QRP Quarterly

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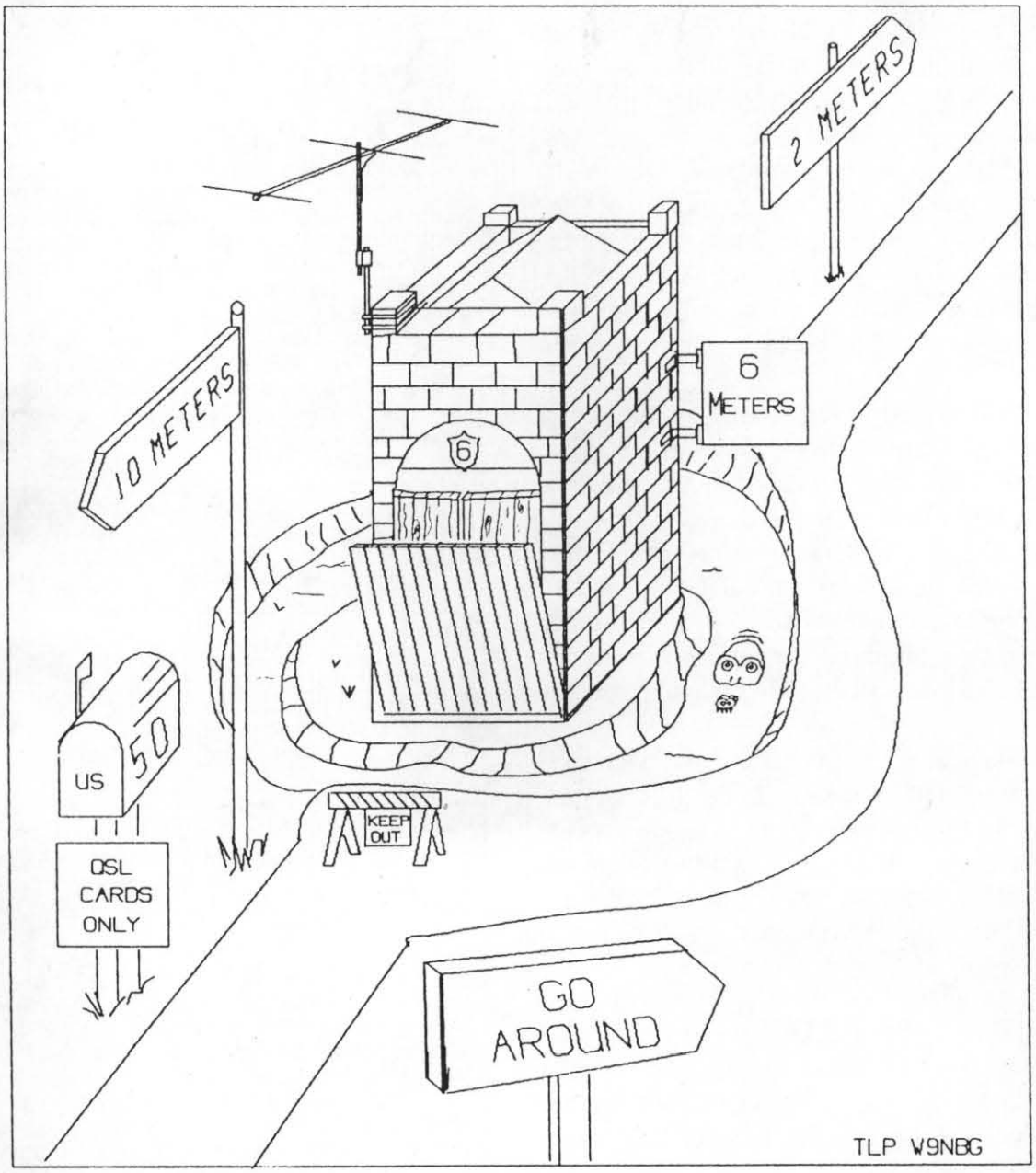

6 METERS: THE FORBIDDEN BAND

DETAILS ON PAGE 9.

EDITORIAL

If I were in charge of the ARCI and could do whatever I wanted, the following are a few changes I would make:

1. One address for the ARCI. If a member has a problem, article, correspondence, or whatever, they would send it to one address. This would avoid much confusion that currently exists. If two below is not followed, then all correspondence could be forwarded to the proper chairperson.

2. One volunteer or a club volunteer to handle membership, contests, and the Quarterly mailing. Perhaps they could be paid a small pittance for their efforts. Considering the current membership level, this would not require a lot of time.

3. In addition to the regularly sponsored ARCI QRP contests, I would attempt to co-sponsor a QRP contest with another big organization such as the ARRL, CQ Magazine, 73 Magazine, World Radio, etc. The idea here is to get a lot of participation in QRP so that the "regular" ham can discover the world of QRPing.

4. I would advertise the ARCI in the major amateur radio publications in the classified sections. So many active QRPers do not know about the ARCI, nor do they know where to find us.

5. I would send ARCI application forms to all those QRPers who participated in our QRP contests, but who did not have a number. They in essence have contacted us, telling us they are not members yet they are active in QRP. They should become members.

6. I would endeavor to integrate modern technology with the simplicity of QRP. So much is happening in the world of electronics, but it appears to me that we QRPers are still twenty years behind in the analog age. Why not construct simple digital rigs? No doubt QRPers have the brains and will power to do so.

That's what I would do. What will the ARCI do? Perhaps those on the Board of Directors will read this editorial and discuss its merits at the Dayton Hamfest meeting. If they did act on these suggestions, I think we would have many more happy members along with many new members.

If you the reader feel strongly on any of these points, why not write your favorite director or the President of the Club and let them know your thinking. I'm sure they would love to hear from you.

Silent Key

I'm saddened to report the passing of **Wally Millard, K4JVT,** on January, 29, 1993, after a brief hospitalization.

Wally, 78, had been active with QRP ARCI net check-ins until very recently. Wally had also kept up correspondence on his homebrewing activities to the very last. We'll miss him.

—Dave Benson, NN1G

From the President

Paula Franke, WB9TBU

The situation here on the homefront has worsened. My husband's health is extremely precarious. We have spent much of the time since November going back and forth from the hospital and various doctors. Medical bills continue to mount. As a result, my two part-time jobs have become two almost full-time jobs, so that I am now averaging a 60-hour work-week.

So I have come to the difficult decision of not running for re-election when my term ends at the end of this year. My husband's health is not going to improve and, quite frankly, I want to devote what little spare time I have to him.

Until recently, I enjoyed being president. However, for the past year circumstances here have made it impossible for me to be an effective president. And I see no indication that things will get better in the foreseeable future.

Luke Dodds, W5HKA, has also told me that he also has decided not to stand for re-election to the office of secretary/treasurer.

The office of vice-president and three directors terms will also expire at the end of the year.

Those interested in running for these vacancies should send a statement of candidacy to Luke at 2852 Oak Forest, Grapevine, Texas 76051.

Note about The Quarterly:

During the five+ years that I've been associated with The Quarterly, I've seen it grow from a 24-page newsletter to a 40-page magazine. This growth is a direct result of our editors and contributors, as well as you, our readers.

If it were feasible, The Quarterly page count would be much higher. However, 40 pages is, for now, the highest reasonable size we can handle in terms of printing and mailing costs, and wear and tear on the volunteer typesetter/paste-up person. So there is a substantial backlog of material awaiting publication. If yours is one of the items waiting in the queue, please don't be discouraged...it will eventually appear. If, during the wait, you feel the need to update the article, please do so.

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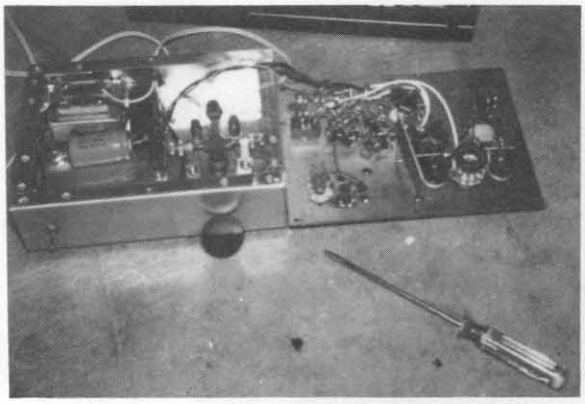

The 160-190 kHz 'No License' Band Revisited

by Jay Coote, WB6AAM

That's right, this band is below the 540-1600 kHz AM broadcast band, and is even below the 200-400 kHz aero and marine beacon band. FCC Part 15 permits transmitter powers of one-watt DC input to the final and any mode in this band. Antennas are limited to fifty feet and any feedline between the transmitter and antenna would subtract from the antenna length.

A license is not required to operate or transmit in the "1750 meter" band but amateur experience may help in building the equipment. The ham and non-ham experimenters using 1750 meters call themselves "LowFERs" for Low Frequency Experimental Radio.

Propagation on 1750 meters is similar to the 200-400 kHz beacon band and the bottom of the AM broadcast band. Vertical antennas are a must here, and noise can be a serious problem on this band. Oscillators in nearby TVs, computers, power lines and unshielded consumer junk such as light dimmers contribute to the noise. LowFERs who live in quiet sites, or who build noise blankers and filters have an edge. With one-watt transmitters and good receiving equipment in quiet sites, LowFERs have been able to cross several states. A more typical range in the suburbs may be 30 to 100 miles.

The most common mode of LowFER operation is CW. CW allows the use of very narrow filters. Many stations stay on 24 hours and use a ham or homemade keyer with a repeating beacon message. The beacon usually gives ID and QTH. If the operator is a ham, the beacon often IDs the last letters of the hams call. Some beacons use nicknames or numerics. A 24 hour beacon lets SWLs and LowFERs know you're there and can be used to check propagation.

SSB, packet, RTTY and AMTOR have also been used in two-way contacts on 1750 meters. I have successfully decoded 150 and 300 baud UNPROTO packets from a LowFER 20 miles away. Packet at 300 baud or slower and Ka-nodes might make an excellent way to communicate on this band, reliably, over a distance. Some experimenters use BPSK and coherent CW with WWV or local TV signals as the time base.

Although most general coverage radios tune down below 160 kHz, they are often "numb" below 1.8 MHz by design. *[Some deliberately reduce sensitivity in the AM broadcast band but then return to normal below that. —WA8MCQ]* You will have better luck if you use a VLF converter. I suggest a converter that DOES NOT tune upside-down so that 4176.5 on the dial will be 176.5 kHz.

Burhans Electronics or LF Engineering make converters that beat the Palomar or Heath converters hands down. Typical ham wire antennas are no good for 160-190 kHz reception in most cases. You will do better in the suburbs with an active shielded loop or active whip antenna which is designed for 10-500 kHz ONLY. Some SWL active antennas cover higher frequencies and let in AM BC signals that will clobber LF reception. Again, Burhans Electronics or LF Engineering is the best source for active loops and whips. Longwires work in quieter sites but you will need a tuner to match the antenna and trap AM BC or signals above 400 kHz. Loops may be 2 to 4 feet in diameter and whips are typically 3 feet long.

The best transmitting antennas are scaled versions of VLF or "nav" beacon antennas. These are the "T" and umbrella antennas. In the umbrella, a push-up mast is guyed at the top with 4 to 8 radials for top-loading. A top-loaded 30 foot mast will work well. The best ground systems are screens or chicken wire laid under the antenna, not a single ground rod. Many 20 to 100 foot radials or a screen work better than four quarter-wave radials on 1750. Since the antenna is very short electrically, an efficient series loading coil must be used. Once resonant, the antenna must be matched to the transmitter.

A CW transmitter for 1750 meters is easy to build. Most designs use a crystal in the 2 to 50 MHz range. CMOS divider ICs get the crystal frequency down to within the 160-190 kHz band. A buffer supplies square-wave to the PA which is usually a power ~ET such as an IRF-511. With square wave drive and power FETs higher efficiency is possible than with class C transmitters. A Pi or multisection lowpass filter of 50 ohms or the antenna impedance smooths the square wave signal and limits harmonics. T106-3 cores and 630 V poly caps are used in the PA filter. The basic CW transmitter may be keyed with a beacon keyer or AM modulated by placing an 8:40 ohm audio transformer in the drain lead of the power FET PA. An old stereo amp will serve as modulator.

Editorial comment: This article first appeared in the 23 April 1992 issue of Westlink Report, published semi-monthly by Burt Hicks, WB6MQV. There is plenty of interest in operation on this band, which is a natural for QRP buffs (although you can't use your amateur call sign here). The antenna restrictions add an extra challenge; the 50 foot limit is the equivalent of using a 3.4 inch tall vertical antenna on 40 meters. When I first read of this band several years ago, I thought it was a joke since the item appeared in the April issue of some magazine. However, it really does exist; I've heard signals there, received a QSL from one to whom I sent an SWL report, and there are newsletters and books available on the subject. We'd be happy to print articles from our readers on anything dealing with this band.

I was told there is a monthly called LOWDOWN, published by the Long Wave Club of America, 45 Wildflower Road, Levittown, PA 19057. There is also a book titled "The Low and Medium Frequency Radio Scrap Book". The cover also says, "All about the license free communications bands. Receivers, receiving aids, converters, active and loop antennas, transmitters, coils and coil winding, solar flare detection and much more." It was written by Ken Cornell, W2IMB, 225 Baltimore Avenue, Point Pleasant Beach, NJ 08742. If you write to either one, be sure to include a self-addressed stamped envelope. —WA8MCQ

Future of QRP Series

Where Does QRP Go From Here?

by Leighton Smart GWØLBI
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Trelewis Mid Glamorgan
CF46 6DBWales

In reply to the call for QRP essays made by Mike Czuhajewski, WA8MCQ in the October 1992 *QRP QUARTERLY*, I would like to share my thoughts, suggestions and hopes for our hobby with our members.

Firstly, I have been a QRP-only operator since January 1991 after operating QRO for two years. The attraction for low power became apparent to me after high power operation became a bore; I imagine this is the case with many other QRPers. Now I work an all-QRP station, and specialize in 160 metre QRP work.

WHAT INFLUENCE HAS THE QRP FRATERNITY?

QRP is a rapidly growing movement - new QRP clubs and groups are being formed regularly; more and more QRP related articles are appearing in the commercial amateur radio magazines; in the UK there is a new Novice License Class with 3 watts output and less on certain HF bands; elsewhere low power operation is on the increase as more and more amateur radio operators realize the effectiveness of QRP.

The World QRP Federation member organizations including the QRP ARCI all report an increase in membership as the QRP message gets across to the amateur radio fraternity in general; indeed it would seem that QRP has a large dedicated following which could be a force with which to be reckoned.

But the question remains: what influence do we have, and what can we do with it? Can we possibly, for instance, use our collective influence to encourage the major amateur radio manufacturers to create and market reasonably priced dedicated QRP transceivers? Yaesu, for example, produces QRP versions of the FT-747 and FT-757 rigs; but they only market them in Japan! Could the QRP ARCI or the WQF attempt to get Yaesu to market them worldwide? Why not a QRP provision on all or most mass produced HF rigs? A switch which would automatically reduce the output power to 5 watts would not be beyond the imagination of the designers and would not put agreat deal on the cost of the rig itself. This in itself would probably give QRO operators the chance to try QRP without any fuss - just flick the switch and call CQ QRP! Could we not at least try to encourage the manufacturers to take our ideas on board; after all, the market is already in place and what's more, it's growing.

A NEW QRP LICENSE CLASS?

Here in the UK a new license class has been introduced; it allows 3 watts and less output on HF, with callsigns beginning 2WØAAA, etc., for a Novice in Wales. Many of the new novices are already committed QRP operators, having first hand direct experience of QRP operation from day one. Even novices I have worked who have upgraded to full status still remain QRP operators after having "understood QRP" from their novice days. So what about each national society being lobbied by the QRP world to press for a QRP license category? One already exists here - and it works. Why not do likewise in other countries, where QRP operation and organization is widespread? Again, the questions of influence arises. Do we have enough "clout"?

WHAT IMAGE DOES QRP PORTRAY AMONGST AMATEUR RADIO IN GENERAL?

I ask this question because I have been greeted with some amusement when announcing my QRP habit/hobby to some amateurs. These comments range from "Can't you afford to buy a decent rig then?" to "Oh you're another of those QRP nutters, are you?"; even "You must be a masochist!"

I kid you not. These statements are true. Which leads me to ask just how do others see us? Are we seen as poor radio hams who can only afford to get on the air by building our own rigs? (In my opinion, the homebrewer is by far the "real" radio amateur -and I'm not a homebrewer!). Or are we seen as eccentrics or masochists? Preferably I would rather be seen as a sort of "specialist", someone who specializes in a certain form of radio communications which gives great satisfaction every time I transmit. Let's get the message over more clearly - the message that QRP can give the amateur the opportunity to use his/her knowledge of propagation, power, equipment, etc. in order to gain a solid feeling of achievement and pride in one's operating and station. We each do this when working a high power station who asks"What power?" and then follows up with "Congrats on FB QRP sigs, well done." He is obviously impressed with QRP, and will maybe go on to try QRP; thus a potential QRP operator. Let's keep at it!

WHAT OF THE FUTURE OF QRP?

Well I am unfortunately not blessed with the ability to see into the future, so I can only express my hopes and suggestions in this respect. I expect QRP to go from strength to strength in the future due to the work done by the QRP ARCI, WQF, and QRPers in general, not to mention the "national" clubs such as OK-QRP Club, SP QRP Club, G-QRP Club, etc. But we must continue pressing the case for QRP wherever and whenever we can; in commercial amateur radio magazines, over the air in QSO, even as far as contacting amateur radio manufacturers directly to offer feedback and ask questions/offer suggestions. (I have myself contacted Yaesu on the subject of the FT-747SX and await a reply). So let's all spread the word.

Logger:
A QRP ARCI Logging & Duping Program

A Review by Jack E. Coster, WF8X *

Bruce Milne, WB2QAP, has written a contest logging and dupe checking program especially for QRP ARCI sponsored contests. The program, called LOGGER, was described in the April 1991 QRP Quarterly. The latest version is April 1992. I have used Bruce's programs in the Fall 1991 QSO Party, the 1992 Fireside Sprint, the 1992 Hoot Owl Sprint, and the 1992 Fall QSO Party.

LOGGER does everything claimed. Logs are made for 160 - 10 meter bands (no WARC bands). Within 30 minutes after the end of a contest (even sooner if I didn't do very well), the final log sheets are printed in QRP ARCI format. With LOGGER's band-by-band summaries the Contest Summary Sheet can be completed ready to put in the mail. It sure beats manually sorting through the coffee-stained log sheets to find the States-Provinces-Countries and verify the points and multipliers for each QSO.

Is it easy to use in a contest? Yes. Data entry is simple and straight-forward. Data is saved to disk immediately after each entry, so a power loss will not wipe out your log -- a fine feature for those portable operations too. As with any program, some practice is required to know the sequence of entries and error-correction routines. The uncompiled GW-BASIC version is a bit slow on my Zenith XT. But then again, my operating in QRP contests does not bring on the blazing QSO rates that I hear during the QRO contests. I operate QRP contests as a single-operator, and I can handle both operating and logging with ease at a tempo fitting of a mannerly, dignified QRP contest.

The 1991 program has a couple of quirks. When you run the program from BASIC, the first message to you is "PRESS [CAP LOCKS] KEY ON!!". The natural inclination for most computer operators is to depress [CAP LOCKS] and then strike [ENTER]. Don't strike the enter key. If you do, you will be abruptly kicked out of LOGGER and find yourself back in BASIC where you get the message "Illegal function call". The thing to do when you get the "PRESS .." message is to strike the [CAP LOCKS] -- then wait. Do not strike [ENTER], do not strike anything. In a moment the program goes ahead and gives you the next prompt, which is for the correct GMT (that's UTC to us newer chaps). The 1992 version corrects this by accepting only the space bar as the go-ahead into the program.

By the way, if you are stubborn and refuse to turn [CAP LOCKS] on in either version, the program will proceed and act normally for awhile. When you try to retrieve an upper-case record using lower case letters, however, you are in for a surprise. LOGGER will not find the record. Records are case-sensitive. Use upper case for all operations with the program.

Although you can easily edit a just-entered QSO, the program has no obvious way to delete an entire QSO record. This can be done, however, by using the "Change" option from the menu, selecting the band and entry to be "changed", and when prompted for fields to be changed, simply strike ENTER rather than typing in new data. Bruce points out that the QSO counter record will have increased by one count since the program counts even blank records. But the printout and scoring will be accurate.

In case you forget to provide complete data to a QSO, a program call LOG-FIX has also been written for LOGGER. LOG-FIX is used to edit a LOGGER entry by entering the date and time of entry. I find it useful in those (rare) cases where I discover later that I failed to enter a call sign, or incorrectly entered an ARCI membership number and want to correct it after the contest.

A special version of the 1992 program, called LOGGER-2, includes a name data base. Using this feature, the operator's first name is displayed when you enter the call sign. This feature may be up-dated by following instructions to go into the program and add or change names and call signs.

I compiled the IBM version of the BASIC program into an executable machine language file (.EXE) using QuickBasic 4.0. The BAS file first must be converted to an ASCII file by saving it as ASCII from GW-BASIC. QuickBasic 4.0 didn't like line #1970 of Bruce's 1991 version, saying it was too long. After breaking that line, the EXE file is compiled. The EXE file really zips along compared to the program running under BASIC. And it is smaller (68K) than the combined BAS files of LOGGER and GW-BASIC (92K).

