SPRAT

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DEVOTED TO LOW POWER COMMUNICATION

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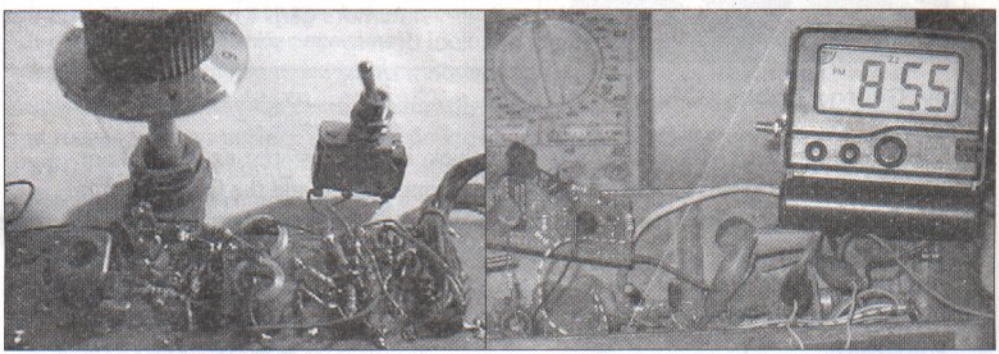

HUFF & PUFF STABLISATION IDEAS FROM G0UPL & G8SEQ

Simple Huff & Puff Stabilisers ~ Huff & Puff Revisited Again
Variable Power for TS430s ~ 80/40 6 volt 5 watt CW Transmitter
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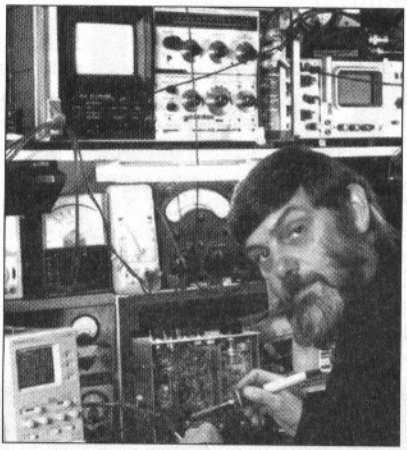
JOURNAL OF THE G QRP CLUB



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Welcome to SPRAT 122 - an issue which, I think, is full of interesting ideas. I am impressed by the Huff and Puff stabiliser ideas from G0UPL and the follow up from G8SEQ. Please continue to share your ideas with other club members. We do not ask for full technical articles – the circuits, a few notes and perhaps a picture of your favourite project can be turned into a SPRAT article. The response to the W1FB Award has been disappointing, so far, this year. So please do show us what you have been doing on your workbench.

The W1FB Memorial Award 2005

For 2005, the theme is **Portable Operation**
Submit any design on this theme – accessories, antennas, measuring equipment … or even a complete transceiver.
Please submit your design to G3RJV as soon as possible, with circuit sketch, all values and brief notes.
The project will be published in SPRAT and the winner will receive an engraved plaque.

72/3

G3RJV

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK
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Simple Huff & Puff VFO Stabilisers

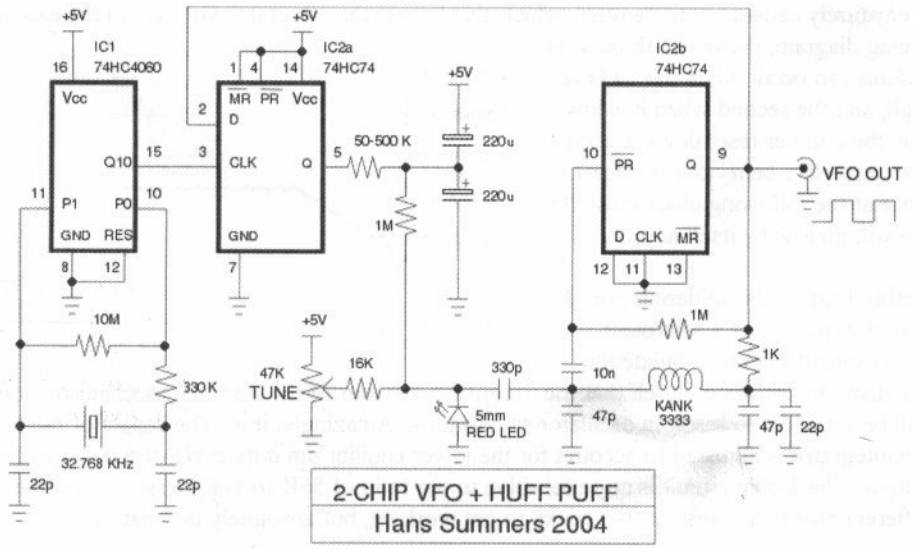
Hans Summers G0UPL, Tudor Capital, Great Burgh, Epsom, KT18 5XT

The Huff & Puff method of VFO stabilisation was developed by the late Klaus Spaargaren PA0KSB in the early 70's. His circuit was published in the Technical Topics column of RadCom, July 1973 and attracted attention and further developments by others over following months and years. It is a clever and simple way to stabilise your rig's VFO!

The basic principle of operation is quite simple. Imagine a frequency counter connected to your VFO, which is set to your desired frequency. Every time the frequency counter indicates that the frequency has drifted slightly, you make a correction using the tuning knob to bring it back on target. The Huff & Puff stabiliser merely automates this process, via control of a varicap diode! In practice, many simplifications are possible. As the operator, you would quickly find yourself looking only at the right hand digit of your frequency counter. The same applies to the electronic version, and in the extreme when we use a binary counter, we only need to look at a single bit. If that is a 1, we say the frequency is too high and we adjust it downwards. If a 0, we say it is low and adjust upwards. In this way the circuit continually keeps the frequency near a target value, never at rest and always pushing it up and down, and soon acquired the term "Huff & Puff". The VFO can be tuned normally and will settle to "lock points" at frequency intervals determined by the choice of timebase division ratio.

The following circuits show how it is possible to build Huff Puff stabilised VFO's, simpler and cheaper than ever before! It should cost less than £2 to build the first:

1. 2-chip VFO + Huff & Puff Stabiliser

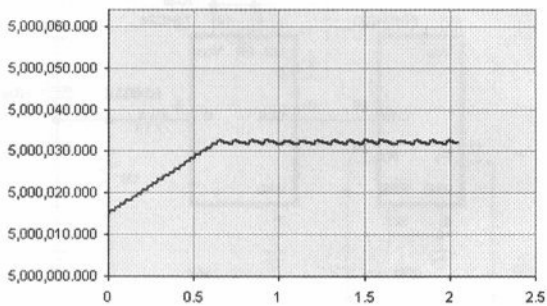


By using an inexpensive and common 32.768KHz watch crystal, the number of division stages required fits into the 74HC4060 oscillator/divider IC1. The Q10 output is at 32Hz and determines the frequency step between lock points. A D-type flip flop IC2a (½ a 74HC74 IC), latches the VFO signal and effectively behaves as the 1-bit frequency counter described above. The output is integrated via a simple RC network. By using two capacitors, the integrator voltage at switch-on is automatically initialised at 2.5V, leading to very rapid settling of the circuit. The integrator voltage is fed to a varicap diode in the VFO tank circuit. For the varicap diode, I just use an ordinary 5mm red LED and it works absolutely fine! The 50-500K resistor depends on the inherent stability of the VFO.

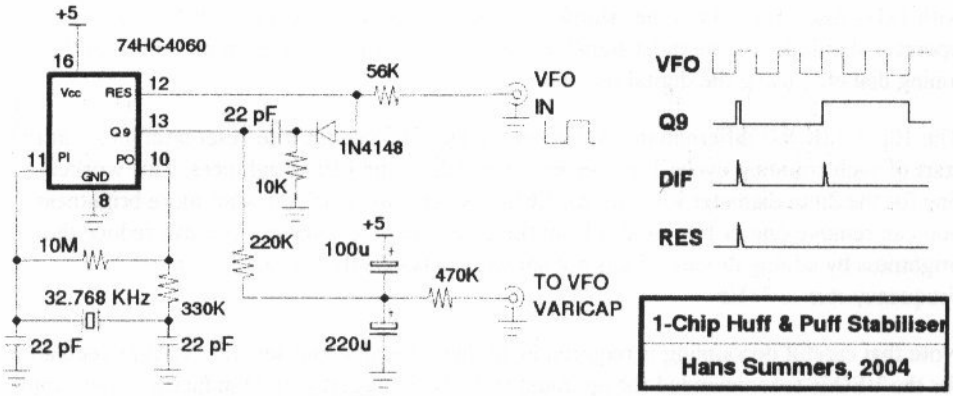
But that's not all! By studying the internal logic diagram of the 74HC74 D-type flip flop, I realised that if the clear (MR) input was held low, then the path between the preset (PR) input and the Q output would function as an inverter. As soon as you have an inverter, you have a potential oscillator! Using a KANK3333 inductor (but others would of course suit) and the circuit values shown, I got 170KHz coverage of the 80m band without further effort. Tuning uses the same 5mm red LED, and a 47K potentiometer. The KANK3333 core is adjusted to obtain the desired coverage. By removing the 22pF capacitor from one side of the VFO tank circuit I got complete coverage of 40m.

2. Extreme minimalism: 1-chip Huff & Puff stabiliser

Yes, it really is possible to build a Huff & Puff stabiliser with a single IC! We start with a 74HC4060 oscillator/divider as before. This circuit is less efficient than the previous, so I chose the Q9 output which is at 64Hz. As well as the correction integrator, a differentiator connected to this pin (22pF and 10K) generates a short pulse each time Q9 goes high (see DIF in the above timing diagram). The diode and 56K resistor gate this short pulse such that it resets the counter, but only if the incoming VFO signal is high at that time. This prematurely causes Q9 to be reset, which also lowers the integrator voltage. In the example timing diagram, the first DIF pulse is assumed to occur when the VFO is high, and the second when it is low (i.e. the counter reset doesn't occur). This latch-like behaviour is imperfect since at the following clock pulse the Q9 will go low by itself anyway.

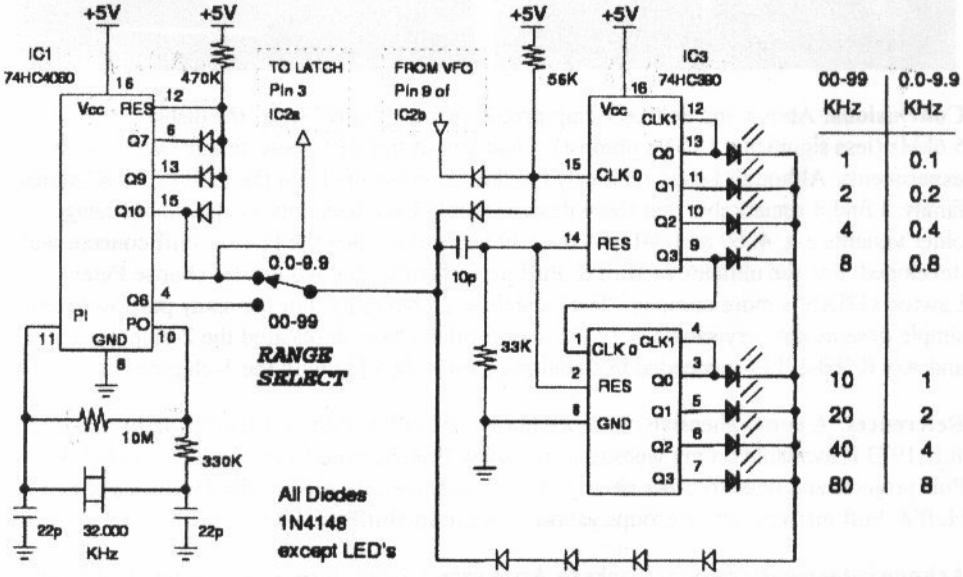


Before heating the soldering iron, I had to write myself a Microsoft Excel spreadsheet to simulate the stabiliser, to convince myself that the irregular behaviour of the resetting mechanism would still be sufficient to result in oscillator stabilisation. Amazingly, it is! The capacitor ratio in the integrator is adjusted to account for the lower equilibrium duty cycle of the integrator output. The 1-chip circuit is quite sensitive to the ratio of 56K to 10K resistors, and the differentiator time constant. It's tricky to get working, but absolutely fascinating!



3. Adding a frequency counter: 3-chip VFO + Huff & Puff stabiliser + counter

If the 32.768KHz is replaced with a 32.000KHz crystal (somewhat hard to obtain, but available from Digikey and Mouser in the US), then the Huff & Puff timebase can perform double duty as the timebase for a simple binary-readout frequency counter as described in SPRAT 120 with updates in SPRAT 121. A single additional 74HC390, gated by the 74HC4060's 500Hz output (Q6, pin 4), gives a binary coded decimal (BCD) readout on 8 low-current LED's, of 00-99kHz.

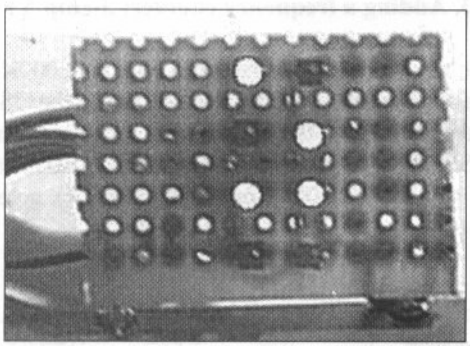


I designed and built a deluxe version, which has additional gating in the 74HC4060 divider so that it produces a 500Hz output and another with 100mS wide high period. This 2-digit display then has switchable resolution: 0.0-9.9kHz with 100Hz resolution, or 00-99kHz

with 1kHz resolution. As in the "simple frequency counter" article in SPRAT 120, the operator should know the most significant digits of the frequency from markings on the tuning dial etc., using the digital readout.

