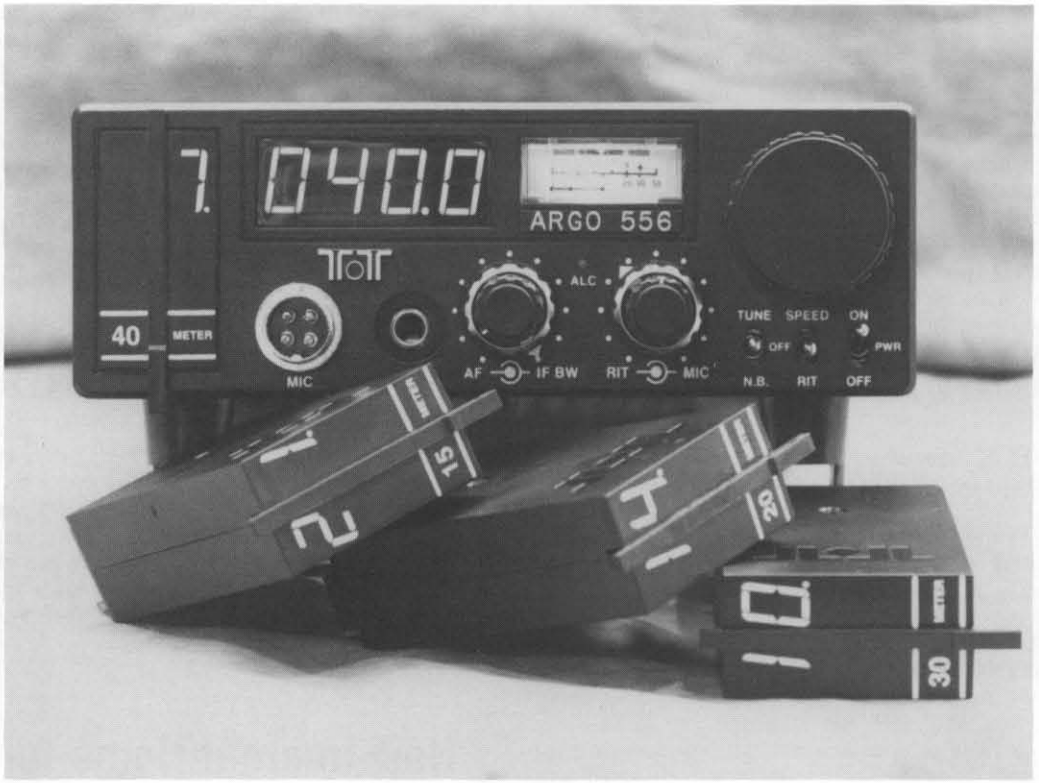
QRP Quarterly

Journal of the QRP Amateur Radio Club, International
October 1994 Volume XXXII Number 4



Meet the Argo 556

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The President Speaks

by Les Shattuck, WN2V
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Greetings...Time is flying by as this will be published in the October 1994 issue. I have tried all summer to keep from falling into a slump and not up to date on QRP news.

The time has come to have major changes in both club policy and the way the club is operated. If QRP ARCI is to remain as a major player in our hobby, these changes must take place. And they are changes for the better. I am very optimistic that the ARCI will be the premier QRP club and our Quarterly a first class publications. You are probably wondering what changes will be required, and what is all this about policy changes. First, let me tell you about how the club operates, or that is did operate.

Of course we have a president, VP and secretary/treasurer. As do most clubs. We also have a board of directors. If all of the seats are full, I think we have 12 directors. Their job was very loosely defined in the past, sort of a watchdog group to oversee money spent and write policy or policy changes for the club. If the president or secretary required any funds, they polled the board for permission. This could take several weeks at least or as in most cases, months. Things never seemed to get done, as they were always tied up with the board. Even little, every day activities were sometimes hogtied for weeks.

Effective this summer, we as president realized something had to be done to make things happen when they were needed. The board of directors were all given new directives. They now only approve moneys over $500 and it will allow Myron and myself to move ahead quickly. Other changes are forthcoming to streamline the operation of the club.

Next month I will print a master plan, a vision of the club's role in the QRP community for the future. Meantime, if you think you are interested in being an officer of the club, there are several board seats open, or if you just wish to find out what is happening inside, I will be happy to send you a copy of the same newsletter and info the officers get if you send me SASE's.

Nominations for the QRP Hall of Fame

The QRP Hall of Fame is an honor bestowed for outstanding accomplishments with QRP and/or on behalf of the QRP community.

Although it seems to have slipped through the cracks recently, we're trying to get the ball rolling again! Nominations are now being accepted for the 1995 inductions into the QRP Hall of Fame.

If you wish to submit someone for this honor, please send a nominating letter to N8DHT, the Secretary/Treasurer. Be sure to include some specific facts and details to support the nomination; you may feel that someone you know deserves it, but you have to convince us! Letters must be received before March 1, 1995. The nominees will be voted on by the Officers and Board of Directors, with results to be announced at Dayton in April.

What is required for induction into the QRP Hall of Fame? There are no hard and fast rules, nor specific "squares to fill." Here's what former President WB9TBU said in the October 1992 issue:

"A nomination will need to be very detailed. One of the previous problems was the fact that no award criteria existed and nominations received went something like "I nominate 'Joe QRP' because he's done a lot for QRP!" Doesn't give the board and officers a whole lot to go on, does it? In response to this problem, the following QRP Honor Roll criteria has been developed:

"The award of honor roll status requires a majority of the board and officers. The award is to be based on one or more of the following: technical accomplishments, writing accomplishments, operating accomplishments (contesting, award achievement, net operations, etc), service to the organization, significant QRP promotion activity, other significant activity and/or accomplishments. Nominations are to be in writing, to the club secretary. Nominations should be very detailed as to the specific reasons why someone qualifies for this recognition."

(The original figure was a 4/5 majority, but by the time voting is done we may have modified that a bit.)

There are no quotas for the Hall of Fame; there is no limit on how many can be inducted each year, but there is also nothing that says we must admit anyone at all. It's up to you; if you know of someone who has made outstanding contributions to QRP in some way and feel they deserve the honor, write it up and send it in!

--WA8MCQ

New Internet Home for QRP

Some of you may have heard and read about the QRP forum on Internet (USENET, actually) but not tried it yet. If so, please file this information away for possible future use: it's address is no longer `qrp@think.com`. In late August it moved to a new home, and messages to be posted to the QRP group should now be addressed to `qrp-l@netcom.com`.

To subscribe, send an e-mail message to `listserv@netcom.com`; the subject line is unimportant, and the body of the message should say (without the quotes, of course) "`subscribe qrp-l` [your address]". Example: `subscribe qrp-l wa8mcq@hambbs.wb3ffv.ampr.org`

(Some people say to leave the subject in the header blank, but if you try that on the UniBoard system which I operate under, it automatically aborts the message.)

The QRP list was started over a year ago at the suggestion of Chuck Adams, K5FO, and the administrative duties were handled until recently by Bruce Walker, WT1M.

I've been on it since June, and it's a blast! Although there are slow days, of course, sometimes you'll see 20 or more new messages in one day, and there are a lot of well known QRPers "reading the mail" as well as posting messages.

--WA8MCQ

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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.

Meet the Argo 556

by John Mori, N8MUU
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My introduction to ham radio occurred many years ago when I went over to a ham radio operator's house and listened in amazement as signal after signal poured out of an HRO-50 receiver. Some of the readers will remember that the HRO was a quality, top of the line receiver that used plug in trays to receive the different bands. You can perhaps understand my feeling of nostalgia when I opened my box from Ten Tec and took out the Argo 556 and the plug in modules that I bought to go along with it. But this radio is far far different from the HRO-50, so let's meet the Argo 556.

As you know, the Argo is a QRP version of the Ten Tec Scout. It is also Ten Tec's answer to a lower priced QRP radio. The higher priced radio, the Argonaut II, has all the features of any modern transceiver and is priced accordingly. The Scout has been on the market approximately one year and the Argo has been sold since approximately April. The radios are identical except for the final amplifier stage being absent in the Argo. Its size-2.5" x7.25"x9.75" places the Argo in a league with the Kenwood TS-50S. The radio weighs 4 pounds, 5.8 ounces, without the module and draws 2 amps on transmit with 5 watts out. Receive current drain is 600 ma., according to the manual.

Besides the small size and unique packaging, what distinguishes the Argo is the plug in module method of changing bands. The manual states, "Each module contains a mixer/crystal oscillator to convert the PTO to the correct local oscillator frequency, a fixed tuned circuit to cover the band selected, and a low pass filter for the power amplifier". While you can change bands rather quickly, it is not always easy. You have to insert the module with one hand and hold the radio with the other. Perhaps because the radio is new, there is a fair amount of resistance to insert the module the full depth.

It is important that the module be fully seated. I once inserted the 40 meter module and the receiver functioned well. Yet when I went to transmit I found that power out did not exceed 3 watts and seemed to decrease as the key was held down. Pushing the module in so that its surface was flush with the radio's front panel solved the problem. You remove the module by pulling the bottom of a plastic strip which pivots and serves as a lever to eject the module. It seems fragile but is not, and a steady pulling towards you (but not upward) will eject the module with ease.

Another distinguishing feature of the Argo is that the tuning mechanism consists of permeability tuned oscillator (PTO) working with a "frequency lock system" (a microprocessor) to reduce drift. I find the radio to be very stable, even from a cold start, but Ten Tec cautiously states that this combination of a PTO and a microprocessor "does not eliminate all drift". My radio did not exhibit the frequency variations that QST mentioned (in its review of the Scout) when I held the radio to change bands or even when I placed the radio under a light. A decimal point in the right lower corner of the display indicates when the system is "locked". The manual says that the operator has approximately two seconds to make final adjustments to the tuning before the system's microprocessor "locks" the frequency.

You will soon discover that you are tuning a variable inductor because the tuning knob does not "spin". "Crank" seems a better description. With your thumb and finger you can only turn the knob one half rotation at time. This was a real surprise for me, but once you begin to use the radio you soon find that you are zipping through the spectrum. This tightness in the tuning knob would be an asset when mobile or in the field.

The radio has a number of other features. Adjustable filtering is accomplished by the Jones filter. This filter is a 9 pole continuously adjustable filter from 2.5KHz to 500Hz. The more I use the filter, the better I like it. Unlike other radios, you do not have to immediately shift from a 2.4KHz to a 500Hz passband, but can select the degree of filtering to suit the conditions. Some users of the Argonaut II and the Scout have reported an increased bass response as the selectivity of the Jones filter is increased. I originally experienced the same response (see below). Using the RIT control will offset this effect.

I compared the radio to my Kenwood 450 to determine how sensitive the Argo was. I found that the Argo could detect even very weak signals as well as the 450. These were signals that were barely above the background noise of each transceiver. If the Argo loses some ground to the 450 it is due to the quieter audio stages of the Kenwood, especially when the filtering for each transceiver is engaged. Overall, I am very impressed with the receiver and I seriously doubt that I will even miss a single QSO because I am using the Argo versus the 450 set at the QRP level.

Other features of the Argo include:

- a Curtis keyer with a front panel control for speed adjustment
- a very large display which should be another plus for mobiling
- a built in, lighted, SWR/wattmeter with a rear panel switch for function selection

• separate rear panel miniature jacks for a key and paddles

• automatic mode switching between SSB and CW. No control switch is needed

• stereo-yes stereo- front panel earphone jacks. Monaural jacks can work if only inserted half way, but the speaker remains on

• bottom access controls for power and sidetone volume. You will need to adjust the volume. Mine was loud! Power is variable from 1-5+ watts

• an optional noise blanker can be installed in the radio

• One of the main reasons I bought the radio was to be able to enjoy the QSK. Ten Tec has not reduced its standards on this radio. You will enjoy it.

I did experience some audio and filter problems with my radio.

The unit was returned to Ten Tec and the problems were corrected.

I originally considered the audio to be the most serious deficiency in the radio. When the audio knob was fully counter clockwise you could hear the whine from the microprocessor. It is distinct and it cannot be eliminated. When you began to turn the knob clockwise you began to hear audio hiss very early. The audio hiss was louder when you had the Jones filter engaged to the maximum. I found that the hiss actually competed with very weak signals.

Also, the audio control did not seem to be linear enough. Volume increased quickly. 509 and 515 owners probably have experienced a similar situation. I had asked to have an audio pot installed, but apparently there was insufficient space to accomplish this mod. The quality of the audio is very good, and I actually prefer it to my 450.

