40TH ANNIVERSARY ISSUE

QRP Quarterly

October 2001 • Volume 42 • Number 4 $4.95

Journal of QRP Amateur Radio Club INTERNATIONAL

DX from HAWAII

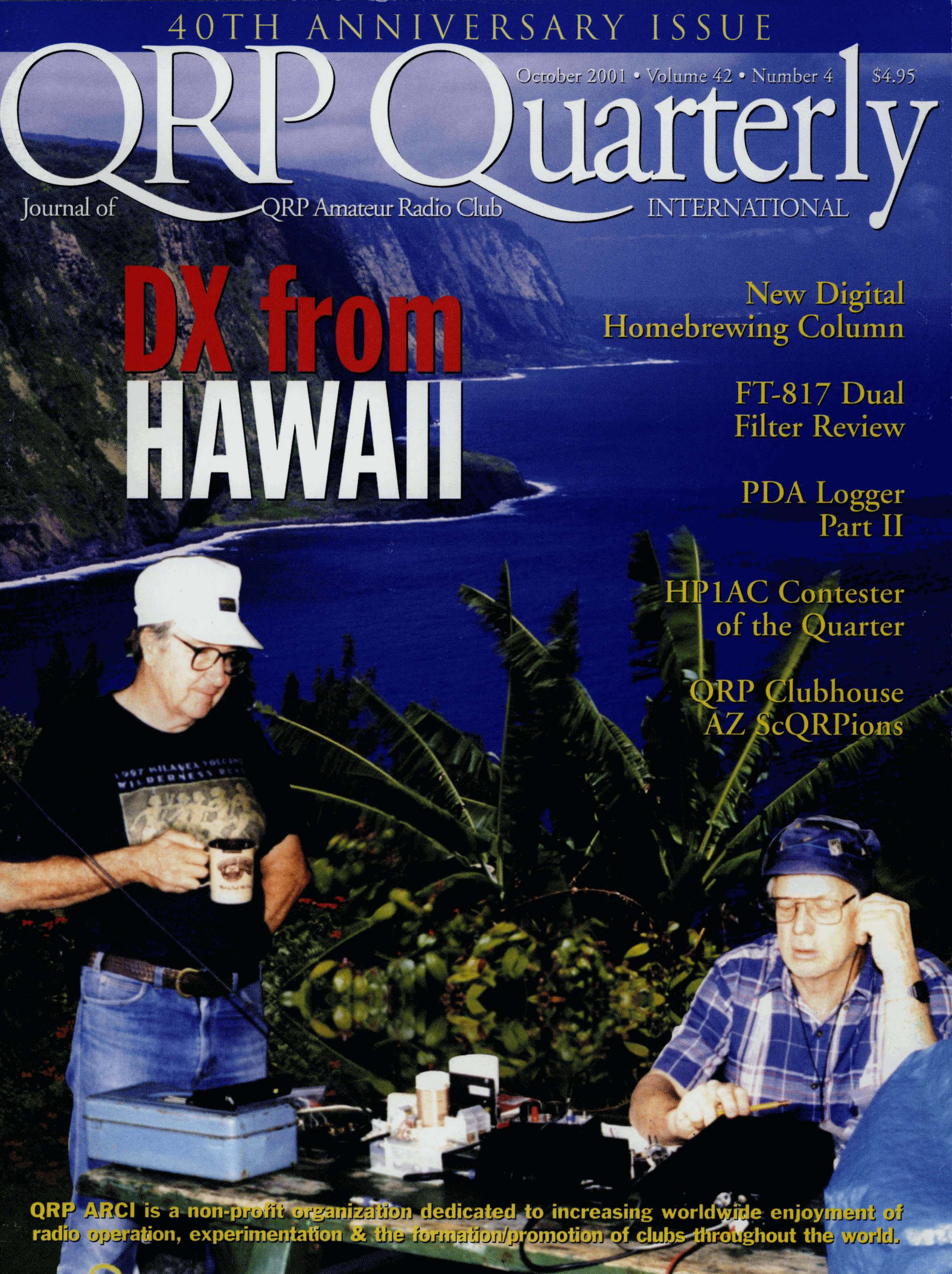
New Digital Homebrewing Column

FT-817 Dual Filter Review

PDA Logger Part II

HP1AC Contester of the Quarter

QRP Clubhouse AZ ScQRPions



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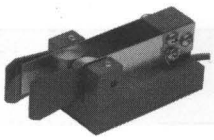

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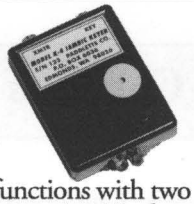

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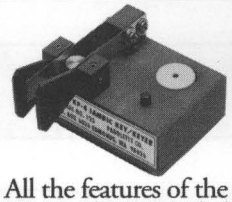

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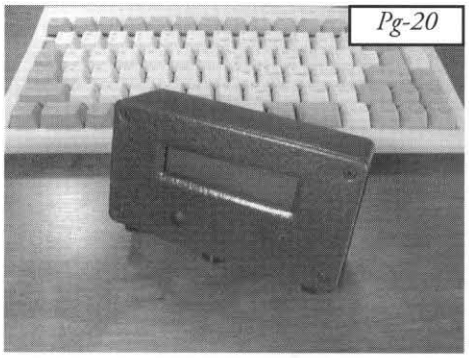
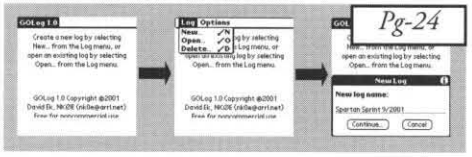
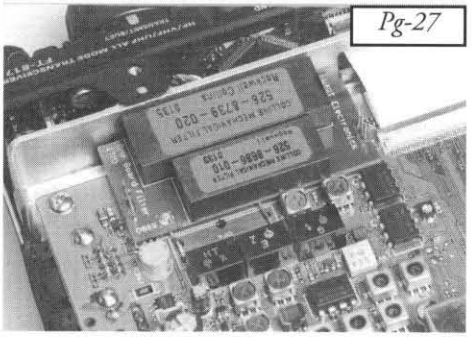
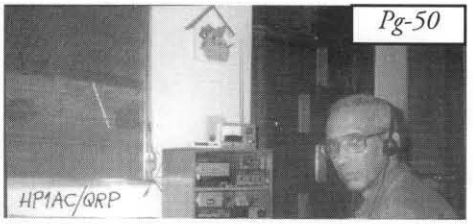
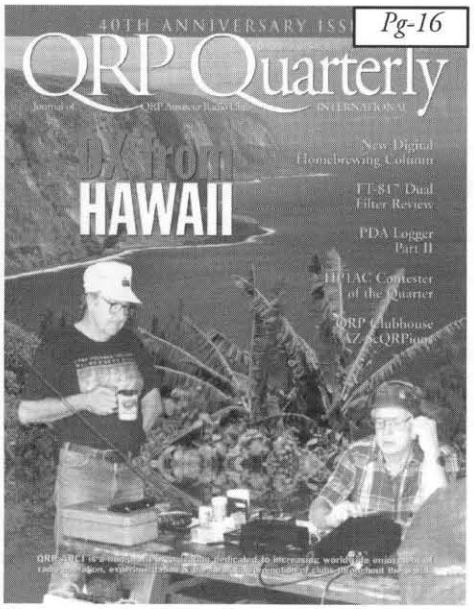
Table of Contents











Technical

Operating

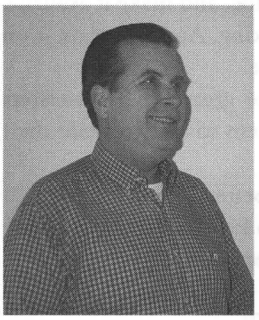
Reviews & Product Announcements

Columns and Departments

Miscellaneous

From the Editor's Desk

Craig W. Behrens--NM4T **craigwb@hiwaay.net**



It's hard to believe that the 4th and final 40th-Year Anniversary Issue is now out to the membership. It seems like yesterday that Jim Stafford, the QQ staff, and I started working on this special series. It has been quite an adventure to say the least.

And speaking of adventure, you'll notice that starting with the front cover this issue has a secondary focus on QRP DX. **Dean—KH6B** and **Don—NH6WW** check in from the Hawaiian Islands, **Harry—W6DXO** shares tales from his A25 (Botswana) QRP Safari, and **Richard—W0IS** tells us how to do QRPxpeditions to XE-Land. To get you a jump-start on your DX trophy collection activities, **Harry—W6DXO** tells us how to work DXCC in a single summer, and **Jim—AD4J** tells us about pursuing "the thrill of the hunt" via Intra-Club QRP DX Competitions.

I am pleased to announce that **George Heron—N2APB** and **Michael Fletcher—KL7IXI/7** have joined the QQ staff to further enhance our magazine's usefulness to the amateur radio community. George will help address new communications technologies of the digital kind, and Michael will focus on the QRP Clubs scattered about the world, starting with the infamous **AZ ScQRPians**. Together, they will help provide a more complete spectrum of technical information and better communications as to what our peers are doing to enjoy the QRP experience.

This issue is chocked full of neat technical stuff, true to QQ tradition.There seems to be no end to the great technical contributions from our dedicated QRP community and the mischief our membership seems to get into along the way, as they find new ways to enjoy this challenging hobby.

Mike—WA8MCQ, a "QQ institution" and QRP ARCI information repository, always gets us off to a jump-start with his ***Idea Exchange*** column. (Where does he find all this cool stuff?) There's no telling how many of us have benefited from the compendium of QRP knowledge he presents.

Larry—W1HUE has been my "rock". He not only edits and creates excellent technical feature articles, but also has advised me along the way, helping me maintain some semblance of sanity along this journey as QQ Editor.

Joe—N2CX, another long-time contributor, has his usual contributions in Mike's Idea Exchange and in his excellent ***Test Topics and More...*** column.

Mike—KO4WX always finds fun ways to make kit building and homebrewing approachable to the QRP newbies.

Greg Buchwald—K9QI is at it again, this time with another superb product review on W4RT's new OBF board.

Randy—K7TQ has another excellent contesting section and presents **Cam—HP1AC** as October's COQ. I don't know how he manages over a dozen major QRP contests each year, but I can always count on him being the first to submit his column for each issue—amazing!

Jim—KJ5TF is one of the most QRP-active guys I know. In addition to his ***Adventures in Milliwatting*** columns, we regularly have fun swapping ideas and experiences.

You will notice that this issue has a miriad of contributions from the **North Georgia QRP Club**. They have a "good thing going" there in the Atlanta area. I've never met a finer bunch of guys! They really know how to "live large" with QRP. (They have been my secret weapon for getting significant QRP activities done and done right.)

Finally, it is here that I offer my sincere thanks to all of the friends I have acquired in this position—those mentioned above and the multitude that I don't have space to thank in this column. Thanks goes to all who have assisted me in so many ways, to all who have been patient and have ignored the misspelled words, etcetera. Although I will be stepping down from being the QQ Editor, having met my one-year commitment, I intend to actively partner on QRP technical projects and create articles for future QQ issues.

As for the January QQ to come...I predict that it and future issues will be a great improvement over what we managed in 2001. The QRP ARCI staff is working hard to implement new production processes to assure this. Having great content for each issue is never a problem, since there never seems to be a shortage of excellent material from our QRP community. After all, there's the QQ's tradition of continual improvement to maintain! ●●

QQ Correspondence

Hi Guys,

Those copies of the July issue have arrived here in the north woods and all I can say is "WOW"!

Craig (and staff), you have done a SUPER job with the QQ.

And what can I say about that good-looking cover? Dave and I will have to think of something to top that with next year! :-)

Thanks again to everyone involved with the QQ for all their continuing work. You are all special people.

72, 73, (but no 88's! :-)

Ron Stark—KU7Y

Craig,

I've been eagerly waiting by the mailbox for QQ's since 1987, the quality and breadth of articles under your leadership has made the wait all the worse.

Thank you for another great issue, this one will be read in small doses to make it last longer. It is amusing that I had just returned from a round of golf to find this in the mailbox. Keep up the good work.

73 & TU very much

Thaire Bryant—W2APF

Hi Jim (Stafford),

Have a look at www.dl-qrp-ag.de/smd_txvr and you will see a much smaller kit. One of the things I will bring to FDIM to show what German QRPers are doing. And if you look at it, dream of the 4 band Version as I do. (I will present some first drawings of the 4-Bander, but timeline is October for this one)

But you are right, the CUB is an excellent rig and I use my 17 Meter version very often. 17m is best choice if QRPers like DXing

72/73, **Peter—DL2FI**

Seen on QRP-L:

Contest tips: Was 2001 ARRL CW DX results (Oct QST)

Wow guys! I'm gunna copy n paste all these ideas in the last 2 QRP-L's to a Word document and save it for study. When I asked to go to school on QRP contesting I had no idea so many would respond with so many interesting ideas.

After reading the Contester of the Quarter, K7RE in the July ARCI QRP Quarterly I saw several more great ideas. If you don't have this issue, shame on you! Get a back issue, and read this article several times, and take notes.

If I have time I will put notes from this article in the Word doc, and make it available to anyone for the asking. And will place it on a web page at my site.

We've got some great QRP contesters here, and they all seem to like to share their secrets!

Can it get any better?

I wonder if Bob P. (N4BP) has done any writing on this subject?

72's & tnx!!!

de **Jim Hale—KJ5TF**

http://sunwatt.mystarband.net/

Craig,

I'm so far behind on my reading that I've just gotten to the April QQ. Outstanding issue and thanks much for the kind words on the Milliwatt Triple Crown (pg 13).

Here's a little more info behind the contest. Doug Hendricks (KI6DS) and Dave Gauding (NF0R) came up with the idea of a multi-club milliwatt contest.

They approached Jay Bromley (W5JAY) and myself about sponsoring the event. At the same time Bob Kellogg (AE4IC) and the KnightLites announced their Holiday Milliwatt Event. Jay and I approached Bob about the KnightLites joining the multi-club contest and the Milliwatt Triple Crown was born. Each club (Ft. Smith QRP Group, KnightLites, and the Iowa QRP Club) sponsored an individual event with winners. The scores from each event were combined to determine an overall winner.

Bob and Jay did a great job and their efforts made the event a success (and I'm very grateful to both of these FB QRP'ers)!

Thanks again for the kind words in the April QQ. You've done an excellent job!

72, **John—NU0V**

Tuned up my K2 last night with Spectrogram. Wow! What an incredible piece of software!

Turns out that the BFO was out of the passband on every filter setting. The widest setting, the desired sidetone was about -40dB down. All the other settings, it was > -60dB. No wonder I had "low audio" (and also that RIT helped with a couple of the QSO's!).

Still seem to have a problem on 20. I could hear some signals. Noise strength was the same on 20 as everywhere else though, so maybe it was the band. Anybody on 20 last night? Still going to trace the 20 RF chain and wiggle components and stuff...just in case.

Pickett, much more audio now...Jim, I went ahead and registered Spectrogram, also. Great program for $25...I can see lots of uses for it...

72, **Mike Boatright--KO4WX**

I wasn't on 20 Wednesday night - too much work to do. However, it was okay late last night.

I'm glad to hear you were able to make such a big difference with the filter calibration. I use Spectogram almost every time I operate.

See you in the pileups.

72, **Jim Worthington--AD4J** <ad4j@arrl.net>

From QRP-L:

Subject: VE7SL's Tuna Tin WAS is Official! (On QRP-L)

Hello Gang:

Let's give a big round of applause to Steve VE7SL for the first WAS in history using a Tuna Tin 2 transmitter!

Check out the official picture and story at the ARRL's web site: http://www.arrl.org/news/stories/2001/04/19/2/?nc=1

Congrat's Steve, well done!

72, **David Bixler--W0CH - VK2IQX**

Way cool!!

I was Steve's Indiana contact in the wee hours of the morning. He's a great op and the TT2 is a great rig!

72, **Brian Murrey**

And I got to be the Connecticut.

Unfortunately, the editor took a bit of liberty; I think Tuna Tin 2 mania started before I brought that rig back to life; the Back to the Future project was, IMHO, the start of the revival.

73, **Ed Hare—W1RFI**

Caught on QRP-L:

Subject: Cover of July 2001 QRP Quarterly

While I am an avid golfer and QRP'er, that cover does not sit too well with me. Had they "staged" this I could see the humor but my sense is they did not and the op actually uses the rig while on the course between shots.

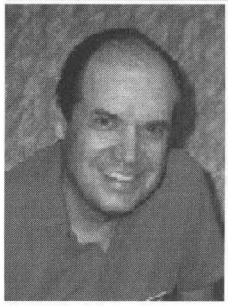
From a golfer's point of view, noise from ANY radio is NOT allowed even during a causal round of golf and believe me sounds carry a long way on the course.

I do have a good sense of humor, but in

continued on page 5

Base Current

Jim Stafford—QRP ARCI President **w4qo@arrl.net**



Goals – Yes, this is a hobby first and foremost but we generally set for ourselves some goals to accomplish in order to stretch our enjoyment. And the fall is usually the time we start thinking of getting snowed in with a new project, operating one of the many contests, or organizing some event for the local QRP club. It's in this way that we all grow in our learning and isn't learning really fun in the end? Your QRP ARCI has something for each of us in these three areas. You don't have to look too far within the past 4 issues of the magazine to find some kind of project to build. It doesn't have to be complicated (unless you prefer that kind of project) – a wattmeter (how about the NoGaWatt? It's even a kit!). Or how about the Fall Sweepstakes? That one is coming up on November 3. Again this year, we'll be encouraging more QRP activity through the Running of the QRP Bulls. You who want to be a "bull" should contact Randy, K7TQ and register. Then just operate as much as you can during the contest and here is the promise you make – you will send in your log to ARRL. The Bull is an "overlay" contest with the Sweepstakes – you operate SS but you count up the number of Bulls you work or the number of QRP stations (see rules on the web site). Last year the number of QRP entries outnumbered the number of High Power entries (as in KW – the most populated category is Medium of course). As for your club – do you belong to one in your area? No, then why not start one. The NoGa QRP club started with about a half dozen guys getting together for lunch once a quarter and now regularly draws 25-30 each month. The meetings run from 10 AM on Saturdays until we get run out of the room around 1 PM! We are not an international club but we do have international members. To find out more (or if you don't have a club in your area join us), check out the NoGa QRP web site: www.nogaqrp.org. You'll have more fun if you do something this fall.

A big thank you – Each quarter in the magazine, Mike, WA8MCQ, almost always mentions how many times Joe, N2CX, submits items for the Idea Exchange and always thanks him for doing it. I agree Joe is a fantastic supporter of the club and also the IEx column. But did you ever think that someone had to put the column together each quarter and frankly I don't know how many quarters it's been while Mike C has hosted the IEx. It's always the first thing I turn to in QQ and from what I hear it's your favorite too. We have discussed actually publishing a book called "The Best of" but somehow no one ever seems to get around to doing it. It should be done as there has been over the years a staggering amount of useful info published in that column. Mike would probably say that he just puts into the column what others contribute and I suppose to a certain extent that is true, but it takes many hours each quarter for him to do the bang up job we all expect and look forward to. Drop Mike an e-mail today and tell him how much you enjoy the column. Better yet, send him your "tip" or favorite circuit for publication in next quarter's QQ magazine in the Idea Exchange. Thanks Mike. wa8mcq@erols.com

TDIA - Two Days in Alabama – or whatever it's called – was a major success! Yes, folks the Southeast finally got its big regional QRP fest this past August. Craig Behrens (our editor and overloaded as he is) put together a bang up Friday night, Saturday and Saturday night QRP bash. I unfortunately could not attend but attendees ranged from far and wide to get to this one. I know some Flying Pigs were there from Ohio and from all parts of Dixie. It fact it has also been referred to as Dixie Q. As I say – no matter what you call it with BBQ, camping, and a full lineup of speakers including Eric, WA6HHQ, it was outstanding. A whole lot of folks were pleased to meet Eric for the first time and know who their rig came from! I have no doubt that it will be an annual event but I've heard there were about 150 QRPers there so next year – well, it could become 3DIA!

Oh yes, the thrill is back, isn't it?

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continued from page 4

the case of ham radio and golf, each has their place...

Mike Morrell—K8KE
<morrellm@ameritech.net>Mike

And...

Wow, this is hard to believe.
Joe—W4JHR

And the rebuttal...

For all of you concerned about the above comments, let me assure you that you need have absolutely no worries! I took the picture you see on the QQ cover (although it was "enhanced" nicely by the QQ folks to show a little richer presentation), and those are my clubs on the driver's side, and that is my radio and antenna in use. I am NOT a casual golfer--I have played the game for over 50 years (since I was about 8 years old), and I would never have done this if it wasn't doable without interfering with others. Golf is very special to me, and I am a stickler for etiquette--both giving and receiving! I know golf etiquette very well, and most certainly would not infringe on other's enjoyment. Neither would Ron!

The fact is that Ron and I practically "owned" the place that day. I don't think there were more than half a dozen other groups on the entire course! If you will all pull out your road maps--find Tucson, then go east on Interstate 10 to exit 331 (about 10 miles west of Wilcox). Turn south on hwy. 191 and go south about 20-25 miles and you will see a small dot on the map called "Sunsites" (close to the Cochise Stronghold monument)! That is where Ron and I played golf--I mean we were out in the boonies! This was not golf in the "hub of the western world", but rather a nice, leisurely round of golf on a relatively remote retirement development that (unfortunately for them) gets very little play. We played our round in the appropriate 4-hour time frame (actually, a bit less), and held up no one. Furthermore, nobody ever got close enough to us to hear anything (the volume was always under control) except at one point where holes cross we did pass one other twosome who got a big kick out of our setup! We could not, and would not have done this on some municipal course in a more metropolitan location.

Well, enough said except that it irks me no end when self-righteous individuals start chastising others when they don't even know the facts! Why do people have to assume the worst instead of suspecting the opposite???? I am pretty sure I know, but I won't press it. Also, I realize they may not know me that well, but I am a little surprised that they would

continued from page 18

Idea Exchange

Technical Tidbits for the QRPer

Mike Czuhajewski—WA8MCQ wa8mcq@erols.com

IN THIS EDITION OF THE IDEA EXCHANGE

Altoids Tins Construction Ideas

Also known as Joe's Quickie #39, this latest installment in the infinite series of Technical Quickies from QRP Hall of Fame member Joe Everhart, N2CX, gives some tips on the mechanics of stuffing things into the ever-popular Altoids tins. (And here's my tip to those who like the boxes for projects but don't like the potent taste you have to endure to empty the tins-after you unwrap the plastic and the box of mints sits around for a few weeks, they weaken a bit and become more palatable.)

Many of us have been infected with the "build everything in an Altoids™ tin" craze. I must confess that I have too! It's really fun to see just how much you can cram into one of those things. This Quickie was written while installing one of the peachy-keen-neato Dan Tayloe Arizona ScQRPion Stinger Singers or SSS (Ref 1) in one of these cases. It offers a series of tips I have read about and developed over the years for making the tin installation easier and more robust. [The SSS is a really neat little display less frequency counter kit for $20, which outputs the digits in CW to a small piezo element speaker. —WA8MCQ]

A real handicap in machining the tins is that the metal is so thin. This makes it difficult to make good, clean holes for connectors and controls and the result is rather flimsy.

An elegant method of making the holes is to use one of the quite handy metal punches sold by Harbor Freight ™ and others (Ref 2, 3). However, when you are using it to make holes in the case sides, you cannot get too close to the tin's bottom due to the bulk of the tool. This forces you to resort to drilling the case. However drilling in light gauge metal is difficult without tearing it. You get best results using a drill press so that you have enough hands to hold the piece to be drilled and to operate the drill. But we all know that!

An old machinists trick (young ones use it too...) when drilling thin metal is to back up the metal with something solid. I prefer to use a block of wood inside the case as shown in **Figure 1**. It needn't be a super tight fit, but should be reasonably snug. Another method that George heron, N2APB has mentioned is to fill the case with water and keep it in a freezer so that a solid block of ice forms inside. It almost goes without saying that you have to work quickly on your drill press to finish before the ice melts.

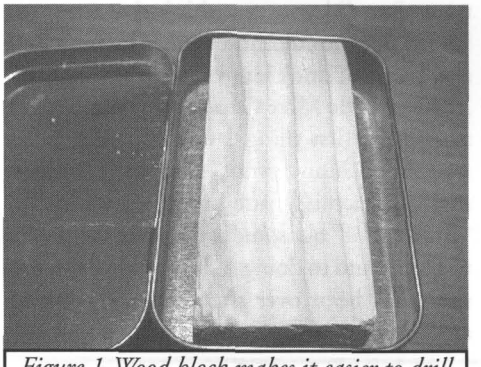


Figure 1-Wood block makes it easier to drill the thin metal of the Altoids tin.

I have also found the best drill bit to use with the tins is a stepped drill (**Figure 2**) as described in an earlier Quickie (**Ref 4**). The one I prefer is a Unibit ™ which costs less than $15 at hardware megastores all over and will drill holes from 1/8" to ½" in 1/16" increments.

The SSS mentioned above needs three holes in the case for a power switch, a pushbutton mode select switch and the signal input connector. The kit comes with a small pushbutton switch and a phono connector. I chose to add a small toggle switch for power and used a standard BNC connector for signal input. It is really awkward to carefully measure just where the holes need to be drilled in a rounded end can like the Altoids tins so I simply eyeballed them. The most critical dimension is the top-to-bottom location of the BNC connector. Too low in the case and it hits the bottom, too high and it interferes with the case. I used the attachment nut as a guide with the tin's lid closed to mark the hole center. The switch holes are not critical.

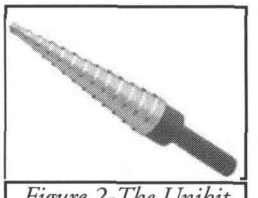


Figure 2-The Unibit stepped drill.

Figure 3 shows the holes after drilling. I don't know the sizes since I merely drilled them to about the right size and gauged how far to go empirically. This is very fast with a stepped drill! Careful examination of the photo reveals a faint centerline between the holes. This is the result of using a ballpoint pen to mark the centers. It scratched the paint leaving a visible artifact - a new lesson learned about ballpoint pens and Altoids (tm) tin paint.

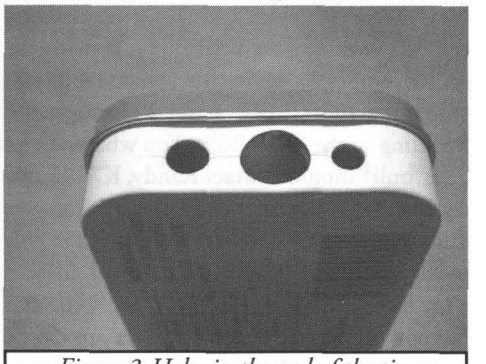


Figure 3-Holes in the end of the tin.

While the holes look great from the outside, the story inside the tin is ugly. **Figure 4** shows ragged metal around each one. I'm not sure if this is a result of my very dull Unibit or if it will occur even with a new, sharp one. At any rate, it was easy to remove with a good sharp knife.

It's also a good idea to make sure that everything is located properly. **Figure 5** is such a fit check. Actually, things were lucky on this attempt. Usually something has to be moved by elongating one or more holes slightly.

Now here's another tip on dealing with the flimsy metal case. I hate to have my BNC connectors rotate when I mate or disconnect a cable. The chassis-mount receptacles are provided with a D-shaped body to hold them steady, but making such a hole in thin steel is a challenge and the thin sheet metal would likely not hold the D-shape long anyway. Yet another metalworker's trick to take care of this is to use a so-called "doubler plate" behind

the panel (**Figures 4 & 5**). This can kill two birds with one stone. In addition to providing more mechanical strength, the doubler plate can be made with the correct D-hole.

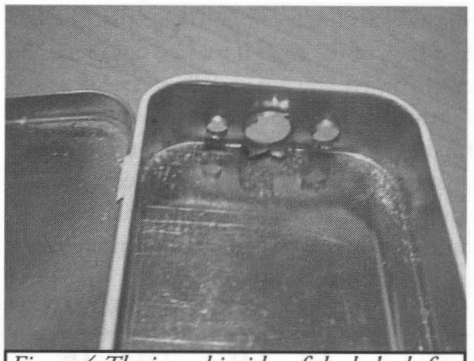


Figure 4-The jagged insides of the holes before deburring.

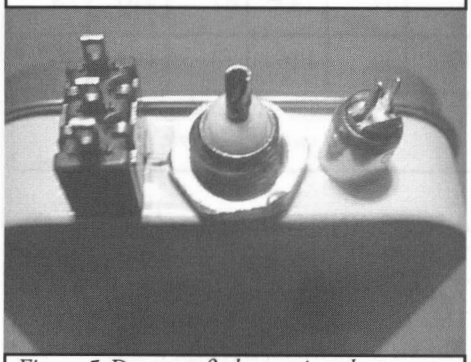


Figure 5-Do a test fit by putting the parts on the outside to make sure everything fits reasonably well.

I used a small rectangular piece of 1/16" glass-epoxy pc board as the doubler, sizing it large to be the same height as the end wall of the case and long enough to fit between the two end radii. Placing it inside the case after the holes were drilled, I marked the hole centers with an indelible marker. Next, the Unibit was used to drill mounting holes for the switches that were slightly larger than the switch threaded bodies. This allows for a little "slop" in doing final fitting. The BNC connector's D-hole was made by the method described in Quickie #36 (**Ref 5**.) In brief, start with a ¼ inch round hole then file one side of the hole flat and round out the remainder with a rat-tail file. Use the BNC connector as a guide while filing. **Figure 6** is the end result and it is shown installed in **Figure 7**. The doubler needs no special mounting - the switch and connector hardware holds it in place.

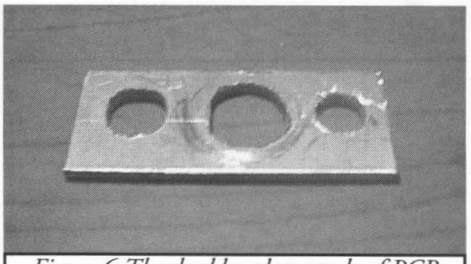


Figure 6-The doubler plate made of PCB material. Note the center hole, which has been filed out to make a rough D shape for the BNC connector.

Figure 7 shows another Altoids tin tip. When you want a 9-volt transistor battery inside the tin, it has a tendency to rattle around. I like to install a partition in the tin to keep it from damaging the electronic components. A wall made of (what else?) copper clad PC board is shown installed in the photo. It is only long enough to keep the battery in place with room at the ends for wires to get by. The wall is easy to tack solder three places on each side to the case bottom. It really needs no more strength than that.

Figure 7-The doubler plate in place, and battery retainer wall.

Yet another consideration in using mint tins as enclosures is securing the circuit board. You can drill holes in the case and secure it with hardware, but that is overkill for a small project. Small circuit boards have little mass so it doesn't take much to hold them in place. My favorite method is to use some double-sided adhesive foam tape. Available from Radio Shack or even most chain drug stores, it is very simple to use. **Figure 8** shows a circuit board bottom coated with foam mounting tape. To install in the case, simply press down on the board. The adhesive will hold it quite firm and the foam insulates the circuit board traces from the metal can.

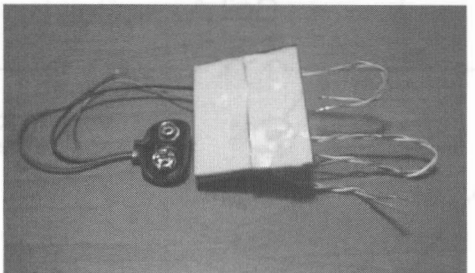


Figure 8-Double sided adhesive foam tope on the bottom of a PCB.

The final construction is shown in **Figure 9**. In it you can clearly see the doubler plate and battery compartment wall. There's one added touch to keep the battery secure when the lid is closed. I glued a thin strip of foam rubber on the inside of the lid. This give just enough pressure on the battery to keep it from rattling around without so much force that the lid pops open.

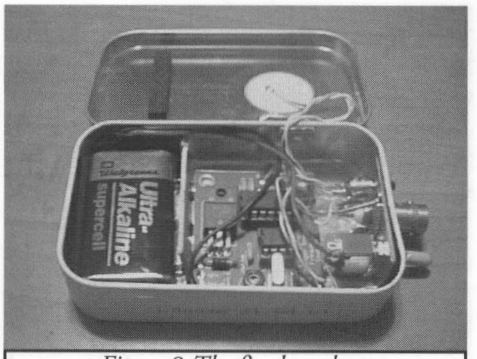


Figure 9-The final product.

Now that's all the Altoids tin tips, but as the TV ads say, "there's more!"

I ran across a handy "mod" to the common BNC connector some years back from a production test tech. In production test any timesaving trick helps save money. For communications radio testing there are all sorts of holding fixtures, shield fixtures and various connection harnesses that allow radios to be set up, aligned and tested very rapidly. They aren't the ultimate in maintaining absolute great shielding or permanent connections, but they're good enough to get the job done.

The cleverest mod is to the humble BNC. When you are connecting and disconnecting many RF cables in a day, the twist action gets old very fast. Now the twisting is very important to ensure that the bayonet locking collar on the connector makes a good solid mechanical connection, but for a quick-on quick-off connection that will only be needed for a minute or so, that's not really needed.

Figure 10 shows a modified BNC connector alongside one that is complete. The mod consists of removing the locking collar from the connector. You can do this by either using a fine hacksaw or a Dremel ™ drill with a grinding bit to cut through the collar lengthwise. When you have cut completely through it, simply twist it off with a pair of pliers. The "guts" of the connector remain undamaged and it will mate with the bulkhead female connector well enough for casual use.

Ref 1—AZ ScQRPions *Stinger Singer*, http://www.extremezone.com/~nk7m/cwafc.htm

Ref 2—"*PC Dots for RF Breadboarding*," Joe's Quickie 21, *Idea Exchange column*, QRP Quarterly, April 1997

Ref 3—"*Manhattan-Style Construction*", Chuck Adams, K7QO, QRP Homebrewer #2, Winter

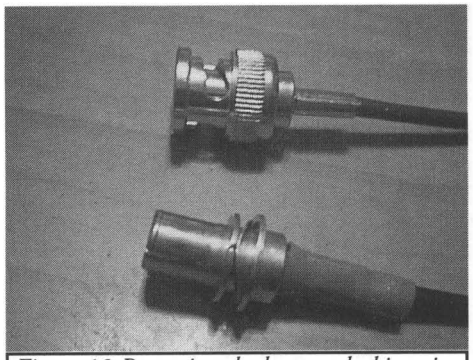


Figure 10-Removing the bayonet locking ring on a BNC connector (bottom) for quick and easy temporary connections. (Not for permanent use, since this can pull off easily.)

2000

Ref 4—"*Drilling pc Board Enclosure Panels*," Joe's Quickie 35, Idea Exchange column, QRP Quarterly, October 2000

Ref 5—*Joe's Quickie 36*, Idea Exchange column, QRP Quarterly, January 2001

-DE N2CX

Missing HW-8 Figures from Last Issue

For some reason, the printer took it on himself to delete two figures from my column last month. One was a schematic of the HW-8 output network and the other was a table of some of the surprisingly high voltages found at some points in it. Here are the missing **Figures 11 and 12.** For the benefit of those who may not have the last issue, I'm including the text as well. (In case you missed that issue, the item described fabrication of the complete set of 8 coils used in the output networks of the Heath HW-8 QRP transceiver, using currently available toroidal cores.)

Big volts in the little green box

As I noted in my original article [several years ago in the QRP Quarterly], this is NOT a low impedance circuit. There are some surprisingly high voltages present within the network [shown in **Figure 11**], which can be seen with an oscilloscope or neon bulb. For example, with a good HW-8 running well over 1.5 watts output to a dummy load I checked the voltages at various points, using a Tektronix 465B scope and X10 probe and saw the peak-to-peak voltages shown in **Figure 12.** (It was necessary to retune for maximum output every time the probe was moved, due to its small but finite capacitance affecting the network.) These are similar to those seen in other HW-8s on these bands.

Yes, that really IS four hundred and ten volts peak to peak on 80 meters, or 205 volts peak and 145 volts RMS. Nonbelievers are invited to verify this for themselves with a high impedance probe (although you will probably have to retune for maximum output due to the probe capacitance; don't forget to retune it again when the probe is removed). Lacking that, you can touch one lead of a neon bulb to the circuit board and watch it light up. (Simply holding the glass bulb in your hand may provide sufficient current path to ground for it to light, or you may have to hold the other lead with your hand.) The other voltages may not be enough to fire a neon, depending on the particular bulb used.

Another test to demonstrate the high impedance—a 22K resistor placed from Point D to ground reduced the voltage at the antenna connector from 28 volts P-P to 22 volts. That's a reduction from 1.96 watts to 1.21, a drop of 38%.

Voltages were lower on the other bands and not as impressive, but still rather high. Note that the highest voltage is at Point D, which is the rotor of the loading capacitor. If you take its knob off, you'll see that the last half-inch of the shaft is plastic, not metal. Be careful where you put your fingers while transmitting with the covers off. You may not get fried at this power level, and you might not even feel it since the added resistance to ground could well be enough to cause the power to drop dramatically. However, I wasn't about to try THAT experiment!

-DE WA8MCQ

Band	A	B	C	D	E
80	37	144	87	410	28
40	34	116	58	160	26

Figure 12—Peak-to-Peak voltages seen in HW-8 output network.

A Simple BNC Dummy Load

From Steve Ray, K4JPN (ex K1VKW) of Warner Robins GA—

This is a simple idea I came up with for a dummy load, which is cheap, works well, and is easy to build. Take a twist-on BNC connector, file the nickel-plating off the end and sweat solder a piece of copper to the top. Likewise take a corresponding piece of copper and use it for the top of the dummy load. Pick your resistors to meet the desired load. For the one shown in the picture, I used nine 470 ohm 1 watt composition resistors in parallel. With the tolerance of the resistors it came to 52.5 ohms.

To sweat solder to the connector, file

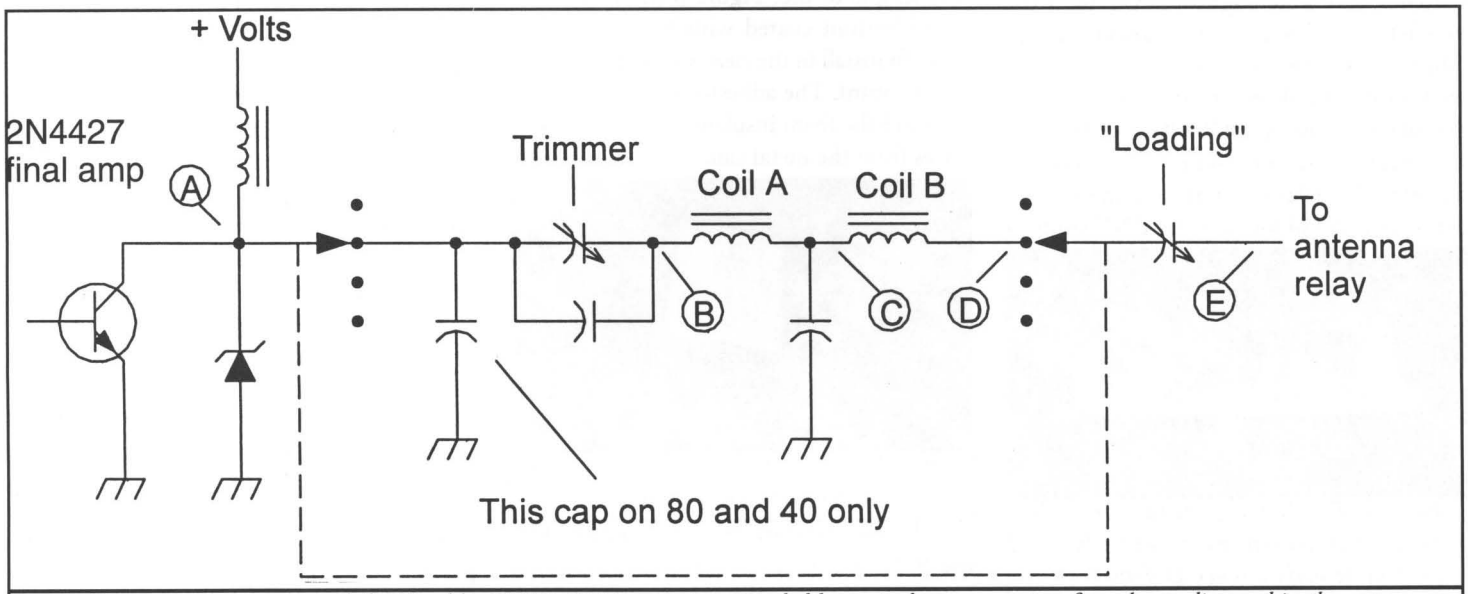


Figure 11-Output network for Heathkit HW-8 QRP transceiver. Circled letters indicate test points for voltages discussed in the text.

down to the brass and tin it with your favorite electronic solder, holding the bottom piece with pliers while you heat from the top. I used a 200 W iron, but I imagine any old iron used for soldering antennas would work. After the bottom was soldered on I installed the resistors. After the resistors are soldered on, take a piece of insulated solid wire and run it down into the center connector and solder it to the top piece of copper.

I used a cheap hole cutter for wood to cut the circles and it also drills the hole for the center conductor wire. One of course could make the copper any shape.

As a side note, on the first one of these I made I shortened up the shaft of the connector, but unfortunately I could not get my fingers in easily to connect and disconnect it. With the second one I just filed down the nickel plating and left it the full length.

The picture (**figure 13**) explains it better than I can write.

—DE K4JPN

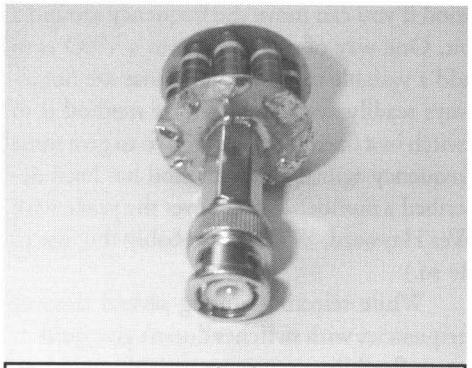


Figure 13-Dummy load made from twist-on BNC connector.

Operating CW with the PSK-80 Warbler

Adapted from his posting to QRP-L, the Internet QRP discussion group, Bill Mabry, N4QA (n4qa@hotmail.com) tells about using this popular rig on another mode.

I made my first cross-mode QSO using the PSK-80 Warbler on 3580.4 kHz, transmitting CW while Al, W6HLC in Williamsburg, VA transmitted PSK31. Al said that the Warbler's CW note sounded fine but that QSB was giving him a little trouble.

It's not rocket science or anything of the sort but it is fun. To make a long story short, there is now a Lionel J-38 straight key in series with my Warbler's transmit audio line along with a 600:600 ohm audio transformer and 20 turn 1k pot (ok, maybe it's a 15-turn pot...). Put the DigiPan software in 'Tune' mode when you wish to transmit CW, and then hammer away at your key.

Feed the Warbler 2455 Hz audio in order to meet all your color-burst buddies on 3579.545 kHz. This assumes that the Warbler has been properly calibrated for a 'phantom carrier' of 3582 kHz and that DigiPan etc has been configured for 'spectrum start' of 3582 kHz and 'spectrum option' of 'LSB'.

Now we're operating a little outside the design frequency range so don't drive the Warbler too hard or your friendly Official Observer may get excited. I'm getting about a half-watt of RF out at 3579.545 kHz. The 2455 Hz receive audio may drive you nuts...provided that you can hear it at all. You must, of course, route the Warbler's receive-audio output to an amplified speaker or some such in order to hear the signals. An audio filter would help, too.

We could re-calibrate the Warbler's carrier oscillator/BFO in order to operate nearer to the CW gang, but then we'd have to re-recalibrate for PSK operations.

Yes, I know, it's a PSK rig...but it sure can act like a CW rig sometimes. Now, where are all those color-burst guys tonight...

-DE N4QA

Threaded Spacers Hold Covers on PCB Box

I claim no originality for this idea; it's such a simple and obvious one that there are probably quite a few people who came up with it on their own. However, the first time I ever saw it was on the web page of Monty Northrup, N5FC, at http://www.io.com/~n5fc/

It was in his description of his step attenuator, under the "gizmos" section of the web page. (It's the "Inline 5 watt 0 thru 25 dB attenuator," the one in the blue box.) I hereby give him credit for passing the idea on to me by way of viewing his web page. (Although not described in his recent QRP Quarterly article about one of his attenuators, a photo of it was included.)

One popular way of holding covers on boxes made of PCB material is with nuts that are soldered into the corners. However this can be a pain to do, and they can eventually break free if the solder joint weakens. Joe Everhart, N2CX, recently described a neat way of installing the nuts in the Idea Exchange, using a long screw to hold them in place while soldering, which makes the process less painful. But there's still the potential for them breaking free eventually.

