QRP Quarterly

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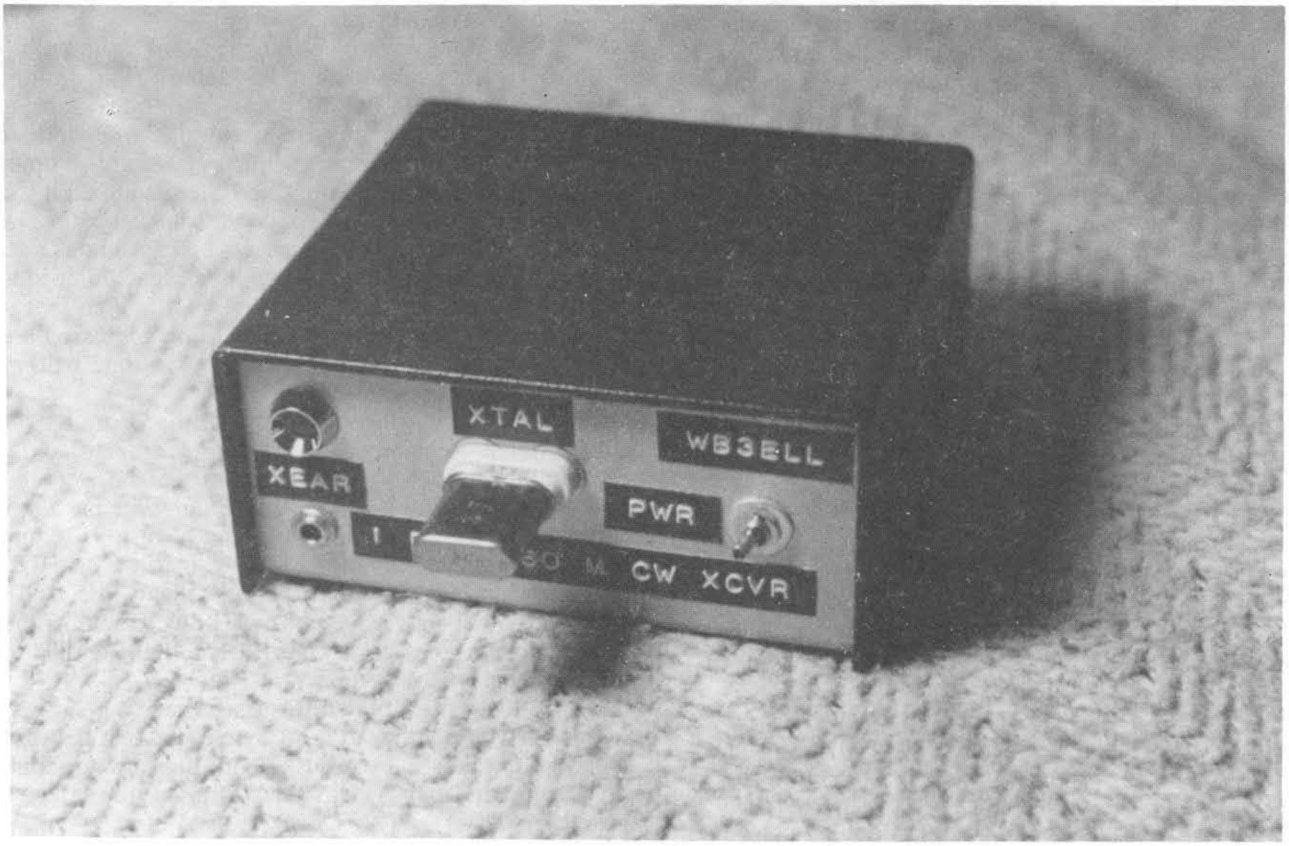

You too can build this one transistor CW transceiver—turn to page 4

Results of the Fall 1989 QSO Party begin on page 12.

Congratulations to our new board members:
Lou Berry, K7TQ; Mike Czuhajewski, WA8MCQ; Les Shattuck, WN2V; and returning board member, Danny Gingell, K3TKS

EDITOR'S WORD

This being my first issue of the QRP Quarterly as editor, I've been trying to think of something to say that would sound intelligent, little did I realize when I rejoined the QRP ARCI at the Dayton Hamfest back in April that I would be the editor of this darn thing only a few months later, well it looks like I really stuck my foot in it this time.

And how, you may ask, did I happened to get this high position? Well I was reading my first issue of the Quarterly, and I saw that Paula was trying to find someone to be the new editor. It seem to me they were having the same problem the last time I was a member, That was one of the reasons that I had let my membership expired about six years ago. You didn't know if you were going to get the next issue or not. So being the frugal (make that cheap) person that I am, I was going to make sure that I got my $12 worth out of my membership.

So, I dropped Paula a note that if she didn't find someone to do the Quarterly that I would volunteer to do it. Talk about being jumped on like a chicken on a June bug!!! And the rest is history folks. But I hope I can do half as well as Paula has, I've been looking thru the last year of the Quarterly and found it to be even better than it was when I was a member in the early 1980's. So let me hear from you out there in QRP land, good, bad, or indifferent, feel free to let me know if I'm doing my job up to the standards that you feel it should be.

Now a little bit about myself, I'm 33 years old, been a ham since "77. I'm a extra class ham, I also have my commercial radiotelephone license. Along with enjoying QRP'ing, I also am into most of the digital modes (packet, RTTY, AMTOR), QRP of course, and FSTV. Some of my other hobbies are target shooting (I shoot a Ruger Blackhawk, and a Thompson Contender .357 Mag pistol for those in the know), and I play the guitar. My other work (the one I get paid for) is for a Independent Living Center for the Disabled, being a disabled person myself it's very important work to me. But anyway, that's everything you ever wanted to know about me.

Now say you want to send in a article to be publish, or a letter to the editor, or you just have something for the want ads, and you just don't know what the cutoff dates are for the next issue? Well your worries are over because here are the cutoff dates:

January issue, November 15.
April issue, January 15.
July issue, May 15.
October issue, August 15.

So now you know. Now for the April issue only, I will take articles until the end of January (I've running behind on this issue), but after that I will be sticking to the deadline dates. You may be wondering why we need two months lead time before each issue? We are all doing this in our spare time, and it take a little time to do it too. Each issue starts with myself and the technical editor, we do our thing to each article to make sure each one is right to start with, then after we have done our editing jobs, each article goes to Paula to be layout, and then sent to the typesetters, then each issue has to be addressed and mailed. So each issue takes time, but it's time that we enjoy, at least I do!

Speaking of writing something for the Quarterly, we need articles. Remember this is your magazine, and it takes input from all of you to make it work. So get that pen out, or computer keyboard going and write me a article that you can be proud of! If you have a PC-Clone computer, you can send me or Gary you article on 5-1/2" floppy disk, 360K, in ASCII format, if not just send a typed or written copy of your article. Now remember that all technical articles go to Gary Devon, KI6DQ, and all non-technical articles go to me.

Well that's it for me on this issue, have a good winter, and if you make it to the Dayton Hamfest in April, look me up. Now if I can just figure out how to mount my Argonaut and a Hustler whip to my electric wheelchair???

Note from the Membership Chairman

Mike Kilgore, KG5F
2046 Ash Hill Road
Carrollton, Texas 75007

I'm your new Membership Chairman, and I want to let you know what I'm doing to help the club into the '90's.

I was first licensed in March of 1978 and joined the club shortly thereafter. I'm not too active on the air right now and thought this would be a way that I could contribute something to the club. I work for a major manufacturer of accessory products for Apple computers and when I heard that the membership list was kept on an Apple IIe, I volunteered.

Shortly after I assumed the position (no pun intended), I learned that the record-keeping was in need of some serious help. We now have about 1,400 subscribers to The Quarterly and have issued more than 7,000 membership numbers.

The software used to keep track of all this activity was written in 1978. For comparison, this would be like using a slide rule (how many remember them?) rather than a calculator to figure guy wire lengths. Not only is this program slow and awkward, it won't use the full capabilities of my computer. So here I was, with my Apple IIe running 4 times faster than a normal IIe, more than a megabyte of RAM, 800k disk storage capability, and having to learn a new (old) program.

Luckily, the old program saved its files to disk in standard ASCII text format. So I converted the data files to Appleworks files. For those of you who don't know Apples, Appleworks is one of the most popular programs ever written for any computer. Almost every Apple owner I've met uses Appleworks. It combines a word processor, database and spreadsheet into one program. It uses all the memory in the system, thus allowing the use of larger data files.

Now it is possible, with only one program, to enter new members or renewals into the database file, write response letters to those who ask questions, and keep the financial records of money received. An added advantage is that whoever next assumes the position will find the job easier.

The result that you will see is that the label on your Quarterly will look a bit different. But on my end, things will go smoother. I intend to see that renewals and new members are handled better and more efficiently than in the past.

The QRP ARCI is a non-profit organization dedicated to increasing world-wide enjoyment of QRP operation and experimentation. QRP, as defined by the club, is 5 watts output CW and 10 watts output PEP.

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One Transistor CW Transceiver

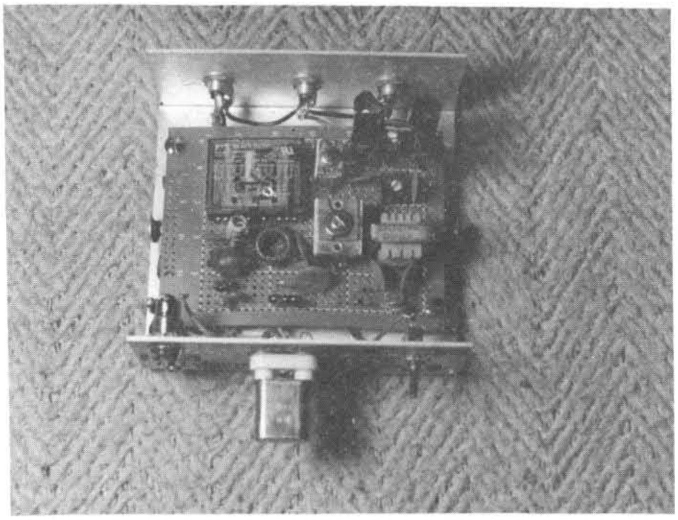
by Mark Boucher, WB3ELL
4813 Lexington
Erie, Pennsylvania 16509

In 1988, I brought this one transistor CW transceiver to Dayton. This is just a brief description; a more detailed version appeared in the February 1988 issue of 73 magazine. I had originally planned to market kits, but decided against it. After several months of experimentation since Dayton, there was still more to do before it could go to market.

This radio does work, however, and it makes more than just local contacts. When adjusted properly with the right crystal, the weakest understandable signal on 80 meters was in the 0.1 to 0.3 microvolt range, and the maximum power output during transmit was 3 watts. Best DX with it was in the 300 mile plus range.

Circuit description follows. The rig is switched from transmit to receive via the 6PDT relay RY1. Transistor Q1 is an IRF-511, high gain power MOSFET. Tl-Cl-C10 form the only tuned circuit in receive, and the combination of C11-C12-C13 and Y1 determine transmit frequency. Tl has a single layer winding of no. 26 wire, tapped at 8 turns from the cold end.

