# QRP Quarterly

Journal of the QRP Amateur Radio Club, International

January 1993 Volume XXXI Number 1

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# EDITORIAL

The word is out that not only is QRP alive and well, it is thriving. More and more articles on this subject are seen in major amateur radio publications such as QST, CQ and 73. There is a feeling in the air that QRP will have its day.

So what are we in the ARCI doing about it? What actions are we taking to capitalize on this golden opportunity?

We run into many QRPers who are not members of the ARCI during QRP contests and during ordinary rag chewing sessions. How many of them have you tried to get into the ARCI? Let's face it: the more members we have, the louder our voice will be in promoting QRP and its benefits. The time is ripe to do something, so let's do it.

Next time you run into a non-ARCI member, why not send them a QSL card along with a short letter about the ARCI. Enclose the address of our membership chairman Mike Kilgore, KG5F. Simply tell them that dues for new members are $12. Tell them about the QRP Quarterly. Tell them about the contests and awards we offer. It will only take a few minutes of your time, but it will be well worth the effort. Your actions today will affect the future of QRP. So do it now.

If we all got two or three new members to join each year, our ranks would be swelling. Please, please, please, take the time and enlist of few new members.

Perhaps the ARCI should sponsor a contest every year to see who can recruit the most members. Perhaps one of our advertisers would be willing to offer a special gift to the winner (or winners).

Another approach is on the local plane. Do you have a QRP club in your neck of the woods? If not, why not start one. You would be amazed how well they can do. From experience I know our QRP club started with about five members; it is now at eighty members. Perhaps the success of this club is that it is very informal - no business meeting, etc. We just get together and enjoy ourselves, exchanging ideas and discussing current happenings, both local and national.

So if you know a couple of QRPers in your area, call them and discuss starting a club. Again, nothing fancy. When other hams in the area hear you talking on the local repeater about your club and the fun you are having, you will find more and more hams knocking at your door.

If you recruit some new QRPers, please drop me a line about it. If you start a club, please let me know. I will be glad to give press coverage to those with success stories. I will be waiting patiently by my mailbox to see how many members take up the call.

Looking forward to hearing from you very soon.

- Jim, W9NJP

*Advertising is now part of the QRP Quarterly. Of course the ads must be geared towards QRP. We welcome all commercial companies interested in QRP and QRPers to contact us for rates. The ARCI feels this effort can only benefit those involved in QRP.*

## OTHER NEWS

*NOT JUST ANOTHER BEACON*
*DK0WCY (10.144 MHz/CW)*

During the world communications year 1983 the beacon was setup near Norddeich Radio (DAN) at the German north sea coast for the first time. Its current QTH is near Flensburg (JO44WQ). A homemade xtal controlled transmitter with an output of 30 watts is used. The power is radiated by a horizontal delta loop, 6 meters above the ground. This antenna ensures reception in the northern part of DL due to the high angle of radiation. Nevertheless it should be possible to copy the beacon all around in Europe and maybe some DX too.

But what's the difference to other beacons? In 1983 DK0WCY started as an aurora indicating beacon: 'dk0wcy beacon _____ (4 sec. dash) ' is transmitted to indicate no aurora. Otherwise you will hear: 'dk0wcy beacon .... aurora / strong aurora'.

In May 1992 basic propagation data has been added to the message format. All 5 minutes you will copy the following data:

measured/
* sunspot number (r)
* solar flux (flux)
* geomagnetic field (ak) and qth of measurement (Boulder, CO)

forecast/
* sun activity
* magnetic field
* sudden wave fade out (swf) [Moegel-Dellinger-effect]

A typical message format looks like this:
'dk0wcy beacon info 30 aug 0849z
r 46 - flux 95 - ak boulder 16 - forecast sunact low - magfield unsettled - swf very low +'
The day-time-group indicates the latest update.

The propagation data are taken out of the German BTX-net automatically 3 times a day by PC which translates them into English and then into codeform for the transmitter. Sometimes, especially on the weekend, you may hear "NA' (not available) instead of the expected term.

Future plans are to connect the PC to PR for supplying DX-clusters with these (and due to a higher speed some more) propagation info.

For more information on using the propagation data I recommend reading the fine "Propagation & DX" articles by Bob Brown, NM7M in the *QRP Quarterly* (esp. Jan. '87; "Solar Activity: Gearing up for Cycle 22").

Thanks to DK4VW, the builder of the beacon, for the technical information. I guess DK0WCY will be a good indicator for using the ham bands more effectively.

- Bert Matthies, DL2HCB

## ERRATA

"Super RIT for the HW-8"
QRP QUARTERLY, APRIL 1990

Despite all the effort to eliminate bugs from creeping into the article a vicious bug wedged its way into the schematic and parts list. The transistor bias resistor R6 should be a 330 Kilohm instead of the 3.3 Kilohm indicated in the schematic and parts list. Proper transmit bias voltages cannot be achieved at the collector of Q1 with the original value of base resistance. This low resistance changes the R3/VR2 voltage divider ratio by effectively adding a low resistance in parallel with VR2.

I deeply regret and apologize for any inconvenience and frustration created by this bug.

- Rulon VanDyke, KA7BCD

# *From the President*

*by Paula Franke, WB9TBU*

In the last Quarterly I told of the first four recipients of the club's QRP Honor Roll/Hall of Fame award. I also described how it had been impossible to get the unanimous agreement of directors and officers, thus necessitating a change in the rules of the award.

Almost as soon as that issue hit the mailboxes, I received an interesting letter from **Anthony Emanuele, WA8RFJ** in Concord, Ohio, He expressed his surprise at my mention of the hitherto fore non-inducting of anyone to the Honor Roll, in light of the fact that he holds an Honor Roll certificate himself.

Tony goes on to say that to his knowledge at least ten members have been elected; his own took place in 1974. Two other inductees that he knows about is **Al N8AGU** (formerly WA8WGJ) and silent key **W7OE**. Tony has taken a quick look through his old newsletters and other club-related material dating from the early 70's, but so far has come up empty on any additional information, but will continue looking.

Does anyone else have knowledge of these early honor rollees? I agree with Tony when he says the club's history should be recorded as accurately as possible.

Tony closes his letter with "The purpose of this letter is not to create a controversy or suggest that the (four inducted) are not deserving of recognition. In fact, in light of their accomplishments my contributions to the Club and the QRP movement pale in comparison."

❧ ❧ ❧

In the last issue, I introduced one of the four inductees, **Doug DeMaw, W1FB**. This time, please meet another of the group, **Rev. George Dobbs, G3RJV**:

George Dobbs is an outstanding low power communicator, accomplished homebrewer and seasoned author. In 1974 he, along with several other British radio amateurs, founded the G-QRP-Club, has served as the club's secretary for 18 years, doing yeoman's duties as senior editor and publisher of the club newsletter "Sprat".

He loves promoting QRP in Europe via his many articles appearing in "Radcom,", "Shortwave Magazine" and "Practical Wireless Magazine". He currently edits the QRP column in "Radcom".

George's thirst for experimentation has led to the publication of some fantastically simple, yet effective designs in QRP transmitters and receivers.

He is a gentlemen's gentleman. Always eager to talk QRP with neophytes and seasoned QRPers alike, he is constantly in search of ways to promote and publicize low power communications. His many public appearances at ham radio rallies, hamfests and club meetings as guest speaker testify to his drive and abilities as an effective public speaker who's in love with the radio hobby.

*Next issue: Randy Rand, AA2U, and Roy Lewallen, W7EL.*

## Dayton Rooms

A few months ago, we received the disheartening news that the doors had been padlocked at our usual hotel for the QRP gathering at Dayton. Since the hotel changed ownership and name on an almost annual basis, this latest event was not entirely unexpected.

However, our hotel liaison Myron Koyle, N8DHT, has made a couple of trips to Dayton to arrange for alternative accommodations for us and has managed to get a block of rooms at the Days Inn–South Dayton.

The rate is $75 a night, with no limit to the number of people staying in the room. Good news is that there is a restaurant in the hotel, as well as several more within walking distance. The hotel is just off I-75, next to the Dayton Mall. There is shuttle bus service to Hara Arena. Hamvention dates are April 23-25.

Contact Myron as soon as possible. He'll need a deposit check of $75, made payable to "Days Inn–Dayton South". His address is 1101 Miles Ave. SW, Canton, Ohio 44710; or call him at 216-477-5717.

## Hamcom

Luke Dodds, W5HKA, has been busy making arrangements for Hamcom in Texas June 4-6. For hotel and other information, contact him at 2852 Oak Forest, Grapevine, Texas 76051.

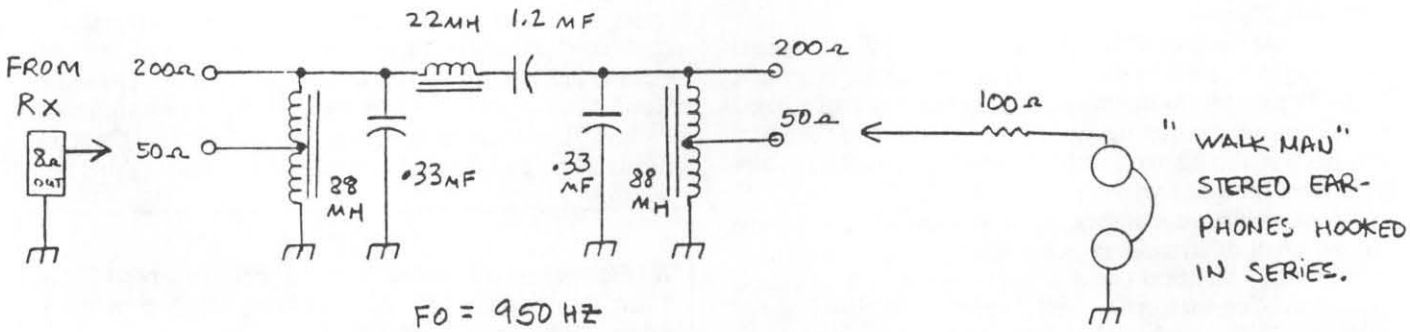
# Contest Fatigue Reducers

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

Below are two simple audio filters that I use during contests. I know passive audio filters are thought to be old stuff, but they can't be beat for getting rid of a lot of hiss, hum, clicks and thumps. I use small stereo headphones because they are light and comfortable. They also have a very wide audio range and that causes them to respond to all the noises your receiver makes. These noises don't add much to operating, in fact, they tend to make you tired sooner than necessary. Active audio filters add their own noises and can't handle much power, so I tried these passive filters just before the earphones. I found that I don't like to operate for long periods without them.

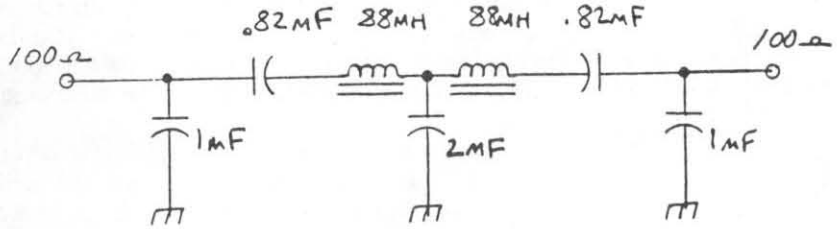
The filters are simple and of a low Q design, so they don't ring too much and add their own "noise". They are not designed to add much selectivity, instead they just clean up the noise residue of a good receiver. If you match in from a low impedance source and match out to a high impedance load the filter shape is not changed too much. These filters are designed with a Z of 50-100 ohms. This is higher than the RX out of about 8 ohms and lower than a small set of phones with a 100 ohm series resistor (which helps to reduce the sensitivity of the small phones, something they also need). Being passive, they can take a bit of audio power, and they do a good job of "scrubbing" the noises off of the main signal.

SSB AUDIO FILTER




FO = 950 HZ
FROM ARRL HANDBOOK

CW AUDIO FILTER




CF = 750 HZ
FROM HAM RADIO

8 Jan 92
W3TS
D. A. Michael

# Effects of Wire Size on Toroid Inductance, Part One

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

*Authors note—I sent two letters to the QST Technical Correspondence section about a month apart. On receipt of the second one, I was asked to combine and condense them for publication. Since some QRPers might be interested in further detail than will appear in QST, we are publishing the original letters in the QRP Quarterly. In this issue we present the first; the second, which details additional work, will appear in a future issue. —WA8MCQ*

Page 35 of the April 1992 issue of QST contained a sidebar by Zack Lau, KH6CP/1, titled "A 20 Meter VXO-Controlled Transmitter". In it he says, "The low pass filter may raise a few eyebrows. Yes, all three inductors have the same number of turns, but L2 uses thinner wire (#28) than that used in L1 and L3 (#22), causing L2s inductance (0.9 µh) to be higher than that of L1 and L3 (0.8 µh)." All three coils are 15 turns on T37-6 powdered iron cores.

I did some carefully controlled tests with various wire sizes on a T68-2 core, and later repeated them on the same T37-6 type that Zack used. I observed nowhere near the substantial 12.5% increase he reported, with the difference being more like 2%.

My test equipment is a Boonton model 260A Q meter, an analog device which was still considered a lab quality unit in the 1960s. It measures voltage rise at resonance of a tuned circuit, at any desired frequency from 50 kHz to 50 MHz, and has a well-calibrated variable capacitor. I used a counter to accurately set its frequency.

I eliminated as many variables as possible. Since there can be small differences in permeability between a number of nominally identical cores, I used only one core of each type, rewinding each one several times with different sizes of wire. Similarly, slight differences in the spacing of turns from coil to coil can lead to small changes in inductance. To insure identical spacing for each coil, I carefully put a series of notches around the outer diameter of both cores for a winding guide.

**Table 1: Typical test data**

**T68-2 core, each coil 16 turns; Fo 7.9 MHz**
**#18, 1.47 µh #26, 1.49 µh**
**#22, 1.475 µh #28, 1.50 µh**
***Increase from #22 to #28: 1.7%***

**T37-6 core, each coil 15 turns; Fo 14.05 MHz**
**Coil 1: #22, resonates with 178.8 pf, 0.718 µh**
**Coil 2: #28, resonates with 175.5 pf, 0.731 µh**
**Coil 3: #32, resonates with 174.3 pf, 0.736 µh**
**Change from #22 to #28: +1.8%**
**Change from #22 to #32: +2.5%**

Since the article dealt with a 20 meter transmitter, all windings on the T37-6 were resonated at 14050 kHz. The values from the capacitance dial on the Q meter were plugged into the standard formula to obtain inductance. (The capacitance can be read directly down to 0.1 pf, and can be interpolated to even smaller values.) The T68-2 was tested at 7.9 MHz, which is one of several standard test frequencies at which the 260A capacitance dial is calibrated directly in inductance. The results on both cores showed only a modest change of inductance when going from #22 to #28, on the order of 2%. Even going from #22 to #32 produced an increase of less than 3%. (Table 1)

The tests were performed many times over several sessions, constantly rewinding the coils at a large cost in wire, and the results were consistent and repeatable. I later obtained a second Boonton 260A and repeated the tests a few more times, with virtually identical results.

My conclusion is that, at least for cores of this general type, size and frequency of use, all of which are typical of many HF projects, only minor and inconsequential changes in inductance will be seen even as wire size is varied substantially.

Independent validation of this conclusion can be found in the Technical Correspondence section of QST for April 1983, in an item by Roy Lewallen, W7EL, titled "Choosing Wire Size for Toroidal Inductors". The aim of Roy's experiment was to chart the variation of Q with wire size, but his data included inductance as well. He wound 22 turns each on a number of T50-6 cores, checking them at 14 MHz with homebrew test equipment. Interestingly, he showed an actual decrease in inductance going from #22 to #28 wire, although this could be accounted for by normal core to core variations or slight differences in turns spacing; while I used the same core for every coil, he used several different ones. (Table 2)

**Table 2**

**W7EL data: all coils wound on different T50-6 cores, measured at 14 MHz (Ref page 39, April 1983 issue of QST)**

| Wire size | Apparent L (µh) |
|---|---|
| 22 | 2.17 |
| 24 | 2.17 |
| 26 | 2.07 |
| 28 | 2.15 |
| 30 | 2.13 |
| 32 | 2.28 |

To confirm the validity of his data, I wound 22 turns of various sizes on a single T50-6 core, notched like the others. Results were similar to his, and to my other tests as well, once again showing a minimal difference. (Oddly enough, my tests also showed a slight drop from #22 to #28 on the T50-6 core at 14 MHz, and I used the same core for both coils.)

One variable factor which was difficult to control with subatomic precision when smaller wire was used was the position of the leads, and hence capacitance between them, as they came off the coils and went to the binding posts of the Q meter. Variations in position could result in a few tenths of a picofarad change in the resonating capacitance. Another factor was the distributed capacitance (Cd) of the various coils. While difficult to measure with absolute pre-

cision due to the small values, it was typically around 1.0 to 1.5 pf. While this range represents a large delta for Cd, it is only 0.3% of the resonating capacitance (T37-6 core), and can be ignored.

I later fabricated a small test jig from a piece of fiberglass perfboard to insure uniformity of wire position between coils. Before and after compensating for the 0.3 pf additional capacitance it added, the results lined up with all others.

If changing wire size from #22 to #28 on a T37-6 could vary the inductance from 0.8 to 0.9 µh, the two coils would require a resonating capacitance of 160.4 and 142.6 pf, respectively. The observed data does not support such a large change of capacitance or inductance.

How about slight differences in turns spacing? That, too, would not account for the 12.5% increase. The general rule of thumb when winding toroids is to fill the core almost completely, leaving a gap of approximately 30 degrees (ref. ARRL Handbook). With 15 turns on a T50-6, checked at 14 MHz, I only saw an increase of 2.7% when compressing the turns to leave a 90 degree gap. (Table 3)

One possibility for the relatively large change Zack reported would be measurement on a digital inductance instrument with 0.1 µh resolution. Regardless of the quality and accuracy of any such device, anything with 0.1 µh resolution has inherent and unavoidable potential for significant errors when measuring a value under 1.0 µh. As an example, two coils could be right at the threshold between reading, say, 0.5 and 0.6 µh. The device could easily give those two values, showing that one had 20% higher inductance while in fact there might be only a 1 or 2% difference in actual inductance.

Similarly, the commonly available handheld LCR meters with 1 µh resolution have significant potential for error when measuring under 10 µh, in addition to any other potential inaccuracies. This basic principle applies to any digital measurement device, regardless of parameter being tested, when the quantity being observed is close to the value of the minimum resolution.

The bottom line is that one should not expect to obtain any significant inductance variation with changes in wire size, and should instead vary the spacing or number of turns to achieve the desired results.

I appreciate the help of ARRL Technical Advisor Ed Wetherhold, W3NQN, in validating my data and conclusions.

Sincerely,
Michael A. Czuhajewski, WA8MCQ

Closing Note: After I sent this letter, Zack wrote to me. It turns out that while his published figures were truncated to tenths of a microhenry, his actual values were much more precise. His test equipment is a Hewlett-Packard 4342A Q meter, using the same basic technique as my much older Boonton 260A Q meter (resonating the unknown inductance with a calibrated capacitor at a selected frequency), so precision of his results was not limited by the test equipment, as I suggested, nor were differing test principles a factor. My second letter, to appear in a future issue, suggests that the true "villain" is core to core variation in permeability among nominally identical cores.