Monty's method is to use threaded spacers. These are readily available from supply houses, and I've picked up quite a few over the years from stripping down old electronic gear. About the only tricky part of using them is getting enough of the proper length for the box you're building, but that's no problem if you're ordering them instead of scrounging in the junk box. (Or if you have several of a particular size, you can adjust the design of the box before you start cutting the pieces of PCB material.) And since they are held in place by screws instead of soldering, you don't have to worry if all you have are aluminum spacers. In fact, even plastic ones would work perfectly

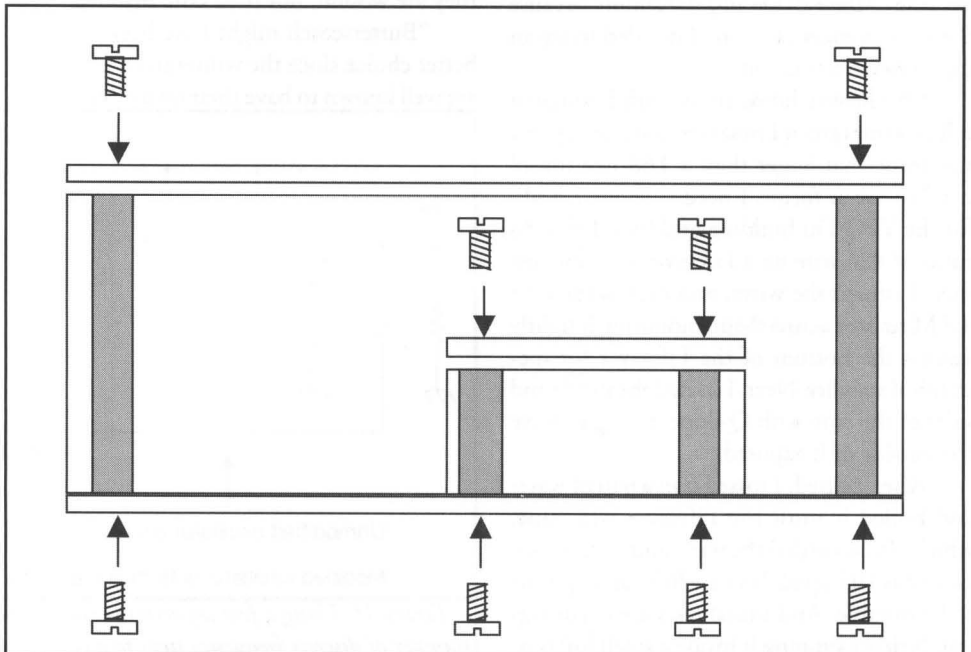


Figure 14-Using threaded spacers to hold covers on a box made of PCB material, instead of nuts soldered to the copper. This can also be used to hold the cover on an internal compartment as shown.

well.

Figures 14 and 15 show a few details of using them. They can be used to hold both top and bottom covers on, and also used to hold a cover for a small internal compartment that sits below the top of the box. If there is a piece of PC board material somewhere between the top and bottom covers, drill holes for the spacers to pass through, or cut notches out.

-DE WA8MCQ

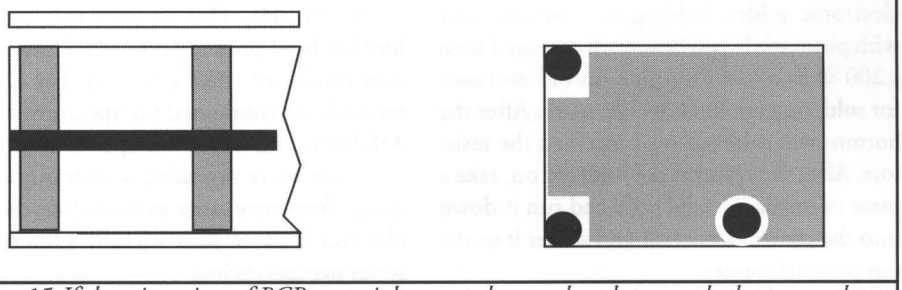


Figure 15-If there is a piece of PCB material mounted somewhere between the bottom and top (left, side view), drill holes as necessary for the spacers to pass through or cut out notches (right, top view). Caution-be careful if doing this with a ready-made printed circuit board, as damage

Experimental Air Core Inductor from a Lifesaver

I had an idea several years ago but never got around to doing it; it involved winding a coil on a custom toroid made of wax. The idea was to look into the distributed capacitance characteristic of a coil, and see how much effect, if any, the presence or absence of a nonmagnetic coil form would have on it. I was going to measure things, then melt the wax off, measure again and do some calculations. I never got beyond the point of drawing up a mold to make in the machine shop, from which to make wax rings. Then recently there was an intriguing post on QRP-L from Denny Payton, N9JXY of Auburn, IN (dpayton@fwi.com) that brought those memories back. His experiment was for a different purpose, but his method was similar.

I was wishing that air-core inductors didn't require so much space; so that I could more easily use one in a VFO I'm building. I got to wondering if toroids are self-shielding because of their shape and not simply because they have a magnetic core. I decided to try an experiment to find out.

On the way home from work I bought a roll of wintergreen Lifesavers [hard candy in a size somewhat larger than a T68 size toroid core] to use as forms. I needed about 1.8 uH for the VFO I'm building and found that 38 turns of #26 wire on a Lifesaver gave me just that. I tinned the wires, and then soldered a 4.7 M resistor across them, mounting it tightly against the bottom of the Lifesaver for mechanical stability. Next, I coated the inside and sides of the core with Q-dope, trying to leave the outside of it exposed.

After it dried, I tossed it in a pan of water and boiled it until the Lifesaver was gone, which also annealed the wire, and it came out as well as I'd hoped. It's very light and appears to be durable. And initial tests are encouraging. Neither slipping it inside a small foil box, nor sandwiching it between two pieces of copper clad circuit board material appears to have much of an affect on the inductance, maybe .005 uH difference. If air cores like this are self-shielding, most people probably already know it, but it's a new one for me.

—DE N9JXY

Steve "Melt Solder" Weber, KD1JV kd1jv@moose.ncia.net) had this reply—"I've heard of winding a VHF toroid on a nylon washer recently, but a lifesaver core has to be a new one! Your tests do show it's reasonably self-shielding, as good a test as any, I'd say. No coil can be 100% self-shielding though, so it's always a wise idea to keep things that might affect or couple into it at least 1/2 diameter away, toroid or not. In any event, brilliant idea!"

And Chuck Olson, WB9KZY (jacksonharbor@att.net) had this comment—

"I remember reading a Doug DeMaw, W1FB, article which stated that toroids (air or other core) are self shielded due to the way they are wound, not their core material.

"Butterscotch might have been a been a better choice since the wintergreen Lifesavers are well known to have their own electrostatic capability (try watching when one gets crunched in a dark room - green sparks are creepy). Seriously, I always wondered about using Lifesavers like this myself; thanks for reporting on it. (The only other problem might be ants!)"

VXO Using Switched Capacitors

When operating a crystal-controlled rig it's good if you can move the frequency around a bit. One way of making it into a VXO is to add a variable capacitor, but those are not always readily available. Another method is to switch in a fixed capacitor or two to give some frequency agility. (This method has been described a number of times over the years, with Wes Hayward, W7ZOI, probably the first to do so.)

While selecting among several discrete frequencies with switches doesn't give quite as much flexibility as using a variable capacitor, it does have the advantage of repeatability. If you accidentally bump the knob of a variable cap you might not be able to find the other station again, but if some switches are involved

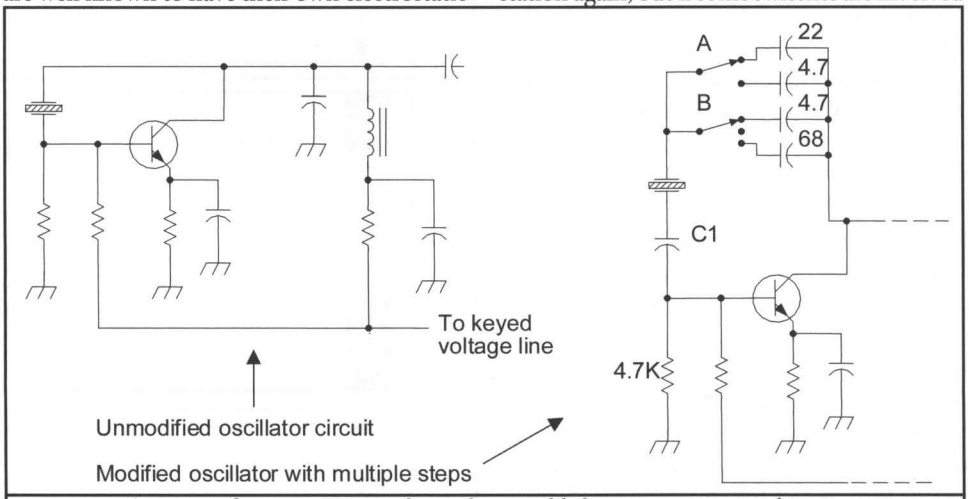


Figure 16-Using a few capacitors and switches to add them in various combinations gives a number of discrete frequency steps to a crystal oscillator. Switch B is shown as an SP3T, although he actually used one side of a center-off DPDT switch, where the center "contact" is nonexistent. You could also use an actual SP3T, leaving the center contact open, or even add yet another value of capacitor to it.

it's much easier.

Jake Carter, N4UY of Vienna, VA, played around with his Tuna Tin II and came up with the circuit shown on the right side of **Figure 16**. Instead of a large rotary switch selecting one of a handful of capacitors he uses toggle switches with a reduced number of caps, adding them in various combinations.

This is not meant to be a "one size fits all" circuit to be duplicated exactly, but rather gives the basic idea of one way to come up with more frequencies out of a crystal with fewer capacitors, one that can be used with any oscillator. Every circuit and crystal is different; experiment with whatever capacitors you have on hand and see how it works out. Jake readily admits that there was no high-power engineering involved, and that he was just playing around with it when this evolved, and that's one of the most basic and rewarding aspects of homebrewing—experimenting with circuits to see what happens.

(I still have some questions about specific details that I can't resolve in my mind, so I've left out some of the more detailed information where I couldn't make things add up about some of his numbers. But the basic idea of switching in caps to vary the frequency is still a very good and useful one.)

I've been messing around with my Tuna Tin again and added an easy way to shift the frequency around. Actually I sorted of stumbled upon this mod; I just stuck the caps in there and it worked.

My Tuna Tin was working but I got tired of being stuck on one frequency. I remembered that Ed Loranger, WE6W, mentioned switching a cap in series with the crystal to shift the frequency of his Pixie [a very simple QRP transceiver] so I put a 20-pF cap and a switch in series with my Tuna Tin crystal. I got a little shift, between 7.039.8 and 7.040.2.

I used the rig like this for a few weeks, and then I figured if one 20-pF cap is good, more caps would be better. So I dug around in the junk box and came up with 2 DPDT switches and some NP0 caps ranging from 4.7 pf to 68 pF. Then came the experimentation, which is typical of my "stick it in there and see if it works" approach to homebrewing.

First I lifted the leg of the crystal that goes to the resistor and added a 20-pF NP0 cap in series. That shifted my freq up to about 7.043 MHz. That made sense — adding a cap in series lowers the total capacitance and increases the freq. Then I added a cap in parallel with the crystal figuring that additional capacitance would lower the freq and I could then work up the switched cap arrangement, but that produced no change.

I lifted the other leg of the crystal and stuck a cap in there and the frequency dropped. I don't know why—capacitance in series would lower the total capacitance but it dropped, so I went with it and rigged up the switches and caps to see what happened when I switched them in.

I lifted the top leg of the crystal and ran a wire from it to switches A and B. (Both are DPDT but one is on-on and the other is on-off-on. There is nothing special about using two types; it's what I had available at the time.) Then I soldered the caps I had available (two 4.7 pF, a 22 pF and a 68 pF) to the switch terminals, and ran wires back to the long, skinny pad.

That gave me 6 switch position combinations, switch A left - right; Switch B up-middle-down. The available capacitance combinations with my capacitors are 4.7, 9.4, 22, 26.7, 72.7 and 90 pF. The result is 6 choices for my transmit frequency, ranging from 7040.20 to 7042.75.

Now I guess I could have thought this through, done the math and come up with a better spread of frequencies, but I'm happy with the results — the mod was done quickly, it was cheap, the rig is stable and I can move around the 40m QRP frequency a bit.

If you're tired of being stuck on one frequency with your Tuna Tin give this a shot.

—DE N4UY

New 365 PF Variables Still Available

A while back I mentioned that newly manufactured (not 30 year old "new old stock") 365 pF air variable capacitors is available from Antique Electronic Supply, 6221 S Maple Avenue,

Tempe, AZ 85283. While rather pricey at $10.95 plus shipping, using their model C-V365 in a project makes it easier for others to reproduce it since they can get the same part used in the original instead of having to scrounge at hamfests to find something vaguely similar that can be forced to fit and may not give the same results.

I finally bit the bullet and bought three of them to see if they were any good (and yes, they are). I could justify the expense to myself since I had worked a lot of overtime recently, and the pain of paying the price for 3 faded after a while. **Figure 18** is a "photo" of one of the units, made by putting it on my flat bed scanner.

Due to the changes in technology over the year's air variable capacitors have pretty much gone the way of the dinosaur in most consumer

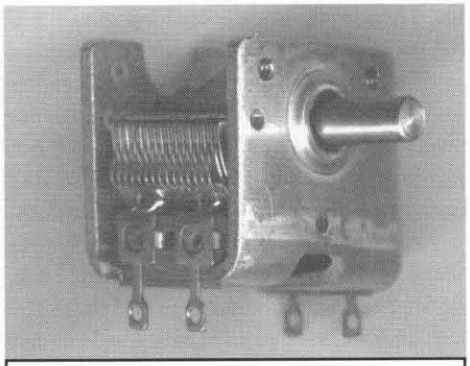


Figure 17—Once ubiquitous electronic component, this 365 pF variable cap is a expensive, but still available off the shelf.

electronics applications, making them much harder to find outside of hamfests or moldy warehouses and basements. Yes, these are rather expensive, but at least they are available.

-DE WA8MCQ

Measuring Capacitance of Manhattan Pads

Here's another interesting QRP-L post from Denny Payton, N9JXY. A very popular technique among QRPers for the last few years is "Manhattan construction." It's similar to the W7ZOI "ugly construction" but instead of using high value resistors connected to ground for tie points, it uses little pads punched out of double sided PCB material and a bit of glue. (The name comes from the appearance, resembling the Manhattan skyline with skyscrapers rising above it.)

Since they are essentially small capacitors connected to ground that could potentially have a significant effect on circuits at HF, it would be good to know the value. Here are the results of his test—

Recently, a friend was wondering about the capacitance of Manhattan pads and mentioned accurately measuring them. I figured I could get a pretty accurate measurement, so did a little experiment.

I fastened a short wire to each side of a 10" x 2" piece of 1/16" double sided board material, then connected my meter and measured its capacitance. The pads I punched out are 5/32" & 3/16". I calculated their area, and then compared it to that of the board to calculate their capacitance. I calculated the 5/32" to be 0.3289 pf and the 3/16" to be 0.4737 pf. [At 14 MHz, the larger value has an impedance of over 24K ohms, and higher at lower frequencies. —WA8MCQ]

To check my calculations, I punched fifty 5/32" pads out of the board material, re-measured its capacitance, and calculated how much its capacitance was reduced per pad punched

out. Then I repeated it, punching out fifty 3/16" pads. The 5/32" pads were calculated to be .346 pf and the 3/16" pads .44 pf.

The two methods didn't compare as closely as I hoped but I see that punching out only fifty pads of each didn't allow me to make a close measurement. [Myself, I'd be overjoyed to have my experimental data match that closely! —WA8MCQ] Anyway, I learned that the 5/32" pads are about 1/3 pf and the 3/16" pads are about 1/2 pf and that's good enough to satisfy my curiosity.

-DE N9JXY

WA8MCQ comments—You can find a good, lengthy article on Manhattan construction at the web page of Chuck Adams (founder of QRP-L) at

http://www.qsl.net/k7qo/manhat.htm

Jim Kortge, K8IQY, is generally credited with introducing the name and technique to QRPers. In his online article, Chuck says that Jim was the winner of the building contest at Dayton several years ago sponsored by the NorCal QRP club, where the theme—suggested by Wayne Burdick, N6KR—was to build a complete transceiver using only 2N2222 transistors (and no ICs).

Jim's 40M design won, he used the name Manhattan to describe the construction technique he used, and it caught the imagination of the QRP community and took off big-time. According to Jim, his son used that phrase in an engineering program at college, where they built things with the technique. Although the inventor of the technique will probably remain unknown, Jim will be long remembered as the one who introduced it to the QRP community.

Stronger Connections to TV Twinlead

A handy TV twinlead tip from Alan Dujenski, KB7MBI of Woodinville, WA, posted to QRP-L—

Just thought I'd pass along a tip to some new folks. When using TV 300-ohm (flat) wire for antenna or feed (or both) you will find the wires are often fairly fragile. This is how I have overcome this problem:

As shown in **figure 18**, I carefully strip the wire back about 3/4 inch on both sides and leave the center insulation intact. I then take two #18 speaker wires (about 3 inches long) and twist and solder one to each side. I then carefully place the wires back along side the center insulator of the 300-ohm and tape it snugly with electrical tape. If for some reason I need to identify one side from the other I will make one side longer.

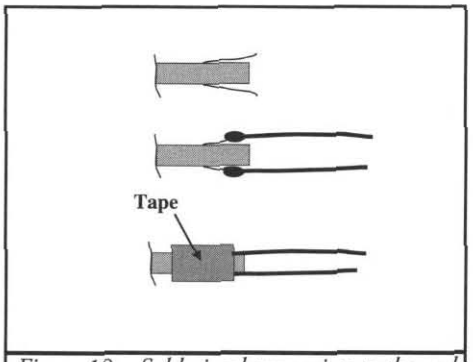


Figure 18—Soldering larger wires to the end of TV twinlead makes it easier to handle and more robust.

[In private mail, he later told me that telling the sides apart can also be done easily by color, since many types of speaker cable have one bare conductor and one tinned.

-WA8MCQ]

I either tin or install an RCA phono connector on the other ends of the wires. This gives good flexibility to the end of the 300-ohm line.

Speaking of RCAs, for most of my antenna activities I use speaker wire with male RCA fittings and interconnect with double female RCAs. When making portable verticals it is sometimes easier to connect all the radials to one RCA and then just connect to the feed with the double female.

-DE KB7MBI

Tool for Fixing Smashed BNCs

Every now and then I see something for sale at a hamfest that has a squashed-in BNC socket on it, but I never let that influence my buying decision. The round end may be dented or the sides smashed together (such as figure 20), but BNC sockets are easily replaced. Depending on what the mounting arrangement is and what you have on hand it might require a bit of work such as drilling some new holes if the mounting holes are in a slightly different pattern. You might have to replace a single hole mount socket with one requiring holes for 4 screws or vice versa. You might even have to go so far as to mount a piece of metal over the main hole in the chassis, and put your replacement connector on that. But in most cases, even if the appearance of the device is altered a bit, the connector can be replaced.

Unfortunately there may be times when replacement of a smashed BNC is simply not an option. I was given an old rotary SPDT BNC switch that would be very handy on the workbench, but the end of one of the BNC sockets was bent inward (worse than **figure 19**), making it impossible to mate with. Replacing it was out of the question due to the unique design of the switch housing and the BNC itself; it was a very specialized part that could only be replaced with another one just like it and using a standard connector of any sort was totally out of the question. (I've seen this on some step attenuators, as well, such as the RLC Electronics model 201AT shown in the October 2000 column.) I hated to throw the switch away, and my only option was to try to restore the BNC back to its original shape.

I could have tried using needle nose pliers, but the result would probably have been

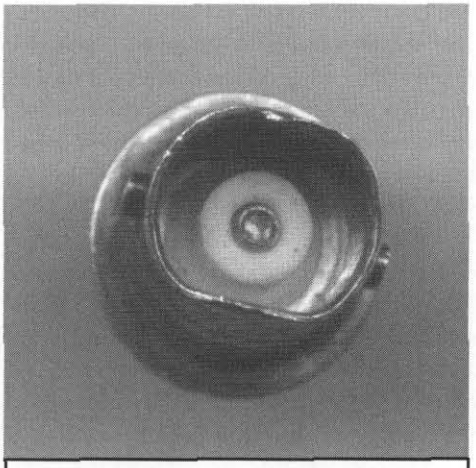


Figure 19—This BNC is smashed in enough that it cannot be mated; I did this myself for demo purposes, but I've seen much worse in the real world.

marginally useful at best, and probably difficult to mate smoothly. The best bet would be to have some sort of conical tool that could be used to reform it. Since I had authorization to use the machine shop at work for personal use I was able to make such a tool from a piece of scrap steel rod, and it turned out well. Although the BNC would not mate quite as smoothly as when it was new, it was still quite usable after using the tool and a handy test accessory was salvaged.

Figure 20 shows the tool, and **figure 21** gives some details. The overall dimensions are somewhat arbitrary. The working end must be able to mate fully with the BNC, and I carefully turned it down on the lathe so it is slightly smaller than the inner diameter of a typical connector.

The center hole must give clearance for the center insulation inside the BNC, so as to not damage it. (Be sure to make it a little larger to allow extra clearance when it goes in at an angle.) The length and angle of the taper were also somewhat arbitrary, but worked out well. The narrowest part of the taper must fit in-

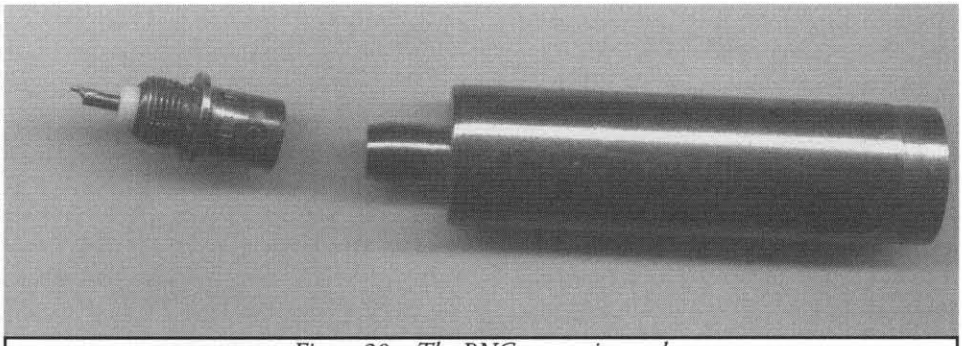


Figure 20—The BNC restoration tool.

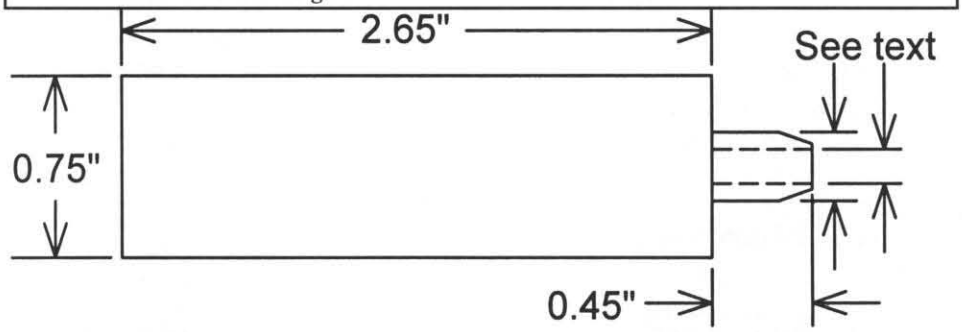


Figure 22-Dimensions of the tool. Overall length and diameter were somewhat arbitrary, based on material available.

side the smashed-in connector.

The outer diameter of the working section is approximately 0.323" and it tapers down, over a length of roughly 0.100", to about 0.286" at the end. The hole is 0.226" diameter. There was no high power engineering involved; I pretty much winged it, just making something that would work and do what I wanted.

To use the tool, I inserted it as far as it would go into the BNC, which wasn't much since it was partially smashed shut, and then started pushing and moving it around to slowly and gently massage the shell back to the original shape as much as possible. There is always the possibility that the shell will crack or break, rendering the connector useless, and taking it slow and easy will help reduce the chances of that happening.

Once the connector is restored as much as possible it will probably not mate as smoothly as an undamaged one. Use care when connecting cables to it, and do it gently. A possible solution, which I've used before, is to use a BNC tee connector. Connect it to the restored BNC and leave it in place permanently. Use one of the two female ends of the tee to connect your cables, leaving the other female end open.

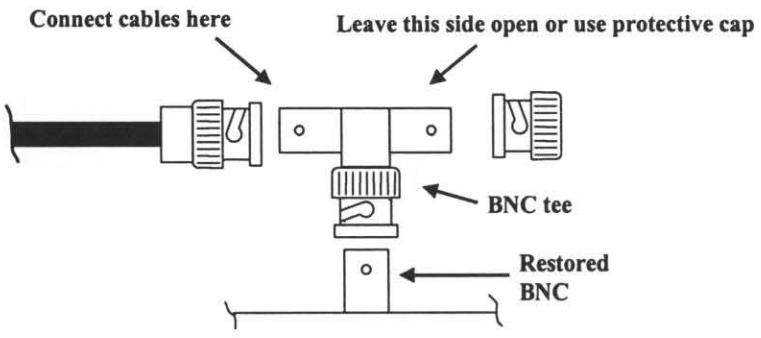


Figure 22—If the restored connector does not mate easily, connect a BNC tee to it, then connect your cables to the tee. The other end may be left open or covered with a BNC protective cap, often available at hamfests. You can also use an old BNC plug with no cable.

To protect it from possible dirt and damage, you could use an old BNC connector with no cable as a protective cap. With luck, you might even stumble across some BNC connector caps at a hamfest. **Figure 22** shows use of the BNC tee, and **figure 23** shows a good BNC and a restored one.

And if lightning strikes twice and the tee gets smashed in on one end, it has a built-in spare connector on the other!

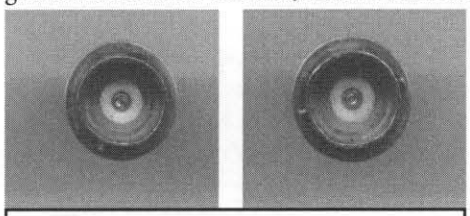


Figure 24-A good BNC on the left, and the restored one on the right. Compared with figure 20, the "before" picture, it looks pretty good. Although the mating isn't perfectly smooth, it's at least usable again.

-DE WA8MCQ

QRPer N3CDR a Silent Key

The Metro section of the Washington Post (which is a local paper for me) has a daily two page obituary section, and it usually includes a few articles with LARGE titles about prominent people who have passed away. (And in the Washington DC area there are a lot of them.) When I glanced at those in the 15 August edition I was surprised to see the name of a local QRPer, Herbert Ley Jr, also known as N3CDR. (And his obit got 12 column inches.) While not too well known in the QRP world now, old timers may recognize the call. He's had a few articles in the QRP press over the years, as well as some QST articles about technical topics.

I knew him from the days when I worked part time at Maryland Radio Center in Laurel (a ham store, now closed), when it was a popular Saturday gathering spot for local QRPers. We talked about homebrewing quite a bit and he was pretty knowledgeable about such things. I was told by K3TKS that he was a retired doctor of some sort, but that's all I knew.

According to the article he worked in that career field as an Army officer (retiring as a Lieutenant Colonel), was chairman of microbiology related departments at Harvard and George Washington University, spent a couple of years as director of the Food and Drug

Administration's Bureau of Medicine, then another 18 months as the commissioner of the FDA (!). Yup, that's enough to rate a major write-up!

All I had known was that he was a QRPer and very interested in and knowledgeable about technical matters, and a real gentleman. He will be missed.

QRP Online

There's been a huge amount of QRP info flying around the Internet for years, and it's still there!

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 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 forum, QRP-F, requires a web browser such as Internet Explorer or Netscape, while QRP-L is a mail reflector and only requires an e-mail account. (If you go to the QRP-L home page, you can check out all the archived messages back to Day One.)

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

QRP-L: go to http://qrp.lehigh.edu/lists/qrp-l/ and you're at the home page where you can sign up, read the archives, etc.

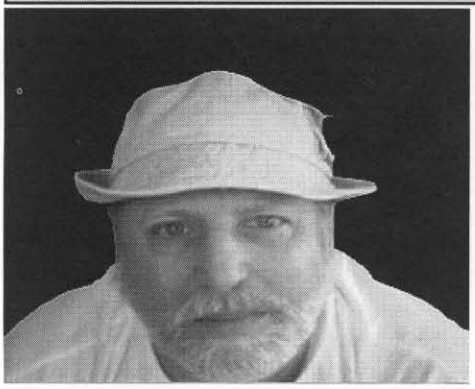
QRP-F: go to http://www.qrparci.org/ and click to enter the site, and then click on QRP-F on the menu at the top.

And while you're on those home pages, don't forget to check out their lists of QRP related links; and at each link that you go to, check THEIR lists as well, since not all sites list all others. (Although this is heresy for me to admit this, as a long time QRP ARCI stalwart, my personal favorite is the NorCal site, run by Jerry Parker, WA6OWR, at http://www.fix.net/~jparker/norcal.html.) You'll find quite a wealth of QRP info online. ●●

Please be sure to pass your great techno treats to Mike to share in the QQ!

Ramblings of a Peaux Displaced Cajun Lad in Maine

Joel Denison—KE1LA **hamjoel@juno.com**



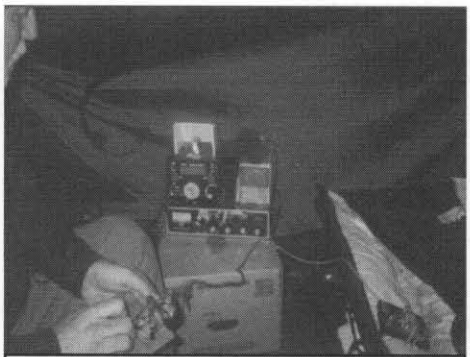
The boss man (Editor) asked me to see ifn I could say sumpthin about the special theme for this quarter, "Serious Contesting", which an't in my vocabulary. However, heah is my serious attempt at field day....aH did make 17 contacts, half SSB and half CW, and these were at the beginning of the contest. At one point, ah was hunting and pouncing on a contact every three to four minutes...which ah thought was good for me.

What ah done realized is u gotta be organized to contest—serious 'bout that—u gottta have a plan of action and counter action...how ur log sheets are laid out...are u gonna hold a frequency or hunt and pounce...are u gonna computer log...are u gonna have someone else log for u... Sure seems like an art to me...and I an't no artist! Ah listened to stations run through two, three or meaux contacts a minute and just marveled at how they could do that. What ah did find most interesting was that the code was within my copy range and ah didn't have to depend on CWGET or one of them utter programs to got the info I needed for an exchange...could usually get it the first or third listen through...

Ah was using my long wooden dowel for my 3 element wire Yagi so the elements were high (about 49ft) and even with each other (the rope broke a few weeks later)...now ah am using just ropes to hold it up and it sags funny in places... anyhow ah found the antenna helped and if I put the K2 at 8 watts out I could bust through the qrm...at 5 watts it was hit and miss...though I'm sure it woulda got better as the contest went on...

What ah figure is, ah needs the help of a true contester to got myself organized... as that seems to be the key to success... my plum near approach won't put me in the serious running, fact is, ah be with the walking crowd... walking backward at times... :-) However ah did have fun and next year ah gonna try and bust that high 17 figure what ah done amassed in this contest... What ah did notice is, it be a lot easier to make the cw contacts...heck 4.5 watts was plenty too much power with the ant ah had...

Which ah guess leads me to spend some time on what ah gonna use for an antenna next year...after all, iffin ah is gonna use 5 watt cw, ah gotta make the most of it and that means ah gotta have an efficient radiator...and that got me to looking at the Sandy River what run through town heah. Iffin ah can find me a bend in the river what will give me a westward shot ah gonna have a ball. U see...ah can put a rope ovah some trees on the bank which be about 50 foots higher than the water and then add 50 foots of tree and man u got sumthin heah...ah can hang a big ole bunch of wire about 50 to 75 foots above the water...in the clear...and drop some twin lead to my canoe or kayak or tent on the side of the river...and unless one of them parasail aircraft come down the river ah gonna have a bang up signal...



Joel making contacts on one of his many QRP mis-adventures!

'Course all this won't done me no good iffin ah don't got myself organized...and ah an't done that in the first 57 years so ah got me doubts 'bout doing this in a year or so. Guess ah gotta get myself a QRP buddy what knows how to contest and see iffin ah can talk him into this crazy idea. Ah think it would be fun and educational for me, however the only thing what ah done got me self organized in be fishing....ah got me kayak loaded, water, bait, rods, paddles, life belt, emergency gear...all set...all ah gotta done is jump into the truck and geaux. Now ah gotta get myself organized for contesting...boy this should be the comedy event of my life!

Gotta geaux now and get organized...y'all be good. ●●

Have some QRP humor to spare? There's always room for it in the QQ...

Using Spectrogram to Measure the Filter Response of a High Frequency Receiver

John Grebenkemper—KI6WX ki6wx@pacbell.net

Introduction

Spectrogram is a program that uses a PC sound card to make spectral measurements in the audio range. With an RF noise generator as a source, you can measure the filter frequency response of an HF SSB or CW communications receiver with a dynamic range of over 70 dB. This note is written toward measuring the filter frequency response of an Elecraft K2 receiver, but it can be applied to any HF communications receiver.

Getting Started

You will need to download a copy of Spectrogram. These instructions were written for version 5.1.6, but the latest download on the web, version 6, should also work fine. Spectrogram can be downloaded from http://www.monumental.com/rshorne/gram.html. Install Spectrogram on your computer and check that you can feed audio into it through your the sound card. This may require configuration of the audio mixer in Windows.

A RF noise source is needed to provide strong broadband noise to the input of the receiver. Noise from the preamp or antenna noise is not strong enough to make measurements over the full dynamic range of the filters. A Noise Bridge works as a source, or the ARRL Handbook for 2001 contains construction details for a noise source and a Noise Bridge. Finally, you will need a cable to connect from the headphone output of the receiver to the input of the sound card. You may need to use an attenuator between them, especially if you are using the microphone input rather than the line input on the sound card. You can follow the step-by-step instructions to determine if the attenuator is needed. Radio Shack sells a 40 dB audio attenuator (#274-300), or you can construct an attenuator yourself from a pair of resistors.

Step-By-Step Instructions

1. Launch Spectrogram

When the display comes up, select **File/F3 – Scan Input**. This will bring up the **Scan Input** dialog box in which you need to select the following options. Most recent computers can use the Preferred Selection; if Spectrogram runs really slow, the Alternative Selection should run faster. Do not vary these settings unless you thoroughly understand Spectrogram and what effect the changes will have. These settings will provide a frequency resolution of 20 Hz, which is more than sufficient to resolve any filters used for CW or SSB reception. All of the following instructions assume that Spectrogram is configured as given in the **table 1**.

Table 1—Spectrogram Settings

Selection	Alternative Selection
Sample Rate (Hz)	44k	22k
Resolution	16 bit	16 bit
Type	Mono	Mono
Display Type	Line	Line
Scale (dB)	90	90
Palette	CB or BW	CB or BW
Time Scale (msec)	100	100
Cursor Offset (Hz)	0	0
Freq Scale	Linear	Linear
FFT Size (Points)	2048	1024
Freq Resolution (Hz)	21.5	21.5
Band (Hz)	0 to 5512	0 to 5512
Spectrum Average	128	128
Pitch Detector	Off	Off
Recording Enable	Off	Off

2. Check Soundcard

In the **Scan Input** dialog box, click **OK**. Adjust the slider on the right side of the Spectrogram display to its maximum (top most) setting. The display should show a frequency range from 0 Hz to above 4800 Hz and an amplitude range of –90 to 0 dB. There should be a small blip in the display near 0 Hz, but the rest of the display should show a flat line at –90 dB. The display below is in the BW Palette and the black crosses may be turned on and off with **Toggle Grid**.

If there is noise above the –90 dB line (except the blip at 0 Hz), there is a problem with the sound card and the noise will limit the dynamic range that can be obtained in these measurements.

3. Connect Cable

With the power to the receiver turned off, connect the cable between the headphone output and the sound card input. There should still be no noise on the display. If noise is present, it is probably due to a defective cable or a ground loop in the audio connection. You will need to determine the cause of the noise and eliminate it if possible. You may also try to use an audio attenuator to reduce the noise.

4. Power On Receiver

Turn on the power to the receiver. The audio and RF gain controls should be set to their minimum level and the AGC should be turned off (Hold PRE/ATT and AGC buttons on K2). Disconnect any antenna to the radio. Set the frequency to 80 meters and the mode to CW or SSB. The Spectrogram display should still show no noise other than the 0 Hz blip. If there is noise present, you will need to use an audio attenuator between the headphone output and the sound card input to eliminate this noise. Slowly turn up the audio level until you can barely see noise at the –90 dB level. This sets the maximum audio level without sampling the internal radio noise in Spectrogram.

5. Connect The Noise Source

Turn on the receiver preamp. Connect the noise source to the radio input and turn it on. This maximizes the noise injected into the radio and will yield the best dynamic range. Set the receiver to the filter bandwidth that you want to measure. Gradually turn up the RF gain until the maximum reading in Spectrogram is approximately –20 dB. For the K2 in the 700 Hz filter bandwidth, the plot will look similar to the one below.

6. Adjust The Displayed Level

The following step is very important to avoid clipping in the sound card and the resulting intermodulation distortion. Gradually increase the RF gain until the noise starts to rapidly increase at the higher frequencies. Reduce the RF gain from this point by at least 3 dB; a larger reduction won't hurt, but a smaller one could lead to measurement errors in the spectral intensity. This step sets the input level into the sound card so that we are avoiding any clipping and the resulting distortion; this distortion can be a significant source of errors when measuring the filter response. For filters with a bandwidth of less than 1 kHz, a setting of –15 dB is safe, and for bandwidths equal or greater than 1 kHz a setting of –20 dB is safe. The previous Spectrogram display was taken with a maximum displayed level of -15 dB and a filter bandwidth of 700 Hz. If your audio level is set too high, the picture below shows what the distortion will look like. Compare this to the previous Spectrogram display. The level

at the higher frequencies is very sensitive to changes in the audio input level.

7. Make The Measurement

You are now ready to measure the filter response. It takes at least 15 seconds to read all 128 measurements for the average, and it may take even longer if you have a slower computer. When you are satisfied that you have obtained a good image, click **Stop** on the Spectrogram display. The image may be saved as a display of the Spectrogram window using the **File/Save Image** command or it may be saved as a set of data in text format that can be read into Excel or other graphing programs using the **File/Log Data** command.

--See Comments in QQ Correspondence--

Conclusion

Spectrogram can make wide dynamic range measurements of the filter response of HF receivers. It does require some care in its use to obtain accurate measurements, and to utilize the full dynamic range provided by the program. I'd like to thank Tom Hammond, N0SS, for taking the time to review this material and making a number of helpful comments. ●●

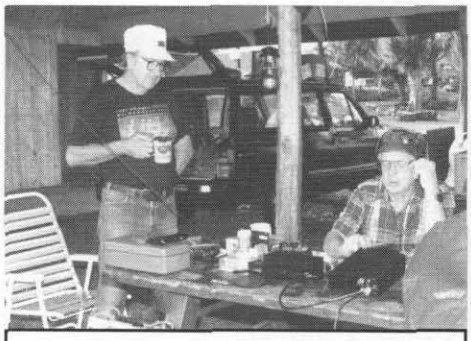
About The Cover

Craig W. Behrens—NM4T **craigwb@hiwaay.net**

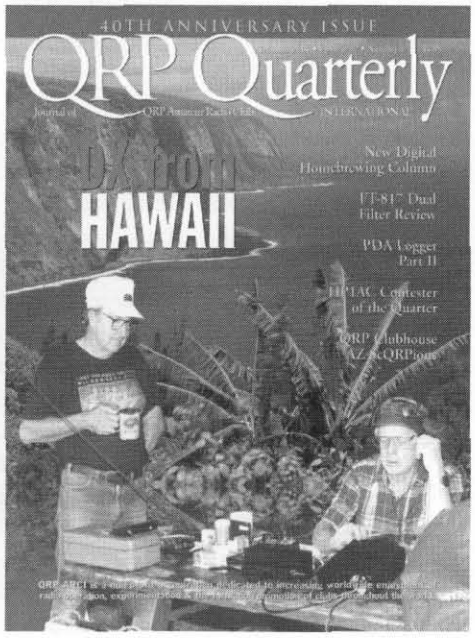
The October QQ's cover displays intrepid QRPers **Don—NH6WW** and **Dean—KH6B** doing "the QRP thing" at the Milolii Beach Park, January, 1998.

How can one not be envious about the fun they have taking advantage of their fantastic location. However, you have to consider the QRP challenge that comes with it—**"Everything's DX from Hawii,"** says Dean.

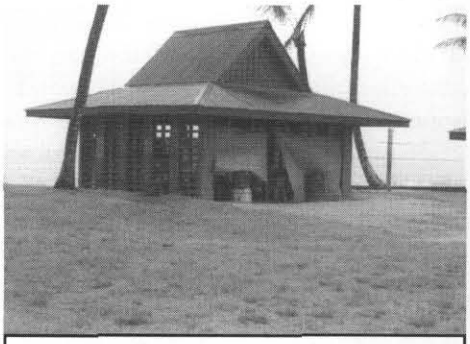
For those who might be curious as to how a cover often comes together, I've inluded a scan of the original snapshot (imediate right). This photo, like the majority of those shot, was of marginal quality when considered for publication use. Inexpensive cameras, and now the new wave of low-resolution digital cameras create a real challenge for graphic artists. My daughter, Kimberly, also referred to as the "Photoshop Queen" by her publishing peers, has a good 15 hours in making this cover's magic happen. We hope you enjoyed it. ●●



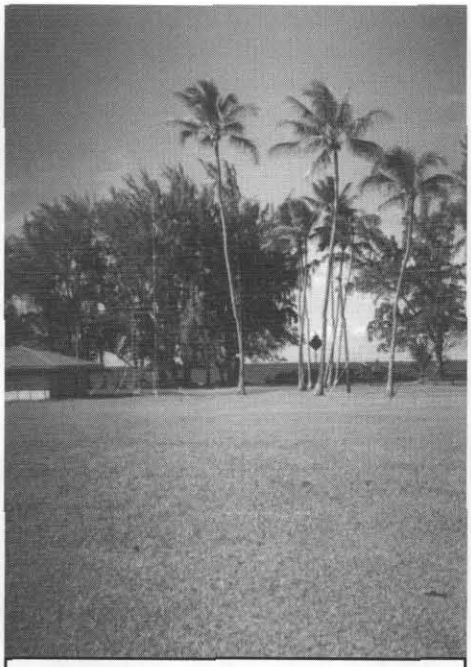
Don-NH6WW (left) and Dean—KH6B(right) Milolii Beach Park, January, 1998.



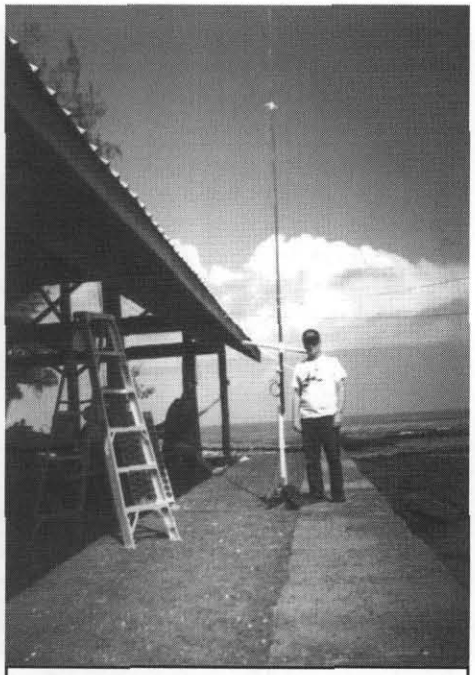
A QRP FD-2001 KH6IN Club Station Adventure at Laupahoehoe Point Beach Park, Hawaii.



The Pavillion on Moku Ola Island, their AL0HA site for the QRP TTF Event April, 2001.



KH6B/QRP at Kaloli Point near Hilo, Hawaii. Note clear pacific ocean path to north and south american DX.



Dean—KH6B with his 40-meter linear-loaded vertical, at Milolii Bay, Milolii Beach Park, Hawaii, May, 2000.

Test Topics and More...#9

Joe Everhart—N2CX

n2cx@voicenet.com

Test Topics and More No. 9

This installment of the column shows the nearly-finished metalwork for the current on going TTAM project. The Microvolt Signal Source is illustrated pictorially as the construction proceeded. Not surprisingly construction details changed during the process. As is typical in such projects the whole thing took much longer than expected .

The number of photographs needed for this installment of the column requires so much space that the Coming to Terms section will not be presented.

Stimulus and Response discusses the realities involved in trying to respond to requests for specific test solutions. In short - we can't have everything we want.

Designed For Test

The Microvolt Signal Source began about a year ago and was conceived as a project that could be built by the average homebrewer with no special tools or techniques. Much of the original thinking concentrated on a clever (well at least I thought so) circuit design that broke the whole thing into a series of small sections that could work independently and predictably. The concept for construction was to use printed circuit board material that could be easily soldered together as I had done in smaller projects. The ancient Greeks had a term for overconfidence in one's ability - hubris!

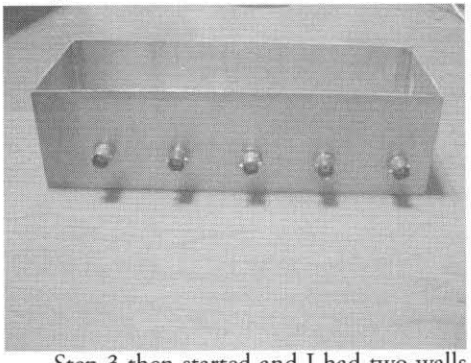
If you check back in earlier installments in TTAM and Joe's Quickies (See references) the basic idea was that an overall box would be constructed by soldering together large sheets of material. Inside the box individual compartments would provide shielding between attenuator sections. The assumption was that putting all these sections together would be straightforward. What I had not taken into account was the learning curve involved.

The very first lesson was that while the detailed computer generated drawings were fine the process of transferring these dimensions to actual physical pieces requires paying attention! A familiar carpenter's rule is "Measure twice and cut once." Well it took me a couple of tries to cut the major box pieces correctly. This was due to a phenomenon that the Pennsylvania Dutch are familiar with - "The hurrier I go the behinder I get." In trying to finish things quickly I made a number of measuring errors and always in the larger pieces.