The 10p + 33K RC differentiator at the reset pins of IC3 cause it to reset briefly to 0 at the start of each counting cycle. Four series diodes adjust the LED brightness. This worked fine for the 2mm diameter low-current LED's which I used. If you want more brightness, you can remove one or two diodes from the series chain; conversely you can reduce the brightness by adding diodes. IC2 is not shown and is exactly the same as circuit 1. Frequency step is 38Hz.

Note that careful decoupling is required in all these circuits, and separate voltage regulation for the VFO is recommended for optimum stability. I suggest a 1mH inductor in the supply rail of the 74HC390 to prevent current fluctuations caused by the LED's from modulating the VFO.



Conclusions: Above: my deluxe 3-chip prototype built "ugly" style, the display reads 5.6kHz (less significant LED's upmost). I had lots of fun with these simple Huff & Puff experiments. Although I used relatively modern components from the CMOS 74HC-series family, I find it remarkable that these designs would have been just as achievable using older variants e.g. 4060 and 74LS74 over 30 years ago when the Huff & Puff concept was developed. For the ultimate in Huff & Puff performance, one would still choose Peter Lawton G7IXH's more complex "fast" stabiliser architecture, but for many purposes these simple designs are very satisfactory. At least 5 others have duplicated the 2-chip design, and Arv K7HKL has succeeded in stabilising a 14MHz VFO with the 1-chip design.

References: A comprehensive reference library of Huff & Puff and articles dating back to July 1973 is available on my website http://www.HansSummers.com with more Huff & Puff projects and links to other sites. A Yahoo forum exists specifically for discussion of Huff & Puff matters: http://groups.yahoo.com/group/HuffPuffVFO

Acknowledgements: Special thanks to Arv Evans K7HKL for encouragement and many thought provoking ideas, discussions and the neat computer circuit diagrams; and to John G0UCP for his modification to the oscillator tank circuit configuration correcting my initial idea, which was based on a configuration I'd used in a 74LS04-based oscillator.

HUFF & PUFF REVISTED AGAIN!

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Many years ago Stefan Niewiadomski wrote an article in SPRAT 63 (1990) called "Huff & Puff Revisited" in which he described a simplified divider chain for controlling a VFO. In this article he intimated that you could use a low frequency, cheap clock crystal to do the job. At the time, I ordered the chips and thought I wonder if I could use the same clock crystal to drive the divider chain and provide a built in clock for the rig. (I have been building clocks into homebrew kit since the 1970's.) The circuit never did get built – until now that is!

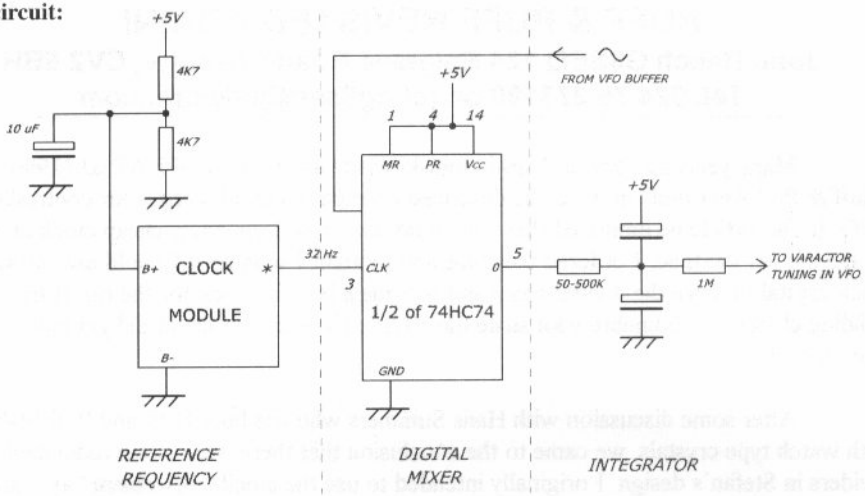
After some discussion with Hans Summers who has built Huff and Puff Stabilizers with watch type crystals, we came to the conclusion that there were some redundant dividers in Stefan's design. I originally intended to use the clock "movement" as is and a buffer amp from the crystal to feed the divider chain, but now using Hans' design. Before the soldering iron got hot, it dawned on me that I might be able to use the clock's divider chain and just build the 74HC74 section and integrator to control the VFO (mine is already varactor tuned over a narrow range.). I thought tapping into the right point on the clocks divider chain might prove tricky, but in the end turned out to be ridiculously easy!

It turns out that on (ALL?) the two different "movements" I had, that all the pads except two on the display were driven at 32 Hz – exactly the frequency wanted. This of course is the strobe for the LCD display. The strobe has to be more than 24 Hz to avoid flicker, but slow enough for the display to respond & 32 Hz is the easiest value to achieve with a divide-by-two chain.

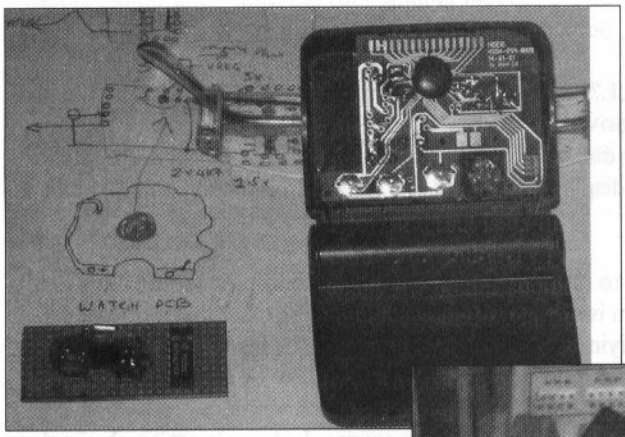
Soldering the thin wire to the track was a bit tricky requiring a steady hand and a magnifying glass; the earth return is much easier, being anywhere on the negative terminal of the battery. I also found supplying the clock module with 2.5 v instead of 1.35 v, gave a peak to peak output of 5 V, ideal for driving the 74HC74 directly. A computer style 2-cell back up battery would be permanently wired into the rig, which would be recharged whenever the rig was connected to an external power source. It doesn't get much simpler than this!

Acknowledgements: Stefan Niewiadomski (Sprat 63 P20-24)
Hans Summers G0UPL
http://www.hanssummers.com/radio/huffpuff/index.htm
http://www.hanssummers.com/radio/huffpuff/library/index.htm
John W. H. Beech M3MKV (Drawing)

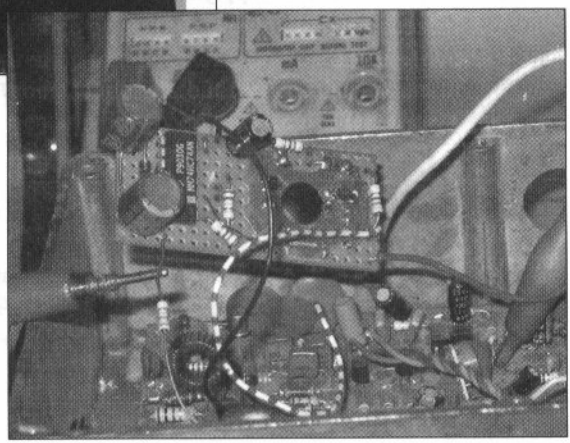
The circuit:



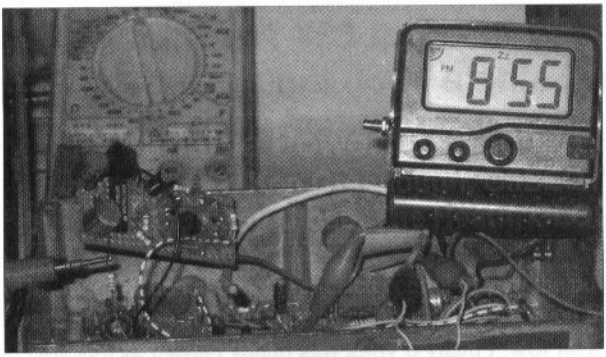
** See text.*



The two movements
I used in experiments



The watch movement (minus the display, which was broken.) wired into a varactor tuned VFO of a DC-80-P Transceiver



As above with the modified clock. The latter has an SMC connector fitted which gives out 32 Hz from the strobe. This will be used as an external control/station clock for other VFO's with the 74HC74 and integrator circuit fitted in the VFO.

Variable Power for Kenwood [Trio] TS430s

Ken Greenough, G8BEQ / GØWBM,
2 Bexley Close, The Heath, GLOSSOP. SK13 9BG

This modification allows the squelch control to vary the power of the TS430s from a couple of watts to full power. The squelch control still operates on FM mode but is disabled on SSB. [not very useful anyway.]

Remove top cover of transceiver. The main board on show is the IF unit. Locate socket 26, with front of set towards you socket 26 is to the left of the board about midway back to front. Cut the wire to pin 6 leaving about 3cms wire on the plug. This wire is usually brown. The wire tail from the plug has to be connected to ground. This enables SSB receive, pin 4 is ground and can be used. The brown lead you have just cut comes from the small PCB behind the squelch control. It runs to pin 6, socket 6 on this board. It is the end pin to your right looking from the front of the set. Pull this brown wire free of the harness so that you have a free lead from the plug.

Locate R211, a 1K resistor which connects the source of Q41 to ground. From the front of set.. right hand side, towards the front of the board. Cut the ground side of R211 leaving sufficient lead to solder to. The ground side should be the top end of the resistor, but check. Take the brown lead from the squelch board, suitably shortened, to the resistor. The squelch control , SSB section, is now in series with R211 and gives excellent control over the RF output level. Although the squelch control operates on FM it unfortunately can not be set independently of the power setting, so that at low power levels the squelch is set at a very high level. If operation is mainly at a certain low power level, i.e. 5 Watts for QRP or 10 Watts for the foundation licence there is a way round this snag. A 50K ohm trimpot can be connected from pin 5, socket 6, on the small pcb behind the squelch control to ground. At your chosen low power level set the squelch threshold with the trimpot.

In use, Maximum power is with the control fully anticlockwise. With the squelch pot set anticlockwise and the set in CW mode, Transmit a carrier [you will need to short the key jack] and set the carrier control for full power. You can then vary power on all modes using the squelch control. Check the carrier control setting required for different bands, it will probably vary slightly between 160 and 10 metres. The protection circuits will still operate as before but if running low power the set will tolerate poor aerial matching without using the protection circuits.

An 80/40 metre, 6 Volt 5 Watt CW Transmitter with full band cover, single knob tuning and QSK.

Chas Fletcher G3DXZ, 12 Park Cres. Retford. Notts. DN22 6UF

Overview.

My initial intention was to build a transmitter to work from low battery voltage that might lend itself to portable operation. From previous efforts with a 1.5 volt supply, the limitations of very low voltages regarding choice of components and output power pushed me to consider 3 volts as a starting point, but, in looking for an rf output approaching 5 Watts I soon realised this was still a bit low. Finally 6 volts was finally chosen as this also allows the use of low cost MOSFET devices in the driver and PA stages. This circuit uses broadband techniques to reduce the tuned circuits to a minimum. As the PA stage is switch-mode, output power is simply controlled by the volts applied to the final amplifier, the exciter supply remaining at 6 volts.

vfo.

The simple pulled ceramic resonator was chosen both for its low cost and also because it is less rigid in frequency control than a quartz crystal. For 80m cw purposes the common 3.580 MHz resonator was chosen due to its closeness to the QRP frequencies. When working at low voltage, circuit impedances tend to fall to maintain a sensible power level and stability. Any associated tuned circuits must also have lower dynamic impedance, which means larger C and smaller L than normally used. As a result 680pF in parallel with a 4 uH, slug tuned inductor was used in the oscillator, and the result was vigorous, and stable. What's more, to my amazement, it continued to oscillate in a stable manner even when the frequency was pulled down to 3.500 MHz using the variable inductor. This meant that the second harmonic would tune the 7.0 to 7.04 MHz cw segment and two band operation was possible using one resonator. My disbelief at the resultant stability was only subdued after a month of testing on 40 metres. I still cannot explain the results, but I certainly recommend the method.

The circuit uses a bi-polar transistor in a Colpitts configuration. I chose the 2N2369A, a high frequency type, seeking to optimise the clean-ness of the keying characteristic. Tuning is accomplished with a 150 + 230 pF variable from an old tuner head, and having a 3:1 slow motion drive, I found tuning was slow enough for easy control on 7 MHz. Although the oscillator will pull well with only the 150 pF across the collector tank circuit, amplitude stability is improved by adding the 250 pF section at the base. The result is a tuning range of >80KHz, with 6 volts p/p across the tuned circuit, fast start-up and good waveform purity.

In this transistor circuit, a 3 volt supply was enough to produce a stable oscillation with fast start-up. It also meant that a low power voltage regulator (LM317LZ),could be used to keep the voltage steady and assist frequency stability. The oscillator output was taken from a step down, bi-phase winding on L1 which delivers 1 volt peak/peak to the 74HC02 buffer/doubler stage.

Buffer/Doubler.

Initially I was drawn to an old circuit, the push-push doubler, as a means of getting a 7 MHz output. This worked well but involved another tuned circuit that did have a little effect on stability. So I tried a digital solution using three NOR gates to produce a switching output on 7 MHz. The first two gates are driven in anti-phase and if these gate have their second input pins fixed at zero, they will drive the third gate with pulses at a 7 MHz rate. However, unless controlled, the output is highly asymmetrical and partly dependant upon the amplitude of the oscillator output. This problem is overcome by averaging the output of the third gate by a fourth stage wired as an integrator and routing the output back as a negative feedback d.c. bias to the first gates via L1, where it is added to the oscillator output. As a result, the r.f. output of the third stage settles to a very good square wave and is of course frequency independent.

