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QRP Quarterly

Volume 45 Number 4
Fall 2004
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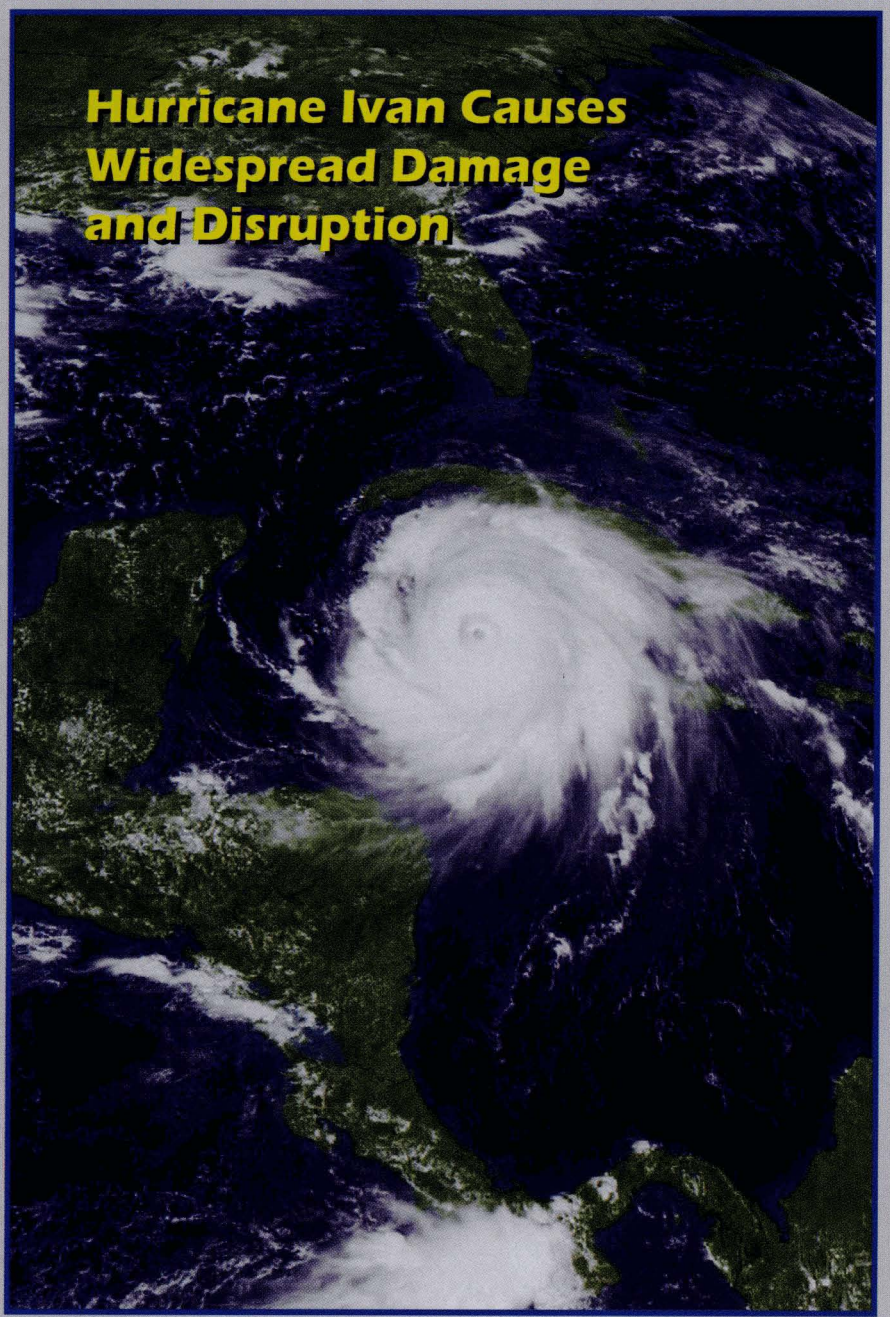
Journal of the QRP Amateur Radio Club International



- WA8MCQ's Idea Exchange—More Great QRP Tips & Tricks
- KC8UD's Handheld Iambic Key
- QRP World News: Global QRP Activity
- GØUPL's Tiny Frequency Counter Module
- QRP Contest Results:
  Hoot Owl Sprint
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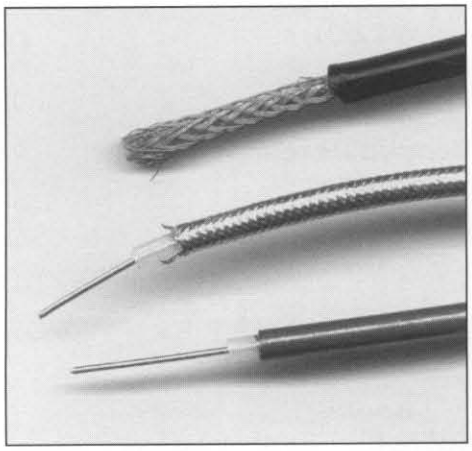

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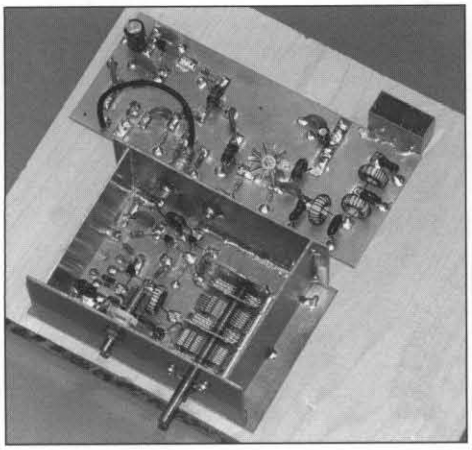

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Technical Articles

The Joy of QRP

The World of QRP ARCI

From the Editor's Desk

Mike Boatright, KO4WX—Editor ko4wx@mindspring.com

Gratitude. It's that feeling you get inside when you receive something that you really don't deserve or that you know you didn't earn. Or, you get it when you're standing next to something really, really old, or hear something said that was really, really profound.

Have you ever noticed that most real Elmers seem to have a lot of gratitude for their hobby and always seem to want to give it away? And the funny thing is, the more they give away, the more gratitude they seem to have.

The QRP ARCI Board recently decided to honor Elmers with an award; a way that we can say "Thank You!"—that is, to express our gratitude—to the persons who Elmered us.

What you will find interesting, though, is that when the first batch of Elmer awards goes out, the folks who get them will probably be embarrassed and may even wonder why they were nominated! That's because the real Elmer doesn't perceive themselves as such—in fact, they often wish they had time to do more. They're so busy Elmering that they don't have time to think about getting any credit for it!

To them, Elmering isn't something that you do for reward; it is more like a way of living that earns its own reward in the giving, not in the getting. Their giving is an outward expression of the true joy that they have found in this hobby, and joy is one of those things that, when shared with another, is doubled, not halved.

I want to talk about two Elmers who have been on many of our minds of late:

If you look really closely at the photograph on the cover, on the northwest side of Cuba, just immediately to the north of Category 5 Hurricane Ivan, you might just see Arnie Coro, CO2KK, operating on 20 meters, relaying vital meteorological data to the US—yes, I said US—National Hurricane Center. I was listening in my shack at about the time this photo was taken from outer space, and heard Arnie's voice—the first time I actually heard his voice—and even though there was a very dangerous hurricane bearing down on him, and even though he had lots of preparations to make, he still had time to comment on the spirit of goodwill and cooperation that amateur radio brings to the world.

I've been told that Arnie scavenges old Russian TV sets for every single part to be used to put together amateur radios—mostly QRP rigs—for the amateurs in Cuba. He has single-handedly helped a whole lot of folks get rigs, who otherwise would not have a home station to operate from. This is the true spirit of elmering.

Late word is that Arnie weathered the storm OK, but is very, very busy.

The other Elmer that I want to publicly recognize is Bruce Muscolino, W6TOY, who became an SK this summer. Bruce, along with Bob Gobrick, VO1ERB/WA6DRB (SK), Paulette Quick, N9OUH and Preston Douglas, WJ2V, put together the first QRP ARCI Four Days in May in 1996. The legacy of Bruce's Elmering is that we will meet in Dayton again next spring for the 10th FDIM! I suspect that we will hold that next gathering in his honor and memory.

It was also true that in his later years, if you saw Bruce's name and email showing up several times on a particular QRP-L thread, you knew it would be a feisty one. But as for me, Bruce almost always had nothing but good words to say, and encouraged me on more than one occasion with thoughtful and helpful e-mails.

Were it not for Elmering, Marconi would have never made it out of Poldhu, and most certainly not gotten to St. John's. This hobby only exists because of the enthusiasm that our Elmers have shared with us, and will only continue because we share it with those we Elmer.

—72 de Mike, KO4WX

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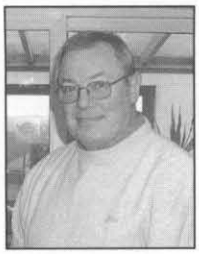
From the President

Dick Pascoe—GØBPS

president@qrparci.org



Winter is coming and after the "summer" of storms, hurricanes and torrential rain we might be looking forward to it. Once again, this is the time when we duck our heads back under the blankets and hope for next "summer" to come around quickly.

The Board of Directors has been chatting over the net over the past few months and few changes have been made in the staffing of the jobs of Secretary, Treasurer and Membership renewals: they have been separated into individual jobs. Jack Nelson, K5FSE, has done all three jobs for a while and we felt that this was overloading a member who also had a proper job of work to do. Jack will still handle the finances of the club with a little help from Tom Dooley, K4TJD. Ken Evans, W4DU, who is also Vice President, will handle the Secretary's job for now. However, it is NOT seen as a requirement of any future VP to take this post.

Offers of understudying those who do all the work at Dayton for the Four Days In May are still required; we cannot expect the guys that have done it for a few years to keep going indefinitely. It is much better to have a few "under training" so that this superb resource continues to be the highlight of the QRP calendar.

The BOD has added another award to the prestigious list of awards available from the club. I have long had a great respect for the Elmers of this hobby and took great delight this year in presenting my own Elmer, Ian, G3ROO, with his Hall of Fame induction plaque. Ian has been an Elmer to many over the 30 years I have known him and there are many more like him out there.

Elmers are the unsung heroes of our hobby, often spending hours or weeks helping their friends or colleagues get a little more knowledge about ham radio. In my own case I would get a short ring on the phone and I would have to drop everything and run for the 2m rig and Ian would give me a 10m session sending CW over the air, getting me up to speed for the exam. This happened several times a day for a few weeks. THAT is dedication for you from an Elmer.

We have agreed that there will be several levels for this award and it will only be given for personal "elmering"—not for providing a web page, or on-line help, though this might come later if needed. If you would like your Elmer to be recognized for their works, have a look at the club web pages for more details and an application form.

As some of you may know our editor, Mike Boatright, KO4WX, is also heavily involved in emergency work in the State of Georgia. The recent hurricanes that passed through the southern states caused Mike a fair bit of extra work and the editing of the *QQ* had to sit on the back boiler for a while.

When I first chatted to Mike about taking over the magazine he told me about this voluntary work and I agreed with him that this emergency work should come first. With all the staff of this great magazine and others who work for the club there is a definite "pecking order" that I subscribe to; You may disagree but I stress to ALL officers and members of the BOD that their family comes first, then the paid work and in Mike's case, his emergency work. Club work comes a little—just a little—lower on the scale of priorities for all who work for the club. I hope all members understand that we are all volunteers and none of us are paid to do the jobs we do.

To most of us it is like elmering—we do it because we love to do it. When we get some thanks, it comes as a surprise.

I well remember some years ago Chuck Adams, K5FO, speaking to a new inductee to the Hall of Fame who had said "I can't understand why they would give me this." His reply was, "If you did, you wouldn't have got it." How true…

Hamfests are a good way of promoting the club and by the time you read this I shall have attended the G-QRP clubs annual convention at the home of Rev. George Dobbs, G3RJV. We plan to have a table to promote QRP ARCI and take a few memberships as well. It has been difficult over the past few years as most of those that attend know me through my ownership of Kanga Products and my work with the British club. So my accent does not stir any reflexes. This year Ken Evans, W4DU, will join me and we hope that his US accent will persuade a few to sign on the dotted line. At least he will be able to see what a British QRP ralley is like and check out how we celebrate it all. We shall report back in the next issue on what we saw and did.

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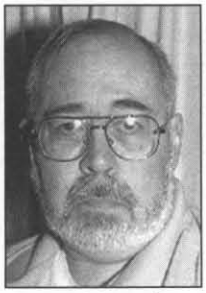
QRP ARCI NEWS



Bruce Muscolino, W6TOY

Bruce Muscolino, W6TOY SK

by Preston Douglas WJ2V

I read with considerable distress (late, as usual) about the passing of my friend Bruce. I hated to see him in a wheelchair, and I knew that if he didn't get up it would eventually kill him. My excuse for not knowing or posting something is that I have gone inactive on the QRP-L after many years of subscription. I am a practicing trial lawyer, and I just couldn't wade through all the postings, even the good ones. I kept losing ground, so I gave up trying. But the trouble is, you miss important things if you lose touch. So, I had to read it on the GQRP list.

Well, now Paulette Quick (where are you, Paulette?) and I are the only two surviving members of the original FDIM (the Four Days in May QRP seminar on the day before the annual Dayton Hamvention starts). When Bob Gobrick (SK) and Bruce Muscolino, W6TOY thought the whole thing up, there was no such thing as a major educational seminar for QRP enthusiasts in the US. If they weren't the first in the world, they certainly were the first here. Bob and Bruce enlisted Paulette and me and the four of us took a risk putting on the first FDIM. If it lost money, we lost money. We had no sponsor; we were it.

Sponsorship by ARCI came three years

later. Indeed, we gave our small "profits" from those first two years to ARCI as seed money for future FDIMs.

Those folks out there who contribute the most to our QRP group know that major works and contributions are never without controversy. You can't build a skyscraper, or even run a little seminar without offending some people.

Bruce did offend a few good people in the organization and presentation of that first FDIM, and it was unfortunate. If you knew Bruce, though, it was never with malice. He was trying to do a good job for us. I hope those folks who held the grudge so long can forgive him now.

W6TOY's best friend was another Bruce, Bruce O. Williams (SK). When I wrote a less than glowing review of William's transceiver kit (honestly, I reread that review recently—I confess I pulled my punches—the review was not as bad as the kit) both Bruces were all over me. Eventually, both forgave me, and Muscolino and I continued our warm friendship, exchanging occasional emails and inquiries about how life was going. He knew I was rooting for him to get his overweight, broken-hipped body moving so he wouldn't get sicker.

Although Bruce contributed significantly in several areas of QRP, he will be best remembered for being one of the two original founders of FDIM. This year there were something like two hundred hams who came into Dayton a day early to enjoy the talks and fellowship of FDIM and QRP. Next year will be the tenth anniversary of the year FDIM began. Quite a legacy he leaves us.

I have his face safely stored in memory. 72, Bruce. (*W6TOY photo courtesy of the ARRL*)

[Starting on the next page (pg. 6), we have included a reprint of W6TOY's report on the first Four Days in May, which was published in the May 1966 QQ.*]*

A W6TOY Story
by Ed Hare, W1RFI

There is a W6TOY story I can tell. A number of years back, I had offered to meet Bruce and Mike C. [WA8MCQ—*ed.*] in MD for a QRP chat. I brought the original TT2 with me. He and Mike fondled it a bit, and we talked, and a good time was had by all.

A few years later, I was talking to Bruce on the phone, and he said to me that holding the TT2 in his hands was one of the greatest moments in his life. Out of the blue, an idea came to me, and I said casually to Bruce, "You know, I have been meaning to check that rig out and make sure it all works, and put it back on the air. But I have been so busy that I haven't had a chance to do it. Do you think you could do me a favor and give it a once over and make sure it works?" There was this long silence, in which I am sure he was mustering as much nonchalance as he could, and he responded, "Sure, Ed. I'd be willing to do that." We both knew.

As it turned out, his health took a bad turn even then, so it took a year to do it, but sooner or later it came back to HQ, all working again. The next night, he and I did a private sked when he was given the honor of being the first QSO with it in over 25 years. A couple of nights later, Dave DeMaw, now W1CER (Doug's call before W1FB) came to W1AW and worked Jean DeMaw, Doug's wife, W1CKK. And, later that night, W6TOY was among those that worked the TT2 on that historical event.

The funnest part of the whole night, though, was to see what happened as Dave signed off with his Mom. I had done a post a day or two before, telling everyone about the historic QSO, in case a few QRPers wanted to listen in. The expectation was that Dave and a few others would stick around and put the TT2 and some other-band replicas on the air for an evening of fun. Well, when Dave said '88' to Mom, one guy started calling, and then a wall of QRP sound came out of the speaker. The look on his face was priceless!

Bruce had been invited, but alas, wasn't feeling up to the trip. But there was no doubt that after the help he had provided, he was there in spirit.

I wonder if anyone will pick up on the call as a memoriam QRP club call. That can be done before the 2 year period as a club call with the permission of the family. That is how W1FB was obtained for the Central Connecticut QRP Club. Dave DeMaw is now the trustee, so the call went full circle. That is somehow just how it was supposed to happen, I am sure.

[Ed Hare is a member of the QRP ARCI Board of Directors—*ed.*]

New Award for Elmers

The Board of Directors of QRP ARCI have approved Elmer awards on August 25, 2004:
(Elmer = one who assists a ham to pass the exam, learn the code or even learn to build/ homebrew. A teacher or 'encourager.')

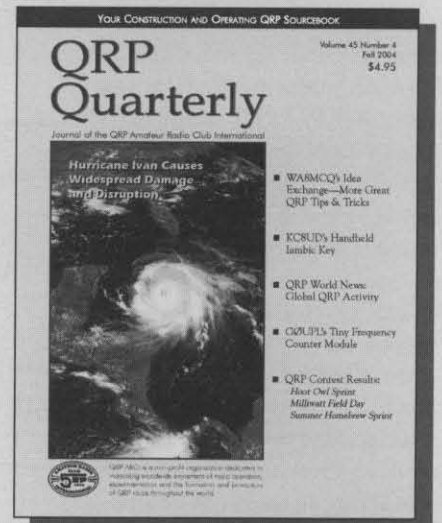
If you would like to say thank you to the person who Elmered you, this is it. It is aimed at those who have been elmered to enable them to say thanks to the one who elmered them. There are five grades.

- Standard: A single Elmer
- Bronze: 3 Elmered
- Silver: 5 Elmered
- Gold: 10 Elmered
- Supergold: 25 Elmered

An application for this award must be from one who has been elmered and if for a multiple award such as the bronze, silver or gold MUST be counter-signed by the others who have also been elmered. Each of the persons making the nomination MUST sign the application form.

For more details, the e-mail contact is: qrparciawards@ yahoo.com

On the Cover



Category 5 Hurricane Ivan with nearly 160 MPH winds, west of Grand Cayman Island and south of Cuba, September 12, 2004, 1745UTC, as seen from the GOES-12 satellite (photo courtesy of National Oceanic and Atmospheric Administration, NOAA).

New Board Appointed Positions

For the past year, one individual has been performing the duties of Secretary, Treasurer and Membership Chairman. With other changes within the club, this created an unusually high workload. Therefore, in order to reduce the work on any individual volunteer, the board has approved splitting the above responsibilities into three board appointed positions. These are:

- QRP ARCI Secretary
- QRP ARCI Treasurer
- QRP ARCI Membership Chairman

The club by-laws will be modified to reflect these changes. QRP ARCI Vice-President, Ken Evans, W4DU will hold the position of Secretary, until a Secretary is selected. Jack Nelson, K5FSE will be both Membership Chairman and Treasurer until a Treasurer is selected.

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QRP ARCI Board Member Hank Kohl, K8DD attends the Findlay, Ohio hamfest September 12, 2004 along Stan, AC8W and Trish, KA8AMX (photo by Kathie Kohl).

QRP, Really!

Bruce Muscolino—W6TOY (SK)

(This is Bruce's report on the first FDIM in May, 1996, that first appeared in the July, 1996, *QRP Quarterly—ed.*)

FDIM

As I write this, the echoes of Four Days in May (FDIM) are still ringing in my ears. From an idea hatched in last year's QRP-ARCI hospitality suite by Bob Gobrick, VOlERB/WA6DRB, and myself, grew a true QRP happening. When we were asked last year how many people we thought we could attract, we said "maybe 25." Over 100 of your fellow QRPers were in attendance, and no one, I mean NO ONE, nodded off all day no matter how tired their arms were from flying in the night before!

FDIM was a roaring success; it far exceeded our expectations. Before I left Dayton I personally thanked all the authors who prepared technical presentations, and I personally thanked the entire FDIM committee—Bob Gobrick, who coordinated the whole event, Paulette Quick, N9OUH, who handled administration, arrangements, and registration, and Preston Douglas, WI2V, who coordinated the vendor show, and I want to thank them again in print, in front of their peers!

What is FDIM you might ask. If you are on the internet or you read the other magazines, please forgive me the use of a few lines to bring your brethren up to date. FDIM is probably the largest QRP technical event in the free world. We had technical presentations by ten authors and myself, that covered areas of QRP of interest to everyone. You'll find a list of the authors and their papers at the end of this column. We had a catered "box" lunch and a talk by Dr. Rick Zabrodski, VE6GK, a successful Canadian occupational health physician and a QRPer of some note, and we had a show and tell in the evening, where vendors were given a forum in which to display their wares and say a few words about themselves. Each attendee got a bag full of QRP goodies—a copy of the technical papers bound as a book; a copy of the new QRP data book written by Paul Harden and published by the Colorado QRP Club; a copy of Bruce Milne's new "QRP Companion" software; and the opportunity to meet their fellow QRPers face to face! And the cost was only $30.00 (not including of the cost of coming to Dayton and miscellaneous purchases while there)!

> He stepped back a few feet and his eyes got wide and he said, "You're Bruce Muscolino? From Wadsworth, Ohio?"
>
> Imagine that, we'd been friends on the air 40 years ago and had never met in person!

FDIM '96 was such a great success that we were asked by almost everyone there to do it again—and we will—plans for FDIM 97 are underway even as I type! As for FDIM 96, you can still get a copy of the proceedings, a 125-plus page 3-ring bound book containing the full text and figures of each paper from me for the paltry sum of $20.00, postage paid. You can get a copy of Paul Harden's book from the Colorado QRP Club, and you can get "QRP Companion" directly from Bruce Milne, WB2QAP. One of our authors did

videotape the conference and we may eventually offer that as well.

Dayton

Dayton is many things to many people. To me it is the opportunity to renew acquaintances with old friends and make new ones while depleting the bank account at the swap meet. Traditionally, the first day of the Hamvention™, Friday, the HARA Arena does not open until after noon. The swap meet, however, is open from 8:00 AM, or some such mythical hour. I got there about 9:30, and started to make my way around the swap meet. About the fourth tent I passed had a display of radios from my childhood, and I went in to look. I found a rig I thought I might like to take home, but it had no price tag, so I looked around for the owner. I saw a fellow standing behind some tables in the corner, and went over to ask. As I approached him I saw his call sign is W8ATH, a call that brought back memories of a teen-age 10 meter net that met several times a week in the Akron, Ohio, area. I asked him if he had lived in Akron—he said yes, a long time ago. I told him I thought I had worked him numerous times. He looked at my present call and asked what my, call had been—I said K8BAL. He stepped back a few feet and his eyes got wide and he said "You're Bruce Muscolino? From Wadsworth, Ohio?" Imagine that, we'd been friends on the air 40 years ago and had never met in person! Ain't Dayton a wonderful place?

Of course the real reason we all go to Dayton is to see what's new and different in ham radio. QRPers look for QRP stuff, and I found some I thought was interesting. First there was the weather. I thought I was in the wrong town—from about noon Friday until we left Sunday afternoon it was in the 80s and 90s, and probably still is! As far as goodies go, how often have you gone on a search for just the perfect box to house that new rig or other project, and ended up with the same old selection from Radio Shack, or Mouser? There's good news out there—Mendelsons, a Dayton landmark (nine floors of surplus) has introduced a line of boxes in sizes QRPers will love. I bought five or six myself. Contact details are at the end of this column. The prices were reasonable, starting at around $3.00 and going up into the teens. Ten-Tec was also there with their line of kits and boxes—not a new item, but some very classy items. They will send you a catalog. Again, details are at the end of the column.

S&S introduced a new digital VFO that has both a programmable output frequency and a programmable offset, plus a digital display. The programmable operating frequency and the programmable offset will allow the unit to be used with any rig.

A new vendor of QRP goodies is "The American Radio QRP Key Mfg Company," run by Gil Kost. They manufacture a line of miniature telegraph keys that are perfect for small rigs, or even large ones. The keys are fully adjustable for contact spacing and spring weight, and sell for $39.95; and you'll probably want several. They are available with two different size knobs; I bought the large knob.

So what did your faithful scribe buy? I several boxes, some from Ten-Tec, and few from Mendelsons. I bought one of Gil's new keys, and I bought a copy of Roy Lewallen's ELNEC antenna modeling software. LB Cebik, one of the FDIM authors, talked me into it—not a hard job either. Oh, and did I tell you about the very nice E. F. Johnson Viking Ranger I I bought? When I was a kid, in the 50s, the Ranger was truly the Cadillac of novice rigs—I always wanted one then and now the fantasy is a reality. No, I won't use it for QRP.

Who's using what survey?

I'd like to get a little information from you so I can better aim my writings. Will you please drop me a postcard, or an email, telling me what rig(s) you use and which are your favorites? What antenna (or antennas) you use? And what are your favorite bands and operating activities? Thanks.

FDIM authors and their papers:

Coils, Linear Loads, and Capacity Hats: An Overview of Small Loaded Yagis
L. B. Cebik—W4RNL

Evolution of an Attic Antenna—QRP Operation from a Townhouse
Walter B. Thomas—WA4KAC

Using Vee Beams for Field Day
Ed Manuel—N5EM

Building Helically Wound HF Antennas
Bruce Muscolino—W6TOY/3

Options to a Homebrew QRP Station
The Rev. George Dobbs—G3RJV

Direct Conversion Receivers
Bill Kelsey—N8ET

A Guide to Building Hi Tech Kits
Kathy Szakonyi—N3SAD

Considerations in Receiver Design
Dick Szakonyi—WA3ZOW

30 Meter Propagation Study
Chuck Adams—K5FO

Milliwatting: Another Addictive Aspect of QRP
Bob White—WO3B

The QRP-ARCI Nets Program
George (Danny) Gingell—K3TKS

Contacts:

Miniature keys—
American Radio QRP Mfg. Co.
Gil Kost
3710 Buckingham Road
Baltimore, MD 21207
(410) 484-7951
email: ahber@ix.netcom.com

Mendelson Electronics
Harlan Mendelson
340 East First Street
Dayton,OH 45402
(800) 422-3525
email: mec@meci.com

S&S Engineering
14102 Brown Road
Smithsburg, MD 21783
(301) 416-0661

Ten-Tec
1185 Dolly Parton Parkway
Sevierville, TN 37862
(423) 453-7172

●●

Idea Exchange

Technical Tidbits for the QRPer

Mike Czuhajewski—WA8MCQ wa8mcq@comcast.net

IN THIS EDITION OF IDEA EXCHANGE

Bruce Muscolino, W6TOY, SK

I was saddened to learn that Bruce passed away in August, as a result of health problems that had plagued him in recent years. Among other things, he was one of the cofounders of the FDIM QRP symposium held annually in conjunction with the Dayton Hamvention. Bruce was one of the locals for me, and I visited his house many times. He always had lots of good stories about old ham radio equipment as well as the perspective on things he picked up from spending three years working for a US electronics company in Holland and operating with a DX callsign.

