QRP Quarterly

Journal of the QRP Amateur Radio Club, International
January 1994 Volume XXXII Number 1

The New ARK 40 by S&S Engineering

See review on page 23

Contest Results!

1992 QRP ARCI Summer Homebrew Sprint
1992 Summer Daze SSB Sprint
1992 Spring QSO Party
1993 Fall QSO Party

Results begin on page 26

Letters to the Editor

LOOP ANTENNAS

As befits the "Grand Old Master of Ninth call-area QRP", Brice Anderson, W9PNE, rang the bell with his article "Single and Multi-turn Loop Antennas" (Oct. 1993 QRP Quarterly). For those QRPers who enjoying experimenting but lack the funds and facilities for highly sophisticated work, the small loop offers a delightful field of effort. I enjoy it myself and recommend it heartily.

However, as I gladly doff my hat to Brice, I would respectfully offer a small codicil to his fine work based on some experience with small loop antennas.

First, while Brice is completely correcting in asserting that the larger the loop and the "fatter" its constituent conductor the greater its radiation efficiency, I have not found that expensive large diameter tubing is absolutely necessary for its use. Indeed, a simple square of copper wire–I have successfully used No. 12 B&S Gauge (house wiring) material–supported on a simple "cross-buck" of dry wood with happy results: five continents with 5 watts easily on 14 and 21 MHz.

While obviously neither as efficient or as refined as Brice's tubing-jobs, a wire loop, carefully made and tuned to exact resonance, will amaze you with its performance, cost relatively little, and tax your shop facilities far less.

As Brice is careful to point out, the small loop antenna is tightly limited, size-wise, in two directions. If made too small its radiation efficiency rapidly drops toward zero. If made too large, a point is soon reached when you will not be able to tune it to resonance. Brice has recommended, for a single-turn loop, that its perimeter not be greater than one-third the wavelength at the highest operating frequency but I have found this to be a bit too large. Most variable capacitors have too many picofarads at the minimum-capacitance end to reach resonance with a loop of this size.

With due respect to Brice, I'd recommend a maximum perimeter of 0.23 wavelength at your maximum operating frequency. With an appropriate variable capacitor in use, resonance is then practically insured. (Just divide the constant number 226 by your maximum operating frequency in Mhz to determine the length of wire or other conductor in feet to be used in a single-turn loop–easy, isn't it?)

Once you have determined this, you may tune your loop to any lower frequency without problems. Be warned, though- its radiation efficiency will then drop rapidly indeed! I believe that Brice will agree that a small loop should not be used over more than a two-to-one frequency range if a reasonable effectiveness is to be had overall. While I have my own ideas upon coupling the loop to the coaxial feed cable, I will not argue against Brice's suggestions in this regard.

The small loop is the ideal in-shack antenna for those who need, or would like one. Having the loop tuning-capacitor's knob ready-to-hand will assist in keeping it accurately in-resonance at all times- this is absolutely essential to acceptable performance. (Motor-driven tuning capacitors, to allow remote, outside loop location can be contrived and are available commercially, but these are a bit difficult for most of us, in actual practice.) But again- a warning: if your home has a metal framework or uses aluminum-sheet covered-insulation, you may have problems with any indoor antenna- radio waves just don't like to penetrate metal! Read Brice Anderson's great article, then build and try a small loop. You will learn something, and have fun, too.

C.S. "Rock" Rockey, W9SCH

REMEMBERING W6SKQ

I was deeply saddened to hear of the passing of Bob Spidell, W6SKQ. Bob's many contributions to the QRP community will be long remembered.

When stationed in Japan, I recall writing to Bob for some antenna information. He not only answered my questions with a beautifully handwritten three page letter, he also included about 20 pages of photocopied materials. It is this kind of selfless commitment that set Bob apart.

Bob's love of antennas and QRP has been a source of inspiration for the many hams that he has known. I know that as he tunes up his ultimate Zuni Loop in the sky, there will be a pileup on his frequency of people thanking him for all he has contributed to our hobby. 73, Bob.

Paul Schaffenberger,
KB8N/DA1AM, 7J6CAM

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QRP ARCI History, Purpose and Policies:

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

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

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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.

80 Meter Transceiver Using Surface Mount Components

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After KN1H, NN1G and I developed an 80 meter VXO transmitter kit for the QRP-NE club, I began thinking of a good follow-on project. The first thing that came to mind was a companion DC receiver to work with that kit. However, I realized that it would not be simple to just add a receiver since T/R switching, receive offset and a sidetone monitor would be required. This would especially be true if I wanted to share the existing transmitter VXO for the receiver since receive offset would need to be accounted for. I wanted the new receiver to use a better mixer than the popular NE602 so that the '602's reported problems with inter-modulation distortion could be avoided. One such mixer is the Plessey SL6440 since it requires low local oscillator drive power and has a +30 dBm third order intercept point. Another desire was to try QSK and RIT. I had never had a QRP transceiver that had QSK and RIT and it looked like a simple thing to try. I also wanted to use as few tuned circuits as possible so that the transceiver could be easily put on other bands and maybe even employ band switching. The resulting schematic is shown in Figure 1.

I wound up with a direct conversion transceiver with the following performance characteristics:

Receiver

Noise Figure:	15db
Dynamic Range:	100 dB
Gain:	74 dB
Bandwidth:	300 Hz at -3db points

Transmitter:

Power Output:	3 watts
Keying Waveform:	5-10 mS rise and fall
Full QSK	
RIT:	+1.5 KHz, - 1 KHz
Sidetone:	800 Hz sinewave

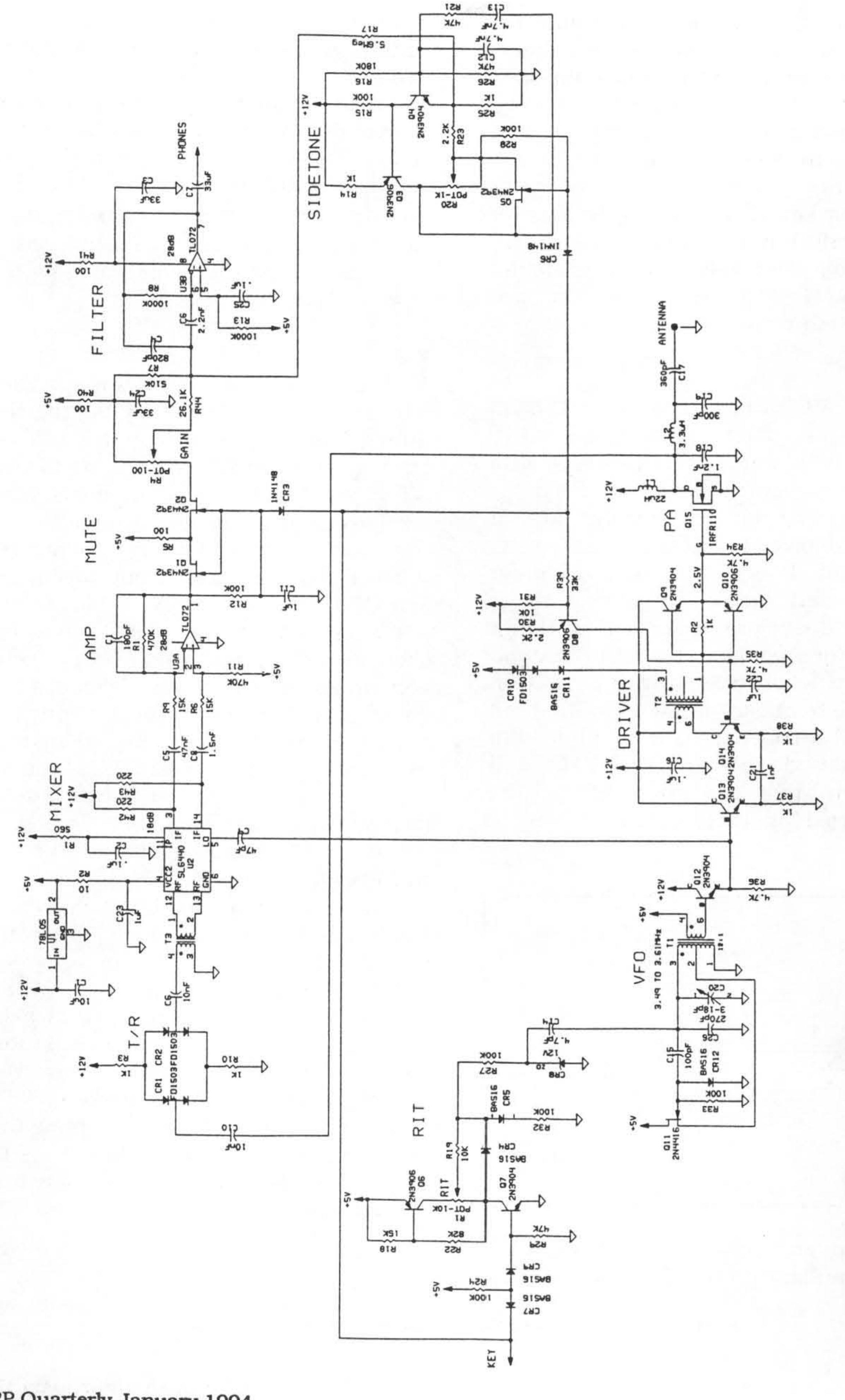
MOSFET TRANSMITTER

The transmitter uses an IRFR110 or IRFR210 MOSFET as the power amplifier. This part is about the same as the common IRF511 (offered by Radio Shack) except it is in a surface mount package and is has a slightly lower maximum drain current. The output matching network is simpler and consequently has a higher output harmonic content than that used in the original 80 meter transmitter kit. The driver circuit is a complementary npn/pnp pair and is connected to an untuned transformer. This transformer, T2, provides a voltage gain of 2. The Q13/Q14 amplifier gain can be adjusted by varying the value of C21. The gate of the MOSFET is very capacitive and requires a fair amount of drive voltage and current due to the multiplication of the drain to gate capacitance by the voltage gain of the MOSFET.

The transmitter is keyed by switching the base bias of Q14 on and off

80 Meter Transceiver using Surface-Mount Components

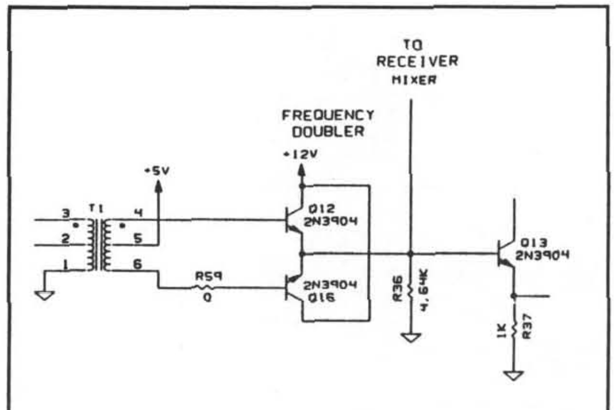
W1CFI - 6/22/93



with Q8. C22 and R35 determine the rate at which the base bias voltage, collector current and consequently gain of Q14 build and decay during keying. This action provides the gentle rise and fall in the keyed output of the transmitter which in turn eliminates annoying key clicks. The gate bias for the MOSFET is provided by CR10 and CR11 from the 5 volt supply and should bias the MOSFET gate at 2.5 volts, just below conduction.

VFO

The VFO design is taken from W7EL's classic "Optimized QRP Transceiver" and is a Hartley type with the output being extracted from the tuned circuit via transformer T1. It tunes the lower 100 KHz of the 80 meter CW band. I used a vernier drive for tuning, and the VFO's tuning range allowed direct use of the dial markings (0-100) for frequency readout. I found no chirp when operating the VFO on the same frequency as the RF output but it is still a concern. The addition of a frequency doubler to the VFO will eliminate this concern and can be constructed as shown below.



Although I haven't built this circuit, I did simulate it on SPICE and it looks like it would work fine as a doubler. An additional feature of the VFO frequency doubler is that it can be switched on or off which would allow the transceiver to operate on two harmonically-related bands. This could be accomplished by adding a switch in the base of one of the doubler transistors. *(An interesting homebrewing subject- doublers. Stay tuned for an article from Paul on the topic. - NN1G)*

RIT

The RIT circuit provides a constant VFO offset on transmit by biasing the tuning diode, CR8, at about 2.5 volts. During transmit Q6 and Q7 are biased off so that the RIT potentiometer can not change the voltage on CR8 and consequently affect the VFO frequency. When the transmitter is not keyed, Q6 and Q7 turn on and provide bias to the RIT potentiometer so that the bias on CR8 can be varied from about zero volts to about five volts. This has the effect of moving the receive frequency above and below the transmit frequency by about one KHz. C14 can be made a variable capacitor which would then allow the RIT range to be varied.

RECEIVER

The receiver taps its input signal off the MOSFET drain which must be biased off during receive in order to reduce drain current noise into the receiver input. The bridge T/R switch, CR1/CR2, allows for good isolation between the transmitter and receiver without using any tuned circuits. T3 makes some attempt at matching the input impedance of the SL644O mixer to the drain impedance matching network of the MOSFET.

Since the noise figure of the complete receiver depends mainly upon the noise figure and gain of the first stage, the SL6440 with gain provided a much lower overall noise figure than could be obtained with the SBL-1. This is true even though the noise figure of the SL6440 is 11 dB and that of the SBL-1 is about 8 dB. If the gain of the mixer stage can be made large enough the noise figure of the following stage can become insignificant. However, if the gain of the mixer is small or is a loss, (as in the SBL-1 case) then the second stage is very important in determining the overall receiver noise figure.

U3A is a differential amplifier and filter which provides about 28 dB of gain to the mixer output. It provides only a modest amount of filtering. The receiver is muted by Q1 and Q2 during transmit. These transistors turn off during this time so that the large overload transmit signal is attenuated by R4 and R5. It is necessary to bias these transistors so that the dc voltage on their sources and drains are equal and no bias shifts occur when the transistors are switched on or off. Bias shifting here causes loud clicks in the headphones when the transmitter is keyed. U3B is an active bandpass filter which provides about 28 dB of gain and enough output drive capability to drive a pair of 40 ohm stereo headphones.

SIDETONE

I decided I'd give a sinusoidal sidetone oscillator a try here. I designed a Wein Bridge Oscillator as a sidetone generator with Q3 and Q4 acting as amplifiers and R20 adjusting the operating point for best sinusoidal output waveform. It does use quite a few parts but is a good alternative to the usual square wave or triangle wave sidetone.

CONSTRUCTION

The transceiver is built on a 2 X 3 inch surface mount prototype board and mounted in a home-made 4 X 4 x 1.5 inch box with the tuning capacitor along one side. No printed circuit board exists for the transceiver since the availability of surface mount components is very limited at this time. The SL6440 mixer is available in the DIP version from Kanga US[1] and all diodes can be 1N914's or 1N4148's. Surface mount construction allows some very small transceivers to be built while providing minimal parasitic capacitance and inductance along with good grounding. It is also easy to work on since no solder needs to be removed from PC board holes before a component is removed.

PERFORMANCE

I am very pleased with the transceiver's performance. It has an incredible hi-fi sounding CW tone in my stereo headphones and makes my commercial transceiver sound pretty bad. The RIT simplifies tuning when compared to my MAVTI-40 homebrew transceiver which lacks it. The real operating pleasure was provided by the QSK which is so quiet that it is impossible to tell when the transmitter is keyed except for the loss of antenna noise.

Next I plan to add the VFO frequency doubler and build a transceiver that would operate on both 80 meters and 40 meters.

1. Write to Kanga US: Bill Kelsey, N8ET
3521 Spring Lake Drive, Findlay, OH 45840

Putting the NN1G Transceiver on 80/40/30 Meters

Dave Benson, NN1G
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Newington CT 06111

What a long strange trip it's been! When I published the 20 meter superhet transceiver design in the Jan '93 *Quarterly,* I had no inkling of the excitement that the article would generate. As of this writing (Sept. '93) FAR Circuits has sold over 150 pairs of boards for this design - an incredible response given our circulation figures!

I've received a number of inquiries about using this design on other bands. This article updates the original design for operation on 80, 40 or 30 meters and slips in a few improvements as well.

Changes:

What would an update article be without changes? I received a few questions about conflicts between the original schematic and the layout furnished in the information package. None of these affected performance, but were a source of confusion nonetheless! Send me a business-sized SASE for the new package - hopefully it's bug-free. Here's a summary of the changes made in this revision of the design:

- There's now a 10 uF capacitor added between pins 1 and 8 of U4, boosting audio gain by 20 dB. I also changed the output network somewhat to reduce high-frequency hiss.

- One of the prototype versions "took off" on transmitter key-down due to the use of extra-long leads to the AF gain pot. I added a capacitor to U4's input pin to cure this sensitivity.

- The dinky 7mm IF transformers have been replaced with the more robust (and cheaper) 10mm version. There's now also a series resistor at U2's V+ lead to protect T4 from burnout due to inadvertant shorts to ground. I commited to make this change after a memorable evening spent replacing three IF transformers in succession *(Those of you who've suffered this setback will especially enjoy knowing that "I got mine" too.)*

- Added pads for a capacitor in parallel with T4 to permit a wider range of IFs. This allowed the addition of 30 meter coverage to this rig's repetoire.

- Added a 100 pF polystyrene cap in the receiver local oscillator (LO) to minimize drift. By adding a poly cap to make up about a quarter of the total parallel capacitance, the temperature coefficient of the oscillator's -6 toroid inductor material is largely cancelled.

- I also added extra pads for a fixed-value padder cap to allow trimming the LO to the right frequency without too much pruning and prodding on L1. I've resisted the urge to add a trimmer cap to the layout because the temperature characteristics of the tiny trimmers are generally poor. If you have space in your rig for an air-variable bandset trimmer, by all means use one!