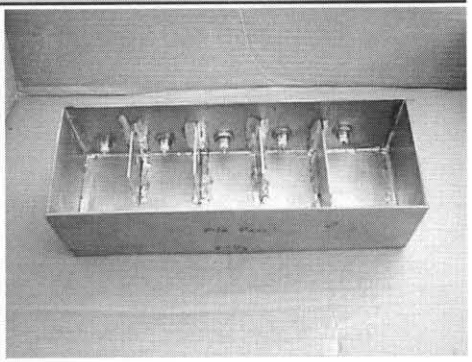
Once the overall box was made, I realized that it would be imperative to continue construction smartly. That is, since the interior is so tightly packed, the building operations had to be done in the correct order. The best way seemed to be:

1. Build the overall box
2. Carefully measure the BNC connector holes then drill and file them.
3. Install the 1-1/2 inch square attenuator section walls individually into the box, using a template piece to ensure accurate spacing so that the sections were uniform in size.
4. Install the oscillator compartment wall.
5. Install the common wall for the attenuator sections.
6. Solder the brass nuts into the corners of the compartments.

Well I've admitted how I screwed up step 1. The next faux pas was in making the BNC holes. Once again in a hurry, I neglected the compartment wall thickness in systematically drilling the holes going from right to left. So by the time I got to the fifth BNC connector, I was 1/4 inch off! This meant removing the entire front panel (unsoldering it carefully so that I did not screw up the rest of the box) and start over. This time all went very well and the final product came out pretty well as you can see in **Figure 1**. Even here you can see that they are slightly off-line vertically, but not enough to matter.



Step 3 then started and I had two walls in place before I realized that the through holes for the attenuator resistors had not been drilled ahead of time. Ah nuts, they had to come out - more unsoldering - and holes were quickly drilled and the slots for compartment to compartment ground conductors were made. **Figure 2** shows the compartment walls with through holes before the slots were made.

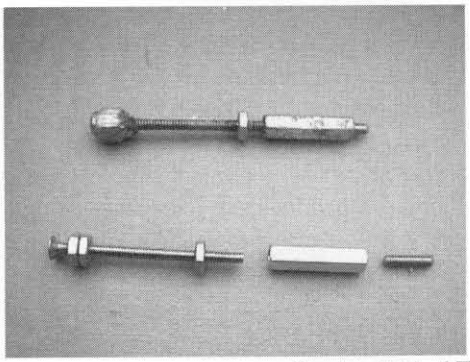


Using the compartment template ensured that each section was then properly sized.

Installing the nuts revealed some additional problems. First, my idea of recessing the nuts so that compartment covers would be flush was much too difficult to do. I had done this in the past with simple boxes not containing internal compartments but doing so in the compartments is quite difficult due to the limited access. Soldering the nuts flush with the compartment walls is much easier - the effect on shielding will have to be evaluated later.

Second, my plan to use long stainless steel screws to hold the nuts while soldering is finem - if you can find screws long enough. The longest I could do find were only about 2 inches long. And this is too short to use on 1-1/2 inch high compartments without burning fingers! However I was able to locate some threaded standoffs and cobble together a good substitute as shown in **Figure 3**. Two extra nuts are used at the top of the long screw to provide a good handle which is wrapped with duct tape for insulation. The photo shows both the individual pieces and the assembled tool.

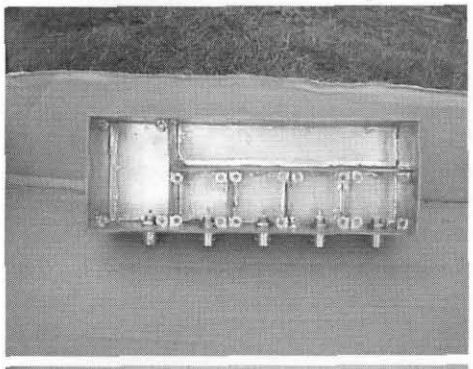
The third problem is one that will be taken care of in the next Signal Source I build. Simple scaling with my computer drawing tool gave an overall enclosure height of three inches. The aspect ratio is fine, but that height means that the exterior walls are nearly 1-1/2 inches above the shielded compartments. That is en-

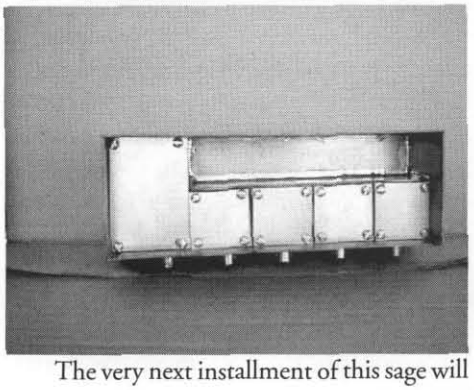


tirely too much unless you are one who enjoys building ships in bottles! An overall height of about 2 inches should make interior construction much easier.

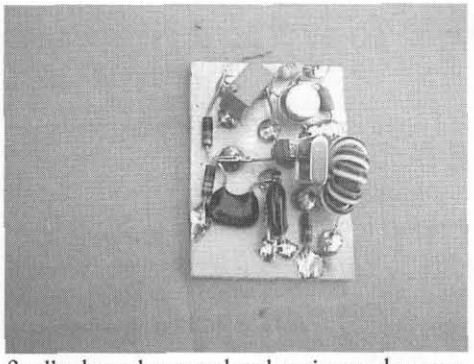
Having learned all those lessons, I was able to finally finish all of the internal compartments and their covers (one minor issue with the covers is that the ones in the box corners need one corner rounded to allow to allow for a solder bead in the box corner.) **figure 4** shows the enclosure without the compartment covers and **Figure 5** with the covers installed.

One positive note is that the crystal oscillator went together quite easily. **Figure 6** shows the model used for the final product.





The very next installment of this sage will



finally show the completed project and present some measurements of its performance made using professional test equipment.

And by the time the next installment is published I hope to write up a comprehensive document showing all of the construction details and a complete schematic diagram and parts list. Doubtless that will be too large to appear in this column so it will be made available in another manner. One possible choice is to offer ti through the NJQRP club either on their web page or as a separate publication.

Stimulus and Response "I want..."

A fair number of letters I receive ask for information on building or buying inexpensive test equipment. It's a natural thing for hams to do and there are lots of great ideas. Our hobby can get rather expensive in a hurry, so we can't afford all of the ancillary things we'd like too have. But this desire has to be put into perspective.

We all have only a limited time to devote to our hobby so we can't do all that we would like to. This forces us to choose what we can and can't do. And "scratch" designs take time to finish. I estimate that something relatively simple like the Rainbow Tuner from several years back took a total of about 2 months of spare time. And if it were all I was working on the Microvolt Signal Source would have taken a little more than that. What this means is the any project I set out to do has to be something I need as well as having value to others to build or to see written up in a column.

There are also requests from folks for "knock offs" of commercial equipment. That is they want either to be told how to duplicate something that a for-profit company produces or they want a club to make such a copy and undercut the original manufacturer. This is not a smart thing to do. First off it's unethical and secondly it's a great way to discourage manufacturers from selling to the ham market. On the other hand, if there is a simpler way to duplicate the same idea or to make a piece of gear that is similar, but does not compete head-on that's fine.

None of the above is meant to discourage asking for ideas on how to build simple test equipment or to locate sources for the same. And even if I don't have the time to tackle a given project, I may be able to give some ideas about how the questioner can do it himself or where he can go for further information.

References:

1. TTAM No. 5, Oct 2000, QRP Quarterly
2. Joe's Quickie No. 36 in the Information Exchange column, QRP Quarterly Jan 2001
3. TTAM No. 6, Jan 2001, QRP Quarterly
4. Joe's Quickie No. 38 in the Information Exchange column, QRP Quarterly Jul 2001
5. TTAM No. 8, Jul 2001, QRP Quarterly ●●

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think someone as well known and respected

Continued from Page-5.

as Ron would have done something inconsiderate like that.

Anyway, as Paul Harvey says, "Now you know the rest of the story!" Which reminds me---does anyone else out there agree with me that Paul Harvey copied his "rest of the story" idea from Marvin Miller? Who is Marvin Miller you say? Well, he used to be the guy who passed out the checks on the old "Millionaire" TV shows in the 50's, but before that he had several radio programs (on Mutual I think), one of which was "The Story Behind The Story". Identical format! Ah, trivia!
72, de **Dave--W7AQK**

Also from QRP-L

Subject: JULY 2001 QQ

Got mine on Saturday, this is one Piece of Art.
72s from KP4 land, **Pablo L. Robles--WP4JXD** <wp4jxd@isla.net>

In addition to all the joy of a great QQ issue, I'm enjoying the hunt!!

I'm trying to figure out who is helping K7RE test something. Or is it that someone is testing K7RE? Can anybody help? :) :)

Again, wonderful issue, what a great team of guys....
72, **David Heintzleman-- K8BBM** pstrdave@kdsi.net ●●

Thanks for all the correspondence. The ideas and criticisms you submit help us further improve the QQ as the years and issues roll by. **ed.**

Web Sites for Grid calculator, Grid Square Info, Operating Aids and more:

For those who failed to bookmark the mother of all calculation pages: http://www-sci.lib.uci.edu/HSG/RefCalculators.html includes grid calculator and much, much more.

Grid Square Info (KB7MBI): http://ac6v.com/opaids.htm#GRID

Operating Aids: http://ac6v.com/opaids.htm

From Alan—KB7MBI in Woodinville, WA

Wideband 80 & 40-Meter Dipoles

Dave Leeson—W6NL leeson@ix.netcom.com

First posted to towertalk@contesting.com Wed, 26 Nov 1997

There's an interesting method of broadbanding antennas mentioned in various ARRL publications by Frank Witt, AI1H. It uses the transmission line length you are going to need anyway to match at two frequencies in the band (say 3.52 and 3.80 MHz). It's also mentioned in a text I use teaching a graduate microwave course at Stanford, and I have been wanting to try it.

Here is a summary of an 80m inverted vee I put up that matches 1:1 at the cw and ssb frequency. The inverted vee is designed using AO to resonate at 3.67 MHz (geometric mean of two frequencies of interest), and to have enough height and included angel to have a resistance at resonance of 70-75 ohms. The apex is at 120 ft, and the angle is about 120 degrees. I use the AO optimizer, then knock off 1% length from experience.

Now for the interesting part. I measured a full wavelength of 50-ohm coax using the MFJ-259 antenna scope. Using Belden 8214, it's about 205 feet long, connects to the antenna 1:1 balun and comes down to the ground. Next is conected a 1/4 wavelength of 75-ohm coax.

At the transmitter end of the 75-ohm quarter wave, the match is perfect (less than 1.1:1) at 3520 and 3800! This should work for a horizontal dipole, or any antenna with impedance in the 75-ohm range.

To see if this was a fluke, I put up a 40m dipole at 50 feet for Sweepstakes. It uses a half-wave of 50-ohm coax followed by the quarter-wave section of 75-ohm coax, and it matched fine at 7.0 and 7.25 MHz.

To see how this works, the best tool is Wes Hayward's Microsmith Smith chart program (ARRL), but you need a reasonable RLC model for the antenna impedance. I do this by getting the impedance of the antenna from AO, using a spreadsheet to figure out what the equivalent series L and C should be, then using that in Microsmith. A better dipole impedance model has the resistance across the inductor, so the variation of R with frequency is better modeled.

Once you have the antenna impedance model, you can see why this scheme works. The electrical line length (in wavelengths or degrees) is less at the low end of the frequency range and more at the high end, and it tends to wrap the impedance plot into a much smaller range. Once you have done enough half-waves, you can convert the impedance to 50 ohms with a transformer or quarter-wave section. AO, Microsmith and the MFJ-259 working together make it easy, and my curiosity is satisfied.

You can use this on any antenna, but if you want to do it with a Yagi, you need to work harder on the model (try RLC plus a short negative line length), and you will find it takes an awful lot of line length if the resistive part is less than 70 ohms or so. But I plan to use a W2FMI transformer to get the impedance up where I can use this on a 3-el 40.

Hope this is of interest, give it a try.

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End-Fed Half-Wave for 20-Meters

John Harper—AE5X ae5x@qsl.net

A trip to Crater Lake NJ last year with my 20m DSW and an extremely simple antenna resulted in some accidental DX that really amazed me. What surprised me was the ease with which the DX was worked with a 2-watt signal. Although I wish Operator Skill or Telegraphic Finesse was responsible for my being able to add these stations to the log, the fact is that I simply called the stations and they came back to me. Not a lot of skill or finesse at all!

So I give credit to my location (at the top of a ridge), band conditions and my antenna - a 33' end-fed wire that I'd hurled into a tree, and a single 17' radial. With more summer backpacking trips planned , I decided to test this antenna at another location. If the results remained similar from a DX point of view, this will be the antenna to pack when I take the DSW/20 along to work DX from the trail. If the antenna's performance from last year proves to have been a fluke, I'll test it some more, but will begin to lean more toward a 40-M rig for the trips, giving up on the notion of working much DX from the tent.

Although a lot of hiking in this area is along ridgelines above the surrounding terrain, I wanted to test the antenna at a less-than-ideal location more typical of where campsites are located along the trail. So, with rig, ZM-2 tuner, batteries, etc, I set up as if I were camping in nearby Waywayanda State Park, surrounded by tall trees. Aside from the light weight and minimal space requirements (backpackability?) of this antenna, another advantage is the convenience with which it is purchased - it is simply a 50' spool of wire. Seventeen feet are cut from the spool to act as a ground radial; the remaining 33' make up the radiating element.

Installation is equally simple: a 20' length of nylon string is tied to the end of the 33' wire and a rock is tied to the end of the string. Throw the rock over a tree branch up 30-35 feet and the weight of the rock will hold the wire taught; the far end of the string doesn't even need to be tied off. In fact, it won't even reach the ground using these dimensions. Then lay out the radial, attach the tuner and you're in business. I usually lay a heavy rock on top of the wire just before the tuner to provide strain relief. Simplicity at its best! Total time—Arrive to Operate—is 10-15 minutes.

I had the antenna tuned at 4:30 PM local time and tuned around a bit to get an idea of band conditions and activity. At 14.022 I heard VP5/W5OE calling CQ from St. Kitts in the Caribbean. He was by far the strongest signal on the band and we exchanged 599 reports. Even with the gain on the DSW turned all the way down, he was so loud I had to partially remove the earphones. A few minutes later, I answered a CQ from 4Z5DW. Leon gave me a 559 from Tel Aviv—he was 579. After a quick bite to eat, I answered a fluttery CQ from UA0AZ. He was an honest 599 and gave me a 589 from Siberia's Zone 17.

For simplicity, cost, backpackability, ease of installation and effectiveness - the desired characteristics of a trail antenna - this antenna is hard to beat on 20 meters. As an added bonus, it also makes a pretty fair 1/4-wave antenna on 40 meters, although I would suggest lengthening the radial to 33' on this band.

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QRP ARCI's member #11,000 just sent in his PayPal payment. He is:

Michael J. Golini, KD7OHW
5184 West Ross Drive
Chandler, AZ 85226-1992

Let the part begin!

Keylite Kit Review, a Memory Keyer with a Difference

Gary O'Neal—N3GO n3go@usibm.com

As one of the founders of the Knight-Lites QRP Association, it feels odd being asked to review our most recent project offering, the "Keylite". While I lit the spark that launched the project, I had nothing to do with its development other than cheering on the designers, Sir's Steve Carr (AE4YQ), and Todd Nichols (AG4AY). This is a heavy burden of responsibility they have anointed me with, and I hope in fulfilling the request, I avoid conflicting personal bias. Just remember, if it sounds too good to be true, it's nothing short of amazing.

The Keylite is memory keyer with a difference: it will operate with paddles or an IBM keyboard, contains a 16 character two line dis-play to view what has been typed and a 32 character buffer allows time to make keyboard corrections before the message is completed. A Beacon Mode and many other features make the Keylite a very flexible tool. The current drain is mini-mal, controlled mostly by the keyboard used. And best of all is the price: $55 plus shipping. (For ordering information, visit the KnightLites' web site at http://www.knightlites.org.)

The first thing that caught my eye about the kit was that it was delivered to me in its case, bound together by a rubber band. The builder is comforted by the notion that all the parts fit (at least initially) in the tiny 4.75-in. X 2.5-in. X 1.5-in. case.

Unpacking the kit was a snap: Remove rubber band, dump box. Oh! My! How neat. Sir Bob Kellogg (AE4IC) went beyond the call here, and pre-sorted the parts into neat little packs. The backlit LCD was snugly wrapped in an anti-static bag and bubble wrap, and the IC's were secured in a compact carrier. Everything is safely buckled in for worldwide traveling.

While I hate to admit this, I read the manual, cover to cover, before starting the kit. I felt an obligation to do so in order to give it a fair review, in the rare and unlikely event that I could actually blunder something. This early precaution killed nearly half an hour, and I wiped out another 15 minutes doing an inventory of the parts, including checking all part values. My kit was short four lock-washers, but otherwise everything arrived.

Soon after assembly began, I was staring long and hard to find a location for that 13th 10k resistor. I finally resorted to counting on my fingers R4 through R15, and kept coming up with 12. Hmmm... Aha! Now I see what happened; we're shipping a "Bakers Dozen". It seems everybody gets a spare 10k resistor folks.

I wasn't going to let the fun I was having interfere with the fun I could be having, so I multiplexed between assem-bling the kit, checking into and monitoring the KnightLites Sunday night Net, trying to get the board assembly completed before my XYL gets home from work, and keeping the toothpicks from puncturing my eyelids. Can you guess where this led? I installed J1 on the wrong side of the board. This could have been any other compo-nent, and life wouldn't be so difficult ... but nooooo, I had to install the one with the most pins, and all closely spaced! Need I tell you that, by removing that little gem without causing a calamity, I've already got my money's worth of fun out of this kit? I certainly didn't deny myself the joy of discovering and correcting those blun-ders I profess to avoid.

Was this a lesson learned? Well cer-tainly... but the mind is a terrible thing to waste... on storage... so two steps later, I read "A dry fit is the best way to ensure the leads are bent at the right points." I asked myself: "What the heck is a dry fit?" With no one wiser than me around to answer, I decided to deal with that later. I installed the 7805 regulator vertically on the board like I usually do when provided with a heat sink. Then it was time to read the rest of the installation step. Oops! Goofed again! When will I ever learn? No problem... I'll just bend the regulator over, and ... oh nuts! Now I have to remove an-other part. This one has but three leads, and all sturdy and healthy. Alas! I was in a hurry. I broke the center lead off the regulator. Now the XYL is home, and I'm off to greet her. This is rolling over into another day. This sure isn't working out the way it does in Hollywood!

I was lucky to have a spare 7805 regulator in my junque box, but correcting one's mistakes is not without it's own casualties. J1 and J2 have some darling little battle scars, and the board is a bit short of being the lovely work of art I had etched in my mind. But then, that's what I'm here for ... to make those first mistakes, and caution you against all your thumbs, or a wandering mind. All is well that ends well, and I'm confident I've made my last mistake. Now pay attention!

I noticed the lock-washer used for mounting the 7805 straddled a couple of land traces on the PCB. Care should be taken when mounting this part. Position the lock-washer such that it doesn't cut into any line traces on the board. It proba-bly wouldn't hurt to leave it out altogether, and eliminate the risk entirely.

Ugh! The next step is designed with me in mind... "Install the two Berg con-nector headers, and make certain they are as perpendicular to the board as possible." You're instructed to solder only one pin first, then reheat it as many times as required to set the header vertical. You've gotta be kidding! I don't have a square that small! As it turns out this wasn't difficult at all. With the keyboard connector J1 installed (properly this time), you can sight along the board from the opposite end of where J1 is installed, and line up the header pins with the right edge of the J1 housing. How convenient... I just know Sir Todd planned it this way as he worked through the

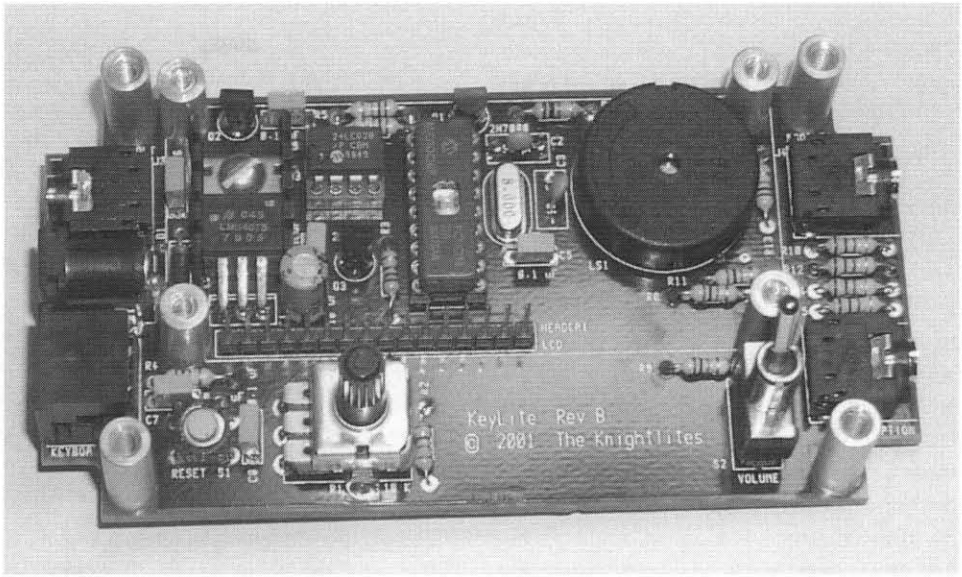
PCB layout. The skill devel-oped at this step was soon tested when installing the mating connectors on the LCD display board. There are no reference markers there, but the connectors seat nicely, and making them ver-tical didn't seem to be a problem.

Chopping off the shaft on the contrast control R1 is a non-reversible alteration, and I opted to hold off installing this part until I was certain of its impact to packaging. I did the same for the volume con-trol switch S2. When it was time to consider mounting it in the case, a quick inspection of these components led to my first critical com-ment on the design, as well as a couple other interesting observations. The 1/4-inch nylon standoffs that support the board from the bottom of the case appear to be an afterthought. Glue is recommended to hold them in place, and this is an absolute requirement if you don't want four 6-32 screws floating around in the case seeing what they can short out. Nuts or threaded standoffs would have been a better choice. I had two problems here. First, one of the nylon spacers I received was only 3/16 inch long, which created a wobble when installed. Second, 1/4-inch spacers are a bit short, and the assembly can rattle with the cover on. Some shimming may be required if you follow the installation example given. Most users will customize the installation to their own exacting require-ments.

With the display mounted on the board, I also observed that the shaft on R1 doesn't rise as high as the top surface of the display, which when assembled, is flush with the bottom surface of the lid. This means that 1) cutting the shaft of R1 off isn't required, and 2) since it's not long enough to protrude through the lid, a small clearance hole is needed if screwdriver access to the contrast control is desired.

On the heels of putting Sir Todd's prototype in beacon mode and letting it run for a couple hours at a recent hamfest, I became convinced that switch S2 is a desirable option. Having it on all the time will drive me nuts, particularly in beacon mode, and especially if I have to decide which volume level I prefer. There are only three choices here. They are off, low, and high.

The high setting is about as high as I would ever want, unless competing with other beeps and squeals on field day, or if entertaining in a classroom or other large audience. It wasn't intended for such applications, and definitely won't support that mode without modification. Like all really good kits, one can fashion an adapter and pipe the audio to an external amplifier.



The low volume setting is still pretty healthy, and not as low as I would like. On those rare occasions that I operate, my XYL is asleep and oblivious to my indul-gence in my hobby. These are the times when I put my straight key away for fear that the clicks will wake her up. In this environment, the house is quiet, and I like to run my audio QRPp as well. On the other hand, it's loud enough to rise above my tapping on the keyboard. My guess is it's probably just about right, and it will be attenuated a fair amount when installed in its case.

The audio output stage is simple enough, and more than a couple of options come to mind for custom tailoring the sidetone level. F10 is an alternate means of toggling the audio on and off, and a jumper can be used in place of S2 if only one sidetone level is desired. A potentiometer could be used in place of R7 for a more conventional volume control. The switch common should be jumpered to the unregulated (high volume) side to yield the largest control range.

Based on these observations, my rec-ommendations are to leave R1 alone, and S2 is optional. As I moved toward final packaging, I discovered I had room to install the reset switch S1 on the bottom side of the board. This makes it easily accessible (with a ballpoint pen or paper clip) through a tiny clearance hole in the underside of the case out of view. I'll not likely have a need for it, but this looked like a clean way to provide for external access, and not deface the cover.

Five 0.01 uF bypass ca-pacitors are supplied to sup-press key-bounce and RFI susceptibility. These were added after the need for them was discovered, so they're installed on the back of the board. Two are identified as optional, and may or may not be needed depending on the keyboard you use. The others are probably a good idea for the ESD (static discharge) protection they provide. They also make the keyer less sus-ceptible to false keying from RF in the shack. Be sure to keep the leads as short as possible; otherwise, they'll fail to serve their purpose.

A nice plus of the kit is that it's shipped with a mating power plug, giving you the freedom to select the wall wart, battery pack, or power source of your choice. Having this supplied was a nice gesture. There are many size variations and styles for wall wart adapters, and it's nice to have one close at hand when you're ready to give it the smoke test. Those chiv-alrous Knights have spared you this grief of running out to buy one.

Now the real challenge: doing a neat job of packaging. What was it that Pop used to tell me? Measure once, cut twice I think... or was it cut once then measure twice... Oh well... I'll figure this all out later. This is where the builder has a chance to personalize his kit. You may want to call out your Elmer to help with this. You will then have somebody to blame if you goof it up, and it doesn't turn out exactly the way you would like it to look. There's a guide in the manual that provides all the required dimensions to neatly package it in the case provided. With care and a bit of patience, it will pro-duce a very nice looking result. I'll not cover this part of the assembly here, because I would be reviewing my work-manship rather than the quality of the kit. Instead, I'll move on to the important operational aspects.

Despite my dastardly determination to destroy this device, it fired up and worked without a hitch. No troubleshooting required. What a relief! The assembly time to get this far was approximately two hours, including

correcting my blunders, searching for a spare 7805, performing initial checkout and functional verification tests. I've consumed nearly $40 worth of fun so far, and haven't yet keyed a rig. What a bargain!

Electrically, the Keylite is extremely flexible. There are important considera-tions of course, but they're easy require-ments to meet.

The input supply voltage can actually go well above the 14 volts indicated in the manual, the limit being set by the power dissipation of the 7805 regulator (about 2 Watts with the heat sink) which can main-tain regulation to 1.5 amperes—plenty of reserve for most keyboards. If your key-board doesn't draw much current, you could go as high as 35 volts, although I wouldn't recommend this. You can even go as low as 7 volts, although a 9-volt battery would be the most likely low power voltage choice for its portability. A very low current keyboard would be a must in that case. This wide supply varia-tion provides great flexibility for the user.

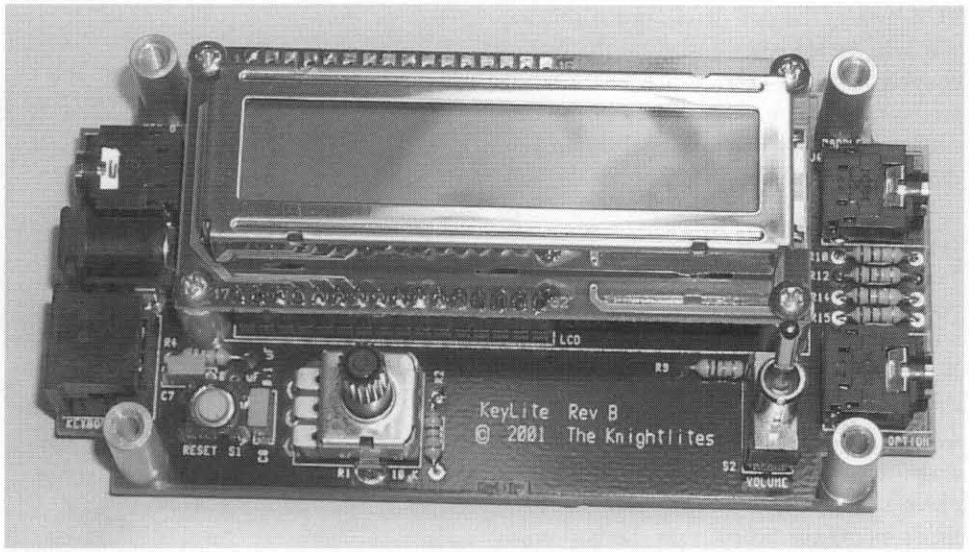
The most vulnerable component is the FET (Q2) driving the key-out jack, J3. There are some of us using incandescent rigs that sport fairly high voltages at the key. The 2N7000 will toler-ate up to 60 volts, but the trade-off of volt-age is current. If you're cath-ode keying, and not QRP, you could end up replacing Q2. There are a variety of measures to protect solid-state equipment from the exuberance of these warm-hearted arti-facts, and as Dr. Laura would guide you... "Go and do the right thing!" The on resis-tance of the FET is sufficiently low that it should key most rigs on the market today, and the vast majority of older solid state rigs as well. If your rig has a high imped-ance (CMOS) input, it may require a pull-up to keep the off leakage of the FET from keying the rig. A 10k resistor will correct this in most cases. This resistor was left out of the Keylite design, because the pull-up voltage used may not be compatible with all rigs. Install this pull-up in the sus-ceptible rig, if it's even required. Drop me an email if your rig does this, and you're unsure about how to add the resistor.

Now the real fun begins... Aside from some confusion about setting word and character speed, everything worked as advertised. The instructions were a bit con-fusing regarding setting it up for Farns-worth operation, but after a few moments of careful scrutiny, this was quickly resolved:

To enable the Farnsworth parameters:

1) Enter the desired sending speed in WPM using the Farnsworth enable key F6.

2) Enter the desired character speed in WPM using the WPM key F5. (This must be higher than the sending speed or the Keylite will default to normal mode at the sending speed entered in this step.)



Entering "00" in response to the Farnsworth enable command (F6) will disable the Farnsworth mode.

Now what can I discover that isn't advertised?

That's pretty easy... J5 for one... Option? What option? Nothing is said about this in the documentation, but it appears on the schematic, and it's wired to two of the PIC's I/O pins. Sir Todd had the best and most succinct answer to my query on this: "It was just much easier and nicer to add I/O up front rather than later." This was added in case we (or someone else) came up with something really useful to do with the extra I/O pins.

If you type beyond the 63 character boundary of programming memory loca-tion four, it wraps around and wipes out what you've stored in location one. This isn't likely to be a problem for most of us, but it's good to be aware that this can hap-pen if we get over zealous. We must learn to be terse.

The display clears the character just before it's sent. This looks odd when watching the display, but isn't really a problem or inconvenience.

One of the first things I tried was typ-ing a long paragraph into the memories. Wow! This thing is huge! I wanted to load 250 characters, and this does it so neatly. I then thought: "Suppose I read memory number two." Press F2 and Bingo! It picks up at character 64 and sends to the end. F3 picks up at character 126 and so on to the end. If only I can fig-ure out how I want to map these.

Extending on this thought, I discov-ered that I could have two memories of 127 characters each, or one of 63 charac-ters and one of 191 characters. In fact, I can span any pair or combination of mem-ory boundaries in 63 character increments. For example, a short message in memory one, a long message spanning locations two and three, and a third short message in location four. The way this works is that messages of 63 characters or less consume one dedicated memory location, messages that exceed 63 characters span two loca-tions, and memories that exceed 127 char-acters span three locations. This is actually mentioned in the manual, but it's easy to miss.

A simple Control - F1 - Escape clears memory one. The same trick works for the others, but each must be cleared sepa-rately, even for the case when memory one is loaded with a long character string that extends beyond the boundaries of the other locations. I haven't stumbled on any way to clear all memories simultaneously.

The memories are nonvolatile, and remain intact even with power removed. The reset key only restores the operational defaults, leaving all memories intact.

The Spacebar is used for inserting word spacing, an obvious expectation, but not identified in the manual as a supported keyboard command. I learned after only a few minutes of use that the space bar or the escape key is the appropriate way to inter-rupt a memory playback sequence. Other-wise, the character you use will be trans-mitted. The spacebar will not interrupt the transmit buffer of course, since its use in that case is to insert a space at the end of the transmitting sequence.

Several punctuation characters, while not directly supported, such as colon, semi-colon, left and right parenthesis, etc., can easily be created using the character concatenation feature of the control key. Omitting infrequently used characters was a good trade-off of pro-

gramming space for more useful features.

The way errors are corrected is a sub-tle but nifty feature. If you hit the back-space key as the error is transmitted, it follows the sequence with the error prosign (a string of 8 dits), but if you hit the back-space before the character is transmitted, the display is simply updated, and use of the error prosign is avoided.

The pause key, <scroll lock>, is a first class feature that allows you to begin com-posing your exchange while the other sta-tion is still sending. Tap the <scroll lock> key again, and away it goes. It's a really nice utility that takes the stress out of getting ahead of the keyer.

The layout of the Keylite function key commands wasn't immediately obvious to me, but a call to Sir Steve brought it all to light. Most keyboards have three groups of four function keys each. The first four were allocated to the memory locations; the next four to keyer adjustments, and the last four are setup as toggles. To help remember key positions, the adjustment keys are laid out in the same order as the related toggle keys. Help "flags" pop up on the display for each of the command keys to minimize the need for consulting the documentation.

I made a small overlay to place above the function keys as I was learning to use the Keylite. This helped me get used to the layout, which quickly became intuitive. After only an hour or so using it, I no longer need the overlay to guide me.

I thought I might need a similar over-lay (or reference card) to help me find the prosign locations, but I soon discovered that the selection of prosign key assign-ments was quite intuitive. I quickly famil-iarized myself with their locations without the need for any reference guide.

It took me a few QSO's to graduate from a bug to a keyer, and it's fair to say that using a keyboard is a bit different, and will take some getting used to as well. Using an overlay to identify the function keys was a big help toward getting used to operating the keyboard in real time. It's taking some effort getting used to ignoring the code being sent as I type ahead, and having the overlay in place helps keep me from falling behind. I find it most difficult getting started, and using the <scroll lock> feature to buffer up the first few characters helps me get into a rhythm. I also tend to be a bit long winded, and the real chal-lenge is going to be keeping my transmis-sions short. After all, somebody on the other end has to copy this stuff.

The Keylite can easily handle all con-test transmitting chores. The <scroll lock> can be used as a pause/resume key to insert a contact number or other variable in the middle of a canned memory string. For small sprints and contests, this might be just the right feature mix. But don't expect it to compete with any computer based contest programs with automatic logging, duplicate tracking, and management fea-tures that assist with maintaining your sanity.

If you like building kits, and doing a bit of custom packaging, you'll get a full return on your investment just by com-pleting the kit. If you simply enjoy sending with a good fist, and keyboarding your way through CW QSO's, you'll find the features of the Keylite are intuitive, and easy to use. Sending CW is like typing a short email, and the operator on the other end will thoroughly enjoy the QSO while you're sending perfect code.

Perhaps asking me to assemble and review one of these slick little keyers wasn't a half-baked idea after all. The very fact that it survived the trauma of my heavy hand is testimony to the high quality and hard work that went into its design. It's also expanded my keying options, and piqued my interest in contesting again. It's time now to start practicing for the CW Sweepstakes. ●●

Antenna Feed System Modeling Software Follow-Up

The modeling software described in the April QRP Quarterly is now available for download from the web, courtesy WB6TPU. Link to **http://www.qsl.net/wb6tpu/swindex.html** and then scroll down to the bottom of the page for the XLZIZL.zip package.

XLZIZL has built-in specifications for over 40 types of transmission lines. This includes the Wes Stewart, N7WS, "as measured" data for four types of Wireman ladder line, both dry and wet, which has been the subject of several recent posts. Also included are the specs for "generic" 300 ohm, 450 ohm, and 600 ohm parallel line from the latest edition of the ARRL Antenna Book, as well as a few dozen different types of coax. You can use the "Transmission Line Details" sub-window of XLZIZL to see what the matched line loss (no SWR) will be for any of these lines at any frequency and at any length. If you can measure, model, or estimate the feedpoint impedance of your antenna you can also see what the additional loss will be due to SWR. Other functions of XLZIZL allow you to see what the tuner losses would be.

For those folks who haven't received the April QQ, here's a brief description of the package:

XLZIZL is an Excel application that analyzes transmission lines and other components of an antenna feed system. Calculations include impedance transforms, SWR/reflection coefficient, loss, voltage and current standing waves, stress on tuner components, network attenuation (S21), and return loss (S11). Analysis results are available in worksheet format and in five different chart formats, including Smith charts.

The program can read the feedpoint impedance data files produced by EZNEC, NEC-Win Plus, and public domain NEC2D programs; it can also use measurement data or arbitrary theoretical data. Results are shown at

the antenna feedpoint (or other load) and at each of up to five user-defined network elements. The network may consist of transmission lines, open or shorted stubs, baluns, capacitors, inductors, and resistors. To aid in modeling matching networks the program can create T, Pi, and L solutions using any load and input specifications.

Documentation includes a 28 page guide in the form of narrative questions and answers and a copy of the journal article "Picturing the -Rest- of Your Antenna System" (QRP Quarterly, April 2001). For users wishing to "look under the covers," the worksheets and associated Visual Basic for Applications (VBA) modules are not protected or locked in any way.

Requires Excel 97 or later. Be sure to check the README to see if an update is required for your version of Excel (free download from the Microsoft website).

73,

Dan—AC6LA

QRP Field Contest Logging in the 21st Century—Part II

Field Day 2001, Contesting in the Palm of my Hand

David Ek—NK0E (ex AB0GO) ekdave@earthlink.net

In the July 2001 issue of QQ I wrote about my prototype computer logging system for contesting from the field. To recap, my system used a Palm handheld computer along with a device of my own making which I call a Serial CW Sender. The Serial CW Sender is a PIC-based device, which is controlled by the Palm via a serial port, and which in turn keys a QRP CW rig during contests, just like TR or CT does for you in the shack. The July article described the Serial CW Sender circuit, its construction, and its operation.

You might be interested in how this whole project has moved forward since I wrote the July article. You may recall that I planned to do a full rewrite of the Palm software because my prototype for QRPTTF really didn't have a good user interface and was difficult to use "under pressure." The new software would need to require fewer actions on the part of the user in order to get contacts into the log. It would also need to be more easily set up for different contests, so the user interface would need to be more generic. But, just like the first version, it would need to be able to control the CW Sender and also perform basic functions like dupe checking and editing of log entries. It would also need supporting software for the PC so that the logs could be moved from the handheld to the PC at the end of the contest. Given that I only had a couple of months until Field Day, this would be a challenging task. Below I'll describe what I put together.

GOLog

I had already named the software GOLog, in honor of my old call sign, AB0GO (okay, so I couldn't think of a better name—that's what marketing departments are for)! GOLog is pretty easy to set up and use. I'll walk you through it here.

Figure 1 shows the opening screen and the sequence for creating a new log. In this case, I'm creating a log file for the Sept 2001 Spartan Sprint (a lot of fun if you've never played in it, by the way). You simply pull down the Log menu from the main menu bar, select New… and give the new log a name.

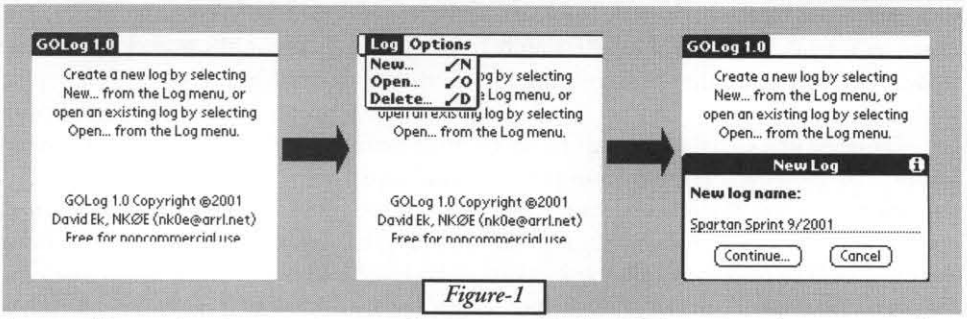


Figure-1

Initial Settings

Any time you create a new log, you need to specify some details about the contest you're going to work. After entering a name for your log, you'll see the Contest Settings form, shown in Figure 2. Here you specify your call sign, information about the exchange, and whether you can work a station more than once during a contest (check the boxes if contacts are allowed on each band and mode, or clear them if only one contact per contest per station is allowed). The Exchange Pattern field describes the format of the exchange and is used to fill in a list on the main Log Entry form (I'll point that out later). The default exchange is the sent exchange that will be logged for each contact. With this version of GOLog there is no provision on the Log Entry form for recording the exchange you send to other stations. Thus, there is no opportunity for you on that form to record a different RST for each contact, for example. This was a design decision I made solely because I was rushing to get GOLog ready for Field Day, where no such capability is need. Future versions of GOLog will add this feature.

Figure 2 also shows the form for setting up the Serial CW Sender, if you have one. If you leave the "Use Serial CW Sender" box unchecked, GOLog assumes you'll be doing all your sending by hand. Otherwise, if you check the box a number of additional fields become visible. The Contest String is used as part of the text sent during a CQ call. For example, for the settings shown in Figure 2, the CW Sender would send "CQ SP de NK0E SP" when calling CQ. The CQ QSL String is part of what the CW Sender will send when you hit the QSL button on the Log Entry form in CQ mode after making a contact. Usually, when operating in CQ mode during a contest, after receiving the other station's exchange you send a short acknowledgement and then call for the next contact. Given the settings in Figure 2, the CW Sender would send "TU 73 de nk0e SP" after the contact is made. If you're operating in search & pounce (S&P) mode and you hit the QSL button on the Log Entry form, the S&P QSL String will be sent ("dit dit" in the example).

The three checkboxes on the CW Sender Settings form allow you to decide whether to send "de" before your call sign, and whether to send "TU" at the beginning and "BK" at the end of your exchange. So, there's a little flexibility in how you do your contest sending. One other note on the contest settings—you can change both the Contest Settings and CW Sender Settings at any time during the contest by selecting Log Settings… or CW Settings… from the Log menu.

Logging in CQ Mode

Figure 3 shows the main Log Entry form, where you'll log your QSO's during the contest. It looks pretty complicated, but it's simple once you get the feel for it. The first thing to notice is that the menu bar says that you're in CQ Mode. If you guess that there's also a search & pounce mode, you'd be correct. The buttons on the form behave differently depending upon which mode you're in. Let's start with CQ mode and assume

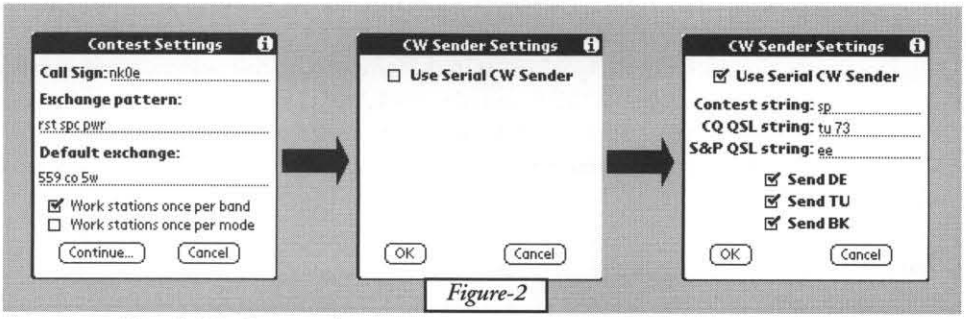


Figure-2

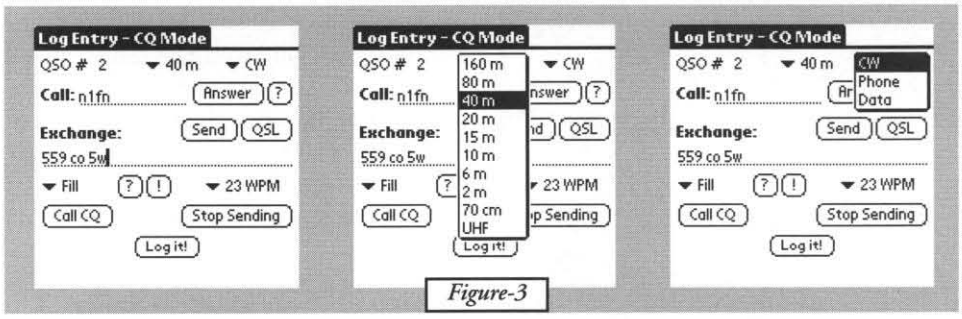


Figure-3

you're using a CW Sender.

First, make sure that you've set the band and mode (CW, phone, or data) correctly using the drop-down boxes at the top of the screen. Figure 3 also shows the boxes that appear when you tap those settings. Next, hit the Call CQ button to make a single CQ call (you'll need to hit the button for each call—there is currently no auto-repeat function). If someone answers, enter their call sign in the Call field, and tap the Answer button. This will answer the call and send your exchange. When you receive their exchange, record it in the Exchange field, and hit the QSL button to acknowledge the QSO and call for the next one. Finally, hit the "Log it!" button to log the contact. Simple, right?

Okay, what happens if you only partially copy the station that answers your CQ? If you didn't get all of the call sign, hit the "?" button next to the Answer button and the CW Sender will send the contents of the Call field followed by a question mark. If you need a fill on part of the exchange, use the drop-down box below the exchange field to choose what part you need and then hit the "?" button next to it (as seen in **Figure 4**). You can see in **Figure 4** that the drop-down box contains entries based on the Exchange Pattern you entered on the Contest Settings form, plus an extra entry for requesting a repeat on the call sign.

On the other hand, if the other station requests a fill, select the part of the exchange to repeat from the Fill drop-down box and hit the "!" button to send it. If you need to repeat the entire exchange, hit the Send button next to the Exchange field. You can also adjust your CW speed by using the drop-down box under the Send button. Figure 4 also shows this setting.

What happens if the station that answers you is someone you can't work again? When you hit the Answer button, GOLog checks the log to see if this station is a dupe. If so, you'll see an error message (also in Figure 4) and the CW Sender will send a "QSOB4" message to the other station and call for the next contact. The contact will also be checked when you hit the "Log it!" button and will be flagged as a dupe there, as well.

