# SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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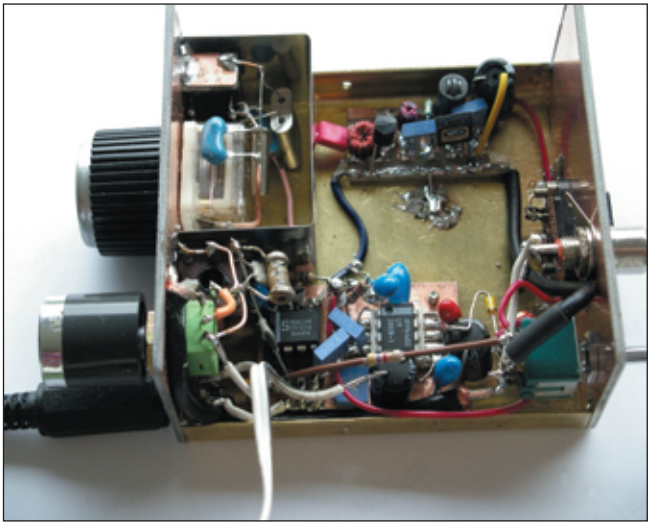

ZL2BMI 80m DSB Transceiver - as built by Bob (ZL2ASO)

## In This Issue:



CHECK YOUR WRAPPER LABEL
THIS COULD BE YOUR LAST SPRAT
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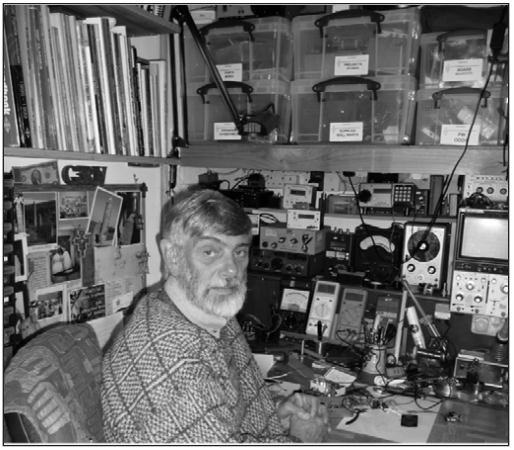
# JOURNAL OF THE G QRP CLUB



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Welcome to SPRAT 146. We apologise for the postal problems with the last issue when Royal Mail failed to deliver SPRAT magazines in the UK until long after the rest of the world had received their copies. This issue was printed a little early to avoid the increases in postal charges. Please do check your mailing label which will tell you if you are paid up to date. If not this could be your last copy of SPRAT. Also please read the notes on the Rishworth QRP Convention that explains our changing situation at Rishworth School (page 24). We are considering a "Constructor's Evening" on the night before the convention and would like to know your views. Keep the SPRAT items coming – we can accept almost any format from pencil on paper to completed articles using a sample page I can supply by email. Let us know about your QRP projects.

72/3

G3RJV

## The W1FB Memorial Award 2010/2011

The project is to **Design a Useful Accessory for a QRP Station.** This can include any useful station addition with extra consideration given to innovation. Improvements on existing designs could be accepted. Please submit your design to G3RJV by the **end of March 2011**, with circuit diagrams, all values and brief notes.
The projects will be published in SPRAT and the winner will receive an engraved plaque.

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# The ZL2BMI extra simple DSB 80m Transceiver

**Eric Sears ZL2BMI, sears@xtra.co.nz.**

Back in the mid 1980's, in order to have a very small rig for tramping (bushwalking or hiking), for up to 7-day trips in remote areas of New Zealand, I designed and built various 80m DSB transceivers. Some of these were initially published in the NZART magazine; "Break-In"; (1984 & 1986) and shortly afterwards I produced a booklet giving some details, which were sold through "SPRAT" around the world.
Subsequently this booklet was published as an article in SPRAT 83.