These changes collectively resulted in the need for new circuit board layouts. The new boards are slightly larger (2.0'" x 4.0"), but I've included conventional four-corner mounting holes this time around. If you're interested in the newer version, ask for the NN1G Mark II boards when ordering from FAR Circuits. *(Dan's Small Parts & Kits is now supplying the newer boards in his offering of this design. While I'm on the topic, for those of you who are curious about the business connotations of this deal: I don't make a cent from Dan's kit. Note also that from an editorial* *from an editorial perspective I'm just another author - see the fine print at the back of each issue for the usual disclaimers about ARCI endorsement. There - now I feel better, too!)*

The Good Stuff:

The tables below show component values for the 80, 40 and 30 meter bands. I've also listed suggested component types for the capacitors.

Receiver Board:

Component	80 Meters	40 Meters	30 Meters
C1- 5% NPO disk or S.M.	330 pF	330 pF	330 pF
C2, C4- 10% ceramic disk	330 pF	47 pF	--
C3- ceramic or NPO disk	5 pF	2 pF	2 pF
C5,C9- 10% ceramic disk	330 pF	--	--
C6,C8- 10% ceramic disk	470 pF	680 pF	150 pF
C7- 10% ceramic disk	560 pF	680 pF	150 pF
C10- 10% ceramic disk	22 pF	33 pF	330 pF
C11- 6mm Murata trimmer	35 pF	35 pF	70 pF
L1- T-37-6	21T, tap @ 3T	26T, tap @3T	23T, tap @3T
L2- FT37-61	10T	7T	14T
LO- (Local Osc. Frequency)	6.42 - 6.5 Mhz	5.25-5.3 Mhz	6.1 Mhz
T1,T2 - 10.7 mhz xfrmr (10 mm)	(Leave cap intact)	(Leave cap intact)	(Leave cap intact)
T4 - 10.7 mhz xfrmr (10 mm)	(Leave cap intact)	(remove cap)	(Leave cap intact)
Y1-Y5 (Intermediate Freq.)	10.000 Mhz	12.300 Mhz	4.032 or 4.096 Mhz

Transmitter Board:

C12- 6mm Murata trimmer	35 pF	35 pF	70 pF
C13, C15- ceramic disk	10 pF	2 pF	2pF
C14, C16- 10% ceramic disk	330 pF	47 pF	--
C17, C19- 10 % ceramic disk	820 pF	390 pF	270 pF
C18- 10% ceramic disk	1500 pF	820 pF	560 pF
C20- 6mm Murata trimmer	70 pF	70 pF	35 pF
C21- 10% ceramic disk	47 pF	--	--
L3- FT37-61	10T	7T	14T
L4- FT37-61	20T	14T	12T
L5,L6- T-37-2	22T (1.94 uH)	16T (1.02 uH)	13T (0.68 uH)
L7- FT37-61	22T	14T	11T
T5,T6 - 10.7 mhz xfrmr (10mm)	(Leave cap intact)	(Leave cap intact)	(Leave cap intact)
Y6	10.000 Mhz	12.300 Mhz	4.032 or 4.096 Mhz

Troubleshooting:

I'd be remiss if I didn't include a few words on this topic. Here's a summary of the typical DC current values you should expect:

Receiver:	U1:	4 mA
(AF gain	U2:	16 mA
@ min.)	U3:	4 mA
	U4:	3 mA
	U5/Q1:	3 mA
		(30 mA)

Transmitter:		
(Key-up):		---
(Key-down):	U6/U7:	5 mA
	Q4:	15 mA
	Q5/Q6:	34 mA
	Q7:	160 mA
		(215 mA)

The information package now includes a marked-up schematic showing AC and DC voltage measurements. If the DC levels and supply currents vary drastically from the expected values, inspect the circuit board carefully before replacing components.

You'd be surprised how often the most perplexing problems trace back to solder bridges or under-etched "whiskers" on the PC boards! Other than that, the trickiest components appear to be the LO's L1 and the IF transformers. If you absolutely can't find the LO signal on a receiver when attempting to set the oscillator frequency, check the wiring on L1 carefully to ensure that the "sense" of the winding is correct. See the building and alignment instructions (in the package) for correct installation. Also, the IF transformers themselves are prone to open circuits. It's not such a bad idea to check DC continuity on these before you install them!

Going it alone:

If you're interested in putting this transceiver on other bands, you'll need to make the following changes:

- new RX/TX bandpass filter values
- change TX harmonic filter
- new collector choke value
- new T-R switch values
- new IF/ T4 tuning (maybe)

The values of C2, C4, and the TX bandpass filter must change to a new resonant frequency. The transformers appear to be roughly 5 uH with a parallel 47 pF cap integral to the base. In addition, the transmitter collector choke and harmonic filter must be scaled to the new output frequency. The T-R switch must be series-resonant at the operating frequency and component values are likewise scaled.

A note of caution: not all IF frequencies are created equal when it comes to receiver design! Although it's possible to pick nearly any IF for a given application, if you choose one that's too near the operating frequency, the local oscillator (LO) components get unwieldy. I tried to keep the LO frequencies around 5-6 Mhz on each band as a compromise between component sizes and VFO stability. You'll also want to keep the IF and LO away from subharmonics of the output frequency to avoid generating in-band spurs on transmit.

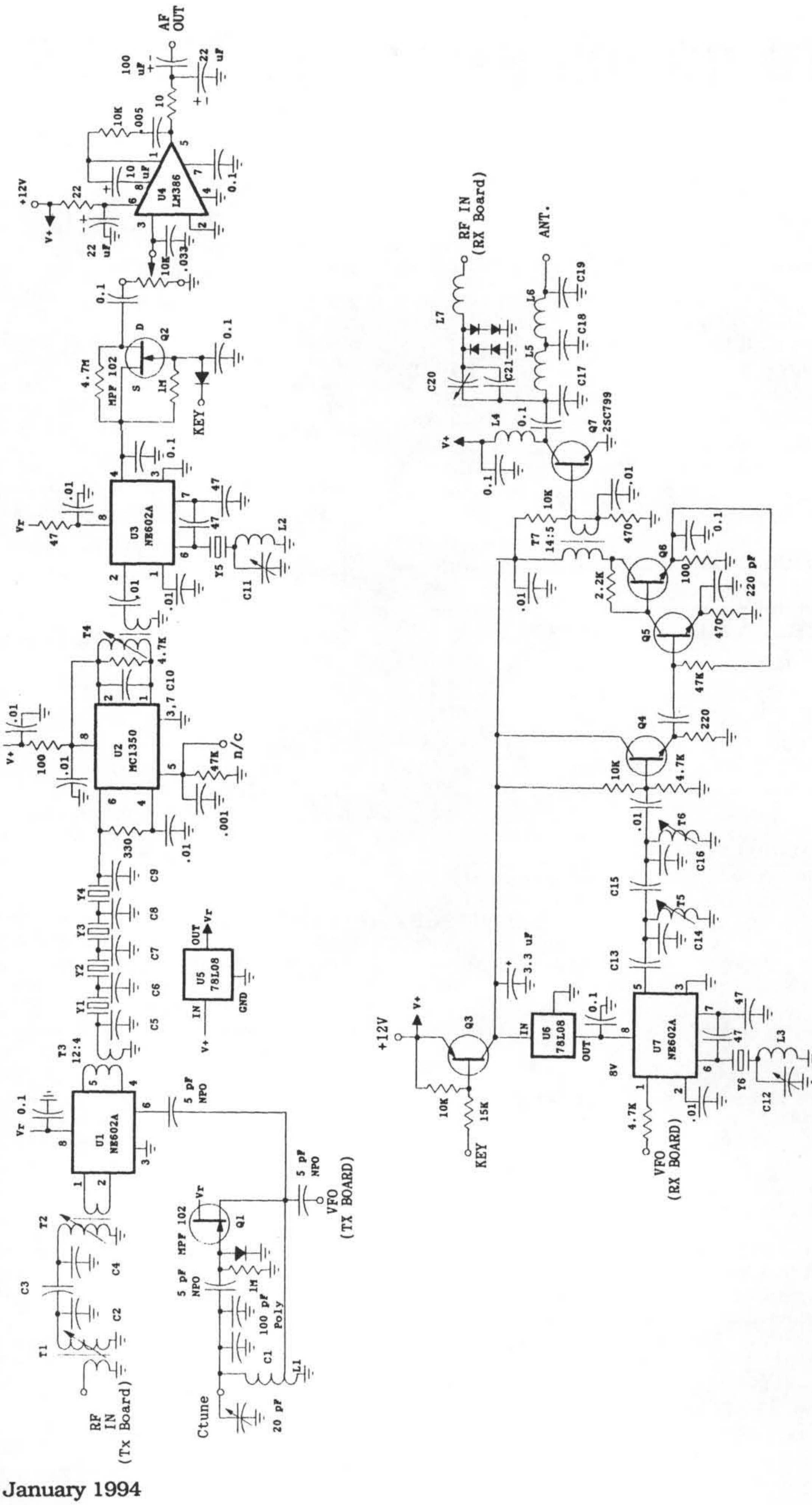
The other trick with IF selection is avoiding "birdies", which are receiver spurious mixing responses. This isn't a complicated topic, but it's outside the scope of this article (*i.e, it wouldn't fit*). You're basically checking harmonics of the LO and BFO against each other, in search of combinations which coincide within the receiver's tuning range. If you're interested, see the ARRL Handbook for a discussion.

If you do select a new IF, the crystal filter capacitor values may need to be revised. As a general rule, the lower IF frequencies yield good CW crystal filter characteristics much more readily. The filter values I've suggested in the parts tables are certainly not definitive-feel free to tinker with these! See W7ZOI's article on crystal filter design in the ARRL's QRP Classics if you're interested in this topic.

Just a suggestion - I'd think twice before using IFs in the 6 Mhz range. I tried this using two different surplus crystal frequencies, and even without an antenna, I could hear the local 49-meter BC giants quite nicely! If you must, check the proposed IF frequency on a general coverage receiver to ensure that there isn't a 40-over-S9 powerhouse camped there.

Conclusion:

I' ve had a lot of fun with these little rigs, and indeed, I now have four of them in my already-busy shack. That'll do for now, thank you! I'd love to hear from other folks who've successfully put this design on 17 or 15 meters or elsewhere. We'll plan to publish this information in the *Quarterly* as we get it - how about it?



RF IN (Tx Board)
T1
C2
C3
C4
T2
U1 NE602A
Vr 0.1
T3 12:4
Y1
Y2
Y3
Y4
C5
C6
C7
C8
C9
330
U2 MC1350
V+
100
.01
47K
N/C
.001
3,7 C10
T4
4.7K
U3 NE602A
Vr
47
Y5
L2
C11
MPF 102
4.7M
1M
Q2
KEY
LM386
U4
+12V
V+
22
uF
10K
.005
.033
100 uF
10
22 uF
AF OUT
U5 78L08
IN
OUT
GND
Ctune
20 pF
C1
L1
100 pF Poly
5 pF NPO
Q1
VFO (TX BOARD)
+12V
Q3
10K
15K
U6 78L08
3.3 uF
U7 NE602A
8V
4.7K
VFO (RX BOARD)
Y6
L3
C12
C13
C14
T5
C15
C16
T6
Q4
220
Q5
47K
470
Q6
2.2K
220 pF
T7 14:5
Q7 2SC799
L4
L5
L6
L7
C17
C18
C19
C20
C21
ANT.
RF IN (RX Board)

More on the Kenwood TS-50S

by Dave Redfearn, N4ELM
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Raleigh, NC 27609

Instead of presenting another complete review of the Kenwood TS-50S, I'd like to expand on John Mori's fine review in the July '93 QRP Quarterly by sharing some of my experiences with the TS-50S.

Compared to my Argosy 525, the TS-50S does draw a lot of current. At 13.5 Vdc, I measured the receive current at 900 mA. I discovered that the setting for the display brightness has a marked effect. With the display lighting at full brightness the receive current was about 1200 mA or so. With the lighting off, the receive current dropped to 750 mA. In transmit, the measurements for different power levels were as follows:

Power Out (W)	Total Current (Amps)
4.5	4.3
50	11
100	20

While not exactly power-efficient at the lower power levels, this seems to be comparable with other synthesized transceivers.

Menu Operation:

The two setup menus are confusing at first and do take some getting used to. I photocopied the manual pages (46, 47) and keep those near the radio for quick reference. Changing a menu setting generally requires hitting several buttons. I wish Kenwood had defined a separate button to access the menus instead of holding down the F. LOCK button–when I'm in a hurry sometimes all I accomplish is to lock the VFO.

There are several different ways to vary the tuning steps and rates for tuning around the bands. The microphone UP/DOWN button's frequency steps can be changed from menu A (16,17). The 1 MHz front panel switch can step in 1 MHz or 500 kHz steps (Menu B - 62). The front panel UP/DOWN buttons step to the next ham band if the 1 MHz switch is OFF, or steps according to the menu setting of the 1 MHz button if it's on. (It's harder to explain this than to actually do it.)

For CW operation, the radio can be set for full break-in from Menu A (05). The radio uses relay switching and the radio is fairly quiet when switching.

Kenwood doesn't mention this, but the 500 Hz CW filter can also be used in-line during the reception of AMTOR and RTTY signals to provide extra selectivity. To use this feature: Set the mode to LSB, set the IF filter bandwidth to .5 kHz, turn the SHIFT control to approximately the 3 o'clock position to center the received signal to the filter passband, and tune in the data signals. I'm using an old Kantronics UTU-XT for QRP AMTOR and RTTY and the added selectivity with the 500 Hz filter helps in copying weak stations under noisy conditions.

The PF keys on the TS-50S microphone are an excellent feature. Each of these four keys can be programmed to perform any of the Menu A and B functions, some of the Front Panel functions, and some of the Special functions. Details for programming these keys are found on pages 49-50 of the manual. I set the following functions on my PF keys:

PF1: Cycles through the RF power settings (4.5, 50, and 100 watts)

PF2: Changes filter bandwidth (2.4 kHz Wide/ 0.5 kHz Narrow)

PF3/PF4: duplicate the Front Panel UP/DOWN buttons

The disadvantage of having the PF keys on the microphone is that the TS-50S does not have an accessory jack for interfacing a terminal unit for RTTY/AMTOR/etc. You have to use the front panel mike jack to hook up a terminal unit or TNC so you'll lose the microphone and the PF keys while a terminal unit is connected.

Adjusting for QRP operation:

Lowering the RF power output is pretty easy if you have jeweler's-type screwdrivers; finding the subminiature pots on the radio is not so easy. Follow the manual's instructions for removing the top cover, the speaker, and the speaker bracket.

VR-16 - the 50-watt pot and VR15 - the 10-watt pot are located on the circuit board, under where the speaker bracket mounts, near the front of the radio. These pots are very small and the silk-screen labels were located away from them. I adjusted VR15 for 4.5 watts output into a dummy load. I noted that I could adjust VR15 so that the power out was less than 1 watt.

In this setting VR15 is near the extreme end of its range and can short to the other end of the pot. When this happens the output power jumps up to 100W, so be careful!

So far the TS-50S has worked well and I've made a number of CW, AMTOR, RTTY, SSB, and FM contacts with it. While the TS-50S appears to be mainly advertised for the SSB mobile market, I think it provides good all-around performance for both QRP and QRO operation.

Remote PF Keys for the TS-50S

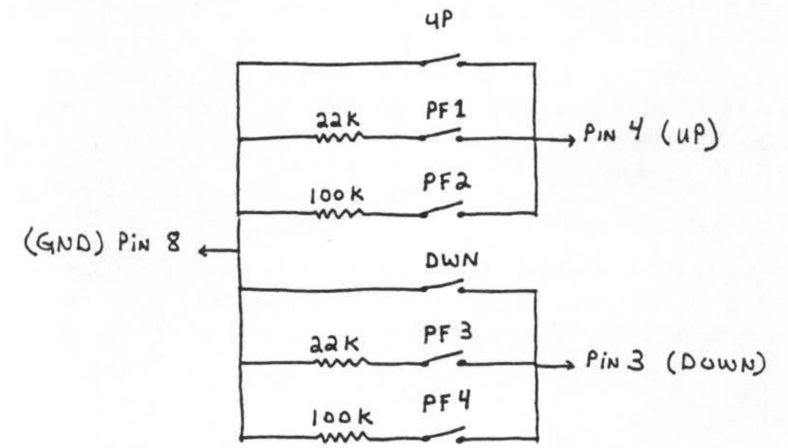
by Dave Redfearn, N4ELM

As I mentioned on the previous page, it's necessary to use the microphone jack to interface the TS-50S with a digital interface unit, resulting in the loss of the PF key functions. I wanted to retain this capability, so I added remote PF keys as described below.

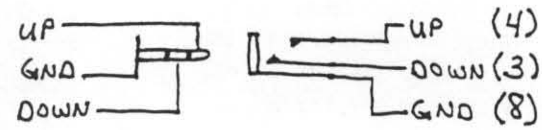
I disassembled the microphone and traced out the wiring for the PF keys. These keys basically switch in different values across the mike UP/DOWN buttons (see Figure 1). I mounted six miniature switches, 22K resistors, and 100K resistors in a small box, wired it to an 8-pin mike connector, and tried it out. It worked! Now I had the PF keys and the UP/DOWN keys in a small box that I could place in easy reach on the desk. The requires only three connections to the TS-50S mike connector: Pin 8-ground, Pin 4- UP and Pin 3- DOWN. I removed the remote unit's 8-pin connector and wired on a 1/8" stereo plug in its place (Figure 2). I wired a 1/8" stereo jack onto a short cable which was wired into the mike connector for the terminal unit (Figure 3-top). With the terminal unit hooked up to the mike connector and the remote box plugged in, I can now use the PF and UP/DOWN keys to control the radio. I wired a second 1/8" jack onto a short cable which was wired into another mike connector (Figure 3-bottom). I used this adapter to connect the remote box directly to the TS-50S.