## Table 3:

**Change due to compression of winding T37-6 core. Wound with 15 turns #28, tested at 14.05 MHz.**

**30 degree gap, resonates with 133.44 pf, 0.9616 µh**

**90 degree gap, resonates with 129.95 pf, 0.9874 µh**

- **Compress from 30 to 90 degree gap, 2.7% increase**
- **Compress from 30 to 180 degree gap, 24% increase Compress from 30 degree gap to almost fully compressed, 89% increase**

QRP

**Problems, Questions, Comments?**

**Who To Contact—*PLEASE include an SASE of an appropriate size if you expect a response.***

- **Subscriptions, dues, membership problems:** Mike Kilgore, KG5F; 2046 Ash Hill Road; Carrollton, Texas 75007
- **Non-technical articles:** Jim Griffin, W9NJP, 1216 Ash St., St. Charles, Illinois 60174
- **Technical articles:** Dave Benson, NN1G, 80 East Robbins Ave., Newington, Conn. 06111
- **Idea Exchange:** Mike Czuhajewski, WA8MCQ, 7945 Citadel Drive, Severn, Maryland 21144
- **QRP Contests:** Red Reynolds, K5VOL; 835 Surryse Road; Lake Zurich, Illinois 60047
- **Member News:** Richard Fisher, KI6SN, 1940 Wetherly St. Riverside, CA 92506
- **Nets:** Danny Gingell, K3TKS; 3052 Fairland Road; Silver Spring, Maryland 20904
- **Awards:** Bob Gaye, K2LGJ; 25 Hampton Parkway; Buffalo, New York 14217
- **Club Operations:** Paula Franke, WB9TBU; P.O. Box 873; Beecher, Illinois 60401; 708-946-2198
- **Club information packets** (include $2): Mike Bryce, WB8VGE; 2225 Mayflower, N.W.; Massilon, Ohio 44647

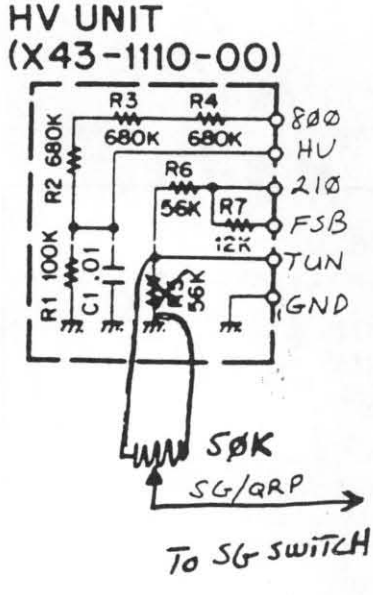
# TS-520SE/QRP Modification

**by Richard E. Kerr, Jr.**
**KA8EGS**
**1516 Broad Blvd.**
**Cuyahoga Falls, OH 44223**
***With additional information***
***by Mike Czuhajewski, WA8MCQ***

*Editorial Two Cents Worth: Although this modification is targeted at the TS-520SE, it can easily be made, with minor variations, to the other Kenwood rigs which use 6146B finals: TS-520/520S, TS-530S/SP, TS-820/820S and TS-830S. Details follow later. —WA8MCQ*

The Kenwood TS-520SE can be used for QRP operation by backing off the CAR (carrier level) control. Although 1 to 5 watts output power can be achieved by using this method, it becomes very sensitive in this range. A slight clockwise rotation of the CAR control will easily jump the output of the radio over 5-plus QRO watts, which can raise havoc with QRP wattmeters and blow holes in the ionosphere.

My solution to this problem is not the most efficient, but provides the TS-520 user with a minor modification requiring very little time (less than one hour) and very little money (less than $1.00). You can also restore the radio back to the original configuration quite easily.




TS-520SE QRP MODIFICATION

The solution is to lower the screen grid voltage. Lowering it to about 64 volts will produce a final output of about 4.5 watts. Power levels from 1 to 4.5 watts can now be easily made by using the CAR control. It has a broader range of travel and the ALC circuit (automatic level control) is still functional and prevents any output over 4.5 watts. (ALC voltage is produced when a current of about 30 microamperes flows to the grid of the finals.)

To accomplish this screen grid voltage modification, replace resistor R5 (56K ohms) on the HV ("high voltage") board (X43-1110-00) with a PC vertical trim pot of the same value. I used a 50K ohm pot. The HV board is located on "top" of the power transformer, accessed easily by turning the radio upside down and removing the bottom cover. **Please remove AC power and discharge all power supply filter capacitors before doing any work inside the radio!**

The HV board is easily removed by loosening two screws. Carefully unsolder R5 and replace with the new trim pot. Solder a piece of hook-up wire to the wiper of the trim pot, and route wire through existing form to the screen grid on/off switch (SG SWITCH) located just below the fan. Remove the existing top lead of this switch (which is on the bottom since you have the radio upside down) and cover with tape or heat shrink tubing, and lay back into form.

Now solder your new SG/QRP lead from the wiper of the trim pot to the top contact of the SG switch. Set the trim pot to mid range. Reinstall the HV board into the radio, and apply power. Carefully adjust the trim pot to get approximately 64 volts on the SG/QRP lead on the SG switch. Load up on 20 meters with your QRP watt meter in line, and peak all controls for maximum output power on your wattmeter. Switch the meter function switch on the TS-520SE to ALC and rotate the CAR control until ALC voltage is applied. If you are indicating more than 5 watts, lower screen voltage further via the trim pot on the HV board. Replace the bottom cover and enjoy your new TS-520SE/QRP. Save resistor R5 and unplug the cooling fan—it won't be needed.

Additional Information: Some tube-type Kenwood QRP comments from WA8MCQ

The HV unit in these rigs has a voltage divider which is used in the metering circuits (R1 through R4) and another voltage divider (R5 and R6) which chops the 210 volt screen grid supply in half, to supply the voltage "TUN". This is half the normal screen grid voltage, and is applied to the 6146Bs when in the TUNE mode, giving reduced power for tune up. (As a practical matter, I suspect many people don't bother with the TUNE mode.) During normal operation, full screen grid voltage is applied, for full power.

A potential drawback to the modification as described is that the most you can possibly run now is 5 watts—you cannot easily and quickly raise it to full power if needed. Another way to modify the rig for QRP is shown in Figure 2, again involving the SG switch and Richard's SG/QRP voltage. This works with the TS-520, 530 and 820; it will NOT work directly with the TS-830; details for that radio follow later.

The normal purpose of the SG switch on the rear of the unit is to remove the positive screen voltage from the tubes and replace it with a negative voltage (about -100) during the neutralization procedure, to cut off the tubes. (I've done this literally dozens of times in the service shop at Maryland Radio Center over the last several years.) The switch can be rewired to select full or reduced (but still positive) screen voltage. When the switch is modified this way, the power level can be instantly changed from 100 watts to 5 watts at the flip of a switch on the rear, rather like some of the older TenTec radios.

This method has a drawback of its own—now you can't perform neutralization using the procedure in the Kenwood service manual, since you can't replace positive voltage with negative on the screen grid to cut the tubes off. However, since neutralization is performed rarely, you could temporarily unmodify the radio to do

it, and then restore the mod; the inconvenience is minor, and, at least on some models, you have to remove the bottom cover anyhow to do the neutralization.

If you perform this mod in either form, be sure to tape a note on the outside of the radio indicating what was done. Anyone who has ever had to work on a modified radio, especially one without documentation of the mod, knows what I'm talking about! This is particularly important if you include the SG switch mod; you will probably remember what you did to the switch and make the necessary correction to the circuitry to do the neutralization, but what if someone else does the work for you, or, even worse, if you sell the radio and forget to tell the new owner? No damage would result, but the neutralization cannot be performed properly.

The neutralization procedure is to tune up to full power on a specified band (21 or 28 MHz, depending on model), turn off the SG switch, then adjust the neutralization capacitor for minimum RF output at the antenna connector. If there is reduced positive voltage, the tubes are still running, but at reduced power, not disabled, and neutralization cannot be performed using the Kenwood procedure.

As always, be careful when working inside the radio. Although the HV position of the meter only gives an indication when in the SEND mode, this is very misleading. The 800 volts for the final is present on the plate of the tubes at all times, as well as various places in the radio. Be sure to allow all capacitors to discharge after you turn off the radio, and then discharge them yourself to be safe.

Please note that the SG switch is wired a bit differently on the TS-830S. Instead of switching the SG line to the tubes between two voltages, it grounds one side of a relay, which then performs the switching. The relay is located on the rectifier unit. The reason for using it instead of the switch is that the TS-830S has a jack on the rear for connection of a transverter. This is wired into the control line of the relay such that if a transverter is used, the SG voltage to the tubes is automatically disconnected and replaced with about -100V, preventing the finals from putting out power. (Now the tubes or transistors in the transverter do all the amplifying, on the new band. The TS-830 just provides a low level signal to drive it.)

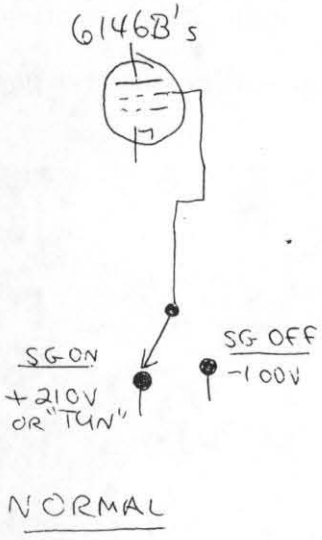
You can still do the 100W/5W modification on this rig, but now you have to go onto the rectifier board, cut a trace and tack on some wires. The relay must switch between full and reduced positive screen voltage, instead of positive and negative. It's not as simple to implement, but it should work. (The same caution about documenting the modification applies.)

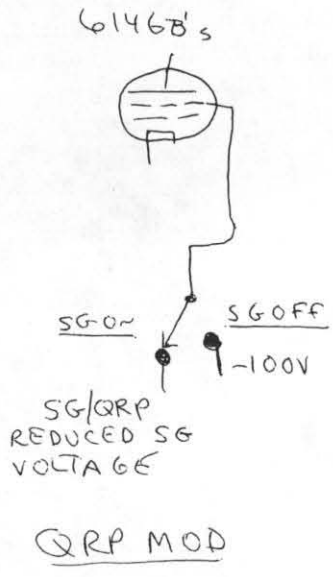
Regardless of which way you implement the mod, it gives you a quick and easy way of getting down to QRP levels with the various Kenwood tube-final rigs.

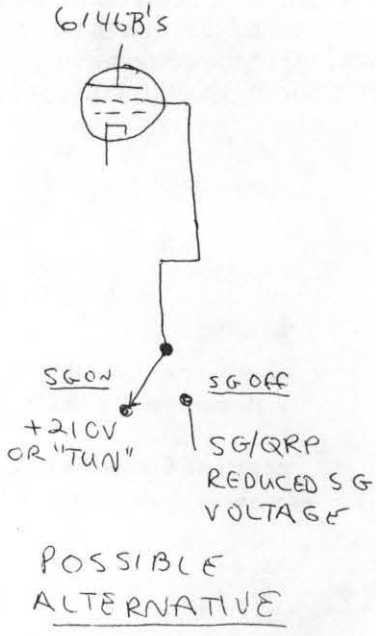
Disclaimer—I have not performed this modification on any of these radios. Although I see them occasionally on the service bench, I did not have access to any of them when this was written, so could not experiment. All this information is based on a study of the service manuals for the rigs.

NOTE—the schematics of the TS-530S, in both the instruction and service manuals, are wrong. They do not show the 56K resistor to ground on the HV board. It is there, just like the HV board in the other radios.

QRP



# Hot Receiver for Your HW-9

**by Phil Salas, AD5X**
**1517 Creekside Drive**
**Richardson, Texas 75081-2913**

My HW-9 is heavily modified. It includes a built-in keyer, SWR bridge, all the "no drift" and anti-thump fixes, and most recently the KB1MJ CW filter.

This CW filter (Paul Levesque, 14 Wesley St., Dedham, MA 02026 — $26 for complete semi-kit) turns your HW-9 into a truly great CW receiver. However, with all that I've done to it, I was still unhappy with the receiver sensitivity, particularly above 20 meters. You can see why this is when you look at the HW-9 schematic. The receive signal passes through the input filter, a couple of transformers, a bandpass filter, several switching diodes, and a passive double balanced mixer before it ever gets any amplification. I don't know how much loss this is, but it is obviously quite a bit. Adding an RF preselector stage appeared to be a good solution.

The attached figures show the "before" and "after" HW-9 receive front-end schematics. The amplifier used provides a 50Ω input and output impedance and a gain of about 20 dB.

Finding a place for the preselector turned out to be quite a challenge, however. I finally decided on the small shielded compartment that surrounds transformer T404 and associated components, I built the preamp on a 1.7" x 0.8" piece of double sided printed circuit board as shown in the figure. It is mounted through the screw hole (shown in the drawing) to the conveniently placed hole in the upper middle shield. I used a #6 screw running through the preamp board with a nut on the backside of the board acting as a spacer.

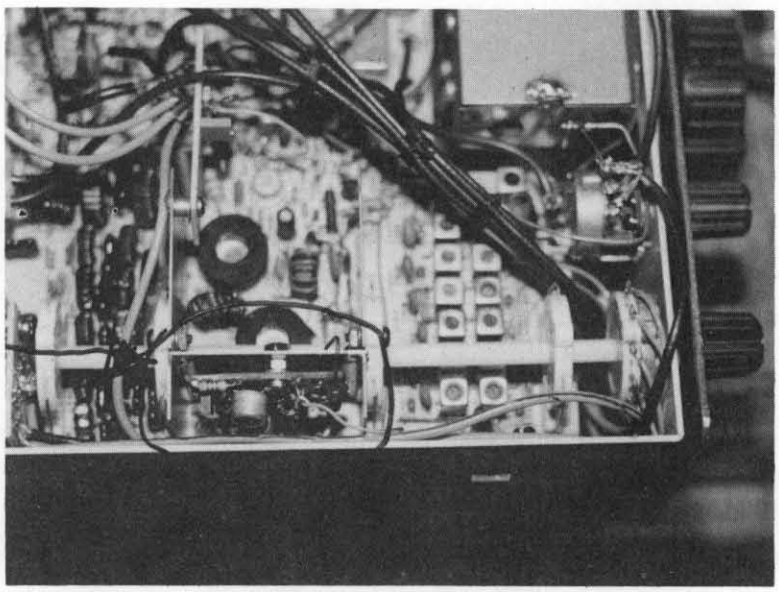
Remove capacitor C442 from the main board and attach small shielded coax cables from each of the removed capacitor holes. I attached the coax cables to the bottom side of the board so I could easily pick up the coax cable grounds. The idea is to replace C442 with the complete preamplifier. I built the amplifier shown using "surface mount" style construction, i.e. all the components are soldered to circuit traces cut out on the top of the pc board with a sharp hobby knife. I did stand up many of the components "Japanese style" for space reasons. The 2N3866 transistor will dissipate about 1/4 watt (current drain is 30 ma) so you should add a small, single fin heat sink to it.

On the main circuit board, remove R423 and L427. Add two RF chokes as shown in the schematic. Make sure that you connect one end of each choke directly to the R12 trace. Also, bypass the R12 trace as shown.

Finally, remove diode D406. The HW-9 is not particularly good when it comes to overload. These changes eliminate IMD problems by increasing current through the switching diodes and should be done as you need at least 50 microhenries and commercial chokes in this range may resonate below 30 MHz.

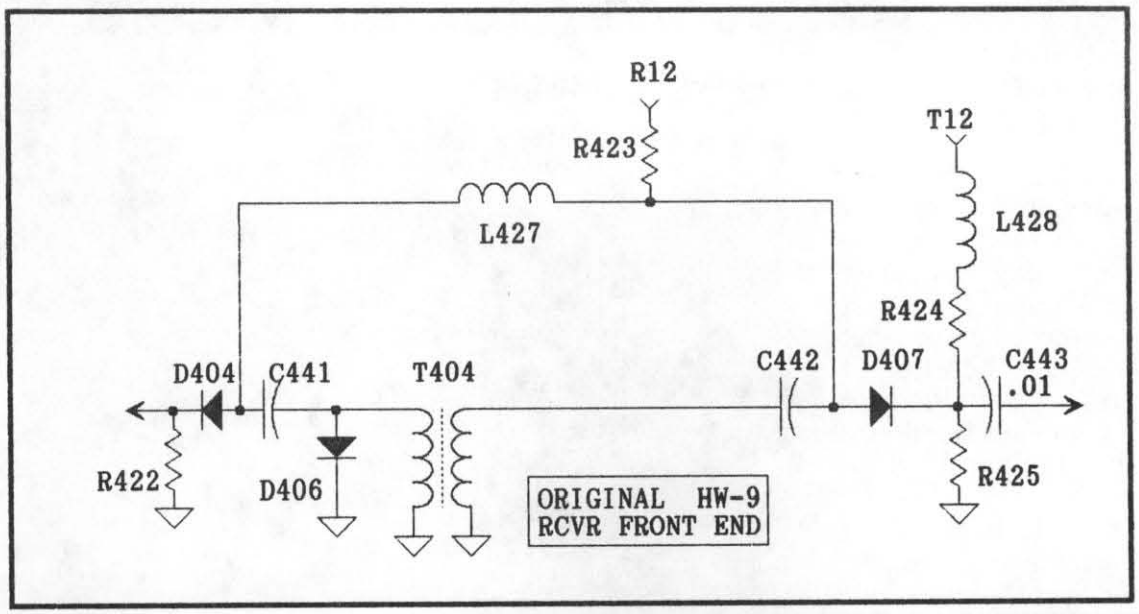
How does it work? Great! My HW-9 receiver now hears everything my TS-440 does with very similar S-meter readings. The entire preamp build and installation took me about three hours and the results are well worth it.

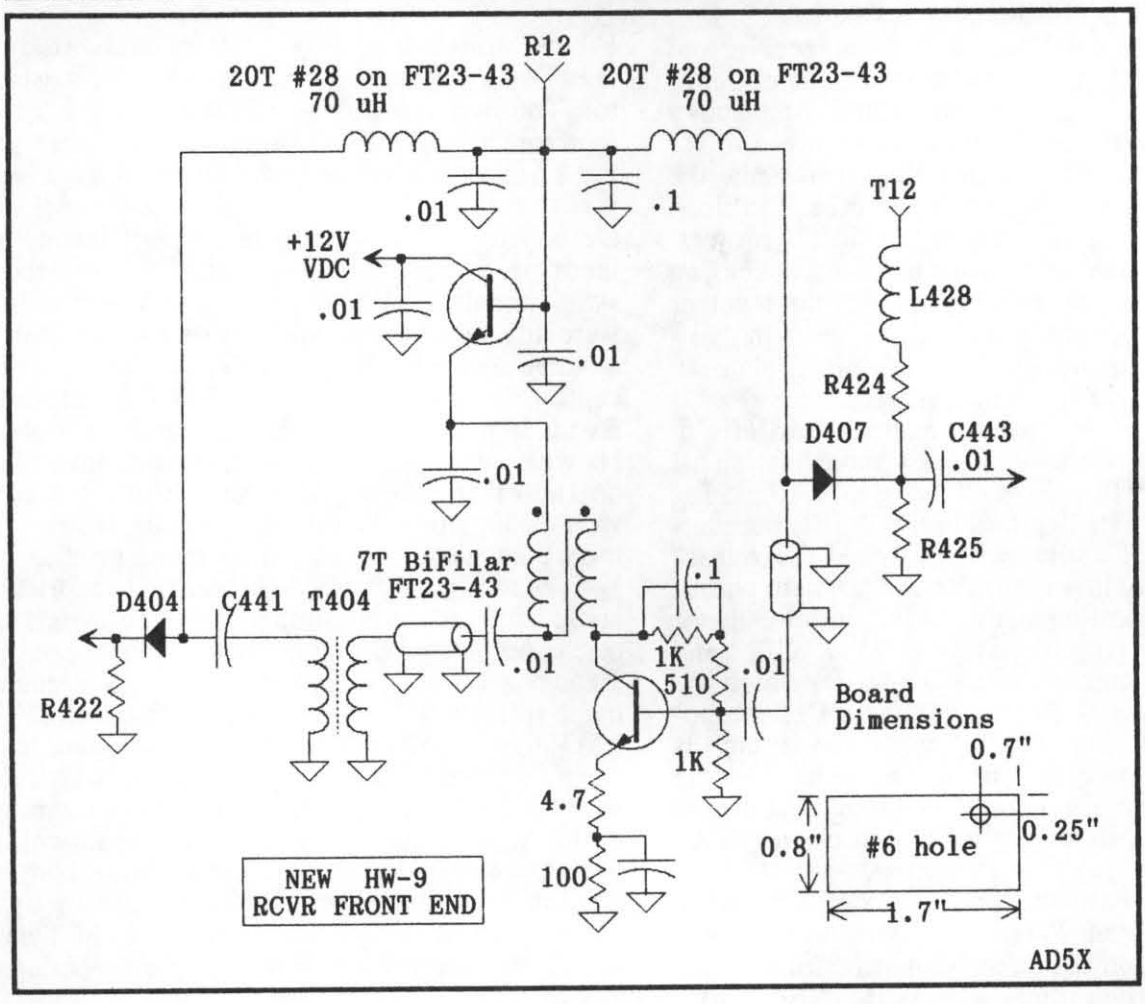
*See schematics on next page* ⇨



Mounting the HW-9
Receive Preamp

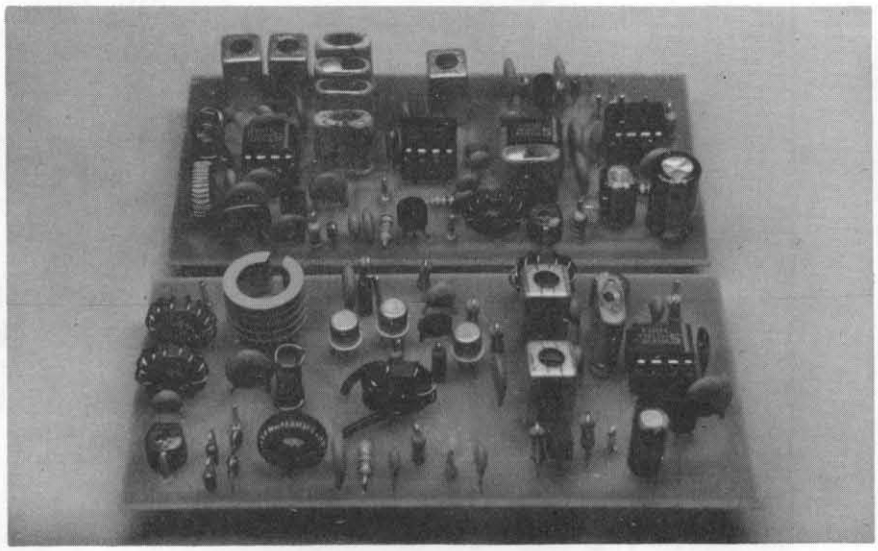
(2N3866 heatsink
removed for clarity)


R12
R423
L427
T12
L428
R424
D404
C441
T404
C442
D407
C443
.01
R422
D406
R425
ORIGINAL HW-9
RCVR FRONT END


R12
20T #28 on FT23-43
70 uH
20T #28 on FT23-43
70 uH
.01
.1
T12
+12V
VDC
.01
L428
.01
R424
D407
C443
.01
.01
R425
7T BiFilar
FT23-43
D404
C441
T404
.1
1K
510
.01
.01
Board
Dimensions
R422
1K
0.7"
4.7
0.8"
#6 hole
0.25"
100
1.7"
NEW HW-9
RCVR FRONT END
AD5X

# A Superhet Transceiver for 20 Meters

by Dave Benson, NN1G
80 East Robbins Ave.
Newington, CT 06111



Just for the record, I didn't rush home and slap this project together over a spare lunch hour–I had to finish it up the next day. Seriously, this project evolved out of an interest in seeing how compact a superhet transceiver could be. While I don't claim that this rig is the ultimate in compactness, it combines small size with performance the experts pro-claim "pretty good".