In receive mode, the radio becomes a self-excited direct conversion receiver. Fundamental type crystal Y1



(372S kHz in this version) is switched in series with trimmer cap C2. Best sensitivity and necessary T-R offset are obtained when C2 is set for the least capacitance consistent with reliable oscillator starting. Low level RF from the antenna goes via C16 to the detector diodes D1-D2-D3. Detected audio then goes via RFC1 to T2, a 1K to 20K audio transformer. The high side of T2 is

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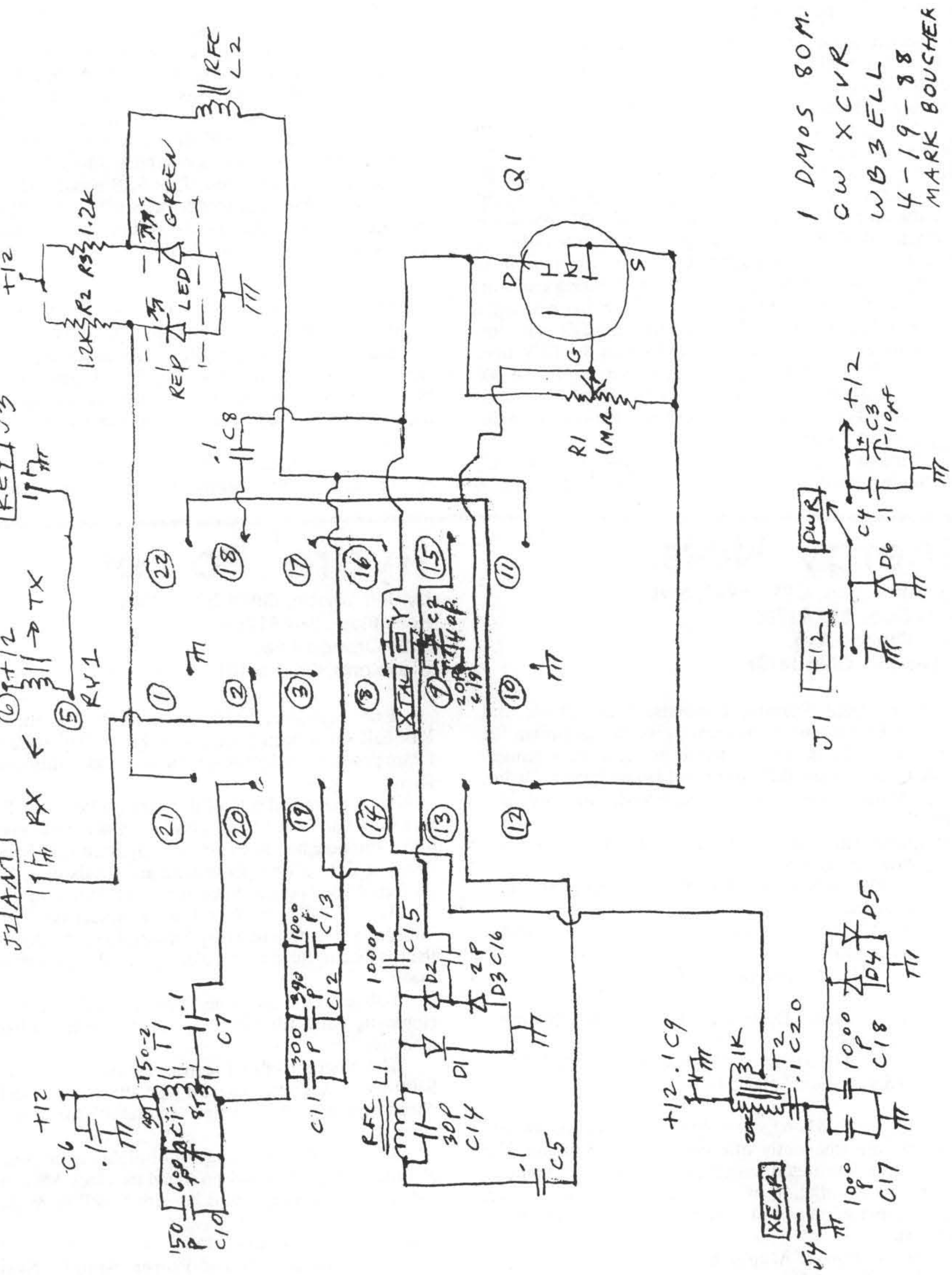
Parts List

Symbol	Supplier	Part No.	Description
Q1	Radio Shack	276-2072	IRF-511 N-Channel power MOSFET
LED1	Radio Shack	276-025	Red/green LED
D1,2,3	Radio Shack	276-1123	Germanium detector diodes
D4,5	Radio Shack	276-1101	1A, 50V silicon rectifiers
D6	Radio Shack	276-1144	3A, 50V silicon rectifier
RY1	Aromat Corp.	NL6EX-DC5V	6PDT TR relay
Y1	Intl. Crystal	031080	80M experimenter's crystal
XEAR1	Philmore	747	Crystal earphone
T1	Amidon Assoc.	T50-2	Toroid
T2	Calectro	D1-719	iK/20K audio transformer
RFC1,2	J.W. Miller	9230-80	330µh RF choke
R1	Jimpak	840P1MEG	1 megohm, 1/2 watt PC pot
C1	Calectro	A1-249	600pf compression trimmer
C2	Calectro	A1-246	40pf compression trimmer
C3	Panasonic	A1CV100	10µf, 100V electrolytic capacitor
C4,5,6,8,9,20	Panasonic	21CM100	0.1µf, 100V capacitors
C7	Panasonic	21CM010	0.01µf, 100V capacitor
C13,15,17,18	Panasonic	21CM001	0.001µf, 100V capacitors
C12	Elmenco	DM10-391J	390pf capacitor
C11	Elmenco	DM10-301J	300pf capacitor
C10	Elmenco	DM10-151J	150pf capacitor
C14	Elmenco	DM10-300J	30pf capacitor
C19	Elmenco	DM10-200J	20pf capacitor
C16	Elmenco	DM10-020D	2pf capacitor
SW1	Radio Shack	275-625	Micro power switch
J1,2,3	Radio Shack	274-376	Phono jacks
J4	Radio Shack	276-248	Mini phone jack
YS1	Steatite	33302	Crystal socket
HS1,2	Caltronics	HS-109	Transistor heatsinks
PCB	Radio Shack	276-168	Printed circuit board
Case	Ten-Tec	TG-24	enclosure


1 DMOS 80M.
CW XCVR
WB3ELL
4-19-88
MARK BOUCHER

CW Transceiver...

continued from page 4

connected to a good crystal earphone. A slight amount of RF is fed back to the gate of Q1 to provide some regenerative gain. Diodes D1 and D2 provide audio limiting and mute during transmit.

During transmit, Q1 becomes a power oscillator. C2 is shorted and the drain of Q1 is switched from T2 to Tl. The high side of Tl and T2 are connected to +12 volts. Rl is a trimpot which must be adjusted for best crystal oscillation for both receive and transmit. Q1 requires a heatsink during transmit to prevent burnout during transmit. Antenna switching is between the tap on Tl during receive and the opposite end of Tl during transmit. The relay is keyed on the relay coil by either a straight key or electronic keyer. LED1 is a red-green T-R indicator. Dl provides reverse polarity protection on the 12 V line. A 4PDT T-R switch used in conjunction with a DPDT relay would work as well if a 6PDT relay can't be found, as long as the substitute relay connects the source of Q1 to ground on transmit.

Tune carefully and use a standard type crystal to limit harmonic radiation, as a low drive crystal may cause a high harmonic output. You may wish to add a bandpass filter, although I did not find it necessary.

Simplicity causes a few problems in this unit. While the sensitivity is there, volume is low. Also, the receiver emits a possibly objectionable, low level signal. The unbalanced diode detector was used because the balanced detectors decreased receiver sensitivity. However, the detector used in this radio does a great job of detecting AM broadcast signals and close 75M SSB signals. On 40M at night, strong European broadcasters may wipe out the CW signals and during the day, the volume may be too low to copy CW, which rules out 40M.

My original purpose was to make the simplest useable CW transceiver possible. It works, but with limitations due to its simplicity. At any rate, have fun with it if you decide to build it. I built mine on a used PCB, using wires underneath to connect the parts. Tuning requires a certain amount of adjustment of the various controls.

My next project will be a type of phone kit, which I cannot talk about now without giving it away. Good luck!

Energy Nets

by Jeff Wilson, QRP# 5947, SWL
Holly Bldg., Box 91786
2400 Orange Ave.
Cleveland, Ohio 44101

Since QRP Sprints, Contests, Field Days, and Disaster Preparedness Programs give bonus points for non-commercial alternative electric power sources, readers of the Quarterly should know about Home Power (Hydro, Solar, Wind) Hams: KE5HV, KG6MM, N6HWY, and KB6HLR.

Regional Home Power Nets may be heard on the following frequencies:

7.230 MHz on Sundays at 1330 Pacific, Central, and Eastern time.

3,900 MHz on Wednesdays at 2000 Pacific, and Eastern time.

14.290 MHz on Sundays at 1900 UTC.

Novices, look for Dave, KB6HLR on the following frequencies:

7.107 to 7.110 MHz on Wednesdays at 0300 UTC, and Saturdays at 0500 UTC.

Weekend hands-on assembly and construction training seminars are frequently offered around the nation. For informative, illustrated magazine about product sources, design and installation of personal photovoltaics, hydro electric, and wind power systems, send your name and address to:

Home Power Magazine
P.O. Box 130
Hornbrook, California 96044-0130

Hydro Power

by Jeff Wilson, QRP# 5947, SWL
Holly Bldg., Box 91786
2400 Orange Ave.
Cleveland, Ohio 44101

Bob Schultze, KG6MM and Otto Eichenhofer, KB6EJR have been living with Field Day style micro hydro power for a decade on northern California's Salmon River.

They make and sell a Micro Hydro Powered Turbine that works on both 12 and 24 VDC systems and produces 4 to 80 ampere hours of current a day from very low water flows of five gallons per minute and heads of as little as 25 feet of PVC pipe and stands about a foot tall.

The off the shelf "Rain Bird" sprinkler nozzles and a "Bosch" alternator are easily replaceable components. On the top face of the unit is a clearly readable ampere output meter.

Bob and Otto are thoughtful hams that have built in electronic noise filtration to protect your radio listening pleasure.

The Micro Hydro Electric Tubine costs less than $400 and comes with standard pipe attachments, technical phone support, and a descriptive installation and operation manual.

So when the dark shadows of night cover your solar photovoltaic panel consider a round the clock Micro Hydro Electric Power Supply and be sure to tell them that the QRP Quarterly sent you.

Bob Schultze, KG6MM
Micro Hydro Electric Power Supply Systems
P.O. Box Eight
Forks of Salmon River, California 96031
(916) 462-4740

Zapp the DX with 'The Zapper'

Larry Feick, NFØZ
3333 Wagontrail Drive
Englewood, Colorado 80110

Most people will spend at least four years of their life in their automobile. If you are as serious about ham radio as I am, you will agree your driving time could be better spent operating QRP mobile. The fact is, most QRP rigs run on +12 volts, making QRP mobile a natural. If you already have a +12 volt rig, you need only add the "zapper" to your car to join the ranks of "QRPers on Wheels".

The "Zapper" is a five band, base loaded whip antenna which offers the ease of "alligator clip bandswitching", from one loading coil position to another for easy band changing. The "zapper" operates on 10, 12, 15, 20, and 30 meters. Construction is quite simple and the components are easily obtained. Total cost will range between $30 and $50, depending upon the use of an optional quick disconnect. As hams, we believe an antenna is thing of beauty and a joy forever; others may not, however. The quick disconnect makes a attractive addition to the unit, at an added cost of $20. The quick disconnect is compatible with most mobile mounting hardware.

Detail Fabrication Process
(refer to drawing)

1) Cut off a 6-1/2 inch section of ABS pipe.
2) Place one end cap on each end of the cut-off piece .
3) Mark each end cap at four equally spaced points around each end cap, 1/4 inch from the edge of the cap.
4) Using a 3/64 drill bit, drill a hole through the end cap and pipe at each of the eight marked points.
5) Measure 3/4 inch from one end of the pipe and drill a 1/8 hole.

