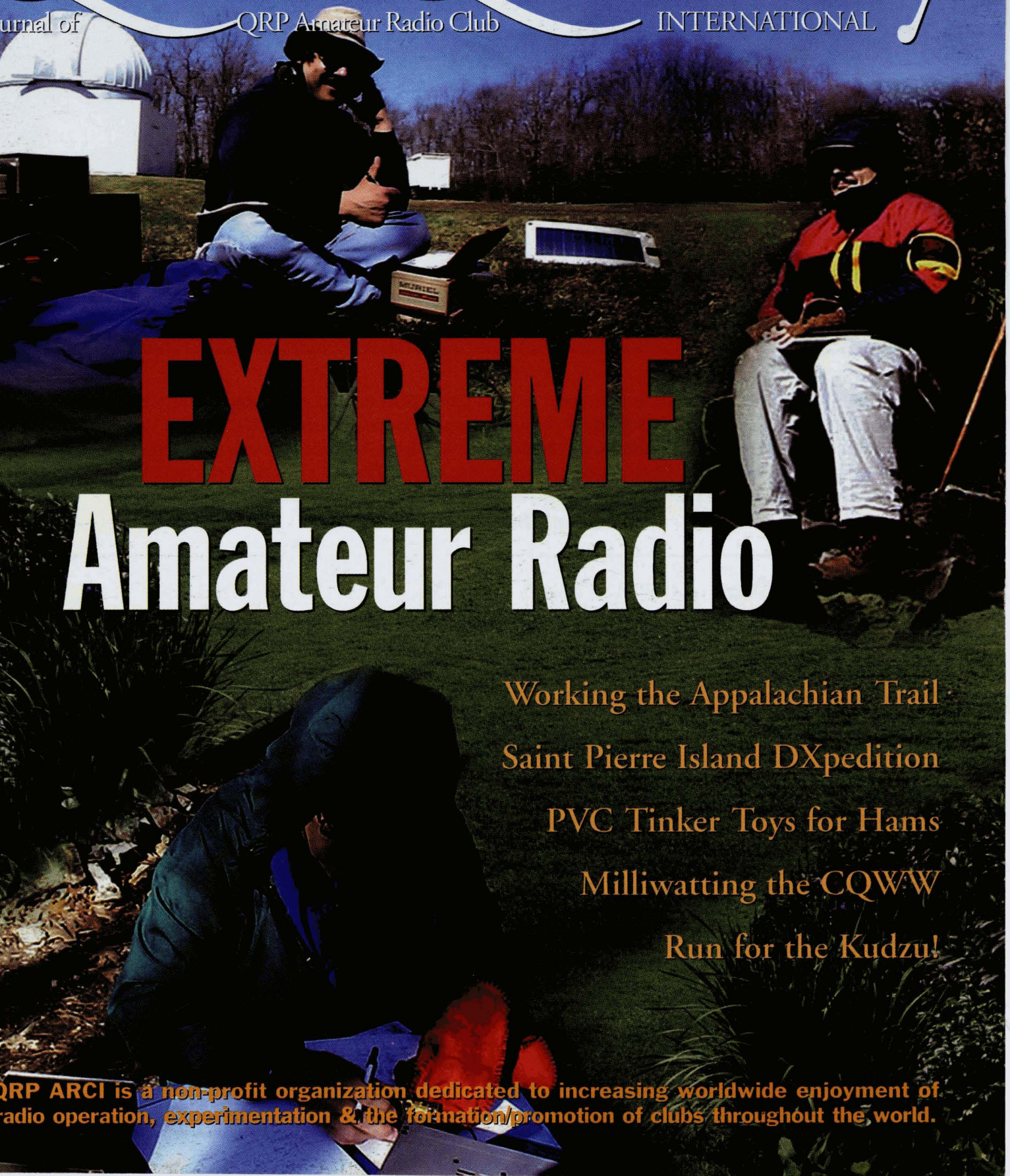
40TH ANNIVERSARY ISSUE

QRP Quarterly

January 2001 • Volume 42 • Number 1 $4.95

urnal of QRP Amateur Radio Club INTERNATIONAL



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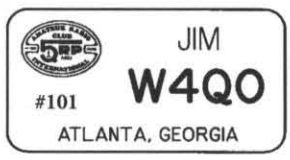
Watch your words; they become actions.
Watch your actions; they become habits.
Watch your habits; they become character.
Watch your character; it becomes your destiny.
-Frank Outlaw

Look for
Rich Arland—K7SZ's
Profiles in QRP Column
in the April Issue

◆◆◆ Visit the Club Web Site ◆◆◆
This month, please take a tour of the QUICK QRP LINKS page. Here, you will find QRP Clubs From all over the world, Parts Suppliers and kit suppliers.
Check it all out at: http://www.qrparci.org/links.html

QRP Official Badge Information



Designed especially for QRP members and offered with a Blue background, White letters and oval QRP-ARCI logo in Gold.

ORDERING INFORMATION

Your QRP badge may be ordered using the form below or through the secure web site order form at www.thesignman.com. Specify "QRP badge" in the free-text entry block located near the bottom of the order form being sure to include your QRP number. Orders may also be submitted via e-mail to **nv5a@aol.com**.

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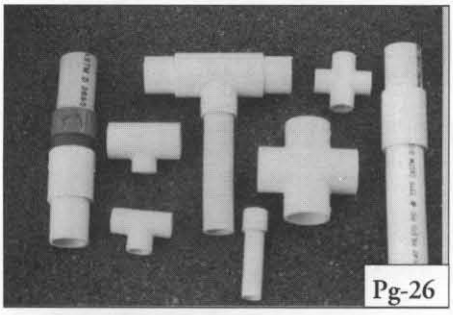

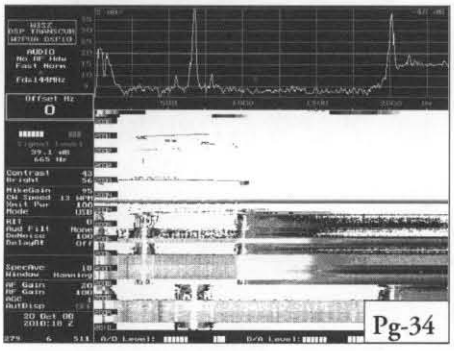

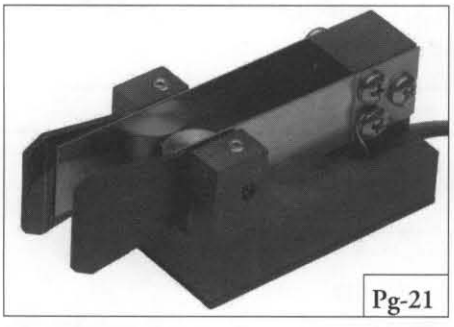

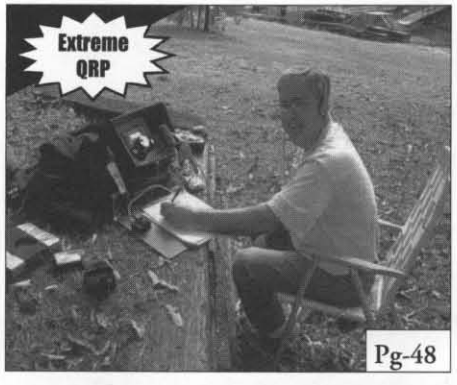

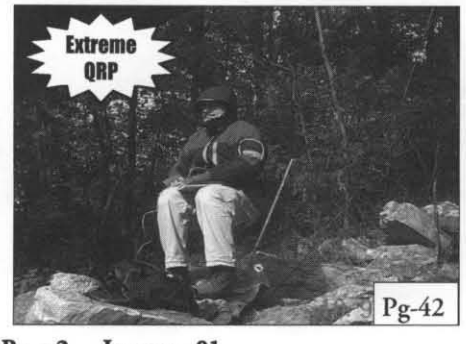

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FROM THE EDITOR'S DESK

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

My staff and I placed the question "How do we reach the next level of QQ excellence" firmly on the table. You have the results of the first of four *ARCI 40th Year Anniversary* issues in your hands—we sincerely hope that you find the product of our team's handiwork worthy.

This issue, as in past QRP Quarterly publications, showcases our proud, "grass roots" Amateur Radio tradition--the pursuit for high standards in technical and operating abilities. In addition to being a key benefit to ARCI members, the QQ indirectly serves the extended QRP and Amateur Radio communities as well.

We at QQ chant the mantra—"keep the good stuff coming, keep the good stuff coming, keep the good stuff coming."

We are blessed with a multitude of worthy contributors who make this magazine possible. The spirit in which these folks work is amazing.

Throw your comments and ideas at any one of us. The QQ team constantly adds your inputs to our repository of cool QRP stuff and...odds are that it will magically appear in future QQ issues.

If you haven't contributed yet, be advised that our talented (and dedicated) QQ staff assists contributors in converting your ideas and information into polished magazine content. (Our contact information is on this page.)

Regarding content, all the usual "neat stuff" resides in this special issue. In addition, Jim Stafford and I thought we should sharpen our focus (just a little) in making members and their activities more visible. We added a ***Correspondence*** section and will scatter short QRP *Spot Light* pieces and pictures throughout each issue to help us all get to know each other better.

The four *ARCI 40th Year Anniversary* issues will include ***Extreme Radio*** feature articles that capture the spirit of adventure that underlies QRP activities. (See **Appalachian Trail** articles as examples.) The theme for the April issue is ***Antenna & Feed-line Perfection;*** for July is ***Extreme Operating Locations***; and, for October is **Extreme *Contesting & DXing*.**

To close each issue, I added the

"It's kind of fun to do the impossible!" Walt Disney

IMHO (In My Humble Opinion) essay on the last text page. This is a place for parting thoughts (not endorsed by ARCI). Yes, I am inviting flames! However, I can't remember meeting a true QRPer without an opinion...can you? For the most part, we are an educated, over-active, big-hearted crowd that comes up with a veritable plethora of ideas. As QRPers, we tend to look at things a little differently and individually decide what we believe to be true. Why not enjoy some good-spirited fun by capitalizing on these special qualities?

Finally, how about the new QQ look? Did you notice a slight difference in the **cover**? Please thank our **advertising partners** and my talented daughter, **Kimberly**, for making this possible.

And...we have implemented a new advertising policy that limits the number of ad opportunities to those companies that best serve our QRP community. Be assured that the QQ staff is more focused than ever in providing **value** to both.

Did the new **Table of Contents** work for you? Could you easily zero in on the article you wanted to read?

Articles—was the mix right? What do you enjoy reading the most? Did you find the larger print and 3-column formatting to be pleasant and easier to read?

We hope so and are soliciting feedback—your comments and ideas. Please join us in our quest for QRP Quarterly magazine excellence.

Now...go take a read. We hope you enjoy the ride! • •

QQ CORRESPONDENCE

Gangue:

I just want to thank Randy Foltz publicly for his hard work as Contest Chairman of the ARCI contests. His decision to move the Fall QSO Party is much appreciated by me, and I'm sure, most others here in the western

US. Folks wishing to both attend Pacificon as well as participate in this contest can now do so, thanks to Randy.

Some of us who have scored contests know something of the time and resources required to handle this job. It's because of Randy, and other folks that are willing to donate their time that these contests exist at all. Thanks to you all as well.
Brian Kassel--K7RE bkassel@dancris.com

Dear Steve Slavsky(QRP ARCI Award Manager)

Many thanks to you for sending me the 3 (three) nice awards received today on 12th Oct. '00.

I am very proud to get such fine awards, especially 1,000-mile-per-watt award is so nice arrangement for to send my QSO friend, LU8VCC, who will receive same award.

Thank you very much for your kindness.
Best regards to you! 72!
Ken Aoyama--JA1KGW, Tokyo, JAPAN

Hi **Mark** (Milburn),

Just to let you know that I have sent my renewal subscription of £13.50p to **Dick—G0PBS**. So you don't delete me from the mailing list. QRP Quarterly is definitely the best QRP related publication around. ARCI—Thanks again for a great read.
Best 72's, **Brian Waddell**--GM4XQJ

Hi, **Jim** (Stafford),

I enjoyed meeting you and the Jackson , MS ARCI members at the Jackson ham fest this year. The ARCI exhibit and seminar was the best part of the ham fest. That is my opinion. I have to pass this along to you.

On the **BSA JOTA** event our club, **Minden Amateur Radio Assn.**, provided the communications. The generator conked out just as the Scouts came for a demonstration.

Floyd Hoskins—N5FH, an ARCI member, was operating battery operated QRP and like that rabbit beating the drum--just kept going and going. He saved the moment and put on quite a demonstration for the scouts while the rest of us were off the air and were trying to find out what was wrong with the generator. We finally changed the plugs.

Battery operated QRP saved the moment!
73, **John Wallace**--K5APB, Minden, LA

Hi **Mike**,

I received your note via Steve. You are certainly welcome. The award would have never happened without you so I felt it appropriate to arrange for you to get your own copy of the award. After all, you were the one who had to do all the hard work. I just keyed the transmitter.

Welcome back to QRP ARCI as an active member. Your **1662** is a really low number...an old timer for sure. I think you will enjoy the QRP Quarterly Magazine.
73, **Jim Larsen**--AL7FS, Anchorage, AK

QRP-L,

I'm sorry to have to announce this, but I have learned that on Sep 17, 2000 **Joel Malman, K1QM became a SK...**

Joel was an active member on this list, and I suspect there are many folks here that know him better then I. I knew Joel through QRP-L and through a number of emails we traded while setting up the New England Hunt Club Foxhunt team. I also have K1QM in my log book on 40m, having worked him on my SMK-1. Joel was very much looking forward to the 40m Winter Foxhunt - he was definitely into QRP.

The New England Fox Hunt team will sit out the first minute of the first hunt in silence to pay our respects. We are also in the uncomfortable situation of having to recruit a replacement hound for the hunt starting this Tuesday. If you are a New England hound and want to join up, please email me directly.
73, **John Wagner**--KB1ENS
john@neknetwork.com Holland, VT

Also...

I had the pleasure of working last year's Tuna-Tin-II/Black Cat Event with **Joel**. He and I were guest ops at W1AW. Joel dominated 20 meters using a T-T II that **Ed Hare**, W1RFI built up in the lab for the occasion.

Joel was a great op and a fun person to be around. He will be missed.
73, **Richard Arland**—K7SZ rarland@earthlink.net

Dear Mr. **Milburn**:

I regret to inform you that **Geurt Jan**—PA0YF became a silent key. He founded (together with PA0GG) the **Benelux QRP Club**. Geurt Jan and I have had pleasure 17 years with QRP.
72/73, **Dick Kraayueld**—PA3ALM

Hello **Jim** (Stafford):

It is with a heavy heart that I must tell you that an avid QRPer and a dear friend became a Silent Key in an untimely death. **Ray Butler, WA4KEJ** died Saturday night of a massive heart attack will driving his truck. Ray was only 53 and the picture of health.

Ray has been a avid QRPer from way back in the 60's when it wasn't the thing to be. He purchased one of the first Ten Tec PM series QRP rigs and never operated anything but QRP. Ray is a member in good standings in ARCI, G-QRP, NorCal and several other QRP organizations. He loved to camp and operate ham radio. He just returned from Holland in June, where he bicycled for two weeks throughout the country and operated ham radio on 20 Meters with his SST.

Ray, Terry—K4KJP, and I operated in the Spring and Fall ARCI Contests every year from some historic campsite. We also attended the FDIM in 1997 and 1999.

Amateur radio and most especially QRP has lost an avid participant and an all around great guy.
72/73, **Jim Younce**—K4ZM K4ZM@aol.com (**PS:** His photo appeared in the August, 2000 QST Page--111 (160 Meter-Contest Results)

Craig,

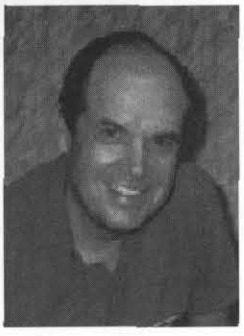
I'd appreciate it if you could post the following regarding my friend David Doubleday.

ARCI member **David C. Doubleday--K8DCD** (formerly WA8HDR, ARCI #7462), passed away suddenly September 17, 2000 at age 55. David held an extra

(Continued on page 30)

BASE CURRENT

Jim Stafford, Club President **W4QO@ARRL.NET**



The thrill is back! **Can you believe this issue?** Our new editor, Craig, NM4T, *really knows how* to get your attention, doesn't he? We welcomed Craig to the post and right away, he brings in a lot of great ideas to make QQ even better. The changes are obvious so I won't delineate them here. But we do appreciate the effort Craig and all the folks - especially Larry East, Mike C., Randy Foltz - who put these issues together. Stay tuned - the best gets better!

Running of the QRP Bulls - One of the things I like about the QRP community is how fast ideas that are proposed, are acted upon. I was having a chat with Ed Hare, W1RFI, and the subject of Sweepstakes came up. Ed proposed something to get more QRP folks on during the contest and to "outshine" the B class boys/girls. B is the "high power" category. So in about 10 minutes, we worked out the details of a way to get more QRPers to call CQ and also to get more of them on during SS. Ed felt we should get some kind of commitment from folks in each state or section to operate a good number of hours and to call CQ as often as they could. Well, it's one thing to brainstorm, but another to put it into action. Welcome, super contest manager, Randy Foltz, K7TQ. Randy is the most open minded and hard working contest manager one could ask for. He readily agreed to keep track of the "Bulls" - the name we would call these folks who wanted to "put their section on the airwaves." All others who got on and made at least one contact would be the Matadors. Well, we didn't get a Bull from each section but we did get one in 43 sections. I can tell you that I have never heard so many Q category stations as this year. And you know what they say, "Every signal is strong somewhere and every signal is weak somewhere." There were some mighty strong QRP stations on the bands. I worked about 14 hours. I worked 24 Q stations. Heck, I didn't even come close to being the top bull. K5NZ had 132 and K0FRP had 127 Q stations! The club will be providing a plaque to the eventual winner (after we recount a couple times) and the winning Matador, KO4PY, (is leading) worked 24 Bulls and will also get a plaque if his lead holds. Both will also receive a handbook from ARRL. Don't you just love this game?.

PSK31 Contest – I mentioned this one last issue. It is also a "new" contest added to the club's long list of sponsored events for 2000. Rod, N0RC, had proposed this in the summer and Randy had it implemented by the middle of September. It seems that Jim, N0UR, from MN had the best score in this event. The point is that the club's response to this proposal was rapid and well received by the PSK31 and QRP community. Now with the NJ QRP Club's introduction of Dave Benson's *PSK-80 Warbler*, we should see a steady increase in the number of QRPers on this wonderful mode.

Club Call - Ever notice that our club logo has the call sign K6JSS on it? Well, it is the call of the late **Harry Blomquist** who founded the club in 1961. You can see a short history on the website. We noticed that the call had not been reassigned so the club applied for and received it. We certainly didn't want the call going to an amplifier manufacturer, did we? So now we have it and the question is - how will it be used? We have no intent to establish a QRP ARCI ham station but there are many other uses. Rather than list some here, send me your ideas. By the way, K6JSS was registered as **member number 1** and so it still retains that number. This might be something to consider in your proposals. I'll let you know what we think is best, based on your input.

Spencer named VP - Although I've been your president for over one year, we had not until recently filled the post of VP. Well, the counts and recounts are in and Director Joe Spencer, KK5NA, is now our new Vice President. Joe has been an active QRPer for some years and has been very active in promoting same at many ham fests throughout Texas, including the popular HamCom each year. Joe lives in Arlington with his wife, Barbara, KK5QA, who also helps Joe with QRP promotion. Joe will also retain his position on the BoD. Thanks, Joe.

FDIM 2001 - It just can't be time to start thinking about Dayton, can it? Yes, it can. See some details elsewhere that are already shaping up. It is hard to imagine topping last year but hey, let us try. Ken, W4DU, is carrying the ball again. Get your orders in early. You will also be able to sign up online using PayPal and your credit card. Just go to the web site and click on Dayton-FDIM.

New Awards Manager - We welcome Thom Durfee, WI8W, of Wyoming, MI as the new awards manager. Thom replaces Steve Slavsky, N4EUK, who has held the position for the past two years and has issued a "ton" of awards in that time. Our award program continues to be very popular. Have you applied for one yet? Go online and get your app mailed today.

Personal Activities Celticon 2000– Well, we're back from Ireland and Celticon 2000. Rev. Dobbs, G3RJV, certainly knows how to put on a classy show. Also, the folks at the Marino Institute were very nice hosts for the event. It was good to meet QRPers from EI and elsewhere in Europe. I will say I have never had better eating at the evening meal than we had at Celticon! We all went down to Temple Bar and had a ball Saturday night. Marilyn and I really enjoyed Ireland. It is a beautiful country and I highly recommend it. Unfortunately, I did not get on the air as we were so busy trying to see the entire country. Still, we continue to get on the air from here at home as often as possible. For those of you who don't know what I do with all my free time, check out: http://go.to/byjimeny I really have a "wonderful life."

Final thoughts - I went on http://www.google.com the other day and searched for QRP. Guess how many pages it found? 97,900! Can you believe that? Google is really a different kind of engine. I went down and looked at nr 77,362 (not really) and found that it had picked out references to QRP that someone had posted in email somewhere but at least QRP is really getting around these days, you must admit. All the more reason - **The Thrill is Back!** ••

Make FDIM Plans Soon!

Go to pages 16 and 17

For More Information.

IDEA EXCHANGE
TECHNICAL TIDBITS FOR THE QRPER

Mike Czuhajewski—WA8MCQ **wa8mcq@erols.com**

IN THIS EDITION OF THE IDEA EXCHANGE:

More on the N2CX Calibrated Weak Signal Source; Joe Everhart, N2CX
Tweaking Transmitter Output Tank Circuits; W0VT & Wes Hayward, W7ZOI
PCB Fix for the NJ QRP SOP Receiver Kit; George Heron, N2APB
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Handy Test Accessories for the Workbench; Mike Czuhajewski, WA8MCQ
QRP Online

JOE'S QUICKIE #36—MORE ON THE N2CX CALIBRATED WEAK SIGNAL SOURCE

*Rounding out an even three dozen of his technical "quickies" with this issue, **Joe Everhart—N2CX** of Brooklawn, NJ departs a bit from his usual practice of introducing new material and amplifies a bit on a project that he introduced in the October 2000 issue in his Test Topics and More column (TTAM). For the convenience of those who did not get that issue I've drawn up the schematic and tacked it onto the end of his material as Figure 6. (Joe provided the rest of the graphics for his item.)*

*For the benefit of the newer subscribers who may not be familiar with him, Joe is an electrical engineer by trade and one of the guiding lights of the **New Jersey QRP Club**, and was inducted into the QRP Hall of Fame in 2000.*

This Quickie is a companion to the current series of TTAM columns. The previous installment of TTAM introduced a calibrated weak signal source. It is a sufficiently involved project that it will require several TTAM and Quickie installments to introduce both the philosophy and theory of operation and the practical details needed to reproduce it. Most of the theory will be handled by TTAM and the more physical details will be described in this Quickie and the next one.

As described in TTAM the main idea for the signal source is to provide a design that will offer several stable-frequency sinusoidal RF outputs at calibrated levels from millivolts do microvolts. Furthermore the signal source will be reproducible by the average home brewer using no unusual or expensive components or tools and will be require only commonly available test equipment such as a couple of batteries or variable power supply and a digital DC multimeter (DMM). Several simple fixtures will be described to aid in the process but they will use only common components.

The primary means of getting a calibrated weak signal output is by beginning with an RF signal at a level that can be easily measured then attenuating that signal with a series of carefully calibrated and shielded resistive attenuators. The shielding to be described may seem extreme but some overkill is necessary to assure accuracy at microvolt signal levels without the need for testing with some very expensive test equipment.

As described in the October 2000 TTAM the signal source uses multiple levels of shielding with carefully controlled signal flow between compartments. The overall enclosure and each compartment within are made of double-sided copper clad printed circuit board material. Each compartment within has sides that are soldered together and has an individual cover of the same material attached by threaded hardware. Figure 1 shows a sketch of the compartmented enclosure.

A crystal-controlled oscillator is the source for the high-level calibrated signal. It gets its DC operating power from a battery inside the main enclosure. Oscillator power lead passes through its compartment wall via a homebrew feedthrough to contain the oscillator energy within that section. The feed through will be described later.

The high-level signal is directly available from a BNC connector in that compartment. It is then attenuated in a series of steps by resistive dividers in successive compartments. Individual outputs are provided in at each level. By doing everything in a chain the need switches and the attendant shielding problems is bypassed.

As can be seen in the **figure 1**, (and described in the accompanying TTAM column) controlled attenuation is gotten by series resistors through compartment walls and shunt resistors in each section. The shunt resistors also maintain the desired 50-ohm impedance level.

As described above, great pains are taken to "keep the genie in the bottle" by

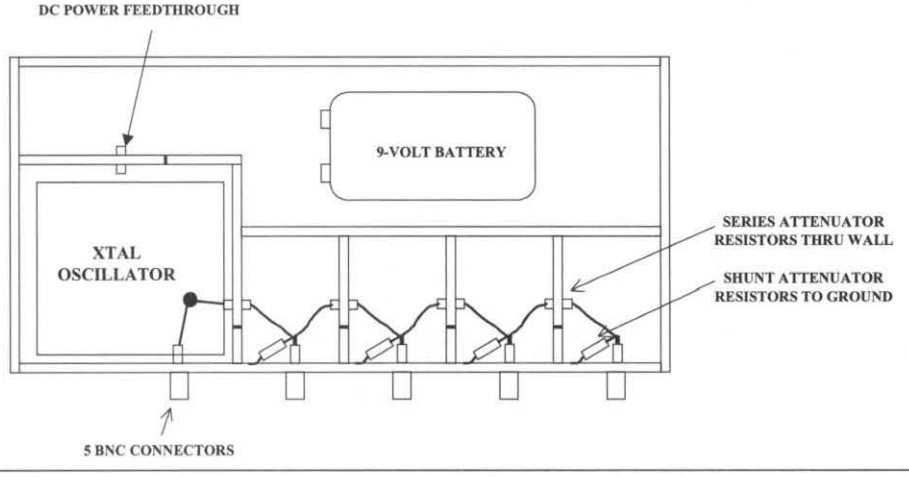


Figure 1—Layout showing thru-wall attenuator and feedthrough components

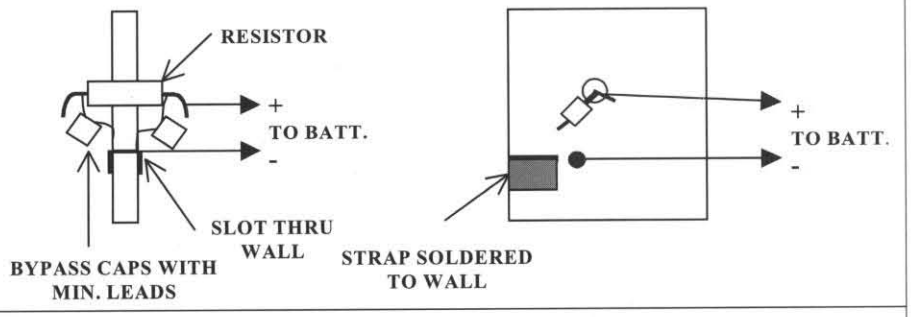


Figure 2—Power feed-thru details

providing multiple levels of shielding. A couple of other techniques are used to make sure that everything stays where it belongs and that signals are passed down the attenuation chain properly by controlled conduction.

It is necessary to feed DC power from the battery in the main compartment to the interior of the oscillator section. This is done by means of a homebrew feed-through filter. It consists of a series resistor thorough a hole in the oscillator section wall and two capacitors on each side shunting any unwanted RF to ground. A ¼ watt resistor is used with some sleeving over it for mechanical protection. The hole through the wall should be sized for a snug fit. One side of each bypass capacitor is soldered directly to the resistor leads and the other side of each is soldered right to the copper compartment. Capacitor lead lengths should be as short as possible to make a good low-impedance RF path. **Figure 2** shows feed-through detail.

In line with the controlled conduction idea note that a ¼ inch slot is shown in the wall next to the feed-through. This has a piece of thin copper strap or braid from small diameter coax cable passed through the wall and soldered to it on either side. Its purpose is to provide a low-resistance path for RF shunted to ground by the external bypass capacitor to flow back inside the oscillator component. If this were not done the return path would be back along the wall and down through the case bottom potentially spoiling some of the compartment's shielding effectiveness.

The resistors in the signal attenuation chain are mounted in a similar fashion as the power feed-through. **Figure 3** shows this detail. The series resistors pass through holes in the compartment walls and are protected from damage by insulating sleeving. As shown in the figure a slot is made in the wall near the resistor hole and a conductive strap or braid is soldered to provide a low impedance RF path through the wall. It ensures that the RF signal flowing between shielded compartments has a preferred path.

Chassis-mount BNC connectors are used in each compartment to output the various attenuated signals. As mentioned earlier using separate connectors minimizes complexity that would be needed to switch attenuation and aids in minimizing leakage between attenuator sections by segregating the different levels. It is recommended that "D" holes are used for the BNCs to keep them from coming loose and rotating in use.

It's pretty easy to approximate a "D" hole by drilling a ¼ inch hole and rounding out the hole on one side and the top and bottom, leaving the fourth side unfiled to approximate a flat. Proceed slowly as you enlarge the hole and use the connector itself as a gauge to tell when it is large enough. **Figure 4** is approximately what it should look like when you are done.

Figure 5 (next page) shows several views of the shielded compartments and their covers. The very top view shows what the enclosure looks like when the top cover is installed to provide an overall shield. The center sketch is looking down from above with the top cover removed. This shows that each internal compartment has its own attached cover. The last view is a cutaway front view to reveal internal detail. The internal compartments are not the full height of the enclosure and each has a cover held in place by nuts in each corner and machine screws through holes in the covers. Details of how the nuts are attached in the corners and an accurate method of locating the cover screw holes will be described in the next Quickie. [***Figure 6*** *is the schematic of the oscillator that appeared in the last issue of the QRP Quarterly.* —*WA8MCQ*]

Stay tuned! —N2CX

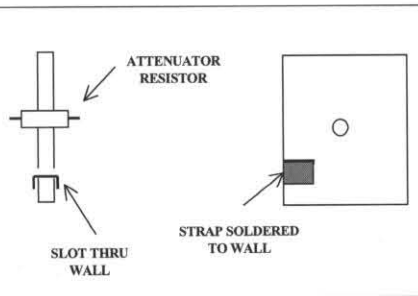


Figure 3—Attenuator resistor details

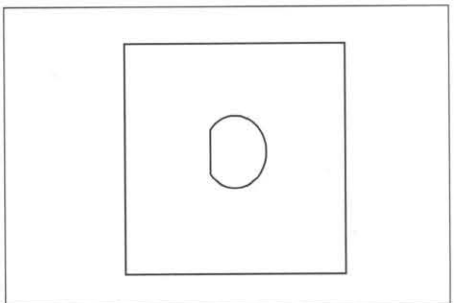


Figure 4—BNC "D" Hole

TWEAKING TRANSMITTER OUTPUT TANK CIRCUITS

Back in October, ***Lee Bahr, W0VT*** *(w5drc@earthlink.net) tossed this out on QRP-L:*

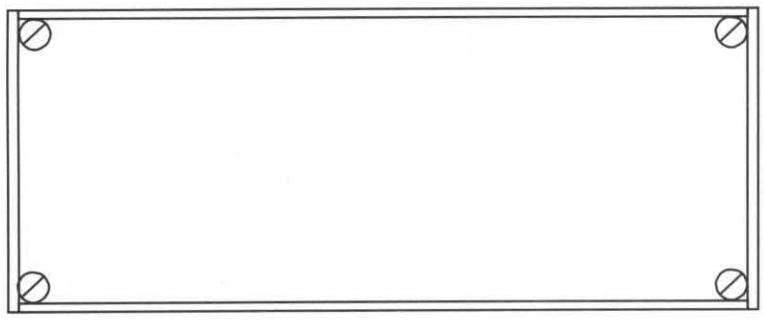
I know it is bad practice to tweak output tank circuits for maximum output on a wattmeter for fear one might be peaking spurious oscillations or trash rather then the output signal. Of course, it is best to use a spectrum analyzer.

With no spectrum analyzer at hand, could one not be somewhat on track by listening to the rig to be tweaked on another receiver with S-meter and attenuator and then adjust the output of the rig in question for MAXIMUM signal strength on the secondary receiver? Of course, one would terminate the rig to be adjusted into a 50 ohm dummy load. (When I say "tweaking output tank circuits," I'm talking about squeezing and pulling apart turns on a core).

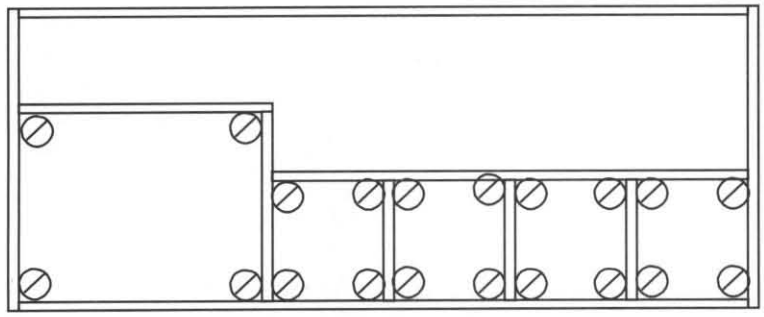
It would seem to me this would be a reasonable approach to adjusting the output without a spectrum analyzer, especially for a well designed kit, better then tuning for maximum output on a watt meter. Am I on track here?

REPLY: *This prompted the following reply from* ***Wes Hayward, W7ZOI:***

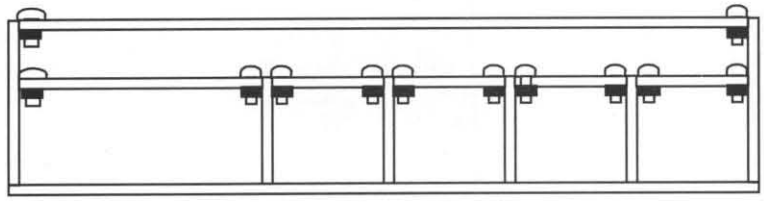
Actually, a power meter is a good tool for adjustment of an output network. You are looking at the overall output while



Top view - top cover installed



Top view - top cover removed



Side view showing compartment covers and hardware

Figure 5—Shielded compartment views

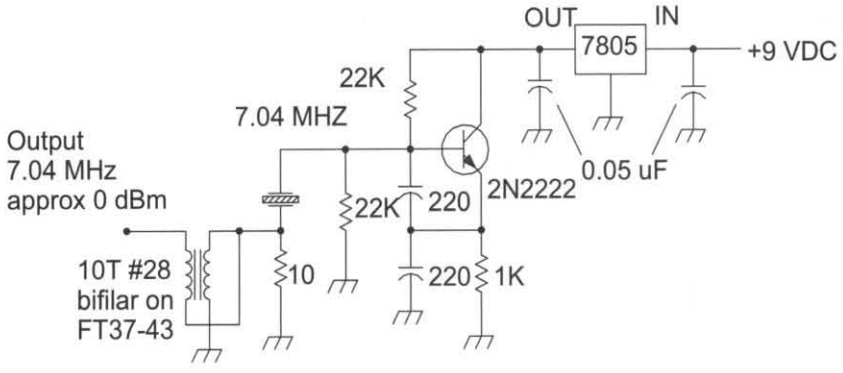


Figure 6—signal source crystal oscillator (redrawn from last issue)

tweaking on a point in the circuit close to the observed power. The "ugly" things that you might see with a spectrum analyzer are rarely the result of anything that could be fixed by an output network (usually a low pass) other than harmonic content. And that is going to be small with any of the networks used in modern designs.

It is often useful to watch both the output power and the power supply current while tweaking. Sudden jumps in either are often an indication of instability. An oscilloscope with a 10X probe attached to either the load or to the PA collector (or drain) can also be informative. Instabilities often show up as changes in the waveform.

It is also very useful to vary drive to a power amplifier. The drive should be reduced until the output drops to zero. The output should decrease smoothly. If there are jumps with either increasing or decreasing drive, instability is indicated. Linear amplifiers are often more stable than their higher efficiency cousins.

If you do use a spectrum analyzer, be sure that you have it set for a wide span. A narrow span might show the desired output frequency nicely while missing others where problems might occur.

One thing you want to avoid is "the golden screwdriver." This term goes back to an experience that a good friend of mine had on the 75 meter band. My buddy, **Jeff—WA7MLH** used to hang out on one particular frequency frequented by builders and experimenters with a variety of backgrounds. One of the guys on the network had the reputation of being able to coax more power from any rig he encountered. He could always get 110 watts or more from any nominal 100 watt rig. He said he did it with his "golden screwdriver."

Well, Jeff finally pinned the fellow down and had him describe just what he did with the colorful instrument. It seems that he went through the radio in detail, tweaking any and all controls while looking at nothing more than the final output. The adjustment was always done with the golden screwdriver. If he could increase the audio going into the balanced modulator, he would do so. If he could increase the transmitter IF gain, he would. If he could change the bias on the final amplifier, he would do that too, all in the interest of that illusive 1 dB difference in output power.

The final result was indeed a bit more power. But Jeff was not convinced that it

was the thing to do. He said that whenever the golden screwdriver had been applied, the rig with the "cure" always sounded much worse than it did in the beginning. Tuning to one side or another would always reveal spurious intermodulation from what had formerly been a clean box. Even the direct response was mushy.

The golden screwdriver attitude is at the root of many problems that folks have when building their own gear, especially SSB equipment, or CW transmitters with mixers. (By "their own gear," I generally mean things other than kits.) You are much better off to adjust the signal level prior to a mixer to be the right one, and then attach the mixer. Or adjust the audio microphone gain to the level needed by a balanced modulator.

For example, a normal diode ring mixer such as the MiniCircuits SBL-1 or TUF-1 should have +7 dBm available to the LO port and a maximum signal of -10 dBm or so at the IF port. The RF output port will then have an output of -17 dBm at a pair of frequencies. Filtering in a double or triple tuned circuit will then produce something that is usually clean and free of spurious junk. The same mixer driven at 0 dBm, which is well within ratings without causing damage, will usually produce an output loaded with spurious responses.

There is no need to have a spectrum analyzer to do experiments. You can build a great deal and have a lot of fun and learn a lot without one. Low power levels can be measured with a variety of methods, allowing levels to be properly established. On the other hand, having a spectrum analyzer on the bench is wonderfully informative. Once you have had one, you will want one to be there for all experiments.

Receivers are hard to use as a spectrum analyzer substitute. They usually have a bandwidth that is too narrow. You can't see much because you can't quickly tune it over a wide range. Also, the typical receiver is not shielded well enough to keep signals out via undesired routes such as power or speaker leads. The shielding on a spectrum analyzer is usually much better.

DE W7ZOI

PCB FIX FOR THE NJ QRP SOP RECEIVER KIT

One of the popular kits from the NJ QRP Club is the SOP (Seat of the Pants) receiver kit designed by ***Joe Everhart, N2CX****, and all 200 that were produced were sold. Unfortunately there was a small error in the layout of the circuit board, which was reported on QRP-L by* ***George Heron, N2APB:***

Thanks to the fine detective work of **Bob Confrey, WA1EDJ** and the **NoGA (Northern Georgia) QRP Club** guys, a small PCB error was found in the audio amplifier area of the New Jersey QRP Club SOP Receiver kit.

A ground trace is missing on the emitter of transistor Q4 and builders need to make a very simple fix in order for this audio amp to work properly. Locate the 3 pads of Q4 on the bottom of the board (seen also in the diagram on page 15 of the manual as the 3 vertical pads closest to C10), and solder a small piece of scrap wire from the lowest of the three pads to the adjacent ground plane. This fix will enable the Q4 amplifier to work and pass the low-level audio signal from the mixer on to the low pass filter. *[See Figure 7.]*

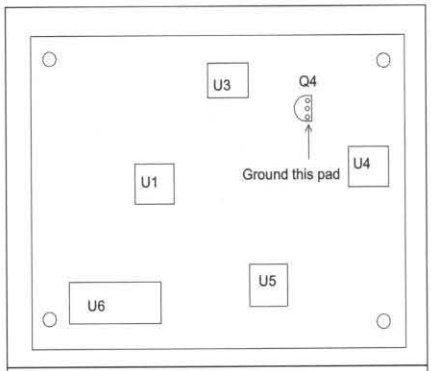


Figure 7—Ground the indicated pad of Q4. (U6 is the optional audio frequency annunciator chip.) This view of the board is from the component side, which is also the trace side.

Thanks so much to Bob and the NOGA guys for their great assist in working through the board issues. All known errata and corrections are located on the SOP Receiver web page.

For complete and up-to-date SOP Receiver Kit information visit http://www.njqrp.org/sop/ or send an email to EMBOT@NJQRP.ORG with SEND SOP in the body of the text.

DE N2APB

The website also has a detailed step-by-step photo assembly guide, including some waveforms for the benefit of those who have scopes, voltage readings and close-ups of the components on the board. Click on SOP PHOTO ASSEMBLY TOUR. You can also find a great deal of other information on the project on the page, including schematic and parts list.