I used parts and wire that I already had in my junkbox, but most of the parts for this project are available from Radio Shack:

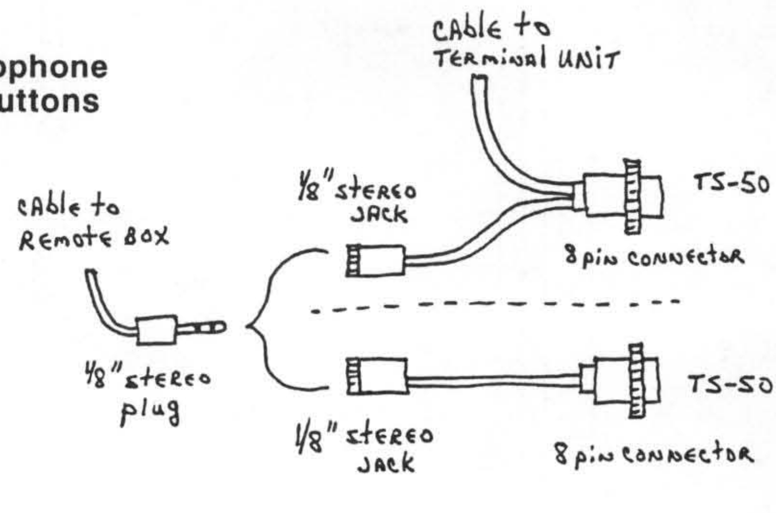
Qty.	Description	RS Part No.
6	Push-button Switches	275-1547
2	100K Resistors	271-045
2	22K Resistors	271-1339
1	1/8" Stereo Plug	274-284
2	1/8" Stereo in-line jacks	274-274
2	8-pin connectors	274-025
1	enclosure	270-220



Wiring for Microphone UP/DOWN/PF Buttons
-Figure 1-



Remote Switch Box connections
-Figure 2-



Remote PF key Installation
-Figure 3-

Simple Attic Antenna for 10 Meters

by Leighton Smart, GWØLBI
33 Nant Gwyn Trelewis
CF46 6DB Mid Glamorgan
Wales, UK

I decided to try a vertical for 10 meters initially because due to difficulty in rotating my 10 M wire dipole I never did too well in the general direction of South America and the Caribbean.

I had worked that part of the world, but copy was always very rough, even when running a full 5 watts. To improve this situation, I wanted to try a vertical. Due to local planning laws, however, I could not erect a vertical outside my house. The local Authority did not seem to mind long wires, dipoles, etc, but verticals would soon have some official or other rushing straight 'round to your house before you could key up!

With this in mind, I made up this antenna with the attic (loft) space in mind. I constructed this antenna on our dining table, much to the annoyance of my wife. Despite my explanations, I'm not sure she understands the importance of 10 meters! The main support for the wire is a six-foot, six-inch length of plastic conduit pipe–the types used for household electrical wiring or plumbing. I actually found a piece of the stuff in someone's rubbish bin- it's now doing better service than buried in the local landfill!

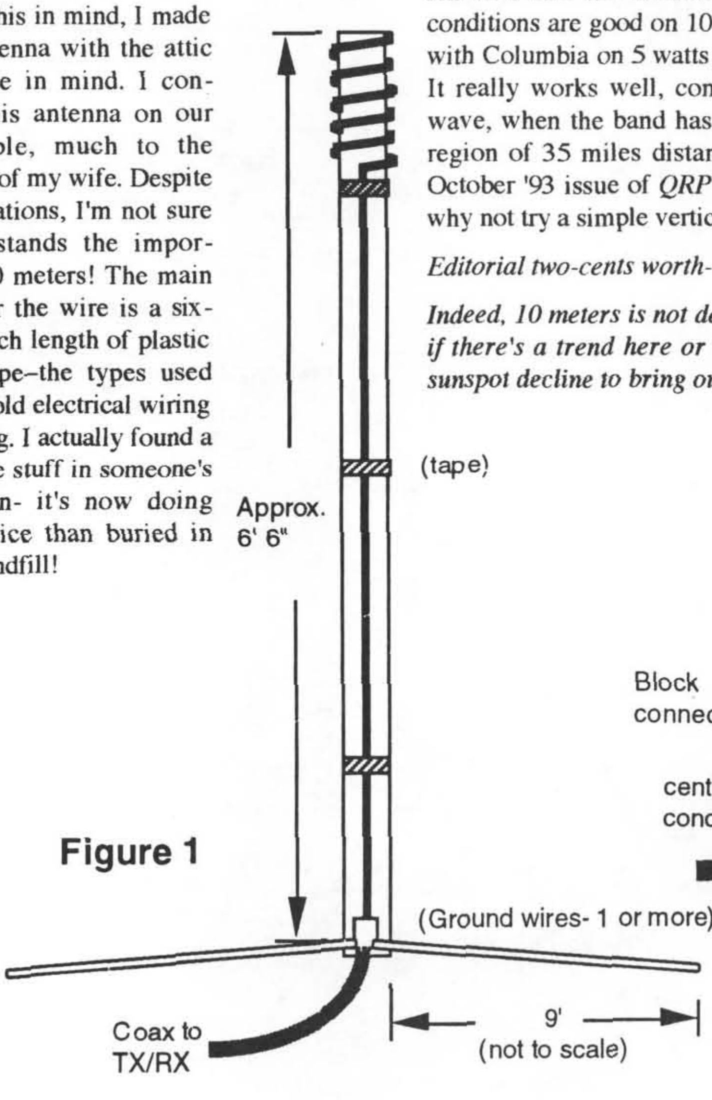


Figure 1

Here are the necessary materials:

1- 6' 6" Plastic pipe, 1" to 3" diameter.
1- Block connector 2-mounting screws
2- 9' lengths of single-strand wire (approx.)
(Insulating tape)

The antenna is constructed as shown in the Figure 1. The wire is run vertically up the pipe and coiled at the top (see Figure 2). I found about six turns to be OK. The antenna is mounted in the loft by screws fastened into a floor joist (Figure 3). One or more counterpoise ground wires, approximately nine feet in length, should be layed out across the loft floor.

To tune the antenna for minimum SWR, simply adjust the loading coil by hand, stretching or compressing the turns, until a suitable match is obtained. I was able to tune mine in under five minutes. If necessary, raise the coil up and off the end of the pipe–the coil will stand by itself because you planned ahead and used single-strand wire.

Since using my vertical, I have able to work all around South America and the Caribbean, as well as other parts of the world when conditions are good on 10 meters. My first QSO using this antenna was with Columbia on 5 watts SSB, followed by VP5P with 4 watts of CW. It really works well, considering it's an indoor antenna! On ground wave, when the band has been totally flat, I've worked stations in the region of 35 miles distant with 5 watts SSB. As W1XH said in the October '93 issue of *QRP Quarterly*, 10 meters isn't quite dead yet- so why not try a simple vertical?

Editorial two-cents worth-

Indeed, 10 meters is not dead–it's just pining for the fjords! I don't know if there's a trend here or not, but it seems there's nothing like a good sunspot decline to bring out the 10 meter antenna articles! —NN1G

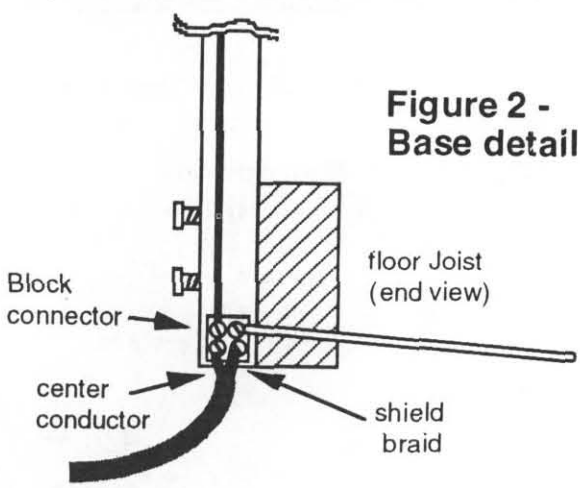


Figure 2 - Base detail

Breathing New Life into Over-The-Hill Tuners

by **Fred Bonavita, W5QJM**
P.O. Box 2764
San Antonio, TX 78299

As pressure on commercial manufacturers from the Checkbook Crowd for antenna tuners loaded with bell and whistles continues, more and more allegedly over-the-hill units are turning up on the used market.

Generation-old tuners, which must be adjusted by hand, are being snubbed by the instant gratification set, which wants only units which tune themselves. As a result, buys on older tuners–particularly the plain-vanilla types–can be found at swapfests, in classified ads, and elsewhere. All one needs is a keen eye, the ability to do a little industrial-strength negotiating and the willingness to build an SWR/watt meter assembly to produce a tuner that is QRP-friendly at last.

The modified MFJ tuner and its companion meter are ready for action. At right in the tuner is the vertically-mounted perf board holding the SWR/wattmeter sampling circuitry. (Photo by Don Randall, WB5ROU)

The tuner shown in the photo–a mid-1970s model 16010-ST from MFJ–was found at a swapfest. A little haggling brought the price to $15. A friend found an MJF tuner designed for end-fed wires at another swapfest for $5, so there are bargains to be found out there.

A little work and about $5 worth of parts produced a rarity: a truly QRP-friendly tuner. Such tuners can be built, of course, but the cost was more than twice that for this modified version. Size was also a factor in my decision. I wanted a compact tuner as part of an HW8-based, suitcase-portable station for vacations, picnics, and other outings. This over-the-hill tuner fit the bill nicely.

MFJ's tuners have never been all that great when it comes to QRP (not even the companion to their new QRP transceiver series, which has a "low power" scale of 0-20 watts). If one wants a reasonably sensitive measurement of, say, 2 or 3 watts, a QRP SWR/watt meter, whether built into the rig or separate, is needed. This approach answers that need.

Luckily, the interior of this swapfest bargain had sufficient room that a QRP SWR/wattmeter sampling circuit would fit in nicely and with no major shuffling of the MFJ parts. The SWR/power circuit I chose was developed by Doug DeMaw, W1FB (QST, August 1983). I used it because it would handle up to 10 watts without smoking the 200-ohm 2-watt resistors I had.

My chief aim was a tuner that would handle balanced feedline, and this one came with a 1:4 balun. The antenna for this suitcase station is the KISS (see the *QRP Quarterly*, October '88). Among the modifications were replacing the SO-239s with BNC connectors; adding a small switch to the rear panel to change among operating, SWR and power metering positions; and adding a panel jack for the external meter.

There was insufficient room to mount the meter in the tuner case or to put the rotary switch anywhere but on the rear panel. This meant I had to reach across the tuner to switch meter positions, and that the meter is housed separately. Both were tradeoffs I willingly accepted, and neither has proved a chore.

The SWR/power-sampling circuit was wired on perf board and installed closed to the input BNC and rotary switch. The output jack is below the switch knob. Construction, which is not critical, can be gleaned from the photograph.

The obvious alternative to all this is a small SWR/watt mater intended for QRP power levels (the no-longer-made Welz RP-120 or the out-of-production MFJ 820/832 combination, for instance) to eliminate the need to build one. However, I'm unwilling to commit either meter (I have both) to my grab-and-gab station permanently. Again, cost is a factor here, too. The roughly $20 this modified tuner has cost is less than half the cost of either commercially made meter assembly.

Where to get parts: Most of mine came from the old junk box. The switch and stereo jack are available from Radio Shack. Ocean State Electronics also has these as well as the 2-watt resistors. (catalog from P.O. Box 1458, Westerly, RI 02891). Meters can be obtained from Hosfelt Electronics, 2700 Sunset Blvd., Steubenville, OH 43952-1158.

For other information on suitable SWR/watt meter circuits, see "The G-QRP Club Antenna Handbook", "QRP Classics", W1FB's Antenna Notebook", "W1FB's QRP Notebook", "QRP Notebook" and W1FB's Design Notebook". All but the first source are published by the ARRL.

IDEA EXCHANGE

Technical Tidbits for the QRPer

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

IN THIS EDITION OF THE IDEA EXCHANGE–

THE RS-12 ROBOT ISN'T DEAD

A note from **Bill Wawrzeniak, W1KKF** of Wallingford, CT, a fellow RS-12 buff–In your piece on QRP satellite work (part one), in the July issue you indicated that the RS-12 robot wasn't working and just sent garbage. I have made a QSO with it and here is what I have observed.

The robot will repeat what it hears. It will faithfully resend your CW if you are on the right frequency and sending at "exactly" the correct speed. This is not your signal being repeated the same way it is through the transponder, but the computer on board resending what it hears. So if you are not at the right speed, or if more than one signal is trying to work the robot at the same time, the computer will send out garbage.

I'll admit it took a few passes to make the contact, and on the first QSO the computer called me W1KKI but it can be done. A memory keyer makes the job a lot easier, since electronic boxes seem to understand each other better.

I borrowed our club's Ten Tec Argosy to use as the transmitter, so it was easy to tell on my TS-850, the receiver, when the computer was repeating my string of dits, as I varied my uplink frequency. It works; if you can't monitor the downlink while you send because you're using a single rig in split frequency mode, try it with a borrowed second rig and listen to the robot while you call it.

–DE W1KKF

STYROFOAM CW FILTER

From **Bob Richardson, W6WHM**–Take a small styrofoam beverage cup, remove a portion of the rim as shown in Figure 1, and invert it over the speaker on your receiver. You will be pleasantly surprised at the enhanced selectivity and volume of CW signals. Do not place anything on the cup to hold it down or you will destroy the resonant frequency response.

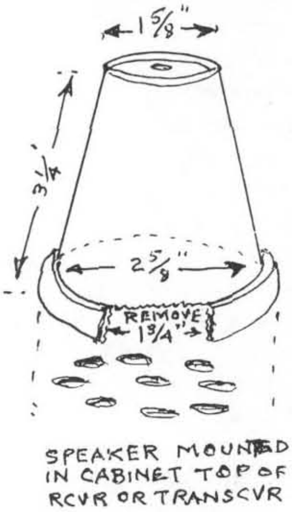


Figure 1

A couple small pieces of cellophane tape are all that is necessary to hold it in place.

–DE W6WHM

A SIMPLE AUDIO FILTER

From **Ray Lowe, WD5DHK** of Lancaster, TX–I took a step backward in technology to build a simple but effective audio filter. By adding a capacitor across a series circuit, I was able to improve the high frequency rolloff response between 800 and 1600 Hz. This filter (figure 2) does a good job; it improves reception even with a 500 Hz filter in line.

–DE WD5DHK

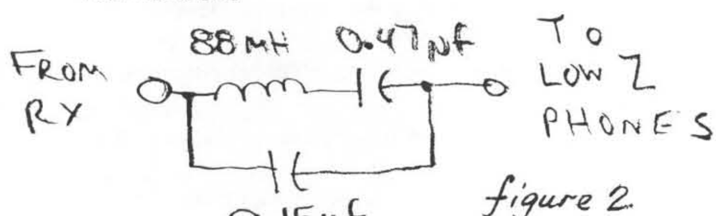


figure 2.

SIMPLIFIED TEETER-TOTTER VXO FOR RIT

From me, WA8MCQ–SPRAT #54 (Spring 1988) carried an interesting little VXO circuit by **Doug DeMaw, W1FB,** and it also appeared in his article in the Oct 1988 QST titled "A Three Channel CW Emergency Transceiver". The rig used crystal control for both transmit and receive, with a small fixed shift on the latter to give a suitable CW offset. In transmit, the crystal is allowed to oscillate at its normal frequency, and in receive a coil and capacitor are added to pull it a bit.

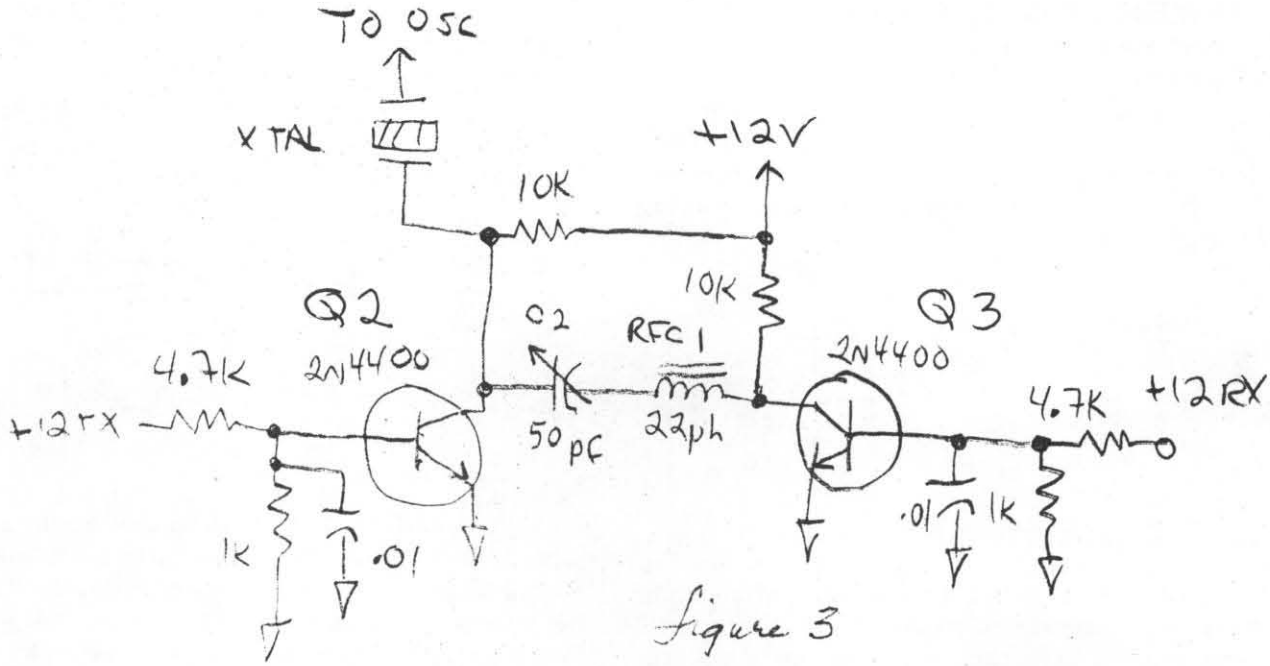


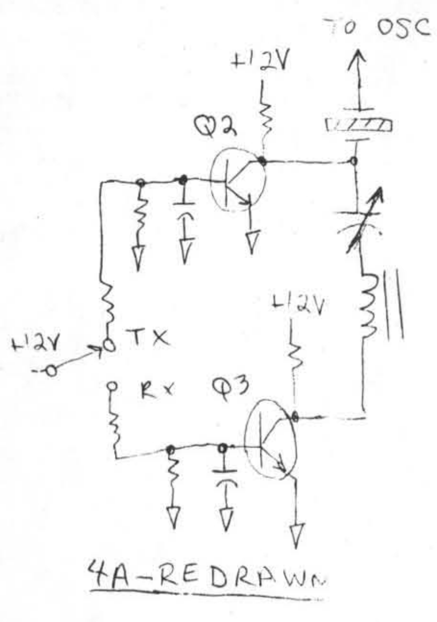
figure 3

As shown in Figure 3, two transistors are used; Q2 grounds the crystal to allow normal operation for transmit, and in receive Q2 opens up while Q3 grounds the end of RFC1 to allow an offset. Figure 4A is another way of drawing the circuit, which makes it a bit easier to visualize the operation, and 4B is the equivalent with a switch instead of two transistors.