I also indicated to Ten Tec that I thought that the Jones filter in the Argo 556 was not as effective as the one in my Argonaut II. Ten Tec returned the radio to me in less than two weeks. Capacitors were added to the input and output of the audio amplifier. Apparently the Jones filter was defective for it was replaced. Some audio hiss is still detectable, but within acceptable limits compared to other radios. The technical staff were courteous and professional in dealing with the problems. Ten Tec's service is to be commended. The bass response issue seems insignificant with the radio now, and I do not have to use the RIT control to compensate for the tone.

I am mystified as to why Ten Tec chose to provide a stereo connector for headphones. Since they made that choice, it would have made more sense to use a miniature connector rather than the standard 1/4" phone connector. They did use miniature connectors for key and paddle inputs, so why not on the front panel? It would have saved precious space. With the correct adapter you can use cheap headphones with the radio. The manual indicates that this was the motivation for this choice.

Other comments and observations include:

• The tune control is of use in the Scout for it reduces output while one adjusters the tuner. It does not function to reduce output in the Argo, but makes tuning through a tuner easier, given the fact that QSK is standard with the radio.

• The bottom scale of the meter is used to measure SWR. There are no numbers, just a series of dots connected by a line.

• The meter seems slow and it is probably due to how the AGC is set in the radio (not selectable). It does not really give you an indication of what band conditions are in the CW mode but is more accurate on SSB signals

•I really like, and use, an RF gain control. The Argo does not have one.

• It is unfortunate that Ten Tec did not install rear panel connectors for its attenuator. This would have encouraged milliwatting.

• It would have been nice to have a switch to shut off the digital display and meter lighting for battery conservation.

•I do not know if Ten Tec could have designed the modules differently and still retain their small size. I am not going to give my modules a drop test, but it does seem that if a module is dropped and it lands on the connector strip, it could be damaged

There is a lot of room at the rear of the Argo to perhaps install an audio filter (see previous issue of ARCI quarterly) or other mods that may be developed over time. That is a definite plus.

An issue of potential concern to me when I bought the Argo was signal imaging on 20 meters. I first read about this in the QST review of the Scout. When you read the article it seemed to me as though the reviewer had "discovered" this fact. However, when I compared the QST text to the Ten Tec manual I was surprised to discover that the words were nearly identical. It appears that QST "borrowed" much of he text right from the manual, yet did not give Ten Tec credit for honestly discussing the situation.

You may find a few signals are occasionally present on 20M depending on conditions. I only found one signal in the CW portion of the band during one session with the radio.

I have noticed one or two signals on the high end of the band. I have not found signal imaging to be a problem in actual operation. Should you have a particular problem due to your location, an additional band pass filter in front of the receiver should help. I am more disappointed in how QST wrote that part of the review than the issue itself.

Ten Tec was also very honest in saying that due to the microprocessor drift control system, the radio may drift some at high speed CW. Personally, I doubt I will ever have to worry about it! I also doubt that the majority of our QRP conversations will be that lengthy at high speed. There is a very easy answer to this problem. Take your finger off the paddle or keyboard every so often. Don't be such a windbag-pause in your conversation. The person at the other end would probably appreciate it anyway.

The manual is of the usual high Ten Tec quality for its thoroughness. The company took the time to explain the PTO and microprocessor system, the imaging issue, the high speed CW issue in relation to frequency stability and so on. I appreciate the honesty and candor. It seems to be rare commodity in this day and age.

There was one final surprise in this radio. I call it the operator-radio interface. We have become so used to accept only a certain kind of radio and a certain kind of operating. After I got the Argo, I realized that I had, over time, become a "band bopper". I would zip up to 20M to check things out, bop down to 40M to give a quick scan, bounce up to 15M to see if I could work some gray line propagation, catch a few SSB conversations and so on. The band stacking registers, memories, and dual VFOs all made this possible. The result was that I never LISTENED to what was going on. The Argo operator-radio interface is different and actually lets you enjoy the activities on the band. It forced me to remember that a radio is a receiving and transmitting device to allow you to COMMUNICATE.

continued on next page

A QRP Review

Low Power Communications, Vol. 2—

Advanced QRP Operating

by Michael A. Czuhajewski WA8MCQ
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As promised, Rich Arland (K7YHA) came out with a follow up to his recent book on QRP operating. Volume 2 has been on the streets for a while now, and it has a lot of good info on various QRP topics. As with the first volume, this is all operating, a topic which has received relatively little coverage in recent years.

This time, Rich did things a bit differently and asked a variety of people to share their expertise in various areas of QRP. Most are well known, a few weren't familiar to me, but all have a lot of knowledge and good tips.

A few quotes from the Introduction—"...Volume II deals specifically with advanced operating techniques that will improve your basic QRP skills and challenge you to expand your amateur radio horizons....I have enlisted the aid of many Master QRPers, all top-notch low-power communicators, each an expert in his or her field....The tips, techniques, ideas, hints and kinks that they present will give you the inside track on how to become successful in the various areas of low-power communications....experts who've done it all, show you how to do it, too....This book is an amalgam of operating philosophies, ideas and techniques that have been proven in the low-power arena. They are the methods used by experts and masters in the fields of DXing, contesting, portable and mobile operating, solar power, satellite operation, and more...."

The book starts out with Low Power Dxing, by Randy Rand, AA2U. Randy was inducted into the QRP Hall of Fame in 1992 in recognition of his legendary QRP DXing. At last count he had DXCC on 8 bands with QRP, and has over 100 countries with under 100 milliwatts. You have to be on top of the game to get away with all that, and he has lots of good tips on how to do it.

Next, QRP Contesting by Bob Patten, N4BP. Contesting can be as challenging as DX, and he passes along some good pointers. As K7YHA says, "Bob Patten has long been a mainstay of QRP contesting. His call has regularly appeared on the "Top Ten" list of QRP contest results for many years." As with the AA2U chapter, much of this can be helpful regardless of the power level.

Off the beaten track, literally, is "QRP DXpeditioning on a QRP Budget" by former QRP ARCI president WB9TBU. Not that many people go DXpeditioning, and far fewer do it with QRP. So what if it was only during a vacation to the Virgin Islands? It's still DX, great fun and quite easy, as she shows. (And veteran QRPer and Hall of Famer Doug DeMaw, W1FB, also did his share of QRP operation from that area of the world, as detailed in QST years ago.)

Next, something that I had a blast with myself—QRP Satcom by K7YHA and Rick Rinehimer, KA3QKI. While some of the ham satellites require a fair amount of power and big antennas to access, there are a number of Low Earth Orbit (LEO) birds which the QRPer can get into, such as the Russian RS-series. They tell you how to do it and where to get more info. (The QRP Quarterly had a few articles on the RS-birds with QRP, and Rich writes a column on satellites for Worldradio.)

Bill Smith, WA6YPE, and Bob Moody, K7IRK, wrote chapter 5, "Milli/microwatting." These are the folks who started the Fireball craze of a few years ago, running milliwatts on 10 meters with computer clock modules. They also set a new record of a couple billion miles per watt a while back, as detailed in Radio Fun and reprinted in the QRP Quarterly. They go into a lot of details of running in the single digit milliwatts and lower, much lower, and this is one of my main QRP interests. (I still have an article in the works about some microwatting experiments a few years ago—stay tuned.)

Field Day operation has been a high interest activity for QRPers for some time, and readers of the QRP Quarterly have read about the Harper Air Hawks and Zuni Loopers year after year. Here, representatives of the two competing groups tell us all about it—Red Reynolds, K5VOL representing the HAH, and the Zuni Loopers with Fred Turpin, K6MDJ, Cam Hartford, N6GA, and the late Bob Spidell, W6SKQ. Field Day is fun, so is QRP, and the two make an unbeatable combination.

The antenna is one of the secrets to successful QRPing, so chapter 7 covers "Antennas and the QRP Operator." Jim Thompson, W4THU, may not be especially well known to the QRP community but he runs The Radio Works, which sells a lot of antennas. As Rich says, "Jim does things with wire antennas that most radio amateurs have to use a beam to accomplish. He does not employ voodoo or any magic antenna formulas, just common sense and a good understanding of the physics involved in making a piece of wire radiate at radio frequencies." Jim says, "It doesn't take a beam or complex wire antenna array to produce a big signal. The ideas presented in this chapter can dramatically improve antenna radiation patterns, reduce antenna system losses and significantly improve antenna performance."

Closing out with chapter 8 is Mike Bryce, WB8VGE, a well known expert on solar power. Mike has written on the subject for QST, and gives a good introduction to "free" power from the sun. You don't pay for the power itself, but converting it from photons to electrons takes a certain investment of time, money and know-how, and Mike shows you how to do it. You can run your entire ham station (HF, VHF and packet) totally from solar power like Mike does, or just build a simple system for your QRP rig for fun, but either way it's a fascinating subject.

SIZE, PRICE, ETC

The text of Volume 2, which is the large, 8 1/2 X 11 format, ends on page 130 (before the ads in the rear). It sells for about $20; check with your friendly, neighborhood radio book dealer or order directly from Tiare Publications, P O Box 493, Lake Geneva WI 53147 (1-800-420-0579, 0800-1800 CST). And while you're at it, you might want to check out Volume 1 if you don't already have it, about $15.

IN THE NUTSHELL ON THE BOTTOM LINE

Let's face it, when you operate QRP you are imposing a definite handicap on yourself. However, by going at it properly, with careful selection of equipment, antennas and operating technique you can significantly reduce the handicap and have a great deal of success and fun. The contributors to this book, all expert in their areas, share "secrets" which will go a long way toward improving your QRP enjoyment. And, as with volume 1, even if you've been QRPing for a long time and only pick up a couple new tidbits, you'll still find it an interesting and enjoyable book.

Meet the Argo...

conclusion:

All the gadgetry and wizardry is pushed to the background in the Argo. You are free to focus on how you wish to talk to the person at the other end. Yet you know that you have a fine receiver, a good filter, and superb QSK at your disposal.

In summary, the Argo continues Ten Tec's tradition of bringing good quality radios to the QRP community. My radio had two problems which Ten Tec repaired with their fine service. Ten Tec is right–it is a fun radio.

Calibrating Attenuators With DC

byMichael A. Czuhajewski WA8MCQ
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Authors Note: The July, 1991 Idea Exchange featured the Huff 'n Puff Power Supply by ***Jim Reid, KD3S.*** *He originally sent it to 73 magazine but they didn't take it, so we got it instead. I later had one of my own articles "not accepted" by a major ham publication; I thought about sending it to another and praying for a second non-acceptance so I could send the QRP Quarterly a TWICE-rejected article and beat Jim's record. However, out of respect for him I decided to settle for a tie instead, so here it is, updated, expanded and in a less formal style—*

Attenuators have many applications in homebrewing and experimenting, and even QRP operating. You can buy used ones at hamfest or make your own--information on building a step attenuator has been in the ARRL handbook for years, and Solid State Design and other books have more info on building fixed attenuators. The Idea Exchange has had items in which attenuators were used, such as testing amplifiers and filters, and there will be more. And for really serious and flexible milliwatt operating you can't beat the speed and accuracy of setting your power with a good step attenuator. (That's the fascinating sport of "milliwatting," which has been covered by G4BUE, WØRSP and others over the years.)

In some applications we don't care if that "10 dB" attenuator is really 10, 10.5, or even 11. For example, you might use one during experiments to prevent overload, or to present a good 50 ohm termination to some device. There are other times when knowing the exact value is important, such as accurately measuring gain or determining exactly how many milliwatts you're putting into your antenna. We might also want to measure our attenuators from time to time to make sure the values have not shifted, perhaps as a result of overload--and that DOES happen!

DO IT AT HOME

Although some of us have access to expensive test equipment at work which can be used to measure attenuation, we all need a simple but effective method of doing it at home. And it IS simple, requiring only some very basic equipment and knowledge--a low voltage DC power supply, resistor, voltmeter and scientific calculator. Although this method does not give any indication of how the attenuation varies with increasing frequency, it still gives an accurate measure which should hold reasonably well throughout at least the HF region.

