# SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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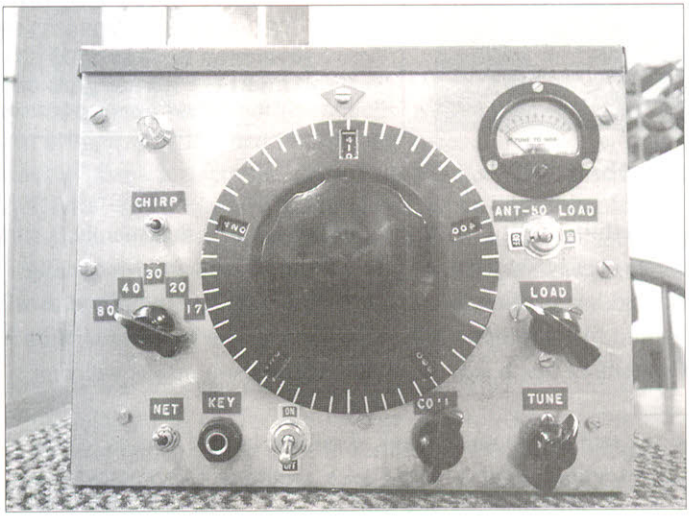
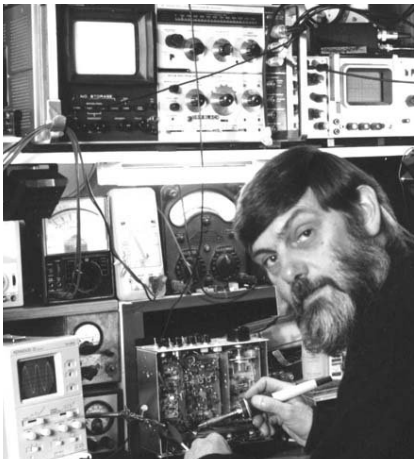



The G3HBN 50mW Transmitter
used to win the G4DQP Trophy in the Winter Sports
and described in this issue.

40m QRSS Beacon ~ All-Valve 40m SSB Transmitter
Simple Software-Defined DSB Radio ~ Hand-Crank Power Supply
Two Pin Coil Formers from Junk ~ Wide Range 3.5MHz VXO
BITX SSB Kit ~ HBN 50mW Transmitter ~ Charger Timer
Matching Large Value Caps ~ Conventions 2008 ~ Bath Buildathon
Antenna – Anecdotes – Awards ~ Communications & Contests
VHF News ~ Member's News

HAVE YOU PAID YOUR SUBSCRIPTION FOR 2008 ?
See note on Page 14

# JOURNAL OF THE G QRP CLUB

**Rev. George Dobbs G3RJV**

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One of the joys of editing SPRAT is the variety of projects that members submit for SPRAT. This issue clearly shows that variety. So keep the articles coming… for all areas of interest, and levels of expertise. Other members are interested in what you are doing. If you would like a sample SPRAT layout page (in MS Word), drop me a line or an email. But remember that handwritten submissions are just as welcome.

I am pleased to say that my announcement about the lack of entries for the W1FB Award produced the two excellent articles in this issue. More would be good – so I will hold it open until May 1st of this year – details below,

## The W1FB Memorial Award 2007/8

Design, build and operate a QRP Transmitter that is powered from a "natural source". Please send details to G3RJV by May 1st 2008

72/3

G3RJV

**WIFB MEMORIAL ENTRY**

# 40m QRSS QRPp beacon with homebrew batteries

**Hans Summers, G0UPL hans.summers@gmail.com**

I wanted to build a low power transmitter powered by homebrew batteries made from natural or common household materials. The first step in this enterprise was the battery, and the obvious starting point was to try lemons. Lemon (or potato) cells using two dissimilar metals poked into a lemon are a common school science experiment and internet research showed many examples. What was universally lacking was any actual data on how much power could be generated using lemons, and for how long. You could power an LCD watch for a week or two, but what about more demanding applications such as a milliwatt transmitter? Some web sites claimed that a lemon could produce 0.5V at 1mA for a "while", and even that several in series could light an LED!

In practice, I found that a lemon could only produce a few uA of current and calculated it would require 30,000 lemons with steel screw and copper wire electrodes to power my milliwatt transmitter. I built several different cells using baked bean can tin soldered together to form a small "tank", filled with lemon juice, and copper wire wrapped in kitchen tissue as the positive electrode. These improved cells produced more power but it would still require 100 of the largest (100 baked bean cans, lots of soldering, and the juice from 100 lemons) to power the transmitter. The overall inescapable conclusion had to be that the claim of 1mA from a lemon was somewhat optimistic, and that expecting to generate a milliwatt of RF using lemons as a power source was unrealistic even using my improved cell made from tin and filled with squeezed lemon juice.

Other electrolytes such as vinegar or dissolved salt will also produce power. A weak vinegar solution in a large cell produced a voltage of 0.45V and a saturated salt solution about half this. Several large vinegar cells in series seemed viable but the resulting "battery" was found to run down very quickly.

In the end after much experimenting, the pinnacle of my battery research and development was a cell built to the following recipe with household materials. Take one empty 400g Heinz baked bean can. Fill a 250ml Johnson's orange juice bottle with water and screw on the lid. Strip the insulation from about 7 feet of solid-core copper wire taken from old 5A household lighting cable. Wind the copper wire around the Johnson's bottle and place it in the tin can. Now the copper wire should be 8mm or so from the can wall and not touch anywhere. Fill the can with pure thick bleach (mine was

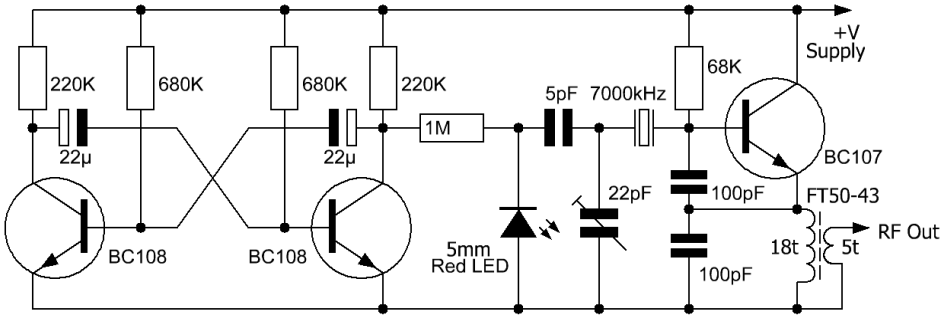
from ASDA supermarket). The water in the orange juice bottle makes it easier to wind the wire without the bottle compressing, and weighs it down in the can. The can is negative, and the copper wire positive. The Johnson's bottle keeps the wire perfectly close to the can but not touching, and also reduces the volume of bleach required: one 750ml bottle of bleach is very cheap and enough for four such cells, which produce well over 3V when connected in series.

Many measurements were made using two DVM's and a 10k potentiometer, from which cell voltage and internal resistance could be estimated. Power dissipation in a 10k or 330 ohm load was measured.

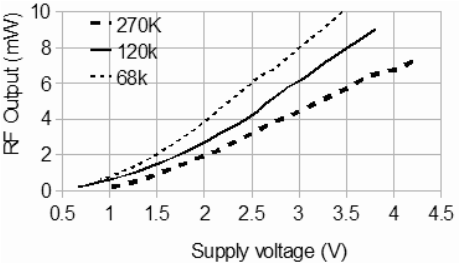
| Battery cell | Unloaded voltage | Internal resistance | Power in resistor |
|---|---|---|---|
| Lemon, steel screw & copper wire | 0.50V | 81 k ohms | 0.3uW in 10k |
| Lemon 50x4mm tin strip & copper wire | 0.50V | 6.9 k ohms | 8.7uW in 10k |
| 35x23x4mm tin cell with lemon juice | 0.41V | 1.7 k ohms | 15uW in 330 |
| 70x50x20mm tin cell with lemon juice | 0.48V | 60 ohms | 325uW in 330 |
| 35x23x4mm tin cell with bleach | 0.81V | 50 ohms | 152uW in 330 |
| Baked bean can with bleach | 0.80V | 30 ohms | 1.4mW in 330 |
| Baked bean can with vinegar | 0.45V | 20 ohms | 480uW in 330 |
| Baked bean can with salt | 0.22V | 40 ohms | 105uW in 330 |

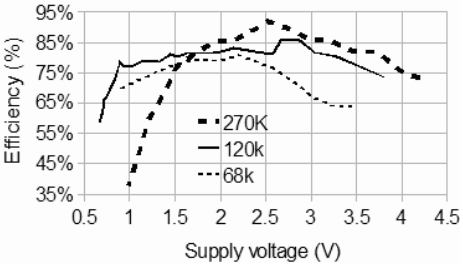
Next, a suitable low power 40m QRSS beacon transmitter was developed to run at low voltages and high efficiency. QRSS has been described previously in SPRAT and elsewhere and consists of the sending of morse or similar signals at extremely low speeds (3 or 10 second dot lengths), which are usually received by computer-aided reception using fourier analysis software. The resulting reduction in bandwidth produces high signal-to-noise ratio and makes possible the reception of very weak signals at great distances. For the purposes of a simple beacon, it is sufficient to generate a simple continuous transmission alternating with a 20-second cycle between two tones at 5Hz separation.

For very low power, high efficiency operation I started from the common Colpitts transistor crystal oscillator circuit. Reasoning that resistors waste power as heat, I eliminated the usual collector resistor, and also replaced the emitter resistor by a FT50-43 toroidal impedance transformer matching to the standard 50-ohm RF output. The only resistor in the single transistor oscillator is the base bias resistor. The 22pF trimmer capacitor allows tuning of the 7MHz crystal to 7,000,850Hz which is in the middle of the 100Hz 40m slice favoured by QRSS experimenters on 40m. Construction was “ugly” style using another piece of baked bean can tin as the “circuit board”.



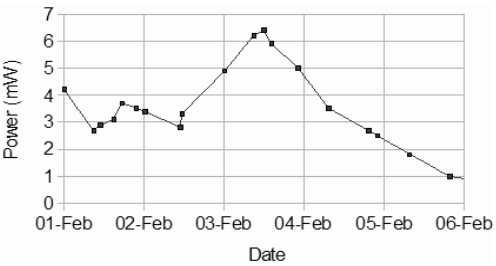
A distinctive frequency shifted keying (FSK) pattern is generated by a classic 2-transistor astable multivibrator in which all the resistors are high values so that it consumes very low current. The voltage from one of the collectors is applied to a standard 5mm red LED in reverse bias, which acts as a varactor (a.k.a. varicap) diode. This variable capacitance is coupled to the crystal via a 5pF capacitor which in practice is a “gimmick” capacitor made from a few inches of wire tightly twisted together, allowing easy variation of the coupling capacitance and thereby size of the 5Hz shift.

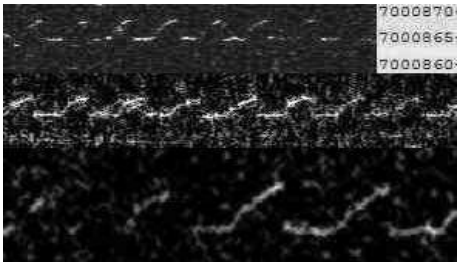



These graphs show the transmitter's power output and efficiency (RF power output as a proportion of overall circuit power consumption) into a 50-ohm resistive load, using different values for the 68k base bias resistor. Oscillation continues all the way down to 0.5V supply! Note that there is no filtering of harmonics and therefore this data is probably over-optimistic, so these graphs should be taken with a pinch of salt (not bleach).

I operated the beacon transmitter on bleach power from my urban London QTH for a week while the battery slowly discharged. A longwire aerial (very short, and very well shielded by surrounded buildings) was fed via my homebrew L-match. I used an earth clip to the heating system via the shack radiator. Only much later did I realise that the heating system uses plastic piping. The graph below shows the power output during that week, from which it may be estimated that I took around 250mAh of capacity from the bleach battery. I received many reception reports, from Les G3VYZ (screenshot below top), Pierre ON5SL (middle), John GM0RZY, Peter PA1SDB (right) and Giovanni IZ1JKO. All with a homebrew battery, couple of milliwatts and very poor aerial system!



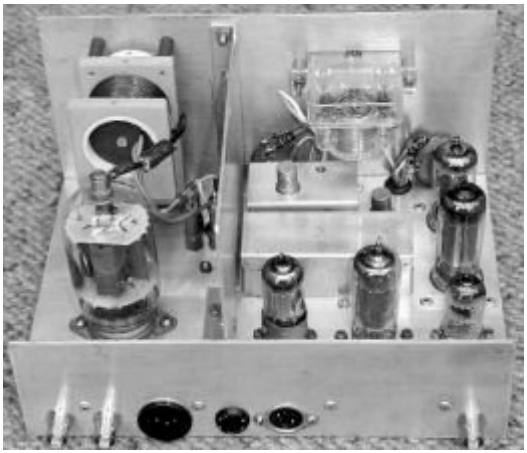




Many more details on these experiments are on my web page at:
http://www.hanssummers.com/radio/qrsslp
http://www.hanssummers.com/radio/homebrew/battery

# All-Valve 40m Sideband Transmitter

**Dr. Andrew Smith G4OEP 15 Dyrham Cl. Henleaze, Bristol. BS9 4TF**

A transmitter of this kind can be made very much more easily using semiconductor devices, but for some constructors the thrill of appearing on the air with all homebrew, all valve SSB equipment is worth the extra trouble. The idea for the design came from my experience using the 6JH8 sheet beam tube mixer in my Retro receiver (Sprat No 122, Spring 2005). The TX is in fact a partner for the Retro RX, and works with it from the GQRP club DDS as a transceiver. The other inspiration was the 6JB6 sweep-tube, which was lurking in the junk box, and is, I think, a very handsome tube, just waiting to be used.