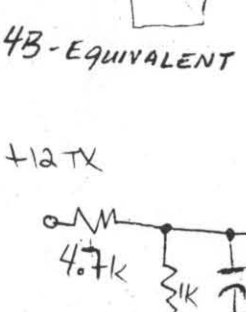
The exact value of frequency shift is determined by the setting of variable capacitor C2. In transmit, Q3 is not conducting and the end of the RFC is above ground. However, a little study of the circuit shows that it can be simplified by permanently grounding the end of the choke and deleting Q3 and its associated parts–see Figure 5. There is no reason why one end of the choke must float during transmit, since the other end of the cap/coil combination is grounded. (I built the circuit and tried it with Q3 operating normally, and with the end of the choke grounded, and there was no difference.)

Note that I also swapped positions of the coil and capacitor; now the rotor of the cap is grounded, which simplifies mounting. The circuit was originally intended to provide a small offset in receive to provide a beat note in CW, with the cap being a "set and forget" adjustment. However, you can experiment with the variable cap to give a larger range, mount it on the panel and use it to tune around a bit in receive. The values of the coil and capacitor are for 40 meters; for other bands you can refer to the many VXO circuits in print.

–DE WA8MCQ



4A–REDRAWN



4B-EQUIVALENT

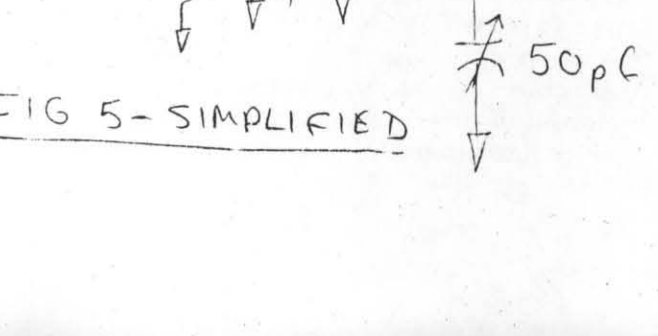
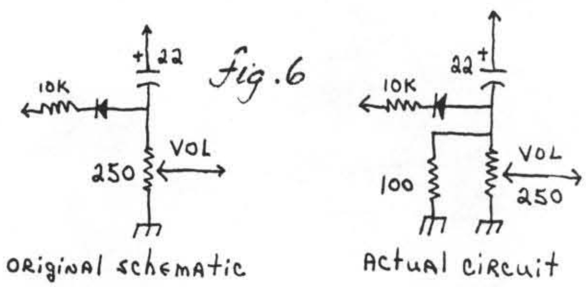


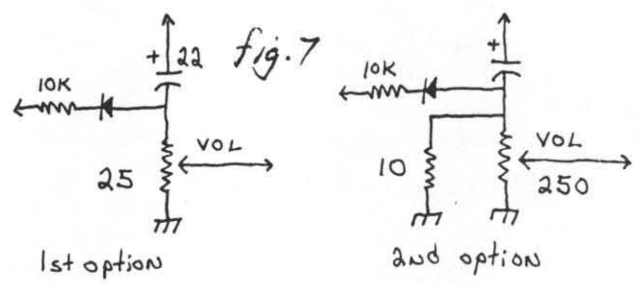
FIG 5–SIMPLIFIED

MORE MFJ 90XX QUICKIES

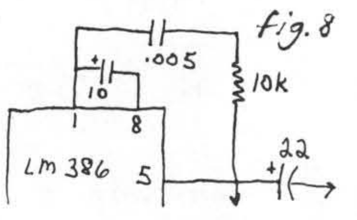
From **Dave Redfearn, N4ELM** of Raleigh, NC–After reading John Ziller's *Weak Audio Fix for the MFJ* in the July 93 Idea Exchange, I got the Radio Shack 25 ohm pot and started disassembling my new 9020. I traced out the path to the audio pot and found an extra resistor in the circuit that was not on the schematic, 100 ohms in parallel with the pot (Figure 6).



I found a copy of Rick Littlefield's original article on building the 15 meter rig. He presents two options for configuring the audio output circuitry. Neither option matched the original wiring of the 9020. Since I already had the new pot and the radio apart, I removed the 100 ohm resistor and 250 ohm pot, and installed the 25 ohm pot which worked great. I suspect that replacing or bridging the 100 ohm resistor with 10 ohms would also work OK and save the cost of the new pot (Figure 7).

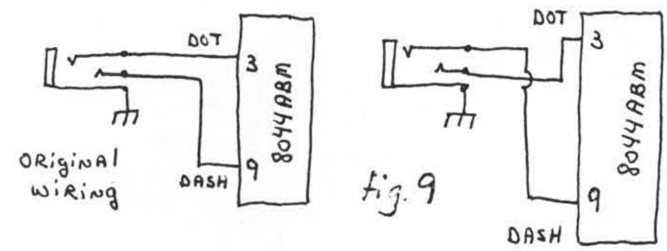


To eliminate some of the hiss in the audio stage I installed a 0.005 uf capacitor and 10K resistor in series between pins 1 and 5 of the LM386 audio chip, as shown in Figure 8. I soldered them between the pads on the bottom of the PC board. [A slightly different version of this mod appears in a later item. –WA8MCQ]

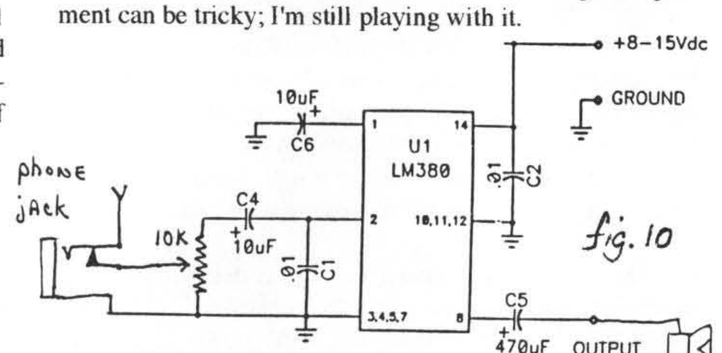


Quick Disassembly: Remove the top cover, unsolder the wire to the SO-239, remove the knob and nut on the keyer speed control (if installed), remove the screw holding the output power transistor, remove the six screws from the bottom of the radio. The bottom of the case will now slide off, leaving the front panel and PC board together as one assembly. Reassemble in reverse order.

CW Keyer Mod: As shipped, the dot and dash connections on the jack are reversed, at least for me and everyone I asked; dot is on the ring and dash is on the tip. I cut the PCB traces and wired two jumpers to connect dot to tip and dash to ring. Now the jack wiring, Figure 9, is compatible with my other keyers.



More Power! Audio, that is...To increase the audio output, I built a Ramsey BN-9 audio amp kit and installed it between the phone jack and the speaker (Figure 10). I built it as the low gain version and added an extra 10K pot to adjust the audio level. I mounted the PCB piggyback on the MFJ CW audio filter board. This works but the gain adjustment can be tricky; I'm still playing with it.



–DE N4ELM

AN ANTI-HISS FILTER FOR LM386 AUDIO AMPLIFIERS

By **Don Kelly, KA5UOS**; adapted from the July 1993 issue of the Oklahoma QRP Group newsletter–The LM386 is a very popular audio amplifier. However, nothing is perfect; the device produces a hiss, most noticeable when the audio is cranked up on a quiet band or with the antenna disconnected. On noisy 40 meters it's not a problem. However, when the band is quiet the effect can be disappointing when trying to hear a weak one.

Here is a simple but effective modification. A portion of the audio output, pin 5, is fed back to pin 8 to cancel the hisssss. I have used it with several of my receivers; in each case I was satisfied with the results. I was especially pleased when I used the mod in a receiver in which I cascaded two LM386s. The hiss was multiplied, but implementation of the filter provided a much improved audio output. It requires only a 10,000 ohm resistor and 0.01 uF capacitor. Figure 11 on the next page shows a typical circuit with the added components. *[This is a slightly different version of the N4ELM hiss reducer. –WA8MCQ]*

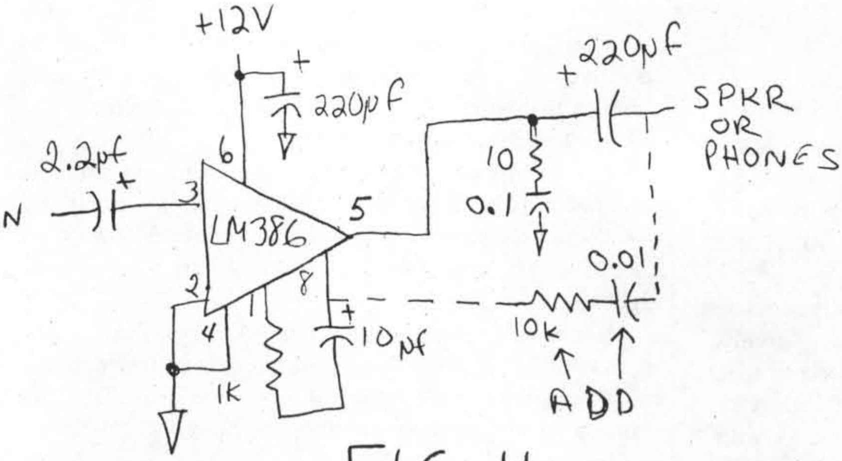


FIG 11

-DE KA5UOS

EL CHEAPO PHONES FOR HISS REDUCTION

From **Byron Weaver, WU2J** of Palm Bay, FL–HISSSSSSS...well, welcome to the group! Numerous comments have been made about the hiss of the LM386, yet I never noticed any although my hearing is quite normal. Oftentimes I thought it overdone, or perhaps my LM386's were exceptional. Recently I bought a pair of stereo earphones for $2.99 on sale, because the sensitivity figure looked impressive and I thought I'd compare it with my well-tested phones I've been using for 6 years. Well, the stereo phones were equal on sensitivity but what a HISSSSSSS on LM386 transceivers (but not on the Argonaut). Now I knew what they've been talking about!

When I originally purchased my first earphones I tested them all on the Argo 509 at the weakest signal level and found a pair for around $4.98 made in Japan, with "Electrophonic" and "SE-1" on them, to be my choice. I bought 4 or 5 pairs (XYL AC4RU is a ham also) and have used them for years. The plastic head loops invariably broke so the ear pieces were later mounted on the other "junky" earphones frames.

Not too long ago I tested about 10 pairs of cheap phones for frequency response and sensitivity by plugging each into my homebrew twin-T oscillator. My 8 ohm Electrophonics were the best on sensitivity (but an equal was Elega Audio Stereo Headphones, EA-601). I found them more sensitive than any others at really low frequencies. At 1.5 to 2 KHz they are inferior to others, but are excellent QRM fighters for a CW operator, especially around 400-500 Hz. They work almost as good as an audio filter and produce no HISSSSS.

-DE WU2J

[WA8MCQ note–On a night with lots of static on 40 meters I tried an old Rheem communications headset, my good quality Koss hi-fi phones, and two pairs of el cheapo plastic stereo headphones. I was using my TS-430S so hiss was not a problem, but the Koss phones really let through all the highs of the static crashes and quickly became rather irritating. The communications-grade headset and el cheapo walkman-type phones were much more pleasing, even though they had poorer frequency response and would sound lousy on a CD player. (Later tests with a new Tangerine Dream CD confirmed that.) The moral is to keep the high quality phones on the stereo where you want all the highs and put the "poorer" phones on the ham rig.]

VARIABLE SIDETONE FREQUENCY FOR THE HW-8

From me, WA8MCQ–I got a letter a while back asking about the sidetone frequency of the HW-8. I checked one on my bench for repair and found it was almost 600 Hz. Since the sidetone didn't quite match the frequency of any of the W3NQN passive audio filters (which prompted the request), I checked the schematic to see if there is an easy way to vary it a little.

As it turns out, it's quite simple–just vary the value of R75, a 47K resistor in the feedback loop of the sidetone oscillator (IC2D), shown in Figure 12. You can play around with just about any value pot you have on hand and get suitable results. A 100K pot would be a good starting point, although it would give too large a range to be practical. You might want to try a smaller pot in series with a resistor of less than 47K, and vary the values until you get a good spread.

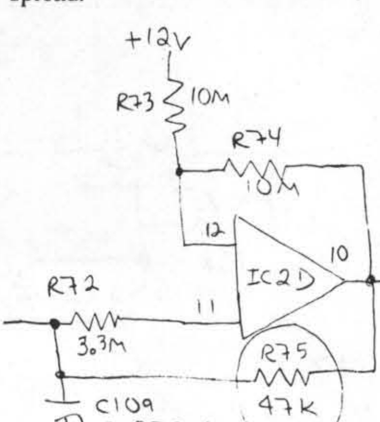


FIG 12

You might want to vary the sidetone a bit to match up with a fixed frequency audio filter, or perhaps the TX/RX offset of your HW-8 isn't quite the same as the sidetone, or maybe you'd just like a little variety from time to time–the mod is quite simple and there's plenty of room on the rear panel to mount the pot without putting more holes in the front panel.

-DE WA8MCQ

JOE'S QUICKIE #8: ROLL-YOUR-OWN QUICKIE VOLTAGE REGULATOR

From **Joe Everhart, N2CX** of Brooklawn, NJ, here's #8 in his aperiodic series of technical Quickies–Here's a homebrew voltage regulator, lifted from a commercial product I designed years ago before voltage regulator ICs were economical. It has lots of applications for QRPers and other homebrewers.

Many transistor and IC circuits need carefully regulated voltages. For example, VFOs and other tuning circuits need regulation for stability. Timing circuits need similar control. And virtually anything that runs from battery or solar power needs regulation to maintain performance with varying source voltages.

Why not just use an IC regulator in the first place? I often do use one of the 78XX (positive voltage) or 79XX (negative) series devices myself. *[There are also the 78LXX and 79LXX, which are low current versions in a TO-92 transistor style package. –WA8MCQ]* They have great specs and are very inexpensive, but they don't always fit the bill. The choice of output voltage ratings is limited, and you can never find the one you want when you need it. They can be tough to get when you need one in a hurry. And they sometimes oscillate or generate noise at low operating currents.

For simplicity, shunt zener regulators are hard to beat, but they tend to be power hogs. Their efficiency is low–they need 20 mA or so for good regulation. That fairly high current also means that they can have substantial warm-up drift. And a serious handicap of operating them with low current is unwanted noise generation. In fact, they're so good that the popular noise bridges use a zener at low current for their wideband RF noise source!

The Quickie Regulator shown in Figures 13 and 14 (positive and negative voltages) is another option. It's more complex than integrated or zener shunt regulators but it also has its own advantages.

The components are very cheap and available to scroungers. It has a very low operating current–less than 2 mA. While the zener diode reference operates low on its knee, the two transistors add plenty of gain to give good regulation.

It also offers some overcurrent protection. Current gain limitations of Q2 limit the maximum current the regulator can provide so a small degree of protection is available. Of course a prolonged short circuit on the output will make Q2 overheat and fail eventually.

An important feature of the Quickie Regulator is that you can set the output voltage by picking the right zener diode reference. The choice of zeners is much wider than the choice of 78XX regulators. Since the zener operates at lower than usual currents, the regulator output voltage is very close to the rated zener voltage (more about that later).

Now for some circuit functions. Zener reference diode D1 current level is set by R1. 560 ohms is a good compromise. A lower value will give higher zener current and perhaps better regulation, but at reduced efficiency.

Transistor Q1 produces voltage gain to overcome the effect of low zener current. Pass transistor Q2 produces current gain so that the regulator can provide 10 mA or so of regulated power. Resistor R2 provides Q2s base drive. Reducing its value will increase the regulators maximum output current at the cost of more wasted power for low current output.

Capacitor C1 provides operating stability for the circuit, keeping it from oscillating. It also helps filter out

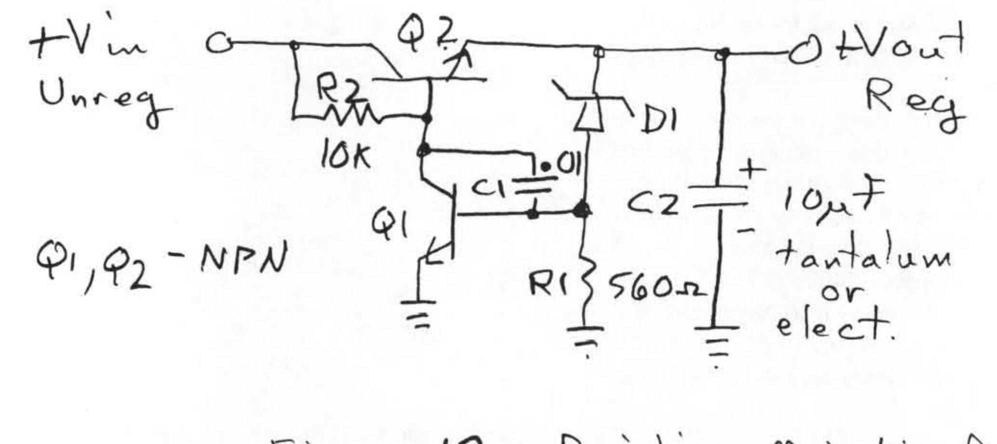


Figure 13 - Positive Quickie Regulator

any noise that might be generated by the zener reference diode. Capacitor C2 gives the circuit good noise rejection. With RF circuits such as VFOs, RF bypassing may be helped by adding a 0.047 or 0.1 uF ceramic cap in parallel. Like most IC regulators, the Quickie has a low source impedance but poor sinking capability, so the output cap is very important.