My favorite memory of Bruce is the time he and I had dinner with Ed Hare, W1RFI, the night before the annual Maryland state convention just outside Baltimore years ago. (Ed was there representing the ARRL.) That's when Ed told us how the famed W1FB Tuna Tin transmitter had disappeared somehow from the ARRL lab and was eventually purchased from a pile of junk at a New England hamfest for a dollar. The purchaser thought it was an excellent copy of the original, but eventually they suspected that the duplication was a little too good. Someone dragged out a copy of the old *QST* article and performed a bit of forensics using the photos, and sure enough, it wasn't a copy.

Ed pulled it out of his bag and let us drool over it for a few minutes. He went on to talk about bringing it back to life and handed it to Bruce to perform the historic task. (Any rumors that he fell to his knees and shouted "I am not worthy!" are false, although there may have suddenly been a bright light shining on him with a choir singing in the background.) The rest is well known, and the revival of the Tuna Tin several years ago was a significant event in QRP history. NorCal revised the circuit to use modern components and put it out as a very successful kit. (It was later put out by NJQRP as well as the Ft. Smith QRP Group, and is currently available through W1REX and the Maine QRP Group.)

Dollar Store LED Bounty

Here's #51 in the endless series of Technical Quickies from QRP Hall of Fame member Joe Everhart, N2CX—

Being basically cheap by nature, I frequent local so-called "Dollar Stores" in search of bargains. As anyone who has visited one can tell you, the vast majority of merchandise they sell is of less than superlative quality. However, due to the low cost of their wares some of what they sell is worthwhile. And if what you buy is not to your liking, you've wasted only $1 and a little of your time. One downside is that if you do find something worth the price, you'd better get it immediately since it may not be there on your next return.

I've been a real sucker for LED lights since they have been available in superbright versions and since (more or less) white LEDs hit the market. As long as they are not more than $20 or so I will spring for unique LED flashlights, lanterns and lamps as soon as new ones appear. I've purchased and built a number of them in the last five years but I'm always looking for something new.

One item missing from my collection, though, has been a USB-powered LED light of the type generally used with laptop computers for nighttime keyboard visibility. I simply could not justify shelling out $20 or more for a single-LED lamp in spite of its "cuteness factor" or usefulness. Recently, however a co-worker and fellow Dollar Store devotee showed me just such a lunchtime "find" from a local emporium. I stopped there on the way home from work that evening and purchase several of them—after all they were only a buck apiece.

Figure 1 is a photo of the packaged lamp I got from my local Dollar Tree™ store. More expensive USB lamps have a flexible boom to allow the user to position the illumination where needed. The $1 version uses a flexible coiled cord along with a plastic clamp and swivel arrangement to attach the lamp and aim it where desired. It's a small compromise for a large price delta.

As may be expected, the lamp does not produce as much illumination as its more expensive brethren, although it is quite useful for its intended purpose. However, being an inveterate tinkerer and homebrewer, I found it a great source of raw materials and inspiration for other uses.

First off, it's the cheapest source I've found for white LEDs. Other sources I've used, such as Digikey and Hosfelt offer white LEDs for $2.00 and up in small quantities. Living on the east coast I have no local surplus outlets to check for better

Figure 1—The USB light as it hangs on the peg at the store.

prices. Perhaps those who live in Silicon Valley have had more success.

The lamp is designed to be powered by a computer's USB port. This port provides a 5-volt source so it's ideal for the lamp as intended. However, around the ham shack or for portable operating use, it would be much easier to power from other voltages. I made some measurements to investigate this.

I varied the voltage applied from 3 to 6 V and added resistance in series to see the effect on current drawn by the lamp.

Interestingly enough, the current is 48 mA with the nominal operating voltage. When I checked the remainder of the half dozen units I bought, I found that the current ranged from as low as 45 mA to as high as 60 mA at 5V. Most LEDs are rated for 20 mA continuous current so this seems a tad high. It may ultimately reduce the expected life, but the amount of reduction is not known. I've operated one of my

Voltage	I with 10 ohms	I with 20 ohms
3 V	2.1 mA	1.9 mA
4.5	32	25.7
5	48	----
6	55	45

Table I—USB Lamp measurements.

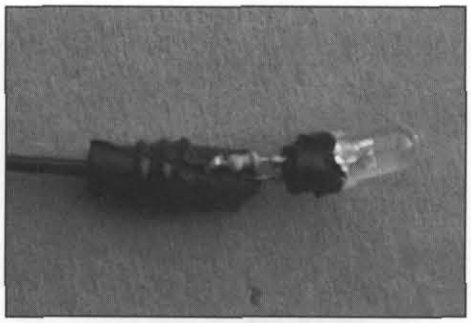


Figure 2—The LED and resistor exposed.

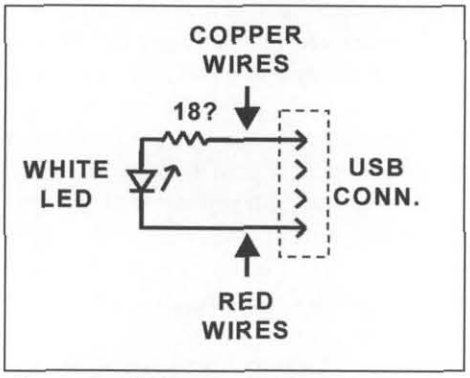


Figure 3—USB lamp schematic.

lamps continuously for over a week without signs of overheating or degradation, so with intermittent use the lamp will likely last quite a while.

The next step was to carefully remove the molded rubber around the LED itself to see what was inside (Figure 2). The device is in series with an 18 ohm 1/4-watt resistor. Ohmmeter checks verified that the circuit is simply as shown in Figure 3.

Next I cut off the USB connector to look at the flexible cable. Much to my surprise, it seemed to be a single wire with translucent insulation inside the black outer jacket. This cant be! How can you connect two power leads with a single wire?

More careful examination of the "wire" showed it to be composed of multiple strands of teeny-tiny wire with enamel insulation. Eight of the strands were insulated with a clear coating and the remaining eight had red insulation. I separated them into two groups and found by trial that the insulation was "heat strippable." Here were the required two connections See Figure 4.

Now one would think that the "red" wires were the positive lead and the others would be negative. However this is not so!

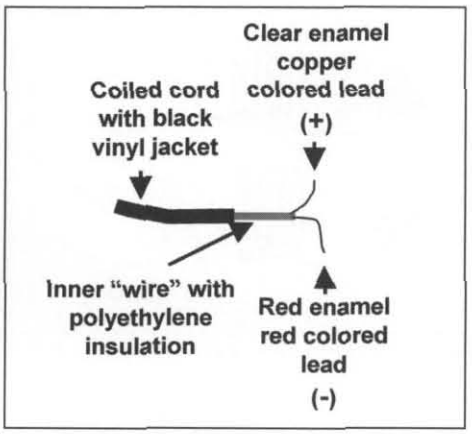


Figure 4—Power cord internal construction.

The red wires are the negative leads and the others are positive.

Armed with this knowledge I've come up with several applications for the USB lamp for lighting uses beyond the obvious.

Use the lamp "as-is" with a 5 volt source. All you need to do is to find a mating USB connector and connect it to a 5 volt DC source. As luck would have it, the mating connector costs more than the USB lamp. In truth you can also get by with using three AA cells in series to supply 4.5V. To get around the expensive USB connector issue, strip the end of the USB lamp cable and install a connector of your own choice. See Figure 5.

Connect two of the lamps in series and run the shebang off a 9 volt battery. Buying two USB connectors is awfully expensive so it would be easiest to simply remove the connectors from the lamps and wire them in series to a 9-volt battery clip as illustrated in Figure 6. Now you have multiple lamps!

Use one USB lamp with a series resistor to run from 12 volts. Since "12 volt" batteries or power supplies may run as

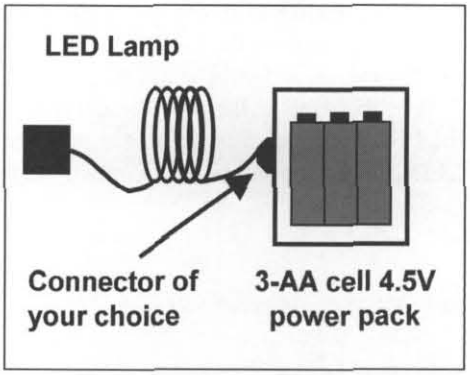


Figure 5—USB lamp with 4.5 volt battery supply.

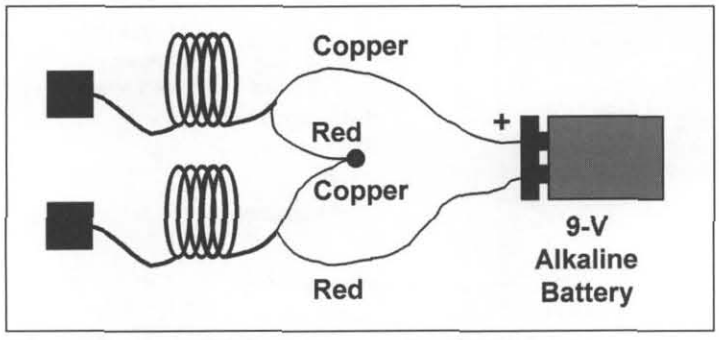


Figure 6—Two USB lamps on one 9 volt battery.

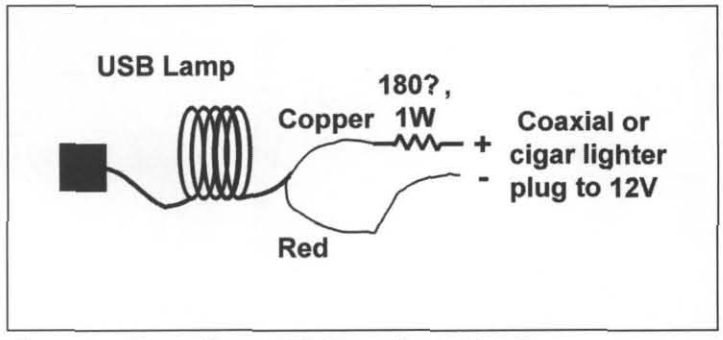


Figure 7—Powering a USB lamp from 12 volts.

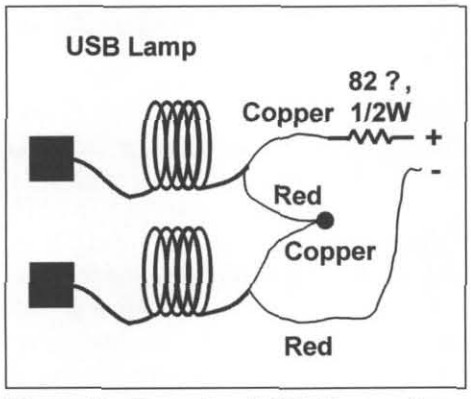


Figure 8—Powering 2 USB lamps from 12 volts.

high as 13.5 volts the series resistor must be sized accordingly. A 180 ohm value is appropriate, though it will dissipate nearly half a watt so a 1 watter should be used. For a connector, use either one of the common 2.1 mm coaxial power plugs or one of the cigar lighter type. Figure 7 is the schematic diagram.

What I did was to use two lamps in series with an 82 ohm resistor and run the pair from "12V" as diagrammed in Figure 8. At 12 V the measured current is 52 mA, close to the original value running one lamp from 5V. At 13.8V the drain ran nearly 60 mA. This setup give a handy lighting solution for QRP portable operation. One lamp can illuminate the front panel of your rig and the second your logbook.

For the dyed-in-the-wool homebrewer, the USB lamps are a cheap source of white LEDs to remove and build your own lamp configuration.

—de N2CX

WA8MCQ comments:

While I was out and about one day I noticed a Dollar Tree store nearby so I stopped in and looked for them. (I tried another "dollar store" chain and they didn't have them. It's probably best to stick with Dollar Tree.) I felt a little twinge of guilt as I grabbed all 4 hanging on the peg, almost like I was doing "insider trading," since this had not appeared in print yet. But it wasn't enough guilt to keep me from heading to the cash register with all they had at the moment. I felt better the following week when I bought another four at a different Dollar Tree, which had about 30 on the shelf.

When I dissected one I found that the wires are a little under 4 mils in diameter, or about #38. Eight of those in parallel are the equivalent of #29 wire. (I learned something interesting when I calculated the cross sectional area of the wires. It turns out that you don't use the standard "pi-R-squared" method for area because wire tables go by circular mils, not square inches, or square mils, and that's calculated differently. To get CM, you simply square the diameter, not radius, and that's the result; pi is not used. Number 38 wire is 3.965 mils diameter, 15.72 circular mils, 12.35 square mils, or 0.00001235 square inches.)

I wanted to try one as soon as I got home. My computer was off but my son was working at his and I asked him to plug one in. I told him what it was for—he'd seen the fancy version Joe talks about—and he pointed out that it would also make a good light for poking around inside a computer. He does a lot of computer helpdesk work as an IT intern during breaks between college semesters, and normal room lighting isn't always sufficient. It's smaller and lighter than a flashlight, and you don't have to worry about batteries. The cable might not reach everywhere inside, so it might not be a bad idea to splice it onto an old scrap USB cable as an extender.

I noticed that the brass sleeve pulled off easily. It's rather thick, about 30 mils, and a little over a quarter inch ID. If you bought these for the white LED, keep the sleeve, too—it will make a good spacer.

Battery Mess Cleanup

Jim Tolson, KF9CI sent this e-mail recently, and brings up a good point that I had never thought about—

I read about the Exploding Battery in the last issue of the *Quarterly*, and have one minor suggestion:

Unlike when many of us were kids, more and more batteries are alkaline these days. I never thought much on that until I read an article in *Home Power* magazine about safety in the battery bank room. These are chock full of rather large cells/batteries, enough to power a house.

For regular lead/acid banks, they'll have baking soda handy to neutralize any spills of the acid electrolyte. But for alkaline banks, muriatic acid is their recommendation.

If that exploding battery is an alkaline Duracell, I'd suggest using vinegar instead of baking soda to clean up the mess.

—de KF9CI

[WA8MCQ comments—in case anyone is not familiar with it, muriatic acid is available in many hardware stores and is used for things such as cleaning concrete. It's considered a strong acid, and is a 6 mole solution of hydrochloric acid; it's also said to be hydrochloric diluted to 30% acidity with water. Vinegar is a weak acid, a 1 mole solution of acetic acid. If you read the label, it usually indicates that it's diluted with water to a uniform strength of 5% acidity.

I'm not a chemist nor do I play one on television, and I didn't stay in a Holiday Inn Express last night. However, I can do

quick Google searches on the Internet and come up with chemical facts and numbers to toss out! What I do know is that muriatic acid is a nasty liquid that should not be treated casually and you should know what you're doing, while the vinegar is much safer. For cleaning up small battery messes at home, I'd go with the latter every time.]

Removing Difficult Allen Screws

Allen head (hexagonal drive) setscrews are used in a lot of knobs, and I've also run across regular Allen screws when stripping old equipment for parts. Sometimes they can be difficult to remove, and sometimes the Allen wrench will start spinning in the head as one of them gets rounded off. Now what?

This is part of a discussion that appeared on the test equipment mail reflector (test-equipment@mailman.qth.net). Mike DiGirolamo, W4XN, put out this call for help—

I need some help and/or tips on how to remove frozen Allen (hex drive) set screws like the ones found on equipment knobs. The typical scenario happens when trying to remove a stubborn setscrew. The Allen wrench "slips" and rounds the insertion pattern slightly. Has anyone heard of a slightly oversized set of Allen wrenches (on the order of .001" - .002") or is this the wrong approach? If they exist, who supplies them?

Jerry Kincade, W5KP, had this to say—This falls under the heading of "if all else fails," but if it's really critical that you get the Allen out, dab a tad of JB Weld epoxy adhesive on the end of the closest-fitting Allen wrench you have, stick it in there and go away for a day. Come back, remove the Allen screw, grind off the screw that's now permanently attached to the end of the Allen wrench, and go on about your business with a slightly shorter wrench. Allen wrenches are cheap. I've done this before rather than trying to drill out the screw, because they are HARD, as a general rule, sometimes harder than your drill bit, and this method avoids boogering up the threads in the knob or whatever with the drill bit. Just be careful not to get the JB Weld anywhere except in the Allen screw hole.

From Bob Downs, WA5CAB—My experience is that it's the wrench more than the screw that gets rounded. Step 0 is to use good quality Allen wrenches (Xcelite, Snap-on, etc.). And don't use one that shows signs of having turned in a screw until you've dressed the end. Be sure the socket in the screw is clear of foreign material all the way to the bottom, especially rust. Soak the screw with a penetrating oil (not a lubricant).

If the wrench turns in the screw, dress the end back with a grinder (fine grit wheel). Do it slowly so as not to overheat the wrench. One reason I prefer black-oxide finished wrenches to plated ones is that you can more easily see how far you have to grind. Don't bother with dressing up the burr on the end. (I've never heard of oversize wrenches.)

Bill Riches, WA2DVU, suggested trying metric wrenches. The sizes on these are different, and that could help. If a set screw is opened up a bit and now too large for a regular Allen to fit, a metric one might work. (Or it could be that a regular wrench won't fit right because the screw is metric. We run into that every now and then at work.)

In one response, someone suggested that they might not actually be hex drive Allen head screws, but perhaps Bristol drive heads, which are fluted. Those are not a good match for Allen wrenches since the shape is somewhat different.

By the way, while we commonly call them Allen wrenches, that's actually a trade name for a particular company's line of hexagonal drive tools. Others make them as well, but they can't call them Allen wrenches.

Figure 9—The earplugs (top) and earbuds (bottom).

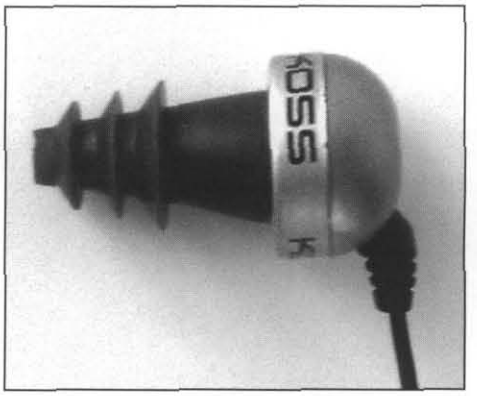


Figure 10—The finished product.

Modifying KOSS "The Plug" Earbuds

Denny Payton, N9JXY of Auburn, IN, passed along this simple modification to some popular earpieces—

I saw a lot of talk about "The Plug" earphones made by Koss on QRP-L and/or the Elecraft mail reflector a while back, but haven't recently. I think they're still popular though. I found I really liked them, but had trouble getting them to stay in my ears so I adapted mine to be easier to use. The modification is quick and easy, and they really stay put.

Several of the larger department stores (but not Wal-Mart) sell "The Plug" earbuds and Wal-Mart sells Silencio #SDI-101 earplugs (hearing protectors) for under $2. Figure 9 shows both items, with unmodified earpieces on the left and mod in progress on the right.

Cut the tip and stem off of the earplugs with a hobby knife (as seen just below the Silencio carrying case), and then drill a hole from the rear into the hollow center area. Starting with a tiny drill bit and then going to a larger one works best. The material won't drill well with the larger bit and an abrasive bit would work better, but you don't need a very big hole, and after a short time, it will have removed enough material.

Next, pull off the earbud's cushion (lower right in the photo) and push on the earplug in its place. If it goes together well, take it back off and smear a little super glue around the post on the face of the earbud. (If it doesn't fit well, enlarge the hole a bit.) Push the modified earplug back on and hold it for a minute until the glue sets. Figure 10 shows the finished product.

I've been using mine for quite a while now, and they're my favorite phones ever.

—de N9JXY

Treating Antenna Ropes

Charles Moizeau, W2SH, posted this to QRP-L—

Like many, if not most, of the readers of QRP-L, I rely entirely on rope supported wire antennas. For most applications, e.g., halyards, a moderate degree of stretch is tolerable and indeed, under storm conditions, desirable. I have for a number of years been generally very satisfied with the products of Synthetic Textiles, Inc.

http://www.synthetictextilesinc.com.

They manufacture a white braided Dacron rope, which is encased in a black woven polyester sheath. Several ham radio retailers market their products.

Their 3/32-inch and 3/16-inch diameter ropes satisfy my requirements. I use the smaller diameter for ropes which are not under tension, e.g., pull-down ropes, and the larger diameter for tensioned applications, e.g., halyards. (For those situations where stretch cannot be tolerated, i.e., pulley support lines, I use a Kevlar-cored rope, which measures about 5/32 inches in diameter).

A couple of years ago I sought to improve the long-term durability of my ropes by dunking them in molten wax. This greatly reduced fraying over time, and I discovered that the technique offers several collateral benefits.

A) The wax impregnation stiffens the ropes and reduces the tendency of ropes not under tension to become entangled in tree branches during a storm.

B) In the case of the 3/32" rope, the wax completely eliminates the occasional and irksome tendency of the Dacron core to poke through the weave of the polyester sheath.

C) Although the wax adds somewhat to the weight of the ropes, its waterproofing eliminates the considerable change in the ropes' physical condition between dry and wet states.

D) Earlier, there had been some unexplained damage to the ropes, which I attribute to squirrels nibbling past the polyester to get at the Dacron core for nesting material—this is now a thing of the past.

I use a 60-40 mixture of beeswax to paraffin. I get the beeswax from a beekeeper for about $5.50 a pound. The paraffin comes from the home canning section of my local supermarket and costs $3.00 a pound. These waxes melt at around 110 to 120 degrees Fahrenheit. Both are flammable and the only safe way to melt them is over boiling water. From a mail order firm, I got a $30 three-piece set of large stainless steel stock pots (together with covers). I get the largest pot filled with about three quarts of boiling water and then put my waxes in the smallest pot which sort of floats in the boiling water. The wax gets completely melted in about 15 minutes.

I carry the pot containing the melted wax mixture outdoors and throw in hanks of rope, one at a time, swish each around in the wax with metal kitchen tongs for at least a minute. Then, holding the hank of rope with the tongs, I shake out the excess wax into the pot, and finally let the impregnated rope dry on a plastic tarpaulin. A half hour later, I remove the excess dried wax by dragging the rope through a tight fitting hole drilled in a piece of angle iron.

Given my suspicions about the squirrels, I now add a tablespoon of diabolically potent hot sauce to the molten wax just before I toss in the rope. I'm not talking about any wimpy milquetoast hot sauce like Tabasco. No Sirree! What is called for is a commercial hot sauce that has been fortified with pure capsaicin. I now use one called Da' Bomb Ground Zero, which I understand is the choice of marine biologists for coating turtle eggs to discourage predators. In the past, I have used Dave's Gourmet Insanity Sauce. There are a goodly number of these high-octane hot sauces. Because I want to stay a member of this family-oriented mailing list I cannot list many of these products, but try http://www.peppers.com for an outfit that retails over a thousand different brands, and many of the names are a real hoot.

I should point out that the wax impregnation is not permanent. After a year, I can perceive some degradation. Cleaning the ropes with a sponge and a water-soluble detergent and dunking them again in wax is not difficult. It certainly would seem to be less tedious than brush painting them with Plasti-Dip, viz. http://www.k1cra.com, whose stuff is marvelous for other aspects of antenna work.

I have not tried impregnating ropes by dunking them in water-based acrylic paint; have others tried this?

—de W2SH

Lubrication of Variable Capacitors

Although far less common than they were decades ago, air variable capacitors are still used by homebrewers, and they are still being made (although in vastly smaller quantities). One thing I never thought about until I saw this discussion on QRP-L was lubrication. After I read it, though, I realized I'd seen the problem a number of times over the years.

James "Dr. Megacycle" Duffey, KK6MC/5, started it with this post—

What is the best lubricant for the end bearings of old capacitors?

I have an old TRW dual section 365 pF unit (remember when pF was micro microfarad, mmf, uuf?) that Jim Cates, WA6GER, gave me when I tried to buy it from him a few years ago. He had cleaned it in an ultrasonic cleaner, which removed all of the lubrication. As a result, the capacitor could not be turned. I finally got it to move by spraying the front ball bearing, end support, and middle contact with Tri-Flow, a light bicycle lubricant. However, after sitting for a few days it becomes frozen again and requires a great deal of force to turn. After this initial stubbornness, it again turns fine, though.

I assume that I need a better permanent lubricant than the Tri-Flow. Does anybody have any experience with this? I am tempted to use a small bit of Lubriplate on the front bearing only, but if someone with experience has a better recommendation I would like to hear it.

Dale Putnam, WC7S, had this reply—What might work well for you is liquid graphite, or even dry graphite. It will not collect dust that then mixes and creates a bit of a hard to turn mess, like oil does. Lubriplate will do that also, if the cap is used in a very dusty environment. It tends to collect it on the surface, but not mix the dust in so much.

I used Lubriplate on record changers, tuners, and many other applications. And this has been in a variety of environments, including a semi dust bowl agricultural area. My rule of thumb is if it is dusty, use graphite; if not dusty, use Lubriplate. Oil is for bushings, grease is for bearings. (The last comes from a fellow that spent a fair amount of time caring for large radial engines, and regular auto things, too.)

From Stuart Rohre, K5KVH—The best of both worlds for light lubrication, for

something as slow speed as a variable capacitor, is the Triflow, a light oil containing Teflon ball bearings of microscopic size. It does not gum up like Lubriplate does over time, temperature and dust. Check out Triflowlubricants.com. They also have a synthetic grease with the microscopic Teflon® ball bearings which should be a modern replacement for Lubriplate.

I usually get Triflow to work for caps, but maybe those I have used it on did not have total loss of lubricant like the one you have. It's probably a good argument for not using anything but a spray you can direct discreetly to clean up a variable cap.

From Karl Larsen, K5DI—Lubriplate is too oily, I think. I would go by an auto parts store such as Auto Zone and see what they use for speedometer cables. Of course, those are soon to be a thing of the past, too, so hurry!

Charles Moizeau, W2SH, had this to say—The bearings of variable capacitors, be they ball, sleeve or thrust (depending on the capacitor's quality), need first of all to be thoroughly cleaned of congealed lubricant, tobacco tar or whatever. Auto parts stores sell the only product I have found to do this properly. It used to be called carburetor cleaner, but with carburetors being an endangered species, the same product is now called gum cutter, or it is marketed as a cleaner for brake drums. Whatever they call it, it is potent stuff and it is extraordinary the amount of gunk that a drop or two will bring forth from a variable capacitor.

After cleaning, I rinse the bearing with acetone. Air, especially under pressure, is the best way to dry the clean bearing. Q-tips or pipe cleaners risk depositing lint into the bearing and should be avoided.

I have found that household lubricating oil, e.g., Three-in-One, will become gummed over time, especially if the capacitor remains unused. I have had excellent results with a tiny amount of Vaseline petroleum jelly applied with a toothpick. The trick is to only apply a minute quantity, just enough to thinly coat the entire bearing; any more will only attract harmful quantities of dust and dirt. There may well be better lubricants, but Vaseline has always worked for me.

The problem with variable capacitor bearings is that, in addition to supporting the capacitor's shaft, they are also expected to provide electrical continuity to the shaft's rotor plates. I have yet to encounter a lubricant that will pass the ohmmeter test, with a blob on a piece of paper. Powdered graphite perhaps comes closest, but I would be pleased to learn of a viscous lubricant that is really conductive. In most applications, so-so conductivity through a variable capacitor's bearing is usually good enough.

There are, however, situations where a better electrical connection is required, e.g., the tuning capacitor of a regenerative detector. Here the only solution I have found is to drill a small hole transversely into the variable capacitor's shaft to a depth of not more than 1/16 inch. Then a short length of very flexible stranded wire is soldered to the shaft and it provides a perfect electrical connection across the rotor shaft's bearings. It is not difficult to choose the right length of the proper wire and mount it in such a way that normal rotation of the capacitor shaft will be unaffected.

From Ron Ricketts, WA5VFA—Lubriplate is still around and is generally available at any good hardware or sporting goods store. It is used by sportsmen for lubricating fishing reels and firearms, and also by model railroad hobbyists. It is available in small metal tubes and seems to last forever. Another possibility is a lubricant called 'Rig,' which appears to have a similar formulation. Again, it is available in sporting goods stores.