The transceiver is built into a TenTec TP-20 enclosure. Peeking under the hood (see photo), all circuitry is laid out on a pair of 1.8" x 3.8" PC boards, corresponding to the receiver and transmitter sections. If you're interested in duplicating this rig, I can make predrilled glass-epoxy PC boards available. Write me for info and for parts layout sketches (SASE please). Despite the obvious head start this provides other builders, please note that this is not a beginner's project! There's still some grunt work involved in chasing down parts and selecting crystals for the receiver filter. All components are available through mail-order suppliers, though there are no "Bulgarian People's Republic" parts needed here.

The design is based on Rick Littlefield, K1BQT's past work with a few modifications. I wasn't happy with the original design's AF muting characteristics, so I grafted in the W7EL-popularized series FET audio switch to yield "seamless" QSK operation. In all fairness, the problem wasn't with the electrical design itself but with the dense layout. The IF amplifier stage (U2) amplifies and outputs a fair amount of BFO energy, which the product detector (U3) receivers as a DC component. The resulting "thump" when the IF amp is muted is tough to overcome, hence the need for the extra circuitry. In a well-isolated layout the MC1350 AGC input pin may be used very successfully to provide smooth muting.

I also added a stand-alone local oscillator at the receiver front end. While it's possible to use the NE602's built-in oscillator transistor for the LO, the QSK configuration subjects the NE602 to a large input signal on transmit. The NE602's internal coupling will tend to "pull" the oscillator transistor, resulting in chirp on key-down.

The crystal filter is the heart of any superhet receiver, and building your own is surprisingly easy. I'd recommend getting 8-10 crystals (they're cheap) and building a "what-have-you" test oscillator. The four most closely grouped of the lot (as monitored on a receiver or frequency counter) are the ones which go into the filter. By the way, you're not restricted to a 10.0 MHz IF–if you're ale to find other frequencies, by all means use them. I've seen a number of crystals offered at swapfests in the 10.1-10.3 MHz range. These were intended for CB synthesizers and are actually a better choice for IF use due to reduced spur susceptibility and freedom from WWV feedthrough. By my casual reckoning, the passband is about 800 Hz wide and only the strongest stations are audible on the other side of zero-beat. While the filter won't compete with the one in your big rig, it's more than adequate for most operating needs.

The receiver AF section is tailored to restrict the audio bandwidth to minimize hiss. The bypass cap on the output of U3 and the network between pins 1 and 5 of Ü4 noticeably reduce the high frequency noise (thanks to Wayne, N6KR, for the tip). The LM386 has another 20 dB of gain in reserve but it wasn't needed for this design. Sidetone is provided by letting a portion of the received signal through to the AF amp during transmit. (The beauty of using separate oscillators for the transmit mixer and BFO stages is that sidetone takes care of itself). A 1M resistor was added across the series FET mute switch to ensure sufficient sidetone level during key-down.

The design uses 10.7 MHz IF transformers throughout, with the 7mm size saving precious board real estate. Each of the transformers is modified by snipping off the primary tap lead and one of the case leads as shown in the parts list figure.

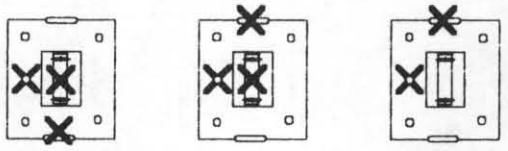
Since most of the transformers will be used above their design frequency, the built-in capacitors are removed from the base (an Ex-Acto knife is the implement of choice). The capacitor in T4 is the exception and is left intact.

The transmit mixer was taken from my recent VFO article (July 1992 QRP Quarterly). The final amplifier uses a bit of DC biasing on its base to make it easier to drive. Any of a number of transistors should work well in this application, including the 2N3553 or the 2N4407. The transmitter puts out about 1.5 watts. Due to the compact layout, a 0.5 inch diameter "hat" style heat sink is used on the PA, and the heat sink is just warm after extended transmissions.

How does this little rig work? Although I'm not a 20M aficionado, I've had goo luck ragchewing with stateside and European stations with the occasional DX QSO thrown in. Signal reports range from 589s to "QRZ?" depending on band conditions. The results have been encouraging enough to tempt me to put up a real antenna for 20M (meaning one whose pattern and gain are a matter of forethought!( Who knows? Maybe DXCC is finally possible–I'd counted on reaching it in the year 2163 at my present rate!

*See schematics on next page* ⇨

Detail: Transformer modifications (bottom view)



T1 T2, T5, T6 T4

Parts Sources:

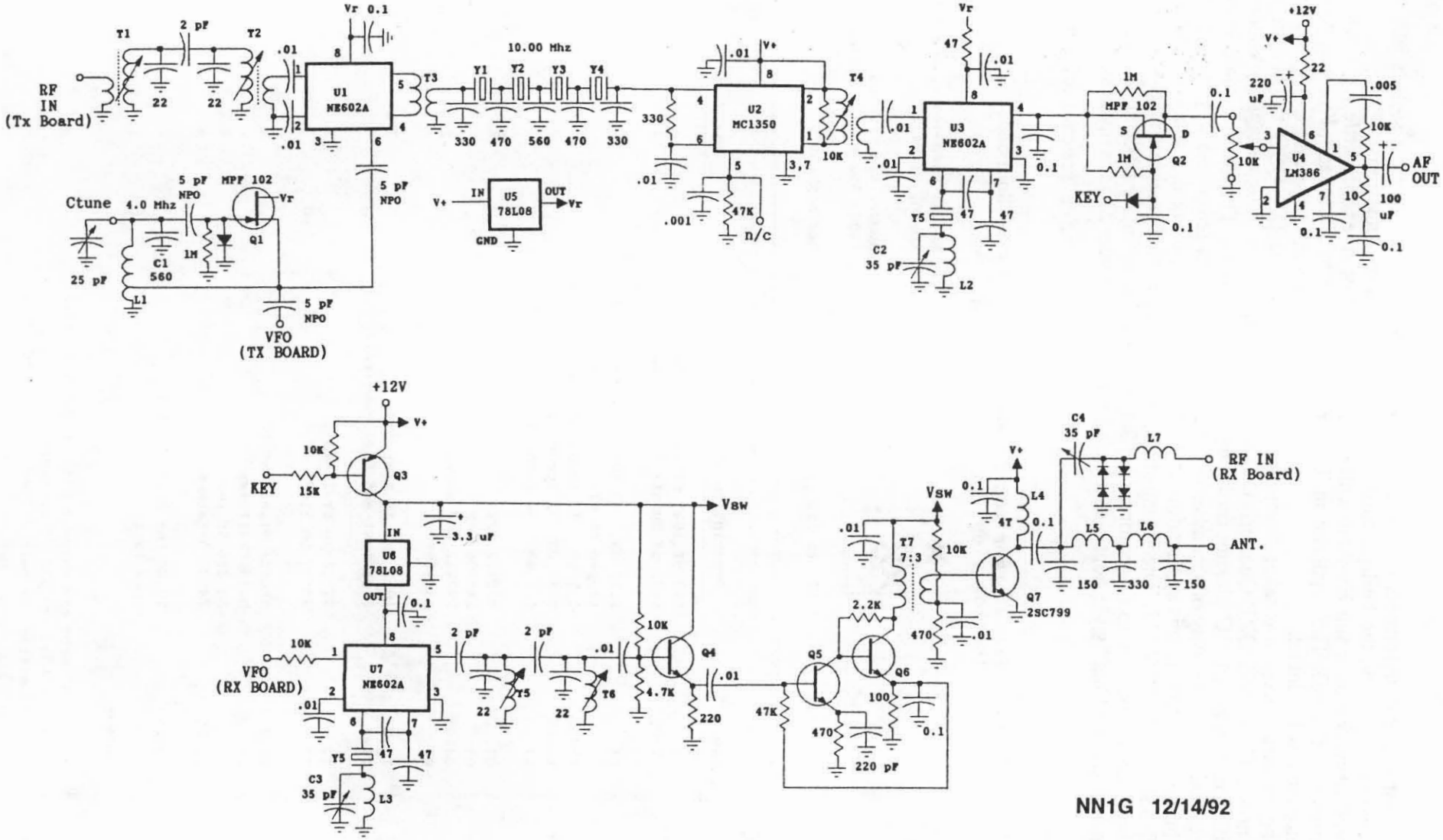
1. KA7QJY Components, Box 3893, Logan, UT 84321
2. Mouser Electronics (800) 992-9943 (catalog)
3. Radio Shack

| Desig. | Description | Source |
|---|---|---|
| C1 | 560 pF 100V Silver Mica cap | 1 |
| C2-C4 | 5-35 pF Murata 6MM trim cap | 1 |
| L1 | 2.70 uH. 30 turns #30 on T-37-6, tapped at 4T. | 1 |
| L2-L4 | 6.7 uH. 11 turns #26 on FT-37-61 | 1 |
| L5,L6 | 0.67 uH 11 turns #26 on T-37-2 | 1 |
| L7 | 4.1 uH 32 turns #30 on T-37-2 | 1 |
| Q1, Q2 | MPF102 JFET | 1 |
| Q3 | 2N3906 PNP | 1,2,3 |
| Q4-Q6 | 2N2222 NPN metal | 1,2 |
| Q7 | 2SC1799 | 1 |
| T1,2, T4-6 | 10.7 Mhz IF Xfmr 7MM, (see text and figure above) | 1,2 |
| T3 | 9T:3T on FT-37-43 | 1 |
| T7 | 7T:3T on FT-37-43 | 1 |
| U1,3,7 | NE602A Mixer/Osc IC | 1 |
| U2 | MC1350P IF Amp | 1 |
| U4 | LM 386 AF Amp | 1,2,3 |
| U5,U6 | 78L08 3-term reg | 1 |
| Y1-Y6 | 10.00 Mhz HC-18/U Xtal (see text) | 2 |

Notes:

1) 0.1 uF caps are ceramic disk, Digikey P4164.
2) All diodes are 1N4148 or equivalent.
3) Transmitter low-pass filter caps are 10% disk.

# A 20-meter Superhet transceiver




NN1G 12/14/92

*QRP Product Review*

# Tejas Backpacker I

**Reviewed by Rich Arland, K7YHA**

*Editorial Two-cents Worth: This review originally appeared in the September 1992 issue of Worldradio magazine (which calls itself an "independent newspaper", perhaps in part because it's on newsprint instead of slick paper, which helps keep the cost down). For those not familiar with it, it's a good general-interest ham monthly of around 70 or 80 pages, with articles and columns on a variety of subjects, including a QRP column (for over 5 years) by the author of this review. Subscriptions are handled through 520 Calvados Avenue, Sacramento, CA 95815. According to the September 1992 issue, the subscription rate is $14 per year, $27 for 2 years, $39 for 3, and, for adventurous souls, life subscriptions are $140. They also accept charge orders, at 1-800-366-9192 (8 AM to 5 PM, Pacific Time). —WA8MCQ*

Texas is famous for two things: the Alamo and H. Ross Perot. Add a third: Tejas (pronounced Tay-hoss) RF Technologies. Bill Hickox, K5BDZ, is the president, CEO and chief design engineer of Tejas, and he has designed and marketed a very nice QRP transceiver. Enter the Tejas Backpacker I, TRFT-500, a single-band HF CW transceiver based on the extremely successful Roy Lewallen, W7EL , design presented in QST's August 1980 issue.

I know what you are thinking—just what the QRP world needs, another cutesie little low power rig with mediocre performance at an outlandish cost. Untrue, my friend...stay tuned.

Bill Hickox is a man with a mission. This mission is to provide the QRP world with a well-designed, easily reproducible, cost effective product line of low power transceivers and accessories. His methodology is simple: Take a well engineered, previously published design, refine the circuitry and market the result. Bill states it well: "Why reinvent the wheel every time you need to make a cart?" Why, indeed?

In the grand scheme of things there are only so many NE-602 based receiver designs and VXO/VFO transmitter designs that can be published before it all becomes rather ho-hum. Bill started with an outstanding design by W7EL, refined the circuitry a bit (after all it has been 12 years since the article hit print) and added his own distinctive ideas. This evolutionary process has resulted in one of the finest little single-band CW QRP transceivers that I have ever had the pleasure to use, the Tejas Backpacker I.

Everything about this little single-bander smacks of quality. The rugged enclosure is custom-made for the rig and features crisp black silk-screened lettering which stands out well against the anodized aluminum of the case. The front panel is extremely uncluttered, featuring a main tuning knob at dead center. To the left is the on/off/volume control, CW filter control and the earphone jack. On the right side of the front panel is the spot switch, the receiver incremental tuning (RIT) control and the key jack. The back panel features an antenna jack, 12VDC input jack and the Tejas logo.

The Backpacker I is composed of a very stable VFO circuit, coupled to separate receiver and transmitter boards via shielded cabling. The receiver uses no RF preamplification prior to the mixer. This greatly reduces the problems associated with high gain RF front ends and direct conversion receivers, namely AM breakthrough, intermodulation distortion and degraded receiver performance. The mixer is a Mini-Circuits SBL-1 double balanced mixer that provides an extremely clean audio signal at the output. The VFO output is mixed with a crystal controlled HFO [high frequency oscillator] to provide the necessary input to the SBL-1 mixer.

The antenna is connected to the other input port of the SBL-1 via a fixed tuned circuit. Audio (AF) output is then taken from the output of the mixer and fed into a two-stage op amp (TL-072). The first stage is a fix-tuned AF filter (750 hz). The second stage is used to increase the gain of the audio signal. From there the AF signal is fed into a second TL-072 op amp which functions as a two-stage CW audio filter with switchable selectivity. From the output of the CW filter, the AF signal is routed to an LM-386 audio amp which provides plenty of gain for earphones or a small speaker, in a quiet room.

The transmitter circuit is straight-forward with the output of the VFO being fed into a buffer stage which is keyed and followed by a driver and final RF amplifier stages. The final stage uses a 2SC799 which is a very rugged RF transistor that will handle 6W easily. The collector to base junction [sic] has a 36V zener diode across it which will offer some protection to the final transistor, should the antenna load become shorted or open. [Rich later reported that a typo snuck into the review. The zener diode is actually in the normal position, from the collector of the transistor to ground. -WA8MCQ] The transmitter features a traditional low-pass filter using toroidal inductors.

My review rig was the 40M version that had been factory assembled prior to Dayton. In addition, I received a 20M version in kit form from Tejas RF Technologies about a month after Dayton. This rig was assembled and used on several family camping trips.

The Backpacker I kit features quality parts and a good manual. Parts overlays have been enlarged from the original manuals to provide easier parts placement. This is NOT a beginners kit! The kit is designed to meet the requirements of the QRP ARCI's contest criteria for a homebuilt rig; therefore, the "Heath-style" instructions are missing. Even though the board density is not great, you must take your time and be careful when placing parts on the boards. It is easy to miscalculate and plug a part in the wrong hole if you are not careful. TAKE YOUR TIME AND WORK CAREFULLY.

The kit went together relatively easily and worked from initial power-up. Bill offers assistance to anyone who buys one of his kits and has trouble making it work. The buyer has only to return the offending unit and Bill will troubleshoot it and get it working at minimal cost.

The Backpacker I is a joy to use. The receiver is extremely sensitive and does not have problems with AM breakthrough. This is a real treat, especially on 40M at night! The transmitter puts out a clean 2W signal that sounds very nice, due to steps taken to properly shape the keyed waveform. The full break-in operation (QSK) was a delight. No popping or pumping was noted on either radio when keying along at 20 to 25 WPM. Frequency spread using the stock components and silkscreened dial is 200 KHz with very good linearity. The main tuning features a 6:1 vernier drive and a large 2 in. diameter knob which makes easy tuning even on crowded bands. Bill offers modifications to alter the tuning range and ships an uncalibrated dial skirt (with each kit) so you can lay out your own customized tuning range, if desired.

In direct comparison with the A&A Engineering 40M rig that I reviewed last year and the MFJ 9020 20M rig (tested at Dayton), the Backpacker I performs quite well. Remembering that the first two radios feature superhet receivers with crystal filtering, the Tejas rig definitely holds its own. The emphasis as of late seems to be moving toward using a superhet receiver design in QRP transceivers because of their "single signal" performance. Superhet designs are a two-edged sword. On one hand, selectivity can be enhanced using crystal filtering in the IF strip, something that the DC receiver cannot do. Unfortunately, this also has the drawback of dropping one sideband in favor of the other, not necessarily the best thing to do under certain circumstances.

While it is true that DC receivers "hear" both sidebands, if you use the proper zero-beating technique, this is actually a plus, because it gives the operator a choice of both sidebands. If the upper sideband is cluttered with QRM and the lower sideband is interference free, it is a simple matter to use the RIT control (on both review radios the RIT range was about 1.5 KHz either side of detent) to select the lower sideband once the incoming signal is centered by zero-beating. There is no transmitter offset using this technique., You simply center the RIT using the detented control, tune in the desire signal by zero-beating it in the receiver passband, and then tune to one sideband or the other using the RIT control. The other operator will never know that you are not using transmitter offset, because your signal is zeroed on his. Adding a second crystal filter to a superhet design just to select both sidebands is an expensive proposition, well beyond the expense justified in a simple homebrew QRP transceiver.

