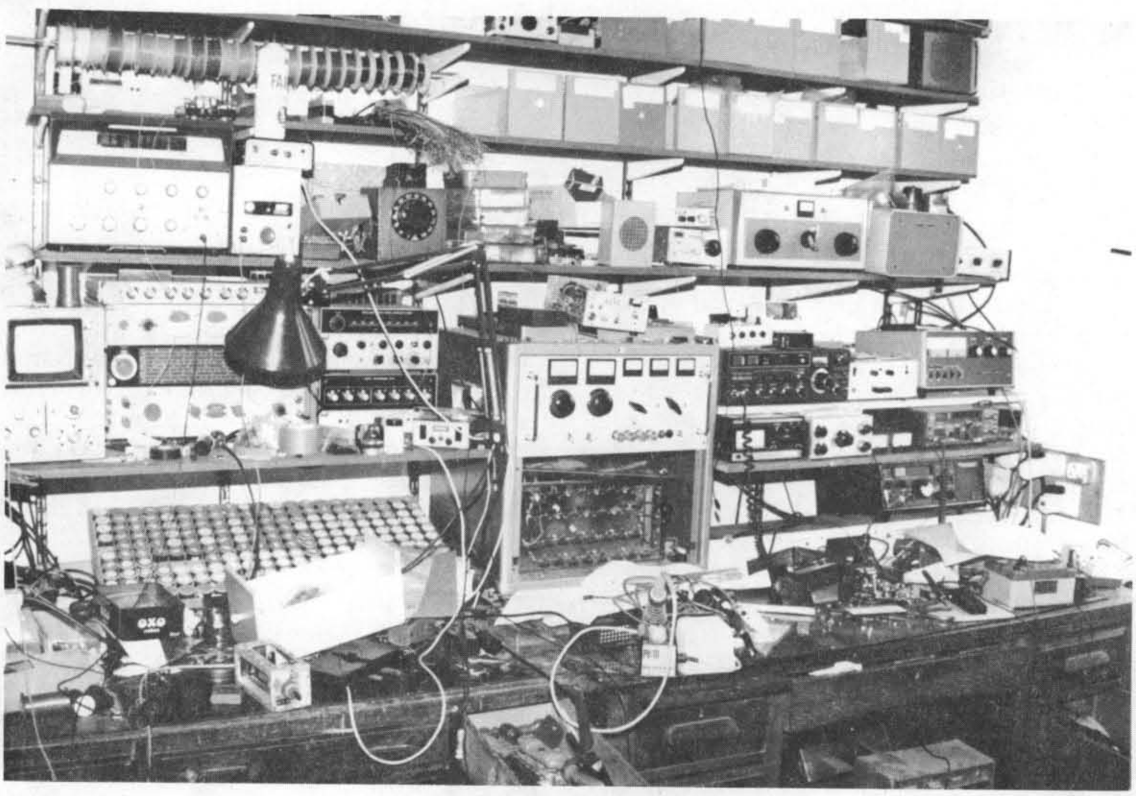
QRP Quarterly

Journal of the QRP Amateur Radio Club, International

April 1991 Volume XXIX Number 2



Ever wonder where many of the GQRP homebrew goodies come from? Here's a look at where George Dobbs, G3RJV relaxes with a project. Those attending the Dayton Hamvention will have a chance to "talk shop" with George and other members of the GQRP.

Results: Holiday Spirit Homebrew Sprint and Fall QRP CW Contest--turn to page 13

EDITORS WORD

Hi gang,

I hope everybody has made it thru the winter with antennas intact. It was brought up to me that the QQ was a little thin last issue. Well we are gòing to try and make up for that in this issue of the Quarterly as we were blessed with a lot of new articles from some new writers. But this brings up again the old problem, if we don't have the articles to work with it's hard to bring out a big Quarterly issue.

That brings it back to you the QRP ARCI member, think about writing something for us. You don't have to be a writer to write for us. So if you have built something, or have done some exciting operating, or anything else that you think would be of interest to the membership put it to paper. Drop me an SASE for our "Writer's Guide" and who knows, you might have some fun doing it.

Name that Column

We've started a new column in the Quarterly for members to send letters to the editor and other information that you think other members would be interested in. Right now it's called"Letters", but that's a little lame for a column name. So now it's up to you to rename it. I am starting a little contest to come up with a new name for the column. I will personally pick up some QRP ARCI momento at the Dayton Hamvention to give as a prize for the winning name. Since I am paying for this myself, I reserve the right to pick the winner (unless the President and/or the board overrules me). So send in your entries to the contest and let the best name win.

That's about it for now. And as always, feel free to offer any ideas to improve the Quarterly. And if you are going to Dayton Hamvention look for me there. I should be at most of the QRP forums. Have a good spring and keep the RF flowing.

FROM THE PRESIDENT...

Paula Franke WB9TBU

It's been an unusually busy winter season here and I don't see any real let-up for the rest of the year. My activity for 1991 includes three QRP gatherings: Dayton Hamvention in April, Hamcom in Dallas in June, and the ARRL National Convention in Saginaw, Michigan in August. Hope to see many of you there.

RTTY QRP

I've recently received a letter from a new member, Millard C. George K6ZRY, 246 Carmel Ave., El Cerrito, Calif. 94530. During his first two weeks of operating RTTY-QRP, Millard has worked 13 states and several DX countries. He's surprised at the lack of RTTY activity in the Quarterly and wonders why there is no frequencies set aside for membership contacts. I confessed my ignorance on the subject and toss the question to the members. Who's active on RTTY QRP? Let us know.

LETTERS...

Chaz,

In an effort to try and promote SSB QRP activity on 10 meters, I will be running QRP SSB mobile in the following Texas counties: Bexar, Medina, Atascosa, Wilson, Guadaluppe, and Comal counties. Every Amateur who makes a contact with me will be able to get a special QRP QSL card to confirm they worked me in that or those counties. Please send a SASE if you wish the county or counties confirmed. The schedule is as follows:

Date/Time	Frequencies	Counties
June 8,1991	28.385 MHz. + -	Bexar, Medina
1600-2000 UTC	28.525 MHz. + -	and Atascosa.
June 9, 1991	28.385 MHz. + -	Wilson, Comal
1600-2000 UTC	28.525 MHz. + -	and Guadalupe

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QRP ARCI# 6332

Chaz,

I just finished one of the most enjoyable projects that I have found in a long time, the "CMOS Super Keyer II" which appeared in the November 1990 QST. This keyer is really fully featured and has all the bells and whistles of my Kansas City Keyer plus some. I would recommend the keyer to anyone since a memory keyer of this type is great for casual operation and is super for any contest work. I have also used it for mobile operation and it greatly reduces the work load for the kind of QSO. The keyer is very low current drain and has its own separate supply so the memory information is not lost when the rig is shut off or the power supply for the rig is changed.

I built my keyer into the top cover of a HW-9. With careful placement I cleared all the components on the top-board, including a speaker which I always felt the HW-9 lacked. Although the QST article does not call for a power switch, because of the very low current drain, I installed one in the HW-9. I mounted the four push button memory switches on the top front of the HW-9 and I was concerned that in backpacking the rig I might close one of those switches and cause the keyer battery supply to run down. Turning off the power does erase the memory contents and another way to avoid the battery drain would be to put a switch in the push button switch lines, this would disable the push buttons but leave power to the memory.

The kit of parts and the PC board go for $45 (plus $3.00 S&H) from Idiom Press, Box 583, Deerfield, IL 60015 is of very good quality and includes excellent operating instructions and tutorial in the keyer. It does not contain a parts placement diagram or schematic so you need the QST article for that purpose.

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Technical

Antennas

Reviews

Operating

Modifications and Improvements to the HW-9

By S. W. McLellan, ND3P
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"Editors note: This excellent article was published recently in QEX, the ARRL Experimenter's Exchange. Due to the widespread interest in HW-9 modifications and the fact that not all QRPers receive QEX, it appears here in its entirety so that more may benefit. (If writing to the author, please be sure to include a self addressed stamped envelope.) Reprinted with permission from October 1990 QEX, copyright ARRL."

Several articles have been written dealing with modifications and improvements to the HW-9 (see references 1-4 at end of article).

After reading them and making my own changes/ improvements/corrections to the rig, I thought I would share the modifications I made and the difficulties with the changes suggested by others.

Although the HW-9 "out of the box" played well, several problems were detected and many enhancements were desired. Most importantly, problems, such as instabilities, had to be overcome to make the HW-9 stable and reliable.

To avoid duplicating the entire HW-9 schematic, portions of the schematic are redrawn to illustrate the changes I made. It will still be necessary to refer to the complete HW-9 schematic to get the "whole picture." In addition, the original components are referred to by Heath's component designation numbers.

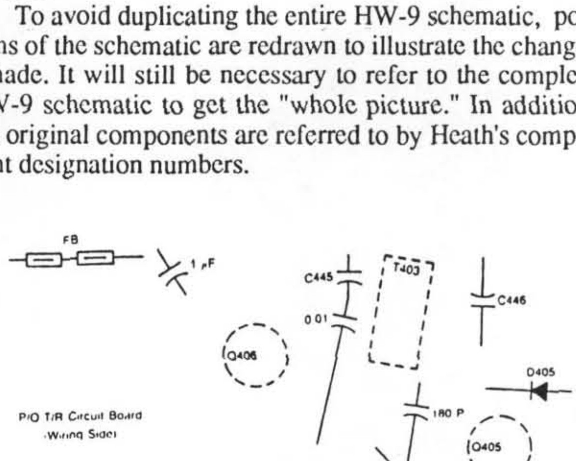


Figure 1: P/O T/R circuit board (wiring side view of power output stage)

The most annoying (and destructive) problem was instability and overheating in the power output stage. My solution is shown in Figs 1 and 2. I (and others—see Ref 1) have noticed that the power output stage of the HW-9 suffers from instability problems. In particular, I noticed that a mismatch to the rig might "induce" oscillations in the power output stage, sometimes at VHF. The oscillation was evident from excessive current consumption, FM radio interference, or by a sudden increase in output power (as measured by a wattmeter) as the drive level is increased. As will be discussed below, I found that I could not rely on the HW-9's output meter to measure the relative output power of the HW-9; AGC and IF amplifier problems interfered with the output meter's readings.

When I asked Heath about the power output amplifier instability problem, they said that Q402 should be a 2N5770 (417-293) and that would solve the problem. They happily sent me the replacement transistor and I installed it; the problem didn't go away

I found that the main problem with the power output stage is the lack of adequate RF bypassing. Heath provided a single 0.1-μF ceramic bypass capacitor (C445) between the output transformer T403 and the two ferrite-bead choke. Further, the ground side of C445 is as far away from the emitters of Q405, Q406 (the power output transistors) as seemingly possible. Too much inductance in the ground path can lead to instability. I beefed up the bypassing by adding a low series inductance 0.01-μF mylar capacitor from the "hot side" of C445 to the ground trace nearest the emitters of Q405, Q406. This is shown in Fig 1, a magnified bottom view (wiring side) of the T/R circuit board. Note that the 0.01-μF capacitor provides the shortest possible path back to the ground and the emitters of Q405, Q406. In addition, I added a 1-μF ceramic bypass capacitor to improve the low-frequency bypassing. Both the 0.01 μF and 1 μF capacitors are tack-soldered on the underside of the T/R circuit board in approximately the positions shown.

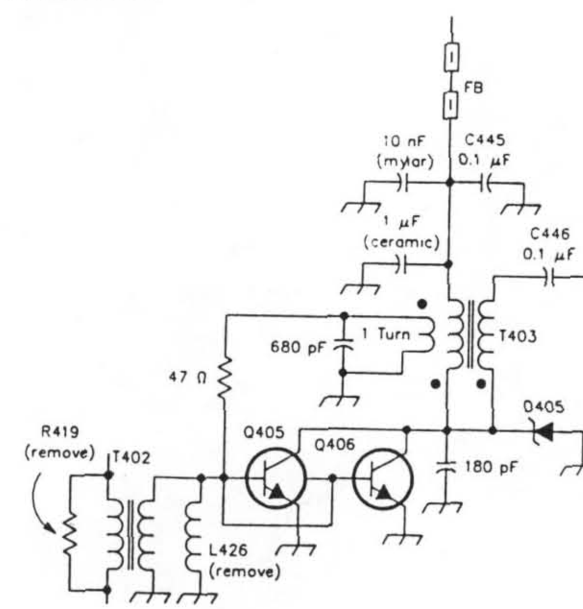


Figure 2: Power output stage

To reduce the possibility of VHF oscillations, a 180-

pF mica (or other suitable, low series-inductance capacitor type, such as a metalized mylar) capacitor was added between the common collectors of Q405, Q406 and ground by the shortest possible path. Again, the 180-pF capacitor was tack-soldered on the underside of the T/R circuit board, approximately in the position shown in Fig 1.

The above modifications are also shown schematically in Fig 2. I further wanted to "flatten" out the gain vs. frequency characteristic of the power output amplifier so that the amplifier is more stable at low frequencies without reducing the gain thereof at high frequencies. For this I added frequency-dependent feedback. As a result, I have been unsuccessful in coaxing the amplifier into oscillation with the load mismatched. I removed R419 (330Ω) and L426 (10 µH) and added a 47Ω resistor to the bases of Q405, Q406. The 47Ω resistor now acts, essentially, as the base load for the power output amplifier, removing the need for R419. Negative feedback is provided by a loose, one-turn, winding added to T403. In my HW-9, T403 is provided by Heath premade and the one-turn winding is wound such that the lead to the 47Ω resistor is wound through the center of the toroidal transformer T403 and the other end of the winding is grounded. Check your T403 to make sure of the correct winding direction. The 680-pF ceramic capacitor reduces the negative feedback at high frequencies, such as on the 12 and 10 meter bands. I grounded the one turn winding to one lead of the 680-pF capacitor and soldered that lead to the ground trace in the circuit board by drilling a hole nearest the emitters of Q405, Q406. Remember, use the shortest leads possible to get the job done.

In Ref 1, emitter degeneration resistors are suggested to help with stabilizing the power output amplifier. I found that they were not necessary. Motorola provided emitter ballasting resistors inside of each transistor so external ones are redundant and significantly reduces the available output power of the amplifier.

I also added extra heat sinks to both transistors (I super-glued another finned heat sink onto each existing heat sink) which greatly reduced the case temperatures thereof. In addition, I heat sinked the driver transistor, Q404, to cool it down.

Stability of the VFO was greatly improved by soldering one end of a short piece of wire (I used a thin braided wire like Soder-wick®) to the frame of the variable capacitor Cl and the other end to the VFO shield. This was suggested in (Refs 1 and 3) and it went a long way in making the HW-9 easy to tune—especially when using the narrow filter.

One very annoying problem was the dropping off of output power from the HW-9 when tuning to the low frequency end of each band. Similarly, the sensitivity of the receiver also decreased at the low end of each band. A major contributor to both problems was the VFO filter shown in Fig 3. A computer model of the Heath version of the VFO filter showed an approximately 4-dB variation in output signal voltage over the desired passband (about 5.75 to 6 MHz). Further, the harmonic suppression was not as great as it could be due to a high-pass coupling arrangement between the output of the filter and the first mixer.

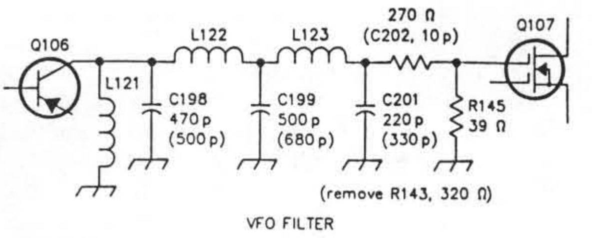


Figure 3: VFO filter

The new filter design utilizes the old inductors (L122 and L123) and changes the capacitors—only two new capacitors are needed, a 470 pF and a 220 pF. Preferably, the capacitors have a low temperature coefficient (NPO) or are of mica. The 500-pF capacitor (C198) is reused and moved to C199's position. The capacitor C202 is removed and a 270Ω, 1/4 watt, resistor is used instead. R145 is changed to 39Ω, 1/4 watt, and R143 is removed. The 270- and 39-Ω resistors reduce the signal level to the first mixer from the VFO filter to approximately that before the above changes were made. Note that to avoid static discharge problems, C202 should be changed first and then R145. The resulting filter has less than 0.5 dB of ripple over the desired passband and the second harmonic suppression is now about 45 dB below the fundamental. This change reduced the level of "birdies" on all bands and substantially flattened out the output power vs VFO frequency problem mentioned above.

A perplexing problem showed up when I was monitoring the output of the HW-9 on another receiver and the output power varied. As the output power increased, the transmit frequency changed almost 1 kHz from minimum power to full power. Initially I thought it was due to power supply voltage droop. Instead I found that the RIT circuit (C179, D118, R126, etc) was being affected by the T/R circuit. When the output power is increased, the output signal through C443 forces diode D407 into conduction, placing a negative voltage on the R12 control bus. When the voltage on the R12 bus (+ 12 on receive) became sufficiently negative (I measured over 10 volts negative at full power), the emitter-base junction of Q103 breaks down and varies the voltage applied to the RIT control diode D118. Placing a diode in series with the emitter of Q103 would solve the problem but still applied negative voltage across electrolytic capacitors (which I removed anyway, discussed below) on the bus.