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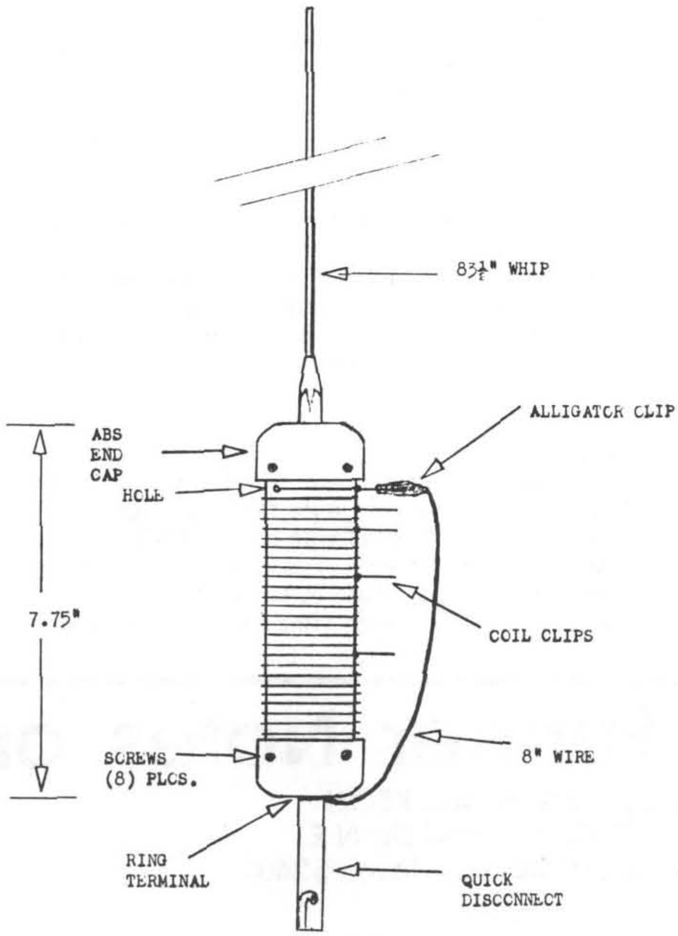

"ZAPPER" MOBILE ANTENNA
10, 12, 15, 20, and 30 METERS

Parts List

Description	Qty.	Part #	Unit Price	Source
59 µH, 10"x2" coil, 14 gauge	1	3026	$6.75	A
Coil Clips	5	S943	45¢	B
S.S. S. Metal Screws 4x1/2 (Phillips)	8	---	4¢	Hardware
ABS Pipe, Sch. 40, 1-1/2"	10"	---	$1.30	Hardware
ABS End Cap, 1-1/2"	2	---	$1.20	Hardware
Stainless Quick Disconnect (model QD-2)	1	---	$19.95	C
Ant. Specialists 102" Whip	1	---	$17.65	C
S.S. Bolt, 3/8x24x3/8	1	---	30¢	Hardware
Alligator Clip	1	---	30¢	Hardware
3/8" Ring Terminal	2	---	15¢	Hardware
8" Insulated Wire	1	---	---	---

Source Information

A) Surplus Sales of Nebraska, 1315 Jones Street, Omaha, Nebraska 68102
Phone (402) 346-4750; Add $2.50 for shipping

B) Radio Kit, 15 Londonberry Road, Londonberry, N.H. 03053
Phone (603) 437-2722; Add $3.00 service charge

C) Amateur Electronic Supply, 4828 W. Fond du Lac Ave., Milwaukee, Wisconsin 53216
Phone 1-800-558-0411; Call for shipping charge

The Zapper..

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6) Find the exact center of each cap, mark and drill a 3/8 inch hole.
7) In one end cap only, drill a 1/8 inch hole adjacent to the large hole for water drainage.
8) Cut the coil in half, using a hacksaw or hot razor blade to cut the plastic ribs. Unwind about six inches of wire from one cut-off end of the coil, and cut.
9) Sand the pipe section with coarse paper until the coil fits snugly over the pipe.
10) Make up an eight inch jumper wire with an alligator clip on one end, and a ring terminal on the other.
11) Cut off an 18-1/2 inch section from the top of the whip. Discard this section.

Assembly
(refer to drawing)

1) Slide the coil over the pipe, with the six inch wire facing the 1/8 inch hole in the side of the pipe.
2) Insert the six inch end of wire into the 1/8 inch hole. Allowing extra for ease of assembly, trim the wire enough to meet the base of the antenna at the top 3/8 inch hole, and solder a ring terminal to the wire.
3) Assemble the whip and the ring terminal in (2) to the top end cap with a nut.
4) Position the top end cap on the pipe and secure with (4) greased screws.
5) Assemble the jumper and the quick-disconnect (if used) to the bottom end cap with the 3/8 x 24 inch bolt.
6) Position the bottom end cap on the pipe and secure with (4) greased screws.
7) Assemble the five coil clips per the illustration. Count the turns from the top of the coil. 10 M tap at top of coil, 12 M at three turns, 15 M at five turns, 20 M at ten turns, and 30 M at 18 turns.

Adjustment and Closing Remarks

After the antenna is installed on your car or truck, adjust the exact coil positions for resonance using an SWR or noise bridge. My version exhibits a very flat SWR across all five bands.

Guying may or may not be necessary depending on your installation. My "Zapper" is mounted on the roof of my pick-up truck, with nylon guys tied to the base of the whip to protect the roof.

Since I finished the "Zapper" in the Fall of 1989, I have made a great many DX contacts all over the globe. Good luck and happy zapping.

Further Notes on the HW-9

by Larry Wilson KFØN
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Cedar Rapids, Iowa 52402

As related in Proverbs, "Better is a handful with quietness than both hands full and vexation of spirit with it." For me, that sums up the QRP spirit. During the Christmas holiday of 1987, my wife asked me for some gift suggestions. When Christmas morning arrived, I was the happy recipient of an unassembled Heathkit HW-9.

A tinkerer at heart, I have remodelled some HW-9 circuits, in an effort to correct the most obvious problems. After several weeks of operation, the reduced receiver sensitivity and the low transmitter power became painfully apparent above 14 MHz. These two problems are interrelated.

Curious about the performance from the passive receiver front-end, as used in the HW-9, I found it exhibited higher than expected loss up to the IF amplifier. The Collins KWM-380 transceiver uses this front-end architecture, and yields a signal-plus-noise-to-noise ratio of 10 dB or more for a .5 microvolt input signal.

The HW-9 performed an order of magnitude below this standard. The IF noise figure was about 6 dB. I obtained an estimate of 1S dB front end loss, and an overall noise figure of 26 dB. The overall receiver sensitivity was 1.3 microvolts input to the antenna for a 10 dB SNR at the output.

The actual sensitivity of the rig was measured along with the AGC gain compression, or at the point at which AGC gain compression begins.

Table 1 summarizes the following results. The degradation in sensitivity is very apparent at higher frequencies. For example, the threshold data shows a loss increase of almost 17 dB at 21 MH2 over that at 7 MH2.

The T401 and T404 transformers are designed with a high impedance transformation ratio (50:1). I removed one of these transformers to determine its performance, using a vector impedance meter. These transformers provide 2500 ohms secondary impedance when connected to a nominal 50 ohm primary source. The data is presented in Table 2.

Notice that for the primary terminated in 50 ohms, the reflected secondary load is much lower. At 7 MH2 it is 800 ohms, and falls to 560 ohms at 28 MHz.

The self-impedance of the link should be 4-5 times its terminated design impedance of 50 ohms, or between 200-250 ohms minimum at the lowest operating frequency.

BAND	ANTENNA INPUT FOR 10dB SNR (MICROVOLTS)	ANTENNA INPUT FOR AGC THRESH. (MICROVOLTS)
3.5	4.1	40.0
7.0	2.3	7.2
10.150	4.6	13.0
14.0	4.8	16.0
18.1	2.1	9.3
21.0	3.1	50.0
24.8	6.2	26.0
28.0	5.5	85.0

Table 1. Sensitivity and AGC threshold as a function of frequency.

Frequency (MHz)	Secondary Impedance with 50-Ohm primary termination	Self Impedance Of Secondary (pri. unterm)	Self Impedance of one-turn link (sec. unterm)
3.5	750 @ +8°	2900 @ +18°	33 @ -4°
7.0	800 @ -8°	2700 @ -30°	38 @ -18°
14.0	740 @ -26°	1500 @ -58°	26 @ -18°
21.0	620 @ -45°	1050 @ -70°	26 @ -28°
28.0	560 @ -48°	850 @ -70°	15 @ -12°

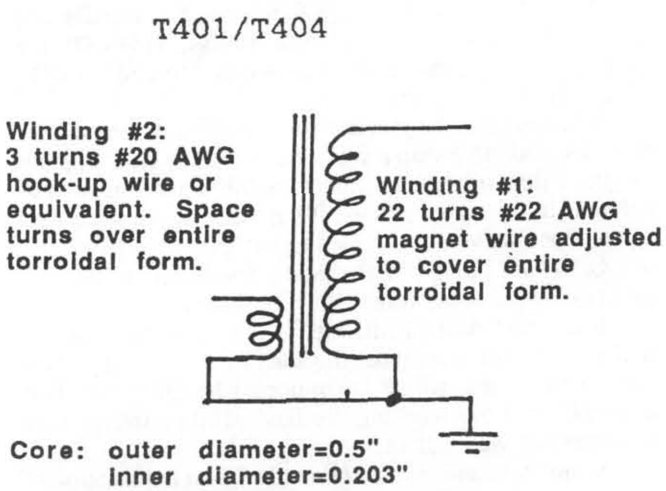
TABLE 2. Measured complex impedance in ohms for original T401 & T404.

This is one of the sources of low drive in transmit at the high frequency end, as T404 is in the exciter path. Therefore, I wound replacement transformers for T401 and T404 using cores obtained from work, as shown schematically in Figure 1.

The new transformer design was measured on the vector impedance meter with a 50 ohm termination on the primary. The secondary impedance was over 2000 ohms over the entire frequency range. With the new transformers installed, I remeasured the receiver sensitivity, as shown in Table 3. The improvement in sensitivity was noteworthy on 80 meters and above 17 meters.

Unfortunately, the core used is only available from an industrial original equipment (OEM) supplier, and is not available in small quantities. However, AMIDON (advertised in QST and other amateur radio publications) has excellent cores which may equal or outperform the ones I used, Their 1988 catalog has a complete listing of Ferrite cores, and also contains basic information on broad-band transformer design.

Two cores which closely approximate the one I used are the FT-87-J or the FT-87A-J. After winding the transformer, coat it with some GC Polystyrene Q-Dope available from most radio/TV parts stores. Don't forget to realign the bandpass filters, as their termination impedances will have changed.



Core: outer diameter=0.5"
inner diameter=0.203"
"J" material
initial perm.=5,000
A1=5,640 Mh/1000T

Figure 1. Replacement transformer details, T401 & T404.

Changing T-404 to a more efficient design will result in an increased drive by several dB at 28 MHZ. I also discovered a premature cut-off of the 12/10 meter low-pass filter section, and found that the actual cut-off frequency was around 26 MHz. By 28 MHZ the response had deteriorated significantly. I removed L443 and L444 from the PC board, removed one full turn from each coil, trimmed the leads, and reinstalled the two coils. The new cut-off frequency was 43 MHz, and the filter response was over 20 dB down by 46 MHZ.

Even after the changes were made, the power output remained low at the high end of the 10 meter band. As a last resort, I removed T403 from the board, and replaced it with a small transformer with a 2:1 turns ratio wound on an old ST core. The output power doubled at 28 MHZ! I also noticed a significant improvement in available power output at all frequencies above 7 MHz.

Again, a search through the AMIDON catalog revealed several candidates for core materials. Several of the "BALUN" cores on page 57 of the 1988 catalog look like good candidates as well as those used for T401 and T404.

Some comments on transmit instability problems are in order. Especially on 15 meters, trouble with transmitter oscillation is common. AS the CW level control is slowly advanced, a setting is reached at which the output indicator jumps abruptly, indicating a regenerative condition. You can eliminate a VHF/UHF parasitic oscillation by the addition of a small series r-c network across critical points in the exciter circuitry.

A sweep of the exciter with a signal generator revealed that two chokes, L401 and L421 exhibited a resonance response around 19 MHZ. Since this is a high impedance point at the exciter input, it is very susceptible to any stray pickup. This is compounded by the fact that these chokes are not shielded, and are vulnerable to stray coupling.

I replaced these chokes with two handmade inductors wound on toroidal forms. A self-shielding toroid minimizes stray pickup. Select a small core with an AL value yielding 100-150 uH of inductance with 10-15 turns on the core. Or, purchase shielded inductors of equivalent values. This change reduced unwanted oscillations greatly. I also bypassed the switched +12V supply side of R423 and L426 with small .01 MFD capacitors, lap soldered to the rear of the board.

The VFO drift and dial calibration problems were my primary concerns even before I started building the kit. There are two sources of drift in the VFO circuit: the fixed capacitors providing the capacitance in the VFO tuned circuit, and the high permeability core used to tune the inductor. I replaced C182-C187 with equivalent polystyrene capacitors. These capacitors have excellent stability characteristics, and are generally available. You don't need the exact values shown, as long as each paralleled branch adds up to the same value as on the schematic. I used a 1200 pf and 330 pf in parallel here. Be certain to purchase smaller size capacitors, such as 22 pf or 33 pf as padders to adjust the resonant frequency.

It has been suggested that replacing the L118 core with one of lower permeability would yield better stability. A suitable low permeability may be found in older TV tuners. The proper core should have a yellow dot on it, and should work well in this application. Since I was unable to obtain this core, I did the following instead.