The two brass boxes in the picture contain the 6CW4 crystal oscillator for carrier insertion, and the 6MHz crystal filter. You can just see the two little nuvistors sticking up their cheeky heads. The SSB filter is identical to that used in the Retro receiver.

The 6JB6 sweep-tube PA runs with 500v on the anode and produces 25Wpep output on a 2-tone test, 30W+ on audio. The power is reducible to QRP levels as required.

The circuit is basically as follows-

**Audio:-** 6CW4 and 12AX7, the latter in a long-tailed pair differential amplifier configuration to provide balanced drive for the 6JH8 first mixer.
**First Mixer:-** 6JH8 sheet-beam tube.
**IF Filter -** 6 pole home-brew design at 6MHz (see Sprat No 122).
**Carrier insertion Oscillator:-** 6CW4 at 6MHz
**Second Mixer:-** 6JH8 sheet-beam tube, with EF95 13MHz L.O. amplifier (takes the low-level DDS output).
**Driver:-** EF91 pentode.
**PA:-** 6JB6 pentode sweep-tube running at 500V on the anode. Uses a tuned link coupler coil in a parallel-tuned anode tank.

**Circuit Details.** The outputs of the 6JH8 mixers are balanced with respect to the g1 input, but are unbalanced with respect to the deflector plate inputs, and I have arranged the circuit so as to use these characteristics in the best way. Thus in the

case of the first mixer, the 6MHz carrier input is balanced out, while the unbalanced AF output is remote in frequency from the passband of the IF filter. Similarly, in the case of the second mixer, the 6MHz IF is balanced out, leaving the relatively remote 13MHz LO output to be attenuated by the 7MHz bandpass filters which follow. In both cases strictly balanced circuits have been used; in the case of the first mixer a long-tailed pair is used to derive the required anti-phase AF signals.

Double-tuned bandpass filters are used to achieve the required 200kHz bandwidth.

The LO amplifier is tailored to interface with the GQRP Club DDS, which produces a low voltage (about 200mVpk) output with a 50 Ohm source impedance. This makes a 4:1 transformer at the input to the amplifier an appropriate interface device.

The output configuration of the PA uses a technique which was common in the 1940s, and which I found in an old ARRL handbook. A parallel tank circuit is connected directly into the anode circuit of the PA tube, while the output is coupled with a link winding which telescopes into the tank coil, and is adjustable for loading. The reactance of the link is tuned out with a series capacitor. There are thus two tuned circuits in the output, giving good harmonic suppression.

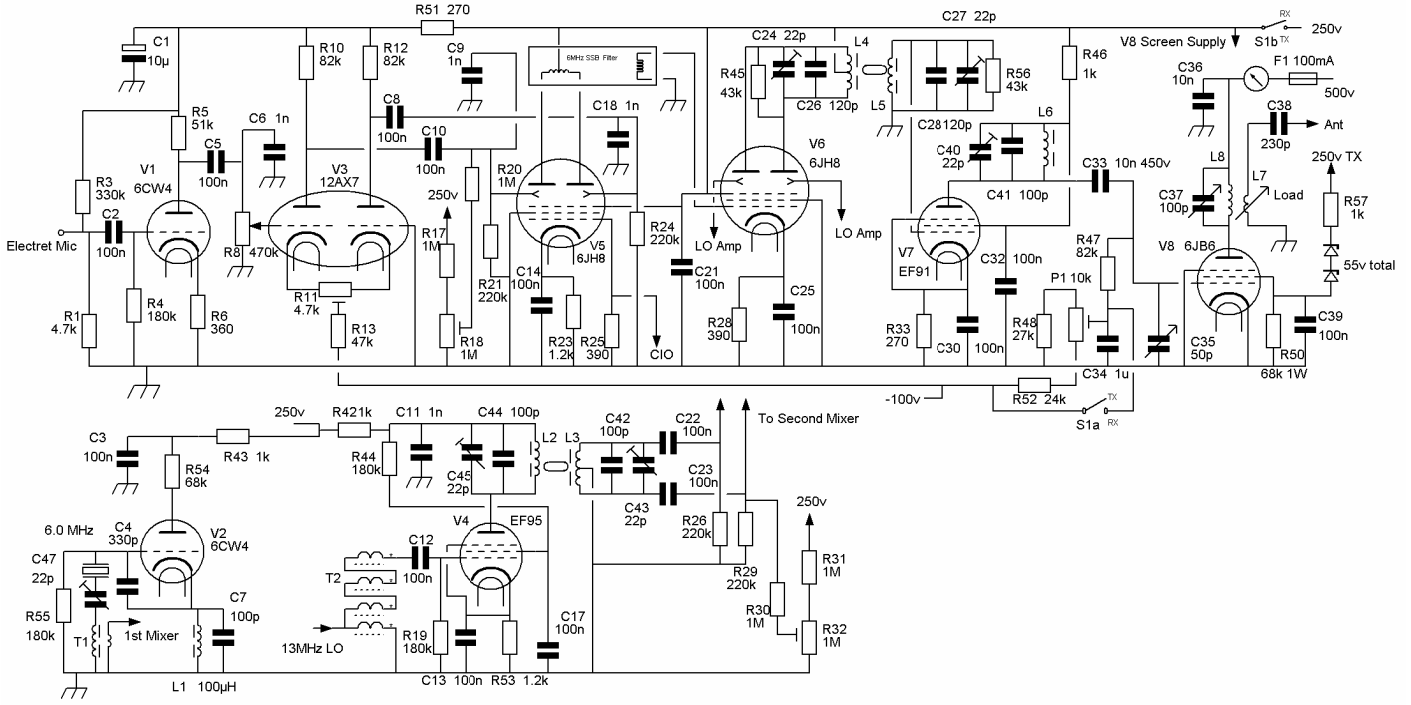
**Neutralisation.** Although the PA performs adequately without neutralising, its behaviour is improved if this is done. I have added a 10-turn coil on a push-in former which fits into L7 (anode tank coil) from the opposite end to L8 (loading coil). One end of the coil feeds back to the control grid of V8 via a 5p preset capacitor, the other being grounded. To adjust the neutralising proceed as follows

1) Disconnect the HT supply to V8

2) Apply drive, tune the driver (C34) and observe the signal at the grid of V8.

3) Adjust the neutralising capacitor and phase of the neutralising coil until no change in grid voltage occurs as C37 is tuned through the resonant point of the anode tank circuit. The test is more sensitive if the PA is not connected to a load.

| | **Coil Details.** | | **Adjustments.** |
|---|---|---|---|
| T1 | 5t/2t on 6mm binocular core | R11 | AF Balance. Adjust for equal anode voltages on the 12AX7. |
| T2 | 4 x 4t on 6mm binocular core | R17 | Carrier Balance. Adjust to null the carrier observed at the output. |
| L2,3 | 18t T37-6 | R31 | LO Balance. Adjust to null 6MHz spurii observed at the output. |
| L4,5,6 | 24t T50-2 | R36 | PA Bias. Adjust for 15-20mA static anode current in V8. |
| L8 | 17t, 35mm diameter, 10uH | | |
| L9 | 6t, 26mm diameter 2.2uH | | |


R51 270
C1 10µ
R10 82k
R12 82k
C9 1n
6MHz SSB Filter
C24 22p
L4
C27 22p
RX
250v
V8 Screen Supply
S1b TX
C36 10n
F1 100mA
500v
R5 51k
C6 1n
C8 100n
C10 100n
C18 1n
R45 43k
C26 120p
L5
C28120p
R56 43k
R46 1k
C38 230p
Ant
L6
C40 22p
C41 100p
C33 10n 450v
L8
250v TX
L7
Load
C37 100p
R57 1k
55v total
R3 330k
V1 6CW4
C5 100n
V3 12AX7
250v
R20 1M
V6 6JH8
V5 6JH8
LO Amp
LO Amp
V7 EF91
V8 6JB6
Electret Mic
C2 100n
R8 470k
R17 1M
R24 220k
C21 100n
C25 100n
C32 100n
R47 82k
P1 10k
R1 4.7k
R4 180k
R6 360
R11 4.7k
R13 47k
R18 1M
C14 100n
R21 220k
R23 1.2k
R25 390
CIO
R28 390
R33 270
C30 100n
R48 27k
C35 50p
C39 100n
R50 68k 1W
C34 1u
-100v
R52 24k
TX
S1a RX
250v
R421k
C11 1n
C44 100p
C42 100p
C22 100n
To Second Mixer
C3 100n
R43 1k
R54 68k
R44 180k
C45 22p
L2
L3
C23 100n
C43 22p
R26 220k
250v
6.0 MHz
C4 330p
V2 6CW4
V4 EF95
C12 100n
R29 220k
R31 1M
C47 22p
T2
R30 1M
R32 1M
R55 180k
C7 100p
T1
1st Mixer
13MHz LO
R19 180k
C17 100n
L1 100µH
C13 100n
R53 1.2k

This is a technique very often used in millimeter-wave-band when the active elements are difficult to build and therefore expensive.

The idea is to use a simple diode type mixer. It seemed good idea to me to apply this circuit in the densely populated 40m band.

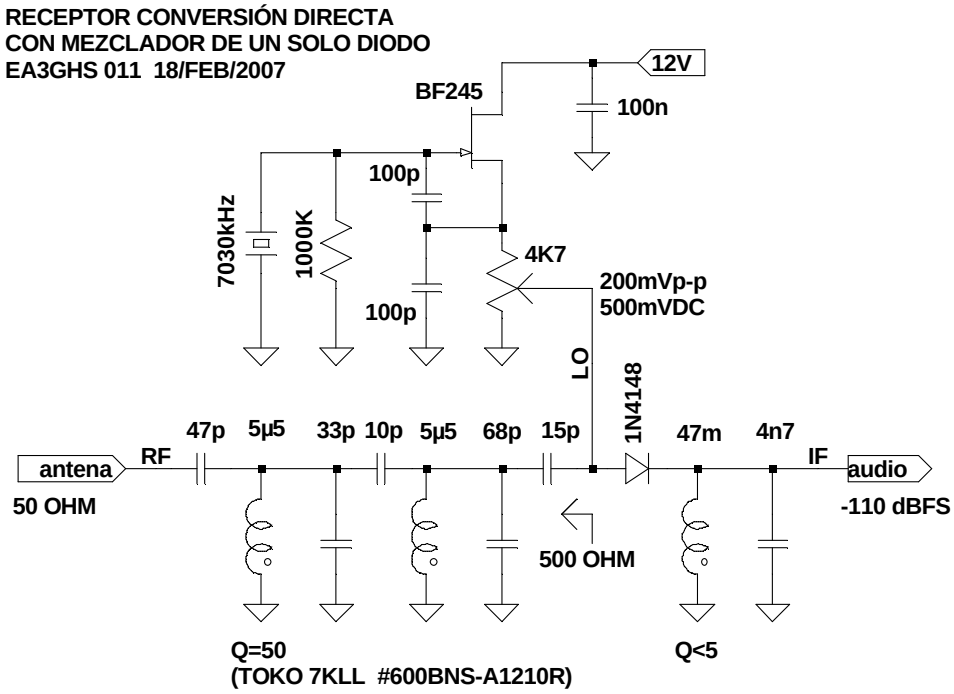



Figure 1

The sum of the local oscillator voltage and the antenna voltage VRF+VLO it is applied to the diode. In a diode, the current varies exponentially to the voltage, appearing currents that they are of double frequency of the oscillator 2*FLO, of the antenna 2*FRF, as well as the frequencies sum FLO+FRF and difference FLO-FRF.

We extract the difference current FRF-FLO by means of a resonant LC network. For the rest of signals, this filter appears like a short circuit. Do not confuse this circuit with a crystal radio.

This circuit has a disadvantage: the signal of the oscillator has an easy path to the antenna and can radiate. Nevertheless, this is very didactic as it reduces to the minimum the parts necessary to construct a receiver.

This receiver follows the minimalist philosophy and it has no a post-mixer amplifying stage. In my case, the noise coming from the antenna is inferior to the generated by the quantization of the signal. This can be observed easily: the level of noise observed in the s-meter does not change when the receiver is switched off. Use the microphone input of your soundcard.

During the morning of the EA PSK31 Contest I could listen 14 different stations with a simple dipole antenna, some with signals of almost +30dB of S/N.

An adjustable resistance has been placed because there is a point of maximum gain. This approximately corresponds to 0.45VDC in the diode and amplitude of the oscillator of 200mVpp.

One open question to the reader: what kind of signals appears in the antenna side if we connect the receiver to the soundcard output?