Component selection is not critical, but here are some notes on picking good semiconductors. As mentioned earlier, zener reference D1 sets the output voltage level. I've had best results with the popular 1N75X series diodes. They range from 5.1 volts for the 1N751 to 10 volts for 1N758. This family is designed for a maximum power of 400 mW and others with similar ratings will probably work just as well. One watt or higher zeners will probably need R1 to be decreased to give higher operating current. For operation from 12 volt sources, it's best to keep the output voltage at 9.1 volts or below to give 3 volts of "headroom" for the pass transistor Q2.

Transistors Q1 and Q2 can be just about any garden variety silicon types. For positive regulators (figure 13), NPN 2N2222 and 2N3904 types are a good choice. PNP types are needed for negative regulators shown in figure 14; 2N2907s and 2N3906s should work well.

The Quickie Regulator is a circuit to enjoy. Like other Quickie circuits, it's not the simplest or highest performance circuit you can build, but it does have a high degree of utility value.

Also, like my other Quickies, it's easy to duplicate and it works as described without major tweaking or alignment. Best of all, it doesn't use expensive or hard to get parts. For the most part you can use what you have on hand, or parts carefully liberated from that "who knows what purpose" board you got for ten cents at the last hamfest. And finally, it's simple enough to be adapted for whatever project you have in mind.

PS–There's nothing new in this world. After I wrote this Quickie, I bought an old Argonaut 509. Later models use an LM723 IC to get their regulated 8 volts, but early models like mine use a discrete voltage regulator–and it's the same circuit as my Quickie. The differences are in the component values:

Q1: MPS6514 **Q2: 2N3053**
D1: 1N756
R1: 1K **R2: 220 ohms**

It's obviously designed to supply more current than my circuit, probably in excess of 50 mA. Using the 1N756 produces an output of about 8.7 volts as measured. The circuit may not be original, but this certainly validates it as a useful design!

–DE N2CX

THE FINE PRINT: Comments in the membership survey in the October 1993 issue said that the QRP Quarterly contains "too much of one author", and "looks more like WA8... personal publication". I'll research and analyze all my old issues to figure out who they're talking about; in the meantime, you can help stop the spread of this horrible cancer by sending YOUR technical tidbits to the Idea Exchange, and longer articles to Dave Benson. The obvious solution is to have more authors; the fate of the QRP Quarterly is in your hands!

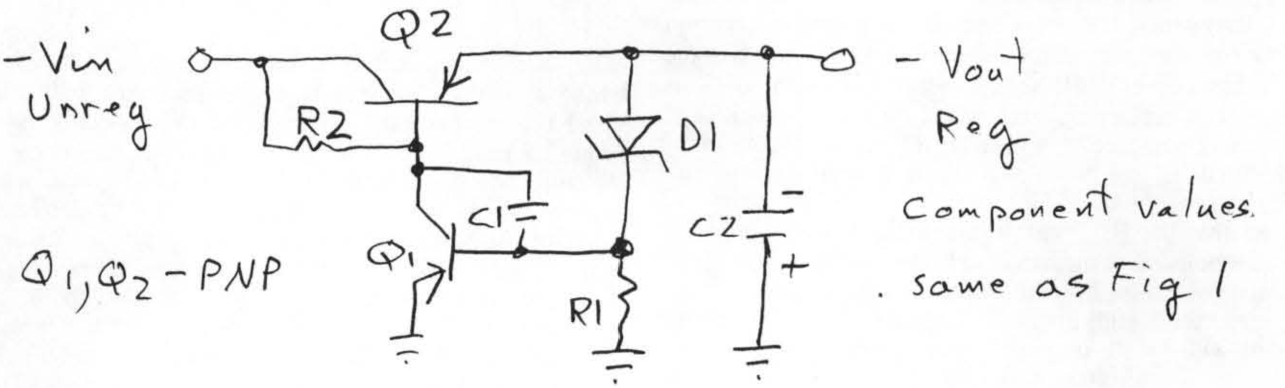


Figure 14 - Negative Quickie Regulator

MODIFYING THE FT-7: (Part 1 of 2)

Turn a Good Radio into a Great QRP Radio

by Phil Salas AD5X
1517 Creekside Drive
Richardson, Texas 75081
packet: @ N5LDD.#NTX.TX.USA.NA.

INTRODUCTION

My favorite QRP rig (of the several I own) is a Yaesu FT-7. Virtually all of the circuitry in this radio is on separate plug-in cards making it easy to get to and modify. All the adjustments are easily accessible and the radio has a terrific receiver. And, since these are mid-70s vintage radios, the price is reasonable when you can find someone who wants to part with one. However, there are several modifications that can be made to this radio to really improve its performance and operating convenience.

MODIFICATIONS/ADJUSTMENTS

The FT-7 is rated at 20 watts input, 10 watts PEP and CW output. My FT-7 put out 16 watts so some adjustments were in order to get to the QRP levels. First, I adjusted the maximum output to 10 watts CW and PEP. This is easily done by keying the transmitter in the CW mode and adjusting the ALC control (VR1501 on the back of the radio by the key jack–see the instruction book) such that you are at the 10 watt level as measured on a wattmeter. The FT-7 should be connected to a resistive 50 ohm dummy load for these power measurements.

The FT-7 now puts out 10 watts PEP and CW but you need to be at 5 watts maximum for CW QRP. You could adjust the ALC for 5 watts for both CW and SSB but I chose to keep the SSB PEP at the maximum 10 watt QRP level and adjust the CW output separately. This is easily done through a simple modification of the IF unit. The IF unit contains a separate 8999.3 Khz crystal controlled oscillator for CW transmit. The frequency gives you the 700 Hz offset necessary for CW. To give a CW drive control, I replaced R421 (10K resistor on the gate of Q404) with a 10K multi-turn potentiometer as shown in the before and after schematics (Figures 1 and 2). I epoxied the 10K potentiometer to the IF unit pc board as close to Q404 as possible. I also replaced several stand-up resistors and large disk capacitors with smaller units so that I would have room for this potentiometer and be able to adjust it when the unit was plugged in place.

I found that the FT-7 gain through the transmitter varies slightly as a function of the band used. The gain is highest on 20 meters, and lowest on 80 and 10 meters. Therefore, I set the potentiometer for 5 watts output on 20 meters. With this setting, I wound up with 3 watts output on 80 and 10 meters. I made one more modification to this board. You can vary the 8999.3 kHz frequency quite a bit with the crystal oscillator tuning capacitor. The FT-7 manual tells you to adjust this capacitor for a given output LEVEL. When I did this, I found that the crystal could be off frequency by several hundred Hz, yielding the wrong CW transmit offset. As it is very difficult to measure this frequency, I modified the board to bring the output to pins on the top of the board where I could easily connect my trusty frequency counter. I used a piece of shielded audio wire connected to the anode of D402 and ran it to the top of the board. For the test pins, I drilled two small holes in the board and soldered two small nails to the ground plane. Then I cut away the ground plane around the nail I was using for the center conductor connection of the cable. *(A Teflon standoff post eliminates the need for ground plane "surgery" -NN1G)*

Now I was easily able to adjust the crystal oscillator frequency for exactly 8999.3 kHz.

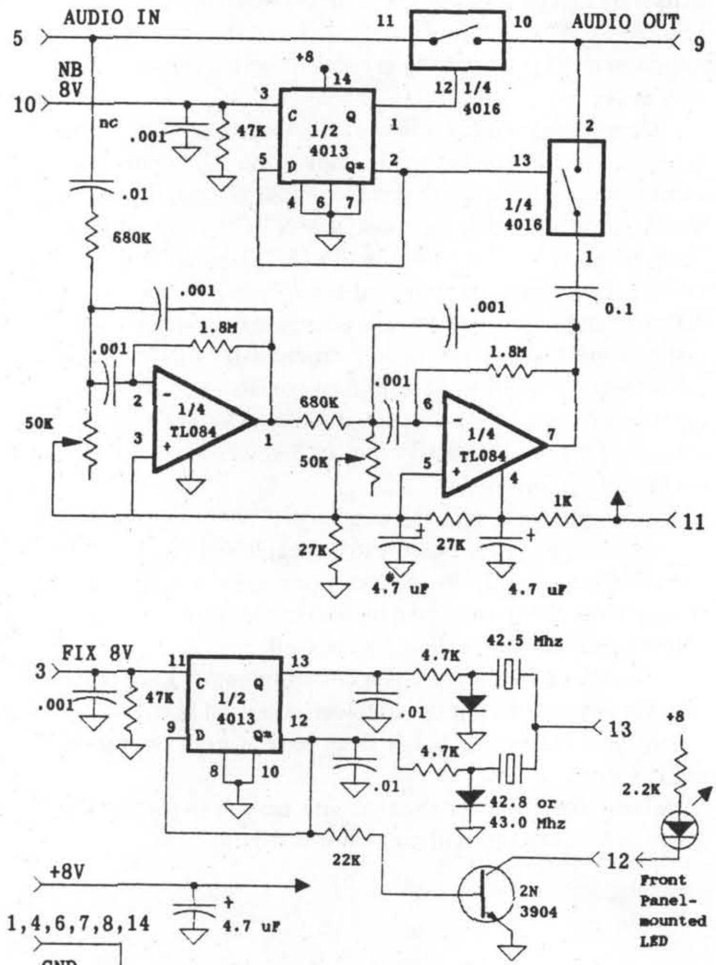


FIGURE 1
AUDIO FILTER/ CRYSTAL SWITCHER

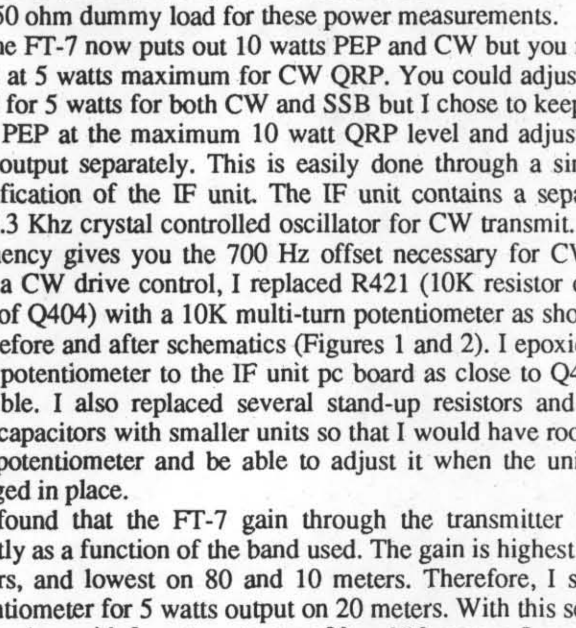


FIGURE 2
FILTER/SWITCHER BOARD LAYOUT

CONCLUSION

With some fairly easy modifications, you can turn the Yaesu FT-7 into an excellent CW QRP rig. In the next installment, we'll add crystal switching to extend 10 meter coverage, as well as a variety of other useful features.

Review—

S&S Engineering ARK40 Synthesized QRP XCVR

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

With additional comments
by Walt Thomas, WA4KA

By now you've probably seen the ads, and many have met the designer and rig at various gatherings around the country. My first impressions of the ARK40 and Dick Szakonyi, KA3ZOW, were very good and the 118 page manual blew me away. I asked him to send me a loaner to review, and when my "lease" expired I hated to send it back.

The usual comment I get whenever I mention the ARK-40 is it's awfully expensive for a QRP radio. There are two schools of thought on that, and I go along with Mike Bryce, WB8VGE. According to his review in the October 1993 issue of 73 Amateur Radio Today, he has said many times that "what the world needs is a low-cost synthesized QRP transceiver," and that now his dream has come true.

Why a synthesized rig? Getting a really stable analog VFO can take a lot of work, and getting accurate and repeatable dial calibration can be tricky, especially on a mass-produced or kit rig. Although the tradeoffs are greater complexity and cost, frequency synthesis takes care of those problems.

Since Mike already covered the rig well, and Cam Hartford, N6GA did it in the KI6SN QRP column in the November 1993 Worldradio, I won't go into great detail on the innards. (Be sure to read those reviews if you can.) The high points: thanks to the synthesizer (one entire PCB is devoted to that function) it has superb stability, accuracy and resettability; it has an excellent receiver (Dick has been designing them professionally for over two decades, and it shows) and great QSK. It's very well designed and constructed, and quite solid. As a matter of fact, before I hooked it up for the first time it took an accidental 3 foot nosedive onto a hard tile floor and that didn't bother it a bit except for denting the plastic bezel slightly. (The chassis is extruded aluminum.) It worked perfectly for the entire 4 weeks I had it. It seems like every other issue of the QRP Quarterly lately has a letter bemoaning the fact that QRPers are 20 years behind the times, hopelessly locked into old technology and super-simple rigs, and asking why we don't take advantage of the newer components and circuitry available. While they didn't use some of the really fancy (and expensive and complicated) direct digital synthesis circuits, S&S Engineering has finally pushed low-cost QRP ahead a step or two toward the future.

STABILITY/SENSITIVITY/SELECTIVITY

Being synthesized, it's literally rock solid–the master crystal oscillator determines the overall frequency stability. I monitored the transmit signal on a counter from a cold start, and over the first hour it drifted 45 Hz. How was the receiver? It could hear anything that my TS-430S could, on both my 40 meter loop and signal generator. Dick specs the minimum discernible signal (MDS) at < 0.1 microvolt, and that's what I got. I measured the noise floor, 3 dB signal-plus-noise to noise ((S+N)/N) ratio, using the technique described by W7ZOI in his July 1975 QST receiver article, and it was about 0.06 μV. (Dick also rates it at 0.3 μV for 10 dB (S+N)/N.)

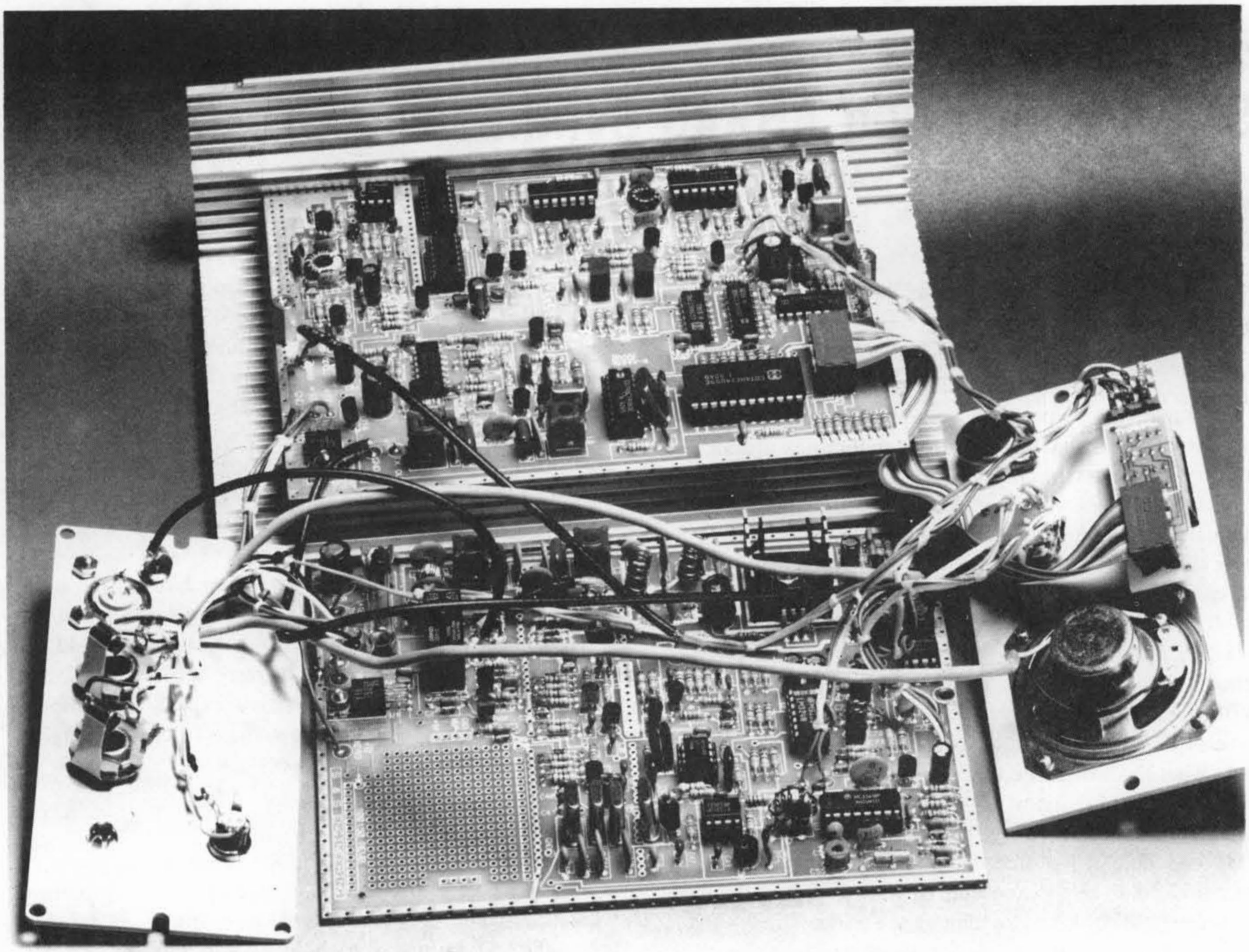
It uses what is now the de facto standard crystal filter for simple superhets, four carefully selected crystals at the IF frequency, and it works well. Strong signals could be heard a little on the wrong side of zero, at low pitches, but you can hear the same thing with some expensive, commercial radios. There is also a narrow audio filter which tightens things up even more when necessary.