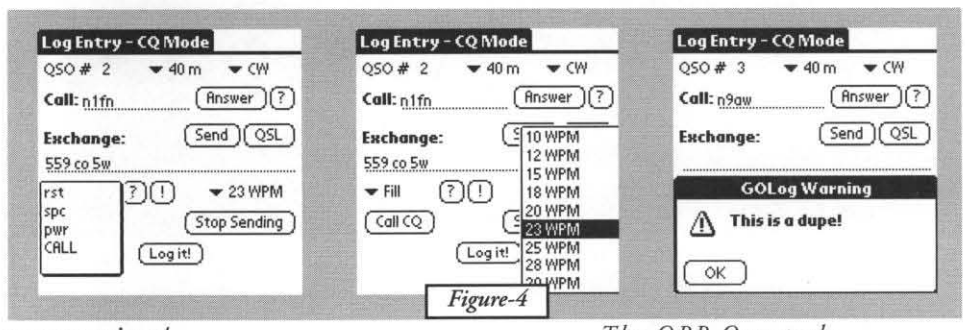


Figure-4

If you need to interrupt the CW Sender while it's sending code, hit the Stop Sending button. Also, whenever the sender is busy you must wait until it's finished before asking it to send something else or changing speed. If you try to do so while it's busy, you'll get a message telling you so. Simply wait until the sender is done (or hit the Stop Sending button) and then try again.

Logging in Search & Pounce mode

If you're operating in S&P mode, the Log Entry form works a bit differently. You'd start by entering the call sign of the station you're going to call in the Call field, and then hitting the Answer button. GOLog will check it to see if it's a dupe, and if not it'll send your call sign (it'll tell you if it's a dupe and won't send anything under those circumstances). If the station answers you, copy their exchange into the Exchange field, and then hit the Send button to send your own. Fills can be requested or provided just like in CQ mode, and you can send your final "dit dit" if needed by hitting the QSL button. Again, you must hit the "Log it!" button to log the contact.

Note that the Call CQ button still appears on the Log Entry form even in S&P mode. If you hit that button, GOLog will switch you over to CQ mode and will call CQ as described before.

Working QSO's without a CW Sender

If you're not using a CW Sender, you can still use GOLog to log your contest QSOs. In this case, you'd have left the "Use Serial CW Sender" checkbox cleared on the CW Setting form. Then the Log Entry form would look significantly simpler, as shown in Figure 5. Here, it doesn't really matter whether you're in CQ mode or S&P mode. Simply enter the call sign of the station in the Call field, and hit the Dupe button to check to see if it's a dupe. If not, enter their exchange in the Exchange field and hit the "Log it!" button to log the contact. It's worth noting, too, that this form will look the same as in **Figure 5** if you switch to Phone or Data using the Mode drop-down box.

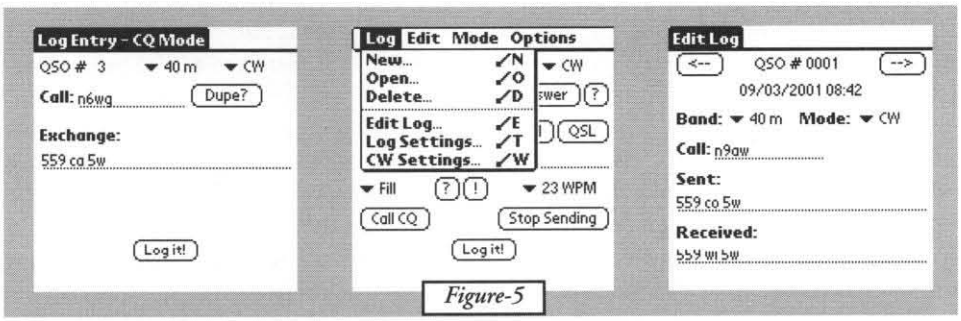


Figure-5

Editing the Log

On the Log Entry form, once you've logged a QSO there's no way to go back to it if you need to look at it or fix an error. Instead, you switch to the Edit Log form by selecting Edit Log... from the Log menu (as shown in Figure 5). The Edit Log form is pretty simple. It starts by showing you the most recent log entry. You can use the "ß" and "à" buttons to move back and forth between entries. To edit an entry, simply change the contents of the field. You'll always be prompted to save any changes you made before moving to another entry or form. Note that the Edit Log form

does not do any dupe checking, so be careful what you do here. When you're ready to go back to logging more contacts, select Enter QSOs... from the Log menu to go back to the Log Entry form.

There are three things that you can't currently do when editing a log entry. First, you can't change the date or time of the log entry. Second, there is no way to delete a log entry. Finally, there's no provision for searching the log for a specific entry—you must traverse the entries one at a time to find the one you're looking for. Perhaps a future version of GOLog will include these features.

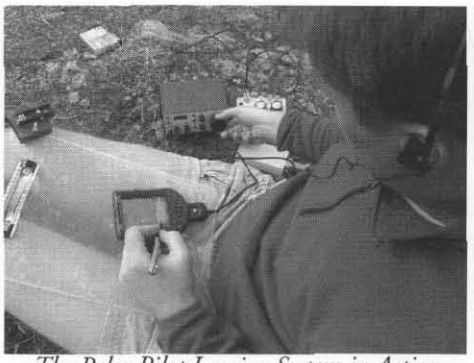
Getting the Logs Out of your Handheld

One of the most important things to be able to do with GOLog is to get the log data out of it and onto your PC so you can submit your contest entry. For this purpose I wrote a conduit, which is an add-on to the Palm Desktop software which gets used each time you Hot Sync your handheld. The GOLog conduit copies the contents of all your GOLog log files onto your PC in ASCII format so you can easily manipulate it using a text editor.

Field Testing

I knew that Field Day would be the ultimate test for a field logging system, especially since I've always worked Field Day from a remote campsite reached by foot with a backpack. This year was no exception, as once again I would join Steve N0MHQ on the top of Mt. Herman near Monument, Colorado for Field Day 2001. At the time, GOLog was only partially functional. The Log Entry form was completely operational, but I had no provision for editing log entries because I hadn't coded the Edit Log form yet. Also, I was accepting on faith that I'd be able to get the log out of the Palm at the end of the contest, as I hadn't yet written the conduit software for that purpose. This would also be an additional (and more thorough) test of the CW Sender hardware.

The results were mostly positive. I'm still experiencing some digital hash noise in the transceiver under some circumstances, but it wasn't as bad as it was for its first test during QRPTTF. Still, I'll need to try adding further isolation between the PIC circuit and the rig. Perhaps an optoisolator in the key line will do the trick. Other than that, though, the CW Sender performed quite well, and I used it for the whole contest. I also had a paddle hooked up to the rig in case I needed it, and I used it a few times to handle special circumstances, but it didn't get used much.



The Palm Pilot Logging System in Action

The software also worked quite well. I didn't run into any crashes or goofy behavior, and it trapped dupes for me a number of times. I found the software to be fairly easy to use, but it's worth noting that proficiency with Graffiti is a must. My biggest problem was with entering data correctly (more a function of my hand than of the software). In all, I worked 175 contacts during about 12 hours of operation, pretty much all in S&P mode while running three watts from my Sierra.

Battery life is also worth mentioning. I ran my CW Sender from a 9V transistor battery, which will last for at least 12 hours (depending upon the duty cycle, probably). You can probably expect to replace the battery once during a long contest. The same goes for the Palm. I was using a Palm m100, which is a monochrome device, and I managed to run for twelve hours on a single set of AA batteries. I even used the backlight on the display for a couple hours in the evening. Heavy use of the serial port on the Palm also drains the batteries faster, but I coded GOLog so that it closes the serial port when not in use to conserve battery life. All in all, battery consumption by the system was quite modest and certainly acceptable for a weekend contest, even when you have to carry a spare set of batteries in your pack.

Get GOLog

GOLog is freeware. You can get a copy of the GOLog software (including the conduit software for Windows) from my web site. Go to http://home.earthlink.net/~ekdave/golog.html and you'll see a link for downloading the software. There are currently no versions of the conduit software for other platforms, nor is there a version of GOLog for other handheld operating systems like Windows CE. I don't have any plans to port the software to other platforms mainly because I don't have any other platforms on which to test. If you'd like to buy me a Windows CE handheld, I'd be happy to do a port for you (grin!). If you give GOLog a whirl, please drop me an email and let me know what you think. I make no promises about enhancements in the future, but I'll always listen to suggestions.

For those of you wanting to build the CW Sender, an updated copy of the original QQ article is on the same web page, along with the files needed for programming the PIC chip for that project. Drop me an email if you have any questions about that article. ●●

Where is Mike—KO4WX When He's Not Building something neat or Writing? Why he's out making contacts with his trusty buddy, D-O-G! (See, I can spell some things ;-)

Digital QRP Homebrewing

George Heron—N2APB n2apb@amsat.org

Plug in those soldering irons and bring up the source code editor on the computers because we're about to take you on an "educational and practical journey" of hardware and software homebrewing! This new regular column of QRP Quarterly will introduce you to the myriad of microcontrollers on the market today - from PICs to DSPs - and show how to tame them for use in the QRP shack. Practical projects will be featured, based on the increasingly powerful chips used in many of the club kits today. We'll even develop a common "digital QRP breadboard" that we can evolve from issue to issue. Coupled with all this is an actively maintained website to handle technical issues occurring in between issues. We think this is a winning formula for harnessing the newest technologies to hit the QRP community ... and we hope you think so too!

Welcome to the first installment of the Digital QRP Homebrewing column! I'm very pleased to be on board again with the QRP Quarterly staff to present a topic near and dear to my heart—the homebrewing of microcontroller circuits and software solutions that make us QRPers more capable and technology-current. There's much to explain as far as goals and format for this column, so let me get right into it.

"There are three parts to each Digital QRP Homebrewing column:
· Part 1—a spotlight on use of a current QRP club kit;
· Part 2—a evolving design & use of our Digital QRP Breadboard project; and
· Part 3—the active website for use in between issues, at www.qrparci.org/digitalqrp"

Our Objectives

We have two goals for this column - education and practical example projects.

From the **educational** perspective, large semiconductor manufacturers regularly bring increasingly capable digital circuits to market and the QRP community can really take advantage of these new capabilities. Our inherently technical bend makes us naturally suited to apply these powerful new chips in ways perhaps not even thought of by the manufacturers. We'll be spotlighting a new digital chip in each issue and provide tangible ways to take advantage of its features and capabilities. We'll explore the hardware interface aspects, the programming techniques, and at times the actual programming and debugging hardware available for it.

Then in order to take advantage of all this newfound knowledge, we'll present QRP-related **projects** using these chips - digital circuits and software routines that you'll be able to build up for use in your own shack. Nothing brings home an educational concept like actually building a project that uses some newfangled chip and seeing the resultant signals on a 'scope or as some kind of modulated RF coming out of your rig.

To help get the hardware, software and tools onto our benches, we've arranged the involvement of kit designers from QRP clubs around the world. These designers will share their design insights and allow us to buy and use their kit's board as the basis for our own projects here. We also have contacts with several big semiconductor vendors that will be able to provide us sample and at-cost chips, programming software and other programming tools. We'll even be kitting up some of these projects for those readers wishing to follow along with us in a step-by-step manner.

Yes indeed, we'll certainly have practical projects for you, so be ready to melt some solder with us with every issue!

Three-Part Format to the Column

We will have a standard and readily identifiable three-part format to each installment of our Digital QRP Homebrewing column. The first two parts will constitute the actual printed column in each issue of QQ, and the third part will be virtual on the Internet.

Part 1 of each column spotlights a microcontroller or digital chip newly introduced by a manufacturer, a chip used in a QRP club's kit, or one that's been around for a while just begging for use in a QRP project. This part of the column will introduce the microcontroller and describe its operation in typical applications. Equally important, we'll also describe ways to program and debug the chip - e.g., the development environment (editor, compiler, debugger), and the programmer used to get your software downloaded to the chip.

A sampling of chips and projects to be featured in the Part 1's of this column include:
* The Scenix/Ubicom SX microcontroller used in the PSK31 Audio Beacon kit from the NJQRP (spotlighted here in our first column);
* The PIC16C715 chip used in the Keylite memory keyer/beacon kit by the Knightlites QRP Association;
* The Atmel AT89C2051 chip used by Steve Weber, KD1JV in his RF Power Meter kit;
* The Cygnal C8051F00 chip used by George Heron, N2APB in his Portable PSK31 single board controller;
* The Motorola DSP56F801 single-chip combo of a fast microcontroller with the signal processing power of a DSP; and
* The Palm PDA "Dragonball" platform from Dave Ek, NK0E, overviewed in July's QQ.

The beauty of the technical spotlight we will give for each of these microcontrollers (and others) is that a circuit board, eval board or entire product is already available. By using this existing hardware platform, the involved reader can easily implement the exercises we feature for it.

So if your favorite controller, digital chip, or kit is spotlighted in one of our future columns, you'll be able to dive right in and follow along with this column! You'll be able to augment or modify the existing functionality, and even put your own new program into that PSK31 Beacon.

Or picture the scenario where you've just purchased the Keylite kit from the Knightlites and built it up as a nice memory keyer. You'll then be able to use the information, tools and techniques covered in our column to program the Keylite PIC to do Morse character recognition, talk to your PC over a serial port, keep the time and annunciate in Morse, serve as a marker generator ... the list is endless!

Part 2 of each column focuses on the design, evolution and implementation of a common "digital breadboard". We'll build upon this breadboard pc board in each issue to produce a platform for performing experiments and working projects in the QRP shack.

One of the first activities is to design a pc board for our "**Digital QRP Breadboard**". It will need to contain a number of peripherals that QRPers find useful in applications around the shack - an LCD, shaft encoder, DDS chip, audio amplifier, RS-232C serial port, general purpose I/O buffers, and a daughter board expansion port all provide convenient design flexibility.

The Digital QRP Breadboard PCB and base components will be offered as a kit to interested QRPers in order to provide a common platform with which we all can experiment from issue to issue. Of course, one could instead build up the circuits easily on a piece

of perf board ... either way we'll have a common design upon which we can grow.

Together we'll design and program a growing library of software routines for the Breadboard. Each issue will bring additional functionality to the project that can be used on the bench, with your rig, or perhaps even coupled with an N2CX test circuit covered in his "Test Topics and More" column here in the pages of QQ. (Don't you just love synergy!)

We're already working with the chip manufacturers and software tool providers to give us deals on related applications for editing, downloading and debugging. Use of these common tools will further enable us to all "be on the same page" during the evolution of this project. Such a deal!

Part 3 of each column concerns the virtual aspect of this whole adventure called the "Digital QRP Homebrewing website." Immediately available and of course "turned on" 24 hours a day, we've constructed this online version of the column to contain all the basic information and references used in the printed column, as well as a bunch of additional information and projects that we couldn't fit into QQ.

We'll even be updating the website in between issues of QQ so readers can have a dynamic and useful watering hole for processor data sheets, circuit diagrams, source code listings, tools and utilities, reader contributions, useful links to manufactures and other related projects, errata listings and expanded information from this printed column, and more. This will surely be a site to bookmark!

Digital QRP Homebrewing
PART 1
Spotlight on Scenix SX Microcontroller and PSK31 Audio Beacon Kit

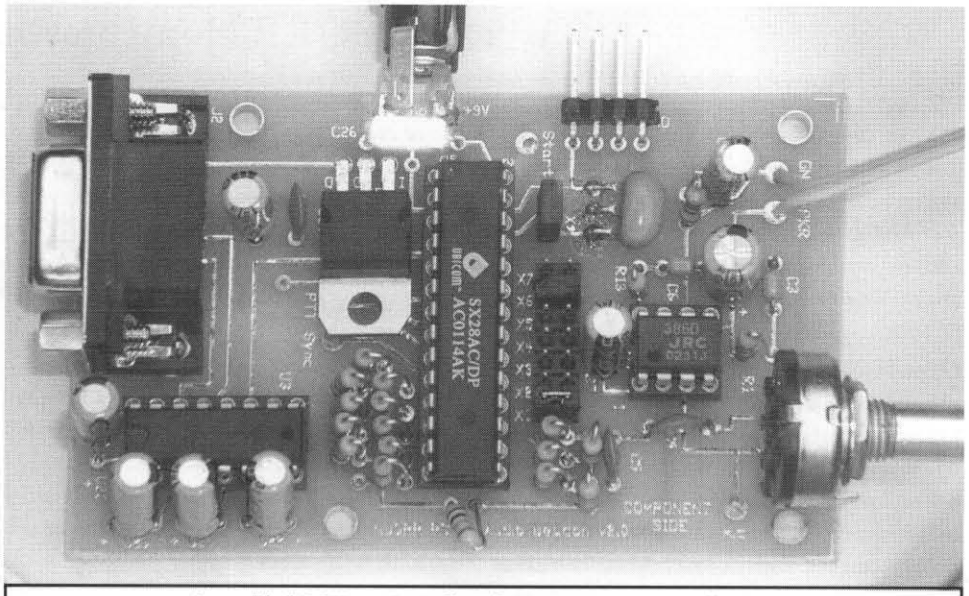
The Digital QRP Homebrewing website can be found at www.qrparci.org/digitalqrp.

Enough of the general stuff!

So that's what we have planned for the format and content in each issue of this column. Let's now get into the meat of our first issue!

In this portion of our column, we'll use a popular and/or inexpensive kit from one of the QRP clubs to describe how you can add custom features or an entirely new program. We'll show you the tools and steps needed to make these software mods, possibly add some extra hardware too, and probably learn something along the way!

This time we'll use the PSK31 Audio Beacon Kit as the basis for our tutorial and experiments. Designed and kitted by the NJQRP Club, this $25 marvel contains a fast RISC microcontroller, a dirt-cheap D-to-A converter, and an LM386 audio amp. For more details, refer to its schematic on the next page. The kit's designer used these simple components to synthesize an audio carrier signal and "PSK31 modulate it" with text string data to create a "beacon", or character-by-character from keystrokes sent over a serial port to create a real-time PSK31 audio encoder.



Assembled PSK-31 Board with SX28 Microcontroller I.C.

We will take this hardware and software system apart and show you how to modify it to create a simple new function: a simple tone generator. Admittedly, this is a roundabout way to produce a tone, but the intent is to illustrate how one can use an inexpensive kit intended for one specific purpose and turn it into something else through your own ingenuity and creativity.

If you haven't yet picked up a PSK31 Beacon kit from the NJQRP (also provided to all Atlanticon attendees this year, and featured in August QST), you can still order one from the club and play along with us here! Check out the references at the end of this column for details.

Introducing the SX

The PSK31 Beacon kit uses the "SX28" uC from Ubicom, formally called Scenix. In a nutshell, the SX28 is a RISC-based uC that operates at 50 MHz to provide the computing power necessary for accurate implementation of the PSK31 modulation algorithm. The SX chip is similar to Microchip's popular PIC chip, containing the same software instruction set but operating more than 40 times faster! But be careful, as the SX packaging differs from that of the PICs and the two are not pin-for-pin compatible.

The SX28 has 2K words of program memory, 144 words of RAM and 20 programmable I/O lines. It has some challenging page-boundary programming limitations, common to RISC processors (including the PIC.) But this little chip is so darned fast, it more than makes up for its limitations when used in the right application!

Entering a new program

Developing assembly language programs for the SX is a fun and relatively simple process. A combined editor, assembler and programmer software application called SXkey.exe is available for free that allows you to compose your program and then "burn" it into the flash memory of the SX device. See the References section for the location of this free development software.

When you run the SXkey program, it displays a standard editor window within which you can load an existing program file from an app note, for example, or enter a new program from scratch. We'll do the latter in creating our "tone generator" example program in just a bit.

Once your program is entered, you can select the Assemble menu item (under the Run menu bar item) to command a check of your program. Any errors will be noted and you'll need to correct them all in order to proceed on to the next step.

Programming the SX chip

When you have an error-free assembly of your program, as noted in the status bar at the bottom of the SXkey window, you'll be ready to

connect the PC to your target SX board (i.e., the Beacon).

You'll need a tool called the "SX Blitz Programmer", which is a small 1" x 1/2" board that fits on the end of a standard DB-9 serial cable coming from a PC. The other end of the SX Blitz plugs into a 4-pin connector on the PSK31 Audio Beacon board.

A more capable device called the SX Key is also available. Like the Blitz, it's able to do the download and programming of the SX flash memory, but the SX Key also provides an ability to debug your programs on the fly by displaying register and memory contents, single step controls and breakpoints.

After connecting either the Blitz or the SX Key, you'll need to remove a little jumper on the Beacon board, X8, to allow the Blitz to supply the clock to the SX chip.

Now you're all set to send your new program down to the Beacon board and burn it into the flash memory of the SX chip. Select the Run menu bar item again, and then the Run sub-menu. A small window will appear showing a progress bar as the programming proceeds. In a few moments the process will be done and your program will be running on the board!

If you have the SX Key programmer (as opposed to the Blitz programmer), you can use the Debug menu item instead of Run. This will load and burn your program in the same manner as above, but will also bring up a debug screen showing all memory, registers and source code listings within which you can set breakpoints. You'll need to read the manual for details on using the debugger, but it's intuitive and powerful ... and pretty essential when developing even moderately sized programs.

The "Tone Generator" program

Although the PSK31 Beacon board comes with a pre-programmed SX chip containing the Beacon program and your custom text beacon string, you can just program over it with a new program that we'll develop right now. Don't worry, you can always just load up the Beacon program in the editor and program it into the chip again.

The simple Tone Generator program that we'll create for the Beacon board uses a look-up-table (LUT) technique for putting sine wave values out to the R-2R D/A converter hanging off port B of the SX chip. (See the PSK31 Beacon manual for a more detailed description of the R-2R D/A operation.) This continuous stream of sine wave values, each separated by a short delay, will form a 0-to-5V sine wave running at 1 kHz into the LM386 audio amp.

You could either enter the short assembly language source code program by hand as listed on our Digital QRP website, or you could download the source file from the website and load it up into the SXkey editor. Selecting the Assemble menu item should produce an error-free assembly and you can program your SX chip as described previously.

When you run the ToneGen program, you should hear a strong 1 kHz tone coming from the speaker hanging off the LM386 output. At this point you could change the value of the variable FREQ and see how it changes the tone when the program is assembled and run again. The FREQ variable determines how long of a delay is inserted between each sine wave sample that is put out to the D/A ... hence the frequency of the waveform is changed.

As mentioned, this is a very primitive program, but we'll explore on the website various ways to enhance this basic technique in order to provide some real usefulness for the project. Please be sure to check out the website and the greater amount of detail provided for this and other aspects of this issue's Digital QRP column.

The next "Spotlighted" kit"...

Next time we'll focus on the Keylite Memory Keyer/Beacon kit from the Knightlite QRP Association. As described in the review elsewhere in this issue, this PIC-based provides a flexible launching pad for extra features and alternate functionality - we'll indeed be adding some interesting capabilities. So get yourself one of these Keylite kits from the Knightlites and get ready for some fun interfacing and programming!

Digital QRP Homebrewing, PART 2— The Digital QRP Breadboard

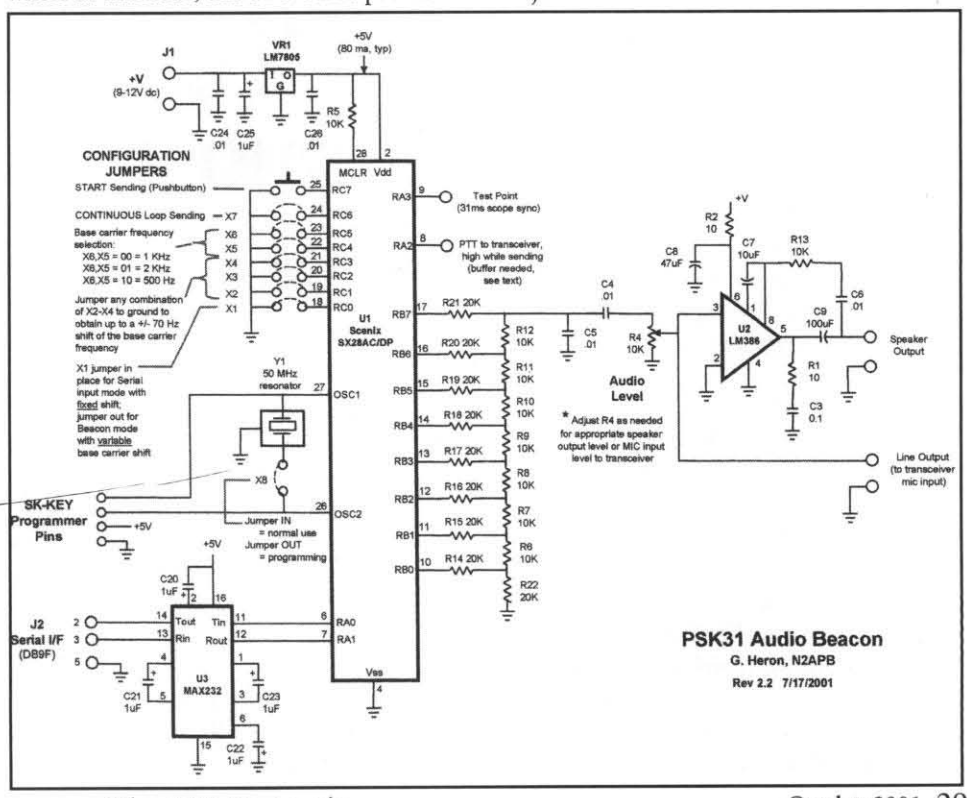
The Plan

Our Digital QRP Breadboard is a brand new project that we're designing to serve as a "discussion and experimentation" platform fir use in each issue. I've stated the initial framework for the project, as you'll see in a moment, and with appropriate feedback from you readers in the coming months we'll solidify the design, create a pc board, and make it available to interested QRPers in the form of a very reasonably priced kit. In this way many will be able to build up the board and experiment right in lock-step with us here in the column, and even more so on the column's website.

We have some very interesting plans for the Breadboard project! The end result will be a compact, flexible and powerful accessory for your bench, and you'll learn a great deal along the way.

Breadboard Features

The best way to describe the planned features and expected use of the Breadboard is to study the Breadboard Layout and Packaging drawings on the next page while I overview the major blocks.



The heart of the Breadboard is the Motorola 68HC908GP32, a highly integrated single-chip microcontroller (uC). It is CISC-based (unlike the PIC) which allows for easy and scalable programming. It has FLASH program memory for easy programming, downloading and debugging, and it has lots of input/output lines for our peripheral control needs. It is packaged in a DIP form factor to allow easy homebrewing, has low power operation ('cuz it's only right!), has lots of good software libraries from an established vendor (Motorola), and it's readily available and inexpensive.

A two-line LCD is provided for conventional display needs, but we also provide three 7-segment displays so we can experiment with numeric readouts (e.g., a voltmeter, frequency meter, etc.). An RS232-C serial port is provided for connection to a PC for program development, download and debug, and provisions are made for connection of a PS2-style serial keyboard for those text entry situations. (Can you spell PSK31?) A 16-key keypad is provided for simpler data entry applications.

Amplifiers are provided for audio input and output needs (e.g., to make filters). Provision is made to support a popular DDS chip so we can create a digital VFO. Potentiometers and a shaft encoder are available to help us control these blocks.

Other low level I/O is provided for simple experiments - pushbuttons, LEDs and a piezo speaker device. Some DIP switches are provided to allow for manual programmability in conjunction with the software, and various other jumpers are provided to allow you to manually select which I/O devices you wish to use (like the LCD instead of the keypad.)

Oh yeah, since a "memory keyer" is a great use of this Breadboard, there is a jack to accept a paddle input. The unit is powered by a 12V, 1A wall wart.

Other hardware capabilities may surface based on reader feedback along the way, but this should be enough to start out with!

Pulling it all together

There certainly is a lot more Breadboard detail to describe than we have space right now. We'll be starting out with a basic, low-level software monitor to get the unit working, and we'll add/modify lots of canned software programs presented in the various application notes along the way. We'll be doing most of the programming in Motorola's popular "HC08" assembly language, and later on we'll be getting into use of higher language programming with a C-compiler. We'll be introducing you to some really neat development tools and maybe even provide sample versions of them for free download from our website.

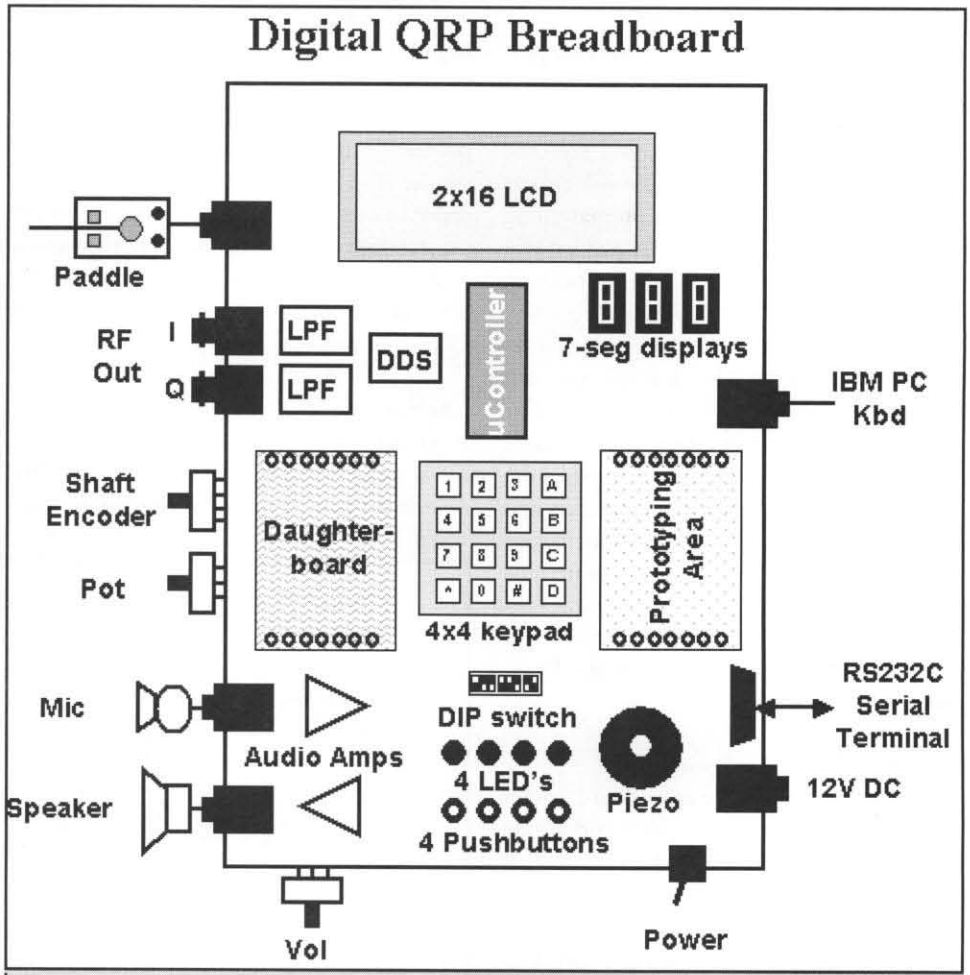
There's truly a lot to cover and I urge you to do a little homework - visit our Digital QRP Homebrewing website to see the bigger picture, download the data sheets for the 68HC908GP32 uC, and check out the other references listed at the end of the column. I'll be happy to answer questions or iterate ideas with you by email. By next issue we should have our Breadboard PCB and basic kit available ... then the real fun begins.

Our next issue will also evolve the Digital QRP Breadboard design to the point of hardware realization. We'll have the base circuit board and components available for those wishing to develop 68HC908-based QRP solutions along with us - and hang on to your socks too, as we'll have a pretty interesting "first application" ready to be explored!

Feedback & References

Feedback ... PLEASE!

We think we have a very cool and useful combination of current technology embodied in this column, but we need you to tell us if we're on the right track. Is this "digital homebrewing technology" of interest to the QQ readers? Is the three-part presentation (general chip spotlight, evolving breadboard, and online virtual website) effective for you? Do you find the writing style easy to comprehend, the diagrams easy to view, and the tools and chips as readily available as stated?



Breadboard Layout

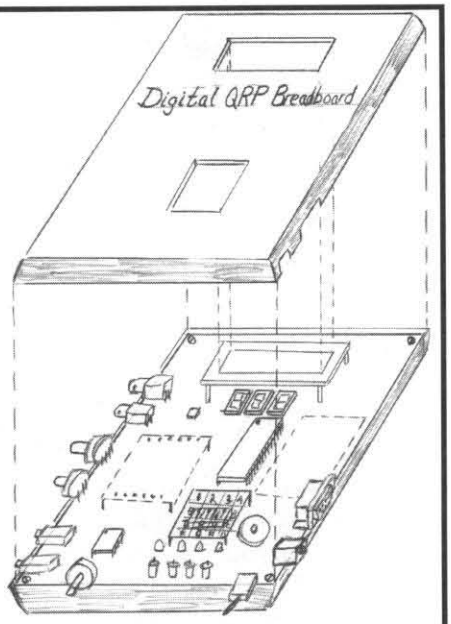
The diagram on the left illustrates the component layout for the Digital QRP Breadboard. The size is about 5"x8" and contains most of the components needed for the various projects planned in the coming issues. Because of uC I/O port limitations, not all capabilities can simultaneously be available, but you'll be able to set jumpers to allow various combinations (e.g., LCD or 7-seg displays, keypad or keyboard, etc.)

A prototyping area is available to allow addition of your own components for that "special" application you have in mind. Further, a unique feature is the daughter board area to the left of the keypad. We'll use this "plug-in" board in future columns to add some specialized functionality - e.g., a DSP pre-processor to beef up signal processing capabilities, a PLL to serve as the basis for a stable VFO, etc.

Breadboard Packaging Option

The sketch on the right illustrates how you could package the Breadboard. The board is dimensioned to fit in a standard and inexpensive plastic clamshell enclosure available from Mouser. It's not really even necessary to put the Breadboard in any enclosure - you could just put some rubber feet on the board and use it on "open" the desktop - or you could choose to purchase this option with the Breadboard kit offering. This type of enclosure was chosen to allow easy access to all mounted components when the lid is off, and to allow components to protrude from all board edges. Cutting holes in the plastic top half is easy for the LCD, keypad, LEDs, switches, and whatever else you might use on the board.

The enclosed Digital QRP Breadboard makes a nice, flexible and powerful accessory for your operating bench ... that is, whenever you're not experimenting with new components or software for it!



Concept Sketch for Digital QRP Breadboard.

Our Digital QRP Homebrewing website has a link that you can conveniently use for giving us your thoughts, both positive and negative. You may also, of course, write directly to me via my email address or my US postal address listed at the end of the column.

I look forward to hearing from you!

References

1) Parallax.com (www.parallax.com), supplier of Scenix/Ubicom SX microcontrollers, resonators and programming tools (free editor software, inexpensive programming cables, etc). Look under the SX Tech link on the Parallax.com home page. SX-Blitz programmer $79, SX-Key programmer $129.

2) Unique Technologies, tel: 1-800-556-0225, supplier of SX chips, resonators, eval boards, and programming software.

3) Build the "Fluffy2 Scenix Programmer" by Steve Willis, http://www.semis.demon.co.uk/Sx/SXmain.htm

4) 68HC908GP32 microcontroller web site (Motorola). For spec sheets, data sheets, development tools, application notes, go to www.motorola.com and do a product search on this processor. Or try entering this huge address on your browser: http://e-www.motorola.com/webapp/sps/prod_cat/prod_summary.jsp?code=68HC08GP32&catId=M98634. We'll have the link on our website.

5) PSK31 Audio Beacon Kit is available from the NJQRP Club for $25 domestic ($28 DX). See www.njqrp.org/psk31beacon.html for specs and ordering information.

6) The Keylite Memory Keyer Kit can be obtained from the Knightlites QRP Association. Kit description and ordering information can be found at http://www.knightlites.org/new_page_9.htm

N2APB Bio Notes:

George Heron, N2APB plays a lead role in the New Jersey QRP Club and has been active in the QRP scene throughout the last decade. He organizes the annual Atlanticon QRP Forum, edits/publishes the quarterly "QRP Homebrewer" magazine, and was recently inducted into the "QRP Hall of Fame" by QRP ARCI. An inveterate homebrewer by nature, with strengths in software and digital design, N2APB's latest project is the design of a PC-less, single board controller for PSK31 portable operation. George is the VP of engineering for SafeNet, a company specializing in encryption technologies and products used to secure Internet communications. He lives in Maryland with his wife and 9 year-old daughter, and may be contacted at 2419 Feather Mae Court, Forest Hill, MD 21050, or by email at n2apb@amsat.org. ●●

E-Mail from Bob Heil regarding the FT-817 and Heil Mics:

Thanks for your note...having wonderful success with the new BM-10 and BM-5 (New Products Section at www.heilsound.com). Use that with our AD-1YM (Yaesu modular)....works great with the new headset - or the PRO-SET. The 817 users like the single side light BM-5 so they can pack it in their back packs.

Chip Margelli of Yaesu did a test in the last contest with he BM-10, AD 1YM and 817....works 90 countries! (The AD 1YM sells for $17.00--ed.)

73 & DX,

Announcing the 3rd Annual QRP Contest Calendar for 2002

This calendar will list QRP contests and contests with QRP categories. It will be a fold-out style, 11' x 17' when open.

There will be a lists of Web sites and contest managers calls. The Web site addresses will have the contest rules plus much more. The color pictures will feature the QRPers on the Appalachian Trail. This is really a handy calendar to have in the shack. For more details check out the EPA QRP Web page at www.n3epa.org.

72 & 73, Ron Polityka—WB3AAL

Call for Board of Director Nominations

Being on a two year cycle of elections for Board members, it is time to nominate (yourself or others) to be a Director. We have six directors and each serves for 4 years with half elected every two years. The directors leaving on April 1, 2002 are Hank Kohl, K8DD, Joe Spencer, KK5NA (Joe was completing the term vacated by Cam Bailey, KT3A . Joe also serves as VP at the present time) and Bill Harding, K4AHK, (Bill is completing the term vacated by Chuck Adams, K7QO). Please send your nominations to Mark Milburn at 117 E. PhilipSt., DesMoine, IA 50315-4114. We would ask that a short bio and a few words about why the person would like to be a Director be submitted at the same time. The full slate will appear in the next issue. Please submit nominations by December 1, 2001. This is a good chance to serve your club and make a positive contribution to the world of QRP. Thank you.

Elecraft Introduces 4-Band Module for K1

Wayne Burdick—N6KR and Eric Schwartz—WA6HHQ www.elecraft.com

4-Band Module for the Elecraft K1 Transceiver

Elecraft's compact CW transceiver, the K1, just became a four-bander. In addition to the 2-band version, the rig is now available with a single band-switched module that covers 40, 30, 20, and either 17 or 15 meters. The 4-band module can also be ordered as an option (**KFL1-4**), so existing K1s can be easily upgraded.

No hardware or firmware changes are necessary to use the 4-band module. It's the same size as the 2-band unit, and the transceiver will recognize whether a 2- or 4-band module is installed. The K1's low current drain (about 55 mA on receive) is unchanged thanks to the use of latching relays for all band switching functions.

The 4-band module works with all K1 options, including the KAT1 automatic antenna tuner, KNB1 noise blanker, and KBT1 battery pack. With the internal ATU and battery installed, the 4-band K1 offers an unprecedented combination of features for field operation or travel, in a package measuring only 2.2"H x 5.5"W x 5.7"D.

The 4-band module covers several of the most popular HF bands. 40 and 20 meters provide activity day and night, and are important for contests, Field Day, and QRP events. 30 meters has a small but active CW segment, and as a WARC band provides a "haven" from contests. The 4th band can be either 15 or 17 meters. 15 meters is a traditional low-noise, daylight DX band, and is very active during Field Day. 17 meters is another contest-free zone, and stays open a bit longer than 15 meters.

These are the only bands available for the 4-band unit. However, it only takes a couple of minutes to swap in a 2-band module, accommodating those who want 80 meter coverage or specific 2-band combinations.

The **4-band K1 (K1-4)** is priced at $349. The 4-band option for existing K1s (KFL1-4) is $129. Both are available now.

The prices for the original 2-band K1 and additional 2-band option modules remain unchanged at $279 and $59, respectively.

For detailed information on the K1-4 and the KFL1-4, along with an updated on-line order form, go to our web site, http://www.elecraft.com, or call 831-662-8345.

73, Wayne—N6KR and Eric—WA6HHQ ●●

Corrections to July QQ Issue

Please note that a certain editor left all of the figures below out of July's *Test Topics and More...#8* article by **Joe Everhart—N2CX**.

I'm not exactly sure how he expected ya'll to follow this excellent technical contribution, but I do know for a fact that he is sorry for the oversight. Please take another read—this time with Joe's full article available.

Thanks, QRP *Ed.*. ●●

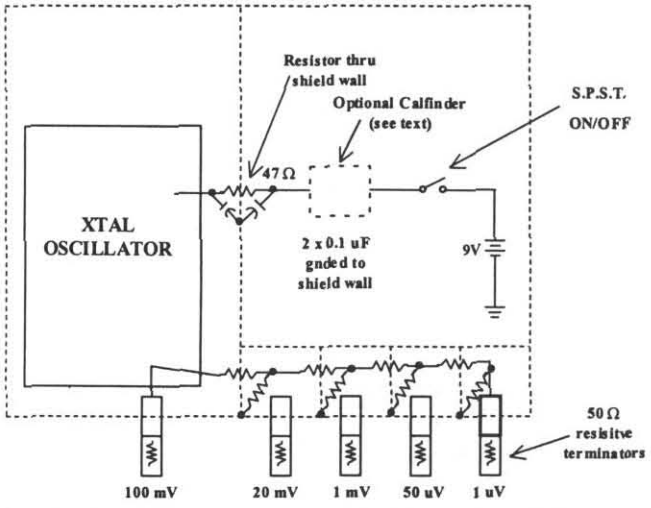


Figure 1 - Microvolt Signal Source Wiring Interconnection Diagram

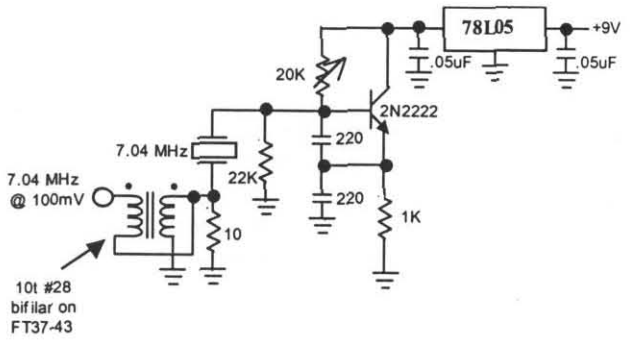


Figure 2 - Microvolt Signal Source Crystal Oscillator

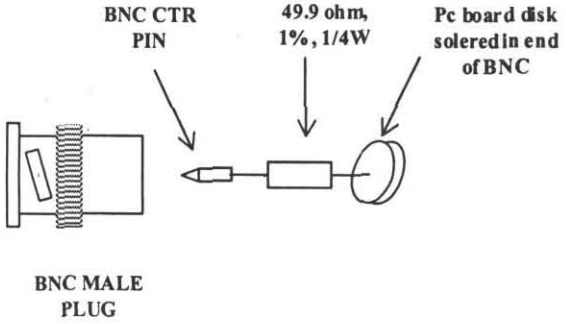


Figure 4 - Precision 50 ohm terminator

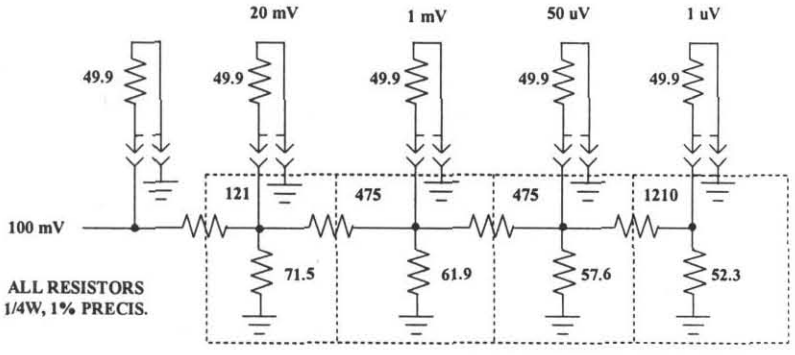


Figure 3 - Microvolt Signal Source Resistive Attenuator Schematic

Collins Mechanical Filters for the FT-817

The W4RT Electronics Retrofit One Board Filter (OBF) Assembly

Greg Buchwald—K9QI agb002@email.sps.mot.com

This will be my third article for QQ and I just can't seem to get off the subject of the FT-817 transceiver from Yaesu. In April, I discussed my thoughts and findings concerning the performance of the -817, while in the July 01 issue I reviewed several products observed at Dayton this year including the OneTouch Tune Module from W4RT Electronics. I met Barry Johnson from W4RT Electronics at Dayton and had the pleasure to visit with him once again at the Huntsville Hamfest on August 18th. It was at the Huntsville Hamfest that he gave me a first look at a new product which W4RT is now introducing: A single board conversion package which houses two Collins Mechanical Filters.