The solution I chose was to redesign the T/R switch to solve the problem and improve the receiver performance. This is shown in Fig. 4. Instead of D407 dragging the R12 bus negative, D407 is reversed, C442 is removed, and the additional transistor passes current to the D407 when in receive and isolates the diode during transmit. D407 is changed to a PIN diode so that it acts less like a rectifier and has a lower series resistance than the old diode when forward biased. Now, more of the input signal gets through to the transformer T404 during receive. Diode D406 is removed (it operated as a clamp during transmit) and another PIN diode is used as a shunt during transmit. During receive, the diode is unbiased, acting as an open circuit. During transmit, the lower forward resistance of the PIN diode further increases the isolation of the transmitted output signal from the rest of the receiver. With this design, only one diode (D403) instead of two (D403 and D404) is used for isolation. D404 is replaced with a strap and R422 is removed as it is no longer needed. The result is that on 10 meters I can now hear the background noise when I attach an antenna.

Note that in Ref 1, the author suggests replacing the diodes with Schottky diodes; *don't do it*—it will worsen an already bad problem and the overload characteristics of the receiver will suffer having diode D406 with a lower forward voltage drop as a clamp across the high-impedance secondary of T404.

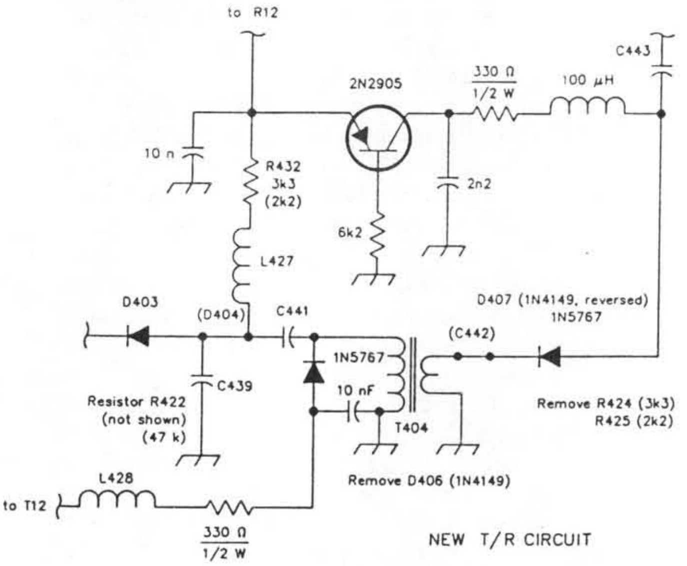


Figure 4: New T/R circuit

I also found an interaction between the transmit return adjustment (R131) and the RIT control due to the emitter-base junction of Q104 breaking down. To eliminate it, I placed a diode (here a germanium diode, such as a 1N3666) in series with the emitter of Q104 (anode to emitter).

Stability of the AGC amplifier was another major concern. I notice that the output of the AGC amplifier U302 was weakly oscillating. Heath evidently forgot to add a bypass capacitor across the power supply to U302; tacking a 0.01-µF ceramic bypass capacitor (circled in Fig 5) from pin 7 of U304 to ground solved the problem. The AGC set point had to be readjusted afterward. In addition, no compensation capacitor on U302 is provided. The lack of a compensation capacitor caused U302 to oscillate when it suppled current to C317 during increasing received signal strength. Adding a 100-pF ceramic capacitor from pin 1 to pin 8 on U302 (also circled in Fig 5) on the underside of the TIR circuit board eliminated the oscillation.

In Ref 1, a suggestion was made to increase the capacitance of C317 to slow up the AGC decay rate. I changed C317 from 3.3 µF to 10 µF which slowed the decay nicely. It was also suggested that the resistor R312 (47 kΩ) be changed; *don't do it!* The values chosen by Heath are critical for the proper bias current for U301 at maximum IF gain (minimum AGC). However, after I changed C317, when keying the rig the S-meter would "pin" at the top end even with low output power. But if I hold the key down, the meter reading would fall to the right level. I traced this to the timing of the voltages on the R12 and T12 (+ 12 on transmit) control busses.

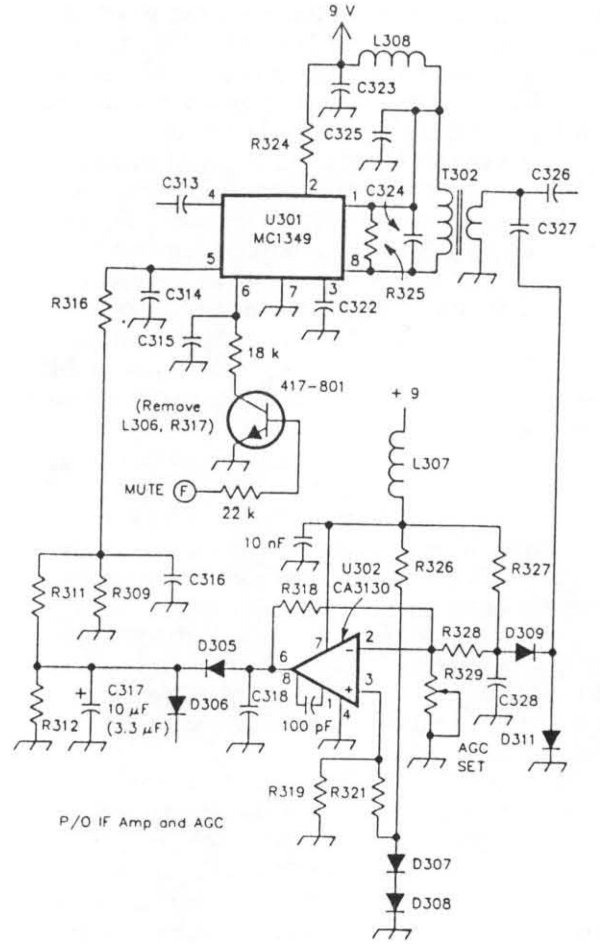


Figure 5: P/O IF amp and AGC

The voltages on the busses were not dropping sufficiently when switching from transmit to receive and vice-versa before the other bus went to full voltage. The overlap would leave the receiver IF on for a millisecond or so during transmit and remained transmitting when the receiver was turned back on. Changing C576 to a 0.01-µF bypass capacitor (it was 3.3 µF) solved the receiver turn-off delay problem. Changing R436 from 1 kΩ to 510Ω solved the transmit turn-off delay problem. Now the meter "reads" correctly even at 35 WPM.

As mentioned above, I could not rely on the output meter to indicate the relative output power of the HW-9. The main difficulty with the output meter was a sudden jump of the meter to near full scale as the output power was increased. Correspondingly, the meter indication would not drop until the output power was nearly zero. The actual output power, as indicated on a watt meter, did not match the output meter's indication. This phenomena occurred mainly on the 80- and 40-meter bands.

The problem was traced to RF energy being amplified by the IF amplifier U301 (Fig 5) and upsetting the AGC. I found that the gain of U301 was not being sufficiently reduced during transmit. Decreasing the resistance of R317 (originally 1.5 megohms) reduced the gain of U301 sufficiently to eliminate the problem but the AGC characteristics would suffer because the AGC bias current from pin 5 of U301 would decrease, decreasing the voltage across C317. The meter would then read well below zero when transmitting with low output power. However, by shorting pin 6 through a resistor to ground during receiver mute (further discussed below), the bias current from pin 5 of U301 would not change significantly and the gain of U301 was reduced sufficiently to eliminate the problem.

I used the transistor that was Q303 (Heath part number 417-801, discussed below in connection with the audio thump suppression modification), removed R317, and replaced L306 with a 22-kΩ resistor. The base of the added transistor goes into the hole where R317 was to connect to the 22-kΩ resistor. An 18-kΩ resistor is soldered into the remaining hole for R317, the unsoldered end connecting to the collector of the added transistor, and the emitter of the transistor soldered to the ground lead of C315. Now the output meter correctly indicates the relative output power of the HW-9 on all bands even though the meter reads slightly less than zero during transmit with no output power. This modification should be made in conjunction with the audio thump suppression modification discussed below.

A small change that will improve the overload capability of the HW-9 receiver is to add an idler to the second mixer U401 during receive. As shown in Fig 6, I added a 51Ω resistor in series with a tank circuit, which resonates at approximately the IF frequency (8.83 MHz), across the primary of T301. The resistor/tank circuit combination has low Q so that the resonate frequency need not be at exactly the IF frequency. The idler, during receive, provides a matched load to the IF port of the mixer U401 at all frequencies except at near the IF frequency. At the IF frequency, the tank circuit resonates and the 51Ω resistor is decoupled. Note that the idler does not couple to the mixer U401 during transmit; steering diodes D301, D302 (not shown) decouple T301, C301, C302, etc, from the mixer during transmit.

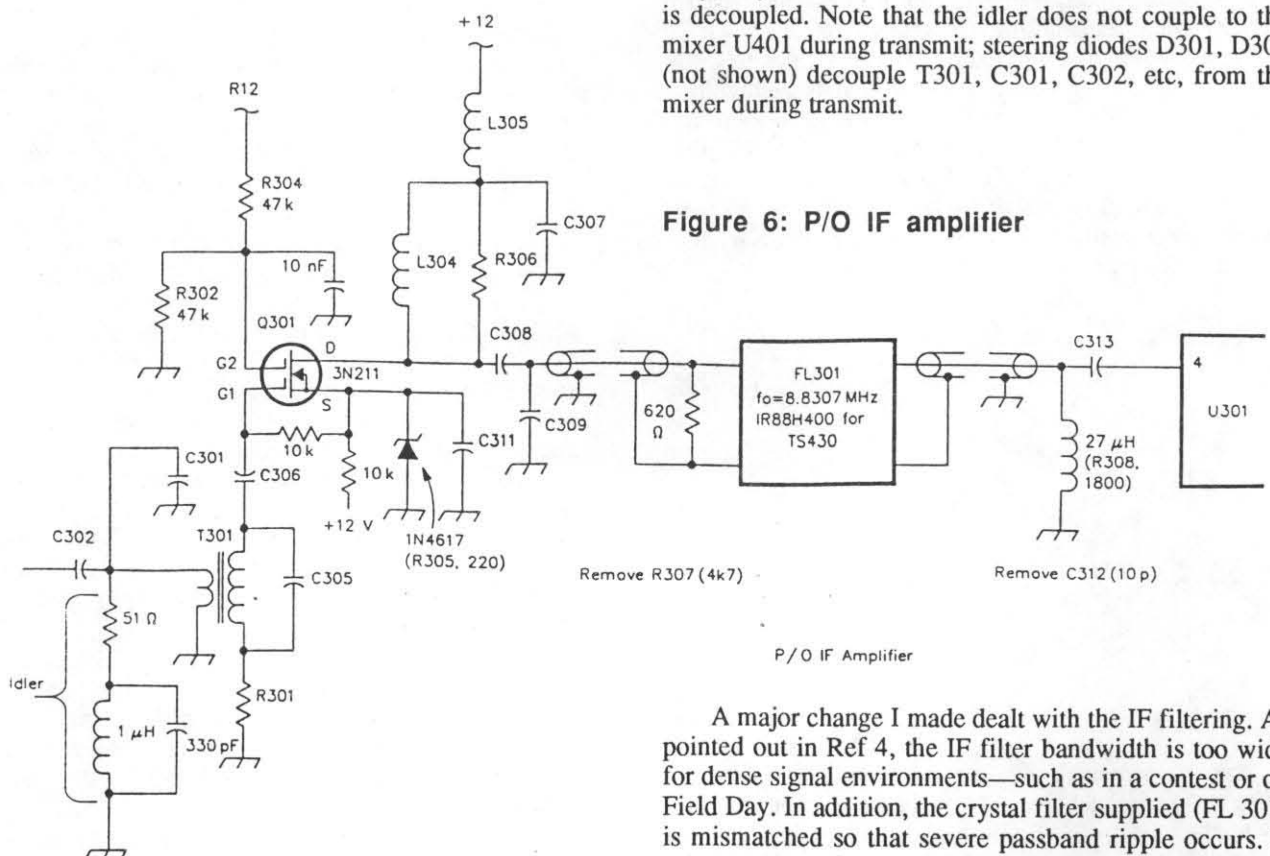


Figure 6: P/O IF amplifier

P/O IF Amplifier

A major change I made dealt with the IF filtering. As pointed out in Ref 4, the IF filter bandwidth is too wide for dense signal environments—such as in a contest or on Field Day. In addition, the crystal filter supplied (FL 301) is mismatched so that severe passband ripple occurs. It was very annoying to have the S-meter vary more than 3 S units when tuning through a steady carrier in the pass band—the signal peaked when the audio note was over 2 kHz! Instead of trying to properly match the existing filter, I decided to replace it with a good (8-pole) crystal CW filter. Fortunately, the Kenwood TS-430 IF frequency is the same as the HW-9's—8.8307 MHz. I bought an International Radio IR88H400 crystal filter, an 8-pole, 400-Hz wide filter. The new filter is designed to be matched with a 600Ω resistive load with a 10-pF shunt on both the input and output thereof.

The new filter arrangement is shown in Fig 6. I removed the old filter and, because the new filter is much larger than the old one, attached a PC board on standoffs to the HW-9 T/R circuit board and mounted the filter on the new PC board. Short pieces of RG-174 couple the new filter to the T/R board. To properly match the output of the new filter, R308 was removed and a miniature inductor (27 μH) was put in its place. The inductor, combined with the input admittance of U301, provided the equivalent of 600Ω/10 pF at 8.83 MHz. The input of the filter is matched with the 620Ω resistor and C309 (10 pF). However, the insertion loss of the new filter is much greater than the old one; the first IF amplifier had to have its gain increased. Q301 was changed to a high transconductance dual gate MOSFET (3N211) and R307 removed. (Note that R306 could be changed to 600Ω and the resistor across the input of the filter removed.

However, I feel that it is easier to do the matching as shown.) L305 (missing from Heath's schematic) is routed to the + 12 line instead of R12. To turn off the first IF amplifier when transmitting, the second gate of Q304 is controlled by R12. To assure that Q304 is completely cut off during transmit (R12 being approximately zero volts), the source of Q304 has a fixed voltage thereon suppled and stabilized by a 10-kQ bias resistor and a 2.7-volt Zener diode, respectively. A visible LED and a silicon diode in series may be used instead of the Zener diode with a lower resistance bias resistor. R301 is no longer necessary but does not require removal.

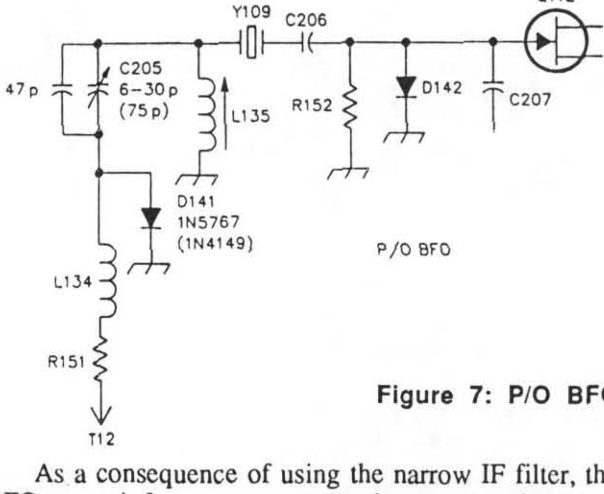


Figure 7: P/O BFO

As a consequence of using the narrow IF filter, the BFO transmit frequency must now be set correctly or you may not be transmitting on the same frequency you are receiving Don't attempt to adjust the transmit return (R131) to compensate; you are compensating the VFO and the "compensation" will be good only for the one VFO frequency you adjust it for. Instead, adding a small trimmer capacitor to the BFO circuit will allow for proper compensation, as shown in Fig 7. I removed C205 and placed a 6-30 pF trimmer in its place and bridged a 47-pF capacitor across the trimmer. I changed D141 from a 1N4149 to a 1N5767 (a pin diode) for better, more stable, control of the BFO frequency.

Next, I drilled another hole in the BFO shield over the trimmer and reassembled the radio. This change means that the alignment of the BFO is now slightly different from the way Heath suggests.

BFO alignment is now as follows: Using a frequency counter, first set the BFO frequency to 8.8314 MHz by adjusting L135. Next, key the HW-9 and adjust the new trimmer (C205) for a frequency of 8.8307 MHz. This gives you the correct 700-Hz shift from receive to transmit.

Another annoyance was the sidetone pitch being lower than the narrow filter center frequency; often I was off frequency and not "zero beat" since I was tuning the receive pitch to the sidetone pitch. Bridging a small resistor (I used a 270 kΩ) across R366 moved the pitch to near 700 Hz.

Ref 2 suggests changing the components in the narrow audio filter. The new narrow filter design works well and implementing the change is strongly recommended. The design is shown in Fig 3 using 1% resistors and metalized film capacitors for more consistent performance. However, I noticed some "fuzziness" when using the new narrow filter. The data sheets on the device (an LM 324) mentions that when the output of the op amp is AC coupled (here, the output of U304C), crossover distortion may result due to insufficient bias current in the output stage thereof. This was causing the fuzziness I was hearing. Adding a 10-kΩ or so resistor from the output of U304C (pin 14) to ground eliminated the distortion.

