

K9YA Telegraph

Robert F. Heytow Memorial Radio Club

Volume 2, Issue 5, May 2005



K9PL Photo

QRP

Doing More with Less... Sometimes

Philip Cala-Lazar, K9PL

QRP is hot. The topic of myriad mailing lists, the subject of Web sites, burgeoning numbers of clubs devoted to it—it's all about low power operation. Spin the dial to the traditional QRP calling frequencies (.040 and .060) and they're jumping with

(low-power) versions of Japanese rigs; the hollow-state Glow Bug transmitter; and replica and original Ameco (AC-1) transmitters.

Low power operation was a real niche activity when I was first licensed. We called often, and too frequently, fruitlessly, both to initiate QSOs and in reply to CQs. Despite that reality of low power HF operation, nearly thirty years ago QRP was my fortuitous start in Ham Radio. Low power operation taught me; in actuality, forced upon me, many good lessons includ-

ing: Morse proficiency (QRP SSB just doesn't cut it with stealthy antennas), the art of listening, timing my calls, a sense of humor, antenna design ingenuity, acute sensitivity to propagation, and patience, patience, patience.

There are many stories of the antenna-restricted Ham household, this is one of them.

My first two years as a Ham I was a third-floor apartment dweller—limited in antenna feasibility and hampered in those pre-cable days by the proximity of neighbors with rabbit ear-fed television sets sensitive to any TVI spewed forth. What were my options?

CONTINUED - QRP ON PAGE 7

daily traffic, weekend and weekday events.

Why this popularity? Is it all the new gear? Antenna restrictions? The allure of Morse? The peanut-power challenge? There is no single answer, but it's obvious, QRP is experiencing real growth. Someone's always looking for a QRP QSO.

*"Someone's
always looking
for a QRP
QSO."*

In the decades following the departure of Heathkit, E.F. Johnson, World Radio Labs, Eico, Knight and Ameco, there swelled a palpable longing for radio kits and kit building. Today, QRP kits from a number of manufacturers are nicely filling that void—they offer a variety of high-quality opportunities for building QRP rigs and station accessories. There is gear for every budget. A non-inclusive list includes QRP rigs like the very basic Pixie; those from Vectronics and Ramsey; and on to the elegant, and under \$30, 250 mw Rock-Mite-with onboard keyer! Stepping up in price and complexity are kits by Elecraft, Wilderness Radio and MFJ. Ready-to-run rigs include the Yaesu FT-817, Ten Tec Argonaut V and the discontinued Icom 703.

"Dinghy anchor" collectors have a trove of QRP "heritage" rigs with Ten Tec's PowerMite, the Argonaut 505, 509 and 515; Heathkit's HW-7, -8 and -9 series of increasingly improved transceiver kits; "V-suffixed"

Inside This Issue...

<i>QRP</i>	<i>Page 1</i>
<i>The Wonderful One-Tuber</i>	<i>Page 2</i>
<i>Fun with QRP CW</i>	<i>Page 4</i>
<i>K9YA Code Practice Nets</i>	<i>Page 5</i>
<i>Mailbag</i>	<i>Page 6</i>
<i>Help Wanted</i>	<i>Page 7</i>

Philip Cala-Lazar, K9PL
Editor

Mike Dinelli, N9BOR
Layout

Dick Sylvan, W9CBT
Staff Cartoonist



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

The Wonderful One-Tuber

6L6 Crystal Oscillator CW Transmitter

Robert D. Null, N4QR



Robert Null, N4QR

I became a Ham in June of 1956, at the age of 16. My first rig was an old homebrew bucket of bolts with heavy-as-lead transformers that I bought from an old Ham for 25 dollars. It was hard for me to scrape up that amount, but with my elmer's help we put it on the air eight months later; the final tube was a TZ-40 triode. I was given a used TV-lead folded dipole cut for 40-meters and the radio club loaned me a Hammarlund HQ-129-X receiver. With

this crystal-controlled rig I made my first QSO, it was on CW, I felt like I was walking on air. The thrill of accomplishment was almost intoxicating.