KEYING

The QSK was nice, and I don't recall any popping or thumping in the audio. Instead of electronic T/R switching, which can result in a bit of signal loss, it uses an antenna relay which kicks in with each dot and dash. It makes a fair amount of mechanical noise but is not terribly objectionable, and when using phones it's hardly noticeable. (The "VOX" is on all the time; there is no provision for manually switching between transmit and receive mode.)

My review rig had the optional iambic keyer installed, which gives it an interesting quirk–it momentarily pops into transmit at full output for about a second when you turn on the power. That's an idiosyncrasy of the Curtis 8044 chip, not the ARK-40 itself, and my homebrew 8044 keyer does the same thing.

Several folks have commented that if you have the keyer installed you're locked into using it. You cannot connect a straight key, bug, keyboard, contest keyer, etc. This was a problem for WA4KAC, to whom I was going to sub-let the rig for more tests–he wanted to use a straight key. Being a loaner which I couldn't chop up, I soldered wires onto the "transceiver" PCB at the proper spots and ran them out through the hole of the jack for him to connect his hand key. An extra jack would have been nice, or a switch to allow the existing one to be used for both key and paddle. (This is not the first QRP rig with this shortcoming.) Don't worry about not being able to key up continuously for adjusting an antenna tuner, though–just turn the speed control fully CCW until it clicks.



Inside the ARK40, synthesizer board on top and transceiver board on the bottom. Not shown is the metal shield which slides in between the two boards. S&S Engineering photo.

TUNING

As most of you know by now the tuning method is a bit nonstandard, using push buttons to step up/down by 100 Hz, 1, 10 and 100 kHz, but it didn't take too long to get used to it. Although it's not particularly convenient for tuning slowly across the band, it's really great if you have to be on a certain frequency. N6GA said it's a unanimous criticism of the rig, and everyone I've talked with agrees, but I think it's an acceptable tradeoff for the stability, repeatability and accuracy of synthesis. (He could have used a rotary knob, but adding a shaft encoder, logic and display would drive up the price even further, cutting into potential sales.)

Need to be exactly on 7037.8 kHz for some reason? Turn on the rig, punch up 7037.8 and that's PRECISELY where you are; come back in ten minutes or ten hours and you're still on 7037.8. (Try that with any other QRP rig under $300!)

Have you ever accidentally bumped the tuning knob on a rig and lost a station? It does happen. With the push buttons of the ARK40 it's much more difficult to accidentally change frequency.

BUILDING IT

I received an assembled unit, so can't relate any personal experiences. WB8VGE recommends that a first time kit builder pass on it, but his comments on assembly make it look like experienced builders should have no problems. S&S says it takes around 16 hours to assemble, and Mike said that's about right. (There are no coils to wind, by the way.)

A SECOND OPINION FROM WA4KAC

I let Walt Thomas, WA4KAC, play with the rig for a few days to get another point of view. His comments:

"I fed the rig through a T-match tuner and a 1:4 balun to a 95 foot horizontal loop about 30 feet above the street in the attic of my frame townhouse. I operated a few evenings during August, making several stateside QSOs and attempting to work some 40 meter DX. I did succeed in working DL5KUS and F5PLZ, and heard many European countries as well as ZL2. I would say the sensitivity is satisfactory. I noticed that very strong (S8-9) signals leaked through the opposite side of the crystal filter at about S2 or 3, but the QRM on this superhet was much less than the audio images on my direct conversion receivers. Sometimes the AGC would pop from AC line transients, reduce the gain and then recover after about 1 second.

"The T/R relay operates at QSK speeds and is quiet; I could hear the signals between characters at my 15-18 WPM as easily as on my W7EL transceiver and didn't hear any mechanical "clicks" while wearing headphones.

"The really different thing about this radio is the tuning method. To scan the band I pushed the UP or DOWN 1 kHz buttons with the active filter in the wide mode. Once I found a station I wanted to contact I switched the filter to narrow and pushed the 0.1 kHz buttons until I got as near the filter peak as I could. This sets the proper T/R offset. Any final peaking was done with the RIT, which tunes 500-800 Hz either side of zero.

"This tuning method definitely takes some getting used to; I found it much less convenient than the continuously variable tuning KNOB on my other transceivers. This thumbwheel tuning method has been used on several aircraft radios and those were not widely accepted, even though aircraft radios operate only on discrete, fixed frequencies.

"The radio is packaged in an extruded aluminum case with silk screened front and back panels and appears to be very rugged. The speaker (which I never used) is mounted on the front in a very nice aluminum "grill". The manual is exceptional. Though not a Heathkit step by step kit, it is very well documented. The schematics are laid out on large fold-out sheets so they can be viewed easily, the parts lists are complete and allow specific parts to be easily located. A complete description of how the radio operates is given, including synthesis section, and excellent assembly photographs are provided.

"Would I buy an ARK-40? Probably not, because of its tuning method and cost. However, this reflects MY preferences and operating style. It is a GOOD radio, as evidenced by the European contacts in August, with abundant QRN, from my less than optimum QTH, an indoor antenna and urban noise levels."

–DE WA4KAC

MISCELLANEOUS

Current draw–The rig is rated at 1.1 amp in transmit at 12 volts, and if you go to 13.8V it will take a little more. Be sure your supply can put out at least that amount without the voltage dropping. This is not a rig to use on a battery power source, unless it's a really big one; just receiving requires 400 ma, since there's a lot of frequency-determining circuitry inside which is active all the time.

Milliwatts–One of the brochures said "adjustable to milliwatt levels," but it was not mentioned in the manual. From the schematic it was obvious that the control is R112 on the transceiver board, which sets the injection level of the transmit mixer, and Dick verified that. Unfortunately it's a PCB-mounted trimmer pot, not very convenient to use–some disassembly is required to get to it, and I wouldn't want to drill an access hole in the case. Since I'm a milliwatting nut at times, a pot with a knob mounted on one of the panels would be one of my first mods if I ever buy my own ARK-40.

No protective zener–The errata sheet points out that there is no SWR protection for the final amp transistor, and a quick look at the schematic verified that; the now-standard 33 or 36 volt zener diode is conspicuously absent. Dick said he could never get it to work right for some reason, so left it out. You might want to put one in there yourself; we don't deliberately transmit with antennas disconnected but it does happen, and even if I had a spare MRF476 on hand I wouldn't want to gamble.

Extra space–Want to put some additional circuitry of your own inside? Dick provided an empty space (with isolated PCB pads) on one circuit board for just that purpose, about 1 1/2" x 2". The optional keyer goes right above it but leaves some clearance; although that limits the available height, you can still put components there if they don't stick up too much.

S&S also has the ARK20 for 20 meters. Dick told me at the time of writing (October) that the ARK30 should be available for the 10 MHz band around the first of December 1993.

"MY FIRST QSO WAS WITH..."

An unwritten rule of reviews seems to be that you have to include comments like "my first contact was the Mellish Reef DXpedition during their first ten minutes on the air." WB8VGE had a refreshingly honest approach to "first QSO" in his review of the HW-9 years ago in the QRP Quarterly, so I'll be honest as well.

On the first night I tuned around 40 meters at 11 PM and heard lots of signals, including several Europeans. I finally answered someone in Fulton, MO. He never got more than half my call right, and told me over and over that he'd never be able to make a real QSO out of it, so 73 OM and QRZ?.... I never even got to make a rebuttal. Ten minutes later I worked someone in the Czech Republic (but didn't really buy the 599 report he gave me!). The trick is to be very careful about who you call for that first QSO.

IN THE NUTSHELL ON THE BOTTOM LINE

The ARK-40 is a relatively expensive QRP kit, but that's because it has a LOT of electronics inside, giving it very good performance and unbeatable stability and accuracy. Design and component quality are top notch, and the manual is head and shoulders above any other QRP kit I've seen except Heathkit (and some folks say it's even better in some ways). It's a "class act" all around. Ten years from now the ARK-40 will probably be remembered as one of the all-time great QRP rigs.

Contests

Conducted by Cam Hartford, N6GA
1959 Bridgeport Ave.
Claremont, CA 91711

First item on the agenda of the upcoming Contest Manager: Thank Red Reynolds publicly for his years of service to the club as Contest Manager.

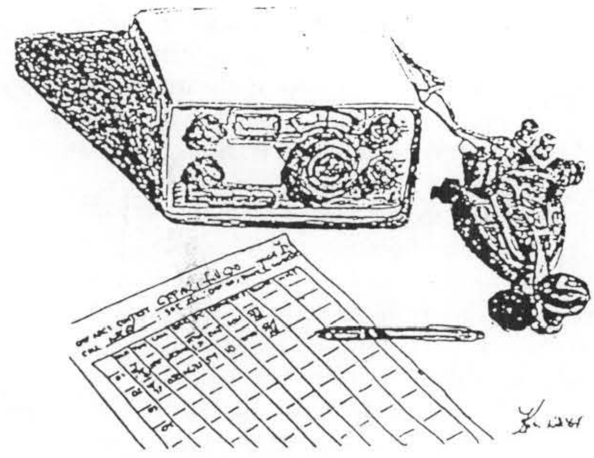
Red's first column appeared in the October 1987 issue of the Quarterly, which was over six years ago. I can't venture to guess how many hours of work he put in, but I am beginning to get the picture. The fact that his name was showing up less and less in the results of his own contests is a partial indicator of the sacrifice he was making.

Thanks, Red, from myself and from the many club members who benefited from your efforts.

Second item: Speaking of effort, I knew I could never hope to accept this position and make a decent effort of it by myself. So I am therefore pleased to have the able assistance of Dave Little, AF5U, And Chuck Adams, K5FO. Our hope is that a committee approach to handling the workload will leave us all with more time for the important things in this hobby–contesting, homebrewing, ragchewing, with a little time left for an occasional dinner out with a spouse.

Thanks to those of you who sent notes of encouragement. Your good wishes are appreciated.

Now to the business of contests. We will be publishing the results of previous contests as fast as we can, or as space in the Quarterly allows. Many of you sent in SASE's for the results of those contests and we will be sending those out to you as soon as is possible.



Some of you may have noticed discrepancies between the rules published in the Quarterly, in *QST*, and on the Packet Bulletin Boards. In all cases we will be scoring contests according to the rules published in the Quarterly. If your score in a particular contest report appears to be different from what you submitted, it is most likely that it was re-figured according to the rules in effect at the time of the contest.

Your input regarding our contest program is most welcome. If you have comments or suggestions, please pass them along. Items which are currently under review are Homebrew bonus points, Power supply bonus points, and use of the WARC bands for QRP contesting. I'm easy to get in touch with–besides the usual US mail, I can be reached by phone (evenings) at 909-621-3516, by fax at 909-622-0192, or Packet at N6GA @ K6UNQ.#SOCA.CA.

Results: 1992 QRP ARCI Summer Homebrew Sprint

State	Call	Score	Points	SPC	Power	Bands	Time	Rig	Antenna
NH	KN1H	16,125	70	7	.9 S	80/40	2	HB TCVRS	140' Dipole
PA	K7YHA	6,225	35	4	1.5 B	40M	0.5	Backpacker I	Windom
ME	WA1WPR	5,385	22	2	1.0 B	40M	0.5	Ramsey, Neophyte	Dipole
ME	KA1UEH	350	20	2		40M	0.5	HW-9	Dipole

Results: 1992 Summer Daze SSB Sprint

State	Call	Score	Points	SPC	Power	Bands	Time	Rig	Antenna
PA	W3TS	34,675	34	11	2.0 B	A-6	1	HB 6 band TCVR	VRS
PR	KP4DDB	12,801	77	19	3.0 B	20/15	3	Argo 2	Yagi
HON	KA2OIG/H	9,555	91	15	10 PEP	15M	4	TR-4CW	3 el HB quad
AR	N5SAN	3,906	62	9	8 PEP	40M	3	TS-520	147 Ft. LW
WV	N8MUU	875	25	5	10 PEP	20/15	2	IC 735	Vert, Dipole
WA	WB8SNH	788	18	5	3.0 B	20M	2	Argo 509	Yagi
OH	WD8OJC	476	17	4		20/15	2	Argo 535	Mini quad
NJ	W2JEK	175	10	2	4.0 B	15M	2	Argo 505	40M Dipole

CONTEST RULES

SPRING QRP ARCI CW QSO PARTY

Date/time:
April 9, 1994-1200Z through April 10, 1994-2400Z

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

QSO Points:
Member = 5 Points
Non-Member, Different Continent = 4 Points
Non-Member, Same Continent = 2 Points
Multiplier - SPC (State/Province/Country) Total all bands.

The same station may be worked on more than one band for QSO Points and SPC credit.

Team Competition:

Team competition of teams consisting of 2 to 5 members will be a separate category apart from individual entries. Team members will be listed as individuals and the team score will be the total of the member's scores. Team entry will be all-band only. The team captain must send a list of its members to the contest manager postmarked at least one day prior to the QSO party. Certificate awarded to the highest scoring team

Power Multiplier:
Ø-1 watt out = x 10; 1-5 watts out = x 7

Suggested Frequencies:

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

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

SCORE = POINTS * SPC * POWER MULTIPLIER

Entry may be an all-band, a single band, "HI-band" (20m, 15M, 10M, AND 6M) or as a "LO-band" (160M, 80M, AND 40M). All entries will compete against other entries in their own class of entry only. Certificates to the top 10 scores and to the top score in each single band, LO-band, and HI-band.

Certificates for the top score in each class in each SPC. The contest manager reserves the right to recognize special significant entries with a certificate award.

Entry includes a copy of the logs and a separate summary sheet. Include duplicate check sheets with entries of 100 QSO's or more. Indicate the total time-on-air, including time spent listening. All entries must include a complete, legible, name, call, and address. All entries must be received within 30 days following the contest. Late entries will be counted as check logs. Members indicate their QRP ARCI member number on all logs. Members and non-members indicate their input or output power for each entry and band. The highest power level used will determine the power multiplier. Output power is considered as 1/2 of the input power. During the QSO party, a maximum of 24 hours may be operated within the 36 hour time period.

Include a description of homebrew equipment, commercial equipment, and antennas used with each entry. A summary sheet and sample log sheets are available from the contest manager for an SASE with one unit of postage. Include an SASE with one unit of postage in the entry for a copy of the contest results. Results will be published in the next available issue of the QRP ARCI Quarterly. The final decision on all matters concerning the contests rests with the contest manager.

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

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1992 SPRING QRP ARCI QSO PARTY

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TOP TEN

1	W3TS	1,583,575
2	WG5G	1,365,875
3	W0MHS/4	1,017,500
4	KH6CP/1	922,619
5	N4BP	838,810
6	KC4IIS	823,375
7	WA0RPI/0	768,075
8	K3TKS	740,625
9	KF0N	657,650
10	W8MVN	634,383

SINGLE BAND

10M	N6BXU	39,200
15M	KF7MD	142,690
20M	K5FO	83,495
40M	N3OS	695,588

HI/LO BAND

HI-B	WG5G	1,365,875
LO-B	NN1G	189,244

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1992 SPRING QRP ARCI QSO PARTY

CALL	SCORE	POINTS	SPC	POWER	BANDS	TIME	RIG	ANTENNA
ALABAMA								
AB4QL	31,500	120	21	.9 S	A-4	4	ARGO 515	VERT / LOOP
W4DGH	4,725	54	10	4.0 B	H-2	3	ARGOSY-2	YAGI
ARIZONA								
N7HID	93,993	262	41	4.0 S	H-3	-	HW-9	YAGI
CALIFORNIA								
W6SKQ	113,575	295	44	2.0 B	H-3	8	ARGO 515	YAGI / DIPOLE
KI6SN	53,200	48	6	2.0 S	40M	1	HB XCVR	DIPOLE
W6SIY	50,540	18	3	.25	40M	6	TUNA-TIN-2/HB RX	DIPOLE
N6BXU	39,200	224	25	5.0	10M	-	–	–
CONNECTICUT								
KH6CP/1	922,619	995	83	4.0 S	A-6	24	VRS HB	DIPOLES / VERTICAL
NN1G	189,244	195	23	4.0 B	L-3	-	VRS HB TCVRS	WINDOM
N1LJR	46,068	266	14	3.0	40M	8	2-FER, TS 830S	DELTA LOOP
FLORIDA								
N4BP	838,810	1042	92	5.0 S	H-3	-	TS-130V	YAGI
K4KJP	130,620	311	48	2.0 S	A-4	-	ARGO 509	YAGI / SLOPER
KE8P/4	26,093	142	21	4.0 B	H-2	9	ARGO 509	R5 VERTICAL
K3HXC	7,546	77	14	5.0	H-2	4	TS-930	RANDOM ON ROOF
K0BZV	189	9	3	3.0	15M	2	HW-8	DIPOLE
GEORGIA								
W0MHS/4	1,017,500	814	100	.85 B	A-5	-	TS-440	DIPOLE
KN4QV	176,904	486	52	5.0	H-3	-	IC 730	DIPOLES
KE2WB	115,920	360	46	5.0	H-3	9	HW-9	R-5 VERTICAL
N4XDC	16,312	87	15	.90 B	A-3	-	HW-9	G5RV
IOWA								
KF0N	657,650	526	62	.90 B	A-5	15	MOD HW-9	45' COLLINEAR VERTICAL
IDAHO								
W1HUE	203,490	408	57	4.8 B	H-3	10	ARGO	TRAPPED VERT
ILLINOIS								
W9PNE	424,856	585	83	4.0	A-5	15	ARGO 515	YAGI / SLOPER / VERT
N9ND	171,806	385	51	3.0 B	A-5	-	ARGO 515	QUAD, VEES
W9NJP	123,051	343	41	5.0 B	A-4	9	TRITON IV	ZEPP
K5VOL	77,675	123	18	.72 S	20M	3	HB 2-FER	LONGWIRE
NF9X	64,063	205	25	.80 B	H-3	9	TS 130V	LOOP
INDIANA								
KE9PO	48,160	215	32	5.0	A-3	-	ARGO 515	INV VEE / DIPOLE
MASSACHUSETTS								
K1VV	191,121	479	57	3.0	A-4	7	ICOM 735	BEAM
WB2CPU	54,880	61	8	.80	20M	-	HB TX / RX	DIPOLE
KB1MJ	54,760	68	10	4.0	A-2	7	HB 40M / HW-9	DIPOLE