Another possible "mistake" is in the design of the low-pass filter of U304B. It is not clear to me what filter type it is; the design suggests a second-order multiple feedback low-pass filter arrangement. I took the basic circuit from Heath and changed the component values and the circuit topology slightly to provide the second order characteristic. The new circuit is shown in Fig 8. The resistance values of R348, R349, and R351 have been changed. The capacitance of C338 was not changed but instead of coupling to the junction of R348, R349, and R351, it couples to the inverting input (pin 6) of U304B. A 0.047-μF capacitor is added from the junction of R348, R349, and R351 to ground to achieve the second-order characteristic. The resulting low-pass filter has a cut off frequency of about 1.4 kHz. Note that capacitor C336 should be reversed per Ref 3 and the capacitance thereof increased to 3.3 μF (or more) for better low-frequency response.

In Ref 2 an elaborate design is presented to remove an annoying audio thump when the HW-9 goes from transmit to receive. A much simpler circuit that completely solves this problem is shown in Fig 9. Q303, originally a bipolar transistor, is replaced with an N-channel MOS-FET, such as a BS-170 (Radio Shack 276-2074), with the gate thereof going directly to the mute line and R371, formerly going to the base of Q303, connecting to ground. The thump in the original Heath design results from collector-base junction of Q303 becoming forward biased during transmit. The FET does not have this problem and R371 now acts as a pull-down for the mute line. The thump is now gone. The old Q303 is reused in the IF amplifier disable modification discussed earlier.

Some operators may think that the receive bandwidth using the new, narrower, IF filter is too narrow for just browsing the bands. I feel, however, that the narrower bandwidth is required since the HW-9's narrow audio filter is not sharp enough for our crowded bands and the narrower IF filter avoids AGC pumping from adjacent strong signals. Still, it would be an interesting project to correct the matching to the original Heath crystal filter so that the pass-band ripple is reduced and still have the wider bandwidth when desired.

No reverse power voltage protection is supplied. I inserted an in-line fuse (2 amps) in the red wire coming from the power connector S1 to switch S2. A diode (such as a 1N4001) was bridged from the S2—fuse junction to ground so that the diode would be forward biased upon applying reversed power supply voltage to the HW-9, thus blowing the fuse. If you frequently get the voltages reversed, it may be more practical to mount the fuse in a holder on the rear panel or put it in line with the power cable so that the fuse can be replaced more easily.

I also suggest that you build in a keyer like that mentioned in Ref 2. It makes it much more convenient on backpacking trips if you don't want to bring along your keyer.

Be forewarned that some of these modifications are difficult and tricky; proceed at your own risk. It took over a year and a half to design and complete the modifications described above. It was both fun and frustrating to figure out the problem and solve it—usually the change interacted with other sections of the rig, causing more headaches and changes I think my HW-9 is now more enjoyable to use both for contest operating and ragchewing than the unmodified version. Some of the modifications can be made at any time. A few of the changes, such as the power amplifier changes and the AGC bypass capacitor and compensation capacitor additions, should be made at the earliest convenience.

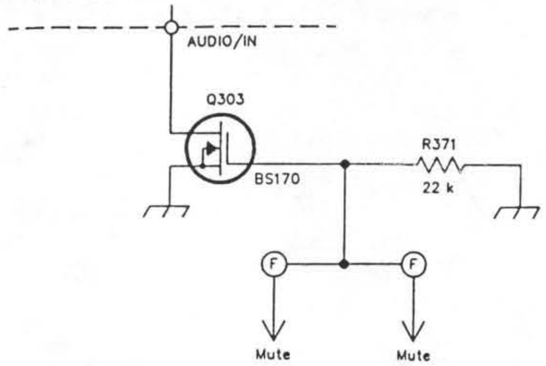
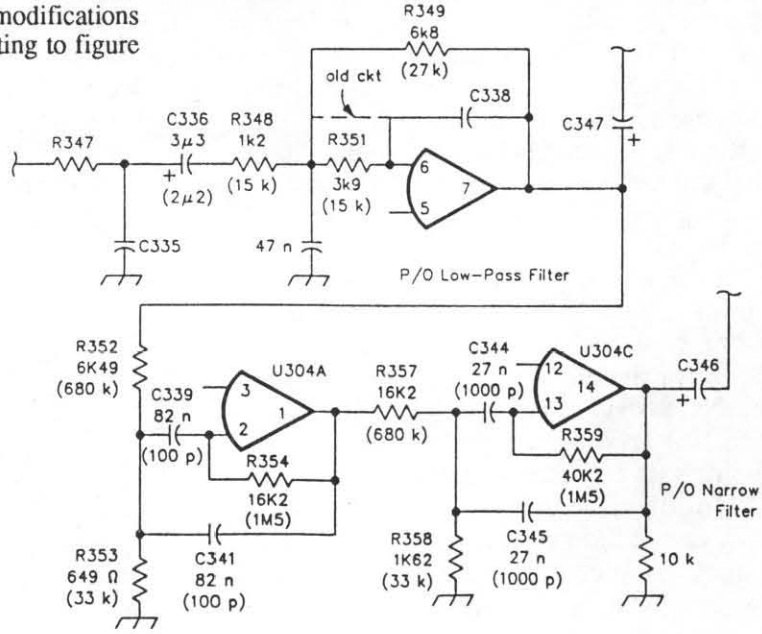


Figure 9: New audio mute control

References

1. "Helping and Hopping the HW-9" by Staudt, 73 *Magazine,* February 1988, pp 50 & 52.
2. "Improving the HW-9 Transceiver" by Hutchinson and Lau, *QST,* April 1988, pp 26-29.
3. QRP Column by Bryce, 73 *Magazine,* February 1989, p 86.
4. Hints and Kinks column by Newkirk, *QST,* June 1990, pp 40-41.

Figure 8: P/O narrow audio filter



HW-9, ONCE MORE

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One of the joys of my 50 years of ham experience has been building the HW-7, 8, and 9 QRP transceivers. Needless to say, I have agonized over the various problems encountered. Figuring by now I was expert, I started my third HW-9 kit intending to avoid the earlier pitfalls and build in some of the mods fellow QRPers have described.

KH6CP/1's anti-thump and SWR sensor worked well, and WN2Q's illuminated dial made a dramatic improvement. I included a Small Parts Center Calibrator which provides 10 kHz markers throughout the range. The substitution of a 2N4401 at Q402 provided trouble free transmitter output at the higher frequencies. Dial rotation was smooth, with no binding, which caused me to wonder why earlier efforts were so much trouble.

VFO drift was one problem I had hoped that a 2N4416 and polystyrene capacitors would solve. Unfortunately, I still experienced the characteristic HW-9 drift and have since reinstalled the stock transistor and capacitors.

One problem I encountered while recording VFO drift was an occasional overnight jump of 10 KHZ of dial calibration. I concluded the problem originated from the way C1 was mounted; a small bracket from C1's frame to the shield made C1 physically secure and the problem was eliminated. I had earlier grounded the C1 shield to the audio control ground lug.

Interestingly, the drift is now relatively slight and I added a small variable across Cl for dial reset. It's mounted midway between the dial and the meter. I cut off a small length of the Heath nutstarter for a knob, which matches the red-handled mini toggle switches I mounted on a polished brass plate beneath the logo. These switches control the audio filter, calibrator, and the meter NORMAL/SWR and FORWARD/REVERSE. This arrangement and the illuminated dial really dress up an otherwise drab panel.

I also followed N3CDR's suggestion to check the BFO injection voltage, and found it OK with the stock components installed. W1HUE's suggestion to check receive/transmit offset also paid off, as mine was about 550 kHz.

Inevitably I scratched the panel and cabinet. I found that KIWI Scuff Magic Shoe polish applied to the scratch area and rubbed in with my finger gradually filled in the scratch to where it was not noticeable.

After all the above, I expected a perfectly performing rig. I was disappointed, and I call this several weeks long phase the "Taming of the Shrew." The problem was motorboating on 80 and 40 meters, with a high pitched howl on the rest of the HF bands, except for normal operation on 20 and 30 meters. The problem was prevalent on both transmit and receive; after a minute or two, it disappeared.

I still hadn't resolved it after checking voltages, replacing components including transistors, and sprinkling ferrite and bypass capacitors in the circuits. It seemed to originate in the HFO/first mixer area, and I found that detuning the HFO coils reduced or eliminated the feedback, but resulted in erratic operation.

Heath was cooperative but unable to suggest an effective solution. Finally, I aligned the HFO coils by peaking them against the corresponding crystal frequencies using a counter at TP103. This solved most of the problem, except for a slight remnant on 15 meters which lasts a minute or so and disappears. Obviously there still is a problem, and I may be too close to the woods to see the trees. If any of you have any suggestions for a cure, I surely would appreciate them. Meanwhile, I'll keep trying.

Otherwise, the HW-9 meets specifications. No more HW-9s! Maybe an HW-10, if one comes along. QRP

HW-8 Handbook Ready

The HW-8 Handbook by Mike Bryce WB9VGE is off the presses. Copies will be available at the Dayton Hamvention and Dallas Hamcom. The book is 56 pages and is a collection of modifications for Heathkit's HW-7, HW-8 and HW-9. Write to Mike at 225 Mayflower NW, Massillon, Ohio 44647.

BOOK REVIEW

W1FB'S DESIGN NOTEBOOK

Michael Czuhajewski, WA8MCQ
7945 Citadel Drive
Severn, MD 21144

When I first saw the ad for W1FB's Design Notebook I drooled all over the page. I waited two agonizing months before Maryland Radio Center got their first shipment, but in the meantime WB9TBU told me she'd received a review copy from ARRL.

She promised to send it to me, saying it should be done by a more technically inclined person than her. MRC finally got the book, and QRPers kept buying it and waving it under my nose, saying how good it looked, but I tried to remain strong—I had a free copy coming!

More agonizing months—it eventually came, after getting lost in the cracks at Paula's a few times, followed by being returned by UPS as undeliverable, but by then I had long since cracked under the strain and compromised my manhood by buying a copy.

This is an almost completely unbiased review. I paid for my copy and gave the free one to a local QRPer. However, it does have the DeMaw name on the cover, which by itself is automatically good for a couple points of positive bias.

For those of you who are relative newcomers and not too familiar with him, Doug has been around the pages of QST for about 25 years now, with the call W1CER at first, always with an emphasis on QRP, homebrewing and experimenting. While he has extensive technical knowledge, he writes mostly for the average ham. He also writes a regular column in Monitoring Times. Some authors may boast of writing hundreds of articles, I haven't counted all of his, but in Doug's case that would probably be literally true. Between January 1976 and December 1987, for example, he had 159 articles in QST—a bit over one per issue.

It occurred to me that the title is very good—calling it a Design Notebook rather than QRP Notebook It would appeal to a broader range of people, although in a way it's still a QRP book in disguise. (Yes, there really are folks out there who won't touch anything that says QRP on it—I've seen lots of them.)

Actually, many QRPers are homebrewers and experimenters, and many homebrewers are QRP-ers—what we have here are two different interest groups which overlap each other, and the Design Notebook is of great interest and value to both.

This is a good, practical book, aimed at the average ham rather than the engineering type, and is generally similar to his QRP Notebook. There is a lot of good information on transistors, diodes and ICs, as well as construction practices. Some chapters have glossaries at the end, which is helpful. There are a lot of good, practical circuits—IF, RF and audio amplifiers, VFOs, mixers, direct conversion and superhet receivers, transmitters and power amplifiers. He goes into a lot of design philosophy at an easy to understand level, telling us what to do and, even more important, points out some of the pitfalls.

Doug presents a lot of good basic information. Many of you probably know much of what he says here, but it's always good to keep an eye on the basics no matter how far we advance. Even if you've heard it all before, it's good review material and I find that I always learn something new or relearn something I'd forgotten about—in this book, that was the case with several chapters.

There are many good tips in the section on construction practices. Some of us might turn up our noses at some of his homemade parts, since we live in major metropolitan areas with electronics and ham stores on every corner and several hamfests a year, with spouses constantly yelling about the clutter of parts in the house. We tend to forget about the folks who live far away from that sort of environment, who have to drive 90 miles to a Radio Shack and 250 miles to the closest hamfest, and have to survive by mail order and improvising. Doug keeps the true experimenters spirit alive; he gives good concrete examples of innovating, and helps get you in the right frame of mind to try some of your own. (I even picked up a good tip here that will come in very handy in a future project. Having all those stores and hamfests nearby doesn't do much good when you're too lazy and/or cheap to go buy certain parts!

Since this is supposed to be an unbiased review, here are a few negative comments, all minor, some nitpicking. I don't want to give the wrong impression by including these; the book as a whole is excellent, and these do not in any way detract from the overall worth. It's just that I'm "tainted" by having accepted a free copy, even though I paid for one first, and need to redeem myself.

The cover has a very interesting circuit board. Don't bother looking for it inside, though. I used a fine-toothed comb and couldn't find any reference to it. The circuit is nowhere to be found. (I'd blame the publisher for this one rather than the author. They also did that on the cover of QRP Classics; the rig there with a crystal and four phono sockets does not appear inside; it's the Sardine Sender by W1FB, from the October 1978 issue of QST.

Next, on page 99, Resistive Attenuator Pads, the table gives values of resistors. Although it doesn't say so, these are the values required for precise, highly accurate results. It could have been mentioned that the nearest standard value resistors could be used with generally acceptable results for amateur use. That's what was done in Solid State Design, where they gave 5% resistor values. (SSD also gave the formulas to calculate the precise values for each attenuator; applying that formula results in the values shown in the Design Notebook.) For even more accuracy, standard resistors of a given marked value could be selected with a good quality meter to select those closest to the actual values needed. The table in the W1FB book implies that a high degree of precision is required in component selection for these attenuators, with little room for error, and this seems a bit out of keeping with the overall experimenter's tone of the book.

Page 128 refers to two receiver circuits that appear in Solid State Design (and originally in QST). Someone trying to cross reference them might have a bit of difficulty since they are not mentioned in the SSD index; even worse, the name of the W1FB design, "His Eminence, the receiver", does not appear anywhere in the SSD description of it. Only someone familiar with the original articles could easily find them there. ("His Eminence" also appears in QRP Classics.)

One of the more annoying things was Figure 5-19 on page 135, a PCB pattern for an audio filter. Puzzles are fine in the comic pages of the daily paper but not in a technical book. No parts placement diagram is given; the caption says that none was available at the time the book was written. They did identify pin 1 on both ICs as well as some connections going off the board, so it could be done with some trial and error. Also, the diagram is done with black and white reversed from the normal style, with the copper traces represented by white. This means that you cannot reproduce this board by using the popular iron-on TEC-200 etch resist transfer film from Meadowlake Corp. (which was mentioned back on page 88). If you tried that, you'd end up etching away the conductors and leaving copper where it's supposed to be removed—in effect a negative PCB. In all fairness, the few other PCB patterns in the book are easily duplicated. (While the SWR/power meter of figure 6-18 cannot be duplicated with TEC 200 film, due to the parts overlay, it is simple and easily layed out by hand.)

There were actually more comments, but not too many folks aside from the publisher would care that the caption of figure 3-17 incorrectly identified Siliconix as the manufacturer of the NE602 (the text correctly says Signetics), or that two different diagrams are labelled as Fig. 3-18.

At this point I feel I've done sufficient penance to clear my good name of the cloud hanging over me due to accepting a free copy of the book. (Remember, I paid for the first one I got and gave the free one away.) The QRP ARCI may never again get a free review copy of anything, but my conscience is clear!

Now that we've got that out of the way, back to the positive aspects. The appendix at the rear contains reprints of three good QST articles on homebrew crystal filters, which deserve wider publicity in the homebrew community. They are "A Unified Approach to the Design of Crystal Ladder Filters" by W7ZOI from the May 1982 issue; "Designing and Building Simple Crystal Filters", W7ZOI, July 1987; and "A Tester for Crystal F, Q and R" by W1FB in January 1990. The first two go into the design of filters, while the third gives an improved version of the tester featured in the first. These three are required reading for anyone interested in the subject, and including them was a good move.