"ONLY RESISTORS NEED APPLY"

This won't work on all types of attenuators, though--only with resistive units, which consist of resistors arranged to divide down the power applied. One type which it will NOT work with is the piston attenuator, often seen in older test equipment. In this one, the distance between a signal source and pickup coil is varied with a rack and pinion drive with a calibrated dial. There are other types that won't work, as well; in general, beware of any attenuator which is rated for a frequency span that does not include DC on one end. Unless you're actually working at those frequencies, avoid something rated for, say, 1 to 10 GHz, and stick to those which start at direct current, like DC-3 GHz.

DECIBELS AND POWER

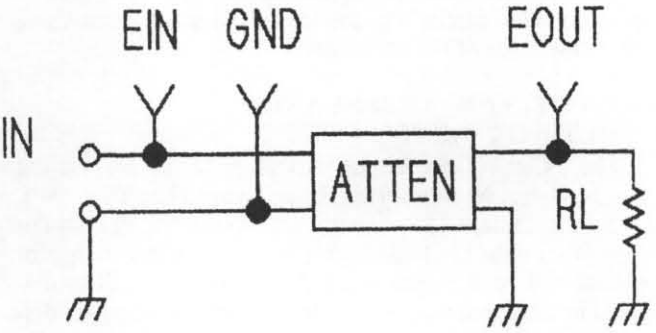
Decibels are defined as:

$$10 \log \frac{\text{Power 1}}{\text{Power 2}}$$

If the system impedance is equal on both the input and output, we can derive a second equation and say decibels equal:

$$20 \log \frac{\text{Voltage 1}}{\text{Voltage 2}}$$

We can thus measure DC voltage going into and coming out of an attenuator and calculate the difference in decibels. To do this, connect a DC power supply and load of the appropriate value as shown in Figure 1. But before you flip the power switch, read the warnings below and keep the voltage to 3 or less so you don't fry anything.



$$DB = 20 \log \frac{EOUT}{EIN}$$

Basic attenuator test

Figure 1

THE CALCULATIONS

$$\text{Attenuation in decibels} = 20 \log \frac{E_{out}}{E_{in}}$$

This is quite simple on a scientific calculator. Typical steps would be:

[Eout] [divide] [Ein] [=] [LOG] [X] [2] [0] [=]

The procedure to obtain logs may vary between calculators. To verify that you have the correct button or sequence, try to find the log of 1000. The correct result is 3. Caution--if you use a calculator which has both natural (base 2.7) and common (base 10) logs, use the latter--the log key with "10", not the one with "e" or "LN". You can still use the natural log, but it isn't as convenient since you must then multiply the result by a constant (0.434295).

With a good, stable power supply Ein will remain constant throughout a test session and you can store the value in memory to speed up calculations. If you have a lot of data to process you might want to make a simple BASIC program; this speeds things up even more and reduces the chance for human error. Unfortunately, most BASICs seem to use only the natural logs, not base 10. You could multiply by the constant, or divide by the log of ten, as done here in line 40. Add whatever bells and whistles you wish, such as printing out the results.

```
10 INPUT "VOLTAGE OUT" ; EOUT
20 INPUT "VOLTAGE IN" ; EIN
30 RATIO = EOUT/EIN
40 LOGRATIO = (LOG(RATIO)/LOG(10))
50 DECIBELS = 20 * LOGRATIO
60 PRINT "RESULTS ARE " ; DECIBELS ;
"DECIBELS."
70 PRINT : GOTO 10
```

Since decibels are based on power or voltage ratios, they are not dependent on system impedance as long as it remains constant; this method may be used with 50 or 75 ohms, or any other value. The only consideration you need give to impedance is to insure that the load (RL) is the same value as the impedance of the attenuator.

PROTECT THE ATTENUATOR: 3 VOLTS OR LESS

The exact voltage is not critical since we are dealing with ratios, but no more than about 3 volts should be used, to preclude damage to the attenuator. Assume a 50 ohm device; with 3 volts applied, total dissipation in the attenuator and load will be 180 milliwatts. At 20 dB, 99% will be dissipated in the attenuator. (Smaller value attenuators will dissipate less; a 3 dB unit will only keep 50% of the power for itself and pass the other 50% to the load.) Since many commercial attenuators (such as the Kay Electric 432C, Texscan RA-54 and Hewlett-Packard 355-series) are rated at 1/2 watt, holding it down to 3 volts leaves an adequate margin of safety. (And at higher impedances 3 volts dissipates even less power, such as 120 mW at 75 ohms.)

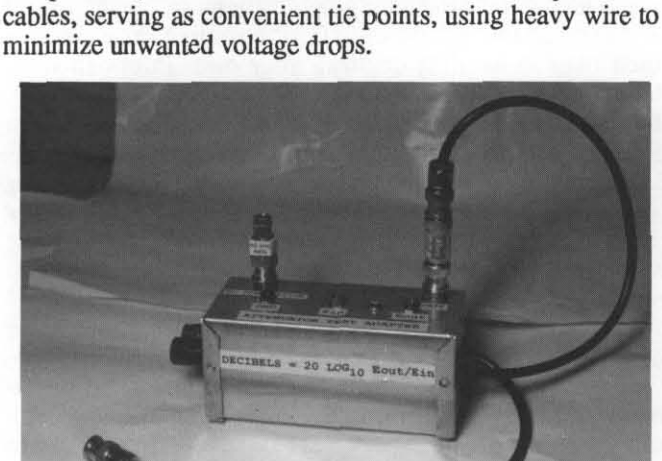
After I had been using this technique for a few years I discovered that the Air Force has two Technical Orders (TO's) for calibrating attenuators. One involves expensive test equipment, but the other uses DC. They use 2.000 volts, however, which gives even more of a safety margin. In a 50 ohm system that voltage will dissipate only 80 milliwatts.

Whether at 2 or 3 volts or somewhere in between, you need the resolution of a digital meter for best accuracy. Getting really precise readings from an analog meter is difficult at best. However, hobbyist grade DMMs are quite common and inexpensive today, and the accuracy of most is pretty good.

The more digits it has, the better; when you get much over 20 dB, the resolution becomes more important since the voltages are so small. As an example, on my Fluke model 77 digital multimeter I can use the normal, autoranging voltage mode and get a display of 0.030 volts on a 40 dB attenuator. Stepping down to the 300 millivolt range gives an additional decimal place, for a value of 0.0309. With an input of 2.983 volts, this gives a difference of 0.26 dB.

A SIMPLE TEST JIG

Originally I used a handful of test leads and adapters to connect everything. It worked but was rather cumbersome, especially since I liked to check my collection at least once a year. I eventually built the adapter unit shown in the photo and Figure 2, to make it easier and neater. There's nothing complicated; it's little more than a collection of jacks and cables, serving as convenient tie points, using heavy wire to minimize unwanted voltage drops.



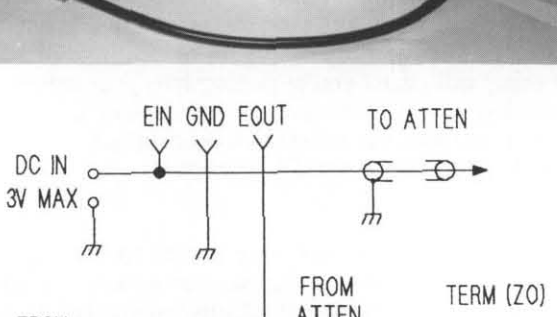


FIG 2--ATTENUATOR TEST BOX

The power supply is connected to the binding posts on the left end. (A really deluxe version could include an LM317 regulator so you wouldn't need the variable supply.) The voltage goes to the attenuator on coaxial cable terminated in a male BNC plug. (This type was chosen since the vast majority of my attenuators use it; adapters are used with the others.) The impedance of the cable and plug are unimportant and need not match the attenuator since we are working at DC instead of RF.

A second cable with male BNC routes the output back into the box, where it goes to a female BNC jack. The cables are over a foot long for good reason--they must accommodate your longest attenuator without excessively sharp bends; my Kay Electric 432C is about 10 inches overall.

Pin jacks monitor the input and output voltages. I considered using a single set of jacks and a switch so I wouldn't have to constantly move the meter probes, but decided against it because of the possible voltage drop across switch contacts as they age. If a good, stable supply is used the voltage will not change during a test session and need only be checked once.

That female BNC is used to connect a termination of the same impedance as the attenuator, RL in Fig 1. The photo shows a commercial 50 ohm terminator (on the left side of the box); a suitable substitute could be fabricated from a male plug and resistor of the appropriate value. Or, since most hams only use 50 ohms, you could solder in a resistor instead. Get a handful of 51 and 47 ohm resistors and choose the one closest to 50 ohms, or put a pair of carefully selected 100 ohm resistors in parallel.

All of my variable attenuators contain a pair of female BNC connectors, hence the males on both cables. However, most small, fixed units have female on one end and male on the other. You could use a dual female barrel adapter (or BNC tee) to accommodate these, but that's something more to buy and get lost. Instead, I added a second female socket to the adapter, in parallel with the output cable. To test the fixed units, simply plug the male end in and hook the input cable onto the other end, as shown in the photo at the right side of the box (a 6 dB unit made by Alan).

Is it worth the trouble of making a jig? After you measure attenuators a few times you'll probably agree it is. I currently have a total of 11 step attenuators and 21 fixed units, so now, even with the jig, only the most frequently used ones get checked on a regular basis.

A FREE SAMPLE

Here's some data from an attenuator with nominal steps of 1, 2, 3, 4 and 10 dB. Although this one is a 75 ohm unit, that fact doesn't enter into the calculations at all; all you need to do is perform the computation on the ratio of the voltages. I did have to use a 75 ohm termination instead of 50 ohms, though.

E_{in}	E_{out}	Log (E_{out}/E_{in})	Attenuation
3.003	2.671	- 0.05088	1.018 dB
3.003	2.384	- 0.10025	2.005 dB
3.003	2.127	- 0.14979	2.996 dB
3.003	1.892	- 0.20063	4.013 dB
3.003	0.952	- 0.49892	9.978 dB

REAL QRP OPERATION: EASY, BUT BE CAREFUL

I mentioned earlier that attenuators are great for doing some REAL QRP operation, and I often do it myself. What's the difference between riding the power control on the rig and using a step attenuator? Let's say you want to try going lower and lower while working someone, or perhaps you keep calling someone with increasing power until they hear you. If you're using the power control on the rig you have the problem of measuring the power at each step--you need a meter that's really good at very low powers, and you have to carefully adjust the control with each change. With the step attenuator you set your power control once and simply crank in or out a few decibels at a time, such as 3 (which is doubling or halving the power), to quickly and accurately set the new power level.

The only bad part is that you always run the risk of damaging the attenuator with excessive power. Remember the power rating of your unit, and stay well below it, preferably half or less. For a half watt attenuator, keep the input to a quarter watt and under. If your rig can't be easily controlled at levels that low you could build an additional attenuator which can withstand your output, to drop it to a level the step attenuator can easily handle. Before transmitting into an attenuator, look at it carefully and think about how difficult it would probably be to open it up and repair it!

(A potential problem with doing this on a transceiver, instead of a transmitter, is that the attenuator is also in line with the receiver input and reduces received signals as well. In actual practice I have found this is seldom a problem, and can still copy most signals with the added attenuation.)

WRAP-UP

I've used this DC calibration method for years on my attenuators, both fixed and variable, homebrew and commercial. I've also had access to high quality test equipment--spectrum analyzers, lab quality signal generators, network analyzers, etc--and tested the same attenuators up to 3 GHz. It's interesting to watch the response change with frequency, and see how the flatness of the homebrewed ones compares with that of commercially built attenuators; as always, care in construction pays dividends. (And sometimes the older factory-made ones deviate significantly from their nominal value at the high end of their rated frequency range.) By the way, the homebrew ones "fell flat" WELL below 3 GHz; they were only made with HF use in mind.

This is a good, effective method of calibrating attenuators at home, and is easily within the reach of all of us. Knowing exactly what values your attenuators are will give you a bit more confidence in the results of your homebrewing and experimenting (and milliwatt operating), as well as take a little more mystery out of electronics.

--qrp--

SO YOU WANT TO QRP

A Column for the Beginning QRPer

by Bruce Muscolino, W6TOY
Box 9333
Silver Spring, MD 20916-9333

(Editorial Two Cents Worth–I ran into W6TOY a couple times at Maryland Radio Center when he was passing through town, and had some good QRP chats with him. He recently moved to my part of the country and is now a resident member of the Maryland Milliwatts. I've been after him to write some sort of column for those who are starting out on The Bright and Shining Path of QRP, and here's the first installment. Enjoy! —WA8MCQ)

In the beginning there were National and Hammarlund and Hallicrafters, and a host of other guardian angels, who kept ham radio in trust for their younger cousins, Icom, Yaesu and Kenwood. While these elder angels were in charge, and even before that, most hams built some, or all, of their own station equipment. Some still do, but in general the new generation of guardian angels ushered in an era of technical sophistication which is beyond most of us. Perhaps not the knowledge, but certainly the test equipment budget.