MARYLAND								
K3TKS	740,625	750	79	.90	A-5	22	ARGO 509	LOOP / DIPOLE
K4JSI	122,657	326	43	3.0 B	A-4	12	ARGO 515 / HW-8	INDOOR ALUM. FOIL
WA3GYW	7,884	53	17	2.0 B	A-4	11	HW-8	DIPOLE
MAINE								
WA1WPR	78,875	165	20	4.0 B	A-4	-	HB TX/RX / HW-9	DIPOLE
WW1P	18,946	123	22	3.0	A-4	-	HW-8	DIPOLE
MICHIGAN								
N8CQA	358,568	674	76	4.0	A-6	19	TS-830S	YAGI / INV L
MINNESOTA								
KB0R	166,054	409	58	5.0	A-4	14	CENTURY 22	DIPOLE
WA0SWD	101,158	341	34	5.0	40M	14	HB TX / TS130	LOOP
WA9WFA	85,260	290	42	2.0	A-4	-	ARGO 509	VERTICAL
WB0POQ	29,904	178	24	5.0	A-2	2	TS 430S	35 FT LONG WIRE
MISSOURI								
K0LWY	169,715	373	52	4.0 B	A-4	16	HW-9	YAGI / G5RV
AA0EN	137,364	307	36	5.0	L-3	18	HB TX(S) / TS930S	TOWER/DIPOLE/SLOPER
NORTH DAKOTA								
WA0RPI/0	768,075	924	95	5.0 S	A-5	22	IC-735	DELTA LOOP
NEW HAMPSHIRE								
KN1H	555,000	408	50	.90 S	A-6	8	HB TX / RX	DIPOLE
KD1AW	99,855	317	45	5.0	A-5	10	HW-9	ZEPP
N1HFE	17,024	152	16	4.0	L-2	-	HW-9 / TS 440	LOOP
NO1E	6,391	83	11	4.0	40M	4	FT-707	G5RV
NEW JERSEY								
WB2CZB	330,260	519	54	.90	A-4	14	HB XCVR / HW-9	YAGI / G5RV
W2JEK	229,400	160	21	2.0 B	A-4	5	2-FER / OHR-40	DIPOLE / HERTZ
N2INN	62,590	37	7	.50	H-3	-	ARC 5 TO 6AQ5	LOOP
NEVADA								
W6JHQ	69,282	214	37	4.0 B	H-3	8	ARGOSY 2	MOBILE VERT
NEW YORK								
WB2QAP	163,954	478	49	3.0	A-5	6	ARGO535	YAGI / INV VEE
KG2H	75,621	277	39	5.0	A-4	-	TS 830	YAGI / DIPOLE
N2KPY	53,438	285	15	.90 S	40M	-	HW-8 / HW-9	YAGI / G5RV
WA3INC	21,980	157	20	5.0	A-2	3	TS-940S	VERTS
OHIO								
W8MVN	634,383	802	79	5.0 S	A-4	-	HB TX / R-8	YAGI / LOOP / CAGE
WA8RJF	67,430	102	17	.30	20M	-	HB TX / RX (S)	LONGWIRE
N8LRH	63,720	98	16	4.0 B	20M	-	OHR-20	INV VEE / VERTICAL
WB0IQK/8	15,820	113	13	3.0 B	20M	9	HW-8	YAGI / INV VEE
W8DYF	1,554	39	6	5.0	A-2	-	FT-757	DOUBLE ZEPP
OKLAHOMA								
K5DP	12,870	99	13	.90	20M	2	HW-9	40M LOOP
OREGON								
AA7KF	375,760	671	80	5.0	A-4	12	TS 940S	G5RV (2)
W7LNG	90,384	269	48	5.0	A-4	-	R4C / T4XB	BEAM / GND PLANE

WX7R	65,100	240	31	4.0 S	A-3	-	IC 735	YAGI, VEE BEAM
PENNSYLVANIA								
W3TS	1,583,575	1007	98	.90 S	A-7	11	HB TCVR	YAGI / VEES / 160 TEE
WA3SRE	344,190	596	66	4.5 B	A-4	23	ARGO 515	VERT / LOOP
NJ3D	96,110	217	17	53uW B	40M	18	HB XCVR	INV VEE / EXT ZEPP
WB2SVF	58,428	86	14	5.0	H-2	11	HB XCVR / HTX-100	G5RV / DIPOLE
K7VHA	51,415	226	26	2.0 B	A-4	4	ARGO 509	WINDOM
WV3W	37,961	187	29	–	A-2	-	–	–
N3CZP	8,484	101	12	5.0	H-2	14	CENTRY 21/HTX-10C	INDOOR VERT - 4 FEET
PUERTO RICO								
KP4DDB	134,946	357	54	5.0	H-3	8.5	ARGO 2	YAGI
QUEBEC								
VE2ABO	41,769	221	27	3.0	A-4	10	HW-9	BEAM / DIPOLE / LOOP
VE2BLX	34,413	171	23	3.0 B	A-3	8	HW-7	LONG WIRE
VE2DRB	17,500	125	20	3.0	A-2	9	PM-3	YAGI / DIPOLE
RHODE ISLAND								
WA1OFT	294,840	648	65	4.0	A-5	20	HW-9	R-5 / DIPOLES
KA9HAO	48,000	160	24	5.0 S	A-4	8	ARGO 515, TS670	G5RV
TENNESSEE								
KC4IIS	823,375	941	100	5.0 B	A-5	-	OMNI C	QUAD / G5RV
WB4O	158,375	362	50	3.0 S	A-4	10	DELTA II	YAGI / LOOP
NY4N	524,842	769	78	4.0 B	A-4	24	ARGO 509	250 FT VEE
TEXAS								
WG5G	1,365,875	1115	98	.90 B	H-3	21	HW-9	QUAD
NK5V	179,520	352	51	1.0	A-4	20	IC 735	G5RV
K5FO	83,495	174	22	2.0 B	20M	5	HB XCVR	LONGWIRE
VIRGINIA								
K4JM	336,700	962	50	5.0	A-5	-	CORSAIR II	VRS
WR4I	256,450	446	46	.90 B	A-4	13	ARGO II	YAGI / DIPOLE / G5RV
KI4RO	200,760	478	60	5.0	A-4	-	TS-140S	80 M ZEPP
N4ROA	79,925	190	18	3.0 B	40M	4	OAK HILLS TCVR	DIPOLE
N3OS	69,588	308	23	2.3	40M	7	12BY7, SB301	LOOP
WASHINGTON								
KF7MD	142,690	299	31	.90	15M	8	HB TCVR	LPDA
WY7F	50,504	24	3	5.0	20M	2.5	HBTCVR	INV VEE
WU7F	35,910	171	30	5.0 S	H-2	-	IC-735	YAGI
K7EAU	2,268	36	9	5.0	10M	10	HTX-100	DIPOLE
WISCONSIN								
WN9U	47,600	138	16	.60 B	20M	3	2-FER/SONY2010RX	INV VEE
KB9W	35,175	201	25	5.0	20M	5	TEN-TEC OMNI C	YAGI
WEST VIRGINIA								
N8MUU	15,470	130	17	4.0	20M	4	IC 735	VERTICAL

1993 FALL QRP ARCI QSO PARTY								
			SPC		BANDS			
CALL	SCORE	POINTS		POWER		TIME	RIG	ANTENNA
**								
ALBERTA								
VE6BIR	92,022	313	42	3	H-2	6	ARGO 509	YAGI / DIPOLE
ALABAMA								
AB4QL	21,470	113	19	0.9	H-2	4	ARGO 515	LOOP / GROUND PLANE
ARKANSAS								
N5SAN	43,680	168	26	0.75	H-2	7	FT 747GX	588 FT DIPOLE
ARIZONA								
WO7T	197,274	462	61	5	H-2	10	ARGO / HB TCVR	5 EL LOG PERIODIC
KB7BEJ	3,850	55	10	5	15M	2	ATLAS 210X	DIPOLE
CALIFORNIA								
KI6PR	201,978	687	42	5	A-3	12.5	OMNI-V	SKELTON CONE
N6GA	198,912	444	64	2	A-5	8	ARGO 515	YAGI / LOOP
NU6U	75,768	264	41	5	A-5	12	ARGOSY II	G5RV
KI6SN	48,720	203	24	0.9	20M	8	HB TCVR	G5RV
N5BF	21,574	134	23	5	H-2	-	TS 680	MFJ 1786 LOOP
N6KM	8,610	82	15	5	A-2	3	CENTURY 22	40 M DIPOLE
KA7ULD	1,428	34	6	5	A-3	5	TS 430S	VERTICAL
K6URI	399	19	3	5	40M	0.25	FT 757	DIPOLE
W6SIY	190	19	1	0.25	40M	4	TUNA TIN / HB RX	DIPOLE
COLORADO								
N0IBT	176,526	467	54	5	A-3	20	TS 830S	DIPOLE
W2CRS	52,577	252	29	5	H-2	2.5	ATLAS 110	YAGI
KI0G	31,710	151	21	0.9	20M	5	HB K9AY	YAGI
CONNECTICUT								
KH6CP / 1	371,700	708	75	5	A-5	14	ARGO 515 / HW-9	DIPOLE / VERT
W1KKF	63,630	303	30	3	40M	5	HB W7EL	G5RV / VERT
NN1G	41,391	219	27	4	A-5	3	TS 130SE	WINDOM
AA1GE	14,364	114	18	5	20M	2.5	HB TCVR	
WM1U	476	17	4	5	80M	0.5	IC 735	G5RV
FLORIDA								
N4BP	1,000,188	1458	98	5	H-3	21	TS 130V	YAGI
WA4VQD	199,395	633	45	5	20M	9	TS 440S	YAGI
K4FS	47,705	235	29	4	20M	-		
K4KJP	17,920	128	20	5	A-3	3.5	OMNI D	DIPOLE / G5RV
GEORGIA								
W0MHS	1,768,000	1360	130	0.9	A-4	24	TS 440S	BIG ANTENNA FARM
KN4QV	390,418	706	79	5	A-5	11.5	IC 730	80 M LOOP
KE2WB	270,613	577	67	5	A-4	13	HW-9	G5RV
ILLINOIS								
W9CUN	1,848	44	6	5	40M	-	DELTA 580	HORIZONTAL LOOP
INDIANA								

K9JWI	54,635	223	35	5	A-4	10		
N9DD	41,860	230	26	1.2	20M	10	HB NN1G TCVR	80 M DIPOLE
KENTUCKY								
N4LH	12,450	83	15	0.8	20M	4	HB TCVR	VERTICAL
LOUISIANA								
KB5KXQ	10,864	97	16	5	15M	3		
MASSACHUSETTS								
N1QY	425,600	800	76	5	A-4	14.5	OMNI 6	DIPOLE / VERT
N1JAC	339,388	713	68	5	A-4	22	HW-8 / TS 450	DIPOLE / YAGI
MARYLAND								
K3TKS	300,040	577	52	0.9	A-4	13	ARGO 509	80 M HORIZONTAL LOOP
MAINE								
KX1E	84,592	333	32	4	A-2	-	HB TCVRS	DIPOLES
MICHIGAN								
N8CQA	426,510	677	90	4	A-6	20	TS 830S	INV "L"
WA8LCZ	135,212	439	44	5	H-3	19	TS 450	GAP VERT
MINNESOTA								
WA0RPI	544,300	820	95	5	A-5	16	IC 735	DELTA LOOPS
MISSOURI								
AA0EN	337,947	619	78	5	A-5	16	HB TCVRS	GP / PHASED VERTS/YAGI
W0GWT	199,528	509	56	5	A-4	14.5	IC 735	VERT / RANDOM WIRE
AA0NB	57,768	257	32	5	H-2	-		
N0IZZ	49,910	230	31	5	20M	12		
MISSISSIPPI								
N5ODV	104,136	346	43	5	A-5	8	TEN-TEC SCOUT	80M LOOP
N5NRG	5,124	61	12	5	L-2	2	CENTURY 22	80M DIPOLE
WD5HLD	3,304	59	8	4	40M	2	MFJ	40M HALF SQUARE
KI5FW	2,870	41	10	5	A-4	2	IC 725	G5RV
NORTH CAROLINA								
AC4QX	35,030	226	31	4	A-3	–	ARGOSY / OHR40	40M DIPOLE
WB4PNE	42	4	2	5	20M	5 MIN	CENTURY 21	ZEPP
NEW HAMPSHIRE								
KN1H	55,180	178	31	0.1	A-3	3	OMNI W/O FINALS	DIPOLES
NEW JERSEY								
W2JEK	100,170	318	45	4	A-4	9	2FER/OHR40/NN1G	DIPOLE / GP / HERTZ
KB2JE	90,146	274	47	4	A-4	5	IC 765	G5RV
W3IST	50,715	315	23	5	40M	18	MFJ 9040	
K2JT	43,470	161	27	0.9	A-4	2.5	ARGOSY I	G5RV
KB2QCY	23,989	149	23	3.5	A-2	-		
KE2KW	17,766	141	18	5	40M	6.5	OHR SPIRIT	INV VEE
N2MNN	14,000	125	16	5	40M	3	OHR SPIRIT	
N2JOC	1,176	28	6	3	A-3	2	OMNI VI	80 M DIPOLE
NEW MEXICO								
KN5S	389,172	678	82	5	A-8	-	HB TCVR, 8 BANDS	VERT / DIPOLE / BEAMS
W3YK	81,830	334	35	3	20m	13	MFJ	3 EL YAGI
NEW YORK								

WA2VEZ	423,808	704	86	2	A-5	16	509 / ARGOSY II	QUAD / VERT / WIRE
W2QYA	220,550	401	55	0.9	A-4	19	HW-8	MARCONI
KD2IX	39,560	172	23	0.9	15M	-	IC 725	DIPOLE
KF2JH	38,626	178	31	5	H-2	-	FT 990	R5
WA3INC	37,436	191	28	5	A-3	6.5	TS 940S	VERTICAL
OHIO								
WA8RJF	467,840	688	68	0.9	A-5	23	ARGO 515	YAGI / LONG WIRE
W8MVN	255,024	792	46	4	40M	20	ARK-40	DELTA LOOP
WA8HQO	180,621	423	61	5	A-5	20.5	ARGO II	VRS INVISIBLE WIRES
OKLAHOMA								
W7BD	136,024	347	56	4	A-5	17	MODIF. DELTA	TRAP VEE / INV VEE
ONTARIO								
VE3KQN	128,520	408	45	5	A-3	-		
VE3CUI	66,430	365	26	5	40M	-	IC 751	BOBTAIL CURTAIN
OREGON								
AA7KF	1,143,240	1361	120	5	A-5	16	TS940 / FT101B	LAZY H / WIRE YGI, INV VEE
WX7R	371,434	617	86	4	A-5	18	MFJ 9015 / IC 735	LW / VEE BEAM / 10M YAGI
W7LNG	101,430	322	45	5	A-5	8	TS 850	YAGI / DIPOLE / GP
PENNSYLVANIA								
W3ZMN	133,245	423	45	5	A-4	10	HW-9	ZEPP
W3TS	91,120	268	34	0.1	A-4	3	HB TCVR	160 TEE / INV VEE / YAGI
NR3Z	83,160	330	36	5	A-3	-	ARGOSY	VERT / YAGI
N3CZB	2,835	45	9	4	H-2	5	MFJ 9020 / CENT 21	INDOOR HELICAL VERTS
PANAMA								
HP1AC	99,456	296	48	4	H-2	4.5	HB TCVRS (2)	
PUERTO RICO								
KP4DDB	45,080	230	28	5	20M	4	ARGO II	YAGI
QUEBEC								
VE2BLX	144,480	430	48	4	A-4	15	IC 735	LONG WIRE
VE2ABO	128,520	340	54	4	A-5	17	HW-9	BEAM / LOOP / INV VEE
VE2DRB	48,069	327	21	1.5	40M	-	OHR SPRINT	HORIZ. LOOP
RHODE ISLAND								
WA1OFT	315,287	617	73	4	A-5	22	HW-9	VERTICAL, DIPOLES
KA9HAO	16,480	103	16	0.8	A-2	6.5	ARGO 515	G5RV
SCOTLAND								
GM4XQJ	11,480	82	14	1	20M	5.5	ARGOSY	YAGI
SOUTH DAKOTA								
WD0T	882,189	1273	99	5	A-5	16		
TEXAS								
AA5WE	153,062	377	58	4.5	A-3	16	MFJ 9020 / TS430	GAP VERT / 80 M INV VEE
K5FO	63,990	237	27	0.9	20M	6	NN1G HB TCVR	LONG WIRE
W5HNS	18,200	130	20	5	H-2	-	TS 930	VERTICAL
UTAH								
WJ7H	31,668	156	29	5	A-4	10.5	TS 440	YAGI / G5RV
VIRGINIA								
N4ROA	467,775	825	81	5	A-4	16	OMNI / OHR40	QUAD / DIPOLES

W4XD	314,160	680	66	5	A-3	12	ASTRO 102BX	G5RV
K4JM	193,431	453	61	5	A-4	-	CORSAIR II	135' WIRE / DIPOLE / G5RV
WD4EXG	66,920	239	40	2.5	A-4	6	ARGO 509	WINDOM
KD4OOI	525	15	5	2	40M	4	UGLY WKNDR TCVR	ATTIC DIPOLE
VERMONT								
N1NPI	48,944	184	38	5	A-4	-		
WASHINGTON								
KB7NTZ	29,624	184	23	5	15M	5		
KF7MD	23,940	114	21	1	15M	4	HB TCVR	8 EL LPDA
WEST VIRGINIA								
N8MUU	138,768	354	56	5	A-4	9	ARGO II / TS-50S	VERT / INV VEES
WYOMING								
AA7QV	57,120	272	30	5	20M	10	ARGO II	GAP VERT

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1993 FALL QRP ARCI QSO PARTY

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TOP TEN

1	W0MHS	1,768,000
2	AA7KF	1,143,240
3	N4BP	1,000,188
4	WD0T	882,189
5	WA0RPI	544,300
6	WA8RJF	467,840
7	N4ROA	467,775
8	N8CQA	426,510
9	N1QY	425,600
10	WA2VEZ	423,808

SINGLE BAND

15M	KD2IX	39,560
20M	WA4VQD	199,395
40M	W8MVN	255,024
80M	WM1U	476

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HI/LO BAND

HI-B	N4BP	1,000,186
LO-B	N5NRG	5,124

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The bands seemed to be in good shape for the Fall contest, with the exception of 10 meters. Activity was high around the QRP frequencies, so much so that some contesters wrote and asked that I urge participants to spread out a little from the suggested frequencies. So here it is -- it's OK to spread out! I know it's a bit tough to do on 20, being jammed in between Digital Alley and the County Hunters, but I heard some contesters as low as 14.054, calling CQ and not being answered. Tune around a bit, you might be suprised.