Contrary to the above, if one of the first two gates has its second input at +6 volts it is disabled, and the output of the third gate is a 3.5 MHz square wave. Thus a simple d.c. bias change controls the band in use.

Driver and P.A.

With an eye to low cost and efficient operation at 5 watts I was attracted to the use of a pair of power MOSFET's in push-pull. Only one type fills these criteria as far as I know, and that is the IRF510. This switching device has a low enough gate to source capacity to allow it to work at 7 MHz as a broadband amplifier without serious input matching problems, yet still carry the required drain current without too much ohmic loss. Also, with square wave drive, efficient broad-band operation is quite easy. However, push-pull operation needs a bi-phase drive and the output of the doubler is single phase, so either a centre tapped transformer or the well known exclusive OR phase splitter (HC86) was indicated. In the end, I used both of these circuits together to drive the MOSFET's using paralleled HC86 gates. The transformer allows easy application of a d.c. bias to the FET's during transmit while firmly holding them non-conductive during receive. The optimum d.c. bias needed by the IRF510 is about 3 volts which is half the supply voltage at 6 volts. The IRF510 circuit is conventional push-pull circuitry and looks into a load of 12 to 14 ohms after the balun, T2.

At this stage the output r.f. is a square wave and rich in odd harmonics. Luckily, the first harmonic needing to be dealt with is the third and after some experiment with Tee and Pi tuned filters I chose the latter as most effective and simple for the purpose. It is possible to use the same capacitors on both 3.5 and 7 MHz and, with appropriate inductors, to produce a clean output with low harmonic content.

Thus we have only two tuned circuits in the whole transmitter, the vfo and the output filter, the inductor for the latter being switched by RL2, a simple 2 pole changeover relay.

QSK Control.

Before reviewing the circuitry, perhaps I should clarify what is intended. QSK is a general term taken to mean a Tx/Rx combination that automatically switches when the key is pressed. In this particular case, the switching is so fast that the receiver is actively listening between sequential transmitted dots at 25 wpm. In my opinion, this is a real advantage

during QRP operation as the presence of strong QRM on the frequency is immediately heard. There's little worse than to finish an 'over' just to find that your signal has been blotted out by a QRO station. The control circuits generate the control voltages needed to accomplish this but of course the receiver must have the ability also. A logic level control voltage is used to control the 'mute' of the receiver and the timing is shown by Fig 2 (QSK Timing). The control circuits have three output voltages that are driven by the 'Key' input. On key down, the 'Mute' output changes immediately from +6 to zero volts, which mutes my receiver. Also at this time, the oscillator +6 volt supply, 'Osc +', is turned on. This action is intended to start the oscillator early and ensure it is operating steadily before the transmitter proper comes to life. There is then a delay of 5 msec., this delay to ensure the Rx is muted and the vfo running steadily. Then Buffer + and Driver + both go to +6 volts to power the buffer/doubler and driver stages. No waveform shaping is used but no-one has adversely commented on the keying even when asked to be critical. The Buffer and Driver supplies are switched through separate transistors to prevent l.f. instability.

When the key is released, 'Key Up', nothing happens for 5 msec., then 'Osc +' and 'Buffer and Driver +' both go to zero and stop the transmission. Note that the 5 msec., delay occurs both at beginning and end of the keyed character and so does not affect the character weighting. After a further 10 msec., the receiver 'Mute' output restores to +6 volts and hopefully by this time all transient clicks and thumps have disappeared.

The timing of these three control voltages are individually adjustable, so if a little more time is needed, for whatever reason, it can be arranged. Also, if the polarity of the 'Mute' output is incorrect for your own Rx, it can be corrected by adding another inverting gate.

Other features of the control circuit are the band switching, 'BS' and 'Net' function. Band switching involves a logic level change at 'FC' and the energising of relay RL1 to change the output filter inductor. A simple toggle or a single pole rotary switch will do this job.

The 'Net' feature is a little more involved! During 'Net', several thing need to be accomplished. Firstly, on key down, the receiver must not be disabled via the 'Mute' function. Secondly, the supply to the driver must be removed to prevent too loud a signal. Thirdly, the side tone oscillator must be disabled to stop it drowning out the actual signal. Finally, the output of the Buffer/Doubler must be disconnected from the Driver stage as it has lost its positive supply and does not like being driven! This latter action was so effective at reducing the signal leaking to the receiver I had to add a little r.f. leakage to make the signal audible and consistent between bands. To do this, the Buffer output is simply connected, from 'Net 1b, to a short piece of insulated wire laid adjacent to T4. The strength of the signal being adjustable by placement of the wire. All these functions can be achieved using a 3 pole 2 way rotary switch.

Power Supply.

The exciter section needs a stable 6 volt supply at 50mA during transmit. So if not on battery power, a 78L06 positive regulator will do nicely. The PA on the other hand will consume 1.5 Amp. at 5 Watts output on 7 MHz and needs something different. I prefer to be able to reduce power on occasion and with a switch-mode PA stage this is very easy - simply reduce the voltage on the PA. The exciter section must continue on its 6 volts

supply, so a separate regulator is needed. The LM317T is a variable regulator that will produce 1.5 Amp and is an easy solution to the problem. The raw supply to these regulators needs to be 9 volts or more. So for use in the shack, a 9 to 12 volt unregulated supply is indicated. Don't use more volts than needed as that only increases the heat to be dissipated by the regulators.

For portable use, a 6 volt battery supply may be used without the main regulators although the vfo 3 volt regulator must be retainedsss.

Construction

I built the prototype on a breadboard and was dead-bug/rats nest in form. Knowing well that re-building on pcb or whatever often reveals unexpected problems I produced two pcb's. Sure enough the exercise proved its worth and the minor problems were dealt with. The only components needing comment are listed in the table. All the diodes used were 1N4148 of similar.

L1. I used a TOKO 10E core gleaned from an old 10.7 MHz i.f. transformer. Fine wire is needed for this bobbin and good eyesight! If you don't fancy tackling the 10E core, any slug tuned inductor will work but screening is well advised.

L2 and L3. Nothing special here, but use 26 swg or thicker wire.

T1 and T4 are wound on two hole 10mm square ferrite cores. Use bi-filar winding for best results as leakage inductance is a problem with square waves.

T2 and T3. TOKO made a range of fixed inductors, the RB7 range. These coils use a bobbin core and are easy to wind. Pick a coil around 150 to 330 uH , remove its winding then wind as per table using 26 swg bi-filar. Easy.

Relays. If you have a box of old relays, as I have, remember that the supply to the coil can be quite independent of the regulated transmitter supplies. So if you are using an existing 12 volt PSU as a power source, then 12 volt relays will do very well. For 6 volt portable operation though, 6 volt coils are necessary.

Components sources.

IRF510	GQRP Club Sales
TOKO coils	JAB Electronics (jabdog.com)

Components in general

ESR Electronic Components. (esr.co.uk)

Finally

Any helpful comments, queries or improvements to chas@g3dxz.go-plus.net

PLEASE NOTE: I HAD SOME TROUBLE WITH MANIPULATION OF THE DIAGRAMS FOR THIS PROJECT. I CAN SUPPLY DOUBLE-SIZED ORIGINAL DRAWINGS TO READERS WHO SEND AN SAE. OR.... BLOW THEM UP ON A PHOTOCOPIER. G3RJV

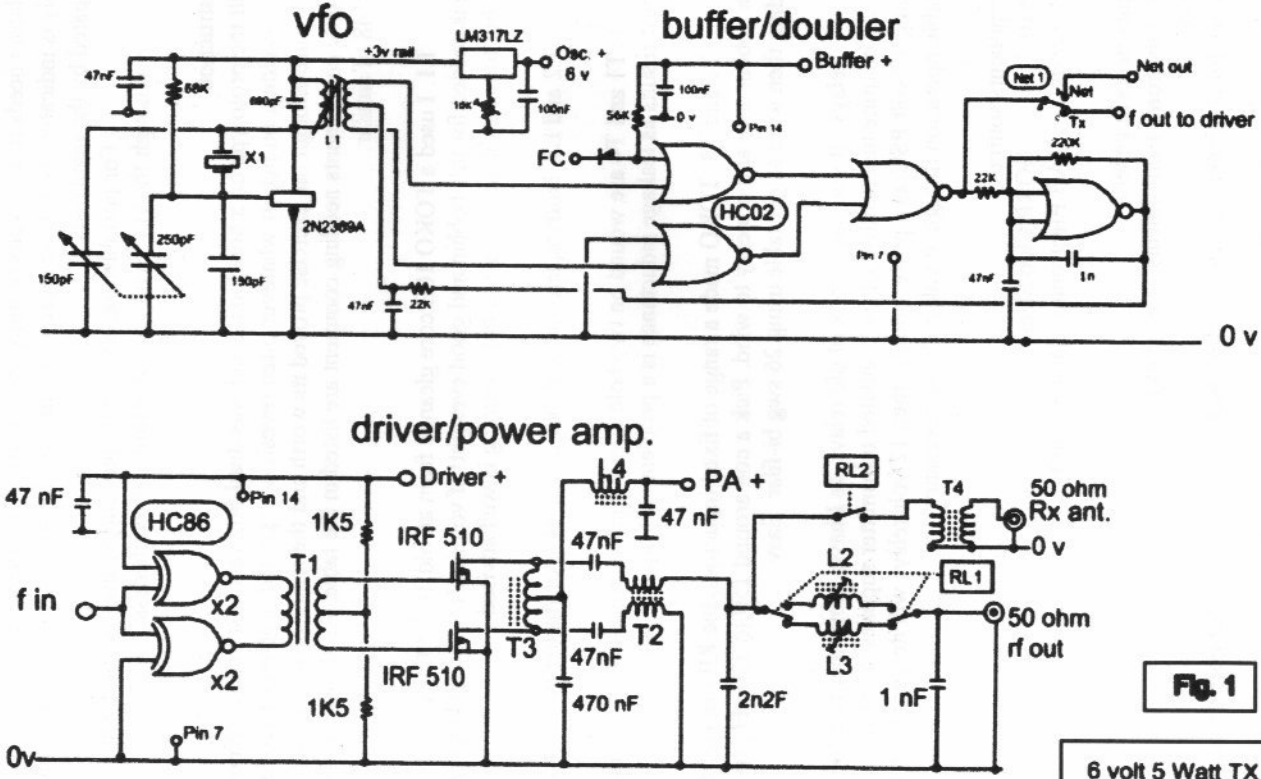
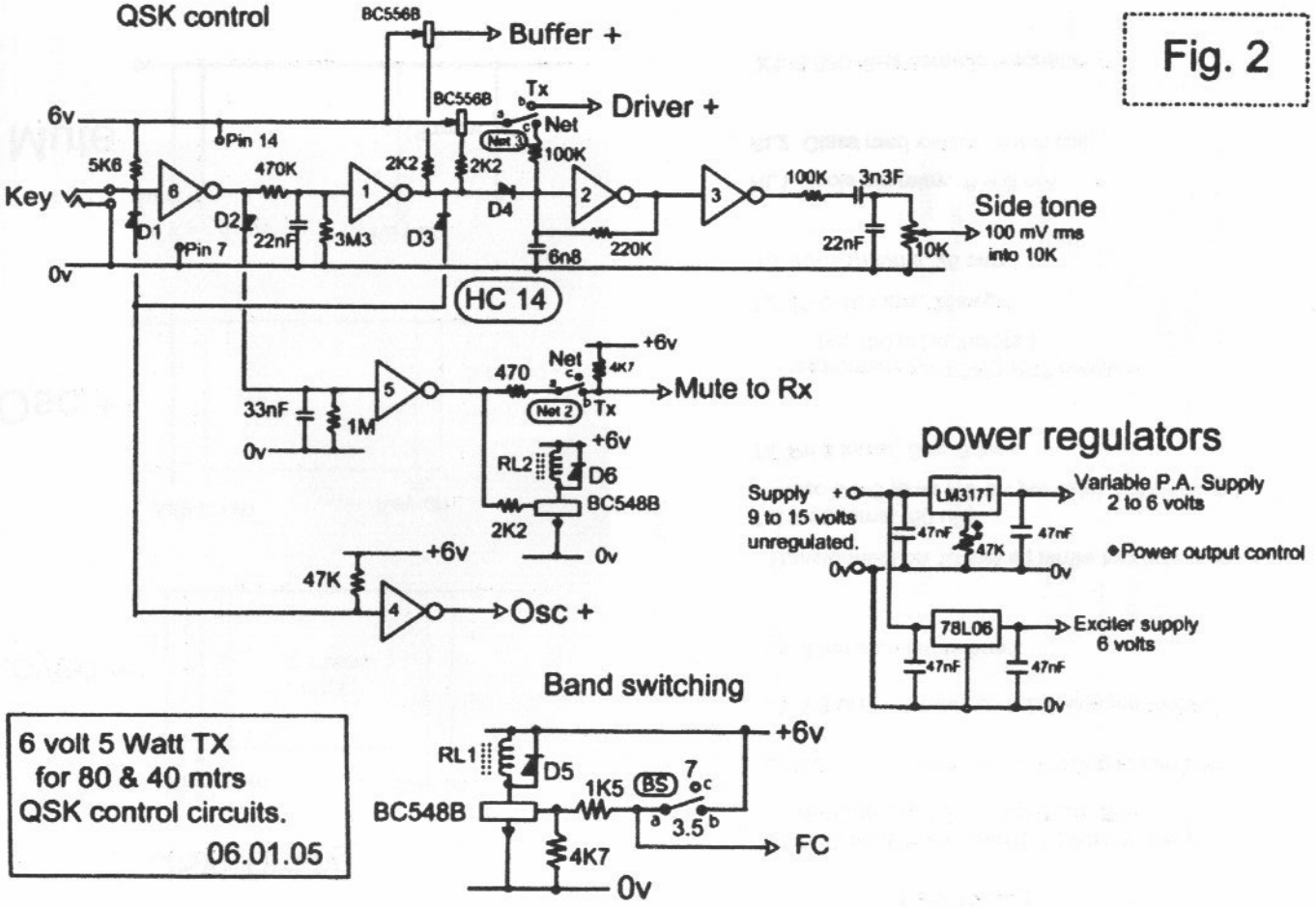