In private e-mail, George later indicated that the kit is out of production for the time being due to several factors but that they may reactivate the project in the future. If so, it will include a redesigned PCB which will incorporate this fix and will probably be changed to use the surface mount version of the SA612 chip (NE602 equivalent). They were experiencing problems in getting the chip in DIP packages.

If you are one of those who ordered an SOP receiver kit, you should have long since received a second mailing from NJQRP with an errata sheet containing this and other fixes, along with a few additional components that were left out of the kit by mistake. They also included a special bonus booklet entitled the "SOP Assembly Photo Tour", which is a step-by-step photographic guide to building it, along with oscilloscope signal snapshots and typical RF probe voltage readings. (This is the same info that's on the web page, although the online version is in color.)

So if everyone who ordered the kit received the updates, why am I mentioning this here? Because I know how the real world operates! Let's say that someone doesn't build their kit for some time, and when they finally get around to it the update package has become separated from the kit, or may have never been put together with it in the first place. There's a good chance that the updates were completely forgotten about, and naturally there will be problems building the kit. Or perhaps they sell the unbuilt kit, and the update info doesn't get passed along to the new owner. Either way, I figure that wider exposure for the info will probably come in handy in the future for someone.

—WA8MCQ

CURE FOR AGC PUMPING IN THE MFJ CUB

Larry East, W1HUE/7 of Idaho Falls, ID, posted this modification to the MFJ Cub Users Group. (If interested in reading users comments on this popular QRP transceiver, log onto the Internet and go to:

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

The other day when 15M had a lot of strong signals, I noticed that the AGC was "pumping" pretty badly in my 15M cub. Let me try to explain what I mean: When a very loud signal is present, the first character (dit or dah) causes a momentary

(apparent) depression in audio gain (that's what I mean by "pumping"); the gain quickly recovers to the level set by the AGC and stays there as long as the strong signal is being keyed within the recovery time of the AGC. This is in addition to the slight "pop" or "thump" on strong signals that is characteristic of audio derived AGC.

I increased R13 to 6.2K and that significantly reduced the initial gain drop, but (of course) the initial "pop" is still there. I found that my BFO was a little off, resulting in too much low frequency response. I reset it so that the IF filter passband peaks in the 700-800 Hz range and that also helped.

If you are experiencing AGC "pumping" in your Cub, first make sure that the BFO is set correctly and then try increasing R13 to something in the range of 5-10K. (I used 6.2K just because I happen to have some 6.2K surface mount resistors in my "junk box" -- a "thru hole" 1/8 W resistor can also be used.) I didn't try replacing R13 with a pot and attempting to find an optimum value. DE **W1HUE/7**

THE RIGHT TUNING KNOB FOR THE K2

Not completely satisfied with the tuning knob that comes with the Elecraft K2 transceiver kit? Arnold Olean, K0ZK of Lebanon, ME, made a different one to suit his tastes, with a knob from the junk box and home made adapter.

After operating the Elecraft K2 for the first few months, I felt that some sort of spinner knob would be an improvement. I looked in my well stocked junk box and the best I could find that was the exact size and feel was the knob on an old LM frequency meter of World War II vintage. *[This is the Navy version of the familiar BC-221 frequency meter. Both types still show up at hamfests from time to time, although in my area the BC-221 is the more common.—WA8MCQ]*

The only problem would be fabricating an adapter to get the LM knob to fit the K2. It was a simple matter to get my brother Dave, K1WHS, to spend a few minutes with his metal lathe to turn a piece of aluminum down to the right size. This little machined gem welds 1999 technology back to the highest form of 1939 technology, the LM frequency meter. **Figure 8** shows the results, while **figures 9 and 10** show the mechanical details.

Figure 8—WW II vintage knob mounted on the K2 with homemade adapter

The face of the adapter towards the LM knob is a full 1.625" to back the three finger holes of the LM knob. The K2 end of the adapter should be 1.500" diameter or a bit less, so it does not interfere with the LCD readout acrylic cover.

A word of warning here: the K2 tuning encoder shaft is not ¼". It is a bit less, 0.235". Make sure you drill a 0.235" hole or you will have a tuning knob that does not turn true. It will turn like a bent axle on a Hupmobile if you do not take this into account.

The 1.500" K2 end of the adapter also needs to be drilled out with a 0.625" drill to a depth of 0.2" and a 0.375" drill to 0.4" depth. This indentation hides the control shaft bushing, nut and flat washer. There is still a surface for the K2 felt washer to rub against, so you can still set up the knob for the amount of play you desire—free running and loose or a bit stiff. Take a look at the inside of the original K2 knob; you want to duplicate that part of it.

Once we did the lathe work, it was a simple matter to finish up the rest at home on my drill press. I drilled out two holes to attach the adapter to the K2 shaft. I used a #29 drill, 0.136", and tapped them for 8-32 Allen head set screws. That left the task of drilling and tapping three holes to mount the LM knob to the 1.625" end of the adapter.

Make sure these holes do not interfere with the setscrews that attach the adapter to the K2 tuning encoder shaft. It is a simple matter to do it right; just realize what you are doing before you start drilling these holes. (The drill is #42, 0.093".)

The LM knob I used has three finger holes and attaches with three 4-40 machine screws. I spent a bit of time getting this just right so the knob would be concentric with the adapter; otherwise, wobble results. The first #42 hole I drilled and tapped for this was a little bit off, so I compensated (eyeballed it) and drilled and tapped a hole close to it that allowed the

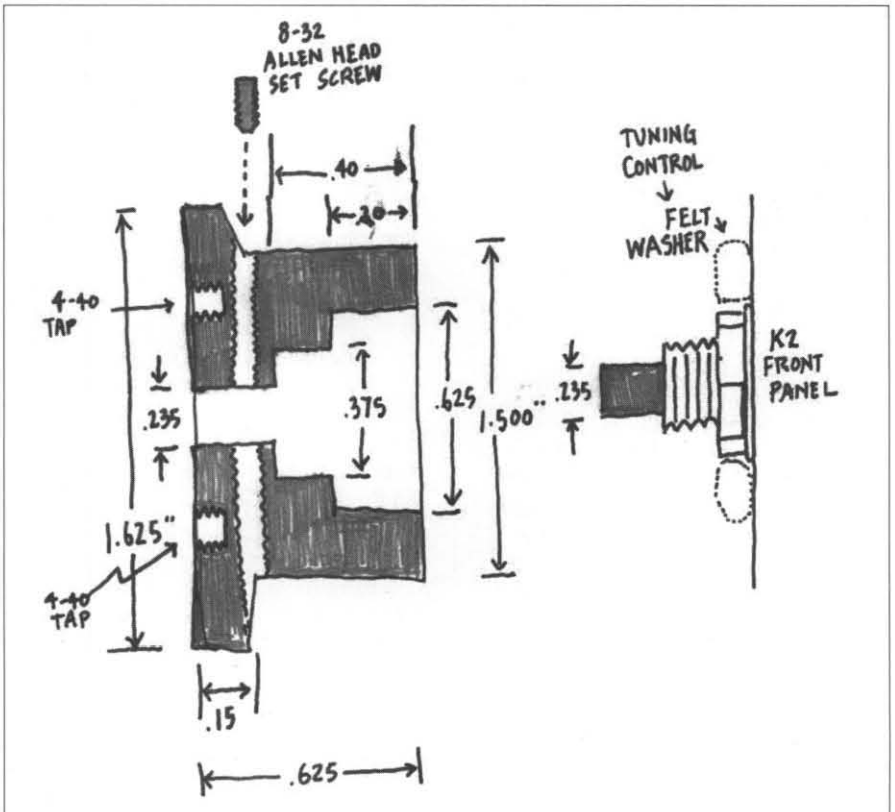


Figure 9—Making the adapter for the new knob

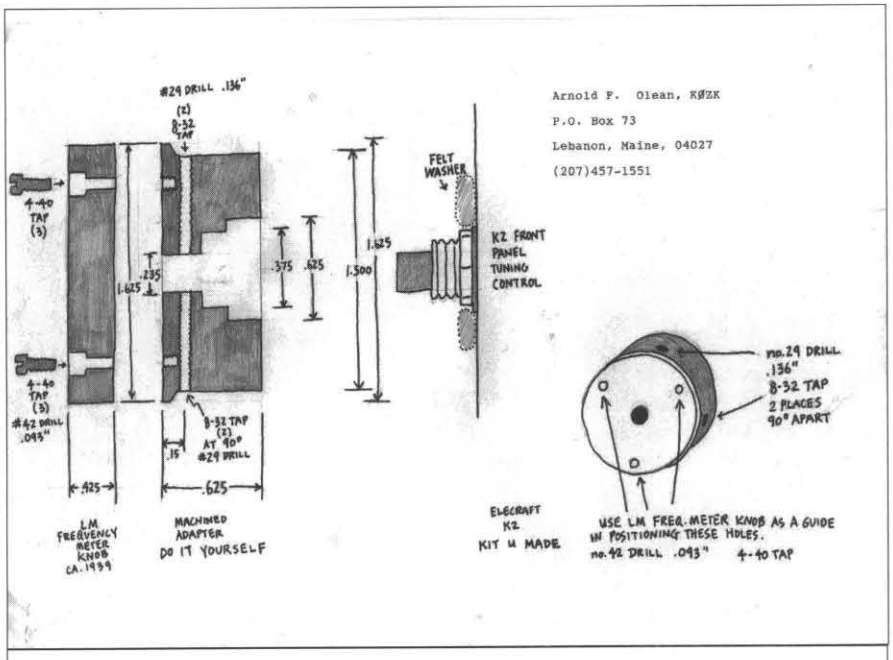


Figure 10—mounting the knob and adapter

knob to line up concentrically with the adapter.

Once this was correct, I used the LM knob as a guide in marking the two spots to punch, drill and tap the remaining holes (#42 drill, 0.093", and 4-40 tap). Don't worry, the initial out of kilter hole is hidden under the LM knob and is not visible through the finger holes.

The adapter was given a light metal primer spray and then a spray of black enamel. Even though the LM knob dates back to 1939 it looks just right on the K2.

I have used the new tuning knob for contests where I am constantly searching for signals, tuning up and down the band. I don't think I could go back to the stock K2 knob now.

Some LM frequency meters [*and the BC-221's –WA8MCQ*] use a single crank knob, but I think the three finger hole style is easier to use. I can tune with my thumb while switching the attenuator with the index finger of the same hand.

In other K2 surgery, I removed the two enclosure side plates and replaced them with duplicates made from 3/16" tempered aluminum. This adds weight and strength. You may not feel you need to do this, but I like the extra mass. I eventually finished the new side plates with a spray of Hammerite hammer gray. It looks great.

I have quite a few extra 8-32 Allen head stainless set screws for anyone undertaking this project. They're free; just send me an SASE please. (PO Box 73, Lebanon, ME 04027.)
DE, **K0ZK**

USEFUL INTERNET QRP SITES WORTH CHECKING

There are a lot of these, some operated by QRP clubs, others by individuals. Of the latter, some are not necessarily "QRP" sites but still have good info on home brewing and building. I'm going to start mentioning some of these from time to time. One of the nice things about web pages is that a great deal of them contain lists of links to other web pages.

When you look at your very first QRP site you can end up looking at a number of other sites that they reference, and each of those in turn will have their own lists. There will be a lot of duplication, of course, but not every site will list every other site of interest. Be sure to check the lists at each site since you might find a new one.

Jim Stafford, W4QO, provided this link after someone asked on QRP-F whether anyone had experience with the R1 receiver designed by **Rick Campbell, KK7B:**

http://www.pconline.com/~rohrwerk/k0jd/

The site is operated by **John Seboldt, K0JD**. Among other things it contains some information on various KK7B designs, as well as other info.

The NorCal web site is an excellent one with a lot of good info, along with an extensive list of links to other QRP pages which are maintained by clubs, individuals and QRP suppliers. The URL is

http://www.fix.net/~jparker/norcal.html

This one has been operated for years by **Jerry Parker, WA6OWR**, and is probably the one I visit the most often. I highly recommend it.

A USEFUL TOOL—SUPER LONG, FLEXIBLE SCREWDRIVER

Here's an item that could come in handy often in the home workshop. ***Mel Evans, GM6JAG*** *of Edinburgh Scotland had this to say on QRP-L—*

When I left a previous employer I hung onto one tool that I cannot live without, a 2 foot 6 inch long flexible screwdriver. These are mostly used by copier/reprographics servicemen (I was that man once!) to access the screws in the backs/bottoms/sides of photocopiers.

They come with interchangeable magnetic bits for straight and crossdrive *[Phillips]* headed screws, torx bits etc. You can also get a bit with a small round magnet on the end for picking up small metal parts and lost screws and so on.

The shaft is like the cable on a cycle brake, but stiffer. Once you locate the bit in the screw slot, the shaft takes up most bends in the way but still turns ok.

Try your local copier outlet for a source if you think you have a use for one, better still, beg one from them if you can.
DE **GM6JAG**

POLARITY REVERSAL SWITCH FOR PADDLES

Here's a simple but very useful idea from ***Monte Stark, KU7Y****. Depending on the situation you can hardwire it into the cable or build it into a small box with appropriate connectors. Either way, having a quick and easy way to do this can be a very useful item in any situation where you have a station that is operated by a number of people who have different CW sending styles.*

If you are looking for little things for the column, how about drawing up a DPDT switch in a cord between a keyer and the paddles which will allow the dit/dah contacts to be reversed? (See **Figure 11**.)

I have found that to be VERY handy and so has **Tom, AC5JH**. He says that

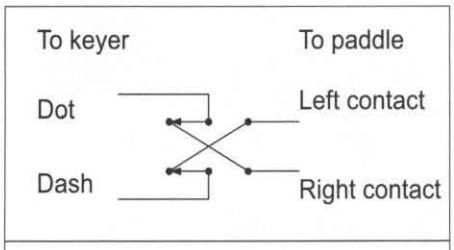


Figure11—A switch in the paddle cable allows instant reversal of the contacts.

ALL FD sites should do that!
DE **KU7Y**

MODIFYING THE DSW RIGS TO RECEIVE SSB

*Here's a recent receiver modification posted to QRP-L on these popular rigs from Small Wonder Labs (operated by QRP Hall of Fame member **Dave Benson, NN1G**). This modification comes from Bruce Prior, N7RR (n7rr@hotmail.com)*

My article, "Modifying Small Wonder Labs DSW Rigs to Receive SSB," was published in the September 2000 issue of *CQ Amateur Radio*, pages 28-29. The simple modification allows you to take advantage of the full band coverage of the DSW rigs by being able to receive SSB stations which are operating LSB on 80 and 40 meters and on USB on 20 meters.

The modification involves installing one fixed inductor in parallel with trimmer capacitor C14. By the way, the 8.2 uH inductor is the best one for any of the DSW-20 or DSW-80 rigs, irrespective of the value of C14. (In the article a distinction is made between the gray 70 pF and the black 90 pF C14 trimmer. This is unnecessary. An 8.2 uH inductor works best with both trimmer types.)

The 15 uH inductor is the correct one for the modification of the DSW-30 or DSW-40. Since the 30-m band is not normally used for phone, it is unlikely that DSW-30 owners would wish to change its receiving sideband.

I recommend a surface-mount style, since it is very easy to solder directly to the underside of the DSW board. (Suitable inductors are made by Delevan and available from DigiKey.)
DE **N7RR**

REPAIRING COTTON COVERED HEADSET CORDS

There are some older headphones still in use, and still found at hamfests, which use a very flexible cord consisting of bronze tinsel wound around, or interwoven with, a core of cotton fiber to form wires. This gives tremendous flexibility, but it can be difficult to work with and solder to. During his long career with the telephone company, **George "Danny" Gingell, K3TKS** of Silver Spring, MD, has years of experience with it. Here are some tips from a professional, adapted from his QRP-L posting-

Someone asked about repairing the cotton covered headset cords, such as used on old Western Electric and Trimm headsets. The pair that I have were made in the year that I was born. They were given to me by a telephone man down the street to use with my crystal radio and later with my [Knight Kit] Ocean Hopper regenerative receiver. I don't know what happened to the Ocean Hopper, but the headset is still with me.

The cords are made of cotton covering and the "wire," if you can call it that, is like bronze thread. There are only a few strands woven with a cotton core string. It is almost impossible to solder it. Here is how I have repaired mine over the years.

First you determine the point where the circuit is broken inside the cord. In my case it was always where the cord entered the headphone receiver unit. It has two tinned brass crimp type connectors on the end of the cord.

[From 7 years of experience working part time in a ham store fixing broken rigs, I long ago learned that this is the same place where microphone cables go bad, where it enters the microphone or the connector. I have never seen a microphone or headphone cable develop an open anywhere between these two stress points. –WA8MCQ]

First, take a piece of 18 gauge stranded wire, preferably the silver or tinned type. Cut it to about 2" long and separate the strands. #30 bus wire is also good for the "wire strands" as it is pre tinned.

Temporarily put a piece of masking tape around the cord about an inch or two from the end. This is to prevent the cord from fraying. Cut a piece of heat shrink tubing 1/8" diameter about an inch or 1 1/2" long and slip it down on the cord. It will be used later to prevent fraying. Tape will not do, since it just comes un-stuck with age.

Now insert three or four strands of the wire into the cotton core so that it makes contact with the bronze tinsel. Sometimes I cut off some of the excess cotton thread, but NOT the bronze tinsel. Then I take a long single strand and insert it also in the center, then proceed to "wire wrap" the strand around the bundle. (Three hands would be nice.)

Make sure the wrap is nice and tight. Apply a bit of liquid flux, or just dip it in a flux tin. [*As with everything else dealing with electronics, make sure the flux is not acid. –WA8MCQ]* Then using some of the nice skinny low temperature solder, solder the bundle.

Next, cut off the joint to about 1/2" long and insert it into the headset and tighten the screw. Slide the heat shrink tubing into position and apply the hair dryer, flame thrower, or whatever you use on the heat shrink. *[To prevent possible heat damage to the body of the headset, it might be better to insert the wire, slide the tubing into position, carefully pull it all out of the headset and then apply heat. –MCQ]*

I have also used a slightly different method with good success. It's a very similar procedure, except not using the long single strand as the outer wrapper. This second method has worked best for me.

Three to five strands are inserted into the center of the Tinsel Wire as before, but then you thread the bundle thru a piece of 1/8" brass tubing (check your local hobby shop). I use a piece about one inch long. After threading the bundle thru the brass tubing, dip the end in the flux and solder. Just like soldering copper pipe, the flux will make the tubing suck the solder right inside. It will fill all the volume and make a pretty decent connection with the tinsel. When done, I use a Dremel Moto Tool with a cutoff wheel to make the new tip the proper length.

You did remember to put the heat shrink on the cord first and slide it down away from the working area? Otherwise you will probably find it shrunken down before it's time due to the heat of soldering.

Some of my former workmates at the telephone company have asked over the years how I manage to keep using the same cords on my test sets. Now you know.
DE **K3TKS**

INSTRUMENTS FOR MEASURING VARIOUS POWER LEVELS

In response to a query on QRP-L, Glen Leinweber, VE3DNL, gave this brief tutorial on some of the devices that are suitable for measuring RF power.

Many have asked the best instrument for measuring their rig's output power (in watts). Here's a personal opinion on which instrument is best, and its limitations. I'll cover: diode peak

detectors, oscilloscopes, and diode square law detectors.

Bolometers using thermistors or thermocouples are appropriate too, but most are laboratory grade instruments that are too expensive for ham use. These fill in the area around a milliwatt where diode detectors aren't so good. For those who want the bottom line - an oscilloscope can give you RF voltage over a very wide range, with fairly decent accuracy. It's my instrument of choice.

The setup is this; connect a rig's output to a 50-ohm dummy load, and connect some device to measure output power. You can measure peak-to-peak voltage with a scope, peak voltage with a diode detector, or temperature rise with a thermistor or thermocouple.

For 5W and above: A diode peak detector is dead simple and decently accurate. The diode's reverse breakdown voltage limits the available power you can measure. For example, if your diode breaks down at 60 volts, that's the maximum peak-to-peak voltage it can stand. Sixty volts p-p is 9 watts RF power. A modern scope's upper input range might be 5 volts per division (most have 8 divisions). That's 40 volts p-p, or 4 watts.

If you use a X10 probe, you get 800 volts p-p, but many probes only allow limited RF voltage - perhaps 100 to 300 volts peak-to-peak. I'd be cautious about using a probe to measure a rig's output power above 25W. Typical scope error is 3%, which gives a final error of 6% because you have to square the voltage when you convert it to power.

For 100 mW to 5W: The scope is excellent in this range, as are bolometers. Diode peak detectors start to give low readings (especially at the lower power end) because of the 0.6v offset required to get a silicon diode conducting. Schottky or germanium diodes give slightly lower error. 100 mW is only 6.32 volts p-p.

For 1mW to 100mW: A scope is still superb in this range. Diode peak detectors must be seriously corrected for their 0.6 v offset. Bolometers can handle this range too but it's still too much for diode square law detectors. 1.0 mW is only 0.632 volts p-p.

For .01mW to 1mW: A scope still works fine over this range but diode peak detectors are out. Bolometers find it tough going at the lower end. This is still too much power for diode square law detectors. 0.01mW is only 63.2 millivolts peak to peak.

Below 0.01mW: A scope can handle the upper end of this range, but this is the domain of a diode square law detector. Followed by a sophisticated DC amplifier, a diode square law detector can measure power output down to nearly 1.0 nanowatt. For those who don't know - a diode square law detector looks a lot like a peak detector, but it always conducts during all parts of the RF sine wave cycle. Its DC output is affected by temperature too, so a calibrated instrument is not easy to make.

Glen later sent me this e-mail-- Guru **Mike Gipe** *[K1MG, well known in NorCal and QRP-L circles as a great Source of Technical Wisdom —WA8MCQ]* pointed out that I left off one important amplitude measuring instrument--a spectrum analyzer. Perhaps a few of us are lucky enough to have one, but folks should know that it is the widest range amplitude measuring device around. It covers the range from noise level (often -90 dBm to -120 dBm, depending on bandwidth chosen) up to around one watt. Absolute accuracy may not be quite as good as a scope, but conversion of its readout to "watts" is a lot easier than having to square the voltage read off a scope.

[If you do have access to a spectrum analyzer, be sure to religiously observe the power input limitation. If the input section is damaged from excessive power, repair is not simple or inexpensive. I know; I saw the bill when one at work needed to have the input attenuator section repaired. As for some of those expensive power meters, such as the venerable HP model 432, they often appear at hamfests, albeit often at princely prices. But unfortunately they often seem to come without the special probes which can be difficult to find.]

Glen also has a web site with a lot of excellent material, including some in-depth treatment of low power measurement techniques and I highly recommend it. He also says-- I hope to keep the QRP material on my web site—

http://epic.mcmaster.ca/~elmer101

indefinitely, and add to it. The most recent addition was on high-efficiency QRP RF power amps. I'm rather excited about this direction, and wonder why so many of our tiny rigs that are run off small batteries have PA's of only 60% efficiency, when 90% isn't hard to do?

[Among other things, Glen's web page also contains a great deal of information about the hugely popular Elmer 101 project that was run on QRP-L a couple of years ago. The project, ran by Mike Maiorana, KU4QO, was to collectively build an SW-40+ QRP rig from a kit from Small Wonder Labs--operated by Dave Benson, NN1G--with everyone sharing questions, insights, tutorials, etc along the way. I highly recommend taking a look at it if you haven't already done so.]

DE VE3DNL

HANDY TEST ACCESSORIES FOR THE WORKBENCH

From me, **WA8MCQ.** This isn't so much a construction project as it is a set of ideas to use when building small items used in home brewing and experimenting, such as attenuators, high pass and low pass filters, small signal transformers, etc. No schematics or parts values will be given, since those can be found in many books and articles.

Over the years I've built a number of handy little devices with BNC connectors to be used in experimenting. For instance, before I started accumulating commercially made fixed attenuators, I built a number of my own. I've also built band pass and low pass filters, all with BNC connectors so they can be easily inserted into whatever project is being worked on.

I've used a few different construction techniques, and I recently saw another one in the June 22, 2000 issue of EDN, a well known electronics design trade journal. They have a regular section called Design Ideas featuring things sent in by readers. This issue had an item titled "Coax connectors make low-cost test pieces," by **Richard Kurzrok** (a technical consultant who is not a ham as far as I can tell). His method differs from mine in that he uses nothing but the BNC connectors themselves, no PCB stock or enclosures.

He said, "Some engineers and technicians occasionally use this construction technique, but the versatility of the technique is not well-known....The technique applies to all commercial, industrial, and educational breadboard units that require a quick and dirty implementation." It's very handy, simple and cheap, and deserves a wider audience.

Figure 12 shows my version of the drawing in the magazine. The basic idea is to take a pair of 4-hole mount BNC sockets, drill out the holes to accept long 4-40 screws (he suggests 1 1/2"), and use 3 screws and a handful of nuts and solder lugs to make an open frame. Not shown but also recommended, is to use lock washers under the nuts. Leave the 4th screw out for the time being, to make wir-

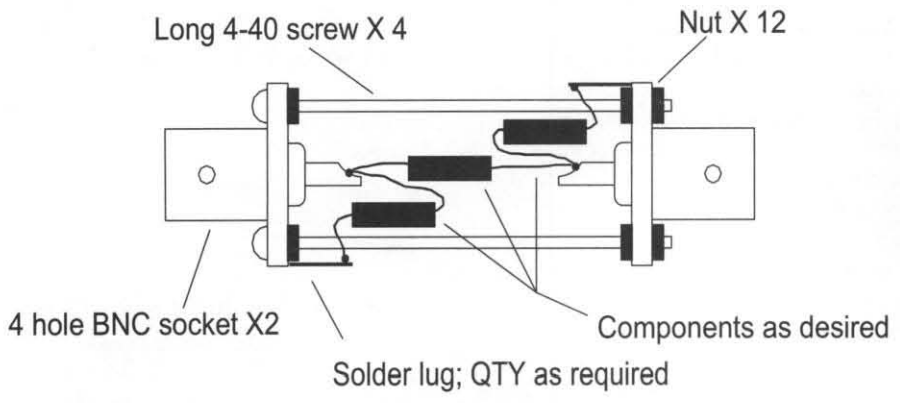


Figure 12—A simple method of constructing simple test accessories. Not shown but also a good idea, is to use lock washers under the nuts. (Not to scale. This is redrawn from an item in EDN magazine.)

ing easier. The components of the filter, attenuator, or other network are wired in place, using the solder lugs for ground as needed, then the 4th screw is installed. If shielding is needed, copper foil adhesive tape can be used to close it up.

In addition to the items already mentioned, other functions can be a simple capacitor for a DC block (something often used in electronics labs but probably rare at home), a resistor and some wire for a feed-through 50 ohm termination, minimum loss pads (converting 50 ohms to 75), or any sort of passive network in a tee, el, pi or bridged-tee format. **Figure 13** shows some typical circuits that might be built.

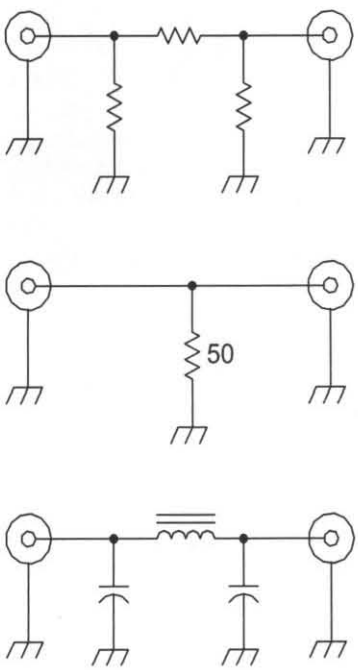


Figure 13—Typical component networks that might be built for homebrewing. Top to bottom: attenuator, feedthrough termination, 3 pole low pass filter.

His is an excellent low cost method, and I have my own cheap ways of doing these things too. But there's also the Cadillac method, which I'll show first. **Figure 14 and 15** show some devices I've built into die cast aluminum boxes from Pomona. Many of these come with BNC connectors on them, usually a pair of females, and on rare occasions a male and female pair.

While frightfully expensive new, these can often be found at reasonable prices at hamfests, either unused or stuffed with components. The trained eye can spot them from great distances. They have an easily recognized blue color although some models are unpainted.

As with everything else you need to shop around since prices can vary radically. I've paid as little as a dollar and a half for clean, unused boxes with two BNC connectors, and also seen people asking five dollars or more for beaten up units full of empty holes on all sides. By the way, these boxes are supposed to come with an aluminum cover plate although they are sometimes missing.

Figure 14 has a low pass filter on the left, one of several different models I made for various bands. The center is a dual terminator, with one watt 50 ohm resistors on both ends. (Although this is nominally a 50 ohm terminator unit, it was actually built as a special purpose device for some microwatting tests which will be described in the future.) The box on the right contains a pi network attenuator, one of several such units.

Figure 15 shows an unused box with cover at the top. The box on the bottom

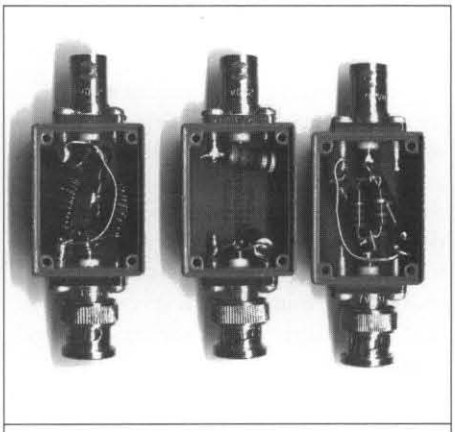


Figure 14—Left to right: low pass filter, dual 50 ohm termination, attenuator

has an extra BNC connector added on one side. That one is a 20 dB coupler. A signal is passed from end to end, and a sample is picked off the third connector at a level 20 dB lower. This gets a lot of use in testing QRP rigs by running the output through it into a dummy load and having a low level signal sample that can be connected to test equipment without damage.

Building with die cast boxes gives a better looking device, and is well shielded

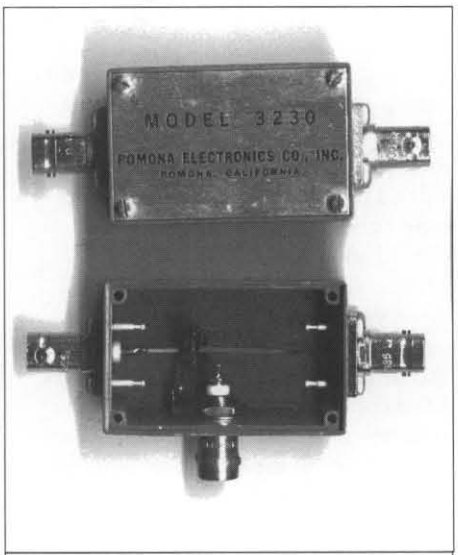


Figure 15—Typical Pomona die cast box (top), 20 dBs coupler (bottom)

and rugged. However, the average ham isn't going to spend a lot of money on new Pomona boxes, nice as they are, and you can't always find inexpensive ones at hamfests. That brings us back to the ugly but dirt cheap methods, and one involves some used BNC connectors and scraps of PCB material.

Figures 16 and 17 show side and bottom views of a 5 pole 40M low pass filter made from a pair of single hole mount BNC sockets mounted in a scrap

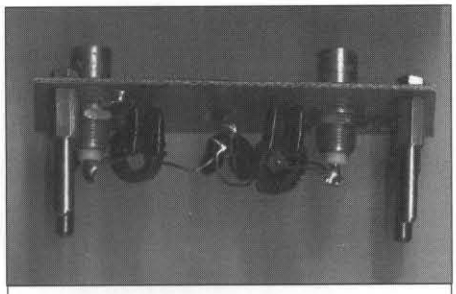


Figure 16—40 low pass filter using a scrap of PCB material and single hole mount BNC connectors.

of PCB material. (Four hole mount BNCs can also be used.) Parallel capacitors were used to get the appropriate values.

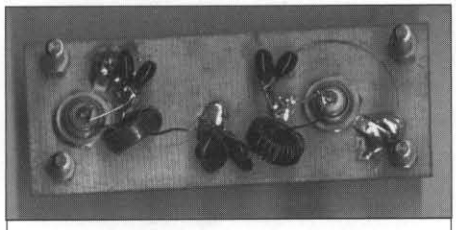


Figure 17—Another view of the filter. Extra capacitors were used in parallel to obtain the precise values needed.

The 4 feet are some sort of metal hardware found in the junk box, which have threaded studs on one end. If I didn't have them I would have used round or hex PCB spacers of any suitable length, held in place with screws. These help prevent damage to the components.

Figures 18 and 19 show top and side views of a 40M band pass filter that was used for some receiver tests. Single hole BNC connectors were used but the mounting method is different. I could have used L-brackets to hold them, but a simpler method is to use ground lugs. Many times when these sockets are removed from old equipment, they have solder lugs included. Put the lug on, tighten the nut, then bend the end of the lug over and solder it down to the copper.

Figure 18—A 40 meter band pass filter

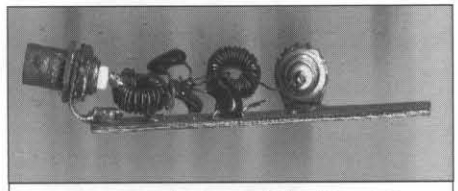


Figure 19—Side view of the filter. The BNC connectors are supported by large solder lugs with the tabs soldered to the copper.

Figure 20 shows a close-up of the technique. Some recycled connectors look terrible on the outside but still work well.

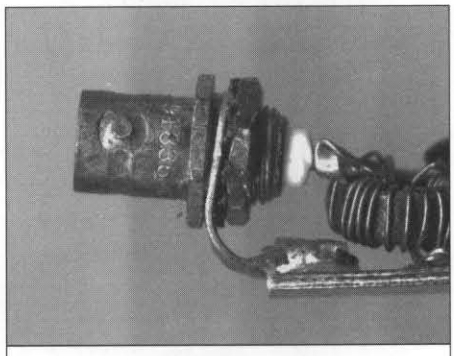


Figure 20—Closeup view of the solder lug used to hold the BNC. (Yes, this is one ratty connector on the outside but it still works great.)

The contact mating action for both the hot and ground sides takes place inside the connector, so external appearance is not terribly important as long as the connector mates properly and the insides are clean and bright, and in good condition.

The solder lugs are relatively thin and not terribly strong, and won't take a tremendous amount of abuse; they can be bent easily and could break off if flexed too much. However, for average home use they should be more than adequate and with care will last a lifetime without breaking off. If the BNC's didn't have lugs on them, you can also find suitable lugs on some potentiometers or order them from a catalog such as DigiKey. Ham fests are another possible source.

Figure 21 shows something known formally as a 4 port hybrid coupler and is handy for some experiments and tests. It's not really that esoteric a device, and many hams have something very similar and don't know it. It can be used as the basis for an SWR or power meter, and has appeared in that guise many times over the years in the pages of QST, SPRAT, et al. Probably the most well known example to QRPers is the Stockton wattmeter presented by GM4ZNX of the GQRP Club several years ago.

Believe it or not, I actually made up nine different versions of this at the same time, with different types and sizes of cores and cable, to compare the frequency response of the cores. I also wanted to see

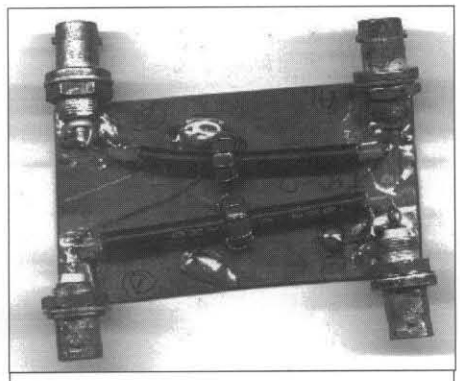


Figure 21—Four port hybrid coupler. A variation of this appears in a huge num-

what happens if you violate the cardinal rule that says to ground the coax shield at one end of the cable but not both.

Yes, that's 36 BNC connectors, but since I have a BNC fetish and a good stock of them that quantity merely made a dent in my supply. As for grounding both ends of the cable shield, it reduces the amplitude response by a fairly constant 3 dB or so across the frequency range. In a wattmeter or SWR meter, that translates into less sensitivity.

Figure 22 shows a single hole mount BNC along with the solder lug that came with it. (I've seen other styles that did not have the locking teeth and different shaped lugs.) It also shows a pair of crimp-on ring terminals, which are often available at ham fests. They may or may not have the insulating sleeve; I've bought

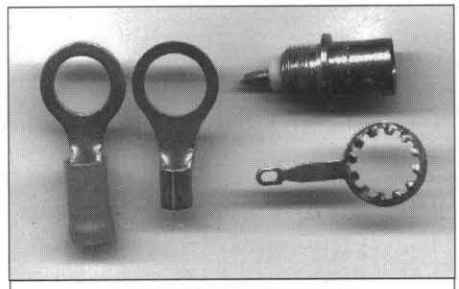


Figure 22—At left, two crimp-on ring lugs with 3/8" hole; they may or may not come with the insulating sleeve. At right, single hole mount BNC socket and the solder lug that came with it

them both ways. Get the size that has a 3/8" hole.

Regardless of the construction method used, having a number of little circuits of various sorts like this at the workbench really comes in handy. And if you don't mind using scraps of PCB material and scrounged connectors, the cost can be very reasonable.

DE WA8MCQ

QRP ONLINE

QRP-L, which I call the "QRP Daily," is the online QRP discussion forum started in 1993 by Chuck Adams, K7QO. 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 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. To check out either one, just go to the QRP ARCI home page at **www.qrparci.org.**

From the opening page, click on the spot indicated to enter the web site. For now, resist the temptation to just click on the QRP-F button on the side on that initial page. What follows gives you a bit more flexibility. After entering the web site you'll see a few rows of clickable items at the top. You can click on both QRP-L and QRP-F there.

QRP-L is an independent entity, separate from the QRP ARCI, although the club web page gives a convenient entry point. If you prefer to go to the opening page directly, point your browser to the following URL. (That's a lower case letter "L" at the end, not a number 1.)

http://qrp.lehigh.edu/lists/qrp-l/

There's been some change recently with regard to QRP-L. There used to be a web page for it run by Steve Hideg out of nd.edu (Notre Dame), but he got out of ham radio several months ago and took the page down. A new page was eventually set up at lehigh.edu, which is where QRP-L itself is hosted. It includes useful information on the various options available with QRP-L, such as the daily digest mode to bundle a whole day's traffic into a single e-mail, or the POSTPONE mode to put it on "pause" while you're out of town. You can also subscribe from there, read the HTML archives without subscribing, and look at past traffic as well.

Since QRP-L is a mail reflector, even those who have just an e-mail account and nothing else can subscribe and take part. If you only have an e-mail account, send mail to me at wa8mcq@erols.com and I'll send info on signing up for the mail reflector.

While the HTML format of QRP-F may seem a bit odd at first, those who read the QRP-L HTML archives, in the "sort by thread" mode, will feel right at home. About the only real difference between that and QRP-F is that the most recent messages are at the top of the list on QRP-F and at the bottom on the QRP-L HTML archives.

You may also "Subscribe" to QRP-F if you prefer, receiving every post by e-mail. Go to: **http://qrpf.listbot.com** and sign up there.

Regardless of the forum, any QRPer who is online owes it to themselves to check out both of these. There is a huge amount of online QRP info flying around, and has been for several years!

The fine print The standard rules apply: if you have something to share with the QRP community send it in any way you want. I take Microsoft Word files, e-mail, actual paper with words typed or printed, and even handwritten material. Some folks send in their own computer drawn graphics, others do them by hand and that's OK too since I enjoy redrawing things on the computer. Photos can be electronic in JPG or other format, or just send in real paper pictures and I'll scan them. I have the technology and the time, you have the ideas to send. Do it. • •

FDIM 2001
Call for Presentations

Planning is underway for the FDIM Symposium at the Dayton Hamvention. This will be our sixth year for this not to be missed event. FDIM 2001 will start on Thursday, May 17, 2001. On that day, QRPers will gather in Dayton to hear from some of the best minds in QRP. The symposium is an 8-hour event, which covers the gamit of QRP.

Please consider sharing your talent and experience by giving a presentation and documenting it for the FDIM 2001 Proceedings. Topics are wide open and may include design; construction projects and techniques; antennas and feedlines; operating techniques or experiences. Be creative and define your own topic! All that is required is that you present your topic at the Thursday Symposium and document it for publishing in the FDIM 2001 Proceedings.

Time slots are limited, so please submit your idea soon. If interested, please send a short description (one paragraph) of the proposed talk to me prior to February 15, 2001.

Ken Evans—W4DU
848 Valbrook Court
Lilburn, GA 30047-4280
w4du@bellsouth.net

FDIM 2001

FOUR DAYS IN MAY

May 17 – 18 – 19 – 20 at the Dayton Hamvention

QRP Amateur Radio Club, International (QRP ARCI), proudly announces the sixth annual "Four Days In May" QRP Conference commencing Thursday, May 17, 2001—the first of four festive days of 2001 Dayton Hamvention activities. Mark your calendar for these four days and register early for this not-to-be-missed QRP event of the new century. Amateur Radio QRP presentations, workshops and demonstrations will be the focus of the full day Thursday QRP Symposium to be held at QRP ARCI headquarters—the Ramada Inn Dayton South.