Originally, there were both IBM and CP/M versions of the program. Why the CP/M version? For portable operations Bruce used an Epson PX-8 that runs under the CP/M operating system. The PX-8 is one of the original notebook computers. It is a handy little battery-operated machine to take on camping trips and other portable QRP opportunities. I have one too, and have adapted it for use from an automobile battery or from little gel cells. I use it for portable QRP and portable packet. The CP/M version of LOGGER operates well with the PX-8.

I like LOGGER and appreciate Bruce's work to make QRP ARCI contest logging and entry easier. LOGGER is a real time-saver, and improves contest accuracy by its duplicate checking routine and accurate calculations for the contest entry submissions. The IBM version can be configured to work with dual floppy drive machines or with a hard drive. If you should be fortunate enough to have a PX-8, you are in luck and can get one of the few logging programs of any kind available for that computer.

Bruce will send a copy of the IBM compatible program if you send him a blank 5-1/4" disk, pre-addressed mailer, and sufficient postage (about 75 cents) to: Bruce Milne, WB2QAP; 2350 Clark Road; Penn Yan, NY 14527. The CP/M version is only available as a listing. Bruce will send you that if you send an 8-1/2" x 11" SASE with sufficient postage.

* Rt. 7, Box 655-A
Morgantown, WV 26505-9807

Member Product Review

MFJ 9020 & 9040 QRP RIGS

Reed Fite, WA4UIK
1277 Jacksons Hill Road
Hermitage, TN 37076

I purchased the MFJ 9020 back in July and recently bought the 9040. I also purchased the MFJ 726 audio filter for both rigs.

Both rigs have performed just great. Owning a HW-8, HW-9, Argo 515, and Argosy 525, I was surprised how well these little MFJ's performed against the other rigs.

The Argo 515 is still to me the best of the lot in overall performance, but the MFJ is a close second and by far the most rugged.

The only complaint I have is with the 9040. While the 9020 covers 14.0 Mhz thru 14.075 Mhz which gives you 20 Hz per turn of the VFO knob, the 9040, which covers 7.0 Mhz thru 7.150 Mhz, almost doubles that (37 Hz per turn). Since I operate mostly in the lower part of 40 Meters I would like the 20 Hz per turn of the tuning knob. Maybe a mod is in order to change this problem.

The audio sounds great on both rigs and the receiver heard everything that my Yaesu 757GX did. The cw filter is very sharp and clean. No ringing!

Both rigs when first turned on will drift down in frequency. First 30 minutes was 600 Hz down and then 100 Hz up after the next hour. After being on 2.5 hours, the drift was approximately 50 Hz per hour.

The 9040 output can be adjusted from 0 to 4.5 watts out from a hole underneath while the 9020 can only be adjusted with the top cover removed.

The manual is complete and gives you voltage measurements, alignment procedures, theory of operation, and schematic diagram.

I have worked several stations that were using the MFJ and all were happy with theirs as I am with mine.

A QRP Review:

"How to get Started in QRP"

Written by Dave Ingram, K4TWJ
Reviewed by Michael A. Czuhajewski WA8MCQ
7945 Citadel Drive
Severn, MD 21144

Many months ago K4TWJ let me know he was writing a QRP book and hoped to release it at Dayton in 1993. However, he really poured on the coals and had it on the streets around Thanksgiving of 1992. When I found out it was available I couldn't wait to get my hands on a copy, and I wasn't disappointed. Dave Ingram is well known to the readers of CQ magazine, and occasionally covers QRP in his columns. Those of you familiar with his style will feel right at home; he attacks the subject with his usual enthusiasm, and really makes it look like FUN (it is, you know). He makes you want to throw down the book and run to the shack and work QRP until you drop.

How about credibility as a QRPer? On page 46, Dave claims to have worked over 100 countries with an HW-8. Do I believe that? You bet! **Adrian Weiss, WØRSP,** used to give a trophy for working DXCC with 5 watts or less. (He started it while he published *The Milliwatt, National Journal of QRPp*, and continued it for several years after the Milliwatt ceased publication.) Dave holds trophy number 26, issued in 1980, and his story was written up in the W0RSP QRP column in the November 1981 issue of CQ magazine.

He covers the usual topics for a QRP book–QRP overview; operating; using commercial equipment, both QRO and QRP; some homebrew rigs; station accessories; antennas; power sources. He also goes into VHF/UHF QRP, something we don't hear a lot about. He includes pictures of veteran QRPers K3TKS (who has autographed several copies locally), W5TTE and G3RJV. No pictures of WA8MCQ in there–I didn't get off my duff and send in the picture he asked for–but he did include a picture of one of my rigs. The cover features K1BQT, Rich Littlefield, but he never really said who he was or what his achievements in QRP are, which is a shame since K1BQT has had a long string of homebrew articles of interest to us.

Dave plugs the major QRP groups, so newcomers where exactly where to go. He went a bit farther than most QRP books do; he included information on the QRP clubs in Russia, Czechoslovakia, Germany and Japan. He also included some pictures of the English language journals and awards, including the 1000 Mile Per Watt award Dave got recently–the latter was not only the first one issued for 18 MHz, a nice feat in itself, but was also for an impressive 44,180 miles per watt, working a VK6 with 250 milliwatts. (There was a miles-per-watt error on page viii of the introduction. He starts one paragraph with "Set your rig for 5 watts output...." He mentions checking into one of the QRP nets and says if you contact someone there who is over 1000 miles away you qualify for the 1000 MPW award. Actually, that distance with 5 watts would only be 200 miles per watt, falling far short of qualifying.)

On the technical side, Dave includes a few simple transmitters and receivers, and even throws in a couple of tube rigs. (Yes, Virginia, people really do build them these days, for nostalgia and the sheer fun of it–and I'm about ready to do it myself! I had great fun in the late sixties with 800 mw to a 6AQ5, getting 47 states.) He covers some of the vintage commercial QRP gear such as the TenTec Power Mite series, Argonaut and Argo 515, as well as the current, high tech Argonaut II. The new MFJ QRP rig (now available in several single band models) gets extensive exposure, with a look inside as well as three external views. He shows the HW-8 and HW-9 (mandatory for any QRP book which wants to be taken seriously!), as well as the K9AY rig from A&A and the Backpacker from Tejas Technology.

Dave covers QRP on VHF and UHF, which most of us probably don't think about much. He also goes into the satellites, and devotes some space to RS-10/11 and it's 2 meter uplink/10 meter downlink operation. I would have liked to see him give some mention of the HF up/downlink operation of Mode K on RS-12 as well, which can be worked with ordinary HF equipment and is gaining more followers in the QRP world. He did include a diagram which showed its frequencies, though.

While some other QRP books have been criticized for the apparent lack of a competent editor, this book appears to have had one since the typos were minor, as well as few and far between–maybe a dozen, total. However, some technical, factual and historical errors detract a bit from the book, such as the non-qualification for the KMW award mentioned earlier, and research could have been more careful in some areas. A few examples–there were some errors in the account of my milliwatting experiences; a couple circuits in the book cannot work as drawn, such as a battery charger with a zener diode connected the wrong way, and an audio attenuator with both input and output shorted to ground; SPRAT is not (and never was) a monthly; an "S" unit is generally accepted as 6 dB, not 3; a QRP transmitter using a pair of ICs as the oscillator and amplifier uses the wrong logic symbol for one; he frequently says "40763" when talking about the 40673 MOSFET. (I will provide a list of all errors and comments to anyone who sends an SASE.)

And now for what should probably be the standard warning printed in the review of every "general coverage" QRP book, and which I had in my review of the K7YHA book previously–if you're a long-time QRPer looking for something truly new and unique, you probably won't find it here. Keep your eyes on the various QRP and "big" ham magazines for that. If you're a beginner in this segment of ham radio–and this is who the book is written for–you'll find it very informative, educational and inspiring. If you are one of those QRP oldtimers, you may still find it very enjoyable–I know I did.

continued on page 11.

SIX METERS - THE FORBIDDEN BAND

Tom Pusateri W9NBG
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Des Plaines, IL 60018

"You will be struck by lightning, all the pipes in your house will rust out, all of your hair will fall out, and you will cause TVI within a 100 mile radius with 3 watts of power if you go on 6 Meters." This is what you will be told by some of your ham friends if you ever mention to them you are interested in going on the 6 meter band. The warning was true at one time that 6 meter operation, in areas serviced by channel 2 TV, brought with it the good possibility of TVI. The big differences that make the enjoyable band of 6 meters a safer place to operate in terms of TVI is the improvement in equipment design, different operating practices, and cable TV.

In this article I would like to share with you information I have picked up since my first days on the band in the mid 1950's, and hopefully entice some of you to explore a not so forbidden band. This 50MHz band offers a lot to the QRP operator, as well as the builder of rigs and antennas. Hams that are not on 6 meters usually know very little about the band. It is difficult to get the flavor of the propagation and activity because most low band rigs don't cover 6 meters, and most VHF equipment only covers one band.

Let us get this TVI business out of the way so we can get to the fun stuff. I am going to dwell on the history of TVI on 6 meters for a while, for these problems experienced years ago are the roots of the negative reputation from which this band now suffers. The hams who live in the non channel 2 area must wonder what all the fuss is about. Six meters is from 50MHz to 54MHz, and almost all of the SSB & CW activity is at the low end of the band; a harmonic could fall on TV channels above channel 2. Getting rid of TVI on channels other than channel 2 is much like attacking the problem of TVI caused by an HF rig. But note, many low-pass filters start attenuating spurious signals a little above 10 meters and would kill your 6 meter signal. One must be careful to look for a filter that starts to work at the top end of 6 meters. I have spent most all of my operating life in two cities, Pittsburgh & Chicago, both with the dreaded channel 2. You might at this point say to yourself, "Self, the man's problem is fundamental overload of the TV set, channel 2 is 54 to 60MHz and the set does not have a chance, right?" Not quite. A smaller part of the problem was the front ends on those old 1950's and 1960's TV sets. The better front ends in todays TVs help with overload, and running low power does too (I wonder who thought of that). But in the 50's some hams on 6 caused TVI for blocks. Why? I think the biggest problem with the early rigs was the crystal frequencies used. Most of the transmitters made then used an 8MHz crystal or 8MHz VFO. These crystals were World War II surplus and cost us 50 cents at that time. A popular crystal was 8.4MHz; 6 X 8.4MHz = 50.4MHz, the calling frequency then. In many cases the 8MHz signal was getting through the multiplier stages and ending up in the final. If 50.4MHz is mixed with 8.4MHz one gets 58.8MHz, which is almost in the middle of channel 2 TV. No filter in the world on the TV set would ever work, and trying to filter a strong 58.8MHz signal at the transmitter's antenna jack is no easy job. I looked at a 1950's 6 meter rig on a spectrum analyzer and the signal on channel 2 was almost as big as the signal on 6 meters. Hams with later transmitters that could also take a 25MHz crystal usually reported that their channel 2 TVI was gone when switching to the new crystal. Another problem can be caused by operating between 50.5MHz and 51MHz; a TV tuned to channel 2 may receive the 6 meter signal as an image. Todays rig do not use 8MHz as the fundamental and todays 6 meter CW and SSB operator in channel 2 country stays below 50.5MHz.

Amplitude modulation was the big thing on 6 meters as well as the other bands in the 50's and 60's. Little CW was used on 6 for many commercial rigs had no place to plug in a key as well as no BFO. Speaker leads for the average HI-FI are just about the right length for picking up 10 and 6 meter signals. HI-FIs, AM radios, and TV sets all suffered from bad interference caused by audio rectification. As CW and SSB were used more with newer transceivers, AM was used less and this type of TVI and BCI happened much less often. After all, with AM modulation the TV viewer saw those big bars sitting there all the time, and move around on the screen as the ham talked. The AM radio and HI-FI received voice as if they were built to work on 6 meters. It did not take much detective work for the sufferer to

find the transmitter. CW and SSB cause bars to come and go on the TV, but on the radio and HI-FI, CW might be unnoticed. With CW and FM modulation the problem of audio rectification for all practical purposes is gone. FM is usually used high in the 6 meter band but operation so close to channel 2 is asking for trouble. There are brave souls that operate FM at home on occasions but find it wiser to go mobile when operating in the 52 to 54MHz range. If a 6 meter transmitter is clean but TVI to a set receiving channel 2 persists, a tuned trap on the TV set might be the answer.

My 15 year old set when tuned to channel 2 is slightly bothered by my 6 meter rig, but my newer VCR on that TV does not even know I am on the air. As operating on 6 is becoming better in comes cable TV to make life even sweeter. I know cable TV has caused a good number of hams much grief but it has been good to those on 6. The neighbor on one side of me uses cable, the neighbor on the other side reads a lot, there are 15 TV channels in Chicago, my three element 6 meter beam looks like a TV antenna, and I run QRP SSB and CW (3 watts); what does this all mean? It means I have never received a TVI complaint from operating on 6 meters in the fourteen years I have lived in this present location.

The list of 6 meter transceivers made since 1955 is long and most of them run about 10 watts out, but the flavor of QRP operation is found in five, 3 watt (or lower) radios. Four of these rigs are true portables and one of them is more in the hand held class. All the radios have room for on board batters, have a built in antenna or the ability to have a whip mounted on them, operate on CW and SSB, and can be carried with a strap.

The portable rigs are:

1. ICOM IC-502, 3 watts, 50 to 51MHz, CW & SSB, used price
   $100 to $150.
2. ICOM IC-502A, 3 watts with RIT, 50 to 51MHz, CW & SSB, used price $125 to $150.
3. YAESU FT-690R, 2.5 watts, RIT, memories, memory scanning, 50 to 54MHz, CW SSB AM & FM, used price $200 to $250.
4. YAESU FT-690R-II, 2.5 or 10 watts, RIT, memories, memory & selected band scans, 50 to 54MHz, CW SSB AM & FM, new price about $750.
5. AEA Inc. DX Handy, 1 watt, 50kHz segments from 50.1 to 50.3MHz, CW & SSB.

Antennas for 6 meters are small by HF standards. With a real good opening I have been able from Chicago to work Massachusetts to Oklahoma with the 3 watt IC-502 using it's built in whip antenna. The rig was sitting on the hood of my car. A 1/4 wave whip is only 54in. long. A three element beam is about the size of a TV antenna, and an inexpensive TV rotator will turn it nicely.

What can worked on 6 meters? Six meters is not like 80 through 20 meters were one can count on activity and openings almost every day. It has more the feel of 15 and 10 meters but will probably have more openings through the lowest part of the sunspot cycle than 10 meters. I look at 6 meters as being at the cross roads of propagation that effects HF and VHF. The handbooks cover this subject much better than I ever could. Now and then the band can go two or even three months without opening, or four or five openings could be experienced in a month. When the band opens stations can be there for hours at a time or come and go in minutes. One call area may only be heard or "4s", "5s", "1s", "2s" and "VE3s" can be all heard at once. At the peak of the sunspot cycle a QRP operator will get a chance to work a number of countries. That's not bad for a band that at one time was thought to be only good for going across town. An HF operator must readjust his thinking about DX when he crosses the border between HF and VHF. DX on the bands above 30MHz is usually any QSO with a station located 500 to 1000 miles away. Six meters provides a challenge unlike any HF band for it takes a lot of endurance to get WAS or DXCC on this band. A challenge more in reach of the casual 6 meter operator is the Grid Square award(s). The world is divided into squares by latitude and longitude that are counted as one would count states, but there are a lot more of them than states in the USA. Clubs like SMIRK (Six-Meter International Radio Klub) started in the 1950's and 60's to help promote activity on 6 meters. SMIRK awards a certificate and has 6 meter contests besides the ARRL's. Hope you can see that there is a lot to work if you're on the band at the right time.

How much investment in time is required to find the openings on the 6 meter band? Not much if you use some of the techniques developed by 6 meter operators over the years. Nowadays it is safe to say that the hams on 6 meters also have the capability to operate other bands. So when it is time to play ham radio you check 6 meters to see if it is open. When you watch TV you take a quick look at channel 2 to see if the picture looks strange because of interference from another channel 2 TV station out of town. If

Six Meters....

that happens there is a good chance 6 meters is open too. Get to know other hams on 6 meters; call one another when the band is found open. If there is an opening during the sunspot cycle, look for another one in 28 days; that is how long it takes for the sun to rotate. Listen to 28.885MHz, the 6 meter net frequency. If you have a radio that scans, scan from 50MHz to 50.2MHz looking for CW and SSB activity, beacons, and FM activity at 52.525MHz. If you don't have a scanning receiver listen on 50.125 MHz, the domestic calling frequency, or 50.11MHz the foreign calling frequency. There is a lot you can do to help find the band openings.

I hope that this article has helped put your fear of TVI from 6 meter operation in prospective, and has opened the door to a band with a whole new list of operating and building challenges.

Thanks to K9LCR and N9DKQ for their help.

Ingram Review...

continued from page 8

Overall impression–this is a pretty good book, as long as you can spot the errors and not be misled by them. Only a few are really worth mentioning. Saying that the power limit on 30 meters is 250 watts, not 200, could conceivably lead to an FCC citation. As for the two circuits mentioned above, the errors would probably be noticed quickly. Most errors are fairly innocuous and rather unimportant. Is it really that bad that he was off by several years on the introduction dates of the Heath HW-8 and TenTec QRP rigs? Or that he refers to a keyer paddle as a one-of-a-kind item, then turns around and says it is in limited production?

As I said earlier, the book is just plain FUN, and Daves enthusiasm is really contagious–he makes you want to stop reading about it and go DO it! If you know anyone who is even remotely curious about QRP, give them a copy–it should push them over the edge and turn them into a dedicated QRPer. Dave is an excellent "sales rep" for QRP, and this book should result in a lot of new folks giving it a try.

"How to Get Started in QRP" is available from The National Amateur Radio Association, P O Box 598, Redmond, WA 98073 (as well as many ham stores) and is in the ten dollar (plus shipping) price range. It is also available from the HR Bookstore, Rindge, NH; see a recent issue of CQ, or call (800) 457-7373, from 0800 to 1700 hours EST.

QRP

QRP ARCI SURVEY

Have you ever wondered exactly who the average QRP operator is? We know some of you are into DXing, some into contesting, some into designing and/or building their own gear, and some into the challenge of just making contacts with low power.

We receive "comments" from some of you from time to time, sometimes negative, sometimes positive, about the content of the QRP Quarterly: too technical, not technical enough, poor editing, great article, etc. Well you can't please all of the people all of the time.

I would like to hear from many of you concerning your thoughts on QRP and the Quarterly. Please take some time to fill out the survey below. Feel free to add whatever comments you so desire, either positive, negative, or both. Use an additional sheet of paper if you have a lot to say. I want to know what the average QRPer is thinking.

Please help me out. Many thanks.

TO: Jim Griffin, W9NJP
Knight Lite USA Inc.
P.O. Box 587
Geneva, IL 60134

MY MAIN INTEREST(S) IN QRP ARE AS FOLLOWS:

- ❑ Rag Chewing
- ❑ DX
- ❑ Contesting
- ❑ Challenge of QRP
- ❑ Designing gear
- ❑ Homebrewing
- ❑ Portable Work
- ❑ Other:_____
- ❑ CW
- ❑ SSB

QRP Quarterly: Overall I ❑ ENJOY ❑ AM UNHAPPY.

COMMENTS: _____

_____

_____

Miles Per Watt Calculations

by Mike Czuhajewski, WA8MCQ
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The 1000 Miles Per Watt award (or KMW) has been around for quite a while. I joined the QRP ARCI in 1967, back in the old 100 watt days before it turned into a true QRP club, but even then the KMW was going strong. It remains quite popular, as you can see from the Awards columns in the Quarterly, and is sort of a "rite of passage" into QRP. If you think you have a qualifying contact, how do you determine the distance to find out for sure? There are a couple ways—direct measurement on a map, and calculation from two sets of coordinates.

When I got going in QRP again around 1986, I started out with a 3 by 4 foot map of the US which I bought at a bookstore in the mall. I took a good, straight, wooden yard stick and marked it off in 50 and 100 mile increments, using the scale on the map. I also marked off the first 50 miles in smaller segments to zero in on the precise distance.

Next, I laid it on the map, drew a straight line from me to the other station, and read off the distance. How did I find them? Although it was a big one with lots of towns, a map of the whole country can't show every one, so I bought a Rand McNally road atlas. When I worked someone, I'd look them up in the index and find that town on the map of that state. If it wasn't on the US map, there were always enough nearby large towns to give me a good idea where they should be.

One day I happened on a BIG world atlas at a library and found that the index contained coordinates of quite a few world cities, both large and small. Not only that, it listed a heck of a lot of those little towns in the US that didn't show up on my big US map, like Jessup, MD, which used to be my post office box. With coordinates for all these, it was simple to plug the values into a distance calculation program on my computer, which will be covered later. The advantage of this method is that coordinates of the two stations can be independently verified by someone else, and they can calculate the distance for themselves. If you rely solely on a measurement on a big map it becomes harder for someone (such as the Awards Manager) to verify the distance.