I worked many old timers. When I told them of my gear almost every one of them would break into a long dissertation of their first rig. It seemed a great many Hams began their radio careers with a one-tube 6L6 oscillator. When electron-controlled, it would drift up the dial as soon as the operator began sending, but, at that time, most receivers were broad and drifted, too. A quartz crystal ended the drift while introducing noises of quite another variety: chirps, thumps, clicks, pops, warbles and many other distinctive sounds indicative of the typical rock-bound oscillator. Not all of them stayed on exactly the same frequency during a transmission-drifting-but less so than the non-crystal circuit. The appeal of the one-tuber was that most beginning Hams in those days (1930s) had little money to spend on hobby work. Tubes were expensive, but the 6L6 was tough enough to work with whatever other parts happened to be available.

Later, I ran into W8JNS on 40-meters. He told me how a few of the old timers, and others, on 30 CW were recreating the grand days of radio by building junk box versions of the 6L6 oscillator. This ragtag

group had the courage to put anything on the air—once. After all, what were the Ham bands for anyway? Experimentation. I became enthralled and set out to be like them.

It is very easy to find parts for the crystal oscillator and simple to assemble. But making such a contraption conform to FCC R&R P-97 is about as productive as teaching a Brahma bull table manners in a crystal shop. To call it a maverick is putting it mildly, you would never believe the amount of time I spent experimenting with such a simple circuit. I would work with the soldering iron, inhaling evil fumes, till midnight more nights than I can count. Talk of trial and error, dozens of times in the wee hours I went to bed, reluctantly, with lots of things I needed to try with my oscillator.

Sometimes, it would oscillate very well, but chirp like a wild goose stuck in a wire fence. If I made it load the antenna well, then it would start too slowly to make CW communication possible.

“...chirp like a wild goose stuck in a wire fence.”

After years of fooling around with Hamfest parts I finally got on the air with my one-tuber. I loved to tell the old timers what I was running. Every one of them would tell me the tale of his childhood days on the Ham bands;

I could listen to stories like that for hours. Nowadays, I still enjoy running my oscillator while sitting in a darkened shack, dim desk lamp glowing, a fading signal drifting in from the noise background and a lone bottle glowing at me. Oh, a rig that glows in the dark makes me feel warm, even when there is no heat in my shack. It is something difficult to put into words—it is a spiritual thing. Yes, working CW on forty-meters with a one-tuber is definitely like leaving one's home dimension and exploring nirvana, or Radio Heaven. The only way such an experience can be understood is by partaking of it.

I once read in an ARRL publication that the crystal oscillator was a thing of the past and had no place in the modern world, let alone on the Ham bands.



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

K9YA Telegraph

I published a booklet of my homebrew projects and sent a copy to the ARRL's technical department, but I was concerned they would deny me a chance to advertise in *QST*. Instead, the head of their technical department replied saying he had been hoping such a publication would some day be available. He loved my one-tubers, two-tubers and three-tubers.

The booklet is printed on yellow paper, 8 1/2 by 11 inches, in green ink. Many of these junk box projects could be improved by an enterprising, engineering Ham, since it has been some years since I compiled the booklet.

To those radio amateurs who sincerely would like to relive the great days of radio, this booklet can be purchased for five dollars. This price holds for anyone in the United States and territories. For Hams in other parts, including Canada, the price is ten dollars. These prices include the cost of postage. I dedicate my pet booklet, with its experiments in hollow-state radio, to that small elite, that special, wondrous group of people, the true radio Hams. Best of luck to the homebrewer.

Building the One Tuber

This project can be built on a breadboard measuring 9 1/2 inches (24 cm) wide by 8 inches (20 cm) deep-use plywood at least 3/16 inch (0.5 cm) thick.

Affix two flat wooden slats approximately 3/8 inch (7 mm) by 3/4 inch (10 mm) to keep the board slightly above the table; this prevents the screws from protruding through the board. On the wooden slats attach a rubber cabinet foot at each corner-this keeps the board stable. On top of the breadboard fasten a piece of copper-clad circuit board with glue or small screws, copper side facing up. This offers a good soldering surface for ground connections.

The tube can be mounted horizontally using an aluminum right angle bracket-this makes connections to the tube socket easier to solder. All other parts can be mounted on the copper-clad breadboard close to the tube base-keep parts leads short as possible where RF energy is concerned.