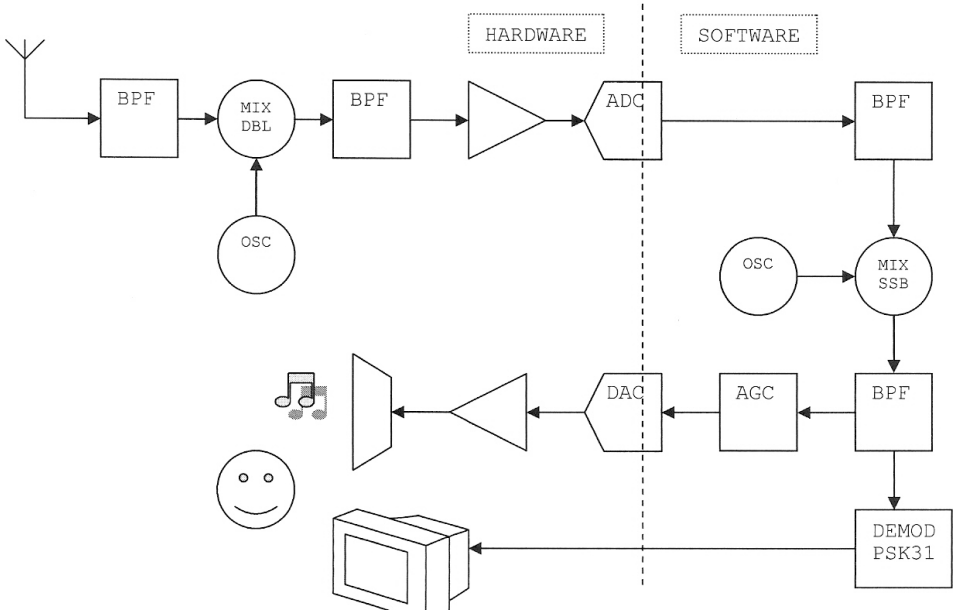



Figure 2: the signal path over hardware and software blocks

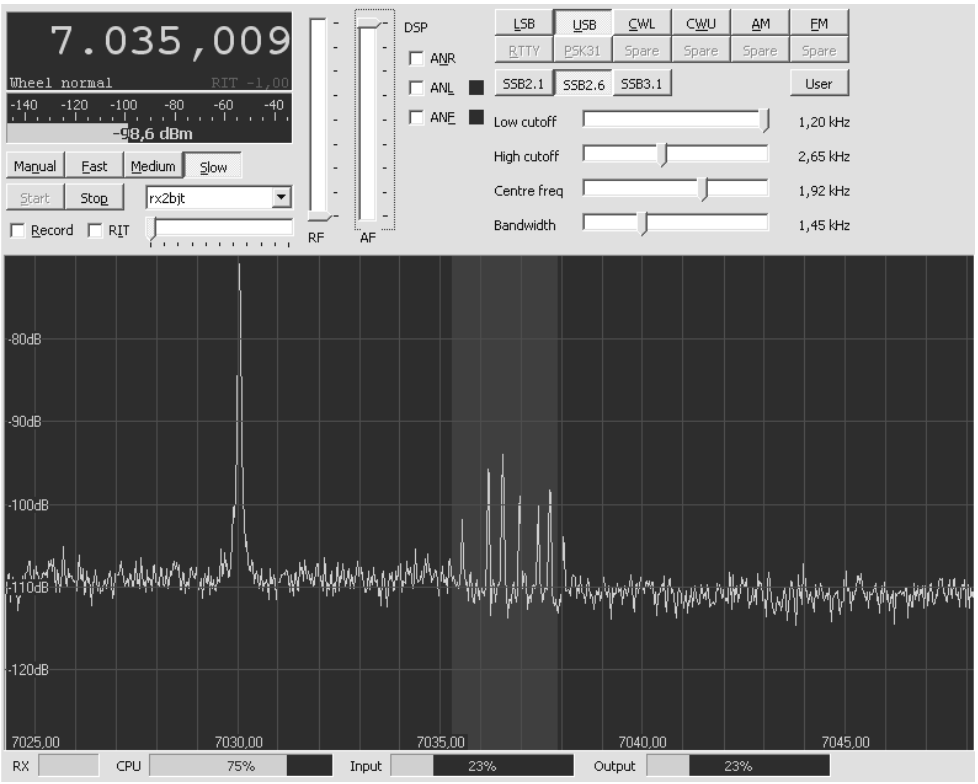



Figure 3: The M0KGK's program shows seven nice PSK31 signals near 7036 kHz. Use WINPSK to decode them.

MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

WANTED: A vernier dial for the HRO receiver, Pete Shepherd, G7DXV, Tel: 01375 640618

FOR SALE: Codar CR 70A Mk 2, matching PR40 preselector and (non-Codar) speaker. A classic "entry-level" four valve receiver of 1970's vintage, with FET preselector. Covers MW - 30MHz. Both in excellent condition and GWO, includes manuals and advertising pamphlets of the period. £50, no offers. Also Ferranti U1003 MW/LW/VHF valve wireless, made 1958, restored and GWO with service sheet, £25. Both buyer collects or local delivery in Reading area. Mark Palmer, 0118 948 3593 g0oiw@qsl.net

FREE for Collection - Complete SPRAT from Spring 1990 to date, first 12 years in binders - collect from Southend-on-Sea (or pp £15). Bruce G0PCF (01702 292462).

WANTED: Thermistor SDT1000 - IC7705. Needed for PA board of Yaesu 757GX. Owen G4VPF Tel 01283 544212

**WIFB MEMORIAL ENTRY**

# Hand-Crank Generator Power Supply [Part 1]

**Mitchell Lee, KB6FPW, 686 North West Twentyfirst Street,**
**San Jose. CA 95112-1626. U.S.A.**

The recent call for W1FB Memorial Award entries in SPRAT Issue l33, which arrived around Christmas time, caught my immediate attention because I had the solution sitting in front of me. One year previous I had received as a gift a white LED flashlight (torch) with a hand crank generator. As soon as the gift-giver departed, I applied a screwdriver to see what was inside the flashlight. I found a small motor as is used to propel toy cars, a gear train, 3 white LEDs and a rechargeable Lilon battery, with a rating of 17 mA maximum charging current. A quick check with a DVM revealed an alarming rate of charge close to 500 mA. Its demise was predictable; by the time Issue 133 arrived, the had crank LWED flashlight was on my bench with one failed LED and Lilon no longer holding a charge. G3RJV's call for natural power on page 2 breathed new life into the flashlight, re-incarnated as a QRP hand crank generator.

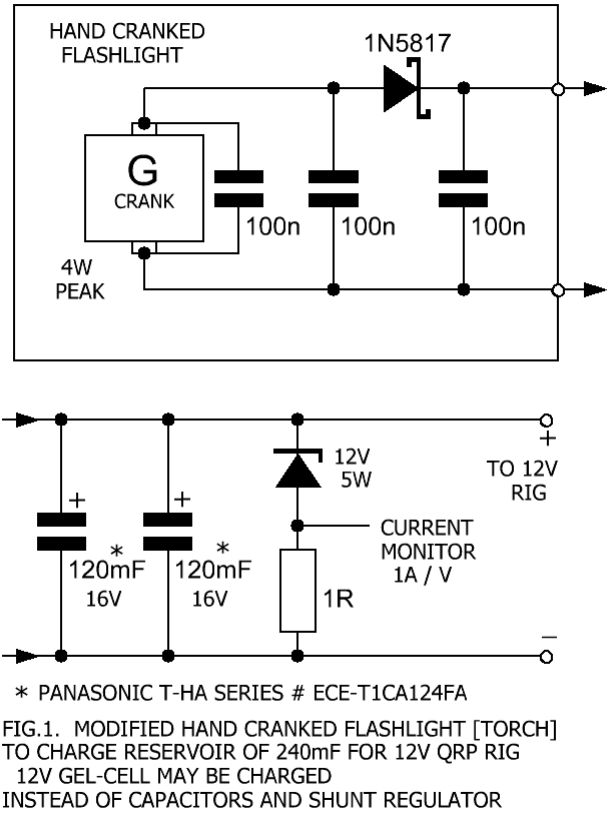
I wasted no time in disassembling the flashlight and removing all the components from the small circuit board contained inside. The Lilon battery was put in the recycle tray, the other few components (some INl4001-class diodes, a few low-value resistors and an electrolytic capacitor) added to the junk box. Next I made some measurements of the motor/generator, finding an appreciable available power: short circuit current was over 500 mA, and the open circuit voltage exceeded 14V. I was able to charge a 12V gelcell with 250 mA, amounting to 3W of power. 3W I reasoned was more than enough to power any of several QRP rigs in my stable, including the Elecraft K1.

My next experiment was to try out the system, using a bank of six, 90 mF (yes, that's milli-farads) electrolytic capacitors as a reservoir to get me through key-down periods allowing the rig's current consumption to be averaged, relieving the generator operator from awkward pulses of torque. I worked quite well, driving a K1 while the memory keyer transmitted a 2W CQ sequence into a dummy load.

For practical use the old capacitors (1982 date code) were physically far too large, requiring something on the order of a lunchbox to tote them around. DigiKey had the answer: new 120 mF, 16V Panasonic snap lock electrolytics. The density of the old electrolytics was about 232 cubic inches per farad; the new ones clocked in at about 51 cubic inches per farad, a significant savings in volume. Further, I found by experiment that 540 mF was more than necessary, and that about half that value was sufficient. I ordered two capacitors.

Although not strictly necessary, I also ordered a 12V, 5W Zener diode for shunt regulation. This guards against an over-zealous cranker who might drive the voltage as high as 16V. Any surplus above 12V is simply spilled into the Zener.

The final solution is shown in Figure 1.




* PANASONIC T-HA SERIES # ECE-T1CA124FA

FIG.1. MODIFIED HAND CRANKED FLASHLIGHT [TORCH]
TO CHARGE RESERVOIR OF 240mF FOR 12V QRP RIG
12V GEL-CELL MAY BE CHARGED
INSTEAD OF CAPACITORS AND SHUNT REGULATOR

Because small toy motors are notorious, prolific noise generators, it is important to solder a 100 nF ceramic capacitor directly across the motor terminals. In fact, toy manufacturers bypass to the motor frame and include small filter chokes. On the circuit board I added 100 nF bypass capacitors both before and after the diode. With this arrangement the noise is slightly noticeable with no antenna connected to the rig, but is easily masked by band noise in actual use.

To reduce losses as far as possible, I used a Schottky typed diode to “rectify” the generator output. Perhaps “steer” is a better word, since the generator produces dc. The diode prevents backfeeding when the generator falls behind the stored output voltage.

With this arrangement you must turn the crank in one direction. I set it up for clockwise rotation: the flashlight is held in the left hand and cranked with the right. If held in the

right hand and cranked with the left it must be rotated "backwards" as compared to the action of, say, a fishing reel. A full diode bridge makes the output independent of the direction of rotation, but it costs one additional diode drop, perhaps as much as 150 or 200 mW, and four diodes instead of one.

I chose to locate the Zener diode across the capacitor bank rather than inside the hand crank generator, where it would have hindered battery charging. One other important note is the effect of connecting a battery in reverse polarity. No harm done, but the generator will revert to motor mode and spin the crank. Because of the risk of reverse polarity, I avoided installing any electrolytics in the hand crank generator.

Ideally hand crank generation is a 2-man operation, one on the rig and the other on the generator. My XYL showed patience for about one, short on-the-air test transmission and is now reluctant to enter the shack. She can hardly contain her enthusiasm for portable operation on our next ski trip. The one-man option is to use a battery and crank during receive periods, relying on the battery while transmitting. The hand crank generator is an excellent way to introduce meddlesome children to Amateur Radio.

The hand crank generator is somewhat more bulky than a battery, but saves significant weight. The 2.2 AHr battery I use with my K1 weighs 840g, while the hand crank generator and 240mF capacitor bank weighs only 458g. As a battery charge, the hand crank generator weighs only a small fraction of a 1W solar panel and is a small fraction of the size, making it a welcomed alternative to solar power.

(Part 2 of Mitchell's article will follow – G3RJV)

# Important Membership Information

**Tony G4WIF**

Please look on your label to see if you need to renew your subs. If it does not at least say "2008" then this is your last Sprat. Please also look for the word "Your standing order needs attention". If you have this on your label then it is because your bank is failing to include your membership number.

From January 2009 this will be a requirement for your payment to be credited to your membership so please speak to your bank and get this corrected.

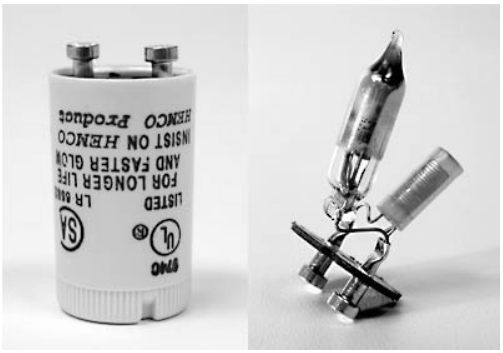
## A Useful Tip from Mike, G3VTO

Last week I was assembling one of Tim Walford's Brendon transcievers in preparation for helping out at the Bath Buildathon, but I was away from home with the minimum of equipment. Came the time to twiddle the TOKO cores. No trimmer tool. I've tried carefully carved matchsticks before, and they still didn't work! Then I had one of my few brainwaves; cut a sliver off an OLD credit card. 2mm wide at one end, 5mm at the other. It's the best slug adjuster ever! Try it.

# Two Pin Coil Formers from Junk

**Ronnie Marshall, GM4JJG, Hillcrest Hillside Rd. Gourock. PA19 1NP**

Get a hold of a dud Starter Switch as used with fluorescent tube light fittings. A starter switch is the little white cylinder which plugs into the side of the light batten. It is made of white plastic and the end is closed with a disc of paxolin, which has two aluminium studs sticking out of it. A little bit of fiddling with a knife point will enable you to remove this disc, and you will find attached to it, a mercury vapour switch, and a condenser. Snip these off, being careful to leave lengths of the wires still attached to the aluminium pins -- remember that you can't solder to aluminium! Now solder short lengths of tinned copper wire to what you left of the leads, and you can bring them out through holes in the side of the white plastic case. Superglue will fasten the replaced end disc firmly, and you now have a coil former, with two soldering points at its side, and two sturdy pins, just the thing for a G.D.O. using a Colpitts Oscillator and a two pin coil. A socket for the coil is got by taking one out of an old light fitting/just pay a visit to your local Civic Amenity Point and do your bit to help re-cycling. Your local electrician probably has lots of dud starters lying around and will be glad to get rid of them.



## A Challenge from Mike…

Mike Bowthorpe, G0CVZ, having read press reports about the Elonex One, a £100 UK laptop and this web reference,
http://www.engadget.com/2008/02/17/elonex-one-englands-100-quid-laptop/
…….suggests a challenge for SPRAT readers……..

1. Develop a PCB board based on the DDS60 principles (simple, low cost, high stability, etc) , but with a USB interface (so the Elonex One can communicate to it)
2. Then write a front end in Linux to enable the user to have a QRP software radio front panel to load up the “DDS60” with the frequency required
3. Build a simple transceiver or use what you have got in the shack to complete the radio system

The result is a highly stable lightweight QRP radio with a software front panel that could be further developed to cope with all sorts of modes. At the very least these are building blocks which hopefully will stimulate further interest and development.