There was one slight problem, though, since the distance program requires coordinates in decimal format rather than degrees and minutes. Converting from minutes to decimals is easy, since you simply multiply minutes by 0.01666 and tack the results onto the degrees. (One minute is 1/60 of a degree, or 0.01666.) A figure of 38 degrees, 45 minutes becomes 38.75 degrees.

No sweat so far, but the problem was telling if decimals were really decimals or minutes in disguise. Some atlases list them in a true decimal format, which is great and requires no conversion. Others list them in what appears to be decimal format but which is really degrees and minutes. For example, 49.45 might mean 49.45 degrees or 49 degrees, 45 minutes. If you use wrong format in the program, there will be noticeable errors in the distance.

I first noticed this "phony decimal" format in a British atlas, but later saw it in one published in the US. Telling which notation is used in a given atlas is easy. Look up a few coordinates, and see if the decimal portion of any are 0.60 or higher, or if all are .59 and under; that gives a clue. To verify, pick some coordinates which are between XX.50 and XX.59, then look them up on the appropriate map. If true decimal format is used, the location will be about halfway between longitude or latitude lines, but if it's the "phony decimal" format, it will be considerably closer to one line than the other.

There are many "miles per watt" programs floating around, which calculate the distance between two sets of coordinates. There was a good, bare-bones program in the January 1990 issue of the QRP Quarterly, by Doc Drake, W5TB

Figure 1: Slightly edited, sample of printed output of program:

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Data on a contact which qualifies for the 1000 MPW award:

From WA8MCQ 7945 Citadel Drive, Severn, MD, 39.13 N 76.73 W

Contact with distant station NG1G on 25 JAN 1992 at 1259 UTC/GMT on 7 MHz CW

Distant station located at BARNARD VT The distance from Severn, MD is 630 KM at
a heading of 34 degrees E of N. Approximate distance in miles is 391.4631 Coor-
dinates of distant station are :
43.75 latitude (no sign shown means North, and '-' is South)
72.33 longitude (no sign shown means West, and '-' is East) The source of these
coordinates is 1988 Rand McNally road atlas (approx coordinates)

Low power station for this contact was WA8MCQ at .003 watts output.

*** This contact with NG1G represents 130487.7 miles per watt ***
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Since the 1000 Miles Per Watt award is given for either transmitting or receiving, both stations participating in this contact are eligible.

with an update by Larry East, W1HUE in the July 1990 issue. I wrote my own, based on the distance and bearing calculation algorithm found in "The QRPers BASIC Propagation Tool Kit", written by Bob Brown, NM7M. (It was sold by the QRP Candy Store a few years ago, but I don't know if it's still available.) Over the months I kept adding to my program, enhancing it haphazardly. As a result, it does what I want but does not necessarily meet normally accepted standards of "good programming".

It includes a great deal of information about the contact, and when I make one good for considerably over 1000 miles per watt I run off a pair of the sheets and send one to the person I worked, along with information on applying for the 1000 MPW award. A second copy goes into my files. (Remember, the award is given for transmitting or receiving, and the person hearing the QRP signal works as hard or harder than the sending end. Anyone can crank down his rig into the milliwatts, but someone has to dig the signal out of the noise and QRM!) Figure 1 shows a slightly edited, sample output of the program.

Running to the library all the time got to be a drag, plus the great big atlas which listed all the little burgs suddenly disappeared for some reason. I was forced to go to a smaller atlas, and it only listed the relatively large towns in the US. Now what? Fortunately, most of my KMW contacts are domestic. Back to the trusty Rand McNally road atlas of the US, which gives coordinates with a little bit of work.

If you look closely at the individual state maps, you'll see marks along the edges showing the longitude and latitudes, in increments of 30 minutes or one degree, depending on the scale of the map. My particular atlas just gives "tick marks" for them, and does not draw the lines across the page, so I have to do that myself. Box in the desired location, drawing the longitude and latitude lines around it, and it's now a simple matter to measure the actual coordinates with a good degree of precision.

Figure 2 gives a fictitious example. The town of Hamheaven is between 45 and 46 degrees north, and between 102 and 102-1/2 degrees west. I take a ruler with a metric scale and measure the distance between the 45 and 46 lines, and then between the 45 line and the town. In this example, Hamheaven is 45 plus 13/23 of 1 degree north, or 45.57 north. Going from East to West, it is 102 plus 7/19 of one half degree West. (Be careful--sometimes longitude and latitude lines are one degree apart, sometimes one half, depending on the particular map.) Divide out the 7/19 and you get 0.36842, but that's the fraction of a half-degree, so the town is 102.18 degrees West.

I use a metric (decimal based) rather than British (inches/feet) scale since it's easier to work with. Actually, you don't need a metric ruler, either, since all we're interested in here is the ratio between two measurements, not their absolute value. I usually use an old architects scale ruler that I found in the trash, since it has a good decimal scale of sufficient length and resolution for my purposes. I use either the 1:1 or 2:1 scales, as appropriate.

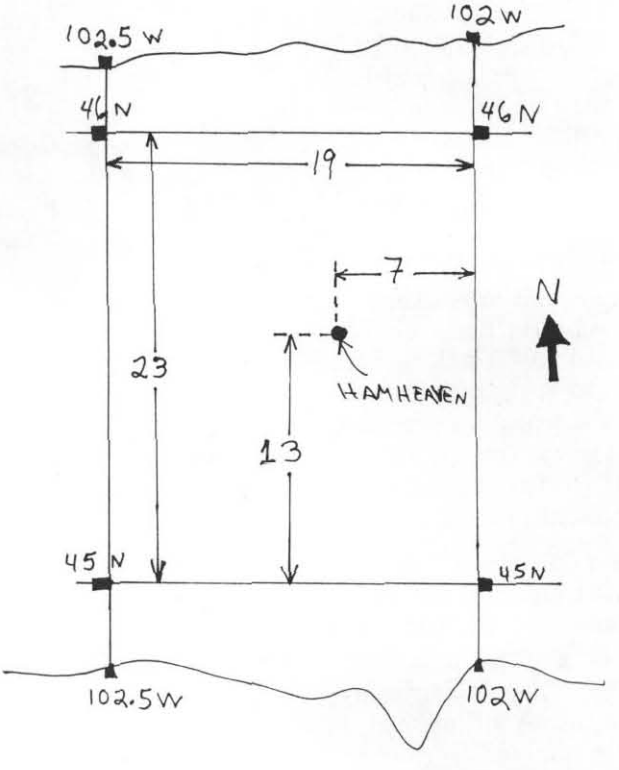
We now have estimated coordinates of 45.57 and 102.18. As a final check, look at the map and see if the position of the town within the rectangle agrees with your coordinates. Again, remember that some of those individual maps use 1/2 degree spacing, so you'll have to take that into account.

Those living outside the United States can probably apply the same principle to finding contacts in their own country, with local maps. Although I haven't looked up any of my dozen or so KMW contacts outside the continent, the same method could be used with an atlas to estimate the coordinates. (Don't let the librarian catch you marking on the pages, though!)

Figure 1 was a sample copy of the printout of the program. It was written in GWBASIC, but should run under most dialects of BASIC. It gives prompts for most of the information except the name and coordinates of my location. Those are "hard-wired" in the program, and the appropriate lines can be modified to suit your own location. It also contains a hard-wired statement that says all coordinates are based on the 1988 Rand McNally road atlas, which is what I use the most. That can also be changed to reflect the source you use the most, or deleted completely. (As the program runs, it says the coordinates are taken from XXXX but gives you the option of entering a different source on a case by case basis.)

The BASIC listing of the program will be printed in a future issue of the QRP Quarterly. We didn't print it this time since it has about 200 lines, although a lot of that consists of remarks, prompts and on-screen info. (If anyone wants to have one right now, send me a self addressed stamped envelope. Please be sure to indicate what the SASE is for, as I get many requests for various types of info.)

Figuring out Miles Per Watt is more fun and a lot easier if you have a good technique worked out, and this one seems to work OK for me. It also helps the Awards Manager, as it gives him a cross check on his own procedures, measurements and calculations. Finally, sending someone a data sheet like this on a contact makes it easier for them to apply for the award, and might even spark some "miles per watting" interest in others.



QRP REVIEW:

A W2FMI Balun by Amidon

by Michael A. Czuhajewski, WA8MCQ
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One of the rarer benefits of writing for the QRP Quarterly (and this one is very rare!) is getting something free of charge to evaluate and review. I had a review of the Amidon toroid data booklet a few issues ago. A reader in Sweden sent them a photocopy when he ordered the booklet (which was the first time they saw it), so they sent me one of their W2FMI baluns for review. Although their Sales Manager said I could keep it after doing the review, I donated it to be given away by the QRP ARCI in a drawing at Dayton 1993.

A little background–most of you have probably heard by now of the extensive work done with transmission line transformers by Jerry Sevick, W2FMI. He has a book on the subject, printed by ARRL; if you have the first edition, for $10, you might want to get the second, $20 version. It costs twice as much but is twice as big, and well worth the upgrade. Jerry is a recognized expert in many areas, and has had numerous articles in QST over the years. He also had one in the August 1992 issue of CQ magazine, on "ununs"–this is related to a balun (BALanced to UNbalanced transformer), but is for UNbalanced to UNbalanced matching. The big advantage of a transmission line transformer over the traditional type is high efficiency, as well as large frequency coverage. (He also had an article on baluns in the Summer 1992 issue of Communications Quarterly.)

For a couple years now, Amidon has been selling both kits and complete units of many of the designs in the W2FMI book. For $8, they sell their 58 page Transmission Line Transformer Handbook, subtitled "48 Improved Designs by Jerry Sevick, W2FMI." This contains a brief introduction to the subject, some tips on building them, and a series of data sheets on the various designs they sell. Each consists of a brief description, schematic and photo of the complete unit (before being mounted in a box).

You may or may not find this book worth ordering, since it consists of little tutorial and background information; it's mostly a collection of data sheets on the various units they sell. However, remember the subtitle above–"Improved Designs." The introduction says, "All of these transformers were selected from the author's book. Many of the examples listed here are improvements over those in the book since they offer more margins at the low-frequency end where excessive core flux (and hence possible damage) could occur."

In his CQ article, Jerry says that "most of the transformers in my book have been redesigned in order to optimize the performance/price ratio." You might find it worthwhile to spend the extra money. (The data sheets give schematics and winding information for the various cores.)

The particular balun they sent me is model W2FMI-4:1-HBM200. The basic specs are coded into that–it's a 4:1 design, high power (H), balanced output (B), medium power range for a high power unit (M), and 200 ohms output. (The M indicates that this one can take 2 kW continuous power, 4 kW peak. If it was an HBL, it would be 1 kW continuous, and the HBH takes a mighty QRO 5kW.)

First, the packaging–this sucker is built to take it! It's mounted in a Bud model CU-234 die cast aluminum box. No need to worry about the label fading or falling off–it looks like it was acid-etched onto the cover! Fifty years from now there will be no question who made the unit or what the model number is.

It has a standard SO-239 connector on one end, and a ceramic feedthru insulator on each side with bolts through them for connecting the 200 ohm balanced side. (As always with ceramic feedthrus, be careful not to tighten them too much and crack them.) On the other end there's a hook eye for hanging the box. Inside, the balun itself is mounted with spray-on self-curing foam insulation. (Ever go to the hardware store and buy a can of that? It's sold for spraying into cracks and crevices around the house. It comes out of the can like sloppy butterscotch pudding, and a few hours later it hardens into solid foam insulation.)

In this particular unit, the balun is mounted quite rigidly but they left some of it exposed. They filled the bottom with foam, put the core to bed on it and put a big dab on top. You can easily see the massive ferrite toroid, the double winding of Teflon® sleeved wire wrapped with the fiberglass tape, etc., all just like the Sevick book says to do it.

The box was not sealed around the edges against the elements. This could be debated either way; if they did hermetically seal it, you'd be forever curious about how it looked inside and if you got your moneys worth. (I also needed to get in to