Most 300V+ power supplies can be used with this circuit. When connecting voltage regulator (VR) tubes to a power supply you will need to measure the full

output voltage. Then, figure R-1 to drop that voltage down to 255V, or whatever voltage your VR tube chain can accommodate. The series current through the voltage regulators will be .040 amps. Subtract 255 from your full supply voltage at the filter caps. The formula $R=E / I$, where R=resistance, E=voltage drop and $I=.04$ can be used.

This will give you your resistance for R-1. Multiplying .04 times the voltage drop across R-1 will show you how many watts will be used by resistor R-1. Choose one with about double this wattage. It will last longer.

The plate tank coil is wound on PVC pipe 1-1/4 inches (32 mm) in diameter. Clamp one end of the copper tubing that forms the coil in a vise. Now, flatten the other end and drill a hole through it to fit a 6-32 machine screw. Near one end of the plastic pipe drill another hole of the same size.



N4QR's One Tuber

The copper tubing (5 mm) can be bolted to the temporary form. Then, using both hands, tightly wind 13 turns of the copper tubing around the pipe. When finished with this step the copper tubing can be removed from the pipe.

Gently adjust the copper tubing until the space between turns is about equal to the tubing's diameter. The coil will be about 4 inches (10 cm) long and

can be mounted on stand-off ceramic insulators to the breadboard. If no insulators are available, use two small blocks of wood, taking care to make sure the mounting screws do not short-circuit the coil to the board. One end is connected to ground and the other end goes to the plate circuit.

When using this transmitter keep the antenna coupling loose-10 watts out is good.

[Click here to download schematic.](#)

Warning! Potentially lethal voltages are present on this project. Exercise extreme caution should you decide to build it. Do not attempt to build this transmitter unless you are familiar with the safety precautions and techniques essential when working with vacuum tube circuits.

"Best of luck to the homebrewer."



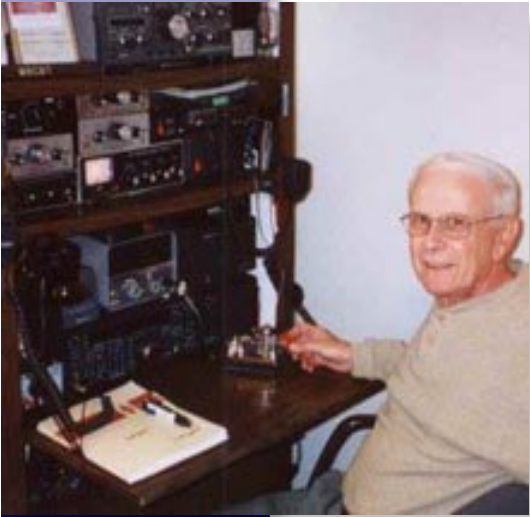
Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

Fun with QRPp CW

Working the World with One Watt and a Dipole

Dick Sylvan, W9CBT



Dick Sylvan, W9CBT

As an old time CW operator, I like the challenge of making contacts on very low power. About one year ago I decided to try operating QRPp CW, that is, with one watt or less and see what could be done with very low power and a dipole antenna. To put one watt in perspective, imagine the typical plug-in household night light. They normally use a tiny four-watt bulb. With

QRPp operation, we are talking about using one-quarter of the power of the little night light, a very insignificant amount of power. Factoring in feedline losses, I imagine the radiated power is even less than one watt.

I had been a QRP operator for about three years before attempting this, so I thought I would have a good idea of QRPp operation. I soon discovered one watt is quite a bit different than four watts. Running four watts, I have worked over 60 countries and WAS. At four watts you will be heard, however, you will typically be 559 not the usual 599 with 100 watts.

With QRPp your signal reports will commonly be 339 or lower. I have even received 319 signal reports, occasionally, I garner a 599. What is really amazing is the recent achievement of Bob Chapman, W9JOP, of Virginia, cited in the August 2004 issue of *QST*. Bob worked WAS using a Tuna Tin transmitter running 250 milliwatts and crystal control! His antenna was a G5RV up 50 feet. He accomplished this without any skeds. That's some achievement!

Operating QRPp you need to refine your skills to be

heard. I got hooked on operating with one watt and spend a lot of my operating time at that level. Here are some tips I learned that will help make QRPp more successful for you.

Propagation is Your Best Friend

If band conditions are bad, find something else to do. There's no way you are going to be heard with one watt. Learn the skip characteristics of each Ham band, the best operating times and the approximate geographical areas you will be working into.