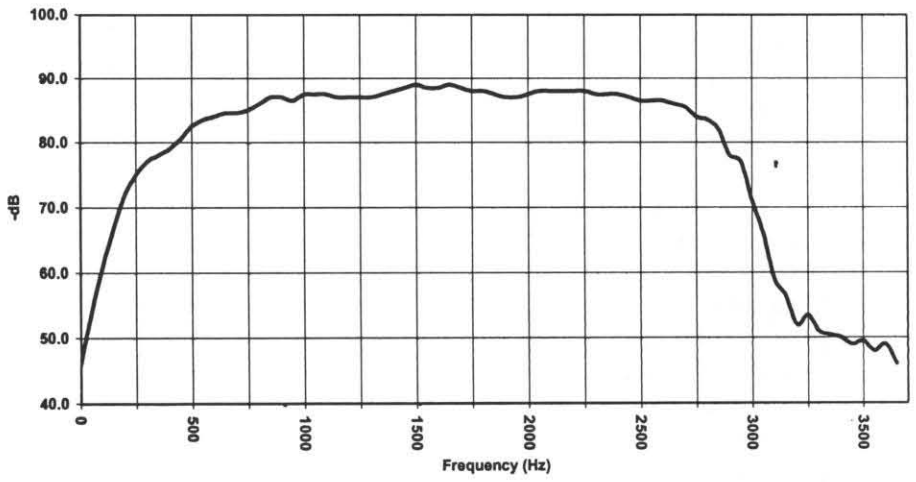
While the FT-817 is a great little rig, Yaesu has provided only one optional filter position on the RF circuit board as well as in the software sub-menu. For the CW-only or SSB-only operator, the choice is acceptable; simply install the filter required for your individual application. But, for those of us that like to run CW as well as SSB, PSK-31, and other modes, the decision as to which filter to buy has been a difficult one. I opted for the 500 Hz. CW filter since that is a requirement, not an option, in my mind, if you want to work the weak ones and operate near the sometimes crowded QRP spectrum on 40 and 20. On the other hand, there have been numerous reports on some of the reflectors discussing the advantages of installing the Collins Mechanical Filter for SSB use. The comments have ranged from better selectivity, to better sounding transmit audio, and, finally, more apparent punch / talk power. To see if there was any merit to this, I borrowed a second radio, from a friend, which contained the SSB Collins Mechanical Filter. Indeed, the improved receive selectivity was immediately apparent. In addition, I had recordings made of both radios at a location a few miles from my QTH - one radio containing the stock ceramic filter and the second utilizing the optional Collins SSB filter. I was amazed at the difference in the audio quality. Quantitative measurements were required to find out exactly what was going on.

Shortly after the recordings were made, I met up with Barry at the aforementioned hamfest in Huntsville. We had a chance to discuss the results that I had observed and he offered to show me his results along with a personal tour of a converted radio. What Barry had accomplished was to design a board, which utilizes two Collins filters, which are similar in performance to the optional filters offered by Yaesu. In order to utilize both filters without significantly altering the gain line-up of the transceiver or re-writing software to operate the rig, the board Barry manufactures replaces the stock 2.7kHz ceramic IF filter, a MuRata CFJ455K device, with the Collins 2.3kHz mechanical filter. The board also contains the 500 Hz. CW Collins mechanical filter. The key to accomplishing this effectively is to properly terminate the filters and be conscious of the layout of the retrofit board. This provides minimum loss through the filters, maintains the system gain line-up designed by Yaesu, and insures minimum ripple throughout the passband as well as the highest possible stopband performance. After our discussion at the show, I decided to send Barry my radio for conversion. He agreed to put a first pass board into my radio, along with randomly selected filters, which he had in stock. Since the conversion required the removal of components, including some surface mount parts, W4RT Electronics plans to sell the conversion only with installation. Just to make life more miserable for Barry, I told him that I had spoken with the editor of QQ and secured a spot in this issue - but he had to turn the radio around in 48 hours. Before conversion, measurements were made of the stock IF filter response in the SSB mode on 20 meters. After the data was collected, I Fed Ex'ed the radio to Barry. Two days later, I had the radio back with the filters and modification board installed. It was time to make some comparative measurements.

There are really only two simple ways to measure the IF response of the radio: 1) Probe the IF at 455kHz and sweep the radio, or, 2) cheat a bit and sweep the radio at the RF input with a single carrier and measure the audio response. Since the latter reflects the overall response of the radio, it was the method that I chose to utilize. Besides, it is much easier than getting inside the radio and using a FET probe to 'look' at the IF. Plus, the capacitance of a FET probe could affect the measurements if method one were utilized. The underlying requirement to insure the proper collection of data when using method 2 is that the AGC must be defeated. On the -817, this is an easy procedure utilizing the AGC sub-menu. The results were quite interesting.

In **Figure 1** we have the swept response of my radio prior to conversion. This reflects the response of the MuRata ceramic sideband filter. In all fairness, I was actually impressed that a small, inexpensive filter of this type could produce this good of a response curve. The -6dB points are about 500 Hz - 2800 Hz, for an overall response of about 2300 Hz. Once again, all measurements were taken on 20 meters. It is interesting to note that the response has a quasi-gausian look to it. While the skirts are fairly steep, there is a definite peak at 1500Hz with roll-off on either side. At 1200 Hz, there is about 2dB of passband ripple. We see about 1.5dB of ripple on the upper side of 1.5kHz, near 1.9kHz. With reference to the peak at 1.5kHz, the -20dB point does not occur until about 125Hz on the low

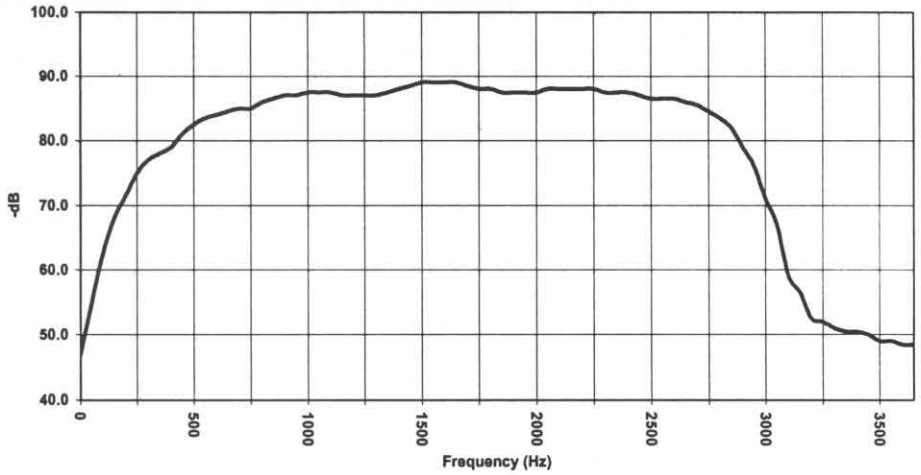
MuRata SSB Filter (Standard) In Radio



side and nearly 3100 Hz on the high side representing a total -20dB bandwidth of 2975 Hz. In receive mode, there would be considerable energy from a strong adjacent signal, which would affect the ability to hear a weak on-channel station. Furthermore, the quasi-gausian shape of the filter will impact the quality of the received audio. On the transmit side, considerable low frequency energy will pass to the final amplifier, potentially robbing so-called talk-power which is so desperately needed for QRP sideband operation. Finally, not shown in this graph is the non-linear group delay of the filter. This will be discussed later. To confirm the response of the stock filter, Barry provided me with his graph of a second stock filter. This is shown in **Figure 2**. The similarity of the two filters is obvious.

Figure-2

SSB Filter (Standard) MuRata Ceramic



Next, the modified radio was tested in both the SSB and CW positions. The Collins filters are mechanical resonator type filters with 10 poles of selectivity for the SSB variety and 7 poles for the CW version. In **Figure 3**, the response of the SSB filter in my converted radio is plotted. The -6dB bandwidth extends from 550 - 2900 Hz (2350 Hz.) and the -20dB bandwidth extends from 450 - 3100 Hz (2650Hz). While it could be argued that the-6dB bandwidth is nearly identical (actually the Collins filter is 50Hz wider in my sample), the 20dB bandwidth presents an entirely different picture. The Collins filters are 325Hz narrower at this point - a much better shape factor providing better attenuation of unwanted signals. The other obvious difference is the flat response of the filter. The SSB filter has less than 1dB of ripple throughout the passband. On the transmit side, this insures that higher frequency components - those generated by consonants - will be articulated at the distant receiving station. For those hams operating QRP PSK-31, it means a more uniform relative signal strength (and therefore flatter MDS) as you tune across the waterfall display trying to pick the station which you wish to converse with.

At this point, it is important to also note that the ceramic filters have a greater non-linear group delay characteristic as compared to the Collins filters. The group delay of the sideband filter is very flat throughout the center 2/3 of the passband. As you approach the stopband, both filters have wildly fluctuating non-linear group delay response, which is expected of any elliptical filter response (any filters with zeros in the stopband, which provide the step skirts required). While some will argue that my next statement is not true, I am of the opinion that it is the linearity of the phase response of the Collins filters, when used in the transmit path, which produces a received signal that seems better articulated. It is not simply a case of a few more higher frequencies passing through the transmit chain; it is the time alignment of the higher frequencies portions of the voiced energy with the lower frequency components which adds to the improved quality of the transmit audio when the mechanical filter is utilized.

Figure 4 is a plot of a second SSB filter as measured by Barry. This gives a good repre-

Figure-3

Collins Mechanical SSB Filter As Tested In Radio

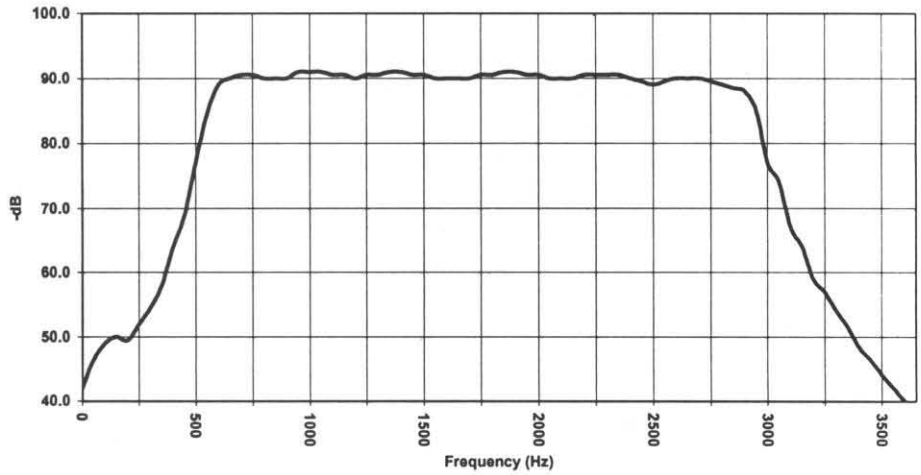
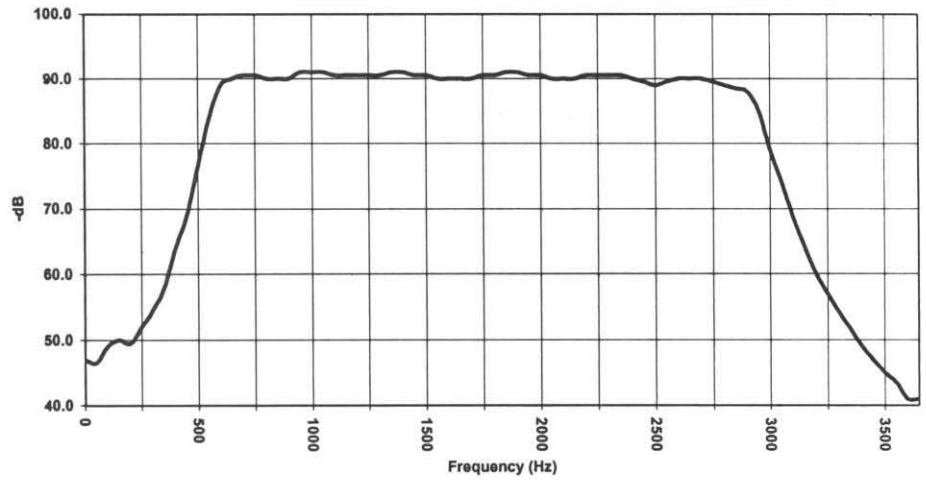


Figure-4

Collins Mechanical SSB Filter (YF-122S)



sentation as to the consistency of the filters Barry has selected to purchase from Collins.

Finally, **Figure 5** indicates the response of the CW mechanical filter. Once again, the filter is a seven-pole design. The -6dB response extends from about 400 - 1000 Hz (about 600 Hz. Bandwidth) and the -20dB response extends from 350 - 1100 Hz. (about 750 Hz bandwidth). The improvement of CW operation over either the stock ceramic filter or the SSB mechanical filter is dramatic, as one would expect. There is higher passband ripple, about 2dB, but this is also expected due to the close placement of the resonator center frequencies and zeros. Once again, the filter has a rather good non-linear group delay response, making for a good CW note without ringing, but those fortunate hams that have owned radios with Collins mechanical filters have known about that for years. **Figure 6** is a graph of the CW filter response as taken by Barry (this is a separate filter - once again indicating the uniformity of the response curves).

I also wanted to quantify, in some way, the increase in talk power that is obtained by the installation of the filter. When looking at **Figure 1** as compared to **Figure 3**, the steeper skirts of the mechanical filter are readily apparent. What isn't quite so obvious is the energy contained in the passband as opposed to the stopband. More important is the energy contained in the transitional bandwidth of the filter - that region of the response curve where the filter is beginning to roll off and the point at which -20dB is attained. On the low frequency side, large amounts of energy exist in these lower frequencies. Many readers might be surprised to learn that the 1/2 power bandwidth of voiced energy occurs at about 350Hz! That is to say that about 1/2 of the energy occurs at frequencies below that point and the other half of the power exists above that point. (It is for this reason that narrow band FM systems can utilize a 750uSec. pre-emphasis specification - effectively raising the energy above 210 Hz at a rate of 6dB / octave with a reciprocal reduction - de-emphasis - in the receiver to get a dramatic reduction of noise). But the

Figure-5 **Collins Mechanical 500Hz. CW Filter As Tested**

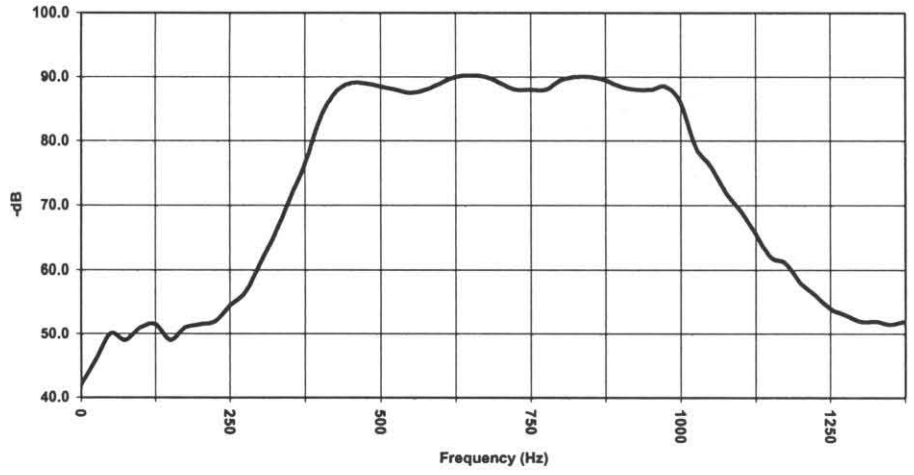
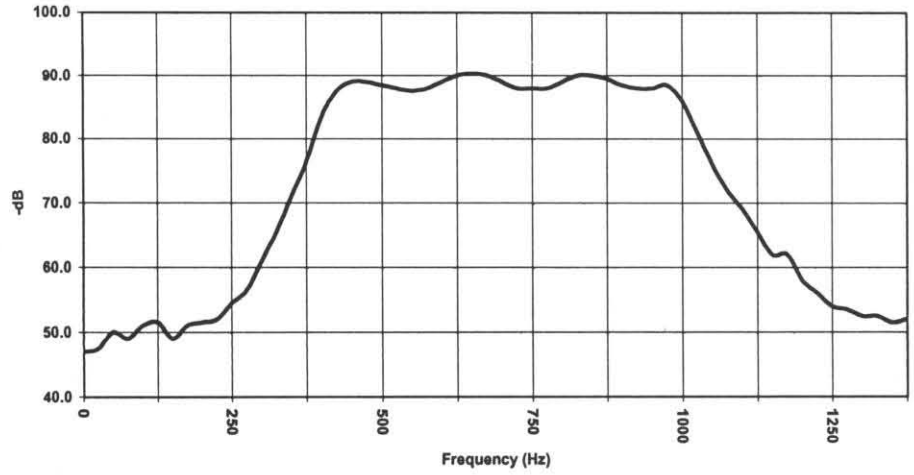
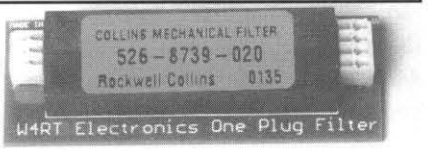


Figure-6 **Collins Mechanical CW Filter (YF-122C)**



Above—The Collins CW Filter

Below–The W4RT One Plug Filter



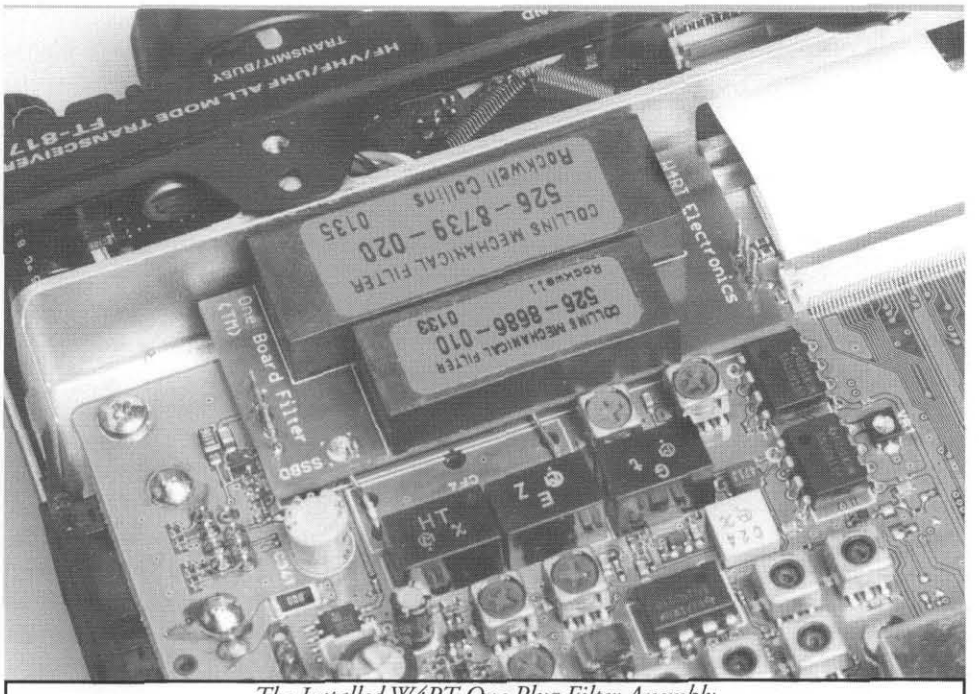
energy below a point starting at about 300 Hz does little for communications quality speech. By removing this energy, large amounts of reserve peak envelope power can be diverted to voiced frequencies, which do improve the overall ability to receive the transmission. In my conversations with Barry, he spoke of a test which he tried utilizing a distant receiver and an RMS-reading audio voltmeter to try to ascertain the improvement in average talk power. His experiment revealed a 2dB increase in received audio energy for the same overall signal strength. Remember that the IF filter in the distant receiver also plays a role in these results. I duplicated the experiment, but performed it in a slightly different way.

My converted -817 was connected to a dummy load / attenuator. I utilized 80dB of attenuation and the resulting .05uW (1.58mV / 50 ohms) was considered a strong signal and fed into a FT-1000D. The widest possible IF filter position was chosen for the passband on the FT-1000D as that would minimize ringing caused by non-linear group delay in the IF filter. The resultant received audio was measured on a Potomac Instruments Quantaural Analyzer. This device is usually used to measure the peak to average ratio, thus the apparent loudness of, commercial entertainment broadcast stations. In this case, I utilized the peak-to-average measurement capability of the device to determine the average increase in talk power. My findings indicated a 1.6 - 1.8dB increase in talk power when the mechanical filter was used in place of the ceramic sideband filter. This was, of course, based on my particular voice as I read in a monotone fashion from a copy of QQ. I then spoke to Barry who suggested that I modify the carrier offset (an extended menu item on the -817). Since my voice tends to contain more lower-frequency energy, this adjustment might center the passband of the filter to match the

specific characteristics of my voice. I was skeptical at first, but it did make sense and I tried it. I eventually found a setting - about 100 Hz lower than the original setting - in which I obtained a 2.1dB increase over the stock filter results. This was good stuff! By adding the W4RT filter board, I not only got the benefit of the filter response for SSB work, but I also gained the equivalent of cranking up my power by 2dB without changing my true PEP one bit. That's like running 8 watts rather than the 5 the rig actually puts out. Sure, that doesn't seem like much, but in some situations, every bit helps. Plus, I could only estimate that the increased clarity of the signal, due to the sharper skirts and the more uniform phase delay response, added the equivalent of another 3dB or so energy. To me, the rig was producing much improved results over a stock, bare bones unit. Thanks to Barry for making this suggestion.

Here's one last note concerning the operation of the converted receiver. When the unit is sent to W4RT electronics for modification, the filters will be installed and menu #38 (accessed by holding the function key down until the second beep is heard followed by rotation of the selector knob until #38 is displayed) will be programmed for the CW optional filter. Once that is done, the normal menu, accessed by a quick push (one beep) of the function button will take you into the everyday use panel. Rotating the selector knob will bring up "nar" on the right-most position and a simple push of the button below the "nar" indication will switch the radio into the CW filter mode. The radio will remember which filter position you want to operate in for each mode on each band. Operation is actually quite simple - no different than having the Yaesu optional CW filter installed.

Are there any down sides to the conversion? The answer is a resounding NO! While it could be argued that utilizing the stock ceramic filter in series with the Collins mechanical SSB filter might improve the ultimate rejection ratio of the receiver, the ripple of the ceramic filter is still present and will, at certain frequencies, be additive to the added mechanical filter. I think the properly terminated replacement method Barry has chosen is the correct solution. Furthermore, I saw no change in the sensitivity of the receiver. In fact, the MDS on CW remained at -136dBm - exactly where I had measured it with the stock ceramic filter plus the optional Collins mechanical filter from Yaesu. There is no need to be concerned over any loss of performance; my findings have indicated that there is a considerable increase in performance over the stock radio.



The Installed W4RT One Plug Filter Assembly

The final question is "What will this improvement cost me?" The answer is, at the time of writing, $275. This includes installation of the board with both filters. While this price may seem high at first, the Collins filters are pricey items to begin with. If you buy the individual filters from Yaesu, they will set you back about $160 / each. For less than 1/2 the cost of buying the two filters, you get the flexibility of having both filters, the board and termination modifications required, and the labor to install the unit. Once again, since the board is a bit tricky to install, W4RT only offers the unit as an installed item - you must send your radio to them. But, in exchange, you know that the conversion has been done carefully and the filter operation is tested prior to the radio being shipped back to you. While most of us do not need fast turn-around like I requested, I was very impressed, once again, with the professional nature in which Barry handled my order and got my modified radio back to me. In case anyone is wondering, I also paid the full price for the modification and insisted that I be allowed to write my thoughts and reflections about the conversion. As it turned out, my only concern throughout the process was whether I would get my radio back in time to perform all the tests I hoped to perform to write this article. As mentioned above, the radio was returned to me quickly and it was packed very well. The old ceramic filter was found in a sealed bag in the bottom of the box along with a few rubber feet to mount on my radio to keep it from slipping on the desktop - a little bonus! Bottom line, if I didn't like the product I would have printed that as well. But, I can't praise it high enough. This is exactly what the rig needed!

For those that do not want to add the entire conversion, W4RT Electronics is offering individual filters, which do plug into the optional filter socket in the radio. The same 10 pole SSB and 7 pole CW filters are available at considerable saving over the cost of the factory units.

For more information on the filter upgrades and other accessories available from W4RT Electronics, check their website at www.w4rt.com. ●●

Tips Learned From Portable Ops:

Always put a wrap of electrical tape (or other insulation) over your battery terminals when packing them. Same idea as not carrying your HT batteries in a pocket where they can come in contact with car keys. (Been there, got burnt.)

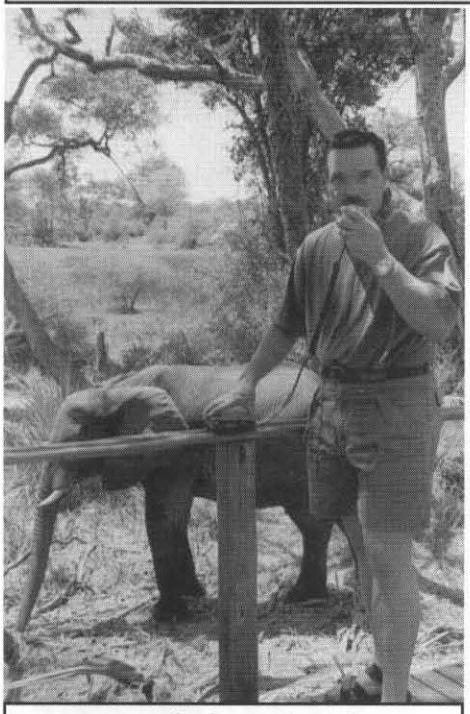
Solar panels can still work on overcast days, but much lower power. I worked with a 12 watt panel once using one watt output just barely keeping up (had to QRT at sundown).

You are often the highest thing around, and you have this tall signal attractor at your picnic table, Lightning likes that sort of thing! QRT and tear down early if any storm approaches.

Insects biting at your ankles hinders your ability to send/receive CW. And they seem to like to wait till you're in QSO to come out. **Roy Parker—AA0B**
http://web.missouri.edu/~ccrip ●●

QRP Safari

Harry Edwards—W6DXO harry.edwards@sharkrack.com



Interested Observer at Mobmo

In 1998 my wife Cathy and I had the great fortune to travel to the African country of

Zimbabwe for a photographic Safari. Cathy and I knew that we would be returning to this thrilling part of the world even before our Safari ended. By the end of 1999 we were already planning for a return visit in 2001--this time to Botswana as well as a visit back to Zimbabwe.

Little did I know then that my return to Africa in 2001 would also coincide with my return to Ham radio as an avid QRP DXer.

After becoming re-licensed in 2001 (I was originally licensed in 1968 as WB6ZFQ Advanced), I began to seriously consider how I might combine QRP Ops. with my Safari plans. The idea seemed a natural...this was going to be easy, right. Wrong!

I was very aware of the CEPT reciprocal license agreement that a number of countries including the U.S. had entered to. Operating within a CEPT country is easily facilitated with a minimum of documentation required. Unfortunately, neither Botswana nor Zimbabwe was signatories to the CEPT agreement. Now what.

Mother and cub at King's Pool

A visit to the ARRL Web Site led me to make contact with Mr. Ralph Ward of the Zimbabwe Amateur Radio Society and Mr. Christopher Cooley of the Botswana Amateur Radio Society respectively. Mr. Cooley was able to open a direct dialogue with Mr. T. Kepelwatse of the Botswana Telecommunication Authority. Within a week I was in e-mail contact with the BTCA and my licensing was in process. The BTCA actually seemed more excited that I was about my proposed Ham radio operations in their country and actually paid my $20 license fee in advance for me to help expedite matters!

The Zimbabwean license took much more effort. Ultimately it fell to Mrs. Molly Henderson, Secretary of the ZARS to personally take up my cause and work through issues directly with the Zimbabwean authorities to secure my license.

When the dust finally settled I was issued temporary licenses with the calls: A25 / KG6GPA and Z2 / W6DXO. (KG6GPA was my pre-vanity call, and the call I held when my Botswana license was issued.)

The choice of operating equipment for the trip was an easy one for me. I had already used my Yaesu FT-817 to complete my goal of working 100 countries during this past summer, so I saw no reason to mess with success. I used the 2001 Field Day contest as an opportunity to completely "field test" my Safari rig. In the end I settled on my FT-817, a Z-11 antenna tuner and the Heil HM-1 microphone. My antenna would consist of 50' of coax and a 2-element dipole cut for 20M and 15M. Power would be supplied by two 6A/hr. rechargeable gel cell batteries. The 817, Z-11, HM-1 Mic. and one battery all fit neatly in a portable CD player carrying case that I already owned. I blissfully put aside the fact that my radio gear and batteries put me way over my luggage weight limit of 26 lbs. imposed by the fact that we would be traveling from camp to camp via small single engine airplanes. I rationalized that since my wife weighed far les than me, in the end it would average out. It did.

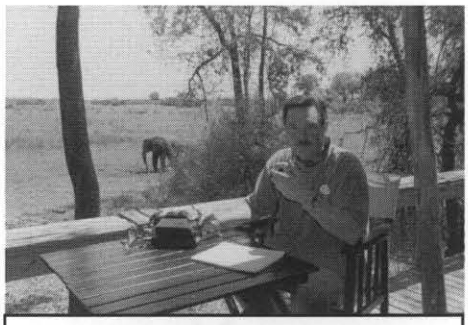
As fate would have it, out scheduled departure date was Sept. 16. 5 days following the WTC terror attacks. Undaunted, we remained committed to the trip and set off.

I was very concerned at how my radio equipment would be greeted in the climate of heightened security. The radio gear itself was no problem, but the batteries were to present a problem for the entire trip. Turns out that gel cells don't give any meaningful X-Ray image, and they are big, square and black. I actually had one battery confiscated by security at JFK. However, thanks to the understanding and patience of the customer service reps from Delta and South African Airways, I was able to get both batteries through security.

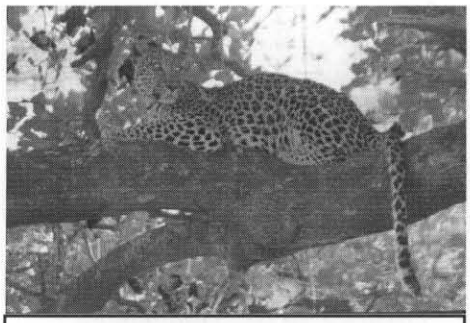
Loading up in Botswana

After clearing security we settled in for the 14 hour flight from JFK to Johannesburg where we would lay over for 18 hours before flying into Botswana, and then by light plane to our first Safari camp.

Once we got settled at our first camp ("Mombo") on the Okvango Delta in Botswana I made plans to set up my shack. Accommodations in Mombo were near ideal. Not only was the camp built above the riverbank ground level but also there were two very large Acacia trees next to out tent. Antenna placement would use the Acacias to anchor each end of the dipole. It took only about 30 minutes to get the antenna up and the 817 unpacked. My first opportunity to



Operating outside our tent at Mombo



Beautiful female leopard at Mobmo

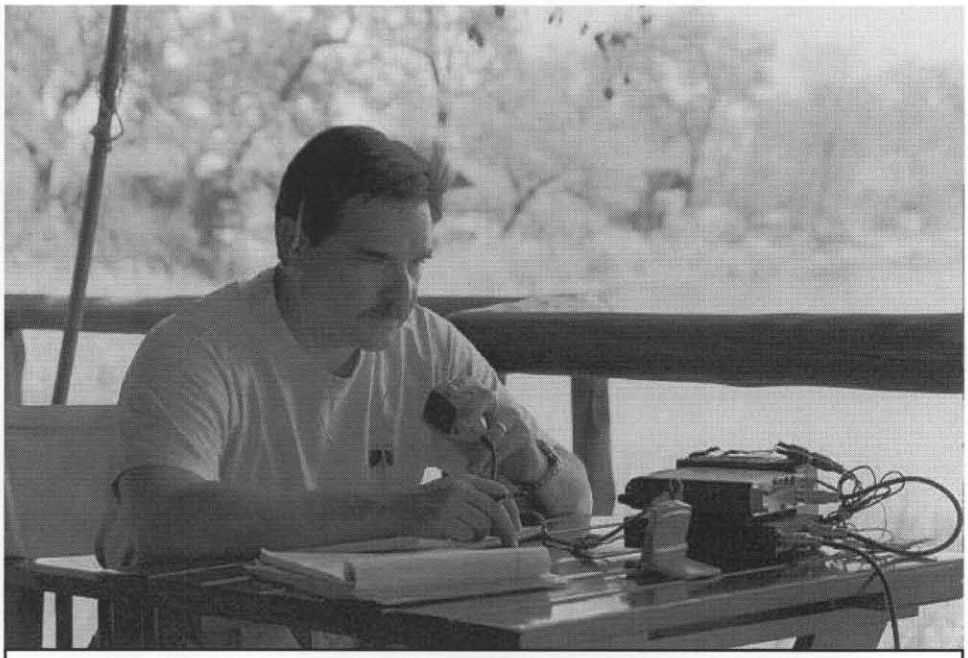
operate would need to wait until after the day's game drives.

From the beginning I had set up a few guidelines for myself: This trip was first and foremost a photographic Safari for my wife and I. Ham radio was to be an accessory after the fact. More importantly I had made a personal decision that my Ham radio Ops. would be as unobtrusive as possible. I didn't want to in anyway disrupt the camp schedule or change the focus of the camp staff.

After dinner I set up to start my first Ops. as A25/KG6GPA / Botswana. Right away I realized that this might be the quietest QTH on earth, as long as the tent's DC to AC power system was switched off. When switched on to power the small electric lights in our tent the background noise level created by the inverter was about an S7+! This was not going to work at all. The solution in this camp and the two others we stayed in was simple--Ops. by flashlight.

Listening that first night I was amazed at the juicy DX I was able to hear. This was helped out by the fact that the background noise floor (with the lights switched of) was effectively nonexistent! I actually had to look up quite a few DX prefixes because I had no idea where they were. My initial strategy was to use the "listen and pounce" technique that had served me so well in the pursuit of my QRP DXCC. I tuned around 20 for a while. There was a lot of activity, but I didn't hear a singe CQ. I decided to give 17m a try. After listening for what seemed like an eternity I finally heard PY7CPC calling CQ. I held my breath and answered with my call and waited. Nothing...I called again...nothing. Finally, I heard the response I had come over 13,000 miles for: "Alpha 25, again, please." What followed was the single most thrilling QSO of my time in Ham radio...an armchair copy SSB QRP QSO from my Safari camp in Botswana to Brazil for nearly 20 minutes!! That evening I worked the US, South America and Europe. I was so excited that could hardly fall asleep. During the next 3 days at Mombo Camp I operated as much as the schedule in camp would allow. I was in QRP DX heaven!

Elephants at King's Pool up close



In the Zone...DX'ing at King's Pool.

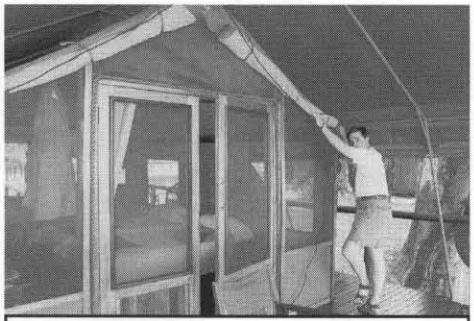
Operating outside the US was a real education. I learned that operating practices in Europe could be "different" than I was used to in the US. QRM was at times horrific, worse that I have ever experienced in the US. I encountered LSB signals (vs. USB) on 20M and 15M as well as QSO's with no apparent requirement for regular identification. In short, we definitely were not in Kansas any more!

From Mombo we moved on to King's Pool Camp, still in Botswana. Again we were able to make effective use of a few large trees to support our portable dipole antenna.

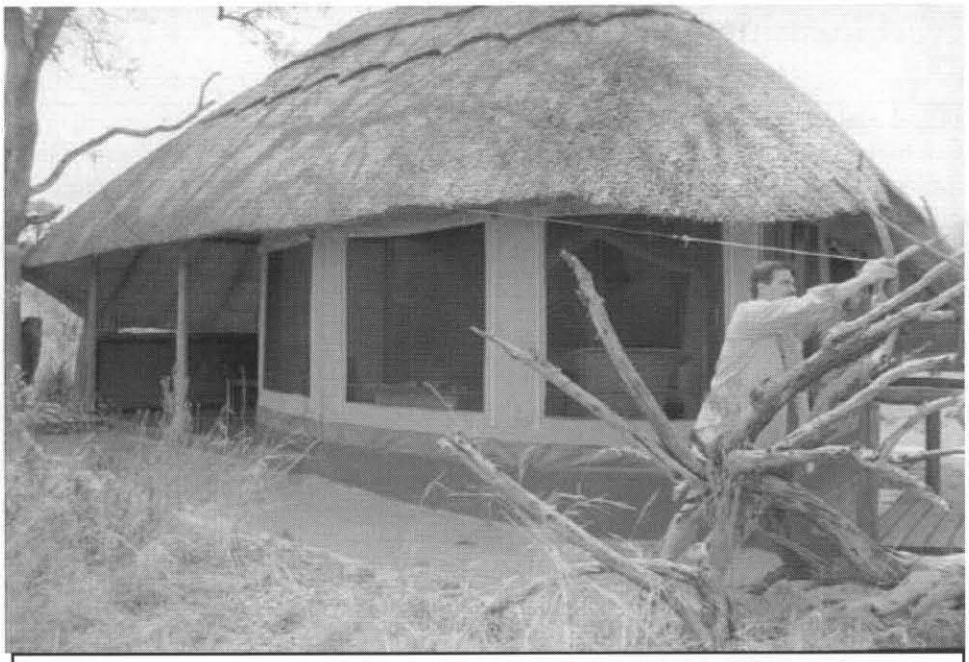
One afternoon I commented to my wife that this QTH was even quieter than Mombo. After listening for a minute or so, I announced, "I think the radio's broken!" I had no signal at all and the SWR was off the chart. What had happened was that members of a local baboon troupe had taken an interest in my antenna and had managed to loosen the coax fitting. The baboons at King's Pool would continue to take an interest in my antenna, so I learned to check it thoroughly at least twice a day.

By the time I was settled in at King's Pool I had my Ops. schedule well refined. Typically we would wake up at 5:00 am and be out on a game drive by 6:30, returning between 11:30 and noon for lunch and a mid day break. Afternoon drives would start around 4:00pm and continue until dark...usually 7:30 or so. I scheduled my operating times around this timetable. Though not ideal, I was able to work shot hop during the afternoon and had pretty good success with long path DX in the evening.

I had also gotten proficient at holding the Mic. and flashlight with one hand so I could write in my log with the other! It's not s hard as it sounds. I continued to make QSO's every time I fired up the little FT-817. I got to know a few Hams from South Africa and worked them both at Mombo and King's Pool. Often I would be invited to "piggyback" with a stronger DX station after we worked. This allowed me to make a number of contacts that I might have otherwise not made. It was gratifying to receive this hospitality and acceptance.



Checking for baboon mischief (See text).



Rigging the "sloper" at Linkwasha

Above all it was always exciting to hear that we were a "new one".

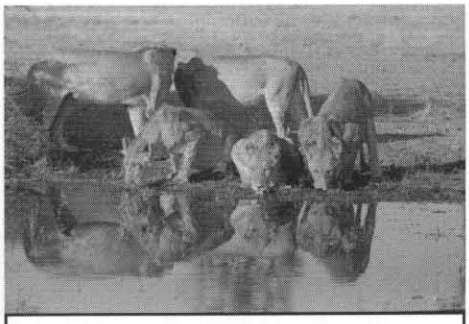
From King's Pool we traveled by Land Rover and small plane to Zimbabwe and the Linkwasha Wilderness Camp. Linkwasha was an area we had been to in 1998, so it was like visiting an old friend.

The Linkwasha camp layout limited our antenna placement. I had to settle for a "sloper" configuration with the high point only about 20' above the ground.

Even with this more limited antenna placement I was able to work DX. successfully.

After four days in Linkwasha we were headed to Victoria Falls for three days of luxury at the Victoria Falls Hotel before our 30 hours of continuous travel back to California. The Safari had been a complete success! Our game viewing was spectacular--seeing lion, cheetah, and leopard at all camps, and even a white rhino on our last afternoon at Linkwasha!

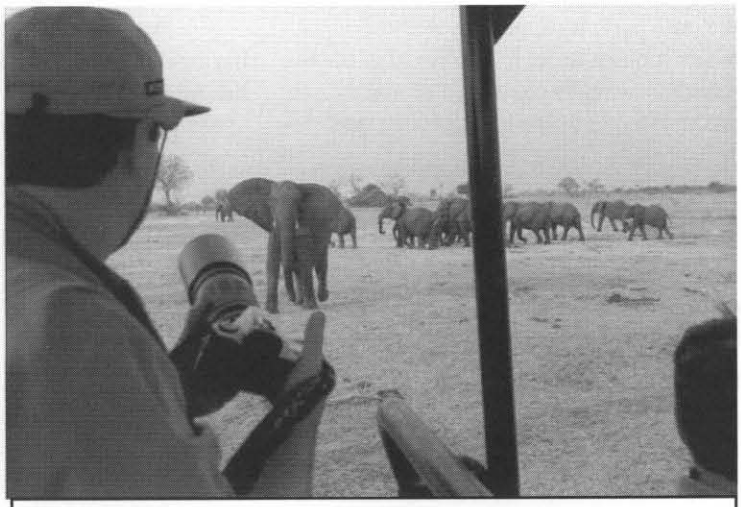
A review of my log shows over 120 QSO's and 21 countries worked, most from Botswana. And although it got bounced around quite a bit while in transit my equipment held up perfectly. Along the way there were some real high points, and a few disappointments as well. I never made any QSO's to ZL and VK land although I could hear many of my friends from down under regularly. Similarly I did not complete my goal of working all continents from Botswana. Nonetheless, it was will never forget the hospitality shown by the Hams who allowed my to piggy-back with them and make some contacts that otherwise would might not have been possible, nor that magical first night operating from Botswana.



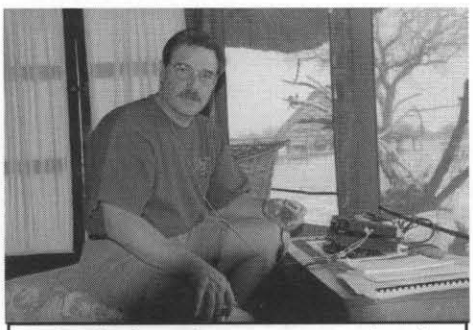
The Mombo Pride

In retrospect, a trip like this would have been the perfect environment for QRP PSK. I simply did not have the room or weight allowance to make that happen. I also gained a whole new level of respect and admiration for the planning and logistical support that is required for larger "formal" DXpeditions.

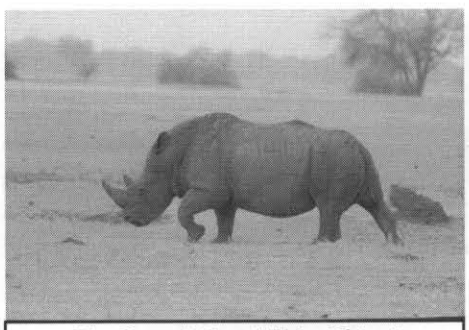
In closing would like to acknowledge the support and encouragement I received from the members of the Botswana Amateur Radio Society, the Zimbabwe Amateur Radio Society, as well as the staff and management of Wilderness Safaris for their enthusiastic support for my QRP Ham activities. And yes, I already know I'll be coming back to Africa again.



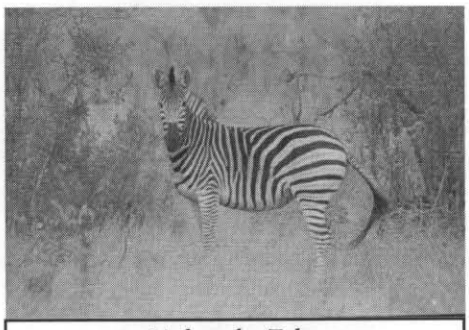
Easy Big Fella!!



The Shack inside our tent at Linkwasha



Big Game DX...a White Rhino!!



Linkwasha Zebra

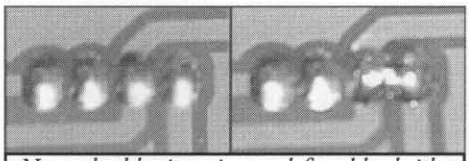
QRV? Finishing Your Cub-40

Mike Boatright—KO4WX ko4wx@mindspring.com

Over the past couple of columns, we've been building a MFJ Cub-40 (40 meter CW transceiver). If you've been following along, you should by now have the basic construction of your Cub complete—you may already have it on the air-if so, great! Maybe you've even been the fox one night this summer (one day I'm gonna catch that slippery fox!).

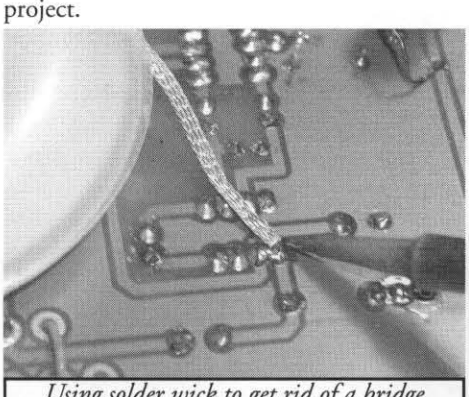
Before You Apply Power!

It has been said that the number one cause of failed construction projects is the old nemesis, the solder bridge. What exactly is a solder bridge? Simply put, a solder bridge occurs when a glob of solder causes a short between two solder points that are not supposed to be shorted. One of the hardest things for me, for a long time, was figuring out if two points were supposed to be shorted or not. The best thing to do is identify the solder points on the schematic (almost always supplied with the construction manual). Sometimes the kit will have the trace pattern supplied as well-this usually makes it much easier to find whether the two points are actually connected or not.



Normal solder junction on left, solder bridge on right

Another useful tool in identifying solder bridges is a magnifying lens. I use a lighted magnifying lens on my bench (cost, about $10)-it also helps to add extra light to the area where I'm working on my construction project.



Using solder wick to get rid of a bridge

To get rid of a solder bridge, just use solder wick to absorb the extra bit of solder between the two bridged circuit points. Don't be ashamed to use solder wick! I use a lot of it! It is truly amazing stuff-the wicking action just sucks the solder right up. Usually, I trim the wick back to bare copper before using. But save that solder impregnated wick-it's useful for lots of things-for example, I use pieces of old solder wick to ground circuit boards to their enclosures.

Before doing any testing (unless otherwise instructed in the manual), be sure to examine the entire circuit board in detail looking for solder bridges, unsoldered connections, etc.

There's No Such Thing as a Failed Test

My personal philosophy is that any test that finds a problem is a successful test. I've also found that you usually allocate more time for construction than for testing, when often it ends up working the other way around! So if you're planning to have that next project on the air in enough time for you're favorite contest, be sure to allocate enough time for testing.