Alternate Power Sources

by Michael A. Czuhajewski, WA8MCQ
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There has been a lot of interest by QRPers in solar power over the years, although the QRP Quarterly hasn't had too many articles on it in recent issues. However, hams everywhere are still interested in the subject. I recently saw these two messages on the packet network. (The originator of the reply consented to use of his call.)

```
From : XXXXX @ XXXXXX.NY.USA.NA
To : ALL @ USA
Subj : Solar Power

Hello...Seeking to exchange information
and ideas regarding using solar panels
to charge batteries to power my ham
shack... Particularly interested in
finding out about sources for panels,
regulators, etc...There won't always be
cheap oil, so who is still into
alternative energy???
                                Tnx es 73
                                    George
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From : N4YIV @ WA4DTE.VA.USA.NA To :
ALL @ USA Subj : Free solar panels?

In reply: XXXXX et al
Subject: Solar power
George: I've found solar panels growing
freely along the roadside like
wildflowers. They appear to be free for
the picking and may be an infinitely
renewable resource. Whenever one is
harvested another one appears in its
place—full grown) in short order. They
are also often found growing on posts
along fence rows, near stream gauges
and weather stations, near traffic
sigllals, and in the shelter of
antennas on mountain tops. Amphibious
marine forms have been seen riding
buoys near shipping lanes. Sure hope
this info helps...let me know how you
make out.
                    73, Paul N4YIV@WA4DTE.VA.USA
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(WA8MCQ comment--And in many places along the road, a related species grows in the vicinity of the wildflower solar panels and can be used as an aid in locating them. This plant has a tall, slender stalk topped by a flat, often rectangular part on which is inscribed, "CALL BOX 1/2 MILE".)

W2FMI Balun Review...

tighten a loose nut on one of the insulators.) If you need to mount it outside, you can easily use your favorite weatherproofing compounds and methods.

One thing it should probably have, which you can also do yourself, is a small hole to allow the box to breathe and prevent problems with condensation. You may not really need it, though. W2FMI had another article in the November 1992 issue of CQ, and near the end he said that no special precautions had to be taken for outside use, since ferrites are ceramics and thus not affected by moisture. He did, however, recommend keeping the transformers out of a pool of water!

Apparently not all their transformers come in die cast boxes. They included a flyer of their 1992 summer specials, listing seven of their ununs. The parts lists for the kits said they come with a CU3015A minibox. The kits appear to be quite complete; in addition to documentation, they include the core, wire, Scotch #27 glass tape, solder lugs, copper strip, SO-239s and hardware and the box. The special kit price for those seven was $28 each (which may well have been raised by the time this is printed). The assembled units ranged from $45 to $50.

Unfortunately, I can't test the unit properly–as a true-blue QRPer, I don't have anything remotely approaching 2000 watts! However, I trust Amidon and if they say it can take it, I believe them. I took it to work and slapped it on a Hewlett-Packard 8753C network analyzer, with S-parameter test set, and measured the SWR. I terminated the high impedance side with 200 ohms, and got an SWR of 1.04 at 3 MHz. It dropped a bit as frequency increased, came back to that value at 24.5 MHz, rising to 1.07 at 31 MHz. (At 1 MHz it was still a respectable 1.14, so it should work well on 160 meters.) In addition to this unit they have a wide variety of baluns and ununs, in a wide variety of matching ratios.

If the prices are a bit steep and you want to roll your own, Amidon also sells the wire, teflon tubing and glass tape. According to the sales flyer the toroid used in a lot of these is FT150-K. I checked my latest Amidon flyer and don't see type K ferrite listed, so they may not be selling the cores separately yet.

If you do a lot of antenna work, or just a little, you might want to check out some of the W2FMI transmission line transformers. They cover a wide variety of impedance ratios, have extremely high efficiencies, and some could be the answer to your matching problems. QRP

ARE WE QRPers THE "SAVING REMNANT" of AMATEUR RADIO?

C.F. "Rock" Rockey, W9SCH
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During the past two decades the radio manufacturing industry, much of it foreign based, has vigorously striven to convert our hobby of amateur radio into merely another commodity market - basically the same in spirit as, say, the automotive, the household appliance, the entertainment and the drug/cosmetic markets. In each of these, industry has clearly defined a definite set of personal satisfactions which will certainly be enjoyed if its products are purchased and applied. It has also, through an extensive advertising campaign, attempted to attach a strong aura of snob appeal and prestige to the purchase and use of these products. Specifically, in amateur radio, the satisfaction, pride-of-ownership and use of the expensive, over-sophisticated transceiver, the elaborate rotary beam and tower, and the "top limit linear" power amplifier represent the most conspicuous examples of this trend.

Coupled with this drive, and arising in parallel and insidiously therewith, has developed a most alarming attitude shift among all too many of our more credulous brother amateurs. Once most of us had developed among us an admirable pride in our growing skill as craftsmen and technicians as well as operators of radio apparatus. Originality of thought and a genuine appreciation of radio theory were both encouraged and highly valued among us. We were a highly self-directed and self-motivated lot. Very probably, as a direct result, radio amateurs became increasingly respected and valued persons in both the electrical and radio industries and in our military services. Indeed, thousands of us served with recognition and honor in two great world wars and in numerous national and local emergencies. May one be so brash as to say that it was the diligence and competence displayed that virtually guaranteed the continuance of the privileges that we now enjoy as radio amateurs.

But that this invaluable attitude has now been drastically attenuated is now becoming painfully obvious. Speaking generally, how many of today's amateurs could begin to call themselves even embryo-technicians? For instance, how many can draw, or even read, a schematic wiring diagram, can use the simplest of radio test instruments, or effectively reason through a relatively simple equipment fault? Even worse, how many even care? After a not-too-technical talk at a local club, a prominent amateur was heard to remark: "Theory bores me!" It appears that, as each year passes, the requirements for passing an amateur license examination must be increasingly watered down. Even the not-abnormal self-discipline required to basically master the telegraph code is being resented more and more by the license applicants. It is becoming more and more apparent that the "dumbing-down" of the American radio amateur is well on the way.

Why has this tragic situation in what used to be called "The Hobby of Education and Service" come about? Why is amateur radio now a-symptomatically approaching that pitiful state which characterizes the "Citizen Radio" service? Let us face this question squarely.

While it is certainly true that the recent spirit of the times has largely been one of growing insouciance and sybaritism, and this has to a certain extent influenced all of us, the callous greed of the present radio industry must certainly bear its share of the blame. In a very real way, the industry has deliberately exploited our hobby to nought by its own ravenous financial advantage and with but little concern for amateur radio's inherent human value. Private capitalistic enterprise is an instrument of unquestioned, civilized benefit. But in this instance cited, it has been probably carried far too far. One may certainly say that it has effectively emasculated our hobby.

But even as in Biblical times, there is always a segment of any society which either deliberately resists or at least tends to ignore strong disruptive trends therein - a "saving remnant" if you please. In amateur radio today that saving remnant seems unquestionably to contain you and I within the so-called QRP movement. As a group, we continue to say a perhaps soft but yet definite NO to the tinselled, superficial world as trumpeted by the current radio industry. Many of us in QRP have repeatedly insisted that the avowed purpose of amateur radio lies in personal endeavor and achievement and it is only in

such personal endeavor that we can both educate ourselves and serve others. To this end we have retained a firm, general interest in the home construction of our apparatus. It is not that we feel that our home built equipment is necessarily superior to that which is professionally proffered, but rather that it both represents our own individual skill and that, through our own self-restraint, it is made to satisfy our purposes. It is thus our very own and not someone else's, however brilliant that someone else might be. Contrary to some misinformed opinion, we are not allergic to a well made piece of commercial apparatus. It is merely that we are not overly awed by its often excess elaborateness and cost.

Furthermore, most of us are well aware of that which can be done when both brains and money are abundant; the work of NASA serves us as an outstanding example of this. Rather, some of us are enthralled by what might be accomplished when both money and brains may be in lesser supply. The upper end of the electromagnetic economic spectrum is being well explored; many of us ask rather: what can be done at the almost unexplored lower end of this spectrum? To us, in QRP, it might well be said that: "Amateur Radio is something that you do, not something that you buy!"

Now, in order to carry through our program thus broadly sketched, it is necessary that we QRPers once again espouse those attitudes and skills which have now become so neglected and are largely considered as unnecessary by the body of radio amateurs as a whole. In order to successfully build, test, and use our relatively simple "firefly powered" equipment (please do not use the phrase "Flea Powered" - let's say "Firefly Powered"; everybody loves fireflies but who can love a flea?), and simultaneously strive for the effectiveness and distance range which, as a group, we so cherish, we cannot allow ourselves to become lax. We must make a genuine effort to master electronic theory and technique to the very best of our ability. We must maintain our skill in the use of the telegraph code and other operating methods, and we must also become intimately familiar with the nature and vagaries of the ionosphere. In short, we must cleave to and expand upon those very personal attributes that have earned for the radio amateur those privileges we now enjoy and for which we were once genuinely respected. Otherwise we completely fail.

Indeed, to many thoughtful amateurs, unless we can once again genuinely fulfill our place within the radio spectrum, amateur radio will soon cease to exist. Despite the intense efforts of the radio industry, amateur radio cannot possibly justify itself upon the purely financial basis of its purchasing power. We have not frequency enough to contain enough amateurs to make this possible! We must earn our place upon the air once again. Parasites are soon exterminated.

Will we QRPers thus become "The Saving Remnant"? Time will tell.....

QRP essay from WB2EZG—

by Vince Biancomano, WB2EZG
143 Pleasant Grove Rd.
Long Valley, NJ 07853

Most hams prefer to consider amateur radio as just a hobby. Unfortunately, it's all BUSINESS when it comes to protecting our frequencies. In that regard, the QRP ARCI, whether it knows it or not, has inherited the major responsibility to help protect those frequencies. It must immediately seize upon this unparalleled opportunity to meet the challenge, because the ARRL has shown no inclination to help at the level I believe is absolutely necessary.

QRP ARCI remains one of the few organizations that represents hands-on learning and technical education–the cornerstone upon which our hobby is built. As the FCC ATTEMPTS to convert the Amateur Service into a personal radio service, the Officers and membership will need to make a decision whether to accept greater responsibility to help maintain that tradition. In short, no one but the various "grass roots" organizations such as QRP ARCI, QCWA, and FISTS can get the job done.

Most hams in one way or another have been led to believe we can protect our frequencies if we simply increase our numbers, without regard to how it's done. It isn't so. If it were, there would have been no need for the Spectrum Protection Act, which literally challenges the authority of the Federal Communications Commission to reclaim our frequencies without due compensation. Those who have closely followed Commission actions over the years understand that FCC would prefer to deregulate the Amateur Service without formally suspending Part 97.1, i.e., without declaring it null and void. Deregulation without declaration, however, has compromised our ability to retain our frequencies (100 MHz has been taken in the last decade or so). Amateurs are being herded into an indefensible position, no longer able to provide a UNIQUE service to the country as a technical learning ground for youth, AND THE FCC KNOWS IT. Fortunately, some of us know it too, and despite the pessimistic views of many in the amateur community who say it's too late to reverse the trend, there's still

QRP Essay...

time to do something, believe it! Indeed, if the trend is not reversed, our time IS up!

It's quite simple. The FCC is based in big business, and business realizes it simply makes no sense for a hobby whose main activity is now casual conversation, to occupy frequencies worth millions of dollars! Apparently, though, very few people understand, or care, that defacto deregulation brings the Amateur Service one step closer to a personal radio service and, ultimately, a reduction or sharing of frequencies. Already, two no-code, no-theory petitions have been filed with the FCC, the last one for all frequencies allocated to the amateur service. No, that petitioner was not a madman or businessman, but an amateur who realizes we are at risk for frequencies because we can no longer meet the requirements of Part 97.1 in the spirit it was originally written. He understands that the existing exam-by-rote structure has created a condition whereby some Extra Class hams can't apply even simple Ohm's Law, and that presents a threat to our very being. It is here that QRP ARCI can make a difference.

The solution to deregulation at this time is clear: demand a return to meaningful standards in order to provide a unique service, thereby justifying our frequencies; or, demand a re-write of Part 97.1 so that amateurs can meet the new terms needed to retain their frequencies; or, suffer the consequences. The demand for a return to meaningful standards is not going to come from ARRL; if it were, we would have seen a change in policy. It's up to us, and all the existing grass-roots organizations, to protect the hobby we now recognize as amateur radio. FCC's actions indicate they plan to "divide and conquer"; we'll never have a better chance to inform both Congress and the FCC we don't approve of those efforts. The alternative is a personal radio service. In any case, nothing less than a coordinated effort with other grass-root organizations, and no-nonsense petitions, will work. Over the last several years, I've started the ball rolling on a fairly wide scale [with letters to congressmen and the FCC]; had we waited for the cavalry, we would still be waiting. Individuals can do so much, however. Now it's up to the organizations. I hope QRP ARCI will be up to the challenge.

Q. R. Oscar & Q. R. Pete

by Wayne A. Burdick, N6KR

(Editor's note—this item first appeared in the March/April 1992 issue of "72", the newsletter of the New England QRP Club. The author is the designer and builder of the Safari-4 QRP transceiver featured in QEX a couple years ago.)

It happened in September, on a cold and stormy day;
The mother of all contests was now nearly underway.
Before the day was over, ears from Bonn to Surinam
Would hear a battle rage between two different breeds of ham.

Oscar, a distinguished man of wisdom (and of wattage)
Lit his pipe and surveyed his substantial shortwave cottage.
'Let the games begin!' he cried, aglow with pride and power;
And with a grin he swung his twenty ton rotating tower.

Not far away a man named Pete crouched low inside a tent,
His sleeping bag was soggy and his penlight made him squint,
Yet as he worked he smiled, twisting wires, tweaking pots,
And soon his rig was bristling with two hundred milliwatts.

Just after zero, zero, zero (UTC),
Both men tuned up on twenty and they listened carefully,
But neither could believe his ears, and both began to pray;
On 14020 they heard 'DE ZA1A'.

Now Oscar moved up five KC with dignity and class;
He gripped his paddle deftly and prepared to pound some brass.
Heterodynes were screeching, hungry birds caged in a zoo,
But he could snag Albania on one call – maybe two.

Pete took quite a different tack. He scanned for open space
Listening to the bedlam with a frown upon his face;
He tugged his random wire to improve its ERP,
And finally he found a place to sign 'slash QRP'.

Well Oscar's monster, fire breathing signal was the best,
But Zed A-1-A knew him and felt sorry for the rest.
With this in mind he listened for the meager and the brave,
And ignored the QRO boys (who began to rant and rave).

Soon the DX station heard a wimpy 'QRP';
He fired off a 599 and waited patiently,
But Pete was eating trail mix now, and feeling quite dejected
Being called by rare DX was not what he expected.

Oscar heard the call and moved in closer for the kill,
Yet when he thought his turn had come, the QSO lingered still,
'So how much are you running?' 'A quarter watt or less.'
'A homebrew rig?' 'My own design, or mostly, I confess.'
'Well I'm a QRP fan too; good attitude to foster,'
Then ZA1A signed with Pete and said, 'OK, it's your turn Oscar.'

On Sunday, Pete packed up his gear, his low-watt mission done.
(Birds who'd perched upon his wire would live to tell their young.)
Pete surveyed the hills and fields, a wondrous sight to feast on.
Then he stuffed himself into his trusty, rusty Nissan.

And Oscar? He had ruled the night with clear, demonic vision;
Slicing QRM with his unleashed atomic fission.
But near the stroke of twelve, he cut his drive by two dB,
Then worked some rare DX and said, 'Not bad for QRP!'

COMMENTARY ON THE MIZUHO MX-18S

Byron Weaver, WU2J
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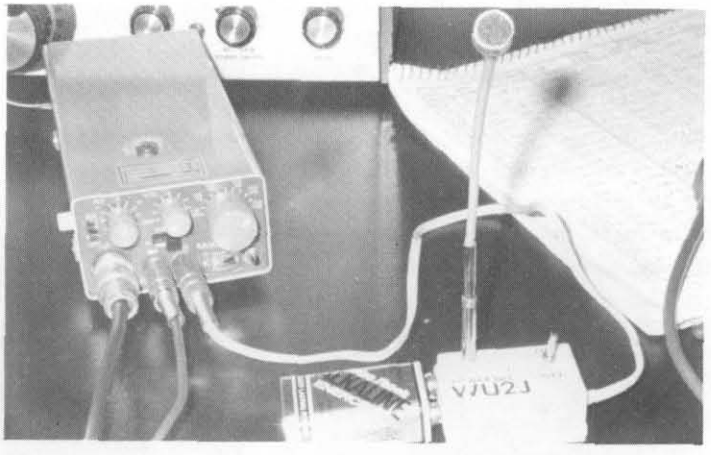
Fortunately I was able to purchase one of the Mizuho MX-18S units from WC4X (see Page 27, January 1993 *QRP QUARTERLY*), and after building some useful accessories, I put it on the air around November 11, 1992. (J-Com has recently started to offer these units and is advertising them in *World Radio*, etc.).

The one-band rig is attractive physically for portable use and permitted me to evaluate 17 Meters since my Argos and FT-7 didn't cover this band. Sensitivity is quite good and using a couple WU2J very narrow spaced wire Yagis (director and driven element spaced .083 wavelength), I managed to work 99 DXCC countries in less than 3 months operation. Only 4 of these contacts were CW, the rest SSB. My impression is that the rig is more of a SSB rig than a CW unit, but I like it!

Since the unit does not have internal sidetone or automatic changeover (T/R), I rushed to build such. A small mechanical T/R switch incorporated in a 1 X 1 X ½ inch box proved adequate. An NE555 sidetone oscillator with miniature components soldered directly to the chip and installed inside the box worked, but yielded what sounded like a slow decreasing oscillation after every dot and dash due to an internal electrolytic capacitor being across the key jack. I decided to put this mod on the back burner and operate CW without sidetone if a certain contact was desired. A regulator chip and several capacitors were fitted into another small box to provide 9.5V for the MX-18S from a 13.5V power supply. NOTE: Sidetone, changeover, and DC converter options are available from Mizuho, but are quite expensive and are packaged in separate boxes.

The internal microphone is inconvenient for station operation so an electret element was used for a separate microphone package which also uses a TL082 as an audio amp, 1N34 diodes for speech clipping, and a R/C filter plus drive adjust. Sidebanders call this a "speech processor." Hi!

Also used to power the unit are 7 internal rechargeable "AA" cells I purchased.



There is one main fault with the MX-18S that is not always present and can be tolerated. When W1AW sends code practice or bulletins on 18.087 MHz, it can be heard (albeit weaker) on 18.067, 18.127, and 18.175 MHz. Every 30 KHz!! Any strong CW or SSB signal exhibits the redundant 30 KHz "freebee" if within the tuning range of the unit. At first I thought this was due to one of the unused crystals of the switchable VXO until I removed one resulting in no change. It was afterwards that I measured the difference in frequency responses. WC4X has the same problem with his unit. A letter written directly to Mizuho got no response. But, as stated previously, it is tolerable and I like the unit for SSB and portability.

The VXO operates with fundamental crystals in the 14.7 MHz range and is then doubled to 29.4 MHz. The crystal filter is 11.2735 MHz and BFO 11.275 MHz. The 30 KHz intrusions are a puzzle.