QRP operation keeps those early days of ham radio alive for many of us; those happy-go-lucky days when anyone could build a station with parts from an old TV set found in the junk. Don't try that today, it's one stunt that definitely requires a trained professional.

Ham radio was a real adventure in those days. You couldn't just turn on your techno-wizzy superradio and talk to hams all over the world using little more than a king's ransom in money. If you wanted to make contact with another station you had to work at it. Where'd you think the term "worked him" came from?

When I was a Novice, we were limited to a maximum of 75 watts input, crystal controlled. Every CQ was followed by tuning up and down the entire novice band, looking for a reply. If you answered a CQ, you listened, and listened until you were sure he went back to someone else. DX more often involved states, not countries, and I still remember the first European I ever worked; a G3. And yes, I still have the QSL. You don't let the really important stuff get away.

QRP equipment is generally simple, and much of it can be built by almost anyone with reasonable skill and average hand tools. And you don't need state of the art test equipment. In fact you can build most of the test equipment you'd need for a good workshop. But the best part of QRP, at least for me, is that my operating skill is just as important to my success as the kilowatt and 7 element beam are for the other guy. No wonder that you want to QRP.

I'll be here to help you, and here's how I plan to do it. For as long as YOU want, we'll have a dialog (that's a two way dialog, by the way) about QRP. We'll talk equipment and I'll try my best to guide you through the maze of what's out there and why some types perform better than others in certain situations. I'm going to try and do this without doing equipment reviews, because while I have my favorites they don't have a place here. We'll talk philosophy once in a while and I'll pass along some operating tips which have worked for me. And I'll give you a warm shoulder to cry on when the DX just won't come back, no matter what you do.

What makes me so sure I can help you? I've been an active ham since 1956, a mere 5 years before this club was founded by K6JSS. I built my first QRP transmitter in 1956. It was a real killer; just ask me, I'll tell you about it. Over the years I've owned and used some of the most popular commercial QRP gear, starting with an HW-7, and going through an Argonaut and an HW-8 (I've got an unbuilt HW-9, too), and culminating with my favorite commercial QRP radio, the Kenwood TS-130V. I've also built a number of QRP radios, a few of my own design and many of others. I've probably done battle with most of the gremlins you'll encounter. Been there, done that, as they say.

You're starting on a great adventure. Just like in the computer games, you've stopped at a bazaar for the supplies and equipment you'll need while you search for treasure. Think of me as the merchant who sells it to you. However, I'm not going to take your money. I'm going to ask for your help. You need to tell me what you want this column to be. Tell me about your QRP experiences and how you like operating QRP. Tell me your operating tips, and your hints and kinks. Tell me who you've worked, and on what bands (don't forget to include a description of your station). I'll use some of your letters in this column. Just one thing, if you want a personal reply please include a self addressed stamped envelope (SASE).

In closing, let me leave you with this thought. A long time ago I met a very successful DXer. One evening, at the local pub, I asked him if he had any advice which could help me improve my station. His reply was a classic: "Of each dollar I spend on ham radio, I spend 92¢ on the antenna, 7¢ on the receiver, and a penny on the transmitter." It's worked for me everywhere, every time.

Next time, we'll look at QRP rigs you can buy, take home and put on the air. Stay tuned.... –QRP–

Amateur Radio Of Tomorrow

by B.C. Weaver, WU2J
P.O. Box 22912
Melbourne, FL 32902

No, I'm not a doomsayer, but this is my 30th year as an ARCI member. Surely, Les Shattuck will get our house in order and hopefully unite us. All those newly created QRP Clubs with their own publications have their virtues, but divides us nationally. Imagine the cost of subscribing to EVERY QRP publication? You could be renewing subscription forms twice monthly! 'Nuf said.

Recently, I was taken back by a manuscript I submitted to *QST*. It was rejected for that magazine with the comment, "Our Handbook staff, however, would like to review the article for possible publication in the 1996 ARRL Handbook. Please contact...if you do not want your manuscript considered for the Handbook or have any questions." Well, I requested it be returned to me. 1996?!

It was an educating experience that I thought might interest you. QST's Author's Guide makes a point of stating that since 1985 amateur radio has grown very much and today Novices and Technicians comprise over 50% of all amateurs. They are seeking *simple* articles which are readily understandable to this segment of amateurs.

In a follow-up telephone conversation, I was advised that an ARRL survey indicated that most amateurs today would build very little except perhaps, antennas and power supplies. My article was on small mobile antennas. I was informed that few amateurs would consider making their own mobile antenna, they prefer to buy one commercially. Never mind that I made actual gain (loss) measurements on many of these compared to a full quarter-wavelength vertical (mobile mounted) on 17m. A discovery was also made regarding ground loss resistance. But, that's not important nor the reason for this writing.

What really bothered me was that the ARRL, itself, was the culprit responsible for the influx of No-Code Technician Class licenses. For $99 they'll sell you a video course which guarantees you'll pass the exam within one year or your money back. It is now probable 70% or more amateurs can't read a schematic. My opinion is that the ARRL has transformed amateur radio into something that approaches CB radio. Furthermore, *they are addressing* this fast-growing majority with *priority*. Ham radio no longer has much to do with electronics and the ARRL appears to want to distance itself farther from the subject. It has become a marketing organization for books, etc.

Ever notice at the QRP Suite in Dayton the lack of youngsters (or amateurs in their early 20's)? I'm confident those of us that gather together are truly a vanishing breed (as another QRPer recently wrote in this journal). Amateur Radio is drastically changing from what it once was as each year passes and the "old timers" pass on. We are helpless to do anything about it since there is only ONE national organization (The League). Most countries abolished monarchies centuries ago but in this country one still rules. Maybe in the future amateur radio will change its name to something else or the FCC will redefine its definition.

Of this we can be certain, the no-coders will eventually be the majority and the controlling group to address. If fewer amateurs buy the technical publications (those with electronic designs and schematics) because they have no use for them, it will be unprofitable to print them. (i.e. they'll seek to exist or be a rarity.) This de-emphasis is well underway at ARRL HQ as an elder generation fades out. Every time an Exam question such as "what is Box A for...or where is Equipment C connected in a station" is added, a more complex electronics technical question is deleted. Today, an amateur need not know basic electronics, those few questions pertaining to such are memorized. No, I'm not a doomsayer!

The positives are that we are getting more amateurs, the market for commercial equipments is growing rapidly, publications are more profitable with an abundance of advertising, and every member of your family can be a ham with minimum effort and knowledge. Needless to say, our similarity with CB radio is becoming ever closer and many of those that would wish to shout, "I told you it would be that way", are no longer with us. The new majority of tomorrow will undoubtedly create more unprecedented changes in favor of simplicity and the senior amateur of today will be a relic of the past with fewer of his kind to converse with or locate.

It's time QRPers unite and come back to the *Quarterly* as our national publication. Our voices might be silenced by other presses due to their financial interests, but as I stated in October 1993 issue, the *Quarterly* is an old and free press. It needs members to support it, especially tomorrow!

(. . . . . _ . . . _ _ _ . _ . _ . _ . _ . _ _ !)

Reserve Rooms Now For Dayton 1995!

Rooms are going fast, as usual, for the QRP gathering at the Dayton Hamvention in 1995.

To reserve your room, send two #10 (business size) SASEs to Myron Koyle N8DHT, 1101 Miles Ave. SW, Canton, OH 44710-1241.

Myron will also need the following information: number of rooms wanted, nights wanted, names and calls of those staying in the rooms, and a home telephone number (this last piece of information is absolutely necessary).

Members' News

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

Simple pleasures

After you've had an opportunity to read through this quarter's Members' News, take a few steps back and breathe in the diversity low power operation brings to this great hobby of ours.

KI6SN
. . .Richard Fisher

It's right in front of you in black and white.

Consider the joys of building a rig with your own hands and mettle, getting it on the air and feeling *really* good about it.

There's the warmth of kinship each year that comes from the QRP gathering at Dayton — and countless other club meetings of all shapes and sizes around the country. We are, indeed, a social species.

Pump a few watts into a somewhat forgotten antenna design and see what happens. It's a thrill — no doubt about it. And the chase for skywires better and better never ends.

Sometimes our validation comes in painful ways: The high power boys' generator goes up in smoke, but the gel-celled QRP rig comes to the rescue.

Take a break from fishing in the backwoods of Manitoba to work a little QRP from the wilderness. Breathtaking beauty.

Such simple pleasures. That's QRP.

— R. E. F.

With a little help from his friends

Dan Levit, N9HBH, of Crystal Lake, Ill., writes that as "a new member of QRP ARCI, I'm really looking forward to being an active QRPer.

"I've had a tech license for some time now, but have never really been very active. One of the reasons that I wanted to be licensed is that I really wanted to build my own equipment and to really explore the world of QRP.

"Unfortunately, somehow I got talked out of it. I ended up buying some expensive equipment that I ended up selling a short time later. I more or less just let my fascination die.

"About a year ago the bug started in on me again. I started to do some investigating, and to just give you the Reader's Digest version, I decided to get active again.

"Presently, I have purchased one of NN1G's superhet kits from Dan's Small Parts and Kits.

"I am kind of working through it sort of slowly . . . as I might have bitten off a bit more than I can handle.

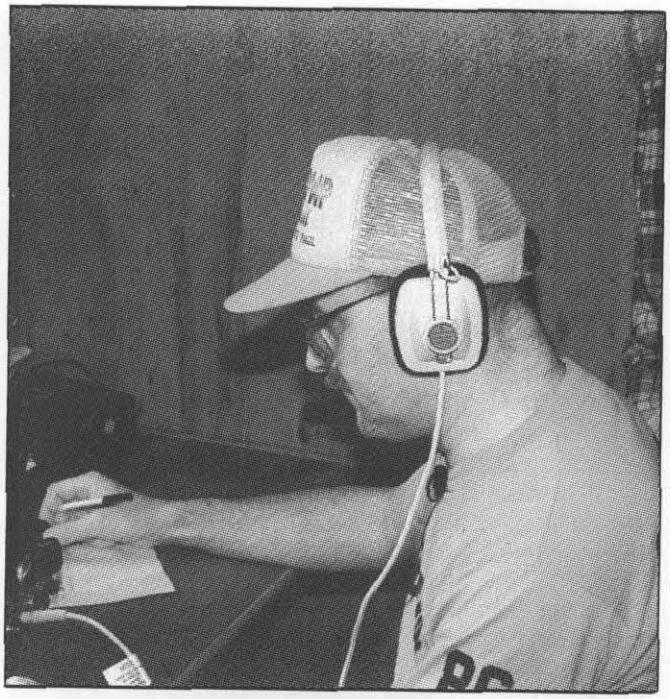
"Still, I'm determined to finish it and get on the air. My code may be a bit rusty, but I hope to be up on the Novice-Tech section of 40 meters and upgrade by the end of the year to General.

"I'm really looking forward to *finally* entering into Amateur Radio the way I wanted to to begin with.

"I never wanted to be an 'equipment horse,' or just a 'user.' It's my goal to *understand* radio as I use it. And it's great to have QRP ARCI around to help me understand it!"

QRP fun at Dayton

Paul R. Goemans, WA9PWP, of Madison, Wisc., sends along this dispatch with the dateline: DAYTON.



Paul R. Goemans, WA9PWP, takes a turn at a QRP operating position on his trip to the Dayton Hamvention last Spring.

"Despite the mediocre weather, I would have to say 'a good time was had by all' around the QRP motel and hospitality suite.

"Our group arrived Thursday evening just ahead of the storm front. Finding our room, we immediately set out to get on the air. With help from a long aluminum 'pool' pole, a monofilament line and counterweight was hoisted over the light standard in the middle of the parking lot. Up went all of our wire (65 feet), sloping down through our motel room door.

"In short order, the MFJ 9040, MFJ tuner, 12-volt gel cell and my Bencher / CMOS Super Keyer II were connected.

"Oops! Rain, thunder and lightning. Time for a few beers.