It also pays to take a look at the novice frequencies occasionally. You might run into somebody like KD4OOI, who is confined there until he upgrades to General. I believe Jay is infused with the QRP spirit, and deserves the Persistence Award for this contest -- he ran an Ugly Weekender transceiver at 2 watts, using an attic dipole, on the 40M Novice band. Three hours of operating netted him 6 QSOs! Hope to see you on 7040 soon!

Not much room for Soapbox comments this time, but as soon as we get the back contests cleaned up, I hope to increase this feature of the column. Meanwhile, hope to see you in one of the January events, either the Fireside, the NW or the Michigan sprints.

QRP ARCI CONTEST SUMMARY SHEET

QRP ARCI CONTEST________________________________; MODE______

CALL____________; S-P-C______; QRP NR / POWER________; ENTRY: MULTI-BAND______

: SINGLE-BAND_____

	BAND	POINTS	S-P-C
	160		
	80		
	40		
	20		
	15		
	10		
	6		
TOTALS			

1. Enter all data above and indicate entry class and band.
2. Enter all points and S-P-C by band.
3. Add total points and S-P-C.
4. Multiply points, S-P-C, power multiplier and bonus multiplier (power source) and add bonus points for final score.
5. Send entries to:

CAM HARTFORD. N6GA
QRP ARCI CONTEST MANAGER
1959 BRIDGEPORT AVE.
CLAREMONT CA 91711
USA

SCORING:

TOTAL POINTS	X	TOTAL S-P-C	X	POWER MULT	X	BONUS MULT	+	BONUS POINTS	=	FINAL SCORE
________	X	________	X	____	X	____	+	______	=	

TOTAL OPERATING TIME______________; DUPLICATE SHEETS INCLUDED__________

TRANSMITTER/XCVR:______________________________; OUTPUT:__________

RECEIVER:________________________; POWER SOURCE:______________

ANTENNA(S):____

COMMENTS:____

____

NAME:______________________________; CALL:______________

ADDRESS:____

CITY:______________________; STATE:__________; ZIP:__________

Members' News

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

To all who contributed in '93 . . .

Members' News is powered by the many members of QRP ARCI who have taken the time and energy to send letters, cards and photographs for publication in this column.

KI6SN
. . .Richard Fisher

Here, in no particular order, are the people who made 1993's Members' News a success:

OK1FVD, Vladimir Dvorak; NN1G, Dave Benson; WW1P, Dennis Vincent; HL2DDK, Dong Hyun Cho; WU2J, Byron Weaver; KA2OIG, Kris Merschrod; VE2XLT, Yuri Dzyuba; K3TKS, Danny Gingell; K4BNI, Dick McIntyre; G4EIB, Jim Challenger; KG5F, Mike Kilgore; WG5G, Dan Walker; WD5GLO, Louis Nix; N5JWL, Dick Swanson; WB5UDA, Jay Stanfield; KD6JUI, Bil Paul; KC6TEV, Steve Cates; KK7C, Jim Stevens; VE7QK, Derry Spittle; WA8MCQ, Mike Czuhajewski; KE9PO, David Elmore; GW0LBI, Leighton Smart; and WA0RPI, Jim Lageson.

Sincere thanks and "72" to them all. And now that we're off and running in '94, how about making a contribution to MN? A card, letter or photograph will do just fine.

Share your challenges, successes, experiences with the general membership — and be in the running for a bigger and better Goodie Giveaway than ever.

The April edition of QRP Quarterly is just around the corner. Here's hoping to hear from you soon.

— R. E. F.

Pedaling a bit of QRP

If you're into bicycling and QRP at the same time, perhaps **Bicycle Mobile Hams of America, BHMA,** is for you.

The organization, based in Boulder, Colo., has a regular newsletter and members around the country. **Russ Dwarshuis, KB8U,** of Ann Arbor, Mich., sent along the club's publication.

The Oct.-Nov.-Dec. edition has articles about bike treks through Africa, trips across America, bicycle HF setups, events and rallys, and letters — lots of them.

Membership has grown to 300. And it all began with a "Strays" item in QST Magazine in June 1989.

If you'd like more information, write: **Bicycle Mobile Hams of America, PO Box 4009, Boulder, CO 80306.**

Friendly neighbors

Bob Leinau, W7BD, writes from Burns Flat, Okla., that QRP fans should remember that "there is good fun to be had in collecting counties just a few KHz below 14.060 MHz. When contacts are slow coming on 14.060, move down to 14.0565. The County Hunters Net (CHN) is active every day from sunrise to sunset.

"I've picked up a little over 500 counties in an eight month effort running four watts out to a trap vee dipole at 50 feet. The net control station is usually **WA6VJP, Ed Sanders,** and he'll ask if any mobiles are ready, QRV, and to check in, QNI.

"When they do, he'll exchange reports with them and assign a number and ask if there are any more to check in. Then he'll tell the mobile to go ahead. The mobile will give his call and county — maybe on a county line, 'CL,' and you get two for the price of one — and then QRZ.

"That's when you jump in with your call. Forget the ' / QRP' bit. When you get 'em, you'll receive a report. QSL the report received and send one to them. After the mobile has worked all heard, then net control will ask to help as a relay, QSP, and if you need help just send your call. NCS will then give your call and ask you to send RST. Send an RST and listen for the one your going to get from the mobile. QSL the report from the mobile. Net control helps with the 'overs,' 'K,' and confirms a good two-way exchange."

Bob says he's "had a lot better luck QRP SSB on the CHN at 14.336 MHz than I've had on the QRP SSB frequency 14.285 MHz, although I enjoy the CW CHN more than the SSB CHN — a lot less congestion!

"I don't know if QRP ARCI has a counties award or not. I'm not trying for the CQ Magazine USA-CA — worked all counties award — because all contacts must be confirmed with a QSL and even though there is a bureau for the county hunters, it costs too much for me."

And speaking of awards, Bob asks: "Are there any QRP-types in Kansas, Montana, Nebraska and North Dakota? I've been working three years on two-way QRP CW WAS, and these four states shouldn't be so hard to contact from western Oklahoma — but they seem to be."

The joys of 40 meter QRP

From Mid Glamorgan, Wales, comes this dispatch from **Leighton Smart, GW0LBI:**

"Well, I've been having some fun here with my QRP station. I've suddenly discovered how useful 40 meters is for QRP working. I have only ever used this band for semi-local contacts, believing — unwittingly — that QRP didn't work well on 40 for DX, but in just one evening with five watts CW I actually worked five continents. These were **CV3A, KA1DWX** (United States), **UH8EA** (Turkmen), **DL8GOP** (Germany) and **EA8EA** (Spain).

"I couldn't believe it!

"I guess it just goes to show how wrong one can be! It seems that there is something new to be learned every day about QRP, eh? The antenna for 40 meters is just a simple dipole at 20 feet up — which makes it even more of a surprise for me to work international QRP DX with it!"

Leighton hasn't much to report in the way of new countries worked, "just **HT1T** for a new one.

"Conditions have been reasonably good, with the higher bands starting to pick up . . . I managed to work a couple of our members during the **QRP ARCI Fall QSO Party** on 15 meters in the form of **N8MUU, W2CRS, W0MHH,** and **N1QY** — good signals, too, here into Europe.

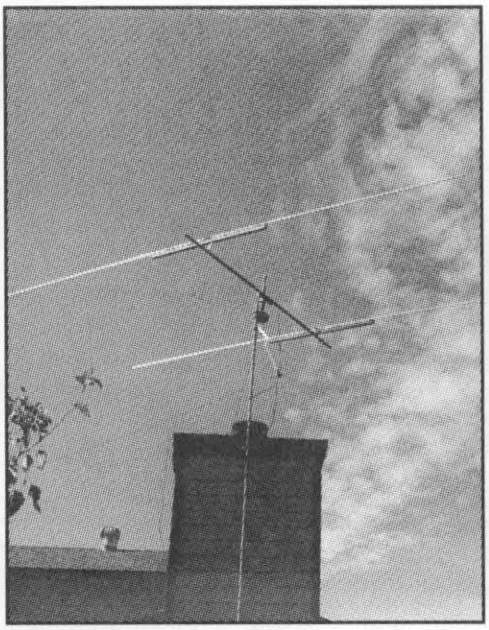
"As far as Top Band QRP (160 meters) goes, I've been operating SSB mostly of late, hooking up with **PA3** (Netherlands), **OY** (Faroe Island), **S51,** etc. Conditions here should improve now with the darker evenings now with us."

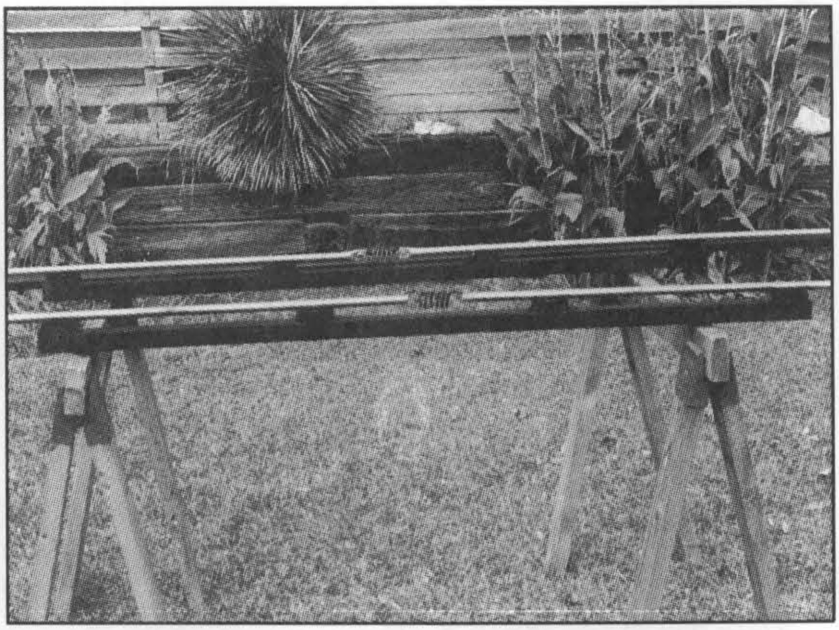
A bigger, better Goodie Giveaway

The 1994 Members' News "Goodie Giveaway" is bigger and better than ever.

If you're new to the Giveaway, here's how it works: Everyone submitting an item to Members' News automatically becomes eligible for a quarterly prize drawing.

Everyone's call is thrown into a hat, and a random drawing





Sky and ground views of Dick Swanson's San Antonio QTH show the homebrew 15 meter beam at N5JWL.

determines the winner. Each quarter the hat is emptied.

So think about it — if five people submit items for Members' News in any given quarter, each of those people have a one-in-five chance of winning. Imagine that!

Past items have ranged from NE602 chips and 1940s-era QST magazines to MPF102 transistors and vintage copies of the ARRL's "A Course in Radio Fundamentals."

Pat Bunn, N4LTA, of **624 Kits** in Spartanburg, S.C., — a great friend to QRP homebrewers — has contributed some items for the Giveaway that any builder would love to have:

√ **10 NE602AN** double balanced mixer chips — that's the IC that is frequently showing up in all kinds of QRP circuits.

√ **A set of matched 12 MHz crystals,** suitable for an IF filter. They're matched to within 25 Hz.

√ **A complete set of ICs for the K9AY Transceiver.** That's the transceiver designed by Gary Breed that is on its way to becoming a classic.

√ **An HF15 variable capactior and vernier drive.** These are becoming harder and harder to find. Submit an MN item, though, and you may find one in your mailbox.

If you're interested in receiving 624 Kits' 1994 catalog, write: **171 Springlake Dr., Spartanburg, SC 29302.**

We'll begin giving these items away with the April edition of "QRP Quarterly."

This quarter's winner is . . .

Bob Leinau, W7BD, from Burns Flat, Okla., is recipient of this quarter's Goodie Giveaway: a rare white marble with the QRP ARCI logo emblazoned on its side.

These novelty items were given away at conventions in years past, verifying that, indeed, QRPers have "lost their marbles." They come to Members' News compliments of **Fred Turpin, K6MDJ,** of Cedarpines Park, Calif.

Also in Bob's prize package is a bunch of "Two Way QRP QSO" stickers, suitable for placing on QSL cards when appropriate.

A QRP salute to Bob, and here's hoping your contribution to MN will be forthcoming soon.

Beaming about QRP

Dick Swanson, N5JWL, writes from San Antonio that he's having great success with a homebrew 15 meter beam

"Does it work? Well, after calling CQ, my first contact while running 5 watts CW was with **G4PBK** (England), with an RST of 559. Second contact was with **F5MBG** (France), with an RST of 569. The third contact was with **OH3KOK** (Finland) with an RST of 579.

"Now, you be the judge."

The beam is a two element monobander with eight-foot spacing. There are loading coils in both the driven and reflected elements, and is fed with 52 ohm coax.

Anyone who would like more information about its design is welcomed to send Dick a self addressed, stamped envelope. The mailing address is **714 Cypress Cliff Dr., San Antonio, Tex. 78245.**

In Dick's letter, he also announced that "we plan on running QRP Field Day from Luckenbach, Texas in June '94. We will issue a special certificate fro all contacts made on: 28.385, 21.385, 14.285 MHz, plus or minus 10 kHz."

"Sorry," he added, "SSB-only for now."

Back, and better than ever

Charlie Stackhouse, WA2IPZ, writes from Bluff Point, N.Y., that on Halloween Day he had his "first CW QRP QSO since May . . . yet I own eight QRP rigs!

"I have Ten-Tec's Argosy, Argonaut 509, Argonaut 515, HW-9, Oak Hills Research QRP 20, Tejas Backpacker I, Digitrex MPX-Mini and a Twofer.

"There are half-finished homebrew rigs all over the shack also. I am more of a rig collector, kit builder, and erstwhile homebrewer than operator," Charlie says.

"Now that bad weather is upon us, I hope to finish some of my projects, put the kits together I bought at Dayton last year, operate a few contests, and get on the air."

Charlie says he operated in the American Radio Relay League's 1993 November Sweepstakes, "and worked 38 sections. Amazing how well a QRP station can be heard when they count for points."

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Technical

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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
- **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:** Cam Hartford, N6GA; 1959 Bridgeport Ave.; Claremont, California 91711
- **Member News:** Richard Fisher, KI6SN, 1940 Wetherly St. Riverside, CA 92506
- **Nets:** Danny Gingell, K3TKS; 3052 Fairland Road; Silver Spring, Maryland 20904
- **Awards:** Chuck Adams, K5FO; 830 Waite Drive; Copper Canyon, Texas 75067
- **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

Message from the President

Paula Franke, WB9TBU

As of the time this issue of the Quarterly heads to press, the club is still looking for a new president. My schedule continues to be filled beyond capacity and I am even finding it extremely difficult to find the time to do the typesetting and layout for the Quarterly. Health problems on the homefront also continue to be a daily concern, both my husband's and now my own. By the time you read this, I should recuperating from surgery, which I hope to have had done during the Christmas holidays.

We do have a new Secretary/Treasurer: Myron Koyle, N8DHT. Many thanks to out-going secretary/treasurer Luke Dodds, W5HKA. The club's financial situation was rock steady during the course of Luke's two terms and his assistance to me was invaluable during that time.

Our Membership Chairman, Mike Kilgore KG5F, is ready to turn over his duties to a new chairman. After five years, Mike says he thinks its time to let someone else have fun with the membership records. He can provide the records in a variety of computer formats. Contact him for details.

Plans are underway for the QRP gatherings at Dayton and Dallas. More details will be provided as they become available.

New Member/Renewal Data Sheet

Full Name______________________ Call__________ QRP #________

Mailing Address______________________________________

City__________________ State/Country____________ Post Code__________

❑ New Address? ❑ New Call?

USA

❑ New Member, $12 (DX: $14)
❑ Renewal, $10 (DX: $12)
Amount enclosed in U.S. funds____
Check or MO in U.S. funds payable to "QRP-ARCI".
Do not send cash.

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

DX

❑ New Member, £7
❑ Renewal, £6
Check or MO in British pounds payable to "G-QRP" or "R. Pascoe GØBPS"

Mail to: Dick Pascoe, GØBPS
Seaview House
Crete Road East
Folkestone, Kent CT18 7EG
England

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