17 Meter Commentary. Working DX on this band with around 2 watts SSB has been a thrilling experience. It's proven a natural for QRP with a decent antenna. Over 90% of the amateurs on this band seem to be using Cushcraft R5s and a few R7s as well as tuners with antennas designed for other bands. Usually I hear the DX stations before them or work the stations without the above ever having heard the DX! Working all Europe, South America, and the Caribbean was easy. But working in pile-ups has been successful to include TZ6VV, 7Q7ZZ, XT2DK, TY1IJ, V73IO, A45ZZ, A22BW, Z21HJ, TF3T, JI7DUD (cw), 3X0HLU, TA1AL, OJ0, OD5, VK8-OB, and the USSR and former affiliates. The MX series units are not cheap in price but in my case it was worth the price as a worthwhile new band was added to existing capabilities.

LETTERS TO THE EDITOR

OPTO HAND KEY

Because my opto hand key (*QST*, Feb. 1992) may be of use to handicapped hams, as well as newcomers and old timers, I should like to explore the potential for commercial kit and/or finished unit production. Changing the oak case to something injection molded-with a custom circuit board holding all parts-might make the unit economically feasible. I welcome any correspondence on the matter. - L.B. Cebik, W4RNL, 1434 High Mesa Drive, Knoxville, TN 37938-4443, U.S.A.

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160 METRE QRP

Do any of our members concentrate on 160 metre QRP operating? I would like to correspond with someone who does in order to compare my reports on this band, as well as antennas, etc. I would appreciate letters on the subject of 160 metre QRP, or, perhaps an article or two in *QRP QUARTERLY* on the subject. - Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan CF46 6DB, Wales

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MILLIWATTS

Can anyone tell me where to buy or how to build a fairly accurate watt meter for milliwatts? I've just finished my WAS SSB (many of the QSOs at less than 1 watt - there is nothing like a pile-up on you when you're running about ½ watt sideband!) and also WAS 3 watt CW and WAS 1 watt CW. My problem is this: 1 watt is just far too much power and there's just not enough challenge anymore. I need to be able to accurately measure lower levels in order to give legitimate power level reports to the other ops. Honest, I'm not being smart; I'm serious. I got rid of my linear after endless complaints from my family and neighbors (in spite of intense filtration on both ends) about TVI and RFI on their phones. I traded it for a keyer and that was the beginning of my CW QSOs. After falling in love with CW I ran across a "nut" who was running 5 watts one day and when he encouraged me to reduce my power to 5 watts which still resulted in great signal reports, I was hooked on QRP. My only problem was that my Icom 735 only went down to 10 watts, so while visiting my family in Bellevue, WA I gave Icom a call and a tech told me which pots to adjust to lower the minimum and reset the maximum power. This got me down to 3 watts and was I excited. But that was far too easy and I wanted LESS! Then I ran across N1DWA, Cliff, who sent me a circuit design by W3TS which puts a small negative voltage into the ALC jack and with the help of my friend AA5YL, Jim, we modified and elaborated on it to create a switchable array of variable pots for any power level; I was off and running, but unable to determine just "how low I could go", and really know. So help someone PLEASE!

Perhaps one of the keys to my good signal out is my big wire loop antenna. It started out as a 400 foot rectangle and I've chopped it down to a 300 foot Delta, not because it wasn't doing well; it was great, but I needed to give it a bit more direction into the NW and NE to better catch some much needed states. It's only up about 15 to 18 feet when it's not laying on the ground from a collapsed corner support due to wind or ice storms. Don't laugh but I once worked 35 different countries in a big world-wide DX contest last year only to look out the window later and see that it had been laying across limbs and on the ground in 2 places from ice build-up which collapsed one corner support. I feed it with itself turned down the wall where it meets itself at the tip of the delta. I stop it about 3 inches from itself and then turn parallel down the wall about 6 feet, then together at the bottom with wire nuts (some day I'll solder the connections, honest!) to about a foot of zip cord through the wall to a standard AC wall plug. From there about a foot to my rig I use another piece of regular AC extension cord with plug for a nice quick disconnect. Cheap and easy. Sorry folks, liners, towers and beams combined with elaborate formulas are entirely unnecessary. Just give me a big chunk of 14 gauge solid core insulated and my MFJ 949D and I can give you a 1:1 SWR, any band, any frequency and a great QRP signal. - Jim Habersetzer, 609 N. 8th, Van Buren, AR 72956

ON HOMEBREWING

May I indite a gloss upon Wally, K4JVT's thesis in the October, 1992 issue, if you please. In this same issue, Mike Czuhajewski wisely writes: "The oldtimers among us have seen enough crystal transmitters to last a lifetime..." On the other hand, when we give Mike, or that other perpetual paladin of homebrewing, Doug De Maw, a free hand, what comes forth? Usually a glorious masterpiece is revealed, of such complexity and sophistication as would roll Marconi himself over in his grave. Marvelous as such creations are to behold, one wonders how many younger (and some not-so-young) homebrewers are frightened out of their socks thereby? How, by the prophet's beard, could one possibly duplicate such a thing upon a kitchen table, using only a pair of gas pliers, a nail file and a dime store screwdriver! It should never be forgotten that many of us of lesser means or without professional electronic connections must work in a shop that is scarcely better equipped - yet we too love homebrewing and long to participate in this venerable, characteristically amateur pursuit. What is there for us these days?

Seriously, may I respectfully propose that there is a "via media", a middle way in this. If there were, among our electronic genii, one who would conceive a project or two which was of respectable design - truly suitable generally to modern operating conditions - yet one which would not demand NACA style shop and test facilities - what a hero among us he would be! One might also hope that the current drive toward miniaturization would be relaxed therein in deference to the older kluteyfingered and bleary-eyed among us. After all, are not most QRP rigs to be used in a reasonably ample ham shack rather than ensconced within Milady's Escritoire? How's about it? Long may the homebrew kettle boil. - Rock, W9SCH

CONTEST FOR QRPers

NORTHWEST QRP CLUB CONTEST. *Saturday*, April 17, 1993. 1700 UTC to 2100 UTC (9AM to 12 PM PST). Freq: 7035-7040 KHz, 14060 KHz. The object of the "Spring NWQRP Sprint" is to contact as many QRP stations as possible within a 3 hour period. Contacts on each band are considered as a new contact. Contacts with NWQRP members count 5 points, non-members count 3 points. Non-NWQRP members must give power level used. Exchange: give RST, State, and NWQRP #. Call "CQ NWQRP TEST". Multipliers: Multiply total score by 5 for one watt or less; by 3 for one to three watts; by 2 for three to five watts. Awards will be given for the highest score in each call area including the Top Score. Results will be published in the June 1993 NWQ Newsletter. Send completed logs by May 15, 1993 to: Bob Farnworth WU7F, Contest Editor NWQRP Club, 6822 131 Avenue SE, Bellevue, WA 98006.

MARYLAND-DC QSO PARTY. 1600Z Aug 14 - 0300Z Aug 15 AND 1600-2359Z Aug 15, 1993. Phone and cw stations may be worked once per band using each mode. CW QSOs in cw band only. Non-MD stations must work MD-DC stations. MD-DC stations may work anyone. Portables and mobiles that change counties during the test count as a separate station in each new county of operation. NO REPEATER OR PACKET QSOs. Exchange QTH and MAJOR CATEOGRY OF ENTRY. QTH is county for MD stations, US State, Canadian Province, or if other DX, Country. MAJOR CATEOGRIES are CLUB, QRP, MOBILE, Novice/Tech, and STANDARD. Stations should send the major category that reflects their highest point value. Suggested frequencies: SSB 3.92 7.23 14.26 21.37 28.38 50.15 146.55 MHz; CW 3.643 3.701 7.06 7.126 14.04 21.115 28.04 28.115 MHz. CW is suggested on the odd half hours; example *1730, 1930, 2130 UTC*. Scoring: For non-MD-DC stations, each MD county, Batlimore City and DC are multipliers. For MD-DC stations multiplers are MD Counties, Baltimore City, DC, each of the other 49 states, Canadian Provinces + 1 for working DX outside of Canada. Multipliers may be claimed once only. They do not repeat on different bands. QSO POINTS: 10 pts for club stations QSOs (clubs anywhere for MD-DC stations); 5 pts for Mobile QSOs (mobiles anywhere for MD-DC stations); 3 pts for QSOs with QRP stations (SSB/CW) or Novice/Tech on CW; 2 pts for CW (or RTTY) QSOs with Standard Stations; 1 pt for any other valid contact (Standard SSB & FM). Special Note: Highest point value per QSO applies (example-a cw/mobile QSO is 5 points). Fine Score: add up all QSO points and multiply by the sum of the multipliers. AWARDS: Certificate and QSO PARTY LOGO WATCH to the high scoring MDC log and Top NON-MD log. Certificates awarded for all other categories including 10 best MD-DC, Best each US State, Canadian Province, DX Country, MD Club, DC Club, MD-DC Mobile, Best YL Score, Best QRP or SWL log each state, Best Novice/Tech each state. A plaque will be awarded the high scoring MD-DC Club. Participation certificates to all with 50 or more QSO points in entry. Send logs with a SASE by Sept. 10, 1993 to A.R.A., P.O. Box 52, Hagerstown, MD 21741.

OTHER NEWS

AGCW-DL. Listed are some important changes concerning the *AGCW-DL Diploma Service:*

1. The SERVICE MANAGER's new address is: Tom Roll, DL2NBY, Richard-Wagner St. 11, D/W - 8502 Zirndorf, Germany. Please send all AGCW-DL award applications to the above mentioned address!

2. Starting January 1, 1993 the award fees had to be changed: for the CW-500, CW-1000, CW-2000, UKW-CW-125, UKW-CW-250, QRP-CW-250, QRP-CW-500 the fees are now DM 10 or equivalent in IRCs or US-dollars (green stamps). The CW-QRP-100 is now DM 6 or equivalent. - Christian Unger, DL5BCJ, Information Manager, AGCW-DL

FOR SALE

C.M. Howes DCRX20 20 meter SSB/CW RX Kit new in sealed bag. MTX20 10 Watt CW TX with 14.060 MHz Xtal new in bag. Both for $55.00 plus $2 shipping. WANTED: Spy Radios in suitcases, etc. Mike Michael W3TS, Church Lane, Halifax, PA 17032-0593; TEL (717) 896 3973.

Molokai with QRP

by Bob Spidell, W6SKQ *

Molokai Island is located between Maui and Oahu in the Hawaiian chain. Our vacation site was located on the southeast side of the island. The tallest seacliffs in the world are on the north side of the island; they rise from the surface of the ocean to above 3,000 feet. Interior mountains rise above 4,500 feet with one mountain range only one mile away from the back of our vacation site. As far as DX was concerned, I figured no contacts with Japan or Russia would be made due to this natural physical RF barrier.

Arrival time at our cottage was during mid-afternoon on October 18, 1992, so once we settled in the natural thing to do first was to take a dip in the ocean which was only 50 feet away from our cottage. The refreshing swim in addition to a stroll along the beach eliminated antenna hanging the first day.

Our site was inside a coconut grove with most trees rising well above 50 feet. They swung feverishly in the strong trade winds. Fortunately there was a clearing which ran north/south and measured about 120 feet. How lucky can one get! I took off 12 feet from each end of my previously prepared 135 foot center fed zepp and connected the 100 feet of 300 ohm feeder. The beach supplied the right size coral rock for connecting the 275 lb. test nylon twine to throw up at least 50 feet. The first end went up in 5 minutes over a non-coconut tree. The other end took over an hour to get up as coconut trees sway wildly in the winds. All the while, a morning downpour came and went.

The first band to check out was 10 meters. Even Hawaii is plagued with QRM from illegal SSB operations on the low end of the band. Very few CW signals were coming through, so I went up to 28.350 and worked a couple of stations in Washington. One gave me a 5X3 and the other a 5X4. Now on to bigger and better

things: 15 meter CW. My first mainland QSO was with W6DDB in Lancaster, CA - my home QTH. Bill had been waiting for me on 21.060. After an hour I QSY'd to 20 meters and operated on that band for about 4 hours.

It took 2 to 3 days to get the hang of how the band conditions evolved on a day to day basis so that I could plan on other activities during my vacation. From 8 AM to 12 noon it made no sense to be on the air; therefore, I spent my morning hours snorkeling, swimming and walking. Even tried my hand on how to stay on a surfboard....tummy to board. I thought I would have had that perfected in a couple of days, but a local told me it normally took two months (it all is in the balance). Went squid hunting about three times also - no wonder I was told to bring some worn out trousers and old sneakers when in the coral reefs.

40 meter CW daytime operation is zilch as well as 80 meter CW or SSB day or night. When 2 meters came of its own the local inter-island CW nets just plain folded. The only HF inter-island activity is a daily 40 meter SSB Friendly Hawaiian net which is on at 9 AM and 4 PM. I joined the net 90% of the time I was around.

A quick rundown on what I worked is as follows: 15 meters: JA, LU, PY, LZ, HL,

continued next page.

Molokai, continued...

S21, 3D2, KH6, CA, TX, LA, MS, OH, MI, VA, OR, WA, WI. 20 meters: LU, UZ, FK, VK, FO, ZL, VE7, 7P8, KL7, JA, CE, 3D2, KH6, OR, WA, WI, CA, TX, NY. 40 meters: YN, FW, KH6, CA, CO. 80 meters: ZL1MH (QRP). ZL1MH runs 4 watts output to a full wavelength on 160 meters. QRP to QRP contacts totaled 14. Not bad for 2 watts output into my simple antenna.

20 meter operation from early morning to around noon produced what I would call polar flutter. I knew there were stations in there but it was hard to tell who they were. Considering the first hop from KH6 to any point on the compass is roughly 1500 to 2000 miles, there are few if any stations within this boundary. I obviously was hearing other signals that were being received from a further distance, but not loud enough to make them discernable (more than likely from Europe). I never did hear much in the way of New England, New York, New Jersey, the Southeast, or the Midwest.

It appears that the antenna configuration of running north/south produced good lobes for directions to the southwest and the southeast as the signal reports were strong into those areas when the bands were open. The effective mean height of the feedpoint was about 35 feet above ground. I was situated on a second floor and did not run a ground bus.

My memorable QSO's were with JA7SSB with a half hour ragchew (normally I work him only during contests), getting into 2 pileups and successfully working a 7P8 and a S21, and working ZL1MH QRP on 80 meters. Last but not least, I worked VK3IM/M while he sent CW at over 20 wpm while driving near Melbourne. That QSO lasted almost 1 hour!

Look for me in "93" on Molokai.

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* 45020 N. Camolin Avenue
Lancaster, CA 93534

THOUGHTS ON QRP

By Bernhard Szymaniak, DL7GK

I'd like to give some comments on Paul Schaffenberger's excellent essay in the April 1992 QRP Quarterly.

QRP–we should keep considering it both a noun and a verb. Setting QRP at a certain output level (i. e., 5 watts), a noun, gives a guideline to the interested ham on "how much" QRP is. This doesn't exclude the proper sense and use of the old, original meaning, to "reduce power", a verb. I think five watts maximum power output seems to be a fair level, leaving us good chances for QSOs, even during the coming low sunspot cycles.

To at least partially overcome this drawback we have to be more flexible in choosing the right ham band at the right time. This calls for at least eight-band equipment for HF use, either commercially made or in kit form. This doesn't need to be unconditionally "high tech" gear, for in most this cases this equates to "high priced." A stable frequency and solid quality are more important. Almost everything on this subject is written by WB6AAM in his fine essay, "Not Enough QRP Equipment Available?" in the April 1992 issue. (I do not agree with him as far as kits are concerned. A good kit could be an alternative at moderate cost.) Anyway, club-backed activities to get appropriate equipment on the market are highly desirable. Maybe other QRP clubs, perhaps overseas, would be interested in cooperating, because the problems are the same over here in Europe. A bigger market may attract more attention.

The contents of a club newsletter depends to a great deal on what the members put in. Personally, I'd like to see more hints and ideas on homebrew HF gear. But this is no measure, for I'm hopelessly old fashioned, sticking to CW-only for almost four decades now. But there are lots of modern electronic parts like ICs, modules, whole building blocks coming out every year. Are all these pieces that top secret that none of the electronic experts attempt to write about them? I guess one or the other of these pieces could be of interest to the avid homebrewers.

Finally, recruiting and building a membership is always a tough task. I think one way to attract other hams to QRP is simply to be on the air, either ragchewing, contesting or whatever. Get in touch with others, show them that QRP really works. Try to persuade them to turn down their power "just for fun" or to "see how good his signal still is at low power." On QSL cards: QRPers should always state clearly the low power level used during the contact and their QRP club membership number(s).

QRP

New World Miles-Per-Watt Record with the Fireball: 2.133 billion

by Bill Brown WB8ELK

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THE CHALLENGE OF LOW POWER

If you'd like a real challenge, why not try out the ultimate in QRP (low power) operation? QRP operation is generally considered to be anything below 5 watts. However, a number of QRP enthusiasts try to push the limits and have been quite successful in making contacts using just a few milliwatts (1/1000 of a watt) of power!

THE FIREBALL

A group called the Fireballers can be found on 28.636 or 28.060 MHz. They have a blast making contacts all over the country (and the world) using a miniature transmitter called the Fireball. These little transmitters put out a maximum of 50 milliwatts (0.050 watts). Bob Moody, K7IRK, the designer of the Fireball, has even worked all states (WAS) using 2 milliwatts. This record milestone took him a little over a year to achieve.

A complete description of the Fireball transmitter and the sport of milliwatting can be found on pages 12 and 18 of the November 1990 issue of 73 Amateur Radio Today.

THE JOY OF QRP

When I first built my Fireball QRP transmitter, I was skeptical that such a little signal could be heard at all. I soon discovered that not only could I make contacts fairly easily, but I quite often received some pretty good signal reports (a couple of them were 579). After a couple of weekends I had QSOs with 17 states (including Hawaii), Norway and Great Britain. Not bad for a transmitter the size of an IC chip. I was definitely hooked on low, low power operation (sometimes referred [to] as QRPp).

A BILLION MILES PER WATT

Bob, K7IRK and I started testing the limits of low power operation. Using the on-board potentiometer on his Fireball transmitter, he could lower the output power all the way down to 200 microwatts (0.2 milliwatts). I found that if Bob's 100 watt transmitter came in at an S-9 level or better, I could easily hear his 50 milliwatt QRP rig. Depending on the condition of the 10 meter band, I could quite often hear his Fireball rig clear down to its low power limit of 200 microwatts (at times pretty well).

Finally, on one particularly good day, I was hearing Bob's big transmitter coming in with a 40-over-5-9 signal. We decided to go for the ultimate in weak signal contacts. The 50 milliwatt level came in at a whopping 5-7 level. He cranked his transmitter all the way down to 200 microwatts and I could still hear it perfectly (although the S-meter wasn't moving at this point). Bob hooked up [an] attenuator pad to the output of his QRP rig and decreased the power even further. He lowered the output as far as he could and sent me a CW message. At first I heard nothing, but with my volume turned all the way up and my CW filter in, I just heard a faint signal. Suddenly, a surge in the band improved the condition just enough for me to clearly copy Bob's message. A minute later the 10 meter band closed down (I could barely hear his 100 watt rig at this point). It was kind of like surfing on a good wave before it crashed on the beach. Bob measured his output power at 0.72 microwatts (720 picowatts). *[A typo—0.72 microwatts is actually 720 nanowatts, or 720,000 picowatts. —WA8MCQ]* He told me that to lower his power any more he'd have to unhook his battery!

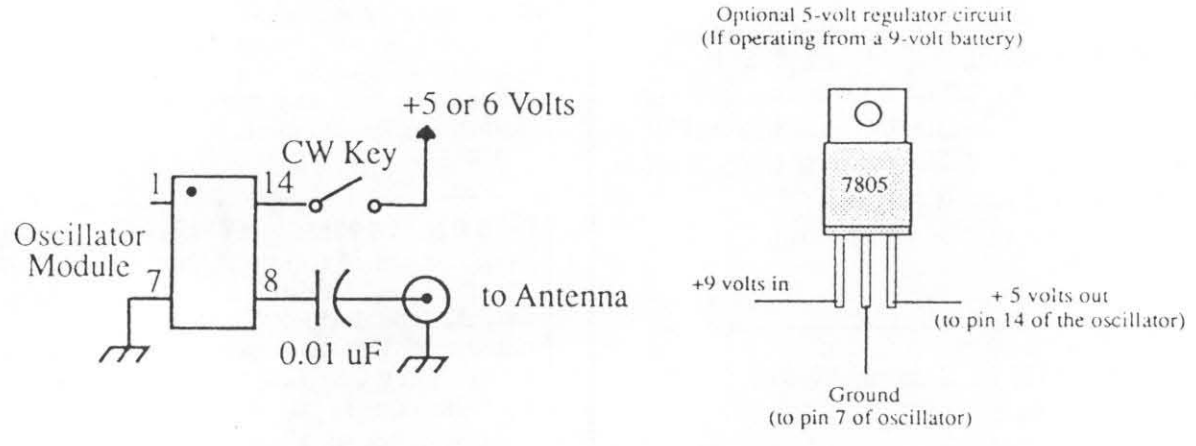


Figure 1. Schematic diagram of the 10 meter micro-QRP transmitter.

A popular measurement of QRP achievement is to take your transmitter power level and divide it by the number of miles you've covered in your contact. It's 1,536 miles from Bob's home in Palestine, Texas, to my location at the W2NSD/1 hamshack at the Radio Fun/73 Amateur Radio Today offices in Hancock, New Hampshire. Our contact worked out to be a record-breaking 2.133 BILLION miles per watt! Curiously enough, we did this at exactly 2133 UTC on 1/19/92. Bill Smith, WA6YPE witnessed this contact from Glendora, California, and was able to copy Bob's transmitter at the 1.56 microwatt level. This contact worked out to be 840 million miles per watt.

THE WAY TO SUCCESS