External Power for AADE LC Meter

Chuck Carpenter, W5USJ, passed along a battery saving modification for this popular piece of test equipment—

I don't use my AADE LC Meter IIB as a portable unit and I'm always forgetting to turn it off. The next time I go to use it the battery is dead, so I added an external power connection. The battery is still an option if I should need to travel with it.

There isn't much room along any side for the coaxial power connectors I prefer but an open-frame single-circuit phone/key jack would fit. Also, there is very little space between the edge of the circuit board and the battery compartment. It's about enough to clear thin wires—keep this in mind.

Figure 11 shows construction details. I Dremel-drilled a small hole in the side of the case near the negative post behind the edge of the circuit board. Then a tapered reamer was used to get the hole to the size needed for the jack, approximately 1/4 inch.

Figure 11—External power mod for the AADE LC IIB meter.

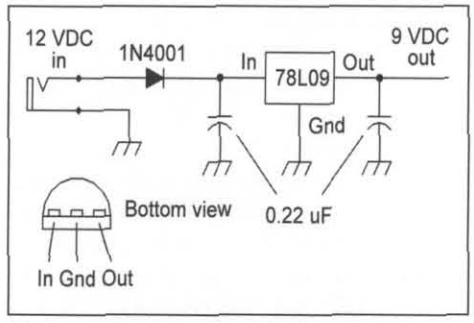


Figure 12—A low power 3 terminal regulator and a pair of caps drops the voltage to replace the 9 volt battery.

A couple of Manhattan pads were glued to the circuit board near the edge of the ground plane. An LM78L09 low power regulator (TO-92 case) was soldered to the pads and to the adjacent ground. A pair of 0.22 uF caps were soldered to ground from the IN and OUT pins of the regulator. (Figure 12 shows the schematic.)

From the OUT pin of the regulator, a connection was made to the same point where the battery '+' wire connects. The IN pin of the regulator is connected to the jack with a 1N4001 reverse protection diode. The ground side of the jack is connected to the ground at the point where the capacitors are soldered to ground.

I checked all the connections, connected the wired 1/8 inch plug to my 13.8 V power distribution box and checked the regulator voltage to the meter. The meter

displayed 9.1 V. I turned the LC meter on and voila, the usual messages were displayed on the screen.

Caution: Inserting the phone plug with the power connected will cause a momentary short. My bench power supply didn't like that much. Insert the plug and then connect the power!

[WA8MCQ note—I wondered if the momentary short during insertion could be avoided by using stereo plugs and sockets, using only the tip and barrel. The unused ring would increase the spacing between them and depending on the length of the bushing in the socket they might not get shorted. I tried some quick and dirty tests using an old computer amplified speaker—the only 1/8" stereo socket I could get my hands on at the moment—and the tip and barrel of a stereo plug did short out. A small, low current wall wart supply might be more forgiving of a momentary short than a high current bench supply.]

Note, too, that there is room along the same side of the case for sub-miniature switches. An SPST switch would be useful for power on/off. An SPDT switch to transfer between battery and external power would also be a nice addition.

Now I can leave the meter on as long as I need to without concern for running down a battery (and having to remove one from the smoke detector because I can't find one).

—de W5USJ

Battery Shrink Wrap Update

The summer issue had an item on this topic from Mike Melland, W9WIS. He later sent this update by e-mail—

I've been designing packs lately for military man-pack HF radios and found another fantastic source for shrink wrap, battery cells and anything else related to batteries and/or chargers, including silicon jacketed wire, etc. Ed Yost owns the company, located in Wisconsin. They will also build custom packs for you VERY reasonably.

http://www.batteriesamerica.com/

—de W9WIS

N2PK VNA Web Site Updated

Back in January I wrote about the impressive Vector Network Analyzer that Paul Kiciak (N2PK) built. Something like this is definitely not for beginners and is a rather daunting project, especially since there appear to be no kits readily available, but it produces a very powerful tool which can be extremely useful to an advanced homebrewer. The performance isn't as good as a commercial unit but is still quite impressive, especially being several tens of thousands of dollars cheaper.

I recently received a mass e-mail from him telling about some updates to his web site. (It includes a note that nothing is being sold or marketed there.) The URLs are:

http://users.adelphia.net/~n2pk
http://n2pk.com

There is also an announcement of the "N2PK-VNA" discussion group at groups.yahoo.com, which I signed up for.

Using an HF Rig as a Signal Generator

Someone on QRP-L said they wanted a good RF signal generator and asked for suggestions. There were several replies, and a very interesting one came from Mark Brueggeman, K5LXP—

A lot of people so far have mentioned lab-type commercial units from ancient to contemporary. Unless you're doing tests that involve precision measurements such as phase noise or IMD as one person mentioned, you don't need an expensive lab instrument for most ham bench work (tuning RF stages, checking oscillators, etc). My favorite bench generator is my old Icom 735 HF rig.

If you think about it, it has a lot of capability as a piece of test equipment. If you 'cut the diode' it will generate a signal from 1 to 30 MHz with down to 10 Hz resolution, send AM, FM or SSB as well as a steady carrier, and as a plus can serve as a monitor for all those modes. The 735 has a fixed-level 'transverter output' that, when used with a step attenuator, can provide known signal levels down to microvolts. I've seen 735s go for as little as $250, which is cheap compared to even an old, used/abused lab grade instrument. It might seem like a 'waste' to use an HF rig as a signal generator, but I think it's more of a waste to spend several times that for a generator that can't receive and that you can't use on the air!

—de K5LXP

WA8MCQ comments—An excellent idea. Older rigs are widely available, fairly inexpensive, and if you can find one that has a bad final amplifier, the price can be even more attractive.

And lack of a fixed level transverter output doesn't rule out using a rig. My venerable Kenwood TS-430S has no such output, but it does have a piece of small coaxial cable that carries the low level signal from the board that generates it to the power amplifier module. Only a bit of minor surgery would be needed to route the end of that cable to the outside world.

Using Semi Rigid Coaxial Cable

Well, technically the one I have isn't really "semi rigid," but it's almost the same. I'll get to that in a minute.

A while back, Brad Thompson, AA1IP, offered some of this for sale on QRP-L at a good price so I took him up on it. I use this sort of thing often at work (or rather, the "real" semi rigid), and it could come in handy at home as well. There are times when a homebrewer would like to use small coax to route a signal inside an enclosure, and RG-174 is perfect for that. Or almost perfect, since it does have a wire braid outer conductor with a lot of fine wires, and the soft insulation melts easily anywhere near a soldering iron.

What he has is surplus Belden 1671A. Think of it as RG-174 missing the plastic jacket and the braid thoroughly soaked in solder. Figure 13 gives an idea of the size. Is this cable really in the category of "semi rigid?" That depends on what web site I look at. A number of different companies make a similar product. Some have it in a separate category, others call it semi rigid with a tin-soaked outer conductor, hand formable, and Belden calls it Conformable, which is a trademark.

True semi rigid cable has a copper tube

Figure 13—Some Belden 1671A cable, about the same size as RG-174 with the plastic jacket stripped off.

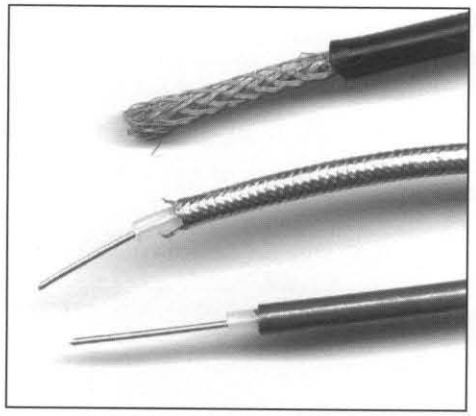


Figure 14—Comparison of RG-174 (top), Belden 1671A with tin soaked shield (center) and true semi rigid cable with solid copper shield (bottom).

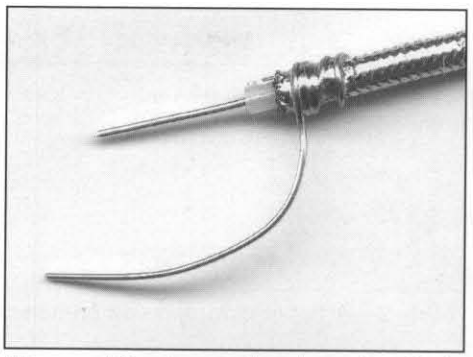


Figure 16—A small wire pigtail is wrapped and soldered onto the 1671A. Don't try this with RG-174 unless you're feeling very lucky.

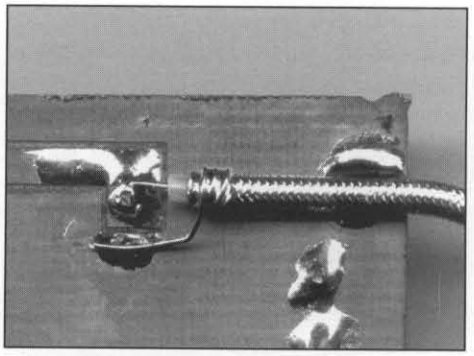


Figure 18—Thanks to the teflon dielectric, the 1671A can be soldered directly to a PCB ground plane (right) with impunity.

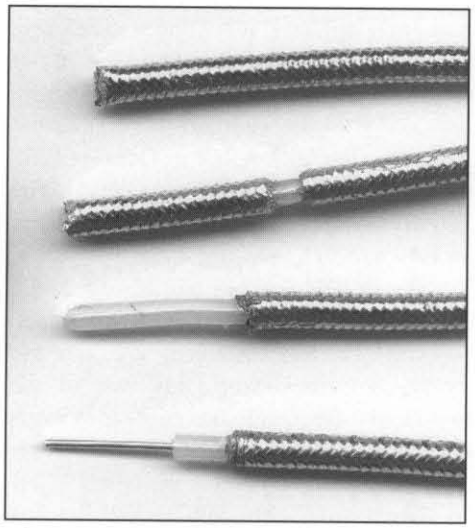


Figure 15—Preparing 1671A for use. (True semi rigid is the same, except that the shield is solid copper.)

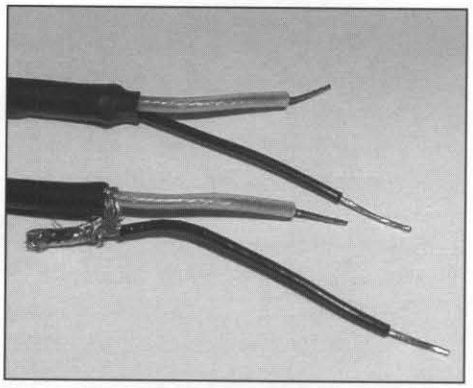


Figure 17—The heatshrink tubing is removed from a commercially prepared length of RG-174 to show how pigtails are attached to it.

for the outer shield. (Figure 14 shows all 3 types. The Belden is in the center and "true" semi-rigid is on the bottom.) While it can be bent to shape to route it over a convoluted path from point A to point B, it's not easy and can require custom tooling. With the tin-soaked outer conductor, the cable can be easily formed by hand; it's more pliable, but still holds its shape.

One big advantage of semi rigid cable (or the Belden) has nothing to do with its rigidity. It has a Teflon dielectric, and that means you can solder with impunity without worrying about it melting and deforming, possibly putting an impedance bump or even a short on the line. It makes it really easy to solder the shield to connectors, using as much heat as you need to get a good connection. It also allows you to solder the shield directly to the ground plane of a PCB, both to ground it and to hold it in place.

The Belden 1671A is essentially the same size as RG-174. The center conductor in the 1671A is solid, silver plated copper clad steel, 0.020" diameter or #24. That's the same size as RG-174, which is stranded copper. The outer diameter of the dielectric is also the same, 0.062". The outer diameter of the shield on the Belden is 0.085", a bit larger than the 0.077" of RG-174. The reason for that is that the Belden has copper foil between the dielectric and the outer shield. The impedance is still 50 ohms.

Working with it is pretty straightforward. As shown in Figure 15, you cut around the shield to separate the end, pull it off, then strip back the dielectric. At work I sometimes work with "real" semi rigid cable, with the solid copper shield. To strip that off, I score the copper lightly by holding it in my fingers and carefully roll it while holding an Xacto blade against it. (If the Safety Guy is in the room, I put it on the bench and roll it there!) Bend the end back and forth a bit and it snaps off easily. (There are probably stripper tools available to do the same thing with more precision but they would be costly, and they'd be impossible to find when you need them because everyone would be borrowing and using them all over the building.)

The Xacto technique doesn't work quite as well with the tin-soaked braid of the Belden and it can be a bit messier. It's not as easy to snap it off cleanly, and there are often individual strands of braid sticking out that need to be trimmed up. (If you look closely, you might be able to see some loose strands extending past the end of the shield in Figure 14.) I've also tried scoring it more deeply, to cut through the braid completely, but that's trickier and you have to be careful to not cut into the dielectric too much.

Like "real" semi rigid, the Belden has a Teflon dielectric. This lets you do things like Figure 16 with impunity. That shows a piece of wire wrapped around the end and soldered on, to make a pigtail connection. While you might be able to get away with this with RG-174, it's nowhere near as easy and much, much riskier. (The bottom of Figure 17 shows the normal way of putting a pigtail on RG-174. The braid is separated, twisted together, then a wire is soldered onto it.)

Finally, we have Figure 18 which shows some 1671A with a soldered-on pigtail on a PCB, and soldered down to the board at the edge. Trying this with RG-174

is inviting disaster. (Although it's a bit hard to see in this photo, there's a good solder fillet on both sides of the cable at the edge of the board.)

If interested in some of the Belden 1671A, you can contact Brad to see if he still has some available by the time this appears in print. (He should have plenty left.)

Brad Thompson
P.O. Box 307
202 Whitaker Rd.
Meriden, NH 03770-0307
E-mail: brad.thompson@valley.net

He's asking thirty cents per foot in short lengths, plus postage. (I bought 30 feet for $9, and he tossed it into a USPS Priority Mail container for another $3.85.) *Disclaimer—I'm just a satisfied customer and get nothing from announcing his offer.*

In case anyone is wondering if that's a good buy, I have no idea what a typical surplus price is but I can sure find the "new" price. On 20 September I checked *Belden 1671A at the Allied Electronics* web page. The smallest coil it comes in is 50 feet, and 1 to 4 coils cost $156.85 each, or $3.14 per foot. You can also get it in 100 foot coils for $266.66 each. If you want, you can drive it down to $1.51 per foot by *purchasing at least 20 of the 500 footers, at* $756.84 each. That one could be a bit hard to sneak past the wife, though.

—de WA8MCQ

Drill or Punch Panels?

Phil Anderson, *WØXI, sent this in—*

To Drill or Punch those Panels? That's the Question!

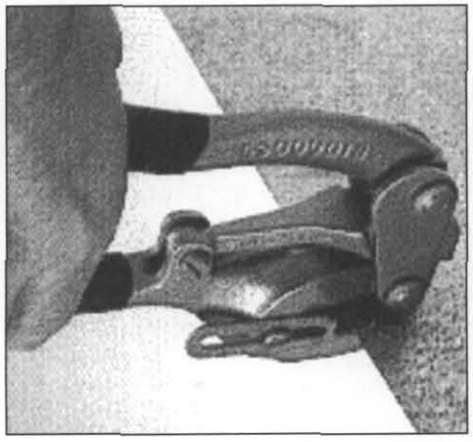


Figure 19—The Roper Whitney No. 5 hand punch.

Part	Opening	Punch	Application
Small LEDs	125 mils		3/16" to stick through front panel
3.5 stereo jack	230 mils	1/4"	PCB mounted panel access holes
2.1 power jack	220 mils	1/4"	PCB mounted panel access holes
SO-239 opening	620 mils	3/4"	center portion panel mount
Switch cap	244 mils	9/32"	to stick through front panel

Table 2—A list of common components and hole sizes.

Over time, I've developed a set of electronic parts I like for my QRP projects: FETs, transistors, molded chokes, etc. I've even adopted a "standard" set of machine screws, PEM nuts, and the like. When it comes time to case the printed circuit board or "dead-bug" vector board beauty, we radio amateurs are sometimes at a loss. Tuna tins are fine, but cutting them up and/or drilling holes can be problematic! And sometimes, off-the-shelf clamshell cases don't look good either. If you buy them, you still have to make the holes.

My solution for casing is two-fold: *design my own sheet metal cases or buy a* good quality one and use a hand sheet metal punch and socket punches to make the front and back panel holes. Drilling leaves burrs but the punches make clean, crisp openings. A picture of my Roper *Whitney No. 5 Hand Punch is shown in* Figure 19. It comes with 3/32, 1/8, 3/16, 7/32, ¼, and 9/32-inch punch sets. I use a ¾ inch socket-punch for making the SO-239 antenna connector center hole (1/8 punch for the four screws).

Table 2 lists some common holes we all need. Note that all of the holes required, except for the inside of the SO-239 panel mount, are accommodated by my Roper Whitney Punch Set. So where do you buy one? I searched Yahoo on the Internet *using "metal hand punch" and found a* number of sources that looked good and had secure on-line ordering

—de WØXI

WA8MCQ comment—To give an idea of the price range, *I poked around the web* a bit and saw this item listed between $63 and $80 at 3 different vendors.

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 to QRPers:

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 a recent 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.

The GQRP club has had it's own mail reflector on yahoogroups.com for years. Although the focus is European, there are many subscribers from this side of the pond and it frequently has content of interest to QRPers everywhere. (It is a moderated list.)

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 and you're at the home page where you can sign up, read the recent archives, etc. Complete QRP-L archives all the way back to the beginning in 1993, maintained by George Fremin III, K5TR, *can be found at http://www.* kkn.net/archives/html/QRP-L/

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.

GQRP: Go to http://www.gqrp.com and

click on Internet Conference for details.

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.

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. ●●

Send your Idea Exchange contributions to Mike C. by e-mail to: wa8mcq@comcast.net or by postal mail to his "callbook" address.

Welcome to QRP ARCI

QRP Amateur Radio Club International, an organization begun in the early 1960s has grown to over 11,000 members. The club is international in nature with members all over the world. Club members like to build and/or operate small, low powered rigs. Most of our members are not against high power and as a group we have never advocated the elimination of amplifiers or high powered contacts. We simply enjoy operating at low power levels—lower than we were used to operating. Why? Because it's FUN!

We have found that there is a real thrill associated with low power contacts. Because low power rigs are relatively easy to build, we have also found that an even greater thrill results from operating a rig that we have built ourselves. Accordingly, there are a lot of technical folks in the club who enjoy talking about new ways to build small transceivers, receivers and transmitters. Finding parts and sharing sources with others is a way of enjoying QRP as well. In fact, most all of our members get very excited about helping others who may be new to building or operating QRP. We answer some questions here and more on our FAQ page (www.qrparci.org/arcifaq.htm).

Why join our club? Here are some of the benefits of being a member of QRP ARCI:

1. **The *QRP Quarterly***—This journal is published each quarter in an 8-1/2 x 11 format and is usually 60-70 pages in length. It is packed with technical content but also has something for everyone from rank beginner to seasoned veteran. If you would like to see some of what we've published in past issues of *QQ*, take a look at the Tables of Contents of Past Issues (www.qsl.net/wd8rif/qq_arci.htm) or to see a list of 1995-1999 *QQ* articles in title order, click here: www.qrparci.org/qrptitle.html, or for a list of *QQ* issues in author order, click here: www.qrparci.org/qrpauth.html

2. **QRP Awards program**—Numerous awards are offered by the club. By the way, these are available for non-members as well as members. The most popular is the 1000 miles per watt. Simply take your output power and divide by the miles between the two stations. If it is greater than 1000, you WIN! For more info on this and other awards, simple check out our Awards Page (www.qrparci.org/arciawds.html).

3. **QRP Contests**—Again, you do not have to be a member to enter out contests. If you are a member, you send your club number. If not, send your power output instead. The standard exchange of the RST and State/Province/Country precedes this information. The contests are very informal and you won't find much in the way of "hogging" frequencies and that sort of thing. They may be thought of as a way to test out your rigs and antennas with other QRPers. Don't own a QRP rig? Well, simply turn your power down on your "big" transceiver as much as you can and have a go at it. Check out our Contest Page (http://2hams.net/ARCI).

4. **Local club support**—We try to help local/regional clubs with their programs by promotion and assistance. We also try to have our officers and board members at as many hamfests per year as possible. We bring along or send out a box of materials and promo items for use at hamfests as well. Is there a club in your area? Check out our Club Page (www.qrparci.org/arciclub.htm).

5. **Dayton Four Days In May**—The club sponsors a huge event each year in conjunction wit the Dayton Hamvention. We actually add a full day of seminars before the hamfest and we have a whole program of activities each evening of the hamfest. You'll find almost a QRP Hamfest at the Ramada Inn South Dayton motel where we take over most of the facility. Check out our FDIM page (qrparci.org/fdim64.html).

6. **QRP Forum**—A place to ask questions, trade ideas, seek information, make friends, in short—have fun! Check it out (www.e-discounter.net/qrparci/).

There are many more reasons to join. Take a tour of our web site. Thank you for visiting us and "try QRP, you'll like it!" THE THRILL IS BACK IN HAM RADIO... and it's QRP! ●●

The "UD" Key: A Lightweight Handheld Iambic Key

Gary Eldridge—KC8UD e-mail

Once I began combining amateur radio with my backpacking hobby, I began to see the real advantages of going QRP. Even my little Norcal 40A with a battery, key and antenna weighed in at a little over five pounds. I noticed the difference right away when that extra five plus pounds was along for an extended hike. So I began to search for ways to lighten the load.

I had decided right away—-and the scales prove it—that leaving the tuner behind and taking a resonant thin wire antenna saves several ounces. The choice of battery makes a difference not only in weight but also in endurance. Some of the NiMH batteries now available will out perform and weigh less than the lead acid, alkaline or NiCad equivalents.

One day while playing with the menus in my Icom IC-706, I found that the Up/Down buttons on the microphone can be used to operate the iambic keyer. CLICK! The light bulb switched on and the idea hit me. How about a very light weight hand held key similar to this microphone? The two buttons on the top of the microphone weren't quite in the right position for comfortable keying, so I began exploring my hand posture to see what felt best.

Just by using what materials I had close by, I came up with a key that can be held and comfortably operated in one hand. Voila! The "UD" Key was born by inspiration of the microphone Up/Down buttons. There is no need to set the key down on a flat surface. The hand held key doesn't require a heavy weighted base or the need to be clamped to a stationary object. There's no need to hold it with both hands. The operator can sit, stand, walk or even lie down (in the comfort of a warm sleeping bag on a cold night) to operate.

The use of extremely light weight and readily available materials makes this iambic key a natural companion for the minimalist who is watching the ounces and the budget. Construction and mastering its use can all be done in less than an hour.

Grab the first two 35 mm film canisters you find (before they become extremely rare). This is the foundation of the hand held-key. After drilling a small hole in the bottom of each canister, you will need three conductor wire to thread through the holes. Then nest the canisters tightly together (see Photo 1). You may want to wrap some plastic tape around them or apply some glue for holding power. I've tied a knot in the wire a couple of inches from the end for strain relief to keep it from pulling back through the canisters and breaking loose from the switches.

Photo 1—UD Key construction.

Photo 2—Positioning of the keying switches.

The switches can be any momentary push button type switch. Be careful not to use the "click-on/click-off" type, although among the several different types of push buttons I have tried, I prefer ones that have just a little "click" to them when I push them in. Once they have just the right amount of force placed on them they pop into place and make positive contact. I prefer this type of tactile feedback which is similar to a computer keyboard. Other switches just push in without any assurance that it's made good contact and I find that my CW sending is somewhat sloppy in this case.

Pull enough wire out the top of the canisters to solder onto both switches. You may want to hold the canister in your hand and mark the mounting positions of the switches according to where you feel they would be most comfortable. Then mount one of the switches part way down the side of the canister. The other gets mounted to the side of a canister lid (see Photo 2). With the switch mounted off to one side of the lid, the lid can be rotated to vary the distance between the two switches slightly. This allows you to fine tune the positions for comfort.

The other end of the wire can be soldered to an appropriate connector or even hard wired to your transmitter and leave the connector out of the parts list if you want to save that much weight.

I've been using my hand held key for several years now and have never seen anything else like it. I even use it on the base station as well as in the field. Several puzzled onlookers at the Dayton Hamvention questioned what it was until I explained. Then there was always the "Oh yeh. Now I see." It may look a little awkward, but if you try it you may find it's a good thing for you. It does just what I need.

Now with the hand held iambic key, my new cinnamon flavored RockMite, battery, earbuds, RG-174 coax and 40 meter dipole, my backpacking QRP station is complete. The entire package tickles the scales at less than one pound (see Photo 3). This feather weight station works. It's a kick to operate and it's hardly a burden to carry on a long trek, even for a minimalist.

●●

Photo 3—KC8UD's backpacking station weighs in at under 1/2 pound.

New Law of Physics Discovered

Greg Dolkas—KO6TH ko6th_greg@hotmail.com

Growing up, I remember taking science classes where we rolled billiard balls down ramps and bounced them off one other to demonstrate the laws of physics. Conservation of energy, conservation of momentum, conservation of mass; Mother Nature, it seems, never likes to throw anything away. Neither do Amateur Radio operators, but that's a topic for a different discussion.

The conservation laws of nature are fundamental and wide ranging. They underscore the sciences of physics, chemistry, electricity and even economics. Pulling a skier up a hill creates the potential energy that is released as kinetic energy as the skier careens down the hill. Go higher up the hill and you end up going faster when you hit the snow bank at the bottom.

Conservation of energy; we know this instinctively. Pulling the string on a toy top will make it spin, changing the work energy of the pull into an equal angular momentum of the spin. As the top slows down, the bearings and air around it get warm from friction. By the time it stops, the rise in temperature is exactly equal to the work put into the toy; conservation again. The universe is one big Teeter-Totter. In economic terms, it's all a "zero-sum game." If I take something from one place, it shows up somewhere else. Debits and credits. Matter and anti-matter. Yin and Yang. The only exception I know of is that the work put into chopping and stacking firewood seems to heat you more than when you burn it, but I must be missing something there.

I was totally astonished, therefore, to discover that one law had been overlooked. In all the science books, in all the teachings that we read and understand, there is no mention of the law of Conservation of Wire. Not even in the *ARRL Handbook* is this important law described.

Simply put, the law of Conservation of Wire states that it takes a fixed amount of wire to support communication from one point to another. Taking wire out of the middle, such as through so-called "wireless" communication, does not eliminate the wire. Rather, it moves the wire to another place or form, for example, in antennas, coax cables, tuning coils, and all the tiny bits of wire that make up an electronic circuit. I realized that the amount of wire in my shack, properly deployed, could have supported my communication activities directly. Instead of the circuitry of transmitters, receivers, and antennas, all the wire used could be strung directly between my shack and the shack at the other end of the QSO, and we could have carried on our conversation just the same.

Amateur Radio is, fundamentally, the application of this law of nature. We see the effect of this in the cabling used to connect our equipment. The shield of coax cables consists of many fine strands of wire. "Low loss" coax is larger in diameter, requiring more wire, so it can reach stations farther away. With "hardline" coax the small wires have become so numerous that they fuse into a cylinder, but it's the higher wire content that improves our ability to talk.

We often shorten an antenna, only to add the wire back as a loading coil at it's base. Without the loading coil we say the antenna is non-resonant. In reality, there is simply not enough wire in the system to reach our destination. Antenna tuners are devices which add and subtract wire, in order to exactly reach the other station. This is easily seen in the operation of a roller inductor.

The law also guides us in making improvements to our stations. We know that as we tweak and improve our stations, the amount of wire in our shack grows as does our ability to communicate. Adding wire to our antenna, for example by putting more elements in a beam antenna, will increase the distance over which we can communicate. More wire still can be added to an antenna until it is completely filled in, and looks like a large parabolic dish. That much wire is sufficient to reach distant stations, as has been demonstrated by our microwave communications between mountain tops and with high flying satellites such as AO-13. The Arecibo Radio Telescope has taken things to the extreme, filling an entire mountain valley in Puerto Rico with the wire needed to reach deep space.