# A Wide Range 3.5MHz VXO

**Mike Rathbone G3ZII, 25 Halsall Rd. Birkdale, Southport. PR8 3DB**

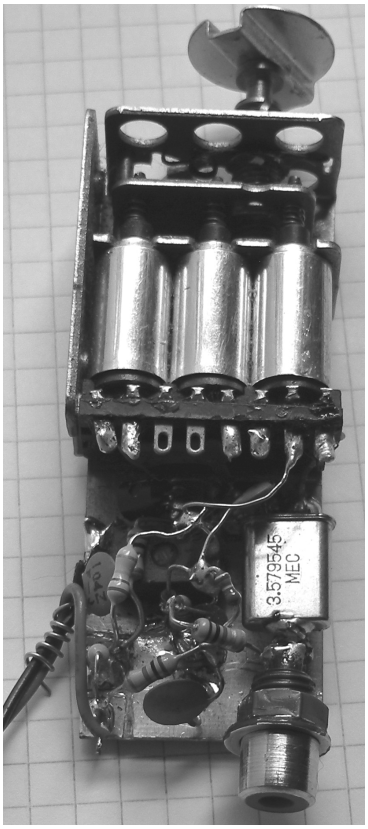
I found that a common 3.579 MHz crystal could be 'pulled' down in frequency by a surprising extent by placing it in an oscillator circuit in series with a variable inductor. The trick is, finding the inductor. Old AM car radios and radio/cassettes usually use a precision variable inductance tuner which does the job nicely. I dug through the 'resource material holding area' ( the junk box) and found a Gloria autosound 1970s Hong-Kong car radio and stripped it down so I just had the case, tuner and drive mechanism with dial.

The circuit was assembled on a scrap of pcb and bolted into the case. Tr1 is the oscillator, with feedback from collector to base via the crystal and coil, is it a pierce or a vackar? I find the best coil to use is the antenna or rf interstage coil, the oscillator section has much less effect, being of lower inductance. There is a snag, in that the tuning rate increases as one goes down the band but 3560 and lower is easily reached. Tr2 is a rather rudimentary buffer amplifier to get the signal out without loading the oscillator too much, improvement is possible in this area. However the stability is good, it will stay put for hours on end and it can even be keyed in the power rail without chirp.

The crystal case should be earthed as the frequency is affected by capacitance to the ground plane from this part of the circuit, so perhaps a varicap diode r.i.t. Control could be connected from one leg of the crystal to deck. I have now built 4 of these units and and they have all worked more or less first time so there does not seem to be anything 'tricky' about the circuit, the latest is in a Motorola set so I may end up with a luxury model 80m qrp rig with push-button qsy.!

Old sets of this type can still be picked up at boot sales etc at reasonable prices, though some of them are reaching 'collectors item' status. You know you are getting on a bit when you see something described as a collectors item and you had one when they were new, even worse, you've still got it! One final point, there is one sharply defined point at the top end of the tuning range where the wave-form goes a very peculiar shape, possibly caused by the crystal going into different modes but when tuned below this point it is a nice sine wave.

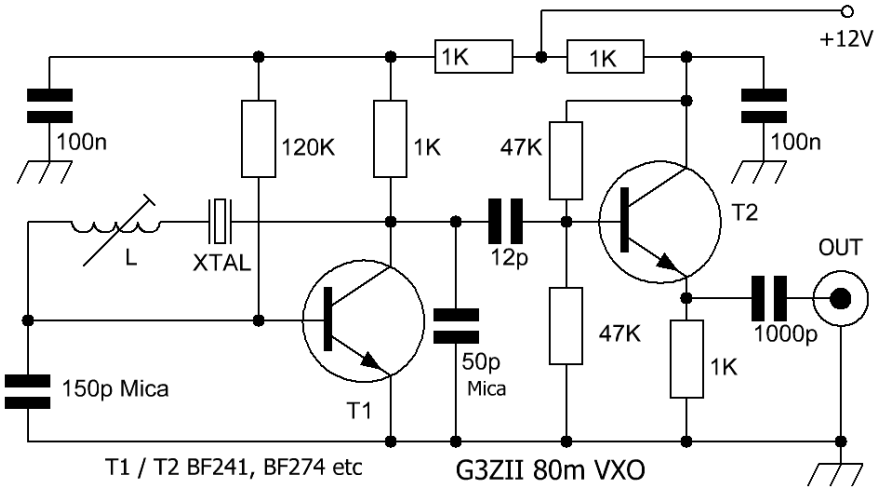
The parts are easily obtained, I bought a bagful of the 3579 Xtals at the Blackpool rally for not a lot. I also found that a medium wave oscillator coil,( red core in square can) as found in almost every transistor set will work as the inductor. It is not as easily adjusted of course, making QSY more difficult.



**Prototype VXO**

Typical Car Radio Inductance Tuner
with approx. DC resistance of windings

| RF | OSC | LINK | ANT |
|---|---|---|---|
| 12Ω | 6 Ω | | 12Ω |



# Remote Antenna Switcher

**David Long G3PTU, 697 Halifax Road, Cleckheaton. West Yorks, BD19 6LJ**

Switching antennas has always demanded some form of RF switch, albeit relays or PIN diodes, but when the switching is remote from the shack it is not always convenient to run a separate control cable.

The described unit can switch one common feed to 4 antennas using only the coax feed as the one and only cable connection. The arrangement can be expanded with additional conductors and to other purposes. All parts are easy to obtain.

The actual Rf switching is done by relays, clearly if UHF is contemplated coaxial relays should be used. A mixture of both is possible. Construction should be sympathetic to that use.

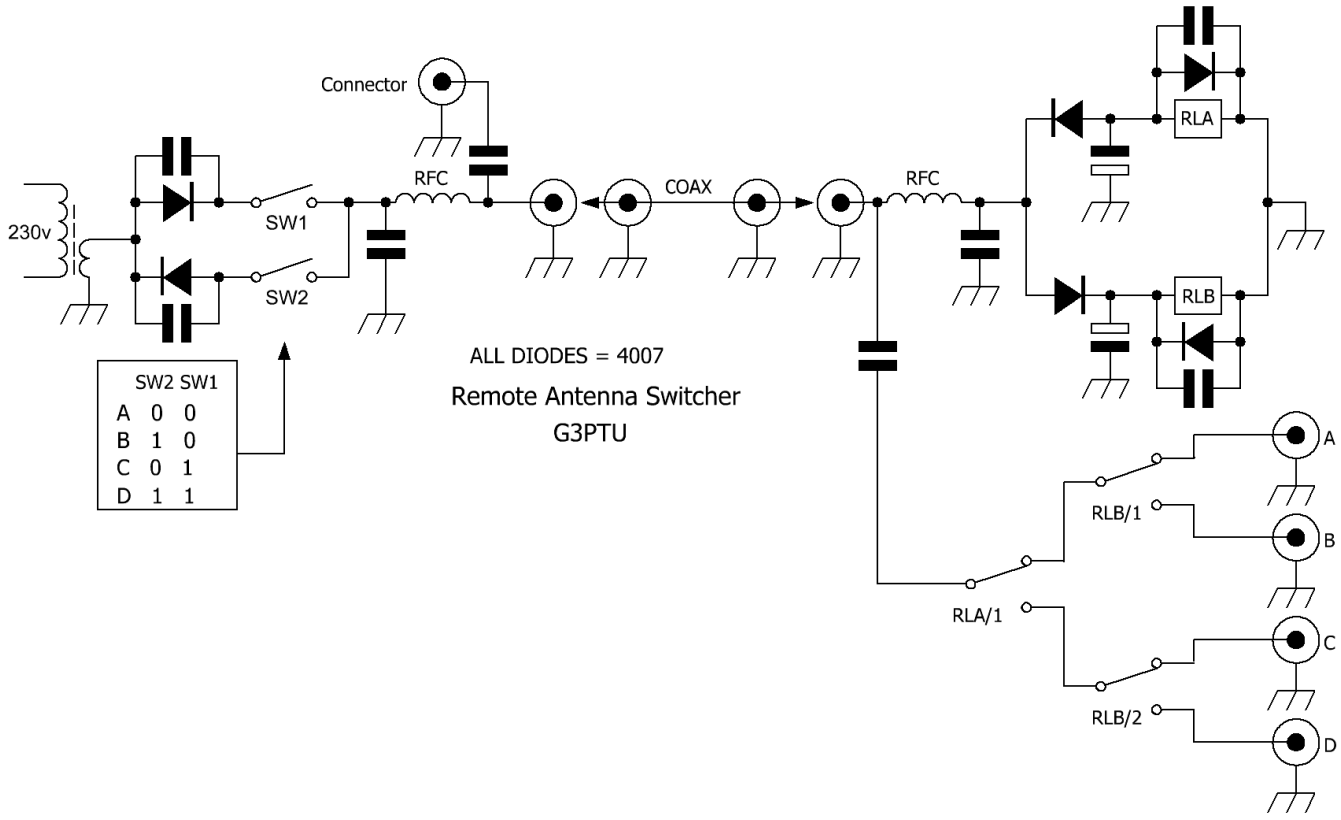
At the sending end a unit designed to suit the individual choice is required, some form of switch or switches dictate, which 'port', is connected to the common feeder. This can be two toggle switches or a 'Yaxley' type of switch arranged to connect as required.

The idea is that the Coax between braid and centre carries an additional component, either a +ve DC, -ve DC or 50Hz AC. This is filtered off and arranged to operate the relays at the remote end. It may well be that some indicator LEDs at one or both ends are a good idea to see what is going on. It is possible to use the DC (just the +ve ports?) for a preamp supply. This basic idea can be engineered for transmission as well as reception

The relays should be chosen and a PSU obtained (this can be a plug in type) that will switch the relays with two extra diodes plus the loss of RF chokes and the coax resistive loss. The PSU needs to be of the AC output type, if it a DC type, the rectifier parts require removing from circuit. This unit needs a low voltage AC supply. The PSU Secondary needs to be well filtered with ferrite or similar as noise can otherwise creep off the 230volts supply and on to the Rx path.

The output of the PSU, the relay coils and all 'DC' need well decoupling. The RF chokes need to be chosen with regard to the bands in use, as does the choice of the Rf coupling and decoupling capacitors. It is good idea to place a small capacitor across the diodes, as they can under some conditions become noise generators.
A possible variation is to only use 3 ports and make the 4$^{th}$ switching into circuit an anti-condensation resistor of say 15 ohms to keep the remote box above 10deg. The unit can be combined with a remote ATU.

Operationally all that is required is to feed the appropriate DC or AC up the coax and the remote unit will respond. You need to keep the supply on during use except for the default port of both relays de-energised.


Connector
RFC
COAX
RFC
230v
SW1
SW2
RLA
RLB
ALL DIODES = 4007
Remote Antenna Switcher
G3PTU
SW2 SW1
A 0 0
B 1 0
C 0 1
D 1 1
RLB/1
RLA/1
RLB/2
A
B
C
D

# Some notes on the Hendricks Kits BITX SSB Transceiver

**Nigel Flatman, G0EBQ, 2 Deben Valley Dr. Kesgrave, Ipswich. IP5 7FB**

**The BITX20 is a bidirectional SSB transceiver for the 20 metre band.**

Most of you will be aware that Hendricks Kits now market a version of the BITX SSB transceiver. I hope that these notes may be useful to prospective constructors. The kit comes in a small box and you will need to download the construction manual separately from Hendrick's website www.qrpkits.com. This is handy since it gives the prospective constructor an idea of what to expect before purchasing the kit.

The manual is really excellent and even includes photos of each stage of construction. Each stage is assembled and tested separately which makes it much easier to locate any faults. Components are quite tightly packed but if mounted vertically and using a piece of pcb as recommended to bend to shape, all fitted together nicely without any problems. Don't use too much solder or hold the iron on the track any longer than necessary, or you will create a nasty great blob on the component side. I would recommend that you have a solder sucker handy because you are bound to make a mistake somewhere. I also suggest that you solder connecting wires flat to the top of the board, as shown in the manual, as I have found in the past that they tend to snap if poked through the board. Hendricks state that the VFO coil may need experimenting with, but mine came out spot on after opening up the turns a shade. As long as you are a reasonably confident constructor and are happy winding toroids, construction should pose no problems.

The kit is still new and there were a few small mistakes in the manual at the time of writing. The only one that is not obvious is that R73 in the mike amp should read 2.7K (as in the circuit and parts placement diagrams) and NOT 2.2K (as in the assembly instructions).

Alignment instructions are also very comprehensive. I simply used a finger on the input to test each stage of the receiver in turn. Similarly I don't have a scope and used the "rough and ready" method to align the BFO, with no apparent ill effect. DO be aware that the driver and pa adjustment pots, and especially the TX driver, are VERY sharp and go from zero to overdrive in a fraction of a turn. I found this out the hard way when both the switch Q22 blew up and my QRP dummy load melted! I initially encountered PA instability in the form of ringing at 8-10w when listening on a cheap "world" radio, but cured this by carefully resetting the driver and pa bias and by changing the cheap CB mike for a decent trio one which gave twice the output, and can now get up to 15w stable output. I recommend all builders look at the yahoo BITX site which outlines cures for this and other problems encountered.

Performance is excellent. The receiver is extremely hot and has been pulling in W6s here at good strength. Audio output and quality are particularly impressive. I worked RA3,YT,SP and I in a couple of hours of trying it out, with just a bent G5RV in the loft. Do remember that there is no AGC and also that polyvaricons are not that strong, so be careful not to force it at either end of the scale. I would thoroughly recommend this kit. At 90$ plus 15$ (about £52) it is a bargain. Congratulations are due to Hendricks Kits, not to mention the original designer Ashhar Farhan for a design that will surely become a QRP classic.