Here is a brief overview of the four days:

Thursday: QRP Symposium: 8:00 AM til 4:30 PM Contribution: $15.00

Topics include:

"SMT Construction"—George Dobbs G3RJV

"Interference to Amateur Radio"—Ed Hare W1RFI

And more—monitor the QRP-F, QRP-l and QRP ARCI web site (http://www.qrparci.org/) for details on other presentations.

Thursday Evening: Author Social, 7:00 PM till 11:00 PM—No Charge

A chance to meet and talk with the QRP Symposium Speakers

Friday Evening: Vendor Social, starting at 8:30 PM—No Charge

Friday evening has been set aside for QRP Vendors. Here is a chance to eyeball the latest equipment and talk with the vendors.

Saturday Evening: QRP ARCI Awards Banquet* - 7:00PM to 9:00 PM - $25.00 per ticket

Saturday evening starts with the annual QRP ARCI Awards Banquet honoring QRPers who have made major contri bution to QRP & Amateur Radio. We will also announce the winners of the various "build-it contests". Fantastic "door prizes", great speaker, tons of fun - be there.

(* NOTE: This is a change from Friday to Saturday.)

Later on Saturday Evening: Display of the Building and Design Contests entries and winners, PLUS the Radio Show—FREE! Saturday evening provides time for QRPers to socialize with the QRPers from around the world. Show off your projects and collections at the Radio Show!

All entries to the building and design contests will be on display. This year we have two general categories:

1. Wide open category - bring your latest homebrew or kit project.
2. The second contest is "in the works". Monitor the QRP-F, QRP-l and QRP ARCI web site (http://www.qrparci.org/) for details.

Please use this form to register. Complete and send with a check made out to QRP ARCI to:

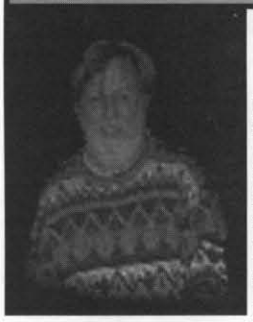
Ken Evans
848 Valbrook Court
Lilburn, GA 30047

	# tickets	
FDIM Seminar	_____ @ $15.00 = _____	**Name** _____
Awards Banquet	_____ @ $25.00 = _____	**Addr** _____
	Total Enclosed = _____	**City** _____
		Call _____
		E-mail _____

(Please include e-mail address for confirmations.)

RAMBLINGS OF A PEAUX DISPLACED CAJUN LAD IN MAINE

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



High Y'all! Did I tell y'all bout my last home brew project... yea man, I put some bells and whistles in that little critter, even had a reverse polarity diode on the power input of the little critter... I grabbed my marine battery and stuck a 20 amp fuse in the line and hooked it up to my project...

Well sheaux nuff when I connected things I heard poof... blew the 20 amp fuse... and u thought it was too high huh... anyway I replaced the fuse and reversed the polarity of my dc plug and hooked the thing back up and turned the switch on... U kneaux I didn't think sumthin that small could make so much smoke! Even the fire department thought its smoke content was exceptional....

Ever watch a printed circuit board slowly burn while resistors smoked and cracked... heck even some of the metal cased transistors had hot spot marks on top of them... seems two things went wrong... I had the reverse polarity diode reversed... an't that novel! Then I had my battery charger set for 24 volts instead of 12 volts... oh, the vent caps on the battery blew across the room also... Scared me so bad they heard me down the block when I yelled "Incoming" and dove under the bed... took two firemen an hour to talk me outta there...and it was too weeks before my lovely cajun belle would let me back in!

Enough of this serious talk... Let me told u about my PSK operations... no not them other operations... let's stick with radio stuffs... U kneaux I went through three computers before I figured I had better isolate the grounds between the computer and radio... I finally got the audio from my QRP++ to the computer sound card and the output of the sound card to the QRP++ and used a little switch for keying...I kneaux it's not fancy but I remembered my last fancy project... yea, now u understand...

I went and tuned up on twenty meters... somewhere around 14.070 Mhz and listened and watched... I was told the software included a waterfall so I put the monitor inside a big pizza pan to catch any overflow... and I watched... sure nuff I could see these lines coming down the waterfall and this funny humming sound and stuffs started printing on my computer screen... PSK-31... I'm in the jet age... KE4— calling CQ the screen said... so I flipped my switch and called him right back... then I waited...

Ke1la de KE4—then he said u overdriving ur rig... u got railroad tracks all up and down the waterfall over here... so I sent him a big thank u and asked him just what that meant... rr tracks up and down the waterfall... He was nice and explained the thing to me and I cranked down the sound card output... and we conversed for a while...

What I didn't kneaux was my cousin and his girl friend (they be in the Sunday choir at church) were behind me and listening... when I got through they asked me to hook my sound card input up to a mic so they could try sumthin.... so I did... Boy was that sumthin... That young fella hummed a note what showed up on the waterfall and his girl friend chimed in and matched the warble they had been listening to...

It was truly amazing, my computer started printing out mary had a little lamb then some words I won't repeat... seems the little gal couldn't control what she said... What a shame... we coulda had a PSK choir or sumthin....

That PSK-31 stuffs be real nice folk... little power go a long way... kinda like being sheriff, or mayor or sumthin... iffin u got the chance, give it a shot... u gonna be glad u did... and don't reverse ur reverse polarity diode...

Y'all be good now.... • •

CODE WARRIOR

Paul Christensen, W9AC **paulc@mediaone.net**

Several years ago, the Northern California QRP Club ("NorCal") introduced an iambic key in kit form, based upon the design of Wayne Smith, K8FF. NorCal's offering was timely in that relatively few vendors were producing small, precise, and reliable iambic keys for the growing world-wide portable QRP community. Some of the more notable attributes of the original NorCal key are its small size, tactile and responsive paddle action, use of machined brass sleeve bearings, magnetic paddle tensioning, and yes...it's very wide paddle spacing. A second production run of the NorCal key was offered with a narrower paddle spacing: the finger pieces were moved from the outside of the lever arms to the inside.

After NorCal discontinued the kits, Wayne and Mitch Mitchell, W4OA and President of The Vibroplex Company, teamed-up to produce the Code Warrior Junior. The Vibroplex Code Warrior Junior is an improvement on the original K8FF design and is now offered only as an assembled product.

The most significant improvements over the original NorCal key are the use of silver contacts and the narrower paddle spacing. The original Norcal key uses stainless-steel hardware for the electrical contacts and I believe the original finger piece spacing was well over an inch. The Code Warrior Junior uses silver contacts, but the contacts may not be pure silver because when contact is made, there is a nice "tick" that clearly indicates the absolute end of travel. This is important to me since several iambic paddles I've used in the past (including my Brown Brothers BTL) use pure silver contacts that have a soft contact closure.

The Code Warrior Junior's paddle spacing is approximately 5/8-inch, which to many operators represents a significant ergonomic improvement over the wide paddle spacing of the original NorCal key . The Code Warrior Junior's paddle finger pieces are composed of 3/16-inch polished acrylic or Plexiglass composition; there's absolutely no paddle "flexing" whatsover. This is another important consideration to me. I hate using a paddle that has any flexing, even if ever so slight. I simply cannot achieve CW speeds in excess of 30 WPM if there's anything but a rock-solid feel to my sending. This is why I eliminated several other iambic keys from consideration for my future portable QRP operations. Until now, I had been

using the "Galbraith Project" key from the New Zealand NZART group. Although it is engineered and constructed very well using silver contacts, the paddles do flex slightly. The Code Warrior Junior's heavy steel base is painted black in a wrinkled texture and four rubber feet are used to securely hold the key in place.

The overall fit and finish of the Code Warrior Junior is about 7 on a 10 scale. While the brass components are brushed and polished, the cutting tolerances are simply abysmal. On my Code Warrior Junior, it appears as if someone took rectangular brass stock, placed it in a vice, and began cutting with a hacksaw; the corners are anything but perpendicular. On the other hand, the brass knurled screws and nuts are machined quite well. Despite the tolerance issue, this does not detract from the precise feel of the key. The brass sleeve bearings work remarkably well and the action is nearly as crisp and precise as by WBL V22 and Hensley Round Presentation.

At relatively light to moderate magnetic tension settings, the return force feels "linear," although the magnetic return is in fact a function of the magnetic inverse-square law. If the key is adjusted for heavy tensioning, closer proximity between the magnet and the lever arms is required. Under this condition, the paddle feel can become a bit "sticky." In other words, much more additional force is required to initially move the levers until enough distance is achieved in order to reach a more linear point in lever arm travel. Unless you like an exceptional amount of return force, the Code Warrior Junior's tensioning feels as smooth as any spring-based iambic key I've used.

My Code Warrior Junior did not work properly out-of-the-box. I believe Vibroplex has a quality-control issue that's worth mentioning: the painted base should be masked at the point where the ground/shield connect screw attaches to the base. Additionally, a stainless-steel lock-washer should be added between the head of the grounding screw and the base such that the lock-washer/screw combination will bite into the base and provide for good electrical contact. Once I removed the paint at the ground lug connection point, the key worked properly.

I might also add that in six weeks of regular use, the key has not come out of adjustment. Many keys that are subjected to light physical shock and environmental changes can easily come out of adjustment. Since our equipment is oftentimes subjected to less than perfect conditions, these considerations can become relevant when choosing a key for outdoor portable QRP activity.

So far, I have been very pleased with the Code Warrior Junior and for me, it's the perfect key for my portable QRP activities. • •

Vibroplex Co., Inc.
11 Midtown Park, E.
Mobile, AL 36606-4141
(334)478-8873

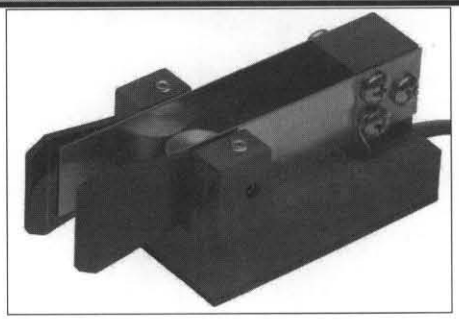
PADDLETTE KEYS

Denny Morales—AD6EZ **ad6ez@arrl.net**

So you want to get out there and operate mobile CW, eh? You have everything you need to get going including that five pound shinny chrome key with the nice red plastic finger and thumb pads. No problem, you can strap it to your leg with bailing wire and duct tape. Sure it's a bit inconvenient, but what the heck, no body said that CW-on-the-go would be easy, right?

There is a better way. We QRPers are an ingenious bunch. If we can't make "it" smaller, then someone else will do it for us. This IS where the Paddlette comes in and that is what this article is all about in the first place.

Bob Hammond has been producing two very small sets of paddles for some time now and I do mean small. If you were to classify them in terms that we can relate to then the larger Paddlette would be the QRP model and the **Paddlette BP**, it would follow, must be the QRPp version. Both are very similar in every way except size. I own the "QRP" version and I have used it exclusively while operating my Wilderness Sierra. Now, it is mounted on the top of my Radio Shack mobile scanner – sandwiched between it and my FT-100. When using it with my QRP rigs I attach it to an Altoids tin half filled with steel washers for weight, using its



magnetic base to keep it from crawling all over my desk. While mobile the leg strap should work FB but I haven't tried that.

The QRPp model better known as the Paddlette BP is a bit trickier to use. I say that with some reservations because this is a very subjective opinion. Both units have a magnetic material glued to the base of the unit, which makes it very convenient to position the key to your liking when using the leg strap and magnetic self-adhesive strips supplied with either key. However, due to the small "footprint" of the BP model there isn't enough magnetic hold-down force to keep my big paws from pushing the key all over my operating desk. I actually have to use two hands to operate it – left hand to hold on to it and send with my right. As you can well imagine, that technique really makes the XYL somewhat uneasy while driving 65 MPH down the road.

That brings up another point. It's tough enough to copy in ones head without someone sitting next to you screaming hysterically every few seconds. If that wasn't bad enough, when the key slips out of your hands onto the floorboard and you bend over to recover it, she seems compelled to lunge for the steering wheel. Of course this causes the vehicle to suddenly change course and simultaneously sending your body in the opposite direction. You quickly and dramatically come to understand the meaning of the term "G-force" while realizing that the strangling sensation caused by your seat belt will subside once she has the vehicle back on to the roadway. So you just wait it out once you have the key safely in your hand.

All kidding aside, the BP should be a fine set of paddles if you have a lighter touch than I do or are at least use it long enough to get comfortable with the key. If you backpack, weight is always a primary consideration. The BP unit weighs in at a mere ounce – a whapping 33 percent lighter than its "bigger" brother.

You can see these keys on the web at: **http://home.att.net/~goodroe/paddlette/** (specifications & prices). Direct questions via e-mail to Email Bob at: **bham379627@aol.com. (See ad in this issue)** • •

QSY BOX

Mike Branca—W3IRZ **w3irz@att.net**

You know once I get started (that's the hardest part) on something I usually stick with it until I either I get it going great or find the reasons why I will avoid it in the future. My past experience with VXO's have convinced me that it is easier to build a good VFO than a good VXO. My two most disturbing VXO problems are: first their unpredictability and second the occasional jumps in frequency while tuning. Add to this is the tendency (at least for me) to chirp when used in a keyed oscillator.

Chapter one: The problem

Now for the current topic. It was fun to do the "NoGa Twin Tube 80" that was in the QRP Quarterly in October 2000 but when I tried to check into the NoGa net recently I was unable to be heard by net control as both of my 3686 KHZ crystals were out of his RX bandpass. So it was time to take a look back at VXOs. Sam, AE4GX, mentioned that he pulled his crystal down to the net frequency with a series 100uh choke and no variable capacitor. That's the beauty of this hobby in that we can learn from each other. After about an hour of experimenting I have determined (from Sam's lead) that we have been going after this VXO thing in the wrong manner (IMHO) and that is why our success has been limited. The proper way to change a TX crystal is with step tuning provided by a rotary switch. Using chokes in the values of 22uh, 30uh, 50uh, 70uh I was able to swing an HC-6 crystal (from an old modem) 2.4 khz and swing an HC-18 crystal (DigiKey) 1.3 kc which is enough to find the net.

For the HC-18 crystal—3686.4khz:

3686.4	no choke
3685.9	50uh
3685.7	70uh
3685.1	70uh + 30uh = 100uh

For the HC-6 crystal:

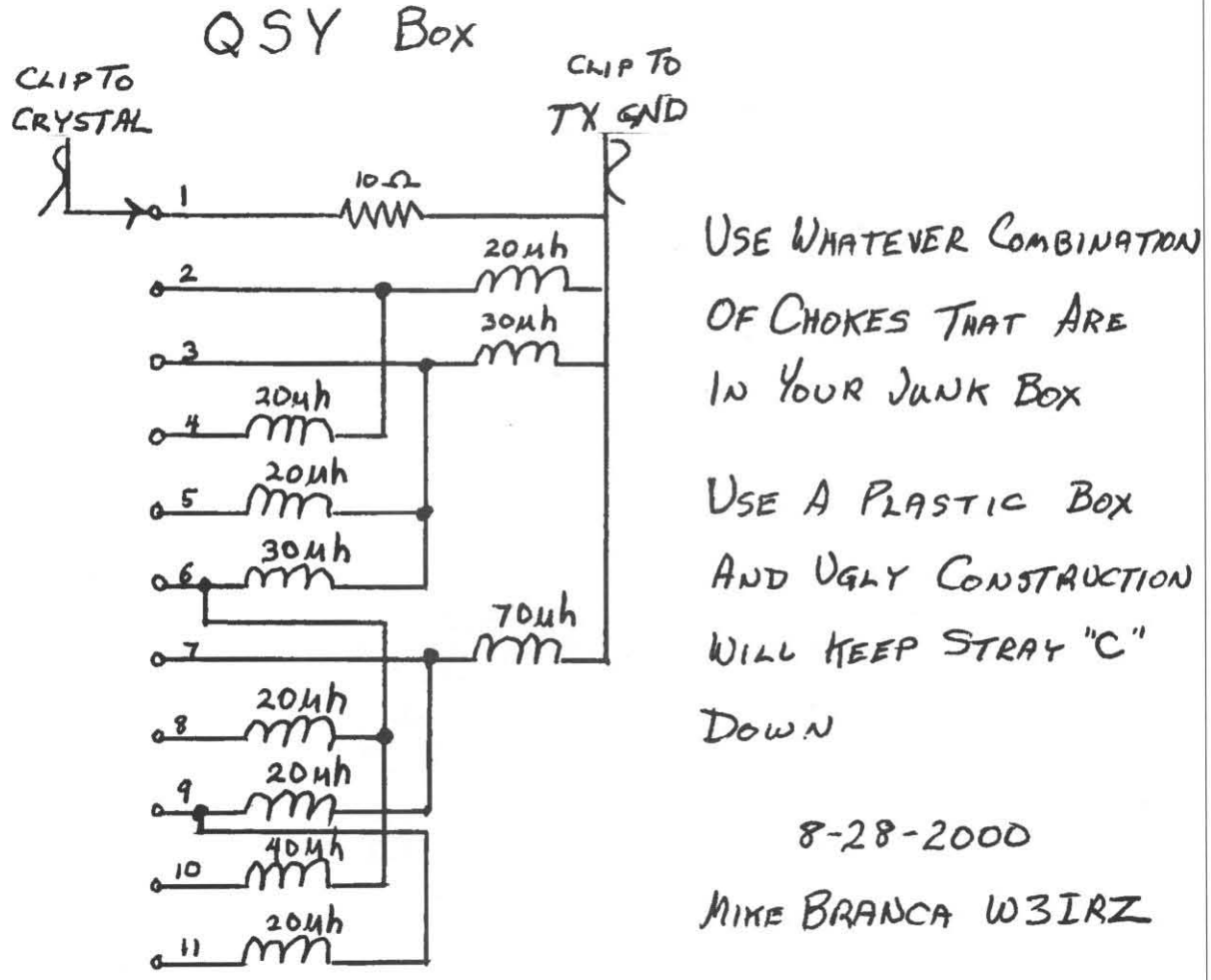
3687.5	no choke
3687.2	22uh
3687.0	30uh
3686.7	50uh
3686.4	30uh + 30uh = 60uh
3686.1	70uh
3685.9	50uh + 30uh = 80uh
3685.4	70uh + 22uh = 92uh
3685.1	70uh + 30uh = 100uh

Now for those who say that the swing is not great remember that we are keying a transmitter and the oscillation start has to be reliable without hesitation or chirp. In a receiver where the oscillator runs constantly you can get a greater swing. You can see the same thing in the SMK-1. I tried to wire this up with an FT37-43 with 15 turns and taps on 5 thru 15 however the Q with 43 material is too low and it failed to operate so I stuck with the chokes in my final design. BTW when using the HC-18 crystal with no choke there is a slight frequency chirp indicating crystal heating. This can be cured with the addition of a 10 ohm resistor in series with the crystal (from Bob AC5AM). When experimenting with this idea you may try to get two crystals with one being cut for series resonance and the other cut for parallel resonance.

When mentioning chirp remember that there is two kinds of chirp. The first is frequency chirp that is most noticeable and annoying. The second is the amplitude chirp caused by the unregulated power supplies that most tube rigs use. This is most noticeable with slower CW speeds. Often both types of chirp occur simultaneously. The only chirp I am concerned with here is the frequency chirp. (The amplitude chirp is fixed by improving the power supply regulation with a heavier transformer current rating, bigger filter capacitors, more loading like a bleeder with a lower resistance, operating only high speed CW or any combination).

Chapter two: The QSY Box (Named by Jerry—W0PWE)

Well I am all done now and I was able to check into the NOGA net on Tuesday. I started with a cute little yellow plastic box with crystal clips, 11 position rotary switch and a short cord with a plug to go into a crystal socket. It was wired to add inductance in series with the crystal starting with a 10 ohms then going to 20uh and then going in 10uh steps to 110uh and this gave me the opportunity to use all of the assorted non miniature chokes that have been accumulating over the years. I put various values in series to get the required values. Well it did not work - too much stray capacity in the plug and cord. So I rewired it to put the common of all the inductors to the ground clip. The wiper of the switch went to the other clip. To use this box you un-ground the ground lead of the crystal and insert the box between the ground side of the crystal and to the TX ground. In other words one side of the crystal must always connect to the tube grid. Now, depending on the crystal used, you get 200 to 500



cycle steps between switch positions. Now I should be able to be easily heard by NCS with this degree of closeness.

Now a word about crystals. If you buy a parallel resonant crystal (usually indicated by: load pf, parallel, or no statement) then the actual frequency may be 3686.0 because the two tube TX I designed had a 32 pf circuit. Now you may be wondering what happens when you plug in a 3686.4 khz crystal that is marked for series resonance. Well in this circuit it comes out high at 3687.5khz which is exactly what I wanted so I could pull it down to the net frequency. The crystal I am using is from DigiKey #XO80-ND series resonant at 3686.4khz—only $0.64. I get 200 cycle steps with this one.

This switch and pile of old and new chokes ideally should be installed inside the transmitter and mounted under the crystal socket. My next tube 5 watt (for NCS) rig will have this feature built in.

••

Mike Boatright—KO4WX ko4wx@mindspring.com

FROM BUSH HOUSE...

Recently, I traveled to London, England, on business (yes, I am a road warrior). I took my DSW-20, coax antenna, and CEPT required documentation and was all ready to operate as M/KO4WX/P. Alas, my hotel accommodations didn't accommodate operating amateur radio. But I did get to do the tourist thing one day (it was my first trip ever to London)—can you guess where I went first? Bush House--home of the BBC World Service—of course!

Like many in the hobby, I've been a shortwave listener much, much longer than I've been licensed to transmit. I remember building my first crystal set at somewhere around seven or eight years of age. And when I was eight, my grandparents gave me a Radio Shack shortwave radio kit (Anybody out there remember that kit? Anybody got one they'd like to let go of?). Living on five acres (in the Midwest), I had several hundred feet of wire strung amongst the trees. I would sit for hours glued to the BBC, Radio Moscow, Radio Canada International and the like. Today, over 33 years later, I drive around Atlanta listing mostly to the BBC on my IC706.

So while I find transmitters very interesting, to me, receivers are *magic*. I've collected them for years (an Atwater Kent sits prominently in my shack), and am always a pushover for a new receiver project. It's only appropriate then, after spending so much time writing about the NOGAnaut transmitter, to give it a companion receiver.

Steve Bornstein, K8IDN, introduced the MRX-40 "mini receiver" in the September, 1997, *QST*. The receiver was kitted by the Columbus QRP Club. It has made a comeback recently, as an excellent companion to the Tuna Tin 2. It is the classic minimum parts, NE602-based, direct conversion receiver. In this article, I'm going to take the MRX-40 and convert it for use on 80 meters as a companion to the NOGAnaut.

Schematic:

The same basic circuit is used. However, some modifications were used due to parts availability and some performance improvements were made as well.

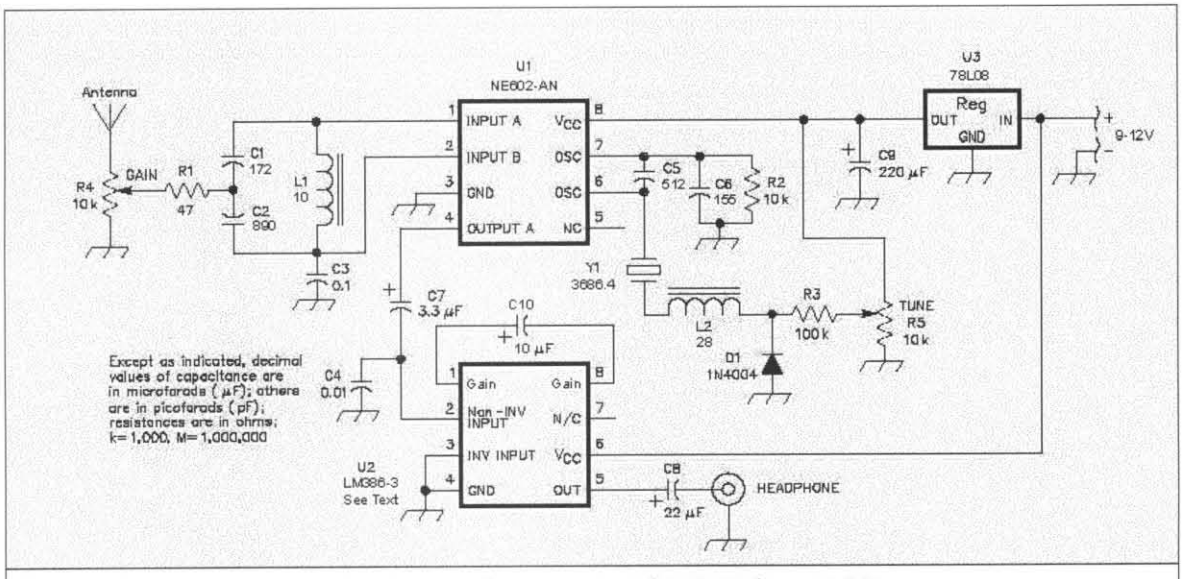


Figure 1. Schematic for converting the MRX-40 to 80 Meters

MODIFICATIONS

Component Changes:

1. U1, the NE612 was replaced with a NE602. Either component will work in this circuit, however, the NE602 has 4 dB more conversion gain than the NE612.

2. U2, the LM380 was replaced with a LM386. The LM386 is a more easily obtainable part (available at most Radio Shack stores) than the LM380N-8. However, it does have less power output. The LM386-3 provides up to 700 mW of power, more than adequate for headphone use. Note that C10 was added to the circuit to boost the LM386 gain to 46 dB (200).

3. U3, the 78L06 was replaced with a 78L08. Either component will work in this circuit, however, running the NE602 at 8V yields an extra 1 dB of conversion gain.

RF Component Scalings

1. C1 – scaled to 172 pF (Xc = 250 Ohms); not a standard value, but can be made using a 150 pF and a 22 pF (or 20 pF) in parallel, or a 180 pF would probably work also.

2. C2 – scaled to 890 pF (Xc = 48 Ohms); not a standard value, but can be made using a 820 pF and a 68 pF (or 82 pF) in parallel.

3. C5 – scaled to 512 pF (Xc = 84 Ohms); not a standard value, but 470 pF works just fine as a replacement

4. C6 – scaled to 155 pF (Xc = 277 Ohms); not a standard value, but 150 pF is plenty close enough

5. L1 – scaled to 10.6 uH (Xl = 246 Ohms); can use standard value 10 uH molded inductor

6. L2 – scaled to 28 uH (Xl = 660 Ohms); can use standard value 27 uH or 33 uH molded inductor

"Manhattan"-Style Construction

The original MRX-40 PC board layout measured 1" x 2", which is a little tight for construction (especially Manhattan-style construction). You should "stand on end" all resistors, inductors and the diode. Use the smallest capacitors you can—there are no voltages over 12V to 15V (depending on supply).

Install the NE612 and the LM386 first. Then work outward from the center of the board, first installing the capacitors and L1 and L2. Then install Y1, R2, wire to AF and ANT pads, R3, R1, U3 and then finally, R4 and R5. Finally, install wire for power supply and ground wires and wire ANT and AF wires to appropriate jacks.

The 1N4004 diode works like a *varactor diode*, i.e. it changes capacitance as its reverse bias voltage is changed. In this circuit, R5 varies the reverse bias voltage on D1, and yields a tuning range of approximately 1 to 1.5 KHz. Your results might vary, however, this should be sufficient to zero beat the NOGAnaut and make a QSO.

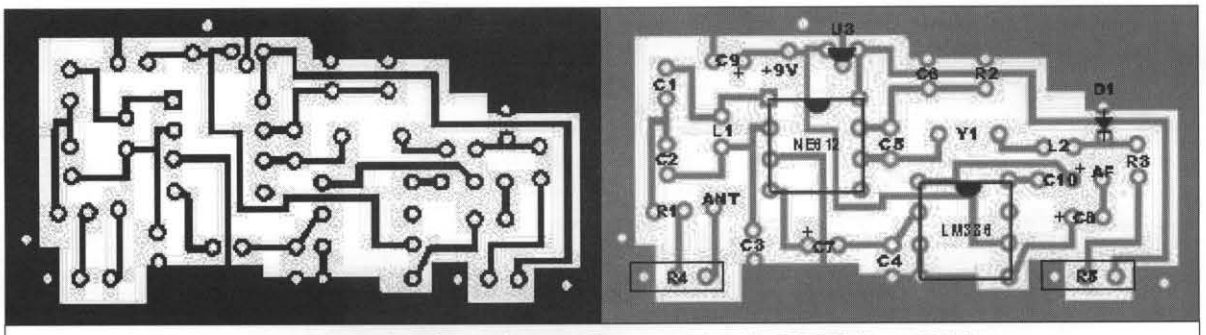


Figure 2. PC board and parts layouts for converting the MRX-40 to 80 Meters

It won't get the BBC, but it will get your NOGAnaut on the air. So it's time to get QRV!

Hope to CU soon on 3686.4 KHz! • •

THE PK-3 KEYER FROM JACKSON HARBOR PRESS

Cam Hartford—N6GA **Camqrp@cyberg8t.com**

This review originally appeared in the July 2000 issue of the Adventure Radio Society's online magazine, ***The ARS Sojourner*** *(http://www.natworld.com/ars/). It is reprinted here (with some minor changes) by permission of the author and the ARS.*

Electronic keyer chips have become so small and so feature-laden that it's now common practice to have a keyer built into just about every rig you own. Even the smallest of rigs, such as the NorCal 38 Special, have room for an 8-pin chip to do all your keying chores.

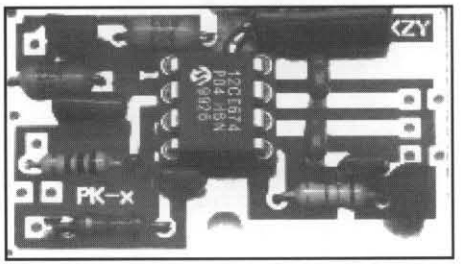
It was not always so. The first keyer I built was the WB4VVF Accu-Keyer, which required something like six 14-pin chips, an AC power supply and a hefty box in which to carry it all. We thought it was a pretty nifty device at the time, rather compact when compared to the tube clunkers of the day.

Since then keyers have shrunk and their capabilities have grown. The Super CMOS keyers marked a quantum jump in keying technology. One chip, numerous features, several memories and peanut power consumption made them an unbeatable combination. My CMOS Super Keyer II is probably over ten years old and is still my keyer of choice for contest work.

But tiny built-in keyers are now the chips of choice for portable work. No need to carry along an extra box when the keyer is already in the rig! At last count, there were seven rigs in the N6GA collection with internal keyers – a 38 Special (TiCK), NorCal 40 (KC-1), Small Wonder SW-40 (KC-1), an SST (KC-1), a Sierra (KC-2), a NorCal 20 (TiCK) and a Red Hot 40 (PK-3).

Never heard of a PK-3? I hadn't, either, until I saw it mentioned on QRP-L email reflector. The PK-3 is an 8-pin PIC-based keyer that is an exact drop-in match for the TiCK. The words that caught my eye were "pot speed control." I enjoy the usefulness and small size of the TiCK keyer chip, but for contest operating, I really miss a knob for controlling my speed. Having a knob to crank on is especially useful in QRP contests where you can encounter a wide range of code speeds. I like to answer a station at the same speed at which he is calling, and with a knob I often end up adjusting my speed as I'm making my call.

The PK-3 is sold by Jackson Harbor Press and contains an amazing number of features for such a tiny little package. The



instructions for operation run about six pages. Inputting commands to the keyer involves a push of the "Keyer" button on the radio in conjunction with a squeeze of the appropriate dot or dash paddle. I know I'll never remember all the commands, so I copied the command menus and had them laminated so I can carry them around like little cheat sheets.

The PK-3 chip can be purchased by itself or with a complete PC board kit (see photo above).

To replace a TiCK with a PK-3 chip and add speed pot operation, you need three external parts: a 100K pot, a 1K fixed resistor and a .01 µF capacitor. These items need to be connected to Pin 2 of the chip. I planned to use the PK-3 in my Red Hot 40, which is designed with Pin 2 of the keyer chip grounded. To avoid lots of delicate surgery, I chose to insert the chip with Pin 2 "flying"; that is, with it bent up in the air while all of its siblings are inserted in the appropriate holes just vacated by the TiCK. I soldered a Molex pin on the end of the wire coming from the speed pot, then slipped it over Pin 2 of the chip.

The only difficult decision of the whole procedure is where to locate the speed pot on my Red Hot 40. I chose an empty space on the front panel, but then had a tough time applying drill bit to that nicely anodized red faceplate. The result is a slightly more cluttered look, but I'll get used to it.

I can now crank my speed up and down to my heart's content. As an added bonus, the PK-3 offers an auto character space feature, which I got used to with both the Accu-Keyer and the CMOS Super Keyer. I feel truly spoiled.

The PK-3 chip with instructions is priced at $8.00 plus shipping. The complete PC board kit is priced at $20.00 plus shipping. Both are available from:

Jackson Harbor Press
RR1, Box 91C
Washington Island, WI 54246
Email: jacksonharbor@att.net
URL: http://jacksonharbor.home.att.net • •

Edited by W1HUE

TEST TOPICS...AND MORE

Joe Everhart—N2CX n2cx@voicenet.com

Test Topics and More No. 6

This month we have several interesting topics to discuss. The DFT section will continue with the project presented last time. In order to fully cover the design background and describe its construction and checkout we won't finish it until the next installment. As mentioned last time as well, some aspects of the project will spill over into my Joe's Quickie segment that is part of Mike Czuhajewski's Information Exchange column. Shucks, trying to do it all at one swell foop would mean taking over most of this journal! There is a tie-in between the CTT and DFT sections, as you will see shortly. Unfortunately the S&R area will have to once more be delayed until a future column. But when it does appear I think that you will find it interesting and useful. It will discuss a troubleshooting aspect that can be very frustrating if you overlook a "feature" of modern printed circuit board technology.

Coming To Terms – Terminal Voltage

Terminal voltage per se is not really a common term. However it's the best overall description of what I want to discuss. As presented in the very first TTAM most test equipment falls in either of two categories- stimulus or response. Stimulus equipment is things like signal generators and power supplies that produce a controlled signal or operating power. And response equipment consists of voltmeters, oscilloscopes, spectrum analyzers, etc., which observe how whatever you are testing responds to the applied stimulus.

One important characteristic of the stimulus end of testing is just what output does the stimulator produce? Generally this is a voltage that appears at its output terminals – see, that's what I mean! But the value that you get is not always what you think.

With power supplies it's easy. There is either a control panel or meter that monitors the output voltage (and often current, too) displaying it directly. Most power supplies are intended to efficiently provide operating power so they try to produce the same output value, usually voltage, no matter what the load.

A little thought can convince you that this implies a low *internal impedance.* If the voltage source had high internal impedance (think resistance for DC) the more current you load the supply with, the more is dropped internally. So since you usually want the voltage to *not* drop with loading the internal resistance is kept low. The bottom line is that the voltage you see at a power supply's output, the *terminal voltage*, is ideally constant regardless of the load.

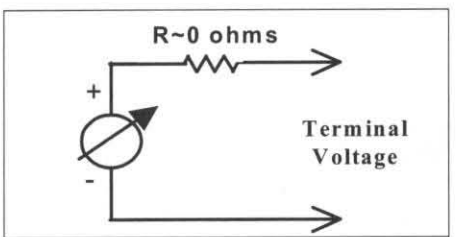


Figure 1 - Power supply equiv. circuit

Figure 1 is an equivalent circuit for such a power supply. The circle at the left is an ideal voltage source (zero impedance) while the resistor shown depends on the individual supply but has to be much less than the lowest resistance load that the supply will see. The ideal voltage source voltage is the same as the power supply terminal voltage.

On the other hand most good signal generators do not behave this way. Signal generators, whether they are audio or RF-type devices, most often are used in impedance-matched systems. Audio systems frequently operate at 600 ohms (except for microphones, loudspeakers, headsets and some intercoms) and the sources, twisted pair audio cables, filters and loads in them all operate at that same impedance level. Similarly the most common RF operating impedance that hams see is 50 ohms. Again, signal sources, coaxial cables and other signal handling components all exhibit the same impedance.

So signal generators in these systems **do not** have the same low output impedance that DC power supplies do. What this means is that their rated terminal voltage is what you will see when they are driving a load at their rated impedance. The (output) terminal voltage will not be the same value when they feed a different impedance load. So in order for the generator to supply its rated terminal voltage into its rated load, it can be represented by the equivalent circuit of **Figure 2**. The circle at the left is an ideal voltage source (zero impedance) while the resistor shown is the rated system operating impedance (600 ohms for audio and 50 ohms for

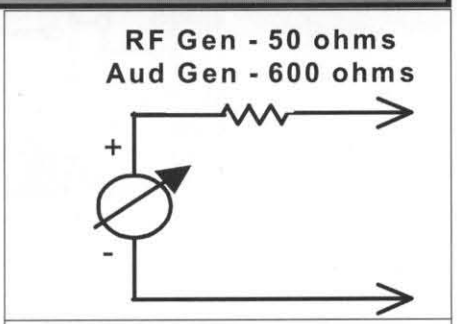


Figure 2 - Signal generator equiv. circuit

RF.) The ideal voltage source voltage has to be twice the rated terminal voltage.

There is a connection to the DFT part of this column, believe it or not! The signal source is designed to be a pretty good 50-ohm source with calibrated output levels. So the calibration process will require terminating the outputs in order to ensure accuracy. And if you use the source with a load that is not 50 ohms, the output level will not be the calibrated value.

Note that I didn't mention waveform function and pulse generators. Like power supplies they do not feed impedance-matched loads so they usually have a low output impedance. A future column will discuss these devices and compare overall characteristics and uses of a whole spectrum of signal generators.

Designed For Test

We are not quite ready yet to complete construction of the weak signal source. Hmmm maybe we could call it the pianoforte, which literally means loud and soft since it sources both strong and weak RF levels!

Well, maybe not...

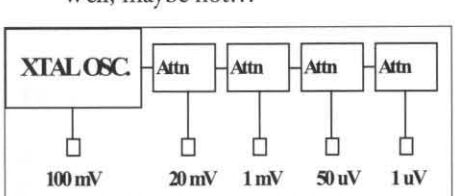


Figure 3 - Signal Source Block Diagram

Figure 3 is a block diagram of the signal source. If you compare it to the one from the last column, you will not an extra output and this time the output levels are listed. Each level shown is what the source will supply to a 50-ohm load. The strongest signal is directly from the crystal oscillator and is 100 mV which corresponds to –7 dBm. (Actually 224 mV or 0 dBm would have been handier but diffi-

cult to get with only a 5-volt power supply voltageÖ) The next two levels are 10 mV and 1 mV, both of which are rather strong RF signals. The fourth is 50 uV which is the defined voltage for an S9 receiver S-meter indication. The weakest output is 1 uV, an ordinary value for a weak signal. Note that there is no switch to select which output level you want. You have to connect a cable to the connector, which has the desired output. Incorporating an accurate way of switching an attenuator chain with this high a range is a formidable task that has been circumvented by the simple expedient of using individual outputs.

As was pointed out in the last column a very important aspect of test equipment and test measurements it the ability to express what you are generating or measuring with known accuracy. A recurring theme in TTAM will be: ìHo w can the average home-brewer do this with minimal facilities at his disposal?î A prime design goal of the weak signal source is to do calibration with only test equipment found on most home-brewerís workbenches. Generally the most accurate item is a digital multi-meter capable of measuring AC or DC voltages to a precision (and hopefully accuracy) of about 0.1% or better. The methods that will be described rely mostly on accurate DC measurements.

The tactics will be two-fold: First the output of the crystal oscillator will be accurately set to 100 mV. Fortunately this is easy to accurately measure! Next, attenuation of the resistive attenuator cascade will be tested and adjusted stage by stage using DC voltage measurements. Exact details of the measurements will be described in a future installment. This time around we will present the theory behind the techniques.

RF voltages can be easily measured using a simple diode detector such as the

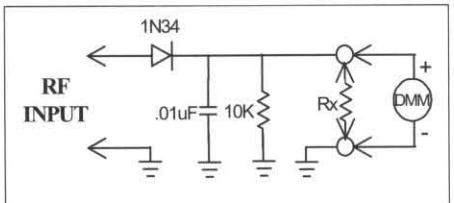


Figure 4 - RF detector

one in **figure 4**. It rectifies the sine wave input signal to produce an output DC voltage that can be read on the DMM (Digital Multi-Meter.) For RF levels of several volts or more it accurately produces a DC reading equal to the positive peak value of the input. (That is 1.414 times the RMS sine wave voltage.)

A 1N34 diode is used since this commonly available diode has a low forward drop. The 10K resistor acts as a load with a relatively low resistance so the low reverse resistance of the 1N34 has minimal effect. The .01 uF capacitor stores the peak sine wave voltage. A second resistor Rx is shown across the output. Its use will be described shortly.

With input voltages of less than a couple volts, the diodeís inherent forward drop (about 0.2 volts) produces an increasing loss of measurement accuracy. You would think that when the RF input had a peak value of less than 0.2 volts (about 0.14 volts rms) there would be no rectified output at all!