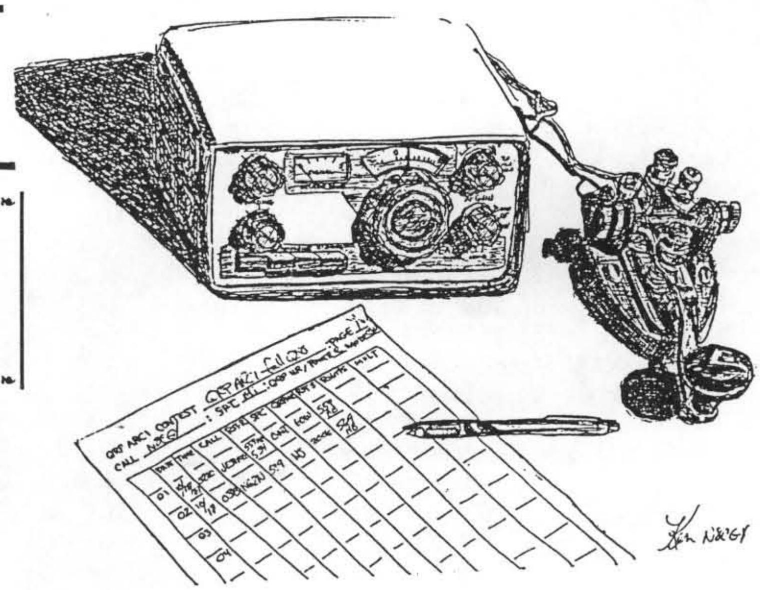
Overall rating of the book? Excellent. Easy to read and understand, good practical design information and circuits for the ordinary ham without an EE degree. Faults—not worth mentioning unless you're writing a critical review and feel obligated to find SOMETHING to retain your credibility. While some circuits and information are similar to those in QRP Notebook, Solid State Design, QRP Classics, etc., I'd still definitely recommend buying this book, even if you have all of those. If you don't have the others, eat beans for a week, skip your lottery tickets or take the bus to work for a while to get the $10 plus postage (or tax) and buy the book—you'll be glad you did. QRP

QRP ARCI AWARDS SUMMARY - AUGUST-DECEMBER 1990

CALL	DATE	BASIC	NOTES	PWR	MODE	BAND
			-DXCC-			
N0JR	8/23/90	105C		5.0	MIX	MIX
KA3CRC	8/23/90	106C	ONE MODE	5.0	CW	MIX
N0JR	12/30/90	105C	200 SEAL	5.0	MIX	MIX
			-WAS-			
KA1RIF	8/23/90	300C	20 STATES	5.0	CW	MIX
KD4EO	12/29/90	301C	50 STATES	5.0	MIX	MIX
			-QRP-25-			
N3FYW	10/14/90	1016	100 SEAL			
NN1G	12/30/90	1019	50, 100 & 200 SEALS			
WJ7H	12/30/90	1000	100 SEAL			
K1GDH	12/30/90	1020				
K2QJ	12/30/90	1011	100 SEAL			
N1CUU	12/30/90	1021	WITH 50 & 100 SEALS			
			-1000 MILE / WATT-			
W6TKV	10/14/90	1199	FT4ZE (QRO) 1566M/W	4.0	SSB#250	14#316
GW0DNR	10/14/90	1200	VS6DL (QRO) 1204M/W	5.0	CW#868	28#154
PY5VX	10/15/90	1201	BY1QH (QRO) 3710M/W	3.0	CW#869	14#317
I3MDU	10/15/90	1202	ZS6KT (QRO) 1691M/W	3.0	CW#870	28#155
I3MDU	10/15/90	1203	KZ1L (2X-QRP) 1318M/W	3.0	CW#871	14#318
KH6CP/1	12/2/90	1204	K1LPS (2X-QRP) 4700M/W	.01	FM#6	10K#2
GM4UYE	12/2/90	1205	VS6DT (QRO) 1974M/W	3.0	CW#872	21#385
GW4ITO	12/2/90	1206	QRO (WB3JJK-QRP) 3363M/W	1.0	CW#873	14#319
KI5AY	12/2/90	1207	PY7LY (QRO) 7096M/W	0.7	CW#874	14#320
NN1G	12/2/90	1208	K3TKS (2X-QRP) 4186M/W	.07	CW#875	3.5#40
KX5X	12/30/90	1209	EA2CAK (QRO) 2043M/W	2.0	CW#876	21#386
KF6TE	12/31/90	1210	W1WSE (QRO) 1283M/W	2.0	CW#877	14#321
G0NAT	12/31/90	1211	W6EVQ (QRO) 10420M/W	0.5	CW#878	28#156
K2YOF	12/31/90	1212	GM0EWX (QRO) 1039M/W	3.0	SSB#251	50#49
			-WAC-			
VS6DL	12/30/90	488C		5.0	CW	MIX
WB8IOA	12/30/90	489C		2.0	CW	MIX

Contests

Red Reynolds, K5VOL
835 Surryse
Lake Zurich, Illinois 60047



UPCOMING CONTESTS

Spring QSO Party (CW)	April 13, 1200Z to April 14, 2400Z
Hootowl Sprint (CW)	May 26, 2000-2400 local time
Milliwatt Field Day	June 22, 1800Z to June 23, 1800Z
Summer Homebrew Sprint	July 14, 2000-2400Z

1990 HOLIDAY SPIRITS HOMEBREW SPRINT

TOP THREE			SINGLE BAND		
1	W1KKF	35,226	40 M	W1KKF	35,226
2	WB9BBC	7,268	20 M	WB9BBC	7,268
3	WK9C	6,900			

ALL-HOMEBREW

CALL	SPC	SCORE/POINTS/SPC	POWER	BANDS /TIME	RIG	ANTENNA
W1KKF	CT	35,226/ 127/ 17	3.0 S	40M/3	W7EL/m	G5RV/Vertical
WB9BBC	WI	7,268/ 36/ 7	3.8	20M/1	HB XCVR (S)	---
WK9C	IL	6,900/ 19/ 5	.75 S	40M/1	HB XCVR	Folded Dipole
K5VOL	IL	5,510/ 17/ 2	.70 B	40M/1	HB DC RX/TX	Longwire

Time of operation rounded to nearest hour B = Battery power HB = Homebrew
S = Solar/natural power (S) = Superhet /m = Modified (SPC) = States/Provinces/Countries

FALL 1990 - QRP ARCI CONTEST

TOP TEN		
1	AA2U	3,761,100
2	WIXE	3,484,880
3	W3TS	2,303,400
4	WØMHS	2,097,000
5	WAØZPT	1,937,319
6	N9AW	1,894,063
7	N4BP	1,786,323
8	KH6CP/1	1,630,780
9	K3TKS	1,573,560
10	W5TTE	1,339,840

SINGLE BAND		
80 M	KA1TQM	5,796
40 M	W8MVN	259,016
20 M	NZ8J	251,620
15 M	KF7MD	312,710
10 M	WD7I	275,760

HI/LO BAND		
HI-B	W5TTE	1,339,840
LO-B	KN1H	156,440

CALL	Score/Points/SPC	Power	Bands /Time	Rig	Antenna
ALABAMA					
N4OHB	14,994/ 84/ 17	2.5 B	A-2/ 2	HW-8	Dipole
ALASKA					
K4FS	4,620/ 66/ 10	5.0	15M/ 2	Argosy	Vertical w/810' Ship GP
ARIZONA					
WD7I	275,760/ 383/ 36	1.0 S	10M/20	IC-725	Loop/Vertical
CALIFORNIA					
AJ6T	170,912/ 436/ 56	5.0	H-3/ 5		
W6SKQ	155,498/ 383/ 58	2.0	H-3/ 6	Argo 515	Yagi
K1EQA/6	155,452/ 329/ 45	2.0 B	H-3/ 7	Argo 509	Vertical
W6MVW	146,832/ 368/ 57	5.0	A-4/ 7	TS-440S	Gp/Vee/Zepp
K6QWH	21,280/ 160/ 19	2.5	H-2/ 3	Argo 509	Spider
COLORADO					
W1XE	3,484,880/1778/140	4.0 S	A-5/24	IC-740	Yagi/Vert/InvV
NXØQ	1,152,024/ 846/ 96	5.0 S	H-3/18	HW-8/m	Yagi/Vertical
WDØFQK	416,752/ 488/ 61	5.0 S	A-5/24	Argo 509	Yagi/Vertical
NØIBT	84,952/ 296/ 41	5.0	A-4/10	TS-830S	Dipole
KIØG	32,820/ 107/ 13	.80 S	20M/ 6	TWO-FER	Yagi/G5RV
CONNECTICUT					
KH6CP/1	1,630,780/1135/102	4.0 S	A-6/24	HB/Argo 515	Loop/Dp/Vertical
NN1G	720,447/ 749/ 91	4.0 B	A-6/--	TS-130SE	Windom
KA5GIS	234,750/ 313/ 50	.50 B	A-5/ 5	Argo 509	Quad/Dipole
W1KKF	62,120/ 204/ 20	3.0 S	40M/ 3	HB W7EL/m	G5RV/Vertical
KA1TQM	5,796/ 69/ 8	5.0 B	80M/ 2	HW-9	G5RV
FLORIDA					
N4BP	1,786,323/1406/121	5.0 B	A-5/24	TS-130V	Vertical Yagi (Half TH6-DXX)
K4KJP	546,000/ 520/ 75	5.0 S	A-5/15	HTX-100/509	Yagi/Dipole
WN2V	306,152/ 616/ 71	3.0	A-4/--	Argosy-2	Zepp/Vertical
W4FRL	184,800/ 660/ 40	5.0	20M/13	HW-8	Vertical
KE8P/4	62,832/ 187/ 32	4.0 B	A-4/ 4	Argo 509	G5RV
GEORGIA					
WØMHS	2,097,000/1165/120	1.0 B	A-5/20	KWD 430	Loop
KB4GID	484,848/ 592/ 78	5.0 B	A-5/15	Argo 509	Dp/Bug Catcher
ILLINOIS					
W9LNQ	1,047,785/1073/ 93	3.5 B	A-3/14	Argo 505	Yagi/Zepp
*K5VOL	388,080/ 660/ 84	2.0	A-5/12	Argo 509	Longwire/Gp
NN9K	367,290/ 538/ 60	4.0 B	H-3/20	Argo 509	Yagi
NF9X	303,555/ 413/ 49	.80 B	H-3/15	TS-130V	Vertical
WD9IWP	201,600/ 240/ 42	.90 S	A-5/ 7	IC-735	Inv Vee/Vertical
K9MOV	122,378/ 259/ 45	2.0 B	A-3/16	HW-8	Zepp/Vertical
NG9E	72,135/ 29 / 30	2.0 B	H-3/ 5	Argo 509	Yagi
ND9X	48,563/ 185/ 25	2.0 B	20M/ 9	HW-8	Dipole
K9PNG	26,243/ 163/ 23	5.0	A-3/ 2	Argo 515	Longwire
W9CUN	5,313/ 69/ 11	4.0	40M/ 1	TT Delta	---
INDIANA					
WD9CBT	560,724/ 676/ 79	2.0 B	A-4/14	HW-8	Dipole/Vertical
KA9JKK	481,080/ 633/ 76	.90	A-5/18	Argosy	Mini Quad/Loop
N9IFH	377,736/ 512/ 52	5.0 S	A-3/ 4	HB XCVR(40)/ Argosy	Loop
IOWA					
NNØF	216,600/ 380/ 57	1.0	A-5/ 5	TS-120S	Dipole
MAINE					
WA1WPR	49,938/ 164/ 29	5.0 B	A-3/--	HW-9	Longwire
KA1UEH/AG	24,255/ 110/ 21	5.0 B	A-3/--	HW-9	Longwire

MARYLAND					
K3TKS	1,573,560/ 846/ 93	.90 S	A-5/21	Argo 509	Loop/Vertical
KB3HH	1,082,240/ 608/ 89	.90 S	A-5/10	TT-540	Yagi/Zepp
KX3U	463,239/ 817/ 81	4.5	A-4/13	TS-140S	Dipole/Vertical
KC3MX	279,720/ 555/ 72	5.0	A-4/12	TS-680S	Dipoles
K3NCO	158,025/ 301/ 50	5.0 B	A-5/ 3		
KA3PMK	100,232/ 333/ 43	4.0	A-4/ 6	Century-22	Attic Dipole
WA3GYW	46,777/ 165/ 27	2.0 B	A-4/ 3	HW-8	Dipole
NA3Q	46,144/ 206/ 32	4.0	A-3/10	HW-8	Inverted Vee
K3AA	33,698/ 166/ 29	2.0	A-5/ 5	HW-8	—
WD3A	4,774/ 62/ 11	5.0	A-2/ 2		
MASSACHUSETTS					
WB1IGJ	543,288/ 681/ 75	5.0 B	A-5/24	HB Tx/Rx/515	Dp/Gem Quad
NJ1T	430,430/ 715/ 86	4.0	A-5/18	HW-9	Yagi/Dp/Inv V
N1BYT	62,800/ 170/ 17	1.0 S	40M/ 7	HB XCVR(S)	Loop
MICHIGAN					
N8CQA	213,620/ 638/ 70	4.0	A-6/13	TX4C/R4C	End Feed Wire
K8DD	73,010/ 254/ 45	5.0	A-6/ 3	TS-830S	Yagi/Dipole
K8CV	50,747/ 179/ 27	5.0 B	A-3/ 3	Argo 515	Yagi/Windom
KW8B	12,978/ 103/ 18	5.0	A-2/ 4	TS-440S	Inv Vee/Vert
MINNESOTA					
KBØR	286,076/ 601/ 68	5.0	A-4/ 8	FT-107	Dipole
WØNGB	209,925/ 311/ 45	.90 B	H-3/ 9	TS-440S	Yagi
KØUBA	20,720/ 148/ 20	1.5	15M/ 4	Argo 509	Vertical
WFØV	4,543/ 59/ 11	4.0	10M/ 2		
MISSOURI					
WØAV	379,680/ 678/ 80	4.0	A-5/12	TS-940	Sloper
NØIZZ	46,200/ 220/ 30	5.0	A-4/ 5	TS-520	Zepp
WØJRP	3,421/ 29/ 7	5.0	40M/ 1	HB 6AG7/DX-400	—
MONTANA					
WAØRPI/7	274,680/ 436/ 60	4.0 B	A-4/ 7	HW-9 Dipole	
NEW HAMPSHIRE					
N1CUU	685,400/ 800/ 81	5.0 B	A-5/24	2-FER XCVR(40)/ HW-9	G5RV/Butterfly
KN1H	156,440/ 272/ 26	.90 S	L-3/ 9	HB XCVR/RX/TX	Dipole
NO1E	6,370/70/ 13	5.0	A-4/ 1	FT-707	Vertical
NEW JERSEY					
AA2U	3,761,100/1393/135	.95 S	A-5/24	IC-730	Yagi/Loop/Dp
K2QJ	527,394/ 866/ 87	5.0	A-4/16	TS-930S	Yagi/G5RV/Vert
K2HPV	72,520/ 259/ 40	5.0	A-5/ 4	IC-725	Yagi/Dipole
W2JEK	55,429/ 126/ 23	4.0 B	A-5/ 4	2-FER	DP/Hertz/Gp
NEW MEXICO					
W5TTE	1,339,840/ 848/ 79	.90 S	H-3/22	Argo 509	Delta Loop
KN5S	5,560/ 20/ 4	5.0	80M/ 1	HB XCVR	Vert
NEW YORK					
WB2QAP	977,445/ 749/ 87	.90 B	A-5/18	Argo 509	Yagi/Inv Vee
W2UYQ	623,530/ 562/ 71	.75 B	A-5/ 8	HB XCVR (S)	Yagi/Loop
W2QYA	459,315/ 519/ 59	.90 B	A-4/21	HW-8	Longwire
W2PFS	356,279/ 661/ 77	5.0	A-5/12	TS-130V	Loop
K2LGJ	183,910/ 347/ 53	.90	A-5/ 8	HW-9	Yagi/Vertical
AA2Y	138,726/ 367/ 24	5.0	A-5/ 5	Argosy 525	Yagi/Inv Vee
WN2Q	49,280/ 176/ 40	4.0	H-3/ 6	HW-9	Attic Loop
WB2UJS	42,779/ 257/ 21	3.0	40M/10	HB XCVR	—
KD2IX	38,304/ 228/ 24	2.0	15M/12	NCG-15M	Dipole
NI2R	33,106/ 231/ 18	4.5	L-2/ 7	HB 6AQ5	—
W2FB	28,896/ 172/ 24	4.0	A-3/ 2	HW-9	Yagi/Zepp/Vert
WA2TVUX	20,633/ 131/ 15	4.0 B	10M/ 3		