Fig. 1

6 volt 5 Watt TX
for 80 & 40 mtrs.
Exciter & P.A.
06.01.05


QSK control
BC556B
Buffer +
Tx
BC556B
Driver +
6v
Pin 14
Net
Net 3
5K6
470K
2K2
2K2
100K
Key
6
1
2
3
100K
3n3F
Side tone
100 mV rms
into 10K
D1
D2
Pin 7
22nF
3M3
D3
D4
6n8
220K
22nF
10K
0v
HC 14
+6v
Net
4K7
470
5
Mute to Rx
33nF
1M
Net 2
Tx
0v
+6v
RL2
D6
BC548B
2K2
0v
+6v
47K
4
Osc +
power regulators
Supply
9 to 15 volts
unregulated.
LM317T
Variable P.A. Supply
2 to 6 volts
47nF
47K
47nF
Power output control
0v
0v
78L06
Exciter supply
6 volts
47nF
47nF
0v
Band switching
+6v
RL1
D5
1K5
BS
7
BC548B
3.5
FC
4K7
0v
6 volt 5 Watt TX
for 80 & 40 mtrs
QSK control circuits.
06.01.05
Fig. 2

QSK Timing

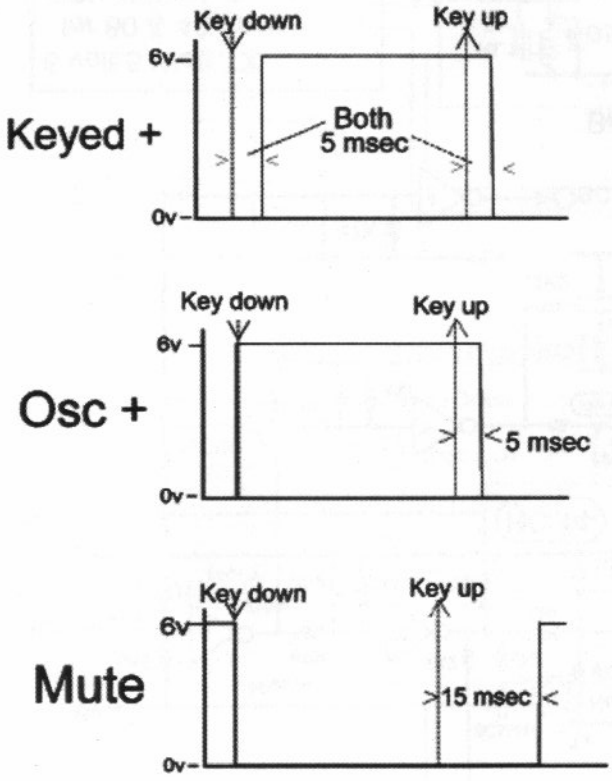


Table 1

L1 TOKO 10E core (from10.7 MHz I.F. tfmr)
4uH, 15 turn Pri., 3-0-3 turn Sec.

L2 0.6 uH 6.5 turns on 0.25" slugged former.

L3 1.3 uH. 7.5 turns on 0.25" slugged former

L4 3 turns on ferrite bead.

Transformers on 10 mm sq ferrite two hole cores

T1 Pri 5 turns (50 uH)
Sec 3-0-3 turns (19 uH per s.Je) bifilar wound

T4 Pri 3 turns. Sec. 6 turns.

Transformers on TOKO RB7 bobbins.
(ex 150 uH inductors.)

T2 10-0-10 turns, 26swg

T3 10-0-10 turns, 26 swg

RL1 2pole c/o relay. 6 volt coil.

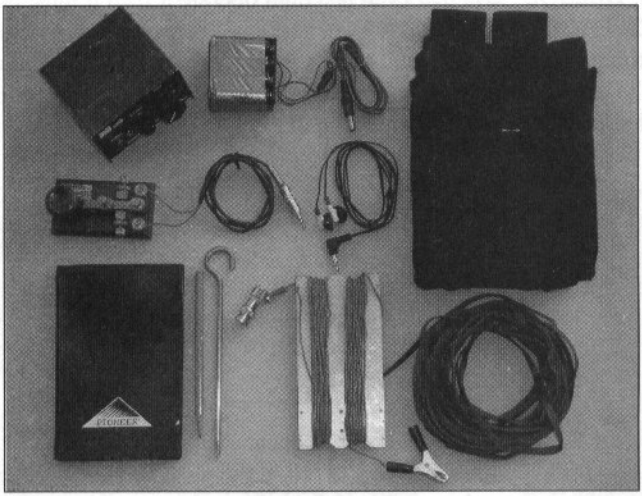
RL2 Glass reed switch. 6 volt coil.

X1 3.580 MHz ceramic resonator.

1 LITRE PORTABLE QRP CW OUTFIT

Tony Lymer, GM0DHD, 16 Gerson Park, Broxburn, West Lothian, EH52 6PL.

Over the last couple of years I have enjoyed developing and operating a compact QRP outfit that fits into a 1 litre ex-army ration pouch. It is surprising how little equipment is really necessary, if you are prepared to make compromises.



The complete station consists of:

1. MFJ-9330, 30m 'Cub' transceiver.
2. 8 off. AA alkaline batteries.
3. 1 litre 'ration' pouch
4. Battery holder and cable.
5. Morse key, cable and 3.5mm jack plug.
6. Walkman earphones.
7. Waterproof-paper notebook
8. Pencil.
9. Tent peg for the free end of the outer antenna section.
10. 2 off, λ/4 lengths of insulated wire for 'upper and outer' dipole antenna.
11. Home-made winder for antenna storage, made from PCB off-cut.
12. Cord for antenna rigging.

The MFJ Cub makes a robust and effective transceiver. I prefer the 'upper and outer' asymmetrical dipole to an inverted-vee or sloper dipole because no feeder or ATU is necessary. The 'outer' is fitted with a crocodile clip and connects directly onto a ground screw on the transceiver case. The 'upper' connects to the BNC socket using a plug that used to be part of a short VHF whip antenna. The cord is usually tied to a handy piece of locally procured timber and thrown over a nearby branch. The antenna is relatively short and light because the 10 MHz band is used. The total weight of the outfit is about 2 ½ lbs. (1.1Kg). The rig runs at about 1W output and the batteries last several outings, as the receiver current is only 38mA. Transmit current is 250mA. Of course it could be improved by adding a keyer and battery pack inside the Cub, and ...

The SPRAT Counter

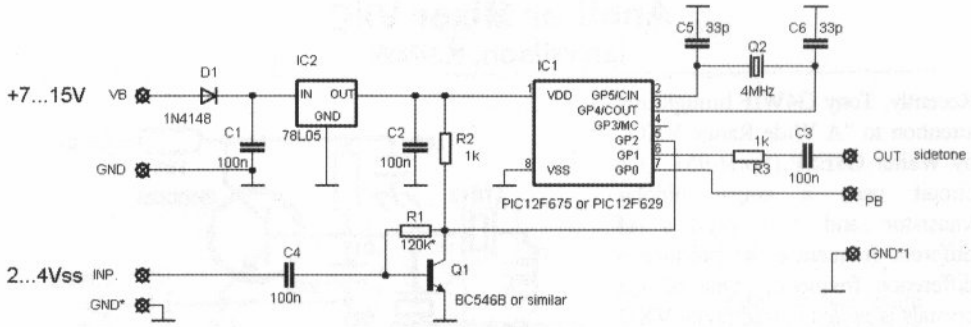
Fred Heusy, DJ3KK, POB 801, D-25697 Meldorf. Germany

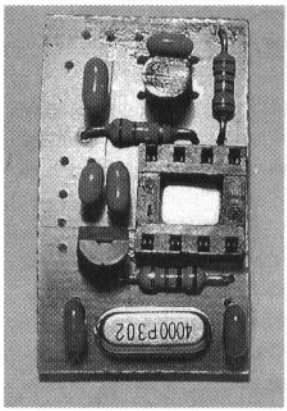
It had been a glimpse of an idea. I wanted to design a counter for qrp riglets, so it had to be Simple-Practical-Reliable-Affordable-Tiny. You'll really see that there are only a few parts, and when Dieter, DL2BQD, says that even he could operate it then it must be fairly easy! Dietmar DL2BZE EAGLE'd the board and then he and Dieter did the HF-tests together. I made a first prototype on veroboard which did a jolly good job and was also very small. There will soon be an SMD version, then only the crystal will be a real giant compared to the board. But that's for the minimalists among us.

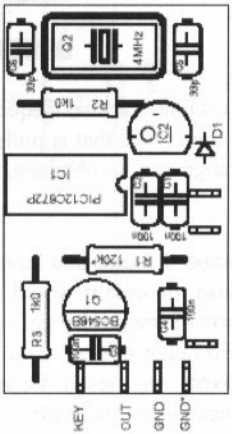
Operation is straightforward: simply use the only push button, press briefly or hold a tad longer, it's all self explaining. Attach the 10-12 V and you will hear the frequency announced in a wonderful cw sound, the PIC push button now waiting for a friendly soft, short touch. When you think of the fact that you built the counter in no time at all - it sounds marvellous! (Without an rf-signal input you will hear a melody of 0000 or 0001 as well. You won't believe how satisfying these 0s can be at this moment! In fact it is a 5-character output of the frequency but in this format the leading 0 is supressed.

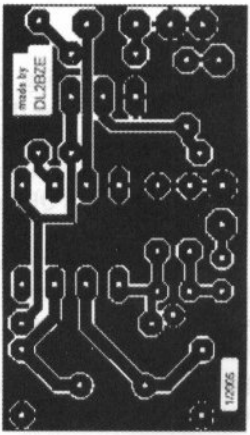
For example if the input is 7.031 254 MHz you'll hear 7031.
In case of 14.123 362 MHz you'll hear 14 123. Hold the push button a wee longer and you will be surprised by the cw symphony of the full readout of 14 123 36 . Between the MHz and KHz there is a tiny break – an acoustic decimal point. Set up: switch off the counter, wait a moment and switch it on again with the push button (pb) pressed. Immediately you'll hear "SP?" i.e. chose cw speed (you may release the pb at the first sound).
Press the pb, hold it and you will hear dits with increasing speed, starting again after the peak if you don't release the pb. Chose that speed you want by releasing the pb at the right moment, and it will be stored in the non-volatile memory and confirmed with "OK".

You can do it as often as you like. A symphony of cw. But you have always to begin as described above. You can simply toggle continuously through the ring menu
"SP? Reset? IF? AD? SU? R1? R2?...R7? R8? SP? Reset?" etc..
With reset you chose the standard mode without IF-offset and in read-out format R1.
If you want to use your SPRAT counter in an RX you can measure the VFO frequency, then add or subtract the intermediate frequency (IF) and you will get the RX frequency then.
Example: feed an rf-signal (BFO, RX or external generator) into SPRAT ; there should be an amplitude level of 2...4 Vpp and toggle till you hear "IF?" Press pb a bit longer, you hear "OK" and all is stored. Then go on "AD?" or "SU?" and "OK". You are finished.
Enjoy!
The hex-code is available at : dj3kk@darc.de
Programmed PICs are also available for the project.









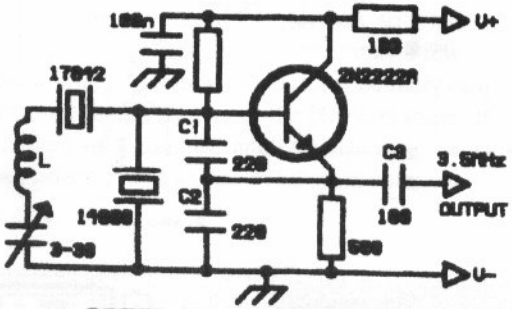
Note:

Fred mentions that Dietmar, DL2BZE, has produced some little boards for the counter and tested the SPRAT counter using an HF Generator (see Member's News in this issue) to a design from a book from Hans Nussbaum, DJ1UGA, (see left). Fred commends this book (in German) as an excellent source of practical test equipment. The book is listed as ISBN 3- 88180 804- 3 and costs 9,80 Euro for 75 pages.

Another Mixer VXO

Ian Wilson, K3IMW

Recently, Tony G4WIF brought my attention to "A Wide Range VXO" by Walter G3ESP (Sprat 95). This circuit uses a single bipolar transistor and two crystals of different frequencies to produce a difference frequency. One of the crystals is *pulled* in traditional VXO fashion by a series C/L combination to produce a range of output frequencies.



The circuit is interesting because, using only a single active device, it oscillates at two frequencies and also generates their mixing products. Because the frequency of the crystal that is pulled can be significantly higher than the output frequency, a useful tuning range can be obtained. Certainly an economical approach to signal generation for a QRP rig!

My results with the circuit were mixed; I found that having two crystals of approximately the same activity was essential; otherwise the circuit would only oscillate at the frequency of the stronger crystal. This meant that many of my motley collection of crystals weren't useable. The operating point of the circuit was also rather critical; it would jump from two-frequency to one-frequency mode as the collector current was raised. I concluded that, at least with my crystal collection, the circuit wasn't very practical for my needs.

I thought that a better approach would be to separate the two frequency generators, while staying with the simplicity of the original concept if possible. The solution I came up with was to use a cascode. A 40m version is shown in Figure 1. The top and bottom transistors in the cascode are both configured as Colpitts oscillators. Note that Q1 plays the role of an emitter load for Q2. As a result of the cascode connection, the collector currents flowing in both transistors contain components at both fundamental frequencies. The non-linearities in the transistors provide sufficient mixing action that a significant component at the difference frequency can be picked off. For use in a practical design, buffering and additional filtering of the output signal will be necessary.