1. Unscrew the core of L118 from the coil form.
2. Wrap or tape some padding around one end of the core and very carefully clamp the padded end in a vise.
3. Using an exacto saw or fine flat blade file, carefully saw off one-third of the core's length. It is very brittle, so use extreme care.
4. Debur the small piece of core material and reinsert it into the coil form. The optimum position was between the main winding and the tickler winding of L118, fairly close to the PC board.

I had no trouble aligning the VFO on frequency, despite the smaller core. These steps were performed as the HW-9 was being assembled, thus no before/after comparison can be made.

I wanted to bandspread the VFO to assure a slower tuning rate. I reduced the VFO coverage from 275 kHz to 150 kHz by inserting a 33 pf capacitor in series with the main tuning capacitor.

To assure perfect dial calibration, I sanded off the original painted dial with fine sandpaper. First, after taping down the dial to a flat work surface, I used a compass to lightly circumscribe an arc where the original calibrated circle had been. I then assembled the dial to the vernier tuning shaft with the hardware supplied. A temporary dial pointer was made from a piece of wire clipped to the chassis top behind the dial, and bent over the dial face.

After the VFO end points were set, I placed vertical pencil marks across the circle behind the pointer, starting at 6000 KHZ (VFO frequency) and down every 5 kHz thereafter, until the entire dial was calibrated. A general

Band (MHZ)	Antenna Input For10 dB SNR (microvolts)	Antenna Input Sensitivity Improvement (dB)
3.5	1.5	+8.7 dB
7.0	2.1	+0.8 dB
10.150	3.8	+1.7 dB
14.0	4.0	+1.6 dB
18.065	1.8	+1.3 dB
21.0	1.7	+5.2 dB
24.8	2.2	+9.0 db
28.0	3.3	+4.4 dB

TABLE 3. Sensitivity data with new T401 & T404 installed.

coverage receiver with a BFO and an accurate frequency readout makes an excellent calibration standard.

To finish this dial, I used model paint to place small colored dots at each calibration mark, applied with the end of a toothpick. Using small (1/8") dry transfer letters, I labelled the red 25 kHz marks. I edge lit the dial using four miniature red LEDs available at Radio Shack. The LEDs are soldered to a narrow strip of printed circuit breadboard, which I epoxied to the top edge pf the inside chassis apron above the dial. Another set of four green LEDs is mounted on a bracket behind the meter for backlighting (made of the printed circuit material). The string of LEDs is connected in series with an 87 ohm resistor, added for current limiting, which connects to the power switch.

If there are corrections, comments, or questions regarding this article, please contact me. I would count it as a pleasure to help anyone through the changes discussed, or to correct any errors.

Members' News

Fred Bonavita, W5QJM
Box 2764, San Antonio, Texas 78299-2764

NOT SO FAST THERE! Member **George Burt, GM30XX**, says while **Dan Walker, WG5G**, may have been one of the first to qualify for a QRP endorsement on his Worked All Zones certificate, he was not the first to have worked all zones at low power (see Members' News, The Quarterly, October 1989).

The report about Dan's activities "should have said he was the first person to hold a WAZ endorsed QRP," George says from his home in Edinburgh, Scotland.

"I don't claim my WAZ award is the first, but it's a bit before Dan's," George continues. "Mine is certificate No. 5284 and dated May 15, 1982."

George won his award using 950 mW output from a homebrew transceiver into a center-fed Zepp mainly on 14 MHz.

"In 1982, they would not endorse WRZ for QRP," George notes, "so I guess it would be easy to find out who was first. I would also think Chris Page, G4BUE, has worked WAZ/QRP."

Lee Haijsmsan, W4KA, who manages the WAZ award for CQ Magazine, which owns the rights to it, says his records do not show who got the first QRP endorsement for that sought after piece of wallpaper. However, the endorsement is available on request, provided all other conditions for the award for working the 40 zones are met.

A DEATH IN THE QRP FAMILY? Details are sketchy, but word is that **Adrian Weiss, WØRSP**, the QRP editor at CQ magazine, has decided to end his QRP DXCC Trophy program.

Ade could not be reached for comment, but he apparently decided more than a year ago to end the once-popular program that provided some fact-filled reading in hes columns in CQ. (By the way, it has been much more than a year since we've been treated to any offerings from Ade in CQ. What's going on? Perhaps a few letters to the editor could shake loose some QRP columns.)

It appears Ade's Milliwatt DXCC Trophy program will continue at least until the turn of the century. This handsome trophy, which is supported by QRP ARCI, is available to those working the basic 100 countries with less than one watt output.

Meanwhile, efforts will be made for an explanation of the reasons for Ade's decision to fold the QRP DXCC Trophy and will appear here as soon as possible. Stay tuned.

SPEAKING OF MILLIWATTING: A Laurel and Hardy "well done" to **Randy Rand, AA2U**, of

G-QRP 126

1 W IN/OUT

GM3OXX

Denville, N.J., for having received the last QSL card needed to qualify for five band DXCC/QRP, much of it at one watt or less output.

Randy's dogged pursuit of the award began in 1983 when he decided to go after DXCC on 40 through 10 meters. "It took a few years to complete 40 meters, and I just barely finished 10 meters before Cycle 21 dropped to the point 10 meters was not open," he recalls.

"At that point, I stopped and did not really consider attempting a five band DXCC/QRP until 1986," Randy says. "During the fall of 1986, I began to work 80 meters using only a 40 meter dipole fed with open wire as a vertical by feeding it against ground."

After working 55 countries with some effort, Randy swapped his dipole for a full-wave loop on 80 meters, and results picked up: "I even had a station in Europe call me at the end of another QSO because they found it hard to believe anyone would work DX QRP on 80 meters. Conditions were really exceptional that year."

Randy says he found conditions on the high bands so good that much-needed DX was up there instead of being around 80 meters when he needed the contacts. And a few QSL's were "quite difficult to get, although many stations were very quick to respond."

The highest power used on any contacts was three and a half watts output. DXCC on 20 through 10 meters was achieved using verticals and wire antennas, although he now has a three-element tribander at 24 feet in pursuit of QRP-DXCC-300 award. He's also one QSL short of qualifying for WAZ/QRP.

Of the 250 countries worked QRP, Randy says proudly, 156 were at less than one watt output and 98 were at less than 100 milliwatts output.

INTERNATIONAL QRP DAY is Saturday, June 17th, so mark your calendar now. In fact, set aside the week of June 9-17 and try to be on all QRP frequencies during the period.

The annual June 17th observance has been marked for several years by European QRP'ers, but interest in joining in the fun is spreading to this side of the pond, too. G-QRP Club in the U.K. has a contest during the period with several awards, including a trophy for the operator submitting the best log from the week.

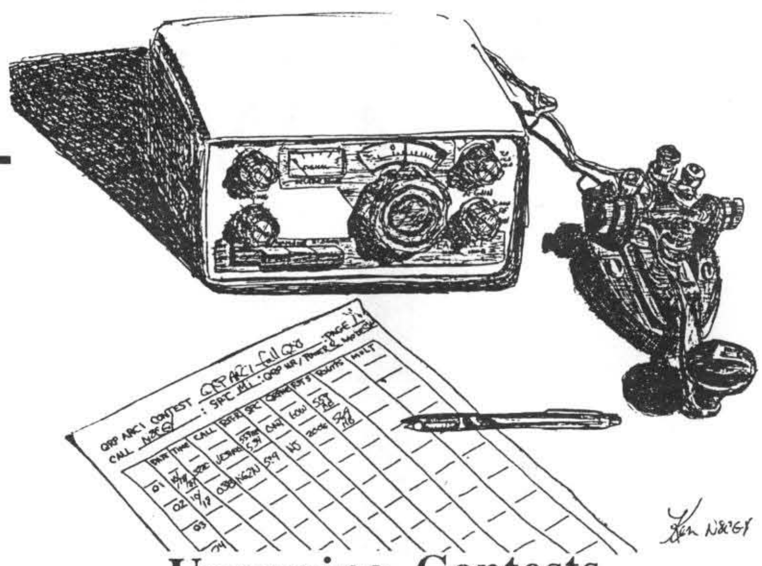
If there is enough interest this year, the annual event can be expanded to include awards and the like that make it truly an international event. Send accounts of your activities during this period to me for inclusion in the October Members' News column, please. If nothing else, test your Field Day gear during this period.

DID YOU FORGET? Response to the request in October for recommendations for new QRP frequencies for the 12-, 17-, and 30-meter bands has been less than whelming. Folks, if we are to have any impact on picking those frequencies, we need your comments and proposals now.

See the October issue for an explanation, and then shower down your feelings, please, to the address above. Send along some additional news about your activities at the start of this new decade, too. Thanks.

Contests

Red Reynolds, K5VOL
835 Surryse
Lake Zurich, Illinois 60047



Effective in 1990 two new categories for all contests will be allowed. These are the 'LO-BAND' and 'HI-BAND' classes. The LO-BAND will be for multi-band operation on 160, 80, and 40 meters only. HI-BAND will be for 20, 15, 10, and 6 meters only. This will help the small-antenna-farmers who do not have enough land to to install a killer 80 meter antenna, or get wiped out on one end of the spectrum but still want to try multi-band operation.

WD71 set a new record for 20 meter single band score with 300,440 points. W8MVN set a new record for 40 meter single band with 284,720 points. The Colorado QRP team set a new team record with 3,825,663 points.

Most of the entries notes problems with the solar event during the QSO party. It also seems a lot of relatives chose that week-end for visiting!

Watch for the G-QRP-Club ramble June 9-17. The 17th is named International QRP Day. Also watch for the next Quarterly for plans for an ARCI event on the 17th to support QRP.

1989 has been a devastating year here with work consolidation of two incompatible data-centers, LOMA exams and family commitments. Most have noted I haven't been in contests or nets. Hopefully now I can get caught up by year-end. Thanks for your patience and words of encouragement.

Upcoming Contests

(CW unless otherwise noted)

March 11, 2000-2400Z
Classic Sprint (CW & SSB)

April 14, 1200Z to April 15, 2400Z
Spring QRP Contest

May 27, 2000-2400 local time
Hootowl Sprint

July 15, 2000-2400Z
Summer Homebrew Sprint

Aug. 12, 2000-2400
Summer Daze Sprint (SSB)

FALL 1989 QSO PARTY

TOP TEN

1	WIXE	2,916,396
2	AA2U	2,798,400
3	WD2H	2,426,400
4	W3TS	2,142,600
5	WAOZPT	1,600,788
6	N9AW	1,478,379
7	KH6CP/I	1,300,100
8	NFOZ	1,224,000
9	K3TKS	1,044,900
10	NIFJ	1,024,900

SINGLE BAND

160 M		
80 M	AB4LX	40,068
40 M	W8MVN	284,720
20 M	WD71	343,200
15 M	N6GA	45,724
10 M	EAIKC	6,176
6 M		

****

CALL	SCORE/POINTS/SPC	POWER	BANDS TIME	RIG	ANTENNA
ALABAMA					
N4OHB	84,630/ 273/ 31	.96	20M/ 2	IC-735	Gem Quad
W4DGH	21,945/ 110/ 19	4.0 B	3 / 5	Argosy-2	Dipole
ARIZONA					
WD71	343,200/ 429/ 40	1.0 S	20M/17	IC-725	5 Slope dipole