NORTH CAROLINA					
K8NQQ	239,659/ 511/ 67	5.0	A-4/ 9	Argo 515,509	Dipole/Vert(M)
OHIO					
NC8X	702,228/ 673/ 74	5.0 S	A-4/15	2-FER(40)/HW-9/ Progressive RX	Loop
NN8B	541,500/ 475/ 57	.90 S	A-4/12	Argosy	Yagi/G5RV
W8MVN	259,016/ 504/ 36	2.0 S	40M/13	HB XCVR	Loop
NZ8J	251,620/ 547/ 46	.90	20M/16	TS-440S/AT	Yagi
KF8FF	68,376/ 264/ 37	2.0	A-4/ 7	Hw-9	Yagi/Dipole
K8UPR	21,756/ 148/ 7	4.0	A-2/ 4	Hw-9	Vertical
OKLAHOMA					
WD5GLO	452,219/ 582/ 74	3.0 B	A-4/ 8	Argo 509	Yagi/Inv Vee
K5DP	2,583/ 41/ 9	2.0	H-3/ 1	HW-9	Longwire
OREGON					
WX7R	345,303/ 522/ 63	4.0 B	A-5/12	IC-735	V Beam/Quad
WA7VTD	64,050/ 183/ 35	1.0	H-3/--	HW-9/Argo 509	---
WAØDIM	9,300/ 62/ 15	1.0	H-2/--	HW-9	---
NO7V	9,240/66/ 14	1.0	A-4/--	Argo 509	---
PENNSYLVANIA					
W3TS	2,303,400/1060/107	.90 S	A-7/13	HB XCVR(S)	Yagi/Tee/Vee
K7HYA	232,440/ 298/ 39	.90 S	A-4/14	HW-9	Yagi/Windom
WC3G	39,750/ 159/ 25	1.0	A-5/ 5	TS-430S	Yagi/Dipole
KA3K	29,750/ 170/ 25	3.0	H-2/ 4	TR-7	Quad
SOUTH DAKOTA					
WAØZPT	1,937,319/1453/126	4.0 B	A-5/24	Argosy-2/m	G5RV/Loop/Vert
TENNESSEE					
KV4B	378,000/ 450/ 56	.90 B	A-4/ 6	IC-745	Yagi/Inv Vee
WM4U	105,350/ 350/ 43	4.0	A-3/ 5	IC-735	Yagi/Dipole
TEXAS					
WG5G	1,323,504/1212/104	4.5 B	H-3/22	TS-130V	Gem Quad
NK5V	92,550/ 235/ 33	.75	H-3/10	SB-104/m	Random Wire
WA5ABR	14,763/ 111/ 19	5.0	H-2/ 3		
UTAH					
K6XO	175,161/ 439/ 57	5.0	A-5/ 6		
WJ7H	109,305/ 347/ 45	5.0	A-4/ 7	TS-440S/AT	Yagi/G5RV
VIRGINIA					
K4JM	456,596/ 709/ 92	5.0	A-5/ 8	---	Longwire/Dp
W4XD	412,538/ 746/ 79	5.0	A-5/12	Astro 103	G5RV
N3DS	97,816/ 472/ 29	2.3	40M/12	HB 12BY7/SB-301	Wire Yagi/Loop
AA4ZS	4,200/ 60/ 10	5.0	40M/ 1	IC-745	Vertical
WASHINGTON					
KF7MD	312,710/ 526/ 39	1.0 B	15M/15	HB XCVR	Log Periodic/Loop
W7HQO	48,314/ 238/ 41	5.0	A-3/ 6	HW-9	---
WEST VIRGINIA					
N9GPF/8	120,743/ 367/ 47	5.0	H-3/20	Argo 509	Inverted Vee
WISCONSIN					
N9AW	1,894,063/1377/131	5.0 B	A-5/18	Argo 515	Yagi/Vertical
WA9TZE	512,474/ 561/ 87	5.0 B	A-5/ 7	Argo 509	Yagi/Sloper
AE9K	258,825/ 425/ 58	5.0 B	A-3/ 9	TS-430S	Inv Vee/Vertical
WA9PWP	174,575/ 425/ 38	3.0 B	20M/11	RADIOKIT QRP-20	Yagi
N9FVN	106,743/ 299/ 34	5.0 B	40M/ 6	Argosy	Extend Zepp
K9BED	66.640/ 272/ 35	5.0	H-3/ 9	TS-520	Alpha/Delta
WN9U	57,960/ 207/ 28	.80	20M/ 4	HW-9	Inverted Vee
KA9VDU	8,946/ 71/ 12	2.0 B	40M/ 1	HW-8	Dipole
BRITISH COLUMBIA					
VE7EQA	9,016/ 92/ 14	5.0	20M/ 2	TS-530S	Quad
N.B.					
VE1MQ	19,656/ 108/ 26	5.0	H-3/ 2	FT-102	Yagi

ONTARIO					
VE3KK	185,024/ 413/ 64	4.0	A-5/ --	–	–
VE3SIF	17,745/ 130/ 13	3.0 B	40M/ 8	HW-7	Dipole
QUEBEC					
VE2BLX	59,598/ 258/ 33	4.0	A-5/12	IC-735	Longwire
VE2ABO	42,042/ 143/ 28	3.0 B	A-4/ 5	HW-9	Yagi/Dp/Loop
BRAZIL					
PY7FNE	19,290/ 130/ 19	4.0	H-2/ 3	HB 2 tube TX/FT-200	---
PY4ZO	6,420/ 34/ 6	5.0	15M/ 1	HB XCVR	Rot Dipole
SRI LANKA					
TI2QRP/4S7	6,545/ 85/ 11	5.0	H-3/ 2	YAESU 767G	Quad
TI2QRP/4S7 & 4S7RR					

CHECK LOGS: W5QJM, GØ/WB9TBU, KF7MD (40,20), N9IYI

Time of operation rounded to nearest hour — B = Battery power — S = Solar / natural power
/m = Modified — HB = Homebrew — (S) = Superhet — (Lw) = Longwire
(Dp) = Dipole — (Gp) = Ground Plane — (H-) = High Bands (20-6) — (L -) = Low Bands (160-40)
(A-) = All Bands (160-6) — (M) = Mobile — (SPC) = States/Provinces/Countr i es

TEAM COMPETITION

East Coast Milliwatts (KH6CP/1, W3TS, K3TKS, KN1H)	5,264,180
Team Wisconsin (N9AW, AE9K, K9BED, WA9TZE)	2,732,002
BRASS QRP Team (NA3Q, KA3PMK, K3AA, WD3A, KX3U)	648,088
HAH QRP CW Team (WD9IWP, K9PNG, K5VOL)	615,923
P (squared) QRP Contesters (NN9K, N9FVN)	474,290
Oregon QRP Team (NØ7V, WAØDIM, WA7VTD)	82,590
4S7 QRP Team (TI2QRP/4S7, 4S7RR)	6,545

CONTEST COMMENTS:

✔ Had two soccer games Saturday and a hamfest Sunday...kids cut 80-40 feedline Friday night mowing the lawn- W3TS; ✔40 meters was an absolute mad house- K7HYA; ✔A nice contest. I enjoyed it- WC3G (ex-KC3KJ); ✔ Great contest- ND9X; ✔ Had a ball- VE1MQ; ✔ Lots of fun- WN9U; ✔ Enjoyed battling QRM- K2HPV (WHAT?- VOL); ✔ Ten meters was best ever, booming QRP- WD7I; ✔ Enjoyed the comaraderie and politeness, not like the big DX pileups!- NNØF; ✔ Always fun QRPing- K8CV; ✔ A pleasant change from the QRO-type contests- N1BYT; ✔ It's great what 5 watts can do to a fair antenna system- WA9TZE; ✔ Had to bring along on a hunting trip to Montana - worked out well- WAØRPI/7; ✔ Knocked off state #49, but where is Delaware?- WM4U; ✔ Big thrill to work WB8YQJ in California with his 40 MILLIWATTS- N9AW; ✔ With my good (CW and writing) arm constrained in a shoulder brace, my left-handed CW could have been better- KW8B ✔ Operating QRP is a humbling experience- N4BP; ✔ Condx so good at times I thought I died and went to QRP heaven!- WX7R; ✔ Really enjoyed my first QRP ARCI contest! Upgrades the morning of the contest - didn't waste time using the new privileges. Had QSO's with 6 new states!- KA1UEH/AG

New High Score Record Setters
AA2U - All Band
W5TTE - HI Band
WD7I - 10 Meters
KF7MD - 15 Meters

WØMHS has a computer program written for the QRP-ARCI contests he is offering free. Send him a 5" 360K floppy for the program and documentation. Be sure to include return postage!

WB2QAP also has one to share. Be sure to include return postage!

THE ANTENNA STRINGING EXPEDITION

JIM GRIFFIN, W9NJP
1215 ASH STREET
ST. CHARLES, ILLINOIS 60174

A fellow ham, known phonetically as the "Good Guy", told me he had 35 acres of prime antenna raising property up in Wisconsin, only four or five hours away from the home QTH. The perfect QRP Field Day sight.

Now some guys think driving four hours is too far away, but look at how many hams drive to the Dayton Hamfest, taking six hours or so of their precious time, only to get squished by 30,000 fellow hams. We would have openness and room to breathe. Plus we wouldn't need a hotel room; we would have our tents.

I couldn't wait to go...

We arrived, more or less. We were two hours late in taking off. The Good Guy took another hour or so to eat a Chinese dinner. It was delicious, of course, but I was too anxious to get to the site. Then he decides to take the back way as a very heavy fog rolled in. Needless to say, we were lost. We could have been lost in my own backyard for all I knew. The fog was so thick that the road we needed to take was passed three times! So we retraced our steps, and finally arrived around 1 AM. All is forgotten as I can't wait to scout the area the next morning, thoughts of huge wire beams everywhere.

The sun peeks over the horizon, the cows are mooing, and the dew is heavy. In fact, the dew is so heavy that the sun must be wet along with us. The grass is very high which means most of our pants, rather than just the lower parts, are totally soaked. Boy, this is fun.

And there it is. Trees everywhere!!!

The Good Guy told me we could string antennas everywhere, but he forgot to mention all the trees. Man, we were in heavy woods. Fortunately, he told me about the ridge where we could string slopers in every which direction. First thing we did was head toward the ridge. Now mind you, I enjoy the wilderness. I guess the difference is what you anticipate versus the reality of the situation. Getting to the ridge was the equivalent of trail blazing and rock climbing.

We must first climb over an electrified fence—remember our pants are totally wet. Then we trudge through heavy brush and climb down a steep, rocky slope. We arrive.

Good thing I knew we were in Wisconsin, for I would have sworn we were in the middle of the Amazon jungle. I was expecting to see boa constrictors slithering down the trees. The Good Guy explains we can use a bow and arrow and shoot a line down the slope over to a farm outbuilding. Since there were trees everywhere down the slope, I wondered how he expected this line to stay free of all the branches. A helicopter would hold it up nicely as we pulled the antenna line. My hopes for slopers in every direction quickly vanished.

We returned to the main campsite. On the way back we passed an open field, an excellent site, even though it was at a 4 degree angle. Upon further inspection I discovered that the field was so big that any hopes of stringing from one tree to another would require an antenna a minimum of 60 wavelengths. I wondered if our QRP signal would ever make it to the end of the loop! The sag in the antenna would be so great that the middle would probably be hitting the ground. Maybe the open field wasn't so wonderful after all.

We sit at the picnic table in the middle of the jungle, deciding what and where we will string. We decide upon a Zepp and a long wire. Let's do it!

Trees everywhere...Good thing I knew we were in Wisconsin!

I get out my trusty pipe wrench. I know it will come down; question is how high can I throw an object which in most states would be considered a lethal weapon. Tying some nylon string to the end of the wrench, I spot the perfect branch, get my arm in motion, and heave. The wrench goes to the left, completely misses any branch, and returns to earth with a heavy thud. The nylon cord also returns into every bush and small tree branch.

Let me digress for a second. Unless you were in the boy scouts or in the navy, most of us don't really know how to tie knots. We don't know what a half hitch really is, we don't remember about following the rabbit through the hole. But string knows!!! Yes, you can throw a string in the air, and when it returns, it has tied all by itself every conceivable knot known to modern man.

Two approaches to resolve the situation are applicable. Get new string and forget the lump. That was my conclusion. But the other approach, and of course the Good Guy believed in this one, was to spend three hours unscrambling the string. This little knot first and all that. I truly believe that some people get a feeling of power from untying a lump of knots.

Did I tell you about the shagbark trees?

Getting back to reality, we pull the string out of the bushes and small trees, little branches stuck everywhere in the string. Good Guy tackles the job of de-stringing, and we are ready for another toss. Up goes the wrench—missed again. More destringing. But just like in fairy tales, the next throw made it. Voila! One line ready to go. We were really on a roll now.

Needless to say, I now considered myself an expert wrench thrower. Having a few throws under my belt qualified me for the pipe wrench throwing hall of fame. We lined up the other tree, got the wrench and string ready, and up went the wrench with such grace and finesse, over the proper branch, and even hung in the air so that we wouldn't have to bend over to get it. Boy, was I good!

Putting up the Zepp was easy after that. After attaching the insulators to the string, up it went, the ladder line bouncing around in a dance of success. We quickly hooked up the Ten Tec Argonaut, and signals resounded throughout the forest. This is what life to a ham is all about.

Understand that we were fortunate, for there was a clearing between trees. Nothing snagged. It was easy.

While the Good Guy played with the rig (he worked Europe with 3 watts on 15 SSB), I decided to start putting up the long wire. Good Guy suggested we string it down the "driveway", which was a swath through the jungle. Getting the nylon cord up with the wrench was easy since I was now a pro. In fact the one throw must have been 40 to 50 feet. This antenna was going to be really up there. I got the wire and insulators ready to go, and even started pulling it up by myself. I pulled, that is, for a few feet until suddenly the cord would not move.

Surveying the situation, the antenna wire was under every tree branch and shrub in the entire jungle. How were we ever go to get this thing in the open air? I begged the Good Guy to forego breaking through the pileups with 3 watts and help me.

Did I tell you about the shagbark trees? If you aren't familiar with this type of arboreal splendor, please be advised that the bark is loose at the bottom end, and they evolved so that they could snag antenna wire. Moreover, they tend to grasp it firmly, never to let go. I wonder if Darwin ever noticed that. And did I tell you that these trees were everywhere?

We love a challenge. All wire antenna stringing men do. The solution was simple. Throw some string over the wire, pull it out of the trees while the other guy pulls it up. Simple enough. And it works well, at least for the tree at hand. The remainder of the wire then looks for other snag points which it always finds. Now if you had 60 guys to help (I now understand why clubs are always looking for new members), it wouldn't be all that bad. With just two of us, it was an Herculean task. But then Rome wasn't built in a day.

In time, though, we did accomplish the task at hand. The long wire was up, somewhat free of trees, and we tried it out. Worked well, although we did like the Zepp better. Perhaps another reason was the gentle breeze. You see, the gentle breeze is an ally of the shagbark tree, and it likes to push the wire over to its friend the shagbark. The tree then grips onto the wire. I think the trees really enjoy rf flowing through them. It must help their vascular bundles or phylum. It didn't take long for the jungle to engulf the long wire.

At least we had one antenna that worked very well, and one that worked ok. I worked a lot of 20 CW that day, getting great signal reports with just 3 watts.

I should say I got great signal reports until I told the other ham I was running QRP. Then suddenly their S-meters have an embolism, and our signals aren't quite as strong as they thought. However, this is another story which cannot be told here.

Speaking of another story, three of us went up there several months later and strung a few more antennas. This story too must unfold at a later date, but let me tell you it is just as exciting as the one above.

In retrospect, it was fun, it was exciting, it was challenging. We had a great time all in all, and isn't that what ham radio is all about? QRP

QRP CONTESTING SOFTWARE

by Peter E. Beedlow, NN9K
741 Greenway Avenue
Colona, IL 61241

With all of the attention given to contest software by the various amateur radio publications. I thought that it was time someone looked at things from a QRP contester's viewpoint.

The "CT" series of DX contest programs written by K1EA is very well done and covers the spectrum of DX contests very nicely. The latest version, 6.19, can be used for the ARRL Sweepstakes contests and there is a VHF format included. The "NA" contest software by K8CC does a good job with the major HF non-DX contests that we in North America might enter. The "CT" and "NA" programs are very user friendly and an obvious attempt has been made to keep key definitions as similar as possible.

However neither of these programs work very well with the contests sponsored by the QRP ARCI. Although both have fields to record all the necessary received information, both programs take for granted that all of the reports sent will be the same. In fact there is no field to record that information and has to be recorded on the summary sheet before logs can be submitted.

The only program that I have found that allows recording of both the sent and received exchange for each contact is the CaGen Log/Term. This program, written by Gene, N4BRA and Carey, W4HIR has been around for a number of years. Gene and Carey originally set out to created a good, basic logging and contest program for the Commodore 64 and have been building on that foundation for several years. There are now also versions for the Commodore 128 and the IBM and compatibles.

The CaGen Log/Term program was intentionally written to be a good, workable, generic logging program suitable for use with a variety of contests. It can be setup for a single or multi-band contest. You can toggle between CW and SSB operation at will. Dupe checking can be set for call only or call, band and mode. The exchange field has room for 32 characters providing more than enough space to enter both the sent and received exchange information.

There are also many other features in the program. For those of you with the AEA PK-232 packet controller the IBM version will allow the use of the computer keyboard as a CW keyboard, message storage and niceties. I have not used that portion of the CaGen Log/Term but I am sure that it works as efficiently and well as the rest of the program.

If you have never been exposed to computer contest logging you are missing out. Not only in adding to your contest score but in removing an element of drudgery present in every contest. Dupe sheet maintenance during a contest is a thing of the past with computer logging leaving you free to concentrate of operating. Consensus among other amateurs using computers for their contest logging is that scores generally increase from 10 to 15% because of the automation of record keeping during a contest.

I hope that this quick review of computer contest logging and the CaGen Log/Term is beneficial to you. If you are not computer logging your contests I suggest that you think seriously about giving it a try. There are some good bargains in used computers to be found at hamfest, or it may be possible to go halves with a friend and split the cost of a computer and software. QRP

More information about the CaGen Log/Term program is available from CaGen Software, 4821 Rosecroft Street, Virginia Beach, VA 23464.

Idea Exchange

Michael Czuhajewski, WA8MCQ
7945 Citadel Drive
Severn, Maryland 21144

New Address: Going on a Long Vacation?

Please note the new address above and use it effective immediately, since I have closed my post office box in Jessup.