Fortunately this is not the case. There is *some* diode conduction even with low levels but it decreases rapidly at low input voltages. For a detailed description of this see the excellent piece in Ref 1 written by KI6WX. I highly recommend both this article and Ref 2 another very good one by the same author. By the way, an extension of his detector calibration method is used to make the Oak Hill Research WM-1 and WM-2 QRP wattmeters very accurate down to milliwatt levels.

Knowing that the diode does conduct at low input RF levels it is tempting to think that perhaps one can calibrate the detector by applying a voltage equal to the peak RF input and noting the resultant output. This is close to correct, but as Ref. 1 points out, diode nonlinearity makes the detector produce an output that is a function of the input waveshape, so its output is different for AC and the corresponding DC input. All is not lost though, since it notes that calibration can be approximated by shunting the detector load resistor with a resistor during DC calibration. The result is calibration that is not exact, but it is within a couple percent of the exact result down to 30 or 40 mV or so! Thatís the reason for Rx in Figure4.

Now letís get down to brass tacks! We want to calibrate our oscillator (Figure 2 in the last TTAM) for -7 dBm output. This corresponds to 100mV rms or 141m V peak. Simple! First we calibrate the detector of Figure 4 at 141mV dc then we measure the output of the crystal oscillator using it.

To calibrate the detector, either use a good variable DC source or build your own as shown in Figure 5. Set the variable source to .141 volts. Temporarily connect a 1.5 K resistor across the output of the

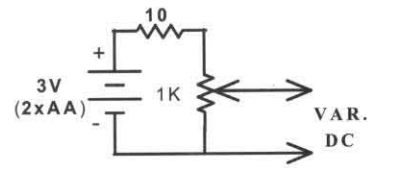


Figure 5 - RF detector

detector and note the DC output. This value is the DC output that corresponds to an RF input of 100mVrms. Record this output number! (Mine read 35 mV DC.) Now remove the 1.5K resistor and the detector is calibrated for this one RF level.

To set the oscillator output, terminate it with a 50-ohm load (for accuracy the load should be between 49 and 51 ohms ñ measurement at DC with your DMM is fine) and observe the detector DC output. The oscillator circuit showed fixed resistor values but you will need to replace the 1K emitter resistor with a 2K or 5K potentiometer. If you can get one, a miniature printed circuit mount pot is best. If you do use a single turn pot use 2K so that the adjustment will not be too critical. Vary the resistance until you get as close to the calibration voltage as you can. You should be able to get it within 1 mV or so.

The attenuator sections will also be calibrated using the DC source and DMM. The attenuator uses carbon film resistors and lots of shielding so that it attenuates equally over a wide bandwidth including DC. So if you connect a known DC value at the input, you can measure the DC output and calculate the DC attenuation which should be very close for RF as well. A step-by-step procedure for checking the attenuator calibration and adjusting it will be described in the next column.

Well that about uses my space allocation for this time around. Next time weíll put some pieces together and, with some luck, make it work. Meanwhile, Iíll try to put some backup information and all figures for the signal source on the NJQRP web page at **www.njqrp.org**. That way you wonít have to flip back to previous TTAM and Joeís Quickies to see all of the figures at one time. And there will be extra photos of the project beyond what I have room to publish in the QRP Quarterly.

References:

1. J. Grebenkemper, **Calibrating Diode Detectors,** QEX, Aug 1990, pp. 3-8.
2. J. Grebenkemper, **The Tandem Match ñ An Accurate Directional Wattmeter,** QST, Jan 1987, pp. 18-26. And **Tandem Match Corrections,** Technical Correspondence, Jan 1986, p. 49. ••

TINKER TOYS FOR ADULTS:
NOTES AND IDEAS ON PVC FOR ANTENNA APPLICATIONS

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*This article first appeared in the Spring 2000 **QRP Homebrewer** published by the New Jersey QRP Club. It is reprinted here (in slightly edited form) by permission of the author and the NJ QRP Club. Be sure to visit LB's web site for a wealth of information on antennas and antenna modeling: **http://www.cebik.com/.***

General Notes: Working with PVC

Ever since I called PVC "tinker toys for adults," the phrase has gained popularity (except among the erector set and "lego" generations). The material is extremely versatile for amateur radio applications ranging from operating furniture to antenna supports. It cuts with a simple saw, glues eternally, and may last a long, long time. However, it also has some pitfalls and inconveniences. Only experience and creativity limit the ways we can put it together to form useful ham items. My interest is chiefly in antenna applications, but other uses abound.

The following notes are taken from several dozen projects in which I have used the material in various ways. They do not form a comprehensive list of uses. Instead, they comprise one of many possible starter collections to whet your appetite and get your own creative juices flowing.

What is PVC?

PVC (poly-vinyl chloride) is a plastic material most usually formed into tubes and associated junctions. It is used extensively in plumbing in its white form and in electrical conduits in its gray form. The difference between colors can be important, depending on where you live. Apparently, there is no clear nationwide uniformity in the exact formulation of the material, so long as it meets certain specifications. The gray form seems everywhere to include a healthy dose of UV-protectant material, while the white form is more variable. In the Southeast, the white form tends to contain more UV-protectants and lasts a long time in outdoor use. In the Northwest, the white form tends to contain less UV-protectants and becomes brittle more rapidly in sunlight. (The white form available in Tennessee is quite durable in continuous sunlight, as some 10-year-old yard benches, arbors, and birdhouse supports all attest.) Hence, before choosing a PVC form to use, check with local experience.

For most uses that are continuously exposed to daily sunlight, about 10 years is a maximum lifetime, even for UV-resistant forms of PVC. Assuming that you perform annual preventive maintenance on your exposed structures, you can detect increased brittleness from the sound made when a tube is tapped. The dull thud of new PVC becomes a sharper rapping sound. When in doubt, replace the length: PVC is amongst the cheapest materials available for construction. If your interests include gardening, then 1 1/4-in to 1 1/2-in nominal PVC can be used to make up the framework of a greenhouse and its integrated work benches.

The primary family of PVC tubing and fittings used for most projects is likely to be Schedule 40. This family consists of tubes that are listed in nominal diameters, where "nominal" means that the inside diameter is at least the size listed. Typically, Schedule 40 tubes have walls that are roughly 5/32-in thick. The following table lists some common sizes and their inside and outside diameters—as measured informally.

There are other diameters of Schedule 40 PVC tubing, roughly in half-inch increments (nominal). Above a certain diameter, we may tend to call these "pipes". Many can be used for in-ground supports for masts and pipes. Our interest, though, is mainly in joining sections into assemblies, so we shall let the big sizes be an exercise in your own creativity.

Nominal Size	Inside Diameter	Outside Diameter
1/2	9/16	7/8–
3/4	3/4+	1 1/16
1	1	1 5/16
1 1/4	1 5/16+	1 5/8+
1 1/2	1 9/16	1 15/16

Schedule 40 PVC Dimensions (Inches)
Note: + and – correspond roughly to woodworker measurements called "strong" (a bit over, but not enough to call for the next increment) and "weak" (a bit under).

From the table, we can immediately see one of the inconveniences of Schedule 40 PVC: it does not nest, one size inside the other. The one exception is 1-in and 1 1/4-in tubing, which will loosely nest. However, the gap is such that a glue connection will not be secure. Nuts and bolts make the best link.

In place of nesting sizes, there are fitting galore, some intended to link tubing of the same size and others intended for joining two different sizes of tubing. So all is not lost.

Before we move on to junctions of tubing, let's note that within the PVC umbrella there are a number of other types and sizes. For example, CPVC is available. It is a thin wall (about 1/32-in) tubing whose dimensions are closer to copper piping. 1/2-in nominal CPVC has an inside diameter of about 1/2-in and an outside diameter of about 9/16-in. I have successfully used this material in relatively unstressed or very low load conditions. For example, I have used it as 4.5-ft spacers for a 10-meter wire beam and as spacers to separate the ends of tubular Moxon rectangle elements to keep them aligned.

Also available are other families of white PVC. Schedule 80 PVC is sometimes available, but usually not in the common home center. A thinner-wall white PVC is more readily available. One common designation is SDR 21, although you may encounter other notations. It has the same outside diameter as Schedule 40 for the same nominal size. However, the wall is only about 3/32-in thick. Hence, 1/2-in nominal SDR 21 has an inside diameter of 11/16in and 3/4in nominal has an inside diameter of about 15/16-in. For many VHF projects, this thinner PVC may be adequate to support an antenna, although it is weaker and more flexible in longer lengths. For example, some aluminum rods shipped to me inside a 5-ft long 1 1/2-in nominal SDR 21 tube arrived intact, but the tube had been cracked somewhere along the route. Schedule 40 would not have cracked, but would have cost considerably more in shipping charges. Do not underestimate the weight of Schedule 40 PVC.

Connecting Lengths of PVC

As we earlier noted, only the 1-in and 1 1/4-in nominal sizes of Schedule 40 PVC nest, and they tend to require nuts and bolts to secure the junction. I have built portable masts with up to three 5-ft sections by alternating the two sizes, with stove bolts securing the assembly. However, there are better ways.

The two chief forms of junctions pieces are the glue and the screw joints. Since every joint requires at least some gluing, let's begin with them. Gluing is more properly called cementing, and the process requires two steps. There is a joint cleaner, usually blue or purple, that prepares the surface for mating with a junction fitting. Many hams skip this step, since the joint need not be as water-tight as a plumbing joint. However, it is always recommended.

PVC cement actually fuses the two surfaces of the pieces to be mated. Depending on the amount of cement used, you have between 15 and 30 second to fit and align a joint before the two surfaces become a single solid. Hence, it pays to have pre-prepared jigs for aligning multiple joint structures, such as a U-shaped assembly. Often, simply locating good straight surfaces is sufficient for the job of alignment. For example, I use my shop floor and workbench legs to align right angles with enough precision for most applications.

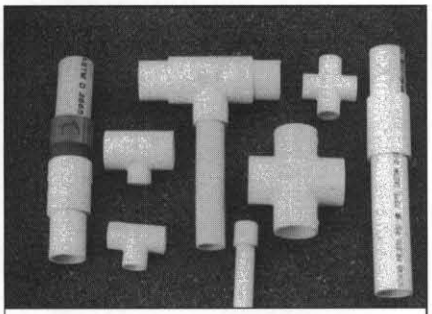


Figure 1. A collection of PVC junctions from my junk box.

Once glued, the connection is permanent. If it is not correct, cut off the junction and use other junctions and tube pieces to replace the cut-out section. Be sure to wipe off each junction immediately after gluing to keep the exposed surfaces clean and smooth.

Glue junction pieces come in many types: in-line, 90-degree Ls (or elbows), 45-degree elbows, Tees, Ys (with a side 45-degree piece), (4-arm) crosses, and caps. **Fig. 1** is a casual photograph of some of the junction types from my junk box. Some combination of these fitting will let you create triangles, squares, and octagons suitable for yard furniture.

See the photo of an inverted yard bench (**Fig. 2**) as an example of PVC construction.

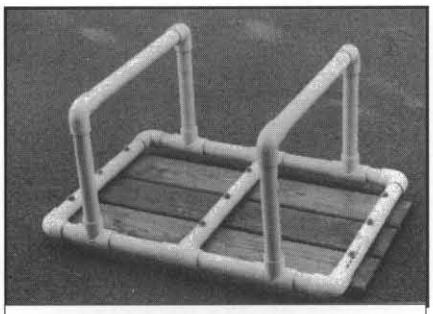


Figure 2—A bottom view of a yard bench illustrating some PVC assembly techniques.

The photo reveals another secret of PVC. We can install junctions—usually 90-degree Ls and Tees—wherever we need to change direction. Since each fitting is limited in the number of junctions available, our designs must offset each junction that changes the direction of the tubing. Between each junction, we must use a link piece of tubing. The link tubing between two adjacent junction fittings may not be visible in the finished product, because it is cut to exactly twice the inset depth of the fitting. However, it is a necessary element in the structure: it serves as a glue surface for the junction pieces, and it doubles the total thickness of PVC at these junction stress points.

Screw joints are handy for joining sections of tubing that you may wish to take apart later or which may serve multiple functions. Each screw joint consists of a male and female section, and each of these is glued to their respective lengths of tubing. Then, the two assemblies are simply screwed together.

Screw sections are available for changing tubing sizes. In fact, there are Tees with a side screw section in smaller sizes. Hence, you can have a vertical support with a removable "handle" for turning. One note of caution: The gray PVC screw fittings, designed to connect sections of electrical conduit, may not be as substantial as the white equivalents. For example, the locally available male gray screw section has a thinner wall than its white counterpart. In the 1 1/4-in nominal size, the white version fits over the swaged end of common 1.25-in steel masting, and wedges nicely onto the full diameter section. The thinner-wall gray equivalent simply slides over the full diameter of the mast. Once more, check your local supplies and test fit everything before buying, since there may be regional variations on the available stock.

Every glue job usually requires some tube cutting to a specification. PVC cuts well with a simple hacksaw. You should take time to deburr the edges, including a good rub of the corners with medium sandpaper. Dry-fitting joints is not only unnecessary, it is sometimes disastrous. I have a few dry-fit junctions around that act as if they were glued. Just be sure the junction areas are clean and evenly cut for a good fit with cement applied.

If you have a motorized shop, then a "chop" saw is very good for cutting PVC—with a couple of precautions. First, clean the blade after every use for PVC if you wish to get clean wood cuts later. Second, be sure to use hold-downs of some sort for each side of the cut. The saw can spit out the shorter cut end at a very damaging rate. I tend to make my cut and let the blade brake to a stop before raising the saw. Of course, safety glasses are mandatory, and gloves are recommended. Also, beware of cutting well-aged and more brittle PVC tubes: the shrapnel can be painful. Hand tools are slower, but rarely create the danger levels of power tools.

PVC also drills easily. A starter hole created by an awl helps to prevent drill-bit skidding. A drill press is useful here, but rarely mandatory. However, a jig or vise to hold the tube is often the key to a neat job. You can also cut slots in the end of PVC. In fact, some applications may involve a combination of slots and drilled holes at their inner ends. For very large diameters of tubes, you can use a saber saw (which are now called jig saws, and the old jig saw is now called a scrolling saw, even though saber saws may have scrolling features.)

Although we shall focus on PVC alone, do not hesitate to look throughout your home center for metal fittings that you can join with sheet metal screws or with nuts and bolts to a PVC framework. You can solder or braze other metal to a copper plumbing pipe cap and add a solder lug or other connector. Some metal parts may require a bit of work to make a good mechanical junction with PVC, but the possibilities are almost as endless as the hardware supplies in home centers.

You may wish to compare these general notes with the materials available in your area. Modify the notes to reflect what is true of PVC to which you have access. Now let's look at some distinctly ham applications of PVC.

Some Ham Applications of PVC

Let's divide our applications into several categories: masts, booms, element supports, and storage. We shall omit other uses of PVC—for example, as a coil form or as a chair frame—for another time.

Masts

My best general recommendation: don't. There is a temptation to use 10-ft lengths of PVC for masting. My personal experience suggests that even Schedule 40 PVC sags and sways too much compared to other available materials. Five-foot lengths can be coupled with less sag and more convenient transport. However, they tend to be heavier than common 5-ft 1.25-in TV masts of the same length—and TV masts have less sag and instability when raising them from the horizontal to the vertical position.

However, using a 1 1/4-in 5-ft section with a screw coupling at the top is convenient for workshop use. In fact, I tend to keep all PVC lengths at 5-ft and under, since they bundle and fit my pick-up and are more easily handled. **Fig. 3** shows part of a small beam under construction outside my shop. The short mast lets me assemble the antenna parts comfortably.

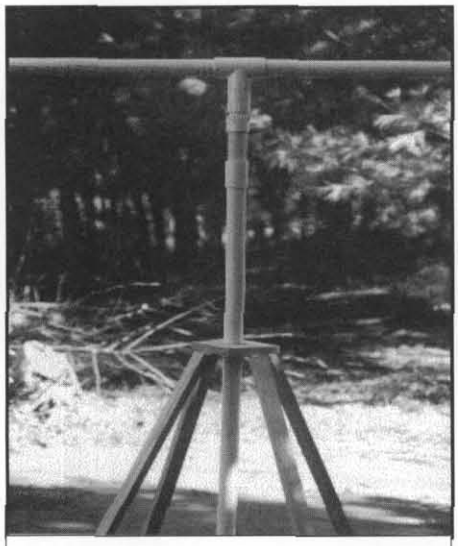


Figure 3—A beam mounted on a PVC mast mounted in my shop antenna assembly jig.

Booms

The photo (**Fig. 4**) of the boom structure of the Moxon rectangle shows one way to use 1 1/4-in PVC as a boom. Beyond the 5-in length, PVC tends to sag too much for effective boom use. However, in the shorter lengths, it hands very much like an aluminum boom—with one advantage: the elements are automatically insulated (or, more properly, isolated) from metal structures.

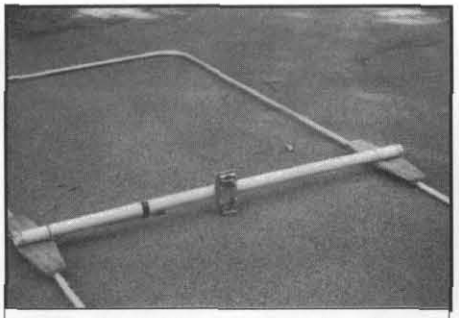


Figure 4—A Moxon rectangle using a PVC boom with element & boom

I have not detected any RF conductivity in Schedule 40 PVC in the HF range. Hence, its use to support elements can be easily recommended. Whether or not PVC has any conductivity at VHF is a question for which I have not seen any definitive data. As we shall see, there are ways of using PVC to support VHF elements that will tend to minimize any possible interaction, just in case at least some formulations are RF conductive above the HF range.

A second form of boom is used with my dipole in a tube and my beam in a boom, both of which have been published in the *ARRL Antenna Compendium*, Vol. 6. The center hub of the dipole and the boom of the beam terminate in a screw fitting. A short section of tubing with a male fitting permits the short mast to fit over the end of a standard section of TV mast and to wedge in place for portable use, as shown in the photo in **Fig. 5**. You can wrap the TV mast with a few layers of electrical tape where the short PVC stub just fits on top. This move will keep the antenna-and-PVC portion stable. No additional clamping is necessary for the usual short- term portable operating session, but for longer periods at height, you may wish to add a stove bolt through the joined sections to keep the wind from turning the assembly without turning the mast.

The elements for these antennas represent two (of many) different ways of

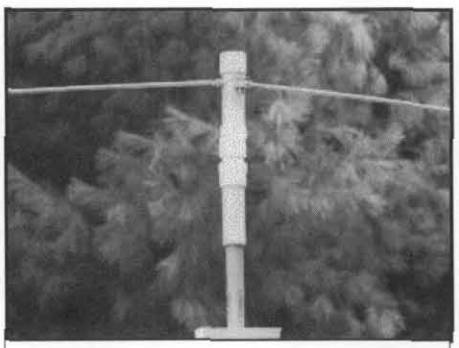


Figure 5. A portable dipole with a PVC hub and screw fitting, mounted on a steel mast.

mounting elements. The rod elements are threaded, as shown in one close-up photo (**Fig. 6**), and simply bolt in place in the

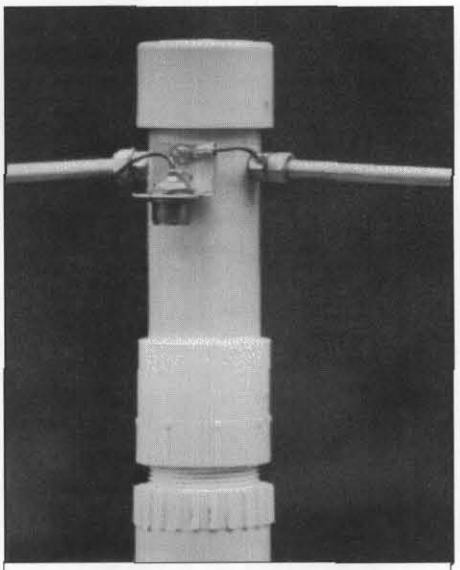


Figure 6. A close-up of a PVC dipole element hub for aluminum rod elements.

end of a section of 1 1/4-in nominal tubing, using nuts both inside and outside the tube. The 10-meter rod elements can be replaced with eye-screws and a large solder lug for attaching wires for another band. As shown in **Fig. 7**, the tubular beam elements fit over a 3/8-in diameter fiberglass

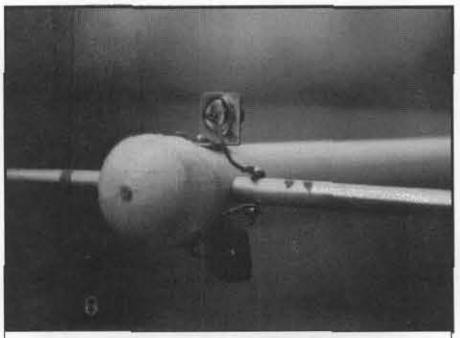


Figure 7—Close-up of a PVC boom with details of the aluminum tubing element

rod and are held in place with #8 stainless steel nuts and bolts. In both cases, I dry fit a PVC cap over the end of the tubing. The cap functions mainly to remove stresses from the elements that might eventually deform the PVC. (As a plastic, PVC retains some fluid properties and may be deformed over time by a continuous set of pressures.) We shall look at another cap function a bit later.

Element supports

Technically, booms and masts support antenna elements, but in this category, I include more complex structures. The first three examples happen to be as-

sociated with 2-meter antennas.

The first example, shown in the photograph in **Fig. 8**, is a wire half-square vertically polarized bi-directional antenna. The antenna itself provides a very sharp figure-8 pattern, similar to that of a horizontal dipole, but vertically polarized—and stronger than that of a quad loop. The structure is a custom arrangement of PVC. The horizontal piece is SDR 21, since the only weight it supports is itself. Its function is simply to hold the #12 AWG copper wire in position. The vertical piece nearest the coax is Schedule 40, since this is the main support. The remaining short pieces are SDR 21. Everything is 1/2-in nominal. This fixture is solely for the purpose of testing the antenna design, although it has served for several years without injury to the antenna.

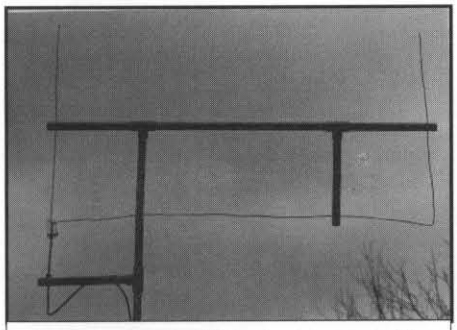


Figure 8—A #12 AWG wire 2-meter half square on a PVC test frame.

The next photograph (**Fig. 9**) shows a 2-element half-square parasitic beam. The 1/2-in nominal pieces are Schedule 40, arranged to provide even alignment for the two element sets. An array of Tees and elbows spaces the elements from the PVC to minimize potential interaction. The horizontal tubing (3/4-in diameter) passes through the 1/2in nominal Tees and is fixed in position by single sheet metal screws at each Tee. This support system is designed for a centered support mast.

Similar to the half-square beam

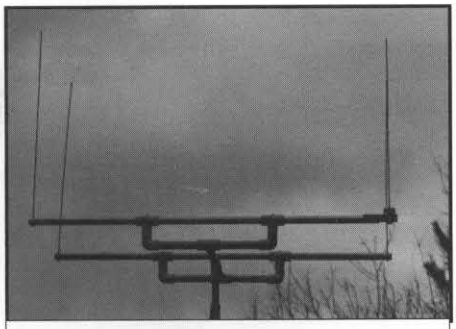


Figure 9—A more complex PVC mounting frame for a 2-element 2-meter half-square beam.

mounting is the element support system for the 2-meter Moxon rectangle, shown in the **Fig. 10**, oriented for vertical polarization. A single bolt on the support arm behind the reflector permits me to rotate the antenna to the horizontal position. The unique part of this assembly is the remainder of the support arm, which extends to a mast stub well behind the antenna elements. To brace the support arm, Tees plus Ys are arranged to form a triangular brace. Also evident is a repair in the angular tube: I cut the bad portion out and added an in-line junction and the short piece to the Y junction. Once more, everything here is 1/2-in nominal.

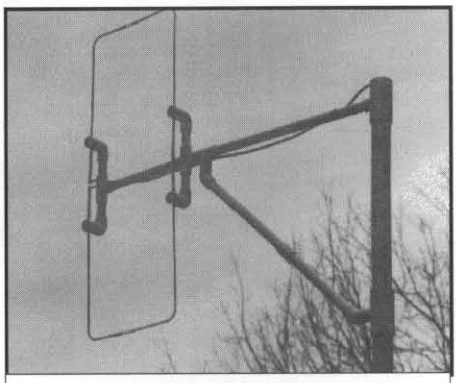


Figure 10—A vertically oriented 2-meter Moxon end-mounted on a braced PVC support.

For either HF or VHF quad antennas (likely no larger than a 15-meter version), we can use a stressed-PVC spreader and boom structure. A sample is shown in **Fig. 11**. For miniature quads for 10 meters, a single 10-ft length of 1/2-in nominal SDR 21 (or similar thin-wall PVC) can pass through holes in a 1 1/4-in nominal Schedule 40 boom. Pin the tubing in place with #10 stainless steel hardware. Offset the two lengths of tubing required to obtain four spreaders. Add 1/2-in Tee fittings to the ends of the spreaders as a smooth surface for the quad element wires at the corners. Stress the tubing to create a square of the right size for the quad loop. I initially use twine to secure the square and then add the wire. I add bridge wire at each tee, which prevents slippage and a wind-forced reversal of the arms.

If you need longer arms, you can use

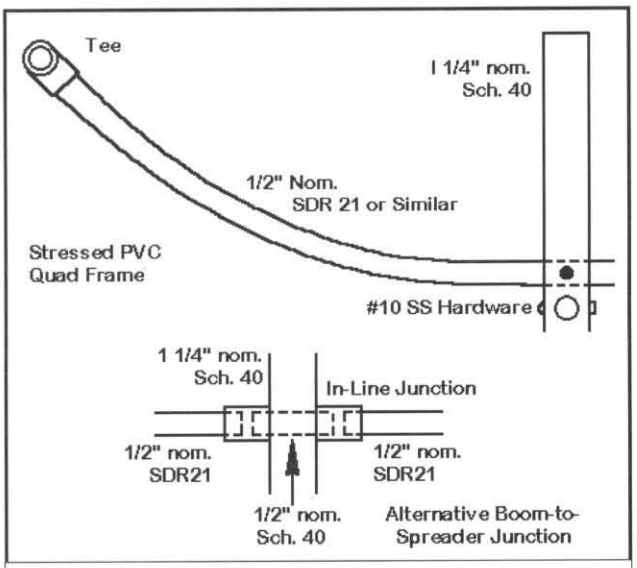


Figure 11—A sketch of a stressed-PVC quad spreader

a short piece of Schedule 40 PVC through the boom holes, with in-line junction glued in place. Then you can make arms up to 10-ft long in each of the four directions. However, there is a limit to the durability of stressed arms based on: a.) The amount of stress and b.) the UV resistance of the tubing used.

Thin-wall PVC and CPVC are highly usable as wire spacers. Among the possible applications are homemade parallel transmission line, double-wire dipole elements (for wide operating bandwidth), and wire beams for 10 meters and up. **Fig. 12** shows one good technique for preparing the spacers. Hack-saw a slot, and then drill a hole as closely as possible to the exact diameter of the wire. I prefer not to deburr the holes. When I press the wire through the slot into the hole, the burrs create a good friction fit that prevents slippage. However, the spacer can still be moved without much force.

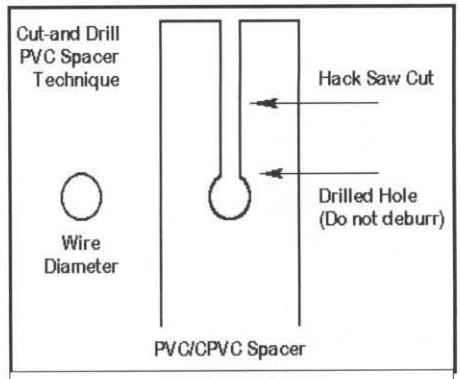


Figure 12—A sketch of one way to use PVC spreaders or spacers.

These examples are just five of endless ways to arrange PVC as useful element support structures. Perhaps they are

enough to give you a start on your own project.

Storage

We may store in a PVC tube, plus caps, almost anything long and thin—like antenna elements. Earlier we saw the dipole in a tube element junction mounted on a mast. In the photo in **Fig. 13**, we can see the rod elements stored inside a capped tube, where the top of the tube holds a female screw junction to mate with the capped element junction piece. The rods are split into two pieces (5/16-in inner sections, 3/16-in outer sections), joined by a 1/2-in x 1/2-in x 1 1/4-in aluminum block, tapped for the threaded ends of the rods. Disassembled, everything pits inside the tube with room to spare.

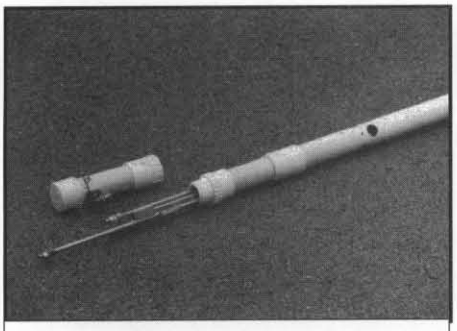


Figure 13—Dipole elements stored in a PVC tube.

Slightly more complex is the boom of the beam in a boom. The elements are 1/2-in and 3/8-in diameters tube sections

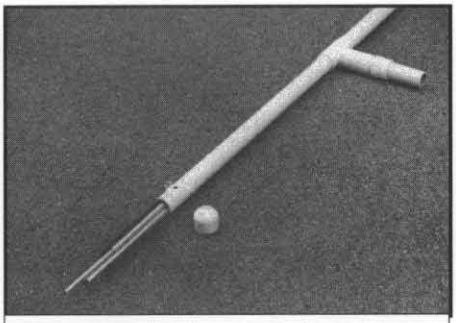


Figure 14—Aluminum Yagi elements stored inside a PVC boom.

on each side. The tubing nests for each element side. The four tube pairs and the two 2-ft section of 3/8-in fiberglass rod all fit inside the boom itself, a 5-ft section of 1 1/4-in nominal Schedule 40 PVC. As **Fig. 14** shows, the mast stub makes a good grip for carrying the entire antenna to and from the car trunk. Although the assembly may look a bit complex, I have in demonstration talks managed to assemble and disassemble both the dipole and the beam within a 40 minute period, all the while trying to describe the antennas to an audience. On a hilltop, everything goes faster, since I can keep my eyes on the work, only occasionally glancing around for East Tennessee black bears.

A short length of 1 1/2-in nominal tubing, with one end capped permanently by a glue joint, becomes a tool carrier for the two antennas (not shown). Inexpensive screwdrivers, nut-drivers, and wrenches, along with a sack of small hardware, easily store in the tube.

Conclusion

These are not by any means the only things we can do with PVC. For example, the four-legged oak support frame, which I use both in my shop and for traveling demonstrations, could also have been made from PVC. I just happen to like wood as well as plastic. In fact, about the only antenna parts that I cannot make from PVC are the conductive elements themselves. At present, the price of aluminum tubing and wire is too low to make PVC elements very practical.

One final note for the ham homestead: If you sand the surface of PVC to give it a "tooth," it will accept a primer for enamel followed by a color coat of good outdoor paint. Hence, it is possible to decorate your yard with your call sign constructed from PVC (including legs to support it). Alternatively, you can create both 2-D and 3-D sculptures from PVC. Combining this idea with others, you can make very non-standard trellises for your decorative vines. You may also construct fences around ground-mounted verticals for safety, using them also as morning glory trellises. With a little ingenuity, a little paint, and a few flowering vines, you can make neighbors forget that 70-ft tower and the maze of wire antennas in your backyard. • •

Edited by W1HUE

Name: Steve/WB0QQT ss94239@alltel.net
Subject: QRP Quarterly
Message: How important is the QRP Quarterly??

Well...Saturday was a cleanup the yard, rake leaves, mow the lawn before the Sunday rain arrives day. No time to read the mail then. Sunday morning is the usual coffee and paper day, but today the Quarterly got TOP PRIORITY. As usual, another great issue !!!!

Feel proud and honored folks, and many thanks to all those involved. And now to go try out the new 4 BTV vertical my son helped me to put up yesterday also.

Think I'll just skip the newspaper today—Steve

Thanks, Steve, for the QQ endorsement. We are all richly rewarded by a multitude of talented QRP Quarterly contributors. And...sharing our experiences and our talents are a big part of why QRP/Amateur Radio is so darn much fun!

Keep the articles and letters coming, folks. If you haven't sent something in yet—Whataya waiting for? You make this magazine (and this hobby) GREAT.

We are open to your ideas and can handle constructive criticism. Let's team up and really make this magazine shine!

The QQ Staff

(Continued from page 4)

class licensee and was a ham with boundless curiosity about every aspect of our hobby. He avidly promoted ham radio and had a fascination with QRP operation and its technology. He was a superb technician who also held a First Class FCC radio telephone license. He was a former engineer for Channel 41 in Battle Creek, Michigan. David was also a retired Air Force Communications Officer. As he had on an annual basis for a number of years, David recently attended FDIM 2000.

David will be sadly missed by both his family and all his fellow hams in the Southwest Michigan amateur radio community.

Thanks very much. • •

Dave Worfel—K8DTW dworfel@iserv.net

UNIVERSAL NOTCH AND BANDPASS FILTER

Randy Hargenrader—WJ4P *randyh@harksystems.com*

The one feature I seem to use very often when operating is the audio notch filter. It is an interesting tool. For example, besides the obvious notching of offending signals in the pass-band, I find that for weak signals, sometimes putting the notch "beside" the signal helps you hear the target signal better. I think that what happens is the notch removes some of the noise near the audio frequency of the signal, improving the perceived "signal to noise ratio". I originally designed this filter circuit for my Elecraft K2 transceiver but I quickly realized that it was applicable to other rigs as well. My OHR-400 will be sporting one of these very shortly!

The design uses a switched capacitor filter IC, the LTC1059, which is Linear Technologies' version of the venerable Texas Instruments MF5C. This IC uses a clock signal at 50 or 100 times the frequency of interest to determine the resonant frequency of the notch or bandpass. This IC has various modes of operation and the mode I employed allowed both the notch and bandpass functions from the same circuit. Other modes of operation can focus on other functions such as high-pass and low-pass filtering.

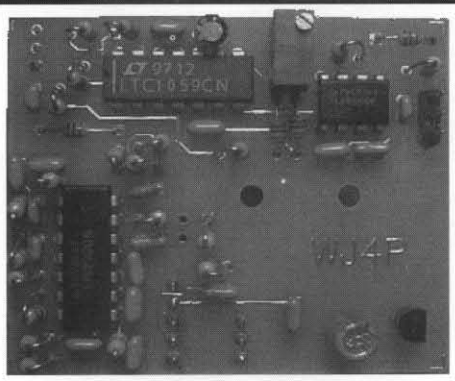
The slope of the notch function for this design is about 65Hz wide at the -3dB points and gets narrower as it gets deeper. I couldn't measure the bottom of the notch with my setup using Spectrogram or with the meters I have in the shack. The signals that are notched do receive a great deal of attenuation, in the order of 30 dB or more. The IC specs predict -50dB of attenuation in this mode.

This filter also has a bandpass function, which has been fun to experiment with. It has been quite useful even with the narrow IF filter settings available in the K2. It gives about 3dB gain to the signal you want, but it does attenuate the other frequency signals depending how far away they are from the center frequency. The slope of the bandpass filter mode is about 115Hz wide at -3dB, with a total attenuation of -15dB or so for the rest of the audio band.

This circuit adds about 12 mA to the current consumption of the radio.

The Circuit

The circuit schematic is shown on **page 35**. The small PC board that I made is shown in the following photo.The K2 required a balanced input and output ar-



rangement. This was accomplished by using a single op-amp for the input and a pair of op-amps for the output. I used LM3900 op-amps because I have a bunch of them around and I am familiar with them. Another op-amp can be used but will require a slightly different circuit to allow for the usual input biasing. The LM3900 is a Norton input type op-amp and can be biased with one resistor.

For radios that use unbalanced audio circuitry, the op-amp circuits can be modified appropriately. The op-amp circuitry was designed to provide unity gain through the filter. If you would like to have this circuit provide some gain to the audio section, I recommend that you match the value of the input resistors to either the input or output op-amp circuitry. Do not change the feedback resistors as they are set to work with the biasing resistor values. To get more gain from this circuit design, change the input resistors to a lower value. (Remember op-amp theory, the gain is determined by the ratio of the input and feedback resistors.)

There is no on-off switch so it is always "active". You take the filter "off line" by putting it in the notch mode and setting the frequency control at one limit or the other *a la* TenTec style.

I used a TLC555 (CMOS 555 timer) as the clock generator. This part is good to about 2 MHz in astable mode. VR1 controls the frequency by presenting voltage to the control pin. This arrangement keeps the R/C circuit nice and tidy right by the IC, reducing radiation from that circuitry. Since I used the 100X configuration for the clock input, it requires that the clock frequencies range from about 30,000Hz to about 300,000Hz to give a filter resonance of 300Hz to 3000Hz.

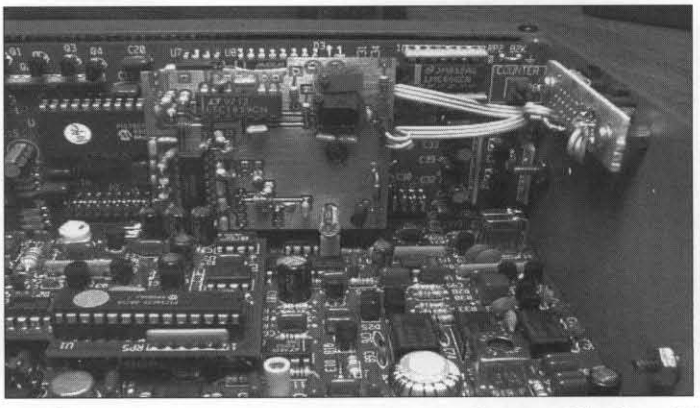
Even though this is an audio circuit, it uses a fairly high frequency clock signal so it is important that when you build the circuit you keep the LTC1059 connections as short as possible. The clock signal from the 555 timer should also be very direct and short.

Adjustment

Adjusting the filter clock circuit to the correct frequency range is accomplished using an oscilloscope or a frequency counter connected to pin 8 of the LTC1059. As stated before, the frequency control pot uses a voltage to control the astable frequency of the 555 timer. This form of control on the TLC555 timer allows a range of 10:1 from lowest to highest frequency. I selected the range of 300Hz to 3000Hz for my notch and passband. To adjust the clock frequency, position the frequency control pot to the low frequency limit and set R2 for 30KHz. Then turn the frequency control pot to the high frequency limit and check that it is operating at about 300KHz.

If you elect to use the oscilloscope method, follow these steps. The waveform from the 555 timer is asymmetrical, with low going pulses of about 5µs in duration. The period of this waveform is the total time from similar points on the waveform. Turn the frequency control pot to the low frequency limit and adjust R2 on the filter board to set the waveform for a period of 33.3 µs. This sets the lower frequency limit to 300Hz. The clock at this frequency is 30KHz for the 100X clock input to the LTC1059. Next, turn the frequency control pot to the high end and adjust the period of the signal for 3.33 µs.

(Continued on page 32)



Installation

I elected to install this board inside my K2. The operating controls needed to be located where I could easily get to them when operating. As you can see from one of the pictures, the frequency potentiometer and the slide switch, both salvaged from a defunct cassette player, were installed on a piece of perf-board. That, in turn was mounted to the inside top edge of the side panel. That would allow me to notch out a place on the top panel for each control. I chose the left side since I am right handed and usually use my left hand to operate the radio. I believe I measured the notch locations about 6 times before actually taking a deep breath and using the nibbler tool!

The internally mounted board fits right on the Control Board and uses the audio filter option headers for insertion into the audio path. The board is held in place by using the audio filter option stand-off located between the two electrolytic capacitors (see photo). For more information and photos on installing the filter in a K2, visit the Elecraft web site at www.elecraft.com and click on the "Tech Notes" link.

Adaptations

This circuit can be added to just about any radio. For an unbalanced audio path, just use conventional op-amp unbalanced circuit connections. You will only need one of the output op-amps to output unbalanced audio. On the input, connect the audio signal to the inverting input and leave the other (non-inverting input) unconnected. There is no need to ground the unused input.

Although the entire circuit will run on 12 volts DC, I used an eight-volt regulator to stay compatible with the K2's circuitry. The DC voltage from the output op-amps is used to bias FET audio switches in a further stage. It is important that you be aware that there are no capacitors coupling the outputs of the op-amps. Your radio might require some DC isolation to keep from unintentionally biasing the next stage. • •

Edited by W1HUE

MATCHING ACCESSORIES FOR THE ZM1 TUNER

John L. Sielke—W2AGN **jsielke@pobox.com**

W2AGN sends these pictures of his handiwork.