ARKANSAS					
W5TB	445,575/ 457/ 65	.90 B	4 /24	HW-8	Random wire
CALIFORNIA					
N6SXF	470,862/ 606/ 74	2.0 B	4 /22	KW-440s/m	Spyder
W6SKQ	384,678/ 639/ 86	2.0	4 /12	Argo 515	Yagi/Skel Cone
AJ6T	232,155/ 402/ 55	5.0 B	2 / 7	FT-726R	---
W6MVW	216,384/ 483/ 64	4.0	4 / 7	TS-440	Vertical
KIEQA	174,636/ 308/ 54	2.0 B	4 / 6	Argo 509	Inv Vee/Vert
W8QZA	59,192/ 302/ 28	5.0	20M/ 9	AT-I/VF1/51J4	Yagi
N6GA	45,724/ 142/ 23	4.0 S	15M/ I	HW-9	Yagi
COLORADO					
WIXE	2,916,396/1467/142	4.0 S	7 /23	IC-740/1C-551	Yagi/Vert/Vee
NFØZ	1,224,000/ 850/ 96	.90 B	5 /22	Century-22	Yagi/Zepp
WØKEA	551,754/ 604/ 87	5.0 B	5 / 8	Argo 509	Yagi/Dipole
KRØU	291,753/ 421/ 66	5.0 B	7 / 7	IC-745/FT-726	Yagi/Vert
KIØG	6,568/ 22/ 4	1.5	20M/ 1	2-FER XCVR	Yagi
CONNECTICUT					
KH6CP/I	1,300,100/ 970/ 95	4.7 S	6 /23	Argo 515/HB	Dipole/Vert
WIHUE	496,125/ 525/ 63	.90 B	5 /19	HWO9/m	Dipole/Inv L
K8HVT	458,003/ 719/ 91	5.0	6 / 8	TS-940S	Yagi/Zepp
NNIG	285,689/ 474/ 57	4.0 B	5 / 7	HW-9/VXO Tx/ TS-130V	Windom
WAITRY	122,400/ 255/ 24	1.0 S	4 /14	Argo 515 Rain Gutter L	
WIKKF	90,680/ 306/ 20	3.0 S	40M/ 7	W7EL/m G5RV/Vert	
NTIE	57,300/ 191/ 20	1.0 B	4 / 8	TS-440S	G5RV
FLORIDA					
K4KJP	540,736/ 568/ 68	2.0 S	5 / 9	Argo 509	Yagi
GEORGIA					
KB4GID	964,656/ 929/ 99	5.0 B	5 /21	TS-140S	Dipole/LW/Vert
N4LDZ	276,917/ 447/ 59	4.0 B	5 / 6	Argo 509	Bugcatcher
WA41ML	56,700/ 180/ 30	2.0 B	4 /10	Argo 509	Inv Vee
AB4LX	40,068/ 159/ 24	5.0 B	80M/ 3	TS-120	Loop
IDAHO					
KA7NOC	202,020/ 481/ 60	3.0	3 /17	TS-430S	Yagi/Vert
KF7ET	3,654/ 58/ 9	4.0	IOM/ 3	Argosy 525	Yagi
ILLINOIS					
NF9X	205,110/ 318/ 43	.80 B	3 /13	TS-130V	Vertical
K5VOL	12,425/ 55/ 9	.80 B	20M/ 1	2-FER XCVR	Longwire
IOWA					
KFØN	214,830/ 495/ 62	4.5	5 /13	HW-9/m	Vertical
KANSAS					
WØTID	42,021/ 207/ 29	5.0	3 / 5	FT-7	Dipole
MARYLAND					
K3TKS	1,044,900/ 810/ 86	.90 B	5 /19	Argo 509	Loop
KB3HH	249,900/ 510/ 70	5.0	5 /11	TT-540	Yagi/G5RV
KC3MX	96,229/ 233/ 59	5.0	4 /16	TS-680S	Dipole/Sloper
MASSACHUSETTS					
NIFJ	1,024,100/ 665/ 77	.90 S	5 /16	IC-735	Yagi/Dipole
NJIT	154,000/ 400/ 55	4.0	5 /13	HW-9	Yagi/Dipole/Vt
WIXH	61,299/ 278/ 21	2.0 B	4 / 8	HW-8	G5RV
ADIC	50,360/ 132/ 23	.90	4 / 2	HB RX/TX	G5RV/Vert

MICHIGAN					
N8CQA	434,007/ 498/ 83	5.0 B	5 /19	HW-9	Longwire
WD8DWM	8,600/ 66/ 10	.90	80M/ 4	DX-440/HA5/m	Longwire
MINNESOTA					
WAØRPI	283,542/ 628/ 43	5.0 B	4 /19	Hw-9	Loop
KBØR	35,429/ 161/ 27	5.0	3 / 3	HB QRP-20/ FT-107	Vertical
WBØL	16,660/ 119/ 20	4.0	3 / 6	IC-735	G5RV
MISSOURI					
WØAV	396,788/ 766/ 74	3.0	5 /10	TS-940	Sloper
WØRCZ	300,440/ 406/ 37	.90 S	20M/II	Argosy 525	Yagi
NFØR	103,225/ 339/ 29	5.0 B	20M/ 6	Argosy-2	Indoor Zepp
NEBRASKA					
NØBQW	45,413/ 173/ 25	4.0 B	2 / 3	HW-9	Loop
NEW HAMPSHIRE					
KNIH	865,840/ 653/ 64	.75 S	6 /18	HB VXO/HB RX(S)	Dipole/Long
NICUU	245,786/ 441/ 52	5.0 B	4 /20	2-FER/HW-9	G5RV
NEW JERSEY					
AA2U	2,798,400/1166/120	.95 S	5 /24	Argo 515	Yagi/Dipole
KR2Q	639,576/ 972/ 94	4.0	6 /19	TS-940S	Yagi/Wire
KD2JC	159,152/ 392/ 58	3.0	4 /11	HW-9	Yagi/loop
K2JT	137,025/ 290/ 45	4.0 B	5 / 4	Argo 515/HW-9	G5RV
W2JEK	39,656/ 104/ 18	4.0 B	4 / 4	2-FER XCVR	Dipole/GP
WA2BQW	16,303/ 137/ 17	5.0	20M/ 4	IC-735	Inv Vee
NEW MEXICO					
W5TTE	376,200/ 342/ 55	.90 S	4 /10	Argo 505	Button Bm/Vert
NEW YORK					
WD2H	2,426,400/1011/120	.90 S	6 /23	Corsair-2/ Argo 509	Yagi/loop/vert
W2PFS	443,520/ 396/ 56	1.0 S	5 / 8	TS-130V	Dipole/Loop
WB2QAP	184,275/ 315/ 39	.90 B	3 /10	Argo 509	Inv Vee
W2FB	131,712/ 392/ 48	4.0	5 /12	HW-9/0mni	Yagi/Zepp
W2QYA	86.880/ 233/ 32	.90 B	3 /11	HW-8	Longwire
WN2Q	50,960/ 182/ 40	4.0	3 /12	HW-9	Loop
NORTH CAROLINA					
N4ELM	125,066/ 277/ 43	5.0 B	5 / 6	Paragon	Dipole
OHIO					
W8MVN	284,720/ 540/ 37	2.0 S	40M/22	HB XCVR	Loop
WA8RJF	113,582/ 427/ 38	5.0	2 /15	Argo 515	Dipole
WV8P	16,891/ 127/ 19	5.0	3 / 3	TS-440S	G5RV
W8KYD	5,250/ 75/ 10	4.0	80M/ 3	HW-8	Dipole
OKLAHOMA					
WD5GLO	356,405/ 599/ 85	3.	5 / 8	Argo 509	Yagi/Inv Vee
K5DP	45,248/ 202/ 32	2.0	4 / 4	HW-9	Loop
OREGON					
WX7R	87,808/ 224/ 28	4.0 S	3 / 5	IC-735	Quag/Vee Beam
W7LNG	13,270/ 115/ 14	5.0	2 / 3	HB PP 45's/ T4XB/R4B	---
PENNSYLVANIA					
W3TS	2,142,60o/ 958/110	.90 S	7 /16	HB XCVR (S)	Yagi/Inv Vee
N3FYW	124,740/ 264/ 45	5.0 B	5 / 6	HW-9	Dipole
WA3SRE	108,836/ 338/ 46	4.0	5 /15	Argo 515	Yagi/Vert
K7HYA	8,568/ 68/ 9	1.8 S	40M/ 3	HW-8	G5RV/Sloper
N3GLK	3,220/ 46/ 10	5.0	2 / 2		

RHODE ISLAND					
WI6I	277,605/ 551/ 72	5.0	5 /11	HW-9	Dipole/Inv Vee
KA9HAO	48,840/ 148/ 22	.80 B	3 / 8	Argo 515	Loop
SOUTH DAKOTA					
WAØZPT	1,600,788/1292/118	5.0 B	5 /23	IC-735	Loop/G5RV/Vert
TENNESSEE					
KV4B	265,320/ 402/ 44	.90	3 / 7	Argosy	Yagi/Inv Vee
WM4U	46,536/ 277/ 24	4.0	20M/ 5	TR-7	Yagi
TEXAS					
WB5FKC	933,280/ 614/ 76	.90 S	6 /--	Delta	Longwire
WG5G	212,807/ 707/ 43	5.0	20M/15	TS-130V	Gem Quad
K5HDX	148,771/ 401/ 53	1.5	3 /19	HW-8	Dipole
K5SN	22,057/ 137/ 23	4.0	2 / 3	HW-8	Vertical
VIRGINIA					
W41F	292,565/ 643/ 65	5.0	3 / 8	TS-940S	Yagi/Dipole
W4XD	91,504/ 304/ 43	5.0	3 / 7		
WASHINGTON					
KF7MD	447,730/ 610/ 66	1.5 B	5 /21	HB XCVR (S)	LP BEAM/Loop
WISCONSIN					
N9AW	1,478,379/1246/113	5.0 B	5 /19	Argo 515	Yagi/Vert
NA9M	565,582/ 665/ 81	2.0 B	5 /14	Argo 509	Yagi/G5RV
KA9VAX	114,840/ 264/ 29	.80 B	20M/ 6	Argosy 1	Inv Vee
BRITISH COLOMBIA					
VE7SL	256,200/ 420/ 61	1.0	4 / 7	TS-440S	Yagi/Sloper
ONTARIO					
VE300L	lo8,045/ 315/ 49	3.0	5 /10	Argo 509	Yagi/Dipole
QUEBEC					
VE2BLX	35,532/ 188/ 27	5.0	3 / 5	FT-101	Longwire
VE2ABO	13,230/ 84/ 15	3.0 B	2 / 5	HW-9	Yagi/Loop
SASKATCHEWAN					
VE5VA	88,605/ 179/ 33	.90 B	3 / 7	IC-735	Quad
SPAIN					
EAIKC	6,176/ 24/ 7	4.0	IOM/ 1	HB XCVR (S)	Longwire

CHECK LOG: N9GRF, K6QWH

Time of operation rounded to nearest hour
B = Battery power
S = Solar / natural **(S) = Superhet**
/m = Modified **GP = Ground Plane**
HB = Homebrew **LP = Log Periodic**

Contest Frequency Change

It has come to our attention the QRP contest frequency listed for 6 meter phone, 50885 kHz, is actually allocated to radio-controlled recreation. So as not to wreak havoc with expensive RC airplanes around the world, it has been determined that 50300 kHz is a more appropriate phone contest frequency. Please make a note of the change for future contests.

TEAM COMPETITION

Colorado QRP Team +1 (W1XE, KRØU, WØKEA, KIØG, W8QZA)	3,825,663
Georgia Peanut Whistles (N4LDZ, WA4IML, KB4GID)	1,298,273
KR2Q QRP Team (KR2Q, AA2U)	3,437,976

Idea Exchange

Michael Czuhajewski, WA8MCQ
P.O. Box 232
Jessup, Maryland 20794-0232

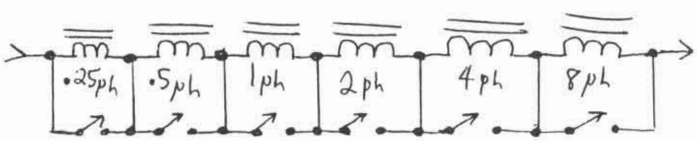
HOMEBREWER'S NET

There is an informal homebrewers net on 3757kHz SSB every Monday night at 2130 hours Eastern Time (normal or Daylight Savings time). Some of the regulars are Mike Michael, W3TS and John Collins, KN1H. I joined them a few times and found it very interesting. You don' t have to limit yourself to running QRP to check in, and many of the people run considerably over the 5 watt "legal" QRP limit.

Strictly speaking, this is a homebrewers net, not a QRP net. Unfortunately, not everyone has a license which allows them to transmit on that frequency. It could be higher in the band, but then QRM would be greater. However, it can still be quite enlightening to just eavesdrop. Either way, give a listen some Monday night and you might find it enjoyable.

RE W3TS STEPPED INDUCTOR

In the Idea Exchange in the October 1989 issue, W3TS presented a stepped inductor using several toroids and DPDT switches. He passed along the following update, which allows use of SPST switches instead of DPDT. As shown, a maximum of 15.75 microhenries is obtained with all switches open. Close the appropriate ones to bypass individual coils to get the desired inductance.



