1N
Ham Radio Test Equip	CQ &QRP ARCI	G8IFF	$30.00 Gift Cert	Kits & Parts	W4CC
Ham Radio Home Brew	CQ & QRP ARCI	W8MEG	Elecraft BL-1 Balun	Flying Pigs	W6SKG
Ham Radio Home Brew	CQ & QRP ARCI	WK8S	Rockmite & Enclosure	W4DU	KE9GG
One Year Sub CQ	CQ	WA4FIB	St Louis Paddle	W4DU	KA8IPO
One Year Sub CQ VHF	CQ	G3PDL	SGC Digital Multimeter	Photon/N1EXQ	WA2ECP
World Azmith Map	Ham Maps & QRP ARCI	G8IFF	Simple Test Equipment Book	G3MFJ & G4WIF	K1TW
World Azmith Map	Ham Maps & QRP ARCI	KE9Y	BL-1 Balun	Elecraft & QRP ARCI	KE9GG
World Azmith Map	Ham Maps & QRP ARCI	KC4MHM	Wide Band Noise Gen	Elecraft & QRP ARCI	WB8ICN
World Map	Ham Maps & QRP ARCI	G3RJV	Wide Band Noise Gen	Elecraft & QRP ARCI	NS1E
World Map	Ham Maps & QRP ARCI	N8WQC	XG-1 Signal Reference	Elecraft & QRPARCI	N5PR
World Map	Ham Maps & QRPARCI	N4HY	Data Book	NA5N	WØNTA
Min Travel Iambic Paddle	MFJ & QRP ARCI	NØDT	IRLP Directory	VE3AYR Publishing	VE1AWJ
Min Travel Iambic Paddle	MFJ & QRP ARCI	GØBPS	FT -817 Packet Ref	VE3AYR Publishing	K5YCM
Min Travel Iambic Paddle	MFJ & QRP ARCI	VE1AWJ	IRLP Directory	VE3AYR Publishing	W8VQ
Min Travel Iambic Paddle	MFJ & QRP ARCI	W9YA	Crimping Tool	West Mountain Radio	VA3JFF
Atomic Alarm Clock	MFJ & QRP ARCI	VA3SB	Five Outlet Power Panel	West Mountain & QRP	AB4GK
Atomic Alarm Clock	MFJ & QRP ARCI	W4QO	EQF Logging Software	EQF Software	KC8W
Atomic Alarm Clock	MFJ & QRP ARCI	KD4TFN	N3FJP Software	N3FJP	VE3XJ
Atomic Alarm Clock	MFJ & QRP ARCI	W8DIZ	30 - LED Strip	Scilux Lighting	N4ZPT
Atomic Alarm Clock	MFJ & QRP ARCI	K5FSE	LED Scrolliing Badge	Thebadge.com	N6CM
Portable Telescopic Ant	MFJ & QRP ARCI	VE3JC	Coleman Power Mate	Radio Shack	WS8T
Finger Dimple	K8FF & Finger Dimple	WA4EWL	$50.00 Gift Certificate	Kanga	WB8UUJ

Nancy, KC4IYD (right), and Kathy, WQ5T (center), W5JAY's XYL, help Past President, Jim, W4QO, with the prize drawings. (Photo by KO4WX)

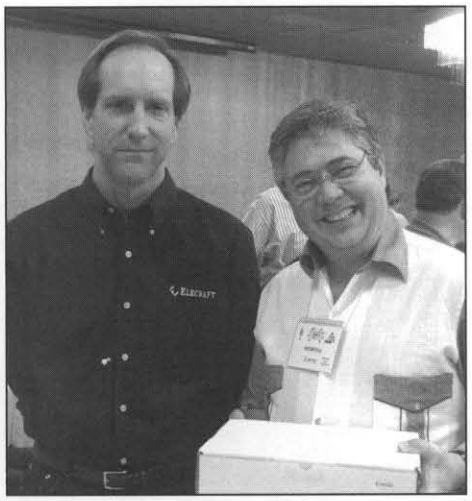


Ian, G3ROO, after being inducted into the QRP Hall of Fame (Photo by KO4WX)

QRP ARCI President, Dick, GØBPS congratulates Bill, N8ET, after announcing his induction into the QRP Hall of Fame (Photo courtesy of GØBPS)

After failing to teach the pig to sing, QRP ARCI Board member, Ed, W1RFI, gives it some tips on flying. (Photo by KO4WX)

ARCI President, Dick, GØBPS and FDIM Chairman, Tom, K4TJD, congratulate Mike, KO4WX, after winning the TenTec Argonaut V in the raffle. (Photo by G4WIF)



Larry, N8MGU—probably the happiest guy at the banquet—poses with Wayne, N6KR, after winning the grand prize, an Elecraft K2 (Photo by KO4WX)

The Dayton Ramada Inn (formerly the Days Inn South), home to the Four Days In May. (Photo by W8BHK) — Start making your plans for FDIM 2005 Now!