Bottom line on the Tejas RF Technologies Backpacker I CW transceiver kit: a good value for the money, relatively easy to build, excellent performer, size and power requirements are just right for portable work (key down current drain is 273 mA and RX current drain is about 61 mA), a joy to use, and can be easily converted to other bands (80 through 10M) using parts supplied by the manufacturer. On the down side, there is no AGC and no crystal filtering (two things that a superhet design can provide). The price for the kit version is $139.95 plus shipping. Bill is now offering completely assembled kits for whichever band you desire at a cost of $189.95 plus shipping.

As a side note, I spent several hours with Bill Hickox at Dayton this year and came away impressed with his resolve to provide a quality product at a competitive price. Bill is dedicated to the idea that homebrewing should be a part of the QRP hobby. He encourages those who buy his products to experiment with the circuitry and send him feedback on modifications. Once you get a Backpacker I, you'll notice that the case has plenty of room for additions like a CMOS keyer, battery pack, antenna tuner, etc. In short, Bill wants you to play with your new rig and have some fun.

For further information regarding the entire Tejas RF Technologies product line, write Bill Hickox, K5BDZ, at 17 South Briar Hollow, Suite 101, Houston, TX 77207.

*[Please verify prices before ordering. The prices shown here were in effect when the review was originally published, but may have changed since then. —WA8MCQ]*

QRP

**Mini-Review**

# The MFJ 20 Meter QRP CW Transceiver

**by Bob Gobrick VE2DRB/WA6ERB**
**Box 1591**
**Champlain, NY 12919**

MFJ has done the ham and QRP community a great service by introducing their new line of QRP rigs. Two of the mainstay suppliers of QRP equipment have abandoned the QRP community. Heath Company has left the ham radio market and with it the legendary Hot Water series of QRP rigs are now relegated to flea market status. Ten-Tec, who could have recaptured the QRP market, has made a marketing decision to strip their new Delta II and call it an Argonaut II. Unfortunately, at its kilobuck price, the Argo II pales compared to the battle proven QRP modified Icom IC-735.

So what we were left with, prior to MFJ's entry into the QRP transceiver market, was a number of companies offering some pretty nice kits—A&A Engineering, Oak Hills Research, Tejas RF Technology , MXM Industries and Ramsey to name a few. It's not that I have anything against kits, it's just that you can't leave a brand new HW-9 kit sitting around un-built for a year because of a lack of time. Being a plug-and-chug QRP appliance operator has its advantages. You are on the air operating and not fretting over when you'll get time to complete that kit. This is where MFJ stepped in—they knew there was a demand for a nicely designed, compact, and prebuilt "appliance type" QRP rig. Something you could take out of the box, hook up and begin operating. *Voilá*—the MFJ-9020.

**"The design has all the right stuff"**

The MFJ Model 9020 QRP transceiver is a *great* rig and destined to become a classic. Why such a strong statement? At Dayton, the MFJ team was asked how the MFJ QRP transceiver design came about. MFJ mentioned two factors—a well developed design by Rick Littlefield, K1BQT and MFJ'S expertise in packaging a quality unit at an attractive price. Let's look at these two factors.

Rick Littlefield has been developing this rig for years. With a search through Didah Publishing's "From Beverages To Oscar Bibliography" computer software (the best source of data that a QRP builder could have) we see that the first version of this rig appeared back in the "Ham Radio" magazine days, June 1987. The design evolved with articles by Rick in the February 1988 *73 Magazine*, January 1989 *Ham Radio*, and finally in the September 1990 *CQ* magazine. And to complete the chronology, Pete Hoover, W6ZH did a feature article in the November 1991 *CQ* documenting his painstaking construction of the RadioKit kit version.

The design has all the right stuff—a single conversion receiver (no direct conversion design compromise here), a narrow crystal IF filter, CW only band coverage and selectivity, and a 5 watt output. All this packaged in a simple box that can be tucked in a backpack or overnight bag. This unit has a lot of glamour for the jetsetting, outdoors person QRPer. MFJ must have known that.

The second factor that makes the MFJ QRP transceiver a winner is MFJ's construction of the unit. MFJ shocked the ham world with their construction savvy back in 1986. After the non-profit Tucson Amateur Packet Radio Corporation benevolently released their TNC-2 packet radio design for a small royalty to all manufacturers, MFJ went ahead and mass produced the TNC-2 using some of the latest offshore PC computer clone manufacturers' quality control techniques. These units were well built, reliable and inexpensive. The packet movement and MFJ had a winner.

The same construction techniques show up in the MFJ-9020 QRP rig. The main board is well laid out, using top grade components (double-sided G-10 PC board, socketed ICs, canned inductors, a real 4-pole crystal filter, etc.). The control components are also good quality—the audio and RIT controls have a smooth feel. The tuning capacitor uses a ball bearing reduction drive with close to four smooth turns of the knob to cover the 75 kHz spread. The size of the aluminum cabinet could have been a "wee-bit" smaller. Even after adding the optional audio filter and Curtis chip keyer there is still lots of room left for QRP hacker goodies.

Technical details will not be covered here. MFJ, in there splendid marketing wisdom, offers its 15-page MFJ-9020 manual for free. Besides circuit description and a full schematic, there is a five-page section on alignment, theory of operation, setting up, QRP operating hints, and even milliwatt power adjustment procedures. You can't beat the price of this fine document. There are a few minor mistakes in the manual which also show up in the MFJ advertisements. The manual states that the 9020 has an 8-pole crystal filter. In reality it is a 4-pole crystal lattice filter (maybe we need to start counting capacitors as poles).

***The following are a few comments resulting from a month of casual operation.***

•Kid-you-not: My first contact with the rig, as I fumbled to get my keyer hooked up, was SU1HV in Egypt. An all-time-new-one for me as I approach 300 countries worked. Now if that wasn't a good omen (the story is really true).

•The AGC is a design that K1BQT has used for a number of years and it is quite effective. Compared to an Argonaut 515 and HW-9 the AGC is fairly smooth. The audio stage is run wide open with an output variable resistor volume control. This was done as part of the AGC design, but the outshoot is that the internal speaker volume is really not loud enough for Dayton QRP hospitality suite type demos. The ohmic load of the earphones will also have an effect on the audio level. In general, the earphone level of audio was never a problem and the effective AGC will save your ears.

•Supply voltage level is important. The rig will draw up to 1 amp on transmit and you need to watch for voltage dips from a poorly regulated supply. The SU1 QSO was made with a cheap wall cube transformer (yes rated for 1 amp +/- 900 ma.) and the sidetone warble was the first giveaway that the voltage was fluctuating. Hooking up a 6 amp gell cell solved that problem.

•Stability: From a cold start the unit drifted about 500 cycles in half an hour. Vibration from pounding on the table (those QRO stations beating me in a DX pile-up) had little effect on stability. The etched frequency scale on the front panel did not match the true frequency. A signal of 14000 kHz read 14009 kHz. The QRP calling frequency of 14060 kHz was right on the money though.

•Selectivity: Selectivity was very good with the 4-pole lattice crystal filter. An unscientific measurement (by ear) of about 1 kHz bandwidth was detected. The optional audio filter cranks in two second order active filter stages for really nice CW reception even on a busy band. RIT range was estimated to be less than 1 kHz. A little wider span, say 1.5 kHz, and a HW-9 like center indent control would have been nice.

•Optional modules: In good marketing form, MFJ offers two nice module options. If you have been raised with a straight key and barn-door wide DC design receiver than skip these paragraphs. But if you've been spoiled by an iambic keyer and tight CW selectivity than listen up. MFJ has ingeniously designed pin headers on the mother board to plug in a two pole active filter and a Curtis 8044ABM chip based keyer. The modules and instructions for the modules were not the same quality as the main motherboard. No double sided G-10 PC boards here. There are a couple of things to look out for when installing these modules.

The audio filter instructions forget to tell you to remove the audio jumper connector when installing the filter. After spending an hour trying to get those little header pins to line up with the PC board holes it will be necessary to start all over as you realize that error (this delay affected my destiny—SU1 may have never been worked).

The keyer module offers a number of options and, of course, the options were defaulted to positions opposite my preference. The keyer is defaulted to a Mode A style of keying—no following alternate elements generated. I have always used Mode B style keying with the dit and dah memory insertion. Isn't this the norm? There is a mistake in the instructions—it should say remove ground jumper from pin 8 of the 8044ABM chip and jumper pins 1 and 8 for the Mode A to Mode B style keying change.

The keying speed was set to 5-30 wpm and this was not the span that I prefer. The instructions tell you how to change the value of the resistor to move the range up to 15-45? wpm. Anyway, another hour fiddling with the pin header, soldering, and you are back in business.

•QSK: The keying is semi-QSK T/R switching using a relay. The relay is fairly quiet and the switching delay time can be adjusted down but it ain't no Ten-Tec.

•QRP Hackers Haven: As mentioned earlier, the MFJ 9020 is destined to be a classic QRP rig. How about some feedback from QRPers on modifications, enhancements, etc. of this fine rig. There is plenty of cabinet room for goodies. How about adding a Super CMOS II memory keyer for a lean-mean contest machine? An S-meter, RIT/XIT, Spot button, etc. are other options, but the 9020 is actually pretty complete as it stands.

So thanks again MFJ. Thanks for making it possible to buy a preassembled QRP transceiver, where all you need is a battery, a key, a set of headphones, and a skyhook and the world is yours.

And as a parting comment, shouldn't MFJ change the name of this unit to something with a little more pizzazz? The MFJ "Mercury" QRP rig (light and speedy) has more appeal than the MFJ-9020. Almost perfect marketing.

# MFJ Deluxe Iambic Paddle MFJ-564

## Review by Chuck Adams, K5FO

MFJ Enterprises announced its new deluxe iambic paddle in a catalog included in the November issue of QST. The list price is $49.95 with an additional $6 for shipping. Always wanting to be the first kid on the block to own some toys, I immediately called them and ordered one. In less than two weeks it arrived via UPS to my front door.

I've been told, "If it looks like a duck, walks like a duck, talks like a duck...Well..." This paddle sure looks like a Bencher. It has the same base dimensions of the Bencher except that the corners are cut at 45 degrees. The Bencher paddle weighs in at 2 lbs., 14 oz. and the MFJ paddle weighs in at 2 lbs., 5 oz. as weighed on an electronic postal scale. The difference in weight may make a difference to backpackers, but I don't think they would carry one.

The Bencher has clear plastic paddles; the MFJ has red ones. The Bencher has a circular arch while the MFJ has a square arch with rounded corners. The screw for the split posts is phillips on the MFJ; an allen wrench is required to adjust the Bencher. The contacts are gold plated on the Bencher and silver on the MFJ paddle. The MFJ has an additional four tapped holes in the bottom of the base for the keyer that mounts on the base.

Both paddles, MFJ and Bencher, are chrome plated.

The only problem that I see, and this is a personal thing, is that the paddles on the MFJ are attached to the arm with rivets, whereas the Bencher uses screws. Although I've had two Bencher paddles from day one, I've never broken the plastic paddles, despite the aperiodic banging they get on the desk. The plastic paddles on the Bencher would be easily replaceable; the paddles on the MFJ would require either some home engineering to replace or ordering a complete replacement of the arm from MFJ at the going rate.

I'm looking forward to years of service from this paddle, just like the Benchers that I own. This author is not in any way associated with MFJ or Bencher or in any way rewarded for this review.

# IDEA EXCHANGE

## Technical Tidbits for the QRPer

### TYPOS IN "SOLID STATE DESIGN"

**Sherman Lovell, WY7F** of Seattle, WA, reported a few typographical errors in resistor values in chapter 8 (Modulation Methods) of Solid State Design for the Radio Amateur. He later received a letter from Wes Hayward, W7ZOI (who co-authored the book with Doug DeMaw, W1FB), saying that these errors have been corrected in the latest printing. This information applies to the second (1986) printing of the book, which corrected many, but not all, errors in the original 1977 version.

•Page 190, figure 20, Q1 has 4.7K resistors in the emitter and collector circuits. These should both be 4.7 Ω

•Page 198, figure 30, 2.7K resistor in the collector circuit of Q8, right above coil L8, should be 2.7 Ω.

•Page 202, figure 33, Q6 has 4.7K resistors in the emitter and collector circuits. Both should be 4.7 Ω.

Here's another one I noticed—page 206, figure 39, the 2N3553 transistor in the "alternate output 1/2W" circuit in the lower right corner has a pair of 4.7K resistors in the emitter circuit. These should obviously be 4.7 Ω—no transistor is capable of putting out 1/2 watt with a total of 9400 Ω in the emitter circuit and 12 volts on the collector, unless someone has discovered a loophole in Ω law.

### LOW AUDIO OUTPUT ON MFJ 9020 QRP TRANSCEIVER

When it first came out, I heard many complaints that the new MFJ QRP rig had weak audio output. It was also said that they had a fix for it, and were incorporating it at the factory on new units. The voltage for the audio amplifier chip was originally taken from the regulated voltage line, which is nominally 10.5 volts. The fix is to lift the LM-386 power (pin 6) off the line and move it over to the main power supply line. The increased voltage on the amplifier is supposed to give greater audio output.

W3CQE let me borrow his MFJ for a week, to check it out, and said he was disappointed with the audio. I put it on the bench a few times to play with it, and noted that the audio, on a speaker, was not tremendously loud; it was more or less adequate (a very subjective term) if the volume control was run wide open. When he came to pick it up, I told him about the modification and offered to perform it for him. He agreed, so we opened it up, examined the circuit board closely and found that the modification had already been performed! In all fairness to MFJ, I admit I never did try the rig with a set of headphones, and conventional wisdom says that you should always use phones for serious CW work, anyhow. Also, this problem is not unique to the MFJ—many designs which rely on an LM-386 for all their audio gain suffer from low output.

For most of the week I had been running the rig with what is known by my club members as an LGA, which gave great audio. The LGA is a Little Gray Amplifier from Radio Shack, a small amplified speaker in a gray box, powered by a 9 volt battery. It consists of an LM-386 with a single transistor ahead of it for a preamplifier. (It's still available, for about $12, although it's now white and has a different amplifier IC.) I've used the LGA on a number of QRP rigs that people let me play with, and it gives them a great audio boost.—*DE WA8MCQ*

### TRANSMIT/RECEIVE AUDIO DETHUMPER

Loud thumps in the audio during T/R switching is a common problem in many simple rigs. Here's a cure from **Byron Weaver, WU2J**—

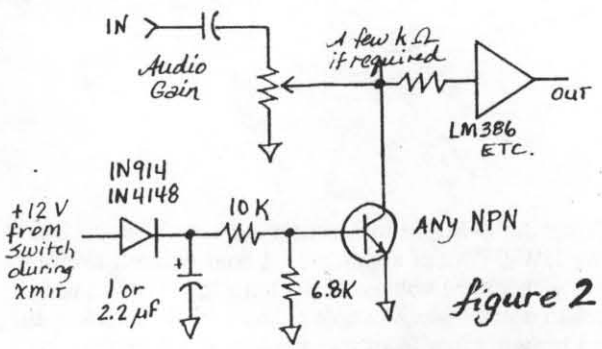



figure 2

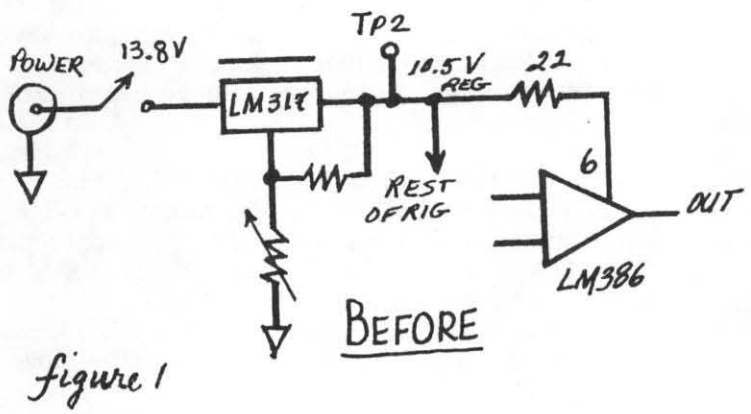
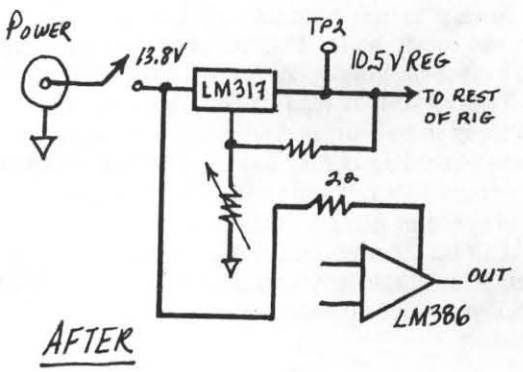



figure 1



## THREE MORE HW-9 MODS

**Bernhard Szymaniak, DL7GK,** shares three modifications for this rig—

HW-9 Variable Bandwidth Control: I replaced the selectivity slide switch SW3 (refer to page 66 of the manual, detail 3-12b) with a 22K linear taper adjustable resistor as shown in the diagram. The coax cable to AF gain control R3 is now soldered to the center of the adjustable resistor, the remaining two cables to the other two lugs. Values from 10K to 22K are acceptable. No mechanical work has to be done when using a mini-adjustable with 9/32" threads, which fits through the existing square hole left over from the removed slide switch.

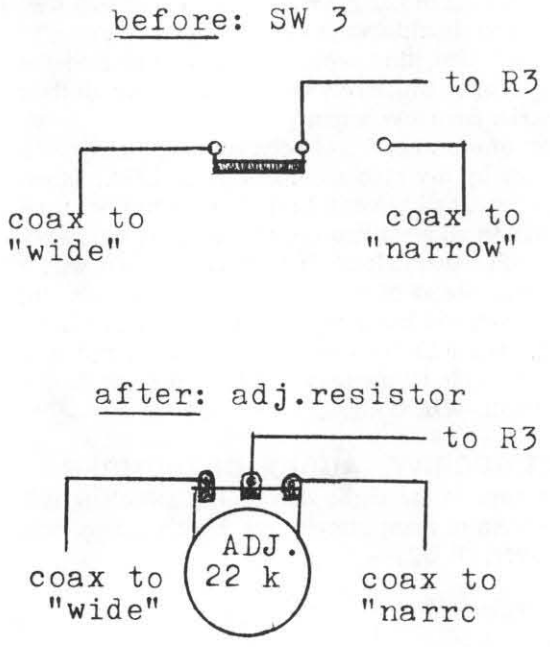



*fig. 3*

Using the S-Meter to Monitor Battery Voltage: Running my HW-9 "out of a suitcase", I considered it useful to frequently check the voltage of the built-in gel cells I added. My idea to do this was a simple bridge circuit. Desolder the red and brown wires from the meter and solder them to a DPDT switch mounted somewhere in a convenient place. Resistors and a zener diode are soldered on a piece of perf board. The meter in my HW-9 has a 150 microampere full scale sensitivity. All resistors were chosen with respect to this value and to have a reading of 11 volts at S1 and 13V at S3 on the meter scale. This requires odd value resistors which I made up from series or parallel connected values at hand. Twelve volts is read halfway between S1 and S3 so the voltage can be estimated with sufficient accuracy. I think this kind of reading is easy to keep in mind. Expanding the meter to read 13V full scale would have required redrawing the meter face or using a calibration chart, both of which I thought to be inconvenient. I don't know if Heathkit supplied meters with different sensitivity in the production run, so check yours out carefully not to burn it up.