SOURCE OF CRYSTALS

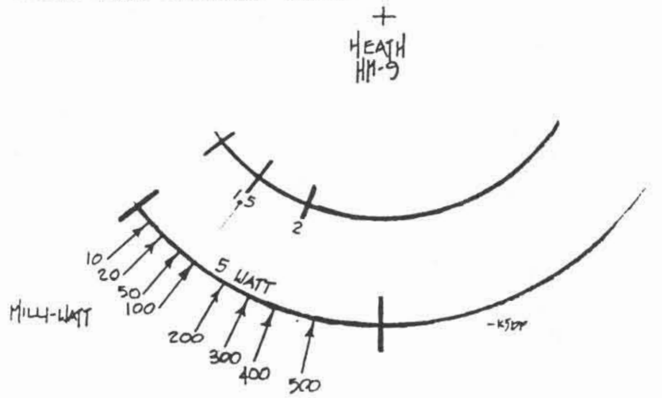
If you browse through the Ham-Ads (classifieds) in the rear of QST, you might have noticed one for CW Crystals, out of Marshfield, Mo. Some of their crystals occasionally appear in photos in The Quarterly, too.

I finally broke down and sent away for a handful for 40 meters. Some of the local QRPers had very slow delivery a year ago, perhaps two months or so. However, the owner later wrote a letter of apology, saying that he had a fire. When I ordered mine in the fall of 1989, it only took about two weeks.

You can get 80 and 30 meter crystals in FT-243 holders for $2.95, five or more for $2.50 each. Forty meters go for $2.95, five or more for $1.95 each (!), and he has others at various prices. Postage is 35¢ per crystal. For four stamps or $1, he'll send you a price list and some oscillator circuits. The address is CW Crystals, 570 N. Buffalo St., Marshfield, MO 65706.

Don't order based on these prices—get a current list first. Prices invariably remain rock solid for years and suddenly shoot up between the time an article is written and appears in print. The prices are somewhere between quite reasonable and ridiculous, probably the lowest you'll see outside a hamfest—and you choose the frequency . I have been very satisfied with the crystals I got from him.

MILLIWATT CALIBRATION FOR THE HEATH HM-9



Mark Miller, K5DP of McAlester, Okla. writes— The Heathkit HM-9 QRP wattmeter is an excellent Companion for the HW-9 (see QRP Quarterly, January 1988). Along with SWR, the meter is calibrated for Ø to 50 watts. The 1 and 10 graduations are at about half scale, making the meter ideal for milliwatting.

Unfortunately, there are no graduations below 1 watt. I developed the accompanying figure by setting my transmitter output at 1, 2, 3, 4, and 5 watts on the 5 watt scale and noting the readings when I switched to the 50 watt scale. By doing this I obtained points for 100 through 500 milliwatts when the switch is set for the 5 watt range. I repeated the procedure using this information and obtained points down to 10 milliwatts. The 1.5 and 2 of the SWR scale and the words "5 WATTS" are shown for reference.

Admittedly, the use of a dummy load and VTVM or DVM would provide more accurate results. However, this method was quick and entirely adequate for my needs. After all, what are a few milliwatts between friends?

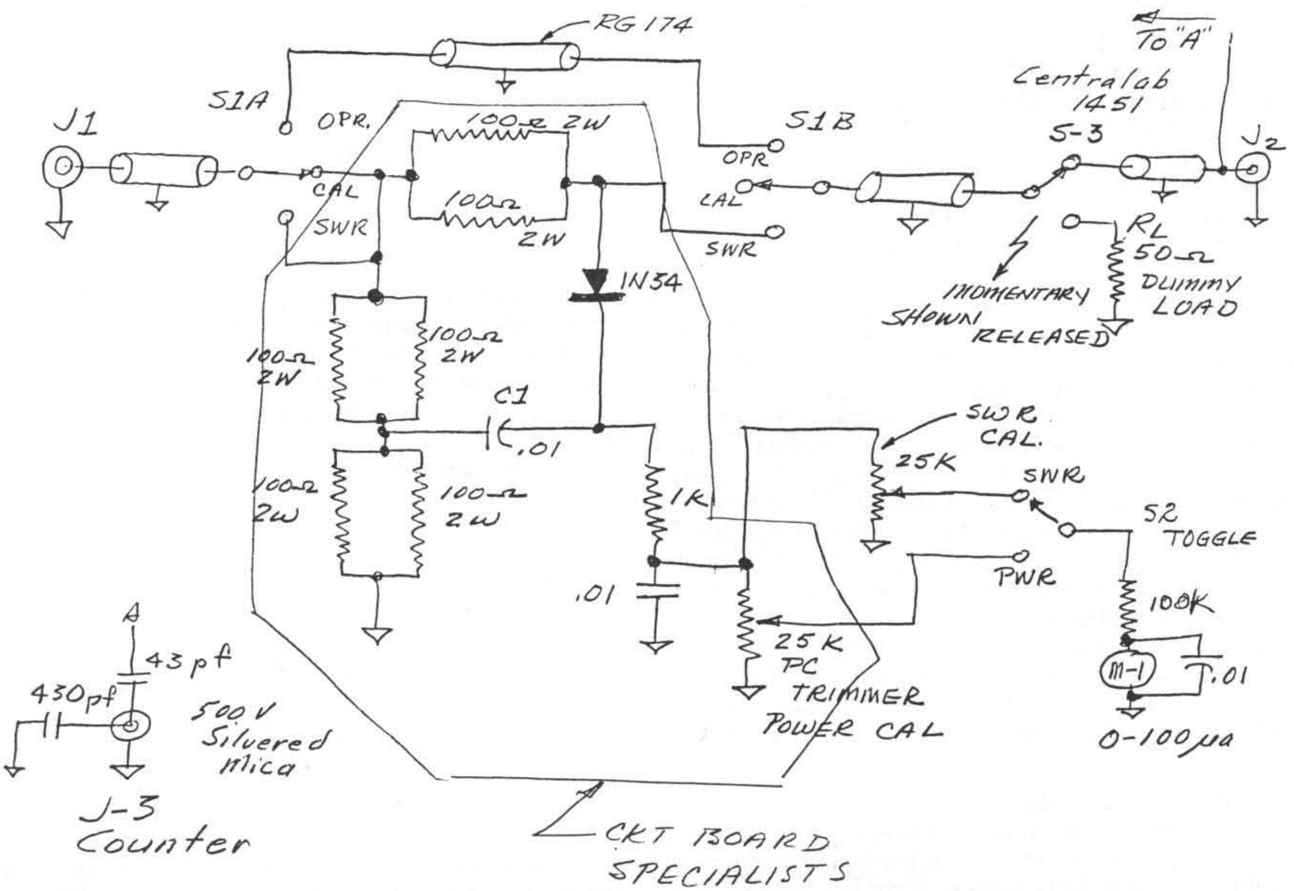
RF POWER METER

From Luke Dodds, W5HKA: Many Doug DeMaw articles include the word "Beginner" in the title. All feature utility and simplicity. An excellent, inexpensive, RF power/SWF bridge is on page 38 of August 1983 QST. It's perfect for QRP, and well above "Beginner" performance. It is in my QRP setup full time.

The article procedures call for a dummy load from time to time. I built one in which S3 (in my schematic) is a spring loaded wafer switch so it can't be left connected accidentally.

I used a 100 microamp meter from a salvaged Swan. It easily calibrated to 0-10 watts and tracked well down scale. Replacing the 100K resistor in series with the meter can adapt to other ranges .

The Circuit Board Specialists kit is excellent. All parts are first rate. The kit provided 100 ohm, 2 watt metal film resistors. I substituted carbon composition units per the QST article. Some metal film resistors exhibit 3 to 5 times the inductance of carbon composition



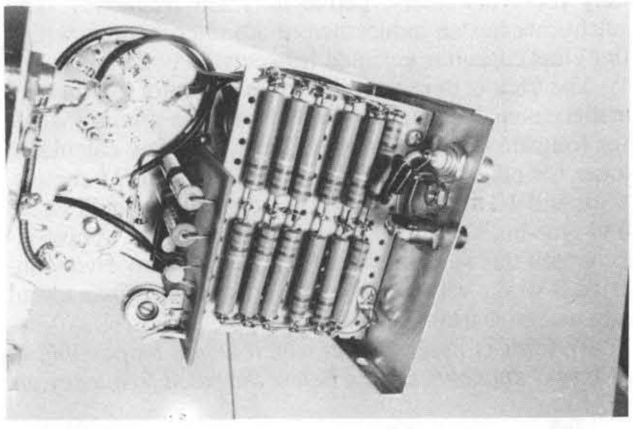
ones. (See QST for November, 1983; Manufacture and Use of of Resistors, by WA3VIL.)

I added the capacitive divider for a frequency counter. It drives my Opto-7000 at 2 watts. My HW-8 dial calibration is a bit weird.

Tests of paralleled 100 ohm resistors on Hewlett Packard 4815A RF Vector Impedance Meter:

Freq MHz	Carbon Composition Ohms	Degrees reactance	Metal film from CBS Ohms	Degrees reactance
2	52	+1	51	+1
4	52	+2	51	+2
7	53	+4	51	+4
14	53	+6	52	+8
21	53	+8	53	+13
28	55	+12	54	+18

Ability to read the impedance meter is limited to plus/minus 2 ohms; and 2 degrees. The difference between the two kinds; of resistors is not great. Higher value metal film resistors show greater inductance since more turns are necessary in the helix from trimming.



QRP ON THE ICOM 751A

Dave Johnson, N7ICC of Helena, Mont., passes this along—As an owner of the Icom 751A, I found the article on page 8 of the July 1989 Quarterly interesting. I have used the ALC controller but haven't been able to get it to provide a rock stable output. Less than a -1 volt difference drives it down to no output. With the rig being adjusted with the controller, the output has a tendency to drift lower.

For outputs between approximately 1 and 10 watts out, I have used the info provided by the Icom techs in Washington. They indicated that R87, which is located near the high/low switch, adjusts the minimum and maximum output, which then may be controlled by the RF power control on the front pane. This has worked for me for about a year and a half now with no complaints. I believe that the article in Icoms advertisement may be misread. True, the 751A doesn't have a pot that will limit only the minimum output as with the other models of Icoms. R87 limits both the minimum and maximum output regardless of operating mode.

Due to the XYL's QRO net operations, I drilled a hole in the rig's top cover that allows me to easily adjust R87 for a minimum output. This has kept peace in the family and still allows me to be able to QRP whenever desired.

IF TRANSFORMERS

This tidbit is passed on by Chris Hethorn, KM8X, Lansing, Mich., who does a lot of building in addition to running the Small Parts Center—Here is a little trick to use the 10.7 MHz IF transformer, that has been seen in many receivers lately, above its rated frequency. The transformer has an inductance of 3.6 microhenries with a 60pf glass capacitor installed between the bottom pins.

The trick is to remove the glass capacitor and place a smaller value capacitor in parallel with the primary windings (outside the transformer). Here are a few calculated values for other frequencies: 20 meters, 33pf; 15 meters, 15 pf; and 10 meters, 8.2 pf. The capacitor should be an NPO type but a regular ceramic disc will work. I have already used this in a simple crystal controlled receiver converter. It works very nicely and is a lot cheaper than toroid cores and mica trimmers.

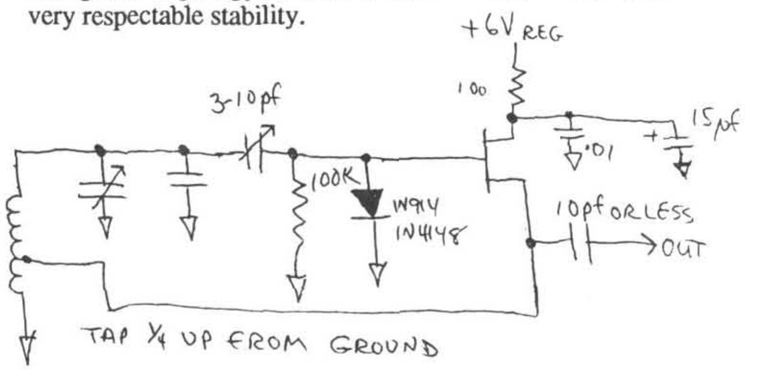
(WA8MCQ note: Conversely, it would be possible to use larger capacitors to go below the rated frequency, as well.)