Figure 1. Cascode VXO/Mixer

Few, if any, of the components are critical – I used 2N4401's for Q1 and Q2 because I have a large supply and the ones I have are relatively 'hot'. The crystals and associated L's and C's should be sturdily mounted. Connect the crystal cases to ground. Shield any filtering circuitry.

I was able to use all my crystals in the second circuit. A couple of combinations that I tried, for frequency generation in the 40m range, were as follows:

	Xtal1,MHz	Xtal2,MHz	fnom, (MHz)	delta f, (kHz)
1	12	5	7	20
2	18.126	25.117	6.99	45

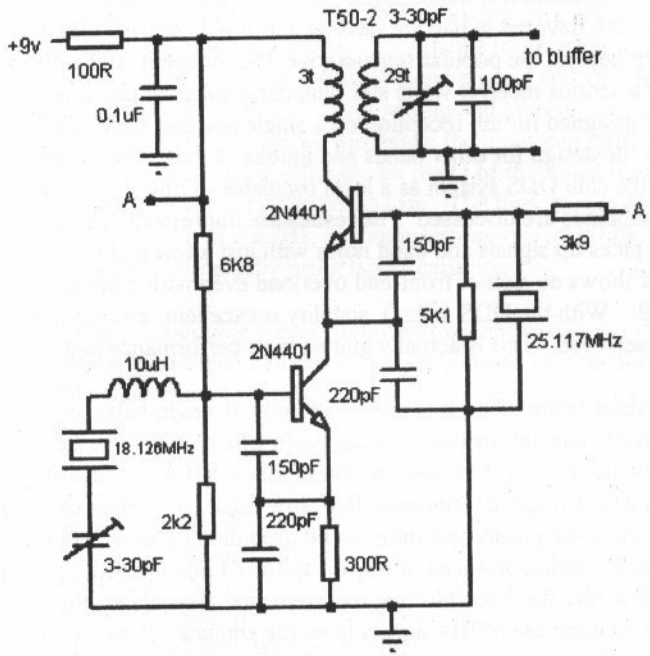


Fig. 1

(Note the two "point "A"'s are connected together)

Notes:

1. The output will require filtering to remove the many undesired mixer products. The most significant of these will be at the fundamental frequencies, and the sum frequency. Selecting the two frequencies to be both above the desired output frequency, and as high as possible, reduces the filtering requirements.

2. The second crystal can also be pulled either up or down in frequency to relocate the range of output frequencies by that amount.

3. The sum frequency can be selected instead of the difference frequency. The higher frequency crystal should still be the one to be pulled, for maximum tuning range.

Thanks to the original author for providing me with a few enjoyable hours tinkering with this idea. I hope that these notes are useful in their turn.

A Retro Receiver Design

Dr Andrew Smith, G4OEP, 15 Dyrham Cl. Henleaze, Bristol, BS9 4TF
(aj-smith@uk2.net)

Like, I suspect, many other club members, the author experiences periodic spasms of nostalgia for a miss-spent youth devoted in part to messing about with valves. The present receiver design takes a step beyond the popular regenerative TRF concept, and aims to realise the requirements of a serious receiver while still remaining quite simple. It is a single-conversion superhet designed for ssb reception on a single amateur band (7MHz), although it is easy to adapt the design for other bands and modes. It has a home-brew 6MHz I.F. filter, and uses the club DDS system as a local oscillator. Other L.O. systems can be used, and some possibilities are discussed. The results are impressive; the receiver has excellent sensitivity (it picks up signals and band noise with just a few inches of antenna dangling on the bench) and shows no sign of front-end overload even with a full size dipole when 7MHz is going full tilt. With the DDS as L.O. stability is excellent, and with care a very good i.f. filter can be achieved. This is actually quite a high-performance system.

The first mixer is a 6JH8 sheet-beam tube. It is one of a family of single-balanced mixer valves originally designed for colour televisions. Similar types which could be used with some circuit changes include the 7360, 6AR8, 6ME8. These tubes perform well with weak signals in the presence of much stronger interference, have low noise, and relatively high conversion gain. Having low-noise means that they can be used directly as an input device without front-end amplification. Being balanced in respect to the r.f input signal, they reject i.f. break-through, which simplifies the input filtering requirements. To balance the modulator simply adjust P1 to minimise 6MHz signals from the antenna. If no null is obtained with trimming bias applied to the first-selected deflection electrode, apply the bias to the other instead.

The i.f. amplifier uses an EF91 pentode. It is unnecessary to push the gain of this stage too far. Layout should be designed for good screening between anode and grid.

The second mixer (cw or ssb detector) again uses a specialist tube. The 6BN6 is a gated-beam tube. This device was developed for broadcast f.m. receivers where it combined the functions of limiting amplifier, quadrature detector, and a.f amplifier. A quadrature detector implies a product detector, and that is its function here. It gives a spectacular conversion gain of 80, which reduces the number of amplifying stages required. It suffers a little from microphonics, and ideally the holder should be mounted on rubber grommets; or you can just relish that authentic valve sound ! Carrier insertion of 4vrms is required.

The BFO uses a 6CW4 nuvistor. Any triode or pentode would do, but I chose this from the junk-box because it is cute. It is wired on to a piece of strip-board like a transistor and hidden under the deck. This leads to a compact design, but reduces the amount of glassware on display, which might be seen as a drawback !. Output is taken via a link winding on the 7.2uH inductor. The BFO is set on the l.f. side of the filter.

The a.f. output tube is another EF91, chosen for its anode dissipation of 2W. The output transformer is a small 240/3v mains transformer, and enough power is available to operate low impedance headphones or a small loudspeaker.

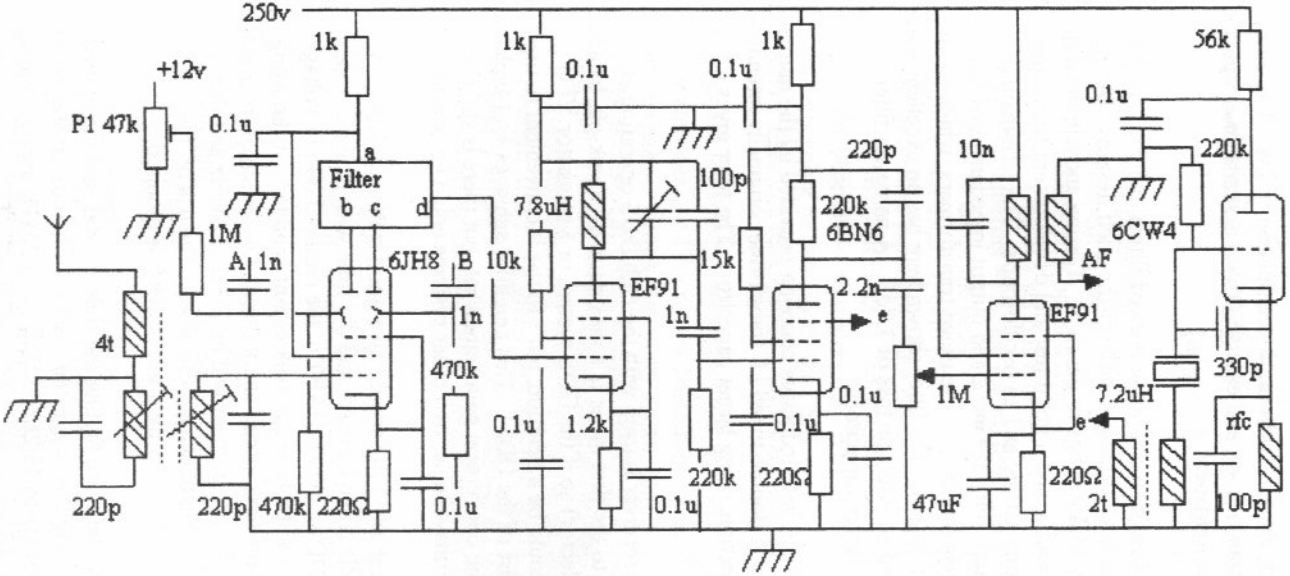
The Crystal Filter. One often sees designs using home-brewed filters and you could be forgiven for thinking that this is a standard technique with off-the-shelf designs. But my experience is that these are extremely tricky things to get right. Testing and trimming the filter *in circuit* is essential for good results, and a good test and development technique is to use the DDS system on its 10Hz step setting and an oscilloscope. The terminating impedances of the filter are critical, and, since the input and output impedances of the valves are so high, these depend largely on the Q of the tuned transformers, which should be high in order to achieve low insertion loss. The filter shown here has an excellent shape; it has a 3dB bandwidth of 2.6kHz, and an insertion loss of 3.7dB. A narrower filter suitable for cw can be made by using larger capacitors.

The input filter is a double-tuned circuit with inductive coupling provided by the mutual proximity of the slug-tuned inductors. A double-tuned i.f. transformer originally intended for 10.7MHz was retuned for this function, using larger capacitors. The filter gives a voltage transformation gain of about 8.

Frequency Control. The prototype receiver is used with the club DDS operating at 13MHz. The required LO injection to the first mixer is a maximum of 40vpk-pk, balanced to ground (i.e. +/-20vpk on each deflector) so if the DDS system or a transistor VFO is used, an amplifier is required. This could be a pentode, but I found it convenient to use a transistor circuit (considered to be part of the DDS). This amplifier achieves +/-14vpk-pk on each electrode, and this reduces the conversion gain somewhat, but there is still plenty of sensitivity. Since the DDS is now unavailable, two other systems could be considered -

a) A 1MHz VFO. At 1MHz, almost any VFO should give good stability. The XFY43 vfo described in a separate Sprat article could be used, and if a tube with a higher anode voltage is substituted (DF91, DF92, DF96, DF97, DAF91) the required output voltage could be achieved without a buffer if a suitable anode tank circuit is added. If the whole 7.0 to 7.2MHz band is to be covered the tank circuit should track the oscillator, requiring a 2-gang capacitor. With a 1MHz LO, the image band will be 5.0 to 4.8MHz and this region is infested with broadcast stations which might cause difficulties. The use of this low LO frequency has not been explored, but is worth trying if vfo control is required.

b) A VXO at 13MHz. The difficulties here are finding the right crystal, and the limited frequency coverage which is possible. Fig 2 is suggested. With a junk-box crystal marked 13,306.2kHz this tuned from 13,301.5kHz to 13,265.1kHz – i.e. a 36kHz swing – enough range (with the right crystal) to cover the cw segment of 40m. Pulling range depends on the inductor, and there is a trade-off between stability and range. Good stability can be achieved with pulling up to ~0.4% - i.e. 53kHz at 13MHz. This would allow the traditional ssb segment to be covered as an alternative. The output is 20vpk-pk on each output.



DDS Buffer Amplifier

6MHz SSB Filter (All crystals 6.000MHz)

Fig 1. Valve Receiver Main Circuit (all trimmers 15p)

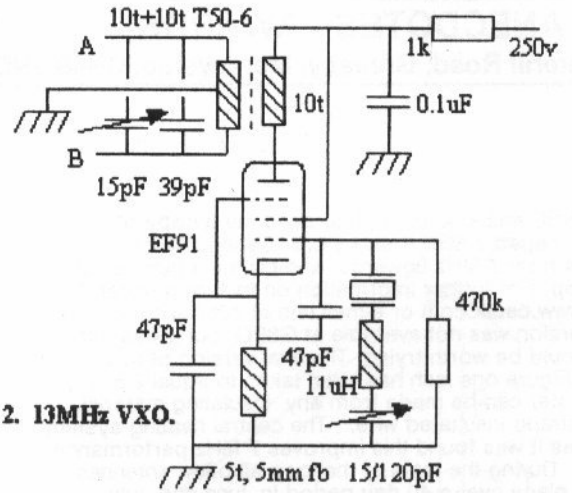


Fig 2. 13MHz VXO.

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

WANTED: 13.8v input QRP CW HF Transceiver for 7Mhz upwards. Must be faultless, full details please to John Windebank, G0KJN, 64 Hillcrest Park, Letchworth Garden City,Herts,SG6 4LF.Tele 01462 681796 or e-mail johnwindebank@amserve.com

FOR SALE: Ten Tec Omni D (model 546), with 30 amp PSU if required. Offers please to Les Austin, G0NMD, QTHR 01598 710807 (north Devon)

FOR SALE: LAKE 40m DTR7-5 factory built transceiver, as new. Too much town noise on band! £70 + pp. Jim Harrison GM0NTR, 17B High St. OBAN. Argyll. PA34 4BG.

FOR SALE: Howes 80m transceiver. £40-00 o.n.o., Howes CTU 25 ATU. £10-00,,Walford Coker 80m transceiver, never used. £5-00, CMOS Keyer £10-00. Maxcom 4E CB radio converted to 29MHz FM £10.00 o.n.o. Box containing many values, open to offers. Prefer buyer collects. Morris G0BQI. QTHR. Phone 020 7359 8885.

FOR SALE: Ten Tec ARGONAUT V. TXCO with fan, as new condition £425 OVNO. Prefer buyer collects inspects etc. Tom, G0HIN@aol.com. or 02392461982 most evenings Hayling Island, Hants.