"With sporadic operating until Sunday morning, we worked from Arizona to Maine with good reports. We even worked the QRP hospitality suite and **Danny Gingell, K3TKS,** at home (in Silver Spring, Md.), missing the festivities.

"The QRP station was brought by **Dan Tracy, KC9RH,** of Cross Plains, Wisc. Also with us were **Rich Bogen, N9AMW,** of Stoughton, Wisc., and **Sam Brown, KF9BF,** of Whitefish, Wisc.

"But why, oh why was the DARA W8BI / 8 Hamvention special event station at the edge of the fleamarket so devoid of guest operators? A shiny new TEN-TEC Scout was begging to be used — as well as an Omni 6!

"I made a few QSOs as control operator of W8BI / 8, but from the looks of the logbook, not many others did."

TEN TEC 544, anyone?

Dave Heintzleman, NØBQW, writes from Scottsbluff, Neb., that he has been doing OK with his R7 vertical mounted on a 60-foot tower.

"Between the rotten propagation at this part of the sunspot cycle," and having to give up his 160 meter horizontal loop at his last QTH, "QRP has been quite a bit more of a challenge."

Dave says he has a clean TEN TEC 544 (digital) transceiver with full 10 meters and narrow CW filter, manual, for someone

fellow (**NC2X, William Farrey,** of Cinnaminson, N.J., not to be confused with me) is interested in HF phone. Another, **N2LVI, Peter Greene,** of Marlton, N.J., sets up a VHF station. I'm the lone CW (and QRP) freak.

"For the last several years I've used a 'high power' Century 21 for most of the CW effort. To get extra natural power points I use a solar charged battery to run a QRP rig to get an hour's worth of contacts (20 or 30) on 80 meters.

"This year, however, I decided to run the whole time using QRP on my Argonaut 509. I intended to run most of the time using a homebrew power supply run off a generator. For natural power operation, I have a portable power source that uses a 12-volt Gel-cell battery and a solar panel installed in a carrying case. Look for future 'Joe's Quickies' in the Idea Exchange on the portable power set-up.

"We set up on Saturday afternoon and were operating normally with our emergency generator. When darkness rolled around, I broke out the solar-charged Gel-cell battery, fired up the Coleman lantern and began to knock off a few contacts on 80 meters.

"About 9 o'clock it got very quiet — no audible noise, no electrical noise and no 'Donald Duck' front end overload. It seems that the gasoline-powered generator had died. We discovered that it had a blown head gasket and a dirty fuel line.

"'Losing the generator didn't stop me at all! Both other stations were completely shut down, but I continued operating normally. Now, that's a real demonstration of emergency preparedness.

The contact total was only 102 for the CW effort, but then we're not in it for points, anyway — it's just a fun time in the woods.

"The CW station has used a variety of antennas over the last few years. I started with several dipoles, but got tired of stringing up too much stuff. I've alternated between a G5RV multiband dipole and an 80 meter loop the last couple of years. Using a tuner with the G5RV gives results as good as the dipoles with a lot less effort. The loop also covers the HF bands using a tuner. And on 80 and 40 meters it has a lot more punch.

"Next year should be even better. Maybe I can use a solar-charged battery big enough to run the Argo all weekend. A nice longwire might add some gain for the distant sections on 20 and 15 meters. And I've got another CW operating volunteer. He's not a QRPer yet — but I'm working on him."

A visit to The Rev. Dobbs

Paul Schaffenberger, KB8N, writes from San Antonio that the Air Force took him to England, "and I had a wonderful visit with **George Dobbs, G3RJV** at his home in Rochdale, England.

"George had just returned from Dayton and was given a 'QRP Plus' rig on loan. He set it up and we had great fun trying it out It is a truly impressive piece of engineering!

"I was also impressed with George's floor-to-ceiling shelves which contained numerous rigs that he had built over the years. I was truly impressed with his technical ability and his hospitality. I also had the opportunity to visit a DX convention that has held in York and met some of England's top contest DX operators."

2-land's ambassador of QRP

Art Ekahn, N2HZB, of Merrick, N.Y., wants the QRP community to know that the ranks of QRP in the New York area have been richly blessed by the indefatigable efforts of a dedicated operator on Long Island.

"Norm Wesler, K2YEW, . . . is probably more responsible for the addition of QRPers to the ranks of amateur radio than any other ham here in the New York area.

Keeping in QRP contact

Part of the fun and fascination of QRP comes in hearing of the experiences, challenges and success of others. And telling your story is part of that natural process.

Why not drop a card, letter or photograph to Members' News? Jotting down a few lines takes only a few minutes. Putting it in the mail is painless, and the camaraderie it invokes in the QRP community is a substantial payback.

Here's the only mailing address you need:

Richard Fisher, KI6SN
Quarterly Members' News
1940 Wetherly St.
Riverside, CA 92506

"Norm, licensed as a young man since the mid-1950s, spends most of his free time 'Elmering' both young and oldtimers alike in the fine art of QRP operations.

"He has been sublimating QRP fever into the minds of unsuspecting hams-to-be initially by teaching radio amateur classes for the past 10 years.

"He follows this process with QRP expeditions to local town parks and beaches for the newly-licensed hams, as well as overnight camping trips for junior ops and OM alike.

"Norm also gives numerous QRP demonstrations at both local and regional hamfests and always displays QRP ARCI membership forms on the table. I took a form three years ago and that's how I became a member of this fine organization. Besides being a devout ham, Norm is one fine gentleman and to know him is to be honored."

Art feels that the QRP community should recognize such a man as Norm, "as I'm sure there are also other QRP ARCI members of fine caliber who we never read about."

Goodie Giveaway

The **February 1972 edition of "73 Magazine"** is proof that interest in QRP is not a new phenomenon. The issue was dedicated to CW and QRP — featuring articles including a QRP tube transmitter, working DX with a half watt, a story on the International Company's crystal kits, and the 1,000-per Watt Award in an article titled "Why Not Try QRP."

The magazine gives an interesting look at the state of QRP more than 20 years ago, and is this month's "Goodie Giveaway."

The winner? **Larry Wilson, KFØN,** of Cedar Rapids, Iowa.

The magazine comes to the "Goodie Giveaway" box thanks to the generosity of **Dick McIntyre, K4BNI,** of Basye, Va.

Here's a salute to Larry for his contribution to Members' News, and an invitation to everyone to submit your story, picture or both for inclusion in the next Quarterly.

Everyone contributing has their name thrown into a hat for the next drawing. So why not get in the running, and share your news with QRP ARCI's membership?

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.

IDEA EXCHANGE

Technical Tidbits for the QRPer

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

In this edition of the Idea Exchange:

CORRECTION TO FORMULA IN JULY

An error crept into the item on the Tektronix 130 in the last issue somewhere between my computer and the printed page. On page 31, both formulas got stuffed onto single lines. The text and correct formulas:

The formula for finding the net capacitance of two caps in series is basically the same as two resistors in parallel, and is

$$Ctotal = \frac{C1 \times C2}{C1 + C2}$$

Ctotal is the net value of the pair, and what we read on the meter. If we know Ctotal and C1, then we can find C2 with

$$C2 = \frac{C1 \times Ctotal}{C1 - Ctotal}$$

--DE WA8MCQ

RE: MILLIWATTS FOR THE IC751A

Dick Wilson, KV4B of Chattanooga, TN, wrote in response to my article "Milliwatt Your ICOM" in the April issue. He asked Icom about internal QRP adjustments for the IC-751A. Quoting from their reply to him, "The pot you adjust is R87 on the main board....located under the top cover of the radio. I want you to be aware that this adjustment affects both high and low power. If you adjust the low power for 5 watts, it is very possible to end up with only 20 watts or so for the high power." Dick says, "The letter indicates that this transceiver cannot be adjusted for true QRP operation, and at the same time retain its QRO capabilities. I'm sure glad I asked before I spent any money!... Apparently an outboard adjustable voltage source fed into the ALC jack is the simplest way to go QRP with the IC-751A."

MORE ON MILLIWATTS FOR THE IC751A

And here's the voltage for the ALC--**Kirk Pengelly, AAØOD** of New Hope, MN, passes along this circuit which came from Icom. (It appeared in Icom ads, and also in Kirks article in the March 1994 issue of The Five-Watter.) Leave the RF power control set at maximum, and vary R3 to set your output level. Kirk says it works great from 100 watts down to below 5 milliwatts. He estimates battery life at several months when using the resistor values shown along with the power switch (drain is just a few microamperes).

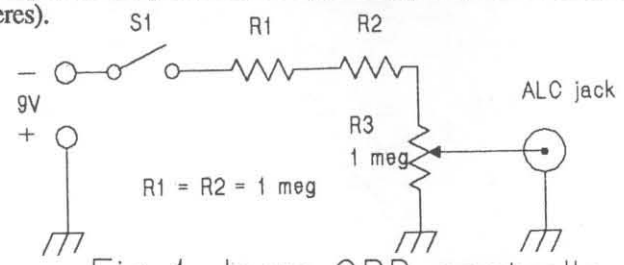


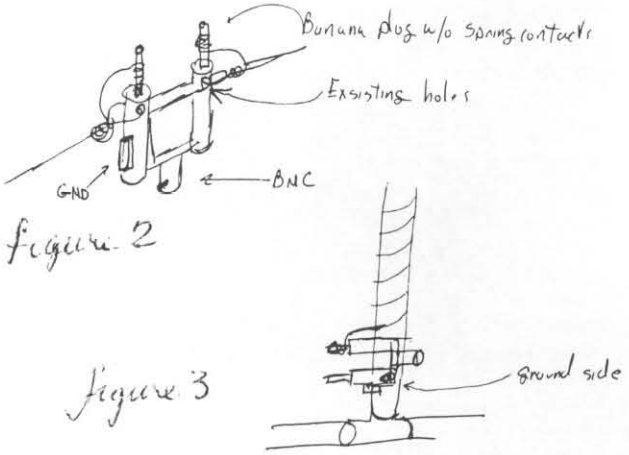
Fig 1--Icom QRP controller

DIPOLE CENTER INSULATOR WITH BNC CONNECTOR

From **Jay Chamberlain, KD4OOI** of Fredericksburg, VA--I use a Pomona #1269 female BNC to dual banana plug adapter for a center insulator. I peel off the 4 spring contacts on the banana plugs so I can solder the antenna wire to the studs. Put antenna wire through the existing holes, twist and solder, then run pigtails to the banana plugs and solder. (Figure 2.)

I also tried building a helically wound vertical using PVC pipe. At the base I used the Pomona #1269 with a 3" long #6 machine screw through the ground side of the plug. This enabled me to mount the plug on the PVC pipe and left enough screw to attach my ground wire radials. (Figure 3.)

--DE KD4OOI



FILTER SWITCHING CIRCUIT FOR YOUR FT-7

From **Phil Salas, AD5X** of Richardson, TX--In the January and July 1994 QRP Quarterly I showed how to use flip-flops, analog switches, and transistors to toggle off and on internal circuits in your ham gear (primarily the FT-7) without having to add extra switches to your equipment. [The schematics got shuffled up a bit; consult both articles to get all the details. --WA8MCQ] The circuit in Figure 4 extends this to relay switching of CW and SSB crystal filters. In my earlier article, I switched an audio CW filter in and out. Unfortunately, the AGC pumping due to an "in-the-IF passband" signal often makes working weaker CW stations a problem when the band is crowded.

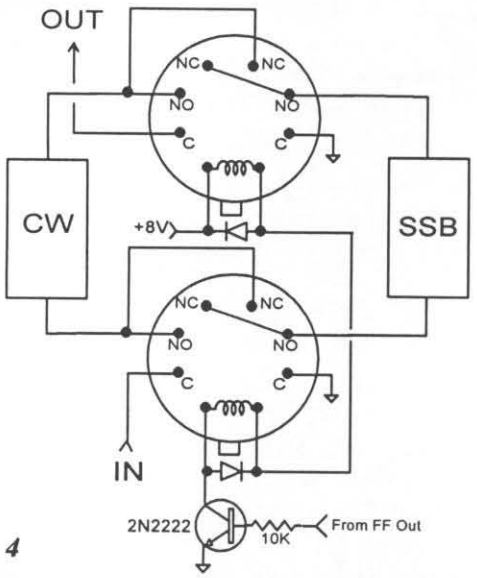


Figure 4

The only way around this problem is to add good selectivity with a CW crystal filter. International Radio & Computer, Inc (3804 South US #1, Fort Pierce, FL 34983 407-489-0956) sells a 500 hz CW filter for the FT-7 for $75 +$6 S/H. I was able to mount this filter on the current FT-7 IF filter board along with the original SSB filter. I did this by clearing room on the board by moving several components from the top side of the pc board to the bottom side (see the attached photo, Fig. 5). Both filters and all the switching circuitry fit without too much problem. The new CW filter is mounted sideways on double sided sticky tape (Radio Shack) and the case of the filter is soldered to the cases of the transformers next to it with short pieces of wire.