NOTES ON STABILIZING VFOS

Denton Bramwell, K7OWJ of St. Joseph, Mich. writes—One day last summer Mike Czuhajewski and his wife dropped by during a trip to this part of the country. We fell to swapping stories, components and theories about the universe. Of course, this quickly led to that most ubiquitous of all topics: stabilizing VFOs. Mike flattered me by telling me that he thought my theories on that topic might be worth committing to paper, and I'm a sucker for that line. For better or worse, here's what I think I know about stabilizing VFOs.

In these days of synthesized transceivers, the basic VFO still has a place, particularly in QRP work. For one thing, a VFO will ordinarily consume a lot less power than a synthesizer. It also produces a cleaner signal, which is important for direct conversion receivers. And then there's that one other fact: I don;t know how to design a good synthesizer, but I get along OK with VFOs. That means I can put them in my home projects and still understand what I'm doing.

Getting the right "model" (or topology) makes stabilizing the oscillator a lot easier. I've built a couple of different topologies, and have had by far the best luck with the little Hartley shown on page 36 of Solid State Design. It has very few components, hence fewer things that can make it drift. It also produced one very unexpected result in my high performance direct conversion receiver: when I substituted the Hartley for the other oscillators (plural!) I had tried, I began to hear the signal "presence" that Wes Hayward describes as being possible with DC receivers. Using this topology, I have built 12 MHz VFOs with very respectable stability.



Component selection is important, and one of the major sources of drift is one that few people initially suspect: the FET itself. A great many schematics call for the MPF102 which sometimes gives good results and sometimes doesn't. You need an FET with low gate capacitance and high transconductance, and the spec on the MPF102 is pretty broad. Things started going much better for me when I switched to the UC734 which has a tighter spec. Equally good is the 2N4416.

Wes Hayward has pointed out to me that T68-2 toroids have a very small temperature coefficient, and I have used them with very good results. I have also used slug—tuned solenoids, but those require a bit of extra care.

My reason for using a slug tuned VFO was to eliminate the costly variable capacitor. In order to make this work, however,you do have to use a ceramic coil form, and design the oscillator so that you are operating with the slug barely into the coil. You want most of your inductance from the air-core part of the coil, because most cores have a pretty substantial tempco according to my experience.

When I finished the high performance DC receiver, detailed in the July/October 1986 Quarterly, I was able to establish that in the middle of the band the VFO was extremely stable, but that at the top and bottom of the band the drift was in opposite directions. It was still very small, but detectable. If the core had been positioned further into the coil, the drift would have been much more noticeable.

It is important to heat sink all the major frequency determining components together, as far as practical. If you don't, you'll find that even if you have added together the right mix of positive and negative tempco parts, you'll still have drift. One part heats up, the VFO drifts, then the next part catches up, and you drift back to the starting point. The net result is being back on the right frequency, but the intervening trip is aggravating. I usually use a small amount of clear nail polish to make sure that capacitors and inductors have good thermal contact with the board and/or each other.

Many authors hold, and with reason, that nail polish or epoxy (a worse offender) will tend to destabilize a VFO. Indeed, such things do introduce stress into the VFO components and the stress varies with temperature. Not to fear, gentle reader, there is a cure.

I find it very beneficial to heat the whole VFO assembly with a hair dryer until it is quite uncomfortable to hold, then let it cool, and repeat the process a couple of times. I suppose that it relieves the stresses in the components that occur as leads are bent and lacquer dries. It does demonstrably improve performance.

Of course, one should always follow the basic rules: short leads, single sided circuit boards only, light loading, minimum feedback and good quality components. Of course, volumes have been written on the design of oscillators and I'm far from comprehending the topic. However, the above rules have been a big help to me in creating oscillators that are stable and clean.

THE FINE PRINT

Any product recommendations in this column are strictly those of the individual authors. Neither the QRP ARCI nor the QRP Quarterly indorse products themselves. Contributions to the column are welcomed and should be addressed to Michael Czuhajewski, WA8MCQ, Box 232, Jessup, Maryland 20794. You need not be excessively worried about spelling, grammar and perfectly drawn schematics, as we'll take care of those as necessary.

QRP AM Milestone

by W6PSS

At 0545Z on 23 May 1989, an AM milestone was achieved when Bill Diggins, WR8LXJ of Morrow, Ohio reported signals of S-9/Q4 to Q5 from W6PSS's 16 milliwatt AM transmission from Chula Vista, California, a distance of approximately 2,100 miles.

The event occurred on 20 meters C14.386 MHz) following a 3-hour old-buzzard marathon. Noting that signals were greater than 40 dB over S-9, the idea of a QRP test seemed to be natural progression of events for this evening.

Test setup consisted of passing the output of a Harvey-Wells Model TB5-50 thru a Hewlett-Packard Model 8498A 30dB attenuator thus reducing the measured power output of 16 watts by a factor of 1,000, or 16 milliwatts. Power output was measured ahead of the attenuator with a Daiwa Model CN-720B SWR/Power meter.

Although the use of a Hewlett Packard Model 435A with thermistor mount and appropriate reflectometer would have yielded more accurate measurements (with repeatability). The 16 mW calculation is within $\pm$ 10%, and does not include the 2dB of insertion loss estimated for the transmission line.

The Ohio receiving system consisted of a stacked "ZL Special" with the top array at 93 feet, and bottom one at 60 feet, and a Collins 75A3 receiver. Transmitting antenna is a four element KT-34A at 98 feet.

Perhaps some of you QRP Buffs are aware of other milestones. This operator would be interested in further statistics for 20 meters AM if such do exist.

In conclusion, please call Bill or myself on the national SPAM frequencies when you are prepared to conduct your QRP milestone.

National SPAM Frequencies?

by Charles F. Wooten Jr., KD4XX

Now the first thought that comes to mind is it must be a group of hams who get together and talk about there favorite lunch meat. But no, SPAM stands for Society for the Promotion of Amplitude Modulation, and there purpose is to promote and encourage amateur radio AM operation on the ham bands. You can find them on the following frequencies:

10 meters: 29.000 to 29.200 MHz.
12 meters: 24.885 MHz.
15 meters: 21.385 MHz.
17 meters: 18.150 MHz.
20 meters: 14.265 MHz.
40 meters: 7.160 to 7.290 MHz.
80 meters: 3.870 to 3.885 MHz.
160 meters: 1.885 and 1.985 MHz.

SPAM was founded in 1967 by W4CJL and has a membership of 1000 members. Membership is free, so if you would like more information about SPAM contact them at:

SPAM HQ
P.O. Box 27
Potrero, California 92063

A Miles Per Watt Calculator

by T.E. "Doc" Drake, W5TB
2321 Miriam
Arlington, Texas 76010

The QRP ARCI 1000 mile-per-watt (KM/W) certificate is a very popular award. It can also be a good way to help spread the word about QRP operation and the QRP ARCI. Unfortunately, the math involved in calculating great circle distances is pretty complicated, and attempting to measure the distances involved with a piece of string and a globe can be both frustrating and rather imprecise.

The program listed below is one solution to this problem. It calculates great circle distances and miles-per-watt using longitude and latitude in decimal form. This information can be obtained from the ARRL Operating Manual or, in more precise form, in the Rand McNally International Atlas. The latter can be found in your local public library.

Using this program, I now provide the exact mile-per-watt and a note on the KM/W award along with my QSL whenever a contact exceeds 1000 miles-per-watt. This tactic has resulted in a number of interesting comments from DX operators. It hasn't hurt my QSL rate any either!

The program listed below is for the IBM PC. To run it on the Apple IIe, simply change line 90 from CLS to HOME. Be sure to enter the data for your latitude and longitude on line 110.

Editors Note:

If you are not able to, or you just don't like typing programs into your computer, you can send me a disk with a pre-paid disk mailer to my address and I will be happy to copy it for you. But only for the IBM computer, if you have a Apple you'll have to do it the hard way, type it! —Chaz, KD4XX

```
10   REM MILES-PER-WATT CALCULATOR -- MPW.BAS
20   REM BY T.E. "DOC" DRAKE, W5TB -- AUGUST 1988
30   REM RDAPTED FROM BEARINGS/BAS BY
35   REM J. HALL AND C. HUTCHINSON, RRRL HQ.
40   REM THIS PROGRAM IS NOT COPYRIGHTED AND
45   REM MAY BE USED FREELY.
50   REM SET VARIABLES ON LINE 110 TO YOUR
55   REM LATITUDE (A) AND LONGITUDE (LI).
60   REM ENTER LATITUDE AND LONGITIUDE AS
65   REM DECIMALS (e.g. 44.32N    111.67E)
70   REM USE THE ARRL OPERATING MANUAL OR THE
75   REM RAND MCNALLY INTERNATIONAL ATLAS TO
80   REM OBTAIN LONG. AND LAT. IN DECIMAL FORM.
85   REM ENTER MILLIWATTS AS DECIMAL FORM (e.g. .75 NOT 750W)
90   CLS
100  M=57.29578 : D=I : K=III.II : S=69.041
110  A=32.44 : L1=97.07
120  PRINT "MILES-PER=WATT CALCULATOR" : PRINT : PRINT
130  INPUT "OTHER STATIONS' LATITIUDE";B$
140  IF RIGHT$(B$,1)="N" THEN B= VAL(B$): GOTO 200
150  IF RIGHT$(B$,1)="n" THEN B= VAL(B$): GOTO 200
160  IF RIGHT$(B$,1)="S" THEN B= -VAL(B$): GOTO 200
170  IF RIGHT$(B$,I)="s" THEN B= -VAL(B$~: GOTO 200
180  PRINT : PRINT"DON'T FORGET TO INDICATE IF LATITUDE IS N OR S"
190  PRINT "(FOR EXAMPLE 32.44N)" : PRINT : GOTO 130
200  A=A/M : B=B/M : PRINT
210  INPUT "OTHER STATION'S LONGITIUDE";L$
220  IF RIGHT$(L$,1)="W" THEN L2= VAL(L$): GOTO 280
230  IF RIGHT$(L$,1)="w" THEN L2= VAL(L$): GOTO 280
240  IF RIGHT$(L$,1)="E" THEN L2= -VAL(L$): GOTO 280
250  IF RIGHT$(L$,1)="e" THEN L2= -VAL(L$): GOTO 280
260  PRINT : PRINT"DON'T FORGET TO INDICATE IF LONGITUDE IS E OR W"
270  PRINT "(FOR EXAMPLE 97.07W)" : PRINT : GOTO 210
280  PRINT : PRINT : INPUT"POWER OF ORP STATION IN WATTS";W : PRINT
290  L=(LI-L2)/M
300  E=SIN(A) * SIN(B) + COS(A) * COS(B) * COS(L)
310  D= -ATN(E/SQR(I-E*E))+1.57079
320  C= (SIN(B)-SIN(A)*E) / (COS(B) * SIN(D))
330  IF C>=I THEN C=0 : GOTO 360
340  IF C<= -1 THEN C=180 : GOTO 360
350  C= -ATN (C/SQR(I-C*C)) +1.57079
360  C=C*M
370  IF SIN (L)<0 THEN C= 360-C : PRINT : PRINT
380  KM= S*D*K : KM= INT(100*(KM+.51)/100)
390  KMW= (S*D*K)/W : KMW= INT(100*(KMW+.51)/100)
```

program listing continues next page

QRP—"Quit Running Power"

by Richard W. Hayman, K3DML
15 Arlive Court
Rockville, Maryland 20854
301-340-8251

I didn't do it on purpose, I swear it was an accident, I really was looking for an SB-200.

It all started when some of my buddies who hang out on the local 147.00 repeater convinced me to go to the Dayton hamvention in 1986. It was to be my first trip to the Mecca of the ham world.

It was cold (I had to buy a warmer jacket), It was raining (I had to buy a hat), and all my buddies were working all the good DX (I had to buy a amplifier).

But what junk!!! But it didn't matter. I picked up lots of wire and coils to make more wire antennas and matching networks, and some big capacitors. Then it happened, I saw a solar panel, and I just had to buy it. It was big enough to run a kW (uh, make that a watt).

Since I live in a neighborhood that outlaws all outside antennas, my wire antennas are hidden in the woods behind the house. Running a amplifier could start a forest fire. There was no way I could ever put out a "BIG SIGNAL" from this QTH, so why try. I decided to go in another direction, cheap antennas and low power.