The law also states that different forms of communication require different amounts of wire to cover the same distance. There is a relationship between the bandwidth of the communication signal and the amount of wire that is required. A CW signal, for example, is widely known for being able to span great distances with simple equipment. This equipment is simple not because of it's design, but rather it's design is dictated by the lower amount of wire needed to reach the other party. The wider bandwidth of an SSB phone conversation dictates that more wire be consumed. That wire is forced into the design of the transmitter and receiver, making them more complicated, and also makes its way into the larger antennas that are often used.

If we compute the wire necessary to support wideband communications such as ATV, we find that so much wire is required that such a system cannot be built to extend beyond a few hundred miles. That is why TV signals cannot be received beyond the "line of sight." We are taught that this limit is due to propagation. This is true, but "propagation" is a result of the more fundamental law of Conservation of Wire.

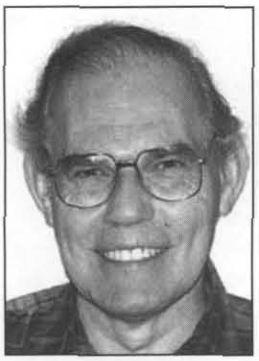
Not all wire is the same, of course. Gold, silver and copper make better wires than carbon or steel, as they have more wire equivalent content. An antenna made from steel wire will not reach stations as far away as one made with copper wire, or steel with a copper coating. We have always been careful to buy connectors with gold or silver plating and now understand how the higher wire equivalence of these metals adds to our station's ability to communicate. Carbon, the primary component of resistors, is so bad at being a wire that it has a negative wire equivalence.

As of this writing, the law of Conservation of Wire is still being researched, but it is clear that the ramifications are enormous. No longer do we need to talk about our stations in terms of watts, cable loss *n* dB/ft, or antenna gains in dBi. Rather, we only need to relate the overall Effective Wire Content (EWC) of our stations, measured in units of Effective Meters, Meff. Just as Universal Coordinated Time is written UTC, Meff is often written as EMF. This is the single fundamental measure of our ability to communicate.

[This article originally appeared in the April 2004 issue of *WorldRadio—ed.*] ●●

Half a Gallon and a Bit of Spare Wire

Chris Gibson—M3ERE c.g.gibson@liverpool.ac.uk



Chris, M3ERE

As a teenager in the '50s I always wanted to build a radio, but life got in the way. Forty years passed till I took early retirement and did it. It simply would not have happened without Stuart, GØMJG. That was my first big lesson: you need an elmer, and you need to listen to what he says. Listening only fuelled my interest—I wanted to transmit. By happy accident the UK had just introduced the new Foundation License, so together with a trio of siblings (the eldest 10 years old) I did the course, and gained access to the HF bands up to a mighty 10 watts. I sheepishly bought an FT817 (according to my wife, the cost of eating for several months) and Stuart made me a 20M dipole from a length of spare household electrical wire.

So it was that M3ERE hit the bands in October, 2002 from Liverpool. (I thought ERE would sound terrific one day in Morse.) Phone had little appeal—too much like drunks shouting across a bar on a Saturday night—and I found CW daunting. Then one day I read a piece by Dick, GØBPS about this new PSK31 thing. All it needed was some free software, and a bit of wire from the radio to the home PC. I still remember the first QSOs scrolling across the screen. Now this looked like fun! That was 18 months ago, and I thought other novices might want to share my experiences, even grizzled OTs looking for a laugh.

Getting Going

I had nagging doubts about my modest starter pack. The magazine gurus had a great deal to say about such exotica as rotatable Yagis, quads and log periodics boasting things like rotators, directors and reflectors, and measured by mysterious numbers like gain and F/B ratio. There were photos of gleaming aluminum constructions mounted on high towers, and throwaway remarks on contacts with places I'd never even heard of. The gurus were particular insistent that aerials had to be high in the air—mine bridged the gap between a first floor bedroom window and a 15 foot pole at the bottom of the garden. Worse still was the power thing. My output in PSK was a bare 3 watts, a goodish half QRP gallon. With increasing dismay I read one respected HF correspondent enthusing about working down the coast of South America on "only" 150 watts, in good conditions too. (And he had a super-duper aluminum thing high up in the clouds). No-one said anything about 3 watts and a bit of old wire from the garage strung down the garden.

But to heck, this game is easy—seven countries on the first day, five on the second, and the third produced 7X2BK, my first DX. I pored over my atlas, religiously looking up every new contact. Life was good, despite hints from my wife that I didn't have one anymore. Within a week I had 20 countries, and my first big break. I called CQ and John VE1CDD appeared out of the ether. I hit every wrong button, and could hardly type with excitement. I'd got over the pond! Three continents down. All I remember of that QSO was John's dictum "You can work the world with 5 watts Chris." How right he was: from that moment on I became an unashamed DX hound! Within a month I had 40 odd DXCC "entities," and another lucky break when I finally managed to tail-end Igor, 4K5D. Four continents down.

It was around this time I first met a fellow digimode enthusiast Wolf, DL2WRJ. Together we worked our way through the digimodes, till the band went down, and the trace disappeared off the waterfall. They were great days, and we were learning a lot, in particular the advantages of MFSK over PSK for QRP DX. But it was winter, and things were getting harder ... Then Lady Luck smiled one dark winter's evening. I was calling CQ on a dead 20M band, on the point of giving up, when Felix, DP1POL replied from the Neumayer Research Station in Antarctica, over a 8,600 mile path—only his second MFSK contact. Stunned, I announced this marvel of communication to my wife, who (absorbed in her BBC costume drama) nodded absently. Five continents down. And a month later MFSK finally allowed me to work Bravo, PY1BK. (It took me some time to realise that my lack of South American success was not unrelated to the fact that my dipole pointed in that direction!) Six down.

Tasa YU1LM brought home to me the value of patience. I wouldn't like to count the number of times I've failed to contact a DX station worked regularly by queues of QRO operators. Patient stalking has become a part of my arsenal, and in some cases it has taken weeks, if not months. Igor 4K5D, Paul EM1HO, Roland FR5AB, Jose HP8AJT, Zal YBØBO, Willie YI/KV4EB and Aricio ZP6GBA all fell into that category. Heed the succinct advice for novices given by Steve KD1JV in *QQ* (Summer 2002): "Put up the best aerial you can, and learn to be patient and persistent." Yep, I'll go for that.

My second elmer is Roger G4XRX, a dyed-in-the-wool DXer. I owe much to his hard-won experience. It was Roger who initiated me into the subtleties of band and mode choice, of timing and of QSLing. He also made me aware of another truth: Radio is Not a Level Playing Field. What you achieve depends on your station, your location, your time, and you. Don't fret about guys with shack walls covered in awards—they may well live on hilltops, with the best antennas and radios money can buy, and have been in the game for decades. By all means set targets for yourself, but don't waste time looking over your shoulder at the next guy—hey, it's a hobby; it's meant to be fun!

The Good, the Bad and the Ugly

One of the great things in life are nice guys who help little old ladies across busy roads. Well, it's the same in radio, and I'm lucky enough to have met more than my fair share. One late spring day I spotted Ian, 3B8IK on MFSK and called him. If ever a QSO was on the edge that was it, with a 339 report. With enormous patience and skill Ian coaxed me along. It wasn't

easy, but we made it, and his QSL card now sits on the top of the pile in a beautiful little German biscuit box that I reserve for my DX cards, a treasured memory of a great contact.

I think we should be grateful to those ops who, though not QRP themselves, support the QRP community. Bravo PY1BK put it in a nutshell "In my shack small signal have preference. Strong signal attend after. Hi hi!" Increasingly I realised that many (if not most) of my better contacts were with very experienced QRO ops having excellent radios and antennas. To keep things in perspective, to this day I have only 21 DXCC worked QRP/QRP and of those only one is DX, the USA. (Thanks to Brad, KD1BL and Mike, WGØI).

Not all is sweetness and light out there. Bad operating practices are not unknown, for instance ops who simply refuse to wait until a QSO is over before calling—even calling CQ on the same frequency out of spite. Getting upset serves no purpose—ignore them. I've been verbally abused in a pile-up when a DX station asks "QRP station only pse," and have been jammed on several occasions by call-less RTTY ops insisting that only a lid like me can be unaware that 14.080 MHz is reserved especially for them.

The Past, the Present and the Future

George G3RJV, President of the G-QRP Club, reminds us of William of Occam's principle of parsimony "It is vain to do with more what can be done with less." (As a Scot, I find that particularly appealing!) That's the key to the whole QRP thing. In retrospect I see how good Stuart's advice was. A few watts and a bit of spare wire are all you need. I'd add a practical suggestion, that the digimodes offer an alternative path into radio for anyone nervous of CW. They also offer intriguing development at both software and hardware levels. I enjoy playing with PSKFEC31 by Patrick F6CTE, which in poor conditions may well outperform CW. And I look forward to operating digimodes on smaller platforms, such as the portable PSK project by George, N2APB.

However, now that I've gained some basic radio skill I feel ready to expand my horizons. It was Roger who brought home to me just how much DX is out there on CW. I've taught myself the code, and can handle around 12 wpm. All I need now is confidence. The minimalist in me likes the idea of replacing the whole PC shabang with a single switch! In any case I'd like to operate mobile, and don't want to lug a laptop around with me. Stuart has introduced me to SOTA (Summits on the Air). So now I have a little 3-element beam for 2M, and can combine a lifelong interest in wilderness walking with radio. (And 2M FM is a delight compared to the cacophony of 20M SSB). It was also Roger who persuaded me to try contesting—excellent advice, succinctly amplified by Anthony, K8ZT in *QQ* (Winter 2004). Within an hour of joining in my first contest I had worked Dean, 8P6SH a new DXCC. And I like the idea of milliwatting. One afternoon I called CQ 500 mW for the hell of it, and was answered by Slava, UY5AP who summed it up very nicely. "500 mW. NOT SO BAD!!!"

Earlier this year we moved from our large suburban house to an apartment overlooking the Mersey River. We are forbidden to have any external antenna, even for TV. I seriously wondered if that might spell the end of the hobby. Far from it. The same bit of wire, strung along the loft ridge, provides regular contacts up to LU in one direction, and UAØ in the other. Indeed, a couple of months back that wire gave me a 20 minute QSO with Graeme, VK3BGH over a 10,600 mile path. Attic antennas are not without advantages. You can play with them just as well in the winter months, they don't need extensive weatherproofing, and rafters provide excellent supports. (I make extensive use of cuphooks and nylon cable ties). The last project was a disaster (an elaborately zigzagged 40M full wave loop) whilst the current one is a Moxon rectangle for 15M. (I'm determined to work ZL). And a neighbour some 150 feet or so away is not averse to the idea of a thin wire stretching from my apartment to his window frame...

I see now that I'm just short of 100 North American contacts. It's nice to think some of you might already be in my log. I'm only halfway towards WAS, so if you see me I'd appreciate a call, and (not that I want to appear biased in any way) but I'd be particularly interested if you happen to live in Hawaii!

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QRP ARCI contests are a great way to make lots of QRP QSOs, earn awards, evaluate rigs and test new antennas... ...all while you're having fun!

Check out the QRP ARCI contest web site: http://2hams.net/ARCI

MARK YOUR CALENDARS!

Fall QSO Party
Oct 23 1200Z to Oct 24 2400Z (CW)

Topband Sprint
Dec 2 0000Z to 0600Z (CW & SSB)

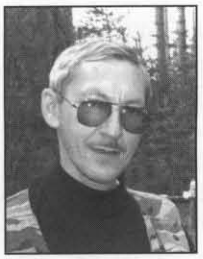
Holiday Spirits Homebrew Sprint
Dec 5 2000Z to 2400Z (CW)

QRP World News

Oleg Borodin—RV3GM

master72@lipetsk.ru

Hello from World QRP News editor!



Oleg, RV3GM

Sometime I wonder, how small our earth is if we can make contact between continents using a few watts or milliwatts! Truly, if you listen closely, it is possible to hear each others' hearts beat. Let's spare our World!

In this issue we have a lot of news I received this Summer. I shall be short and concise. So, lets go…

Jacob, NØLX, operating maritime mobile at 13,800 feet.

Jyoti, VU3BGI, moderator of new VUQRP group.

News From Hawaii

My old friend Dean, KH6B, Hawaii QRP Club President, wrote to tell about Hi-QRP members who have morning meetings with coffee at little shop near Hilo every day. Dean wrote: "I still meet with the QRP group each morning for coffee. Our next event is the 73rd annual Summer Picnic of the Hilo Amateur Radio Club, Saturday, August 21. The Club president is Kenny KH6AFQ. He is 89 this month."

He also wrote: "Very busy these days getting ready to move the Hilo Christian FM radio station to a new location. We will have a new building, new tower and a new transmitter! Also, just completed last weekend operating in the IARU HF World Championships and the QRP ARCI Summer Homebrew Sprint. Fun. We camped near Hilo at Kaloli Point with KH6BMM, NH7OD and NH7OH. I had a score of 1860. K1YR operating here with the club call KH6WT had a score of well over 1,000,000! On 40m, I worked 8N3HQ, on 20m: 5WØTR, KG6DX, PJ2HQ, XE1MM and ZL6A/HQ. On 15m: JH3AIU, TI3M and XE1NW. Also worked a few on the USA mainland. Besides working on moving the FM broadcast station, I am working on two new antennas for the ARRL 10 Meter Contest in December: a pair of 'Portable' Sterba Curtain Arrays. Each to be 14 elements. One antenna suspended for NE/SW operation. The other for NW/SE operation. We expect to work the world with 5W QRP!"

NØLX/MM QRP at High Altitude

"Just for fun, on Saturday, August 14 2004 at 1500Z, I was at 13,800 feet altitude in my eight foot rowboat attempting the highest ever HF "marine mobile" operation. The weather cooperated and the bands were in good shape, considering where we are in Solar Cycle 23. I was joined by Eric, KGØHO and Bruce, KGØSH who helped me get the boat and gear to the water and to witness the event."

He used 20 foot-long fishing pole vertical antenna, 10 Ah battery, homebrew matching unit, FT-817 transceiver. 72! from NØLX.

From Faraway New Zealand

I asked well known QRPer Sam, ZL1TOI about QRP activity in New Zealand and received this message: "Although there are QRP individuals there seems to be no organized QRP group. I myself have only been allowed on to the HF bands as of 17 June, due to a change in the Radio Regulations. On that day the Morse requirement was scrapped. New Zealand now only has one class of license, so this may produce an upsurge of Homebrew/QRP activity. I rely on SPRAT and the Australian LO-KEY magazine to stay in touch because we have no NZ publication. Our National organization NZART has it's own publication "BREAK-IN" but only about half of ZL HAMs are members of NZART. Parts for construction, unless very ordinary, must come from Australia, US, or UK I will shortly make a start on the BITX20. I count 20 ZL callsigns in the G-QRP membership list, but I've no idea how to contact them—but I will try and do something about that."

From the Indian Subcontinent

Jyoti, VU3BGI announced that VU-QRP group have started an Internet discussion group and invites all QRPers to visit their forum at http://groups.yahoo.com/group/vuqrp. Jyoti is moderator of the discussion group. Their motto is "By the HAMs, for the HAMs and Of the HAMs!" This is the place where Indian QRPers exchange their news, views, share their problems in relation to ham radio QRP projects and kit building.

[See the detailed story from Jyoti following this column—*ed.*]

Portable QRP News

Summer is the best season for QRP/portable operating. Many QRPers take their radios with them during vacation or weekend trips. Darren GW7HOC operated as M5HOC/p on July from Marconi Field in Poldhu, Cornwall [where Marconi performed many of his early experiments-ed]. Darren used FT-817 and also FOXX-3, his antenna was 40 m doublet about 33 feet high in the center.

Edward, WA3WSJ, wrote: "Yes the bands have been terrible lately, but I've still had fun operating portable with my K2 SSB. I cranked it up to ten watts and worked many stations on SSB from Cape

Edward, WA3WSJ operated on 40 meters from the Overfalls Lightship in Lewes Delaware

Alex, RV3DPM and Oleg, RV3GM operating UE3QRP/3 from the Rybinsk Sea, 400 km north of Moscow

The UE3QRP/3 QRP station setup: K2 and FT-817. Operation included CW and PSK modes.

Henlopen State Park in the State of Delaware here in the US. I also worked DX on PSK31 from my tent at night running about QRP. Forty meters was like no antenna attached to the rig, but one night it opened and I ran a bunch of stations operating from the Overfalls Lightship in Lewes Delaware. If you would like to see more pictures, go to my website at http://www.wa3wsj.com/files/WA3WSJevents.html"

Adrian, G1UBL described his travel to France: "It's been great for SWLing! I was QRV /p in France in mid-July, heard Japan, South Korea and Somalia on 17m on what was otherwise a dead band, but couldn't work any of them with my 5 watts. I'm back there at the start of September for 12 days and will be taking some wire and bits and pieces to knock up a better aerial, also hope to have a Kanga 10m pole so will be able to get it higher, it was only at 4-5 meters last time. Will be QRV on usual SSB freq on 40/20/17m bands."

"Just returned from 2 week vacation in France—worked ZL on 3W for first time," wrote Steve, GØFUW.

RU-QRP Club HQ station operated as UE3QRP/3 from the Rybinsk Sea near Tver City, 400 km north of Moscow. They used an Elecraft K2 and Yeasu FT-817 in both CW and PSK modes. It was a joint expedition of the RU-QRP Club and the Noginsk Amateur Radio Club station RK3DZJ (QRO). Our QRO colleagues used 100-watt FT-900 and IC-706MKIIG transceivers. The most wonderful fact: we heard weak QRP-stations on the K2 when RK3DZJ operated 100 watts on the same band near our position and with no QRM. But… when UE3QRP operated 5 watts all of the Yaesus and ICOMs were blocked-once again, confirming the Elecraft K2's excellent receive performance.

Notes from "QRP-Diaries"

Eric, KI4EFO: "Just worked Joe, KAØENU, with him on his Rockmite at 400 milliwatts into a dipole and me on my SW 40+ at a whopping 2.5 watts into a Delta Loop. I used to feel kind of silly running 100 watts when the other guy was QRP. Now here I go again running 5 times the power even with my itty bitty rig J. We exchanged 579 reports and I really don't think we were being crazy generous. I literally turned my gain down when I heard him! That is just too crazy."

Jim, WØEB, wrote: "I set up the PAC-12 and the experimental 80 meter coil (146 turns on a 1" x 8" Schedule 80 PVC threaded pipe nipple) in the front yard to have it available in the early morning. Before the sun came up, I tuned the low end of 80m and heard AC5AM calling CQ. He was 599 into Wichita, KS, so I called him. He came right back and give me a 559. We chatted for about 15 minutes and lost the band when the sun came up here in Wichita. AC5AM is in Natchitoches, LA. He was the only signal I heard on the band. It appears that this particular coil actually works pretty well. Setup was K2 @ 5 watts, PAC12 with 4' of rod between feedpoint and bottom of the coil, whip almost fully extended and 6 ten foot counterpoise wires made out of radio shack 5 conductor rotor wire (all 5 conductors tied together on each of the 6 ten foot pieces). Forward power 5 watts, reflected power 20 milliwatts as measured on an Oak Hills WM-2 wattmeter. More tests to follow as time and band conditions permit." Remarkable QSO for the small antenna on the difficult 80 m band!

Extract from URØET (RU-QRP # 050) Log-Book:

21 July 2004
Time: 19:28 GMT
Band: 28 MHz
Call: ZX5PGA (op: Clau) QSL-manager PY5PDC
Mode: SSB
Reports: sent—59 / received—55
Grid: GG54rl

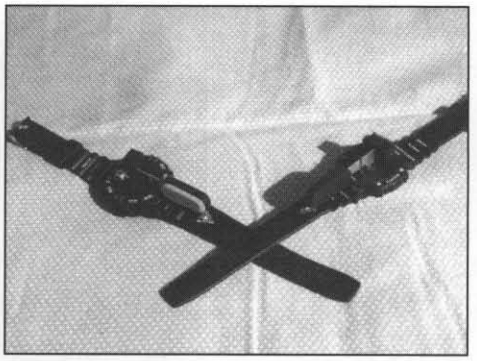
21 July 2004
Time: 19:46 GMT
Band: 28 MHz
Call: PY7AHA
Mode: SSB
Reports: sent—59 / received—51
Grid: HI12vb

Since we can see, both QSOs lasted 20 minutes! Vlad used transceiver Dragon SS-485 4 watts output and Delta Loop antenna on the top of 16-story building (~50 meters). Beautiful, isn't it?

Some amateurs think that it is necessary to have beam antennas for QRP-operating. Sometimes, maybe, but not always. Read the message from Dave, G3YMC: "In the past couple of weeks I have worked 7P8DA and VP5/N2AMD on 18 MHz, 5Z4DZ on 24 MHz (yes it did open!) and a few DX-stations on 20m. Earlier in July I had 520 QSOs in the IARU-Contest and 218 in IOTA. All with 5W CW to a long wire antenna from my K2. Things can't be that bad! I suspect most of the problem is lack of activity."

Also: "Had a nice QSO with Steve, NY3A, in Glenrock near Denver on 15 m CW. Using FT-817 5 watts into antenna Inverted-L. He gave me a 569 report and I was absolutely amazed. Also LU1CZ in Buenos Aires heard my call but conditions changed very quickly and he faded out," wrote Martin Walsh M3CUS from London.

Mark, KB9OCE's digital watch/key.



Digital watch paddles.

QRP "Hard" and "Soft"

Hardware: You have never seen anything like this before! Those are novelty keys or "Novel-Keys" have been called amazing, cute, and the original digital watch for which I haven't any more words! You can contact Mark, KB9OCE at kb9oce@aol.com for more details. [Even Douglas Adams would be impressed!—*ed.*]

Software: Just heard about a new digital mode "DigTRX," information is at http://planeta.terra.com.br/lazer/py4zbz/hdsstv/teste1.html#digtrx. In this mode, it is possible to transmit not only pictures, but many types of picture file formats (gif, jpg, png, txt, html, midi, wav etc.). Sorry, I haven't tried to operate this mode yet and haven't any info about QRPing with DigTRX mode, but would be happy to hear about any experiences with this mode.

Thanks everybody who helped with this column! CUL

—72! Oleg RV3GM

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Announcing the VUQRP Group

Jyoti P. Chakravartty, VU3BGI jyoti@vu3bgi.org

Greetings friends. On behalf of VUQRP Group I want to invite you to join our group. Special thanks to all those who have already joined us from DX countries (outside of India). We are really encouraged in how the VUQRP group is growing. Since its inception on May 6, 2004 we have now 70 members from all over India and also few from DX countries. Here are few of our objectives:

VUQRP is Group of ham radio enthusiasts from the Indian subcontinent and DX countries whose purpose is to promote QRP and other ham radio activities.

VUQRP does not and will not have any office holders, but rather there is a core group who are working towards the goal of making the vision of VUQRP a reality. I formed this group initially after my communication with VU3WJM OM Rahul and VU2MUE OM Sandeep. None of us wanted to form "another org," but rather to do something practical and constructive to promote ham radio activities in India.

The group aims to provide the following essential ham radio equipment at a very affordable price to ham radio operators.

1. SB20 HF dual-band SSB/mono-band high performance
2. Low cost SSB HF rig using TA7358 IC
3. Frequency counter with Antenna Analyzer
4. Power Supply
5. Digital Interface
6. Digital RF Power Meter.
7. Morse Reader

Target of the completion of the above mentioned project should be approximately a year and a half.

OM Rahul VU3WJM and I (VU3BGI) are working towards getting the first batch ready. As of now VU3WJM is heading the kit building R&D. VU3BGI is now looking after the administrative side of VUQRP.

In India alone we have more than 14,000 ham radio operators and very few have access to or can afford to have commercial equipment and many do not have any equipment at all. VUQRP aims to make essential ham radio equipments at a very affordable price from the components that can be procured locally.

VUQRP Group Kit

We are in the process of getting a VUQRP kit together and making it available to the members; most likely it will have the following:

- VUQRP Log Book
- Indian Amateur Radio Rule Book along with the Equipment Register for Ham Shack
- VUQRP Logo sticker
- VUQRP logo pin/badge.
- VUQRP Group Certificate.
- VUQRP QSL Card (optional)

Please be advised that the above-mentioned materials will be available in a kit form to all those who join the group. A small contribution or price has been fixed which will be announced in later date. However we will welcome your suggestions and comments on the price and kit.

As of now we have decided there will be no fixed paid subscription, however, annual contributions towards the R&D of the projects and also towards the administrative expenses of the group activities will be appreciated.

VUQRP is a non-profit making group and will plough back the little income (if any) back towards the VUQRP kits R&D.

VUQRP Journal

We intend to publish a bi-annual VUQRP Journal in Adobe PDF format and perhaps later, limited copies will be available in printed form.

DXpedition/ Ham Holiday

VUQRP also hopes to organize an annual meeting of like-minded hams from around the country in a holiday spot. This is not going to be "another hamfest," but rather more a relaxed holiday and discussing interacting on ham radio. Maybe there will be a special kit building project and operating from the spot with a special call sign. Your suggestions?

VUQRP Web Site

We do look forward to launching our own website.

Summary

We do value your suggestions and comments. I will be sending all members a form that we would appreciate if you would kindly fill out and send it back to us at the earliest. We would like to have a database of our members.

Any publicity or promotion of VUQRP will be appreciated

—72, Jyoti P. Chakravartty, VU3BGI
Moderator/founder, VUQRP

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Marconi and Cheese

By Dick Arnold—AF8X
af8x@arrl.net

Portable QRP operation... No, this is not a tutorial on QRP operation; I just like doing it and talking about it. One of the pleasures in life for me is, after a hike or bike ride to a remote location, setting up my QRP station, laying out my snacks, (this is where the cheese comes in) and contacting other hams around the world.

As soon as I slip the headphones on and hear the crackle of static, I am immersed in a different world, sort of like diving under water. For some reason I don't get the same thrill from making contacts with the home, state-of-the-art station equipment. Out in the field it's a challenge to contact someone maybe half way around the world using only a battery powered rig with a single digit output rating and a length of wire thrown up into a tree.

On one occasion while testing some new antenna configurations at home on my back deck, I lapsed into an imaginary world where I was on a remote, very rare island. As I worked one station after another, I was, for a few moments, the

rarest of rare DX stations.

Now you may be thinking I need some psychiatric treatment, but what's the harm in a little imaginary exploration. At this point in my life I've discovered that it doesn't matter what you're doing as long as you're having fun doing it. For me, QRP is a ball!

If you've never tried it, you may be missing some of the best times you will ever have in the hobby. QRP equipment is inexpensive and considering the cost-to-pleasure ratio, is a terrific bargain. I have three QRP rigs, each with it's own characteristics making one more useful in one application than another. For example, size and weight is important if you are going to carry the rig in your pocket. A memory keyer is a great help in the QRP Sprints. An on-board tuner is handy for unknown antenna arrangements. Wherever your interest lies, there is a QRP rig tailored for you.

When I first received my Novice license some twenty-five years ago, I was so thrilled with the hobby I could hardly think of anything else, but as the years ticked by, I slowly lost interest. The modern equipment made communicating anywhere in the world as easy as being on the right frequency at the right time. I became a "Quiet Key" and only turned on the rig occasionally to see if I could still copy CW after long periods of inactivity.

One day I saw an ad in a magazine for a QRP rig; my interest was piqued and I started reading the ham journals again. A new wave of enthusiasm engulfed me and I was hooked! I sold my QRO equipment and recycled the money into QRP kits. For the first time I had a taste of what the "old timers" in the hobby must have felt, building their own equipment. I even went back to the books to recover some of the electronic knowledge that had slipped away over the years. QRP brought me back to ham radio and it's growing in popularity everyday. Soldering irons are warming up as a new wave of home brewing is sweeping the Ham world.