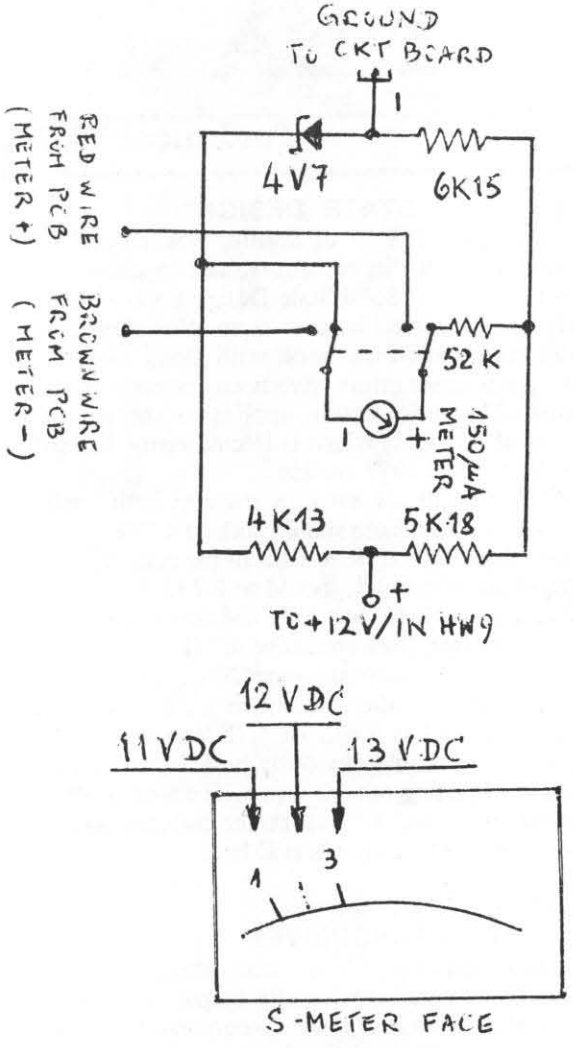



*fig 4*

Extending the RIT Control: Originally the RIT offset is at most +/- 1 KHz, which is too low in some cases. This can be altered easily just by changing the variable resistor R1 (10K ohm) to one of 100K (linear taper). Frequency shift is now approximately +/- 5 KHz. Total shift can vary slightly, depending on the variable resistor accuracy. For good stability, use only a new, high quality variable resistor; a Cermet type is best. Since a variable resistor with detent in mid-position wasn't available in stores around the corner, I used a normal one. After replacement, the VFO alignment and transmit-return adjustments have to be repeated with the new variable set to mid-position.—*DE DL7GK*

## MORE ON HW-9 BFO INJECTION LEVELS

From **Jack Cleary, WN2Q** of Syracuse, NY—Taking the suggestion of Herb Ley, N3CDR, in the April 1989 Quarterly (page 11), I measured the BFO injection to U303 at TP104 and found it to be a low 65 millivolts.

As Herb suggested, I changed Q112 and Q113, but could not improve the injection level beyond 300 millivolts.

I installed sockets to make it easier to change semiconductors until I found the two that would bring voltage upwards to 600 mV as he recommended, but to no avail.

Finally, in desperation I went back into the circuitry and played with capacitors C211 (10 pF, which I increased to 33 pF) and C225 (75 pF, which I increased to 120 pF). This vastly improved the sets performance and I measured 600 mV at TP104.

Two measurement methods were used: peak to peak wave shape on a 20 MHz scope, and RMS RF voltage probe (see page 142 of "The Joy of QRP" by Adrian Weiss, K8EEG/WØRSP) into a Micronta digital multimeter. I did notice that when both the scope and RF probe are connected to TP104 together, some loading occurs and gives a false voltage reading. Best to use one at a time and compare readouts. In my case they were right on.

HW-9 BFO injection at U303 apparently varies all over the place from set to set. Herbs testing of three different HW-9's back in 1989 made this obvious. For those HW-9 owners who have not checked TP104 for BFO injection voltage, they should do so. They might be surprised what they find.—*DE WN2Q*

## LIGHTS FOR THE HW-9

From **Jack Hines, K4GIO** of Reston, VA, a revival of a simple mod that many newcomers may not have seen yet—

A catalog received recently (from All Electronics Corp., P.O. Box 567, Van Nuys, CA 91408-0567) had some T-1 size "grain of wheat" lamps that looked like they could be used to light the tuning dial and meter of the HW-9. They are rated at 14V, 45 ma, have 10 inch insulated wires, two for a dollar, catalog #LP-6. They fit snugly into the approximately one eighth inch space between the HW-9 front panel and the chassis compartment. Just place one above the tuning dial (but not touching it) and run the leads around the space on the right side between panel and chassis box to the volume control underneath, to get voltage from the volume control switch and ground lug. Voila! Gives bright lighting. A lamp can be put over each side of the tuning dial, but one works just fine. You can also use folded or rolled up half inch strips of paper to hold the lamp wires in the space between the front panel and the chassis box. The base of the lamps are a snug fit and hold them in place. *[If there will be times when current consumption is critical, such as battery operation, you can include a switch somewhere to disable the bulbs.—WA8MCQ]*

## DE K4GIO
## RE N2CX'S BAD FEEDLINE CONNECTORS

**Jack Cleary, WN2Q** of Syracuse, NY, comments on **Joe Everhart's** item in the July 1992 Idea Exchange

Re Joe's Quickie #4: When I signed off the SS Samuel F. Miller (liberty ship) as radio officer back in September 1945 I had just dismantled the short range VHF equipment, taken down the antenna, and coiled up the RG-8/U coax. Thinking about getting back on the ham bands, I asked the captain if I could have the coax. There was about 100 to 150 feet as I recall. He gave me his OK and I stowed it in my trunk and shipped it home. It laid around for a year or two while I took another ship out, but I finally got back home, married, set up housekeeping, and started putting a ham station together. I pulled the coax out of storage, built a ten meter beam, connected the coax using the same connectors that went through the war and started working stations around the area. I was getting S1 and S2 reports. I should have been getting 9-plus because I was running 50 watts into a Harvey-Wells. A little investigation at the coax plug ends (the plugs themselves were clean) showed plenty of green corrosion under the insulated cover. I started stripping back from the PL-259 plug at one end for 2 to 3 feet until I started to find bright copper shielding. (This was the end which was exposed to Pacific weather up on the ships mast.) I cut off the bad cable, connected a new plug and the 9-plus signals started rolling in from all over the place. I was finally getting out of my own back yard and working the world on ten meters.

As I recollect, the cable and antenna were installed sometime in April 1945 on the West coast prior to leaving for the final destination of Okinawa. The equipment was not used until we joined convoy at Ulithi Atoll in the Caroline Islands. Dismantling of cable and antenna was sometime in September 1945. I don't know if the cable was brand new when installed, or from some other ship. At any rate, green migrating corrosion from Pacific salt air and humidity took place over a period of only a few months, if it was new when installed. The system was used only for a couple of weeks going westward, for inter-convoy communications. It was not used returning to the States. At that time no problem was experienced receiving or transmitting. So, the mystery was when did corrosion start and how did it creep along the cable shield so quickly to cause my trouble getting out on 10 meters?

The moral to all this? Check your antenna connections often and keep them clean and covered.—DE WN2Q

## STILL MORE ON
## BAD FEEDLINE CONNECTIONS

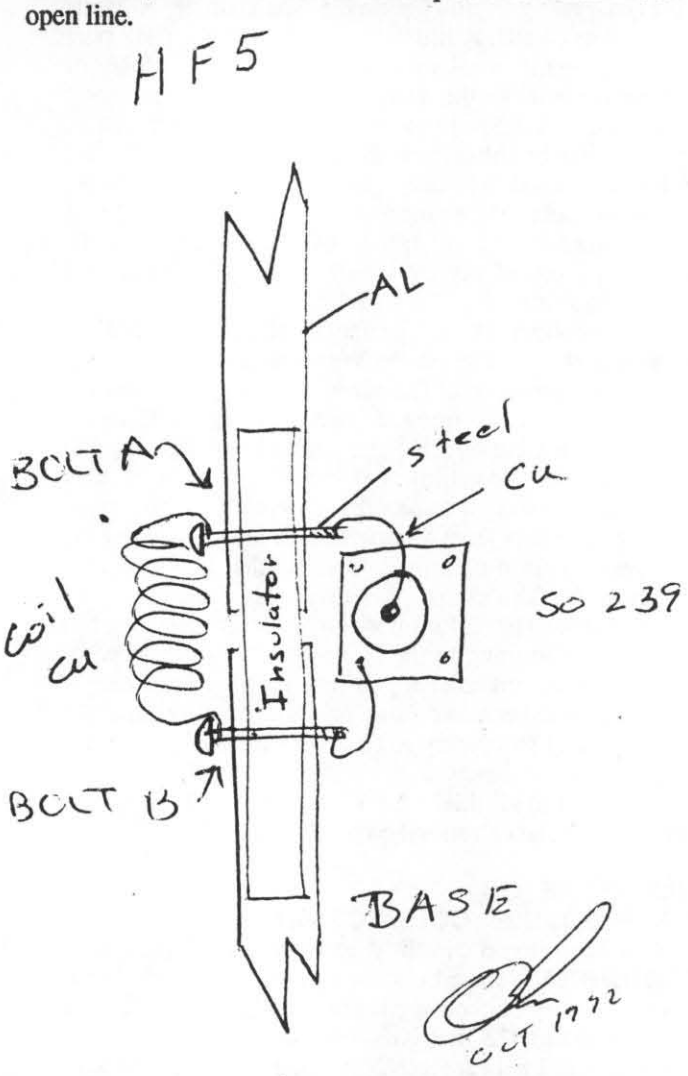
**Kris Merschrod** currently operates from Honduras as **KA2OIG/HR3**. Before he moved there from Costa Rica, he had the luxury of choosing his own callsign and operated for a few years as TI2QRP. Kris writes—

As soon as I read Joe's (N2CX) notes on the HF6VX in the July issue, I put the ohmmeter to the coax going to my HF5V because I'd had "shifting SWR" and "matching" problems since connecting it about a year and a half ago. Well, the ohmmeter said 3.860 megohms! My "matchbox" and coax must have been my "antenna". That makes QRP a greater challenge. Talk about a low ERP!

The problem wasn't the barrel connector (I'll explain below); it was the connection of the coax wires to the antenna. The connection consisted of the aluminum antenna parts, a steel (not stainless) bolt, a tinned steel connector soldered to a copper wire. If there is such a thing as a paradise for electrolytic spirits, then I'd recreated it right there. How many times do we use plated steel terminals and sheet metal screws to hold copper wires to aluminum tubing?

On most of my antennas I use an SO-239 connector on a plexiglas base so that it can be bolted to the antenna. Silicon tub sealer is used to seal the back of the SO-239 to try to keep moisture from penetrating through to the PL-259 and on to contaminate the coax. That way the coax can be properly connected and sealed as Joe suggested. In this case the wires going from the SO-239 were bolted to bolts A and

B (see figure). The 3.86 megohms was the resistance between the two bolts! There should not have been any resistance at all, but corrosion had built up so that it was like an open line.




Most antennas (commercial or homebrew) have this weak link in the feedline. Stainless steel bolts help, but when we sandwich aluminum and copper, then we have a problem.

Briefly, we should use as few different metals as possible, and then use a joint compound which is designed for those connections. Fortunately, in the aluminum-to-copper or aluminum-to-aluminum (see note) situation there are compounds available at electric supply houses because aluminum wire is used for domestic wiring along with copper. Some state codes require the use of these compounds with aluminum wire. These compounds are good when assembling telescoping elements. It assures a good RF connection, is weather proof, and also makes adjusting or taking the joints apart very easy because they are typically "greasy" compounds. I had put a small dab of it on the center connector of the PL-259s just to be sure, even if sealed, that they would not corrode in the barrel connector, but I'd forgotten to put compound on the main bolts.

(Note: Aluminum does oxidize (turns dull), and the aluminum to aluminum joints are potential RF problems.)—*DE KA2OIG/HR3*

## BUTTERNUT VERTICAL HINT

The Butternut HF6V vertical remains popular with QRPers. A hint from **Ron Thompson, FP/VE1KM** of Saint Pierre et Miquelon—

I have some modifications on my HF6V vertical antenna for humid, salty environments (like Saint Pierre, here). Because of the dangerous nature of the chemicals used on the aluminum surfaces, I do not think it a good idea to publish this information. However, I have found it a very good idea to take a number 40 drill bit and drill a small hole just at the top of the insulators that separate the different sections. These insulators act like plugs and trap any condensation which in turn hastens the corrosion of the tube from the inside. Putting a small hole in the tube allows the water to drain off, and putting a little oil in the tubes during assembly further reduces internal corrosion.—*DE FP/VE1KM*

## CHECKING LOW PASS FILTERS AT HOME

It's me again, WA8MCQ—**John Ward, KA3GNG,** is an "almost QRPer"; while he hasn't joined our ranks yet, he does tolerate our weekly QRP gatherings at Maryland Radio Center. Some time ago he let me play with his Ramsey 40 meter QRP transmitter kit; I slapped it on the CTS-3000 service monitor in the shop and checked the output on the spectrum analyzer function—the second harmonic was about 12 dB down from the fundamental, which is hardly acceptable. A quick check showed his kit did contain the correct component values.

A few months later the store bought an IFR FM/AM-1200S service monitor, which includes a spectrum analyzer. I hooked his rig up to it, and this time the 2nd harmonic was 20 dB down. (Either I made a mistake a few months ago on the CTS, or his rig had aged like fine wine.) It still wasn't good enough to suit me (or the FCC, which requires at least 30 dB if the power is 5 watts or less), so I offered to supply some mica capacitors and make a good 5-element Chebyshev low pass filter if he'd buy the toroids.

A few hours later I had the 2 coils wound and pruned carefully to the correct value, and soldered several carefully selected dipped mica capacitors together to form the 3 proper values. This is where my Boonton 260A Q meter really came in handy; winding the coils with the number of turns calculated from the Al value made the inductances a bit too high, even with the windings spread over the whole core, and would have resulted in the cutoff frequency being too low and excessive insertion loss at 7 MHz. (I had that happen to me before, on other filters.)

As for the capacitors, I needed values of 470 and 820 pf. I didn't have any 470's with suitably long leads, so I took a large handful of 240 pf caps (a lucky hamfest buy) and selected pairs that came close to 470 when soldered together. They were marked with a tolerance of 5%, but most of them were running beyond that, on the low side, which is probably why some manufacturer dumped them.

Checking the value on a Q meter is simple enough; I connected a convenient coil which was laying nearby, and set the variable capacitor dial in the Boonton to 200 pf. I varied the oscillator until I had resonance, and read the frequency on an external counter. Some quick calculations told me the coil was 4.378 microhenries. Adding a 240 pf capaci-

tor would give me a total of 440 pf; I calculated the new resonant frequency and set the oscillator to it. Connecting the capacitors one at a time, I varied the dial above and below 200 pf to find resonance. All required more than 200, indicating that they were all less than 240 pf. The amount over 200 on the dial told me how much they were below 240. The same basic procedure was used to select an 820 pF capacitor which was closest to the correct value.

Now for the fun part, checking the response of the filter. Sure, I could take it to work and slap it on the IFR—it has the tracking generator option, which pushed the price just above $10K and allows you to see a frequency-domain representation of the response, and adjust filters in real time. However, not everyone has access to something like that, particularly at home, and we need a good method which can be done easily by the average homebrewer. Here it is....

What we need to do is send a signal into the filter at a number of different frequencies and measure what comes out at each one. All you need is a signal source (I use a noise generator), some variable attenuators and a power measuring device (I use my TS-430S transceiver as a frequency selective voltmeter). The technique is a very old one—insert a network (such as a filter or attenuator) between a generator and measuring device, measure the output at the first frequency, replace the network with a variable attenuator and set it for the same output level. The value shown on the attenuator is the loss of the network at that frequency. Repeat for all frequencies of interest, at least up to the second harmonic. Using a good quality receiver with an S-meter is very handy, since most folks have one, and they have large dynamic range. General coverage is preferable, so you can check at every MHz if you want.

An actual example: I have a 40M low pass filter I built in a small Pomona die cast box, with BNC connectors on each end, and it's a handy experimenting aid. I connected it and looked at the signal on the S-meter—it was a hair under S9. I removed the LPF and got the same reading—if I cranked in 1 dB, there was a slight drop, so the insertion loss is under 1 dB. I switched up to 14 MHz, and with the filter in line there was no meter reading so I added the amplifier between the noise source and first attenuator—this gave a reading of a bit above S5. When I removed the LPF the meter shot up, and I had to insert 36 dB attenuation to get the original reading. Next, I checked it at every MHz between these two:

| | |
|---|---|
| 8 MHz | 2 dB? |
| 9 MHz | 6 dB |
| 10 MHz | 15 dB |
| 11 MHz | 20 dB |
| 12 MHz | 25 dB |
| 13 MHz | 31 dB |
| 14 MHz | 36 dB |

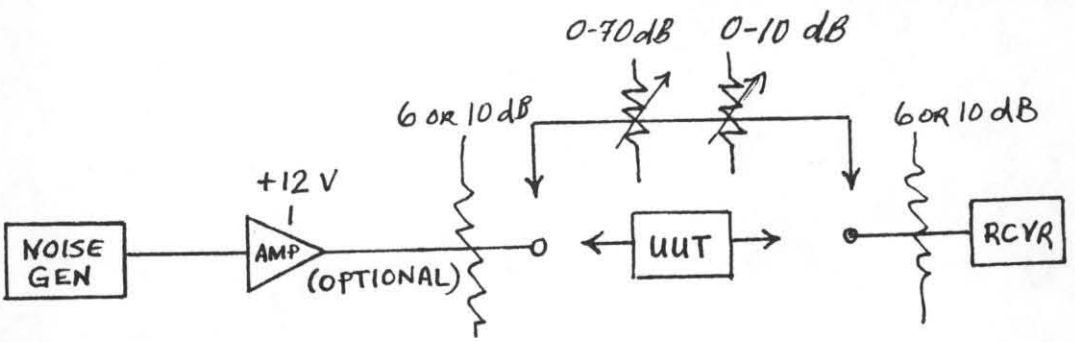
The final check at 14 MHz was done as a double check. While there may be an accuracy of plus/minus a couple dB, this is still good enough to give you an idea how good your filters are.

The figure gives the details. Note that a fixed attenuator is used on both sides of the UUT (Unit Under Test); this is to insure that it sees a reasonably clean 50 ohm termination, which is important when testing filters (or anything else). Some folks use 10 dB, and others use 6 dB (see the W7ZOI article in the December 1991 issue of QST, page 31); the exact value isn't critical.

One property of attenuators is that they tend to swamp out variations in impedance on the far side. I can take one of my 10 dB pads and terminate it with a nominal 50 Ω. When I "look through" it at the termination, I see 49.7 Ω. If the far end is open, or infinitely high resistance, I see 60.8 Ω instead of infinity. With it shorted, I see 40.8 Ω, instead of zero. Although the mismatches at the open or shorted far end are quite bad, they are reduced substantially at the near end of the attenuator, to 60 and 40 Ω. Opens and shorts are worst case figures—lesser mismatches will result in smaller deviations from 50 Ω.

Higher attenuation improves the termination even more (20 dB on a different attenuator gives 51.9 and 49.9 Ω for open and short, respectively), while lower attenuation has less of an effect—one of my 6 dB pads gives 84.0 and 30.3 Ω for open and short. (That 20 dB attenuator could even be used as a reasonably good 50 ohm dummy load or termination in a pinch, although you have to respect its power rating.) Naturally, using a 10 dB pad on each side means that you lose 20 dB of signal by the time you get to the measurement device. You can make it up by cranking up the level of the generator when possible, or adding an amplifier like I did above. It has approximately 37 dB gain (by actual measurement), and came from the June 1989 issue of QST, where it was part of a W1FB project. (If you build one, your may have somewhat more or less gain.) If using an oscilloscope or meter, you could simply step up to a more sensitive range.

For the receiver, you really should use one with an analog S meter. Many newer rigs come with digital bar graph displays, and each individual segment on them may represent more than one S unit—you simply cannot get sufficient resolution with them. The TS-450S and TS-850S are good examples—going from S7 to S9 (or S3 to S5, etc) is three bars for 2 S units. Since one S unit is nominally 6 dB, that's 3 bars for 12 dB, or 4 dB each. With the analog meter on my TS-430S I can reliably measure within 1 dB. (You could use the existing meter markings as reference points and make up a chart correlating them to decibels, but it's better and easier to use the variable attenuator substitution method and match meter positions.) If the rig has selectable AGC, use the FAST mode. The TS-430S doesn't let you do



it manually—it's selected automatically by mode, so I always use CW, which has fast AGC. There's nothing wrong with SLOW, but the meter is sluggish and that can slow you down a bit.

