Good Times and Great Goodies

The good times and great goodies just keep on coming in our wonderful world of QRP, and although sunspots are declining, interest in and enthusiasm for QRP continues to rise. Will the trend fade anytime soon? That’s doubtful, as today’s amateurs are keen on small, low-power rigs for both portable fun and emergency preparedness. Equipment manufacturers are also recognizing that fact and are turning out some really terrific gear—and at quite affordable prices. How do you fit into this QRP picture? Are you still running 100 watts but becoming inspired to try QRP, or are you presently running QRP and thinking about trying the next step up—err . . . down—from milliwatting? Either way, you win! You just need a positive mindset and some good operating savvy, and you will have a ball!

Remember the little Tuna Tin Two transmitter designed by Doug DeMaw, W1FB, during the 1980s? It ran only 350 milliwatts (that’s less than a half a watt) and folks built copies and worked far and wide with them. The New Jersey QRP Club produced an updated kit version of the “TT2” a couple of years ago, and folks again built it and proved very low power still works out well today. Now the tiny, low-power Rock Mites from Small Wonder Labs are hot, and you can hear folks around 14.060 MHz using them almost daily. Yes, QRP works; yes, milliwatting is a gas; and yes, there is a special place for everyone—including you—in QRP. Come on in and join the fun! How long and loud must I continue beating this low-power drum? Is anyone still asleep?

I recently answered a slightly weak, but quite readable “CQ” from Jerry Felts, NR5A, on 20 meters and was pleasantly surprised to hear his setup was a plain Little Rock Mite running 560 milliwatts to an inverted-Vee (photo A). Furthermore, the Vee was only up 20 feet and Jerry had just finished “hot rodding” his Rock Mite from only 250 mw. Previously, since building the palm-size rig a month earlier and while using only 250 mw and a G5RV antenna, Jerry had worked 14 states. Amazing, but true! The Rock Mite, incidentally, is a direct-conversion mini-transceiver that uses one crystal and operates on two adjacent same-band frequencies. It is available from <www.smallwonderlabs.com>, and its power-boosting mod (which just involves changing R-18 to a 2.2 ohm resistor and changing RF output transistor Q6 to a 2N2219 or NTE 123) is shown at <www.qsl.net/wb6dwd/home.htm>.

Jerry endorses our philosophy that patience and persistence are vital for successful milliwatting, and he also points out the importance of “going with the flow” of good propagation. In his case, that involves shifting to his Elecraft K2 “big rig” for 5 watts output when band conditions get rough. Only 5 watts, and he still has a ball. Now answer honestly, friends: Where but in the world of QRP could one experience such radio fun at such low cost?!

DSP for the FT-817

W4RT Electronics—those friendly folks who brought us the One Plug battery packs, One Big Punch speech compressors, dual IF filter mods, and more for Yaesu’s popular FT-817 portable transceiver, are now installing “One Button DSP” in Yaesu’s FT-817 portable transceiver, and it is hot! The unit features four levels of noise and carrier reduction that are selected by a new top-mounted pushbutton and confirmed by an LED on a small top-mounted panel. (Photo courtesy W4RT Electronics)

*4941 Scenic View Drive, Birmingham, AL 35210
E-mail: <k4twj@cq-amateur-radio.com>
transceiver—has done it again. This time the company is custom-installing DSP in the FT-817, and it really moves the little transceiver into the big-rig category (photos B, C, and D).

The DSP module is manufactured by BHI Ltd. in the U.K., distributed in North America by GAP Antenna Products, and the authorized dealer/installer in the U.S. is W4RT Electronics. The little 26 by 37 mm module fits right inside the FT-817’s top cover, and a tiny push-button mounted on the cover steps through the DSP’s four modes of operation. Blinks on an adjacent LED and/or beeps from the FT-817’s speaker or an earphone confirm mode selections. In Mode 1, band noise is reduced 11 dB and “tune up” carriers are attenuated 5 dB. In Mode 2, noise is reduced 13 dB and carriers attenuated 8 dB. Mode 3 reduces noise 19 dB and carriers are attenuated 21 dB, and Mode 4 reduces noise 35 dB and carriers are attenuated 65 dB.

This DSP uses dynamically adaptive neural network technology, which in plain language means it performs a mite better than average audio-level DSP. In this system the (DSP) passband is divided into subbands. Noise and carriers within each subband are reduced separately, and then the subbands are recombined. Cool!

I talked with Barry Johnson of W4RT Electronics after he installed the first DSP unit in an FT-817, and he was both excited and impressed with the results. He noted that while using only level 2 (13 dB noise reduction and 8 dB of carrier reduction), he could copy a DX station that was buried by noise and indiscernible with the DSP off. Now that’s good DSP!

Although you can purchase the BHI DSP module (and pushbutton) LED panel from W4RT Electronics and install it in the FT-817 yourself, the process is tedious, and W4RT’s charge for custom installation is very reasonable. The firm’s turnaround time is also quick, and unlike your work, theirs will be under warranty. It is a good deal, and if you want to really make your little FT-817 a hot rod, you can even get a dual filter mod and speech compressor installed at the same time. Want more details? Check with W4RT Electronics, 3077-K, Leeman Ferry Rd., Huntsville, AL 35801 or go to <www.w4rt.com>.

Simple SWR Monitor

Several types of QRP transceivers utilize a 40 or 50 volt zener diode connected between the collector of their power output transistor and ground for mild SWR protection. If and when SWR exceeds a preset level, the zener shunts excess voltage to ground and prevents damaging the transistor. Nice! Now suppose we insert a low-value resistor (10 to 30 ohms) in series with the zener and ground, and then connect an isolation resistor (20 to 60 ohms, typically) and an LED across the added

Photo C— Here you see the 26 by 37 mm DSP board/module installed under the top cover of an FT-817. The board sits atop the “main board” in the transceiver, while the pushbutton and LED on its left in the photo mount to the top cover of the rig’s case. (Photo courtesy W4RT Electronics)
zener resistor (fig. 1). When the SWR then increases and the zener conducts, a fraction of sampled voltage illuminates the LED. Bingo—a high-SWR monitor!