A shameless plug for Elecraft right here-having built both the K1 and the K2, I firmly believe that while these are both great pieces of equipment, the truly great thing about these projects is how much testing is integrated right into the construction process. You can't build a piece of Elecraft gear without testing it in the process! While this doesn't guarantee success, it sure does reduce the number of problems in the end.

Fire!

One of the first tests in most projects is the smoke test. Apply power to the circuit. If there's smoke, there's obviously a problem. Usually this can be traced back to either a solder bridge, or a component installed either incorrectly or in the wrong place. No smoke doesn't guarantee no problems with the circuit, but it's at least a good start.

Most kitted projects do not require complicated testing equipment. Usually, all that's required is some kind of VOM (Volt-Ohm Meter) and a radio (to tell if you're generating RF or not). I've found that some other simple test gear to be very helpful:

Simple, but useful test equipment

MFJ Antenna Analyzer (MFJ-259) - other than the VOM, this may be the most useful piece of test equipment I have in my shack. It is very useful for its intended purpose (antenna SWR/resonance measurements). However, I've also used it as a signal generator, a sweep generator (for example, to measure the response of a filter), and as a grid dip meter (for finding the resonant frequency of a tuned circuit). There are tons of uses for this device!

MFJ Frequency Counter (MFJ-886) - the basic building block of all RF equipment (receivers, transmitters, transverters, etc.) is the oscillator. It's often useful to find exactly (within the error limits of your test equipment) what frequency your oscillator is generating. For a long time, I simply used a radio, but I've found that a frequency counter really does help.

RF Power Meter - it is often useful to determine how much power you are generating. Page 146 of Solid State Design for the Radio Amateur, has a very simple diode detector for RF power measurements. Again, I've found this circuit to be incredibly useful. While it doesn't give exact measurements, it definitely does the trick for most of my construction projects.

Audio Signal Generator - recently I found a neat little audio signal generator kit from Velleman (PMK1051). It generates a 1KHz tone (sine, square, sawtooth waves)-this can be very useful in tracing a problem in the audio chain.

Finding the Problem

Ok, so you applied power to your circuit and it didn't smoke, now what? The MFJ Cub instruction manual has a good set of testing and alignment procedures. In general, this involves setting the BFO frequency, calibrating the VFO, tweeking the bandpass filters, setting the transmit offset and measuring the power output.

Everything seemed to be going well when I built my MFJ Cub 40. I had audio coming out (even could receive signals when hooked up to an antenna). But in the process of calibrating the VFO, I noticed that I only had

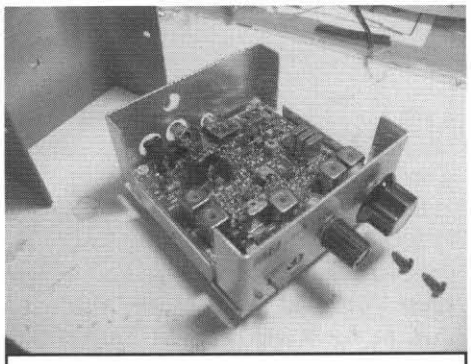
one or two KHz of VFO swing. Hmm, what could be wrong? This is where learning to read a circuit schematic becomes very useful.

From the schematic, it looks like R3, R4, R5, R6, D2, L3, C6, C7, C8, C9 and C10 are all involved in setting the VFO frequency (the VFO is the internal oscillator in U2, a NE602 an integrated mixer, oscillator and RF amplifier IC). In normal operation, R4 is used to tune the VFO, by varying the reverse bias voltage to D2 (in this case D2 is acting as a varactor diode, who's capacitance changes with change in its reverse bias voltage).

Re-examining the completed circuit board, I discovered that I had installed R14 (a 500K pot) where R4 (a 10K pot) goes and vice versa. No wonder I had no VFO swing! The real trick was unsoldering the pots! All I can say is that I used a whole lot of solder wick getting those guys out! (A solder sucker would have come in really handy right then!)

Putting the pots where they were supposed to go, and voila!-the VFO worked just like it was advertised. All that was left was to mount the circuit board inside the MFJ Cub 40 enclosure, and I was QRV!

72 de Mike, KO4WX ●●



Voila! A finished Cub-40. Time to QRP!

Pomona Box Projects

Brian Kassel—K7RE **k7re@arrl.org**

When you find a technique that works—stick with it!

Brian, whose past call was W5VBO which is marked on boxes below, has a small army of electronic units ready to address his every need.

QRPers all seem to have there favorite project enclosures. Pomona boxes are classics among the multitude of choices available today.

If you haven't already spent time at your local RadioShack.com or other electronics supply outlet, make it a pint to check out the many packaging options available to homebrewers today.

Finding unique and/or efficient ways to package your projects can be a lot of fun!

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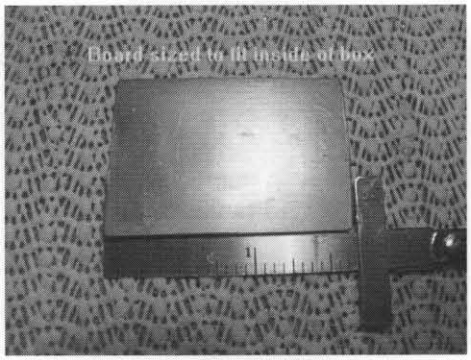
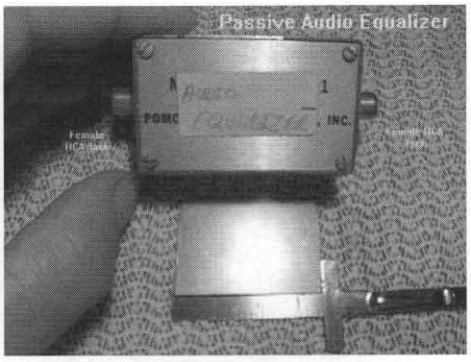
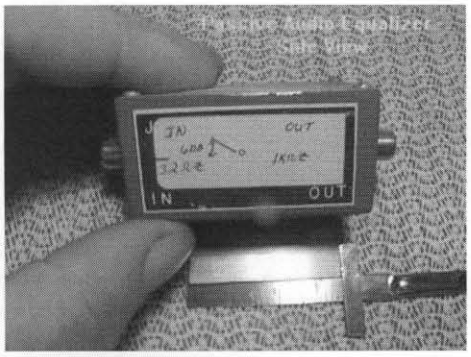
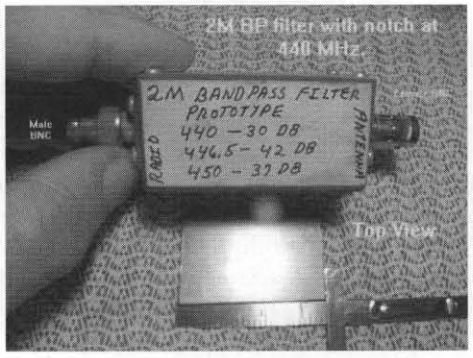
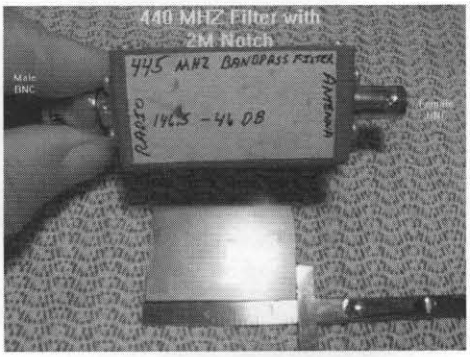
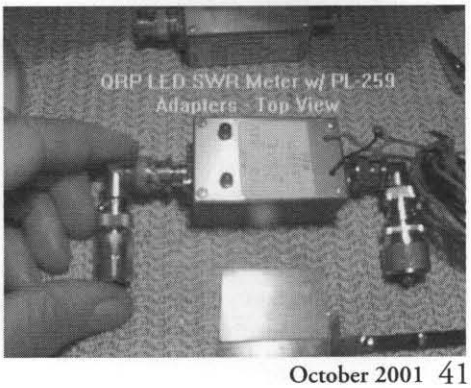












Raising Hell with QRP—Part 2

How to Get Started with this Facinating Mode Using a SB or CW Rig

Murray Greenman—ZL1BPU as149@detroit.freenet.org

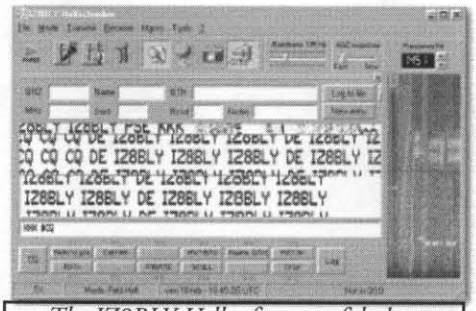
The Transmission

Feld-Hell, the most popular format of Hellschreiber, is transmitted as a series of fast dots, keying the carrier on and off, roughly equivalent to 80 WPM Morse. This means that the signal will be about 200 Hz wide, maybe more if the keying isn't clean. However, it does mean you can receive it using the popular 500 Hz CW filters.

Transmitting Feld-Hell with an SSB transmitter is really easy, as all you have to do is translate the on - off sounds from a sound card PC program to the correct radio frequency, which is no different to transmitting SSB. Yes, you can also send Feld-Hell using the little PSK-Warbler transmitters as well! However, using a straight CW rig, such as one of the many QRP rigs, takes a little more preparation.

Using an SSB Rig

I recommend you use the IZ8BLY Hellschreiber software. It gives the best performance, is easy to use, and also offers a range of other Hell modes, some with incredible performance. This software requires a Windows 95/98 PC, with a 16 bit sound card. There is also software for the DOS PC, the Motorola EVM DSP unit and the Macintosh family.



The IZ8BLY Hell software—fabulous performance!

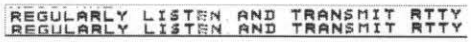
The setup for the IZ8BLY software is just the same as for other sound card modes. If you already operate PSK31, then just download and install the software and you are away. For those that have not tried sound card modes before, you are in for a treat! Here's what you need to do:

1. Organize a set of cables
   - between the PC Line In and the radio speaker, (or accessory socket)
   - between the PC Line Out and the radio microphone (or accessory socket). This cable will need a 10:1 attenuator, preferably a 10 k series resistor and a 10k pot.
   - if you wish, a cable to operate the PTT circuit
2. Install the software. Adjust the PC Volume Control applet so that the transmitted tones (from the WAVE output) are selected and drive the rig correctly. It is best if the drive is kept down so the ALC does not operate. The IZ8BLY software transmits rounded tones for minimum bandwidth, and increasing the drive will widen the signal. Adjust the PC Record Control applet so input is from the Line In port and the level is OK.
3. Tune in a signal, and start copying! Tuning in is easy, because the software has "point and shoot" tuning like the best PSK31 software. You can also use it with a crystal-controlled rig such as an NN1G Warbler.

It is best if the cables are electrically isolated. This not only gives peace of mind, and:

- Eliminates the risk of high ground loop currents which could damage the PC or radio
- Eliminates hum and noise from the PC in the radio microphone circuit
- Reduces the chance of RF getting into the computer, causing erratic operation
- Reduces risk of RF in the microphone circuit
- Reduces the potential QRM caused by the computer in the receiver

I recommend small line transformers, such as are sold by retail electronics stores. Transistor radio interstage transformers work well too. The PTT circuit should be isolated with an opto-coupler or small relay. Another good way to connect the equipment together is with a commercial interface such as the Rigblaster, which includes the PTT circuit and isolated TX circuit, and a convenient level control. Be aware however that the Rigblaster is not supplied with the receiver cable, and you will need to isolate any cable you use.



(above) Typical Feld-Hell copy using the IZ8BLY software

Using a CW Rig

The first thing to do is check whether your rig will key fast enough. Hell dots are only 8 ms long, so the rig needs to be able to respond in less than 4 ms. If the rig is too slow, the transmission will be hard to read, or not have much punch. Most CW rigs are designed for about 5 - 10 ms rise-time (which reduces clicks), so you might find that you need to adapt yours a little. This is best checked with an oscilloscope and an electronic keyer. An 8 ms dot should generate close to 8 ms of RF.

The best software for Feld-Hell with a CW rig is LA0BX's veteran program HS.EXE. It's a DOS program, so will go really well on that old laptop. This makes the ideal combination for a QRP mountaintop vacation. You will also need an interface. There are three that are suitable. One is very complex, another a parallel port design recommended by LA0BX, and included in his documentation, the third a simple Hamcomm adaptor. I'll deal with this option, since you probably already have a suitable interface.

Install the software and connect the Hamcomm interface to the COM1 serial port. Edit the HS.CFG file as follows:

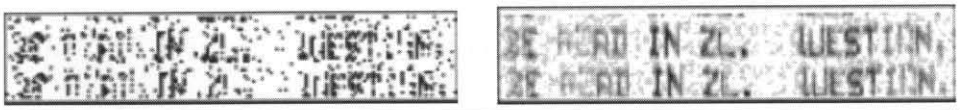
```
>INT4          >UF1200
>SPON
>COM1          >LF600
>SPF900
>TXD0          >CW14
>NOP1
```

The software ignores any lines that don't start with ">". I've not included settings that don't matter, but might like to mess with them anyway. Unfortunately the instructions supplied with the software are rather terse!

The Hamcomm interface receives best if the audio level is very low. If copy is poor, reduce it further! Be aware that the software has quite sharp high pass and low pass filters. You need to tune the signal in at around 1 kHz pitch. If you prefer a different pitch, change the HS.CFG file filter settings (UF and LF) and side tone (SPF). Unfortunately there is no tuning indicator.

To transmit using the Hamcomm interface you need to railroad the PTT circuit so that it operates from the TXD line from COM1, and keys the rig. If your rig uses a separate PTT or TX circuit, it is best to duplicate the circuit in the Hamcomm interface (an NPN transistor, a diode and a couple of resistors) and key the rig with that. Be careful though - your rig may put more current through the key than the 100 mA this design is intended to handle. If necessary, add a higher current keying stage. By the way, this software makes a great CW keyboard as well.

The performance of the LA0BX software is fairly good, but does not match the IZ8BLY software for DX. This is because the receiver



Non-Fuzzy reception (left), and Fuzzy reception (right) of the same DX signal

display is not "Fuzzy" (not gray-scale), and when signals are noisy the text is less easy to read. The LA0BX software can be used with an SSB rig as well, but the transmit signal is less clean, although still perfectly acceptable.

In the next part of this series, we'll discuss what "Fuzzy" modes are all about, and how they enhance the chances of good QRP DX. We'll also look at PSK-Hell and FM-Hell, the super-DX modes.

References:
IZ8BLY Hellschreiber, available from http://iz8bly.sysonline.it/
LA0BX Hellschreiber available from http://www.qsl.net/zl1bpu/FUZZY/software/Hs-v9902.zip
"Fuzzy" is explained at http://www.qsl.net/zl1bpu/FUZZY/fuzzies.html ●●

160-Meter MPW Record Challenge

Dan Wolfe—N4ROA n4roa@arrl.org

This story unfolded a little over a year ago. It all started when Jim Hale, KJ5TF, "Mr. Milliwatt", broke the world record MPW on 12M. This created some excitement on QRP-L when he posted a note concerning the event. He was all excited about it and was letting everyone know about the other records. He pointed out that the 160-Meter record was kind of low and had been around for some time. One thing led to another and he invited others to join him on 160 Meters to attempt breaking it.

E-mail passed back and forth and a date was agreed upon. Looking back through my log, our first attempt was on January 6, 2000. At 0228Z, I worked WS4S, Conard. I was at 250mW and he was at 100mW.

No record here, but sure a lot of fun. Next, I worked KJ5TF, Jim, at 0237Z. He was at 200mW and I was at 250 mW. This was no record either, but this 160-meter milliwatt stuff was beginning to be a lot of fun.

I had not been lowering my power much, just trying to copy the others as they went limbo down, down, down. I thought I would try working stations with lower power than the 250mW. On January 10, I worked W4VHH, Tom, in Gold Hill, NC with 25mW. Yeah, man, this sure is fun. Hee hee!

On January 13, in early morning (1201Z), WB8QYY, Diz, in Cincinnati, OH showed up. We decided to do the limbo and I began at 100mW, then 50mW, 20mW and finally 12mW, which was a new record (17,083 MPW). The old record was at around 13 or 14,000. Yeeeehhhaaaawwww! We did it. Man, oh man, it really felt good. We, of course, set up a schedule for the next morning.

Yep, right on time, there was ole Diz a poundin' the brass "CQ, CQ de WB8QYY K". We made contact, said our "good mornings", and then decided to limbo again. This time it was Diz's turn. I looked back at my QSO notes here. (Yep, I keep a notebook with all the scribbling of each QSO) It sure did come in handy for factual information. Ole Diz started QRO at 1W and was really loud. He dropped to 300mW, 100mW, still good copy, 25mW, and then "8mW". I copied several times with "that's as low as I can go". My power at the time was 12mW and he had no problem in copy. Hey! That's another new record. Broke the world record on back to Back days. This time it was 25,625 MPW. Not too bad.

Well, most of you know how Sir Jim, KJ5TF, is. He loves the milliwatt stuff. He gave us fair warning that the record would not stand long. I knew that we had just thrown out a big challenge to him by breaking the record. Sure enough, he did not even let us get our 1000 MPW certificates before he broke our record. Less than two weeks, I think. Hee hee! He works fast. I do not remember for sure but his record was 27 or 28,000 MPW. Ole Diz and I tried a few times after that but no luck. Oh well, next time propagation permits, we will give it another try.

On December 21, 2000, at 0145Z, our next opportunity with favorable propagation arrived. I heard Diz on 160M calling CQ. I answered and we exchanged hello's and chatted a while. We decided this might be a good time to do the limbo thingie. Yep, you guessed it, he went down, down, down, and finally last I could copy and confirm was "4mW". That's right, 4mW! Incredible, fantastic, exhilarating, to say the least! I was QRO at 100mW and no need for me to try to go any lower. The distance between Diz and I is a little over 200 miles. It figures out to be another new world record at 50,500 MPW. Man, what fun. Jump in and give it a try. You will be glad you did. A record is there to be broken.

Here is a breakdown of Diz's and my station equipment at the time of the new world record.

Diz was using his "multiPIG" with a 160M band module. Power was at 4mW measured with a WM-2 and Attenuators. Later confirmed with 50ohm load and a scope. Antenna was a 470-foot horizontal loop.

I was using my Ten-Tec Omni C. Power was at 100 mW measured on a WM-1. My antenna was a quarter wave 160M inverted "L" with 24 radials. Vertical part is 60 feet. I call it the "Limestone Lamblaster".

Hope to see a bunch of you QRPers on 160M!

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ARE WE HAVING A GREAT YEAR FOR DXING?

Joe, W1JR, thinks so. He wrote to OPDX and stated, "Just a note to tell you DX this year is doing well and possibly ahead of all years. Each year I try to see how many DXCC entities I can work. In a good year I can make about 280-290. Hence, on January 1, 2001 I started anew AGAIN. I guess I never learn! Yesterday (May 3rd) I worked XU7 for DXCC #270, all in just over 4 months. This is the earliest in the year that I have ever worked 270 entities. I figure I have missed about 10 others. I do keep a normal sleep pattern and don't catch them all! The DX is there. You just have to listen and work them!"

Although August is usually a slow month DXwise and conditions haven't been all that great…Joe will tell you otherwise: "I put on a new Yaesu FT-817 just 4 weeks ago and the latest tally is over 158 different DXCC entities and 35 zones (missed zones 3,4, 19, 30 and 38) worked. No help or nets or going from QRO to QRP! The antenna is a Hygain TH-11 up 20 meters. Contacts are split, very close to 50% for CW and SSB with over 90 worked on each mode! Not bad for 4.0 Watts! DX is still alive and well!"

The Summer of My (QRP) DXCC

Harry Edwards—W6DXO harry.edwards@sharkrack.com

This year I returned to the Ham Radio hobby after an absence of nearly 30 years. As a teenager I was originally licensed as WB6ZFQ way back in 1968. Back then I remember thinking that 500 watts was the minimum I would ever consider running. I remained active through college and the start of my career in Hi Tech. Eventually; however, I lost interest and let my license lapse.

My return to Ham Radio was spurred on by interest in modern QRP operations. The more I read, the more interested I became. After becoming re-licensed I purchased a Yaesu FT-817 and put up an inverted-V antenna at my QTH (NO Beams allowed!) and set out to complete the goal of working 100 countries by the end of summer.

I started my QRP DXCC quest on May 25, 2001, the day before my 50th birthday. As of this writing (August 20, 2001) my log shows 98 countries worked (49 confirmed), virtually all on HF SSB phone, and all QRP.

My first two weeks on the air were filled with frustration and disappointment. I began to fell like a midget in the "Land of the Giants," and nearly gave up on QRP altogether. Then something happened that would be repeated several times over the course of the following months. *I call this a "break through QSO".* Break through QSO's are really object lessons that have helped craft and reinforce my QRP DX operating techniques.

I had my first "break through" QSO with LY2ZZ. He was calling CQ. I called him and got a 5/5+. In that one QSO I learned two things: First, QRP DX *was* really possible, and second, I needed to re-think my whole approach to chasing DX with QRP if I was to have any chance of completing my 100 country goal.

Here are the other lesson's I learned through these "break through QSO's":

Tell'em You're QRP:
During the first few weeks I was operating QRP I actually felt somewhat embarrassed telling other Hams I was operating QRP. I know this sounds funny, but that's how I really felt. Again, I had another "break through QSO". This time I was trying to work my first OK1. For some reason I added "/QRP" to my call. To my amazement, I heard the reply: "only the QRP station please call". Most Hams are at least intrigued by QRP. I've found that many more are very supportive of QRP Ops and will often go out of their way to work the QRP station.

An even better example of this type of support was my QSO with C91CU who very graciously QSY'd *twice* 'till we found a clean frequency for a QSO. He knew I was QRP and wanted to help. Remember, they won't know that you're QRP if you don't tell them.

Put in the Time and Set Goals:
I learned quickly that chasing DX, especially with QRP power requires time on the air. You're likely to find DX success quite addictive, so this may not be a problem. It wasn't for me. Any time I may have devoted to things like watching TV, reading a book, or talking to my wife has now been devoured by Ham Radio! These days you can find me on the air every day.

Setting goals is something I picked up from reading John, K3WWP's web site. I always try to work at least 1 DX station per day or one new State, no matter who or where that might be. For me there's very little difference between working Kingman Reef or the State of Rhode Island...there both over 3,000 miles away, and neither have a large Ham population!!

The message here is this: If you're always looking, you have a much better chance of finding.

Keep Track of Your Success:
I set "milestones" of 10, 20, 25 countries worked, etc. 100 countries is a lot, but when broken down to smaller amounts you can begin to see the fruits of success much sooner.

My first "big" goal was to complete my WAC. I remember feeling very discouraged because I was not making any QSO's with stations in Africa. The truth was that I wasn't using the operating rules I'd set out for myself. I was getting completely blown away in the pile-ups where I didn't belong, I wasn't tracking African DX spots, and I was getting frustrated and discouraged. I began thinking that working 100 countries in a summer was completely unrealistic—Time for a re-set.

Once again I was saved from myself by another breakthrough QSO with a ZS2 in Zimbabwe. This time I spent a week getting up early to try to catch an African station that I had spotted on an early morning DX Net. Sleep deprived but happy I finally put the first of several Africa stations in my log.

Be Prepared:
I always sit down ready to work DX. My log (computer or paper) is open and ready, I have something to write with and I'm comfortable and "psyched up". In the beginning I missed opportunities to answer a DX CQ because I didn't have a pen handy or I was drinking coffee and thought I'd just "tune around" and listen. When I heard a DX CQ I couldn't respond because I wasn't ready to operate. I don't let that happen now.

Work the Contests:
I love contests! Well over half of the DX I have worked QRP has come from this summer's major contests (FD, IARU, IOTA). Hey, in a contest every QSO counts. I like to start at the very beginning of the contest, and then I always try to work the last few hours. During the end of a big contest the hard core DX stations will work anything they can hear, and you won't be competing with nearly as many (domestic) big guys...they've gone to bed already!

Work the Bands:
I make a habit of always tuning through 20, 17 and 15M regardless of what band I'm operating on. I am a total band-hopper! Who says the band isn't open? By sweeping the bands and checking the DX spots I sometimes come up with a new one that I would have otherwise neglected to hear because I just assumed the band was dead. My 95th country was a VP5 who I heard calling "QRZ DX" on 15M. The band sounded awful, but there he was—Another break through QSO.

Come Back to the DX:
If there are a bunch of stations calling a DX station that's just come up I'll go tune around and see what else I can work to check propagation and then come back to the DX. By then they might be calling CQ. That could be my chance. During the recent IOTA contest I waited all day to finally work CQ9A. I kept going back to him until he was finally reduced to calling CQ. You guessed it; I got him in one pass!

Know Where and When:
I was complaining to my lovely wife that I was working all the VK's and ZL's I could hear, but I couldn't hear any JA's. I began obsessing

that my QRP signal was dying at the Sea of Japan! One very early Saturday morning I heard a JA calling CQ on 15M. I called him and got a very respectable 5/3. This was another "break through QSO" In the next hour I worked 3 other JA's. Big light bulb goes on in little head! I finally began to bring all the pieces together. Know the local times of the DX you're hoping to work, check the propagation and the DX spots and listen, listen, listen.

Join a Net:
If you're serious about working QRP DX (SSB) I recommend that you find a DX Net that suits your operating schedule and personality, as it were. There are one or two DX Nets that I frequent that welcome QRP operators. This is a very good way to improve your operating technique and make new contacts.

Be a *Great* Operator:
I was going to write, "be a good operator" here, but I think the real operative word is great. Listen and learn how to operate in a pile up. Know when a DX station is working "contest style" or "listening up", so you don't become the one that's flailing around—the one that the other Ham's cringe at. Always, always place a premium on courtesy. Remember you're representing the rest of the QRP community too. (At least that's how I feel.)

I realize that most of what I've written has been discussed previously by others far more experienced in QRP operation than myself. What I hope I have conveyed here is the learning curve that I needed to pass through and the fact that QRP DX success is very possible, and at least for me is the most thrilling thing I've ever done in Ham Radio. Say Hi if you hear me on the air...and if you're a DX station, give me a call. I still need 2 more!

●●

The QRP-ARCI Toy Store is Updated & Includes:

1998 through 2001 FDIM Proceedings.

Antennas & Feedlines for QRP by L.B. Cebik W4RNL

And a lot more. Check us out at:

http://www.qsl.net/k8dd/toystore/thetoystore.htm

The Thrill of the Hunt—Intra-Club Competitions

Jim Worthington—AD4J **ad4j@arrl.net**

The North Georgia (NOGA) QRP Club has periodic operating events such as the Run for the Kudzu, Field Day and weekly nets. This year, we decided to encourage further interest in operating by creating a couple of on-going competitions for members.

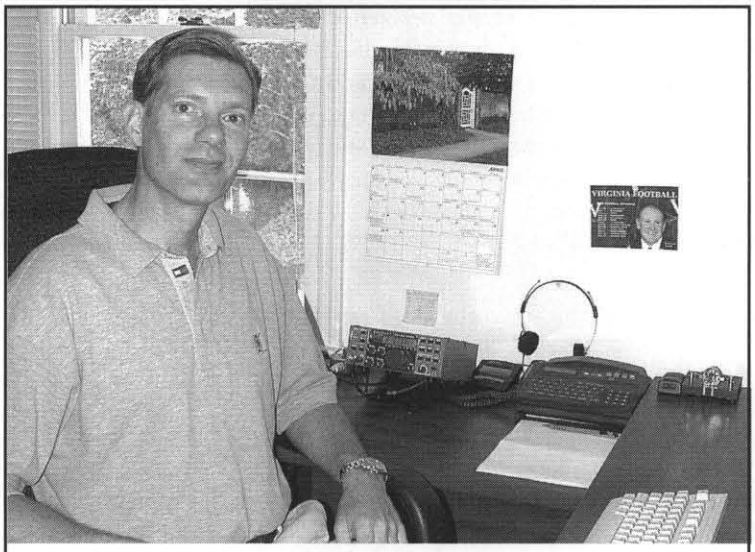


Figure 1—AD4J in his hunting blind

WAS Competition
In February, we began the Worked All States competition. Details were posted on the club Web site at http://www.nogaqrp.org/ (click Activities on the left and then NOGA QRP Worked All States Competition). We track each participant's progress with a Web form, e-mails and frequently updated standings on the Web.

Members are encouraged to apply for the ARCI QRP WAS Awards. The awards are issued for 20, 30, 40 and all 50 states worked. ARCI will endorse your award for nearly anything you specify. So far, NOGANauts have WAS endorsements for:

* All PSK31 QSOs
* All QSOs Human-powered
* All QSOs with 1 watt

Our members have chosen an interesting arsenal of hunting weapons to create a greater challenge. KR4IP bagged used his Warbler to bag over 30 states on 80 meter PSK31 before the summer static arrived. AE4GX pursues his prey using only power from a hand-cranked device. KN2Z hunts mostly on foot. Ken operates SSB pedestrian mobile climbing Stone Mountain with his FT-817 and a backpack-mounted whip. He claims this setup is a chick magnet. It's certainly good exercise. Though I built a K2 a month into the competition, I decided to stick with small arms using - Small Wonder Labs DSW-20 and DSW-40 rigs at 1 - 1.5 watts.

The WAS competition has encouraged members to increase their contest participation. The ARCI contests, the monthly Spartan Sprint and non-QRP contests like Sweepstakes, CQ WPX and NAQP provide fertile hunting grounds for new states.

The competition has been friendly with members helping each other to flush out those last few states. AD4S completed his WAS in August after a fellow hunter alerted him to a Wyoming station CQing on 14,048 kHz during NAQP. The PSK31 NOGANauts at Field Day let another member know about a Delaware station he needed. Hints on how to get needed states and coax QSL cards from those already worked are freely exchanged.

Trying to work all states makes you aware of weaknesses in your antenna coverage. I found that I was having trouble getting a few of the states to the northwest and wasn't hearing Alaska at all. I realized that those states were all off the end of my doublet. After I put up a second doublet perpendicular to the first, it got much easier. The second doublet has proved very useful in fox hunts and working certain DX, as well. Sometimes, a signal is 2 - 3 S units stronger when I switch doublets. Stations I can't even hear on one antenna are Q5 copy on the other.

When the final QSL for NOGA WAS #1 was received, KO4WX created a painstakingly crafted certificate showing the call sign of the confirming station in each state. Mike did a beautiful job with this (see figure 1). Special thanks goes to AL7FS. Jim traveled to the KL7Y contest station one Saturday to give several of us two way QRP QSOs with Alaska. For me, that was the final pelt.

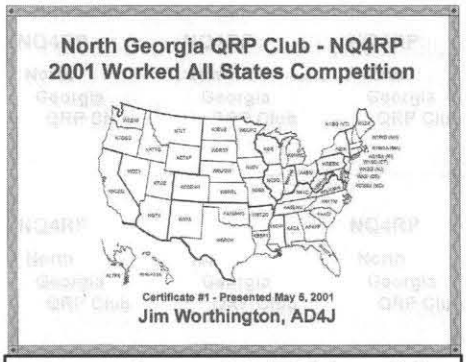


Figure 1 Caption: KO4WX's beautifully crafted certificate

DX Competition

With all the fun we've already had in the WAS competition, the club added a DX competition on September 1. Below is the original posting announcing the hunt for more exotic prey.

Subject: [NoGaQRP] Club DX Competition
Sent: Tue 8/21/2001 11:46 PM

As fall approaches, it's time to get those antennas ready for some good DX. The noise levels will be dropping on the low bands and we'll see better DX openings on the high bands, particularly 10 and 12 meters. The ARRL QRP DXCC is slated to be launched in January and their "Logbook of the World" won't be far behind. Contest season is right around the corner. The CQ World-Wide DX Contest weekends in October (phone) and November (CW) are a great chance to work a lot of DX in a short time.

In addition, to all these incentives, I'm adding a NOGA DX Competition. It's very simple: work as many countries as you can start September 1, 2001. This will be on the honor system to avoid the time and money-consuming task of collecting DX QSL cards.

Periodically, I'll post a message that I'm about to update the NOGA DX Competition standings. Send me your country total at that time. This will work much as the WAS Competition does. However there won't be a Web form to fill out since we aren't tracking which countries you've worked. The DXCC list available at: http://www.arrl.org/awards/dxcc/listmain.html. This determines what is a country. Technically, they're entities, not countries, but I haven't made the vocabulary transition.

Even though we aren't tracking which countries each member has worked, I hope there will be a lot of banter on this list about working new ones. It's always fun to share the joy of working another country. I enjoy reading about what DX you are working as well as when and on what band.

If you are interested in awards for working a hundred countries, QRP ARCI offers one with confirmation requirements identical to those for their WAS award. The ARRL QRP DXCC award is like their Millennium DXCC award: only a list of the 100 QSOs will be required.

If you're not using a logging program, this might be a good time to start. They make it easier to track your progress and will be invaluable once the ARRL "Logbook of the World" becomes widely accepted for award confirmations.

I'll see you in the pileups :-)
72/73 de AD4J

Where We are Today

At the time of this writing, three members (AF4PP, AD4S and AD4J) have completed their hunt (worked all 50 states). Two have collected all the pelts. AF4PP is awaiting a QSL for either of his South Carolina contacts.

The DX safari is just a week old and already eight members have reported kills (see http://people.atl.mediaone.net/ad4j/NOGA_DX.html for the current standings).

These competitions are both instructive and fun. We look forward to a great winter of stalking new entities, improving our weapons and swapping hunting stories. ●●

QRP + FT-817 + VHF Contest + Nice QTH = BIG FUN!

Mark S. Adams, P.E. a.k.a. K2QO **msadams@acsu.buffalo.edu**

On September 6, 2001, I threw down the gauntlet in a QRP-L post that went as follows:

Gang,

I have a new FT817 and I know lots of you do to! I'd also bet that lots of you are know that the ARRL VHF contest is this weekend but are thinking that you won't get on the air with that 817 due to: a) no antenna, and b) I don't have enough power. Well, YOU ARE WRONG!!

Last night I built a 4-el Yagi for 144 in about 20 minutes flat. Just check out this web site and you will be having a ball this weekend. http://www.clarc.org/Articles/uhf.htm

I also build a 432 model and both work great. Clamped to a HB 1" x 20' aluminum pole made out of old antennas and bungeed to my daughters swing set, I worked guys 40-50 miles out on 2M without even trying! (Yes, I was using the 817 at 5W.)

So, check out the rules at ARRL, make a couple of nearly free beams, find a 10-20' pole of some variety and get on the air Saturday! The contest starts at 1800UTC and runs until Sunday at 0100UTC. http://www.arrl.org/contests/announcements/rules-09vhf.html

CUL es 72,
Mark—K2QO
VHF+ QRP-portable on the cheap

Now that the contest is over and the K2QO Single Operator Portable score is in the bag, how did it all go? Just as planned as far as the technical details. What about fun? Well, the fun meter was off the chart!

Unfortunately, the contest had no propagation enhancement of any kind as near as I could tell operating from FN02wv for only the first 6 hours on Saturday afternoon. The final QSO tally was 40. Looking at the logs for some of those early QRP contests back in the mid-90's, I have to say that 40 Q's is darn good! And given that this was my first "serious" attempt at this, I am pleased. OK, I hear the really observant geeks saying wait, 'didn't K2QO win WNY in QRP in the 2000 June VHF?' Well, yes, I did but only because I was the only one who entered! It only took about 13 Q's to take that nice piece of parchment.

Mark all set up—ready to go on hill top.

I know that we can all imagine a QRP contest where the solar flux is decent, the A-index is high and the K-index is off the map in HF terms. Sound familiar? Recent conditions like this have caused me to give up in

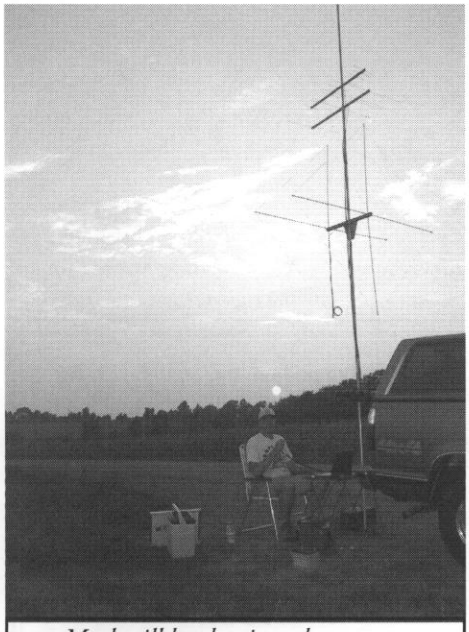
more than one contest. Sitting in front of the rig and fighting the noise and static crashes can get to be too much very quickly. In some HF contests with these conditions, QSO rates are so low that I'd rather watch TV.

Now how about a contest where you do not expect ANY propagation enhancement? In the September VHF contest there is very little enhancement so you go out knowing that line-of-sight is very important and that the more bands you have, the bigger your score.

The week before the contest when I posted that email, the SF, A and K indices all looked good but there hadn't been any sporadic E in a while to help out 6M, and the tropo that is so helpful on 2, 220 and 432 was not likely to be absent. Nevertheless, my new FT-817 was begging for a workout and my 2-el 6-meter quad had not been set up in many years. In anticipation of the event, I searched the web and found 2 meter and 70 cm quads that could be fed directly with coax and cost less than $5.00 each. Some old aluminum scavenged from lifeless beams and verticals would provide the vertical support along with my trailer hitch mounted bike rack.

After testing the gear in my back yard the week before the contest, I quickly realized that 144.200+/- and 432.100+/- are busy places to congregate for a nice SSB QSO. My QRP signal was easily netting me contacts out to 40 miles, and I am in a BAD VHF spot in WNY. I figured that the hill in Genesee County that is used by all the local rovers would work FB.

So, off I ventured to FN02wv, near Pavillion, NY for the September running of the ARRL VHF contest. Setup went smoothly thanks to the preparations of the previous week. When I sat down at the rig to operate, the contest had just started. The next six hours went by too fast as I hunted down stations on 6, 2 and 432 using just 5W and my nearly-no-cost antenna farm. While I worked many locals, quite a bit of "DX" is in my log.



Mark still hard at it as the sun sets.

As with any nice hilltop, you are bound to have company. A local rover from the Rochester area, Charlie, N2IM, and his dad rolled up and assumed a position on the other shoulder of the road soon after the contest began. Fortunately, this was not a busy road. Maybe 20 cars ventured past us all day!

Some of the highlights included working W2SZ/1, the VHF super station on Mt. Greylock, FN32. Also worked were N3EMF in FM19, W3SO in FN00, W4IY in FM08 and VE2ZP in FN25. Although I would never guess this, these stations were worked with greater ease on 2 meter SSB than on 6 meter SSB. As far the my favorite QSO goes, it has to be working W3SO on 432.090 MHz using CW. Single side band is the standard mode on the VHF+ bands, but if an operator is having trouble pulling the QRP out of the noise, they will ask you to try CW. Some operators will even call CQ using code to try and elicit longer contacts.

As for the Yaesu FT-817, it performed great just as expected. I bought it primarily for tackling VHF contests as a QRP entry (which is now called Single Operator Portable). Its dual antenna ports are a great help when changing bands. (In VHF work, once you work a station, they immediately ask what other bands you have. You then go to the frequency they give you and try and work them again. This cool technique makes VHFing neat.) Pre-contest checks with the 817 resulted in great on air reports of its SSB audio and CW note. The 817 would be more than up to the task of a QRP VHF assault.

As for the actual setup on the hill, I used the 817 fed by a surplus 32A-hr gel cell with power supplanted by a 10-watt solar panel. Logging was handled by my old Compaq 486/SL25 laptop and TR-Log. This unit runs directly off the battery, which is why I still use it! The antennas were the two cheap beams and a 2-el Quad on 6 meters. The antennas were clamped to a 1' aluminum pole that was held vertical by my Saris Bike Rack. A table provided by my XYL as I hurriedly left home and a lawn chair rounded out the gear. All this gear could be setup or taken down in abut 20 minutes.

So there you have it. I was out to prove that a VHF+ station could be whipped up for little expense and provide a huge fun/dollar ratio. You do not need big power to have a great time on the VHF bands if you put some effort into decent antennas. Selection of a good operating site is as close as asking the local VHF crowd and looking at some topographical maps. All in all, this experience has spurred me on to begin planning for the June VHF contest in 2002.

K2QO setting up the N2IM Rover.

Lastly, I need to thank some of the hams who really helped spur my interest in VHF + operating. First is Mark, K2AXX, the president of the Rochester VHF Group. He spoke at our local DX club meeting and gave a GREAT presentation. It was truly inspirational. Scott, AC3A, a local ham whose enthusiasm for 2 meter moon bounce taught me how much alike QRP, VHF and moon bounce guys are in terms of weak signal skill work. While I hammered him on getting into QRP, he kept talking up VHF. And Paul, W2TAU, a talented EE who built a set of WBFM 10 GHz rigs that helped me to win the WNY QRP-portable category back in June of 2000.

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ESP - DSP - Copy CW

Re-wire your head-phones so that signal to right earpiece is out of phase with left earpiece. That way the CW flows back and forth through ears and brain. Otherwise, with normal head-phone wiring the CW hits both ears and brain in phase and you lose the back and forth flow of sound.

It makes copying high speed and low signal strength CW much easier. I tried it and WOW what a difference.

Got it from Bob Locher's book "The Complete DXer".

Larry Duncan—K4WLS
K4WLS@carolina.rr.com

QRP Clubhouse—Arizona ScQRPions Club Special

Michael Fletcher—KL7IXI/7 michael.fletcher@attws.com

Each successful organization continues because of meeting the interests of the targeted audience or members.

The Arizona ScQRPions is one such successful group, a group of contest-minded QRPers that meet monthly in Phoenix. The club has been active since 1995 when local QRPers saw the increasing interest in low power operation and wanted to get their own activities started.

"We have 72 members that are active in most of the QRP contests, and we even sponsor some annual contests," Bob Hightower, NK7M, said. "The club has settled into specific groups to take care of hamfest activities, contests, and kit building."

The ScQRPions sponsor a Ft. Tuthill Ham Fest QRP Symposium each year to promote QRP. In 1998 the symposium gave away donated Tuna Tin 2 transmitter kits but required that they be built at the hamfest. More than 50 hams and young people soldered and tested the milliwatt transmitters, and even more crowded around to observe and ask questions.

"The contests we sponsor are the BUBBA (Burn Your Big Buns Away) in August, and the FYBO (Freeze Your Buns Off) in February," said Hightower. Both contests have temperature multipliers and see contestants seeking temperature extremes. The ScQRPions set up a fun oriented Field Day station each year.

Past kits offered by the ScQRPions are designs by Dan Tayoe, N7VE and laid out by Dave Fifefield, AD6A. They include the N7VE Mini SCAF, SCAF, and a LED Power Indicator that is now used in Emtech's ZM-2 tuner. The current club offering is the ScQRPions Stinger Singer Frequency Counter with up to 10 Hz accuracy at 4 MHz.

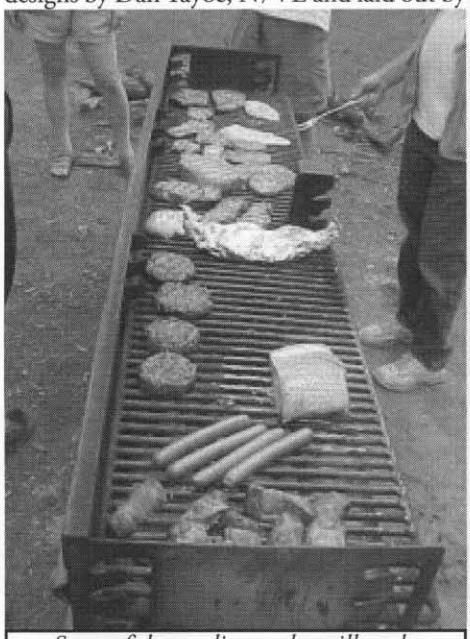
The profits from the kit sales go toward supporting the Ft. Tuthill activities, door prizes, and, supporting a presentation by Tony Fishpool—G4WIF and Graham Firth—G3MFJ for next year's QRP Symposium.

"We want to stay in the low cost, practical kit area," Bob said. "In the long term is a modular kit, that when you finish, will be a decent transceiver. We haven't decided whether to use Molex connectors, or just stack the boards. The boards will be very inexpensive and designed to get youth groups involved in how radio works and stir interest."

The ScQRPions website and Elmer page is available at: http://www.extremezone.com/~nk7m/

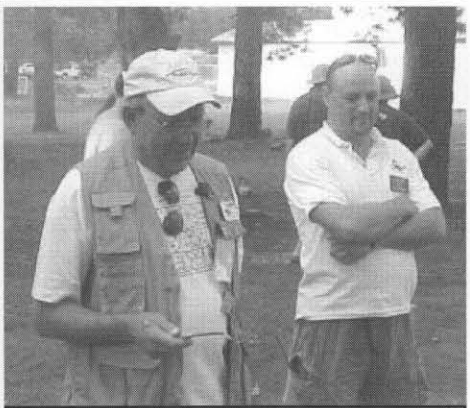
Meetings are the first Saturday of each month at Luby's Cafeteria, next to the Phoenix Ham Radio Outlet. ●●

Brian Kassel—K7RE, Bertie Hightower—N7XJW and Joanna Jones (Brian's XYL) KD7GLY getting ready to announce the evening's festivities.



Some of the goodies on the grill at the Saturday night cookout.