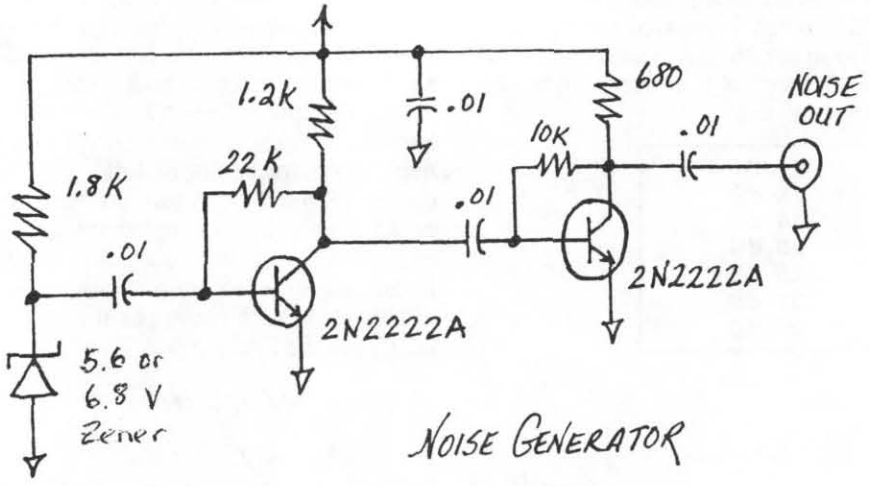
For the frequency source you can use a signal generator, but this can complicate things a bit. If you're using a receiver for the detector, you have to tune it for maximum response at the generator frequency. If either one of them drifts a bit, you might have to do some retuning. A noise source contains energy at all frequencies simultaneously, so you just use the receiver to look at a tiny slice of that energy, at one frequency (plus or minus the width of the passband). No retuning is necessary; even if the receiver moves a bit, the energy is still the same level, although with real-world noise generators the energy level will vary noticeably with large excursions. I use the circuit which has appeared in the ARRL handbook for years, embedded in an antenna noise bridge. Just build the circuitry before the bridge components. A similar circuit appears elsewhere in the handbook, as a noise source for signal injection during troubleshooting. Since these do not provide a 50 ohm output, the 6 or 10 dB attenuator mentioned earlier is important.

As for the variable attenuator, the best way to go is a pair of rotary units in series, one with 1 dB steps and the other with 10 dB. This allows you to change the value very quickly and precisely, with a twist of the wrist—just dial in the 10's and 1's. You can sometimes find rotary attenuators at good prices at hamfests. The most frequent models I've seen are the Hewlett-Packard 355C and 355D, which are 1 and 10 dB steps, respectively. Unfortunately, these are well known units and in constant demand, and command a hefty price, usually well over $50. You can still buy them new, for about $600. Other companies make less expensive attenuators, but even those are still up there, by homebrewer standards. I just received a catalog from Alan Industries; they have a number of good units in the $200-300 range. Look for the lesser known types at hamfests. (My units were made by Texscan, which is now known as Trilithic.) I've also seen units which contain two attenuators in one housing, with concentric dials, one for 1 dB steps and the other for 10 dB. My Cheapskates Pricing Guide won't let me pay more than $5 for a rotary attenuator, although bargains like that do take a LOT of hunting.

I also have a Kay Electric 432C attenuator; it is similar to the step attenuator in the ARRL handbook in that it contains a number of switches which let you insert various values to add up to the attenuation you want. For instance, for 34 dB you would turn on the 20, 10, 3 and 1 dB sections. This is less convenient and more error prone than the rotary attenuators. There's an awful lot of switch-flipping, and there is always the chance that you'll make an error since you have to add up all of the "on" sections for each reading.

I've used this method on a variety of low pass filters at home, and later checked many of them on the IFR service monitor. The home test results agreed closely, within 1 or 2 dB, validating the technique. (And how did the output of the Ramsey transmitter look with the new filter? Much better, thank you, but that's the subject of a separate article in a future issue.)

THE FINE PRINT: I've had many good comments over the years about the column (gads, is it REALLY my third anniversary already?), but it couldn't be as big without your inputs; let's Exchange those Ideas! Don't forget to send them and your technical tidbits to Severn (which, oddly enough, is many miles from the Severn River). QRP



NOISE GENERATOR

# LETTERS TO THE EDITOR

*QRP CREDITABILITY*

Here are some comments on the issue of QSL/Non-QSL requirements for awards, as well as QRP Credibility, but first an extract from G4BUE's Member News Column in issue 58 (Spring, 1989) of the GQRP Club's SPRAT --

"XXXX says the requirement for cards for the [GQRP] club awards is absolutely ridiculous; we are on honor as to the power we use, so why not on honor for the actual QSO? He suggests a log extract and declaration should be all that is required...My own view is that we should continue to require QSL cards because a card is the only way of confirming [that] the contact was valid. It can happen that an amateur genuinely believes he has made a QSO with another station, but for some reason the contact was not completed, or his call was mis-read, causing it to be an invalid QSO. By only requiring log extracts this type of borderline QSO would not be picked up. DXers all agree that the acquiring of the QSL card is often more difficult than making the QSO, and is all part of the fun (and frustration of the award chasing game..." (By the way, as of 1992 they still require QSL's).

Let's face it, some people simply refuse to QSL. There is a certain KO who I worked in both his home QTH of Colorado and at a DX location and who refused to reply either time, even with SASE's. What if I needed his card for something and only his card would do it? I'm out in the cold. Then there is another KO; I genuinely believed that I worked all 50 states with QRP during the 1988 CW SS, including one single station in Nebraska, but he didn't seem to think so. He refused five QSL requests; those included SASE's, dollar bills, homemade cards he only need to sign and drop in the mail box, certified mail, etc. He steadfastly ignored them all.

Did I really work him? Who knows? We traded contest exchanges (or so I thought), but I must admit I never did hear his "QSL ES 73" due to sudden QRM. This certainly qualifies as a borderline contact (or perhaps just another of those @#$%'s who refuse to QSL!). In the late 60's, I worked a certain person during a contest and wanted his card for some award. This ham, who was rather prominent nationally at the time, wrote back with his regrets that he never sent QSL's for contest QSO's, only for "real" QSO's!

I think the best solution by far is the suggestion by Mark, WO7T, in the October 1992 Quarterly - give awards on the honor system, with certified log extracts (I'm sure lots of awards are already done this way), and have a "Proven by QSL" endorsement sticker for added prestige (the sticker itself should be hand scribed by the Awards Manager to indicate what award and endorsement level it goes on; otherwise, someone could put the "QSLed" sticker for his QRP-25 award on his DXCC-QRP certificate!). If enough people like this idea, we could bring it before the Board and Awards Manager for a vote. As for the viewing of the cards, we can retain the currently used option of having two local hams view them and sign a statement to that effect.

I like the bit in SPRAT about being on our honor for the power, too. How do we really know someone is running only 5 watts or less, as claimed? This is one of those touchy subjects which is sometimes discussed when QRPers meet but seldom, if ever, addressed in print. There have been occasional people over the years who often sound suspiciously loud when they claim to be running QRP, taking into consideration band conditions, strength of other stations (both QRO and QRP) from the same region, etc. Or perhaps someone does have a very weak signal but claims such an exceptionally low power output that it still sounds suspiciously loud.

It's very interesting when you read about someone making a particularly impressive claim for unusually low power operation, write to them twice for details about the accomplishment

and they ignore both requests (I might buy the excuse of one getting lost in the mail, but two gets might suspicious). Makes you wonder, doesn't it? By the way, my station is open for QRP inspection by the Watt Police at all times; on request I will discuss my Power measurement and attenuating techniques at great length, and have done so many times (I am also willing to undergo a polygraph test on my claimed power levels, if anyone wants to foot the bill for it).

There is one person in New England who I really trust when he says he's QRP, having passed the Ultimate QRP Believability Test: I heard him on 7040 KHz on a Saturday morning, with a very loud signal. He said he was running 800 watts but would crank it down to 5 watts to check into the QRP net coming up in a few minutes. Sure enough, when he did check in, his signal had dropped by precisely the appropriate number of decibels, according to my well calibrated S meter, and he was at his normal QRP signal strength (which is still quite respectable). Now that's QRP Credibility (I'll gladly crank my TS-430S up to 100 watts on request at any time to establish my own credibility - or, in some cases, crank it up to at least one watt!).

Perhaps we could tactfully do this test with some of those suspiciously loud QRPers by asking them to put on the Big Rig "so we can see if it's really true that there's only a 2 S-unit difference between 5 and 100 watts".

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

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*MORE ON QSLing*

Hurrah for W9NJP and George Zimmerle, N4XDC! I firmly affirm your complaint against the present QSL cult.

While QSL cards are interesting, pretty and even mildly educational, and those who like them should continue to collect them, their value as an iron-bound confirmation of contact has become questionable at best. This is particularly true of cards from "rare" countries. Indeed, I believe that anyone who unquestioningly accepts the veracity of such cards probably is also a devoted disciple of the Great Pumpkin.

When in serious conversation, a friend tells me of some communication feat, I am strongly impelled to believe him. And I expect the same courtesy in return. This is the basis of civilized conduct, so a mere QSL card seems irrelevant. And let's agree: ultimately a QSL card is only as valid as the integrity of those who display it.

The present QSL business has become an enterprise in itself, having little to do with competence in the radio art, per se. Thus its present importance seems irrelevant. So I would fully agree that not only the QRP ARCI but also the other QRP organizations - and the ARRL - should drop the QSL card requirement for all operating awards.

Honest QSLing may indeed be difficult and expensive, but dishonest cards are relatively cheap. Why prolong this farce?

C.F. Rockey
Box 171
Albany, WI 53502

*(EDITOR's NOTE: We have had many letters on this topic published in past Quarterlies; I think it is time for the Board and the Awards Chairman to come to some conclusion on the subject.)*

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*QRP CALLING FREQUENCIES*

One night on the Homebrewers Net run by W3TS, the use of QRP calling frequencies was discussed. I suggested that in addition to the calling frequency a time also be designated; that the megahertz be minutes past the hour. Thus one would listen on 7 MHz at 7 minutes past the hour, etc. W3TS added that it should be done after the half hour as well; for example, 3 and 33 minutes after the hour for 3.5 MHz. Naturally, one must consider propagation with this scheme, but with the decline of the solar cycle, it should help QRPers make QSO's.

- Donald Younger, W2JEK

# OTHER CORRESPONDENCE

*FROM RUSSIA WITH LOVE*

Oleg, RV3GM wrote a letter and sent a QSL card. The card delineates QRV only QRP/CW. Now that is hard core! Oleg never runs more than 2 watts. His rigs include a TRX DC 80 meter at 0.3 watts; a TRX Xtal DC for 80, 40, and 20 meters based on the "Oner", and a TRX Xtal DC for 20 meters at 0.5 watts, along with solar panels for power. He usually is on 14.060 in the evenings. Oleg is a G-QRP Master #50, WAC, and near to completing DXCC-QRP.

He has his own firm called THE RADIO-S; the "S" is for simple. They produce simple RX, TX, and TRX units in kit form. They also produce guard systems for automobiles on radio channels.

One kit Oleg is particularly proud of is his MICRO-80 TRANSCEIVER KIT. It runs 0.7 watts output, has a 2 uV sensitivity, and full QSK. Oleg calls it the pocket transceiver. He sent the schematic, but we don't have the room to present it in this issue. The kit sells for $17.

If interested, send cash (or equivalent) only to Oleg V. Borodin RV3GM, P.O. Box 229, Lipetsk 398043 RUSSIA.

We wish Oleg all the best in his endeavor.

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*IMPORTED GEAR*

Ned, WC4X, writes that he is importing Mizuno HT's from Japan. The MX-18 is a 17 meter HT SSB & CW with 1 to 2 watts output. Ned claims it is an excellent single band QRP radio. He will have about 10 to sell at $325.00 shipped. He also has one MX-21 15 meter HT at the same price. If interested contact Ned Mountain, 185 Carriage Station Circle, Roswell, GA 30075, TEL: (404) 992 8576.

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*FROM DOWN UNDER*

Don, VK5AIL, sent me a copy of the LO-KEY, the journal of the CW operators QRP club in Australia. The journal is very well done, and reminds me of SPRAT. There is a plethora of articles covering the spectrum of ham radio activities. Their schematic drawings put us of the Quarterly to shame. They even list new members to their club. Nice touch.

I didn't see any dues schedule, but the Treasurer and membership Secretary is Kevin Zietz VK5AKZ, 41 Tobruk Avenue, St. Marys SA 5042 Australia.

Also speaking of the LO-KEY, Fred, W5QJM relates that an excellent article appears in the June 1992 issue of LO-KEY (#34) entitled "Review of K1BQT's QRP-20 Receiver". We are looking into the possibility of reprinting the article if we can get approval. Should you become a member of the Australian QRP organization, you may want to try and start your membership with the June 1992 issue.

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*When writing for information from any of our advertisers or article writers, please remember to enclose a self-addressed, stamped envelope.*

# COMMENTARY ON THE ARGONAUT II

*by*
*John Mori, N8MUU* *

It is perhaps fair to say that the introduction of the Argonaut II has caused somewhat of a stir. The first indication of this came from the October 1991 *Quarterly* where early purchasers of the unit quickly voiced their concerns. Like many QRPers, I anxiously awaited the long overdue delivery of the unit. My enthusiasm over the radio dimmed somewhat when I read those early concerns and I decided to wait and see what developed.

The January 1992 issue of the *Quarterly* and the January issue of QST added to the confusion. Myron's (WM4Z's) report seemed almost too good to be true, given the concerns raised by fellow QRPers and the technical staff at QST. I convinced myself that an Icom 735 with a CW filter would do just as well and went ahead and purchased one. I adjusted the necessary potentiometers and had a power range from under 5 watts to 100 watts. What more could I want?

I ran the Icom in some QRP contests and it performed well. But I just wasn't satisfied. My pulse quickened at Dayton when I heard that Ten Tec would be starting a new production run. I called the company to check on the progress of the new run and patiently waited awhile. I ordered the radio after the Fourth of July Holiday.

Let me share with you some of my observations regarding the radio and the press it has received.

First, I believe that the long delays in delivering the radio to the distributors heightened everyone's expectations. I know images ran through my mind of this being the "perfect" QRP rig. These heightened expectations were fed by Ten Tec's own advertising which said, "Many of the features are the direct result of feedback from the QRP 'Gurus'." You could only go downhill from here, and when the early reports of problems surfaced, I think many were needlessly disappointed and critical.

Second, I think more credit should be given to Ten Tec on two fronts. First, they **did** honor their commitment to the QRP community and develop a radio that brought QRP operations into the modern world. Admittedly, it has had a difficult start, but they did it. They also did develop and patent the new Jones filter. Some might not like all its operating characteristics and quirks, but Ten Tec did develop and risk the commercialization of a new development in amateur radio. No one seems to have given them credit for this bold initiative.

Third, the press and gossip surrounding the radio is something to behold. In hindsight, it seems that some of the early negative reports reflected true design glitches, such as the keying issue. Other criticisms seem to be the result of early production woes, where individual units exhibited individual problems. The commercial press offered no consensus. QST certainly seemed to stress the negative in their review. In fact, CQ said it was "nit-picky" and while CQ said they put the rigs through measured tests, there were few substantive performance results given. I heard one amateur at Dayton refer to the Argonaut II as a "dog". He didn't say he owned one; he didn't even say he tried one! It says something about the power of the articles in the *Quarterly*, the commercial press, and gossip in general.

The truth (to me) is that the Argonaut II is not the "perfect" QRP rig; it is overall a very good radio and certainly not the "dog" that some claim it to be. There are many excellent features to the radio and some items one would like to see improved. After I turned the radio on and became somewhat familiar with it, I realized just how "modern" this radio is. The vast majority of the functions are controlled from a microprocessor driven keypad. The VOX keypad accessibility is mentioned in the ads and reviews, but this is really minor. The Icom 735 is controlled almost entirely by 28 mechanical switches, and it seems to be "old technology" by comparison. The keypad functions can be learned rather quickly, even for an old "analog" man like me.

I was surprised by some of the features which either escaped my attention in the reviews or were not mentioned. Included are: a handle on the side of the radio; an annunciator to inform you of the mode you are in (it can be

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Morgantown, WV 26505

disabled); a scratchpad to store a frequency you use often; a process whereby cw signals are passed through a 1 kHz filter which eliminates a lot of extraneous noise; a lock function that disables the main tuning knob, and variable tuning rates for the main dial. Of course, all new production models have the external speaker jack and the accessory plug to operate the digital modes. If you wish, and you can buy their model 290 Step Attenuator at a modest price for instant milliwatting.

With one exception that I will mention, the rig worked just fine. Many of the complaints that appeared in the earlier issues of the *Quarterly* did not exist in my radio. Hence, the microprocessor has not locked up; I have been able to use a keyer and a TNC to control the keying with no problems; the rig is extremely stable from a cold start up; received signals did not appear attenuated; there were no complaints of frequency instability when sending CW, and so forth. The QSK is flawless. I hate to use a non-radio term, but it is **smooth**. My SSB reports have been good, and I have heard a few other SSB signals. They sound great.

That leaves the issue of the "birdies" or spurs to use the QST term. In certain portions of the radio spectrum (including some of the ham bands) spurs will be found 10.1 kHz apart. They are 10 Hertz wide. They were immediately eliminated when either the main tuning knob or the PBT was moved slightly in either direction. When I called Ten Tec they indicated that these signals were a result of the PLL technology. I was asked to ship the rig back for review.

Ten Tec realigned the mixer board and re-routed some of the wiring harnesses. The signals are still discernible with the antenna on, but the volume is substantially diminished. Am I concerned? Not really. With a signal that narrow, just touching the tuning dial (or moving the PBT) eliminates the signal completely. In a few discussions I have had with Argonaut owners, I conclude that they have not even detected the presence of these signals. While it would be nice if the signals were not there, it is not a problem in the real world.

Other findings should be mentioned. The power plug in the rear is not stamped for the polarity even though the manual says it is. It should be marked on the rear panel. A diagram of the digital display is desperately needed. I accidently hit the "F" and Shift key sequence to find a "M. Lock" appear. I could find no reference to it anywhere in the manual.

My verdict is still out on the Jones filter. It works well, but I disagree with WM4Z's account of its amazing selectivity. There may be a perceived difference in filter effectiveness because the selectivity is gradually attained as you turn the knob. The perceived instant selectivity of throwing a 500 Hertz filter in line is absent. I have run a lot of A/B tests and find it basically equivalent to the 500 Hertz filter in the Icom 735.

There have been complaints about the cost of the rig. Compared to what? The Argonaut II is a specialized radio that features most of the modern bells and whistles of other HF radios. The Argonaut is certainly more advanced than my 735 and costs must be compared perhaps to a Kenwood 450S. The chief competition to the Argonaut may well come from radios such as the 450 or a Yaesu 890, where one can turn down the power to achieve QRP levels.

But then we in the QRP community spend a lot of time harping about efficiency and such, so if we truly practice what we preach, the Argonaut seems to be the answer. Each of us will have to make our own decision on the price issue. It is expensive, but I am personally more peeved when I have to pay an equal amount to buy a 2 Meter all mode transceiver. All that money just to work one band! One can justifiably be "nit picky" but also remember that we are the group who spends most of our time and money finding ways to fix the HW-9!

My point in writing this is to tell you that I have not experienced many of the early problems that were reported in these pages. The Argonaut II is a full featured, state-of-the-art QRP radio. The service department at Ten Tec did their usual incredible job. I appreciate their courtesy, friendliness, and patience. That service actually means more to me than any particular bell, whistle, or issue over the radio.

Personally, I am basically satisfied with the radio. I would urge each of you who are interested in the Argonaut II to look at the radio as **objectively** as possible and make your own decision.