If your interest in the hobby is starting to wane, give QRPing a try, it might just rejuvenate the passion for radio you once felt. ●●

QRP Reflections

Rich Arland—K7SZ richard.arland@verizon.net

We are coming up on the contest season so let's take a minute to take a look at how we can get our QRP stations into "contest mode" and be more competitive during the 2004/05 season.

In briefly reading the "Soapbox"" comments regarding the Spring QRP QSO Party in the summer 2004 issue of the *QQ*, I found the comments pretty well split between "abysmal conditions" and "few participants." Well, gang, we can't do a lot about the conditions but we certainly can do something about the participation levels. The word here is get out and contest! Its fun and you don't need to be in the top ten to "win." Anytime you upgrade your station and/or exceed last year's score, you have "won."

Many QRPers fail to grasp the positive side of contesting. To many a contest weekend spells the end of HF as we know it, resulting in very crowded band conditions and meaningless contacts. Those of us who regularly contest know differently.

Contesting gives the participants a way to sharpen their radio operating skills, increase their knowledge of propagation, improve their overall station configuration, and intensely play radio for a specific time. All too often in this hectic day and age, many of us cannot dedicate specific operating time due to career, family obligations or just lack of time. By setting aside a few hours to enjoy the thrill of rapid fire ham radio in a sprint-style contest or a full weekend for a major world-wide contest, we can cram a lot of operating into a very short time span, thereby getting our "fix" of ham radio.

As is mentioned quite often in QRP circles, the antenna is the key to success in ham radio, and especially in QRP. As QRPers we are giving up approximately 13 dB of power to play in the low power arena. Operating skills will bridge some of that 13dB gap. However, having some killer antennas will further narrow the RF disparity between the QRP station and the standard 100-watt station. Of all the things that a QRPer can do, erecting effective and efficient antennas is the most cost effective and yields the biggest return on investment of time, money, and expended effort.

Let's be perfectly clear here. You do

not need to erect a 90-foot tower and top it with a KT-34XA of Force 12 yagi in order to be competitive in QRP contesting. Without a doubt, more DX has been worked on dipoles and simple wire antennas than on rotatable beam antennas. Therefore, just because you don't have the real estate, money, or time to erect a killer tower/antenna array doesn't mean you cannot be competitive and come up with alternative solutions involving wire antennas.

Case #1: In 1997, I decided to do an ARRL Field Day QRP effort from my back yard (Yeah, I know...big challenge...well, it is...considering my 135 pound Alaskan Malamute "puppy" name Oki, uses the yard as his "litter box"!). I erected my tent in the rear portion of the side yard and proceeded to erect a 40-meter horizontal loop antenna (at approximately 15 ft. above the ground) around the perimeter of the yard. This loop antenna was fed with 450-ohm ladder line via a balanced line tuner.

First of all, I live in a valley, in the middle of a town of about 47,000 people. Second, I wanted to keep the station configuration as simple as possible both antenna and rig wise. The loop was my first choice since I was going to be using 40 meters only. The rig: a NorCal NC-40 (original NorCal kit) with a homebrew balanced line tuner. Radio power was furnished via a deep cycle marine battery. I used a 300-watt DC/AC inverter on a second battery to power the computer for logging and tent lighting. It was a pretty bare bones operation: One rig, one antenna, homebrew antenna tuner, one computer and a single DC light for working at night.

Over that Field Day weekend, I managed around 150 Qs, many of them from outside the immediate area. I never will forget the "W6-run" that occurred around 1 a.m. Sunday morning. It seemed that I worked nearly all the sections in California, including my buddies out at the Zuni Loop in the San Gabriel Mountains, where I had spent the previous Field Day last year! I was totally psyched! The path held up to the West coast for a couple of hours enabling me to work sections in Washington (my old stomping grounds), Idaho, Oregon, Montana (yes, someone actually lives in Montana and enters Field Day!), Utah, Arizona, Nevada, New Mexico, etc. All this with only 2.5 watts RF output power to a very low 40-meter loop antenna! Life is good!

Case #2: Two years ago found my family and I visiting my daughter's in-laws in Buford, Georgia, just outside Atlanta. I had the foresight to bring along my FT-817 portable kit, including power supply, Z-11 auto tuner (with built-in 4:1 balun), paddles, Appalachian Trail Dipole (40-meter dipole fed with 300-ohm balanced line), and 10-meter fiber glass collapsible pole used for antenna support.

Cleve and Debbie (my daughter's parents-in-law) were fully briefed by my daughter prior to our arrival. Nobody batted an eye as I asked and received permission to assemble my modest station. Out on the back deck I went and within a short time I had the A-Trail dipole erected, 30 ft. at the apex with the ends about 5 ft. off the ground. I fired everything up and all was working fine. I decided to tune around the bands and make some pre-contest Qs. I was pretty impressed with the overall performance of this modest station.

The ARRL Ten-Meter contest kicked off and I hit the air with a vengeance. In casual operation over the contest weekend I made over 200 Qs—not my best effort, by any means, but I had a ball with a very modest station and a simple wire dipole antenna. With a little planning and some understanding family members, it is entirely possible to incorporate some intense ham radio operating into a family visit.

Case #3: In an effort to improve my existing monoband dipole antennas for 80, 40, 30 and 20 meters about 8 years ago, I decided to do some serious research into the idea of an all-purpose multiband HF wire antenna. *CQ* magazine to the rescue!

In a recent (at that time) issue of *CQ*, I found the answer to my all-purpose HF wire antenna in the form of an Extended Double Zepp (EDZ) for 40 meters. This antenna looks a standard dipole approximately 0.6 wavelength per side; a total end-to-end length of about 180 feet! Big? You bet! But does it work? You have NO idea!

I quickly constructed the EDZ and erected it off the side of my 55-foot tower up about 45-foot at the feed point. Each leg was extended and then bent to fit inside my lot. Essentially the dipole legs lay out in an east-west configuration. Modeling this antenna configuration on ELNEC yielded very nice omni-directional patterns on 160 (yes, this antenna will tune 160 with the right tuner) and 80 meters. On 40 there are some prominent lobes; the same for 30.

Regarding performance: this wire antenna out performs ANY wire antenna I have previously used at K7SZ. This antenna is a "signal getter" if there ever was one. During the annual CQ 160 meter contest a few years ago, I used this antenna and a Wilderness Radio Sierra (running 3 watts), to work a total of 84 Qs and 26 states during the contest! On 80 it works like gangbusters! On 40: WOW!!! There is no equal! Really! The 40-Meter EDZ is my all time favorite wire antenna. In my location it is NOT erected as a standard dipole but has the ends bent back upon themselves to fit inside the property lines. Even in this weird physical configuration my 40-Meter EDZ still performs in an outstanding manner.

If you've been paying attention, you'll plainly see that there is no reason not to have some very efficient and effective antennas using nothing more than wire, coax, and/or balanced feed line. Two years ago at Atlanticon, my good friend Ron Polityka, WB3AAL, the A-Trail Ninja, turned me on to some high quality 300-ohm twin lead from The Wire Man. This feed line is about 1/2 inch across, and features #18 AWG stranded conductors in a ladder-line type configuration. It is lightweight (ideal for back packing on the A-Trail), rugged (to withstand the rigors of the trail or prolonged exposure to the elements at your home QTH), and is easily worked. I terminate my twin lead into a PL-259 plug which mates into a SO-239 jack at the antenna feed point. This makes for easy setup and teardown for trail applications. Additionally, you can replace the open-wire line with standard 50 coax and have a mono-band dipole.

Speaking of the A-Trail, Ed Brenheiser, WA3WSJ, developed a nice little back-packing antenna he calls "The A-Trail Dipole." This antenna consists of a half wavelength 40-meter dipole (33 ft per leg, center fed) coupled to some cheap Radio Shack twin lead. Ron's modification entails using the small 300-ohm twin lead described above. This antenna will tune 80 through 10 meters using a balanced line tuner or coaxial tuner with a 4:1 balun at the antenna input.

The original A-Trail Dipole utilized "Stealth Wire" (also available from The Wire Man), a very small (approximately 26 AWG) stranded wire covered with a black polyvinyl sheath that is close to indestructible. This simple multi-band dipole is not only rugged but very lightweight and packs away nicely in the old rucksack. Nothing says you have to use this antenna out in the bush. It will work equally well at the home QTH. You can't go wrong if you use quality wire, twin lead, and connectors.

So there you have it: simple wire antennas that offer great performance can be easily constructed and erected at a substantial cost savings of a tower and beam installation. These same antennas work well for rag chewing and contesting. Now there is no excuse. Grab some wire, feed line and connectors, get out and put up a wire antenna and participate in the upcoming QRP contests and sprints. Remember, when you contest not only are you honing your QRP operating skills, you are learning about antennas and propagation, which results in making you a better all around amateur radio operator.

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QRP Clubhouse

Paul Schreier—HB9DST/AA1MI PGSchreier@swissonline.ch

Although it was already mid-June on Saturday the 19th, 2004, the Helvetia Telegraphy Club (HTC) undertook its annual Maibummel ("May excursion"). This is a social event often held outdoors where the members bring their spouses and children, and there is generally a hike or sightseeing. This year, Hans HB9UH and his XYL, Ada organized a visit in and around Schauffhausen, Switzerland, and it was a very pleasant day, indeed.

I began my day by gathering my 9-year old daughter, Antonia and meeting Robi, HB9DEO and his wife, Silvia on the local bus going into Zurich, where we picked up the train to Schaffhausen. It was about a 45 minute train ride, and just a few miles before we arrived we got a very nice view of the Rhein Falls, Europe's largest waterfall and thus their counterpart to the Niagara Falls in North America. At 450 ft. wide and 75 ft. high they aren't nearly as high or wide as the Niagara Falls, but it's nonetheless a very impressive sight, and you get a wonderful view from the train. There's a castle on the rocks high above the falls, and you can also see a number of sightseeing boats that take the visitors through the mist to get a damp close-up view of the falls.

We arrived at the train station, which was the main meeting point for the group at 11 a.m. Besides our small group plus our guides Hans and Ada, the group was now completed with the addition of Guido, HB9BQB; Rolf, HB9CNU; Ernst, HB9CTP and his XYL, Hanni; Beat, HB9HQX plus Andy, HB9JOE with his XYL, Yvonne, HB3YFG.

Schaffhausen is a town in northeastern Switzerland, and it's a place that not many Americans have heard of, and in fact, not many Swiss spend much time there. The Rhine forms the northern border of Switzerland for most of the length of the country, but in a few spots the border to Germany is a few miles north of the river. Schaffhausen is one such exception, and it's the northernmost territory of all Switzerland bordering on Germany. Being on the "wrong" side of the river is why most people tend to think that, during WWII, American bombers apparently assumed it was German territory. This makes it the only Swiss town to be bombed by the Allies—and they actually made the same mistake twice. Fortunately most of the old town was not damaged significantly.

We began by walking through the old town. Schaffhausen has

The HB9HC "Maibummel 2004 group" standing on the hills above Schaffhausen and the Rhine. From left to right: Yvonne HB3YFG and husband Andy HB9JOE, Guido HB9BQB, Robi HB9DEO and wife Silvia, Ernst HB9CTP and wife Hanni, Rolf HB9CNU, Hans HB9UH (our very accommodating host), Beat HB9HQX, Toni (second harmonic of Paul, HB9DST/AA1MI), Paul, and Ada (our gracious hostess).

roughly 35,000 inhabitants, so it has the feel of a small "big" city, but where everybody seems to know everyone else. Hans is a native of Schaffhausen, and during our walk through the old town he pointed out the house where he made his first QSO. He was also sure to have us watch out for one of Schaffhausen's most famous architectural features: the "oriel" on many buildings. These are richly ornamented bay windows set just above the main entrance. The owners gave their houses names and put them on the oriels, and there are sometimes slots on the floor of the bay window area so that the inhabitants could discretely peek down to see who was banging on the front door (or, as my daughter asked, maybe drop a raw egg or something worse on their heads if they were unwanted guests).

We wound our way around the town and ended up having a nice lunch at one of the older restaurants in town, the Schützenstube. Hans had arranged for a large table that fit everyone. From a menu of several specials of the day, I had a slice of warm roast pork with cold potato salad, and I washed it down with some of the local beer. During lunch Hans and Ada gave us some interesting historical tidbits about the town. They also presented a gift to Beat, HB9HQX, who traveled the furthest to be with the group. The HTC is a country-wide organization and has meetings only infrequently, and Beat drove up from Brig, about 3.5 hours to the south, near the imaginary border between German and French speaking Switzerland. Beat's gift was a package of a local specialty, Schaffauserzungen (Schaffhausen "tongues"), which are thin cookies with a filling, and which, according to Hans, are made such that they hold for many months and are still quite good.

After lunch we made our way up to the most famous landmark of Schaffhausen, the Munot. It's a round stone fortress, necessary since this territory was on the "wrong" side of the Rhine and couldn't use the river as a natural defense. Sitting on a hill overlooking the city and the Rhine, its massive structure has a diameter of 53m, a height of 25m, one large tower and three smaller towers. Hans had arranged for the fortress keeper and curator, Herr Purtschert, to give us a guided tour. He has lived on the site at the very top of the tower for several years, and among his responsibilities is to ring the bell every evening at 9 p.m. for a full five minutes to indicate that the city gates should be closed for the night, a custom that has been going on since the Munot was completed in 1589. He gave us a fascinating tour, and he's full of interesting history, stories and trivia about the place. It's the second-most visited castle or fortress in Switzerland, led only by the Chateau de Valere in the city of Sion. The building itself is dark with massive stone vaulting and an internal spiral ramp that allowed horse-drawn cannons to be brought to the top of the tower, where you get a fine view of the city and surrounding areas. Many tours of such buildings can be deadly dull, but Herr Purtschert made the Munot come to life, and it was among the best tours I've ever gone on.

We left the top of the fortress through a roofed pathway that led down to the Rhine. From there we strolled upriver for half an hour. We eventually made a turn off the river and started walking up a gentle hill until we spotted some party tents that had been set up. It turns out that one of the local vineyards was having a spring festival to greet the return of the grapevines for the season. This was the Heerenberg vineyard, the oldest one in the canton of Schaffhausen, having been established 650 years ago. Again Hans was kind enough to reserve us a table with the owners and his friends, Marlies and Fritz Keller. We sat almost underneath the Windegg-Hüsli ("the little house on the windy corner"), a local landmark that gets its name from being near the top of the bluff and not having any natural protection from the winds.

Here the HTC sponsored a couple of cheese plates, and Hans' wife Ada was kind enough to pick up the tab for the wine for the group. This was a small modest wine festival with about a dozen tables, but they did have a grill going, so many of our group indulged in other regional specialties; I myself had a piece of onion cake (similar to a thick-crust pizza with a soft chewy dough and an inch of onion in creme on the top).

The group sat drinking the Heerenberg wine or whatever else they chose, and we chatted about everything under the sun, of course including ham radio every now and then. At about 6 p.m. it started to rain slightly, so we decided it was time to break up the party. Indeed, the weather forecast for the day had called for heavy showers, but we were very lucky and in fact had more than one stretch of sunshine, and the temperatures were pleasantly warm.

To wrap up the day, we walked a short distance to Hans' condo, where all the hams immediately had to examine his antenna system. Antennas are a big, big topic among Swiss hams because of restrictions from both the town authorities and the neighbors—a large number of hams, including myself, are severely "antenna challenged." We then said our goodbyes; those people with cars hit the road, and for we train-travelers, Hans rode with us on the city bus to the train station, where we stopped for some beer and cola for the ride to Zurich and had one last look at the Rhine Falls.

Overall, it was a very pleasant day. As a foreigner, I got to experience many things and places that I ordinarily wouldn't have seen. The hams and their wives were all extremely kind, especially to my daughter Toni, who ended up having a great day even though she speaks little German beyond pleasantries. My thanks to all the HTC'ers who made our day so pleasant, and a special thanks to Hans and Ada for organizing things so wonderfully.

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A Simple Frequency Counter

Hans Summers—GØUPL

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This is an incredibly simple and cheap frequency counter (cost under £2) with binary readout, based on the ideas of Onno, PA2OHH (www.qsl.net/pa2ohh/sfreq.htm). I built two versions: a Mk1 "prototype" for development and optimisation of component values, and a miniature low current version Mk2 designed for inclusion in a portable battery powered rig. These counters are ideal for when you want better precision in your QRP rig than a marked dial, but you don't want a frequency counter which will take more current, cost more, or be more complicated to build than the rig itself!

The readout is in binary so is a little harder to read than a conventional digital frequency counter's numeric display. Such is the price of simplicity and it won't suit all tastes, but with a little practice the binary is easy to read. Figure 1 shows the counter read out as it is when connected to the same VFO as my HF receiver (www.hanssummers.com), tuned to 3.689 MHz. The indicated frequency on the simple binary frequency counters reads between 89.0 - 89.5 simply by adding the value of the lit LEDs (64 + 16 + 8 + 1 + .5 = 89.5 kHz). The readout assumes that your dial markings are sufficiently accurate to read the frequency to 100 kHz accuracy, with this counter providing the finer resolution of the offset 0 to 99.5 kHz.

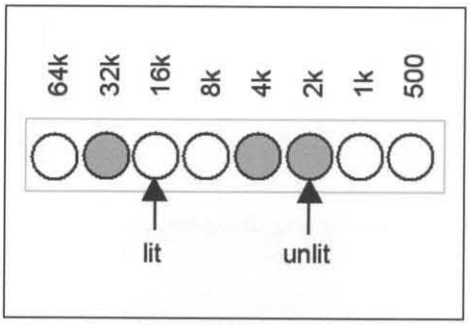


Figure 1—Frequency readout using binary LED indicators.

Operating Principles

The original idea is simple and elegant. A 74HC4060 IC is used as the oscillator and timebase, which controls a 74HC4040 IC, which in turn, counts the incoming signal frequency. Half of each cycle is used for counting the incoming signal. On the second half of the cycle, the count is latched into a 74HC574 IC and the 74HC4040 is reset to zero. The state of the latched count in the 74HC574 is displayed on a row of LEDs. I imagined a number of improvements to Onno's basic design, as follows.

The most important improvement was the reduction from 3 to 2 ICs. I realised that the latch could be eliminated, by gating the incoming pulse stream so that it counted only during the first half of each cycle, then displaying the result only during the second half of each cycle by switching the LEDs off during this time. I wrote to Onno about this and he built one possible implementation within a matter of days, long before I had a chance to build my own version. Switching the LEDs at 50% duty cycle also means the LED series resistors can be reduced whilst maintaining the same average LED current, which decreases overall current consumption.

Onno uses 8 LEDs which indicate 200, 100, 50, 25, 12.5, 6.25, 3.125, 1.5625 kHz. These arise naturally and conveniently by design, from the choice of 6.4 MHz crystal for the timebase. The frequency as an offset from the lower band edge (or any multiple of 400 kHz) is read by adding up lit LEDs. Because all those decimals are inconvenient, Onno applies the approximation 200, 100, 50, 25, 13, 6, 3, 1.5 to make the mental arithmetic easier. I was uncomfortable with this approximation (call me pedantic) so I designed a version using a 4.096 MHz crystal, which reads 64, 32, 16, 8, 4, 2, 1, 0.5 kHz (see Figure 2). A special AND-gate circuit resets the count back to 0 when it reaches 100, so that the display always reads 0 - 100 kHz from the lower band edge or any multiple of 100 kHz.

Since my counter is intended for use in a 30 meter portable rig, and since the 30 meter band is only 50 kHz wide, the higher resolution at the expense of reduced range is preferred. Other outputs of the 74HC4040 could easily be used to increase the range, or further LEDs added for example. The binary sequence 64, 32... etc. is easily added up (at least to my mind), though some may prefer Onno's

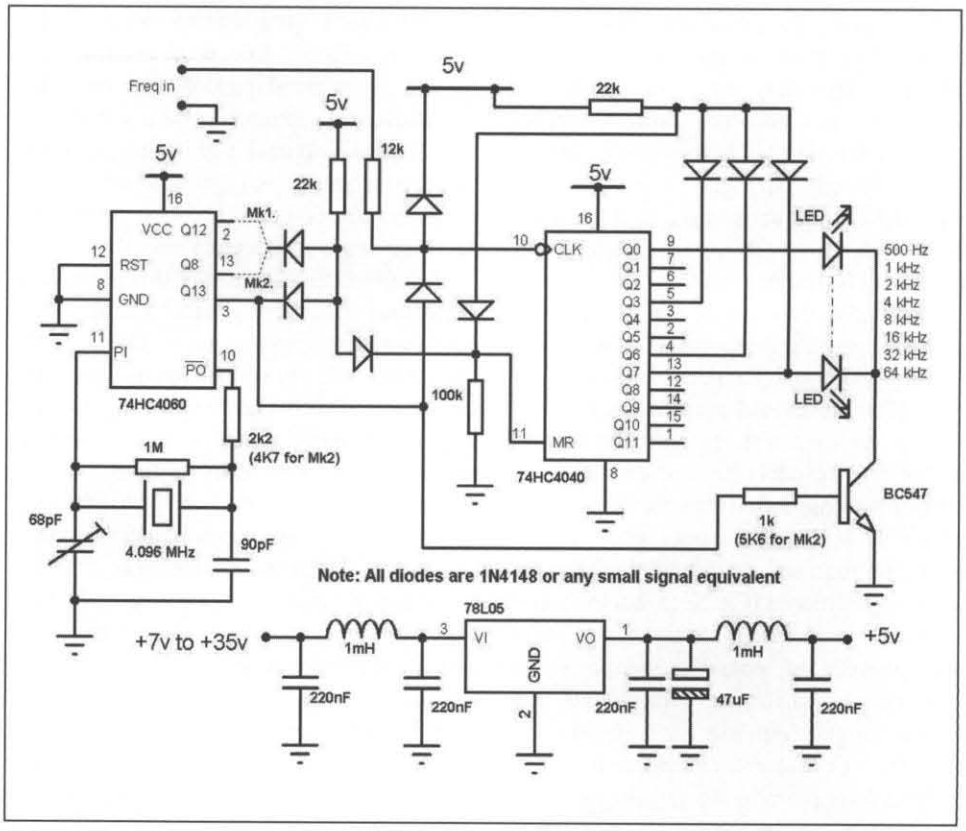


Figure 2—Frequency counter, Mk2 version, schematic.

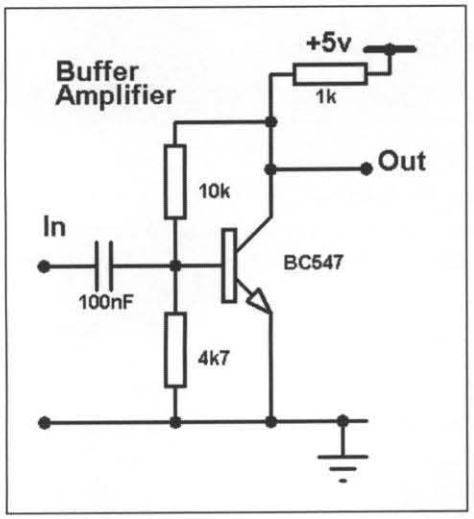


Figure 3—Optional buffer amplifier to isolate and amplify the signal input (typically from the VFO).

original scheme.

Note that my counter is designed without Onno's MHz frequency scale, which I won't need in my application, but that could easily be remedied.

Finally in the pursuit of the ultimate in low power consumption, I wanted to eliminate the LED resistors altogether. Those resistors lower the voltage to the LEDs by simply dissipating it as heat and that equates to wasted power. An alternative is to apply the principles of switched mode power supplies, and pulse the LEDs with the right duty cycle to obtain the average current required. Using a transistor to switch the LEDs this turned out to be surprisingly simple. Using this technique the current consumption of the Mk1 counter is 10 to 38 mA depending on which LEDs are lit.

Logically, the design requires two 2-input OR gates, a 2-input AND gate, and a 3-input AND gate. Think of the number of extra ICs you would require for this-but there is another way, namely the use of diodes and resistors to implement these logic functions. I find this method works extremely well where only one or two gates are required, avoiding the requirement for additional ICs. Note that the input is a TTL-level signal. Since there are a wide variety of possible signal levels between the different equipment this counter might find use in, I decided to leave the VFO buffer amp outside the basic design and leave it to the responsibility of the interface to the rig itself. (A suitable buffer amplifier is shown in Figure 3). I did however protect the input from excessive voltages via a diode to +5V.

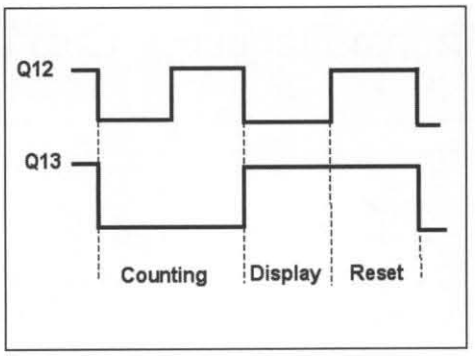


Figure 4—Timing diagram.

The timing diagram in Figure 4 illustrates how each complete cycle is divided up. The first half of the cycle is for counting. When the count is complete, the display is switched on during the entire second half of the cycle. But since the reset pulse occurs during the 4th quarter, the LEDs are blank, creating an effective duty cycle of 1:4 (25%). Outputs other than Q12 on the 74HC4060 can be used to create shorter duty cycles. In the Mk2 counter I use Q8 (pin 13), for a duty cycle of only 1:64!

The Mk1 counter was built "ugly" style on a piece of un-etched PCB stock measuring approximately 45mm square. 3mm clear-lens yellow LEDs were used for the display. No particular effort was made to miniaturise this counter, since it was being used for development and optimisation of component values and I needed to be able to change components easily. Nevertheless the final size is respectably small!

An interesting feature of this counter's display is the flickering effect. On any reasonably simple frequency counter the right most digit will flicker between two adjacent values, this occurs on all my numeric display frequency counters. When near the border between two nearby values such as 799 and 800, all three digits will flicker between the two. An identical effect occurs on the simple binary counter, except it is far more pronounced (for example, the case where the three right most digits of a numeric counter flicker is 1 in every 1000 readings). With a binary counter being base 2 rather than base 10, this effect on the right three LEDs increases to every 1 in 8 readings (I hope this explanation is clear).

The right LED indicating 0.5 kHz is ALWAYS flickering. But I don't let it annoy me! No, it's a FEATURE... the brightness of that 0.5 kHz LED provides some indication of where the frequency is within the range sub-500 Hz, effectively providing me with a better resolution than 500 Hz by considering this LED as an analogue frequency indicator of the range 0 - 1000 Hz. Neat!

Mk2—The ULTIMATE in Miniaturization

The photograph in Figure 5 scarcely does justice to the tiny size of this counter, which is just 25 x 16 x 16 mm. Here it is with the case removed, next to a paperclip.

High performance components were chosen for small physical size and to provide low current consumption of less than 5 mA. The TO-92 packaged LM2936 5V 50 mA voltage regulator has a bias current measured in uA. The 2 mm high brightness high efficiency GaAlAs technology LEDs offer 1 mA current consumption, one twentieth that of a standard LED. The 4.096 MHz crystal is in a low profile HC49/4H style case. The trimmer capacitor is the tiniest I could find—yet none of the components used are surface mount. The enhanced physical and electrical specifications of these components more than tripled the total cost, (including postal charges), to approximately £7.50.

The circuit diagram (Figure 2) is essentially the same for the Mk2, the difference being the values, which are marked on the diagram. The series resistor in the 74HC4060 crystal oscillator was increased from 2.2K to 4.7K. Experimentally, this was the resistance value producing lowest current consumption and saves approx. 100 uA relative to the 2.2K resistor. The base resistor of the BC547 was increased from 1K to 5.6K to reduce current consumption, representing a good compromise between brightness efficiency and current consumption. I use Q8 (pin 13) of the 74HC4060 to give an incredibly low duty cycle of 1:64 for these LEDs, which are still very bright.