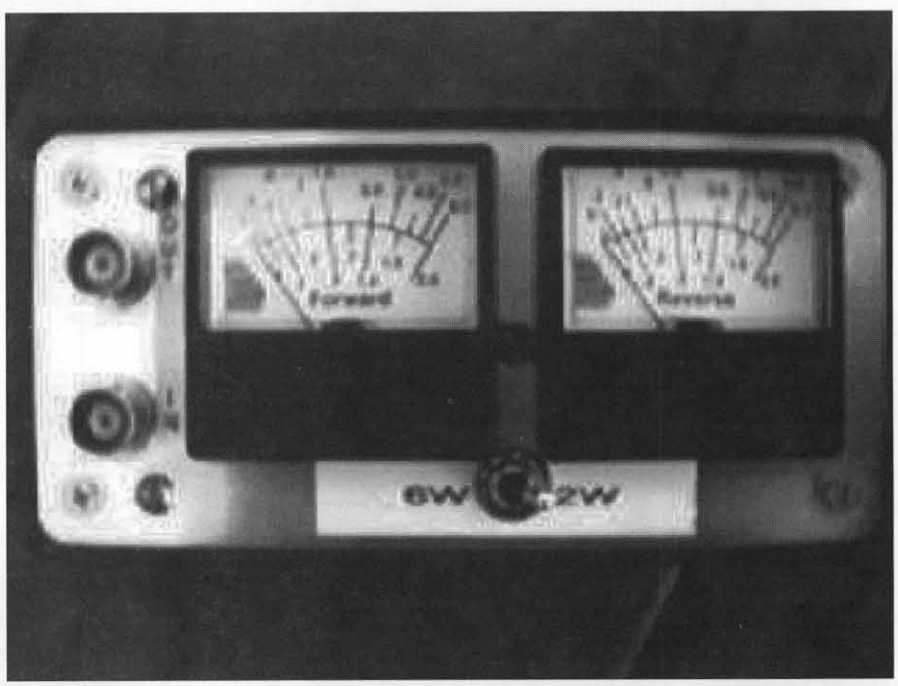
It is always interesting to see the creative ways that kits are implemented and customized. This is part of the charm that home build, personalized equipment offers.

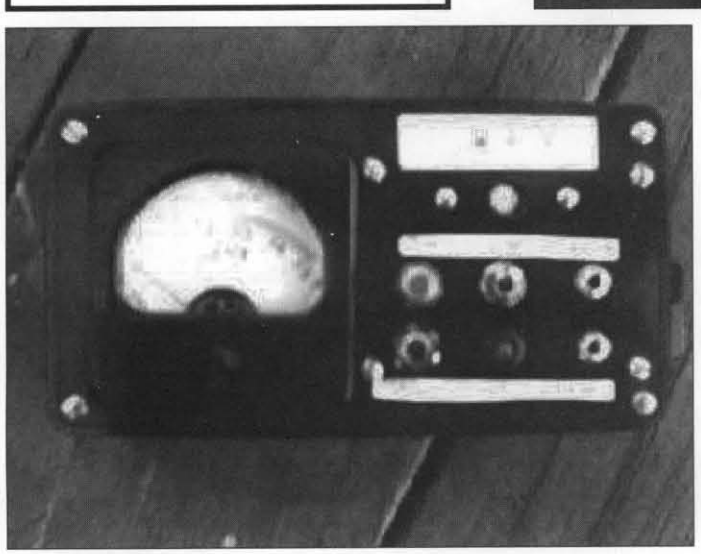
Right—A NoGaWatt Wattmeter, built to match the ZM1 tuner.

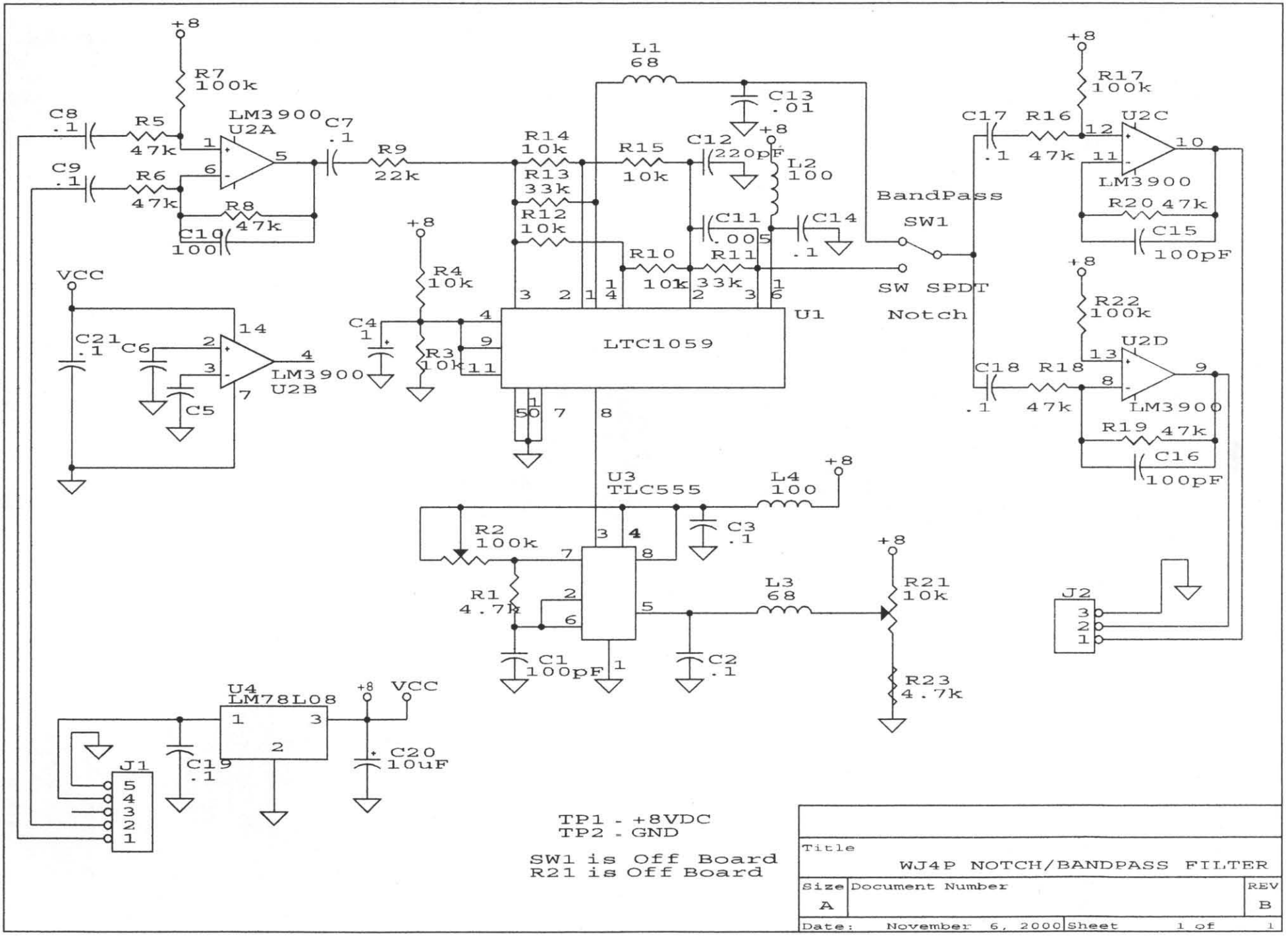
Lower Right—A picture of the matched ZM1 Tuner and NoGaWatt together.

Below—Power distribution box with built in NoGApig, TiCK Keyer and an expanded range voltmeter. • •

Please share pictures of YOUR projects by sending them with a short description to one of the QQ Staff members.






+8
R7
100k
C8
.1
R5
47k
LM3900
U2A
C7
.1
R9
22k
C9
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R6
47k
R8
47k
C10
100
R14
10k
R13
33k
R12
10k
L1
68
C13
.01
R15
10k
C12
220pF
L2
100
C11
.005
C14
.1
R10
10k
R11
33k
BandPass
SW1
SW SPDT
Notch
U1
LTC1059
R4
10k
C4
1
R3
10k
VCC
C21
.1
C6
C5
LM3900
U2B
+8
R17
100k
C17
.1
R16
47k
U2C
LM3900
R20 47k
C15
100pF
+8
R22
100k
U2D
C18
.1
R18
47k
LM3900
R19 47k
C16
100pF
U3
TLC555
L4
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+8
R2
100k
C3
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R21
10k
R23
4.7k
C1
100pF
C2
.1
J2
U4
LM78L08
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C20
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TP1 - +8VDC
TP2 - GND
SW1 is Off Board
R21 is Off Board
Title
WJ4P NOTCH/BANDPASS FILTER
Size
A
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REV
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Date: November 6, 2000
Sheet 1 of 1

OVERVIEW—DSP SOFTWARE FOR WEAK SIGNAL DETECTION

Roger Rehr, W3SZ *rrehr@epix.net*

Introduction:

DSP is an acronym for "Digital Signal Processing". There are many uses, both current and potential, for DSP in amateur radio. The 2000 ARRL Handbook has an excellent chapter on DSP. Anytime an analog signal is converted to digital form and processed in some way, DSP is occurring. This article will discuss some of the DSP software that is available to enhance the receiving of RF signals. The day of digital communications gear, with the entire radio, or nearly the entire radio, in software is coming fast. But here we'll stick to software that is in use today by hams who need to pull those really weak signals out of the mud, or to separate one signal from many crowding it.

This article consists of two parts. The first is a general discussion of several of the mostly software DSP solutions I've tried. The second part is a brief discussion of my experience using the Elecraft K2 as the IF for 144 MHz EME/weak-signal work with the audio processed by the DSP-10 system, and an RF version of DSP-10 (both described below).

DSP Software for Weak Signal Detection:

The Holy Grail of EME and other weak signal work for many of us is a DSP program that will provide visual evidence of very weak signals over a fairly large frequency range as well as substantial improvement in signal reception by virtue of DSP processing. Specifically, the ideal program would provide:

Waterfall display with adjustable gain, baseline, visualized bandwidth, frequency bin size, and number of averages per displayed line

Spectral display with the following parameters being adjustable: gain, baseline, visualized frequency range, frequency bin size, and number of averages per displayed spectrum

DSP audio processing with:

variable bandwidth filtering with adjustable center frequency;

adjustable LMS (Least Mean Square) or equivalent noise reduction algorithm;

binaural receive capability;

defeatable and adjustable AGC;

adjustable notch filtering.

Programs (and accompanying hardware in some cases) to date have each provided one or more of the above capabilities, but no program to my knowledge has provided all of the above.

When fully implemented, the software being planned by Leif Asbrink, SM5BSZ, may come the closest of any package to providing all of the above. Leif's software is now in the developmental stages. He has begun the migration and upgrading of his MS-DOS PC radio to LINUX. This is where ham radio will eventually be for weak signal work, but it is currently a work in progress, with just the early stages under construction at this point. For more information on Leif's ambitious project, visit his web site at **http://ham.te.hik.se/~sm5bsz/pcdsp/pcdroot.htm**.

Other software performing some of the above listed functions are described in the following paragraphs. In addition, a list of "Sound Blaster" and other sound-card-related ham software can be found on the WEB at http://www.muenster.de/~welp/sb.htm#analyzer. This list is very useful, although it is somewhat dated.

For a superb web page that has a link to an excellent DSP Resource page go to http://www.nitehawk.com/rasmit/ and click on the "DSP for Weak Signal" link at the top of the page. Or, go directly to http://www.nitehawk.com/rasmit/dsp50 . html to get to the DSP info directly. If you do that though, you'll miss a nice introductory page.

DSP-10:

Of software/hardware currently available, the superb DSP-10 system (complete info at http://www.proaxis.com/~boblark/dsp10.htm) comes the closest to doing all of the desired functions listed above. It has an excellent waterfall display with adjustable gain, baseline, and averaging. The visualized bandwidth can be set only to 2400 or 4800 Hz, and frequency bin size is not adjustable. It has an excellent spectral display with adjustable gain and baseline, 2400 or 4800 Hz visualized bandwidth, and adjustable averaging. The frequency bin size is not adjustable. It also has DSP audio processing with 200 and 450 Hz filters, fixed at a center frequency of 600 Hz. It has adjustable LMS noise reduction, binaural receive capability, defeatable and adjustable AGC, but no notch filter. It is different from the other products reviewed here in that it uses an Analog Devices EZ-Kit Lite to do the DSP rather than a sound card; it connects to a PC via a serial port and just makes use of the PC for control and display. It runs under DOS (not a DOS Window).

The software is free from Bob Larkin's web site listed above. The EZ-Kit Lite is available from a variety of vendors. I got mine from Newark Electronics (Newark Pt No 66F3812, price $94.70). Setting up the audio version is a piece of cake. For performance and versatility, DSP-10 is heads and shoulders above the other currently available packages, although I believe the long-in-the-tooth DOS program DSP-Blaster, while very limited in its display capabilities, may still hold the edge in terms of audio signal processing effectiveness.

In addition to the audio version, a complete computer-controlled 144 MHz transceiver using the DSP-10 software was described in the September through November 1999 issues of *QST*. I have built this and have found it to be superb as a microwave IF. The ability to spot those weak signals that are up to 4 kHz off frequency at 2305 MHz and above is critical in the microwave contests, and this radio really does that superbly. I have recently tried this RF Hardware Version of the DSP-10 as a 144 MHz weak signal receiver and used it on 144 MHz EME. Below I've given a short note on my reactions to it in comparison to my usual receiving system.

DSP-Blaster:

This is an early DOS SoundBlaster based DSP program by K6STI, Brian Beezley. This program has good LMS noise reduction, narrow filters with adjustable bandwidth and center frequency, a beautiful notch filter, synthetic stereo, and much more. http://seti1. setileague.org/software/dspblast.htm gives some info. Brian has been difficult to reach and I don't know if any of the listed email addresses are current, although you could try k6sti@n2.net. More comments can be found at http://www. nitehawk.com/rasmit/dsp_soft.html and a bit of K6STI history at http://www.qth.net/archive/bitbucket/199901/19990131.html. Brian may now be back in business, I am not sure; the November, 2000 *QST* (p58) suggests that he is again selling at least some of his software.

This is a good program but it works only with genuine Sound-Blaster Cards,

and can be quite finicky in terms of not wanting to run unless your computer is set up 'just right'. But when it works, its does a very good job and I find I can pull out the really weak EME signals with it a bit better than with any other program, although DSP-10 is a very close second, and provides much better display capability. Essentially, it's much easier to find a weak signal initially with DSP-10 because of the spectral and waterfall displays, but the intelligibility of the signal once found, if it's very weak, is better with DSP-Blaster.

FFTDSP:

This program is available from **http://www.webcom.com/af9y** and provides waterfall display capability but no audio processing, was written by AF9Y. This is an excellent display program that many EME'ers swear by. AF9Y's web page referenced here is a superb tour/reference for a variety of weak signal, DSP, and astrophysical topics. I don't use it because I find the display of DSP-10 adequate, and I need the filtering that it provides.

ChromaSound:

This program (available from http:// www.siliconpixels.com) by N7CXI and VE3EC provides graphic filter control and spectrum display over 5000 Hz or so, along with DSP noise reduction but no waterfall. I don't think it does as good a job as DSP Blaster, DSP-10, or the Hamview author's programs in signal processing, and mention it here just for completeness. I don't use it at all as the other programs just mentioned do a much better job for me.

GNASP1:

GNASP1 provides selectable filtering and spectrum output but no waterfall, noise reduction, or notching. See http:// members.tripod.com/~gniephaus/gnasp1/ gnasp1.html. I don't use this at all any more as the filters didn't seem to be anything special and its lack of noise reduction is a real negative here at W3SZ.

HamView and Spectran:

Hamview (by I2PHD and IK2CZL), now being replaced by Spectran (version beta4 build 127 as this is written), provides a waterfall display, spectral display, mouse-adjustable filters, an LMS type denoiser. The filters/denoiser functions in Spectran do not work as well for me as those in DSP-Blaster and the DSP-10 audio package, but the waterfall display is excellent. Links are at http:// www. radiodsp.com or http://members. nbci. com/spectran/. I don't use this program because the filters as noted just aren't quite as good as I need.

DSP "Work in Progress" at W3SZ:

The goal here at W3SZ is to have something like Leif describes on his web site (see URL given above). John, K3PGP, helped me to get started with a homebrew computer-controlled receiver using TUF-1's for mixers, a couple of computer-controlled frequency synthesizers for the LO's, and the DSP-10 as the final audio stage. This has worked well, but the visible bandwidth with the DSP-10 at 4.8 kHz is less than the 10-30 kHz I want. Hence my interest in Leif's software.

I had never used LINUX, or any UNIX before, but found that with a little help and some quick reading I was able to get LINUX installed on my Windows 95 computer and Leif's program running over a couple of evenings. Right now, his program just gives a visual display of the audio. Hopefully there is more to come, and I want to keep up with his progress so I bit the bullet and started now.

I run a Pentium Pro 200 with a Sound Blaster AWE32. The machine was originally set up to dual boot with NT and Win95 so I can't boot LINUX from a hard disk; I just boot from floppy when I want to run LINUX. I will eventually get a separate machine for LINUX. I have 1.5 GB HD space set aside for LINUX (about right), 128 MB RAM (much more than I need, I think), Number Nine Virge S3 type video card, PS2 3 button mouse. I am running Red Hat LINUX 6.2 and got the OSS sound drivers off of the web from www.opensound.com; they are not free but made the installation pretty simple. I had never used LINUX before and don't really know C but I was able to get going with the documents on the web from OSS and Red Hat (www.redhat.com). So it's not too hard to do.

Please note: if you have WindowsNT on your system and you install LINUX to boot from a hard disk you will have a disaster—*do not do that!* I believe you must do a *custom* install in order to choose the option of *not* installing LILO on the hard disk (the boot utility). To me, even if I could have set it up to boot from the hard disk, I likely would have taken this route; when I want to boot to LINUX I boot from the LINUX boot floppy. When I want to boot to Windows, I pop the floppy part way out of the drive before start-up.

The following paragraphs give some details on the look/feel of the program.

The spectral display is very nice and it's great the way the bandwidth and center frequency etc. can be varied. The bandwidth as well as the center frequency of the display are changed using the mouse, and the floor and gain of the waterfall are changed by clicking on the appropriate parameter field with the left mouse key and then using the keyboard to enter the new parameter.

At this point, at least here, there is no audio output from the soundboard while the program is running, but just the graphics (which are very nice, especially in the weak signal CW screen). Currently there is a waterfall display at the top, with the spectral display below; kind of like DSP-10 but reversed, and with the ability to change the width of the display in terms of Hz (within the range permitted by your prior choice of FFT parameters) as well as physically on the screen, the center frequency, the zero point of the spectral display as well as its amplitude range using the left mouse button in real time.

You can create .GIF files of the screen by just typing "g" and following the instructions. Read the files "settings.txt" and "mouse_on_graph.txt" in the "dsp" directory to see how to control things once you have the program running.

But anyway, *right now* the spectral display is the best there is that I've seen in terms of its on-screen adjustability, although I don't have it all figured out yet and there is still room for improvement.

Good Show, Leif!!

As noted above, I've used FFTDSP, DSP-Blaster, Spectran, HamView, and DSP-10 here over the past several years. If Leif continues with his system, it should obviate the need for the others.

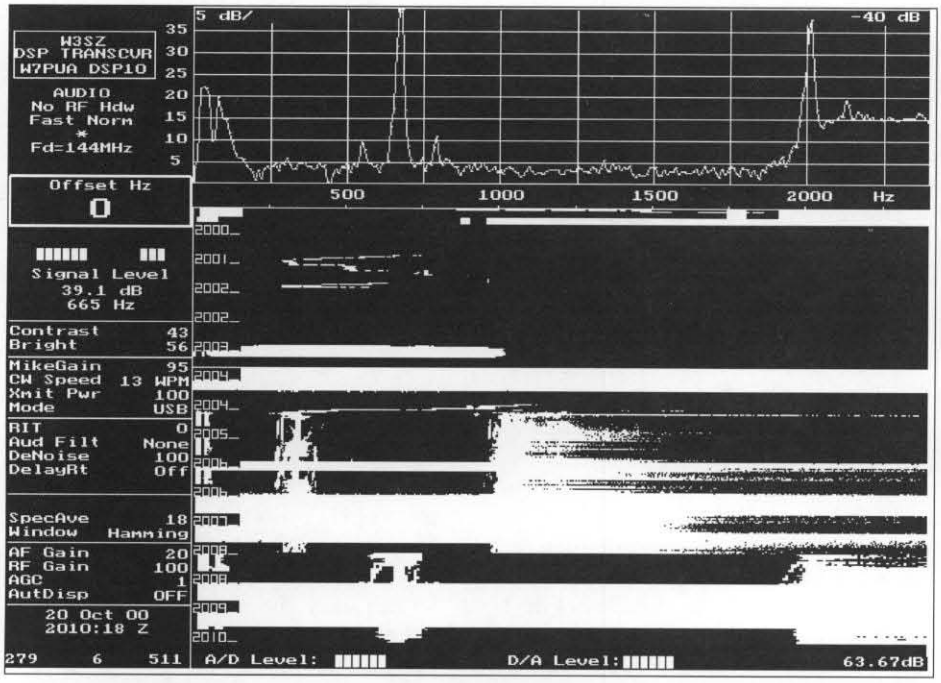
Comments on the K2 and DSP:

I got things working again, at least receive-wise, just in time for the Italian EME Contest, and was able to compare in an admittedly unscientific way some of the receive combinations we've been talking about in an EME environment. This was the first time I had the 2 x 2 MXP20 array 'on the moon' since it went up this past February. I didn't get the calls on any small stations, but I did hear and copy the usual big guns: **WB9UWA, OZ1HNE, F3VS, I3DLI, EA3DXU, SM2CEW, K2GAL (tropo and EME), RU1AA, I2FAK.**

The big guns were mostly 10-14 dB out of the noise as measured by the spectral display on the DSP-10.

What I found is described in the following paragraphs.

The new version of Spectran does a better job than DSP-10 (and of course better than DSP-Blaster) of visually *dis-*



playing the signals in both the spectrum display and the waterfall. But the audio processing (what you listen to, as opposed to what you see on the screen) is much better with DSP-Blaster and DSP-10 than it is with Spectran. So you can run two computers: one to watch the band with Spectran, and one to hear the signals with DSP-Blaster or DSP-10.

It was not a very noisy night from a pulse noise/noise blanker standpoint, but I found that the noise blanker in the Elecraft K2 was very helpful and there were some times when I felt that the lack of a noise blanker in the DSP-10 hardware was a disadvantage, even with the LMS noise reduction turned on and cranked up.

Nevertheless, to my surprise I felt I could find the stations more easily and found listening to them/copying them more comfortable on the DSP-10 hardware than on the SSB LT2S/K2 combination, whether I was running the LT2S/K2 with no DSP, with DSP-blaster, with the audio version of DSP-10, or with Spectran. I think this relates primarily to the fact that the binaural implementation on the DSP-10 is very much to my liking, and I like it far better than the DSP-Blaster's, even though I previously liked the DSP-Blaster's version very much. There were signals I essentially couldn't appreciate with the binaural OFF on the DSP-10, that just popped out when I turned it on (I normally run with it on, and turned it off just to try to figure out why the DSP-10 receiver seemed so 'hot', so what actually happened was that signals that were easy copy became lost in the mud when I turned off the binaural).

Also, the quality of the signal through the RF DSP-10 just seems better than when the audio DSP-10 is tacked onto the end of the audio chain after the K2.

Thirdly, the very slow tuning rate of the DSP-10 (10 Hz at a time by keystroke, not with an infinitesimal rotation of a knob) was a real advantage with the weak signals, especially since they could be seen on the display and 'dialed in' till they were centered at 600 Hz on the screen, right at the center of the DSP filter. Finally, I think the mast mounted preamps likely eliminated any effect of the better MDS the Xvrtr/K2 has compared with the DSP-10, and evened the score in this regard. I had previously compared the K2 with the IC-735 as IF, and the K2 won hands down. I think the K2 is a very, very good IF rig, but liked the DSP-10 better today. Please note that it may take a bit of fiddling with the delay parameter on the DSP-10 for optimal effect. I have the delay set at 1024.

So I guess the ideal setup for me would be the RF hardware DSP-10 with a spectral display and waterfall more like that of Spectran, and with a noise blanker in addition to the DSP functions it has.

All of this is subjective, so take it all with a grain of salt...

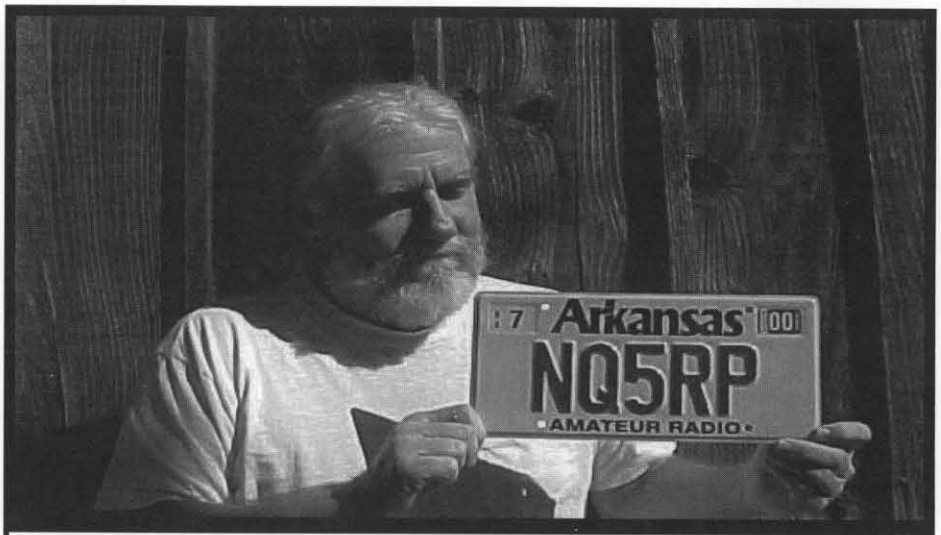
I did not try the spectral display of Leif, SM5BSZ, in this comparison as I was sure it wouldn't be as good as the others (yet) under these extreme conditions, and the DSP audio processing isn't available yet.

The DSP-10 screen capture at the bottom of the page is of the W3CCX beacon here on a night with a lot of pulse noise, and the K2 Noise Blanker turned on. Just focus on the spectrum display at the top of the graph, not at the waterfall, below. The waterfall is essentially a history of all of the playing around I had done for the prior 10 minutes (time lines on the left). Note that the noise floor is about 2-3 dB on the scale and the W3CCX beacon at about 665 Hz reaches the 40-dB mark. With the K2 Noise Blanker OFF, the noise floor came up to 20 dB, an increase of 17-18 dB. The effect of the K2 noise blanker is truly impressive!

There is not room here to include displays from the other programs, but the web sites listed above have pictures of their displays, so you can see them there.

I hope this was helpful. If you have any questions/comments, etc., just fire away! • •

Edited by W1HUE



Jim Hale—KJ5TF holding the AR QRP club callsign. As trustee, he gets to have this item on his pick-em up truck. Jim started working mW DXCC 1/99 and stands at 72 confirmed with about a dozen more needing QSL's, but worked. He hopes to get the 100 by 1/01.

THE PK-3 KEYER FROM JACKSON HARBOR PRESS

Cam Hartford—N6GA **Camqrp@cyberg8t.com**

This review originally appeared in the July 2000 issue of the Adventure Radio Society's online magazine, ***The ARS Sojourner*** *(http://www.natworld.com/ars/). It is reprinted here (with some minor changes) by permission of the author and the ARS.*

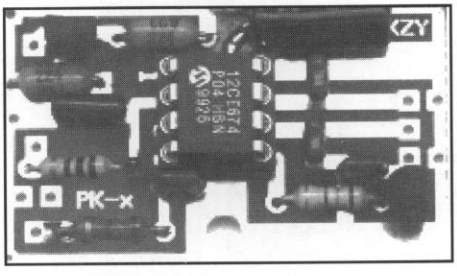
Electronic keyer chips have become so small and so feature-laden that it's now common practice to have a keyer built into just about every rig you own. Even the smallest of rigs, such as the NorCal 38 Special, have room for an 8-pin chip to do all your keying chores.

It was not always so. The first keyer I built was the WB4VVF Accu-Keyer, which required something like six 14-pin chips, an AC power supply and a hefty box in which to carry it all. We thought it was a pretty nifty device at the time, rather compact when compared to the tube clunkers of the day.

Since then keyers have shrunk and their capabilities have grown. The Super CMOS keyers marked a quantum jump in keying technology. One chip, numerous features, several memories and peanut power consumption made them an unbeatable combination. My CMOS Super Keyer II is probably over ten years old and is still my keyer of choice for contest work.

But tiny built-in keyers are now the chips of choice for portable work. No need to carry along an extra box when the keyer is already in the rig! At last count, there were seven rigs in the N6GA collection with internal keyers – a 38 Special (TiCK), NorCal 40 (KC-1), Small Wonder SW-40 (KC-1), an SST (KC-1), a Sierra (KC-2), a NorCal 20 (TiCK) and a Red Hot 40 (PK-3).

Never heard of a PK-3? I hadn't, either, until I saw it mentioned on QRP-L email reflector. The PK-3 is an 8-pin PIC-based keyer that is an exact drop-in match for the TiCK. The words that caught my eye were "pot speed control." I enjoy the usefulness and small size of the TiCK keyer chip, but for contest operating, I really miss a knob for controlling my speed. Having a knob to crank on is especially useful in QRP contests where you can encounter a wide range of code



speeds. I like to answer a station at the same speed at which he is calling, and with a knob I often end up adjusting my speed as I'm making my call.

The PK-3 is sold by Jackson Harbor Press and contains an amazing number of features for such a tiny little package. The instructions for operation run about six pages. Inputting commands to the keyer involves a push of the "Keyer" button on the radio in conjunction with a squeeze of the appropriate dot or dash paddle. I know I'll never remember all the commands, so I copied the command menus and had them laminated so I can carry them around like little cheat sheets.

The PK-3 chip can be purchased by itself or with a complete PC board kit (see photo above).

To replace a TiCK with a PK-3 chip and add speed pot operation, you need three external parts: a 100K pot, a 1K fixed resistor and a .01 µF capacitor. These items need to be connected to Pin 2 of the chip. I planned to use the PK-3 in my Red Hot 40, which is designed with Pin 2 of the keyer chip grounded. To avoid lots of delicate surgery, I chose to insert the chip with Pin 2 "flying"; that is, with it bent up in the air while all of its siblings are inserted in the appropriate holes just vacated by the TiCK. I soldered a Molex pin on the end of the wire coming from the speed pot, then slipped it over Pin 2 of the chip.

The only difficult decision of the whole procedure is where to locate the speed pot on my Red Hot 40. I chose an empty space on the front panel, but then had a tough time applying drill bit to that nicely anodized red faceplate. The result is a slightly more cluttered look, but I'll get used to it.

I can now crank my speed up and down to my heart's content. As an added bonus, the PK-3 offers an auto character space feature, which I got used to with both the Accu-Keyer and the CMOS Super Keyer. I feel truly spoiled.

The PK-3 chip with instructions is priced at $8.00 plus shipping. The complete PC board kit is priced at $20.00 plus shipping. Both are available from:

Jackson Harbor Press
RR1, Box 91C
Washington Island, WI 54246
Email: jacksonharbor@att.net
http://jacksonharbor.home.att.net

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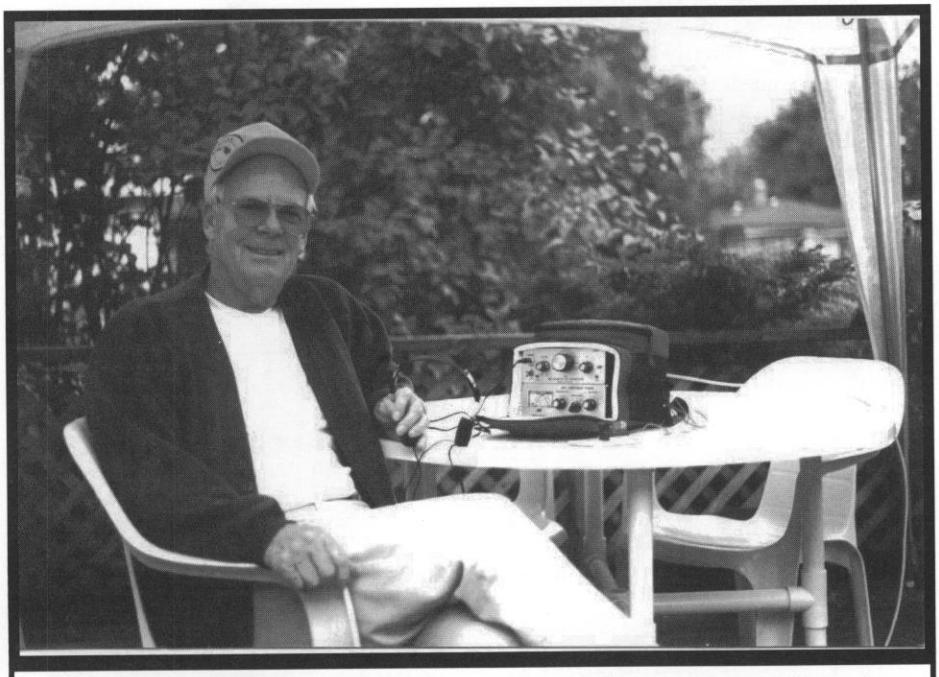
Edited by W1HUE



Dick Arnold—K8RJA in back yard expedition with MFJ 9040/971 package & 40 mtr. hustler mobile antenna mounted on a camera tripod using a shorted dipole for a counterpoise.

DX-101
NADXC TUTORIAL ON WORKING DX

By Chuck Lewis—N4NM

DX...WHAT IS IT?

Just two letters; but these two little letters have excited hundreds of thousands of hams worldwide, launched expeditions to countless exotic locations and been the catalyst for many countries around the world to tear down political barriers and allow their citizens to join the amateur radio community. DX stands for DISTANCE, but DX is a relative term: DX stations might be 2000 miles away on the HF bands, 200 miles on the VHF/UHF bands, or 20 miles at microwave frequencies. Most DXers gained their experience on the HF bands from 160 meters to 10 meters. And, although those bands are what this brochure will concentrate on, all DXers share a common characteristic: *the thrill of the chase*, and capturing a QSO with someone who is far, far away. For us, it's exciting to snag a new country or new island, or even a new grid square, by digging a call sign and signal report out from behind a wall of noise and interfer-ence. There's just something special about snagging a contact with a guy in New Guinea, Japan, Pakistan or Sweden using your own rig and antennas that is hard to beat!

DX...WHAT DO <u>YOU</u> NEED TO WORK IT?

You do <u>not</u> need a big station to work DX. A surprising amount of DX has been worked from modest stations with meager antennas. A basic transceiver and some good dipoles will get you going in DXing. Some NADXC members have gotten to the 300 country level using 5 watts! Build your station as your interest and finances dictate. Adding a little more power or putting up a beam will improve your score, but if that's not in the cards, you can still work a lot of stuff with a minimal station. Concentrate on improving your listening ability and your operating technique; it will pay handsome dividends, especially if you don't have the loudest signal on the band.

DX...WHERE DO YOU FIND IT?

On the HF (High-Frequency) bands, you'll find DX signals on all modes including SSB, CW, digital (RITTY, Pactor, Amtor, Packet), SSTV(Slow Scan TV) and ATV(Amateur TV), and even FM (but rarely).

For the past several years, during the recent lull in the seven-year sunspot cycle, DX could be heard on the "high-bands" (20-10 meters) only during daylight hours, and on the "low-bands" (160, 80/75, and 40 meters) only during nighttime hours. This is because energy radiated from the Sun during sunspot activity affects radio *propagation* (the way our atmosphere reflects and refracts radio signals), and sunspots have been on the decline until just recently. So, as the Sun becomes more active over the next three or four years, it will be easier than ever to find exotic DX on all our HF bands. The new solar cycle (cycle 23) has already begun to get DXers around the world excited with the prospects of "easy pickin's" nearly any hour of the day on many of the HF bands. For now (Summer '98), try 20 or 17 meters during morning, evening and late night times. Fifteen and Ten meters are usually best for Europe near daybreak and for the Pacific at dusk, and are sometimes open to Africa & Asia mid-day, while the low-bands (160-40) will be open, but noisy, at night. As Fall approaches and the Sun angle changes, the low bands will become quieter and you'll be able to hear DX there, too. At the peak of the cycle, a couple years off, the high-

Look for DX here

Band	Characteristics	Where's the DX ?
160	Late evening/night; best in winter	1820-1850 kHz.
80/75	Late evening/night, early morning; best in winter	CW: 3500-3530; SSB: see *SPLIT*
40	Early evening thru early morning; Fall thru Spring	CW: 7000-7030; SSB: see *SPLIT*
30	Sometimes like 40, sometimes like 20. Try it!	CW and digital only; mixed anywhere
20	Open somewhere 24 hours, best Fall thru Spring	CW: 14.000-14.040; SSB: 14.150-14.250
17	Sometimes like 20, sometimes like 15. Days/Eve.	CW: 18.068-18.100; SSB: 18.110-18.168
15	Daybreak to Noon: Europe/Africa, Midday to Evening: Asia /Pacific	CW: 21.000-21.150; SSB: 21.150-21.350
12	Sometimes like 15, Sometimes like 10. Try it!	CW: 24.090-24.930; SSB: 24.930-24.990
10	Lots of surprises! Dawn & Dusk best but improving!	CW: 28.000-28.100; SSB: 28.300 & up

bands, especially 10 meters, will allow round-the-world contacts with really low power and modest antennas. If you haven't heard 10 meters filled wall-to-wall with strong DX stations, you have a real treat in store! Contrary to what many people think, working DX is not difficult, and the more you work, the more you will sharpen your skills. You will learn about equipment, antennas, QSLing, propagation, pileup technique, operating etiquette, and before you know it, you, too, will be a DXer!

Start tuning around your favorite band on the frequencies your license class permits – no use getting frustrated listening to all that good stuff down in the Extra Class band if you can't work there. But it certainly does provide an incentive to upgrade!

The most fun is to prove these predictions wrong! Band openings to a specific part of the world can sometimes really be surprising and interesting. A good DXer is a good Short Wave Listener FIRST. Listen, Listen, Listen! Tune, Tune, Tune!

DX...How Do You Work It?

Casual DXing is usually done like any other QSO. For example: a short response to a CQ, using your full call sign on the DX station's frequency should result in a nice conversation. Many DX ops speak English fairly well, and can at least exchange name, location, signal report, and often will enjoy a nice rag chew. CW ops can use Q-signals even if they don't share a common language. If you're on SSB, give a few short calls on his frequency using International phonetics that your DX target is likely to understand: "Kilo Foxtrot Four Zanzibar Tango Sierra" is a lot more easily understood than "Kilo Fox Four Zany Tennis Shoes". Speak slowly and clearly -- none of the cutesy stuff.

Split operation:

On some bands and modes, U.S. stations cannot transmit where the DX station can, so you'll often hear the DX station announce a 'listening frequency'. For example, F2XXX in France, CQ'ing on 7035 might say "listening 7130". That's your cue to set up your rig for *split* operation with each of two VFO's on a separate frequency. You listen on his transmit frequency and he listens on your transmit frequency. It's a little like repeater splits, but with freedom to pick your own (legal) frequencies. This can get a little tricky until you become comfortable with the way your particular rig works in *split* mode. After a while it'll be second nature, but at first, listen to how other ops are handling it.

Rare DX:

Sometimes a place with few or no active hams will be visited by a "DX-pedition" with operators, equipment and antennas ready to put a "new country" on the air for the benefit of DXers around the world. Or, perhaps it's just a case of a less rare area with especially good propagation. Whatever the reason, you'll know something's up, because there will be a whole group of stations calling the DX all at the same time. This is affectionately known as a *pile-up*. The size of the pile will be an indication of the rarity of the DX! Pileups require a little technique...here's where you can gain a real advantage by using a little knowledge and planning:

Plan to go *split:*	The DX will usually try to move the pile away from his transmit frequency in order to be heard over the masses, so be ready to transmit where he's listening. It makes no sense to call him on his own frequency once he says "listening UP TEN", or "200 to 220", or just "UP"!
Get in step	The DX op will try to catch one complete call sign from the pile on the first call, and will try to establish a rhythm that benefits everyone with a lot of contacts during the time propagation is in our favor. So send just your full call once, with STANDARD phonetics, on his listening frequency, then listen for his response.
Play the pileup	If you can figure out what his tuning pattern is, you can often anticipate where he'll be listening next in the pile, and slip your call right in. This works, but takes some patience. If it's a small pile, you can try picking a spot just on the edge...move around a little. Try to be noticed. Does it sound like Bass fishing? Yup.
Time your calls	Sometimes a little delay (a second or two) will let your call stand out among the rest as they taper off. Really experienced ops seem to have a knack for sensing the most opportune time to throw out their call. This is a pretty subtle skill that will pay off if practiced.
Follow his lead	If the DX op wants the pile to move, spread out, squeeze up, go by numbers, speed up, slow down...whatever...do it (legally). On CW, try to respond at his speed.
Don't react to others	Don't be tempted to be a traffic cop by telling others they are on the "wrong vfo" or "up, lid!" All this does is add to the problem. If you hear an obvious jammer, work around him; he wants to get a rise out of us, and he is thwarted when we IGNORE him. Patience! Discipline!
	Don't be discouraged. Busting pileups on the first or second call is for the "BIG GUNS". The rest of us "little pistols" have to replace brute power with skill and cunning. You Can Do It! Be patient. Listen. Figure out how the guy is playing the pile. Listen, Listen, and LEARN!