Don't expect to break a major DX pile-up with your QRP transmitter. To make successful contacts, wait until your frequency is clear before you try calling "CQ QRP". It's best to call on one of the QRP calling frequencies for best results (28.060, 21.060, 14.060, 7.030, 7.040, or 3.560 MHz). Also, on 10 meters, try 28.636 and a Novice frequency of 28.322 MHz. Don't get discouraged if no one comes back to you at first. A little persistence and careful study of band conditions will start *bringing* in the contacts.

ROLL YOUR OWN

Some mail-order catalogs offer a number of very inexpensive computer clock oscillator modules. Some of these actually land in the ham bands. The most popular frequencies are 14.318 MHz (not a good choice for QRP) and 28.322 MHz (in the Novice voice band). I've found that the 28.322 MHz frequency works well since you can establish your initial contact on voice with a higher power rig before you fire up the micro-transmitter. It's also become the frequency of choice for a number of high altitude balloon experiments that have been launched from various areas of the country (imagine flying a micro-transmitter to 100,000 feet).

All you need to make your own 10 meter micro-QRP transmitter is a computer clock module on 28.322 MHz, a 6-volt battery, a key and an antenna jack (see Figure 1). You can also power the micro-transmitter from a 9-volt battery if you use a 5-volt voltage regulator (don't operate the oscillator module with more than 6 volts).

Just wire up the circuit (as shown in Figure 2) on a small Radio Shack breadboard, hook up a 10 meter antenna and attach your battery source. You're now ready for the real QRP fun. You will have to wire up an antenna switch to change from your receiver to the micro-transmitter (or just physically move the coax each time).

Computer clock oscillators are available from Digi-Key at (800) 344-4539. Order their CTX128 module on 28.322 MHz for 30 milliwatts of output power, or their X131 module for 8 milliwatts. You can order an oscillator module on a custom frequency from Cal Crystal Lab, Inc., 1142 N. Gilbert, Anaheim, CA 92801; (714) 991-1580. A module is also available on the QRP frequency of 28.060 MHz (or 28.322) from Smith Enterprises (address below) as part of a complete kit.

If you'd like a full-fledged kit with a high quality PC board that includes an antenna relay and a power adjust control, you might consider getting a Fireball transmitter from Smith Enterprise, 408 E. Mauna Loa, Glendora CA 91470; (818) 963-0079. For $26 you not only get the transmitter, but receive an official Fireball number and certificate with your transmitter. They also have an LED power indicator available that will tell you when you are at the 10 milliwatt level.

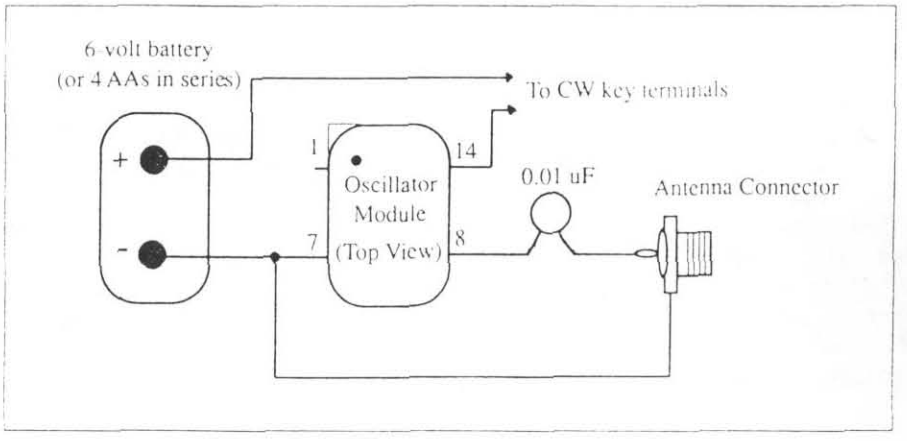
I hope you give QRP operating a try. You definitely don't need a thousand watts to communicate, and you'll have a lot of fun making contacts with a transmitter that fits in the palm of your hand.

(Editor note: Cost of the kit from Smith Enterprises is $24 plus $2 shipping. California residents must add sales tax. Be sure to specify your choice of 28.060 or 28.322 MHz. The QRP ARCI and QRP Quarterly, and probably WB8ELK and Radio Fun magazine as well, in no way warrant this offer. —WA8MCQ)

Parts List:

- 1 oscillator module (28.322 or 28.060 MHz) (Digi-Key CTX128 or X131)
- 1 14-pin IC socket
- 1 0.01 µF capacitor
- 1 5-volt regulator (optional if using 9-volt battery)
- 2 1.0 µF tantalum capacitors (9-volt option)
- 1 6-volt battery (or 9-volt with regulator)
- 1 prototype board (Radio Shack)
- 1 antenna jack (RCA jack, 50-239 or BNC)
- 1 Morse code key or microswitch
- 1 battery connector or clip leads

Figure 2



IDEA EXCHANGE

Technical Tidbits for the QRPer

by Michael A. Czuhajewski WA8MCQ
7945 Citadel Drive
Severn, MD 21144

FOLLOWUP ON BAD HW-8 OUTPUT CORES

The October 1992 issue of the Quarterly contained my article on the output cores going bad and lowering power on 80 and/or 40 meters. I included the results of some tests of the FT37-63 coils, both good and bad, on a Q meter. Since that time I fixed the eighth HW-8 with this problem (see, it's NOT an isolated incident!), and did some tests on the FT50A-63 coil. (That's L27, the larger of the two 80 meter coils.)

Nominal value of L27, per HW-8 manual: 27.5 µH
Bad L27, measured at 2.5 MHz: 35.2 µH, Q 220
Good L27, wound on fresh FT50A-67 core: 27.0 µH, Q 360

The new coil was wound with the same number of turns as the original. The inductance came down to the correct value, and there was a dramatic increase in Q. (Measurements were done at 2.5 MHz, one of the frequencies at which inductance can be read directly off the dial on the Boonton 260A Q meter.)

The 40 meter cores from a previous HW-8 both measured 10.1 µH at 7.9 MHz (another "standard" frequency on the Boonton) with Q of 186 and 196. Coils wound on fresh FT37-67 cores were trimmed to the nominal 7.0 µH, and their Q values were 300 and 337. (Although the original core material for the 80 and 40 meter coils is type 63, type 67 is a replacement for it and may be used.)

MORE ON THE W3NQN PASSIVE AUDIO FILTERS

I mentioned these excellent filters in previous editions of the Idea Exchange. When talking to Ed recently, he requested that you include the sidetone frequency of your transceiver when writing, to prevent any unnecessary delay in processing your order. He has filters available for many different frequencies; if you want to use them in a receiver you can use just about any frequency which suits your fancy. However, if you use it in a transceiver, the frequency must match the sidetone or you won't hear it. I have two of his filters, for 800 and 534 Hz. I tried both on my TS-430S; both work very well, but when I tried transmitting with the 534 Hz filter I only heard a little bit of clicking–the 800 Hz sidetone just wasn't getting through.

If interested in reading more about them, check the Idea Exchange for January, April and July 1991. These passive filters were previously detailed in QST and QEX, use surplus telephone company 88 mH toroids, go in line with your audio output, and provide very sharp selectivity with reasonable loss. (You might be disappointed if you use them with a receiver which has low audio output to begin with, though.) Ed passes on the surplus coils at no charge to amateurs (except for shipping charges) through the cooperation of the C&P Telephone Company. He also sells the necessary capacitors and transformers at reasonable prices if you don't want to provide your own.

It's been a while since my last order, but it was under $20, including shipping, for the capacitor set (WELL worth the extra money), matching transformers, mounting clip for the coil stack, as well as the free coils. Ed requests serious inquires only; if interested, send an SASE to **Ed Wetherhold W3NQN, 1426 Catlyn Place, Annapolis, MD 21401.** Don't forget to tell him your sidetone frequency, if known. Ed reports that he's processed close to 1400 orders so far, and still gets about one order per week.

REDUCED CURRENT DRAW FOR THE ARGOSY II

From **Paul Goemans, WA9PWP** of Madison, WI–Here is a simple mod for the Argosy II, to switch off the meter lamp with the LED frequency readout, cutting power consumption when running on battery. Switching off the display circuit is smart, as it draws 330 milliamperes. It seemed logical to save another 120 mA by extinguishing the meter lamp at the same time.

Remove the top cover of the Argosy II. Disconnect and tape off the wire soldered to the meter lamp socket. Now locate the counter logic board, at left front. The switched B+ voltage is the (red) second lead from the right on the 5-pin connector, front edge of this board. Verify with a voltmeter while activating the "display on" front panel switch. Splice a 6" wire from this red lead to the meter lamp socket previously vacated.

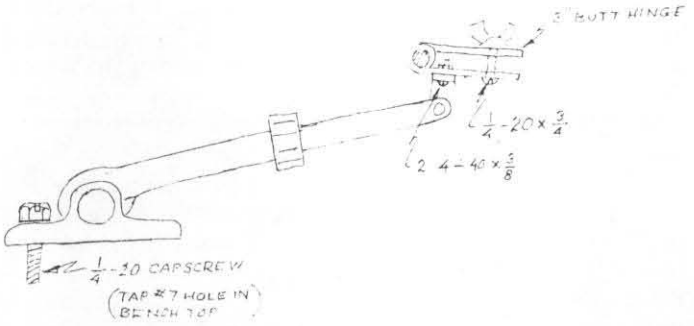
My Argosy II now draws only 285 mA on receive with the display and lamp off, a considerable improvement! Transmitter improvements are a future project for someone!

–DE WA9PWP

A TRULY FLEXIBLE CIRCUIT BOARD HOLDER

Wally Millard, K4JVT, writes–I make no apologies for being a devoted junk collector, and the source of this old truck side-view mirror is buried deep in the sands of time.

The mirror support consists of two telescoping tubes, with a locking ring, a ball joint at the end, which attaches to the mirror by means of two 4-40 machine screws. The mirror was removed, and in its place I mounted a three inch butt hinge. For a clamping screw, I used a 1/4-20 X 3/4 inch screw, with a wing nut. This produces clamping force enough to support a 5" X 7" PC board. Select the hinge to be loose at the joint, so you won't have to pry the jaws apart when you release the board. I was tempted to put a small compression spring over the screw to open the jaws, but my hinge was too stiff.



This gadget has several advantages over the alligator clip variety. Its reach can be extended from seven inches to ten inches, which allows plenty of room underneath for a parts tray, or a schematic, or even tools. The head can be rotated on the main axis, adjusted by the ball joint, and raised and lowered easily without removing the work. You can stuff the board from the top, turn it over, and solder from the top without changing the board in the vise.

I supported mine by drilling and tapping a 1/4-20 hole in my bench top, but it could also be easily mounted on the wall. It is also easy to store in a drawer.

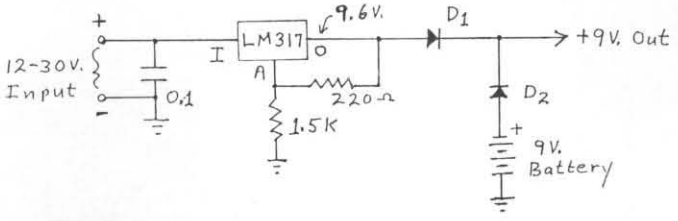
I've found it to be a very handy addition to my work bench.

–DE K4JVT

BATTERY BACKUP FOR CMOS KEYER

From **Larry East, W1HUE** of Idaho Falls, ID–

The note from WA9QMO in the June "Idea Exchange" concerning the use of external power for a keyer reminded me of a mod I made to my CMOS memory keyer several years ago (and am still using). I, too, added an IC voltage regulator so that it could run from an external power supply, but I left the 9V battery installed in such a way that it would become operational if external power was lost. The simple circuit is shown below.



D_1 - 1N4001 Silicon Rectifier (R.S. 276-1101)

D_2 - 1N5819 Shottky Rectifier (R.S. 276-1165)

LM317 - Adjustible Regulator (R.S. 276-1778)

I used an LM317 variable voltage regulator (available from Radio Shack, part number 276-1778) rather than an LM7809 9V regulator so that I could get slightly higher voltage output (9.6V). Diode D1 keeps the battery from feeding back into the regulator in the absence of external power, and D2 keeps the output of the regulator from feeding into the battery. When external power is present, D1 conducts and provides 9V output from the regulator. When external power is absent, D2 conducts and the battery becomes the power source. Diode D1 is a small silicon rectifier (1N4001, etc.; RS 276-1101). For D2, I used a Schottky rectifier (1N5819 or equivalent; RS 276-1165A) because of the lower forward voltage drop of about 0.2V compared to about 0.6V for a silicon diode. A silicon diode would work OK, but the supply voltage when operating from the battery would be a little lower.

For this scheme to work, the output of the regulator less the voltage drop across D1 under load must be slightly greater than the battery voltage less the drop across D2. Although the open-circuit voltage of a fresh 9V alkaline battery can be 9.4V or greater, the output drops to 9.0V or slightly less under even very light loads. The regulator output needs to be at least 9.6V, but probably no higher than 10.0V, for the battery to be effectively isolated when running from the external power source. Due to normal component tolerances, it may be necessary to play around a bit with the resistor values–or use a different diode type for D1 or D2.

I use this arrangement with a small "wall plug" 12V power supply as the external power source for my TRAC memory keyer. Because of the wide operating range of the LM317, any source of DC voltage between about 11V and 30V can be used. The internal 9V battery is there ready to go for field day operations, etc. It also reliably backs up the keyer memory during power failures, or when I pull the wrong plug while moving equipment around!

–DE W1HUE

IMPROVED TOROID CORE FOR VFO USE

From me, WA8MCQ–In recent years, type 7 powdered iron material has been getting a bit more notice. It has slightly better temperature stability than the popular type 6 which is usually used in VFOs.

The general rule of thumb has been that you should use type 6 (yellow) for VFO coils since it had the lowest temperature coefficient of all cores sold in the past by Amidon, 35 parts per million (PPM) per degree Celsius. Type 7 comes in a bit under that, at 30 PPM. By comparison, type 2 (red), sometimes used in VFOs, is 95 PPM. That doesn't mean you can't successfully use type 2, of course; best stability is obtained when the temperature coefficients of the coils and capacitors match but with opposite signs, for a net coefficient of zero. However, most VFO circuits use type NP0 (sometimes called COG) capacitors, which have a nominal coefficient of 0 PPM, with a tolerance of +/- 30 PPM. When using these, you want to have the lowest coefficient possible in the coil.

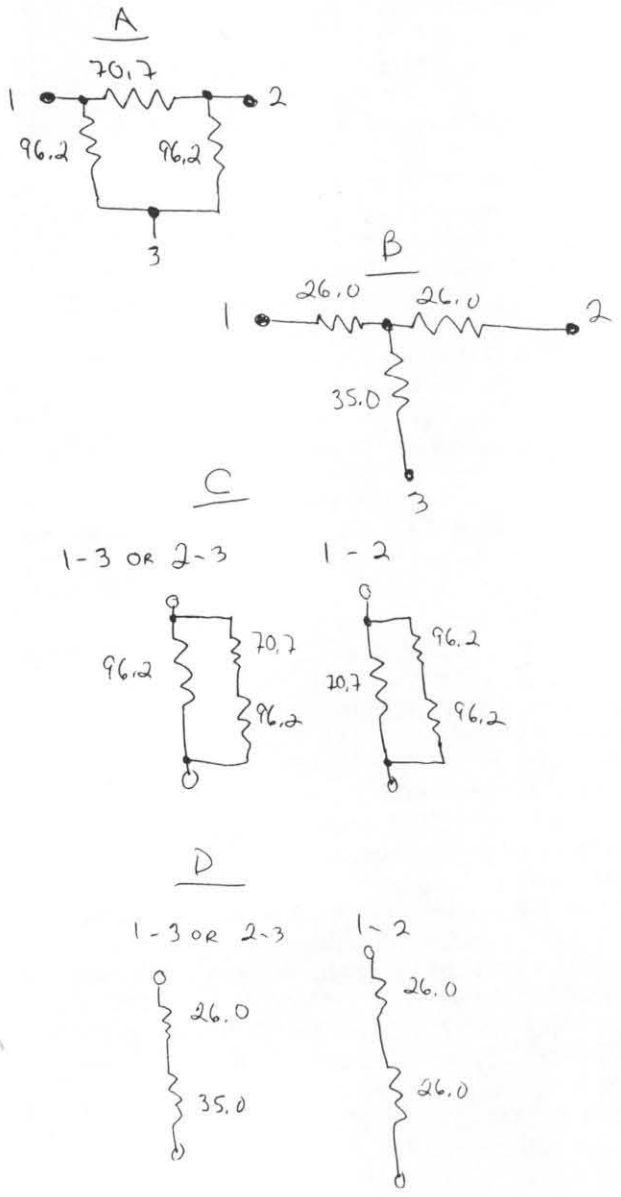
This core has not been widely used in ham projects since it was not readily available; although manufactured by Micrometals for years, it was not stocked by Amidon until recently. They now have it for sale, and it is available in T37-7, T44-7, T50-7 and T68-7 cores. The permeability is between that of type 2 (red) and type 6 (yellow) materials, and the cores are color coded white. I expect to see this material start appearing in homebrew VFO projects. (Hint.) One kit maker is already doing it–WA4KAC let me see his brand new W7EL kit from Oak Hills Research, and it uses this core.

–DE WA8MCQ

CHECKING HAMFEST ATTENUATORS

From me, WA8MCQ–Dedicated experimenters probably have a few attenuators around the shack, both variable and fixed, and for some of us they fall into the category of something you always need more of, whether you really need them or not. There are a lot of them for sale at hamfests, but you have to be careful not to get burned since some of them could be bad. Attenuators can be easily damaged if excessive power is applied, and you usually can't tell by just looking at the outside. Here's how to check them on the run.

Take a digital multimeter to the hamfest, so you can do some quick ohms tests. Most attenuators have either a tee or pi configuration; you can't tell which from looking at the outside, but it really doesn't matter–a dB is a dB, no matter what's inside. (It's the engineers job to make sure the right resistances are in there.) You also can't tell by probing it with an ohmmeter. However, what you CAN tell is if something is drastically wrong with the unit. If you see suspiciously high or low resistances anywhere, pass it by.



The figure shows a pi-type 10 dB attenuator (A) along with a tee pad for the same value (B). All you can do with that ohmmeter is measure between the hot side of either connector and ground (1-3 and 2-3), and then between the two hot sides (1-2). C and D show the equivalent circuits when you make those measurements. Some quick work with Ohms law will show that you can't tell which is pi and which is tee if all you can look at is the resistances between the three terminals.

If an attenuator is marked with the impedance and attenuation, and you have a chart of expected resistances, you can quickly tell whether it's a good unit or if something is funky inside. If one or more of those resistors have changed value drastically or opened up completely you'll see substantially different values on your meter. Here's the chart for 50 ohm units. Those up to 40 dB were based on resistance values in the ARRL Electronics Data Book, chapter 5. (By the way, the Second Edition, First Printing, copyright 1988, has an error in Table 5-2, for tee network attenuators. The value of R2 for 3 dB should be 142 ohms, not 132. You can confirm that by running through their formulas for the tee section attenuator.) The values I listed here are only approximate (no decimal places), but are sufficient to tell if something is wrong. (I verified these with my own attenuators.)

Note–these figures apply only to attenuators which are NOT terminated in their characteristic impedance–the connectors on both ends are left open. Since you'll be checking them on the run you probably won't have a 50 ohm terminator handy, and this is just a quick and dirty go/no-go test, not a precision measurement of exact attenuation.

Resistance values looking into 50 Ω attenuators (with nothing connected to either connector)

Attenuation (decibels)	Either end to ground	Between both ends
1	436 ohms	6 ohms
2	221	11
3	150	17
4	116	22
5	96	28
6	83	33
7	75	38
8	69	43
9	64	48
10	61	51
20	51	82
30	50	94
40	50	98
50 and above	50	99 or 100

These will let you know if an attenuator is reasonably good or not, or in the case of a variable attenuator with many switch positions you can tell if one or more is bad.

Before you buy an attenuator, make sure it's for the impedance you want, which will normally be 50 ohms. I've come close to buying a few, only to discover at the last moment that they were for other impedances. In addition to 75 ohms, I've also seen 93 and 125 ohms. The 125's were easy to spot, since they used GR-874 connectors, which are proprietary coaxial connectors made by General Radio (you may see them on old test equipment from time to time). The interesting thing about them is that they are sexless–they all

mate with each other. They are usually made for 50 ohms, but the 125 ohm versions are also out there. Those have a small, bifurcated center contact, although the general appearance is similar to the 50 ohm version. I have several 125 ohm attenuators with GR-874's, made by Tektronix; they were free and I kept them as an oddity.

One final hint–not all attenuators are rated down to DC. Some older microwave attenuators, both fixed and variable, are rated only for microwave frequencies. At work I've seen fixed attenuators rated for 1-10 GHz, and a variable unit for 1-2 GHz. I looked at them on an ohmmeter, and they "fail" the test. However, looking at them on a network analyzer showed them to be perfectly good at their rated frequencies. Dropping below them, though, the attenuations started to change quite a bit; don't try using a microwave-only attenuator at HF or you'll get strange results.

–DE WA8MCQ

PRACTICE SAFE FERROMAGNETIC SEX; BEWARE OF FERRITES IN POWDERED IRONS CLOTHING

Or, Can You REALLY Trust Color Codes on Toroids?

From me, WA8MCQ–Here is this month's technical quiz: 1) What is the permeability of a yellow toroidal core? 2) If you see a box of red toroids at a hamfest at a great price, should you buy some to make low pass filters for your 80 or 40 meter rig?

The answers: 1) Anything the manufacturer wants it to be. 2) If you expect the rig to work properly, probably not!

Can we REALLY trust the color codes on toroids? Not necessarily; only if you know who made them. Serious homebrewers are familiar with the colors used by Amidon and know many of them by heart. We usually use yellows and reds, with an occasional blue, black or gray, and in the future we'll probably start using whites. (More on that last one earlier.) The problem is that there is little standardization among people who make cores. A core of a certain color could be a powdered iron or a ferrite, and it could have any of several different permeability values, depending on who made it. There is no universal color code for toroids.

In his QRP column in the October 1992 issue of *73 Amateur Radio Today*, **Mike Bryce, WB8VGE** talked about the Stockton bidirectional QRP wattmeter. This is a nifty little item introduced in the Winter 1989/1990 issue of SPRAT (#61), and a kit of parts (less meters) is available both from Kanga Kits in the UK as well as Kanga US, which is run by **Bill Kelsey, N8ET** of Findlay, OH. (It will also be included in an article I'm writing about directional couplers.)

Mike mentioned that he didn't know what type of toroid cores were used; they were supplied in the kit but not identified. He suggested that if you tried to build your own you could try a T60-6. I suspected that was a typo, instead of T50-6, and he confirmed that. However, I later found out that Micrometals, which makes the powdered irons sold by Amidon, does make a T60-6 core on special order.

Still, type 6 powdered iron didn't sound quite right for this application, since the schematic in the column (and in SPRAT) shows 12 turns on each core, and that would result in too little inductance for good performance on the lower bands. You'd normally expect to see a ferrite core used with that number of turns. (Details are beyond the scope of this article, but will be included in the one on the directional coupler.)

I did some checking, and it turns out that the cores in the kit are ferrites which look like powdered irons–they're painted yellow, just like type 6 powdered iron material! The SPRAT article says they are yellow, and I can verify that–K3TKS loaned me the cores in his Kanga kit to play with, and sure enough, they are! They're made of type S1 ferrite by Salford Electrical Instruments, a British firm. SPRAT didn't further identify them as to permeability, although their description made it sound like it was somewhat similar to the more familiar type 43 ferrite.

I checked about six years' worth of SPRAT, and the vast majority of toroids used in their projects carry Amidon part numbers. There are very few from other manufacturers; two names were Mullard and Neosid, and I know nothing of their cores.

Mike's thinking they were type 6 material is quite understandable, and I would have thought the same thing–I would never have expected to find a ham kit with a ferrite painted like a powdered iron. We automatically assume that a yellow core is type 6 material. Unfortunately, it turns out that's a bad mistake–color does not uniquely identify toroid cores. There is no universally accepted color code.