As this is being written, there is a very good chance that I will be accepting the offer of a year-long job overseas. I have made arrangements for someone to take over the Idea Exchange on a temporary basis in the event that I do go, and all items will be forwarded to him.

More W3NQN Passive Audio Filters

Ed Wetherhold, W3NQN has another passive CW filter in the December 1990 issue of QEX. This time the center frequency is lower, at 534 Hz, since studies by hams in England show that many folks prefer lower tones than the 750-800 Hz used in many commercial transceivers. I ordered the parts from him, and as with his last design (December 1988 QEX) I am quite impressed with the performance.

Assembly of this filter was easier than the last one, since it only uses one stack of 88 mH toroids. The other used a stack with additional coils glued on the end. As always, Ed will supply parts at nominal charge; the toroids themselves are free, provided through the cooperation of the C&P Telephone Company of Maryland, and only charges shipping for them. As I recall, he offers the transformers to match the input and output to 8Ω lines at $1.50 each, a plastic clip to mount the toroid stack at 50¢, and $10 for a set of matched capacitors for the 534 Hz filter. (The set for the other filter was less, since it uses fewer parts.)

Ten dollars sounded like a lot of money, especially since I hadn't priced capacitors lately. However, it seemed worth it just for the matching; the design requires precise values for proper operation. When I opened up the envelope, all 12 capacitors for the filter fell out, and most of those were actually two capacitors carefully selected to give the proper value, soldered together and labelled—total of 22 individual capacitors. (While this filter used a total of 12 "capacitance units", the earlier one only used five.) How many capacitors would I have had to buy or scrounge to have enough to be able to mix and match and build up the exact values? I don't even want to think about it. I'm very glad I spent the extra money.

Construction was simple; he includes a schematic and pictorial, as well as a response curve for the filter. One thing to watch out for: be sure to follow the instructions he gives as to which side of the transformer is designated as the primary. His filter from the December 1988 QEX (higher frequency) uses 200Ω transformers, and the latest one uses 120Ω. Both parts come from Mouser, but one has the low impedance side marked as primary, while the other has the high impedance so designated. If you get both filters, be sure to use the instructions supplied with each to avoid confusion. (He also gives resistance readings so you can double check). With reversed windings, signal attenuation is considerably greater.

I noticed one slight drawback with this latest filter when using it with my TS-430S. Although the frequency doesn't match up with the stock transmit offset, I could take care of that with the IF shift and RIT. Unfortunately, though, there is no cure for the sidetone. It's a fixed frequency, and with the lower filter frequency all that gets through when sending is some weak clicking—the filter is TOO good! The tone could be lowered by changing a couple resistors and capacitors in the rig, though I won't do it since the filter won't be used with the TS-430. This won't be a problem if you use a separate receiver and transmitter, or if you can easily change your sidetone frequency.

With W3NQN, filters are more of a passion, labor of love and lifelong mission than a money-making proposition. (I like to think he at least breaks even on this deal, but I can't guarantee it.) As with his earlier designs, this one is an excellent performer and I highly recommend it. See the Idea Exchange on the January 1991 issue for more details on requesting info, and be sure to include an SASE when writing to him at 1426 Catlyn Place, Annapolis, Maryland 21401.

SPC QRP Kits and Parts Available from Oak Hills Research

As mentioned briefly on page 2 of the January issue, Oak Hills Research (OHR) was sold to KE8KL, a QRPer, and Small Parts Center went out of business. The latest development is that OHR has acquired the kit and component inventory of SPC, so the QRP community can still benefit from the expertise of Chris Hethorn KM8X. Dick Witzke, the new owner of OHR, now has a new catalog for which he requests $1 to cover postage and printing. The address is 20879 Madison Street, Big Rapids, Michigan 49307.

The catalog looks like something straight out of the glory days of SPC, filled with QRP parts and kits. Some of the latter include the Two-Fer II transmitter, the T/R switch and sidetone kit, Micro-30 superhet receiver and separate three-band converter kit, CW/SSB active filter, 12 watt audio amplifier, QRP SWR bridge, wideband untuned preamp, high performance shortwave converter, and finally, the OHR QRP 40 and OHR QRP 20.

The last two are the 40 and 20 meter versions of SPC's replacement for their discontinued W7EL Optimized QRP Transceiver, before they went out of business. For about the same price as the W7EL, it has a superhet with crystal ladder filter and switchable audio active filter and looks like a very good rig.

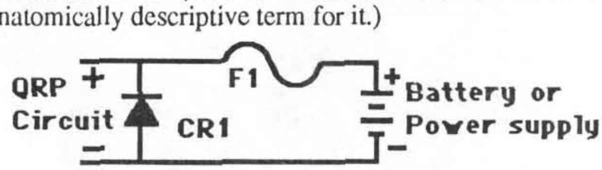
Best of all, it looks like KM8X will still be with us. In a recent letter, Dick said he and Chris continue to work together in developing new kits, and are working on a new transceiver. Go ahead and send the dollar for the catalog—it's worth it.

Joe's Quickie #2

From **Joe Everhart,** N2CX; 214 NJ Road; Brooklawn, N.J 08030:

Here's another circuit "quickie" from my grab bag. It's for homebrewers and QRP'ers who suffer from temporary lapses of sense when they hurriedly hook up a battery or DC power supply to a rig without double checking polarity. The laws of probability say that you have a 50/50 chance of getting it right, but our friend Murphy tips the scales so that 90% of the time the polarity is wrong. The result seems to be usually that you end up frying something. And if the rig has unusually expensive or hard-to-get parts, they are just what goes up in smoke!

There is a simple fix for this malady—the dummy diode. That's not a new type of semiconductor device from Motorola, but an ordinary diode to help protect dummies from themselves. (One ham friend of mine has a much more anatomically descriptive term for it.)



CR1 - 1N400 series diode
F1 - Fuse rated to pass maximum current drawn by QRP circuit

Figure 1 - Dummy diode gives reverse polarity protection

Figure 1 shows this device in use. It's merely a garden variety rectifier diode hooked up with reverse polarity across the DC power input to your rig. If the DC power is hooked up as it should be, the diode is reverse biased and will draw only only microamps of leakage current. But if you accidentally reverse the negative and positive power leads, the diode conducts and looks like a short circuit to ground. I ***highly*** recommend adding the in-line fuse shown in the figure. If the fuse is in place, the short circuit will blow this fuse, protecting the rig and telling you that you goofed. Without the fuse, several outcomes are possible:

1. If the DC source is a current limited power supply, the supply will just reduce its output voltage low enough to supply the rated short circuit current. The rig will see a reverse polarity voltage of only about 0.7 to 1 volt (one diode drop). It will probably survive.
2. If the DC source is a non-current-limited supply to a high current battery, a ***large*** short circuit will be drawn. Again, there are several possible sub-outcomes:

2a. If the current is much above the diode's forward current rating, it will eventually overheat and fail. When it fails, it will probably become an open circuit. When this happens (within a fraction of a second), there is no longer and reverse polarity protection and your rig will fry. Therefore the diode did you no good in the first place.

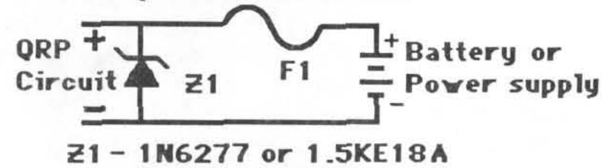
2b. If the current is less than the diode's rating, the power wiring and/or power source will go up in smoke. Again, the diode did you no good.

2c. If you are ***extremely*** lucky, the diode, the power source and wiring will not instantaneously self-destruct and you will eventually notice that something is over-heating. You may have enough time to remover power and correct the reversed polarity, but don't count on it!

The bottom line is, ***use a series fuse.*** It should be large enough to pass the highest current you will normally draw, but small enough to blow if there is a short circuit or reverse polarity condition.

What kind of diode should you use? Well, that depends. For low power transmitters and such, I usually use a 1N4000 series diode. The 1N4001 will withstand a back voltage of 50 volts so the usual 12 or 24 volt DC supply will be unaffected. If your rig normally draws less than an amp, use a 1 amp series fuse for protection. For higher power rigs, both diode and fuse should be upgraded accordingly.

For even better protection, you can use a transient suppressor diode. It hooks up the same way as a regular diode, but acts like a high power zener. Figure 2 shows its use. The diode shown is specially designed to have low leakage for a DC reverse voltage of up to 15 volts or so, as you would see in 12 volt applications even including auto battery voltage. Above 18 volts, it conducts heavily to protect electronic equipment from overvoltage surges. And of course, it acts like a regular diode if the power is backwards, to provide reverse polarity protection. The series fuse is still needed to provide a "safety valve" if overvoltage or reversed power make the protection diode conduct.



Z1 - 1N6277 or 1.5KE18A transient suppressor
F1 - Fuse rated to pass maximum current drawn by QRP circuit

Figure 2 - Improves circuit adds protection from voltage spikes

I highly recommend the transient suppressor diode if you can get one. The part number I have used successfully is a General Semiconductor Industries 1.5KE18A. Motorola also manufactures the same device under the part number 1N6277. I can't guarantee a source for the diode, but I know that some branches of Active Electronics used to carry the GSI part. Their head office is at 133 Flanders Road, Westborough, MA 01581. They have a toll-free telephone number, 1-800-677-8899.

Whichever scheme you use, I think you should consider adding a protective diode and fuse to your DC-powered QRP gear. This little "quickie" can save you big trouble and a lot of bucks if you should slip up and swap positive and negative power leads. Just think of it as a prophylactic measure to help you practice safe QRPing!

P.S. Why don't I just use a series diode? Well, I could but don't for two reasons. First, I don't like to lose the 0.7 volt diode drop. When I'm using batteries, I want to every last bit of efficiency I can. And secondly, using a series diode adds a nonlinear impedance to the power supply. That can make either a receiver or transmitter oscillate unpredictably. Only a dummy would use a series diode!

Speaker Connectors

Bob Vitullo, K9TWK of Arlington Heights, IL writes:

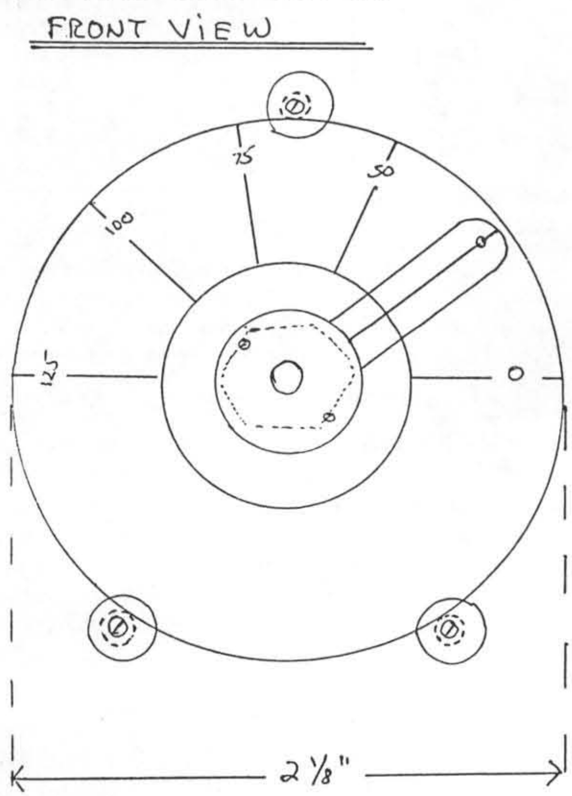
An annoying problem often found when constructing a piece of homebrew equipment with an internal speaker mounted in the cover arises when it is opened for service. Inevitably, the speaker leads are ripped out or, at best the top is in the way, being tethered by the leads. A simple solution to this is to use two sets of 9 volt battery terminals to make the connection. Solder one set to the speaker leads and the other to the equipment audio output. It is a simple matter to disconnect the two sets of terminals, thereby separating the enclosure halves when desired.

Slip Dial Face

Another input from K9TWK:

In the course of constructing an all-band superhet receiver based on the Small Parts Center Micro 30 Receiver/Converter kits (now available through Oak Hills Research), a problem was encountered in zeroing the lower edge of the various bands to the dial scale.

Though provision was made for zeroing via trimmers, exact duplication for each of the seven band edges was difficult to achieve and subject to future change due to physical abuse. A satisfactory solution was developed based on the slip dial arrangement used on the Drake R-4C.



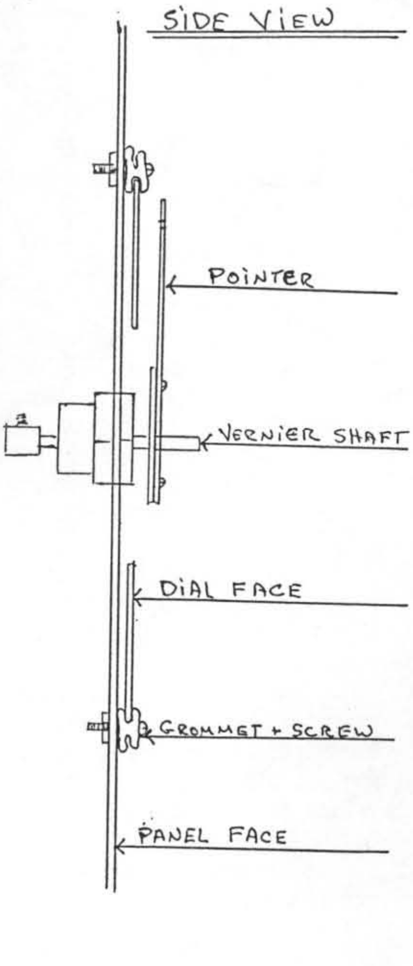
I used a "doughnut" cut from one end of a plastic wire spool as the dial face which fits nicely over the panel mounted 10:1 miniature vernier drive used in my receiver. A paper covering was glued onto its face for scale marking. The dial face was attached to the receiver front panel using three small grommets mounted with screws equally spaced around the dial face outer edge. The grommets hold the dial face in their grooves and the attaching screws are adjusted for a snug slip fit. Washers can be added between the panel and each grommet to space the dial face the desired distance between the pointer and panel.

The pointer I used on my vernier drive was made of a light piece of plastic with a scribed zero line and a small hole drilled through the line near the pointer's end.

Calibration was accomplished by indexing the dial face with a pencil point through the hole in the pointer with final numbering being added at the index marks later.

As bands are changed, the receiver's internal calibrator is switched on, the pointer is set to zero beat the low band edge calibrator tone and the dial face is rotated to coincide with the pointer's zero line. This arrangement is designed to be used with a tuning system that's range and linearity remain constant from band to band. In the event this is not the case, multiple scales would have to be used on the dial face.

I have found this arrangement works well, is easy to construct and is an asset for use with a multi-band receiver tuning system.



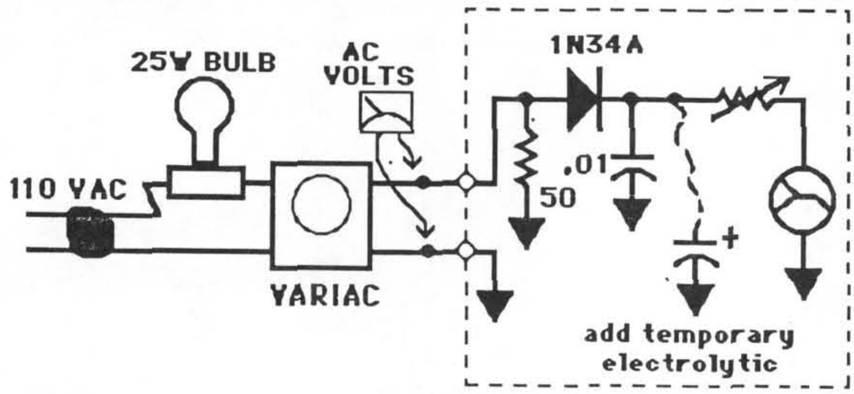
RF Wattmeter Calibration for Poor Folks

Here a tidbit from long-time QRPer "**Rock**" **Rockey, W9SCH** of Albany, Wisconsin:

There is nothing here which would not be obvious to anyone experienced in even simple electrical measurement. (But how many hams are so experienced—even the Extras?) Toney folks with labs full of fancy gear may sniff their aristocratic noses at such elementary stuff, but there are many of us (me, for instance) who will find such an operation both helpful and educational. It is always an educational experience to measure anything quantitatively with one's own hands.

If you have access to a Bird RF wattmeter or similar refined apparatus, rad no further. But if you are not so well situated and have a home-cooked RF wattmeter that you'd like to calibrate and can wangle a Variac variable voltage transformer, you can calibrate your wattmeter at 60Hz. While this technique does not compare in accuracy with a good RF calibration job, it is vastly superior to guessing; indeed, it is probably adequate for most amateur work.

Of course, you will also need a fairly trustworthy AC voltmeter (even one of Radio Shack's better models will do), and a high capacitance electrolytic capacitor in addition to the Variac and your wattmeter. Let us assume that you wish to thus calibrate a typical diode type RF wattmeter as often used by QRPer's. Connect it as follows:



The components inside the dotted rectangle are those normally present within a typical amateur QRP-level RF wattmeter. It will be necessary to get inside the wattmeter itself and temporarily connect the large electrolytic capacitor across the smaller capacitor already within the wattmeter. (That one is most likely 0.01 or 0.001 µf.) Probably any 50 working volts unit larger than 10µf will do—I used 40µf.