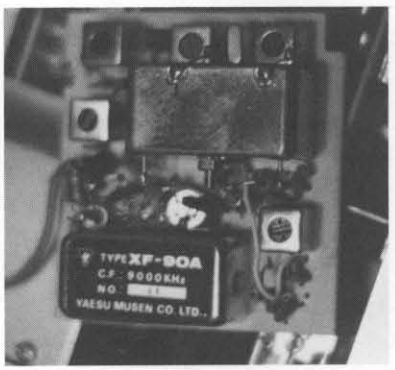


Figure 5

I originally selected the filters with a single DPDT relay, but found that the relay isolation was poor enough that some signal was getting through the open relay contacts and the non-selected filter. I measured this leakage at around 40 dB, and believe-it-or-not, this is enough leakage to hear opposite sideband stuff! The circuit shown uses two DPDT relays and shorts out the unused filter relay contacts instead of leaving them open. This completely solves the problem. The relays I used were two 6 VDC miniature metal can surplus relays with their coils wired in series. They work fine on the 8 volt internal FT-7 power supply. Don't forget the diodes across the relay coils!

I went ahead and left the audio filter described in my earlier article in line as it helps remove some high frequency audio stage noise as well as provides some additional audio selectivity.

I keep making my FT-7 better and better. Now, how do I get the WARC bands?

--DE AD5X

HIGH-Z HEADPHONE COMMENTS

From one of the Great Masters of QRP, **W9SCH, Rock** of Albany, WI--**John Collins, KN1H,** had some interesting material on old headphones in a recent Idea Exchange (reprinted from the New England QRP newsletter).

As he shows, these commonly despised "antiques" may be interesting devices and often remarkably sensitive. Indeed, for amateur CW reception, a good pair of old magnetic phones will put these modern stereo headsets deep in the shade for sensitivity. Also, usually having an impedance on the order of ten kilohms and a DC resistance of 2K, they work well directly in the collector circuit of a small transistor. Because their audio frequency response usually peaks between 500 and 1500 Hz, they are highly effective for CW reception.

Some years ago I ran an informal sensitivity check upon some phones I own with the following results, the test being made at 400 Hz, the only AF signal at my disposal. To produce a barely useful response, an old, abused pair of "Brandes" phones required 1.1 microamps. A 1960 pair of "Trimm Dependables" required but 0.37 microamps, but the star performance was observed with a pair of "Nathaniel Baldwins" (called "baldies" in the old days), made around 1924. These produced a useful response with only 0.08 microamps, having mica diaphragms connected by lever action to the magnetic system.

The manufacturer claimed that this was equivalent to one stage of amplification or a gain of about ten decibels. So, if you have a pair of these phones, hang on to them--they're still a good deal.

Back in the Old Days, Hugo Gernsback described an interesting, simple test for the practical sensitivity of a pair of headphones. Wet the tips of the cords slightly and touch these together. A sensitive pair will respond with an audible click. He claimed that the voltage generated by the damp metal tips was less than 0.001 volt and the current less than 1 microampere. Be this correct or not, the Trimm and Baldwin phones passed the test easily, the Brandes slightly. This is still a handy test and I pass it along for what it is worth. Try it with your pair.

--DE W9SCH

NOTES ON VFOS IN D-C TRANSCEIVERS

From the other half of the WA8MCQ Antenna Farm Erection Committee, **Walt Thomas, WA4KAC** of Laurel, MD--I constructed a kit version of the W7EL transceiver which used a Colpitts oscillator and a T50-7 core. The prewound toroidal inductor resonated at 7.33 MHz with the tuning and trimmer capacitors set at their maximum capacitances (minimum frequency).

To get the desired frequency coverage, the turns on the core had to be compressed from the original 90% to approximately 60 to 65% of the circumference. This gave an 11% inductance increase, calculated from the known capacitances. This was consistent with a 24% change noted by WA8MCQ (1) in compressing turns on a T37-6 toroid to 50%.

"Tweaking" toroidal inductors is a necessity to get the desired frequency coverage (ie, inductance). It can be tedious, as relatively small changes in the windings can affect an oscillators resonant frequency quite markedly. The inductance variations are caused by both manufacturing process variances (which affect core permeability) and by individual winding techniques, ie, the size, spacing and tightness of turns on the core.

The windings can be adjusted over a limited range by expanding (less inductance) or compressing (more inductance) the turns around the circumference of the core. The end turns seem to have the greatest effect on changing the inductance. For larger adjustments turns can be added or removed. This "tweaking" is a price we pay in using toroids. They do give us high Q, self shielding inductors at a low cost and in a relatively small size for our QRP rigs.

In an on-the-air QSO, Mike noted the VFO in my transceiver was shifting when going from transmit to receive. Using Lewallens method (2) we measured a +650 Hz shift. When we disabled the on-board oscillator and fed a signal from a 7 MHz test oscillator to the 10K resistor in the buffer, the shift was only -149 Hz. This indicated a problem with the oscillator on the circuit board. The VFO tuning capacitor in this kit was mounted directly to the chassis using metal screws. The ground return from the capacitor frame to the tank circuit was through another screw connecting to a PCB ground trace near the tank circuit, a total length of 2 to 3 inches.

I removed the capacitor and remounted it using nylon hardware; the inside of the front panel was taped to keep the frame from grounding out there. A ground to the frame was made with RG-174 braid soldered to the board at the same point where the inductor was grounded. This yielded a shift of only -22 Hz between receive and transmit using the on-board oscillator. Lewallens recommendations regarding grounding oscillator tank components (2) do need to be followed. In this case, the tuning capacitor also needed attention.

(1) M. Czuhajewski, "Effects of Wire Size on Toroid Inductance, Part 1," QRP Quarterly, January 1993, p. 7. (2) R. Lewallen, "Optimized QRP Transceiver Updated," QRP Quarterly, July 1987, p. 15.

--DE WA4KAC

"BITE" FOR THE QRP-SPIRIT

From **Guido Giannini, HB9BQB**--The Oak Hills Research QRP Spirit is an excellent kit with high quality printed boards and components. After assembling the 500 parts you have a hot rig--it works fine. But to be perfect it needs some little gadgets: The BITE (Built In Test Equipment). There is plenty of room in the box. (Actually thought about cutting the box to about half the height, but....)

A portable QRP transceiver needs:

1) S meter
2) Battery voltage meter
3) SWR/power meter

On the front panel I cut out a rectangle to insert a small meter salvaged from some old hi-fi gear. (See Fig 6.) Cleaning the front panel with white spirits I found out that the black printing is easy to remove (sorry--had to sacrifice the label). Too easy--so it needs a coating of transparent acrylic spray after the new labeling with press-on decals. I never use a power switch when I am portable so the place for the meter function switch is found without drilling a new hole. You can move the power switch to the back panel if you like.

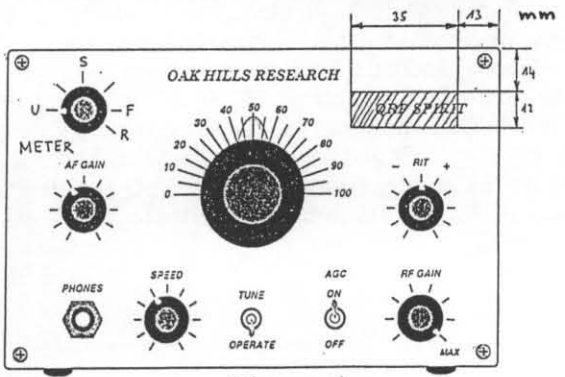


Figure 6

My meter had marks of 0-1-2-3-4-5 and for battery monitoring it would be nice to read 10, 11, 12, 13, 14, 15 volts. This is done easily with a zener diode trick--the voltmeter is biased with 10 volts and reads from 10 to 15 volts. Figure 7 shows this as well as all other meter switching for these circuits.

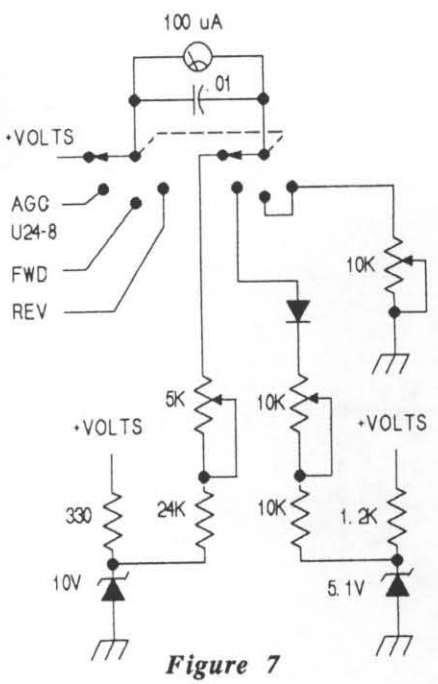


Figure 7

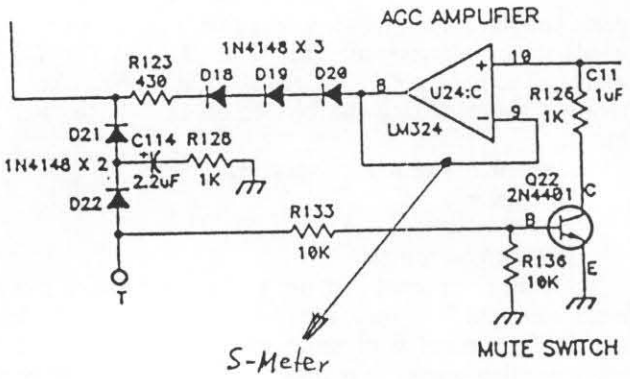


Figure 8

The S meter (Fig 8) is connected to a low impedance point on the output of the AGC amplifier, U24 pin 8. There is a DC offset of 5 volts with no signal, so the same zener diode trick resolves the problem. The few components fit on a small perfboard mounted to the side of the case.

Finally, I added a small perfboard near the antenna connector with the SWR bridge (Fig 9, and ref. Doug DeMaw, W1FB in QST for Nov 1987, or any other design you like) for checking SWR and power. [The two variable caps are for nulling the bridge; typical value is 7 pf, and they should have as low a minimum capacitance as possible. -- WA8MCQ]

--DE HB9BQB

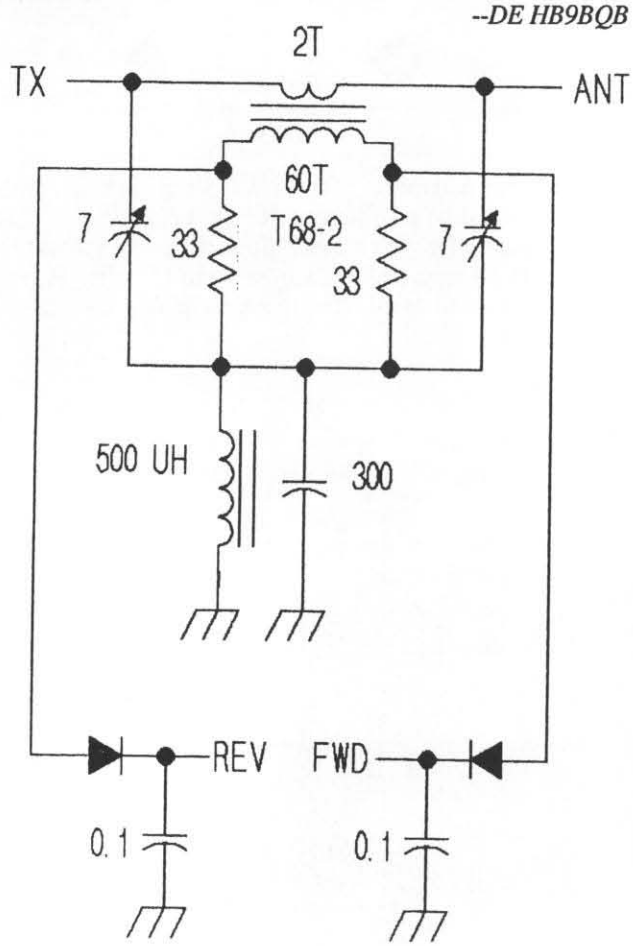


Figure 9

JOE'S QUICKIE #11, MEASUREMENT ERROR WITH THE MFJ-249 SWR ANALYZER

Here's the latest in what he claims is an unending stream of Technical Quickies, from **Joe Everhart, N2CX** of Brooklawn, NJ. (I believe him--I already have the next three Quickies on my desk!)