Operate on as many different bands as you can. If the 10-meter band is open, for example, it is easy to work very long distances with one watt. On the HF bands, typically, the higher the frequency band, the longer the distance you will work.

Use A Good Antenna

A good antenna is very important for successful QRPp. Without it you will not have much luck. I am fortunate to have three W9INN dipole antennas which work very well. Unfortunately, they are not up very high—20

feet—but they still work quite well. Of course, if I had a beam, I'd work more contacts because of the antenna's gain, but with a dipole, I feel I'm doing it with a "pure" one watt or less. My antennas are all connected through a coax switch for quick band changes. Make sure you have a low SWR and, preferably, use an antenna tuner for the best match.

Monitor Your Output Power

I have an obsession about not exceeding one watt. My rig is capable of 100 watts output, but I can go down to one watt and below. I use a separate power meter for QRPp operation which gives me a full scale

"...you need to refine your skills to be heard."



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

K9YA Telegraph

meter reading over a one watt range. I found going into the milliwatt range offers diminishing returns—unless you like sending to yourself.

Watch Your Code Speed

With QRPp it is important not to send too fast. I recommend 15-wpm—tops. I find if you go too fast, QRM, QRN and QSB take a toll on your signal's readability.

Good receiving capabilities are important. When you are dealing with QRPp signals, it is important to have the best receiving capabilities possible. I use a Kenwood TS850SAT with a MFJ 752 signal enhancer, dual-tunable filter. I can peak and null signals at the same time.

Hang out on the QRP operating frequencies. The QRP operating frequencies are the best places to start looking for contacts. You have a ready-made group of QRP'ers who hang around these frequencies and are looking for other QRP'ers or QRPp'ers. They want to contact you and are more accustomed to listening for weak signals.

Learn to Listen Carefully

It is best to do a lot of listening first. If you hear a CQ, your odds of making a contact are better than if you call CQ. Although I found if you do call CQ on the QRP frequencies, you will get a surprisingly good response. Other QRP stations are listening for you on these frequencies.

Enter QRP Contests and QSO Parties

QST and *CQ* magazines and on-line sources publish upcoming QRP contests and QSO parties every month. This puts a lot of stations on at the same time. You can also enter QRO contests, but you are going to have a problem competing with very low power. I have participated in contests where stations were running high power and found it difficult to be heard.

Make a sked with a station in a particular state or country you need for an award. This is a quicker way to work WAS or DXCC. If you hear a station, but can't work him or her, you can look them up on qrz.com and get their address or e-mail, then try to set up a sked. I don't do this because I'm too much of a purist, but it is legitimate to do so and mention it as an option.

Operating QRPp is fun and very satisfying. It is a real test of your operating and listening skills. I now listen for even the faintest signals, where in the past I would skip over them and hunt for someone stronger and easier to copy. My goal is to someday work DXCC with one watt and am up to 21 countries.

I am close to completing WAS having worked 48 states and lack only South Dakota and Montana. It is not I can't work them, I haven't heard them. I will find them—eventually.

Give QRPp CW a try, I think you'll have a great time. ■



Fun with QRPp

"...do a lot of listening first..."

K9YA Code Nets

Join Dick, W9CBT, and the rest of the *K9YA Telegraph* staff, every Wednesday for the K9YA Code Practice Nets. The nets meet at 7.137 MHz +/- QRM at 2400 UTC.

The Fast Net (20+ wpm) is on the first Wednesday of each month. The remaining Wednesdays are slow nets, where we QRS to the slowest op. The nets are informal and a lot of fun!



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

K9YA Telegraph

Mailbag

I read your article about the D104 desk lamp you built in the *K9YA Telegraph* (March 2005). I thought it was such a neat idea I just had to build one of my own. I built it in just one evening and it went together nicely.

Details at:

http://www.geocities.com/n2uhc_2/d104lamp.html

Thanks for the neat idea!

Tom Sevart, N2UHC
Frontenac, Kansas

You know... I have been an ARRL member for over 40 years (still am). The *K9YA Telegraph* beats the current trend in *QST* hands down.

Congrats!

72/73,

Steve Sims, W00OW
Johnson, Nebraska
CW - It's still magic!



N2UHC's Completed D-104 Lamp Project

MORSE TIPS & QUIPS



AT SOME POINT WHILE LEARNING MORSE CODE, YOU CAN RUN INTO A BRICK WALL

In the News...