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Go to the QRP ARCI web site and use the Online Member Lookup feature to keep track of your membership/subscription status:

http://www.qrparci.org/lookup.html

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http://www.qrparci.org/us2signup.html

and follow the instructions. Be sure to select the appropriate button for the area of the world you reside in (US, Canada, or DX). International members may send payment by check directly to the club Treasurer, but ... ***funds must be drawn on a U.S. bank and be in U.S. dollars.*** Make checks payable to: **QRP ARCI**.

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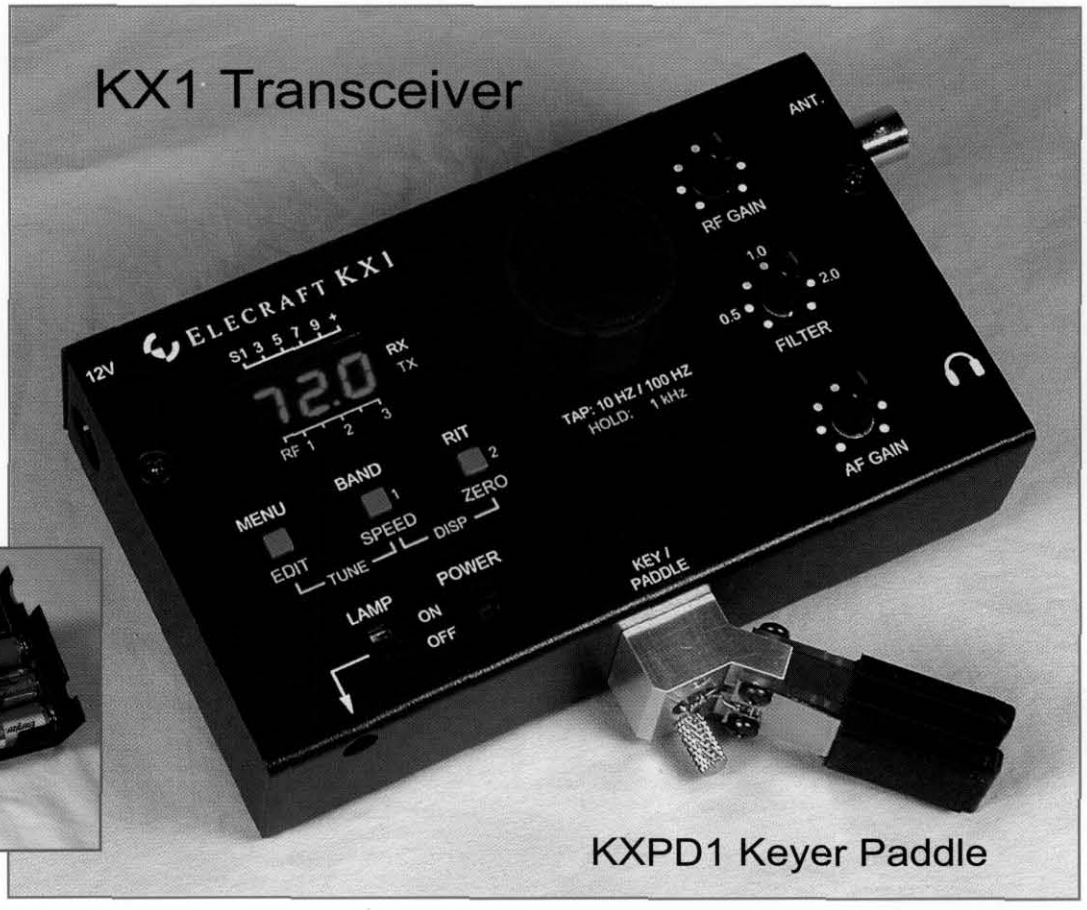
New! KX1 Ultra-Portable Transceiver

- Weighs 9 oz.
- 2 or 3 bands
- Up to 4 W
- DDS VFO
- SWL Receive
- Internal ATU
- Internal battery



Our KX1 CW transceiver kit is the new featherweight champ! With all controls on top, it's ideal for trail-side, beach chair, sleeping bag, or picnic table operation. And at 1.3"H x 5.3"W x 3"D, it's truly pocket size. Its superhet receiver covers ham *and* nearby SWL bands; the variable-bandwidth crystal filter handles CW, SSB, and AM. Also features memory keyer, RIT, 3-digit display, audible CW frequency readout, and a white LED logbook lamp. The internal battery provides *20 to 30 hours* of casual operation. Add our KXPD1 paddle and KXAT1 automatic ant. tuner options to create a fully-integrated station. KX1 basic kit covers 20 & 40 m ($279). KXB30 adds 30 m ($29).

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