This one is sort of a follow-on to an earlier piece (Quickie #4), "Bad Feedline Connections," and also an offshoot of sorts from an article I've submitted about another use for the SWR analyzer. Number 4 warned of unexpected antenna problems masked by corrosion. Here's another.

After getting one of the extremely handy MFJ-249 SWR analyzers, I proceeded to measure every antenna I could. Most behaved as anticipated. However, my Butternut HF-6VX showed suspiciously low SWR, even on 80 and 40 meters. Not only that, but it did not show any resonance on 30 meters and seemed to tune just outside of the 20 and 15 meter bands.

Worried that A) the analyzer wasn't working, or B) my antenna was screwed up, I hooked up my Argo 509 to recheck baseline SWR numbers from a year ago. They all agreed with the year-old data, and rechecking with the MFJ analyzer gave almost identical readings.

Then the light came on. I hadn't used the antenna for a month or so except for listening. Apparently the connections between tubing sections had corroded slightly, adding ohmic loss. The extra loss gave inaccurate readings when I used the analyzer because it has a very low output power (about 1/4 volt measured into a 50 ohm load). When I transmitted into the antenna with the Argo, its bone crushing 2 watts zapped through the corrosion.

I have since taken the antenna apart, cleaned all connections and recoated them with "Butter-it's-Not". Repeated readings have been consistent over the last winter season. It's probably a good idea to do this on, at the very least, a yearly maintenance schedule with any antenna that doesn't have solidly soldered or welded connections.

Milliwatters beware! (Mike, are you listening?) The nominal MFJ analyzer output corresponds to a power level of just over 1 milliwatt. Maybe the reason no one responds to your peanut whistle isn't QRM, maybe you just can't blast through the aluminum oxide on your antenna. So clean up your act and communicate!

--DE N2CX

"ALMOST NOISELESS" T/R RELAY MOD FOR HW-8

From **Herb Ley, N3CDR** of Rockville, MD--There have been a number of suggestions for modifications of the T/R relay circuit in the HW-8. One of these involved a solid state diode switching circuit published originally in the QRP Quarterly and reprinted in the HW-8 Handbook by Mike Bryce, WB8VGE. The original open relay in the HW-8 is definitely noisy and is subject to contact corrosion, so replacement is sometimes necessary for electronic as well as esthetic reasons. It is not necessary to go to diode switching to solve these problems.

I offer a simple mod that is almost noiseless, easy to install, and permits easy replacement of the relay if it fails. It centers around use of the Radio Shack sealed-unit 5V, SPDT relay, part number 275-243, $2.39 in the current catalog. (The rear of the package shows the pin-outs.) The coil

resistance is 70 ohms (requiring a 100 ohm series resistor in the HW-8), the contacts carry a 2A rating, and the relay plugs into a standard DIP socket. When installed in the rig the relay switching is nearly inaudible.

Now for the details. I used a small piece of circuit board cut from Radio Shack 276-168A General Purpose Component PC Board to mount a 16 pin DIP socket. The board measures slightly more than 3/4 X 3/4 inches. The relay is mounted with pin 1 at one end of the socket so that the pin for the armature is immediately adjacent to the antenna jack. At the opposite end of the socket a 100 ohm, 1/4 watt resistor is plugged into pins 8 and 9. With this resistor, the total resistance in the coil circuit and the coil current are the same as with the original relay. Jumpers are used to connect this resistor in series with the relay coil and to connect the coil and resistors to two wires extending down from the circuit board in the approximate positions for the coil connections on the HW-8 circuit board. Similarly, wires are attached to the NO and NC pins for connection to the appropriate pads at the mounting position for the old relay. A simple outline drawing of the assembled sub-unit is shown in Figure 10. Details on the location and configuration of the jumpers required are beyond my skills as an artist. Follow your own inclinations.

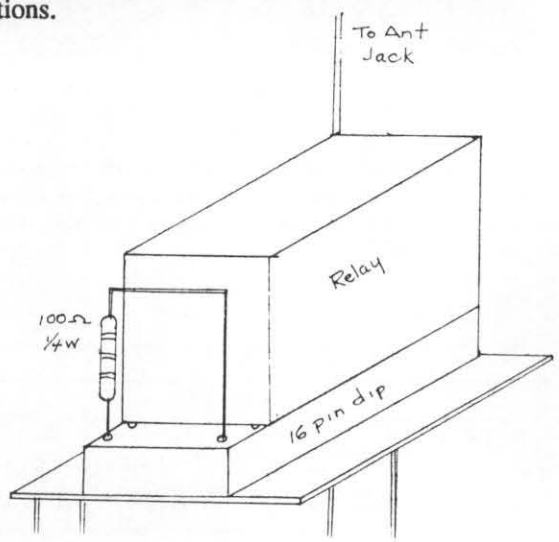


Figure 10

Regardless of your approach, it's a good idea to check out the lead functions with an ohmmeter before soldering the board to the HW-8 circuit board. It's easier to change a jumper than to find out after installation that one should have been changed!

The most difficult part of the mod is removing the original relay from the HW-8 board. Once it is removed, shape the leads from the new relay board to match the appropriate holes in the HW-8 board. Because the holes for the relay in the circuit board are larger than the wire used in this mod I like to bend the wires over to lay on the pads, to insure good contact when soldering. Check the clearances between the board and the case before soldering.

Fire up the HW-8, sit back and enjoy the nearly silent relay operation. Don't forget to get a spare relay. Radio Shack sometimes discontinues items without notice or rationale.

--DE N3CDR

"SHOW ME HOW THE FILTER WORKS"

From me, WA8MCQ--Here's something I'd been wanting to do for a long time and finally got around to it. We all know that a solid state QRP rig (or a big one, for that matter) with a class C amplifier has a lot of harmonic energy present on the collector(s) of the amp and that a low pass filter is necessary to clean up the signal. How about a couple of "before" and "after" pictures to demonstrate it?

I took a QRP kit rig which runs about 5 watts output and looked at it with a spectrum analyzer at the output with the filter in place, and then with the filter removed. I will not identify the kit so that no one will construe this as being a shortcoming of it, which it is not--just a basic fact of class C amplifier life.

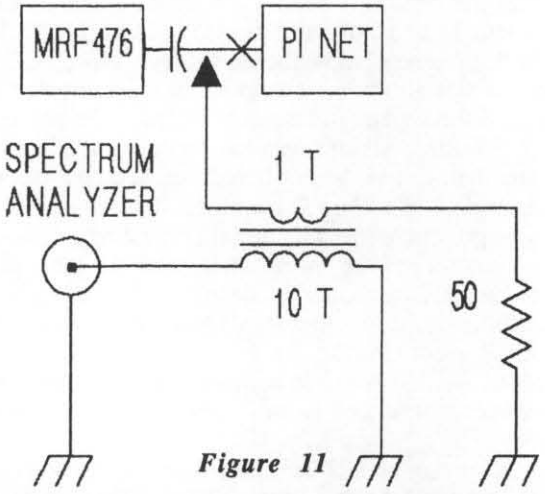


Figure 11

I disconnected the pi net filter at the coupling capacitor between it and the amplifier, and ran the amp output through a piece of RG-174 coax to a 20 dB coupler and then into a dummy load. (See figure 11.) The coupler is straight out of Solid State Design, and provides a sample of the signal which is attenuated by 20 dB (or 100 times). This prevents damage to the analyzer, which has a maximum input considerably lower than 5 watts. The core can be FT50-43 or FT37-43; the primary is a single piece of wire running through the center of the core, and the secondary is 10 turns.

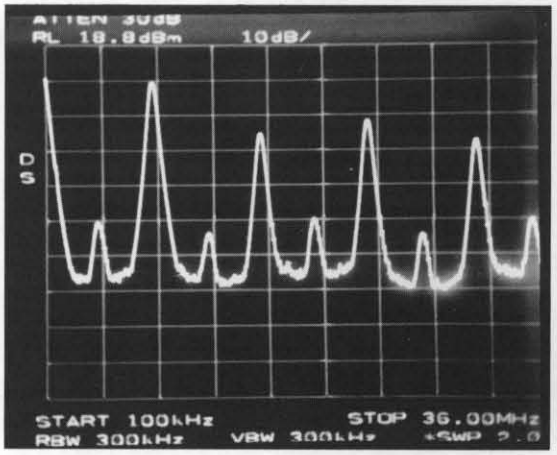


Figure 12

Figure 12 is a picture of the waveform without the filter in place. The sweep is from 100 KHz to 36 MHz, for a horizontal scale of about 3.6 MHz per division. Ignore the spike at the left, which is inherent in the analyzer. The fundamental signal at 7 MHz is the large spike at the second horizontal division. You can see the 2nd, 3rd and 4th harmonics near the 4th, 6th and 8th divisions. (Although the sweep showed the 5th harmonic as well, the camera cut it off.)

Down around 3.5 MHz is a spurious emission which is related to the transmit IF frequency. You can see related spurs between the harmonics as well, but they are all down at least 40 dB and thus well within FCC specs. The important thing here is the harmonics of the transmitted signal--the 2nd harmonic is down about 16 dB from the fundamental (10 dB per vertical division), the 3rd harmonic is only down by about 11 or 12 dB, and the 4th is about 17 dB down (or -17 dBc, decibels below the carrier level). The FCC requirement is that all spurious outputs must be down at least 30 dB from the signal (and down by 40 dB if the power level is over 5 watts). All of these harmonics fail this miserably. Remember, this is the unfiltered output of the rig, and it is quite typical of a class C amplifier--these strong harmonics will be present in virtually any rig operating in class C.

Figure 13 is the "after" shot, with the filter in place--this is what the antenna connector sees. The 3.5 MHz spur is still there at a low (but legal) level, but now the 2nd harmonic is about -36 dBc, the 3rd is about -42 dBc, and the 4th is about -48. You can see a little bit of the spur between the fundamental and 2nd harmonic but the rest are lost in the noise.

Other rigs with class C amps may have higher or lower harmonic content ahead of the filter, and the harmonic reduction can vary depending on the design of the filter. Some rigs may have finals running in other classes, such as B, AB1 or even A, like a W1FB rig in QST some years ago. These rigs will have lower harmonic content to begin with, and filtering requirements will be less stringent.

We've all seen lots of photos like figure 13 in magazine reviews, which is what the antenna sees. Now you know what's on the other side of filter, which should give you a better feeling for what it does and how important it is.

--DE WA8MCQ

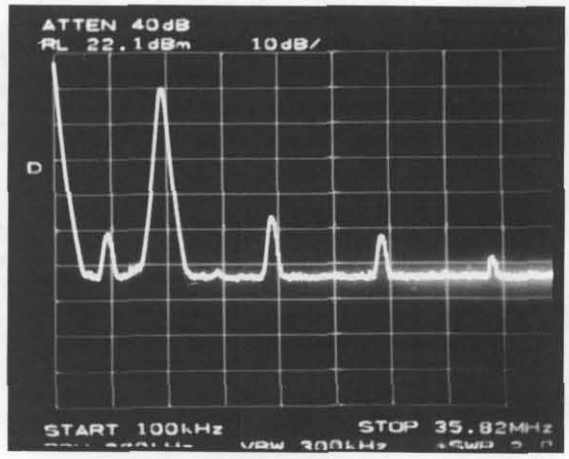


Figure 13

THE FINE PRINT

It gets harder and harder to come up with cute comments for the end of the column. I don't have any this time, just a reminder to keep sending those technical tidbits to Severn for the Idea Exchange!