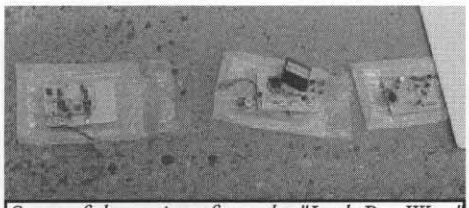
Floyd Smithberg—NQ7X, Jay Miller—WA5WHN, Mike Connor—NQ7K and Brian Kassel—K7RE discuss the weekend



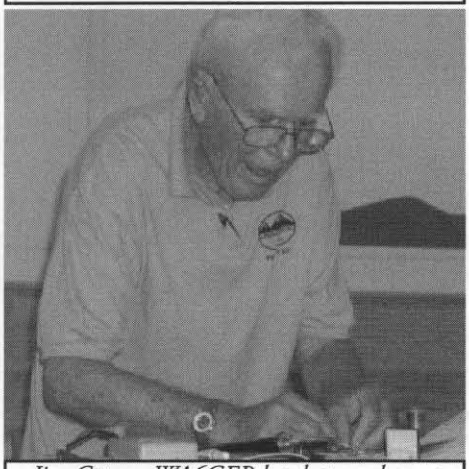
John Nystedt—KJ7YN and Mike Connor—NQ7K trying to decide if the meat is done.

Mike Connor—NQ7K getting psyched-up for the cookout.

Please be sure to get your club information in to Mike so we can share your activities too!

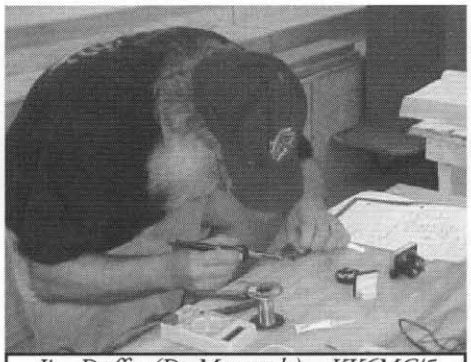


Some of the projects from the "Junk Box Wars" building contest

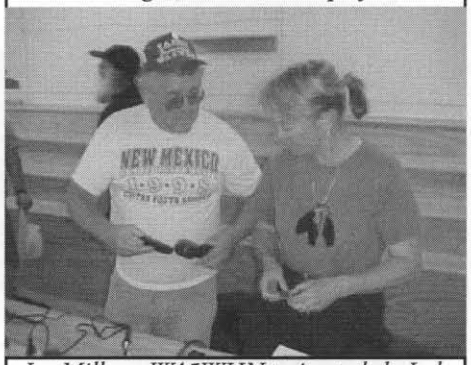


Jim Cates—WA6GER hard at work on a JBW project

Jeff Johnson—KJ7LO pondering his JBW project

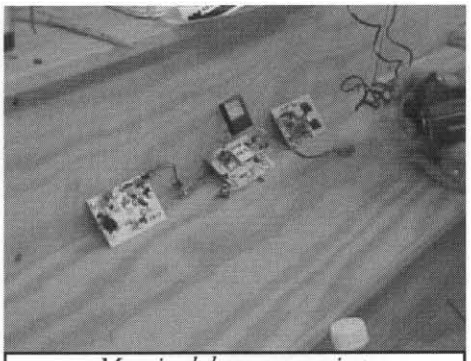


Jim Duffey (Dr Megacycle)—KK6MC/5 building a Junk Box Wars project.



Jay Miller—WA5WHN trying to help Judy Miller—WB5LYJ in the JBW contest. She really didn't need any help.

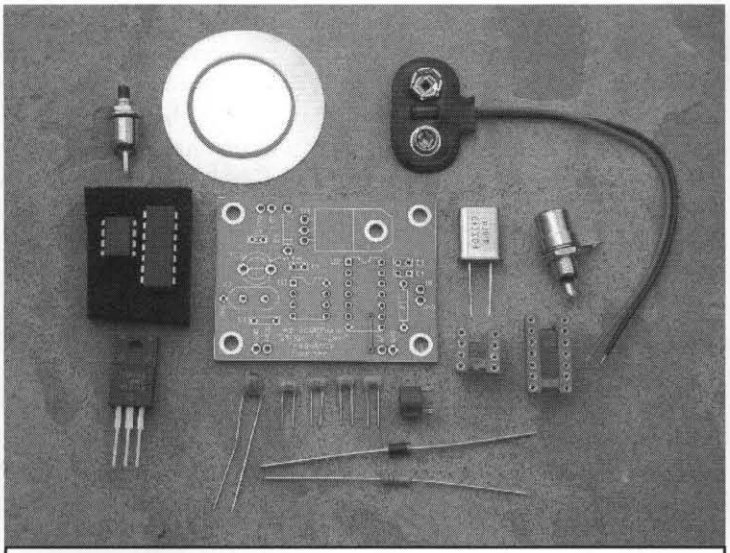
Bertie Hightower—N7XJW, Jay Miller—A5WHN, and Mike Connor—NQ7K discuss the situation.



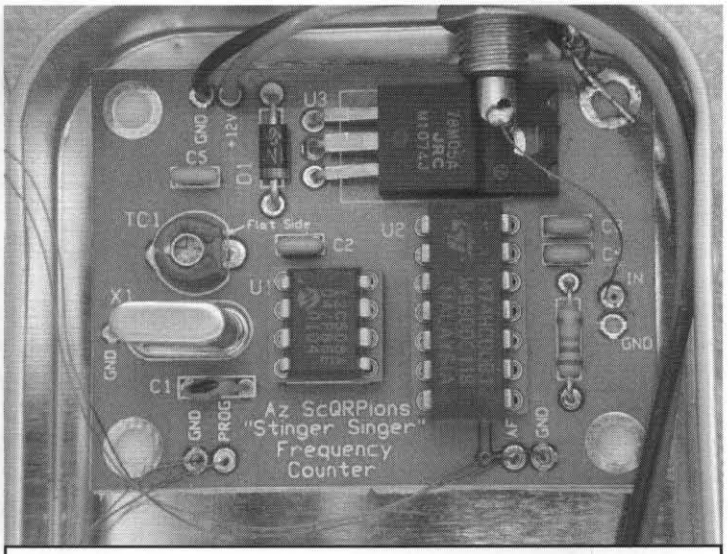
More junk box wars projects

All ages got involved in building out of the junk box.

Jay Miller—WA5WHN, Mike Connor—NQ7K, Brian Kassel—K7RE and Steve Schroder—KI0KY having a good time.



ScQRPions Stinger Singer frequency counter, newest club project.

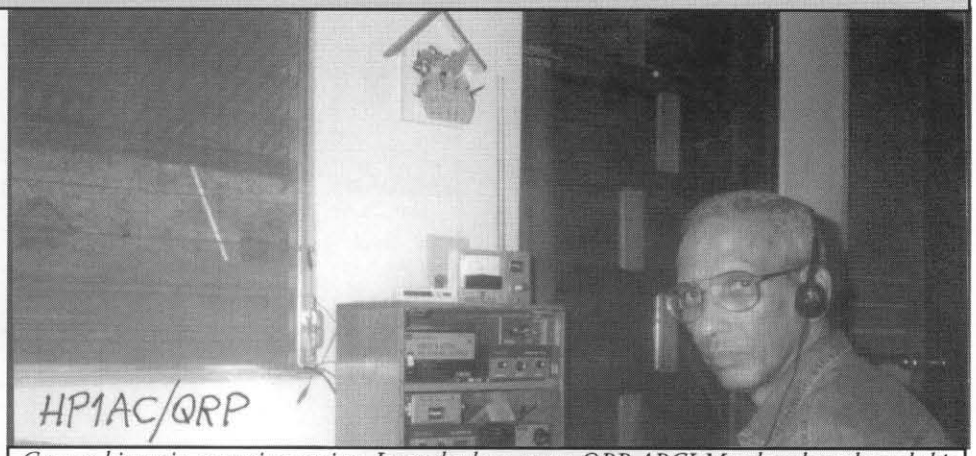


A completed SSS frequency counter mounted in an Altoid case.

Cam Castillo—HP1AC
The Contester of the Quarter for October 2001

Randy Foltz—K7TQ rfoltz@turbonet.com

We will shift gears a bit in this issue of the *Contest Operator of the Quarter*. Rather than talking about contesting tips as we did with Jim, N0UR, in the April issue and with Brian, K7RE, in the July issue, we will talk to a DX QRP contest operator. We will attempt to get a flavor of what it is like to be a ham and operate contests from outside of the US or Canada. I've selected Cam Castillo, HP1AC. Cam lives in a suburb of Panama City, Panama. He has been licensed since 1957 and began contesting in 1960. In 2000 he was the top DX operator in the Holiday Spirits CW Sprint and again the top DX operator in the Summer Homebrew Sprint. More recently in 2001 Cam was the top, and only, DX operator to brave the terrible conditions during the Spring QSO Party. Many of you have Cam in your log book either from QRP ARCI contests or QRQ contests. I've been able to work Cam in most Fall or Spring QSO Parties and a couple of the smaller ones as well.



Cam at his main operating station. I wonder how many QRP ARCI Members have logged this prolific operator as their DX QRP Panama contact over the years???

As a refresher in geography Panama is located in Central America, nearly due south of Miami, FL. It has nearly 3 million people in an area about the size of the state of South Carolina. My Radio Amateurs World Atlas lists prefixes for Panama as the familiar HP, and the not so familiar H3, H8, H9, 3E and 3F. Some of you may have worked KZ5 stations from the old Panama Canal Zone.

K7TQ: Cam, your QTH is Cerro Viento, Panama City, Panama. I see on the map that Panama City is on the Pacific Ocean side of the Panama Canal. Tell us a bit about your neighborhood.

HP1AC: It is a small upper middle class neighborhood of about 2,000 three to four bedroom residences about 10 to 15 minutes from Panama City. My home is a three bedroom house with some patio space for my tower and a garage for my 4 wheel drive car.

K7TQ: Our readers know the licensing structure in the US or in Canada. I'd guess that it is different in Panama. Please, tell us about it.

HP1AC: The radio amateur licensing structure is controlled by the Minister of Government and Justice. There are three types of licenses. The lowest type, Class C, requires passing a written test only. The holder can operate on 160, 80, 40, 15, 10, and 6 meters on phone and CW with a maximum power of 100 watts. You can identify these stations by their H3 call letters. The second type requires being licensed as Class C for one year and having passed both a written exam on radio theory and a 5 WPM CW test. You also have to submit proof that during the previous year you contacted at least 40 stations. This class, B, permits all modes with up to 1,000 watts PEP. The top type, Class A, requires one year experience at the Class B level, another written exam and a 5 WPM CW test. The power limit is extended to 2,000 watts PEP. The duration of each license is 5 years. We have the same bands allowed to US ham operators except that there is no 30 meter operation and UHF extends only to 70 cm. All UHF and microwave bands were canceled and now are allocated to commercial use only. We are in the process of claiming back our internationally assigned amateur bands.

K7TQ: Your last remark is rather chilling. Good luck in your efforts. You often participate in US contests, as we've seen. Are there contests in Panama or South America that we can participate in?

HP1AC: There are several local contests here in Panama sponsored by the local radio associations. The club I belong to, Radio Club de Panama, has an anniversary contest every September. This year it will be the 23rd. It includes all modes including PSK-31. The web page is www.radioclubdepanama.org. Last year I had the honor of getting the First Place in Upper Side Band. There are other Central and South American contests to celebrate independence days or special events. I usually participate in them especially in the CW part. The rules are generally the same as any other contest around the world. The main difference is that they like to exchange the time of the contact as well.

K7TQ: I took a look at the rules for the Radio Club Panama XXX Anniversary Contest in the September issue of QST. The contest lasts 12 hours from 1200 Z to 2400 Z. The exchange is RS and serial number. As you said all modes, phone, PSK-31. and CW are supported. Bands are 20 and 40 m. However, by the time this makes print, the 23rd of September will have past. Rats! Maybe we can mark it down for next year. You mentioned special events. Earlier this year I heard you working JA's right and left using a special event call. Give us some insight into what was going on there.

HP1AC: At the beginning of the year 2000 I operated with the special call 3E2K for the Y2K. I made around 3,000 CW QSOs on all bands. Then in the year 2001 during April the club got a special prefix 3E500 to commemorate the 500 years since the discovery of the Isthmus of Panama by Rodrigo de Bastidas in 1501. Again I made around 3,000 CW QSOs using the call sign 3E500AC. I'm still waiting for the special card from the government office that was promoting that event. I have also used the call sign 3F1AC in December 1999 to commemorate the Canal Reversion. Finally, many years ago I used H81AC during a WPX contest.

K7TQ: Lots of special event call signs! The 3E500AC was the one I heard you using. I guess the JA calls were covering up my QRP signal when I tried to contact you. Some readers will remember that during the US Bicentennial special calls were authorized. I used AK5QMP a few times but preferred my nov-

ice call of WN5QMP. The distance from your QTH in Panama to Miami is 1150 miles, to New York is 2200 miles, to Denver is 2600 miles, to San Diego is 2900, and to Seattle is 3500 miles. These distances are greater than most paths in the lower 48 states. What rig and antenna farm do you use to be able to routinely work these distances in QRP contests?

HP1AC: For many years my regular rig was a TS430 cranked down to 5 watts. I recently changed to an ICOM 706 MKIIG also set to 5 watts. For an antenna I use an old Mosley TA33jr and a long wire with a tuner on the other bands. The tower sits next to my three bedroom home in the patio.

K7TQ: That is a fairly modest set up. I heard that you operate a 10 meter beacon. What are those details?

HP1AC: That is correct. It operates on 28.231 MHz with a power of 5 watts and signs HP1AC/BCN. The antenna is a dipole. I hope people can use it to tell when 10 m is open to my part of the world.

K7TQ: Let's talk a little bit more about your QRP contesting. What is your favorite QRP contest?

HP1AC: I like the Fall QSO Party. I usually have a good score and get lots of multipliers....

K7TQ: Yes, I'd say you do. In 1999 you scored 149,000 points and were the top DX operator. In 2000 you scored 324,000 points and were again the top DX operator.

HP1AC: I like the 24 hour contests because of the distances I have to work. Conditions and propagation change over the 24 hours which allows me to get more mults. I have on the wall a plaque that was given to me by ARRL in 1995 for top QRP score in the ARRL DX CW contest. Every year I participate in that one as QRP. On the other hand sometimes during the four hour sprints I can work only one band. 40 meters is only good for me during the night. Every contest is quite different from the others. Sometimes it is just nice to sit and CQ and jot down the points. But sometimes time goes by and no progress so I have to search for QSOs. I have tried several times inside the novice bands in order to get extra multipliers. Recently that has not worked as I have noticed a decline in the activity of QRPers inside the novice part of the band. With the recent changes it will get worse.

K7TQ: Some of the QRP events, such as FYBO and QRPTTF, encourage out door operating. Do you participate in those outdoor events?

HP1AC: I participate in outdoor events. I have a place about 45 minutes from my home high in the hills. For those times I use a HW9 with a dipole and do some QRP. Locally I like to participate in FOX Hunting activities in VHF.

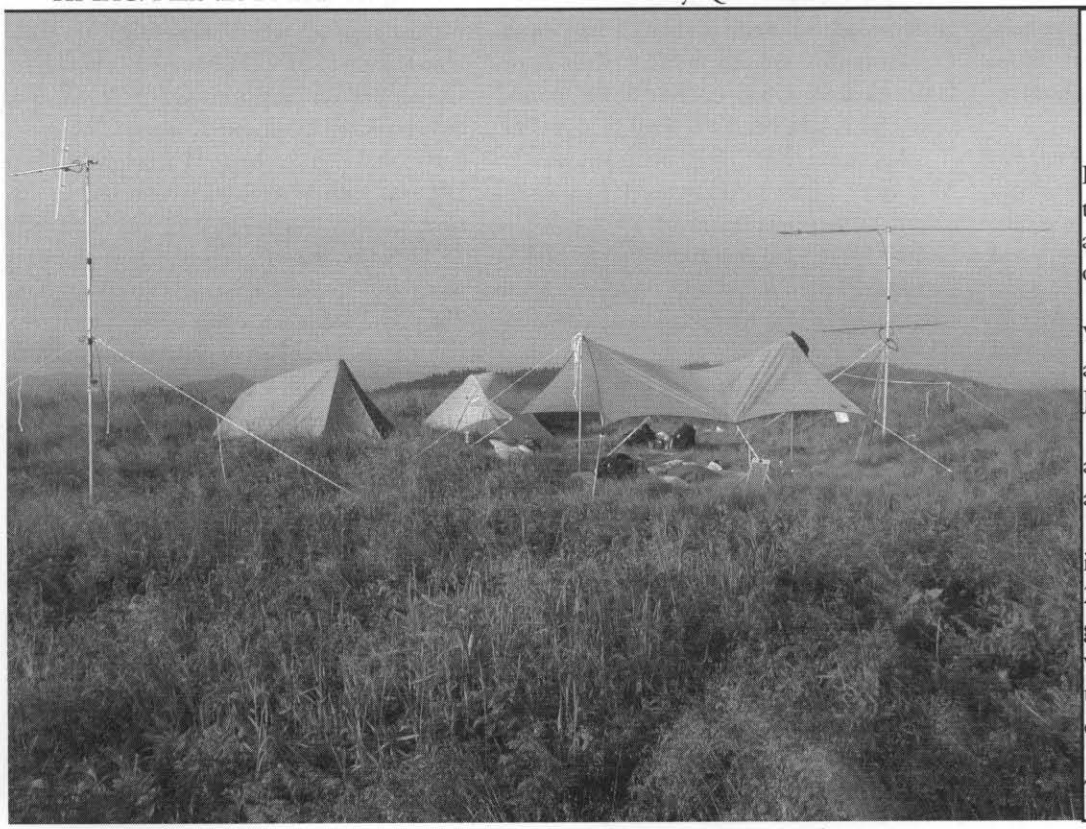
K7TQ: What is your most memorable contest?

HP1AC: I have certificates from almost all the contests I have participated in. Often times I'm the only QRP station outside the USA. I think that my best one was in a QRO contest where I operated QRP against the world and got 1st place. I have reached 2nd and 3rd places in the same event after that 1st place and still participate. I got a plaque from the 1999 TAC contest as a DX winner. But the real thing is to participate and give the extra bonus or multipliers to my fellow ham friends that always are looking for my call.

K7TQ: We're about out of room here so do you have any suggestions to ARCI members to help them insure that you get into their log during our contests?

HP1AC: I would like to have a magic stick so I can get everybody to work me during QRP contests. But I believe that I always put my best so I can make it to the majority of the participants logs. My position down here far away from North American ham operators with limited operating antennas and rigs sometimes makes it hard for them to copy my five watts. Sure my antenna helps and my 44 years of experience is an extra bonus. I thank God and you fellas for helping me. My health is not so fine business as I am a retired fellow with 62 years of age and four bypasses and some other bad experiences in my heart. But it sure gives me a great pleasure to work QRP contests and hear you fellows calling me by my name. GOD BLESS YOU ALL.

K7TQ: Thanks, Cam. I'm sure we will all enjoy putting you in our logs and saying "HI CAM" in the next contest. ●●



<—Pictured Left

WT4IX is Radio Active in the July CQ VHF contest

I believe it was your editorial, Craig, that was asking for more VHF QRP and youth articles. Well I may have one that covers both.

We activated our troop call—WT4IX, troop 49 of Charlotte, NC, and climbed a mountain to work the July CQ VHF contest.

We operated on 2 bands--QRP and all solar power. We had 2 adults and 2 youth.

Although we have 14 amateurs in our troop, we decided to take just 2 of the boys that seemed to have the greatest interest on this trip. We wanted to give them an oportunity to participate in a (somewhat) serious contest effort.

Tim O'Rourke—KG4CHX ●●

QRPxpeditions to XE-Land

Richard Clem—W0IS clem.law@usa.net

I hope none of the QRP purist readers of this journal will take offense, but I am not one to work QRP for its own sake: If it takes six watts to make the desired QSO, and if I have six watts available, I am not adverse to using it. But since five watts usually does the job very well, and since a QRP rig doesn't take up much space in a suitcase, I've brought it with me on many recent travels.

Until the last year or so, I hadn't been very active on the air. But some recent opportunities to travel were what got me back on the air. Prior to a recent trip to Venezuela, I learned how easy it had become to obtain a license in many foreign countries. For example, Venezuela (and most countries in the Americas) requires only an International Amateur Radio Permit (IARP), which is issued in the U.S. by the ARRL. And most of Europe features automatic licensing for U.S. Amateurs.

When I realized how easy it was to get on the air in YV-land, I simply had to do it. The only problem was that I didn't have a rig. I quickly started searching e-bay for something to bring with me. My main criteria was that the rig be expendable (in other words, cheap). I didn't want to cart expensive equipment with me only to have it lost or broken.

Well, believe it or not, the rig I found that met that criterion was an EICO 753, a 35-year-old transceiver that weighed in at about 50 pounds. I'm sure quite a few luggage handlers cursed me for having made this decision, but the rig did work, and I worked a number of QSO's as YV5/W0IS.

It did become quite obvious, however, that lugging a fifty-pound antique boat anchor with me was not the way to go. When an opportunity presented itself to go to Germany, I had to find something better. Another trip to E-bay netted me an MFJ-9040. With that rig, and a dipole strung out the hotel balcony, I worked quite a few QSO's all around Europe as DL/W0IS. I didn't quite manage to hop the pond, but I did get a "QRJ TOO WEAK" from one W2.

My latest travels have taken me to Mexico, where not coincidentally, my girlfriend (soon to have an XE2 and/or W5 call sign no doubt) resides. The procedure for obtaining a license in Mexico is, unfortunately, somewhat more difficult than other countries, although certainly not impossible. A very good overview of the process can be found on the following web pages: http://www.qsl.net/oh2mcn/xe.htm http://www.qsl.net/wd9ewk/xe-permit.html http://www.qsl.net/n9viu/mexpage.htm

With my girlfriend's help in delivering my application and picking up the license for me, I was ready to get on the air as XE2/W0IS. My first opportunity to use my new XE license came on a trip to Matamoras, near Brownsville, Texas. Since I was actually staying in a hotel in Texas, I was in need of a place to set up my minimalist QRP station. Since Matamoras is only a few miles from the beach, that's where I decided to go. Originally, I had intended to use a helium balloon to hold up a quarter-wave vertical. A quick stop at Toys R Us in Brownsville yielded some balloons. Unfortunately, there was too much wind, and the vertical wound up being mostly horizontal. Undaunted, I simply ran the quarter-wave wire to a couple of the beach umbrellas. For a ground, I buried a wire in the damp sand. The power supply consisted of 9 D cell batteries.

My setup is shown in the accompanying pictures. As one friend put it, "it looks like Gilligan's Island." But the QRPedition was fairly successful, netting about a half dozen QSO's, mostly around the U.S. Gulf coast. Unfortunately, I had to shut down around sunset, just as the band was starting to get hot.

My next XE2 QRPedition was to Monterrey, Mexico. At my hotel, I requested a room on an upper floor with a balcony. The balcony had a solid wall about four feet tall at its edge. A close inspection revealed a loose screw in the ceiling, near the sliding-glass door to the room. Using one of the hotel chairs, I was able to reach up and slip a twist tie around this screw for holding the apex of an inverted Vee. I initially just draped each leg of the dipole over the balcony and let them drop down along the building.

Unfortunately, this did not work very well. In my first night of operating, a couple of stations copied a partial call from me, but I did not manage any QSOs. Probably at least ten feet of each leg of the antenna was touching the surface of the wall, and this was attenuating my signal to the point of being imperceptible. To cure this problem, I went to a local building supply store in search of something to use as an antenna support. What I came away with was two ten-foot sections of wooden doweling. I placed these on the balcony railing (which was almost two feet wide) extending out from the building about 8 feet. The hotel phone books were put into service to hold these dowels in place. I tied the antenna wires to the end of the dowels, and let the ends of the wire (about 10 feet) hang free. (In retrospect, a safety line to each of these supports would have been a good idea, but no mishaps resulted.) Since the ends were now out from the building, the antenna was more or less in the clear.

At first, the results were still somewhat disappointing. During the early evening, I did hear a number of loud U.S. stations, but did not manage to work many. However, I tried again in an early-morning session (about 3:00-5:00 U.S. central time), with quite good results. I've found that when operating QRP, in the early morning hours, generally, if you can hear 'em, you can work 'em.

For some reason, I never have good luck with calling CQ, whether I'm QRO or QRP. I always seem to have the best luck listening for CQ's, or tail-ending other QSO's. I managed an even dozen QSO's on 40 meter CW, as well as two more on 2 meter FM. I believe my best DX was with Wisconsin with a mobile station.

My first experience with QRPeditioning was about 25 years ago when I took my Ten-Tec PM-1 along on a Boy Scout canoe trip. For me, the great part of QRP is being able to operate from just about anywhere. The next time you are packing your suitcase, just remember.... You don't need all of those clothes! There is still room in there for the QRP rig! (And don't forget to ask for the room with a balcony.)My second V31GX Belize QRPxpedition Aug 2001 ●●

My second V31GX QRPxpedition Aug 2001

Sam Billingsley—AE4GX sambillingsly@earthlink.net

During August 2001 I got to make my 3rd trip to the islands of Belize located just south of the Mexican Yucatan on the Caribbean side of Central America.

The island I visited was Caye Caulker a very small primitive island described in the travel books as "Gillian-like". No paved roads, no cars or trucks and a very laid back life style. This island is noted for European and North

American backpackers looking for an inexpensive Caribbean vacation spot. I have an old Atlanta friend that moved there several years ago to permanently enjoy this quaint community.

I'm a SCUBA diver and Belize hosts one of the best reef systems in the world--diving is always a great adventure there. QRP radio, being my other hobby, accompanies me there on my trips. Getting a radio permit is easy and inexpensive--well worth the effort. My process with a phone call and a FAX to the license bureau. I had them mail an authorization to me to allow a painless trip through customs on arriving at the international airport just north of Belize City. The licensing bureau is very friendly and you can pick your call from the unused calls. The license logging is kept in a hand written accounting binder and looking through the history of transactions is interesting.

Traveling to the island is still primarily by open water taxi for a 45 minute kidney jarring ride but it's over quickly and Caye Caulker is open and waiting for the next small load of tourists coming for their first visit and the locals returning from Belize City shopping for supplies.

My wife and I stayed in the "best" new hotel, the Iguana Reef Inn (http://www.iguanareefinn.com/) on the island and enjoyed the luxury or an air-conditioned room that's very rare on the island.

I knew my radio time with be minimal

since there's so much to do with SCUBA diving during the day so I decided to try two operating time spots one late afternoon before the evening meal and the second before bedtime.

Two years ago, I used my INDEX QRP+ on several bands, but when I got back and checked my logs I noted I had more than half my operating time on 30 meters (with great luck BTW). This trip I decided to take my NORCAL 38 Special with my 5 watt FET Molded final. The 38S was my first QRP kit when I got back into QRPing and it always performed well for me. It had the Tick/K8 keyer MOD added so I used my Whiterook paddles for keying. A cheap pair of earphones did the audio output.

For an the antenna I decided to use my field tested W3EDP 87 ft end fed wire and my homebrew L-tuner for coupling to the rig. I had a quarter wave counterpoise to help with the loading. My ground floor hotel room had window and door access to a porch as I used light twine to get the wire up to about 25-foot in an L-shape. The 60-ft or so of horizontal wire was headed east/west since a fence stopped me from going north.

I had NimH battery packs, alkaline for backups and even a small switching PS if needed. With my limited operating the batteries were more than enough for the effort.

I managed about a dozen or so 30 meter QSOs during the 6 days I was there including two DL stations and one XE. Most folks gave me a 3-5 signal strength but all were coming in FB to me. My think in my antenna location was the limiting factor.

The entire rig and support gear was contained in an old early cell phone case about 10X7X2 inches. Even though I checked the gear in my luggage I found a security inspection sticker in the battery pack when I arrived.

My short but restful trip was a joy for me since I got to do the two hobbies I enjoy the most: QRP radio operating and SCUBA diving. Was it worth the effort YES, YES, YES!

I highly recommend that you take some QRP gear and enjoy your hobby away from home, whether it's a foreign country or just the family vacation to the coast/mountains. It will enhance your stay and give you the opportunity to experience the thrill of QRP on the road. ●●

Adventures in Milliwatting—DX and Contesting Ideas

Jim Hale—kJ5TF **kj5tf@madisoncounty.net**

For many years, I wasn't at all interested in contests—the idea of the 10-second-QSO's just didn't excite me at all.

It didn't take long, however, to notice all the great DX on the bands during the contests. So, I'd get on the air and work a few DX stations on occasion. I found that it was a useful way for seeing what I could expect from my rig and antennas with QRP power levels.

As I got more and more into QRP and CW, I found myself wanting to do more of the contests, and...actually send in my score. The sprint type contests were better for me since they didn't involve the entire weekend, and I had most of the weekend available for family activities.

Once you really get bitten by the DX Bug, you will find that the big (CQWW-WPX & ARRL) DX contests offer a chance to at least go after some new DXCC countries, at any power you chose. If you want to go after the ARCI QRP DXCC award running 5 watts, you can work your 100 countries in one year. The QSL cards might take a little longer. Or as some QRPers are doing, you can use these contests to work for the ARCI milliwatt endorsement to your DXCC.

The ARCI QRP Worked All States award is a worthwhile project for anyone. But by using QRP or QRPp you can add extra sport to it. There are many CW & SSB contests where you can get the rare states by carefully scanning the bands. Even the rare ones have times when they nobody is calling them. This is a window where you can try the lowest power you can measure, and try to work them. This will also build up your DXing skills.

If you can bag the rare ones with 5w, 1w, 500mW, or 50mW then you might consider the challenge of getting the rest of that DXCC, or WAS at that lowest power level.

You can design your own goals within these awards, and that's even more fun. How about the WAS award with all 50 state contacts being with mobile stations? There are both CW and SSB nets to help you find mobile stations, on several bands. Or you can totally avoid nets, and contests, and make it a challenge of a lifetime.

We are lucky to have more and more computer programs all the time to help us enjoy the contests. Some will even keep your score as you go, and calculate the totals when you're done. There are several affordable contest programs around. You can see them advertised in QST, and on the Internet. But there is some freeware, & low cost shareware around also that does all this for the big contests, as well as our QRP events. You can download QRP Dupe, and N3FJP software here.

http://www.dancris.com/~bkassel/index.htm#top

http://www.n3fjp.com

Recently I've been trying the digital modes, and trying my luck with those contests. The new PSK-31 mode has its own contests, and they have a QRP class built in. And ARCI has now joined in with a PSK-31 contest or our own.

This mode is low power friendly with all hams, even those who run 100w on CW. So a QRP PSK31 contest is a natural. ●●

TDIA (Two Days in Alabama—August 17-18, 2001)

Mystery Brown Bag Construction Contest

John (Pickett) Cummins—AD4S jpcummins@netscape.net

During the recent TDIA in Huntsville, Alabama, sponsor, Craig Behrens—NM4T included a QRP building contest, which was held at the Monte Sano State Park TDIA campsite on Saturday night.

Interested groups received a large brown bag with various materials. This year's inaugural event called for the construction of a 40-meter antenna from just what was found in the bag.

This year's bag included about 33 feet of 16-gauge stranded, insulated wire, about 36 feet of 450-ohm ladder line and about 10 feet of RG8U coax. Also included were rope, electrical tape, a PL259 coax connector, a soldering station and solder, a note pad and pen, a slinky, 6 practice golf balls, an empty liter soda pop bottle, a toy pinwheel and some small plastic toy aliens.

The rules called for the construction of a 40-meter antenna. Builders could not use any type of reference material or electronic analyzers, noise bridges and such in the construction process. Teams had approximately 1 hour to construct their antennas. Rigs used to make contacts could not be connected through any type of antenna matching device.

Various weights would be given in the judging to all aspects of this product development including the effectiveness of the antenna design, SWR, gain, marketing presentation and number of contacts including the time of the first contact.

Each team had to elect a CEO, a CDO (Chief Design Engineer) and a CMO (Chief Marketing Officer).

The SJ "sole judge" for this event was none other than **Eric Swartz—WA6HHQ**, one of the founders of Elecraft who produce the K1 and K2 QRP transceivers. The SJ and other impartial observers would visit each construction site during the event to insure that no team was flagrantly violating any rules. This was a difficult task considering the bribery, skullduggery, spying on the competition, which were all allowed.

This year's event produced two competing teams: The Flying Pigs QRP Club of Cincinnati, Ohio and the North Georgia QRP Club (NoGa) of Atlanta Georgia.

This year's winning team was the **NoGaNaughts** from Georgia with their winning entry "The NoGa Nawdy Fawdy". That is Southern for "Naughty Forty". While the antenna design and use of available material were impressive, the marketing presentations were awesome and in the end judge Schwartz awarded the NoGa team the win being swayed by the fact the NoGa team was the only team able to make an on the air contact with their entry.

The winning team from NoGa. Left to right, Mike, W3IRZ, Pickett, AD4S, Ken, W4DU, Mike, KO4WX, Jim, AD4J and Gary, N9AY.

Here are some points from the NoGa marketing presentation for the "Nawdy Fawdy"

1. A ¼ wave vertical with elevated radials was the chosen configuration. This choice provided increased bandwidth and used both conductors of the ladder/window line. This configuration also provided a low angle of radiation and would be good for DX work.

2. The 6, plastic, toy aliens were identified as Mojo alien deep space noise attenuaters and were placed in strategic locations on the antenna. When they glowed from RF the user would know that they were doing their job.

3. The material that appeared to be practice golf balls were identified as alien Mojo balls. Two of these were used in the antenna construction (attached to one of the aliens) and the other 4 were presented to SJ Swartz as a memento of this history-making event.

4. It was determined that this product design would be well received by the amateur radio community since the materials used were readily available and could be found in campgrounds world wide.

5. After considerable thought, we determined that the object that appeared to be a soda bottle was actually the basis for a NoGa AMOD "Advanced Mechanical Oscillation Damper". This design element was used to place a pull rope about 40 feet over a tree limb and then weighed down the pull rope to stabilize the vertical portion of the antenna.

6. NoGa was very aware that the antenna needed ESF (Extreme Safety Factors). The predominant safety factor was that all components of the antenna were physically above ground. This is really important in a campground at night.

7. After considering several rig options, the NoGa team opted for the Elecraft K1. This decision was only finalized after SJ Schwartz visited the construction site and made a remark about the FT-817 that had been connected to the antenna during the testing phases. The team then realized the obvious advantages to using the K1, which is reported to have outstanding alien Mojo characteristics (and a positive influence on the SJ).

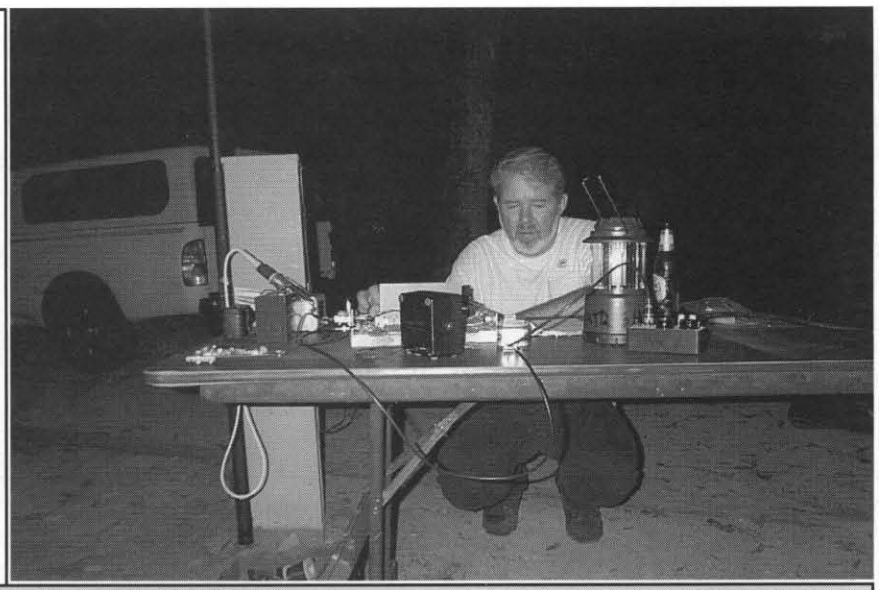
8. The pinwheel was attached to the vertical portion of the antenna and performed flawlessly as a MFI (Mojo flow indicator).

The NoGa team held a successful 2 way CW QSO with Bill, N4IQ, in Greenville, SC at 00:43Z and received a 599 signal report. (It was a 599 wasn't it Bill?)

Members of the **NoGa** team included CEO Mike—KO4WX, CDO Mike—W3IRZ, CMO Pickett—AD4S, COO (Chief Operating Officer) Gary—N9AY, CBLO (Chief Bottle Launching Officer) Chuck, AF4PP—CDKO (Chief Design Kibitzing Officer), Jim—AD4J, CACO (Chief Administrative Confusion Officer), Ken—W4DU.

The **Flying Pigs team** included Diz—W8DIZ, Jay—AJ4AY, Chuck—AA8VS, Don—AI4CW and Matt—WB6BWZ. This team decided to have no officials (and lacked extra consultants). Due to the diffulculties they encountered, their marketing presentation evolved into selling something to the government that didn't work, but looked really neat!

●●



Diz Cranking Q's with his Multi-Pig Transceiver. Although several Pigs were unable to attend, their talented team made a valiat effort in the contest.

Contest Solitaire

Jim Gooch—NA3V **jgooch@penn.com**

QRPers who enter the big weekend contests with simple wire antennas know they aren't going to make a big dent in the scoring column. So what's the use? You may as well ask: why play solitaires? In solitaire the point is to play the cards we're dealt as shrewdly as we can. As we get more skillful, the opponent we beat is the less skillful player we used to be. In "contest solitaire" we try to use our improved skills and savvy to top the contest scores we made before.

Here I want to discuss ways that new contesters operating QRP CW and mainly S & P can take advantage of geography and band skip to hike up their scores. To keep things short I'll concentrate on contests in which U.S. and Canadian political units are important multipliers.

Working as many state, territory, province, or ARRL section multipliers as possible is a great way to boost contest scores. For example, if every contest QSO counts 1 point, and every state is a multiplier, you get 1+1+1+1 = 4 points for 4 QSOs in CA. One QSO each in AZ, CA, OR, and WA, though, gets you 4 x 4 = 16 points. That why they're called multipliers

It helps to increase contest efficiency and reduce logging errors if you memorize - and I mean burn right into your brain - the abbreviations of U.S. states and territories, Canadian provinces, and ARRL sections. For one thing, sound-alike states are tricky. If you miss the last dit, for example, AL sounds like AR, and you can't be sure the call-area 4 or 5 will clue you in because many American hams tote along their old call letters when they move into a new call area. That M_? sent at 35 WPM might be MA, MD, ME, MI, MN, MO, MS, or MT, and the N_(static, static) might be NC, ND, NH, NJ, NM, NT, NV, or NY. Contesters who can pull multipliers out of the QRM while tuning through ongoing contest QSOs will be the first to zero in on needed multipliers. Also, the barrage of states and provinces they hear tells them the skip characteristics of that band.

Once the state abbreviations are down pat, the new QRP contester should tackle the ARRL sections. Most are just standard state abbreviations, with compass direction prefixes tacked on the populous states, such as NTX, WTX, STX; WPA, EPA. The exceptions are California, which is carved into10 sections (with obscure abbreviations full of S's and V's), and the NYC-LI section of New York.

Plenty of stations in populous multipliers such as CA, FL, IL, OH, ON, NJ, NY, PA, and TX hit the airwaves in contests, and you'll collect them on the fly without trying. Ditto MN and TN, which seem to have contesters all out of proportion to their populations. But when you first hear a station identifying itself as AK, DE, MT, ID, ND, NE, SD, WY, NF, NT, NU, PE, or YT, drop everything and pounce. They're as rare as Snail Darters, and you may not get another chance. As for ARRL sections, the rare states are just as rare when labeled ARRL sections. In states divided into several sections, the least populous regions, naturally, are scarcest. NNY and WTX, for example, are harder to work than the other sections of NY and TX because not many folks live in the Adirondacks or the scrublands of west Texas. The NFL, WFL, and SFL sections of Florida, however, are all "gimmies" because hams are as thick as Palmetto bugs all over the peninsula.

The efficiency and directivity of our antennas, patterns of contest activity, propagation peculiarities during the contest, and other variables affect the availability of contacts and multipliers. There are also other underlying factors. The accompanying sketch is a very generalized solitaire contester's map of North America. It shows multiplier-rich regions (states and provinces in this case) and the dot pattern indicates QSO-rich (densely populated) areas. Above and below the map are lines that roughly indicate the geographical span of territory that you can expect - on average - to reliably work on the contest bands, from the west coast and east coast respectively.

On an open 10M band eastern QRP contesters should make some QSOs in CA, but much of the continent is likely to be inside their skip zone. Most of their multipliers will be Pacific Rim states plus maybe AZ, BC, and AB. On 15M they will still reach the Pacific Rim, but they get greater inside depth back to the Rocky Mountain and high plains states. Twenty meters is a great contest band, not only because of its busy activity, but also because of its exceptional reach and depth. From the East it's often possible to work everything from the tier of states just east of the Mississippi all the way to the Pacific rim - a fat haul of multipliers to fill out the ones you didn't get on the higher bands, or to add to the multiplier column in contests - like the ARCI-sponsored ones - where multipliers count anew on every band.

The high band situation is even better for far western ops working into the multi-

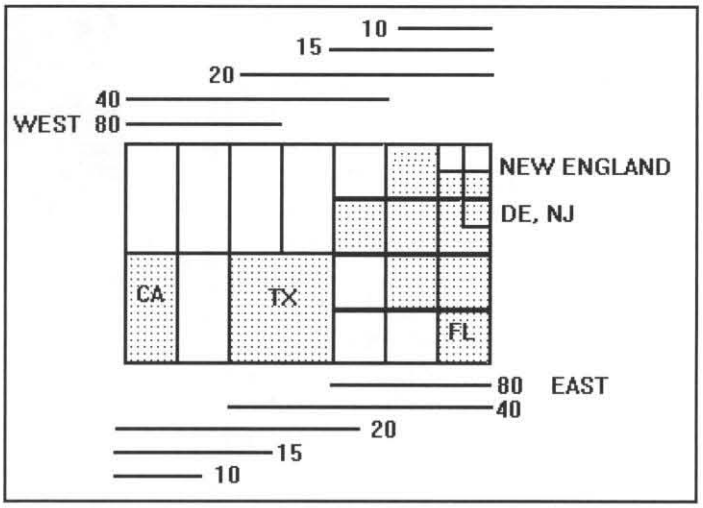
plier- and QSO-rich east. On 10M they can pick off the numerous little seaboard states and provinces. Everything east of the Mississippi comes within range on 15M, and the continent east of the desert and high plateau states is available on 20M. Since the East is so rich in multipliers and QSO potential, western contesters are likely to score at a faster clip on the high bands than do their eastern cousins, and they should, other things being equal, spend more time there.

Skip is shorter on the principal contest low bands, 40M and 80M, which makes them better for close-in contacts. These bands are hog heaven for eastern ops, who can bag multipliers by the dozen and QSOs by the hundred right in their own back yards. Just as 20M is the best high band for activity and geographic reach, 40M is the best low band for the same reasons. You can make a clean sweep of the eastern states on 40M with a short wire out the window in PA, whereas the same antenna deep in the heart of TX wouldn't tickle the ears of a listener in KS.

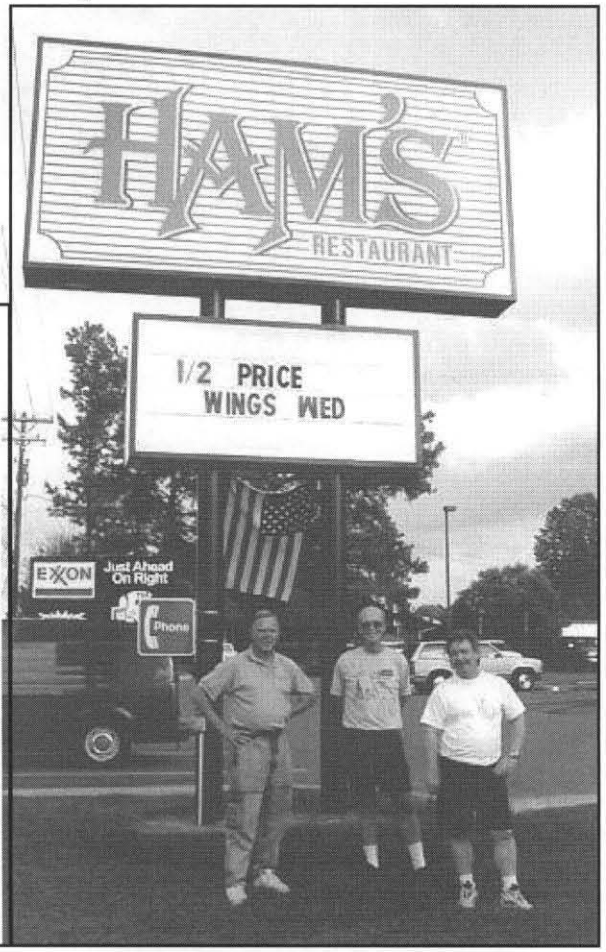
During the day atmospheric absorption on 40M limits eastern QRPers to working their own and immediately surrounding states. Lengthening evening skip generally extends the radius of reliable communication to about half or more of the continent, with occasional contacts to the opposite coast. Longer nighttime skip can make the close-in eastern states tough to contact. I worked the high bands all day in one ARCI contest. When I switched to 40M in the evening signals from TX, MO, and MN were booming in (as much as QRP signals ever boom), but I couldn't hear a peep from neighboring MD, VA, and NJ. The next contest I dipped down to 40m during the day long enough to scoop up those close-in multipliers.

Eighty meters is something like 10M in reverse: a part-time band - night instead of a day - and effective close in and mid-range instead of long-range. Due to their blanket coverage of the multiplier- and QSO-richest part of the continent, the 40M - 80M combo are prime bands for eastern QRPers to run up their scores. These bands are less rewarding in the West, where contesters are thinner on the ground (CA excepted) and multipliers are far apart. Not having worked a contest from the middle of North America, I don't feel qualified to discuss strategy from there, except to say 20M and 40M are still the bread-and-butter bands for QSOs and coverage.