WANTED. Jackson Dilecon solid dielectric variable capacitor value 500pF
Tel Owen G4VPF on 01283 544212

WANTED: Circuit diagram and/or handbook for 2M Trcvr Trio TR 2200g.
John G4VPU Tel 01912522304 or johnina@tiscali.co.uk

FOR SALE: Mizuho 14MHz 2W SSB/CW handheld xcvr GBP60, Epiphyte EP2 80m SSB xcvr GBP30, Cirkit/G3WPO FET Dip oscillator unbuilt kit GBP30, G4PMK/Bonex spectrum analyser unbuilt kit plus set Badger PCBs GBP60, Collins 455kHz SSB mechanical filter (B9A base) GBP25, SPRATS 78-119 GBP10, ARRL Handbooks 1981/94/98 GBP9 the lot, Vintage Fellocryst crystal set in wooden box with original headphones and aerial wire GBP30, Bronica S2A 6x6 camera with 80mm/2.4 lens and 2 backs GBP80. All postage extra at cost. ON9CAU, e-mail: mike.whelan@skynet.be

ANTENNAS - ANECDOTES - AWARDS

Gus Taylor G8PG 37 Pickerill Road, Greasby, Merseyside, CH49 3ND

THE MINI STAR

G8PG

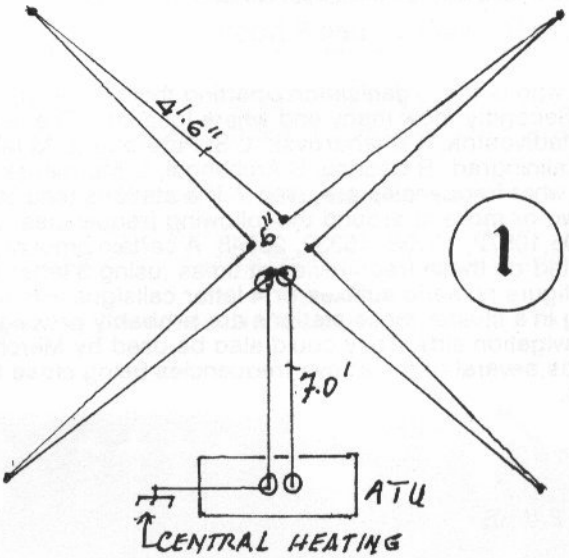
Some months ago Brian, GoNSL was kind enough to send me a copy of an article on a full wave, star shaped 7 MHz loop by L.B. Cebik, W4RNL. It can be used on all hf bands from 7 MHz upwards, and claims a number of advantages over a square loop. For further information on this loop either access the W4RNL website www.cebik.com or e-mail him at cebik@cebic.com. Space to erect the full size version was not available at G8PG, but it was felt that a mini version indoors would be worth trying. The final version of this is shown in Figure 1.(In this Figure one inch has been taken to equal 2.5 cm) The plate at the centre of the star can be made from any insulating material, and the wire used was multi strand insultated wire. . The central heating system was used as a counterpoise as it was found this improves 7 MHz performance. The Z-match is conventional. . During the tests of the loop all other antennas were taken down .Tests took place over a 40 day period in June and July 2004, with operation on 28 days. Conditions were exceptionallly poor for the first 30 days. Despite this 35 countries in 4 continents (EU,AF,AS,NA) were worked. During the AA Contest 5 UA9s were worked in 10 minutes on 7 Mhz , and during an IARU event 5 Ws were worked in 15 minutes on 14 MHz. The most rare was YI9ZF, Green Zone,Bhagdad on 14Mhz. All contacts were made using 3 watts of CW with the loop hung below the ceiling in a bedroom shack

A VERY SIMPLE LOOP ANTENNA FOR 7 MHZ RECEPTION

G. de Geoijer, PA3CRC, St Adrianusstraat 81 , 5614 Eindhoven, Netherlands.

This loop can be used to reduce out-of-band QRM, QRM from a nearby amateur station, or QRN from a single local electrical or TV source. A simple changeover relay can be used to switch between the normal transmitting antenna and the receiving loop, with contacts provided to switch off the power to the loop antenna amplifier when transmitting. In my version the loop is made from 1mm diameter copper wire, mounted on a wooden X frame with arms 1 metre long. it can be mounted on a suitable, rotatable wooden pole , or,if the interference is always from the same direction .it can be fixed in the position giving maximum interference reducation. In my model the tuning capacitor and amplifier were assembled on a copper clad board using haywire construction. The tuning caacitor is a solid dielectric type salvaged from an old BC radio. The circuit, with component values, is shown inFigure 2. I found the loop to tune sharply and give good results. It can be adapted for other amateur bands quite easily. Efficiency could be imporved by using an air dielectric tuning capacitor and heavier gauge wire for the loop if you so wish. It should also work OK with BF245c or BF256c FETs.

(Note; It is also possible to use a ferrite rod for making an anti-interference loop of this type. I used one on .3.5 and 7 MHz for several years very successfully, particularly for greatly reducing QRM from nearby amateur stations. The main winding on the rod was tuned by a 500p capacitor and this tuned circuit ws coupled to the amplifier via a suitable coupling coil wound over the tuned winding. G8PG), ..


41.6"
6"
7.0'
ATU
CENTRAL HEATING

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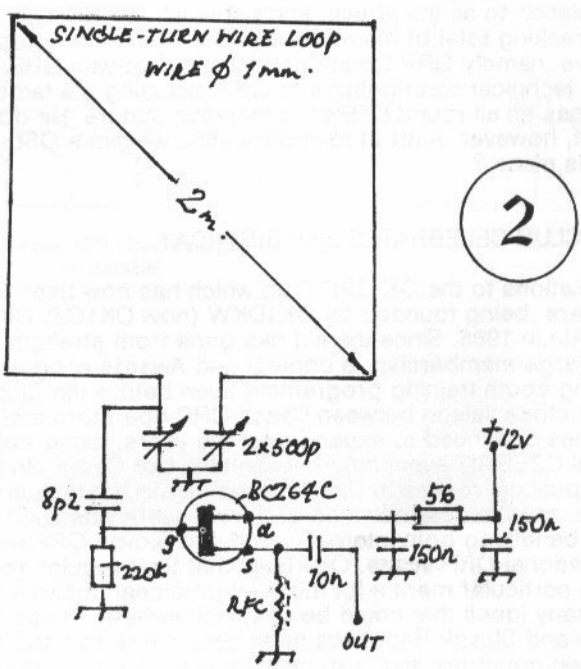

SINGLE-TURN WIRE LOOP
WIRE Ø 1mm.
2m.
2x500p
+12V
8p2
BC264C
56
150Ω
220k
10n
150n
RFC
OUT

2

THOSE C AND D SIGNALS -SOME ANSWERS

G8PG

Firstly, what or who is the organisation operting them ? This appears to be the Russian Navy. Secondly, how many and where located ? The list shows C Moscow, F Vladivostok, K Khabarovsk, L St Petersburg, M Magadan, , O Moscow, P Kaliningrad, R Ustinov, S Archangel, U Murmansk, V Tashkent, X Prague.Next, what frequencies are used ? The stations tend to operate in clusters of two or more at around the following frequencies; (all in KHz) 5154, 7039, 8495,10872, 13258, 16332, 20048. A certain amount of traffic is now transmitted on these frequencies at times ,using 3 letter R callsigns, some with two figure numeric suffixes,or 4 letter callsigns with a U or R prefix.. When operating in a cluster these stations are probably propagation beacons or,less likely navigation aids. They could also be used by Merchant Ships as propagation aids,several of the above frequencies being close to hf shipping bands..

AWARD NEWS

QRP MASTER. EA6BB

WORKED G QRP CLUB **1500 GM3OXX** ; 200 EA6BB, 20 OZ1BXM.

QRP COUNTRIES. 75 EA6BB, 2EoATZ

TWO-WAY QRP. 50 F6ACC; 30 EA6BB.

Congratulation to all the above, and especially to George, GM3OXX on his record breaking total of members worked. His country tota;s are equally impressive ,namely QRP Countries 270 and Two-way QRP 100. Add to that his many technical contributions to QRP,including the famouse OXO transmitter and one has an all-round QRPer of majestic stature. He does have one complaint, however. A lot of members still owe him a QSL. Could we rectify this,pleae ?

OK QRP CLUB CELEBRATES 20th BIRTHDAY

Congratulations to the OK QRP Club which has now been in existance for 20 years.,being founded by OK1DKW (now OK1CZ) OK1DCP, OK1DZD and OK1AIJ.in 1985. Since them it has gone from strength to strength now having a large membership, a contest and Awards programme, and an expandong youth training programme.Even before the Club was founded there was close liaison between Czech QRP operators and G QRP Club, and this has continued to expand over the years, being exemplified in the annual CZEBRIT event held between the two Clubs . In the very early days the political regime in Czechoslovakia did not favour an independent QRP Club, but the determination of the pioneers was such that one was achieved,benefiting both internal Czech and Slovak QRP activity and also the international QRP scene. One feels that their regular Youth QRP Camps in particular merit a lot more international publicity as they seem to have many ideas that could be useful elsewhere. Those of us outside the Czech and Slovak Republics must surely wish to congrtulate our friends in these two countries and wish them an ever more successful future in QRP activity and the training of future radio amateurs.

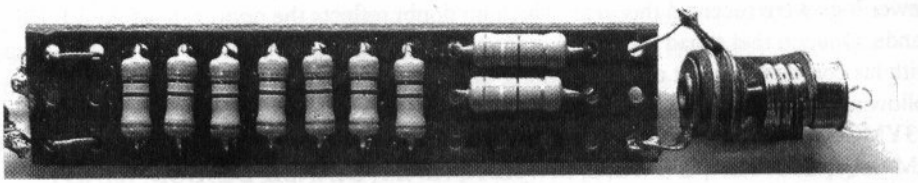
QRP 50Ω Dummy Load

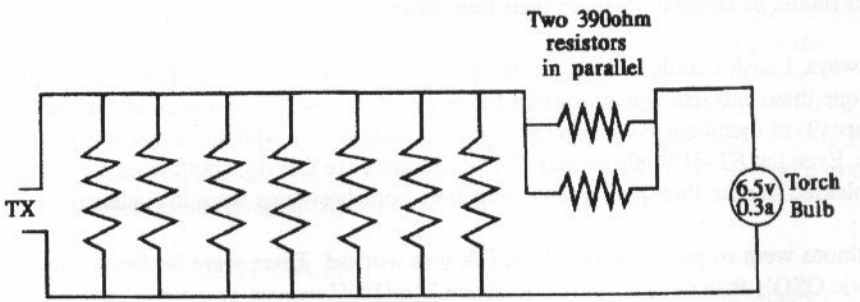
Chas Watkins, G3TTZ, 70 Calcott Road, Knowle, Bristol, BS4 2HE

This has been in use at G3TTZ for 15 or more years. I make no claim for its originality, having constructed it from a magazine article and have never seen it repeated in print.

Components: - Seven 470 ohm and two 390 ohm one watt close - tolerance resistors mounted on a piece of perforated board and terminated with a 6.5 volt 0.3 amp torch bulb. This version is housed in a tube which had contained denture cleaning tablets.

It has been used for various low powered transmitters including the FT817 using the full five watts.





COMMUNICATIONS AND CONTESTS

Peter Barville G3XJS, 26 Hever Gardens, Bickley, Bromley, Kent. BR1 2HU.
E-mail: g3xjs@gqrp.co.uk

To start with the 'admin', I should first draw your attention to my new postal address at the top of this page. As I write this, my exact moving date is undecided but please use the new address with immediate effect. There is no scope for any outside antenna at the new QTH, but I will do my best to employ stealth antenna techniques to get on at least the higher bands. Current plans are to move house again within a couple of years, when antenna considerations will be high on the priority list!

WINTER SPORTS 2004

Fewer logs were received this year, which no doubt reflects the poor state of the LF/HF bands. Opinion that it had been hard going was unanimous, but Gus G8PG summed it up with his comment "worst ever conditions, but still great fun". I would like to thank the following for sending their log to me: 2E0ATZ, EI4DZ, G0KRT, G3ICO, G3MCK, G3YMC, G3ZHE, G4VPF, G4XRV, G8PG (check log), GI4SRQ, GM0NTR, GM3OXX, GM4XQJ, GM4YLN, GW4ALG, MW0IDX, AB8FJ, DL4NSE, DL9BQD, I2IAL/1, IK1RDN, OK1DZD, OK2BMA, PA0RBO, PA9RZ, RW3AI, W3TS and W7CNL, all of whom should be congratulated on their fine effort.

As always, I wish I could include far more of the detail and comment these logs contain, but hope these extracts will give a true flavour of the event. I was struck by the high number (9) of members using Elecraft rigs (K2's and K1's), which is a real sign of the times. Even the FT-817 only scored 2! The Elecrafts are fine rigs, built from a kit, but I was pleased to note that quite a few completely homebrew rigs were in evidence.

Conditions were so poor that very little DX was worked. There were far fewer trans-Atlantic QSO's than normal, and none above 21mHz. However, two UK members managed to achieve a QSO into VK. Bob **2E0ATZ** (using a G5RV antenna) worked VK3BDB on 20m, and Chris **GM4YLN** (3 ele tri-bander) worked VK6ASG on the same band. These were not two-way QRP contacts, but indicate that low power and (in Bob's case) a simple antenna can still achieve good results, even when conditions are down. Chris also winkled out TA1UU QRP on 40m (a slightly rare one), as did George **G3ICO**.

Gerald **G3MCK** used his standard Winter Sports set-up (VXO/PA and homebrew superhet Rx), but chose to run 5 watts instead of last year's 500mW which, he says, made a BIG difference. Gerald worked 12 DXCC countries during his WS (all 80m) activity. **G4XRV** Rupert's best DX (with his K2 5W and doublet) was 5B4AGN, who was running just 500mW and answered Rupert's CQ on what was otherwise a dead 20m band. It just goes to show - never assume the band is actually dead! **GI4SRQ** George's log included CW, PSK, 2m FM QSO's and (uniquely, I think) some two-way QRP SSB QSO's on 60m. Although a Licence Notice of Variation is required, that band deserves far more attention from QRP operators, as do 30m, 17m and 12m, whether with SSB or CW.

is an excellent place to try out simple home made rigs. I have a 3W DSB TRX I made about 20 years ago but it is collecting dust."