Techniques for Making That Rare DX Contact

DX...Now What?

You've done it...you worked the DX...so? Most DX chasers like to have a QSL card to confirm the deed, and if you want to apply for any of the many DX awards offered by the world ham community, you'll need that confirmation. The most prestigious and sought after award is ARRL's DX Century Club (DXCC), awarded for confirming contact with 100 different "entities" (call them countries, for now). There are over three-hundred 'countries' identified for DXCC purposes, and most are inhabited by active hams, so the first hundred is attainable with even the most modest station...especially in the next few years. If you become hooked on collecting countries, you'll join a huge group of like-minded DXers around the world who think this is the most exciting and challenging aspect of ham radio, and who will welcome you as a member of their fraternity. You don't need to be a big-gun; you don't even need a hundred countries...just the desire and interest will identify you as a DXer!

DX...How Do You Get Help?

Elmers:

You may already know what an Elmer is—a nickname for someone who is really helpful at showing you the ropes. North Alabama DX Club abounds with them, and we love to help out beginning DXers with advice, tips, technical help, & moral support. We love to see 'em grow!

WWW:

There are lots of DX-oriented sites on the Internet. We have our own that is open to everyone (www.nadxc.org). Other prominent sites include those sponsored by the Texas DX Society, Potomac Valley Radio Club, Northern California DX Club, several European and Asian sites. All are easy to use, have helpful tips and info, and have lots of links to data, software, propagation forecasts and news.

Yeah, man...You oughta see it when it's High Tide!

Magazines:

DX Publications abound. They run the gamut from weekly advisory DX bulletins, monthly columns in QST, slick magazine DX publications like THE DX Bulletin. NADXC also publishes a monthly summary of current DX happenings in our own monthly LONGPATH.

Clusters:

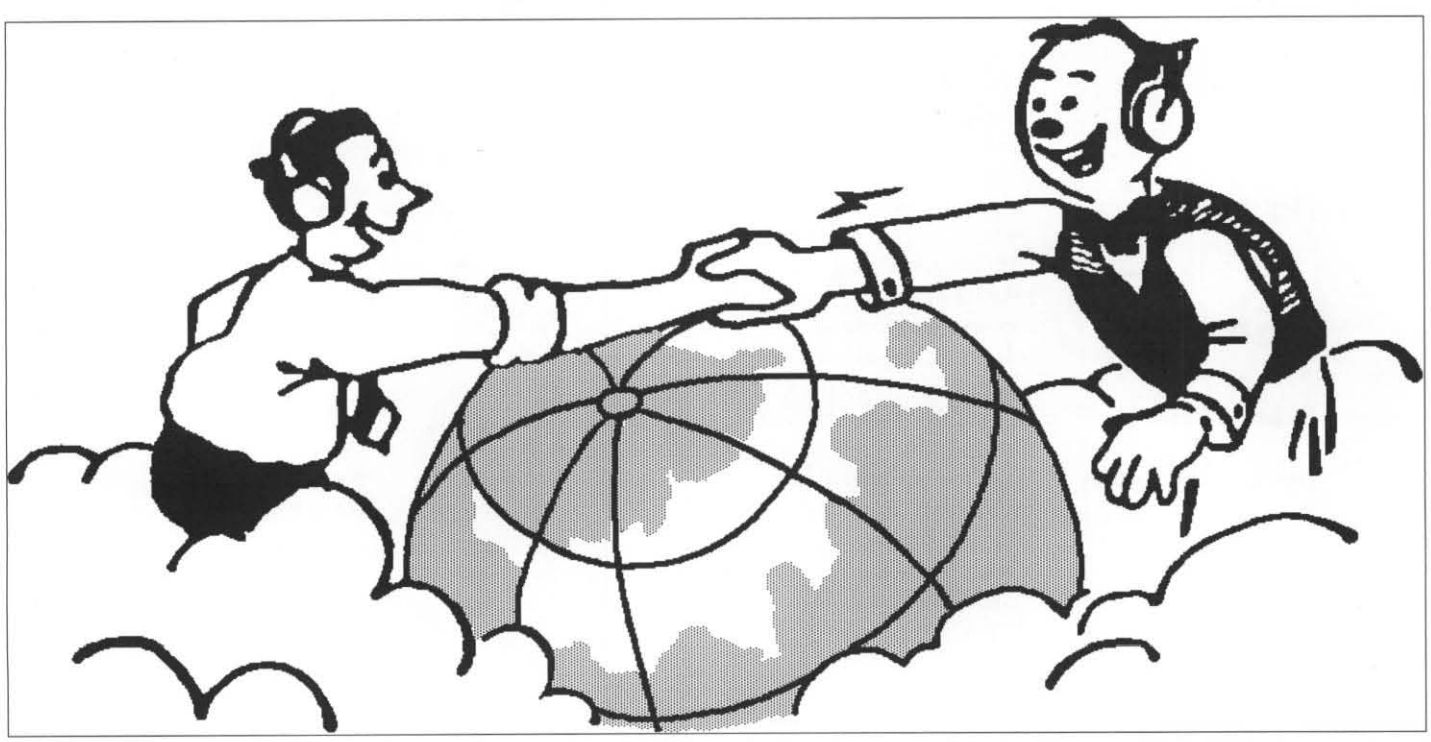
Packet Clusters are an excellent help to the new or seasoned DXer. Packet Clusters are networks that link up cities into large spotting networks. Hook in to our own local one on 144.93 or 145.73 and watch your screen for awhile. You will get the hang of it in a hurry. DX alerts (*Spots*) will appear from DXers all over the Southeast telling you what the call sign and frequency is of something they just spotted. There are also lots of other aids there, like current propagation info, an online callbook, help with hard-to-identify prefixes, QSL advice, and a QSL manager's directory. Talk to W4NS for more info.

NADXC:

The North Alabama DX Club is one of the oldest DX organizations in the South. They meet once a month at a Huntsville area restaurant, sponsor two 2-meter repeaters (147.30/90, and 147.10/70) for providing DX info, a terrific web page (**www.nadxc.org**) on the internet, as well as the Packet Cluster. Dues are nominal, and they are a super helpful group. They'll help get you started on the right track, offer you a helping hand, and even tell you what traps to avoid right from the start.

Publications:

Check out the stuff in ARRL's Operating Manual, the ARRL handbook, the ARRL Antenna Handbook, or any of the others in the list of good ARRL publications. There's help there on any subject you can think of. Don't forget to get yourself a copy of the ARRL DXCC Countries List and see what countries, islands and other entities count for your country totals. **HAVE FUN...DX IS!** • •



ADVENTURES IN MILLIWATTING

Extreme QRP

Jim Hale—KJ5TF kj5tf@madisoncounty.net

Practical Milliwatt Mod for the K2:

I reported in my last column about Randy Hargenrader—WJ4P & his milliwatt mod for the K2. This is a very simple way to get the K2 to do a 1/10 power reduction by adding a few resistors to the power control circuitry. This mod uses a double pole switch to exchange the stock resistors with the proper resistors needed for smooth control of the power output of the K2 in the range of 10mW to 1.5W.

I've had a chance to try this mod and it seems to work as advertised. Now with my attenuator, I can easily take my K2 to all new lows. I made the plans available on my website. Just look on my Links page. http://www.madisoncounty.net/~kj5tf/

Bagging DX with milliwatts

FR5FD on Reunion Island was CQ'ing and I bagged him 11/04/00 with 700mW on CW.

The next day I was tuneing across 10M & all EU signals were 599+! I found HA9RT/3 CQ'ing & worked him with only12mW. On 11/08/00 I caught ZM8CW on Kermadec island CQ'ing on 10M and got him with 700mW.

RTTY

On 11/06/00 I caught FO0POM Clipperton Island CQ'ing on RTTY and worked him off the back of my beam with 700mW. Yes, it was still pointed at EU, and the back was toward the Pacific area!

Back on 5/20/00 YL2KF was CQ'ing on 15AM and I answered him with 700mW. He gave me a 599, and we had a normal QSO, until I told him my power. Then he asked me if I could lower my power more.

At 500mW still he still had perfect print, so he asked me to go lower. I hit 65mW, and still good copy, he asked for 10mW, and he copied that power, but said there were many print errors, but ok for a QSO at that level.

I was worried about QSB so raised my power to "QRO" 100mW and we chatted back and forth more. At one point he mentioned QSB and losing me for afew seconds, so I raised my power to 500mW. We chatted on some more, and I finished back at 800mW to say bye bye.

At 700-800mW, keyboard to keyboard RTTY communications was 99-100% solid copy for our path, & band conditions.

Hellschreiber & MFSK16

In the past few weeks I've picked up a couple more ham digital mods that work via my computers sound card. The cables are exactly the same as what I have for PSK and RTTY. Hellschreiber is named after its German inventor and used during WW2. Interesting history, and only CW is older than Hell. (No pun intended)

Free software is available on the Internet at this address. http://iz8bly.sysonline.it/

It's well known to perform well in unstable ionosphere conditions, and noise. In RTTY, and psk31 you see the message as nice text on the screen exactly like the words I type now. With Hell there is no nicey nicey test! You are looking at a Fax like print! There is a more "flying by the seat of the pants" feel to this mode, and I for one like it.

Don't have a SSB rig? There's some other software that will allow you to use a CW only rig! I haven't tried that yet, but plan to do so.

On the same webpage, notice the link to download Stream. This is the software for a MFSK16 program, also by IZ8BLY. A new robust SUPER-DX mode especially for low bands and long path. Read more about Hell and MFSK16 on the ZL1BPU website. http://www.qsl.net/zl1bpu/

With Hell, and MFSK16 (Stream), I've had no problems making DX QSO's using less than 1 watt.

ARCI PSK31 Contest

QRP ARCI member Rod Cerkoney, N0RC and contest manager Randy Foltz, K7TQ, get a pat on the back for suggesting this new contest. How about a winter, & spring psk sprint?

Like most QRP'ers my 1st love is CW, but this psk31 has "something" that draws me, and many other QRP'ers to it. Hard to explain unless you've tried it. We will always have plenty of CW QRP contests, so psk QRP contests are additional flavor in our QRP stew.

Many feel the same about RTTY, and QRP. Maybe someday ARCI will run a RTTY QRP contest.

Why not explore these modes with QRP? Enjoy all the flavors of the QRP stew.

"The receiving station does all the work"?

I was in a chat with a DX station afew weeks ago and was a little "hurt" when he made the statement. "The rx station does all the work, with QRP".

Being caught off guard, I didn't say anything in reply to that comment. But instead posted his comment on QRP-L for some feedback. Here are a couple of the responces.

Naturally if my RST is Q5, and there's no QSB I maintain my lowest useable power. If not, I raise my power to as much as 5w. If that's not enough, I then QRT.

From QRP-L

Thought that question had been laid to rest. I figure (therefore this is the correct reply) :-check ur rst reports... iffin u are getting an R report of 4 or five the other station is not doing any work...

The R report is the tattletale.. or rattlesnake heah... if he says reading u with little to no problem... how can he be working???? strength is neither heah or thair... as many times u can work ten meters with a 0 S meter reading and perfect readability/// or rst 509 kinda like the argonaut... hee hee

Oh, to answer ur question... I ask them how they are copying me? Or why did they give me an R 4 or 5 report... if it wasn't true... and then move on...

Bye now,

ke1la joel...in maine...freezin up heah!

While it can be argued that the other guy "does all the work" that really isn't the case in most instances.

The majority of the time I'm on the air using QRP and talking to other QRPers, I don't have a problem copying their signals (QRM aside). Currently I am at my daughter's house in Panama City, FL and using my K2 and a Gusher dipole on a DK9SQ mast in the yard. I have made many Qs from here using that set up and outside of only one or two contacts, all the signal reports I gave out were an honest 559 to 579 and that is to other QRPers!

There are those out there who must have a 20dB over S-9 "armchair copy" signal in order to be content, but for the rest of us a 559 signal is perfect copy, especially for us QRPErs, cuz were just better at this game than most other folks!!

73 Rich K7SZ (QRP column editor for some obscure ham magazine in Newington, CT.)

Milliwatt editor coments

Through the wonders of email, I can end this discussion (for now), with a "happy ending". It's a copy of my email to

(Continued on page 50)

Extreme QRP

APPALACHIAN TRAIL AWARD PROGRAM

Ron Polityka—WB3AAL wb3aal@fast.net

During 2000, more than 20 intrepid QRPers braved the elements and ventured out on the Appalachian Trails to make hundreds of QSOs up and down the East Coast. For some, it was like a walk in the park while for others it offered major adventures.

In January 2000, I was looking to create an award program that the Eastern PA QRP Club could sponsor. I wanted to combine hiking in the great out doors and Amateur Radio hobby. February 2000 I came up with the idea of the Appalachian Trail Award Program.

I called a local club member, Ed Breneiser, WA3WSJ, and told him of my idea. Ed liked what I had on my mind and helped me develop the program. First, we established some general guidelines: all contacts must be made after January 1, 2000; they cannot be made during any contest; and, the contacts can be made on any band from 160 to 10 meters including the WARC bands. By the time we were done, we decided that it would take 5 award categories to properly address all the needs of our club and the QRP community.

The 5 categories are Basic, Deluxe, Trail, Trail to Trail and Trail WAS. The Basic Award you need to contact all fourteen states that the AT runs through its borders. The Deluxe Award you need to contact one station that is on the AT in each state. The contacts do not have to be with the same station throughout the entire AT. The Trail Award was made for the hams that venture out and operate their radios on the AT. They have to contact someone in the fourteen states to qualify for the award. The Trail-to-Trail Award is for all those hams that go out onto the AT and operate their radios. They need to contact someone on the AT in each of the fourteen states. The Trail WAS Award is to promote operation on the AT on the higher HF bands. This will allow the hams on the west coast to work toward the different awards. Starting in January 1, 2001, we will be adding the Trail DXCC Award. This should prove the toughest award to receive.

Some hams like to hike in a few miles before setting up their station and others find a spot where they can drive too. I have several spots that I like to operate. Most of my locations are less than a 45-minute drive from my home QTH.

Sometimes I like to take a mono band rig and hike several miles with Ed, WA3WSJ, just to make a couple of QSO's from the AT. Some of the rigs that make their way onto the AT are the K2, SST-20, 38 Special, NorCal 20, SW transceivers series, Ten Tec Argonaut 515 and the Kenwood TS-50s. Yes, a large rig like the TS-50 does make it to the AT, I like taking this radio to the trail so I can make some SSB contacts for those who want a QSO. I will be replacing this in soon with the K2 that is on the bench. The new rig that is going out onto the trail is the new K1. Several QRP'ers have already purchased and built the rig with the intension of it going onto the AT. We have found that the best antennas for the trail are lite weight mono-band dipoles. Some have found that multi-band doublets work also. You don't have to have the dipoles and doublets very high off the ground to make them work. A average high of 15 feet will get you out. If you like to work with a vertical the "Killer Vertical" from June 99 QST will work but it is hard to find trees taller than 40 feet on top of the mountains.

If you plan on doing serious hiking on the AT you should check into light weight hiking boots, backpack and chair to take on your trips. This will only make the trip more enjoyable.

Ken Newman, N2CQ, has gone on a week-long journey to three states, MD, WV & VA. He spent a couple of days in each place and made many QSO's. Ken had a blast and in the following weeks he and Ed went for a couple of days to place northern NJ and southern NY on the air. There have been many hams that are going out and operating their radios from the AT.

Ed, WA3WSJ, is planning a July 2001 trip to the Presidential Range in NH . He plans on hiking between the AMC's cabins and making his assault on Mt. Washington. He plans on working one full day on Mt. Washington with his K1, so look for him during the third week in July.

Hiking the Appalachian Trail is not just a walk in the park. You must be prepared for all kinds of dangers. The most popular problem at the present time in the North East is the dreaded Lime Disease and bacteria in the water. They can be controlled by received shots and using spray for the Lime Disease and using a water purifier for the drinking water. Some people are sensitive to the poison ivy, well you should stay on the trail and you will be ok. There are a number of different kind of animals that you have to watch out for while on the AT. The three popular ones in the PA area is bears, snakes and coyotes. Those three species are very good reasons why you should always carry a walking stick and hike with a friend. If you are not sure of an area you can always go hiking with a friend, this is a good idea for your own personal safety. This way if anything should go wrong you will have some kind of help with you at your side.

Below is a picture of Ken, N2CQ, checking out Ed's K2 on the AT in PA.

Back in September, I went out to one of my favorite spots to work Ken on the AT. When I arrived at my location and started setting my station set up, a through-trail hiker noticed me. He stopped and asked what I was doing. I told him that I was a ham radio operator and I was going to work a friend in MD on the AT. He introduced himself as Eric and told me that he started hiking the AT in Maine on July 1. He asked if I would mind if he had his lunch and watch how I

was going to hang my antenna. I told him I would be more than happy to have his company. He told me that his neighbor was also a ham so he knew what the hobby was all about. I asked Eric if he would like me to pass a message with a picture along to his family via e-mail. He was happy that I made the offer and he asked me to send it to his parents. Well one hour after I took Eric's picture his parents received the e-mail. They were very happy to hear that he is OK and to see his picture.

There are several reasons why operating from the Appalachian Trail is very beneficial. The number one reason on the list is to just get out in the great outdoors and relax. In today bustling world some people do not take the time to enjoy their environment around them. Since the AT Award program has been in existence I have had several QRP'ers thank me for creating the program. They all had the same comment, they are getting back outdoors and remembering the years gone by when they use to hike the AT in their youth. Some are even going back to their old hiking areas to operate with their QRP radios to create new memories.

I like to talk to the thru-hikers and offer to take a digital picture for them and send it onto their family with a short message. I did this three times this year and all the families were very thankful for sending the message! Hey, isn't that what Ham Radio is all about?

Now the hams that live near the AT have a good excuse to get outdoors and get a little exercise with their radios.

Ron de WB3AAL:

"It is great to get out doors on one of our National treasures and enjoy QRP on the AT. I really enjoy making the contacts with hams all over the world from the AT in PA. I think we have created a little bit of history by going out on the AT with QRP"

Rich de K7SZ:

"The AT was a vital part of our Nation's early history. Many famous frontiersmen traveled the AT. It's quite a thrill to be on the trail, making contacts with other hams and pioneering a little QRP history of our own."

Carter de N3AO:

"I feel like all my efforts to go out and lug all the radio gear is appreciated; plus, it's such a rush to have a pile-up on my station. I have enjoyed day-hiking the Trail too. I had never thought about that aspect of the AT. And getting out of doors in such natural surroundings is such a privilege; QRP operators can do this, while QRO types are tied to their big rigs at home. But what would we do without those at home? I love contacting my friends at home while I'm "on the Trail..." And making some new friends is neat too!"

Ed de WA3WSJ:

"I love to hike to a lookout and operate QRP from the AT. The scenery is usually very beautiful. You "feel" the outdoors! I had a back operation about a year and a half ago so hiking is good exercise for me too. When you're on a part of the AT that new to yourself, you feel like exploring the AT. It's all so exciting and new. Building the radio gear; hiking with some friends and enjoying the outdoors. It doesn't get any better than this!"

Craig de WB3GCK:

"Even if you're not into hiking or backpacking, you can still activate the Trail. There are a lot of easily accessible points where you can set up your radio gear. A good guidebook will show you highway crossings, trail heads and other access points. To really enjoy your trip, keep it simple, keep it light and, by all means, be sure to take in some of the great scenery along the Trail."

And A Sad Farewell:

I would like to say farewell to Joel, K1QM. He became a silent key on September 17, 2000. Joel always found anyone on 40 meters when they were on the AT. He was a regular contact when I was on the AT and we had some great QSO's. 72 Joel, you will be missed.

Award Status:

As of November, there are 6 awards that have been issued and more are waiting to make that last QSO. The Eastern PA QRP Club is the main force behind the program. But the biggest drive in the AT Award program is all the hams that venture out onto the AT with their radios in hand. With out them there would be no Appalachian Trail Award Program. You can find more details about the AT Awards at the **Eastern PA QRP Club's web page: www.n3epa.org.**

Look for WB3AAL on the AT in the winter months. I have been going out to the AT since March 2000 and I plan on hiking year round with the radios placing AT in PA on the map.

Always remember to leave the area you were operating at in the pristine condition you found it in. Pick up the trash you might find along the way to help mother nature retain her beauty.

72 and keep on hiking the Appalachian Trail! ••

APPALACIAN TRAIL PART -2

Ken Newman—N2CQ n2cq@arrl.net

Why should a person who is 63 years of age decide to take an extended trip to the Appalachian Trail within a week from retirement? My family wanted to know too. I always wanted to return to the Skyline Drive and the Trail since we were there about 20-25 years ago. The new Trail Awards sponsored by the **Eastern PA QRP Club** also gave me the spark to do it. The weather all summer were such that kept me in the shack but at the end of the season I could wait no longer. Just for the record, I had no plan to hike from Maine to Georgia with a radio, as many asked on the air. I only plan to use the Old Chevy to do most of the mountain climbing.

Thursday, Sept. 7, through Sunday, Sept. 10, 2000:

Virginia. The trip started from Woodbury, NJ, about 10:30 AM EDST to Big Meadows Campground with a tent, equipment and food for a week or so. Almost all the QRP equipment I had come along too.

The route was via I-95 and then I-66 west from Washington, DC to US29 then US211 to enter the Skyline Drive. The Old Chevy was working a little to get up the mountains but not like it was before when we used to come with a travel trailer. Since I was convinced I would come back or go to other national parks, I bought the "Golden Age Pass". The $10 price for a lifetime pass can't be beat. On the way on the Skyline Drive I stopped at many overlooks to see the views. The nice day made it very worthwhile to see.

At Big Meadows I picked a campsite closest to the Trail. Mine was Y5, a very good site. If you plan to camp there try Y14. This is the best view to the mountains. My campsite was close enough to count as a trail station for the awards. I setup the tent and then the station.

In VA the station was a dipole fed

with twin lead held up with a "Black Widow" fishing pole up about 18'. I used the MFJ 971 tuner. The 18' mast was not a big help but the elevation at camp at 3600' above sea level definitely did! The other equipment were the OHR 100A rig for 40m at 5 watts, the NW20 for 20m at 4 watts, 38 Special for 30m at 4watts and the Green Mountain 15 on 15 meters at 1 watt. Each had a QSO on the trail but 40 meters was the mainstay.

About 7 PM I was on the air making a few QSOs . I decided to cook some soup and move the station into the tent since it was dark. About 13 QSOs were made until 11 PM EDST. The first night weather was about the worst at 2 AM with strong wind and mist all night. I wasn't that sure the tent was going to stay up so I covered the equipment and slept in the car. It was chilly most nights but cozy in the tent after that. The rest of the weather was much better. Sunday afternoon got a bit warm and the activity dropped off with the football so I spent some time hiking in the area.

Big Meadows is an excellent day trip from Washington or Baltimore and others. Many came on Saturday to camp too. There is a lodge with a dining room which I used several times, a camp store and grill room near the drive and an excellent visitors center with movies about the Shenandoah N.P. history and area. Ranger programs are just the thing for anyone especially with kids. Good hiking trails are nearby which I enjoyed. Ice cubes and hot showers were available which are not found on the A-T very often.

Some interesting QSOs were on the Tuna Tin transmitters which went into the log.

Most of the operation on Thursday through Sunday afternoon was playing radio. The Saturday evening contesting put me on 30 meters working some DX and new states on the trail. 3B8CF and U5WF happened to be there and answered on the first call. Some interesting QSOs were on the **Tuna Tin transmitters** which went into the log. **W9JOP/4** was worked with his TT2 more than once and **N4UY** also. Jake's QSOs were with his Manhattan style TT2. A contact with **W2PE/2** was a kick for me. Their location was aboard the USS Little Rock, now at the Naval Park at Buffalo, NY. I was a sailor years ago as part of the crew of CLG-4. On Sunday morning I was happy to work **WB3GCK/AT**. Greg took a trip to the border of PA/MD on the A-T. Trail-to-Trail QSOs are the most rare of Trail contacts. 98 QSOs were logged on this stop with most rag chew contacts and some more than 30 minutes.

Monday and Tuesday, Sept. 11&12, 2000: West Virginia:

First thing was to break camp and get going to the next Trail spot. I started early to take the tent down before the possible rain came. It looked like it would. I haven't found it fun to pack up a wet tent or sleeping bag so the early start was successful. I stopped at some overlooks on the Drive but the mist made it hard to see the mountains on the other side of the valley. I did stop at Skyland and check out the lodge and cabins. **Doug, W4IDW**, had recommended it and I would too--an excellent vacation or a day trip. I also hiked the Limberlost Trail across the drive. This is one of the few locations where the Hemlock groves still stand before most were lost as lumber. This hike is excellent for anyone including the handicapped. The great Hemlocks make a trail one can't forget. I have a picture on the shack wall I hung about 20 some years ago of them. Beautiful! Moving on the drive, the fog became heavy and one couldn't see much ahead. It is like being in the clouds. I decided to take US211 down the mountain toward Luray, VA to improve the travel. The fog cleared up half way down the mountain. The next planned spot was at Key's Gap between Charlestown, WV and Leesburg, VA where the A-T crosses Rte 9 at the VA/WV border. It is a good spot to park and setup the station. I walked the trail for a short time to find the Skeeters were plentiful and active. I decided to put Key's Gap as a first choice for Tuesday and have the repellant in use.

I went on down to Harper's Ferry where I had reserved a room at the Comfort Inn. The Inn is close enough to the trail to be a Trail Station. Unfortunately, the lower price rooms are on the wrong side of the building to put antennas up. I had to move to the pricey room to get the antenna erected. This time I used the N2CX Gusher-2 for 20M and 40M. This fan dipole was also on the "Black Widow" mast, up 18' or so. When I set the station up and called CQ at 5 PM, it sounded like they were waiting for me. For the 2.5 hours thereafter, I didn't have to call CQ. I quit at about 10 PM to enjoy the shower and catch the Monday Night Football. Yes, not the expected amenities for the A-T but I'm a senior ya' know!

Tuesday continued to be a busy day to continue giving QSOs from the trail from WV. The morning rain kept me at the room instead of going to Key's Gap. Early afternoon I took a break from the radio to visit the Harper's Ferry N.P. I was able to use the Golden Age Pass again to visit. I seem to be more interested in the history of the area than I was 20 years ago when there. The park has been upgraded very well and the info is presented interestingly. I hiked the A-T on the foot-bridge over the Potomac into MD. It is an excellent view of the two rivers and the mountains above. Harper's Ferry being a transportation center in the 1700s seem to be so today with the CSX freight trains coming through every 10-15 minutes. It's a neat view of them when they pass when you are on the foot-bridge. I actually hiked most of the trail in WV by going up to the Jefferson Rock. WV is the shortest run of the A-T in any state probably less than 2 miles.

Back to the radio and more QSOs. I was lucky to narrow my needed states for the Trail Award to one left, GA. **KB1ENS** responded from VT needed from the help posted by my friends on QRP-L. Thanks John.

I logged 51 QSOs on this stop in WV.

Wednesday, Sept. 13, 2000: Washington Monument S.P., MD:

The park is near to Boonsboro, MD to help locate the site. It wasn't far from WV. When I arrived, I hiked up the Trail to Washington's Monument itself. There are signs as you go up showing George's history. The monument was built by the local citizens of Boonsboro after Washington passed on. It has been kept in good shape by the state since. At the monument the view is striking. It is a complete overlook of the valley and mountains. It must be a sight to see at night from the valley with the lights placed on the monument

I found a good picnic table close to the Trail and set up the station. Again it seems the folks were looking for me when I came on about noon. This afternoon I spent more time on 20m looking for GA. I kept hitting around it but no GA. Coming back on 40m, I worked **WB3AAL/AT** at his usual AT location in PA. He called earlier at home to be sure I would be here. The weather was perfect at the park but I had to move the station into the shade. The OHR was drifting badly in the sun. Toward late afternoon I was not sure GA was going to show up at all. With a QSO with **WD3P, Larry** let me know he would post the GA need on QRP-L so I thought

I had a chance. After working the remaining stations on 40m I moved to 20m and the first CQ was answered by **AD4S**. John was reading QRP-L and GA was in the log in the last hour left in MD. I logged 25 QSOs at this stop. Time to go home for a few days before heading out on A-T in NJ and NY.

The interest on the trip on the first day and thereafter was very surprising. The good folks at the NJQRP Club, Knightlites in NC, the EPA QRP Club, QRP-L Zombies and others, brought me more QSOs and concerns of my condition. A couple of operators in the NTS offered to relay traffic to home also. Many thanks to all!

Monday & Tuesday Sept. 18/19, 2000: New Jersey:

Ed Breneiser, WA3WSJ, had rented a cabin at the Mohican Outdoor Center in the northwest part of NJ. It is operated by the **Appalachian Mountain Club**. He invited me to go along to play radio some more. Being the marvelous host that he is, I jumped at the chance. The cabin is about a mile off the A-T. I went up early to get my stuff situated in the cabin and go out on the Trail on 20m to work some new states. Ed came about an hour later. Not much going on 20 so I went back to the cabin. Ed had set up the K2 and was in the process of preparing an excellent meal for the evening including big steaks with mushrooms and corn. Man, this is way better than when I was doing the cooking for myself in VA! Not only that, I get to play with Ed's K2! Did I mention Ed is a marvelous host?

In the AM, Chef Ed did a repeat with a great breakfast with eggs, bacon and potatoes. After enjoying that, I went to a good AT location where it crosses route 602 above Blairstown, NJ. I liked that location better than the one near the cabin. Ed was packing his K2 for a hike to set up on the trail. My antenna this time was the twin lead dipole I used in VA, up 30' in a tree thanks to the EZ Launcher. The name "Slingshot" is not to be used in Jersey by the way. Just as I got it up, the rain came down. I threw the feeder in the car and set up the station inside. Everything tuned up ok and worked several stations including W9JOP/4 with his TT2 again. He came in as 579! I was worrying about Ed's situation hiking along with little cover. Just then two hikers came by to let me know he had been at the fire tower about a mile down the trail and he had climbed up to the top of the tower to get some shelter. He shortly answered my CQ to make another Trail-to-Trail QSO in NJ! It was raining all day so I stayed dry in the car working anyone who would call. After 4 PM I tried 20m. This time I worked **IZ1BLE/QRP**. I think having the antenna at 30' may have helped even the altitude was about 1500'. The rain stopped a little while so I thought I better shut down when I can, and head back to the cabin. I logged 29 QSOs on the trail from NJ. Ed was back at the cabin

drying-out and resting. He looked like he was glad to be out of the Great Outdoors. Ed had also started another creation for the evening meal. This time it was chicken breasts and big ones that he had marinated all day. Did I mention that Ed is a marvelous host? After enjoying the banquet, more K2 contacts off the trail and plans to get to the trail in the morning.

Tuesday Sept. 20, 2000: NY/NJ border on the A-T south of Uniontown, NY:

At Chez Ed, breakfast is always at the ready to begin the day and this was no exception. It was just the thing for us to get rolling to the next A-T location.

This part of NJ is never a quick trip. To get up there and find the Trail took at least 1 - 2 hours. We went by the trail crossing the road several times until a neighbor happened to pull out of the driveway and got directions. Yes, Ladies, we asked for directions. It was about 1 PM before I was on the air. The antenna this time was an end fed half wave wire up about 15' in a tree and using the fish pole. First QSO was who else but **WB3AAL/AT**. He knew we would be here as many others did. Another Trail to Trail QSO and Ron logs two states for this award. The second QSO was of course **WA3WSJ/AT**. Ed was down the trail with the K2. Each logged two states for **Trail-to-Trail award**. Lots to go though for that one. Conditions seemed poor today based on the signal from **W3BBO**. I worked Bob at every stop with his strong signal. This time the QSB took over but still made a QSO. I really couldn't raise anybody so we had lunch. The entertainment for lunch was to watch the beekeeper across the road doing his thing with the bees. Since he had his beekeeper suit on it didn't seem a good idea to go over and ask questions just now. Instead we hiked up the trail for yet another fantastic view to the east. There are many of these on the A-T, Folks. A couple more contacts and that would be the end of the A-T traveling before Fall comes. (Really it was the next day!). I was ready for the road at 4 PM, hoping to get home by dark. Ed's hospitality had made the trip one that should not be missed. Thanks, Ed! Where are we going next time? ;-)

Thanks to all for the interest on the trip and the Trail itself. I hope to work many of you who can get your rigs into the Great Outdoors!

Post Script:

One of most active stations contacted on the Trail was **Joel Malman, K1QM (SK)**.

We'll miss you, Joel, and Happy Trails to you, OM. ••

LOG SUMMARY: (ON THE TRAIL ONLY)	
VA QSOS:	**98**
WV QSOS:	**51**
MD QSOS:	**25**
NJ QSOS:	**29**
NJ/NY QSOS:	**5**
Total Trail QSOS:	**208**
Trail WAS: 32 States	

C6A/WA3WSJ WITH TUNA TIN-2

John Harper--AE5X **ae5x@juno.com**

I worked Ed C6A/WA3WSJ on 10 meters @ 20:00UTC while parked on a turn-out on the Appalachian Trail near Vernon, NJ. As you probably know, he is a member of this list and he had asked me to post that he would be on the air 2000 UTC (5pm Eastern) this afternoon from the Bahamas using his TT2. I listened for him between 7041-7043 kilocycles.

He was 599 here at my QTH and was using his K2. Sounded great. ••

Outdoor QRP: www.qsl.net/ae5x

Extreme QRP

TRY 6-METERS

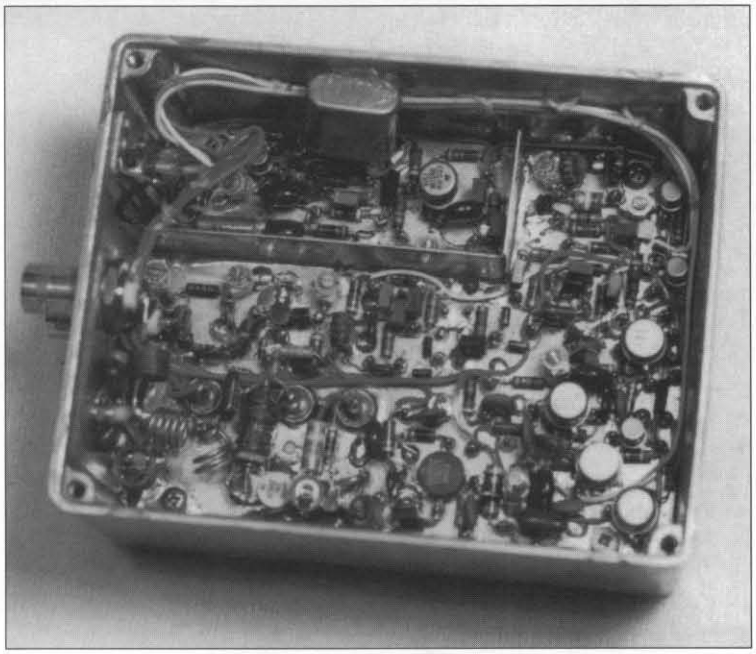
Richard Stroud w9sr@arrl.net

It may be a surprise to some but QRP also abounds on the VHF frequencies. It is amazing what low power can accomplish on these bands. An easy way to join the VHF crowd is to build a transverter which converts your lower frequency equipment to the desired VHF band, both in transmit and receive.

The little unit described here has been used over the last several years to convert the six meter VHF band to the 10 meter band of a Kenwood TS-820. Six is very good now because of the sunspot cycle and, with this unit, several foreign stations have been worked as well as about anything heard stateside. Any 28 Mhz. transceiver capable of delivering at least 5 dBm of power can be used to drive the transverter. The unit has a power output of 5 watts and a receiver sensitivity, with the TS-820, of less than 1 microvolt. Operation is simple. In transmit the 10 meter mode and frequency are converted to 6 meters. For example a ssb signal at 28.300 Mhz selected on the transceiver will generate a 50.300 Mhz SSB output signal. Receiver operation is similar. With a simple antenna you will be enjoying one of the best VHF bands. When the band opens to sporadic E you will be hooked!

The unit is housed in a Bud CU-234 cast aluminum box, although I would recommend using a larger box such as a CU-247, to allow a little breathing space. The

construction method I used is a good alternative to etched circuit boards for bread boarding and prototypes. A 1/16 -inch thick, double sided, copper clad board is cut to size and tinned on both sides. Teflon press-fit terminals, inserted at key locations as construction progresses, are used to support components. Ground connections are made by soldering directly to the tinned board. Teflon terminals are available in many sizes and styles from surplus outlets. I use 3/16-inch high units that mount in a .089-inch diameter hole. Before inserting the terminal, hand chamfer the hole slightly on the circuit side of the board with an oversized drill bit. The board is mounted to the bottom of the box with 1/2 inch long aluminum spacers and screws. Component lead length in the RF circuits should be kept at a minimum.



No internal antenna relay is provided. This is so an external power amplifier or receive preamplifier can later be added if desired. An antenna relay driver circuit is included in the transverter which grounds the relay line when in the transmit mode. BNC type UG-1094 panel connectors are used for the receive and transmit antenna connections.

The receiver RF section consists of a double tuned filter driving a dual gate RF amplifier. The tuned output from the amplifier is routed through pin diodes to a high level double balanced mixer in the mixer - IF amplifier section. The high L. O. injection for the mixer, 20 dBm at 22 Mhz, provides good intermod performance. The 28 Mhz. output from the mixer, again switched by diodes, is routed through a junction FET amplifier and to the companion transceiver through a SMA panel type connector. The 6-dB resistive pad in series with the 28 Mhz. input signal can be adjusted depending on the level available from your transceiver. Do not exceed 1/2 watt of drive, or damage to the mixer could result.

The transmitter meets the goals of good linearity and low spurious output. In the transmit mode the mixer input is switched to the 28 Mhz. input attenuator and the output is switched to the transmitter drivers. Use of a low pass harmonic filter in the transmitter output ensures good spectral purity.

The 22 Mhz. crystal oscillator and amplifier provide injection for the double balanced mixer. The oscillator supply is regulated at 8.2 volts. The oscillator output is routed through a resistive pad which puts a fixed load on the oscillator resulting in increased stability. The 2N5109 amplifier supplies 100 milliwatts of LO injection.

Straight-forward switching circuits are used to control the transverter. An LM-747 dual op-amp is used as the PIN diode switch driver. The op-amp sections are connected in parallel to supply sufficient current to the diodes. A 2N2907 saturated switch provides receiver on/off control, and a 2N2905 is used to switch the transmitter voltage. Grounding the transverter key line through the mating transceiver enables the transmit circuits. A 2N1711 is used to switch an external antenna relay. The relay is connected between an appropriate voltage source and the collector of the 2N1711. It will sink up to 250 ma. of current A connector pair can be used to bring power and control leads into and from the transverter.

The double balanced mixer is located under the circuit board with the pins protruding into the receiver compartment. It may be necessary to adjust the value of the 24 ohm resistor in the power amplifier base bias circuit to provide about 25 ma of quiescent current. I found it was not nec-

(Continued on page 47)

Extreme QRP

QRP TOURING IN FRANCE

Jim Speck—W5AI

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It was to be our third trip to France on bicycles. Before, I had taken a dual-band HT, but hadn't had much luck making contacts. This year, I'd take an HF rig, and try to make a schedule back home. At the July Oklahoma City Ham Holiday hamfest, I picked up a used NorCal 20, a complete twenty meter transceiver in a small package, about 6-in x 6-in x 2in, and weighing a pound, more or less. It tunes from 14035 to 14075 kHz, has a superhet receiver with a sharp crystal filter, and has a built-in keyer and frequency counter. It puts out about 5 watts with a 12V supply.

I wanted something small and light, because everything we take has to be carried on the bicycle or in the trailer. The bicycle is made by Green Gear Cycling, in Eugene, Oregon. It is a tandem two-seater and is called the Tandem Two'sday. Its claim to fame is that it comes apart into two pieces, and each piece folds to fit into a 26-in hard side suitcase. The two suitcases make a trailer that is pulled behind the bike, and all the clothes and gear go in the trailer. (See photo below.)

We planned to fly into Bordeaux, in the Southwest of France, then ride through the Dordogne and Lot river valleys to see the sights. We signed up for a week of hiking and sightseeing with a British hiking club (called HF Holidays) in Sarlat-la-Caneda, about 150 miles east of Bordeaux. That is where I planned to do my operating, since we'd be in a hotel for that week, and I could rig an antenna somehow.