Contest activity is apt to follow a progression from the highest open band, 10M or 15M, then down to 20M for a long stay, followed by a stretch on 40M as night-time skip develops on that band. As night wears on activity shifts to 80M—fast CQing QRO stations will be wall-to-wall on the lower part of a band. The slower CW ops tend to congregate higher up. One way to work the band is to start by S & Ping the slower stations and gradually tuning down-frequency, getting your brain attuned to fast CW as you go so that you can handle the speed burners. Since the slow stations you worked first turn over fairly rapidly, you should return there after reaching the bottom of the band to pick up latecomers. Then go to the next lowest band. It doesn't hurt to flip back to a band you have "used up" every now and then to check for propagation changes and to work stations that weren't on earlier.



Lastly, should you work stations as fast as possible late in a contest, or take time away to search for new multipliers? A KW station that has CQed for hours on end might run through most of the QSO pool and then switch to S & P to scrounge for remaining multipliers. I suspect that the QRP solitaire contester is better off chasing QSOs till the last minute. Considering our tinny little signals, there will be plenty of unworked stations at the contest's end. On the other hand, the many hours we spent S & Ping will have flushed out most of the multipliers available by that mode, no matter how hard we search. So this is a good time to sneak into an open frequency and begin CQing. There are always QRO ops hovering in the background who hand out contacts but never CQ themselves. Some are rare multipliers gun-shy of being the object of a pileup. If you wrap up the contest with a good number of these bashful folk in your log, you have played a good hand of solitaire. You'll be pleased with your score - until the next contest, that is. ●●



Right—>
QRP at the Shelby Hamfest
There were a lot of QRPers at th Shelby ("Granddaddy of them all"), NC Hamfest. Lots of QRP gear in the huge boneyard. The Knightlites QRP Radio Club had a fine get together as did some of the NoGaNaughts from North Georgia. Some of the NoGaNaughts found the ultimate restaurant when you go to this hamfest. Below are Pickett—AD4S, Tom—K4TJD and Karl—K4GZZ. Unfortunately, the photographer, Paul—K4HCM wasn't in the picture.

Bicycle Mobile II

Dick Arnold—K8RJA (Now AF8X)

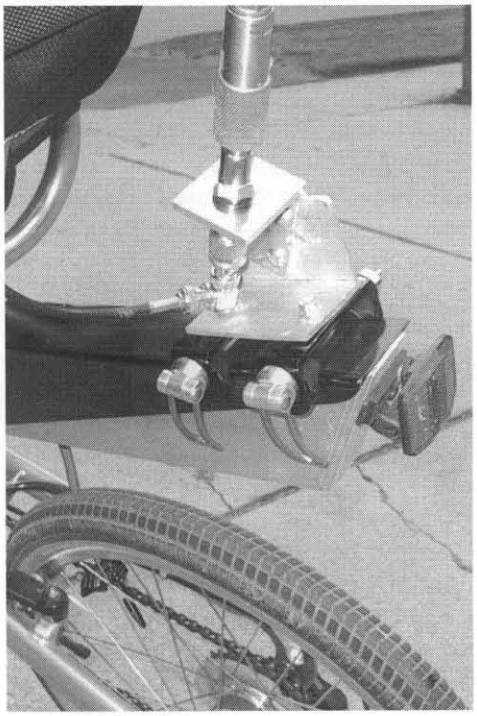
af8x@arrl.org

In anearlier issue I described my first attempt at bicycle mobile operation. Since then I have replaced my mountain bike with one I felt would be a more comfortable ride. My choice was the recumbent BikeE®. To be precise, it is more of a semi-recumbent vehicle as compared with the "true" recumbent bikes on which the rider is positioned in a more prone attitude. As can be seen in the picture, it has a seat that offers a large area of support unlike a standard "wedgie" seat.

The aluminum channel frame precluded mounting the antenna in the same manner as the previous installation on the mountain bike, but on the other hand, it was a simple matter to bolt the antenna mounting bracket to a short piece of 2" X 2" X 1/8" aluminum angle, which in turn was bolted to a pair of BikeE accessory mounting brackets, then clamped via the quick release cams to the rear of the frame. The antenna is a Hustler mobile mast and 20 meter resonator. I chose 20 meters because of the light weight and small size of the resonator, plus it seems to be a good band for mobile operation. As in the previous installation, the antenna is angled to the rear to clear low overhead branches along the bike path where I ride.

A bracket was prefabricated for mounting the Palm Mini Paddle on the handlebar, positioned so as to allow operation without taking my hand away from the handle grip. This done, the next problem was locating the K1 where it would be insulated from the vibration and jolts of riding over rough surfaces. I came to an impasse at that point and have decided for lack of a better idea, to use the "body mount." I made a harness for the K1 from some web straps left from a couple of discarded bags of some sort. The rig is suspended from one strap around my neck and secured to my stomach area by another strap around my waist, both attached to the K1 by nylon bolts in the threaded holes provided in the sides. This affords easy access to the K1 controls and when not operating mobile, there is no bracket to be removed.

A 12 volt 10 cell NiCd battery is housed in a small bag attached to the handlebar. In order to copy signals and still be able to hear outside sounds, a pair of Radio Shack "Ear Buds" top off the installation. ●●



QRP Contests

Randy Foltz—K7TQ rfoltz@turbonet.com

This version of contests contains the results from the Hoot Owl Sprint, Milliwatt Field Day, and the Summer Homebrew Sprint. The two sprints were CW only, short duration contests with good participation. I've got the results listed by state. If you'd like to see them sorted by descending score take a look at http://personal.palouse.net/rfoltz/arci/past.htm. This page also has the results from many previous QRP ARCI contests. Milliwatt Field Day results with CW, digital, and phone contacts are summarized by class. Rules for the Running of the Bulls and the Holiday Spirits CW contests are included as well.

As a reminder, a contest submission to QRP ARCI consists of a summary sheet and your logs. The High Claimed Scores reporting sheet is a satisfactory substitute for a summary sheet, but you still need to send me a copy of your logs. A list of stations is not a log. A log contains the date, time of day, call of the station contacted, exchange, and frequency or band used. Without a log I count your submission as a check log, which means your score, doesn't get on the list and you are not eligible for any certificates.

After each contest you can use the High Claimed Scores form at http://personal.palouse.net/rfoltz/arci/form.htm to send me your contest summary. Watch the scores change nightly at 9 PM Pacific Time for 10 days after the contest. See what others have claimed by looking at http://personal.palouse.net/rfoltz/highclm.htm.

Summer Homebrew Sprint

The Summer Homebrew, like the Holiday Spirits Homebrew Sprint, places a premium on using radios that the operator built. The bonus is a PER BAND one, just like the SPCs. For example, if you built your K1 and operated it on 40 and 20 meters, you can take 10,000 bonus points. What this can translate to is that a single contact on 15 m would give you an additional 5,000 bonus points plus the QSO points and multiplier. This makes looking a bit on 15 and 10 worthwhile.

The battle for first place was between N9NE and N4ROA. After the dust settled, N9NE had a mere 1,640 point lead. This was the closest QRP ARCI contest that I can remember. Both had 48 SPCs with Dan (N4ROA) making 10 more QSO points. Ten QSO points is contacting just 2 members. In spite of the fewer QSO points Todd was able to take first place by scoring an additional 5,000 points for using 15 meters plus he made 5 QSOs for 22 QSO points and gained 3 multipliers in two quick excursions to 15 m. This shows the benefit of using as many bands as possible.

TOP THREE

N9NE	*129,576*
N4ROA	*127,936*
N9AW	*89,632*

The solar flux was 142 with an A-index of 11. The solar flux was down considerably from last year's 240. The top scores seem to reflect this reduction as well. More indications that we are likely past the prime of solar cycle 23.

Finally, take a look at the category winners box. The "Less than 1 W" winner was N4HAY who used an attic dipole! That ought to be an incentive to get on the air no matter what antenna you've got.

CATEGORY WINNERS

20 m	*K5TZY*	*30,872*
40 m	*K9PX*	*51,900*
High Bands	*AA7EQ*	*22,019*
< 1 W	*N4HAY*	*36,690*
< 250 mW	*N1EI*	*36,975*

Summer Homebrew Sprint Soap Box

K2QO—Seemed like the solar propagation gods were giving us a taste of the hard times to come as 15M was poor and 10M was completely dead here in WNY. **N9AW**—Good condx on 20 mtrs. 40 m opened nicely near end of contest. Didn't hear activity on 10 or 15 m. Nice to see lots of activity on 20 mtrs. **W0PWE**—Unfortunately I could only operate about one hour of the contest but it was lots of fun. Many nice HB signals on 20M. **KK4R** - The homebrew sprints are my favorite operating events. **W1PID** - Great sprint. 40 was the best band. Quite a lot of activity. Good fun. **KW4JS**—Enjoyed the sprint, I look forward to the next one. **W1HUE**—I expected 20 to be better than this! Had to take time out because of thunderstorms and antenna static discharges due to wind and rain. **K5ZTY**—One of my favorite contests and I got involved in a digipeater project and forgot about it until 2255Z. Only one hour to operate but had a good run and as always lots of fun. **W2AGN**—Didn't really have time, but just got on for a few quick contacts. Band 20 and above lousy. **KK5PJ**—The 4 hour contests are great. The family does not object, one doesn't have to stay up all night. **AF4PP**—Operation was from picnic table on back deck of home (very nice evening). **N9NE**—Bands were in their summer "dog days", but QRP ops sure can pick signals out of the noise. Thanks for the fun! **AD6GI**—Sporadic band changes made return rate rather low; heard K7TQ four times in 3 hours; no one from WA or OR; must keep on trying. **KB8UMD**—First contest ever entered, first time w/K2 in contest, first "mini run" on a freq. First time in contest w/every great CW op being so patient & courteous. Very neat to hear all ops on freq near end say 73/73's to each other. Needless to say, I'm hooked! **WB4JJJ**—Bad atmospheric noise, but the K2 is really a contest machine. Turned the AF gain all the way up and worked everyone I heard. **N3XRV**—Went with pico power again and loved every minute of it. Conditions must have been good as there were few requests for repeats. QRP ops have the best ears! **N1EI**—15M seemed kind of quiet. Great fun! **KG4FXG**—This was my first ARCI Contest. Had fun and will be back for future contests. Wish I could have operated longer. **AD2A**—Had a fun time! Wished I could have operated longer. 40 meters seemed to improve toward the end. **WO7T**—Forgot about the test until last 30 minutes. Gave a few Arizona. Missed a W2??? Right at the hour. **N4HAY**—Great contest! 40 meters was fun but a struggle on 20 meters. **N3FZX**—It was a fun little contest. I really appreciated people slowing down to my speed. This makes it much more enjoyable for those of us developing our code speed.

Hoot Owl Sprint

The 2001 version of the Hoot Owl Sprint was held May 27 from 8 PM to midnight local time. The solar flux was 147 with an A-index of 9 so conditions should have been good. Most folks reported that 20 m was good with

Mark Your Calendars

Running of the Bulls
Nov. 3, 4, 5, 2001

Holiday Spirits CW Sprint
Dec. 2, 2001

Summer Homebrew Sprint Scores

T	Call	Score	Pts	SPC	Bonus	Power	Bands	Time	Rig	Antenna
AZ	**AA7EQ**	22,019	101	17	10000	LT5	20,15	4	K2	GAP Titan
CA	**AD6GI**	12,688	48	8	10000	LT5	20,15	3	K2	Dipoles
	NK6A	8,920	56	10	5000	LT5	20,15	1.5	K2	
CO	**N0RC**	18,566	114	17	5000	LT5	20	3.5	K1	Attic dipole
CT	**N1EI**	36,875	75	15	20000	LT250	80,40,20,15	4	OHR500	80 m doublet @ 50'
FL	**K4FB**	46748	213	28	5000	LT5	20	1.5	K2	C3 @ 75'
	W4STX	5,140	10	2	5000	LT5	20	0.6	OHR400	Inv Vee
GA	**AF4PP**	12,520	45	8	10000	LT5	40,20	2	Sierra	44' doublet @ 50'
	KG4FXG	3,542	46	11	0	LT5	40,20	2	FT817	G5RV @ 30'
IA	**W0PWE**	16,050	85	13	5000	LT1	20	1	SST20	Dipole @ 45'
	KQ0I	2,632	47	8	0	LT5	40,20	0.5	TT580 Delta	Multi-band dipole
ID	**K7TQ**	15,010	110	13	5000	LT5	20	4	K2	GAP Titan
	W1HUE	10,040	56	9	5000	LT1	20	1.5	NC20	450' long wire
IL	**N9MZP**	21,186	94	17	10000	LT5	40,20	4	OHR400	G5RV
	N9KO	1,421	29	7	0	LT5	40,20		1	
IN	**K9PX**	51,900	268	25	5000	LT5	40	3.5	K2	80 m loop
MD	**W3MWY**	12,257	103	17	0	LT5	40,20,15	4	Argo556	23' Vert ladder line
MI	**K8CV**	17,252	74	14	10000	LT5	20,15	1	K2	TH7DX @ 60'
MO	**WA0OTV**	280	40	7	0	GT5	15	1	HB dipole	
MT	**AC7GM**	11,372	28	7	10000	LT5	40,20	2.5	NC20, OHR 100A	G5RV
NC	**N4HAY**	36,690	157	17	10000	LT1	40,20	3.5	K2	Attic dipole
	AC4QX	19,742	162	13	5000	LT5	40	3	ARK-4	G5RV
NH	**W1PID**	16,762	69	14	10000	LT5	40,20	1.25	DSW-40, DSW-20	OCF Dipole
NJ	**W2BVH**	19,212	94	14	10000	LT5	40,20	2.5	K2	80 m CF Zepp
	W2JEK	17,058	42	7	15000	LT5	80,40,20	1	OHR-500	20m gnd pl/40M dip/80M end fed
	W2AGN	14,851	77	9	10000	LT5	40,20	1.5		
	AD2A	9,977	79	9	5000	LT5	40	2.5	2N2/40	W3EDP end fed wire
NY	**K2QO**	22,590	69	11	15000	LT1	40,20,15	1	Sierra	140' loop
OH	**KB8X**	16,648	104	16	5000	LT5	40	1.6	OHR100	Dipole @ 45'
	N8RN	10,880	68	16	0	LT1	40,20,15	2	TS570	Attic dipole, Inv vee
OK	**N5UW**	15,376	64	12	10000	LT5	40,20	2	GM20, SW40+	Butternut vert
PA	**NA3V**	38,490	195	26	3000	LT5	80,40,20,15	3	IC756PRO, OHR100, EMTECH	130' Zepp @ 65'
	N3IUT	25,470	91	17	10000	LT1	40,20	3	K2	9 el yagi
	K3HX	20,048	179	16	0	LT5	40	4	TS870S	40 dipoles @ 25' & 40'
	N8LXR	14,702	77	18	5000	LT5	20	3	TT 1320	Dipole @ 45'
	W3ZMN	7,100	50	6	5000	LT5	40	1	K2	Dipole
	N3CZB	357	17	3	0	LT5	20	0.5	MFJ9020	HB indoor loop
TN	**KW4JS**	22,257	103	17	10000	LT5	40,20	4	K2	Vert & dipoles
TX	**K5ZTY**	30,872	168	22	5000	LT5	20	2.5	K2	C4S
	KK5PJ	11,600	55	12	5000	LT1		4	K1	Outbacker
VA	**N4ROA**	127,936	351	48	10000	LT5	40,20	4	K2	2 el quad, 450' loop
	WB4JJJ	46,764	202	26	10000	LT5	40,20	3.5	K2	Carolina windom
	KK4R	23,760	134	14	5000	LT1	40	2.5	NC 40A	Doublet
	WA4CHQ	15,260	114	9	5000	LT1	40	2	SST-40	Dipole
WI	**N9NE**	129,576	341	48	15000	LT5	40,20,15	4	K2	80 m zepp, triband beam
	N9AW	79,632	316	36	10000	LT5	40,20	3	K1	PRO57B @ 50', 40 m delta loop

*Check Logs by: KB8UMD, N3XRV, WO7T, N3FZX

15 only lightly used. Because of the hours of the contest most of the 15 m opening had past leaving 20 and 40 as the workhorse bands. At least this time we were not visited by the impact from a solar flare like happened during the Spring QSO Party.

W4FMS had the top score of 71,316 from his FL QTH by operating the entire 4 hours exclusively on 20 m. K2QO in NY and K5ZTY in TX put in a bit over 2 hours operating time to take the 2nd and 3rd place spots. Both used 40m and 20m bands.

Hoot Owl Top Ten

W4FMS	**71,316**
K2QO	**55,836**
K5ZTY	**53,550**

Hoot Owl Category Winners

40 m	**K9PX**	**41,300**
Less than 1 W	**KB9BVN**	**18,750**

Hoot Owl Sprint

QTH	Call	Score	Pts	SPC	Power	Bands	Time	Rig	Antenna
AB	**VE6QSL**	10,080	90	16	LT5	20	2.75	IC706	GAP Titan
AK	**AL7FS**	15,120	108	20	LT5	20	2.5	TS450S	KT34A @ 40'
CA	**NK6A**	15,694	118	19	LT5	40,20	2.75	K2	C4
CT	**W1TS**	8,827	97	13	LT5	40	2	FT1000MP	200' cf doublet
FL	**W4FMS**	71,316	283	36	LT5	20	4	K2	A4-S @ 30'
GA	**AD4J**	43,470	207	30	LT5	40,20,15	3	K2	33' & 66' doublets
	K4GT	15,372	122	18	LT1	40,20	3	K2	Yagi, dipole
	K4GZZ	3,591	57	9	LT5				20,15
IA	**KQ0I**	1,890	45	6	LT5	40,20	1	TT580 Delta	Multi band dipole
IN	**K9PX**	41,300	236	25	LT5	40	3.5	K2	80 m loop
	KB9BVN	18,750	125	15	LT1	40	3.5	NC40A	40 m dipole in attic
	N9QIL	4,200	60	10	LT5	40,20	3	K2	Doublet w/ ladder line
KY	**K4YKI**	11,172	114	14	LT5	40,20	2	TS570DG	Zepp @ 45'
	KU4A	2,793	57	7	LT5	40	2	MFJ9040	Sloping dipole
ME	**K0ZK**	44,128	197	32	LT5	40,20	3	K2	Indoor dipole
MI	**KI8AF**	2,912	52	8	LT5	20	1	K1	Zepp dipole
MN	**W0UFO**	44,940	214	30	LT5	40,20	4	FT840	20 m dipole, long wire
	N0UR	41,006	202	29	LT5	40,20	2	FT-920	Yagi, wire
ND	**K0EVZ**	25,375	145	25	LT5	20	1	SST-20	Inv WYE
NE	**NB0W**	420	7	6	LT1	20	1.5	Sierra	3 el beam
NH	**W1PID**	7,644	91	12	LT5	40,20	1.5	FT817	OCF dipole 136' long
NJ	**W2JEK**	5,544	66	12	LT5	40,20	1.5	OHR-500	40 m dipole, 20 m GP

Hoot Owl Sprint 2001 Soap Box

AD4J—My first Hoot Owl Sprint-lots of fun. **KT3A**-40 m had most of the action and all the QRN. 20 m had little room to spread out between FISTS and digital. **N8VAR**—The QRP+ seemed noisy so did the last hour with the NorCal 40A. **KF8JW**—Fun to work CW-especially with lots of numbers. **K3HX**—Had to wait until 2030 local for thunderstorms to pass. Great fun. Listened until 0230 local for west coast...nothing heard. **K7NTW**—QRN-Mother nature showed up with a few megawatts on 40. Not ideal for QRP. **W1TS**—My first QRP ARCI contest. Much fun and I can't wait until the next one! **VE6QSL**—20 m was good band tonight for nearby states and rim of USA also. Band skip slowly changed thru the evening. QSB fast tonight and made copy difficult at times. **NA3V**—Thunderstorm chased me off the air. Fifteen minutes after I unplugged antenna and the rig from electrical outlet, a nearby lightening strike blew out 3 light bulbs and tripped the house circuit breakers. Mother nature does not mess around! **W0UFO**—Had to work hard. Back and forth between 20 m and 40 m to glean contacts. **KB9BVN**—Loads of fun, but 40m just kept getting noisier and noisier as the night went on. Was surprised that I heard virtually no 5', 6's, or 7's from near Indy. **K5ZTY**—Things started off with a bang but didn't last long. 40 meters never did produce much. Had fun for a couple of hours though. Thanks to all who jumped in and played. **NB0W**—Not a stellar work everyone I could hear. 10 & 15 were dead, 80 was just too darn noisy! **KI8AF**—First real test for my K1 and I was really pleased. Highlight was working AL7FS. Nice group on the air as always. **W4FMS**—Rough going with very noisy conditions. Too much static in South FL for 40m to be useable. Enjoyed working working everyone. **K0EVZ**—Thanks to all who dropped by. Wish I could have had more time, as there were plenty of good signals when I had to pull the plug. **K2QO**—The contest manager promised better conditions than we had in the Spring QSO Party and he delivered! But the noise was still bad and I had to run with the attenuator on to save my ears. **AL7FS**—Fun as usual. There were several I just could not pull through. You folks have much more QRM that you hear than I do. Thank you, one and all.

Milliwatt Field Day

Milliwatt Field Day is run piggy back on the ARRL Field Day. It isn't really a milliwatt operating event, but rather a QRP operating event. Five watts or less (CW or SSB, since it is an ARRL event) is just fine.

This year there were nine entries for the June 23 and 24 event. I'd put many of them up against QRO FD operations. The highest score reported was 3,825 points not including ARRL bonus points. The NJ QRP Club who operated in the 5A class accomplished this. Also notable was the effort by K2WNY whose two operators in the 2B class made 306 CW and 42 phone QSOs.

Next year let's have more reports!

2001 Holiday Spirits Homebrew Sprint

Date/Time: December 2, 2001; 2000Z through 2400Z. CW only.

Exchange:

Member - RST, State/Province/Country, ARCI 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 more than one band for QSO points and SPC credit.

Power Multiplier:

0 - 250 mW = X 15 2 5 0

mW - 1 W = X 10

1 W - 5 W = X 7 Over 5 W = X 1

Bonus Points for Homebrew Gear (per band):

add 2,000 points for using HB transmitter, add 3,000 points for using HB receiver, or add 5,000 points for using HB transceiver.

Homebrew Definition: If you built it, it is homebrew!

Suggested Frequencies:

	General	Novice
160 m	1810 kHz	

Group Name & Class	Call	Section	Score *	CW Qs	Digital Qs	Phone Qs	# Ops	Class	Rig	Antennas
NJ QRP Club	**WQ2RP**	SNJ	3825	361	0	0	5		5A	
	N1EI	CT	2045	177	0	55	4	14A	OHR500, Scout	160-40 m fan dipole, 15 m dbl ext zepp
HI QRP Club & HILO ARC	**KH6IN**	HI	875	67	0	41	20	20A	K2 & Scout	3 el beam on ext ladder, 40-3el vert array
Michigan QRP Club	**WQ8RP**	MI	745	74	0	1	3		3A	
Guano Reef Bashful Perverts	**N4BP**	SFL	10920	1092	0	0	2	1E	K2	TH7DXX @ 65'
(5 WATTS - 2 OP)	**K2WNY**	WNY	3270	306	0	42	2		2B	
5 WATTS - 1 OP	**N7RVD**	WWA	3190	319	0	0	1	1B	K2	Dipole on 38' ladder
	W8UE	MI	2540	508	0	0	1		1D	
	WD4IFN	NC	970	97	0	0	1	1B	DSW-40	Dipole
	AE4EC	NC	965	96	0	1	1	1B	MFJ 9406, MFJ 9020	44 ' doublet, hamstick
	AC7GM	MT	530	31	0	44	1		1B	
	VE3WMB	ON	570	52	1	8	1	1E	FT817	GAP Challenger

*** Scores are w/o Bonus**

80 m	3560 kHz	3710 kHz
40 m	7040 kHz	7110 kHz
20 m	14060 kHz	
15 m	21060 kHz	21110 kHz
10 m	28060 kHz	28110 kHz

Score:
Points (total for all bands) X SPCs (total for all bands) X Power Multiplier + Bonus Points.

Entry may be All-band, Single-, High-, or Low-Band. Entry includes a copy of logs and summary sheet. Include legible name, call, address, and ARCI number, if any. Entry must be received within 30 days of contest date. Highest power used will determine the power multiplier.

The final decision on all matters concerning the contest rests with the contest manager. Entries are welcome via e-mail to rfoltz@turbonet.com or by mail to:

Randy Foltz
809 Leith St.
Moscow, ID 83843

After the contest send your Claimed Score by visiting http://personal.palouse.net/rfoltz/arci/arcisum.htm. You must still submit your logs by either e-mail or regular mail if you use the High Claimed Score form. Check the web page for 10 days after the contest to see what others have said and claimed as their scores.

2001 Running of the Bulls

This is a "mini-contest" coincident with the ARRL CW Sweepstakes.
Date/Time: Nov 3 2100Z through Nov 5 0300Z, 2001

Goal: To encourage more participation in the QRP category of the CW Sweepstakes. We are trying to get more QRP entries than high power ones. We accomplished this last year!

The Plan:

1) Sign up as a **BULL** - Bulls are QRP stations that attempt to Work 15 hours Call CQ. Score is number of Q stations worked

2) Sign up as a **MATADOR** - Matadors are QRP stations that Work as many of the Bulls as possible. Score is number of Bulls worked

Both groups send your log to ARRL. All other contest rules same as ARRL Sweepstakes Contest Rules. Sign up as a Bull or a Matador after October 1, 2001.

A list of Bulls and Matadors will be posted. We will attempt to get Bulls and Matadors from each of the 80 ARRL sections

Use the QRP ARCI on line reporting form at http://personal.palouse.net/rfoltz/arci/form.htm to send your score and soapbox comments.

Send QRP ARCI contest entries (summary sheet, no logs) within 30 days of contest date to:

Randy Foltz, K7TQ
809 Leith St.
Moscow, ID 83843

or e-mail ASCII-text entries to rfoltz@turbonet.com

2001 Top Band Sprint

QRP ARCI announces a new contest for 2001 that will feature three new, to QRP ARCI, aspects. The first is the band, 160 m. We've not had a 160 m contest in my recollection. The second is mixed mode, both CW and SSB, in the same contest. Again, I can't remember when we've had a mixed mode contest. Finally, the contest will take place not on a weekend but on the Wednesday evening before the ARRL 160 m contest. Rules are similar to other QRP ARCI contests. One difference is that the power multiplier for mixed mode entries is the smaller of the CW or the SSB mult. For example, if you operate at 500 mW on CW and 10 W PEP on SSB, you will use the mult that goes with the SSB, x 7, for all your contacts.

Since this is the first time we've done a mixed mode contest, there maybe a few bugs to be worked out. For this one just get on and have a good time, then let me know what you would like to see different.

Date/Time: December 5, 2001; 2000 local through 2400 local. CW and SSB.
Exchange: Member - RS(T), State/Province/Country, ARCI Number.
Non-member - RS(T), State/Province/Country, Power Out.
QSO Points: You may contact another stations 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).

Power Multiplier for CW QSOs:
0 - 250 mW = X 15, 250 mW - 1 W = X 10
1 W - 5 W = X 7; Over 5 W = X 1
Power Multiplier for SSB QSOs (PEP):
0 - 500 mW = X 15; 500 mW - 2 W = X 10
2 W - 10 W = X 7; Over 10 W = X 1

Frequency note: Participants are reminded that the segment 1.830 to 1.835 should be used

for intercontinental QSOs only, in compliance with the ARRL band plan.

Score:

QSO Points X SPCs X Power Multiplier (use the smaller multiplier if you operate mixed mode)

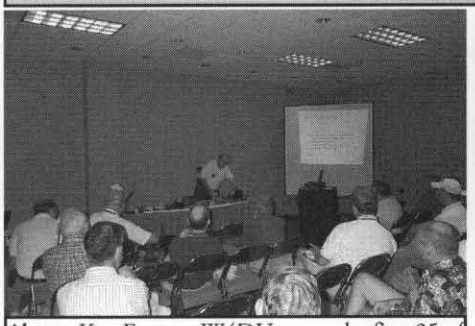
Entry may be CW only, SSB only, or Mixed Mode. Entry includes a copy of logs and summary sheet. Include legible name, call, address, and ARCI number, if any. Entry must be received within 30 days of contest date. Highest power used will determine the power multiplier.

The final decision on all matters concerning the contest rests with the contest manager. Entries are welcome via e-mail to rfoltz@turbonet.com or by mail to

Randy Foltz
809 Leith St.
Moscow, ID 83843

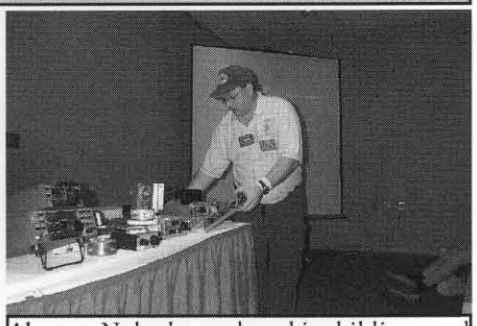
After the contest send your Claimed Score by visiting http://personal.palouse.net/rfoltz/arci/arcisum.htm. You must still submit your logs by either e-mail or regular mail if you use the High Claimed Score form. Check the web page for 10 days after the contest to see what others have said and claimed as their scores.

2 Days in August
The Huntsville QRP Forums



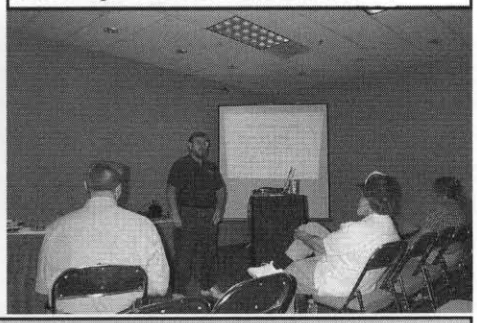
Above: Ken Evans—W4DU wows the first 35 of over 200 attenddees at the Huntsville Hamfest QRP Forums on August 19th, 2001.

Below: Eric Swartz—WA6HHQ shares high-performance receiver design magic with the more technically inclined QRPers.



Above: Nobody makes kit bilding and homebrewing more approachable than Mike Boatright—KO4WX.

Below: Gary Breed—K9AY focusses on serious QRP Contesting techniques. (**Not shown:** Barry Johnson's—W4WB PSK-31 & Craig Behrens—NM4T QRP Portable Antennas forums.)

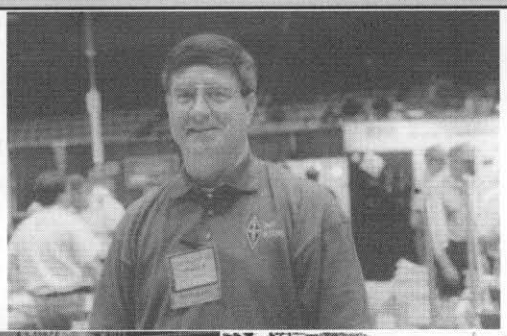


3 Big-Gun Brothers Do The QRP Thing

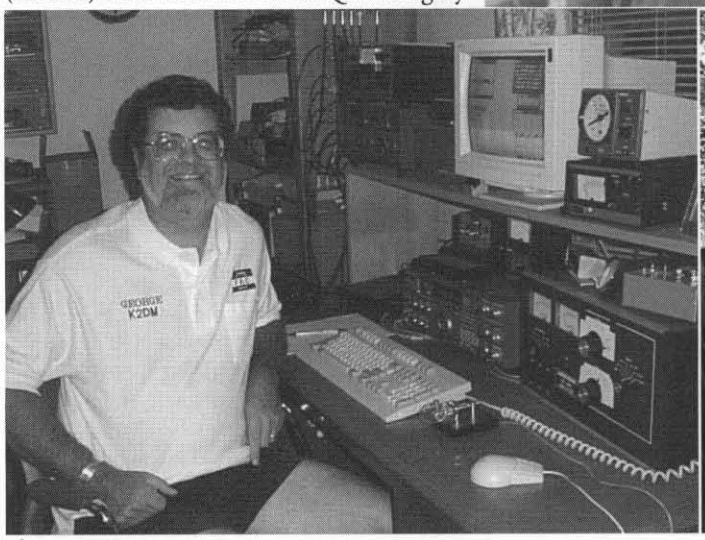
Jim Worthington—AD4J ad4j@arrl.net

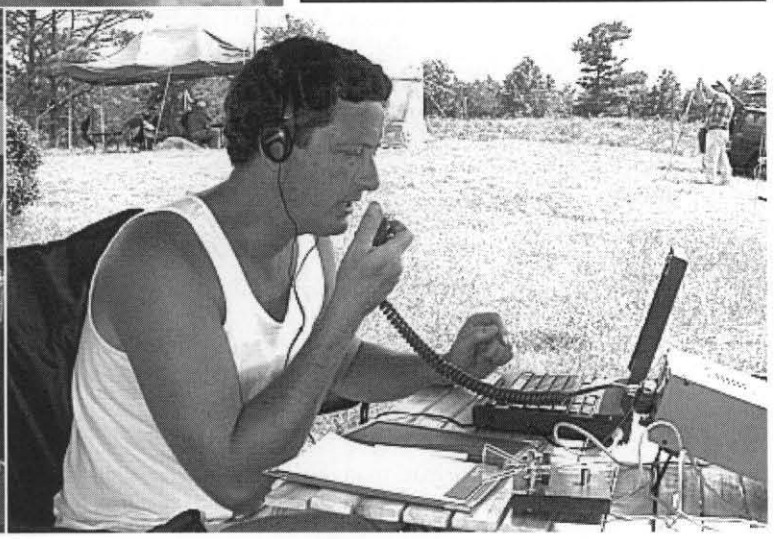
The ARRL DX Competition results are now posted on the ARRL Members-Only Web site. Another big-gun DXer, K1ZM, has come to QRP after winning several DX contests with the legal limit. Jeff Briggs won the QRP category setting a new all-time record with more than twice the previous top score. Jeff made 2,720 DX contacts in a weekend!

Interestingly, Jeff's brother, George (K2DM) came in second in the QRP category with what would have been a record score. The third Briggs brother, Peter (K3ZM) operated QRP Field Day with NOGA this year. All three normally use 1,500 watts in contests.



Jeff—K1ZM (Center),
2nd in QRP Category George—K2DM (Lower Left),
Peter--K3ZM operating in this year's Field Day with NOGA (Below)





QRP ARCI STAFF

President/COB
Jim Stafford—W4QO
11395 West Road
Roswell, GA 30075-2122
(770)993-9500
w4qo@amsat.org

Vice President
Joe Spencer—KK5NA
3618 Montridge Ct
Arlington TX, 76016
kk5na@quadj.com

Secretary/Treasurer and
Membership—Subscription/Renewall
Mark Milburn—KQ0I
117 E. Philip St.
Des Moines, IA 50315-4114
mark.milburn@juno.com

Membership Chairman
Steve Slavsky—N4EUK
12405 Kings Lake Dr.
Reston, VA 20191-1611
radioham@home.com

Awards Manager
Thom Durfee—WI8W
3509 Collingwood Ave. SW
Wyoming, MI 49509
wi8w@arrl.net

Contest Manager
Randy Foltz—K7TQ
809 Leith Street
Moscow, Idaho 83843
rfoltz@turbonet.com

BOARD OF DIRECTORS

Bill Harding—K4AHK
10923 Carters Oak Way
Burke, VA 22015
k4ahk@ix.netcom.com

Hank Kohl, K8DD
2130 Harrington Road
Attica, MI 48412-9312
k8dd@arrl.net

Jim Larsen—AL7FS
3445 Spinnaker Drive
Anchorage, AK 99516-3424
al7fs@arrl.net

Dick Pascoe—G0BPS
Seaview House
Crete Road East
Folksestone, Kent CT18 7EG, UK
dick@trickie.com

Joe Spencer—KK5NA
3618 Montridge Ct
Arlington TX, 76016
kk5na@quadj.com

Ken Evans—W4DU
848 Valbrook Ct.
Lilburn, GA 30247
w4du@bellsouth.net

The club is now taking membership application and renewals via credit card - online - using the **PayPal** system. In fact, we prefer it. This is true for all applicants- ***worldwide***! Simply go to the club web site, specifically, **http://www.qrparci.org/us2signup.html** and follow the instructions. Be sure to select the appropriate button for the area of the world you reside in (per box below).

PayPal replaces all previous methods of payments for non-US hams except that you may always send your payment directly to **Mark Milburn**, our treasurer; however, funds must be drawn on ***a US bank and be in US dollars***. Make Checks out to: *QRP ARCI*

If mailing your application (if renewing, it helps to send in the mailing label from your QQ), send your application to:

QRP ARCI—Mark Milburn, KQ0I
117 E. Philip St.
Des Moines, IA 50315-4114

Need an ***Information Pack***?
Send email to: **k3tks@abs.net**, or…Send an SASE to:

Danny Gingell, K3TKS
3052 Fairland Road
Silver Spring, MD 20904

TIPS:

1. Use the Online Member Lookup feature to keep track of your membership status—check **http://www.qrparci.org/lookup.html**
2. Is your data on file now incorrect? Use online form to send info to our database manager: **http://www.qrparci.org/**

USA—$15 / Canada—$18 USD / Non-US/VE—$20 USD per year

New Member/Renewal Form

CALL _____ **QRP ARCI#** (or "New" if new member) _____

Full Name _____

Mailing Address _____

City _____ **State/Country** _____

Post Code (ZIP + 4 for USA) _____

Previous Callsign(s) (if any since you joined the club) _____

(The following is optional and is not released to others)

Email address _____

Comments _____

Become a Famous Author!

Write a Review for the QRP Quarterly

Have you just purchased a new gadget, rig or kit that you would like to tell the QRP world about? Then write a review and send it to the QRP Quarterly! Reviews are handled by our Special Features Editor, **Larry East**—W1HUE (see page one for address). We have no strict guidelines for reviews, but we do ask that you include the manufacturer's basic technical specs and any results of technical tests that you have performed. If you are not sure about some aspects of the device that you are reviewing, don't guess; ask the manufacturer for clarification. (We reserve the right to also contact the manufacturer for additional details or clarification.) Please try to be as objective as possible: tell about the good as well as the bad features. Larry prefers to receive articles in machine-readable form as ASCII text files on PC format floppy disks or as email attachments.

If you want to send word processor files, Larry can handle MS Word 6/95/97, WordPerfect 5/6 and "Rich Text File" (RTF) formats (please don't do any fancy formatting or embed graphics within WP files). Figures (drawings and photographs) can be supplied as "hard copy" (good quality, B&W or color prints for photographs) or as digitized images (GIF, TIFF, JPEG, PhotoCD, PCX or bitmap files). If you want your disks, drawings, etc., returned, please enclose an SASE with sufficient postage.
●●

IMHO—QRP DXCC

Ed Hare—W1RFI ehare@arrl.org

As QRP's low friend in high places in the ARRL Lab, I want to offer my personal views from my unique perspective that I can about how the League got to this point, and what things the QRP community can do to encourage ARRL to take the next steps.

To those that don't me, I will say up front that I am both an ARRL employee and an avid QRP ARCI member and supporter. This editorial is my personal opinion about QRP, ARRL and the recently announced ARRL QRP DXCC award for submitting log data QRP contacts with 100 DXCC entities.

There are a lot of opinions about this award. Some are disappointed that the League did not create a fully-endorseable QRP version of DXCC. Others feel that the present new award is a positive step in the right direction. I share both views. Let's face it, there are those that never believed the ARRL would issue any sort of QRP DXCC award. When I get that award, I will know that ARRL recognizes the value of my QRP accomplishments

It is a good step for QRP. To help the League take the next steps, we need to show them that doing so would be another positive step for Amateur Radio, for the ARRL and for the QRP community. That will be best accomplished through appreciation and encouragement. We should let the League know that there is more progress to be made, but IMHO, the message that this is a good thing for QRP and the League is the strongest message they can hear right now.

Under the rules, the DXCC award is issued irrespective of power level. The very premise of DXCC presumes that the operator follows the rules of his or her country. True enough, but ARRL does not arbitrate this — the administrations of the involved countries do. If a DXCC member were to lose his or her license because of running high power, that DXCC is history. Well, that cannot apply to QRP. No ham is going to be busted by his or her administration for using 6 watts instead of 5 to crack a pileup. Putting the ARRL into a position of arbitration is a change — one that does create a distinction between QRP and QRO. *We* have raised this distinction.

Over decades, ARRL has been a supporter of QRP. Its publications have featured QRP construction projects often for as long as I can remember. QST and the ARRL web page have QST columns. Most contests have a QRP category. And ARRL is taking a step in the QRP direction with DXCC. We should *not* imply that we think the League sees QRP as anything less than an active, vibrant and important part of Amateur Radio. Doing so would be unfair and would only serve to undermine the progress that QRP has made over the years. (A number of ARRL people are QRPers, too, btw!)

It is up to the QRP community to help the League see why it is important to continue with QRP DXCC. This should be expressed in a positive way. As one who personally knows some of those who will make the decisions, I can offer some suggestions on how to most effectively make our points with ARRL.

The League has made it clear that verification issues are in the way of a "fully endorsable" QRP award. We should start thinking of what kind of award *could* address those issues. Speaking *only for myself*, intermediate steps could include things like a QRP-100 award that requires QSL cards or even something as unexpected as a 2X QRP award or perhaps a "Worked 100 QRP Countries" award, for which the QSL cards issued by the DX station *could* verify that *he or she* was running QRP. [That sure solves the "verification issue, eh? :-)]

The ARRL Board does react to membership input. I have thanked the New England Division Director for the QRP DXCC awared. I encouraged him to help the League find a way to do more. I encourage my fellow QRPers to do the same, in your own words and with your own balance between appreciation for what has been done, and the good it will do for QRP, and the wish for the League to do more. (See http://www.arrl.org/divisions.)

This may be a long-term project, but I am in Amateur Radio for the long run. It may take me the rest of my life to accomplish all the goals I have in ham radio, but that works out perfectly fine — that is exactly how much time I have!

QRP, ARRL and DXCC
Ed Hare, W1RFI ●●

The Last Word

The QRP Quarterly invites readers to submit original technical and feature articles as a service to fellow QRP enthusiasts. Although The QRP Quarterly cannot pay for submissions accepted for publication, it will acknowledge, with thanks, authorship of all published articles.

Due to space limitations, articles should be concise. Where appropriate, they should be illustrated with publishable photos and/or drawings.

Full articles should go to any of the volunteer editors for review. Information for columns should be sent directly to the column editor. See the ToC for addresses. Submit technical and feature articles with a printed copy and a copy on disk (if possible). ASCII text is preferred. Photos and drawings should be camera-ready or .tiff format. Other formats can be used with prior approval.

Technical and feature articles should be original and not be under consideration by any other publication at the time of submission to the QRP Quarterly or while the QRP Quarterly is reviewing the article. If you contemplate simultaneous submission to another publication, please explain the situation in a cover letter.

Material for possible use in the QRP Quarterly should be sent to only one of the editorial volunteers, not to several at the same time. The QRP Quarterly editors and columnists will transmit the submission to others on the staff if it better fits another category.

Accepting advertisements for publication in the Quarterly does not constitute endorsement of either the product or the advertiser.

Material cannot be returned unless accompanied by sufficient postage.

The act of mailing a manuscript constitutes the author's certification of originality of material.

Opinions expressed are those of the authors and do not necessarily represent those of the QRP ARCI, it's officers, Board of Directors, Staff or advertisers.

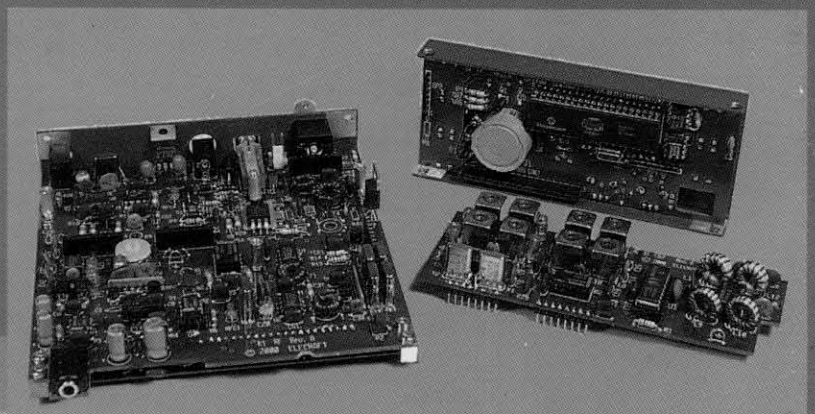
The QRP Quarterly will occasionally consider reprinting articles previously published elsewhere if the information is especially useful to members of QRP ARCI. If your article has been published, include the name of the publication and the issue it appeared in. In all such cases, the QRP Quarterly will obtain permission to reprint from both the author and the original publication and acknowledge the source of the material.

The QRP Quarterly will occasionally print information first appearing on QRP-L after obtaining the author's permission and ascertaining that the information is not scheduled to appear in another publication.

Performance *and* portability--QRP operators want the best of both. With its excellent receiver specs and 15 W max output, our K2 160-10 m SSB/CW trasceiver is a favorite for home-station use. Yet its light weight and internal ATU and battery options make it ideal for field trips, too. The latest K2 accessories are the KIO2 RS-232 interface w/remote control software, MH2 Elecraft/Heil hand mic, and KAF2 audio filter.The KAF2 includes a real-time clock, providing time and date on the K2's LCD. For backpackers, there's our versatile K1 dual-band, 5-W CW rig. Add the KAT1 internal auto-tuner, new KBT1 internal AA battery pack, and a random-wire antenna--you'll be on the air from anywhere in minutes!

"My son built a K1, and was very impressed. As the ex-chief engineer of Heath, may I offer my congratulations for a kit job well done – and I should know!" – Mike Elliott, W8KRR

"This is really a kit? In my 20+ years now of playing with electronics and building kits I have NEVER seen a kit that fits together like this. It is magic." – Randy Rathbun, NV0U



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