K9YA Telegraph (April 2005) articles on the venerable J-37 and J-38 straight keys were referenced in the *ARRL Contest Rate Sheet* for April 6. Ward Silver, NØAX, edits the bi-weekly publication, which caters to Ham Radio contesters—casual and hard core.

The *K9YA Telegraph* was also referenced in the December 1, 2004, issue.

After reading some books and magazine articles concerning QRP operation I decided that was the way to go. I believed QRP was less likely to disturb my neighbors with RFI and safer for me as I would be operating quite near the antenna.

This was during a seismic time for Ham Radio design as hollow-state rapidly evolved to hybrid, and then to all solid-state gear. The long weeks awaiting my license were filled with rig shopping and shack design—then I saw an ad for the Ten Tec Argonaut 509 in *QST*. Previously, I considered popular rigs like the Atlas 210, Yaesu FT-101 series, Kenwood's TS-520, even Henry's Tempo, but they were overkill for my new and possibly precarious Amateur Radio environment. How about the Heathkit HW-16? I came up empty-handed at the nearby Heathkit store in Lincolnwood, Illinois—the kit was discontinued and none in stock. So, I started my Amateur Radio adventure as a QRP'er.

I went with a “full house” Argonaut 509 station with its complement of CW filter, 100kHz frequency standard, power supply and ammeter. Months earlier, to learn Morse I used a 1930s vintage, general coverage, Hallicrafters SX-9. Therefore, I was more than happy to own a Ham bands-only rig—it made me a “real” Ham. Sure, compared to the massive SX-9 it was limited in frequency coverage, but it also did not provide me with the full range of electrical shocks the leaky capacitors in the Hallicrafters freely contributed to my tuning digits.

After a succession of antenna experiments that tested the indoor abilities of a Hustler mobile whip and resonators (responsible for my QRP A.R.C. 1,000 Mile-Per-Watt award from my KH6JDM [Makawao, Hawaii] contact on 15-meters); a “Slinky;” and a couple of half-wave dipoles, I soon arrived at the conclusion that something better was needed. One QSO-less day I pondered this situation while staring out a broad expanse of windows facing an unobstructed western horizon and suddenly realized the answer to my antenna problem was staring me in the face. Forty-feet of aluminum-framed storm windows would make a nifty random wire antenna!

Using short wire jumpers and quarter-inch sheet metal screws, I connected all the windows together and tuned them with an L-section antenna tuner. For a “ground,” this was on the third floor; I used a quarter-wave counterpoise for each band I planned to work

(10-80 meters). The five counterpoises were connected to the tuner at one end and then run around the room's baseboard resulting in good SWRs on all bands.

Now that the aluminum storm window antenna was configured, in rolled the QSOs—both stateside and DX contacts became daily occurrences, e.g., I collected nearly one hundred JA QSL in one year—it was truly my “window-to-the-world.” Over two years of much patience, a cooperative solar cycle, compulsive QSL'ing and CW-only operation I was able to work, and confirm, 86 countries and 46 states. It took me another two years, a move to a house and “real” wire antennas to achieve DXCC, but the lion's share was worked with my storm window antenna.

As a member of both the G-QRP and QRP A.R.C. I stayed current in those pre-Internet years via the clubs' newsletters. The old QRP A.R.C. logo reminds me that, in the 1970s, anything less than 100 watts was considered QRP, not the “full gallon” five watts that jiggles the headphones plugged into today's sensitive rigs.

Yes, I still have the Hallicrafters SX-9; it awaits its recap and renaissance.

That's my QRP tale and I guess the moral of the story is: no matter your housing situation, with a little ingenuity and a few watts of RF you can be a happy Ham. ■

Help Wanted

The K9YA Field Day Team is looking for a few good Hams! Positions available June 25-26 in Woodstock, Illinois.

Satellite Operator - If you have the skills and equipment to demonstrate a satellite contact, please join us.

Non-Traditional Modes (APRS, ATV, SSTV) - We are looking for experienced operators to supply equipment and expertise to demonstrate one or more non-traditional modes.

Alternate Power - Set-up, install and demonstrate solar or wind, battery charging system.

Contact us at: k9ya@k9ya.org

K9YA Telegraph



Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org