Please drop me a line with your thoughts by the end of April.

2005 YEOVIL QRP CONVENTION FUN RUN (Amended rules)

George **G3ICO** has kindly sent me the slightly amended rules for this year's event:

FUNRUN BONUS +/- 2kHz. STATIONS.	GB2LOW from the station of G3BPM near Yeovil on 3.563 & 7.023 MHz 2E0OOO at Scarborough on 3.558 & 7.028 MHz +/- 2 kHz. 2E0ATZ at Whitstable on 3.553 & 7.033 MHz +/- 2kHz.
WHEN 21.00 UTC	Tuesday 15th March 2005 to Friday 18th March 2005 inclusive, 19.00 to
FREQUENCIES	3.560 MHz and 7.030 MHz, both +/- 10 kHz.
CONTACTS	Contacts should be between QRP stations with a maximum 5 watts output CW. However contacts with QRO stations are permitted, but with reduced points value. (see "Scoring" below) All stations may be worked ONCE EACH EVENING on EACH BAND. Funrun Bonus Stations will be operating each evening randomly for one hour on each band.
CALL	"CQ FR"
SCORING	Each QSO with another QRP station scores 10 points. Each QSO with any Funrun Bonus station (including GB2LOW) scores 25 points. Each QSO with a QRO station scores 3 points. All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice that particular QSO score.
EXCHANGE	RST, Serial Number (see below), Output power and name.
SERIAL NUMBER	The three figure number must start at any random number of your choice not less than 100 and must be increased by one for each QSO throughout the WHOLE of the contest. However, the three Funrun Bonus Stations listed above will all commence at 001, with all leading zeros being sent.
ENTRY SHEETS	Separate log sheets for each band, with sub-totals for each evening, preferably in the RSGB format. A separate RSGB style cover sheet stating the Rig, Output Power, and aerial. Entries should be sent to G. W. Davis, G3ICO, Broadview, East Lanes, Mudford, Yeovil, Somerset BA21 5SP to arrive not later than Thursday 7th April 2005. Entries will be accepted by E-mail to george@mudford.fsnet.co.uk

The only station to show entries for all bands 160m-12m (except 60m) was George **GM3OXX**. He tried very hard for at least one 10m QSO but didn't quite make it, despite going after a 5T5. George's operating time was a little limited this year, compared to other years, but he still completed more than 160 WS QSO's with his homebrew 1 watt tcvr and doublet antenna!

Ted **AB8FJ** did his usual "GTRO" (get the rigs on the air), and used 10 in total, mainly of the simple homebrew variety, along with the 67' end fed wire. He also pressed into service his Ten Tec 9 Regenerative Rx. For Tom **DL4NSE** a contact into ZB2 was a new one for him. Dieter **DL9BQD** commented on two "Aurora like" 30m QSO's with VA5DX, and a QSO with W4YE during which the Stateside station had to QSP to Dieter comments from his son who had called in, but with whom he had no propagation. My thanks to Jack **W7CNL** for the photograph of his fine 5 ele Wilson "fixed on Eu looking for WS contacts with G-QRP members around 14060 1600-1700z". Robert **PA9RZ** made one or two observations, including one about stations who called more than 200Hz off-frequency and were therefore outside the pass band of his CW filter. He wishes more Club members would QSL, particularly when they are 'new ones' for him, and that we all make far more frequent use of 10116kHz.

As good and interesting as they all were, this year's outstanding log came from Chris **GM4YLN**, to whom the Club awards the G4DQP Trophy. Chris was using his homemade Shimizu SS-105 and 3 ele HF tri-band yagi. He has no dedicated antenna for any of the other bands, and so feeds (via a matching unit) the yagi by strapping the coax outer/inner together. This arrangement produces good results for Chris and he made over 200 QSO's spread amongst most of LF/HF bands. In addition to his VK 20m QSO, he made 6 QSO's across the pond, including one on 15m, at a time when others were often struggling to even hear a W. Chris deserves our congratulations.

160m QRP CALLING FREQUENCIES

The G-QRP Internet Reflector has recently carried discussion on the subject of whether or not new QRP calling frequencies (or "centres of activity") should be adopted for both CW and SSB. I am not currently QRV on this band, and therefore do not feel qualified to enter into the debate. However, this is **your** opportunity to voice an opinion and influence any decision reached. To set the ball rolling, I will give you some idea of what has been said via the reflector:

Dave **G3YMC** wrote "Certainly 1843 is useless as a QRP frequency (SSB or CW) as there were some very big SSB signals on there. 1860 had a much weaker SSB QSO on it. In general these days above 1850 is relatively little used outside contest weekends, so it is only a matter of settling on an appropriate frequency. 1843 is probably historic from the days we had to fit in between the fishfones and when European wide usage was non-existent. 1810-1830 is definitely the QRO DX CW section." Phil **G3SES** said "I do not expect 160m activity to return to what it was when I got my call sign in 1963.(I had 3000 QSOs on 160m in one year). Yet I feel the band is underused and

AWARDS	Certificates will be awarded for the highest score for any THREE evenings out of the four, on each band and also for the highest overall total score for any THREE evenings on both bands. These evenings do not necessarily have to be the same on 3.5 MHz and 7 MHz. A certificate will also be awarded to the station consistently using the lowest power. All certificates will be presented at the Convention on 10th April 2005 immediately after the lunch break.
S. W. LISTENERS	Listener reports will be appreciated and a certificate will be awarded to the listener who submits the most comprehensive report.

NOTE, apart from the Club's GB2LOW, the other two Bonus Stations, as in previous years have been selected from last year's entrants. This provides not only variety but also allows a geographical spread of their locations.

Your comments on any aspect of the Funrun will be appreciated.

Further information from G3ICO, postal and E-mail addresses above, Tel. No. 01935 425669.

I've had extremely limited 'radio time' during the last few months, and ask that you accept my apologies for a complete lack of activity on the bands (e.g. during WS). I hope my lack of time has not resulted in this column being produced in too much haste, resulting in errors and/or omissions, but if so then I hope you will understand. Next issue's deadline is the end of April.

72 QRPeter

Subscription Correction for members in the Netherlands

Vergissen is menselijk en niets menselijks is ons vreemd. Helaas is er een vergissing gemaakt bij de vermelding van de Nederlandse vertegenwoordiger en is jammer genoeg de tekst van 2003 opnieuw geplaatst. De tekst moest dus eigenlijk luiden:

De Nederlandse leden betalen € 10,- per jaar. De contributies moeten tijdig worden gestort op postgiro 295504 ten name van E.C. van Wette te Enschede, zodat ik op 30 januari de contributies over kan maken naar de G-QRP club in U.K.
Vermeld uw call EN G-QRP lidmaatschapsnummer!! Geld dat te laat wordt gestort en/of niet voorzien is van call en lidmaatschapsnummer wordt onder aftrek van € 1,- teruggeboekt.
Neem voor meer informatie contact op met Erik PA3GVF. Tel: 053-4339887 of e-mail: PA3GVF@amsat.org
Erik van Wette, PA3GVF
H.B. Blijdensteinlaan 24
7514 CB Enschede

FROM THE CLUB MEMBERSHIP SECRETARY

John Leak. G0BXO. Flat 7. 56 Heath Crescent. HALIFAX.
West Yorkshire HX1 2PW
Tel:- 01422-365025. Email:- g0bxo@gqrp.co.uk

Thank you to members for prompt subscription payments. Thanks also to those members who sent extra contributions to Club funds and to those who wrote expressing appreciation of the work of Club officers.

Please quote your membership number and callsign on ALL communications.

Please remember that we do not issue receipts unless we receive an SAE with your payment. Your receipt is the updating of the data on your SPRAT address label. Members who have paid by credit card **via email** will have received an acknowledgement from me via return email.

Please remember that there is a time delay of about 4 weeks between the printing of the address labels and the despatch of SPRAT.

Please write to, telephone or email me if you think we have made a mistake.

CHANGE OF ADDRESS

Please remember to tell us if you change your address. Each quarter, several copies of SPRAT are returned to me by the Royal Mail as undeliverable because the member has moved and has not arranged for mail to be forwarded. Please remember that changes take time to work through the system.

STANDING ORDER PAYMENTS

IF YOU ARE A U.K. MEMBER AND YOU DO NOT ALREADY PAY YOUR SUBSCRIPTION BY STANDING ORDER, PLEASE CONSIDER DOING SO IN THE FUTURE. THIS METHOD OF PAYMENT IS EASIEST FOR CLUB OFFICIALS TO PROCESS AND IS ALSO THE CHEAPEST FOR THE CLUB.

A standing order mandate form appears in the Winter issue of SPRAT each year.

For Your Diary

ROCHDALE MINI-CONVENTION 2005.
SATURDAY 8th OCTOBER 2005.

SSB & Data Report

Dick Pascoe GØBPS. Seaview, Crete Road East. Folkestone. CT18 7EG
Tel 01303 894390 – Email gØbps@qarp.co.uk

Steve, G0FUW has recently finished building the VK3XU TCF (Twin Crystal Filter) SSB TRx for 40m. He used a random bunch of 4.433MHz ex-TV colour burst crystals for the filters and BFO and said "the rig sound fine to me. The receiver is pulling in PA stations wall to wall – some sort of contest" He has changed the VFO to suit the IF but also to cover 7.0-7.2MHz. The wattmeter is showing about 7W from the IRF510 PA. He has not yet tried it on air as he has no permanent 40m antenna he thinks that the book 'Radio Projects for the Amateur', from whence it came, is now only available as an MFJ publication - his copy came from G-QRP club sales a year or two back. Highly recommended, whatever the source! That's all the news this time.

QRP-ARCI Announcement

Our American based cousins have put the last 25 years of their club magazine the QRP Quarterly onto computer disks, Yes 100 issues!
These are available to ARCI magazine subscribers for £19.95 and for non-subscribers for £24.95. Both include shipping.
Please make your cheque payable to R Pascoe or pay by PayPal to **arci@trickie.com**. State if CD or DVD req'd
Send to: R Pascoe G0BPS, at the above address

Dick G0BPS has now put his three books onto disk!

Pascoe's Penny Pinchers, Introducing QRP and *The History of QRP 1049 – 2003.*

Just £4.95 (Postage / packing is just £1.00)

Please make your cheque payable to R Pascoe or pay by PayPal to **dick@trickie.com**. Send to:
R Pascoe G0BPS, at the above address

INTERNATIONAL QRP WORKING FREQUENCIES
CW: 1843, 3560, 7030, 10116, 14060, 18096, 21060, 24906, 28060
SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360 kHz
Keep these frequencies special for qrp - call "cq qrp" often!

VHF Manger's Report

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

Recently I joined another Yahoo reflector group that has just started up. This new group is interested in reviving AM on all the VHF bands and 28 MHz. Although not strictly a QRP group, most operators are running QRP from FT817's, converted PMR rigs or homebrew. There has been some discussion on what frequencies to use and what polarization to use, but the current consensus is around 144.570 in the multimode section, 70.260 (old AM mobile calling frequency & still in use) and 50.57 . 432.57 and 29.050 MHz have also been suggested. Several people are considering purchasing crystals to go in existing equipment around these frequencies.

On the homebrew front, a lot of interest has been focussed on an old design from the 70's called the FREDBOX. This is a miniature hand held 10 mW Transceiver which produced some remarkable results in the Cambridge area when it was first used, with a best dx of 160 km! Designed by Roger G3XBM, this little gem of a transceiver features a super-regen. Rx and a three stage Tx with collector modulation. Quoting Roger:

"The most exciting results took place away from Cambridge in Yorkshire and in South Devon. In Yorkshire the Fredbox was regularly used to make QSOs from my wife's parent's house in Barnsley up to Leeds about 20 miles to the north. In Devon, it was used to make several QSOs from Start Point to Portland Bill in Dorset at 60 miles distant, all with just the rig handheld with a whip antenna. Then, on one occasion the best result of all - a 100 mile QSO from Bolberry Down across to Brittany in France. I was so amazed that this happened, but it most certainly did one fine summer morning.

"I was so impressed by these results that I submitted an article on the Fredbox to the RSGB for publication in RadCom. The fact that several had been made with good results was testimony to its reproducibility. Sadly the committee of the day thought it was "not suitable for its readers", so the article was never published. It is reproduced in its exact form here (follow the link). As it is a big .pdf file please be prepared to wait a while for the download unless you have a fast connection. One reason cited was the amount of re-radiation from the super-regen oscillator on RX. This was very small and I do not believe it would have been audible beyond a few metres."

I decided that I couldn't do the FREDBOX justice in this hastily prepared article and refer you to Roger's web-site below. In next SPRAT I will publish the circuit and hopefully some updated construction details. A group of people are busy trying ideas to work around the now obsolete Toko coils (I favour air wound coils with miniature Murata varicaps.) Although this rig is tiny, it is made of standard wire-ended components (NO surface mount), and so should be easily made by a competent constructor. The L shaped board was used to accommodate a PP3 battery in the box.
http://homepage.ntlworld.com/lapthorn/fredbox.htm -- Thanks for that Roger.

Personally, I am considering putting my old Pye Cambridge back to original spec AM (was modified for 6 Ch FM) and reviving a Heathkit 2m AM rig, which was given to me a number of years ago and only switched on once or twice. I am also considering Modulating my DC-6-P CW rig , now it has HuffnPuff fitted. Then there is the ubiquitous FT-817. Spoilt for choice or what? So far I have only worked two stations with AM, the other 3 skeds aborted when we found the line of site paths to be impossible due to intervening high ground.

73 de John G8SEQ.