**********

# Contests

**by Red Reynolds**
**835 Surryse Road**
**Lake Zurich, IL 60047**

| Contest Calendar | |
|---|---|
| **Spring QSO Party-CW**<br>2000Z, April 3 to 2400 Z, April 4 | **Summer Daze Sprint-SSB**<br>August 8, 2000-2400 Z |
| **Hoot Owl Sprint-CW**<br>May 30, 2000-2400 Local Time | **Fall QSO Party-CW**<br>1200 Z, Oct. 16 to 2400 Z, Oct. 17 |
| **Summer Homebrew Sprint-CW**<br>July 11, 2000-2400 Z | **Holiday Spirits Sprint-CW**<br>Dec. 5, 2000-2400 Z |

# 1991 Holiday Spirits Sprint

**Top Three**

| | |
|---|---|
| W3TS | 304,440 |
| KH6CP/1 | 152,800 |
| WB2QAP | 141,570 |

**Single Band Leaders**

| | | |
|---|---|---|
| 40M | VE2BLX | 22,063 |
| 20M | K4KJP | 19,600 |
| 15M | KD2IX | 284 |

| | | |
|---|---|---|
| HI Band Leader: | KE2WB | 21,098 |
| LO Band Leader: | KN1H | 97,720 |

| State | Call | Score/Points/SPC | Pwr | Bands/Time | Rig | Antenna |
|---|---|---|---|---|---|---|
| CT | KH6CP/1 | 152,800/255/28 | .90 S | A-5/4 | HB 40, 20 HW-9, 509 | Dipole |
| FL | K4KJP | 19,600/100/14 | 2.0 S | 20 M/3 | Argo 509 | Yagi |
| GA | KE2WB | 21,098/137/22 | 5.0 | H-3/4 | HW-9 | Vertical |
| IL | K5VOL | 37,300/105/13 | .60 S | 20M/2 | HB 2-fer | Longwire |
| IN | NW9G | 43,659/189/33 | 5.0 | A-3/4 | Argosy-1 | Vertical |
| MA | N1BYT | 63,000/120/20 | .90 S | L-3/3 | HB Xcvrs | Loop |
| MA | KB1MJ | 18,706/89/11 | 4.0 S | 40M/2 | HB RX (S) HB TX | Dipole |
| ME | WA1WPR | 2,572/35/7 | 5.0 B | 40M/1 | HW-9 | Dipole |
| ME | KA1UEH | 630/20/3 | 5.0 B | 40M/- | HW-9 | Dipole |
| MI | N8CQA | 3,150/50/6 | 4.0 B | A-2/1 | HW-9 | Yagi/Inv L |
| MO | KBØWZ | 8,280/69/12 | 1.0 | 20M/2 | FT-7 | G5RV |
| NH | KN1H | 97,720/188/22 | .90 S | L-3/4 | HB Xcvr/HB RX (S), TX | Dipole |
| NH | NO1E | 14,385/137/15 | 5.0 | A-2/2 | FT-707 | G5RV |
| NJ | W2JEK | 47,560/72/10 | 4.0 | A-4/2 | HB 2-fer | Dp/GP/Hertz |
| NY | WB2QAP | 141,570/286/33 | .09 B | A-5/3 | Argo 509 | Yagi/Inv V |
| NY | AA2Y | 13,965/105/19 | 5.0 | A-3/3 | FT-102 | Yagi/Inv V |
| NY | WN2Q | 3,080/55/8 | 4.0 | 20M/2 | HW-9 | Attic Loop |
| NY | KD2IX | 284/9/3 | 2.3 B | 15M/1 | NCG-15M | Dipole |
| OK | WD5GLO | 3,750/50/5 | 2.0 | 40M/1 | HB Rockbender/Argo 509 | Inv V |
| OR | WMØB | 17,103/91/19 | 5.0 | 20M/4 | HB Radiokit | Yagi |
| PA | W3TS | 304,440/314/48 | .90 S | A-6/4 | HB Xcvr (S) | Yagi/Inv V/T |
| PA | WA3SRE | 18,200/130/14 | .90 | A-3/4 | Argo 515 | Vertical |
| TX | KI5AY | 13,860/110/18 | 5.0 | H-2/3 | FT-1000 | Yagi |
| TX | AA5HN | 13,064/72/8 | 5.0 S | 20M/2 | HB K9AY/Argo-2 | Yagi |
| VA | K4AHK | 19,580/81/9 | .40 S | 40M/2 | HB Xcvr | Attic Dipole |
| WI | NZ9U | 22,008/131/24 | 4.0 | A-34 | HW-9 | Loop |
| QUE | VE2BLX | 22,063/125/13 | 5.0 B | 40M/3 | HB MAVTI-40/m | Longwire |

Check Logs: K4KJP, W2FB

Time of operation is rounded to the nearest hour.

S=Solar/natural power
Dp=Dipole
A=All bands (160-6)
/m=modified

B=Battery power
Gp=Ground plane
H=High bands (20-6)
S)=Superhet

T=Tee
L=Low bands (160-40)
HB=homebrew

*This sprint rounds out the 1991 year and the end of the 1991 rules. Beginning in 1992, a number of changes were made, especially in the homebrew bonus points and power supply multiplier. The 2-FER now gets the same bonus as all other homebrew rigs and not double. Bonus for homebrew in the QSO parties was increased. Solar and Battery classes were combined and the multiplier changed to 1.25 1993 will probably see this multiplier phased out. 1992 may also be the last year for the SSB sprints, depending on participation. As always, the Quarterly is the final word on contest rules and schedules.*

# 1992 Winter Fireside Sprint

**Top Three**

| | |
|---|---|
| W3TS | 158,125 |
| WT3W | 47,880 |
| KCØPP | 42,550 |

**Single Band Leaders**

| | | |
|---|---|---|
| 20M | NXØQ | 32,775 |
| 15M | KF7ET | 11,074 |
| 10M | NØMEH | 770 |

HI Band Leader: KCØPP 42,550

| State | Call | Score/Points/SPC | Pwr | Bands/Time | Rig | Antenna |
|---|---|---|---|---|---|---|
| AL | W4DGH | 5,871/61/11 | 4.0 B | 20M/2 | Argosy-2 | Yagi |
| CA | W6SIY | 7,280/80/13 | 3.0 | H-3/3 | Delta | Mini Quad |
| CO | NXØQ | 32,775/138/19 | 2.0 S | 20M/4 | Argo 509 | Yagi |
| FL | WU2J | 35,930/130/23 | 10. | H-3/4 | Argo 509/m | Yagi/Vertical |
| FL | K4KJP | 26,100/116/18 | 2.0 S | H-3/4 | Argo 509 | Yagi |
| IA | WBØT | 19,521/97/23 | 6.0 | H-2/3 | Argo 509 | Inv Vee |
| ID | KF7ET | 11,074/113/14 | 7.0 | 15M/4 | IC-730 | Yagi |
| IL | KF9FU | 31,948/163/28 | 5.0 | A-4/4 | Argo | Dipole |
| KS | NØMEH | 770/22/4 | 4.0 B | 10M/4 | Argo 535 | Dipole |
| PA | K1KDG | 2,632/47/8 | 5.0 | A-3/2 | Argo 509 | Dipole, Vertical |
| MO | KCØPP | 42,550/148/23 | 3.0 S | H-3/3 | Argo 509 | Yagi |
| MO | KBØWZ | 19.992/136/21 | 10. | H-2/4 | FT-7 | G5RV |
| MO | WØGWT | 11,280/94/12 | 1.6 | H-2/4 | IC-735 | Vertical |
| NH | NO1E | 1,295/37/5 | 5.0 | H-3/3 | FT-707 | G5RV |
| NJ | W2JEK | 5,175/46/9 | 1.8 B | A-3/1 | Argo 505 | Dp/GP/Hertz |
| NY | WN2V | 8,925/85/15 | 5.0 | A-5/4 | Argosy-1 | Vertical |
| NY | KD2IX | 7,394/65/13 | 10. B | 15M/4 | NCG 15M | Dipole |
| OH | WA8RJF | 15,960/114/20 | 8.0 | A-3/3 | Argo 515 | Longwire |
| OH | WD8OJC | 13,120/82/16 | 2.0 | H-3/4 | Argo 509 | Mini Quad |
| PA | W3TS | 158,125/250/41 | 2.0 S | A-6/4 | HB Xcvr (S) | Yagi/Inv V/Tee |
| PA | WT3W | 47,880/171/32 | 5.0 B | A-5/- | TS-440S | Yagi/Inv L |
| WV | N8MUU | 25,536/152/24 | 4.0 | A-4/4 | IC-735 | Inv Vee/Vertical |
| WV | WF8X | 17,080/122/20 | 4.0 | A-3/4 | Argo 505 | G5RV/Butterfly |

Time of operation is rounded to the nearest hour.
S=Solar/natural power
B=Battery power
Dp=Dipole
Gp=Ground plane
T=Tee
A=All bands (160-6)
H=High bands (20-6)
L=Low bands (160-40)
/m=modified
S)=Superhet
HB=homebrew

# 1991 Milliwatt Field Day

The Milliwatt Field Day was resurrected in 1991 with 14 entries in the club and one/two operator class.

The Zuni Loop Mountain Expeditionary Force, (W6SKQ) took first place in the club category. The Zuni Loopers racked up 742 QSO's using a variety of rigs at one watt, about three miles of wire in the air, eight operators, and one BEAR, who are Bob Spidel's steak!

John Collins, KN1H, ran 750 milliwatts to a dipole 110 feet high, good for 260 QSO's , taking first place in the one/two operator category.

**Clubs**

| | | |
|---|---|---|
| W6SKQ | 11,292 | Zuni Loop Mountain Expeditionary Force |
| W3TS | 4,152 | Berrys Mountain ARC |
| WK9C | 3,402 | Northeast Illinois QRP Society |
| WY7Z | 2,424 | Cougar Mountain QRPers |

**One/Two Operators**

| | | | | | |
|---|---|---|---|---|---|
| KN1H | 3,270 | 1 watt | WK1G | 1.032 | 1 watt |
| NM7N | 1,740 | 5 watts | KT1G | 1.032 | 1 watt |
| N1BYT | 1,720 | 1 watt + N1DGO | KT1H | 480 | 5 watts |
| KZ1L | 1,554 | 5 watts + K1CGJ | N5JWL | 462 | 5 watts |
| KM8X | 1,542 | 5 watts | K5VOL | 12 | 1 watt |
| W7UAB | 1,134 | 5 watts | | | |

# AWARDS

Bob Gaye, K2LGJ
25 Hampton Parkway
Buffalo, New York 14217

## QRP ARCI AWARDS SUMMARY - THIRD QUARTER 1992 23-September-92

| CALL | DATE | BASIC | NOTES | MI/W | PWR | MODE | BAND |
|---|---|---|---|---|---|---|---|
| | | | **- DXCC -** | | | | |
| WA2UUK | 8/29/92 | 115C | | | 5.0 | SSB | MIX |
| W3ARK | 8/29/92 | 116C | | | 5.0 | MIX | MIX |
| SM6SLC | 8/29/92 | 117C | | | 5.0 | CW | MIX |
| | | | **- WAC -** | | | | |
| WA8RJF | 8/29/92 | 510C | | | 5.0 | CW | 14.0 |
| WA8HQO | 8/29/92 | 511C | | | 5.0 | SSB | 28.0 |
| JH1BUB | 8/29/92 | 512C | | | 5.0 | CW | 21.0 |
| G4MQC | 8/29/92 | 513C | 2-WAY QRP | | 2.0 | CW | MIX |
| WA7RQP | 8/29/92 | 514C | | | 5.0 | CW | MIX |
| PAØBGJ | 8/29/92 | 515C | | | 10PEP | SSB | 50.0 |
| | | | **- WAS -** | | | | |
| K7PJT | 8/22/92 | 323C | 20-50 STATES | | 4.0 | CW | MIX |
| W3FAF | 8/22/92 | 324C | 20-50 STATES | | 5.0 | MIX | MIX |
| WA8RJF | 8/22/92 | 325C | 20-30 STATES 2-WAY QRP | | 5.0 | CW | MIX |
| WA8HQO | 8/22/92 | 326C | 20-50 STATES | | 5.0 | MIX | MIX |
| N8PCX | 8/29/92 | 328C | 20-30 STATES 2-WAY QRP | | 0.5 | CW | 14 |
| SM6SLC | 8/29/92 | 328C | 20 STATES | | 5.0 | CW | MIX |
| WB,POQ | 9/7/92 | 319C | 30 SEAL | | 5.0 | CW | MIX |
| | | | **- QRP-25 -** | | | | |
| WA8HQO | 8/22/92 | 1035 & 50 SEAL #557 | | | | | |
| WA8RJF | 8/22/92 | 815 50#556 100#338 200#117 | | | | | |
| N7JXS | 8/22/92 | 1022 200 SEAL #118 | | | | | |
| N8PCX | 8/29/92 | 1036 & 50 SEAL #558 | | | | | |
| VE2BLX | 8/29/92 | 1014 100 SEAL #339 | | | | | |
| K8RL | 8/29/92 | 1037 | | | | | |
| | | | **- 1000 MILE / WATT -** | | | | |
| GWØOSQ | 7/3/92 | 1296 TO AC8W | 2-WAY QRP | 2,970 | 1.2 | CW#945 | 28#190 |
| WGØI | 7/3/92 | 1297 TO EC8ARX | | 2,153 | 2.0 | CW#946 | 21#406 |
| K4TWJ | 7/3/92 | 1298 TO VK6HG | | 44,180 | 0.25 | CW#947 | 18#1 |
| NM1K | 7/3/92 | 1299 TO YJØAMH | | 1,702 | 5.0 | CW#948 | 14#241 |
| WA8RJF | 7/3/92 | 1300 TO PY5CC | | 1,022 | 5.0 | SSB#268 | 50#52 |
| JA1GTF | 7/3/92 | 1301 TO KP2J | | 1,662 | 5.0 | CW#949 | 10#10 |
| JA1GTF | 7/3/92 | 1302 TO ZP6CW | | 222,880 | 0.05 | CW#950 | 14#342 |
| WA8HQO | 7/3/92 | 1303 TO ZL1ATW | 2-WAY QRP | 1,678 | 5.0 | CW#951 | 28#191 |
| WA3ULH | 7/3/92 | 1304 TO ZL1AH | | 1,679 | 5.0 | CW#952 | 14#343 |
| KC6QOQ | 7/3/92 | 1305 TO JA8DEB | | 1,704 | 3.0 | CW#953 | 14#344 |
| WA9OHR | 8/29/92 | 1306TO K7ZR | | 2,299 | 1.0 | CW#954 | 7#184 |
| G4CLD | 8/29/92 | 1307TO VK2ACG | | 2,112 | 5.0 | CW#955 | 14#345 |
| KD6GNQ | 8/29/92 | 1308 FROM KBØIWV | | 5,572 | 0.25 | SSB#269 | 14#346 |
| N5SAN | 8/29/92 | 1309 TO KC6BLW | | 3,294 | 0.5 | CW#956 | 14#347 |
| N5SAN | 8/29/92 | 1310 TO WB7CRK | 2-WAY QRP | 2,056 | 0.5 | CW#957 | 24#2 |
| N8PCX | 8/29/92 | 1311 TO PY2ZI | | 12,588 | 0.4 | CW#958 | 14#348 |
| G4MQC | 8/29/92 | 1312 TO VK5FE | 2-WAY QRP | 5,048 | 2.0 | CW#959 | 14#349 |
| VK5LG | 8/29/92 | 1313 TO VK6ALC | | 37,033 | 0.03 | CW#960 | 14#350 |
| DL6FBQ | 8/29/92 | 1314 TO WØGK | | 4,656 | 1.0 | CW#961 | 21#407 |
| PA3FGI | 8/29/92 | 1315 TO VE1YX | | 16,140 | 0.2 | SSB#270 | 50#53 |
| VE1YX | 8/29/92 | 1316 FROM PA3FGI | | 16,140 | 0.2 | SSB#271 | 50#54 |
| JL2LPX | 8/29/92 | 1317 TO FT5ZB | | 1,579 | 4.0 | SSB#272 | 28#192 |
| G4WQW | 8/29/92 | 1318 TO VK6WT | | 1,822 | 5.0 | CW#962 | 14#351 |
| KF7CD | 9/20/92 | 1319 TO WN1F | | 1,053 | 2.0 | SSB#273 | 7#185 |

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# Members' News

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

## To all who contributed . . .

As 1993 begins, I want to express my thanks to all the QRPers who took the time and effort to contribute to Members' News in 1992.

Since its re-start with the April edition of QRP Quarterly, Members' News contributions have grown steadily, and the words of encouragement and support about the column from club members around the country and world have been most appreciated.

**KI6SN**
. . .Richard Fisher

Here, in no particular order, is a list of all who, through their contributions, helped make MN a success last year.

**KA2OIG/HR3, Kris Merschrod; AA2U, Randy Rand; W3RDF/TA2ZD, Don Shipman; K3TKS, Danny Gingell; G4BUE, Chris Page; WG5G, Dan Walker; N5JWL, Dick Swanson; WA6ARA, Mike Herr; N6GA, Cam Hartford; W6SKQ, Bob Spidell; WX7K, Josh Logan; WA8MCQ, Mike Czuhajewski; N9BDL, Lee Andreas; W9NJP, Jim Griffin; HL9BK/K2KSY, Frank Kelson; K0BZV, Carl Hattan; GW0LBI, Leighton Smart; WA0RPI, Jim Lageson.**

A QRP salute and 72 to you all.

For those who have yet to share their good news or challenges with the fraternity, a reminder that the welcome mat is always out. There's room for everyone in MN, so keep those cards, letters and photographs coming in 1993.

— R. E. F.

## From Russia . . . With QRP

**Yuri Dzyuba, VE2XLT,** sends this dispatch from Montreal:

"Three years ago I came to Canada from the former Soviet Union. First I got started in 1968 as **UB5LT** running maximum legal power for my third category license of 10 watts input on 40 and 80 meters.

"This did not bother me much, for I also did not have the privilege to contact so-called 'capitalist' countries and was restricted to the USSR, Poland, Bulgaria, etc.

"In 1973 I was arrested and charged for 'anti-Soviet slander' by the KGB. My radio equipment was confiscated and after five years conviction I could not operate a ham station any more.

"Only 20 years later I got a chance to resume my hobby in the New World. Here I have evolved from catch-all activity, through 10-X SSB chasing and kilowatt 40-meter DX-ing, up to the most thrilling QRP experience.

"Though I am quite happy with my FT-757 GXII enabling me to crank output power down into the milliwatt region, I am planning on building a small power consumption rig for Field Day QRPing, admitting availability of parts and filters in this part of the world. While back in Russia only those in the defense industry had access to RF components for homebrewing.

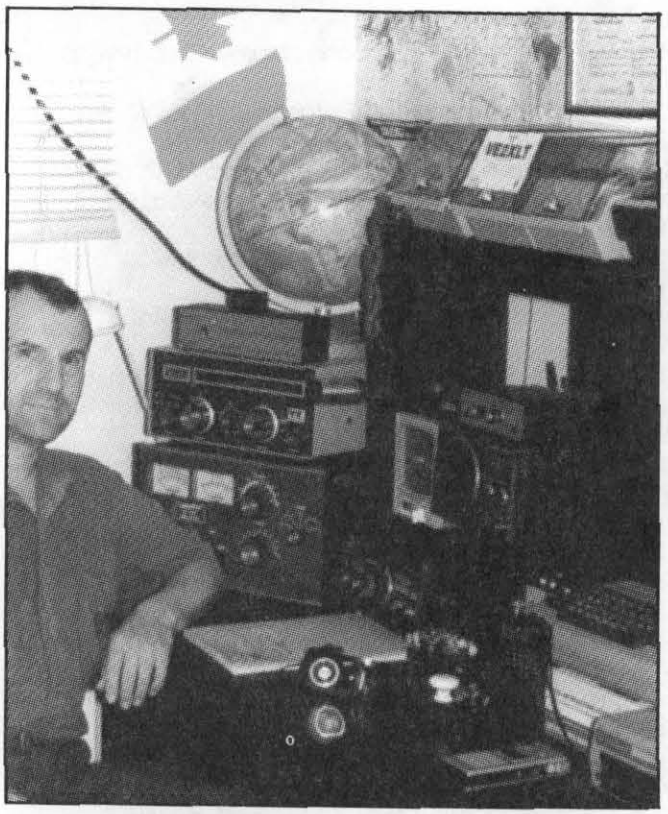
"My Palomar M-835 SWR/power meter gives me exceptional possibility to monitor power very accurately from 20 milliwatts to two watts on its QRP range and it turned out to be that the vertical delta loop for 40 meters is a nice performer on 30 and 20 meters.