Details can be found at www.qrpkits.com and Doug Hendricks may be contacted at ki6ds@dospalos.org or Hendricks QRP Kits, 862 Frank Ave. Dos Palos, CA 93620. U.S.A. Kits may be ordered from the U.K. using PayPal.

# The HBN 50mW Transmitter

**Jimmy Bolton G3HBN, Gordon Lodge, Vale View Rd.**
**Elms Vale, Dover, Kent. CT17 9NP**

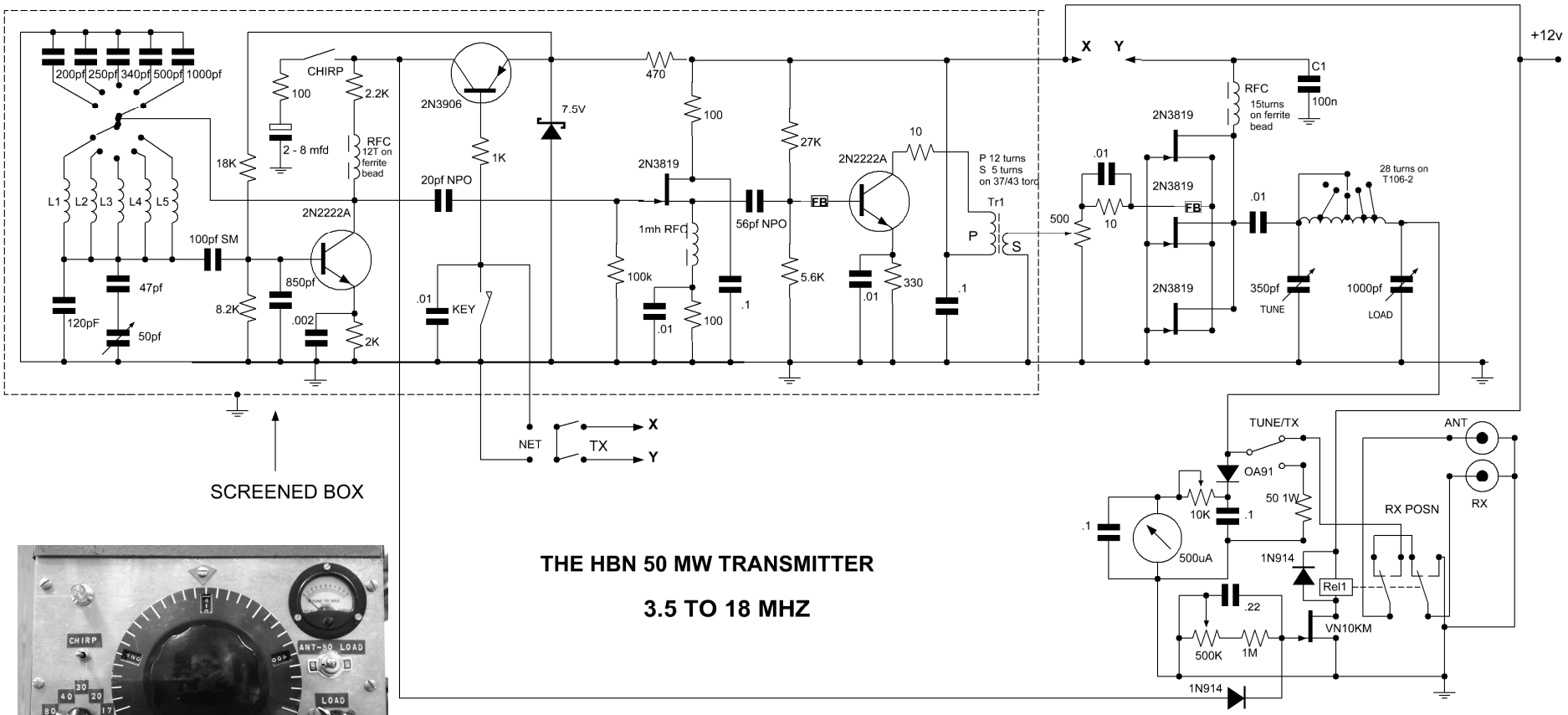
*[After Jimmy's VFO appeared in SPRAT 132, several readers asked about the complete 50mW multi-band transmitter – G3RJV]*

Originally I was going to make a 5 watt TX following the same sort of layout that a valve rig might have used some 50 or 60 years ago but using transistors. I wanted to keep it as simple as possible and avoid the trouble of either frequency doubling or mixing. Both cause problems with harmonic generation. Straight through seemed to be the answer. This transmitter works well using that method although there is pulling of the frequency on the higher bands. At 18 MHz it is about 1.5 kHz. However, when the TX is tuned properly to the aerial, the pulling remains at a constant level and therefore causes no problems, except for netting. Keying remains good although there is a very slight chirp at 18 MHz. But even then, it is not bad enough to cause any problems and better than many signals heard on the band.

The heart of this transmitter, the Vackar VFO, was published in SPRAT issue Nr 132, and an explanation was given about its operation in this article, photos of the TX were also included. The most important factors in the construction of the VFO are simply good practice. Make sure that all the earth points within the 2N2222A oscillator components are all earthed to one common earth bus. This bus can then be earthed to the remainder of the transmitter. The coils must NOT be made with toroids. Toroids cause unwanted chirp, drift and general instability. Use air spaced formers. Slug tuning is OK and helps to adjust the tuning position of each band with the main drive. The main tuning capacitor can be outside the screened box and so too, can the key socket. The feedback capacitors, including the 850pf base to ground, should be polyester or good quality stable components, silver mica etc. These are, in brief, the most important considerations in making this VFO stable enough to be able to *add* a chirp!

The remainder of the transmitter is fairly standard. The source follower after the VFO was the only circuit I found that would give me a good clean output and the 2N2222A wide band buffer after that provides plenty of drive for the PA. Again, further tuning circuits are avoided in using wide band coupling which gives low impedance output to the PA. Various circuits for a PA were tried but at the suggestion of George, GM3OXX, I tried a Grounded Gate amplifier. This gave far better isolation than any other amplifier. Eventually it took three in parallel to provide sufficient gain to give me 50mw at 18 MHz. On 7 and 10.1 MHz it will produce up to 80mw, hence the need for a drive control so that a standard of 50mw could be maintained over the bands. The built in 50 ohm load and meter is set to read 2volts FSD. 50mw at 50 ohms is about 1.6 volts.

I intended to use this transmitter, because the VFO used an HRO dial, with my HRO receiver. For this purpose it was necessary to have an aerial change over system and







**THE HBN 50 MW TRANSMITTER**

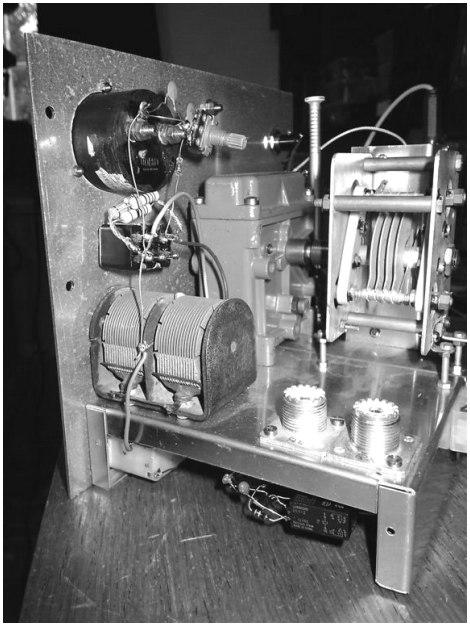
**3.5 TO 18 MHZ**

L1 to L5 – see text
RFC [VFO] – 12t on ferrite bead  Tr1 – P 12t. S 5t on bn 37/43 core
Pi output coil – 28t T-160-2  RFC [PA] 15t on ferrite bead

generally a semi break-in method of transmit/receive changeover. This can be any changeover system but I used a VN10KM because I was given one and told it would be best. The relay used is of the Omron miniature type readily available at rallies. I also use another relay in parallel with the one shown to operate a muting circuit within the HRO itself. This provides a very good changeover facility. For successful QRPP working a rapid changeover system is well worth the effort.

A word or two now about working Very Low Power. Given a reasonable path, a properly tuned aerial system and a bit of luck, plus attentive operating at the far end, it is quite easy to work up to about 6 or 700 miles, single hop E layer or Sporadic E propagation. Contacts up to 1500 miles can also be worked this way but often such contacts are short skip F layer propagation. Beyond this distance one is more dependant on what the Ionosphere is doing at the time. This can be judged to some extent by the strength of signals and it is always worth giving a distant station a call if he is very strong, particularly if conditions sound as though they are going to change within the next few minutes. A very noticeable condition on the higher bands.

A VFO is essential to VLP working. Plodding away with a single frequency on 80 can be fun to begin with but can become tedious and wont give you the satisfaction you can get from multi-band VFO working. In fact, it requires quite a lot of operating skill by both parties to keep a QSO going at low power. I found that on 14 MHz my beam (home brew wire Moxon) has given me a great advantage over the multi-band dipole by cutting out the ATU, Ah! yes. A word about tuning up. There is not much power, so what I do is to tune up the main transmitter first for minimum SWR and best match, tune the little rig to the band and maximum output with its own dummy load, and then switch over to the main aerial tuning system. There is no need to retune the transmitter after this although it's meter might read differently.



P.S. You could make it for just one or even two bands if you wanted to - its all there.....

Inside the transmitter.

The VFO and buffers are in a little box next to that great big old fashioned tuning condenser.
The PA is underneath the chassis with its switched tank coil and one of the tank condensers, the other you can see on the top along with the meter (2volts FSD) and dummy load.
The six inch nail is the drive control for the PA to keep the power at the 50 mw level on all bands.

# A simple timer for battery chargers

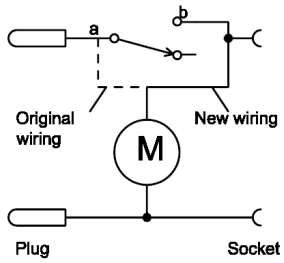
**Luca Norio, IV3TEK, via Umberto I°116, 33085 Mania go (PN) Italy**

A battery charge intended as a constant current source is quite easy to build. A lot of projects are available on handbooks and literature and few components are required.
It's well known that one of the important requirements for a correct charge is to keep the battery under charge for a determined number of hours. This feature isn't so easy to obtain like a constant current source even if specific IC's are available for long periods (hours) timing. Without a time control it's easy to forget the batteries under charge for an excessive period.

I have found an easy and cheap solution by using a simple electro-mechanical time switch that may be bought for few Euros in many stores.
It must be without built-in charge reserve that seems to be the most diffused type.
To get from the time-switch the operation we need it is necessary to do a simple modification on the internal wiring as hereafter explained.
Before this one, I tried to do the same modification on another similar time-switch but its internal structure did not allow any wiring change. This to inform that not all the models are suitable for this job and a little luck is also necessary.

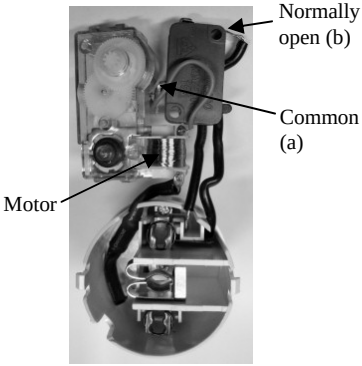
The modification (see the diagram and picture) consists in moving the connection of the wire that supplies the clock motor from the plug side (a) to the socket side (b). In other words from upstream to downstream of the switch. Doing this, when the ON time has elapsed, the clock stops permanently and the load remains OFF. To start a new cycle it is necessary to rotate the drum until the switch goes ON like on the programmer of a washing-machine.
The number of "ON" hours have to be set by the drum sectors.
There is another interesting aspect to be considered. In case of lack of the power supply during the charge, the time-switch stops "where it is" but doesn't re-set (as it happens with some timed battery chargers) and completes the charge as the power supply is again available.

Two final notes: 1-Ensure that the battery charger is provided with a device (normally a diode) that avoids the discharge of the battery trough the charger when it is switched off.
2-Remember that the time-switch is connected to the mains. Ensure that all wirings and insulations are reliable after the modification and safety is maintained.



Diagram


Time switch



Internal view (before modification)

# MATCHING LARGE VALUE CAPACITORS

**Anthony Langton GM4HTU, 71 Gray Street, Aberdeen, AB10 6JD**

Why would anyone want to? I have been building a MicroR2 direct conversion SSB receiver, designed by Rick Campbell, KK7B, (details in QST for December 2006) and using the superb printed circuit board from KangaUS. It is important in a phasing receiver that, where necessary, the parts are accurately matched. I have used home-made bridges to match resistors to around 0.1% and the phase shifting capacitors to around 0.5%. There remained two electrolytic capacitors, at the input of each audio chain, and it seemed a pity not to match these as well. The absolute values of components are not so important as the fact that both paths are the same, where possible.

The values given in the circuit diagram are 33μF, but I used 47μF as they are more easily obtainable and the value is not critical. This is too large a value to match on the bridge, it would need a very low frequency. The excellent Peak Atlas LCR meter would work well, but it is rather slow when dealing with a large number of components, and somewhat heavy on its little battery. I acquired a bandolier of about 50 capacitors from a Rochdale QRP bash, so I needed a quicker way to do a rough sort.

I came up with the following idea. Charge two capacitors together through precision resistors from a common voltage. It does not have to accurately known: I used 12 Volts from a battery. R1 and R2 are 0.1% tolerance if possible. I have a small selection for measuring work. They are never soldered, never stressed with excess current or high voltages, nor do they have their wires pulled unduly. C1 is the reference and C2 the one on test. If the capacitors are identical, the voltages will ramp up together when the switch is closed to the supply, and down together when the switch is connected to ground. The voltage difference between the two will be zero at all times.