What antenna to use was discussed with several locals here, and the feeling was a dipole or a vertical could probably work OK. I decided on a vertical, made like a two-meter ground plane, using a coax connector with four radials connected to its corners, and the vertical connecting to the pin. I made up five 16.5-ft pieces; four for radials with solder lugs on one end and a loop in the other. I soldered the fifth to the center pin, and rolled up all five pieces and put them in a bag. I made up a balun using a toroid of #43 ferrite material with several turns of some very small coax. The lead-in was 30-ft of RG-58 A/U coax, a little heavy but time was short.

I also picked up a miniature "Te-Ne-Ke" at the hamfest from KK5PY, the key's designer and builder. This key weighs almost nothing, and is packed in a pill bottle for transportation. I stole the headphones from my wife's laptop computer (she never uses them, anyway), and found that the portable charger for the laptop puts out 13 volts at one amp with 90-230 volts input! I got an adapter from Radio Shack from the 110v to 220v European plug ($2.00), and made up a power cable. I was all set!

Licensing for operating in Europe has become duck soup since the FCC implemented the "Recommendation T/R 61-01" of the CEPT or European Conference of Postal and Telecommunications Administration. (See http://www.ero.dk/ for more info.) The only requirement is to carry the FCC Public Notice DA 99-2344 and a copy of your amateur license with you for inspection, if requested. No one ever asked about a license on this trip, however.

We left from Will Rogers Airport, where the bike and baggage were checked through to Bordeaux. The entire package weighed 155 lbs.

A really nice feature on the Michelin maps of France is that a steep climb on a road its marked by a small chevron across for 6% to 10% grades or two or more chevrons if it's really steep. We chose roads with no chevrons since climbing with all that weight was tough. There were a few hills that weren't marked, however, and one was at the end of the first day's ride (of 50 miles) to Monbazillac. This is the site of a famous "chateau" and the source of one of the area's finest wines. We climbed the last kilometer to the chateau and town, to find there were no hotels there—but we stumbled onto a nice bed-and-breakfast, so everything turned out fine.

We made our way to Sarlat, found the hotel, and checked in. Our room was on the second floor, with a nice balcony. I didn't ask about stringing up the antenna, but just went ahead and did it. The top of the antenna was tied to the timbers of the eave over the balcony using waxed tie-cord, and the four radials were approximately 90 degrees apart and drooped three feet or so at the ends. The base was about 18-ft above ground. The feedpoint was right above the balcony below.

That evening at dinner a nice gentleman asked if that was my antenna above his balcony. I admitted that it was, and he introduced himself: G3MFW from Cornwall, England. He was on the same hiking tour. At home he operates on the 137 kHz band with 1 watt ERP (800 watts to a pair of 813's, driven by an audio oscillator). His antenna is about a mile of wire wrapped around his house—very short in wavelengths and inefficient. His best DX is 60 kilometers. He uses very slow speed code, sent by computer, and DSP techniques for weak signal reception.

That evening I set up the rig and looked for a contact. I worked England, Italy, Belgium, and Germany. Looking good. The schedule I had was for 6AM in France and 11PM in Oklahoma the previous night. I got up at 5:30 and tuned around 14060, our schedule frequency. I heard W5JKK, W5EIU, and K5DLE well above the noise but they didn't hear me. Later that day I worked several more stations in Europe. The next morning I heard the same suspects, and called and called. Then N5UW called me—Cliff is in Earlsboro, OK. The band changed and he faded out after a few minutes, but it was a great thrill. Later that week I heard W5SJC in Oklahoma City but couldn't work him. I did work another QRP station in Florida, though. I never did work any stations in France.

When it came time to leave, I decided to give the rig to a local amateur, if I could find one. I'm sorry to say, I couldn't, so I had to lug it around for the next three weeks on the bike! • •

Edited by W1HUE

(Continued from page 46)

essary to adjust the frequency of my crystal in the oscillator. If you need to adjust your particular crystal to 22.000 Mhz. select a capacitor which would be placed in series with the crystal. This would be less than 100 pf. (NPO). All remaining adjustments are made in the conventional manner; the receive circuits are peaked for best signal-to-noise ratio, and the transmit stages are adjusted for maximum output power. Be looking for you on six ! • •

Extreme QRP

RUN FOR THE KUDZU 2000

Pickett Cummins—AD4S ad4s@arrl.net

The 2nd annual North Georgia QRP Club (NoGa) "Run for the Kudzu" was held on Saturday, October 7th at Lake Lanier just north of Atlanta. The format of this event is similar to the "Run for the Trees". Due to the distances that operators had to travel on the property, everyone was allowed to get to their venue and set up before the official start time. The event ran for 2 hours and was followed by lunch and the awards were handed out.

Each award recipient also received a jar of Mrs. Annie Dukes' "Kudzu Blossom Jelly". Mrs. Dukes is an 89 year old lady in Flowery Branch, Georgia and each year she makes this rare jelly during the 4 weeks beginning August 15th. This is the only time of the year that the kudzu vine has a bloom. The blossom is a deep purple in color and the jelly tastes much like grape jelly but is said to have special medicinal benefits.

Unlike last year, the bands were in great shape. Most operators worked the bands above 40 meters. The California QSO party provided many contacts and several NoGaNaughts even worked some pretty good DX including Germany, Norway, Sweden and Hungary.

Many very nice door prizes were handed out. These included a number of QRP kits, a NYE paddle, Turner Microphone, caps and more.

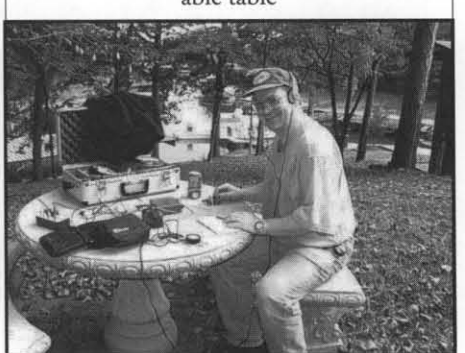
The operators, left to right are: **Tom**—K4TJD, **Pickett**—AD4S, **Mike**—KO4WX, **Ted**—W2ICV, **Jim**—AD4J, **Sam**—AE4GX, **Chuck**—AF4PP, and **Russ**—AD4GX.

Sample of the Awards..!There really is such a thing as "**Kudzu Jelly**"..!

Pickett—AD4S operating his K2 in the side yard of his lake cottage. He won the "First Contact" and "Most Contacts" awards. Note the standard NoGa portable table

Russ—AE4NY, stayed under cover. Russ, a WW2 U.S. Army Air Force CW operator won the "Kudzu Special" award for having the most gear and not being able to make a contact no matter how hard he worked. Except for the K2 and the Sierra, this is all of Russ's gear

Sam, AE4GX, found a natural table, borrowed a chair and went at it with his Index and STL vertical.



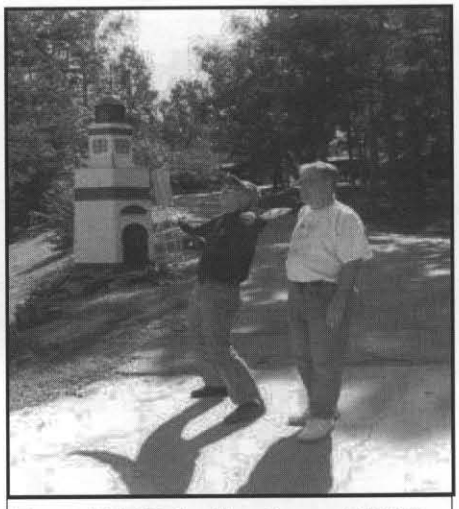
Mike—KO4WX grabbed a close picnic table. Mike won the "Most Unusual Antenna" award for the "toilet paper" rf choke dipole. Mike has an article in the Fall ARCI QQ on this antenna.

Tom—K4TJD and his K2 won the "Best DX" award for his Budapest Hungary contact. Note the NoGaTable..!

As we approached, we were convinced that Chuck was fast asleep..!

But NO..! Chuck had his headphones on, using his lap as the operating position he was busy making contacts..!

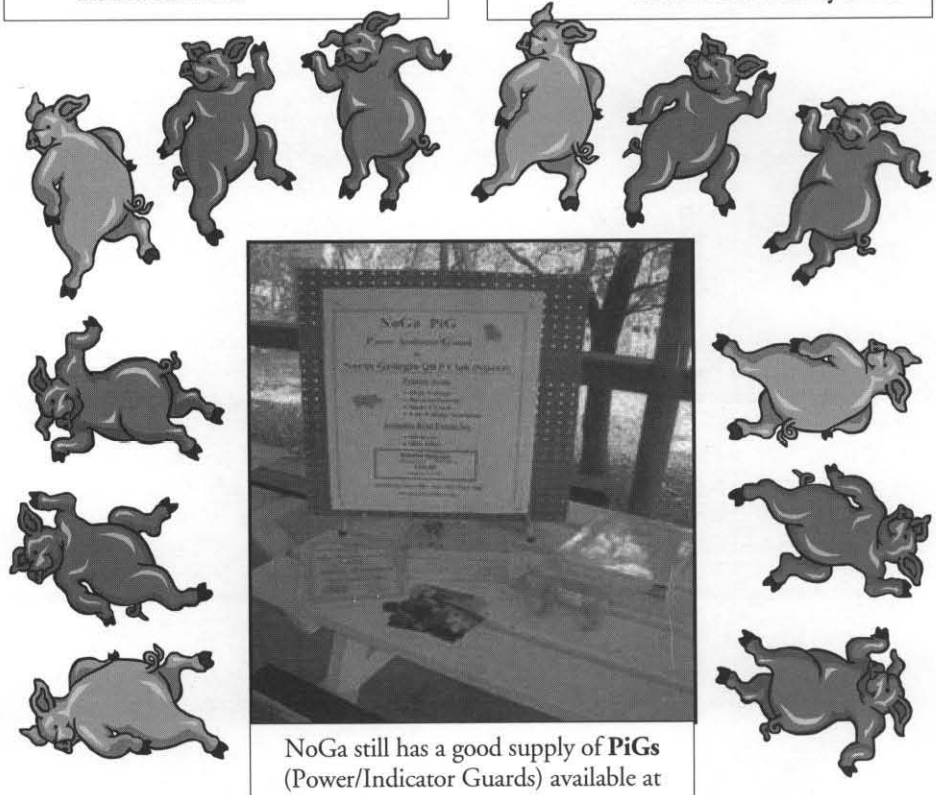
Jim—AD4J. His antenna is attached to an old dock pier that is out of the water due to the prolonged drought. Jim won the "Lowest Weight Rig" award. He was in the running for the antenna award with his toilet paper choke antenna. Note the **NoGaTable**!



Tom—K4TJD is telling **Sam**—AE4GX **"It Doesn't Get Any Better**

NoGaNaughts doing what they do best... EAT and EAT!

Chuck—AF4PP, gets to try out a K2 after the Kudzu Run is over. He liked it a lot!



NoGa still has a good supply of **PiGs** (Power/Indicator Guards) available at **www.qsl.net/nogaqrp**

Thanks, Pickett! The NoGa QRP Club's "Run to the Kudzu" pictorial essay you submitted was a joy to behold. It's no accident that creative activities like this occur around the world. They are manifestations of the fact that "the fun is back!"

Please make sure you capture your club's special moments, as the NoGa gang did, so we can share them internationally in the next *QRP Quarterly*.

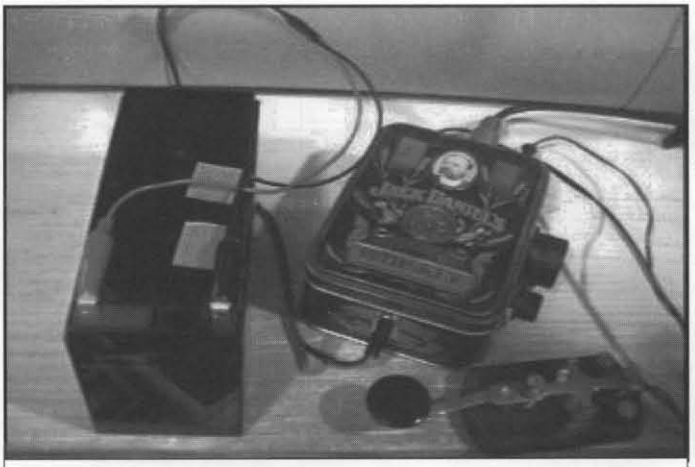
Have major fun...and help spread the true spirit of operating QRP. ••

REBIRTH OF A HAM OPERATOR

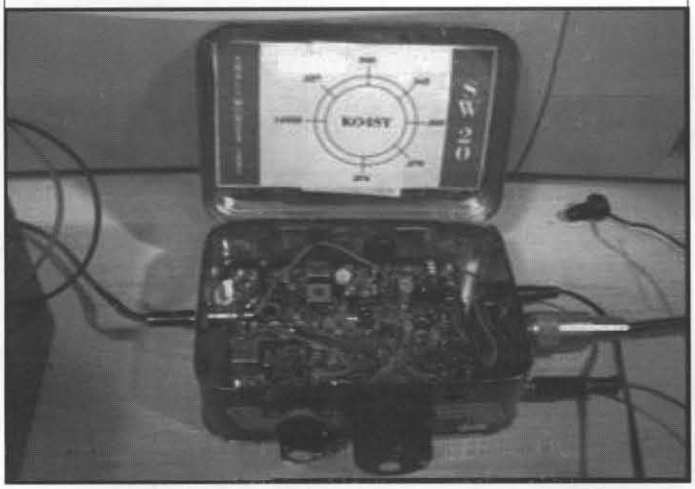
Tom Mize—KO4SY **ko4sy@arrl.net**

Most of the people in our club have been licensed amateur radio operators longer than myself. They have seen me go through about every phase of ham radio that exists. From the time of my first ticket, when I was KD4FOJ, they saw me become fascinated with packet radio. That was in 1991 and packet was hot back then. That was before the internet made it's impact. From there they watched me move into the MARS program and develop my traffic handling skills and move up to a zone coordinator in that program. While in the MARS program I became very much involved with emergency communications and joined ARES and RACES and learned all the do's and don'ts.

In the middle of all of this, the internet was born, and I naturally was smitten with it. So off I go to learn about computers and finding info on the internet. The internet turned into the world wide web (www) and it has grown by leaps and bounds ever since. I wanted our club to have a website, so I set off to learn html (hyper text markup language) programming and we've had a website for several years now. After a few years of that I wanted to try something new and was encouraged by our resident DXCC spokesman **Ted Jones**—WA4UEU to start chasing DX. It really is more fun than it sounds, you'd have to try it to understand it. From there I was drawn to altering my transmit audio and picked up an 8 band audio equalizer and a Heil Gold-Line mic. This is pretty amazing equipment and does wonders for audio., but this isn't what I've come to talk about, what I want to tell you is that we often overlook so much in ham radio. Almost everything I've mentioned up until now, was something that I thought I'd never be interested in. As a matter of fact I thought each one of these things was silly and couldn't understand why anyone would waste their time on them. I had once said that I had no use for packet and couldn't see why anyone would have a computer in their home. Now I can't see how anyone could live without one, especially if you're a ham operator.



My Small Wonder Labs SW-20 QRP Kit mounted in an antique Jack Daniels Tin, along with 12v battery, straight key and earphone. A complete station.) Where else could you have so much fun for so little money?



As you can see, I've been through a lot of hi-tech stuff and the latest and greatest things going, and I've had a ball learning and achieving many goals, but the most fun I've come across in my ham career wasn't until I was introduced to building and operating QRP by **Larry Lyda**—WA4PJP. Folks if you haven't tried this stuff, you are definitely missing one of the greatest joys of ham radio. This is the foundation of what amateur radio is. It is ham radio in it's purest form. This makes me think I can feel what the old timers felt back when everyone built their rigs. To take several bags of components, and solder them onto the board and mount the board in a box and pick out knobs and what type of connectors to use to come up with your special creation, and take that creation and with only 2 watts, talk 1,000's of miles on it, I tell you folks, there ain't nothin' like it. It has got me interested in CW again and bringing my copying and keying speed up pretty good.

Sure, I can turn on my Kenwood TS-850, crank it up to full output, and talk to the same people, but to fire up a rig that you built yourself, then find someone that can hear you and you hear their excitement when you tell them you're running 2 watts on a QRP kit, it's special.

You want to be reborn in ham radio? Try something new. It doesn't matter what it is. There's many facets to amateur radio and I'll bet you haven't tried them all yet. Get out there and try something, build an antenna, build a kit, try packet or APRS. Don't forget the newest mode, PSK 31, I'll bet **Ed Jordan**—KV4BP can help you with it. Don't forget the old ones either, like CW.

There's a whole world out there just waiting for you to discover, enjoy it.

Now... I wonder when that next satellite past is? • •

(Continued from page 41)

a DX station, & his reply.

Hello - thank you for the little QSO on 11-04-00 17:56z on 10M band. I wanted to thank you, and let you know my power was only 700mW to a 2 el quad.

Congratulations for your antenna, and ears my friend! How do I QSL with you?

Thanks and 73, **Jim**—KJ5TF

Don't think it's my ears! Must be your 700mW and propagation. You can send me a card via buro or POB 24834, Nicosia, Cyprus. Will be back to 5B4 probably for CQ WW CW then Xmas so the card will be answered on one of those 2 occasions

Regards, **Marios**—5B4WN • •

QRP CLUBHOUSE

Les Shattuck—K4NK **kn4k@aol.com**

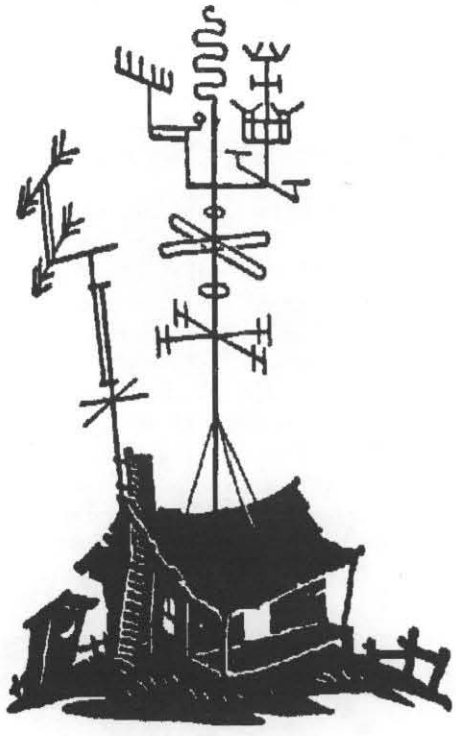
Hello from your *QRP Club House* editor. This issue we have a lot of club news to share with you so lets get to it.

Eastern PA. QRP club—From **Ron**—WB3AAL comes word that the new 2001 QRP calendar is ready for order taking. Ron says this year's calendar will be 100% better than last year's with a new style. This is a must have...so get your order in early. Contact them at www.n3epa.org for ordering details.

NETXQRP—A new QRP club recently formed in North Texas is modeled after NORCAL. This info comes from **Chuck Carpenter**—W5USJ, and Lew Pace—N5ZE they say little structure but lots of fun...now that's the way I like it. For info on joining in look up www.netxqrp.org.

WESTFLA QRP Club—A note picked up from **Mike Maiorana**—KU4QO tells us that the WESTFLA group had a meeting at the TARC clubhouse in Oct. , he say's no dues and very informal meetings. E-mail mike at mikemo@attglobal.net for more information. Sounds like QRP is in great shape in West Central florida.

NoVaQRP—Now from my old friend **Bill Harding**—K4AHK comes some info from my old stomping grounds of Northern Virginia. Seems QRP is alive and well with a very active membership.If you would like to be added to Bill's list for info send your request to him at



K4AHK@ix.netcom.com and he will see you're notified of the next meeting. They tell me the restaurant has great chow, and a lot of QRP fun to be had.

QRPacific QRP club—It's official...the club now hold the call **K7LOW**. Sounds like a great call for an active QRP group. Listen for it during all the QRP contest. And visit their web site at www.teleport.com/~cqdx/qrpclub.htm. Thanks to **John**—K7FD for this info.

IOWA QRP club—The Iowa QRP club had a special guest for their meeting on Nov. 19th, 2000. **Wayne Burdick**—N6KR of the Elecraft fame was on hand to speak to the group. Wish I could have been there and I'll bet it was a great meeting. The show and tell section will include both a K1 and K2. Thanks to **John**—NU0V for this info.

LONG ISLAND QRP club—This from WB5GWB tells us about the Long Island (New York) QRP club established back in 1996. Again this club has informal meetings and as **Jeff** puts it "all we do is eat and have show and tell." Well I bet a lot of QRP talk goes round the table. Want to get on the list? Try this LISTSERVE@APPLEGATE.ORG then in the body SUBSCRIBE LIQRP . That should get you all the info coming out of the big apple and now lets move down to Texas again.

NORTEX—The North Texas QRP club meets on the first Sat. of the month at 10 am. Please contact **Joe Spencer**—KK5NA for details. You can call him at 572-2218 or email at kk5na@quadj.com for the meeting location. Why not visit their web site at www.quadl.com/nortex.htm. Nortex is the QRP host for **HAMCOM** each year and really does a great job.

Well, that's about all the room I have for this time, keep sending in your clubs info and we will get it in. • •

REMENBER WHEN

Les Shattuck—K4NK **kn4k@aol.com**

Well. time for another column and this issue we will preview a newsletter from 1979. The editor at that time was Bill Dickerson WA2JOC. Bill held a number of offices in the club over the years and the call WA2JOC was widely known in QRP circles. This issues was run off on what looks like a mimeograph machine but in black. Info on the nets of that time states that ARCI QRP held a net on wed. 01:00 on 3560 (yep, I checked in) and net controls were W2YVQ and WA3NTJ. On Saturday at 17:00z on 7060 the NEN net used rotating NCS's WB4LKC, K9PNG,WA3ZBJ and K4JO.

Certificates were available back in 1979 as they are today and on 4-12-79 W2EMW got cert. #4 for his 20 QNI's to the 80 meter net. There was a column on the Milli-watt field day Trophy and the club sponsored an award for Field day QRP 1979. Page 5 was the rules and regs for the 1979 fall QSO party (yours truly took part) . About the same as today but we have a lot more entries now. Sandy Blaize W5TVW was the contest chairman. On page nine is the old style application, yep even the 100-watt clause all of us old timer signed.

At the time this newsletter (Quarterly) came out K8IF Thom Davis was president. It was at this very time when our club was changing to a pure QRP, under 5 watt club. Yes there was a great turmoil in the club and some were not happy but as we see today QRP ARCI is alive and well and growing.

I want to thank Fred K7LNS for all the back issues he provided for the historian. His info certainly filled a large gap in old Quarterlys. Fred held several offices in the club and served for many years. He was especially active in helping to form our early chapters .

On another note I found some old info on the HONOR ROLL. Seems that there were several who received Honor Roll certificates...this will take some digging but let's see if I can find them and get something in the next QQ. • •

DXPEDITION TO FP (SAINT PIERRE ISLAND)

OR...THE DK9SQ FIBERGLASS MASTS GO TO FP AND SURVIVE THE STORM!

Hank—K8DD; Stan—AC8W; Ken—N8KR; and Kurt—W8IQ **wb3aal@fast.net**

Some time in early August 2000 I got an email from Ken, N8KR, saying something like "hey, are you and Stan AC8W ready for another DXpedition—C6A Bahamas is open and so are the hotels on FP Saint Pierre Island". Normally I'd take an email like this and think about it, talk it over with my wife and then Stan and we'd decide if we thought something like this would be possible. And then let Ken know. Well, I actually took all those steps - a little out of order, but I really took all the steps. First I hit the reply button and said "OK". Then I talked to Stan. Normally he would talk it over with his wife, figure if we could do it, check everything out and get back to me. And, like me, Stan took all the steps - a little out of order, but he really took all the steps - starting with saying "OK - when?" My reply—"Dunno - this year, I think for CQ WW SSB." Stan thought about it for what I thought was an excessively long time (28 milliseconds) before he said "OK".

The next step was sell our wives that this was something we could do! We know we can go to the Bahamas, rent a house complete with one station and antennas and take very little along. But St Pierre Island would be something else. We would have to take everything – radios, power supplies, coax, antennas, accessories like computers, keyers... everything. And the island is all 220 volts. It took a couple times taking our wives to real nice restaurants (no McDonalds or Burger King) to sell something like this! We decided to cut the trip back from two weeks to one week and enlisted the help of Jean Christophe, FP5AC, to pick the hotel with the best roof. JC also offered the room under his house and his double yard for antennas in case we wanted to have two operating sites a couple blocks apart.

By the end of September we had emails going from Michigan to St. Pierre in a regular basis and, using the AltaVista bablefish translation service, things were progressing. Did I mention that 95% of the people on St. Pierre speak only French? In September Kurt, W8IQ, from Toledo, Ohio, joined our team, and voila - Kurt speaks fluent French. Things are really good now because instead of six checked baggage pieces we can now have eight pieces with Kurt on the crew. Air reservations to St Pierre from Toronto to Halifax to St Pierre on October 23 at 9 AM returning October 30 to Toronto are in hand.

October 15 we all loaded everything we thought we would need and met at N8KR's in Oakland, MI for a packing session. We loaded 2 shipping cases with radios and accessories, two suitcases with those things that use 572-b's and 811-A's, one hard case golf club cart with masts and tubing. Another hard case golf cart had a Battle Creek Special antenna for 160, 80 & 40 Meters and enough wire for about 40+ ground radials. One carpet tube held more mast and dipoles for 10, 15, & 20 Meters made out of aluminum tubing

The back of AC8W's Van. Loaded!

We left Port Huron, MI a little after midnight on the morning of October 3 and drove to the Toronto airport, arriving about 3:30 AM for a 9 AM flight – well, we might have had a flat tire...or two! At the park & ride places at most airports, you park your car and a van comes and the driver takes your luggage and puts it in his van, takes you to the airport, unloads your stuff and gets a tip and drives away.

However at Toronto airport we found the van driver standing back mumbling and letting us take our luggage out of our van, putting it in his van, riding to the airport and unloading the luggage ourselves at the terminal. I had several tips for him, but for a change I kept all my suggestions to myself! When we got inside the terminal to check in with all our "stuff", the agent did admit that he had not seen many parties of four with that much baggage. Then he tried to lift the one hard golf bag - sent us right over to special shipping with the golf bags. Over there the special shipping counter man

Kurt and Stan in the Toronto Airport

said to Ken, N8KR, "How much does it weigh?" Ken replied "Well, it's sort of heavy." Special shipping says "Put it up there, if I have to pick it up, I'll have to weigh it!" Ken lost no time getting the hard golf case up on the conveyer belt. Whew!

On the way to our gate for the flight to Halifax – believe it or not – Gate 73, we had to pass through the security check and metal detector. At the security check they decided that my carry-on was too big to carry on. Back to the special shipping counter. The lady there was real nice and agreed with me that my wife could have most likely carried it on, but...well "you know how it goes!". She checked it and the folding handcart so I had four checked things – not sure how I got away with that one! Also, Kurt had a large pair of pliers – a stake-on tool. The security man told him he would have to check it because he could not carry it with him. Kurt and Ken conferred for 5 seconds and they decided to surrender it to the guard for his disposition. That caused a bit of confusion and the guard could not understand them just giving it up, so he said "oh, don't give it up - take it with you".

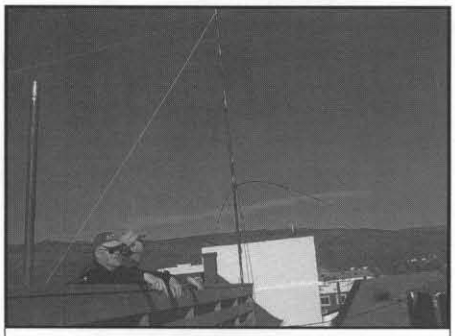
Fortunately the trip to Halifax NS was very uneventful, as long as you don't count the fact that they had mechanical problems and had to call maintenance. 45 min later we leave Toronto and we only had a 90-minute layover in Halifax. We got to Halifax 30 minutes before the flight on Air Saint Pierre and in the last 10 minutes before we boarded we saw all our "stuff" being loaded onto the little plane – about 40 seats. That was a real relief.

The flight left on time and made it to St Pierre and there we saw everything come off the plane while we were walking

into immigration. Got the passports stamped and when the baggage came, one piece – a carpet tube filled with our "one element yagis – wasn't there. We got the rest to customs after the customs dog got a chance to sniff everything and everybody. The customs man was somewhat confused because we all had stuff in all of the containers. Kurt was out looking for the big tube, which he found in the mail cart. It seems that there were address labels and stamps and Priority Mail tapes on it and they had it ready to go back on the plane and get mailed home for us!

Finally we made it through customs, walked out figuring on looking for a taxi or two. What a surprise - Jean Christophe FP5AC was there with his car and a friend Francios with a big Ford F-150 pickup to transport us and our bags, boxes, carts and bodies. We loaded up and they dropped at FP5AC's what we wanted to use there and the rest at the Ile de France hotel. With the two hour time difference from eastern time, we still had plenty of daylight available, so we checked into the hotel, got adjoining rooms and then the manager's son took us out the third floor emergency exit and up an aluminum ladder onto the roof and explained that we had the use of the complete roof. Since most of the antenna material was at FP5AC's we went back there and we put the Battle Creek Special in the air and started on the radials. Since it was nearly dark, we went back to the Ile de France for a leisurely dinner and crash after about 36 hours awake traveling! End of Day One at Saint Pierre Island.

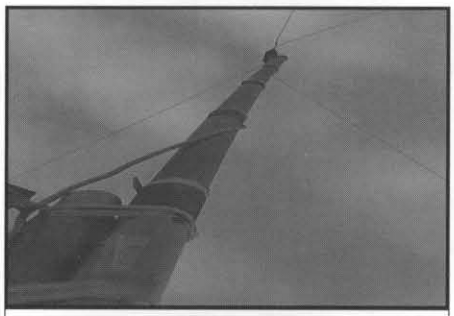
Day Two started out with the French breakfast at the hotel at 07.45. Then by 9 AM putting up the mono-band antennas. One-element aluminum dipoles - some people would call them dipoles, but I like to call them one-element aluminum Yagi's! A single mast 2' high holds a 10 Meter aluminum dipole at the top of the mast. Five feet under that is the 15 Meter and five feet lower is the 20-Meter dipole. There was not a whole lot of interaction between them.



10, 15 & 20-Meter elements. That's Ken, N8KR, in the background looking short path to Europe and Stan, AC8W, in the foreground checking out short path to Africa! As the pictures show, the weather is great – so far.

Next we made a 40 & 30 Meter dipole on one Hi-Que center insulator and put it up on about 25 feet of DK9SQ fiberglass mast. This antenna worked very well – the first QSO that evening on 40 M was G3JAG/qrp!

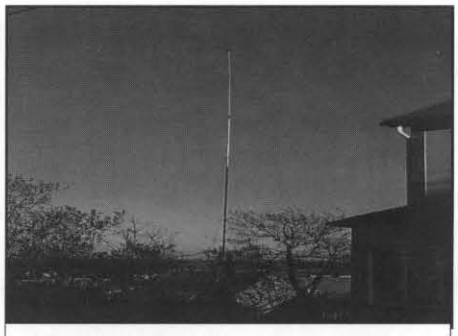
After the hotel antennas were working, we went back to FP5AC's and put out about 30 more radials and set the 80 and 160 loading wires in position. Then it was time to start putting QSO's in the log! By the end of Day Two (Tuesday) we had about 500 total. Day Three (Wednesday) got us up over 1000 and it continued to go up from there. In this kind of a situation on 10 through 40 M it really does not matter how much power you are running–5 to 100 watts --the pile-ups are the same, you have to go split (I normally listen up about 1 KC to keep within most everybody's RIT) so that you can be heard!



The DK9SQ Mast

The 40/30-Meter Dipoles

Day Three and Four kept QSO's going into the log and deciding how we were going to operate the contest. We finally decided on Multi-Multi with four operators getting as much air time as we wanted. The purpose of the trip was not to win (well, as the only entry from the country we knew we would win Saint Pierre) but to have fun and hand out a multiplier in the CQ WW SSB contest.



The 45-foot Battle Creek Special Antenna

Wednesday, Jean Christophe FP5AC told us that his friend worked for the local TV station and since Kurt spoke fluent French, she wanted to interview him live on TV. Stan and Kurt went to the TV station and Ken and I got to watch Kurt on TV. We think Kurt gave a very good view of DX'ing and contesting even though we couldn't understand much of what was said, and they did not put subtitles on for the two of us. The upside of this is Kurt was the lead story, and took about 15 minutes. On the other hand, Saint Pierre is an island of 6000 people where most everyone knows everyone and there isn't a whole lot of news!

Thursday evening I had planned on a trip to 7040 to operate QRP as I had announced on qrp-l. What I didn't know when I posted that plan was two things. First, there is a two hour time difference from Eastern Time, so 0000Z was two hours later than I had planned. FP is only two hours from GMT – it's REALLY close to Europe. And second, there is French cuisine! With the exception of the one small restaurant that actually had hamburgers, cheeseburgers and great onion rings on the menu, the French eating experience is a minimum of two hours! Thursday evening we took our host FP5AC out to eat for all of his hospitality at what he said was "the finest restaurant on the island". That turned into a three or four course meal that lasted from 8 PM until 11 PM (which is 2300Z to 0200Z). I did show up on 7040 when we got back to the hotel and found six QRP stations and a couple of Europeans found me! What this means is I will have to come back to FP again to make up for being late.

We had heard about how Saint Pierre was cloudy, windy, foggy, rainy and cold. But on our trip Monday through Thursday were absolutely great. The highs were about 9 to 15 degrees C. and sunny and

breezy. Jean Christophe, FP5AC, took us out to an adjoining island, Ile de Marin or Sailors Island on Wednesday which is a vacation spot with summer homes. No power, but some of the places have wind generators, solar panels and we saw two diesel generators.

However on Friday everything changed. The weather report came in that said 60 knot winds out of the east, rain, and cold. Well, it didn't get that cold, but the other two hit the island full force. The only antenna we lost was the 20 M aluminum dipole (the bottom one) which had the tag line on it to keep it broadside to Europe, so we had no control on direction of the dipoles. And even though I probably have the least "wind loading" of the group, I was not about to climb up on the roof! The Battle Creek Special antenna danced and wobbled, but it stayed up. The DK9SQ masts that we used for dipoles stood up on the roof and never wavered. I don't think I want to go anywhere again without one or two of them.

Friday started the contest at 0000Z (Saturday). After 24 hours we had about 2300 QSO's in the log. We found that we could only run one station from each location at a time because of transceiver noise and close proximity of the antennas.

The FP/ crew on the island with St Pierre in the background. You cannot see our antennas in the background unfortunately, but they are approximately over my right shoulder!

It was really phenomenal to watch the contacts go in the log as we were spotted on the DX PacketCluster system. There was one period on 10 M SSB that we must have been reported on an east coast cluster because the rate meter on the NA logging program went up to over 400 per hour for about a half hour – what a rush. That's why we do this – whether it's CW (which I really prefer) or SSB (which is tolerable - HI). About 20 minutes after that run, rates down to the 150 to 200 per hour (that's about 3 a minute) the local Radio France Overseas affiliate TV crew cam in with their cameras, microphones, etc and started asking all kinds of questions. I was operating with Kurt, W8IQ, so he answered all their questions in French and I got to sit there and run stations while they shot pictures of every angle of what I was doing, including unplugging the headphone plug so they could get on tape what it sounded like. It is somewhat difficult to copy in one ear for me, especially on SSB. Kurt said they were going to shoot 10 or 15 minutes, but Ken, N8KR, walked in and since we were using his call we showed them what an operator change looked like without dropping rate. The crew shot about 30 min of tape and said it was going to be most likely shown on the RFO stations across France and Canada. And they were going to try to get us a copy of the tape in our format before we left the island. Hmm...can we sell autographed copies at Dayton?!

No we weren't 100% QRP, but while life is NOT too short for QRP, I feel it is however too short to partake in only one type of operation in this great hobby of Amateur Radio if the opportunity presents itself. I am going to make it to one of the islands (up north here or down south in the Caribbean and operate one of the major contests (CW, of course) QRP—That would be a blast. • •

QRP ARCI AWARDS

Steve Slavsky—N4EUK **bham379627@aol.com**

By the time you read this in the Winter issue of the Quarterly, the reigns for the QRP ARCI Awards Program will have been handed over to **Thom Durfe,**WI8W. When I became the awards manager in January, 1999, I did so hoping to give back to the QRP community some of the benefits I have received from it over the past several years. Though I have been a ham for over 35 years (first licensed as WN2TJE in 1965), my activity level has swung between two extremes. Prior to 1995, I was essentially inactive for many years, getting on the air for a few hours every now and then, but not to any great extent. This was due to many factors we all encounter - kids growing up and the demands of job and family predominating. In 1995 I discovered QRP-L, QRP ARCI, NorCal and the joys of QRP. I had a lot of help getting back into the hobby and my goal, over the past two years as your awards manager, has been to return some of the benefit I received.

If nothing else, I believe I have helped to increase awareness of our awards program. The number of awards issued has increased dramatically over the past 24 months. When I started, I was receiving 3 to 5 applications a month, now I often get 3 or more applications a week. During the last two years, I issued (up to Nov 1, more will be issued prior to January 1, 2001) approximately 183 1,000 miles-per-watt awards. That is roughly equal to the total number issued in the previous 4 1/2 years. I don't take any credit for anything other than making you more aware that the awards are out there for you to receive – it's been your interest in the awards program, the renewed vitality of QRP, the internet list and the many QRP clubs which all add up to lots of hams discovering or rediscovering QRP.

I hope the transition to having Thom as your awards manager goes smoothly. If you are a subscriber to QRP-L, you will already know about this, as I will have made numerous postings informing everyone of the change. Due to delays in issuing awards, all applications submitted after December 10, 2000 should be sent to:

Thom Durfee—WI8W
2781 Woodlake Road SW #4
Wyoming, MI 49509
(E-mails to wi8w@arrl.net)

I will forward any mail I receive after December 10 to him so he can issue your award. If I get your application and you sent a check made out to me, don't worry, I will cash it and then send him the money. Same with cash, I'll just send him a check for the amount. Please, as you have been doing so well with me, make your checks out to Thom Durfee, not to QRP ARCI.

There are several lessons learned from my experience working with you, the US Post Office and banks. **First**, please make sure to use the application forms on our web page at **http://www.qrparci.org**. The two most popular forms, the applications for the 1,000 Mile Per Watt Award and the multi-purpose GCR application for WAS, WAC and DXCC, are available on the ARCI web site or mail be sent as an e-mail attachment on request. It makes life a whole lot easier when you fill them out completely, especially the location portions for both stations on the 1,000 miles per watt application. **Second**, you must enclose some evidence to show that a QSO has taken place – this can be a copy of a QSL card (no originals), an e-qsl, a copy of an e-mail or letter confirming the contact, or a printout of a Fox contact list or other third party verification. For WAS, WAC and DXCC (as well as QRP 25), you just need to send contact information and the endorsement of two other hams on the application that they witnessed the actual documents proving the QSOs. You certify the power used - we trust you. Awards are issued for the lowest power used in the QSO, even if you want a companion award issued to the other ham in the QSO. And last, for US stations only, please enclose a check or money order made out to Thom or send IRCs or cash. If you are in a foreign country, please do not send a check or money order. Even if banks here do accept them, they often impose fees that exceed the $2 value. I strongly recommend 2 $1 bills in a folded sheet of paper. I have never had a single problem with cash being removed from an envelope. This actually applies to US hams also, if you want to avoid having to write a check.

The post office lesson is that postage costs have risen way beyond what they were when the awards program first began. This is not a problem for awards sent within the US, but the average cost to send an award overseas via airmail is now $1.80. This means QRP ARCI loses money on every award mailed overseas. I am recommending to Thom that he reexamine the fee for awards destined for foreign destinations other than Canada and Mexico. I'm sure you will hear from him on this topic.

Finally, on the application process, we are not in a position to accept e-mail applications – since you still have to send the application fee, you might as well fill in the form and mail them all together with the QSO verification. We do, however, appreciate when you enclose your e-mail address. This lets us ask a question if there is something we don't understand in your application, rather than taking a guess, possibly wrong.

Since this is my final column as awards manager, I'm not going to take space listing the QRP ARCI 1,000 mile per watt records. That came out a few issues ago, and there have been no changes to date. If you want to establish a new record in the official list, you have to apply for, and be issued, a 1,000 mile per watt award. Just telling us you have a new record isn't enough. The only way we can track the records is through the awards numbering system and database.

Some additional statistics that you may find of interest, all as of November 1:

WAS Awards issued in past 2 years: 32
WAC Awards issued in past 2 years: 9
DXCC Awards issued in past 2 years: 9
QRP 25 Awards issued in past 2 years: 8

As you can see, these numbers pale before the 183 1,000 mile per watt awards issued during the same time period (includes instances where 2 awards are issued for the same QSO). I encourage everyone to apply for the awards they are eligible – the certificates are very nice looking, look great in frames and you get a real feeling of achievement. And please remember the ham at the other end – they are working hard to make your QSO a success. An award for them may heighten their interest in QRP or, at the very least, be a thank you for helping you earn your award. We all know it takes two to make a valid QSO.