Construction

Well the Mk2 doesn't use a circuit board at all. The two ICs are glued on top of each other, and their leads cut very short. The voltage regulator, switching transistor, crystal and trimmer capacitor

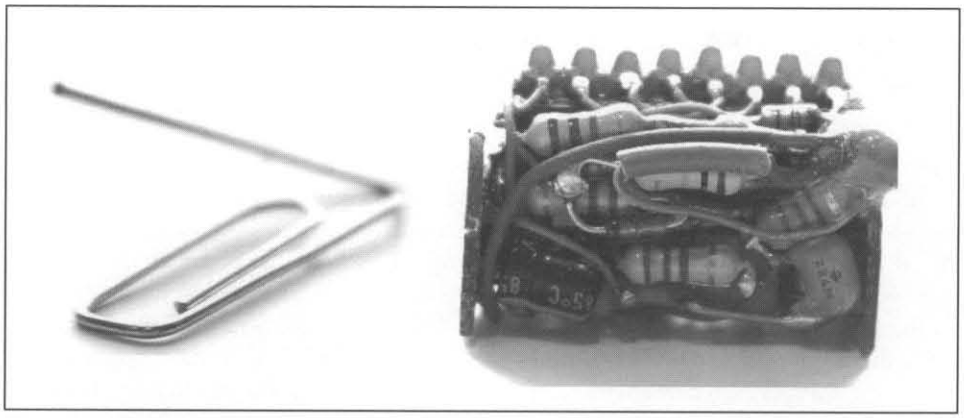


Figure 5—Mk2 counter shown next to a paperclip to indicate its size.

are glued to the bottom IC (74HC4060) and their leads also cut to about 2 mm length. The 8 LEDs are lined up and glued on the top IC (74HC4040). The remaining components are just piled on in the most space-saving way I could devise. Connection to the counter is via a twin screened cable (+V, Signal and GND).

This tiny Mk2 counter even has a screened box to keep the digital noise out of the rest of the receiver! The box is made from single-sided PCB stock, with the copper side outwards (so as not to short the internal components). The edges are soldered on the outside by applying thin strips of brass shim over the edges and soldering them in place. This unique construction technique is an inside-out version of the usual boxes made from PCB stock.

I should also mention that this particular PCB stock from my junk box is fibreglass and half the usual PCB thickness than you are maybe used to. Small squares of PCB are stuck at either end of the circuit, and position it perfectly and firmly in the box.

There is no front panel. The intention is to mount this frequency counter in the front panel of a portable transceiver having a PCB-stock case, with the copper side inside. A small slit will be cut in the front panel for the LEDs, and the copper outside of the frequency counter box soldered to the front panel at its corners (permitting easy removal if necessary). This will complete the RF screening of the counter.

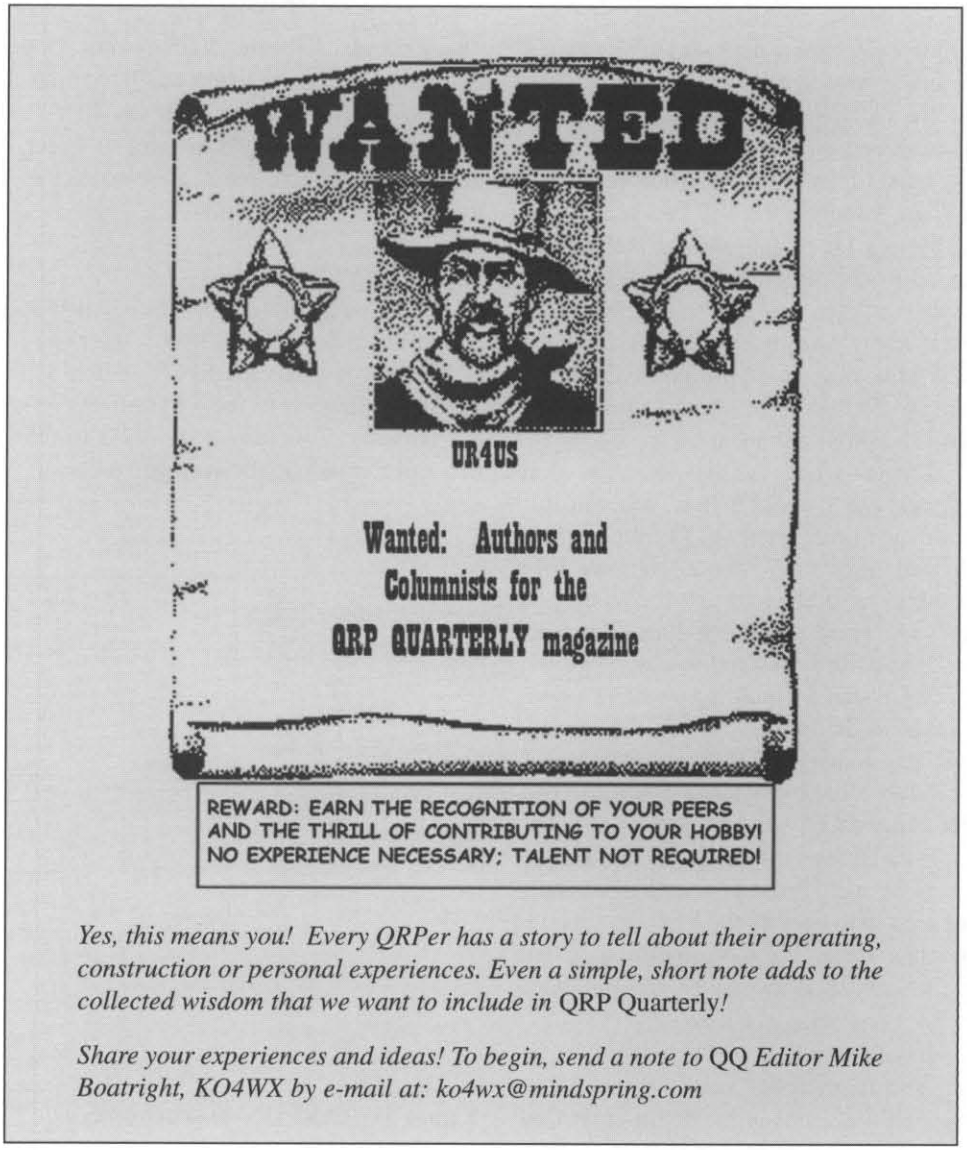
Observations

Due to the switching nature of the counter, some interference might find its way back into the receiver either via the VFO or via the supply lines. Careful attention to VFO buffering and/or supply line filtering may be required. It might be advisable to fit an on/off switch so that if a harmonic is troublesome the counter can be temporarily disabled. Updates will be posted on my website (www.hanssummers.com) when I learn more about this, as will future developments on the simple counter.

It is interesting to look at the distribution of current consumption in the Mk2 counter. The LEDs consume about 1.2 mA when all are lit. The diode-resistor logic, switching transistor, ICs and voltage regulator consume a further 1mA approximately. Which means about 3 mA is consumed by the crystal oscillator alone. If a more efficient oscillator topology was available it would perhaps half the overall current consumption of the frequency counter. But I don't know enough about oscillator topologies.

●●

[This article first appeared in the G-QRP *SPRAT* and is reprinted with their gracious permission.—*Ed.*]



Yes, this means you! Every QRPer has a story to tell about their operating, construction or personal experiences. Even a simple, short note adds to the collected wisdom that we want to include in QRP Quarterly*!*

Share your experiences and ideas! To begin, send a note to QQ *Editor Mike Boatright, KO4WX by e-mail at: ko4wx@mindspring.com*

QRV? Building the Tarpon 40

Steve Hudson—AA4BW sdhudson@reedbusiness.com

With only a little additional effort, you can turn last issue's VFO into a neat 40-meter transmitter. Here's how...

Last time the topic was the noble VFO—specifically, how to build one of your own—and it's been great to see the amount of interest which that project generated. Several folks commented that were surprised to discover that a good VFO is not beyond the capabilities of even a beginning homebrewer, and many others noted that they were thrilled to discover how to use most any air variable to tune most any VFO. Bravo! That's homebrew hamming at its finest, and judging from the responses there are by now dozens of 7 MHz VFOs swishing up and down the 40-meter band—to the delight of their builders (including me!) and to the dismay of at least one Shetland sheepdog, Chester the Ham Shack Sheltie, whose ears seem to be bothered by certain frequencies in the passband of my trusty 40-meter receiver.

Yes, swishing the VFO back and forth really is a lot of fun and can keep many homebrewers entertained for hours. But sooner or later you'll probably get to the point where you want to do something else with your new creation—and what better thing to do than to attach it to a transmitter strip and put it on the air?

That's what we'll do this time around—we'll look at how you can turn your just-completed VFO into a full-fledged transmitter. The circuits we'll be building have been around for many year and represent time-tested designs, and we'll build in stages and test as we go.

We'll start by building a simple keying circuit. In the interest of future flexibility, this transmitter will utilize a front-panel-switched relay for antenna T/R switching, but experienced builders may want to add more elaborate switching arrangements.

Next, we'll build a basic QRP transmitter section to go with the VFO described in the last issue. It's a straightforward and well-established two-stage design; we'll build it one stage at a time.

Finally, we'll construct a low-pass filter. The filter design comes straight from the *ARRL Handbook* tables—a great QRP builder's tool, by the way.

(And next time, I think, we'll build one more module and turn the transmitter into a direct conversion transceiver—but that's supposed to be a secret. Better forget I ever said that.)

For clarity, and to help you keep things straight, the parts in each particular section of the circuit have their own set of numbers. Keying circuit parts are numbered in the 100s (C101, R101, Q101, and so on). Driver stage parts are numbered in the 200s. Output stage parts get 300 numbers, while low-pass filter parts get 400 numbers (see Figure 1).

Just one thing remains—a snappy acronymic name for this little project. Hmmm... I've been thinking about fishing a lot lately, so I think I'll call it...the "Transmitter, Amateur Radio, Puts Out eNoughpowertodothejobon 40." That boils down to TARPON 40, so TARPON 40 it is.

Ready to get going? I thought so. Clear off the work bench, plug in the soldering iron, and get ready to build!

The Keying Circuit

The keying circuitry, as already noted, is assembled first. Here's how it works.

When you press the SPOT switch S1, 12 volts is applied to the VFO offset control circuitry. This moves the VFO to the transmit frequency, allowing you to "spot" your transmitter's signal in your receiver and zero-beat the other station. Note that pressing the key at this point won't do anything, since there's no power applied to the transmitter driver stage.

However, when you flip DPDT switch S2 to TRANSMIT, 12 volts is applied not only to the VFO offset circuitry (which moves the VFO its transmit frequency as before) but also to transmitter keying circuit (via the other set of S2 switch contacts)—and through it, when the key is pressed, to the driver stage. In other words, when you close the key, you turn on keying transistor Q101, which applies 12 volts to the driver stage—activating the transmitter and putting a signal on the air.

Note that switching to TRANSMIT also applies 12 volts to the antenna switching relay, which switches the antenna line to the transmitter.

Construction Options

This project is built Manhattan style—that is, with small pads of copper-clad material glued to a larger groundplane, with component connections made to the Manhattan pads and to the groundplane itself as dictated by the circuit.

The most straightforward way to construct this project is to build it on a single piece of copper-clad groundplane board. The layout shown in Figure 2 uses a rect-

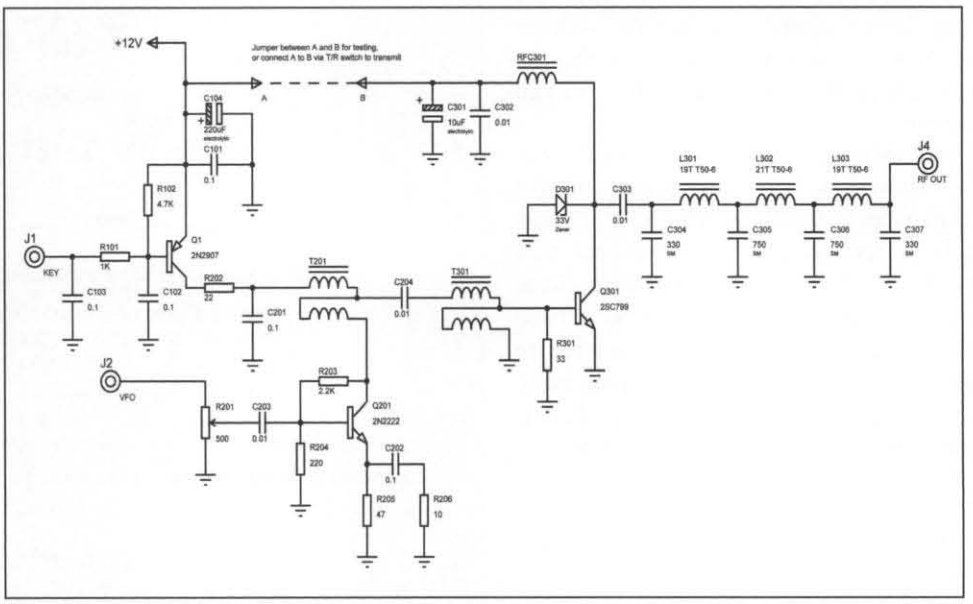


Figure 1—TARPON 40 schematic.

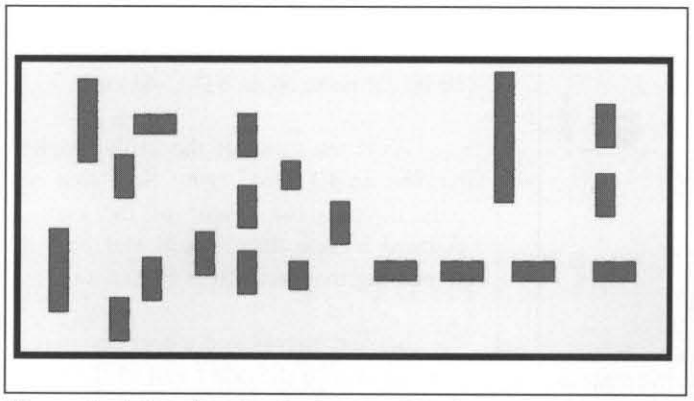


Figure 2—Template for laying out Manhattan-style pads on PC board (actual size is approximately 2.75" x 8.5").

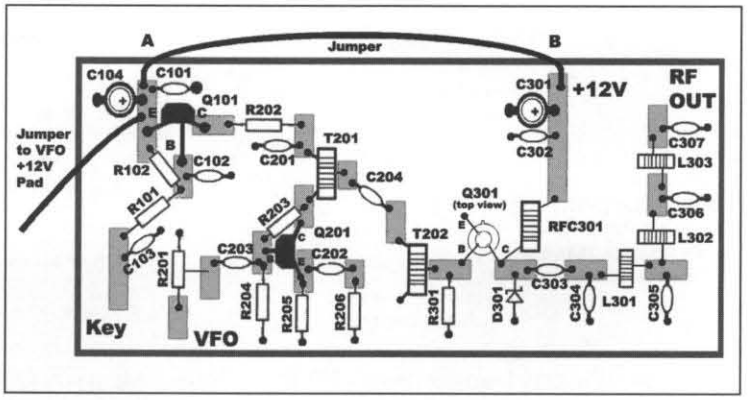


Figure 3—Parts layout (all sections shown).

angular piece of board measuring about 2.75 by 8.5 inches. There's nothing critical about those particular dimensions; that's just what was on hand. Bigger is fine, but do be aware that if you go much smaller you may run into component installation problems.

Building on a single board has the advantage of significantly improved simplicity, particularly when it comes to interconnecting the various circuit stages. It also makes board mounting easy and, with a bit of planning, eliminates a lot of jumpers and connecting wires. The downside, if there is one, is that single-board building does limit you somewhat when it comes to circuit additions later on.

But you don't have to build it on a single board if you don't want to. Numerous variations are possible. For example, during development of the project I built up another version of the circuit using separate modules for the keying circuit, the transmitter strip, and the low-pass filter (and of course the VFO). It's an interesting and very versatile approach. The modules, and how they're interconnected, are shown in one of the photos. Modular construction has the advantage of added flexibility, though of course you've got the added complexity of interconnecting them all.

I even built up yet another version in which VFO, keying circuitry, and all transmitter circuitry are on a single board.

For now, we'll take the single-board approach. But if you'd like to try another approach, by all means take the plunge and do so. Most of the step-by-step instructions will still apply, and the end result should still be a very nice little transmitter!

Preparing The Board

First, prepare the groundplane board by doing the following. Refer to the template for Manhattan pad locations:

___ Cut a suitable piece of copper-clad board.

___ Use steel wool or fine sandpaper to clean the copper side of the board

___ Prepare the pads for mounting by cutting Manhattan pads from a scrap of PC board material. Pad size is not critical, within reason, and you can use the template as a guide to the approximate sizes you'll need.

___ Using the template as a guide, glue Manhattan pads to the groundplane board. I like to use a Superglue-type gel glue. Be sure to use enough glue. We'll go ahead and glue down all of the pads at one time, even though we'll only use a few of them during construction of each circuit section.

___ Using an ohmmeter, check to be sure that no pad is shorted to the groundplane. This occasionally happens due to a stray whisker of copper left after the pads are cut, and the ohmmeter check is an easy way to make sure you don't have any problems.

Keying Circuit Construction

Now you're ready to mount the keying circuitry components. The order given here will help you avoid any conflicts.

As you mount each part, check the schematic to see what you're installing and how it connects to the rest of the circuitry. This not only helps you begin to understand how it all goes together, it also helps you catch any misplaced components early on.

To see where each part goes, refer to the parts layout (Figure 3).

___ R101, 1K (brn blk red)

___ R102, 4.7K (yel vio red)

___ Q101, 2N2907 or equiv. PNP switching transistor. Note transistor orientation.

___ C101, 0.1 uF

___ C102, 0.1 uF

___ C103, 0.1 uF

___ C104, 220 to 470 uF electrolytic, not critical. Note polarity.

___ Install a jumper wire from Point A to Point B. Use insulated hook-up wire.

___ Prepare another piece of jumper wire; at this point make it about 12 inches long. Solder one end of the wire to point A on the transmitter strip board. The other end will be connected to the VFO 12-V IN pad later on to provide operating voltage to the VFO.

There—that wasn't so hard! Double-check your work to be sure you've got all parts in correctly. In particular, make sure that the transistor is installed correctly and that the electrolytic cap is oriented properly. Then proceed to testing your keying circuit, as follows:

___ Connect the power supply's negative lead to the groundplane foil.

___ Connect the positive lead of the power supply to the 12 V IN pad. If you're using clip leads, you may want to mount a small wire loop on the 12 V IN pad to facilitate clip lead attachment.

___ Don face mask, heavy gloves, and flameproof suit.

___ Apply power and check for overheating, smoking or exploding components. If none are seen, remove face mask, gloves, and flameproof suit.

___ Connect a voltmeter between the collector lead of Q101 and ground. Now ground the KEY pad. Voltage should appear on the Q101 collector when you ground the KEY pad, then disappear when

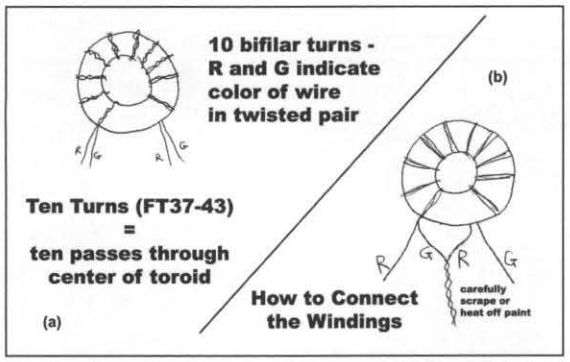


Figure 4—Winding transformers T201 and T301.

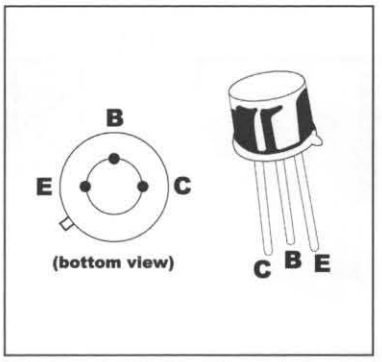


Figure 5. Q301 orientation.

the key line is ungrounded.

___ Take a break. You've got your keying circuit up and running as it should!

Transmitter, Stage One

Now you've got a functional keying circuit. All you need is something to key - and we'll take care of that in Stage One of transmitter construction.

This transmitter is a variation of the "Ugly Weekender" transmitter project that has been described in a number of ARRL publications. Essentially, it's a two-stage broadband amplifier strip using a 2N2222 or equivalent as a driver and a 2SC799 or similar RF power transistor as the output stage.

Stage One of the transmitter strip consists of the 2N2222 driver stage, along with a trimpot used to set the input level to the transmitter from the VFO.

Here's how to put Stage One together. Following the schematic and referring to the pictorial diagram for help, mount the following parts in the order given:

___ R201, trimmer pot, 500 ohms.
___ R202, 22 ohm (red red blk)
___ R203, 2.2K (red red red)
___ R204, 220 ohm (red red brn)

Double check to be sure that you have not mixed up any of the just-installed resistors. It's easy to mix these particular components, particularly with all those red bands!

Once you're satisfied that they're in correctly, continue with Stage One parts installation, as follows.

___ R205, 47 ohm (yel vio blk)
___ R206, 10 ohm (brn blk blk)

Now move on to the Stage One capacitors, as follows:

___ C201, 0.1 uF (may be marked 104)
___ C202, 0.1 uF (may be marked 104)
___ C203, 0.01 uF (may be marked 103)
___ C204, 0.01 uF (may be marked 103)

Double-check to be sure that each capacitor is installed correctly; then proceed to install the Stage One driver transistor:

___ Q201, 2N2222 or equiv. Be sure to orient the transistor correctly.

There's only one more part to install in Stage One—a bifilar wound toroid transformer. But first you've got to wind it - here's how.

Winding the Bifilar Transformers

Yes, transformers. In this transmitter, there are two bifilar transformers for you to wind. But not to worry. They're not difficult to complete!

First, you've got to prepare the bifilar wire. "Bifilar" simply means that you wind them with a pair of wires, treating the pair as a single unit during winding. Thus, step one is to prepare the wire pair.

Here's how:

___ Locate two three-foot lengths of enameled wire. Ideally, choose different colors for each of the pieces of wire - for example, red and green.

___ Anchor one of each piece in the end of a power drill.

___ Affix the other end to something solid.

___ Fire up the drill to twist the wires. You're going for about 6 to 8 twists per inch. Note that you'll need to over-twist the wires slightly, as the springiness of the wire will unwind the pair a bit when you're done.

Each of the transformers is wound with 10 bifilar turns on an FT-37-43 core:

___ Wind ten turns of the bifilar twisted pair on an FT-37-43 core. Note that one pass through the center of the core is counted as one turn. You'll end up with something that looks likes Figure 4a.

The next step is to connect one end of one winding to the other end of the other. Confused? No need to be. Here's the easy way to do it:

___ Connect one end of one winding to the other end of the other. You'll end up with something that looks like Figure 4b—a three-legged coil.

As you can see, having different-colored wire for each piece in the pair makes it easier. You can do the same thing with same-colored wire, though you'll have to use an ohmmeter to identify the windings and make sure you don't get things crossed up.

Note that improper winding of the bifilar transformers is the most common cause of problems with this circuit. Read over the preceding instructions several times to make sure you understand how to wind them before you begin.

Remember, you'll need two of these transformers—one to serve as T201 (which you'll use now) and the other to serve as T301 (which you'll use later on).

Now install the transformer:

___ Install T201, a bifilar wound transformer, as shown. Note the placement of the center lead.

Testing Stage One

Testing Stage One of the transmitter strip is straightforward:

___ Visually double-check installation of all parts.

___ In particular, check the installation of Q201 and T201.

Next, you'll prepare a cable to connect the transmitter strip to the previously-completed VFO:

___ Prepare each end of an 8-inch length of miniature coax by stripping about one

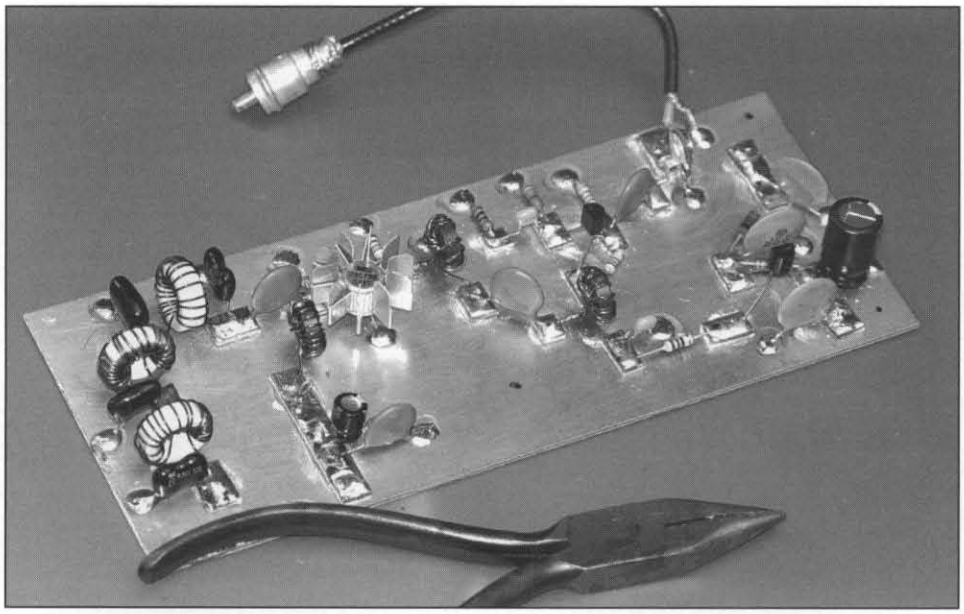


Figure 6—Completed transmitter board.

inch of the rubber insulation and fanning the braid, then stripping the center conductor.

___ Mount an RCA plug (or other plug suitable for attachment to your VFO) on one end.

___ On the other end, solder the center conductor to the pad holding the ungrounded end of R201, the trimpot.

___ Then solder the free braid to the groundplane near that pad.

This completes wiring of Stage One of the transmitter strip. There are just a few more things to do before testing everything:

___ Connect the negative lead from the supply to the groundplane foil.

___ Making sure your power supply is turned OFF, connect +12 volts to the 12 V IN pad.

___ Using the jumper previously attached to Point A on the transmitter strip, connect +12 volts to the +12 volts in pad on the VFO module. NOTE: Don't worry about connecting anything to the VFO offset control pad at this time. You already know that the offset is working, and at this time you're just checking to be sure that the transmitter strip's Stage One is working as it should.

The diagram shows how these interconnections should look.

Actual testing is straightforward, since you already know that the VFO module and keying circuitry are working. Simply ground the KEY pad. Voltage will appear at T201, which fires up (so to speak) the 2N2222 amplifier. You should be able to hear the keyed signal in a receiver tuned to the VFO frequency; if not, touch a screwdriver to the free end of C204 to act as an "antenna."

Finally, check to see that you can vary the strength of the signal by adjusting the drive control pot, R201.

That's it—you're ready to move on to Stage Two of the transmitter strip!

Building Stage Two

Stage Two of our transmitter, the power amplifier, utilizes a 2SC799 or similar transistor. There are very few parts left to install, and it won't take long:

___ R301, 33 ohm (org org blk)

___ D301, 33 volt 0.5W Zener. Note polarity; the banded end goes to collector of Q301; unbanded end goes to groundplane foil. I used a 1N5257B since that's what I had on hand, but note that a 33-volt 1-watt zener will work fine. Also suitable for use here is a 36-volt 0.5- or 1-watt Zener.

___ T301, the remaining bifilar transformer. Install as shown.

___ RFC301, 17 turns on an FT37-43 core.

___ C301, 10 uF 50 V electrolytic. Note polarity.

___ C302, 0.01 (may be marked 103)

___ C303, 0.01 (may be marked 103)

___ Q301, 2SC799 or equivalent. Note orientation (see Figure 5).

Now double-check the wiring of the output portion of the transmitter strip. It won't be tested just yet, so use the time you'd have spent testing at this point to check your wiring (particularly installation of the bifilar transformer T301, output transistor and polarity of the Zener diode) one more time.