If anyone ever hears me, I'll have an unbelievable story to tell everyone (but, I didn't expect it to be thrilling too. More about that later). So I began to look around for a small rig. I came upon the QRP ARCI booth inside the commercial exhibit area. Talk about little rigs, these things were just about two inches by three inches, and smaller.

It was there that I bought two QRP kits, one was a receiver board for 40 meters and the other was the matching 2 watt transmitter. I got a few crystals and then went shopping for a cabinet and a tuning capacitor for the receiver.

I was glad to leave Dayton. It was like two trips in one, my first and my last but, what the heck, every ham has to go to "ham heaven" at least once.

The little kits went together easily. The receiver picked up the entire 40 meter band (no tuning required), and the transmitter put out a solid two watts. I hooked it up to my big 40 meter full wave square loop and worked not one station, I called CQ forever.

The following weekend the weather turned nice and sunny. So it was time to try out the solar panel. Out on the deck I hooked up that ugly little transceiver to the panel and antenna, then I zero beat the transmitter frequency and listened. There it was, CQ CQ DE W8 something or other, so I answer.

He hears me!!! I felt like a novice again, only this time I could understand what the other guy was saying. I couldn't believe it, Just me, my antenna, my ugly rig, and the SUN! No batteries, I was hooked. QRP really works. QRP forever. I couldn't wait to tell the guys. You know the guys? The ones with the big antennas and lots of power. Their thrills come with contacting a new country once in a blue moon. My thrills were now coming with "every" QSO. A thrill a day. My interest in ham radio renewed itself.

But I knew trouble was brewing when my XYL caught me reading "The Joy of QRP". She told all her friends. It was embarrassing, but I didn't care. I had found a new niche, the perfect niche. The kids stopped yelling at me, they could watch TV again and actually hear their friends on the phone.

I put up more wire antennas and kept turning the power down and worked more and more stations. So I set myself a goal, to work all states with one watt. And I did it. Other milestones happened along the way, I worked New Zealand with one watt on 17 meters, I worked Texas on 20 meters with 10 milliwatts, that's 0000.010 watts as measured on my very special QRP Wattmeter.

Then I bought a real QRP rig, the HW-9. It's quite a radio with lots of parts on the boards. (It took a long time to build it.) It works really well. It drew too much current for the small solar panel alone so I now use it with a rechargeable gel cell connected to the solar panel.

It had to happen, I'm out of control. Every "real" QRP guy has a TEN TEC. Now I have one (a Triton II). I even removed the power amp to make it a real QRP rig. I'm now trying for WQS QRP SSB, but all the DX keeps getting in the way. Bands are good. The big guns get five-nines plus a million, and I get five-eight's. They hear me, unbelievable!

The Manassas hamfest did me in. I came back with another SSB QRP rig (FT-7 Yaesu) and a beautiful HW-8. The MARC QRP Field Day effort will be the end of me for sure. I hate FD, but I love QRP. This should be really interesting. But my XYL keeps reminds me that my idea of roughing it is staying in a Ramada Inn, I'll let you know if I survive it.

Miles Per Watt Calculator...

continued from page 20

```
400  MI= S*D*M : MI= INT(100*(MI+.51)/100)
410  MPW= (S*D*M)/W : MPW= INT(100*(MPW+.51)/100)
420  PRINT : PRINT"THE GREAT CIRCLE DISTANCE IS :" : PRINT
430  PRINT : PRINT KM; "KILOMETERS (WHICH = "; KMW ; "KILOMETERS-PER-WATT)"
440  PRINT : PRINT :PRINT MI; "MILES (WHICH = "; MPW ; "MILE-PER-WATT)"
450  D=0 : PRINT : PRINT : PRINT : PRINT :
460  PRINT "          PRESS ENTER TO CONTINUE (Q TO QUIT)"; : INPUT ZZ$
470  IF ZZ$="Q" THEN END
480  IF ZZ$="q" THEN END
490  GOTO 90
```

Treasures in Tube Technology

by Paul Schaffenberger, 7J6CAM/KB8N
PSC #1, Box 20272
APO San Francisco, California 96230

The QRP operator today has a fairly good variety of solid state HF transceivers available on the market, many of which will "power down" to QRP power levels with little or no modification. The main problem with most of these rigs is extremely high cost. With the limited numbers of used Argonauts and Argosys available, the QRP'er is sometimes forced to build his own gear or "go without". What many QRP'ers don't realize is that there is still an abundance of tube-type gear available at swap meets that can reliable service, especially at the QRP power levels.

I am rather biased about particular makes and models of gear mostly because of my own good fortune with that gear. There are other factors that should also influence your selection of equipment, which includes buying gear with common tube types, gear that is easily repairable, and gear that you can still find owners and service manualg for. My article will focus on the separate HF receivers and transmitters from the 50's and 60's that are still available today.

The vacuum tube era saw many first rate receivers. One brand stood out and the Cadillac of all the receivers of its day, Collins. The Collins 75A1, 75A2, 75A3, and 75A4 were superb units in every respect Cexcept size'). The 75A4 was the best of the bunch, with a Product Detector, and superb IF filtering. The "S-line" receivers were also superb, although they did not cover the 160 meter band. The 755-1, 75S-2, and 75S-3 were all wonderful, high quality receivers. Don't let a little dirt on Collins units scare you away, they clean up beautifully, and are relatively easy to work on. If you can find almost any of these models for under $200, it may be worth the investment.

The receivers that best compared with Collins were, in my opinion, the Drake series receivers. The Drake 2R, 3R, and 2C were all sensitive, stable receivers. When combined with their companion Q-multiplier/speaker (the 2AQ, 2BQ, and 2CQ), they ere extremely competitive receivers. Their main disadvantage was their lack of 160 meter coverage. The later hybrid R-4 series (R-4, R-4A, R-4C) represented the latest and perhaps best vacuum tube design. ~any Drake 4-Lines are still in use in contest superstations, indicating their staying power. The R-4 series had a silky smooth mechanical PTO that set the standard for its time. Auxiliary crystals provided coverage of all ham bands from 160-10 meters. Passband tuning was also a very strong feature in this series.

There are still many Drake receivers around, with 2A's going for as little as $50 and R-4's going for as little as $100.

There were many other fine receivers during the vacuum tube era. Hallicrafters, National, Hammerlund, and others built high quality receivers that are still usable today, but few are as desirable as the Collins and Drakes. Many of these have good sensitivity and selectivity, and relatively good stability. Many are general coverage receivers with calibrated bandspreads for the ham bands. These can often be found for well under $100. Good buys include the Hallicrafters SX-100, 101, and 111; and the Hammerlund HQ-170 and 180.

If Collins dominated the receiver market, the E. F. Johnson dominated the transmitter market. While these transmitters were designed primarily for AM and CW, a few of the later models could be adapted for Single Sideband. As CW rigs, most models were superb. The Ranger and Valiant models were the best of the bunch with the Ranger II and Valiant II the newest and most refined versions. These rigs featured 160-10 meter coverage (plus 6 meters for the II models) and a PI-network that could tune virtually any impedance antenna. It was like having a built-in antenna tuner! I often used a random wire plugged directly into the antenna jack with my Ranger. Both the Ranger and Valiant can be powered down to QRP level with little difficulty. A rare and little-known QRP rig was the Navigator, and CW-only 40 watt version of the 75 watt Ranger. If you find one of these, buy it for me! All of these rigs are big and heavy. The 50 Watt Adventurer is also a good candidate, but requires a separate VFO or crystals. You should avoid the Viking I and II (prone to TVI and bad keying characteristics) but they are a super source of parts for antenna tuners or other projects requiring RF components. A good variety of Johnson rigs can be found for under $100.

There were many, many other tube transmitters on the market from the 50's to the 70's. Many of the more expensive ones, such as the Collins lines and Central Electronics rigs were designed as Single Sideband rigs, and were not especially good CW rigs. The Heathkit DX-20, 40, and 60 were all good rigs, but required separate VFO's. These are very cheap at the flea markets, but removing the case may reveal whether the rig is a bargain or not, as some of the builders were literally "Novices'.

The Drake 4-Line companions to the R-4 series receivers are also a good buy. As mentioned earlier, many are still in use. Their main disadvantage is that many of their tubes, including the finals, are becoming very difficult to find.

When looking at these classic tube rigs, you should keep several things in mind. First of all, the final selling price is likely to end up far below the initial asking price. Some of these rigs are real "boat anchors" and the seller is often glad to find someone strong enough to haul the rig away. Secondly, many sellers have built up a supply of spare tubes and other parts. By all means, try to include these into the purchase price! Sometimes they are yours for the asking. Thirdly, these old rigs are very reliable, but firing up that receiver or testing that transmitter into a dummy load before the sale may save you a lot of grief later. Finally, be sure to press the seller for any literature or documentation that he has for the rig, even old equipment reviews and advertising. All this will help you keep that classic on the air.

continued on page 23

The Quarterly's 1989 Index of Articles

Treasures...

continued from page 22

The "dream tube rig"? I'd have to categorize it into two classes, the "middle weight" dream rig and the "heavy weight" dream rig. (There are no light weight tube rigs!) My smaller dream rig would be a Drake 2B with the 2BQ and a Johnson Navigator. The big dream rig would be a Collins 75A-4 with all mechanical filters, and a Johnson Ranger II transmitter. I would recommend the Johnson T/R switch for full QSK, and I would adjust transmitter bias for QRP level output.

With some careful shopping, a great tube rig can be purchased for under $200, with plenty of spare tubes and parts to boot. I think you'll enjoy these classics, and you'll find they compete very well with their newer counterparts. You'll also have a lot of fun in the Classic exchanges! Good luck.

New Member / Renewal Data Sheet

Full Name ______________________ Call__________ QRP Number__________

Address ____

City ____________________ State or Country__________Postal Code __________

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

[ ] New Call? **[ ] Renewal (U.S. $10.00, DX $12.00)**

Amount enclosed $__________ Please make your check or money order payable to: **QRP ARCI.**

**** Please do not send cash! **** Note: Renewals must be received 30 days before publication.

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.

	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

QRP ARCI
Fall/Winter Net Schedule

Net	QRG	NCS	Day	UTC
TCN*	14060	W5LXS	Sunday	2300
		ANCS-NM7M		
SEB**	7030	K3TKS	+Wednesday	0001
		ANCS-KH6CP/1		
GSN	3560	W5LXS	+Thursday	0200
		ANCS-W5XE		
GLN	3560	KH6CP/1	+Thursday	0200
NEN	7040	WA1JXR	Saturday	1300
		ANCS-W1FMR/K3TKS		
WSN	7040	W6RCP	Saturday	1600
		ANCS-W6JIIQ/W6SIY/NJ7M/KV7X/NM7M		

* On weekends of major contests, TCN will meet one hour later.

** If conditions on 7030kHz are poor, QSY to 3535kHz at 0030Z.

+ Evening of the day before for W/VE

Other QRP Nets

MI-QRP	3535	K8JRO	+Wednesday	0100
VE-QRP	14060	VE6BLY	Sunday	1900
NWQRP	7040	N7MFB	+Tuesday	0400

+Evening of the day before for W/VE

Please remember to tell your friends about the QRP Nets. They might decide to join us after seeing how friendly we can be.

Convention Update

Dayton 1990

Rooms are going fast for the Dayton HamVention, April 27-29, 1990. For QRP room information, contact Myron Koyle, N8DHT, 1101 Miles Ave. S.W., Canton, Ohio 44710.

Saginaw 1991

MQRP president Lowell Corbin, KD8FR has plans well underway for a QRP effort at the 1991 ARRL National Convention in Saginaw, Michigan. I've misplaced the dates, but you can get more information from Lowell at 1318 W. Michigan Ave., Lansing, Michigan 48915. The QRP ARCI is supporting the MQRP in this venture.

Upcoming Contests

(CW unless otherwise noted)

March 11, 2000-2400Z
Classic Sprint (CW & SSB)

ØØØ

April 14, 1200Z to April 15, 2400Z
Spring QRP Contest

ØØØ

May 27, 2000-2400 local time
Hootowl Sprint

ØØØ

July 15, 2000-2400Z
Summer Homebrew Sprint

ØØØ

Aug. 12, 2000-2400
Summer Daze Sprint (SSB)

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

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