–qrp–

1994 WILLIWATT FIELD DAY								
STATE				SCORE	POWER			
	CLASS	GROUP NAME	CALL	QSOs			RIG	ANTENNA
TN	CLUB	DICKSON COUNTY ARC	NY4N	6036	981	5.0	ARGO 509, 515	LONG WIRES, YAGIS
CT	CLUB	ABOVE ALL MOUNTAIN	WA1U	5946	966	5.0	NORCAL 40, TS 850	VRS
PA	CLUB		W3TS	3846	616	5.0	HB TCVR, TS 130V	DOUBLETS, ZL SPECIALS
CA	CLUB	ZUNI LOOP MEF	N6GA	2900	483	5.0	ARGOS, SIERRAS	VRS
RI	CLUB	ALLEN HARBOR	W1XH	1650	125	0.9	40-40 / ARGO 515	G5RV
CO	ONE OP, 1W		NXØQ	2784	232	1.0	ARGO 509	YAGI
IL	ONE OP, 5W		NN9K	2256	351	5.0	?	?
CO	ONE OP, 5W		KIØG	1296	191	5	HW-9	20 / 40 DIPOLE
IL	ONE OP, 5W	HARPER AIR HAWKS	W9ZSJ	1116	161	5.0	ARGO 509	G5RV, 40 M VEE
FL	ONE OP, 5W		K4KJP	648	83	2.0	ARGO 509	LOOP
IN	ONE OP, 5W	EX-CBARC FD OPS	W9FHA	588	73	4.0	OHR CLASSIC	C. F. ZEPP
TX	ONE OP, 5W		W5TB	456	51	5.0	MFJ 9020	VY RANDOM & LOW WIRE
TX	ONE OP, 5W		N5JWL	330	30	5.0	FT-7	VERT

Contests

by Cam Hartford, N6GA
QRP ARCI Contest Manager
1959 Bridgeport Ave.
Claremont, CA 91711

Congratulations are in order for the winners in this year's running of the Milliwatt Field Day competition. The Dickson County ARC, NY4N, took Club honors in a very tight race with the Above All Mountain Contest Team, WA1U. The difference was a scant 15 QSOs. I'll bet both groups will be sharpening up for next year's competition!

In the One- or Two-Op, 5 Watt class, NN9K turned in an impressive 351 QSOs for a final score of 2784. Quite an effort for only one operator!

And as if it were a testimony to the degrading propagation conditions, only one entry was made in the under 1 Watt class. NXØQ seemed not to notice the fading sunspots, however, as he turned in 232 QSOs for 2784 points.

Soapbox: The 40-40 transceiver just played it's heart out... The only trouble is the tuner and SWR bridge are much bigger than the rig. - W1XH. The random wire was about 60 feet long and only about 7 feet off the ground at the highest point... Many thanks to all those good ears on the far end. - W5TB. We had a great time and know we can greatly improve our score by making sure the traps on the 20 -10 beam don't fill with water again! WA1U. Luckenbach, TX will never be the same. - N5JWL. Air conditioning and power provided by Mother Nature, along with an abundance of mosquitoes which came out for the tent set-up right after the rain stopped... - K4KJP. FIRE!- K6MDJ.

The Summer Homebrew Sprint was braved by 14 hardy souls who tried the airwaves and found the usual bottom-of-the-sunspot-cycle conditions. They assaulted the bands with an amazing assortment of Homebrew goodies, however, including such Classics as a Tuna Tin II and a Wave Bender. I'm still wondering where all the Norcal 40s and NN1Gs are hiding on contest weekends.

I also received a non-entry from Bob Easton, N2IPY. Bob is confined to the Novice bands, was all revved up for the Sprint, but got no takers. I suspect we all forget that there are QRPers in the Novice segments. It would probably prove beneficial to make regular checks of the Novice QRP frequencies, say every hour, on the hour, during our contest periods. It would help both us and the newcomers to the sport.

Comments: How much longer before the bottom of the sunspot cycle? - WO7T. Conditions were Stink-O! Maybe next time.. N9DD. 1st time - enjoyed it. - WVØR. Vy bad thunderstorms in local area - Had to really work at QSOs. - K7YHA. Where were all the Norcal 40s? 1 thought 40M would be crowded. - W6SIY. The HB Sprint was a bust on the 40M novice segment!! I was all ready for a good party and NO ONE showed up. - N2IPY.

I would also like to acknowledge Bruce Milne, WB2QAP, for his entry into the Hootowl Sprint, the only entry received. The Hootowl was not well publicised, partly because of some cockpit error on my part, and partly because of the lateness of the April QQ. We hope to do a better job next year.

Hope to see you all in the Fall QSO Party.

1994 SUMMER HOMEBREW SPRINT									
STATE		SCORE		SPC		BANDS			
	CALL	POINTS			POWER		TIME	RIG	ANTENNA
*****	**********								
15 METER STATIONS									
AR	KJ5TF	4888	33	7	1.0	15M	1.5	RAMSEY KIT	2 EL QUAD
20 METER STATIONS									
AZ	WO7T	7756	45	7	3.0	20M	1	OHR-20	LOG PERIODIC
IN	N9DD	5770	22	5	1.2	20M	2	NN1G	80M DIPOLE
CO	KIØG	5450	15	2	1.0	20M	1	K9AY	YAGI / G5RV
40 METER STATIONS									
PA	K7YHA	20827	133	17	4.0	40M	2	NORCAL40 / ARK40	INVERTED VEE
OH	W8AC	9400	44	8	0.2	40M	2	HB XTAL CONTROL	VERT
CT	NN1G	7625	42	5	0.9	40M	0.5	40 - 40 TCVR	WINDOM
MN	WZØJ	6808	43	6	1.5	40M	4	TEJAS BACKPACKER	DIPOLE
NJ	W2JEK	5595	17	4	2.0	40M	1	OHR 40 TCVR	DIPOLE
ARK	N5SAN	5338	9	3	0.3	40M	1	WAVE BENDER / NEOPHYTE	650 FOOT WIRE
CA	W6SIY	5120	12	1	0.3	40M	2	TUNA TIN 11	DIPOLE
KS	WVØR	148	12	2	5.0	40M	1	TS 440S	DIPOLE
ALL-BAND STATIONS									
NM	KN5S	47402	113	22	5.0	A-6	4	HB 6-BAND TCVR	VERT / DIPOLE
NJ	N2MNN	9144	74	8	5.0	A-2	4	OHR 40 / SCOUT	40M LOOP

QRP ARCI HOLIDAY SPIRITS HOMEBREW SPRINT

Date/Time:
December 4, 1995; 2000-2400 Z

Exchange:
Member - RST, State/Province/Country, ARCI Number
Non-Member - RST, State/Province/Country, Power Out

QSO Points:
Member = 5 Points
Non-Member, Different Continent = 4 Points
Non-Member, Same Continent = 2 Points

Multiplier:
SPC (state/province/country) total all bands.
The same station may be worked on more than one band for QSO points and SPC credit.

Bonus Points:(homebrew equipment used any band worked)
Bonus: +2,000 HB Transmitter Used
+3,000 HB Receiver Used
+5,000 HB Transceiver Used

Power Supply Multiplier: (bonus multiplier)
X 1.00 - Commercial Power
X 1.25 - Solar, Natural, Battery Charged By Natural

POWER MULTIPLIER:
Ø-1 watt out = x 10 ; 1-5 watts out = x 7

SUGGESTED FREQUENCIES:

	CW	Novice
160 M	1810 kHz	
80 M	3560 kHz	3710 kHz
40 M	7040 kHz	7110 kHz
20 M	14060 kHz	
15 M	21060 kHz	21110 kHz
10 M	28060 kHz	28110 kHz
6 M	50060 kHz	

CALLING:
CQ QRP, CQ QRP, CQ QRP DE N6GA, N6GA, QRP TEST K

SCORE = POINTS * SPC * POWER MULT * POWER SUPPLY MULT + BONUS.

Entry may be an all-band, a single band, "HI-Band" (20M, 15M, l0M, AND 6M) or as a "LO-Band" (160M, 80M, AND 40M). All entries will compete against other entries in their own class of entry only. Certificates to the top 3 scores for the sprint. Certificates to the top score in each single band, LO-band, and HI-band. Certificates for the top score in each class in each SPC. The contest manager reserves the right to recognize special significant entries with a certificate award.

Entry includes a copy of the logs and a separate summary sheet. Include duplicate check sheets with entries of l00 QSO's or more. Indicate the total time-on-air, including time spent listening. All entries must include a complete, legible, name, call, and address.

All entries must be received within 30 days following the contest. Late entries will be counted as check logs. Members indicate their QRP ARCI member number on all logs. Members and non-members indicate their input or output power for each entry and band. The highest power level used will determine the power multiplier. Output power is considered as 1/2 of the input power.

Include a description of homebrew equipment, commercial equipment, and antennas used with each entry. Homebrew bonus points may not be claimed if a description is not included with the entry.

A summary sheet and sample log sheets are available from the contest manager for an SASE with one unit of postage. Include an SASE with one unit of postage in the entry for a copy of the contest results. Results will be published in the next available issue of the QRP ARCI Quarterly.

The final decision on all matters concerning the contests rests with the contest manager.

Send Entries To:
Cam Hartford N6GA
1959 Bridgeport Ave.
Claremont, CA 91711

QRP ARCI WINTER FIRESIDE SSB SPRINT

Date/Time:
January 8, 1995 2000z-2400z

EXCHANGE:
Member - RS, State/Province/Country, ARCI Number
Non-Member - RS, State/Province/Country, Power Out

QSO POINTS: Member = 5 Points
Non-Member, Different Continent = 4 Points
Non-Member, Same Continent = 2 Points

Multiplier:
SPC (State/Province/Country) Total All Bands.
The Same Station May Be Worked On More Than One Band For QSO Points And SPC Credit.

Bonus Points:(homebrew equipment used any band worked)
BONUS: +2,000 HB TRANSMITTER USED
+3,000 HB RECEIVER USED
+5,000 HB TRANCEIVER USED

Power Supply Multiplier: (bonus multiplier)
x 1.00 - commercial power
x 1.25 - solar, natural, battery charged by natural

Power Multiplier:
Ø-1 watt out (0-2 watts PEP SSB) = x 10
1-5 watts out (2-10 watts PEP SSB) = x 7

Suggested SSB Frequencies:

160 M	1810 kHz	15 M	21385 kHz
80 M	3985 kHz	10 M	28385 kHz
40 M	7285 kHz	6 M	50885 kHz
20 M	14285 kHz		

CALLING: "CQ QRP, CQ QRP, CQ QRP DE N6GA, N6GA, QRP TEST K".

SCORE = POINTS * SPC * POWER MULT * POWER SUPPLY MULT + BONUS.

Entry may be an all-band, a single band, "HI-band" (20M, 15M, l0M, and 6M) or as a "LO-band" (160M, 80M, and 40M). All entries will compete against other entries in their own class of entry only. Certificates to the top 10 scores for the QSO certificates to the top 3 scores for the sprint. Certificates to the top score in each single band, LO-band, and HI-band. Certificates for the top score in each class in each SPC. The contest manager reserves the right to recognize special significant entries with a certificate award.

Entry includes a copy of the logs and a separate summary sheet. Include duplicate check sheets with entries of 100 QSO's or more. Indicate the total time-on-air, including time spent listening. All entries must include a complete, legible, name, call, and address. All entries must be received within 30 days following the contest. Late entries will be counted as check logs.

Members indicate their QRP ARCI member number on all logs. Members and non-members indicate their input or output power for each entry and band. The highest power level used will determine the power multiplier. Output power is considered as 1/2 of the input power.

Include a description of homebrew equipment, commercial equipment, and antennas used with each entry. Homebrew bonus points may not be claimed if a description is not included with the entry.

A summary sheet and sample log sheets are available from the contest manager for an SASE with one unit of postage. Include an SASE with one unit of postage in the entry for a copy of the contest results. Results will be published in the next available issue of the QRP ARCI Quarterly.

The final decision on all matters concerning the contests rests with the contest manager.

Send Entries To: Cam Hartford N6GA

New Member/Renewal Data Sheet

Full Name_____ Call_____ QRP #_____

Mailing Address_____

City_____ State/Country_____ Post Code_____

❑ New Address? ❑ New Call?

USA

❑ New Member, $12 (DX: $14)
❑ Renewal, $10 (DX: $12)
Amount enclosed in U.S. funds____
Check or MO in U.S. funds
payable to "QRP-ARCI".
Do not send cash.
Mail to: Mike Bryce, WB8VGE
2225 Mayflower, NW
Massilon, OH 44647

DX

❑ New Member, £7
❑ Renewal, £6
Check or MO in British pounds
payable to "G-QRP"
Mail to: Dick Pascoe, GØBPS
Seaview House
Crete Road East
Folkestone, Kent CT18 7EG
England

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QRP Quarterly
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