Low-Pass Filter

The final section of this transmitter is its low-pass filter. The component values for the low-pass filter are taken from tables in the *ARRL Handbook*. These tables are really easy to use, though all those numbers they present you with can be a little intimidating at first glance. But don't let the quantity of digits scare you off. The filter design tables are one of the best things for homebrewing since sliced bread and give you a tremendous amount of flexibility in building just the filter you need.

The filter used here is a seven-pole low-pass filter using standard capacitor values and toroid coils wound on T-50-6 cores. Here's how to build it, starting with installation of the silver mica capacitors:

___ Install C304, a 330 pF silver-mica capacitor, at the position shown.

___ Similarly, install C307, another 330 pF silver-mica capacitor, at the position shown.

___ Now install C305, a 750 pF silver-mica cap, at the position shown.

___ Similarly, install C306, another 750 pF silver-mica cap, at the position shown.

___ Check to be sure that you have installed the caps in the correct positions—330 pF caps on the outside, and 750 pF caps on the inside.

Next, turn your attention to winding and installing the low-pass filter's inductors. Three inductors are used. Two of them (the "outside" two) are identical, while the third is different. Don't get them mixed up during installation:

___ Wind L301, which has 19 turns on a T-50-6 core. Then mount this core in the position shown on the filter module board. It's one of the "outside" coils.

___ Similarly, wind L303, which also has 19 turns on a T-50-6 core. Then mount this core in the position shown on the filter

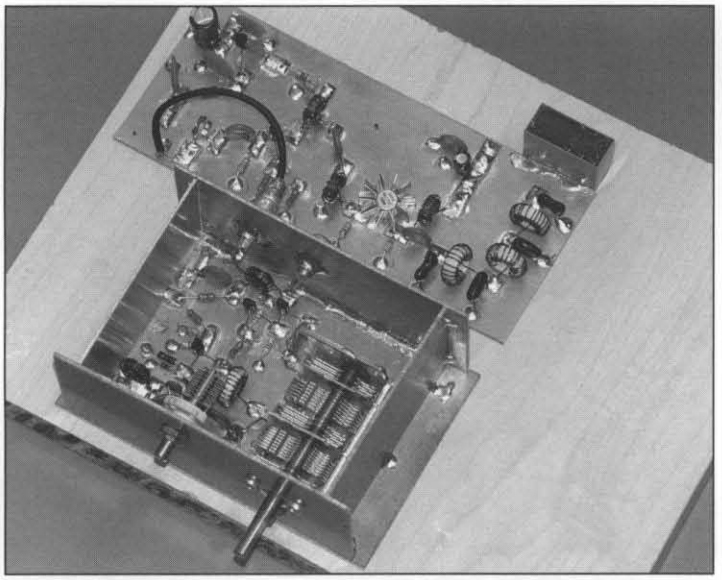


Figure 7—One option for mounting the VFO and transmitter boards is to use a piece of particle board.

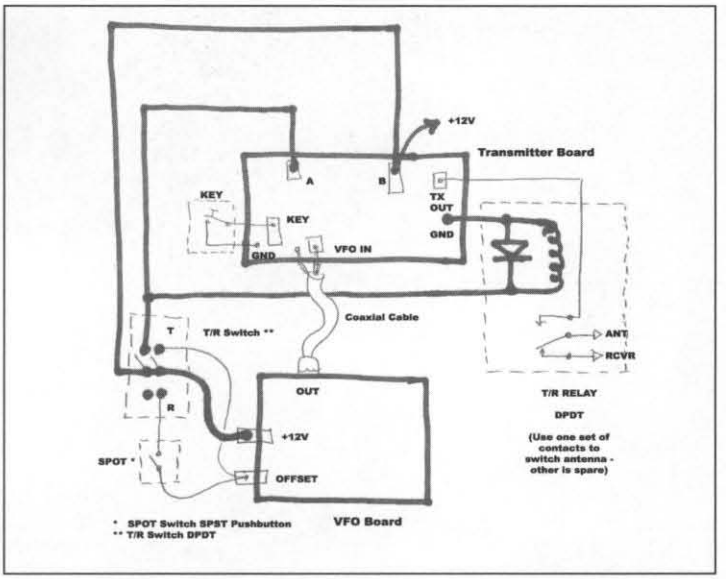


Figure 8—Using a DPDT switch and relay to perform Transmit/Receive switching.

module board. It's the other "outside" coil.

___ Finally, wind L302, which has 21 turns on a T-50-6 core.

___ Now mount this coil at the "center" coil position on the filter module board.

___ Check to be sure that you have installed the correct coils in the correct positions.

___ Compare your finished transmitter board to Figure 6 to ensure all parts are installed correctly.

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Thoughts About Finishing Up

Is there a right way to package your transmitter? Absolutely not. You can use any packaging arrangement you like. On some recent projects, for example, I've had good success mounting homebrew Manhattan boards on a piece of shelving board. Others I've put in a variety of off-the-wall containers, including not only the ubiquitous Altoids tins but soup cans, coffee cans, and even a variety of plastic VCR tape boxes or surplus steel boxes. Now and then I'll even use a traditional aluminum chassis—but only when I can find one cheap at a hamfest!

But for this particular project I decided to go with the particle board base route. A scrap of leftover shelving proved just the right size (see Figure 7).

In keeping with our last few projects, an executive decision was made to make the front panel from clear acrylic. Before mounting the panel to the shelving board base, I drilled four holes in it—one to pass the VFO tuning capacitor shaft, one for the SPOT pushbutton switch, one for the T/R switch, and one for the KEY jack. Looking ahead, I laid out the panel to include a place for a volume control (to accommodate a future receiver module) and a headphone jack. But I didn't drill the receiver-related holes—not yet, anyway!

For the back panel I decided to use a small scrap of copper-clad board just big enough to hold the power connector, the antenna connector, and the receiver jack. It would be easy to mount, and I'd be able to solder its copper foil directly to the main transmitter board's groundplane—an aid to good grounding. Later, when the unit converted to a full-fledged transceiver, the back panel's receiver jack will become a spare hole. But that's okay—this is homebrewing, and a spare hole or two can be thought of as a badge of honor.

After making the decision on how to mount everything, and before you drill the first mounting hole, position each of the modules on the base to make sure everything fits (it's that old measure-twice-drill-once thing). Consider not only where the module boards will go but also where jacks, connectors and present or future controls will be located—and don't forget to take into account the fact that they may stick out on the inside! Consider where any needed jumpers will go, too, then take pencil and paper and sketch the layout to confirm that you haven't left anything out and that everything fits.

Go through the same process with the front panel and rear. Double-check the placement of everything, then do any necessary drilling.

Finally, permanently mount the modules to the base and secure the front and rear panels to your chosen base.

Final Wiring

Since your approach to final wiring will be determined largely by how you lay out your transmitter, I'm going to leave the details of that part to you.

Here are a few thoughts to consider as you wrap things up.

One thing to think about is the matter of antenna switching. For this project I decided not to use outboard antenna switching, so the decision was made to include a small 12-volt DPDT relay to switch the antenna between the transmitter and an outboard (eventually onboard) receiver (see Figure 7). I use only one set of the relay's contacts to switch the antenna; the other is available for something else such as receiver muting.

I decided to control the T/R relay via a front-panel DPDT T/R toggle switch. One set of switch contacts switches 12 volts to the relay; the other set switches 12 volts to the VFO offset circuitry. I wired it so that in the T position, the relay is activated and the 12-volt offset line is turned on. In the R position, the relay is deactivated (switching the antenna to the receiver) and the offset voltage is removed, which moves the

VFO off the frequency but leaves it running for stability's sake. Again, there's nothing to keep you from taking a more sophisticated approach to T/R switching, but in this case simple works well.

One thing to remember: don't forget to put a diode across the relay coil as shown on the schematic. This diode clamps the voltage spikes that occur when the relay coil is de-energized. The cathode (banded) end goes to the +12 volt side; the unbanded end goes to the grounded side.

Finally, make sure that your chosen key jack clears everything when it's installed. I also like to put a bypass cap (another 0.01 cap is fine) across the jack itself. I don't know that it's needed, but it makes me feel better and looks cool through the clear acrylic panel.

Final Testing

After you've put everything together, you're ready for final testing—though at this point there should be no surprises:

___ Connect 12 volts, making sure that polarity is correct.
___ Connect a suitable dummy load and wattmeter to the RF OUT jack.
___ Set the TR switch in the R position.
___ Turn on the power.
___ Check for smoke or flames.
___ Locate the VFO signal in your receiver.
___ Press the SPOT switch. The VFO signal should move.
___ Return the SPOT/OPER switch to OPER.

Note, by the way, that flipping the T/R switch to the T position also lets you spot your signal. That means you could leave off the dedicated SPOT switch if you'd like.

Now continue testing.

___ Be sure you still have a dummy load attached to the ANTENNA jack.
___ Plug a key into the key jack.
___ Flip the T/R switch to T. The antenna relay should switch, and the VFO should move to the transmit (SPOT) frequency in preparation for transmission.
___ Close the key. When you do, voltage should appear at the +12V KEYED terminal. Depending on where trimpot R201 is set, you may or may not have output.
___ Adjust R201 for about 1.5 watts (or a power level suitable to your output transistor and operating preference) as read on the wattmeter.

If that's what you see, then you're in great shape!

What If It Doesn't Work?

If you've followed the step-by-step building and testing procedures outlined here, you should have no problem getting your transmitter to work. In fact, you've tested everything as you've gone along, so your confidence level should be pretty high.

However, Murphy is alive and well, and even with the greatest attention something can still go wrong.

Based on building a number of these transmitters, as well as helping other hams build a number of them too, here are some specific things to check:

___ It almost goes without saying, but make sure that all connections are soldered. Use a bright light, a magnifier, and fresh eyes. I know that you never make mistakes like that, but I do. In fact, on the final prototype build, I spent 15 minutes looking for a problem that turned out to be an unsoldered connection at the input to the transmitter low-pass filter. Duh!
___ Make sure that the transistors are installed correctly. Oddly enough, this particular problem seems to plague experienced builders more than it does beginners.
___ Make sure that you've made all necessary module interconnections.
___ Make sure that you haven't fried the miniature coax cable. RG-174's insulation is prone to melting, which can allow the center conductor to short to the shield. It happens more frequently than we'd like.
___ Make sure that the bifilar transformers are wound correctly. As noted, this is much easier to do if you've used two different colors of wire.

On The Air

I've had a great time making contacts on 40 CW with the various prototypes of this transmitter, and I think you will too. It's got a great signal, very stable and very clean. Several operators have commented on the good signal quality, and it's really fun to tell the other op that I'm using a homebrew VFO-controlled transmitter.

If you've been rockbound in your homebrew QRP efforts, you'll find that having a VFO is better than…well, it's just real good. No longer will you have to wait and wait and wait for your crystal frequency to clear; with a VFO, you can just ease up or down the band and find a frequency that's open. It's great!

Now who will be the first to make a contact with this little transmitter? An here's an even greater challenge—who will be first to make a TARPON 40-to TARPON 40 QSO?

Let me know!

●●

__ R101, 1K (brn blk red)
__ R102, 4.7K (yel vio red)
__ R201, trimmer pot, 500 ohms.
__ R202, 22 ohm (red red blk)
__ R203, 2.2K (red red red)
__ R204, 220 ohm (red red brn)
__ R205, 47 ohm (yel vio blk)
__ R206, 10 ohm (brn blk blk)
__ R301, 33 ohm (org org blk)

__ C101, 0.1 uF
__ C102, 0.1 uF
__ C103, 0.1 uF
__ C104, 220 to 470 uF, 16 v or 50 v, elect.
__ C201, 0.1 uF (may be marked 104)
__ C202, 0.1 uF (may be marked 104)
__ C203, 0.01 uF (may be marked 103)
__ C204, 0.01 uF (may be marked 103)
__ C301, 10 uF 50 v, electrolytic
__ C302, 0.01 uF (may be marked 103)
__ C303, 0.01 uF (may be marked 103)
__ C304, 330 pF silver-mica capacitor
__ C305, 750 pF silver-mica capacitor
__ C306, 750 pF silver-mica capacitor
__ C307, 330 pF silver-mica capacitor

__ Q101, 2N2907 or equivalent PNP switching transistor
__ Q201, 2N2222 or equivalent NPN switching transistor
__ Q301, 2SC799 or equivalent

__ D301, 33 volt, 0.5 or 1 w Zener, 1N5257B

__ T201, 10 turns bifilar, FT37-43 core
__ T301, 10 turns bifilar, FT37-43 core
__ RFC301, 17 turns FT37-43 core
__ L301, 19 turns T-50-6 core
__ L302, 21 turns T-50-6 core
__ L303, 19 turns T-50-6 core

Tarpon 40 parts list.

VHF QRP: Awards

Bob Witte—KØNR

k0nr@arrl.net

Go for some VHF QRP wallpaper!

Awards are a great way to encourage amateur radio operating. From time to time, I pick a new radio-operating award so that I have a goal to focus on. Although I don't want to turn my favorite hobby into something that resembles real work, it's fun to have a specific goal in front of me.

I think my first real award was Worked All States (WAS), followed by Worked All Continents (WAC), DX Century Club (DXCC) and VHF/UHF Century Club (VUCC).

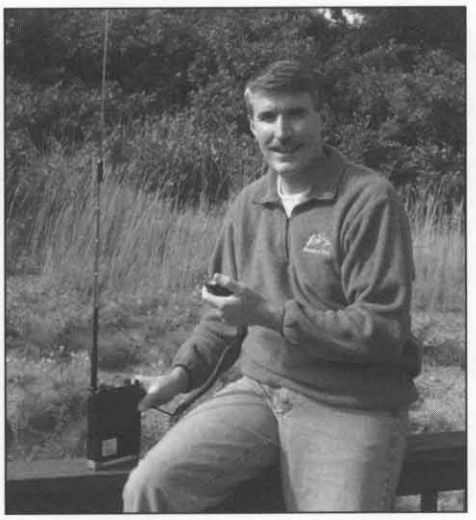
There are a number of lessor-known awards that I've pursued, again with the idea of having a specific goal to aim for. There are plenty of awards out there... so many that you will never earn them all in a lifetime.

This column takes a look at what's available in the way of VHF QRP awards. At first glance, there aren't many awards that are aimed specifically at "VHF QRP" operating. However, we can use award endorsements to tweak some awards to have a VHF and higher emphasis.

VHF/UHF Century Club

The VHF/UHF Century Club (VUCC) Award from the ARRL is the VHF equivalent of DXCC for HF operators. This award has helped establish the "VHF grid" as the key measure of VHF operating. The Maidenhead Locator System defines a system of grid squares that measure 1 degree latitude by 2 degrees longitude, which is approximately 70 x 100 miles in the continental US. More information is available from the ARRL web site: http://www.arrl.org/locate/gridinfo.html

To earn VUCC on 50 MHz, 144 MHz or satellite, you need to work and confirm 100 grids. It takes 50 grids for 222 MHz and 432 MHz, and fewer grids for the higher bands. There is no QRP endorsement for VUCC, so if you are looking for a VHF QRP award, this isn't it. Of course you can always obtain VUCC while using QRP and award yourself an unofficial QRP endorsement. (Or keep reading and we'll explain how another award accomplishes the same thing.) The VUCC Award rules



require ARRL membership for US hams. Complete rules are available online at http://www.arrl.org/awards/vucc/

Worked All States

Another popular award from the ARRL is the Worked All States (WAS) Award, which is earned by confirming contact with all 50 states. This award has a number of endorsements, including SSB, CW, Novice, QRP, Packet, EME and any single band. WAS also has the concept of "specialty awards" that are numbered separately, available for OSCAR Satellite, SSTV, RTTY, 144 MHz, 432 MHz, 222 MHz, 50 MHz, 160 meters and Digital. Therefore, we can combine the QRP endorsement and the 50 MHz "specialty award" to produce a QRP 50 MHz WAS award. Working all states on 50 MHz is a challenge that requires some favorable propagation and lots of perseverance. Working WAS 50 MHz on QRP is even more of a challenge.

Similarly, a QRP WAS for 144 MHz is theoretically possible but is extremely difficult to achieve. Most 144 MHz WAS applicants employ meteor scatter or EME to complete some of their contacts—not all that viable at QRP power levels.

More WAS information is available at http://www.arrl.org/awards/was/

QRP ARCI Awards

The QRP ARCI has a great set of QRP-oriented awards. At first glance, these don't appear to be VHF oriented. However, upon closer examination, we see that there is applicability to the bands above 50 MHz. The rules (see http://www.qrparci.org/arciawds.html) say "Endorsements are available for just about anything providing you can prove the claim." I verified this with Thom Durfee, WI8W (QRP ARCI Awards Chairman) who wrote back "Yep, like it says in the rules. I will endorse any award for just about anything as long as the applicant can prove the effort. So a VHF, 50 MHz and 144 MHz and other bands will be gladly done." You can email Thom at qrparciawards@yahoo.com.

So let's take a look at the potential VHF QRP endorsements on the QRP ARCI Awards. One of the more unique awards available is the 1000 Miles Per Watt Award (KMPW). You can qualify for this award by making a contact with distance in miles divided by your transmit power exceeding 1000 miles per watt. For example, if your transmit power is 1W, then contacting another radio amateur 1000 miles or more away would qualify you for this award. Similarly, a contact made with 0.1 W would need to cover 100 miles or more. (100 miles/ 0.1 W = 1000 miles/watt) This award is very achievable on the VHF bands (and higher). Thom told me that he has issued KMPW on every band from 160 Meters all the way up to 33 GHz. On 50 MHz, a 1 W signal ought to do OK for 1000 miles during a really good band opening. For 144 MHz, I am thinking I could take a large yagi to the top of a mountain and work 100 miles with 100 mW. Or would 10 miles with 10 mW be easier? Clearly, you'd want to use SSB or CW for the best weak signal performance. Take it one step further and you'd need to work a station 1 mile away using less than 1 mW.

I asked Thom whether this kind of short distance/ultra-low power QSO was consistent with the spirit of the award. He said "yes" and gave me an interesting example of a flea-powered VHF contact that qualified for the award:

"On June 20, 1987, OK1DKW and OK1OFK successfully transmitted/received a signal over a distance of 14 miles using a power output of 160

nanowatts at a frequency of 144 MHz. I have heard that the transmitter used was nothing more than a common signal generator connected to an antenna."

Now that is taking QRP to an extreme.

WAS-QRP

QRP ARCI offers the WAS-QRP award. This Worked All States award is issued for confirming 20 or more states while running QRP. Endorsement certificates are issued at 30, 40 and 50 states confirmed. Completing these contacts on only one VHF band, such as 50 MHz or 144 MHz, would qualify you for a single band endorsement. This creates a reasonable single-band QRP VHF award. Using multiple VHF bands (say 50 MHz and up) to complete these contacts could result in a "VHF" endorsement. Again, anything reasonable will be accommodated.

Another QRP ARCI award is the WAC-QRP (Worked All Continents, QRP). This is applicable to 50 MHz but is probably not possible on the higher bands. The DXCC-QRP award is for working 100 of the official DXCC country list on QRP. This also is achievable on 50 MHz but probably not likely on the higher VHF/UHF bands.

County Hunters can go for the County Hunter-QRP Award, earned by working at least 500 counties in the USA. This award can be endorsed for single-band or VHF operating.

Grid Square-QRP Award

The Grid Square concept is not limited to just VHF and higher. Some HF awards have adopted grid squares as part of the award criteria. The Grid Square-QRP award is one such award, issued for confirming a minimum of 100 grid squares on any band. This award was really created with the HF bands in mind, but we can apply a 50 MHz, 144 MHz or "VHF" endorsement to this award and morph it into a VHF award. This actually sounds a lot like the VUCC award except now it is explicitly QRP.

To encourage contacts between QRP ARCI members, the Worked All ARCI award goes to applicants that have worked 50 or more QRP ARCI members. This award can also be endorsed with anything reasonable, so it can become a VHF award.

Summary

By now, you should see that the QRP ARCI Awards are a very flexible and accommodating awards program that applies to VHF and higher bands. This is fun stuff, so I encourage you to take a look at these awards and figure out which one you want to take on as an operating goal. Perhaps you'll think up some additional endorsements that make sense. Also, you may know of other QRP VHF awards that I haven't mentioned in this column. Please drop me an email with your comments.

—72 and 73, Bob KØNR

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Resources:

QRP ARCI Awards: http://www.qrparci.org/arciawds.html

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

ARRL Grid Info: http://www.arrl.org/locate/gridinfo.html

Rule Highlights For QRP ARCI Awards

http://www.qrparci.org/arciawds.html

For any radio-operating award, you'll want to check out the details of the rules so you are sure to understand all of the fine points of earning the award. Here a few highlights of the QRP ARCI Awards program:

- All awards offered by the QRPARCI are available to any licensed amateur radio operator worldwide.
- The fee for all awards or endorsement certificates for W/K amateurs is $4.00 US or for non-W/K $5.00 or 10 IRCs.
- For most of these awards, confirmation must be obtained to claim credit. Regular QSL Cards, Mobile Reply Cards and EQSL (http://www.eqsl.cc) cards are accepted.
- For the Worked All ARCI Award, QSL confirmation is not required. A copy of the GCR form attesting that 2 amateurs have examined your log for the required info is all that is needed.

One thing to be aware of is the definition of QRP power level. The QRP ARCI defines QRP 5 watts output on CW and 10 watts PEP output on SSB. This is inconsistent with the definitions used by the ARRL VHF contests for the "Single Operator Portable" entry category. The power limit for this QRP category is "ten (10) W PEP output or less," independent of mode. This is a fine point, but if you are active during the contest and chasing QRP ARCI awards, you'll want to stay at 5W or below on CW.

Is Your QRP ARCI Membership Up-To-Date? (Hint: Check Your Mailing Label)

Your *QRP Quarterly* mailing label includes the expiration date of your membership and subscription. If it also has a reminder to "Renew Now," it's time to fill out the form on page 64 and send it to the Treasurer, or go to the club web site — www.qrparci.org — and complete the renewal, including PayPal credit card payment.

Keep your membership current and don't miss the next issue of *QRP Quarterly* !

The QRP Home Companion: Sharing the Wealth

Anthony A. Luscre—K8ZT k8zt@arrl.net

"Wisdom is like electricity. There is no permanently wise man, but men capable of wisdom, who, being put into certain company, or other favorable conditions, become wise for a short time, as glasses rubbed acquire electric power for a while." —*Ralph Waldo Emerson (1803-1882)*

The key to knowledge is the challenge to accomplish results. In my day job, I often teach people to use complex software programs with hundreds of features. Unfortunately, some of my trainees think I can open their skulls, pour in my accumulated knowledge and they will walk away as experts in using the software. I find that most people, including myself, are much more successful in learning when one of two situations occur—they have a project that needs to be done or they are required to teach others.

If you want to learn how to do something, having a project that you are passionate about greatly enhances the learning process. Even more effective is teaching the skill to your peers.

Learning in a Vacuum

Many of you may remember the hours you put into studying to pass or upgrade your license. Most of us also realize how much of that "knowledge" vanished from our brains, starting even as we left the testing center.

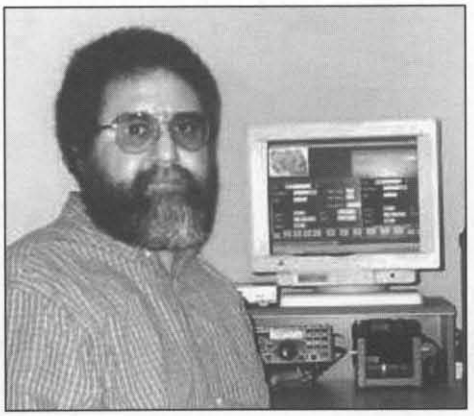
The concept of "Incentive Licensing" has already been debated ad nauseam. Whether you loved or hated it, one thing was very clear—studying material to pass a test had very little lasting effect. But when there is something you *really* wanted to do in amateur radio, I'll guarantee we will see a much greater retention of the material you learned to accomplish that goal.

My Challenges for You

As we approach the end of the year, I would like to challenge you to:

1. Learn Something New
2. Share Your Knowledge

I have some ideas to get you started.



Learn Something New

The best way is to first identify a new ham radio activity or skill you would like to try: I've mentioned many examples in my previous columns* (try a new operating mode or band, build a rig or accessory, experiment with new antenna designs, prepare yourself for emergency communication by taking the ARRL course, etc).

You can further enhance the project and your learning by working together with a group of hams.

Share the Knowledge

In the "olden days" there were really only two ways to share the knowledge-in person or by writing for magazines or books. Today, the Internet has provided a third, highly accessible, means.

- *Elmering*—One of the greatest gifts a ham can give back to the hobby is to act as an Elmer.
- *Teaching a Licensing Class*—Be a public speaker. Provide programs for local organizations and/or put on public demonstrations of Amateur Radio for fairs, schools, etc.
- *Writing*—Write articles for your local radio club's newsletter or for a ham radio magazine (Especially our own *QQ*).
- *Publishing*—Writing a book and getting it published was once a fairly difficult task but with today's software and duplication equipment, a self-published soft cover book or booklet is quite a viable endeavor.
- *Create a Web Page*—Probably the ideal way to share your ham radio knowledge is to create your own web page. Work at your own pace. There are no deadlines and it is easy to change mistakes or update information. Your work is available to your audience, immediately worldwide with no mailing or printing costs. You control the content, style and functionality.

Web Site Hosting

You may have heard that web sites are expensive, hard to maintain and require learning all that HTML stuff. The good news is that these are all myths (usually put out by people who want to impress you with their own web site or want to charge you to design and build your site).

You can create a site for free thanks to Alan L. Waller, K3TKJ and his free hosting of ham radio web sites at http://www.qsl.net. He got myself and many, many others started in producing our first web sites. Alan's work is a real gift to the ham community. To learn more, stop by http://www.qsl.net. Then start your own ham radio website and make a donation to help support his fine efforts.

If your site outgrows QSL.net, you can find hosting companies that will host your website and even let you register your own domain (i.e. www.yoursite.com) Rates starting at under $7 a month are easy to find. Do a web search for web site hosting. There are also other "free" site hosting offers but most carry advertising on your pages and require you to use their domain (i.e., www.geocities.com).

Creating Web Pages

No need to know HTML coding to build your first site. If you can word process, you can build a web page. Free, easy to use, WYSIWG software called Composer is available from www.mozilla.org. I built all the pages on my site using Composer. If you want to create more complex pages, Macromedia and Adobe make excellent (but not inexpensive) software called Dreamweaver and Go Live respectively. The learning curve can also be fairly steep on both of these products. A very popular in-between product from Microsoft is Front Page (personally not my favorite as it often uses proprietary coding

schemes and results in "bloated code"). Try the free Composer first and save yourself the time invested in the steep learning curve and some cash.

Content, Content, Content

The main reason that I suggest that you keep the page creation simple is so you can concentrate on the content. If location is everything in real estate, content is everything in getting return visitors to your web site. If you build it and it provides users with information they can use, they will come! If you want them to return, make sure you keep content up to date, useful and dynamic (adding new content frequently).

Five basic content varieties include: links to other sites, original content, content from other sources, databases and interactive forms.

Links to Other Sites

Links are a way to direct users to helpful information at other web sites. Successful linking is dependent on selecting and grouping helpful sites. You need to visit sites you plan on linking to and evaluate each site's content. Ask yourself the following questions:

- Is the information accurate and kept up to date?
- Does it fit in with other sites you are linking to?
- Does it provide important information for a visitor to your site?
- Is the content already well represented in your other links?
- Does it fill a void in information lacking in your other links

Finally, frequently check the links from your page to make sure they are not "broken" (is the other site still online, is the address still correct, and is the content still relevant?).