"The Cushcraft R-7 half wave vertical made it possible to make QRP one watt contacts with Europe on all its seven bands — 10 to 40 meters — while in favorable propogation.

"I like to QNI in your nets and my recent QRP achievements include **NV2F, Alfred Lorence,** of Dorchester, N.Y., who gave me a 449 for my 100 milliwatts on 30 meters; **ON4UN** on 40 meters running one watt, so I am going to apply for the 1,000 Miles Per Watt Award soon.

"Though I still cannot resist the temptation to fire-up my linear on hearing a ZS4 station calling CQ on 160 meters, I believe that QRP ARCI membership will gradually elevate my QRP communication from about 30 percent now to some 90 percent in the future so that my neighbors would not complain about their alarm clocks and answering machines being triggered by RF late in the night.

"And my friend **(Leonard Arsenault), VE2BLX,** (of Montreal) is also happy to have one more competitor in contesting QRP from Quebec."



**Canadian QRPer** Yuri Dzyuba, VE2XLT, sits at his operating position in his shack in Montreal. After leaving the Soviet Union, Yuri now enjoys QRP in Canada using a Yaesu FT-757 GXII.

## Help wanted: HW-7 modifications

**Dave Elmore, KE9PO,** writes from Kentland, Ind., that he has an HW-7 and is interested in modifying it, including putting the popular Heath rig on a WARC band.

"Some time ago I sent for a book with the mods for the HW-7, 8 and 9 rigs," he says. "My check was returned due to no more books."

Dave would really like to get a copy of the modification book, and "would like to talk to anyone who has converted the HW-7 to 30 meters."

If you can give him a hand with either the book or the 30 meter conversion, write to him at: **209 E. Washington, Kentland, IN, 47951.**

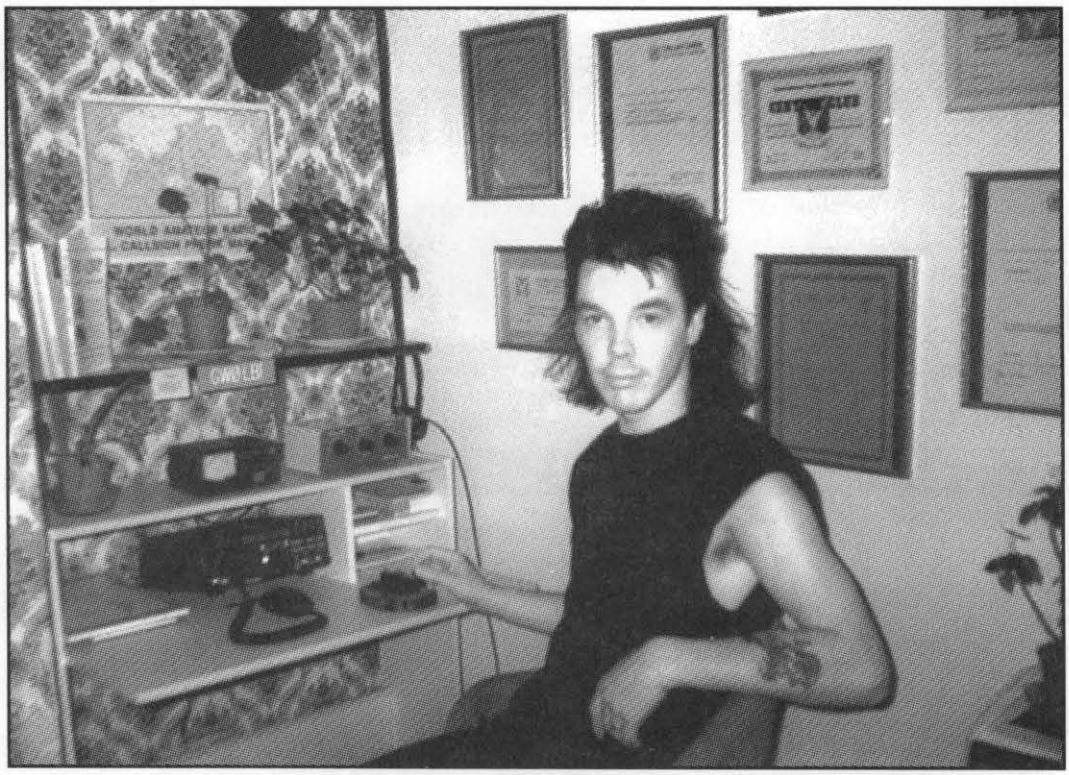
## Expanding QRP horizons

**Dennis Vincent, WW1P,** sends thanks from Berwick, Me., to a couple of QRP ARCI members who — through QRP Quarterly — enlightened him about other aspects of the hobby.

"I recently sent letters to **Mike Herr, WA6ARA,** and **Dick Swanson, N5JWL.** I received very nice letters from Mike about QRP and satellites, and from Dick about 10 meter FM.

"Both letters contained lots of information and I am now using these modes with QRP."

Dennis adds that he sends "thanks to **Rich (Arland), K7YHA,** (of Wilkes-Barre, Pa.), for being my first RS satellite contact."



**From his QRP** station in Wales, Leighton Smart, GW0LBI chases DX using an FT 747G, a Daiwa CN101 power meter and an Amtech 300 antenna tuning unit. His antennas include a 60 meter longwire, trap dipole, and four monoband dipoles.

## From Wales, the best of a bad situation

From Mid Glamorgan, Wales, **Leighton Smart, GW0LBI** writes that July-August 1992 "has been rather poor conditions for low power operating here in Europe, particularly on the higher bands.

"Much of my time has been therefore spent on 160 meters, trying to increase my country score there.

"I have now reached 27 countries on this band with both QRP SSB and QRP CW, the greatest distance being a **UA3** at approximately 1,500 miles. The other catch was **4J1FS** (Malij Vysotski Island) with three watts of CW up the spout! Not bad for the summer doldrums!"

Leighton says that another new catch was **JW0D** (Svalbard) on 17 meters, with 500 milliwatts CW. "As the contact progressed, I gradually reduced the power output until the drive control was at zero. At this point on the control the rig still puts out some power — somewhere in the region of 50 milliwatts or so, yet I received a 439 report at this level!

"I could not believe it! Anyway, I'm looking forward to (this) winter in the hope that conditions will improve on the higher bands like 15 and 10 meters — especially in the hope that I'll be able to work some of our members with QRP SSB.

"I work regularly with SSB, (10 watts PEP maximum from the modified rig) so it should be no problem to work my fellow QRP SSBers on the bands."

## Goodie Giveaway

If a survey were taken of the workhorses of QRP homebrew design, the **MPF102** would certainly be near the top of the list. Builders will atest to the fact that there never seem to be enough of these popular field effect transistors around. They show up in schematics all of the time.

And thanks to the generosity of QRP ARCI member and homebrewer **Dong Hyun Cho, HL2DDK,** a Ph.D. in the Biology Department of Kang Won National University in Chun Chon, this month's Goodie Giveaway is **30 of the popular FETs.**

They come to Members' News by way of **Mike Czuhajewski, WA8MCQ,** who kindly passed them along for this quarter's prize.

The winner? **Yuri Dzyuba, VE2XLT,** of Montreal, Quebec, Canada. The devices might come in handy in a QRP rig he would like to build for Field Day.

A sincere 72 and thank you to Yuri for his news item and photograph.

And keep this in mind: Everyone contributing news items or photographs to Members' News is eligible for the current quarter's giveaway. So let the membership know what you've been up to, and get into the running for a goodie at the same time.

## Etc., and so on . . .

**Dan Walker, WG5G,** of San Antonio, Tex., is the new QRP DX columnist for Michigan QRP Club's quarterly publication **"The Five Watter"** . . . The October 1992 edition of **The NWQ Newsletter,** a periodical published by the NorthWest QRP Club, shows membership numbers approaching 100. Club founder and membership chairman **Bill Todd, N7MFB,** has a new address as of Nov. 1, 1992. It is 4153 49th Ave. SW, Seattle, WA, 98116 . . . **Kris Merschrod, KA2OIG/HR3,** has QSY'd to W1-Land. His QSLing address is 161 W. Norwalk Rd., Norwalk, CT, 06850. But stay tuned. "I hope to be in South America in early 1993 and will be operating QRP from there," he says . . .

## NEIQS: Nothing, and a lot

"We have no officers. No constitution or bylaws. No business meetings. No dues, currently." But what the **North Eastern Illinois QRP Society** *does* have is "much enthusiasm for QRP, a QRP net on 3.560 MHz each Thursday (except the first Thursday of the month), an active group of builders, an active Field Day operation, a lively monthly meeting, and a great quarterly newsletter."

Anyone who would like to subscribe to the NEIQS newsletter should send a supply of at least five business-size self-addressed, stamped envelopes to: **Lee Fenton, WS9F, 1970 Heather Dr., Aurora, IL, 60506.**

## A QRP voice from Vancouver Island, B.C.

**Ken Orton, VE7BLU,** of Nanaimo, British Columbia, Canada, writes that "Not being a type that is easily pleased, I was pleasantly surprised when I opened (the October QRP Quarterly) up — all those tricks that one can, or attempt to do to an HW8."

He says he loves his version of the rig — "slightly modified."

"I really did enjoy the articles, I must admit," Ken writes, "and hopefully will add something to it one day."

Ken says his interest in being a radio amateur goes back to the 1930s. "I was preparing for my ham exam in Leicester, England, when the war broke out in 1939. That was that.

"I spent from 1940 to 1946 in the RAF and British Army."

Ken received his Canadian ticket in 1959 and has worked QRP "off and on over the years, but like to think it really started in September 1990" with a two transistor crystal-controlled transmitter running one watt. On November 10 he QSO'd **ON4MFT** (Belgium) using a wire antenna, and **JF4MBC** (Japan) with a TA33 beam. "I was hooked!"

Ken says he would like more details of requirements for awards.

He has yet to meet a member of QRP ARCI, "or I have, but did not know it."

"Our club in Nanaimo, B.C., had a project during last winter — a receiver for 10 MHz, and later a transmitter," he writes. "There were quite a few builders, but *very few* completed the receivers. None completed the transmitter, which was a shame."

Ken says he's going to check into some of the QRP nets in an effort to hook up with other club members, and that he will be "looking forward to having a few QSOs with members and giving reports from Vancouver Island."

## An SSB QRP log from N5JWL

There's DX to be snagged using QRP in the phone bands, and Dick Swanson, N5JWL, is proof of the fact. Here is a list of his SSB QRP DX showing total confirmed countries from his San Antonio, Tex., location. His rig is an Argonaut 505 feeding a Mosley TA-32 Jr., two element beam.

| Station | Location | Band |
|---|---|---|
| EI4FP | Ireland | 10 |
| EI8GS | Ireland | 10 |
| G0BBV | England | 10 |
| SM7FN | Sweden | 10 |
| LA9HW | Norway | 10 |
| TM6A | France | 10 |
| OZ1BUR | Denmark | 10 |
| Y24GE | Germany | 10 |
| ON4AMT | Belgium | 15 |
| ON4AAQ | Belgium | 10 |
| OE2BAN | Austria | 15 |
| EA2KL | Spain | 10 |
| EA1EVW | Spain | 10 |
| EA7DHP | Spain | 10 |
| I1POR | Italy | 10 |
| IX1BGJ | Italy | 10 |
| IP4T | Italy | 10 |
| IK1GPG | Italy | 10 |
| YU3MM | Yugoslavia | 20 |
| OM7LO | Czechoslovakia | 20 |
| OK3TDP | Czechoslovakia | 15 |
| ZP5XHM | Paraguay | 10 |
| HZ1HZ | Saudi Arabia | 10 |
| YS9YS | El Salvador | 15 |
| LU1VZ | Argentina | 20 |
| HC1OT | Ecuador | 10 |
| CE5GCW | Chile | 15 |
| KA5TBF/HK3 | Colombia | 10 |
| N6EK/HC8 | Galapagos I. | 10 |
| V31TP | Belize | 10 |
| J88BS | West Indies | 10 |

*Source: Dick Swanson, N5JWL, San Antonio, Tex.*

## QRP is OK in OK

**The Oklahoma QRP Group** was started by a handful of people, writes **Louis Nix, WD5GLO,** from Moore, Okla., "and has grown to 28+ members in only three years."

"We've been putting on a QRP seminar the last few years at the local hamfest," but the group has no officers and "nobody is 'in charge.'

"We also do not have official dues. Donations are gathered and used," he says, but the group's newsletter "outruns the donations quickly. I make my 'donation' by getting the newsletter out despite an empty 'kitty.'"

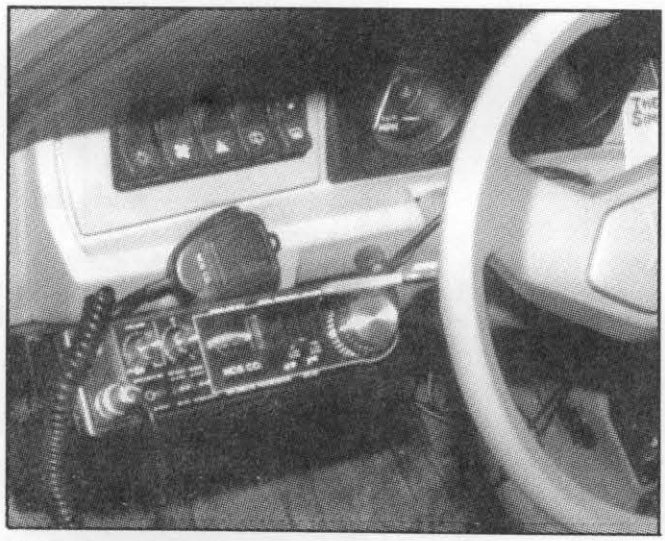
Louis says the newsletter "does a lot for the local guys, allowing them to share their ideas with others. I do not have a fancy computer . . . just an old Commodore 64. I've been putting out a bi-monthly (sometimes monthly, if there's enough input) newsletter for three years now." Last December, however, he planned to step down, hoping to pass his editing duties to another member of the group.

The Oklahoma QRP Group has a net on 7.060 MHz Sunday mornings at 8:30 a.m. Central time. "Anyone is welcome," Louis says.

The group meets on the second and fourth Saturdays of the month at locations in Oklahoma City. "On the second Saturday we meet at the south Denny's Restaurant located just off of S. 82nd and I-35.

"On the fourth Saturday, we meet at the Denny's north restaurant located at Portland and N. 39th Street."

Louis writes that he's 30 years old and has been an a CW operator for 15 years. "I work as a radio technician for the city of Oklahoma City in the fire department."



# QRP from Yugo

**Texas QRPer** Dick Swanson can sign "N5JWL, 15 meter QRP mobile from Yugo," but it's not the former Yugoslavia. His NCG-15M mobile rig is tucked beneath the dashboard of his Yugo automobile to the lower left of the compact car's steering wheel. Dick's QTH is San Antonio.

## Correction

The day and time of a newly-formed 10 meter QRP SSB/CW net was incorrect in Members' News in the October 1992 edition of QRP Quarterly. The **TCSN (SSB/CW)** is held **Saturdays at 1900Z on 28.322 MHz.** Net control is **Max H. Adams, KA9JKK.**

*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.*

# Townsend Electronics

With the end of our largest kit company, amateur radio has suffered a setback. There are a number of small companies springing up around the USA that are trying to fill the void. We are one of them. Rather than try to develop a line of amateur radio kits from scratch, we went to the largest kit company in England in order to get a complete line of kits now that are ready to go and proven performers. That company was C.M. Howes Communications.

What do we offer? Transceiver kits for all the HF bands from 160 to 10 M. But best of all for you QRP experimenters, we offer a degree of flexibility unmatched by other kit makers. We offer our kits as a complete unit *or* you can buy whatever separate kits you need. Use our case as a backbone to put your entire station in–or just use it to try out various VFO's you wish to experiment with using our transmitter/receivers. Experiment with it!!

**What do we have? Here is a partial list:**

✔ 160/80 M DSB/AM/CW Transceiver

✔ 80, 40, 30, 20 M Single Band Transceivers

✔ 15/10 SSB/CW Transceiver

✔ QRP Antenna Interface Unit, which includes an SWR Bridge, Dummy Load, Power Meter, Sidetone Generator/Code Oscillator, Transmatch with Balun.

✔ 5 Digit Matching Digital display for any of the above *(will also work with your present homebrew equipment)*

Plus: 4 digit Digital Display for any analog equipment, Active Antennas, Crystal Calibrators, Mike Amps, Audio Filters, Speech Processors, and , of course, receivers, VFO's, transmitters, S-meters.

Mix our kits with your homebrew gear or other commercial kits. Add an S-meter. Try it.

Look for us at Dayton. We'll be there. Send for our free catalog of kits, books and radio mounts. Please include a dollar is you wish First Class Mail. Include your QRP-ARCI number and get a certificate worth 10% off on your first purchase.

**Townsend Electronics, Inc.**
**P.O. Box 415**
**Pierceton, IN 46562**
**1-219-594-3661**

## PC BOARDS

FAR Circuits is now adding printed circuit boards from past *QRP Quarterly* articles to its extensive lineup. The following boards are now available:

| | |
|---|---|
| Two-Fer Transmitter | $4.50 |
| Stalking the Stable VFO | $4.00 |
| Curtis 8044ABM Iambic Keyer | $4.50 |

These high-quality glass-epoxy boards are tinned and predrilled. The Two-Fer and Keyer boards are screened with component designators to ease assembly. A complete listing of offerings is available for an SASE. Please include $1.50 per order for postage and handling. Address your order to:

FAR Circuits
18N640 Field Ct.
Dundee, IL 60118

# QRP Classifieds

FOR SALE–Argonaut 509, Model 405 linear, 208 audio filter, crystal calibrator. 1.8 kHz crystal IF filter. $400. Call Rich Arland K7YHA, 717-825-5395.

WANTED–MFJ-820 SWR/Power Meter. WX7K Logan, 7521 West 8th Place, Lakewood, CO 80215.

## Back Issues of the Quarterly

Back issues of the QRP Quarterly are available from Doug Hendricks, KI6DS, 862 Frank Street, Dos Palos, CA 93620. He has photocopies of the Quarterly from 1985 through 1991. They are bound individually by years, and the cost is $10 per year of your choice. A complete set of all seven years is available at the special price of $60. The shipping and handling charge is $3 per order.

# Tejas RF Technology

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

**BACKPACKER II TRANSCEIVER MODEL TRFT-550**

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

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

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

**SWR/POWER METER, 1-30 MHz MODEL 8401**

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

**TUNABLE BANDPASS AUDIO CW FILTER MODEL 92150**

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

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

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

**SCOPE RF MONITOR SENSOR MODEL 92111**

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

**GEL CELL BATTERY CHARGER MODEL 8101-12v**

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

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

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

***Other kits available include:***

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

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

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

# Having subscription problems?

We've been getting a lot of requests for replacement copies of issues never received. Please realize that the post office will not forward The Quarterly when you move, nor will it return undeliverable copies to us.

So many people are moving without giving us a change of address, that a lot of Quarterlies are ending up in post office limbo. Replacement copies cost much more to mail and, quite frankly, take up a lot of time that we would rather be spending doing other things. We will no longer replace missing issues at no charge to those who do not send a change of address to Mike Kilgore, KG5F; 2046 Ash Hill Road; Carrollton, Texas 75007.

If you are having a problem with getting you magazine, contact Mike so he can verify the status of your subscription. If he does not have your current mailing address, or he finds that your subscription has lapsed, it will cost $2 for each replacement copy requested.

## QRP ARCI History, Purpose and Policies:

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

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

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

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

## New Member/Renewal Data Sheet

Full Name_____ Call_____ QRP Number_____

Address_____

City_____ State or Country_____ Postal Code_____

[ ] New Address?
[ ] New Call?
Amount Enclosed _____
** Please do not send cash! **

[ ] New Member (US $12, DX $14/£7)
[ ] Renewal (US $10, DX $12/£6)
Please make your check or money order payable to: **QRP ARCI.** Note: Renewals must be received 30 days be fore publication.

Mail to: Mike Kilgore KG5F
2046 Ash Hill Road
Carrollton, Texas 75007

UK address: Dick Pascoe GØBPS
3 Limes Road
Folkestone, Kent CT19 4AU

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