Implementing this idea will require some dinking, as adding a resistor in series with a zener will raise its point of SWR protection because a zener’s value depends on the related rig’s output power. As a starting point for dinking, try using a 10 to 30 ohm potentiometer for the zener’s resistor and 20 to 60 ohm resistor in series with the LED. Connect an antenna tuner and external SWR meter between the transceiver and antenna, and adjust its controls for a near 1:1 SWR. Confirm the transceiver is delivering its full output and your added LED is not lit. Then carefully reset the tuner for 2:1 SWR and (quickly!) adjust the zener’s potentiometer to reduce output and protect the output transistor.

Next, vary the LED resistor’s value until the LED lights to indicate high SWR. Finally, reset the tuner for a low SWR and confirm the LED is extinguished and output power is back up to normal. Remember to key-down only long enough to read a meter or view an LED when transmitting, and closely monitor output-transistor temperature when dinking with the idea. Then enjoy more confident operations when using unusual portable antennas.

**Acorns for QRP**

We close this month’s column by briefly reflecting back on those golden days of yesteryear, and highlighting a trim little QRP transmitter built around one or two unique-style 955 Acorn tubes (fig. 2A, B, and C). The transmitter makes a nice weekend project for homebrew enthusiasts and can be assembled for operation on 80, 40, or 30 meters, as desired. It runs a whopping 500 milliwatts of DX-grabbing power with one Acorn—err . . . tube—and one full watt output with two tubes. I dreamed up the circuit several years ago, and a twin-tube version was devised by GM3OXX and written up in the G-QRP Club’s magazine, SPRAT, during the fall of 2002. Yes, the 955 is primarily a VHF/UHF tube, but it works just fine on HF and is a real attention grabber. It is available from several vintage-tube suppliers (some advertise here in CQ), and its unusual center-mount socket often surfaces at surplus dealers such as Fair Radio.

Parts hunting is half the challenge and fun of building this mini-rig. If you experience difficulty, look for a couple of low-cost, cardboard-case aircraft beacon transmitters. They have both

---

**Fig. 1**—Experimental circuit for adding in SWR monitor/indicator to a QRP transceiver. (Discussion in text.)

**Fig. 2**—Circuit details of (A) a single 955 Acorn Tube transmitter, (B) twin 955 Acorn tubes transmitter, and (C) power supply for single or twin 955 Acorn tube transmitter. (Discussion in text.)
955 tubes and sockets at a fair price. As an alternative, you can substitute regular 1S4 or 3S4 miniature tubes for the 955s. In that case, just connect the tube’s screen grid to its plate (at the tube[s] socket[s]) and use a classic Sucrets tin for a chassis. Sucrets boxes foreran Altoid tins as early symbols of genuine QRP.

Referring to the Acorn rig’s circuits, any small RF choke between 1 and 2.5 µHy that will handle 40 or 50 ma is fine for the plate circuit. If you feel creative, you can even switch to a series-fed plate circuit like that used in the dual-tube version and eliminate the RF choke. An older FT-243-case crystal or a larger HC-6 metal-can crystal with 30 pFd load capacitance (a “regular” ham-band crystal) works fine in this transmitter. Just avoid using a miniature HC-18 type crystal, as even a small amount of grid current could cause it to break. A miniature 100 or 150 pFd tuning capacitor or even a heavy-duty ceramic trimmer capacitor can be used in the plate circuit. Remember to insulate both of its connections from ground if you build the twin-tube version.

The plate coil is wound on a drugstore-obtained pill bottle 1.25 inches in diameter and 3 inches tall. The coil consists of 22 turns for 30 meters, 30 turns for 40 meters, or 56 or 60 turns for 80 meters. Number 22 or 24 copper enamel wire works fine here. The antenna coil is 8 turns of similar-gauge insulated wire wound over the plate coil for 30 or 40 meters, or 15 or 16 turns for 80 meters. The center-tapped version is made by winding half the total turns, pulling about a half inch, twisting it a couple of times to make a tiny loop, and then winding the coil’s other half. When you are finished, scrape the enamel coating from the loop/tap and solder on an insulated wire for connecting the high voltage. A 150 to 365 pFd tuning capacitor can be connected in series or in parallel with the antenna coil for tuning up the transmitter “pi-net style” and obtaining maximum output. Just remember to exercise care with the little tubes, as 10 ma each is maximum plate current. Check signal quality with a mating receiver (a refurbished S-38 would be great), reduce loading as necessary to obtain a clean note, and then enjoy some real QRP fun!

Need a quick-and-easy power-supply suggestion for this little transmitter? Just connect a pair of small, low-current 120-to-6 volt transformers “back to back,” tap off filament voltage “between” the transformers, and then connect a simple half-wave rectifier with filters to the 120 volt output of the second transformer. Actually, I just straight-rectify and filter the 120 volt AC line and use only one transformer “AC-DC style,” but suggesting such brings screams of disapproval from our “do as I say, not as I do” readers. Bless you everyone!

On that note of good humor, we must bow out of yet another wonderful year of sharing good thoughts with you and writing for CQ. I lost track of exactly how long I have been writing for CQ (probably 25 to 30 years), but I can truthfully say every year just gets better, and I owe it all to you, our friends, fans, followers, on-the-air associates, and the staff of CQ. Thanks, and may the force of good signals always be with all of you!

73, Dave, K4TWJ