At first I used a two-beam oscilloscope to monitor this voltage. With the probes and channels carefully matched, and the brightness reduced to make the spot just visible and very small, it proved possible to see a 1% difference. I used 100μF capacitors and 10kΩ 0.1% resistors for the test. The ramp up and down has to be fairly slow to give enough time to see the error. When I found two from the roll that appeared to match I added a 1μF across one of them. The error could be seen on the scope. It seemed to reach a maximum at the point t = CR, when the voltage is at 63% of the supply.

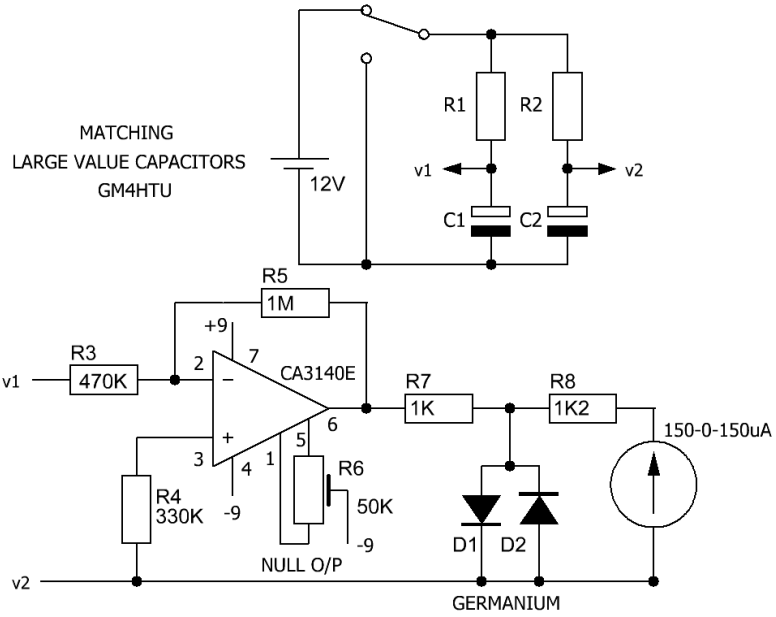
I plotted out two overlapping graphs with 100μF and 101μF capacitors. With a 12 Volt supply the error was about 50mV at that point. I analysed it mathematically as well, and got a similar result. Perhaps someone who is more adept with the calculus could provide a more rigorous proof.

To avoid working in the gloom and peering at the scope, I built a simple dc voltmeter, using an op-amp. Much as I like digital instruments, this is one job where a swinging needle is hard to beat. I do not wish to measure, which is where digital instruments excel, but to compare and look for changes. It does not need a very high input resistance, as it is

across a very small voltage (I hope). It is a coincidence that I used an op-amp famous for its massive input resistance: it was the only single unit in my IC box. A large gain is not necessary; the device is more of an isolator and impedance converter than an amplifier. A gain of 2 was thought sufficient. The centre-zero meter is essential. This also came from Rochdale.

The circuit on the output of the op-amp is for meter protection. Should things go horribly wrong, and the output voltage rise to a scary level, the germanium diodes will clamp the feed to the meter at about 0.2 Volts. They do not conduct with low voltages so maximum sensitivity is maintained when the error is small. The 1.2kΩ resistor limits the current from this reduced level to a safe value of about 150μA. Different meters will need a different value. The device is powered by two 9 Volt batteries. It must be quite separate from the testing battery.

I worked my way through the bandolier of 47μF capacitors until I found a very good match. Checking with the Atlas LCR meter showed them to be within 1%. I also tried it with 1μF capacitors and 1MΩ resistors, although these were only 2% tolerance. Again, it matched a pair closely. To avoid the need to operate the switch manually a 555 oscillator was added, with a led to show when the volts were high, to help with sorting. If the meter swings to the left when the led is on, put the capacitor in the left-hand pile. If it swings to the right, put it in the right-hand pile. If it doesn't swing, put it in the circuit board.



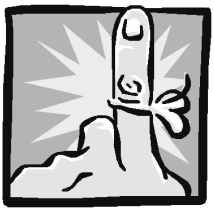
# QRP Conventions in 2008

## The 24th Yeovil QRP Convention

The Yeovil Amateur Radio club announce that that their annual QRP convention will be held on 27th April 2008 at the Digby Hall, Sherborne.
Talks include "Circuit Design" by Stef Niewiadomski, "The First Low Power Britain to New Zealand Contact" by Rob G3MYM, and "Submarine Communication" by Paul Hawkins. Tim Walford (G3PCJ of Walford Electronics) is offering a prize for the overall winner of this year's Fun Run, and is also sponsoring the Club's Annual Constructors competition.
Further details may be had from http://www.yeovil-arc.com/.

## The 12th Red Rose QRP Festival.

The 2008 festival is on Sunday 1st June, 2008 from 11am to 4pm at the Formby Hall, Alder Street (off High Street), Atherton, Manchester. M46 9EY. This is a friendly, annual event, to promote low power amateur radio operating and home construction. The event offers easy access from all directions, trade and individual stalls, club stands, including RSGB, GQRP, low cost "Bring and Buy", plus sales of new and surplus equipment and components.
The venue offers large spacious halls at ground level, a huge free car park and disabled facilities. Talk-in is offered on S22. The admission remains at £1.50 and some tables available at £7 if booked early. Further details can be obtained from
Les Jackson, G4HZJ, g4hzj@ntlworld.com Telephone: 01942 870634.



## REMEMBER… G QRP Club Min-Convention

**Saturday 18th October 2008**

The 2008 QRP Mini-Convention (in conjunction with the Halifax Radio Society) will be on Saturday 18th October at The Rishworth School, on the A672 (Ripponden) road from Junction 22 on the M62. More details and map to follow .

## Four Days in May 2008

### Thursday 15th May 2008 - Sunday 18th May 2008

The QRP ARCI has announced their "Four Days in May" event for 2008. This annual QRP symposium runs in parallel with the Dayton Hamvention and is now in its 13th year. It offers a full day of lectures, a programme of social events and a grand QRP Banquet. Full details may be had from http://www.fdim.qrparci.org/

# BATH BUILDATHON WAS A HUGE SUCCESS

**Steve Hartley, G0FUW, <g0fuw@tiscali.co.uk>**

The first Bath Buildathon took place on Saturday 26 January with 12 amateurs building their first transceivers. Some had been licensed for years but had never built anything whilst others were Intermediate students from the Bath radio classes. Builders travelled from as far away as Wolverhampton, East Grinstead and Southampton showing that there is still a widespread interest in homebrewing in the UK.

The kit chosen for the Buildathon was the Walford Electronics Brendon 80m DSB transceiver and very popular it proved too. Everyone commented on how well the kit went together and all were extremely pleased when they received their first signals. Not everyone finished the transmit side before the event closed but those that did enjoyed QSOs across the room with Tim Walford, G3PCJ, the kit designer. Tim very kindly donated a prize to Brian Jones, M1ZEZ, who was the first to complete the kit on the day.

Feedback from the builders was extremely positive and most are ready to do it again soon. Steve Hartley, G0FUW, who arranged the event said that it had been a huge success and that he would encourage other tutors and clubs to have a go with their own Buildathon.
Steve was assisted by Mike Coombs,G3VTO, and Lewis Thomas, G4YTN, and all agreed that team work was the key to success.

If anyone would like more information on how to organise a Buildathon of their own Steve can be contacted at g0fuw@tiscali.co.uk or at the address in the RSGB Yearbook.

Right: Steve Hartley, G0FUW with Jim Farrant, M0JRZ, at the test bench.

## Paraset Webpage

Those interested in the Paraset might enjoy http://www.sm7ucz.se/Paraset/Paraset_e.htm An English account of the SM7UCZ paraset with plenty of pictures and technical information.

### Request from deceased member's wife

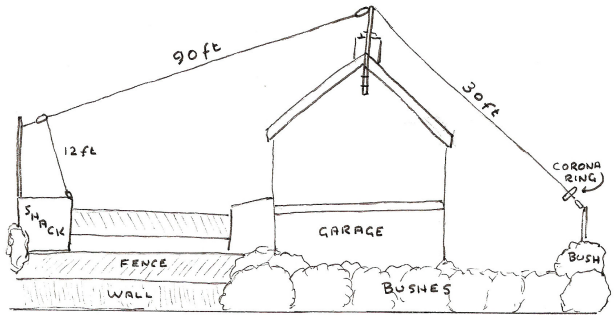
We are sorry to announce that John, G0KCA, died in the summer. Sylvia, his widow has asked if we could pass on the news to those who were in postal communication with him. She would rather not have to deal with his radio mail.

# Antennas Anecdotes and Awards

**Colin Turner G3VTT**
**30 Marsh Crescent High Halstow Rochester Kent ME3 8TJ**
**G3vtt@aol.com**

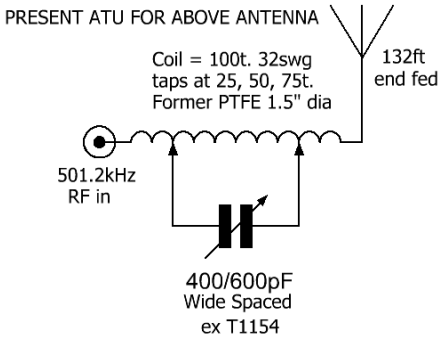
Once again I have received some interesting correspondence from members. Adrian G4GDR has kindly sent me details of his antenna system and how he has adapted it for 500 KHz operation. Adrian is a prolific QRP constructor and operator and we have had many contacts on 80 and 40m and recently on the new MF band. You may not operate MF here in the UK without the NoV, (Notice of Variation), and if you are abroad you certainly will not have permission to operate unless you live in Belgium but I hope many of you will get some idea of how fellow enthusiasts tackle problems – its all about sharing and developing ideas.

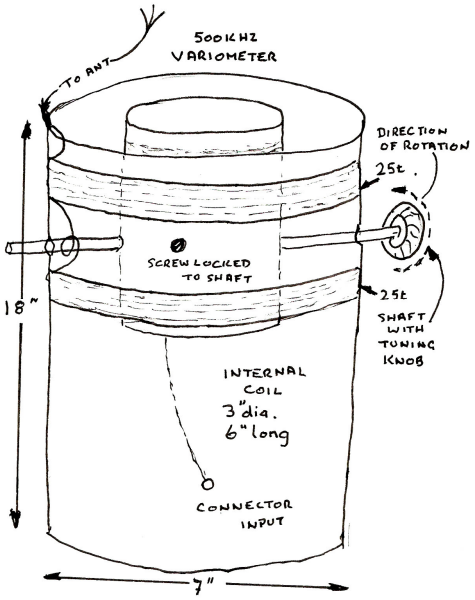
Like many others Adrian is using a 132 foot end fed wire as his main antenna system for LF/HF and by adding a simple ATU he has obtained excellent results on MF. The wire is tuned against a ground system made up of two 8 foot copper rods and two radials each 80 feet long. Luckily in the area of Swindon where Adrian lives he has a high water table which provides a better earth than many locations and this is proven by tests he has carried out.




The initial ATU he tried can be seen from the diagram below and this is a parallel tuned arrangement that uses a 1.5 inch diameter PTFE former. I suspect a piece of suitable plastic pipe will suffice. A wide space variable capacitor of about 400 pFd is used to tune the system, gathered from an old RAF T1154 transmitter.

As a second ATU he tried the old time variometer which works well without a variable capacitor. Incidentally Adrian has told me he would be very pleased to here from anybody who wants to make a variometer and has suggested they write to him with a SAE. Adrian explained in his letter to me that the variometer shown below has been tried on the band to tune his system and its design may inspire others. It is constructed from two coils each of 25 turns on the top and lower sections. The inner coil has 15 turns on top and bottom sections on a 3 inch diameter former which is rotated by the shaft and tuning knob. Both windings are in series.




I must admit I have become a little despondent about activity on the new 501 to 504 KHz band as there seems to be a lot of beacon activity and few regular CW contacts taking place. It would make an excellent band for QRS CW contacts and the coaching of slower operators by some of the more experienced amongst us. The 100 mW ERP level has been upgraded to 1 W ERP for us in the UK. Whatever happened to simple easy to measure RMS watts measured with an RF probe and a dummy load?

**The GW8AWT Off-Centre Fed Windom Variation**

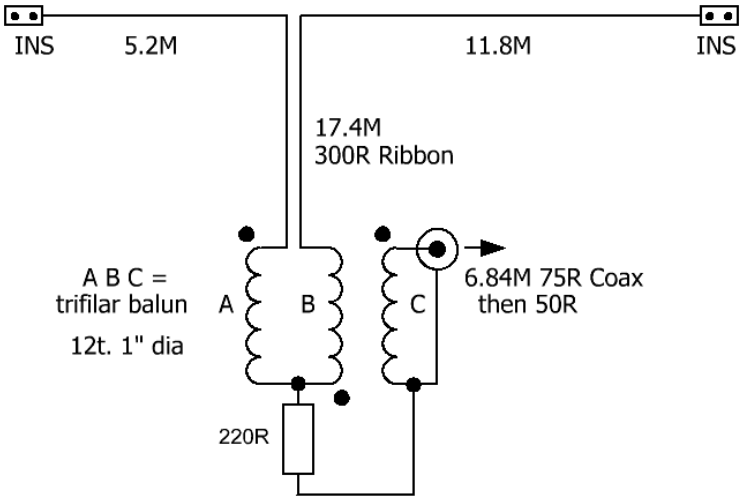
Wyn has sent me a note about his experiments from which I have deduced he is trying a version of the off centre fed Windom antenna using ribbon feeder for 40 and 15m. Wyn has gone to a lot of trouble to explain precisely how the antenna is constructed. Unfortunately some of the drawings he sent are a mass of detail and cannot be scanned to be included here. If any of you want to see your ideas in print here please supply simple sketches! Incidentally I still have plenty of letters for you in the pipeline. The sketches show the toroidal transformer and damping resistor arrangement.