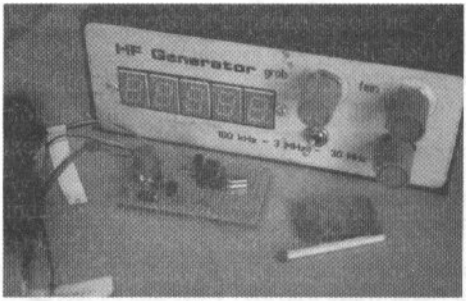
MEMBERS' NEWS

by Chris Page G4BUE

Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ.
Tel: 01798 815711
Email: g4bue@adur-press.co.uk

RV3GM writes the *World QRP News* column in the ARCI-QRP's *QRP Quarterly* magazine and welcomes contributions from G-QRP members. The ARCI-QRP have recently announced they have the past 100 issues of their *QRP Quarterly* magazine available on four CDs and DVD, from either The QRP-ARCI Toy Store, 2130 Harrington, Attica, MI 48412-9312, USA ($29.95 members and $34.95 non-members), The QRP-ARCI Toy Store Seaview House, Crete Road East, Folkestone CT18 7EG, UK (£19.95 members and £24.95 non-members) or <www.qrparci.org/qqdvdsales. htm>. **WA8MCQ** says the ARCI-QRP web-site now contains a *QRP Quarterly* index compiled by Chuck, **AD6GI**, covering 1995-1999 sorted by author and title which should be expanded to 1985-2004 by the time you are reading this.

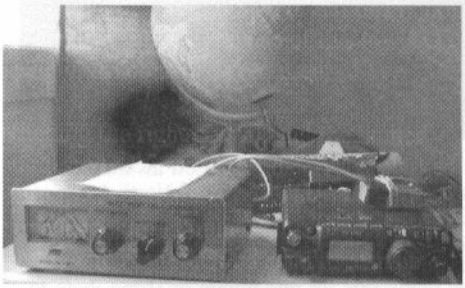
DL2BQD (left) sent the picture above of his prototype of **DJ3KK**'s counter published in SPRAT, with a HF generator that Dieter built from the book information by Hans Nussbaum and a SPRAT board for comparison. **GØNSL** says to look on **KB4YLY**'s web-site at <www.KB4YLY.com> if you have an interest in limited space antennas, including loft antennas, and **G3UGY** says that <http://www.intio.or.jp/jf10zl/> is one of his favourite



home-brew sites. Welcome to new member Uli, **DF5SF**, who is QRV with a modified TS-50 to a magnetic loop on his balcony on CW and PSK31.

G3XBM mentions the Miracle Whip (MW) Group at <http://groups.yahoo.com/group/miraclewhip/> which has just over 500 members and shares views on how effective the MW is. Roger says the MW is "a compromise antenna but, if you are prepared to accept this, there are situations when it is a good choice. *Always* use a counterpoise or good ground with it as it makes several S points difference. Mine has given me good service and some remarkable QRP SSB DX QSOs on the higher HF bands, all from indoors too". There is a re view of the MW on Roger's web-site at <www.g3xbm.co.uk.

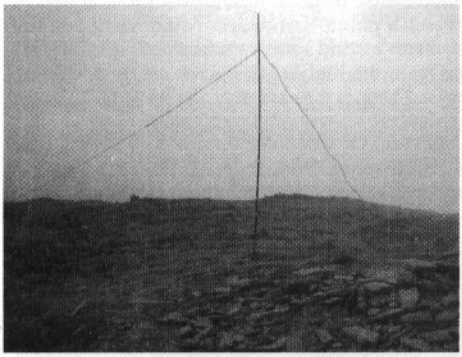
GM4CXP was loaned a FT-817 for his visit to Fuerteventura between 22 December and 5 January (see photo of operating position below)



where he was QRV as **EA8/GM4CXP** with a 16 feet end-fed antenna just eight feet high with a 16 feet indoor radial, which he lengthened on New Year's day to a 28 feet end-fed. Derrick made 41 QSOs in casual operating on 40-12m and **WA1JAS** in Michigan on 12m was his best DX QSO. **GM3OXX** was his only GM QSO and Derrick used an indoor MW for their first QSO on 15m and compliments George on his hearing ability. Derrick was so impressed with the FT-817 that he has since bought himself one. **K7VO/8** was QRV 23 January on 20 and 40m with his new Shimizu Denshi SS-105S and says, "What a

great receiver! The audio is very crisp and pleasant to listen to. It's an analog rig so, as expected, the noise floor is very low, and the sensitivity is as good as any rig I have. Mine has the narrow CW filter installed". Caity does not have the marker unit, FM receive and transmit boards, original mic or the matching transverter and says if anyone has any of them and is willing to sell, please contact him, <www. mizu horadio.com/personal/k7vo>.

GWØTQM was QRV 16 January from the summit of Pen Llithrig Y Wrac (799 metres ASL) in North Wales with his FT-817 and 50 feet antenna (half 300 ohm twin) fed from a balanced matching unit which, he says, was "a guarded success" despite the rain and gale force winds (see photo below). Carl first tried CW but then changed to SSB and 2m FM because, "copying CW in a gale when your new rucksack turns out to be semi-permeable isn't fun". He doesn't know who he worked until his log-book dries out, "As my pen touched the page, water poured down my arm and pooled on the paper".

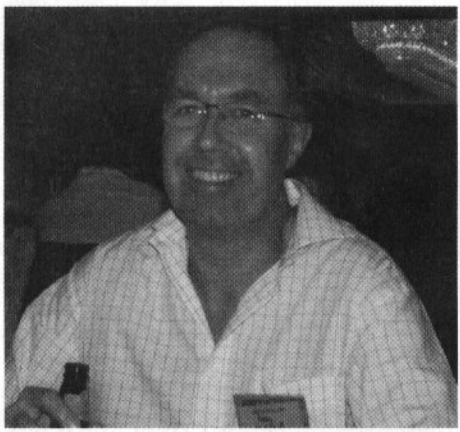


W2LJ sends details of a new award for 2005 sponsored by the newly formed North American QRP Club, *The QSO a Day Award.* As the name suggests, you have to make at least one QRP CW QSO each day and can earn the basic certificate by doing this for one month or string them together and do it for a full year. Larry says the object of the award is to increase QRP activity and full details are at <http://www.qsl.net/kb3lfc/qsoaday.html>. **MØHBR** (formerly **CU2JL** and **N2CQR**) is homebrewing low power phone equipment in Central London. Bill has a new 40m home-brew rig on the air and is preparing a 2m AM station to QSO with the new UK VHF-AM group. He had more QSOs with UK amateurs as **CU2JL** (he is inside the HF skip zone now) hence the move to 40m with NVIS and the 2m project. Bill would be interested in meeting members in the London area, <n2cqr@arrl.net>.

Too late for inclusion in the last SPRAT, **EA1BP** sent details of the EA QRP Contest held on the third weekend in December. Perhaps Miguel will send the information earlier for 2005 so we can publish it in the Autumn edition of SPRAT? Held over the same weekend was the QRP-Canada's *Run with RAC*, which includes a 5W category for QRP stations and clubs. This event runs in parallel with the RAC Winter Contest and **VE5RC (VE5QRP)** says QRP-Canada now has 260 members. Again, perhaps Bruce will let me have the information for the 2005 event to publish in SPRAT?

VU3BGI reports on 4/6 February the Ham Radio Club IIT Kanpur organised a Hamfest to coincide with the International Conference & Exposition on Communications & Computing and the first VUQRP core group met together and several important decisions were made to promote the VUQRP group and QRP activities in the Indian sub-continent. Jyoti says a number of seminars and workshops were held including a 'hands-on' event where 25 low-cost Pixie transceivers were assembled by participants in three hours and all 25 worked.

AL7FS has an interesting web-site at <www.al7fs.us/> which has a, "Series of articles to help amateurs who would like to get a start in QRP (less than 5W) but are not quite sure how". Jim's site also contains a report of the Pacificon 2004 QRP Forum held in San Ramon, California in October 2004 and attended by **GØBBL**, **GØXAR** and **MØPUB** (photo below) from the UK.



N8ET "put in another major QRP effort this year" in the 2004 CQWW CW Contest. Bill claimed 687k points which includes 703 QSOs and 63 DXCC on 40m, 83 on 20 and 74 on 15m. His 10m DXCC of 33 was down on last year.

GM4HQF made 240 QSOs with his FT-817 and end-fed wire from his apartment. Dave found conditions down on 10 and 15m and says this was the first year he has had more QSOs on 20 than 15m. **DL1BQD** made 110 QSOs on Sunday including one with **GØKDZ** on 80m. Dieter used a post-contest logging program for the first time this year.

At 2200z on 30 January, **KB2FEL** copied **G4CAO**'s CW CQ on 60m in Long Island, NY at 589. Amateurs in the W1-W5 call areas called him on SSB (USA amateurs are not permitted to use CW on 60 metres) but he did not hear any of them. **KI6DS** reports the February 2005 meeting of the Nor-Cal QRP Club on his web-site at <http://www.norcalqrp.org/mtg 2005_02.htm> where the latest product from Elecraft was displayed. It is the T1, which is the world's smallest automatic ATU and uses a self-contained nine volt battery that Wayne says will last more than a year and will work with any QRP rig (photo below).

On 11 February **MØNDE** had a QSO with YV on 40m, Nigel says he was "Pleased as I am new to HF DX and my location under the Dover cliffs makes it difficult.".

G3ROO has been receiving 58 to 599 reports from European stations on 160m while using 3W and mentions a "valiant try by **K7CA** between 0630 and 0700z on 10 February to copy my callsign". Ian also mentions **VE3ZI** who replied to his 3W CQ on 12 February and received a 339 report after he reduced to 1W before increasing to 150W for a rag-chew. Ian doesn't usually do skeds but, "Perhaps 160m should be an exception - anyone want two-way QRP skeds?".

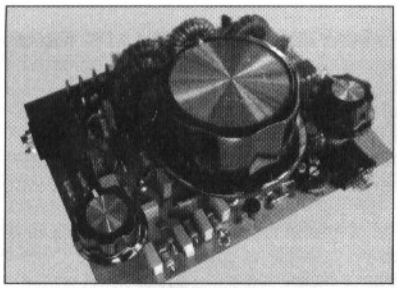
GWØTQM got a Miracle Whip (MW) antenna for Christmas and after setting it up on the window ledge on Christmas Day, tuned to 5MHz, heard SSB and received a 31 report from a station in west Wales. He then went to the shack and received a 59 report with his magloop but couldn't copy the other station until he went to CW. The other station said Carl's MW was a miracle attenuator - which he says, "Compared to my 6dB increase in power leading to a 31 becoming a 59 (48dB?) has to be agreed, but he was comparing a 50 inch whip sloping on a window ledge next to a uPVC window frame indoors to a mass of aluminium and capacitors motor driven in the loft. I couldn't hear the other station on the magloop (I have nighmarish data interference on 50MHz at this QTH so the QSO wouldn't have happened without the MW, which is marvellous for general coverage receive".

G3MCK also doesn't like the use of the callsign suffix /QRP but raises an interesting point. Gerald writes, "DXpeditions seem to be happy to work the same station on different bands and modes but taking the case of a CW operator who uses QRP and QRO, if he has never worked the country before then I suspect he will use QRO to ensure he works them. How then does he later make a QRP QSO? The only reasonable way is to sign call/QRP. Just calling them runs the risk of being ignored as a duplicate QSO. I now wonder whether we are right to give a blanket condemnation to using call/QRP in a DX pile-up?". Well, are we? What do you think?

G4FBC goes out car-packing (as opposed to back-packing) and has two ex-army radio sets he uses portable. One is the Pye Compak 8 SSB/CW manpack as used by UN forces which Ron has converted for 80 and 40m LSB/CW and gives 1W on the LP setting and 20W on HP. The other is the ex-SAS manpack PRC320 with its internal tuner and eight feet whip. Although it has a crank handle generator, Ron has yet to find a supplier for the 24 volt battery pack which clips on the bottom of the set, and asks if anyone can help?

G4FBC/P using the PRC320, Whinlatter Forrest, Keswick

That clears the files again. I hope the smaller print has not strained your eyes too much? It was either that or leave out some items. Please let me know how your spring goes, by 20 May please, to my UK address.



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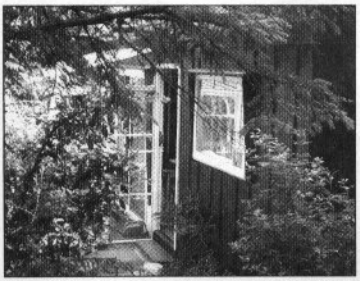

Amateur Radio in a Lovely Place

G3RJV has a Wooden Lodge situated in the Dyfi Valley in central Wales close to the Irish Sea and in the Snowdonia National Park. It has been completely refurbished with a large living area, conservatory, double bedroom, twin bedroom and a double bed sofa in the living area. Naturally there is a small amateur radio station with a QRP HF transceiver and a 2m multimode. An easy to use station in a quiet location.

Leaflet with details and prices for 2005 - write to G3RJV or email g3rjv@gqrp.co.uk

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N.B.T.V.A

The Narrow Bandwidth TV Association (founded in 1975) is dedicated to low definition and mechanical forms of ATV and introduces radio amateurs to TV at an inexpensive level based on home construction. NBTV should not be confused with SSTV which produces still pictures at a much higher definition. As TV base bandwidth is only about 7kHz recording of signals on mini cassette is easily achieved. A quarterly 12 page newsletter is produced and an annual exhibition is held in April/May in the East Midlands. If you would like to join, send a crossed cheque / postal order for £5 (or £4 plus a recent SPRAT wrapper) to Dave Gentle, G4RVI, 1 Sunny Hill, Milford, Derbys. DE56 0QR, payable to "NBTVA"