A 25 watt, 120 volt lamp is connected in series with the input to the Variac to reduce the voltage and make adjustment to the correct value less critical. It also contributes to safety.

Start with the Variac set to zero. Then gradually increase the voltage (easy does it!) across the input to the wattmeter. If your wattmeter is set up to provide a 50Ω load to a transmitter, you may use the table below to find the input RMS voltage which corresponds to each value of indicated power. Make a table of your own with WATTS in one column and the corresponding reading on the wattmeter's scale. Then plot a calibration curve for your wattmeter from this data. If you use a sheet of two-cycle double logarithmic paper (available at good stationery stores or a college bookstore) you should find that your curve closely approaches a straight line. This will make it easier to read than a curve plotted upon ordinary graph paper. Plot the wattmeter readings on the horizontal scale, and watts on the vertical scale for greatest convenience.

We have calculated the corresponding RMS (as read on an ordinary AC voltmeter) voltage for typical power values, to three significant figures. You may not be able to read the meters to that level of precision, but do the best you can. When you have completed the calibration, remove the electrolytic capacitor—it was necessary only to provide reasonably correct voltage at 60Hz. For radio frequencies, the capacitor in the wattmeter will suffice.

While a 60Hz calibration does not allow for a number of small errors which will exist at radio frequencies, it will be significantly accurate for most measurements which a QRPer desires to make. While no one claims that either a DC or 60Hz calibration of an RF wattmeter compares in accuracy to a lab grade RF calibration, is not ANY reasonable RF power measuring technique better than a crude guess? But it is not a replacement for a good RF calibration job, when that is possible. I might add that I have now calibrated my own QRP RF wattmeter by calculation, with DC and at 60Hz and that these three methods agree well.

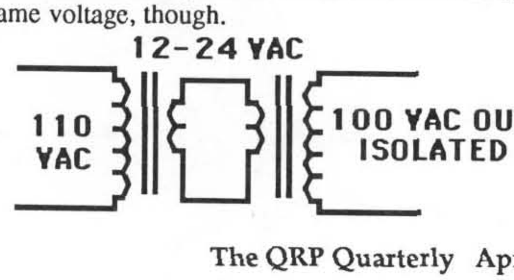
Power	RMS volts (60Hz, 50Ω load)
50 mW	1.158
100 mW	2.23
300 mW	3.87
500 mW	5.00
1 W	7.07
3 W	12.2
5 W	15.8
10 W	22.3

If your wattmeter is designed to provide a different load resistance, other than 50Ω, you will need to recalculate the voltage corresponding to each power value using Joules Law:

$$E_{volts\ RMS} \sqrt{P_{watts} \times R_{ohms}}$$

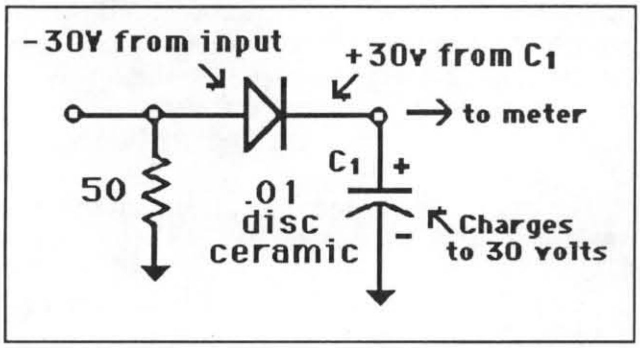
WA8MCQ Wattmeter Calibration Notes

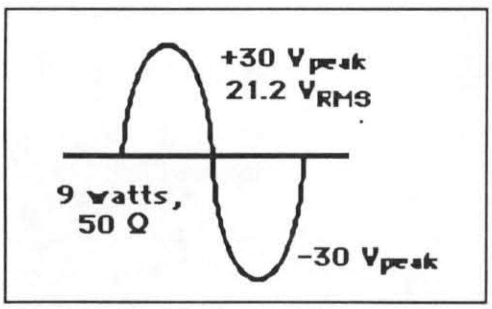
For those uncomfortable with using something directly off the AC line, you could make an isolation transformer by putting a pair of low voltage transformers back to back as shown. You could use any of the low voltage units available from Radio Shack. In this application, neither voltage nor current are critical; do make sure the two secondaries are the same voltage, though.



For QRP wattmeters, it is generally accepted that a germanium diode is better than silicon due to the lower turn-on voltage. There is a drawback, though—germanium diodes tend to have relatively low reverse voltage ratings and thus tend to blow out quickly when QRP power levels are exceeded. For example, the popular 1N34A is rated at 60 PIV (peak inverse volts). This means that it can only withstand a power of 9 watts.

How do we get this? Refer to the figure below, which is typical of a diode detector wattmeter.





Assume a 50Ω system and a power of 9 watts. By Ohms Law, this comes out to 21.2 volts across that 50Ω. If we're measuring DC, that's 21.2 volts, but if it's RF, which is just high frequency AC, it's 21.2 volts RMS, or 29.98 volts peak. This means that on positive peaks of the signal the diode is forward biased and conducts, and the capacitor charges up to that voltage (less the small voltage drop across the diode). However, one-half cycle later the input signal goes to a negative peak voltage of the same amount, or -29.98 volts. Now the diode is reverse biased, with close to 30 negative volts on one side and positive 30 on the other, for a total of 60 volts, right at the diode limit. (This isn't unique to wattmeters; this happens in any rectifier circuit.) Exceed that 9 watt power level and you've exceeded the rated PIV of the diode. (See "Match Your RF Probe to Your Meter", Hints & Kinks, QST May 1985.)

I happen to have a lot of 1N270 and 1N277 diodes from old circuit boards, which are also germanium, with ratings of 100 and 125 volts. Those come out to about 25 and 39 watts respectively, and I use them in my wattmeters to get a little more headroom. For normal QRP use, i.e. at 5 watts and below, the 1N34A is quite adequate and more readily available.

Don't yield to the temptation to use a power rectifier diode to get a higher peak voltage rating. (There was some discussion of that in QST a while back, in "A Handy RF Sampler for Coaxial Transmission Lines", Hints & Kinks, QST March 1986, with follow-up comments in Hints & Kinks in March 1990, titled "Diodes for RF Probes". The latter rebuts the 1986 item. While you're at it, read the entire Hints & Kinks for March 1986, which contains other comments on RF probes as well.)

The bottom line is that while such diodes may have good current and voltage frequency ratings and work well at 60 Hz, they make lousy high frequency rectifiers. There is a brief mention of this in the power supply article in the February 1991 issue of QEX, which is a switching supply with high frequency voltage that must be rectified. What you need is a "fast recovery" diode.

I did some experiments with a variety of different diode types in a diode detector wattmeter, testing each at 40, 10, 6 and 2 meters. I may write up the details some day but, in a nutshell, the 1N34A/1N270 types worked pretty well while performance of the 1N4004 and 1N4007 fell off rapidly with frequency. Not only did the output voltage droop, but the diodes themselves ran hot at the higher frequencies.

How do the manufacturers get the high voltage ratings? (The 1N4004 is 400 PIV, 1N4007 is 1000 PIV.) I'm told they add an intrinsic material layer between the P and N parts, to increase the breakdown. This makes them de facto PIN diodes. While not specifically designed for PIN diode service, that's what they amount to and PIN diodes are well known to be poor rectifiers.

The Fine Print

Don't forget to use the new address above if you write to me, since I've closed my box number. Also, don't expect a speedy reply since my mail will probably be forwarded to me overseas. Inputs for the column will be intercepted here and routed to the proper person. Keep those ideas coming!

QRP

News from Germany...

Bert Matthias, DL2HB has been licensed for seven of his 24 years. He is a technician in the telephone/data communications field and finished two years as a Navy radio operator.

Bert writes that he sold his Argosy and is awaiting the new Argonaut II. In the meantime he has completed a Heath HW-9 (A) and is on the air using a wire antenna. He is a member of QRP-ARCI and G-QRP. Listen for him on the bands.

News from Ecuador...

Jim Alfaro, HC2GE has recently joined the ranks of QRP-ARCI. His QTH is Guayaquil, Ecuador.

His past interest has been primarily 6 meters. He is now planning to get back on HF to join our activities. A new HF rig in on the way. Jim and his friend HC2NI have finished a vertical antenna for 160 and 80.

In Ecuador ham licenses are codeless so in the near future look for Jim and his friend on the QRP SSB frequencies.

Problems, Questions, Comments?

Who To Contact—

PLEASE include an SASE of an appropriate size if you expect a response.

•**Subscriptions, dues, membership problems:** Mike Kilgore, KG5F; 2046 Ash Hill Road; Carrollton, Texas 75007

•**Non-technical articles:** Chaz Wooten, KD4XX; 103 W. 7th St.; Jasper, Tennessee 37347; 615-942-5116

•**Technical articles:** John Devon, KI6DQ; P.O. Box 61128; Pasadena, California 91116; 818-441-5523

•**QRP Contests:** Red Reynolds, K5VOL; 835 Surryse Road; Lake Zurich, Illinois 60047

•**Nets:** Danny Gingell, K3TKS; 3052 Fairland Road; Silver Spring, Maryland 20904

•**Awards:** Bob Gaye, K2LGJ; 25 Hampton Parkway; Buffalo, New York 14217

•**Club Operations:** Paula Franke, WB9TBU; P.O. Box 873; Beecher, Illinois 60401; 708-946-2198

•**Club information packets** (include $1): Mike Bryce, WB8VGE; 2225 Mayflower, N.W.; Massilon, Ohio 44647

"Stable VFO" Improvement

Tech Editor's note: I received the following improvements from Antoine Galindo, 10941 Allen Drive, Garden Grove, CA 92640 author of "A Stable VFO," which appeared in the July 1990 issue. J.D.

"I talked to AA6CZ who built one for the 2-2.5 MHz range. He is very pleased with the results. His version drifts only a few Hz/hour. He pointed out that the 47 ohm resistor is in the wrong place and should be replaced by a 10 ohm. He also replaced the 220 ohm resistor and 9.1 volt zener diode voltage regulator with a MC 78L08.

The 3.3 pf NPO coupling capacitors were increased to 10 pf. Silver mica to sustain oscillation in the 2-2.5 MHz range." Reference figure 1, below. QRP

Build Your Own Fireball Transmitter

by Mike Czuhajewski, WA8MCQ

Remember the Fireball transmitter from the November 1990 issue of 73 magazine?

It used one of those little computer clock oscillator cans which happened to be in the 10 meter band. I ran across some recently at a hamfest, for 28.322 MHz and picked some up. While this is not as convenient as the custom made 28.060 cans made expressly for the Fireball, it is still quite usable.

The originators of the Fireball started out with cans for 28.636 MHz, and WG3R, the former WB3EVS, found some in a New York surplus house for 29.491, which I used briefly. The only "drawback" of using "odd" frequencies is that you'll normally have to ask someone to listen for you. It may not be as sporting that way, but it's still fine for doing QRP experiments.

The 28.322 MHz cans I saw were for sale at $4 each or $10 for 3. I called the dealer later and he said he still had 75 or 80 of them left for that frequency, and would be willing to sell some by mail order. Unfortunately, his business has to charge $5 per order for shipping, but he said that if someone ordered a large quantity, such as 20 or more, he'd drop the cost to $3 each. (The shipping remains at $5.) Perhaps someone would want to buy a batch of these and pass them on at QRP gatherings, hamfests, etc. (He later said he was a ham, and expressed great interest in QRP—a possible convert!) The address: Computer Doctors; Attn Dave Green, N3IBY; 9204-B Baltimore Blvd.; College Park, MD 20740; Phone (301) 474-3095

By the way, I've done some work with my own version of the Fireball, and discovered a few idiosyncrasies, enhancements, etc. I'll write it up for the Quarterly in the future. QRP

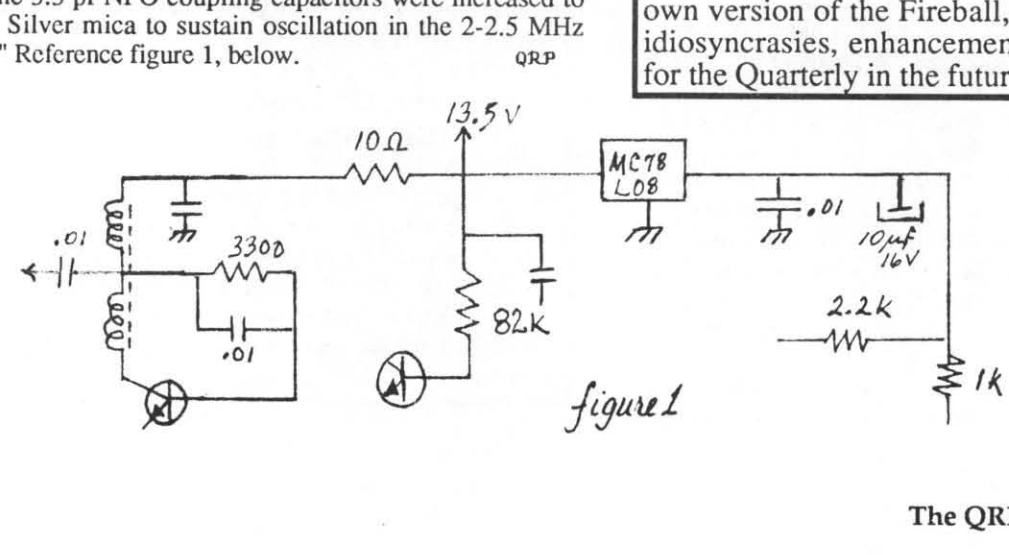


figure 1

MULTI-BAND, SHORT VERTICAL DIPOLES

By John Stanford, NNØF
1327 Clark Avenue
Ames, Iowa 50010

For years, to avoid the expense and the visibility of large beams on tall towers, I've used ground mounted, short vertical monopole antennas (12 to 19 feet high). With only 48 radials, I worked DXCC on 80 and 40 M. But nearby buildings and low hills blocked the lowest angles of radiation from these ground mounted verticals.

About a year ago I decided to use an elevated vertical system which would allow the low angle radiation to more clear nearby obstacles. I chose the vertical dipole because (1) elevated radials would not be needed and (2) a dipole has higher radiation resistance than a ground plane. The higher resistance would allow easier tuning over a number of bands with open wire line to a transmatch. The first system I used was a simple vertical dipole 25 feet long which hung from a nylon cord line between two trees (Fig. 1 A). This worked well on 10-12-15-17-20 M, as attested by a large number of DX contacts. It also worked well for 1,000-2,000 mile QSOs on 30 and 40 M.

However, because my trees are not very high, the bottom of the dipole was only one or two feet off the ground, and I worried about the high RF voltages at the dipole's lower end which someone could accidentally touch. The heights of my support trees are fixed, so to get the dipole ends at least eight feet off the ground meant I needed a shortened vertical dipole.

The book HF ANTENNAS by L. A. Moxon (RSGB, but available in the USA) provided a number of good ideas. The shortened versions appear in Fig. 1 as B and C. Antenna B is in the shape of an H lying on its side. According to Moxon, its parameters can be estimated from the formula:

$$L = 3/4\ (W/2 - H) \text{ or,}$$
$$W = 8/3L + H$$

where W is wavelength at resonance, H is the length of the vertical wire, and L is the length of the top and bottom wires, which act as capacitance hats to lower the resonant frequency.