Wyn has reproduced the Windom off centre fed dipole with a minor variation that reduces the SWR on the feedline over a wide range of frequencies by using a damping resistor in the balun. The

antenna itself consists of two wires, one 5.2 metres long (16.4 feet) and the other 11.8m (38.7 feet), with a 17.4 metre (57 feet) feeder using 300 ohm line. This is connected to a trifilar balun which is wound on a 1 inch diameter cardboard tube, soaked in varnish for environmental protection that is connected to a section of 75ohm coax 6.84 metres (22.4 feet long) and then to the station via 50 ohm coax. The balun has 12 turns of 3 pieces of coax cable inner cable although any stout wire could be used and the resistor is rated at 220 ohms carbon, presumably a 2 watt rating.

The antenna exhibits a low SWR on the 7 and 21 MHz bands and by chance Wyn found a further resonance on 160m which he exploited by inserting a 41 turn coil giving 21 uH in the coax feed which reduced the SWR on Top Band. You may need to make one or two minor alterations to the measurements given but give it a try. It's a joy to hear of antenna experiments being carried out in the Welsh Hills.

As we used to say in our old holiday QTH in Drefelin, Carmarthenshire – bydew 'n diggon Wyn, cadw I fyny 'r da gwiethia!




**Portable at W3TS**

Mike W3TS has also written to me to tell me about his portable activities along with John KN1H. They use a variation of the Windom antenna, which is an off centre fed dipole, but without any feeder. Mike explained that he uses a 92 foot long wire tuned against a 46 foot counterpoise via his 'Super Tee' tuner for 80m and he has found that the system works well with most simple tuners. He also confirms that a 46 foot radiator fed against a 23 counterpoise works well on 40m and upwards in fact he just reverses the hanks of wire and pays out 23 feet from the 96 foot reel. This sounds like a rerun of some portable work Mike and I did a couple of years ago here in North Kent when Mike and Judy came to stay with me.

**Members Letters**

Charles W2SH has written to me a long and interesting letter regarding large loop antennas and makes the following observations.

- Remember to try a loop open opposite the feed point as well as closed. You may have a rhombic style increase in gain.
- Insulated wire will not affect any antennas performance although it may have less snow or rain induced static due to less electrostatic effect.
- Solid wire can be better than multistranded wire for antennas as there is a much less risk of moisture ingress and corrosion. There will also be poor conduction between the strands as the wire(s) corrode.
- Charles has proven that homemade open wire line using solid wire is superior to the commercial 450 ohms plastic variety and he now uses a home made line using painted solid wire and bamboo chopsticks with kite line securing the feed lines to them for spreaders. - Interesting points to ponder.

**Awards - G3MCK Worked British Counties Award**

Gerald's kind offer to sponsor this 1960's style event has sparked flurry of letters and emails! We have had requests for different bands, different powers, different modes and confirmation of the 1960's counties. Richard G3CWI has kindly put a list of the counties on his SOTA website and if you have no Internet facilities you can send me an SAE or drop Gerald a line at his home address at 22, Peterborough Avenue, Oakham, Rutland, LE15 EB. Gerald is also interested to hear your comments about this event and will explain the particular criteria for the rules if required. You will need 60 counties for the basic award with 2 watts output and you can work QRO stations as there are plenty of FISTS operators around 3558 Khz. By the way, why not consider an award YOU would like to sponsor in 2009?

There have been no further award applications to date although I would be interested to receive your lists of counties worked to start a ladder. I have a few articles ready for the next issue including vertical antennas, another variation on the Windom and a useful little gadget for tuning up in the field. Why not let me know about your spring and summer field activities – what antenna did you use and how did it tune? I am very interested in hearing about compact antennas for the flat dweller. Watch out for G3VTT/P and G3YVF/P from the North Kent Marshes this spring and summer. That's all for this time, I've run out of space but there's always room for a little cat…….

(I've worked my 60……time for a nap)

# COMMUNICATIONS AND CONTESTS

**Peter Barville G3XJS, Felucca, Pinesfield Lane, Trottiscliffe, West Malling, Kent ME19 5EN. E-mail g3xjs@gqrp.co.uk**

**2007 WINTER SPORTS**

Rather like last year, I would like to offer a quote from George Burt **GM3OXX** who says in his WS log, "Like anything, it's hard graft if you want any return." How very true, particularly when we are contending with a combination of low power and poor band conditions. However, those who have so kindly sent their WS logs demonstrate the excellent results that are achievable, and the huge amount of fun and satisfaction there is to be had when using QRP, particularly during Winter Sports. Stefano **IK5XCT** sums it up perfectly when he says, "To participate is all and everything."

The more logs that are submitted, the more of the fun and spirit of the event I can share amongst you, and I am very grateful to the following members who have taken the trouble to put pen to paper, or finger to keyboard: **AB8FJ**, **DL2BQD**, **DK5RY**, **G0KQK**, **G0KRT**, **G0OTE**, **G3HBN**, **G3ICO**, **G3ILO/P**, **G3JNB**, **G3MCK**, **G3NFB**, **G3NUA**, **G3PEM**, **G3UKV**, **G3YPZ**, **G4ARI**, **G4VPF**, **GM0NTR**, **GM3OXX**, **GM4BKV**, **GM4XQJ**, **GU3TUX**, **IK5XCT**, **MI0BPB**, **PA0RBO**, **PA3CRC** and **W3TS.** That's three more logs than last year – my thanks to you all. As well as 'the faithful few' (you know who you are!), I'm pleased to say that there are members submitting logs for the first time, which is good to see.

**AB8FJ** (Ted) adopted his usual "Get The Rigs On" approach, using an SW Rockmite 40, Tuna Tin II, xtal controlled Howes AT-160, SW-40, SW-80, SW DSW-II 20, 14060 vxo rig, Argonaut II and Argonaut V. **G0KQK** (Snip) says, "Pity we have just one WS per year!" **G3JNB** (Victor) was delighted to have an 80m QSO into Andorra amongst his 5 pages of log.

Steve (**G3ILO**) operated /P from the 65ft narrow boat Edna-May during his WS exploits. If you were hearing the spacer-wave from Gerald's (**G3MCK**) homebrew station (and some did), it was a huge 10mW! **G3PEM** (Carl) used an SP1 board, G-QRP 7030 xtal, 6v battery and W3EDP antenna to compile his first WS entry. Another to submit a log for the first time was Martyn (**G3UKV**). The log entries from **IK5XCT** (Stefano) were made using a homebrew 80m tcvr, SW-80, DSW-II 20 and a roof-mounted HF9V vertical. Mike's (**W3TS**) log consisted of five 20m QSO's with GM3OXX, and one 20m QSO with GM4XQJ. He called G4EBO "many times", but no QSO resulted.

As always, the signal and operating skills from the homebrew 1 watt station at **GM3OXX** were truly outstanding. George's dedication is second to none, as are the results he achieves on all bands 160m-10m. Virtually every other log includes at least one contact with George, and the number of complimentary remarks made by others about him is almost countless. He remains a shining example of QRP operating at its best – a true beacon. His log this year shows 340 QSO's and include a 17m QSO with 5R8FU, who

came back to George's CQ - as did K0IEA on 30m. George was just as pleased to be able to give M3RYB his first 160m QSO.

I was interested to see that George's vote for "man of the match" went to Jimmy, **G3HBN**, and I have to say that I agree. Jimmy used a homebrew 50mW Tx (the Rx was an HRO, and IC756 Pro-III) into a doublet for 80/40m, dipole for 30m and a homebrew 2 ele Moxon wire beam for 20m. His intention was to promote the use of VLP, and his log shows just how successful he was, making 49 QSO's into 17 different DXCC countries. It includes some genuine RST 599 reports, and a number of VLP/VLP QSO's. Jimmy admits that conditions made for hard going at times, but his best DX was C33IU on 40m. The Club is delighted to award the Winter Sports 2007 G4DQP Trophy to Jimmy, and I know we all offer him our sincere congratulations.

**[Note – Jimmy's 50mW TX is described in this issue – G3RJV]**

## 2008 QRP CALENDAR – CORRECTION

Please correct the date of the Swiss HTC-QRP Sprint on your QRP calendar to 13th September. The date I quoted (8th September) is not correct. My apologies, and thanks to Guido (HB9BQB) for pointing out my error. The contest is always held on the second Saturday of September ( see www.htc.ch ).

## 2008 LOW POWER SPRING CONTEST

My thanks to Alex G4FDC / OM6SA for sending me a copy of the rules for this event (held on Easter Monday every year), which remain "as before". He has also sent the 2007 results. Drop me a line if you need either.

## 2007 CHELMSLEY TROPHY

As usual I would like to defer publishing results of this event until the next issue of SPRAT. This is mainly because of lack of space, but will also allow time for any late entries!

## PRACTICAL WIRELESS 2m QRP CONTEST

Space does not normally allow me to publish details of none-Club events, but Colin (G6MXL) has written to say that he has now taken over (from G4HLX) as adjudicator for this event, which takes place on Sunday 8th June 2008 from 0900z to 1600z. Please write to Colin for further information.

Please send items for inclusion in the next SPRAT by the beginning of May. Although it's close to freezing as I write, warmer weather should be on the way by the time you read this. Time to think about /P operating! In the meantime I hope you all have plenty of QRP FUN.

72 de QRPeter

# VHF Manager's Report

**John Beech G8SEQ 124 Belgrave Road Coventry, CV2 5BH**
**Tel. 024 76 273190 or johng8seq@ntlworld.com**

First a reminder from Colin G6MXL #3199. He says he has taken over running the PW 2m QRP contest which will be taking place on Sunday 8th June from 09:00 to 16:00 UTC. Also several members of the AM VHF group haves aid they will come on during the latter part of the contest, so listen for them on 144.550 AM. Most of them will be vertically polarized I suspect. In Scotland there is activity on AM on 145.800. Users are well aware that this is also the satellite band and avoid using the frequency if there is any activity from an orbiter. They'll continue to use that frequency until the RSGB acknowledges the need for an AM calling frequency.

The end of 2007 produced some tropo conditions on the VHF bands. All the well known Wx symptoms were there – high pressure, still air and fog. The latter is often an indication that an inversion layer has formed , which is a necessary condition for a duct to form. So what is a duct? A duct is a refraction effect and works in a similar way to an optical fibre. The foggy layer has a higher refractive index than the air above and below it. The difference in RI causes a phenomenon known as Total Internal Reflection for waves which strike the boundary at greater than the critical angle. TIR is what it says it is – there is no loss on reflection and signals within the duct are no attenuated meaning 59 reports are common and accurate. In practical terms this means beaming into the duct at an angle slightly above the horizon. For the duct to be of any use for Dx it must extend as far as the Dx station, so Wx conditions must prevail over a wide area.

This winter also saw an Es opening as well and Derrick GN4CXP reminded me it is worth listening on 28 MHz first when checking fro Es. This type of opening usually starts on the lower frequencies and progresses upwards whereas ducting usually occurs at SHF/UHF and works its way down to VHF. Derrick worked: 1753z I5TAT CW Sent-599, Rcvd-559 JN53FL & 1830z IZ5ICH SSB Sent-58, Rcvd-55/7 JN53JG on 6m with just 4W to a triband vertical. He also worked half-a-dozen continental stations on 10m.

Eric G0KRT (Surrey)has been using his W3EDP hf antenna as a long wire, loading it up on 2m with an ATU and1/4 wave counterpoise. He worked 7 stations in G-land on the RSGB activity night, the last day of the Winter Sports. He also work 7 different stations using a homebrew "Roostick" in one evening on 2m FM.

Personally, I managed one more CW contact with Arnold G4SPY on 2m. He is relatively local to me but thought I was further away as we were cross polarized & I was only running 1 W. Mondays aren't the best nights for me and radio – too many other things going on and I had to cut the QSO short.

De John G8SEQ.

# MEMBERS' NEWS

## by Chris Page, G4BUE

Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ
E-mail: g4bue@adur-press.co.uk

The headline for this column tells you we are still in the UK as I write this. We were due to return to Florida (and **N4CJ**) on 10 January but had to cancel because I developed a DVT (deep vein thrombosis) in my right leg, probably caused by our flight back to the UK from Florida on 20 December. We are hoping to return to Florida on 10 March if the doctors at my local hospital let me fly, and I will now religiously follow the advice the airlines give about wearing flight stockings, exercise, etc, and strongly advise those of you who make long haul flights to do the same. The medication and injections for a DVT are not very nice.

**G4HZJ** tells us that the 2008 Red Rose QRP Festival will be held on 1 June at Formby Hall, Atherton, Manchester. **G4GLF** reports that the 'Four Days in May' web-site at <http://fdim.qrparci.org> is up and running. **GM4VKI** posted information on the Ten-Tec Reflector about importing transceivers into the UK and how to get the duty removed. The text is too long to publish here but I am sure Roy will forward you the details if you ask him, e-mail to him at <RKavampsev@aol.com>.

**G3LHJ** made 338 QSOs on 20m in the 2007 CQWW CW Contest but said it was very hard going with the band closing for QRP working each evening at 1800z. Derrick was also QRV in the O-QRP Contest with his little OXX SP-1 transmitter running 200mW. He made ten QSOs in five countries on 40m but, again, said it was hard going. Derrick made 125 QSOs in the ARRL DX CW Contest with his 5W on 20m. The latter days of the **VP6DX** Ducie Island DXpedition provided an opportunity for many to work a 'new one' on QRP with several European stations making QSOs. **G3JFS** found them to be loudest on 40 and 80m and managed a SSB QSO with his 10W PEP to an end-fed wire, and **G3XJS** worked them on 20m with his 3W homebrew DSP transceiver and inverted vee doublet. **G3YMC** worked them on 40m CW using a K2 at 5W for Dave's country 223 and your scribe also worked them with his K2 at 5W on 17 and 40m CW.