Thank you all for allowing me to be your awards manager. I have enjoyed the experience and I am sure Thom will do an excellent job for you. Hope to meet you on the air! • •

CONTESTS

Randy Foltz—K7TQ **rfoltz@turbonet.com**

This version of *Contests* contains the scores from the Summer Homebrew Sprint that didn't make the October issue, full coverage of the Summer Daze SSB Sprint and the End of Summer PSK-31 Sprint. As is my wont, the results are sorted by state. If you would rather see them sorted by descending score, take a look at the QRP ARCI Contest web page at http://personal.palouse.net/rfoltz/arci/arcitst.htm. This issue also contains full rules for the Winter Fireside SSB Sprint, the Spring QSO Party, and the Hootowl Sprint. Don't miss the Spring QSO Party as it is one of our two premier contests. Let's have more participation in the SSB Sprint and I'll be looking for you in the Hootowl, one of my favorites.

After each contest 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 2 weeks after the contest by taking a look at http://personal.palouse.net/rfoltz/arci/highclm.htm. If you use the High Claimed Scores form, you still need to send me a copy of your log. There are a few entries in the reports in this issue where the folks became "Check Logs" because they didn't send me a copy of their logs. Either e-mail or regular mail is fine. The log doesn't have to be fancy, just readable and contain the required exchanges.

SUMMER HOMEBREW SPRINT

QTH	Call	Score	Pts	SPC	Power	Bands	Time	Rig	Antenna
AL	K4AGT	11,958	71	14	LT5	20	1.5	OHR-100	Dipole
AZ	K7RE	167,675	425	53	LT5	20,15	4	K2	3 el trap tribander @ 35'
CA	W6ZH	71,952	226	36	LT5	40,20,15	3.9	K2	KT-34-XA, 2 el yagi on 40
	AD6GI	29,238	113	18	LT5	40,20,15	4	K2	40 m short dipole
	WA6ARA	5,130	13	1	LT1	40	3	SMK-1	Center fed Zepp
CO	N0RC	19,140	101	14	LT1	20	2	Norcal 20	Attic dipole
CT	W1VT	9,536	54	12	LT5	20	0.5	K2	Yagi
FL	W4MVZ	36,456	186	28	LT5	20,15	4	IC-738	GAP Titan
	K4KJP	11,554	37	6	LT5	40,20	4	SST	Dipole, Mini-33
GA	AF4PP	8,542	46	11	LT5	20	1.5	DSW-20	Dipole @ 35'
	K4GZZ	5,124	61	12	LT5	20,15	2	FT920	TH-3
HP	HP1AC	20,769	129	23	LT5	20,15	3	TS430S	TA33jr
IA	W0PWE	10,200	52	10	LT1	40	4	Homebrew xmtr and rcvr	Homebrew coax trap invert vee
	KQ0I	5,628	67	12	LT5	20,15	1.25	TenTec 580 Delta	
IL	N9MDK	16,340	108	15	LT5	20	3	NC-20	R5
	WB9HFK	10,292	63	12	LT5	40	4	OHR-100A	150 ' random wire, OCF dipole @ 20'
	WD9IFF	5,964	71	12	LT5	20	2	MFJ 9020	Attic dipole
JA	JR0BAQ	140	10	2	LT5	15	1	TS-440V	Multi band beam @ 50'
MA	K1QM	65,450	275	34	LT5	80,40,20,15	4	QRP+	G5RV
MD	KB3WK	77460	169	34	LT1	80,40,20,15	4	K2	Dipole on 80 & 40, 3 el beam
	K3NY	31,675	181	25	LT5	40,20	2.5	K2	G5RV
	NU3N	18,524	138	14	LT5	40	4	ARK4	Carolina Windom
	W3MWY	9,401	79	17	LT5	40,20,15	3.5	ARGO 556	Ground plane w/ tuned feeders
MI	K8CV	7,252	74	14	LT5	40,20,15	2		
MN	W0UFO	24,817	149	19	LT5	20	2.5	NC-20	Dipole @ 25'
	NI0A	8,372	92	13	LT5	20	4	QRP+	End fed Zepp
NC	K04PY	31,250	175	15	LT1	40	2.5	SWL 40+	Phased dipoles
NH	W1PID	40,322	174	29	LT5		3.5	Emtech, FT900	OCF dipole @ 40'
NJ	N4JS	23,840	68	13	LT1	40,20,15	2.5	K2, Sierra	Zepp on 40, KT34 @ 50'
	W2JEK	19,081	53	11	LT5	80,40,20	1	OHR40, OHR100A, TenTec 1380	Gnd plane, dipole, end fed hertz
	N2CQ	9,130	59	10	LT5	40	0.7	OHR 100A	Dipole @ 20' on fishing pole
NY	K2UD	27,100	130	17	LT1	40	4	2N2/40	End fed half wave
	KC2AFK	9,536	72	9	LT5	40	1	K2	Windom
OH	WB0IQK	14,900	49	10	LT1	40,20	3	GM20, GM40	Windom
OK	N5UW	50,472	224	29	LT5	20	3.75	DSW-20	TA33M
ON	VE3KQN	26,700	155	20	LT5	20	4	Sierra	
	VE3XT	5,294	14	3	LT5	40	3	SWL 40	HB 6 band vert
PA	W3DP	16,284	124	13	LT5	40	2.5	OHR-100A	G5RV @ 25'
	KT3A	14,004	52	11	LT5	40,20	4	Norcal 40, Norcal Sierra	40 m loop, 20 m vert
	W3BBO	7,800	50	8	LT5	20	1	K2	Horiz. 80 m loop
SC	WJ4P	43,700	129	20	LT250	20	3.5	K2	Off center fed dipole
VA	KK4R	12,380	82	9	LT1	40	2	Norcal 40A	Doublet
VT	W1SVU	44,296	226	28	LT5	20,15	3.25	FT-1000MP	12 ele log periodic @ 60'
WA	WB7OEM	5,140	10	2	LT5	20	4	HW-8	Hustler 4BTV gnd mntd
WI	N9AW	76,440	312	35	LT5	40,20,15	4	FT900	G5RV

Check logs: NO8C, VE3JC

Solar conditions may have been responsible for the low turnout in the 2000 Summer Daze SSB Sprint held on August 6, 2000. Many folks commented on the tough conditions. In spite of the conditions Pete, W6ZH, operating with less than 2 watts PEP lead the pack. Let's give the Sprint another try on August 5, 2001 and hope for high solar flux and low A-index values. Remember that the power multipliers have been changed to be consistent with QRP ARCI values. You may use 10 w PEP and still be QRP in the QRP ARCI contests.

Summer Daze SSB Sprint **Top 3 Scores**	
W6ZH	20,800
K0LOA	16,464
N5WU	13,020

Summer Daze SSB Sprint

QTH	Call	Score	QSO Pts	SPC	Power	Bands	Time	Rig	Antenna
CA	W6ZH	20,800	104	20	LT2	80,40,20,15,10	2.75	K2	KT34A, 402CD, Vert
CO	KI0II	5,740	82	10	LT10	20	1.5	Omni VI	Windom
GA	N4OLN	1,610	46	5	LT10		4	FT840	Dipole @ 45'
MA	K1QM	1,050	25	6	LT10	20	3	QRP+	G5RV
MO	WA0NKE	3,850	55	10	LT10	40,20	3	FT900	G5RV, R7
ND	K9IUA	4,697	61	11	LT10	20	1.5	TT Scout	20 m hamstick on auto
OH	WB0IGK	1,596	38	6	LT10	40,20,15	2.5	K2	Windom
TX	K0LOA	16,464	112	21	LT10	80,40,20,15,10	4	K2	TA36
	N5WU	13,020	124	15	LT10	20	4	K2	TH3 @ 33'
	K0RDS	2,070	23	6	LT5	20	0.5	SG-2020	Delta Loop @ 25'
UT	WA7LNW	6,132	73	12	LT10	20	2	K2	Full wave vertical loop @ 35'

2000 Summer Daze SSB Sprint Soap Box— K9IUA: My first Summer Daze SSB Contest. Stayed on 20m and tried to keep my frequency, calling CQ for all but the first QSO. Quit early as I didn't want to run down my car battery. Apologies to W1RDB for not being able to complete the QSO -- shucks! Nice to be able to hand out ND to folks. **W6ZH:** Q's scarce on 80,40 & 10. Conditions could have been better! **N4OLN:** Nobody was on 40 meters, 20 was ok but conditions were so-so, 15 and 10 meters were DEAD. had a good time in spite of the fact that I felt like I was spinning my wheels in the sand. It reminded me of why I like CW. You don't get hoarse. **WA0NKE:** My first QRP contest. Enjoyed the SSB challenge. Band cndx were noisy with QRN and QRM. Got better at the end of the contest. Loudest signal here in MO was Steve. **KI0II:** Found nothing on 10 and 15 meters. Condx poor to fair on 20 meters. You have to really WANT to do this on 20 meters or it is easy to get discouraged. Found 20 meters to be very spotty, more like 28 MHZ. Worked only 10 SPC in 23 contacts, rather strange. 9 in OH, 3 in KY and 2 in VE7 land including VE7FMM/M (bicycle mobile @ 5W). Sure makes QRP fun! Thanks for a fun time. **K0FRP:** El Stinko easy contest to cross check and score. **N5WU:** Propagation from Texas was pretty bad. Most stations worked were due North. **K1QM:** Condx on 10 and 15 were very poor, not one station heard. By contest time 40m was filled with broadcast stations. 20m was not so bad - but where were all the QRPers with K2's? **K0RDS:** Band conditions were bad here, but hope to work more next time. **WA7LNW:** Extremely poor band conditions. Hats off to everyone who hung in there!

While radio Contesting has been around for a long time...the recent change over to hand keys was led by QRPers! (It is rumored that some that some die hard QRO ops still use foot keys.)

End of Summer PSK-31 Sprint

This year on September 10 was the first running of the End of Summer PSK-31 Sprint. It was the brain child of Rod Cerkoney, N0RC.

Participation appeared to be greater than the SSB sprints with both QRP and QRO folks enjoying the activity.

This is definitely a keeper, so mark your calendar for **September 11, 2001** for a repeat performance.

Top Three	
N0UR	**24,311**
KD5EOV	**20,020**
N5WU	**19,250**

Mark Your Calendars:

Fireside SSB Sprint
Feb 11, 2001

Spring QSO Party
April 14 & 15, 2001

Hoot-Owl Sprint
May 27, 2001

2000 End of Summer PSK-31 Sprint

QTH	Call	Score	QSO Pts	SPC	Power	Time	Rig	Antenna
AB	VE6CXU	2,660	38	10	LT5	4	IC736	Dipole @ 40'
AR	NQ5RP	9,360	72	13	LT1	4	K2	20 m half square
	KC5DUI	7,875	75	15	LT5	4	TS450S	Dipole @ 15'
AZ	K7RE	5,698	74	11	LT5	4		
Belgium	ON4CCX	3,168	132	24	GT5	4	FT77	FD4 homebrew
CA	W6ZO	5,194	53	14	LT5	4	IC756PRO	6 ele monobander @ 85'
CO	WM0N	6,279	69	13	LT5	3.5	SWL PSK20	Dipole @ 20'
	N0RC	4,774	62	11	LT5	2	IC746	Attic dipole
FL	KF4SIR	12,740	70	26	LT5	4	TS570D	Inv vee @ 9 m
GA	W4JHR	1,064	19	8	LT5	4	TS570D	80 m dipole
GREECE	SV1COD	13,104	78	24	LT5	3.5	IC706 MK II	3 el tribander
IA	KQ0I	3,780	54	10	LT5	2.5	TT 580 Delta	Multiband dipole
KY	KB4DJR	13,433	101	19	LT5	3.5	TS570D	20 m 1/4 wave HB vert
MD	N3FX	19,159	119	23	LT5	4		
MI	WB8DQT	7,840	70	16	LT5	2	IC707	Gnd-mtd R7000
MN	N0UR	24,311	151	23	LT5	3	FT-920	3 el yagi
NJ	W2AGN	4,536	54	12	LT5	2	K2	KT34A
NM	K5OI	1,176	28	6	LT5	2	PSK-20	40 m dipole
NV	WB7QBO	203	29	7	GT5	4	TS520	Dipole
OK	KB5XG	1,078	22	7	LT5	1.3	PSK20-SMW	HB ugly vert
SC	KS4DU	5,390	55	14	LT5	4	IC-706	Dipole
TX	KD5EOV	20,020	130	22	LT5	3.5	TS440SAT	4 ele tribander
	N5WU	19,250	125	22	LT5	3.8	K2	TH3 @ 33'
	KE5OG	8,925	85	15	LT5	1.9	TS940S	TA33 @ 37'
	KD5EIT	6,216	74	12	LT5	3.8	IC706mkIIG	Hornet Tribander
	W5HNS	2,926	38	11	LT5	4	TS930	2 el quad
	K5EYE	1,288	23	8	LT5	2.5	IC746	Delta Loop
	KC5NT	420	42	10	GT5	2.5	TS570DG	40 m inv vee
	WB5QLR	396	44	9	GT5	4	IC-706MK2G	40/20/10 dipole
WA	KK7UQ	1,584	99	16	GT5	3.5	TT Pegasus	G5RV
WI	WN8VIX	3,290	47	10	LT5	3	TS570S(G)	GAP Titan

2000 End of Summer PSK-31 Sprint Soap Box— KB5XG: Great fun but extremely hot in the shack 100 degrees + really cut down on the operating time. **WM0N:** This sure was fun. I had a great time. This contest caused me to finish the PSK20 and get on the air with it. **KB4DJR:** Great contest with lots of activities. Got lots of new states for QRP WAS. We need to find that pactor station though he was a killer. **K5OI:** Fun - my 2nd PSK31 contest in a month! Not lots of Qs but enjoyed anyway. **W2AGN:** Unbelievable signal from NQ5RP!!! 250mw. **KD5EIT:** Lot of fun. **N0UR:** Very strange using your eyes more than your ears. I take pride in pulling a cw signal out of a crowd, but just had to sit and watch with PSK. Fun, but will never replace good ol CW. **K5EYE:** Well this was another fun contest from ARCI. I had a very good time working this contest, but either I don't know what I'm doing, or the band was in poor shape. I heard the same station at 50 watts all day who was taking out most of the other stations. I have a lot to learn about PSK, its a great mode and I hope to hear more club members on the air next year. Overall , another wonderful contest. **N5WU:** First time using this neat mode. I bought a Rigblaster at Dayton but never used it before the contest. I love these contests that give you a reason to use new equipment. PSK is great fun too. I might play with it more often now. I heard some Europe DX, but they did not come back. Oh well, maybe next time. Let's have this again. FUN FUN FUN.... **KE5OG:** Great fun. Wish I could have been around for the whole 4 hrs. PSK31 contesting is cool, but boy do I need to learn how to contest this way. **KC5DUI:** Had a GREAT time!! Can't actually be sure of the power level, MFJ 949E was showing about 3 watts and the TS450S just under 5 watts. Will have to get an accurate meter before I really try to claim any scores - any suggestions (I'm new to QRP)? **NQ5RP:** Great

2001 Winter Fireside SSB Sprint

Date/Time:
February 11, 2001; 2000Z to 2400Z SSB HF only
Exchange:
Member - RS, State/Province/Country, ARCI Number
Non-member - RS, 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 (PEP):
Note the higher SSB power limits!
0 - 500 mW = X 15; 500 mW - 2 W = X 10; 2 W - 10 W = X 7; Over 10 W = X 1
Suggested Frequencies:
80 m = 3865 kHz
40 m = 7285 kHz
20 m = 14285 kHz
15 m = 21385 kHz
10 m = 28385 kHz
Score:
Points (total for all bands) X SPCs (total for all bands) X Power Multiplier.

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 report by visiting http://personal.palouse.net/rfoltz/arci/form.htm. Check the web page at http://personal.palouse.net/rfoltz/arci/highclm.htm for 2 weeks after the contest to see what others have said and claimed as their scores.

contest, lots of PSK signals. QRP ARCI member Rod Cerkoney, N0RC and contest manager Randy Foltz, K7TQ, get a pat on the back for suggesting this new contest. A bold move by QRP ARCI and one that has paid off in loads of fun. Please lets have a winter, and a spring PSK test. **WB5QLR:** First PSK contest. Had a great time. **KF4SIR:** Great contest, had lots of fun and got some new states for WAS. **WB7QBO:** Don't contest much. First time on the air using PSK-31. Do use RTTY. Don't have a rig that will operate below 75 watts so had to use about 100W. Need to get a QRP rig. **N0RC:** Well that was a bit different, but fun! Of course I'm biased since I help bring this contest into being. ;-) Thanks all for joining in to give it a try. Same time next year? **W6ZO:** Software logging problems (new to me software - that is what I get). Poor band condx. Too many stations running too much power. Pactor stations with RFI... but I had FUN!!! Lowering the antenna might have helped. First QRP contest - amazing what 4 watts will do!!! **WN8VIX:** Excellent contest! See you guys again next year. **KS4DU:** There weren't many fish in the pond. More QRP ARCI members should try this mode. It's fun! **K7RE:** This was quite a different contest! Lot's of QRO types showed up too. I used my PSK-20 and triband beam at 35 feet. Had several QRO stations overdriving their rigs, which really took out lots of weak signals with their broadband noise. Still, lots of stations to work, and no ringing in my ears after the event! **KQ0I:** The right contest at the right time, lots of non-members were interested and participated. A good time for a PSK event. Especially good to see some member numbers in the 10K group...nice to see them active in operating events. • •

2001 Spring QSO Party

Date/Time:
April 14, 2001; 1200Z through April 15 2400Z. You may work a maximum of 24 hours of the 36 hour period. 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; 250 mW - 1 W = X 10; W - 5 W = X 7; Over 5 W = X 1
Suggested Frequencies:

General	Novice
160 m = 1810 kHz	
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

Teams:
You may enter as a team of either 2 to 5 members per team or unlimited number of operators as long as a maximum of 5 transmitters on the air at a time. You compete individually as well as on the team. Teams need not be in the same location. Team captain must send list of members to Contest Manager before contest.
Score:
Points (total for all bands) X SPCs (total for all bands) X Power Multiplier.
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 determines 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 report by visiting http://personal.palouse.net/rfoltz/arci/form.htm. Check the web page at http://personal.palouse.net/rfoltz/arci/highclm.htm for 2 weeks after the contest to see what others have said and claimed as their scores.

2001 Hootowl Sprint

Date/Time:
May 27, 2001; 8:00 pm to 12:00 pm Local Time. 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; 250 mW - 1 W = X 10; 1 W - 5 W = X 7;Over 5 W = X 1
Suggested Frequencies:

	General	Novice
160 m = 1810 kHz		
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.

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

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After the contest send your report by visiting http://personal.palouse.net/rfoltz/arci/form.htm. Check the web page at http://personal.palouse.net/rfoltz/arci/highclm.htm for 2 weeks after the contest to see what others have said and claimed as their scores.

KIMG & AK1P—QRP AFIELD

from Expedition to Sanborn County Park Near San Jose, CA

Paul AK1P and I (K1MG) picked nearby Sanborn County Park in the hills above Silicon Valley for our QRP Afield outing. They settled for a grassy glade near the parking lot with picnic tables and a few trees for shade and natural antenna supports—elevation 1,500ft. Started on 20 meters with my DSW20 and a dipole in the trees. Then we tried Paul's Sierra on 15 and 40 with both a PW1 vertical and a ZM2 where we fed the 20 meter dipole as a "T" top-loaded vertical.

My wife and daughter joined us with a picnic lunch. Then got back to it.

We ran 1.5 watts with the DSW, 1.5 to 2 watts with the Sierra, and 5 or 3 watts with the K2 (to save batteries). We worked just about everyone we heard.

As the sun dipped below the mountain ridge to the west, we figured we had had enough fun, so we packed everything up.

Then...we finished off a very pleasant day with a glass of Napa Cabernet—QRP Afield, California style!


3

1. Ops: Mike—K1MG assisted by his harmonic; 2. Paul—AK1P (left) and Mike—K1MG; and, 3. K1MG works another one.


1


2

Extreme QRP

MILLIWATTING IN THE CQWW

Jerry Scherkenbach—N9AW jerrys@execpc.com

After working Rumi, LZ2RS, a couple of months back on 20 mtrs using about 200mw I was hooked. He worked me with only 50mW which he said was the first time he had worked the USA on 20 mtrs with that power level. Since I couldn't accurately measure my power at that low level I bought a WM-2 wattmeter kit, built it, and decided to try for DXCC using only milliwatts.

For mostly work related reasons, my quest to start this personal challenge was delayed until this weekend. I've always enjoyed the CQWW CW contest. In 1989, a few years after getting interested in QRP I entered the contest as single op, 15 mtrs, QRP. Well, that's a pretty limited category but I was really amazed to work 90 countries with 5 watts that weekend on 15 mtrs. I was even more amazed when a #1 World certificate showed up for that effort. Like I said, its a pretty limited category – I think there were around 40 entries.

Anyway, for this year's CQWW CW I decided to try Milliwatting. So, with the WM-2 set to 900 mW, I started out on 10 meters on Saturday morning. When I look back, I was awful casual about not getting in until 1547z (9:47 am CST), however, I didn't think it would turn out this well. Today, Sunday, I also got a late start. Now I wish I had started earlier. Maybe I could have got those 100 countries while milliwatting in one weekend.

My goal was to work as many countries as I could, not QSOs or points. I mostly worked one QSO per country but did have a few extra QSOs with Japan, England, France and Hungary.

The results with 900mW:

110 QSOs..... 95 countries.....10/15/20 meters. Most QSOs were made on 10 mtrs.

Worked all continents. Most QSOs were with common countries but also had some not so common ones.....3V, OX, JX, OH0, PY0F, JW, A3, 9G, KH0, 9H, FR, YJ, TZ, VP8/H and VR2.

Equipment:

Yaesu FT1000MP, Oak Hills Research WM-2 wattmeter, antenna is a Mosley Pro-57B at 50 feet.

The bottom line:

This was really a lot of fun! I don't think I will be hesitant to operate in the 'less than 1 watt' category in future QRP ARCI contests.

Observations:

1. Patience. If you're not the type to be patient milliwatting might not be for you.
2. CQing—forget about it, I didn't even try.
3. Packetcluster—I used it but avoided newer spots where the pileups were likely to be big.
4. Rare countries spotted on packet almost always have a big pileup—forget about it.
5. Stay with the highest open band. The QSOs were easier to make.
6. Stay alert to propagation changes for your area. Jump around between the two highest bands when the highest band doesn't seem to be producing.
7. Generally, the louder they are, the faster the QSO unless there is a pileup.
8. Timing, as always in DXing, is key. There were a number of QSOs made where timing made the difference because there was always someone calling besides me. Not really a pileup but the higher power stations will almost always beat you.
9. Code speed… don't be afraid to crank it up, if you're comfortable with higher speed that is. I hear a lot a QRP ops slow way down, maybe thinking their signal will be easier to copy if their CW is slower because the signal is weaker than most. Not so, some of the DX ops have a rhythm they are trying to maintain and seem to answer stations that fit it.
10. Forget that you're running QRP. Remember, your QRP signal is not that far down in S units from the big guns, everything else being equal (whenever that happens). 100 watts to 1.5 watts (or so) is theoretically 3 S-units.

I hope everyone that operated the contest had as much fun as I did. • •
72, Jerry—N9AW

Meet Joe Spencer—New ARCI V.P.

Joe Spencer—KK5NA kk5na@quadj.com

It's an honor to have been selected as ARCI's new vice president. I am looking forward to assisting Jim with some exciting new projects he is working-up for the club. I hope to complement the already excellent leadership we have and stand ready to assist in any way I can. I encourage you to contact me with any ideas or areas I can help you with.

A little of my background

I have a degree in electronics engineering, I retired from the Navy after 20 years working in Avionics, training, and computers. I then went to work for a local college where I have taught electronics, computer hardware and programming. My current position there is as a network engineer. I also teach electronics as it pertains to amateur radio and am a Volunteer Examiner (VE).

I have attended many of the local Ham get-togethers in the last few years and have talked to many QRPers, interested non-QRPers and others who have heard of the successes and the adventure of low-power operation and have a desire to find out more about it. I feel organizations like ours, which support many outside QRP related endeavors, aid in bringing the "QRP message" to more and more people by providing "less-formal" access to it.

There is certainly a growing interest in low-power operation. This is evidenced by more "press" from the radio magazines and more kits and radios from the mainstream manufacturers.

I feel we (the QRP community) have moved to the leading edge and are providing a renewed area of interest to many older Hams and a convenient way into the hobby for newer Hams. • •
72, **Joe Spencer**—KK5NA

CALL FOR 2001 QRP HALL OF FAME NOMINATIONS

Mike Czuhajewski—WA8MCQ **wa8mcq@erols.com**

Over the years there have been many QRPers who have stood out from the pack. Some have outstanding on-the-air accomplishments with QRP, while others have made tremendous contributions to the QRP community in a variety of other ways. The QRP Hall of Fame is an honor bestowed by the QRP ARCI to recognize some of these. Started up by former president Paula Franke, WB9TBU, the initial round of inductions was done in 1992; the program was revitalized in 1996 and we have been fortunate to have people inducted every year since.

It's that time again—we are now accepting nominations for possible inductions into the QRP Hall of Fame in 2001. If you feel someone has had a significant impact on the QRP community through outstanding accomplishments (technical, operating, organizational, etc), it's time to nominate them for this honor. Please provide your write-ups to me, WA8MCQ, via mail or e-mail by the end of February. The nominations will be collected and sent to the voters, we'll allow a bit of time for them to discuss the nominees if they wish before voting, and the inductees (if any) will be announced publicly at the QRP Banquet at Dayton.

(The voting body consists of the Board of Directors plus the executive team. Existing QRP HoF members have also been offered the opportunity to vote for several years, although as their numbers continue to grow there will have to be some adjustments made to the process. A 2/3 vote is required for induction.)

Although the QRP HoF is administered by the QRP ARCI, nominations may be submitted by anyone, whether a member or not. Similarly, membership is not required for someone to receive the honor, since this is an award to recognize those who have made great contributions to the QRP community, not just to the club.

As always, each nominee is judged individually on his/her merits; this is not a competition to choose the top two or three from a field of worthy candidates. We have no quotas and no limits. If the voters don't feel any nominees truly deserve the honor in a given year, none will be inducted simply for the sake of having someone to announce at Dayton. On the other hand, if there are a dozen nominees and all are judged worthy, all will be inducted. (And we get a quantity discount on the plaques!)

If submitting a nomination, you must do more than simply toss out a name. We need to have a few paragraphs giving some details of the accomplishments, telling us why you feel the person is worthy of being in the QRP Hall of Fame. Don't count on all of the voters knowing everything about your favorite QRP hero; you think the person is worthy of the honor and it's your duty to convince them. In the past it was not unusual to see comments from the voters to the effect that if someone didn't bother to write more than a line or two, then the nominee must not be terribly worthy of getting the vote.

While we have no list of specific requirements to meet for induction, we do have some guidelines. In general, nominees should be someone who has made significant contributions to QRP in one or more areas, and preferably things benefiting a large number of people. Categories include technical, organizational, operational, etc. Long-term contributions carry more weight than limited, short term ones. Nominees have a much better chance of induction if they have been active in the QRP community for an extended period of time, ie, several years. Naturally, the nomination letters should only include information on achievements that are related to QRP.

The following, in alphabetical order, have been inducted into the QRP HoF in the years indicated:

Chuck Adams, K7QO 1998
Brice Anderson, W9PNE 1996
Dave Benson, NN1G 1999
Michael Bryce, WB8VGE 2000
Wayne Burdick, N6KR 1998
George Burt, GM3OXX 1996
Jim Cates, WA6GER 1998
L. B. Cebik, W4RNL 1999
Mike Czuhajewski, WA8MCQ 1997
Tom Davis, K8IF 1996
Doug DeMaw, W1FB (silent key) 1992
Rev. George Dobbs, G3RJV 1992
Joe Everhart, N2CX 2000
Paul Harden, NA5N 1999
Wes Hayward, W7ZOI 1996
Doug Hendricks, KI6DS 1997
Roy Lewallen, W7EL 1992
Rich Littlefield, K1BQT 1996
Dick Pascoe, G0BPS 1997
Randy Rand, AA2U 1992
C. F. Rockey, W9SCH 1996
Gus Taylor, G8PG 1998
Adrian Weiss, W0RSP 1996

Remember, if there is someone you feel is deserving of being inducted into the QRP Hall of Fame, you have until the end of February to submit a nominating letter to me, WA8MCQ. Important: all inputs I receive will be acknowledged! If you do not hear back from me in a short time, please assume that I never received it and let me know. I'd hate to see someone lose out on the chance to be inducted because a letter or e-mail never got through. • •

There is more to life than increasing its speed.
Mohandas Gandhi

(Surely this refers to code speed...)

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Join QRP ARCI

Credit Cards for all!

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/input.html**

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.

Extreme QRP

IMHO—V/UHF QRP...YOU BET !

James R. Duffey KK6MC/5:

Just as the HF QRP sector has been on the rise, I believe V/UHF QRP activity is an up and comer.... With new QRP rigs like the FT-817 hitting the market soon, it's bound to open it up even quicker. Especially attractive to those with "Basic" tickets who aren't licensed for the HF bands. Keep your eyes on offerings from the "other guys"! I'm sure there's more to come.

On a less expensive note, there *are* inexpensive kit alternatives out there. I've had reasonable success with my Small Wonder Labs White Mountain-20 QRP rig connected to a Ten-Tec 6 meter transverter. Some minor mods to the input attenuator in the transverter and I was getting full power out from the xverter. For a couple of bills, the WM-20/ TT xverter combination makes for a great inexpensive 6 meter CW/SSB QRP station. If 6 meters is dead, you can always tune in to some 20 meter action!

6 meters truly is a "Magic band." My origins on this band started with a homebrew transverter (5 watts) and a 1/2 wave dipole made out of coax that was thumbtacked to where the wall meets the ceiling in my shack (second floor of the house at the time). I amazed myself by working all kinds of CW and SSB stations with a mere 5 watts and an indoor antenna. When the band is open, it doesn't take much. There are always sporadic-E openings in the spring/summer and midwinters and F2 openings when the sunspot cycle is up. Even when the band is closed, there's usually someone hanging out on the SSB calling frequency.

2m and 70cm are somewhat more challenging but the fortune factor here is the antenna...you can get a high gain beam on a small boom to make up your ERP when using QRP power levels. It doesn't take much power to work (relatively) great distances when both stations have killer beams! Of course, the quick and dirty "kludge it together" methods on HF don't work at V/UHF. There are more technical challenges, like paying special attention to feed lines and quality connectors. That's where the "wring the towel dry" challenge becomes fun. Get a decent antenna and feed line with a few watts and you're cooking. Chasing grids (and more distant ones) gives me a greater buzz than what I get from working countries on HF (I think the novelty wore off many years ago :).

TenTec also makes a 10 meter to 2 meter transverter...tie one of these babies onto the back of a cheap 10 meter rig and you're flying on 2 meter SSB/CW. If you're into V/UHF home brewing/ kit building...check out Hamtronics. They make some neat transmit and receive converters that will work with cheap 10 meter rigs too.

Of course, talk to the microwave dudes for the real scoop on a challenge. DownEast Microwaves is the king of that hill.

That's the beauty of this hobby. Each band has it's own properties and propagation that can differ so greatly from another.

So, for sure...there's (QRP) life after 30 MHz if you're up for the challenge.

Hugh Duff—VA3TO:

All of the kit manufacturers mentioned are on the net. Check them out !

Chuck Carpenter—W5USJ:

Remember that 6 is a propagation dependant band, mostly Es for QRP, and you will need to monitor for useful conditions. April to September is the most likely season for Es in the states. You can do well with simple antennas when conditions are *right*. I've worked stations who were using simple dipoles, long wires, TV antennas, ground planes, verticals, and HF antennas. If you can load it, you can be heard. • •

THE LAST WORD

The QRP Quarterly invites readers to submit original technical and feature articles as a service to their 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 .tif 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 they believe it better fits another category.

Accepting advertisements for publication in the Quarterly does not constitute endorsement of either the product or the advertiser.

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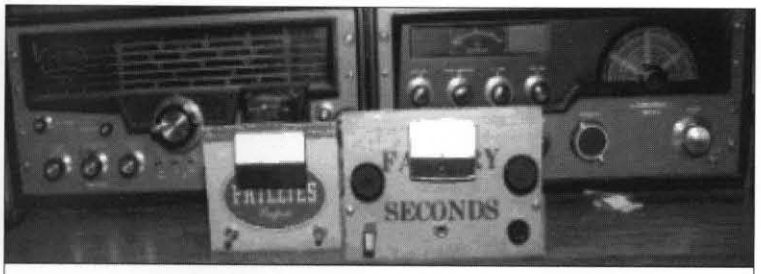
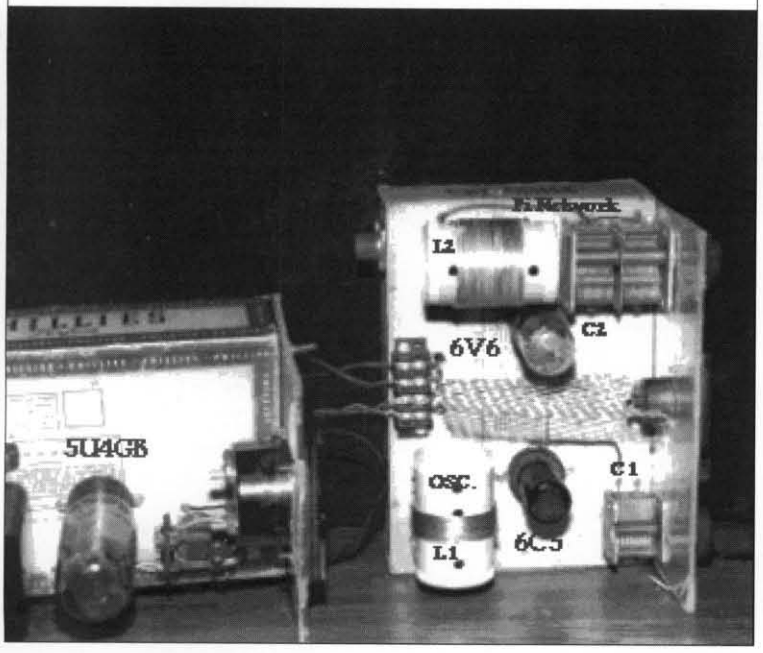
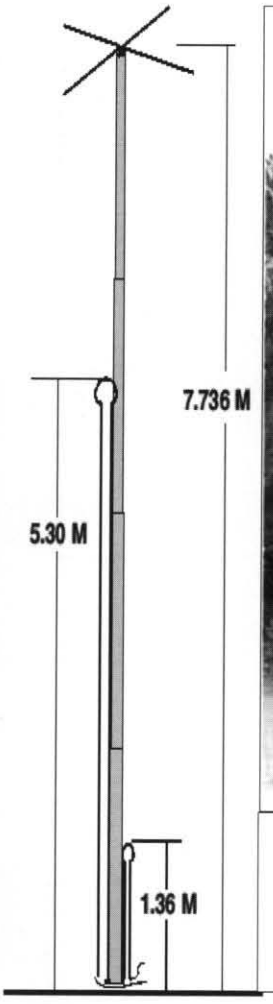
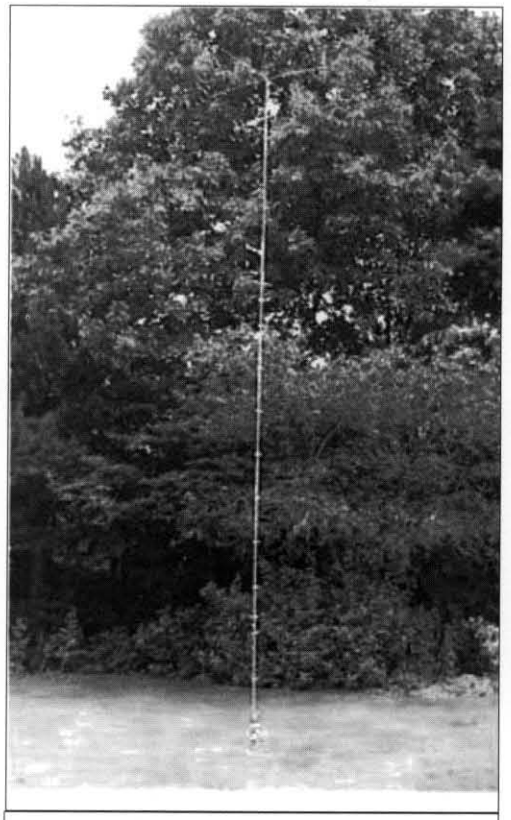


6-Watt Transmitter & Cigar box power supply (CB-1 and the CB-PS)
Norman T. Hunt—W1FIF http://www.qsl.net/w1fif/





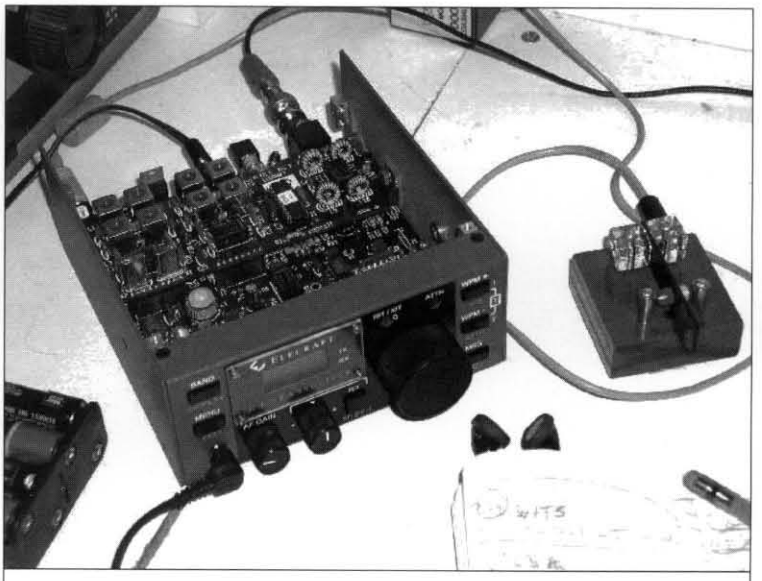


Linear Loaded Antenna for 40 and 80 meters
David A.Reid—PA3HBB/G0BZF
http://www.qsl.net/pa3hbb/arframe.htm

DJ ALDRIDGE—G3VGR
ESSEX, ENGLAND
(Featured in *SPRAT*)
http://www.qsl.net/g3vgr/images/halfwave.gif

First described by M0AJL in Sprat #97. Now modified, no counterpoise is required—antenna gives good performance on band of choice.

L1 (20m) 29 turns 26AWG on T68-6
L1 (40m) 45 turns 26AWG on T68-2
C1 75pf air-spaced trimmer (in parallel)
40m antenna 67 ft; 20m antenna 34 ft



Fine little K1 set-up that Michael C Boatright—KO4WX from Smyrna, GA used in the last Spartan Sprint.

http://ko4wx.home.mindspring.com/projects/pc040005_sm.jpg

Thanks to all who supported the creation of this *QRP Quarterly* issue. Please keep the articles, pictures and e-mails coming to the QQ staff and I—we sincerely appreciate your support.
72,
Craig W. Behrens—NM4T

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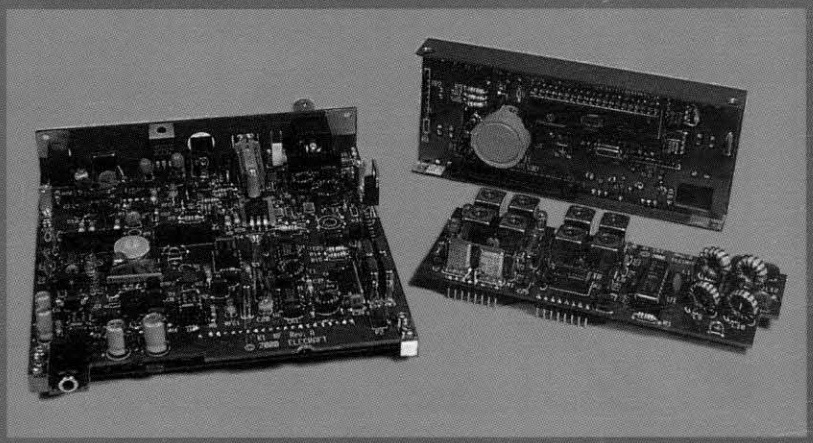

"I just have to say thanks...my K2 performed flawlessly on the Island of Abaco and during the CQWW CW Contest." – Ed, WA3WSJ

"This is such a beautiful piece of equipment. The attitude and performance of the people at Elecraft are outstanding, and reflected in the product!" – Allan, W6MEO

We're so busy designing exciting new kits for 2001 that we've decided to let our customers do the talking. Just ask anyone with a K1 or K2: they'll tell you about the hot receiver, excellent signal reports, no-wires assembly, and of course the *mojo* that seems to be built into every Elecraft kit. But if they get too emotional on you, visit our web site, where you'll find rational, objective information. See how our all-band, SSB/CW transceiver, the K2, stacks up against the world's best rigs. Check out the small size and versatility of the K1 dual-bander. Dowload a complete owner's manual. It won't be long before we'll have *you* talking, too!

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