We have a good example of a foreign manufacturer using color codes differently. Do we care? How often are we likely to come across a core made in a different country? Considering the way the world is now, probably not all that unlikely! Unfortunately, we also run into the same problem from a variety of domestic manufacturers. A red core isn't always type 2 material, and in fact may not even be powdered iron. The permeability of a red core could be 10, which is what we're familiar with, but it could also be 850, 1800 or 10,000. And, depending on what a customer specifies when he orders, a core of ANY permeability could be red!

I see a lot of equipment and circuit boards with toroids at hamfests and homebrewers always scrounge them for parts. Who made the cores? What colors does that company use? I see dealers selling surplus toroids at every hamfest I go to. Those usually have tags on each box indicating what type they are. They may be right–the vendor may have taken them out of a bag or box labeled by the manufacturer, or they may be making an educated guess, and that could be wrong.

The toroids most of us are familiar with are sold (but not made) by Amidon and Palomar. The powdered irons are color coded, while the ferrites are all uncoated. The Micrometals/Amidon powdered irons, their color codes and permeabilities are:

0, tan, 1 (this is actually phenolic, not powdered iron)
1, blue, 20
2, red, 10
3, gray, 35
6, yellow, 8
7, white, 9
10, black, 6
12 and 17, green/white, 3.5
15, red/white, 25
26, yellow/white, 75

The ones we see the most, by far, are the type 2 and 6, reds and yellows. You might occasionally see types 3 (gray), 10 (black), 0 (tan) and 1 (blue), and I've seen articles using all of them. I also see type 26, yellow/white, in switching power supplies. (Warning–do not use that type of core for any HF projects. Although it's a powdered iron, it's a low

Q, low frequency material, more suited for DC choke and AC line filter applications.)

People with access to Micrometals catalogs started to realize that the temperature coefficient of type 7 (white) was even better than type 6, at 30 PPM vs. 35, and this got occasional mention in the ham press. Unfortunately, it was not readily available, at least not from Amidon, which is probably the best known ham supplier. However, it now appears on their price list. They stock it in sizes T37, T44, T50 and T68. As word of its easy availability and superior stability spreads, I would expect that it will see increased use in VFOs, and we'll become more familiar with it. (See earlier item.)

I did some digging in brochures and catalogs from Ferroxcube, Pyroferric, Arnold Engineering and others. Some supply cores already color coded, and there is little standardization among them. Some make no mention of colors, and presumably their cores are bare. Others say that they can be coated on request, and don't say anything else; presumably the customer could order any color he wants. Others do say they can be had in any color you specify. If someone orders a few thousand cores to build into his equipment, which might end up in your junk box some day, the colors on those cores could be anything he wants–he doesn't know that red or yellow have special meanings to us.

Pyroferric makes powdered irons. The only brochure I have from them covers "high permeability materials for EMI and power filters", so I don't know about their other products. This category covers powdered irons with permeabilities ranging from 50 to 75. Some colors are red/white, green/gray, red/gray, and white/gray. No problem so far, since most of these do not conflict with our "normal" colors. However, they use gray for the core with permeability of 60, which could be confused with the gray Type 3 material from Amidon (permeability of 35, and occasionally used in ham projects, such as a directional coupler by Grebenkemper in QST, and an artificial ground tuner by KB4ZGC in a recent 73 magazine).

Arnold Engineering is "good folks"; they make some of the same cores that Micrometals does. These include the SF, TH, C, E, W, HP and GS6. Those of those designators may look familiar–you'll find them mentioned in the Amidon brochures; look up the descriptions in the section titled "Iron powder cores and materials" and you'll see those correspond to types 6, 7, 1, 2, 10, 3 and 15. The color codes match up, too, for the blue C (1), red E (2), yellow SF (6) and white TH (7). But now things start getting interesting–they do NOT color code the W (10), which is black when it comes from Amidon, or the HP (3, gray) or GS6 (15, red/white).

Their GQ4, permeability (ui) of 35, is orange, and type 55 (ui 33) is brown. Their type 75 (ui 75, and probably similar to the Amidon/Micrometals type 26, white/yellow) is black–the color used by the Amidon type 10, ui 6. But wait–the double asterisks on their chart by brown and black indicates that those two colors are available by request only–those two cores usually come without any coating. Their type W (Amidon type 10, black) and HP (Amidon type 3, gray) always come without coatings, as do the majority of their powdered irons. Finally, to totally confuse things, the single asterisk at the very top of the chart indicates that ALL of their cores can be had with ANY color you want if you pay extra for it!

Next, on to Ferroxcube. They have some familiar colors–brown, blue, gray, white, red. These suckers aren't even powdered irons–they're all ferrites! The Ferroxcube designators and permeabilities are 3C6A/2000, 3C8/2700, 3D3/750, 3E2A/5000 and 3E5/10,000. They also have type 4C4, coded green, with permeability of 125, which is the same as the familiar type 61 ferrite.

Siemens has their M33 ferrite, ui 750, colored white, like the Micrometals type 7 powdered iron, with ui of 9. They also have type U17, gray, a low permeability ferrite with ui of 10. Their red core is type N22 ferrite, ui 1800–try using one of THOSE red cores in a circuit that calls for a T50-2! As for Stackpole, you can get any of their ferrites in black, green or gray, on request. Permeabilities on those range from 12.5 to 2500. The ferrites from Magnetics, ui from 750 to 15,000, are available in black or gray.

Finally, some more familiar colors with unfamiliar characteristics, from Steward, all ferrites: yellow, ui of 10,000; blue, 5000; orange, 2700; red, 850 (the same as the familiar type 43 ferrite from Amidon); green, 125, the same as Amidons 61 ferrite; and gray, 80.

If you're still with me and not totally confused, it's time for the moral of all this, which is to be very suspicious of any colored toroid that you get from a source other than a trusted dealer–practice safe ferromagnetic sex. It may be nowhere near what you think it is. If you buy from a toroid retailer like Amidon or Palomar, or a trusted surplus source such as Danny Stevig, KA7QJY, you know what you're getting. Otherwise, the cores you get might not be what they appear to be. Don't put blind faith in the color code, since there is no uniformity. Resistors have a single, universal color code but toroids do not.

Color	Permeability, depending on manufacturer
Yellow	8; 10,000
Red	10; 850; 1800; 10,000
Blue	20; 2700; 5000
Gray	10; 35; 60; 80; 750; any other value the customer desires
White	9; 750; 5000
Black	6; any other value the customer desires
Green	125; any other value the customer desires
Orange	35; 2700
Any color	Any value the customer desires

THE FINE PRINT–Every time I talk to WB9TBU, who does the actual typesetting, final layout, etc. for the QRP Quarterly before it goes to the printer, I ask if she has any problem with the size of the Idea Exchange, and she always tells me she doesn't. It probably won't get much bigger than it's been lately; we have to leave space for other things in the Quarterly. However, we can't keep it at this size without your inputs. Keep those ideas and tidbits coming to Severn.

QRP

The Phoenix QRP Transmitter

by D.A. Michael, W3TS
POB 593 - Church Lane
Halifax, PA 17032-0592

No — this little transmitter did not arise from my junk box ashes, it was built for a business trip to Phoenix, Arizona. When I travel I like to take my Sony 2010 portable receiver along and listen to the ham bands.

I thought it would be nice to have a small QRP Gallon (5 watt) transmitter to throw into the suitcase to use with the 2010 to make a few QSOs to pass the evenings. I have also never operated from that far west before and so it was a new challenge to see what could be worked with QRP from a motel room in Phoenix.

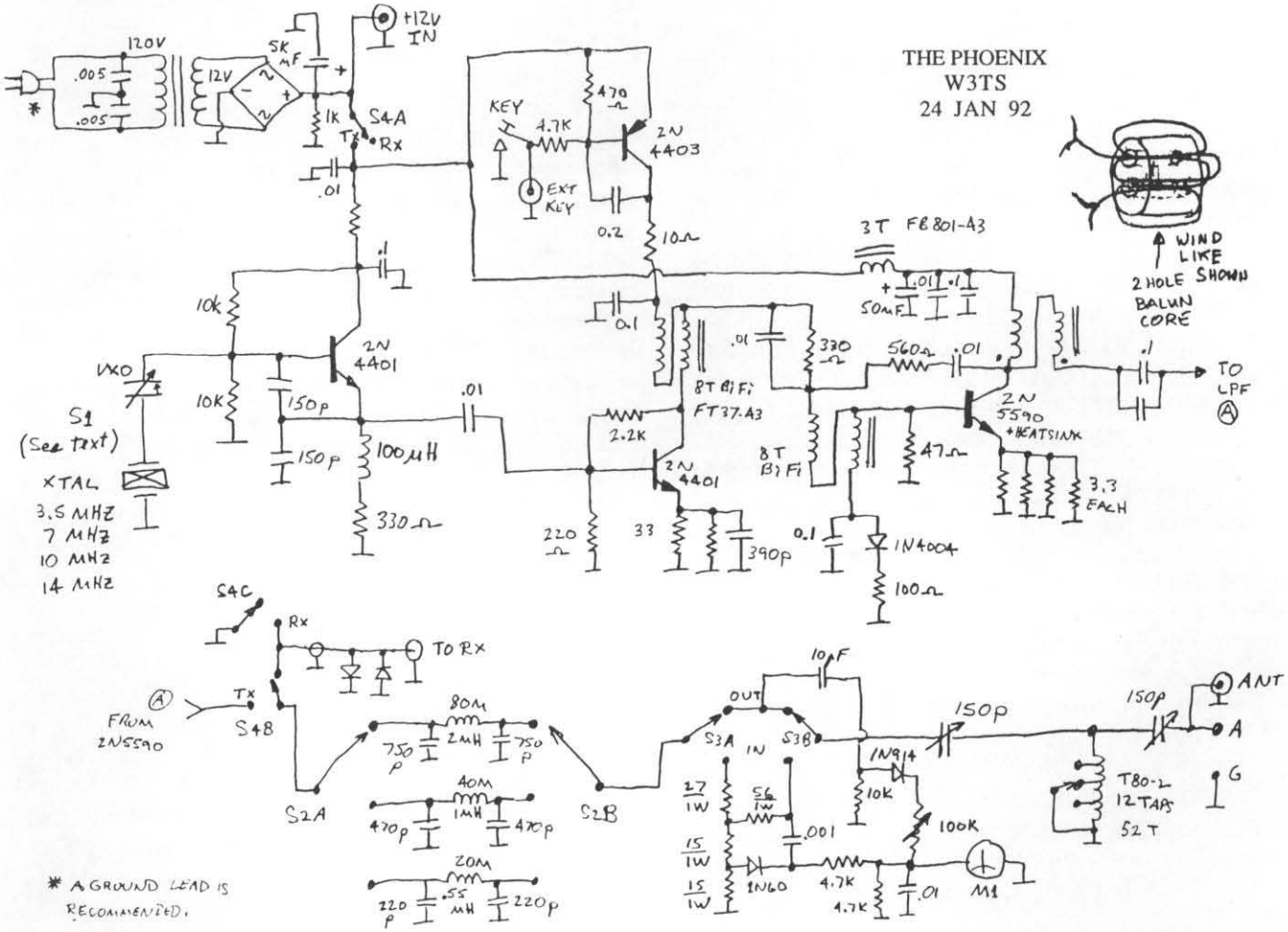
The transmitter is a collection of different circuits that have worked well in the past. I wanted a built-in power supply and SWR bridge and antenna tuner.

The whole package is built into a 2x5x7 inch aluminum chassis. The bottom lid, which now becomes the top panel, is a piece of 5x7 inch single sided copper clad board. The transmitter and SWR circuit and antenna tuner parts are mounted to the copper side and hooked up using "Sky Wiring" (another name for ugly construction—an engineer friend of mine picked up the circuit board and took a look and said "Oh—Sky Wiring").

Inside the chassis are mounted an old brass hand key and the power transformer and filter capacitor. A small barrier strip and a fuse holder completes the AC wiring. The brass hand key is mounted so that its arm sticks out through a hole in the front. That way only the knob is exposed and it makes the package smaller.

The VXO capacitor has one plate bent to contact the other plates when fully meshed. This saves a switch and gives a different frequency than when the VXO capacitor is used in the circuit. I did not include the usual inductor in the VXO because it would have to be optimised for each crystal and band. The SWR bridge can be used to reduce the transmit power if required. It can also be used as an attenuator for the receiver if needed. Just remember to switch it out for full power TX. I used manual T/R because I ran out of room in the small box and it also saves some power when operating with batteries.

This small rig plus my Sony 2010 have made quite a few QSOs from some interesting vacation places. To complete the portable station, I take a pair of folding head phones, a few crystals for the QRP frequencies and some wire for an antenna in a small Band Aid box.



More Tuned Antenna Replies

by Bob Fries, KK6FI and Bob Richardson, W6WHM

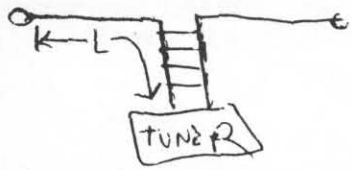
Editorial Two-Cents Worth–The January 1992 Idea Exchange had a call for help from AC5K about tuned antennas.

He had heard that the general rule of thumb for a dipole fed with open wire line and tuned with a tuner for multi-band operation is that the total length of one side of the dipole plus the length of the line going from the center down to the tuner should not be an exact multiple of either 16 or 22. He was having trouble operating on the WARC bands and wanted to know if there was any new rule of thumb which would allow such an antenna to easily work on 10, 18 and 24.5 MHz.

We printed some of the replies he received, and here are a few more that turned up recently. I was involved in a major excavation project (cleaning off the inch-thick pile of papers on the desk) when I came across a year-old letter from Wes, including photocopies of these letters he received. Enjoy.–WA8MCQ

From Bob Fries, KK6FI of Ventura, CA—

The old rule of thumb that the total length of half of the antenna plus all the feedline length, L, must not be evenly divisible by 16 or 22 only works for the 80, 40, 20, 15 and 10 meter bands because (at the low frequency end, at least) these frequency bands are multiples of seven (or in the case of 80 meters, a submultiple).



Unfortunately, the frequencies of the 30, 17 and 12 meter bands do not fit this harmonic relationship, so no single value of L exists that will satisfy the requirement above for all bands. Nevertheless, I don't feel that this is, or shouldn't be, a problem.

My copy of the 1965 ARRL Handbook shows a table on page 367 that lists dipole and feedline lengths for four multiband Zepp antennas. The dimensions given in the table were chosen to insure that the antennas could be matched to a transmitter with the series- or parallel-tuned "couplers" then in use. These couplers could only handle a relatively narrow range of impedances, and thus care had to be taken to avoid certain feedline lengths that could pose matching problems for the couplers.

Now, however, most hams use T-section transmatches which are capable of dealing with a much wider range of impedance values. Furthermore, a well-designed transmatch offering means for precision adjustment of the L and C elements of the matching circuit can match virtually any antenna/feedline combination.

My own antenna and feedline arrangement is a case in point; the antenna is a 30 meter dipole suspended about six feet above the roof of my house. The feedline consists of a random length of 300 ohm twinlead that runs from the center of the antenna to a convenient spot under the eaves where it is connected, via a shield choke, to a random length of RG-59 coax. The coax runs into the shack where it is terminated by an MFJ-949D transmatch.

It has no difficulty in transforming the complex load presented by this setup into a 1:1 match on 40, 30, 20, 15 and 10 meters. On 17 and 12 meters the match is an acceptable 1.1:1.

I'm certain that if my transmatch employed a rotary inductor that allowed the inductance to be varied continuously, instead of a tapped inductor,k providing only 12 discrete values of inductance, a perfect match could be achieved on every frequency band.

It is worth noting at this point that the 1986 edition of the Handbook contains the following statement on page 17-5: "Under some circumstances it may be necessary to experiment with the length of open-wire feeders when using an all-band Zepp. This is because at some operating frequencies the line may present an "awkward" impedance to the transmatch...depend[ing] on the capability of the transmatch being used."

This quotation, slightly abridged, suggests that some transmatches are more capable than others, and implies that the solution to "awkward" feedline/antenna matching problems lies not in trying to find the ideal feedline length but in using the most capable, i. e., versatile, transmatch possible.

Bob followed up with this letter a few weeks later—

On reflection, I think I got a little over-enthusiastic about the virtues of T-section transmatches.

As you probably guessed, the reason that my antenna/feedline system seems to work so well is that I'm using an unbalanced to unbalanced transmatch and a hybrid transmission line (twinlead and coax) with the coax section terminated at the transmatch.

A problem arises, however, if one tries to match a transceivers unbalanced output to a balanced feedline (open wire or twinlead) with a T-section (unbalanced) transmatch because a balun is needed to make the unbalanced to balanced transition.

Unfortunately, baluns stop acting like wideband transformers when confronted with load impedances in excess of about 600 ohms. (See DeMaw, "How to Build and Use Balun Transformers," QST, March 1987.)

A better approach when trying to match an unbalanced output to a balanced feedline is to use a Johnson Matchbox or similar type tuner which can effect the unbalanced to balanced transformation directly and handle large values of feedpoint impedance without the need for a balun.

I felt I should clear up the impression given in my previous letter that T-section transmatches are the answer to every matching problem.

From Bob Richardson, W6WHM of Monterey Park, CA—

Enclosed is a method I have used for many years. I found it most difficult to get all the frequencies in the clear with the addition of the new bands. Seems like one is on the edge of disaster no matter how you juggle the figures.

My favorite tuner for a zepp or that type is in the latest ARRL antenna book. The original version was in March 1959 QST, page 11, and it works better; old fashioned.

I have Maxwell's [sic] ARRL book on toroid baluns and have been disappointed when trying to use them on all bands–lossy, and they sometimes heat up with mismatch.

This chart came from an ancient, out of print book and I used it for end fed wire antennas, but each side of the zepp is an end fed wire and if you try it out on the old accepted lengths that have been used for zepps over the years, you will find it is compatible. An antenna tuner is a variable source of both types of reactance, inductive (+j) and capacitive (-j).

A definition of resonance is when capacitive and inductive reactance cancel each other at any given frequency, and there is a maximum transfer of energy. (Refer to the reactance chart.)

Approximately every quarter wave along a wire antenna there is a reactance flip flop where the reactance goes from a negative to a positive and repeats, requiring a change in antenna tuner configuration to restore resonance and a 1:1 SWR. Those flip flops at each half wavelength are quite dramatic and cause erratic tuner tuning.

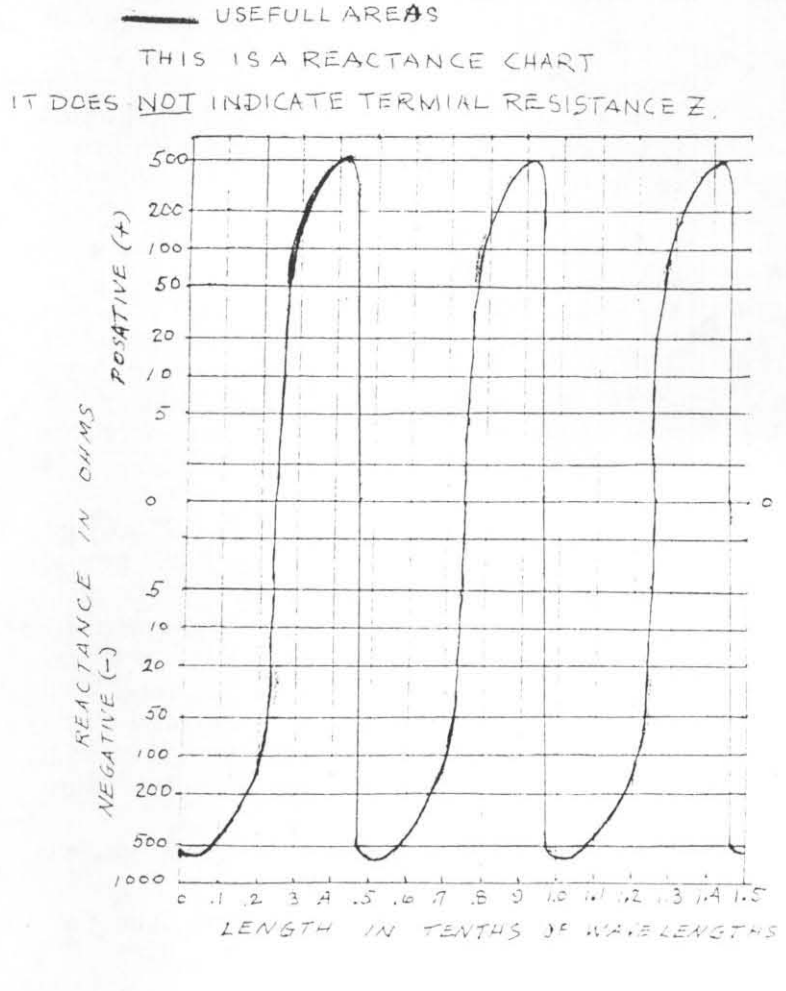
Try to plan your wire antenna lengths so as to avoid the glitch between the flip flops.

It is difficult, since the addition of the WARC frequencies, to find one length wire antenna for all amateur frequencies. There may be one of the frequency allocations that will cause critical antenna tuner adjustment.

Use an SWR bridge between tuner and transceiver to tune for a 1:1 SWR and make a chart to facilitate rapid band changing and tuning. Plan the length of your wire for the high frequency end of each band and your tuner will then tune to the low frequency end of each band.

Remember–the length of a wire antenna starts at the antenna tuner antenna terminal. Because the diameter to length ratio and height above ground are determining factors, the reactance chart will show general trends and not precise data.

Because of the flexibility that is inherent in antenna tuners the chart is quite useful and is a starting point to planning all band or multiple band wire antennas.



ANTENNA REACTANCE CHART FOR END FED WIRES

The Talking Staff

by Jack Frake, NG1G
P.O. Box 1153
Barnard, VT 05031

This is not a technical antenna article but more of a shop project. All the heavy thinking was done by Gus Taylor, G8PG, in developing his six-foot linear-loaded vertical [*G-QRP Antenna Handbook,* April 1992]. The following takes his work and applies a different wrinkle.

On past camping/backpacking trips it became clear to me that simple end-fed or dipole antennas, although efficient radiators, failed to provide "hassle-free" operation. Supporting trees are not always convenient or may not be present at all, as was the case while hiking in the Presidential range of New Hampshire's White Mountains.

Last winter while camping in the Florida Keys, I couldn't operate at all because State Park rules prohibited use of trees for any reason. (I was caught attempting to erect a 40 meter 1/4 wave wire vertical with four radials in the highest coconut palm. The ranger was courteous but for 10 days kept a watchful eye...)

My home QTH is five minutes away from the Appalachian Trail and 25 minutes from Vermont's Long Trail. I've spent much of my free weekend time day-hiking with a W7EL rig. Getting antenna supports up and over tree limbs has resulted in the catapult weight tangling, creating frustration and extra work. Besides, on overnight trips, I'm usually just too exhausted to even want to erect an antenna. I needed a better and more reliable solution... After thinking about G8PG's vertical, an idea came to mind. While hiking, I'm never without a hiking staff. Why not combine the two? An antenna and a hiking staff! A perfect solution...if it worked.

Several prototypes were constructed and field tested with satisfying results. (See sketch and notes for construction info.) The first version utilized 1 1/4" black plastic water pipe, which is available in rolls. Even though this one seemed to work best, I could never remove its naturally curled shape. I used a propane torch to carefully heat and bend the pipe only to find it returned to its original banana shape a few hours later. The second prototype used a 1 1/4" fir dowel. It is strong, lightweight and the woodgrain appearance is most appealing to me.

Both prototypes were also tested inside with great results. With the antenna leaning against my workbench, I've worked the Midwest using 3-4 watts and received 549 and 569 reports. Received signal strength is down about 3 dB when compared with a full wave loop.

On the trail is where it shines! With good band conditions, I have easily worked many stations. The antenna's most appealing attribute is its ease of operations–it only takes 30 seconds to erect and attach the single wire feed line. What could be easier?

The only negative is that you need an antenna tuner. This antenna is sensitive to surrounding objects (including humans) and to weather conditions. My first trail test proved interesting. While sitting on top of Vermont's Pico Peak, the clouds rolled in and out every 10 minutes or so, and there was a stiff breeze. As the humidity rose, the vertical dripped with moisture, requiring retuning. As it cleared, and the wind dried, I had to tune all over again! It should be noted that these were inordinately harsh conditions! *{Adding one or more quarter-wave ground radials at the tuner should reduce some of this sensitivity. This is a narrowband antenna and you may expect to do some retuning as you saunter around the band.–ed.}*

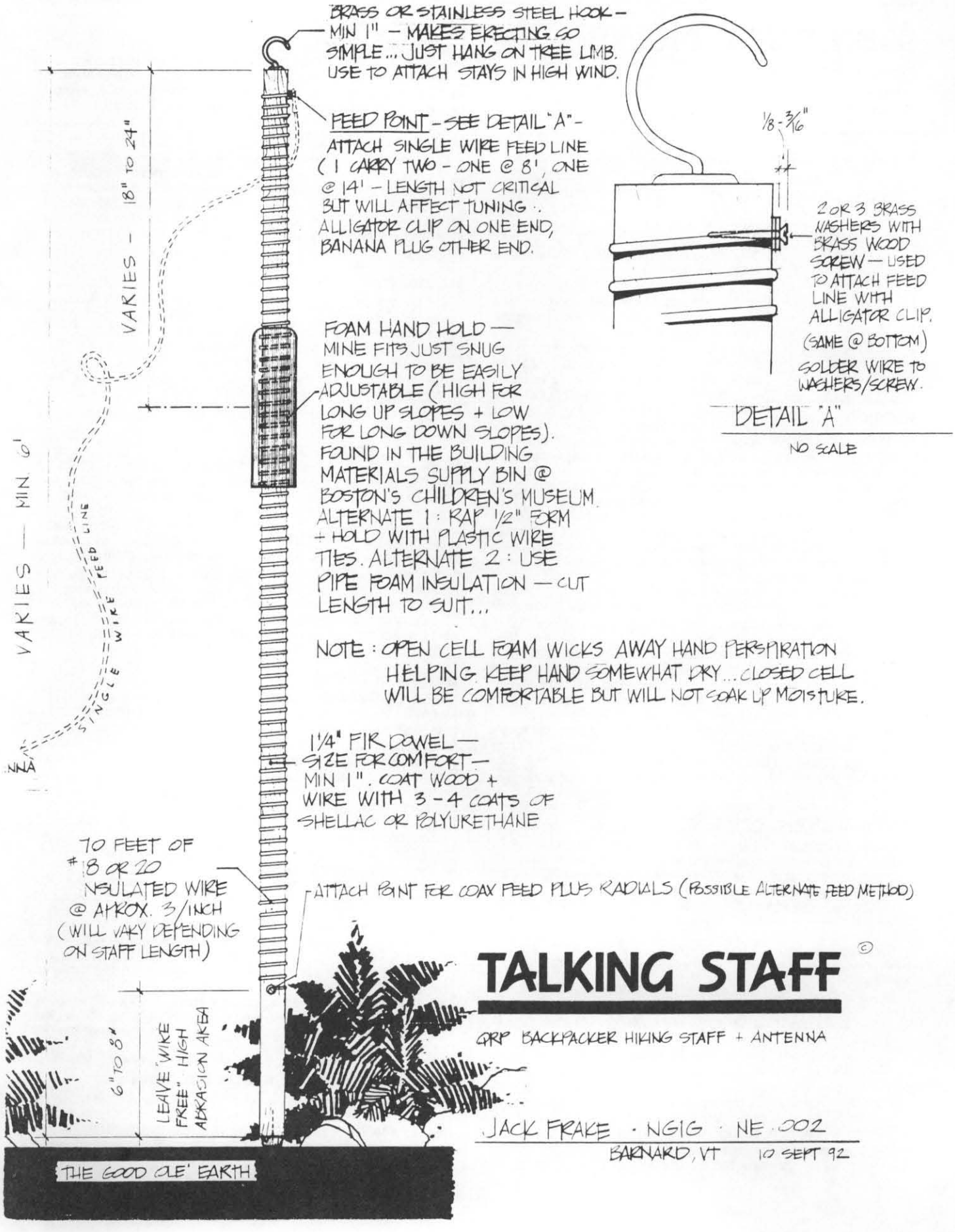
If you camp in a casual fashion or backpack in the wilds, this antenna might work well for you. There are many variations which I have not had time to try. 52 ohm coax feed and one or two 1/4" wave radials, fed at the bottom, is a possibility. If you talk your hiking spouse or partner into using a talking staff, you could double the length to approximately 12 feet by attaching the two together. Or...how about a 12 foot rotatable dipole (coax fed)? Remember, the longer the vertical, the more efficient the antenna becomes.

A note to the serious backpacker: As you know, weight is always a consideration when out on a trail. My fir version is relatively light, but a lighter staff can be fashioned using Sitka spruce wood. If you're unable to find a source for this material, or for that matter would like a copy of G8PG's article, please send me an SASE.