**VK4TJ** suggests conditions on 20m are improving as he made two-way QRP QSOs with **G3RSP** on 20 January followed by two UA1 stations. **GM4CXP** found an Es opening on 6 and 10m on 15 January when Derrick's 4W found two Italian stations on 6m and DL, F, I and S5 on 10m. **AC8W** (PZ5WW), **K8DD** (PZ5DD), **KB8TXZ** (PZ5TX) and **W5JAY** (PZ5AY) were QRV 13/18 February from Suriname, including the ARRL DX CW Contest. **GØEBQ** will be QRV in the first week of April and May, and again in late August/early September from EA5, and will be looking for members in the evenings around 14060kHz. **N2CQR** (formerly **MØHBR** and **CU2JL**) is now QRV in Rome as **IØ/N2CQR** using an old HW8 and nearly invisible antennas made from 30 gauge wire. Look for Bill most mornings 0400-0600z near the 80 metre QRP frequency.

**RV3GO** welcomes everyone to the RU-QRP Club CW Net on 3577kHz daily at 1900z. Oleg says there are not any net controllers, just a 'round table' of QRPers. Congratulations to **2EØNCB** who passed the exams and became **MØGGK** just before Christmas. **2EØBDS** will be operating QRP/P at the Dambusters Hamfest at the Thorpe Camp Museum in Lincolnshire on 4 May, <http://beam.to/tcrm>. Brendan invites anyone attending the rally to, "Come over and introduce yourself for a chat and a coffee (the kettle will always be on the boil!), or even to have a go on the radio". **GM4CXP** will be QRV from 16 March in EA8 and **F5NZY** planned to be QRV 8/15 March from the French Alps. **M1KTA** will be QRV 3/15 March from 3B8 and **DL2BQD** will be QRV 1/8 March from CT3.

**GM4XQJ** used the good tropo conditions on VHF just before Christmas to work into OK with his 5W CW and eight element Jaybeam on 2m. Brian says that was the first time he had

worked into OK with QRP since 1983. He also worked LA, SM, PA, OK, OZ and DL on SSB. Using his FT-726R at 10W to a five element Yagi fixed northwest, **LY2PU** made QSOs with G and GM stations on SSB (first time) and CW. Vytas then made a QSO on 70cms with a DL7 station while running 10W to an 11 element Yagi, and with two PA stations the following day. **G3CWI** says, "I think it was one of the best tropo openings for many years, and probably one of the longest too. I only had an hour to spare but still managed contacts up to nearly 1800kms. I see some people made contacts over 2400kms (G to UT5)! ". Richard has been experimenting on 10gHz and says he is following in the footsteps of **GM3OXX** - not many people know about George's pioneering 10gHz 'sumiteering' before he became the 'ultimate' HF CW operator. Richard is wondering if 200mW at 3cms is QRP?

**GØUCP** built the BITX20A and finds it puts out a good 10 watts (with the danger of more!). John says the PA is a really neat pair of separately biased IRF510s in push-pull with a pair of BS170 in the driver, and the change-over is PTT using switching mosfets. **2EØAYQ** has built five of the Ten-Tec 1300 series of kits (two 1380, 1340, 1320 and 1315) and thoroughly recommends them, together with the mods by **N5ESE**. Martin says the kits are not for beginners but he will be pleased to assist anyone who wants help or advice, (e-mail <mwals@tiscali.co.uk>). If you need a schematic capture/PCB layout program, then **G3LLV** suggests you look at <http://www.lis.inpg.fr/realise_au_lis/kicad/>, where you can download the latest zip file of this free program.


**G4DFV** has just completed a five valve TRF receiver that tunes LW, MW and two shortwave bands (see picture left). It is based on the receiver circuit of the WW2 'Paraset' with the addition of an untuned RF stage and an audio power stage. Duncan says reproduction of AM commercial broadcast stations is superb and CW and SSB on the amateur bands is ok.

**MØPUB** has put the schematic and brief notes for a new sampling mixer design (he says strictly it is a quadrature sampling detector, or QSD) in the 'Files' section of the SoftRock group on Yahoo! Alan says Jan, **GØBBL**; John, **G8BTR**, and himself have been working on the QSD design for quite a while and believe it has MDS figures which are comparable to the best designs they have come across. The key feature is that it maintains performance well beyond the HF bands, and still turns in very respectable figures up to 70MHz.

**F4DYT** has a story to show what a small world it is. Writing in December, Dimitri says, "I have been in Basel, Switzerland for a few weeks and one day saw a German radio amateur's car, equipped with a 2m radio and the **DF2TB** callsign in a car park. I left a hand-written QSL on the car and a few hours later I saw Andreas, my neighbour from next door, asking for me. It turns out that we had been working for two weeks besides each other, without knowing that we were both radio amateurs and members of the G-QRP Club!

**MØNKC** recently got a NoV for 5MHz and is looking for QSOs on the band. In a few evenings of listening, with the exception of the **GB3RAL** beacon, Kristijan hasn't heard very much. **F8BBL** reports a new QRP challenge started on 1 January - The Radio Nature Balade Challenge QRP/p: Km par watt. The details are on the Internet at <http://qrpfr.free.fr/challenge/index_gb.php>.

**GM4CXP** writes, "I am enjoying some good old fashioned county chasing on 80m CW in order to see how I get on with G3MCK's WABC Award. I think this is a great idea and it does seem to be generating a bit more inter-UK activity around the QRP CW frequencies". To assist in getting entries for the new WABC Award, **G3CWI** has produced a spreadsheet. It can be freely downloaded from the bottom of the download page of Richard's web-site at <http://www.sotabeams.co.uk>.

**GØEBQ** has just finished building the Hendricks BITX20 (see picture right) and worked YT, RA, I, SP and OH in a couple of hours in a recent contest with just his G5RV in the loft. Nigel says, "It is a great little rig and an absolute bargain for anyone this side of the pond".

**GØEBQ's Hendricks BITX20 transceiver.**

Welcome to new member **MØWYM** in Southampton who runs QRP with loft antennas (picture below right). Charlie has also just built the BITX20A from Hendricks and has construction progress notes and pictures of it on his very impressive web-site at <http://www.radiowymsey.org/BITX20A.htm>. There are also links to other BITX20 web-sites and I recommend anyone considering building the BITX20 to look at Charlie's web-site first.


**The shack of new member Charlie, MØWYM.**

**M1KTA** has made some cross-band CW QSOs (transmitting on 80m and listening on 501kHz) with **G3ROO** and **G3ZWH**. Dom has also worked/heard **G3KEV**, **G3GMH**, **G3XIZ** and **GØMRF** and **GI4DPE** who, he says, has made a trans-atlantic QSO on 500kHz. **G3XBM** had two CW cross-band QSOs on 21 January with **G3XIZ** (579) followed by **GI4DPE** (339). Roger was listening on 501kHz and transmitting on 80m and says, "If you can listen on 501kHz do check for stations listening for crossband QSOs - they would appreciate the reports and contacts". Roger is retiring in the next few months and says, "Operating/fiddling time should then increase".

**OH9VL** wonders if anyone has tried the PSK31 transmitter at <http://digilander.libero.it/rvise/qrp_20m_tx/qrp_20m_transmitter.htm> and **G1HSM** mentions another PSK31 idea at <http://kd1jv.qrpradio.com:80/PSKTX/SIMPLEPSKTX.HTM>. Leon has designed a little PCB for the Silicon Labs Si570 chip, which is a useful programmable frequency source. The board includes a 3.3V LDO regulator and uses a PIC16LF88 controller for the I2C interface for the Si570. He has also provided connectors for a rotary encoder and two push-buttons. The components are mounted on the bottom layer, the top layer is a ground-plane with a few wire links. The schematic and PCB layout are at <http://www.leonheller.com/Si570>.

A tip from **G1INF**. Pete writes, "Take a look in your local Total fuel station. On 17 January I bought a pair of tweezers there, and they have a LED light in them. They are called La-Tweez, are made from stainless steel, cost £2.99 and are absolutely magic for handling SM devices. They are aimed at YLs and XYLs for plucking eyebrows, but like nail varnish, they prove highly useful to radio constructors".

Please let me know how your spring goes, what you have been building and working on the air, where you will be operating from this summer, plus pictures, by 20 May - thanks.

## QSL Cards from Nasko - LZ1 YE

LZ1YE has sent me details of some attractive QSL cards including the Club Log.
Members can make their orders by sending samples, explaining what they want to print, and sending the materials: photos, files...etc via e-mail: qsl@qslprint.com or qsl@kz.orbitel.bg or if no internet access via the postal address: Atanas Kolev, P.O.Box 49, 6100 Kazanlak, Bulgaria. Examples of cards and prices can be seen at **www.qslprint.com**
For people need QSL cards urgently LZ1YE dispatches three days after the payment is made. UK Members can pay via a UK address: Please send your cheque / cash via recorded delivery to: LZ1YE QSP Print service, c/o Melanie Rowe, St. Leonards House, 35 St. Leonards Road, Exeter, EX2 – 4LR, Devon. e-mail: m0mja@aol.com (make cheques payable to : Melanie Rowe)

# GQRP Club Sales

## Graham Firth, G3MFJ, 13 Wynmore Drive, Bramhope, LEEDS. LS16 9DQ

**Antenna Handbook – 2nd edition** – members £6.00, non-members £10.00 plus post } £1.00 (UK); £2.30 EU } DX - £3.90 per book

**6 pole 9MHz SSB crystal filter** 2.2kHz @ 6 dB, 500ohm in/out **£12 plus post** } £0.80 (UK); £1.00 (EU)

**6 pole 9MHz CW crystal filter** 500Hz @ 6dB, 50ohm in/out **£12 plus post** } £1.50 (DX)

**Pair LSB/USB carrier crystals HC18U wires** - [9MHz ± 1.5kHz] **£6 pair** } **plus** postage

**Crystals** – HC49/U wire - **3.579MHz - 30p each; 10.111MHz - 50p each** } (ANY quantity)

**SA602AN - £1.75, MC1350 - £2.00, IRF510 FETs - £1.25** } 60p (UK),

**MAR-4 RF amplifier - £1.50** } £1.00p EU,

**HC49U** (wire) crystals for all **CW** calling frequencies – 1.836, 3,560, 7,030, 10.106, 14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each } £1.50p (DX)

**HC49U** (wire) crystals for DSB on 40m – 7.159MHz - **£2.00 each** } If

**Miniature crystals** (watch crystal size – very low power) – 3.560, 7.030, 10.106, 18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each** } ordered with heavier items use that postage, plus 10% of this postage

**Ceramic resonators** – 455kHz, 3.58MHz, 3.68MHz & 14.30MHz – **50p each**

**Polyvaricon capacitors** – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft ext & mtg screws - £1.20 each

**Schottky signal diode – 1N5711** low fwd volts for up to vhf/uhf **20p each** } max of 5

**Varicap diodes** – **MVAM109** – 40pF @ 9v, 500pF @ 1v. **75p each** } max of 2

– **MV209** – 5pF @ 12V, 40pF @ 1v **35p each** } per member

**CA741** op-amps 8pin DIL – **5 for £1**

**2SC536 transistors (npn)** fT - 100MHz, hFE-320, VCBO+40V - **5 for 50p**

**MPSA92 transistors (pnp)** fT - 50MHz, hFE-40, VCBO-300V - **5 for 50p**

**MK484** radio on a chip - **£1.00** inc circuit diagram.

## Toroid cores – Priced per pack of 5 – max of 2 packs of each per member

**T37-2 – 75p; T37-6 – 75p; T50-1 – £1.00; T50-2 – 90p; T50-6 – £1.10; T50-7 - £1.20; T50-10 – £1.20; T68-2 - £1.80; T68-6 - £2.20**

**FT37-43 – 80p; FT50-43 - £1.20; FT37-61 - £1.00; FT50-61 - £1.20; BN43-2402 - £1.00; BN43-302 - £2.00 BN43-202 - £1.80; BN61-202 - £2.00**

**FT114-43 – 80p each** (for postage – 2 counts as a pack of 5)

**Ferrite beads – FB-73-101** (3.5mm dia x 3.2mm long, 1.2mm dia hole) – **40p for 5**

Plus postage – up to 5 packs = 60p (UK), £1.00p (EU), £1.30 (DX); 5 – 10 packs = £1.00, £2.00p, £2.60 etc. (please note – if you order 2 packs – you will probably get all 10 in one pack)

**Binders for Sprat** - the original 'nylon string' binding type back in stock again! Black with club logo on spine **£3.75 each plus postage** (one: UK – 80p, EU – £1.50, DX - £2.00. More – add 75p, 80p, £1 each)

**Back issues of SPRAT are still available at 50p each. I have most issues from 78 plus a few earlier ones. UK Postage is 1st magazine – 50p, each additional magazine add 40p.**

**Sprat-on-CD V3 – 1 to 132** (see Sprat 132) – members £5 – non-members £10 plus post as for components

**Sorry – I have sold out of the HW8 book and FT240-43 toroids and no more are expected.**

**Please note -** I only have stock of the above items – I do not sell anything else. Anything in previous advertisements not shown above is out of stock – if it becomes available again – it will be in the next magazine.

**To keep within second class postage limits, orders may be sent in more than one package!**

**Cheques (UK) and payable to G-QRP Club. Sorry, but cheques in other currencies are uneconomical to us due to bank exchange charges!**

**Visa/Mastercard. - Due to insurmountable problems, we have now ceased to accept credit card payments – sorry to anyone this affects – if it really stops you buying from the club, or paying your subscription - please contact me and we will sort something out.**

**If ordering multiple items, enclose the highest postage charge plus 10% of the rest please.**

## MINIMUM ORDER for cheque or PayPal payments is £5

**For orders less than £5 – please use postage stamps (any denomination £1 or less please), or cash. We can accept cash in GBPound, or US$, or uros – but please send securely!**

**You can order via e-mail to g3mfj@gqrp.co.uk Pay by PayPal please.**

**PayPal is very successful – if you can use it, please do – it is easy! Send the order to Paypal using g3mfj@gqrp.co.uk - show clearly what you want with the payment – and your membership number!**