Original Content

Links are good, but what if everyone had web sites full of links to other sites and no content of their own? That would be like everyone listening and no one calling CQ, resulting in no QSOs. Original content does not have to be prize-winning prose. Examples of content can be: simple lists of information, equipment photos, illustrations or schematics, the step by step description of how you solved a problem, built a better mouse trap, successfully modified a piece of equipment, descriptions of antenna projects, etc.

Content From Other Sources

You didn't invent the resistor color code but having a handy copy on your web site can be very useful for someone who has forgotten whatever little mnemonic device they used to learn the color values. Do you have a friend who has plenty of information to share with the QRP community but doesn't want to create their own web site? Your local ham radio club's newsletter editor might have plenty of content to share. Don't forget about information/instructions for older equipment that many users may no longer have manuals for.

Important note: Whenever you use content from others, make sure you obey all appropriate copyright laws. If you would like to reproduce material from another person's web site instead of linking to it, contact the owner for written permission to use the material (this also includes photos and illustrations).

Databases

Databases are collections of information in a user searchable format. Callbooks, QSL Managers and Online Log Books are some examples of popular databases on Amateur Radio web sites. Uploading of new data may be automated (daily download from FCC ULS) or manual (the web master has to upload new information or databases). In some cases, user input is possible (a common example is the ubiquitous online opinion polls). Databases usually require more sophisticated coding then your average content page. Those with programming experience can often easily make the jump. Fortunately for the rest of us, many of the higher end webs designing packages have the ability to build interactive or database pages or we can acquire turnkey online database systems.

Interactive Forms

Similar to databases, interactive forms allow the page users to add or exchange information with the page owner or other users. One simple example is "Guest Books." Online forums allow users to post questions and answers to each other and other page visitors. Even simple guest books can be adapted to other tasks. Last year when my local radio club ran a year long special event call sign for the Ohio Bicentennial (KO8HIO), we needed any easy way to know when someone else was using the call sign and what band they were using. Stations would leave a guest book entry stating starting time and band before transmitting. Before beginning operation, each station would check the online guest book to see if the call sign was in use. When an operator was finished, he would enter QRT or QSY information in the guest book.

Again, there are ready to use interactive coding page examples—or scripts—as they are known. You can check my web site for links to sources of free or inexpensive scripts.

Web Site Style and Design

Your can let your imagination go wild with colors and graphics when designing your own web page. Unfortunately, a lot of the resulting pages can be hard on the eyes, difficult to read or very slow to load.

I could fill the entire *QQ* with design suggestions (fortunately my editor will not let that happen). My suggestion is to visit a number of web sites and find examples of styles that are easy on the eyes, easy to read, aesthetically pleasing and fast loading.

My top five suggestions are:

1. Use page and text colors that work well together
2. Avoid using excessive or difficult to read fonts
3. Control page layout by using tables and/or frames
4. Avoid pages that require the user to scroll right or left when reading
5. Optimize file size, resolution and quantity of graphics to avoid slow loading pages.

Static is Bad

Always remember, you are writing a web page not a book, so there is no final copy. Web sites should always take advantage of their strongest point—flexibility. Revise, correct, update and add content frequently!

—72, de K8ZT

*For links to columns visit my web site www.k8zt.com/qrp-com.html. ●●

QRP Contests

Tom Owens—WB5KHC wb5khc@2hams.net

I want to take this opportunity to thank those who have modified their modus operandi to using the forms when submitting their contest results. It eases the task of getting all the information sorted into a format that is used to generate the certificates, the web updates and the mailing labels.

Thru trial and error and over time, we have found that the forms work only with Internet Explorer V4 and later. You can not use Opera, Netscape or Firefox to submit using the forms. You will get a blank email when you click on "Submit" or I will get partial information only which will result in a flurry of emails back and forth trying to determine why.

Please, use IE when submitting your contest results. There are NO popups, adware or spyware on the contest server to worry with. IE is installed on virtually every computer sold and according to some sources has 93% of the browser "market." Take a couple moments to launch it and input your contest results then you can return to using your preferred browser. Your information gets published much quicker if the information comes in formatted for immediate use and I don't have to re-key your entry.

Thanks also to those who recently made announcements on the listservers to which they are members about our upcoming contests! Multiple announcements from different sources helps increase our contests participation. More people equal more fun and more contacts!

With band conditions being poor, propagation in the doldrums and us being in the bottom of the sunspot cycle every bit of advertising enthusiasm we can muster will help to increase the contest participation level. If no one is working the contest but 10 people it sure makes it difficult to keep your rate up <grin>. We need to get more QRPers to take advantage of the contests by publicizing our contests in any ham related venue, not just the contesting areas.

Perhaps next year, we can have more spontaneous contests like the recent QRP SK Memorial contest. A suggestion was made on the QRP-L listserver and within three hours the ARCI Contest website had a new contest listed with rules and submission forms published! Another suggestion has been made about an OF (QRP Old Farts) contest where the exchange would be RST, STATE (S/P/C) and Year First Licensed. The score calculation would include bonus points based on the sum of the Year First Licensed. An interesting possibility and a fun contest—would require a different strategy to win top place.

We probably won't have another new contest this year as the upcoming schedule is getting full but next year we may substitute new contest ideas for some of the contests that had slim participation in years past.

It doesn't look like we will be having a QRP Vintage contest as there was zero ideas submitted and no comments received concerning it.

Speaking of equipment, during the Milliwatt Field Day contest there were 11 Elecraft rigs used among 15 contest entries! Does that tell you something about the "rig of preference" among QRPers? Or, was this just a fluke of statistics?

In closing, please keep our friends and fellow QRPers down in the southeast in your thoughts and prayers during the current hurricane season.

I'll see you in the next contest! Adios from Texas...

—72 de Tom, WB5KHC

MARK YOUR CALENDARS!

Fall QSO Party
Oct 23 1200Z to Oct 24 2400Z (CW)

Topband Sprint
Dec 2 0000Z to 0600Z (CW & SSB)

Holiday Spirits Homebrew Sprint
Dec 5 2000Z to 2400Z (CW)

Hootowl Sprint 2004
Top Three Finishers

Call	Score	Name
NK9G	25,116	Rick McGaver
W5TA	17,199	Dick Foster
W1SA	9,408	Alan D. Kamman

Soapbox comments—
Hootowl Sprint 2004

Was it my imagination or did band conditions really stink?? Spent contest time between QSOs learning how to use the new IC-703. See you next time!—**Al Kamman, W1SA**. All contacts were worked with an 85' end fed random wire with a 17' counterpoise while portable and on battery power.—**John Stooksbury, KW4JS**. VERY slow contest. Just operated in spurts, waiting for activity. I guess everyone was tired out from CQ WPX or Memorial Day or whatever.— **John Sielke, W2AGN**. Band Conditions were not the greatest. By 8 pm my local time, QSB and QRN levels were high with few takers on 40m. 20m was completely dead by 8pm.—**Don Minkoff, NK6A**. QRN terrible from same storms that shut down Indy 500!— **Paul Kirley, W8TM**. Please consider changing the rules to allow everyone to operate the same four hours. The staggered start and ending times are a disaster. How do DX stations participate? How do we work stations not within three time zones? How can they work us? When the contest started, we could have worked stations to the west on 20M, but by the time they could operate, the band was out. I assume stations in KH6 cannot work stations on the east coast at any time and count in the contest. Same for Europe. I heard LZ2RS/QRP on 20 M, but he wasn't permitted to operate. I guess his four hours had started many hours before when no one in the US could work him in the contest.—**John T. Laney, III, K4BAI.** Conditions not very good. Plus, I was "pooped" from operating WW2DDM in the CQWW CW WPX contest.—**Stan Reas, K4UK**. I've worked a number of these QRP Sprints and this year's Hootowl Sprint had the worst conditions of any of

Hootowl Sprint 2004

Award	Call	QTH	QSOs	PWR	PTS	SPC	Bonus	Score	Time	Bands	Rig & Antenna
1st Place	NK9G	WI	36	LT5	156	23	0	25116	3.1	40.20.	Jupiter + Moseley PRO, rotatable dipole
2nd Place	W5TA	TX	24	LT5	117	21	0	17199	3	40.20.	Orion + 20M 5/8 Vert, Butternut HF-2V
3rd Place	W1SA	VT	24	LT5	96	14	0	9408	4	40.20.	IC-703 + TH6DXX, 40m Half Sq.E
Top Score TN	KW4JS	TN	11	5	55	8	5000	8080	2	40	K1 + 85' EF Random wire
Top Score PA	KB3AAG	PA	3	LT5	15	3	5000	5315	4	40	KX1 + Temp. G5RV
Top Score OH	W8TM	OH	13	LT5	62	12	0	5208	2.5	40	K1 + 40m Inv. Vee
Top Score GA	K4BAI	GA	11	5	52	11	0	4004	0.75	40.20.	FT1000MP + TH6DXX, Zepp
Top Score VA	K4UK	VA	13	5	56	10	0	3920	1.5	40.20.	? ?
Top Score NJ	W2AGN	NJ	12	LT5	51	10	0	3570	1.5	40.20.	Argonaut V + KT34, 300' Loop
Top Score FL	N3JV	FL	10	5	47	9	0	2961	0.75	20	IC756 PRO II + Flagpole Vert. 16'
Top Score CA	NK6A	CA	10	5	44	9	0	2772	2	40	K2 + Force 12 C4
Top Score AL	W4RYW	AL	10	LT5	49	8	0	2744	2	40.2	FT847 + 160m Vert full wave loop
Top Score NH	W1PID	NH	9	5	36	6	0	1512	1.5	40.20.	FT817 + Windon OCF dipole
Top Score KS	KCØPMH	KS	5	5	19	4	0	532	1	40	FT817 + LDF Autotuner, 102' doublet

them. 20 meters went out early (before 0200Z), but that is to be expected considering where we are in the sunspot cycle. While it was open there was little activity that I could hear, but the good news was that the skip was long. I have seen Sprints when I didn't work anything northeast of Ohio on 20. This time I worked several mid-Atlantic and New England states, and even a VE1 in New Brunswick. When 20 died I QSY'd to 40m and was faced with the most orrendous thunder storm QRN I've ever heard on 40m. I listened on 80m after 0400Z and didn't hear a single QRP signal. I learned from the weather man the next morning that a band of nasty thunder storms were working their way across the country that evening. These were all north of Texas but still blanketing 80 and 40 meters with terrible QRN. I worked very few Midwest 8s and 9s which are usually the majority of the QSOs in these QRP sprints. I hope this Sprint is as bad as it gets. Looking forward to hearing y'all in the next one. Very 72,—**Dick Foster, W5TA**. Rained here with lots of static crashes 20 was noisy, but quieter than 40 where was everyone 40 was so so, more paricipation! sometime hot, sometimes not! Did listen on 80, Heard NO ONE!! All In All It was lots of fun—**Rick McGaver, NK9G.** Terrible QRN, 20m died at 8:30pm... QUITE a challenge!—**Joseph G. Gay, W4RYW**

Milliwatt Field Day
Top Three Finishers

1st Place Class 1A:
Guano Reef Bashful Perverts—N4BP

1st Place Class 1B:
Jim Lageson—WQØRP

Highest Score Less Than 1W:
D.A. "Mike" Michael—W3TS

Soapbox Comments—
Milliwatt Field Day 2004

A very nice weekend...lots of activity. I need to use the K-1 more. What a rcvr. —**Joseph E. Vrabel, KD2JC.** Great fun!

Milliwatt Field Day 2004

Name/Call	QTH	Power	CW QSOs	SSB QSOs	Points	Score	Time	Rig + Antenna	Class
Guano Reef Bashful Perverts–N4BP	FL	LT5	1023	13	2059	14,413	27	K2 + 4BTV, tribander, dipole	1A
Jim Lageson–WQØRP	MN	LT5	532	0	1064	7448	18	K2 + CF Zepp	1B
D.A. "Mike" Michael–W3TS	PA	LT1	313	0	626	6,260	18	HB Xcvr + feed tuned doublet	1B
BEARS Seattle Boeing ARS–K7NWS	WA	LT5	217	126	560	3920	24	KX1, FT-817, TenTec Argo V, TS-2000, Triton IV + delta loop, 40m collinear, A3S, 15m yagi	4A
Werner Haschke–WA8VNE	MI	LT5	284	0	284	3,976	10.3	K2 + 40M G5RV	1B
Matt Lee–K4AQ	GA	LT5	258	18	534	3,738	15	FT-897 + OCF stealth ant	1E
Doug Ferris–VA3DF	ON	LT5	246	39	521	3647	18s	K2+ Vertical dipole, doublet	1B
Joseph E. Vrabel–KD2JC	NJ	LT5	203	0	406	2,842	15.5	K1 + Dipole	1B
Hawaii QRP Club–KH6IN	HI	LT5	172	15	359	2513	24	K2, Argo 5 + tribander, vert	1A
T. N. Colbert–K3HX	PA	LT5	74	0	148	1,036	6	TS-870+ inv-L, dipoles	1E
Jack Falkenhof–K4BYF	FL	LT5	65	0	130	910	16	K2 + 80m Loop	1B
Philip Schweitzer–KØCD	WI	LT5	0	91	91	637	14	FT817 + doublet	1B
The Eastern PA QRP Club–N3EPA	PA	LT5	170	167	507	507	24	(2) K2, FT-817 + Wires, SWAT-4	3A
Stan Reas–K4UK	VA	GT5	210	0	420	420	14	K2 + Dipole	1B
Albert Bowers–KA6FBB	CA	LT5	14	0	28	196	12	K1 + 24' End-fed wire	1B
Greg Harris–WB9MII	IL	LT1	6	0	12	120	6	FT817 + Indoor Zepp (condo)	1D

Summer Homebrew Sprint 2004

Finish	Call	QTH	Bands	Power	QSOs	Points	S/P/C	Bonus	Score	Time	Rig + Antenna
1st Place & #1 FL	N4BP	FL	160-10	LT5	80	317	51	30000	143169	4	K2 + TH7, 40M Dipole, 80/160 Dipole
2nd Place & #1 MI	K8DD	MI	40-10	LT5	49	224	38	20000	79584	2:26	K2 + 40m dipole, Patriot, X7
3rd Place & #1 UT	WA7LNW	UT	20	LT5	61	263	33	5000	65753	3.5	K2 + 2-el HEX beam
#1 GA	K4BAI	GA	40-10	LT5	53	235	38	0	62510	4	(2) FT1000MP + TH6, Zepp
#1 VA	K4UK	VA	80-15	LT5	34	142	26	20000	45844	3:20	K2 + 160M Dipole, Ladder Line Feed
	W8TM	OH	40-15	LT5	38	157	28	15000	45772	2	K1 + ladder line 40 m inv. vee
#1 HI	KH6B	HI	160-10	LT5	6	12	6	35000	35720	2	K2 + 48' Vertical Loop
	VA3DF	ON	40-10	LT5	22	104	21	20000	35288	4	K2 + Tribander, 88 foot doublet
#1 WI	WA9PWP	WI	40-15	LT5	18	75	17	15000	23925	3.25	K1 + Carolina Windom, HF6V
#1 PA	NA3V	PA	40-20	LT5	27	117	23	0	18837	3.6	IC756 + 130' Doublet
#1 IN	KC9BXV	IN	40-20	LT55	11	46	9	15000	17898	4	Explorer II, Emtech + vert, inv-Vee
#1 IL	N9RY	IL	40-20	LT5	8	34	8	15000	16904	1.5	K2 + Inv-Vee, 30' random wire
#1 MN	KEØG	MN	40-20	LT5	24	105	16	5000	16760	2	K1 + 80m OCF dipole w/tuner
#1 WI	NK9G	WI	40-20	LT5	15	60	13	10000	15460	35	K1 + Pro 57, 40M Rot. Dipole
#1 40M	K8KFJ	WV	40	LT5	14	64	11	10000	14928	4	K1 + Random wire and counterpoise
#1 TN	KW4JS	TN	40-20	LT5	19	89	15	5000	14345	2.7	K2 + 80m Vertical Loop
#1 MO	KØLWV	MO	40-20	LT5	21	78	21	0	11466	?	FT757GXII + Dipoles
#1 less than 1W	K2EKM	VA	20-15	LT1	4	20	4	10000	10800	?	VXO RockMites + 88 foot doublet
	K4BYF	FL	20	LT5	14	61	13	5000	10551	:46	K2 + 80m Loop
#1 NJ	W2JEK	NJ	40-20	LT5	3	15	3	10000	10315	1	OHR-500 + 40m dipole, 20m GP
#1 KS	WBØSMZ	KS	20	LT5	12	52	11	5000	9004	1	Norcal 20 + Butternut Vertical
#1 TX	W5KDJ	TX	20	LT55	5	25	5	5000	7500	2	K1-4 + Yagi
	KCØPMH	KS	20	LT1	7	32	7	5000	7240	:48	MFJ Cub + 102' Doublet
#1 OK	K5DP	OK	20	LT1	7	35	6	5000	7100	0.5	HW-9 + 40 meter horizantal loop
	KO4WX	GA	20	LT5	1	5	1	5000	5035	:30	IC706 + High Sierra
	W9CC	IN	40-20	LT5	11	52	11	0	4004	1.75	IC-756 PRO II + Inverted Vee
#1 High Bands	K4AVX	KY	20.15.10.	LT5	11	55	10	0	3850	2.2	FT 817, DSW-20 + 80 meter dipole
#1 AK	AL7FS	AK	20	LT5	4	17	4	0	476	0:25	Omni 6+ + KT34A

Good folks although lousy conditions here. Found out how long my solar charged battery will run (abt 30 minutes). 72.—**Tim Colbert, K3HX**. The weather man said no rain in the forecast... he lied. I used 4 VW solar panels for power 100% of daylight time. Rig was an FT-817. received visit from Dave Kaun, N9KMY EC St. Croix County Philip Schweitzer, KØCD. It was work, but FUN, QRPp and with indoor antenna.—**Greg Harris, WB9MII**. I used the Club call W4FCR. I was going to run my K2 on a battery that had been charged by Solar Power to make the 5 QSOs and get the 100 point bonus for "Natural Power Operation," but I went ahead and ran the K2 'QRO' at 14 watts on the battery for the whole contest.—**Stan Reas, K4UK**. Granddaughter paid a surprise visit so had less time on radio but what a fun time late night on 40. worked most everything I heard.—**Werner Haschke, WA8VNE**. Hawaii QRP Club and Hilo ARC, using memorial call KH6IN, operated again this year from Laupahoehoe Point Beach Park. Mosley TA33JR was blown down from strong mountain wind. We had to finish the event using only the 40m vertical. Even so, we bettered last years record score. 72, Aloha! Operators this year:—**KH6ZM, AH6NJ, NH7D, WH6LU, KH7FV and KH6B**. First Milliwatt Field Day. Started on 20m but it was wall to wall sigs; couldn't raise anyone. Went to 40m and had a BALL and went back to 20m later.—**Albert Bowers, KA6FBB**. Battery power all the way for 2004 FD. Lots of fun.—**Doug Ferris, VA3DF**. Had to go to a wedding Saturday night, so did this one from the backyard.—**Jim Lageson, WQØRP**. The EPA-QRP Club had a great time. We set up at a state park in Eastern Pennsylvania. See the special edition of our newsletter for details and pictures. http://www.n3epa.org/Newsletter/FieldDay04.pdf—**Ronald J. Polityka, WB3AAL**. Low QRN, but poor conditions made it hard work for every QSO with 1 watt. CQing did not work; all done by hunt and pounce.—**Mike Michael, W3TS**. We were really short on CW operators this year. Must begin a campaign to develop more operators. A good time was had by the few. We operated in the field adjacent to the K7NWS shack in Kent, WA. We ran class 4A (battery) with 5 watts or less. Rigs included a KX1 (primary CW rig), FT-817 x2, Ten Tec Argo V, KNWD TS-2000 cranked to 5 watts, and an old Ten Tec Triton IV cranked to 5 watts. We had 1-1/2 CW shacks and 2-1/2 SSB shacks.—**Phil Decaire, WB7AEI for BEARS Seattle Boeing Amateur Radio Society K7NWS**.

Summer Homebrew Sprint
Top Three Finishers

1st Place & Top Score Florida:
Bob Patten—N4BP (143,169)

2nd Place & Top Score Michigan:
Hank Kohl—K8DD (79,584)

3rd Place & Top Score Utah:
Jack Reed—WA7LNW (65,753)

Soapbox Comments—
Summer Homebrew Sprint 2004

Very poor condx and storm static for

entire sprint. Highlights: Working two KL7s and UR on 20M and G3NYY on 40M with booming signal. Logged with new version of free N1MM Logger.—**Bob Patten, N4BP**. It was cool to move up the bands with some stations!—**Hank Kohl, K8DD**. Only one QSO on 80 and 15 Meters. Nothing heard on 10 Meters. Enjoyed Sprint again. Surprised to be called by two English stations.—**Stan Reas, K4UK**. We set up in a shelter at Voorhees Park. K9DRP used a push up mast and a inverted vee on 40 meters. WD9EYB used the Voorhees Vertical quarter wave on 20 meters. K9DRP used an Emtech 40 meter rig. WD9EYB used an Oakhills Explorer II on 20. K9VDQ used a HW-7 on 15 meters but didn't make any QSOs. The other ops helped setup and gave encouragement.—**Eastside Outdoor Ham Club, KC9BXV.** Started late but enjoyed myself! Good chance to check out the new antenna system at VA3DF.—**Doug Ferris, VA3DF**. Propagation was poor in Hawaii at midday, but was good during the IARU HF event. My field location was Kaloli Point, south of Hilo. NH7OD agreed to band-hop, giving me all 6 bands. 72 & Aloha—**Dean Manley, KH6B**. Was great to use my milliwatt Rockmites again (380 mW on 15m, 700 mW on 20m). Had to tear myself away from my new main "QRO" rig, a TenTec Argonaut V (g). Always amazed at how well milliwatts can perform! 72—**Bill Gregory, K2EKM**. Yuckie band, CU next contest—**Wayne Rogers, W5KDJ**. Conditions on 20 were good at first on 20 but faded and few signals heard on 40 here in SE Wisconsin. Had some noise. Just short on time to participate longer but had fun!—**Rick McGaver, NK9G**. In the spirit of the contest I dusted off the MFJ Cub and put the little beast on the air—none too shabby and as always I had a blast! Thanks for all your work and God Bless you and yours, 72/3!—**de Wayne Stephen Dillon, KCØPMH**. Returing from NC to take my daughter to camp—too late to get home to operate—so operated /M in South Carolina. Only contacted Jack WA7LNW, who was booming in to SC from Utah. IC706 turned down to QRP and worked him from SC/GA border (contact made in SC).—**72 de Mike Boatright, KO4WX**. Delayed and interrupted by our daily summer thunderstorms.—**Jack Falkerhof, K4BYF**. I had a wonderful time on 20m. Thanks to everyone if was great fun!—**John Stooksbury, KW4JS**. FIRST time in a contest working portable!—**Larry Mergen, KØLWV**. Started late but was a lot of fun even with the QRN!—**Larry R. Card, W9CC**. Made 3 of 20 meter contacts on DSW-20, and used the FT-817 for all others. 15 and 10 meters were good for short skip, but only found the same stations there. Worked K8DD on 3 bands. 40 meters was unusable due to extreme static and poor conditions. Finally had to get off the air because of lightning nearby.—**John Farler, K4AVX**. I made a big mistake getting on late and missing more than the first hour. I only managed FL, PA, UT and WY and at 2145Z after about 25 minutes of operating it was like my receiver went dead EXCEPT at the same time, N4BP cam up from 339+ to 569+. I just checked again at 2230Z and I can still only hear N4BP and WØNTZ/7 in WY. Also thank you to WA7LNW and WB3AVD for the QSOs.—**73 Jim Larsen, AL7FS**. Operated from patio with antennas in the trees.—**Ron Yomantas, N9RY**. Not much activity.—**Donald C. Younger, W2JEK**. Rough "summer" band conditions made most signals S-5/3 here in southwestern Utah. Thanks to everyone who took the time to dig my signal out of the noise in order to make a contact.—**73s de Jack Reed, WA7LNW**.

Contest Announcements

For all contests — See the contest website http://2hams.net/ARCI for the link to submit your contest results. Entries should be mailed to the Contest Manager:

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

2004 ARCI Fall QSO Party

Date/Time:
October 23, 2004, 1200Z through October 24, 2004, 2400Z. 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 for QSO points and SPC credit.

Power Multiplier:
>5 W = x1
>1 - 5 W = x7
>250 mW - 1 W = x10
>55 mW - 250 mW = x 15
<55 mW = x20 (Note the higher Multiplier)

Suggested Frequencies:

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

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. Teams need not be in the same location. Team captains must send a list of members to the Contest Manager before the contest.

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 TEST as possible, or call CQ QRP or CQ TEST yourself. You can work a station for credit again if on a different band.

What to send:

Give a signal report + your state (for Americans), province (for Canadians), or country (for everyone else) + your 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 QRP participation of all QRP contests!

Relative challenge:

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

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

2004 Topband CW & SSB Sprint

Date/Time:

December 02, 2004, 0000Z to 0600Z

Exchange:

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

QSO Points:

You may work each station only once, regardless of mode.
Member = 5 points
Non-member, Different Continent = 4 points
Non-member, Same Continent = 2 points

Multiplier:

SPC (State/Province/Country) total for both modes.

Power Multiplier for SSB Contacts:

>10 W = x1
>2 W - 10W = x7
>500 mW - 2 W = x10
>100 mW - 500 mW = x15
<100 mW = x20 (Note the higher Multiplier)

Power Multiplier for CW Contacts:

>5 W = x1
>1 W - 5 W = x7
>250 mW - 1 W = x10
>55 mW - 250 mW = x15
<55 mW = x20 (Note the higher Multiplier)

Mixed Mode entries use the smaller multiplier if you use different power levels for each mode.

Suggested Frequencies:

CW around 1810 kHz
SSB around 1910 kHz

Remember that 1830-1835 should be used only for intercontinental CW contacts per the ARRL band plan.

Score:

Points (total for both modes) x SPCs (total for all bands) x Power Multiplier + Bonus Points.

Bonus Points:

NEW!!! If you are operating PORTABLE using battery power AND a temporary antenna add 5000 points to your final score. [You can NOT be at your shack operating from battery power using your home station antenna to qualify for this bonus.] This is to help level the playing field for contesters who work from the field against contest stations with huge antennas.

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.

Categories:

Entry may be CW, SSB or Mixed Mode.

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:

A fun mixed mode QRP contest.

Relative challenge:

Easy to Moderate.

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

2004 Holiday Spirits Homebrew Sprint

Date/Time:

December 05, 2004, 2000Z to 2400Z.

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 for QSO points and SPC credit.

Power Multiplier:

>5 W = x1
>1 W - 5 W = x7
>250 mW - 1 W = x10

>55 mW - 250 mW = x15

<55 mW = x20 (Note the higher Multiplier)

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 + Bonus Points.

Bonus Points:

Bonus Points for homebrew gear, if you built it, it is homebrew (per band)—add 2,000 points for HB transmitter; add 3,000 for HB receiver; add 5,000 for HB transceiver.

NEW!!! If you are operating PORTABLE using battery power AND a temporary antenna add 5000 points to your final score. [You can NOT be at your shack operating from battery power using your home station antenna to qualify for this bonus.] This is to help level the playing field for contesters who work from the field against contest stations with 5 element Yagis at 70'.

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.

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. Let's use the calling frequency +5 kHz and –10 kHz for our operating range. Please avoid the FISTS calling freq on *x*.058 and the County Hunter's Net on *x*.056.5. Tune down 10 and up 5 looking for QRP CQs. The end result will be more contacts and less congestion! Please allow the Calling Frequency to be used by those who are XTAL-controlled and can't move. A station running 5 watts is QRO to a station running 55 mW especially when both are trying to work on *x*.060 MHz! Stake out a spot on *x*.052 MHz and start calling CQ QRP—let's NOT self-impose a 3 kHz bandwidth limitation upon ourselves.

What to send:

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

Relative challenge:

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

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

United States Postal Service

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I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

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