For my system B, H = 20 ft. and L = 10 ft., so that the equation suggests a resonant frequency near 14 MHz. I measured 13.5 MHz with a dip meter. To measure the resonant frequency, short across the terminals at the dipole. Couple the vertical wire to the dipmeter by wrapping a couple of turns around the dipmeter coil. If the wire is too stiff to bend easily (as mine was), tape three turns of hookup wire on a plastic coat

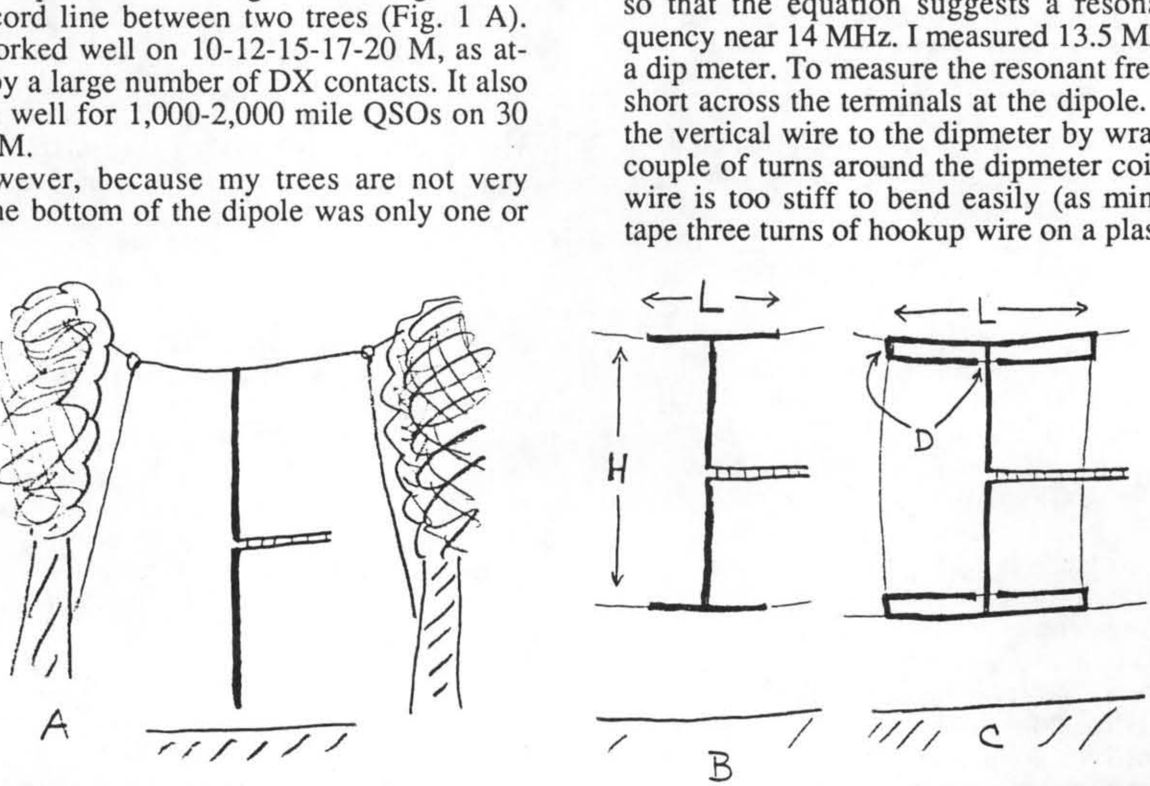


Fig. 1 Heavy lines: #12 or #14 copper wire (I used electric wiring with insulation removed). Lighter lines: nylon cord or fishline. Support lines can run through plastic pipe clamps (from a hardware store) which allow easy raising/lowering for experimentation. Dimension D should be small compared with H to prevent cancellation of currents in the vertical radiator H (I used D = 12"). Bottom wire should be out of reach to prevent possible RF burns. A DPDT knife switch is used to ground the system when not in use.

hanger "former" and use this in place of the regular dipmeter coil. Calibrate the new dipmeter/coil with your receiver. Then place the long side of the coat hanger coil along the vertical wire of the dipole. Don't use it along the capacitance "hats" because you may excite spurious resonances.

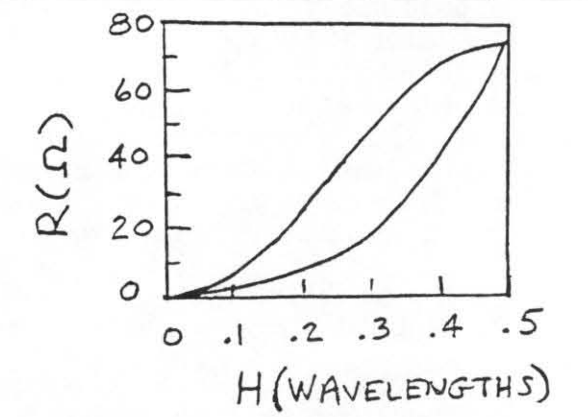


Fig. 2 Dipole radiation resistance as function of dipole length (H in Fig. 1). Use upper curve if dipole is resonated only with capacitance hats. Lower curve is for short straight wire dipoles resonated without end hats. (Adapted form Moxon's HF ANTENNAS.)

To preserve symmetry, run the feedline as nearly as possible at right angles to the vertical element. My feedline is one-inch open line/ladder line which feeds into the house through two holes, drilled one inch apart through the wood window frame. Two short pieces of RG-8 inner conductor were inserted in the holes, caulked, and soldered to the feedline on either side. With this antenna, a large number of Asian stations were worked on 10 through 20 M. On 30 and 40 M, it worked out 1,000 to 2,000 miles.

However, the radiation resistance (and the efficiency) seemed low on 40 M. The dipole's radiation resistance may be estimated from Fig. 2. For operation at resonance with capacitance end "hats", use the upper curve; if used at resonance without capacitance hats, the lower curve gives the radiation resistance. For example, antenna B's H is about 0.3 wavelength on 20 M. Since its resonant frequency (13.5 MHz) is near this band, the upper curve in Fig. 2 can be used to estimate a 20 M radiation resistance near 40 or 45Ω.

On 40 M, H is about 0.15 wavelength, and since the capacitance hats do not resonate the antenna on 40 M, its radiation resistance will be closer to the lower curve in Fig. 2, i. e. about 4 or 5 ohms. Consequently, the efficiency of this antenna is low on 40 M, due to ground loss. To improve antenna efficiency on 40 M, antenna C was built with larger capacitance end "hats".

Due to space limitations and to reduce direct radiation from the capacitance hats, these were folded in on themselves as shown in Fig. 1C. I used H = 20 ft. and L = 15 ft. (total of 30 ft. in each capacitance "hat".) Antenna C resonated at 9.0 MHz. Its efficiency is good on 40 M and it has proven to be a good DX antenna due to its low angle radiation. If only 30-10 M is desired, antennas A or B may be a better choice, since they are simpler and resonate nearer those bands.

It must be emphasized, however, that antennas need NOT be resonant on ANY ham band to be used, since most transmatches will tune out the reactance and resonate the whole system (feedline plus dipole) to the frequency of interest. Use a transmatch with a balanced output. To avoid potential problems with toroidal output baluns, I use a link coupled tuner built from the ARRL Handbook.

Summary: Short vertical dipoles are useful because: 1. they produce maximum radiation at low angles to the horizon, 2. they can be raised to "see" over nearby obstacles, 3. they do not require a high tower, 4. they do not require a ground plane radial system, 5. they are nearly invisible from a short distance away, 6. they can be fed with open wire line, tuned to resonance with a transmatch in the shack, and easily operated over a number of bands.

Pounds of DX QSL cards received at NNØF attest to the efficiency and low angle radiation characteristics of these antennas. Power levels between 1 W and 90 W are used. (I have a homebrew kW amplifier, but haven't used it in years.) If you want a cheap, inconspicuous, high performance multi-band DX antenna that can be placed on a small yard, try a short vertical dipole. It's easy to modify and an antenna experimenter's delight. QRP

Classified Ad Policy

The Quarterly will accept short classified ads from its members who are looking for or want to sell equipment and other items of interest. They will be printed on a space available basis. Send information to the editor.

KANGA MARKER GENERATOR KIT

by Luke B. Dodds, W5HKA
2852 Oak Forest
Grapevine, Texas 76051
817-481-3805

This inexpensive kit provides accurate frequency markers for for use in the HF bands. The available separate frequency steps are 10 MHz, 1 MHz, 100 kHz, and 10 kHz. Power is provided by a nine-volt battery. Prudent use of the ON/OFF switch will allow a useful battery life of greater than one year.

I have obtained adequate strength markers by connecting a wire to the circuit output which is then wound around the rig's output coax. Should incoming signals mask the marker signals it helps to disconnect the rig's output coax at the tuner and attach a dummy load. Some may succeed by simply draping a wire over the rig.

With the output switched to 10 Mhz, calibration can be performed by tuning the generator frequency to zero beat with WWV just below the 30 MHz band. You may find it easier if you use the rig's AM detector to eliminate the sometimes ambiguous beats of SSB. The trimmer capacitor next to the crystal provides this adjustment.

This kit is not a difficult construction project. It is a good project for the beginner and certainly useful for the experienced builder. A quality printed wiring board and all the board mounted parts are provided. Pictorials and general comments are included on the "How to" sheet. A beginning builder's tutorial is also provided.

The builder must provide the switches, battery circuit, output connector, hardware, and box. These came from my junk box as well as Tanner Electronics, 1301 W. Beltline Rd., Carrollton, TX 75006. The telephone number is 214-242-8702. Tanner's is an excellent source for the homebrewer. The project box was $1.49.

The kit is a product of KANGA Kits, 3 Limes Road, Folkestone, Kent, CT19-4AU, England. It is in the $28 range. A catalog of their many useful and interesting kits is available from the above address. As an alternative see KANGA at Dayton. Should all else fails, contact the author and please send an SASE.

QRP

News from the Netherlands...

Peter, PE1MHO was one of the DX attendees at the QRP gathering in Rochdale, England last October. He and ARCI secretary-treasurer Luke Dodds, W5HKA hit it off and Luke sent an ARCI coffee mug to Peter after returning home.

Luke reports that Peter claims his tea tastes better in the QRP mug. A ringing endorsement if we ever heard one! (A limited number of mugs will be available at the Dayton Hamvention and Ham-Com in Texas. In addition, a new color combination will be available for the 1991 edition of the mug.)

LOGGER: QRP ARCI CONTEST LOGGING AND DUPE CHECKER PROGRAM

Bruce Milne, WB2QAP
2350 Clark Road
Penn Yan, NY 14527

"Logger" was written and designed specifically for ARCI sponsored contests. I used this program for the October 20-21 Fall QSO Party, and it performed flawlessly. It will:

1) Log each entry in ARCI log format;

2) Enable you to review contacts by call or State-Province-Country (S-P-C);

3) Check for and eliminate duplicate contacts on each band;

4) Determine the points for each QSO, including bonus points;

5) Determine if contact is a new multiplier for each band;

6) Give you a complete, ready-to-mail printout with scores and multipliers tallied for each band, in ARCI contest log format; and

7) Enable you to retrieve an entry and make changes to it.

Although the program is written in GW-BASIC to run without modification on IBM compatibles, it should run on most computers that run BASIC. Program and data reside on a 5-1/4" disk, and is designed for "A" drive use; hard drive users may easily modify the program for "C" drive (refer to note 1 at end). The data is stored in a random access file named QRP-DATA.DAT. By using a random access file, the information can be retrieved much more quickly. You may save this file indefinitely, but be sure to use a "clean" data storage disk for each upcoming contest.

To use the program, first load GW-BASIC. Then, type LOAD A:LOGGER. When ready, type RUN.

The first prompt will be to put the CAPS LOCK key on to ensure you don't try to retrieve an upper-case record using lower case letters.

The next prompt will ask you to enter the time, in GMT (UTC). Be sure to follow the prompt's time format, or an error will shut down the program.

The computer next asks if the bonus five points/QSO is offered for working homebrew stations. If yes, you will be asked for homebrew/commercial data for each log entry, and that information will appear on the printout. If no, that information won't appear on the screen or printout.

When starting up for the first time, the screen will show "Number of records=2". Record #1 is used for internal program bookkeeping. To save on keystroke time, you will be asked to set the band from the menu. Remember to change bands on the program menu when changing bands during a contest.

Data entry is quite simple:

1) Callsign--up to eight characters (ex: WB2QAP/l);

2) Date and time are automatically entered;

3) RST received (two or three characters)

4) S-P-C: Enter two letters for state, three for province, and four for DX other than Canada;

5) ARCI number, if there is one. ARCI numbers only, please; DO NOT ENTER POWER IN THIS CATEGORY! If no number, just hit RETURN;

6) Enter power here, up to 99 watts. Greater than 99 will cause an error and end the program. This category won't appear if an ARCI number has been entered;

7) Homebrew/commercial—this won't appear unless the "bonus 5 points/QSO" was entered.

8) RST Sent. If inclined to send everyone the same RST, see note 2 at end of article.

The screen will then clear and display your entries in the log format. You may make changes here as required. After a logging is complete, type M for "menu". If you would like to review the entry, enter R for "review". If you would rather review by S-P-C, then hit RETURN to advance to this category.

When you are ready for a printout, go to the menu and press P for "print ". You will be asked to complete some information (contest name, date, your call, SPC, mode, etc.) This information will become the printout's heading. Dupes will be removed and the form is in ready-to-mail, ARCI log sheet format, with scores tallied. Power or ARCI# appear under the same column, as on the ARCI log form.

I've included sample printouts from a couple of contests, reprinted here. If you would like a copy of this program for your IBM compatible, just send a blank 5-1/4" disk, pre-addressed mailer, and sufficient postage (about 75¢) to: Bruce Milne, WB2QAP; 2350 Clark Road; Pen Yan, New York 14527. If you just want a listing, to try it out on a non-IBM compatible, just send an 8-1/2" x 11" SASE with sufficient postage to the same address. QRP

Note 1: To store data on a hard drive, change the A: to a C: on ten lines: 70, 850, 980, 1570, 1700, 1870, 2120, 2370, 2560, and 3070. The lines should all read:

XXXX OPEN "R",#1,"C:QRPDATA.DAT",45

• • •

Note 2: If everyone you log receives a 579, change 450 to:

450 STNS="579"

or whatever RST you prefer.

ARCI QRP HOMEBREW SPRINT 12/10/89

CALL-WB2QAP S-P-CNY QRP #/Power 5639 BAND 20 MODE CW

DATE	TIME	CALL	RST-R	SPC	QRP #/PWR	RST S	POINTS	MULT	HB/COM
10-28-90	15:58	W4FRL	559	FL	2173	579	5	1	C
10-28-90	15:58	WOHEP	559	CO	5	579	2	1	C
10-28-90	16:01	N9GPF	599	WV	6019	579	5	1	C
10-28-90	16:01	NA5G	599	LA	6751	579	10	1	H
10-28-90	16:02	K5VOL	569	IL	4016	579	10	1	H
10-28-90	16:02	K8KIR	599	MI	3796	579	5	1	C
10-28-90	16:03	VE3EWS	589	ONT	5218	579	5	1	C
10-28-90	16:04	WI5W	579	OK	6612	579	10	1	H
10-28-90	16:04	KVOK	559	CO	5082	579	10	0	H
10-28-90	16:05	N4OHB	569	AL	6788	579	5	1	C
10-28-90	16:05	NC8X	579	OH	6061	579	5	1	C
10-28-90	16:05	NF5Y	569	MS	5736	579	5	1	C
10-28-90	16:06	WM4U	579	TN	5676	579	5	1	C
10-28-90	16:06	VE5OT	559	SK	6793	579	10	1	H
10-28-90	16:07	W9GJS	599	IN	5381	579	5	1	C
10-28-90	16:07	NFOR	559	MO	5378	579	5	1	C
10-28-90	16:07	KK4HF	339	AL	4	579	2	0	C
							--	--	
							104	15	

New Member / Renewal Data Sheet

Full Name ______________________ Call__________ QRP Number__________

Address ____

City ____________________ State or Country__________Postal Code __________

[ ] New Address?

[ ] New Call?

Amount enclosed $__________

**** Please do not send cash! ****

New Member Applications Only:

License Class________ Age______

Year 1st Licensed____________

Other Calls Held____________

Rig__________ Ant________

Bands Most Used____________

Please circle your chief interests: Ragchewing, DXing, Contests, Traffic, Awards, Homebrew, VHF/UHF, Packet, CW, SSB, RTTY, ATV, Satellite, Other.

[ ] New Member (U.S. $12.00, DX $14.00)

[ ] Renewal (U.S. $10.00, DX $12.00)

Please make your check or money order payable to: **QRP ARCI.**

Note: Renewals must be received 30 days before publication.

	Yes	No	Maybe
Would you like to be an officer/director of club?	[ ]	[ ]	[ ]
Would you help write for the QRP Quarterly?	[ ]	[ ]	[ ]

What subjects______________________

What QRP awards/achievements have you won?__________

____

Why do you run low power? ______________

Mail to: **Mike Kilgore, KG5F**
2046 Ash Hill Rd.
Carrollton, TX 75007

Dayton Hamvention (Ohio)

April 25-28

Three QRP forums at Hara Arena: GQRP homebrewing forum on Friday (George Dobbs G3RJV, Dick Pascoe GØBPS and Ian Keyser G3ROO); ARCI homebrewing forum on Saturday (Paula Franke WB9TBU, Tim Groat KRØU and Mike Bryce WB8VGE); and QRP activity forum Sunday (Jim Fitton W1FMR, Randy Rand AA2U and Lowell Corbin KD8FR).

Hospitality Suite evenings at Country Suites Inn. Buck Switzer N8CQA is in charge of the commercial booths at Hara Arena.

The QRP dinner will be held on Friday night at the Spaghetti Warehouse. The ever popular beer and pizza party will be held Saturday in the hospitality suite.

Ham-Com (Texas)

Arlington Convention Center

June 7-9, 1991

Convention and Registration Information 214-521-9430

Luke Dodds W5HKA has been working closely with Ham-Com organizers to provide QRP participation at Ham-Com. There will be a QRP forum on Saturday. A QRP Hospitality Suite will be at the Marriott Courtyard Hotel (For reservations, call 817-277-2774).

GQRP & QRP ARCI Memberships

British agent for QRP ARCI memberships and renewals is Dick Pascoe GØBPS, 3 Limes Road, Folkestone, Kent, CT19 4AU. New memberships are £7, renewals are £6.

U.S. agent for GQRP is Luke Dodds W5HKA, 2852 Oak Forest, Grapevine, Texas 76051. For new memberships and renewal dues send Luke a check for $12, payable to QRP ARCI.

QRP Quarterly
P.O. Box 776
Alpine, Texas 79831

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