A woodshop can turn down a 2 x 2" to your specifications, and can most likely cut in a groove to accept wire. Also, other types of plastic pipe, such as schedule 40 PVC and the type used by electricians. If I decide to build a final version, I will use Sitka spruce with its interior carved out (except at the top and bottom for strength). I would use the smallest wire possible for good operation. Remember, the wire must be well protected against trail abrasion.

There are endless possibilities with this project and it's been great fun to think about.

See illustration on the next page ☞


BRASS OR STAINLESS STEEL HOOK – MIN 1" – MAKES ERECTING SO SIMPLE... JUST HANG ON TREE LIMB. USE TO ATTACH STAYS IN HIGH WIND.
FEED POINT – SEE DETAIL "A" – ATTACH SINGLE WIRE FEED LINE (I CARRY TWO – ONE @ 8', ONE @ 14' – LENGTH NOT CRITICAL BUT WILL AFFECT TUNING. ALLIGATOR CLIP ON ONE END, BANANA PLUG OTHER END.
VARIES – 18" TO 24"
FOAM HAND HOLD — MINE FITS JUST SNUG ENOUGH TO BE EASILY ADJUSTABLE (HIGH FOR LONG UP SLOPES + LOW FOR LONG DOWN SLOPES). FOUND IN THE BUILDING MATERIALS SUPPLY BIN @ BOSTON'S CHILDREN'S MUSEUM. ALTERNATE 1: RAP 1/2" FOAM + HOLD WITH PLASTIC WIRE TIES. ALTERNATE 2: USE PIPE FOAM INSULATION — CUT LENGTH TO SUIT...
VARIES — MIN 6'
SINGLE WIRE FEED LINE
NOTE: OPEN CELL FOAM WICKS AWAY HAND PERSPIRATION HELPING KEEP HAND SOMEWHAT DRY... CLOSED CELL WILL BE COMFORTABLE BUT WILL NOT SOAK UP MOISTURE.
1/4" FIR DOWEL — SIZE FOR COMFORT — MIN 1". COAT WOOD + WIRE WITH 3-4 COATS OF SHELLAC OR POLYURETHANE
70 FEET OF #18 OR 20 INSULATED WIRE @ APPROX. 3/INCH (WILL VARY DEPENDING ON STAFF LENGTH)
ATTACH POINT FOR COAX FEED PLUS RADIALS (POSSIBLE ALTERNATE FEED METHOD)
6" TO 8"
LEAVE "WIRE FREE" HIGH ABRASION AREA
THE GOOD OLE' EARTH
1/8-3/16"
2 OR 3 BRASS WASHERS WITH BRASS WOOD SCREW — USED TO ATTACH FEED LINE WITH ALLIGATOR CLIP. (SAME @ BOTTOM) SOLDER WIRE TO WASHERS/SCREW.
DETAIL "A"
NO SCALE
TALKING STAFF ©
QRP BACKPACKER HIKING STAFF + ANTENNA
JACK FRAKE · NGIG · NE 002
BARNARD, VT 10 SEPT 92

Members' News

Richard Fisher, KI6SN
1940 Wetherly St.
Riverside, CA 92506

Taking on duties at 'Worldradio'

Is there an astrologer in the house?

April is a most curious month for me as a journalist. It was a year ago this month that Members' News was resurrected in QRP Quarterly — my first plunge into amateur radio journalism.

KI6SN
. . .Richard Fisher

With the April 1993 edition of Worldradio magazine, my radio writing horizon is broadening to include conducting its monthly QRP column. I have been invited to take the duties from fellow QRP ARCI member **Rich Arland, K7YHA.**

For the seven years he has written the WR column, Rich has made QRP one of the most popular features in the publication.

I am anxious to take on the challenge of continuing his fine work, and hope that many Quarterly readers will take the opportunity to flip through WR's pages for more coverage of low-power communication.

As for Members' News, I plan to carry on business as usual, and hope that more and more voices from our club find their way to the MN mailbox, and into the pages of this publication.

As a newpaperman on dailies for almost 20 years, I've become accustomed to the rigors of multiple *daily* deadlines. So the monthly deadlines for WR, and quarterly deadlines for the Quarterly seem somewhat a luxury. We'll have to see if the sentiment is as true a year from now as it is today.

The *real* challenge for any writer has little to do with deadlines and lots to do with having something interesting to say — not the number of bylines compiled or column inches devoured. Where Worldradio's QRP column is concerned, you'll have to be the judge of its success.

Here, however, as it has been from the beginning, Members' News is produced by you — its lifeblood flows from the club membership. I just tidy up your contributions, and get them to the typesetter.

The more, and diverse voices that find their way here, the more interesting this column will be.

As always, a 72 to those who have contributed in the past, and here's hoping that those who haven't yet, will drop me a card, letter or photograph. There's room here for lots more.

And see you next month around the corner in Worldradio.

— R. E. F.

Northern Lights: QRP in BC

Derry Spittle, VE7QK, writes from North Vancouver, B.C., Canada, that QRP SSB "is alive and well in the Pacific Northwest."

Danny is president of the **QRP Club of British Columbia,** which is dedicated to homebrewing and low power transmission.

"We have at present some 26 members in our somewhat informally-organized club — at least half of whom are on the air with homebrew SSB transceivers running between one and five watts PEP.

"Our net meets twice nightly — firstly following the BC Emergency Net (presently ending at 1900 PST) and again at 2230 PST" on 3.729 MHz.

Danny points out that although U.S. amateurs cannot use phone on this frequency, "don't be afraid to check in on CW. We can always move up the band if you want to use SSB.

"I have had no problem in working Washington and Oregon in the U.S. phone band with one or two watts when it's open.

"Several of us have worked the East Coast in Canada using this power."

The QRP Club of B.C.'s membership is spread over a wide area. "Members living in Vancouver and Victoria get together for lunch on a regular basis. Two or three times a year we endeavour to hold a joint meeting — alternating the location between Vancouver Island and the Mainland and occasionally see members from the interior of the province."

The club's February 1993 newsletter features a block diagram of **The KBE-3,** a simple SSB transceiver for 75 meters.

For more information about the club, write: **Derry Spittle, VE7QK, President, QRP Club of British Columbia, 1241 Mount Crown Rd., North Vancouver BC, Canada, V7R 1R9.**

'Adventure' for QRP ops

Longtime QRPer **Jim Stevens, KK7C,** of Provo, Utah, is publishing a 56-page catalog titled **"Radio Adventure"** featuring his line of AntennasWest equipment for radio amateurs. It contains how-to information for QRPers about selecting everything from solar panels and controllers to "Grab-N-Go" antennas and QSL cards. For information about getting the catalog, contact AntennasWest at 1-800-926-7373.

Manual tranmission, anyone?

The Heath Corporation may be history as far as radio amateurs are concerned, but there are lots of Heathkit QRP transceivers out in Radio Land with their owners in the hunt for manuals.

Case in point: **Jay Stanfield, WB5UDA,** of Fort Worth. He's looking for "one original manual for a Heathkit HW-7." Contact him by phone at 817-834-5244. His mailing address is 3212 Rita Lane, Fort Worth, TX, 76117.

Etc., and so on . . .

Bill Todd, N7MFB, who heads The NorthWest QRP Club, reports in the December 1992 edition of The NWQ Newsletter that the **"30-30 QRP Transmitter"** is being offered in kit form by the organization. The 5-watt rig was designed by **Bruce Franklin, KG7CR,** of Longbranch, Wash., and comes with a 10.123 MHz crystal — not coincidentally the club's 30 meter Monday night net frequency. For more information, write **The NorthWest QRP Club, 4153 49th Ave. SW, Seattle, WA, 98116** . . . The **Oklahoma QRP Group's** roster lists the names of 30+ members. Most are from Oklahoma, with California, Texas, Washington and Minnesota also represented. For information about the group, contact **Louis Nix, WD5GLO,** at 15177 SE 7 St., Moore, OK, 73160 . . . **Harry McDade, W1LMU,** is the new membership manager of **The QRP Club of New England.** His address is 194 Winslow Rd., Waban, MA, 02168 . . .

QRP on a higher frontier

Mike Czuhajewski, WA8MCQ, reports from Severn, Md., that he's made 40+ QSOs in 19 states on RS-12, "with not too much actual time on" the low-earth-orbit Russian Sputnik. He's working the satellite Mode K, with its 15 meter uplink and 10 meter downlink.

"I worked **CO2HA** (Cuba) and heard him many times. A couple nights ago was a real treat — didn't work anyone, and in fact got the rig turned on too late in the pass to have any chance, as it was going out, but I actually heard several Brits!" Mike is on "the extreme west fringe of the footprint and they were on the extreme east end."

Mike says he has already worked all of the U.S. west coast, and "heard, but not worked Alaska, so at least a 48 state 'Worked All States' is possible with QRP from the east coast.

Another Czuhajewski-thrill was "hearing — albeit very weak — RS-12 while it was 31 degrees below the horizon, somewhere east of Kamchatka. Try *that* with a VHF-only bird!"

More and more QRPers are giving RS-12 a go.

Mike has worked **Bob Brown, NM7M,** of Anacorta, Wash., on RS-12, who is former secretary of QRP ARCI and the Quarterly's propogation columnist. He "passed along his regards to the QRPers," Mike says.

In addition, Mike worked **Malcolm Keown, W5XX** of Vicksburg, Miss., on the satellite. "formerly known as **K4RIN/5** back in the late '60s. I knew him quite well back then, as he was the editor of QRP Quarterly at the time."

QRP news from the Austin City Limits

A dispatch on QRP activity in the Austin, Tex., area comes to MN via **Luke Dodds, W5HKA,** who passed along an update from **Stuart Rohre, K5KVH,** who lives in Round Rock, Tex.

Stuart writes: "**Mike Allen, KB5RBW,** was asking me for hints and kinks on RF testing about QRP rigs and he said it sure would be nice to

Poetic license

QRPer Dick McIntyre, K4BNI, of Basye, Va., makes clear where his energies are directed in amateur radio. The license plate on his Nissan reads "QRP 5," a four-wheeled billboard reminding all that low-power operation is alive and well in Shenandoah County.

have a program or course on how to build one's own QRP gear and get it tested and debugged. I agreed and said if he came up with a class, I would help.

"Then we ran into **Bruce (Williams), WA6IVC,** (of Smithville, Tex.) at our Manchaca Hamfest last fall and he said he would do a class using his transmitter and receiver MXM kits as a 'lab' project if we got enough interest.

"Well, last Saturday at Murchison Junior High School — where we do novice classes and VE exams here in Austin, 23 of us showed up for the first kit building class.

"We had father (ham) and prospective ham daughters; granddad hams and grandson; old hams, new hams, YL hams and, in short, a good cross-section.

"Most are trying the MXM Industries 40 meter transmitter-receiver board."

The subsequent Saturday they planned to build — "or Bruce will build" — a receiver in class as a demonstration.

"Loosely, then, further classes will finish the transmitter board, and debug individuals' boards.

"We hope to graduate with 100 percent indentically good rigs.

"Plans are to help less experienced builders do their cabinet drilling in class under supervision of us who have punched a hole or two!"

Stuart says that "now we have this much local QRP interest, it would be nice to keep it going."

Tales of the Argonaut 515, and beyond

Dick McIntyre, K4BNI, of Basye, Va., says Quarterly readers "might be interested in my recent experience with my Argonaut 515.

"I purchased it in 1980 when it first came out and it has given excellent service as a fixed, portable and mobile rig until a couple of months ago when the vernier dial drive mechanism started to bind — especially about the first 100 kHz of calibration.

"I checked with Ten-Tec and from their remarks, mine was not the first to have the problem. I sent the rig to them and they rebuilt the PTO drive, replaced the dial cord, realigned the appropriate circuits and replaced the audio IC. The result was not only a bind-free drive, but also a very noticeable improvement in performance.

"It was back in two weeks to the day."

Dick says he has also purchased and built the Oak Hills Research WM-1 wattmeter kit. ". . . Very pleased with it and from what I can tell it is certainly accurate within the five percent area.

"Components are quality; the cabinet attractive and the meter calibration (three scales: 10 watts, 1 watt, 100 milliwatts) clean and very readable."

"Meanwhile," Dick says, "my much-modified HW-9 has gotten over its cranky childhood and has turned out to be a stable, reliable performer."

DXCC-QRP, the Smart way

Leighton Smart, GW0LBI, of Mid Glamorgan, Wales, writes that "since last August things have been quite busy here QRP-wise. I have finally reached DXCC-QRP with VP5 (Turks and Caicos Island) being the 100th country.

"I worked him on 10 meters, actually cracking the huge pileup with just five watts, and ended up ragchewing with him, while all the big guns had to QRX!"

Leighton says he's waiting for the QSLs now to apply for the DXCC award. "I have also further modified the FT747G, it now runs a maximum of five watts on *all* modes. I decided that 10 watts PEP SSB was far too much power!

"On 160 metre QRP, I have now reached 37 DXCC countries, the best DX being **EA8QO** (Canary Island), a distance of about 2,000 miles, and my first contact outside Europe, much to the envy of my local QRO friends, none of whom have managed EA8 with high power.

"So things are looking up on the QRP front here, and the interest in low power operating here is increasing — at least one other member of my local radio club is applying to join the QRP QRCI. Hopefully he will be the first of many."

Party time! Excellent!

Reminder: April brings QRP ARCI's **Spring QSO Party,** from 2000Z April 3, to 2400Z April 4, and is followed by the **Hoot Owl Sprint (CW)** on May 30 from 2000 to 2400 local time.

Goodie Giveaway

This month's Goodie Giveaway features a publication that has the potential of becoming a real collector's item: a 1960-vintage copy of The American Radio Relay League publication **"A Course in Radio Fundamentals."**

Oldtimers may remember dogeared copies of the 100-plus page soft cover book around the shack years ago. But the League has long since ceased its publication.

Part Three of the book features a laboratory-style tube oscillator featuring a 6F6, which with a tuned output circuit would make a fine QRP transmitter.

In thanks for his contribution to this month's MN, **Dick McIntyre, K4BNI,** of Basye, Va., is its recipient. A tip of the QRP hat to Dick, and an invitation to all club members to get in on next quarter's givewaway by sending an item for MN.

Items for the Members' News column should be sent to Richard Fisher, KI6SN, 1940 Wetherly St., Riverside, CA, 92506. Photographs — either black and white or color — are welcomed. Please include a self addressed, stamped envelope if you would like pictures returned.

Tejas RF Technology

17 South Briar Hollow, Suite 101
Houston Texas 77027
Telephone: 713-840-8600 Fax: 713-840-8608

BACKPACKER II TRANSCEIVER MODEL TRFT-550

You'll be happy to know that the Backpacker II has the many great features of the Backpacker I...PLUS! We incorporated the new Mini-Circuit Labs TUF-1 miniature doubly balanced diode ring mixer and we have newly redesigned the preamplifier, AF low pass filter, dual section CW filter, and audio amplifier sections.

All this means that the Backpacker II receiver section has improved gain and gain distribution throughout. Audio? WOW! You won't believe it! Designed for 8Ω phones. Yes, it has SPEAKER POWER...so hook up your own 8Ω speaker and impress the crowd!

Our improvements were also designed to simplify receiver construction by builders at all levels of experience.

SWR/POWER METER, 1-30 MHz MODEL 8401

Outstanding design for one to two meters, which does not require tuning or nulling RF pickup section. Two wattmeter (FWD) positions as well as FWD and REF SWR. Based on your construction and calibrations, can be 1, 2, 3, 4, 5, up through 10 watts QRP power levels or 50-100 watts main rig power level. Includes pre-wound toroids and two small edge mount meters with information to add to your own calibrated scales to suit your needs.

TUNABLE BANDPASS AUDIO CW FILTER MODEL 92150

This very effective little filter is what some call the "poor man's pass band tuning". The tuning control not only peaks the received signal, it varies the peak frequency for those of us who prefer listening to various audio frequencies due to band conditions or personal hearing conditions.

The Model 92150 is very simple to operate. Just plug it in to your receiver headphone jack, add 9 to 12 volts power (not included), plug in you headphones (or small speaker), and operate. The BK kit is small enough to build into your own rigs, either commercial or homebrew.

While testing the new Model 92150, the QRN on 40 meters was terrible. I tuned in a CW signal, unreadable due to QRN, simply switched the filter to the first filter position, tuned the PEAK control, and the CW station went from zero copy to FULL COPY. Switching the filter into the second filter position, the QRN all but disappeared, and the CW station sounded like a lone bright star in a pitch black sky!

SCOPE RF MONITOR SENSOR MODEL 92111

Turn your regular scope into an RF monitor. See what your transmitted signals look like without spending big bucks for a special monitor scope. 500 kHz to 150 MHz. No insertion loss. In-line coax connection. Monitors all transmitted signals. Will work with almost any scope.

GEL CELL BATTERY CHARGER MODEL 8101-12v

This gel cell battery charger kit offers charging rates for 12 volt gel cell battery ratings from .9 amp hours up, with maximum design charge current of 700 mA. The Model 8101 offers overcharge protection with three LEDs indicated "current limiting", "charging" and "float", indicating when the battery is fully charged.

The Model 8101 is fully automatic! Connect it to your battery and forget it. No worry about overcharging or overvoltage.

MODEL 8101-6v available also. Same price as above.

Other kits available include:

- **Mini-Keyer**— designed around the Curtis 8044ABM chip. A real cutie!
- **Maxi-Keyer**— designed around the Curtis 8044 ABM chip. Full features plus.
- **Station speaker system**— includes a variety of options built into the speaker. Great for SWL, Hams, offices, and a variety of other uses.
- **SWL antenna tuner**— tunes a number of antennas for better bandpass response and less interference from strong, unwanted stations.
- **Tejas RF "IMPI-MATCH"**— a fixed impedance 50Ω noise bridge that is placed inline between your antenna tuner and 50Ω receiver antenna input. Tune your antenna just by listening to your receiver! For SWL's and Hams. Great for sightless or visually impaired.
- **Tejas RF FUN-KITS**— a new series of very simple kits of all types for beginners and hobbyists. Designed for very limited budgets, yet with a purpose in mind.

Plus much, much more, including many new hobby enclosures of market-proven Tejas RF design.

Want something you don't see here? Write us. It may be available soon.

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:** Jim Griffin, W9NJP, 1216 Ash St., St. Charles, Illinois 60174
- **Technical articles:** Dave Benson, NN1G, 80 East Robbins Ave., Newington, Conn. 06111
- **Idea Exchange:** Mike Czuhajewski, WA8MCQ, 7945 Citadel Drive, Severn, Maryland 21144
- **QRP Contests:** Red Reynolds, K5VOL; 835 Surryse Road; Lake Zurich, Illinois 60047
- **Member News:** Richard Fisher, KI6SN, 1940 Wetherly St. Riverside, CA 92506
- **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 $2): Mike Bryce, WB8VGE; 2225 Mayflower, N.W.; Massilon, Ohio 44647

QRP ARCI History, Purpose and Policies:

The QRP ARCI was founded in 1961 by the late Harry Blomquist, K6JSS, with the aim of reducing QRM on the air, by members voluntarily limiting their power to 100 watts or less at all times. Due to increasing interest in true low power operation, and through the leadership of then-president Tom Davis, K8IF, the Club voted in the late 1970's to redefine its purpose in that direction, and adopted the generally accepted definition of QRP as 5 watts output CW and 10 watts PEP SSB.

The voluntary 100 watt power limit was later abolished; members may run any legal amount of power necessary at any time, for any purpose, although the 5 watt limit should be observed when claiming to be operating QRP. Club awards and activities are geared to the 5 watt and under level. The QRP ARCI does not advocate the reduction of the legal power limits of amateurs in any country, and serves only to provide a forum for those who enjoy the thrills and challenges of building and operating with low power equipment. The QRP ARCI is a member of the World QRP Federation and maintains ties with various other QRP organizations.

The QRP ARCI publishes the QRP Quarterly in January, April, July and October. All contributions are welcome and should be directed to the appropriate editor or columnist. (No payment is made for material published. Unless expressly requested, manuscripts, drawings, pictures and diskettes will not be returned.) Except for those items with a copyright indication, material may be reprinted elsewhere if proper credit is given to the author and the QRP Quarterly. The products, projects, features and fantasies described are intended solely for the enjoyment of our readers. No testing has been done unless explicitly stated, and no warranties are intended nor implied. The QRP ARCI and QRP Quarterly in no way warrant any commercial or private offers herein unless expressly stated.

To promote on the air QRP operation, the QRP ARCI promotes the use of designated QRP calling frequencies, regular QRP nets, and a program of QRP operating awards and contests. Information on these is found in the QRP Quarterly from time to time. Detailed information on the awards program is available from the Awards Chairman. To join the QRP ARCI or renew your subscription to the QRP Quarterly, see the form inside the back cover.

New Member/Renewal Data Sheet

Full Name_____ Call_____ QRP #_____

Mailing Address_____

City_____ State/Country_____ Postal Code_____

❑ New Adress?

USA

❑ New Member, $12
❑ Renewal, $10
Amount Enclosed in U.S. funds_____
Check or MO pay to QRP-ARCI.
Do not send cash.
Mail to: Mike Kilgore KG5F
2046 Ash Hill Road
Carrollton, Texas 75007

❑ New Call?

DX

❑ New Member, £7
❑ Renewal, £6
Check or MO pay to G-QRP or
R. Pascoe GØBPS
Mail to: Dick Pascoe, GØBPS
Seaview House
Crete Road East
Folkestone, Kent CT18 7EG
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