In the intervening years I have continued to use a very small (100gm) version of this radio, but did not have the time or incentive to improve it, partly because of another interest in micro-hydro and renewable energy.

In the last few years, as I have had more time for tramping, a good number of my friends have seen the rig and have done their amateur license so that they could use one on tramping trips also. However, reproducing the original was quite difficult (see the original article), particularly as the VFO was so small. So I began to look for a simpler way to produce something using the ubiquitous NE602, and dispensing with the vfo as a separate unit.

No-where on my searches of the internet had I ever seen anyone use the two mixers of the 602 as both transmit and receive at the same time, but I didn't see why it should not be possible. Having an inbuilt oscillator, I figured it should be possible to use that as the tuning, especially since ceramic resonators were now available – which either didn't exist or were not available in the mid 1980's.

By continuing to use a carbon microphone, I was able to get plenty of audio to drive one of the mixers in the NE602 as a balanced modulator, and used the other mixer for the receiver. Attempts to use the oscillator as a VFO were unsuccessful because of insufficient buffering within the 602, leading to severe fm-ing. However, with a ceramic resonator, as long as the frequency elements were shielded, the DSB was quite acceptable. Naturally a crystal works very well (even without shielding).

In addition, the circuits published in SPRAT in the last few years about getting further gain from an LM386 enabled it to be used (combined with the mixer gain from the 602), to drive a small speaker (27mm).

So the final line-up is just two i/cs and two transistors. The output is about 1.5 watts PEP and the sensitivity has been measured at about 1 - 2uV.

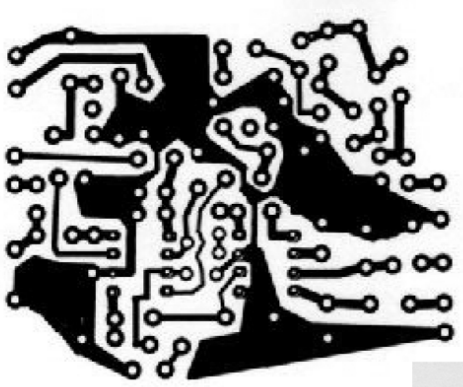
Basically the NE602/612 runs all the time, and there is no muting of the receive input – it just remains connected.
Likewise, the mic remains connected, though the +ve supply to the mic. is switched.

The audio amp (LM386) supply is switched as is the supply to the RF amp board (which is basically the same as in the earlier versions of ZL2BMI transceivers). However, because the output of the NE602 is high impedance (about 1500 ohms), a small ferrite transformer is used for impedance matching to the RF amp.
I tried driving the amp directly but the output was poor. However, I showed the rig to Peter Parker (VK3YE) while in Melbourne a few months ago, and he produced a 40m version within a short time which seems to work ok without the need for this transformer.

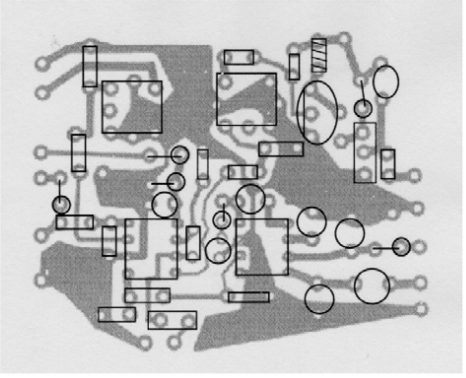
I did use an electret mic to directly replace the carbon mic and had reports of excellent signals (5/7) from a station about 800km away, though it did not appear to me that I was putting our more than about half a watt.

I still do not use a filter on the output, partially because there are seldom any problems with such low power in remote areas of the bush, but also because there seem to be far fewer harmonics with the oscillator of the NE602 than I ever had with external oscillators. But I suggest using the standard pi-net if used in town.

The circuit is built in a kind of “neat” ugly-bug construction, and there are at least 5 of these now built, three by myself and two by Bob ZL2ASO. A number of others are at present under construction.



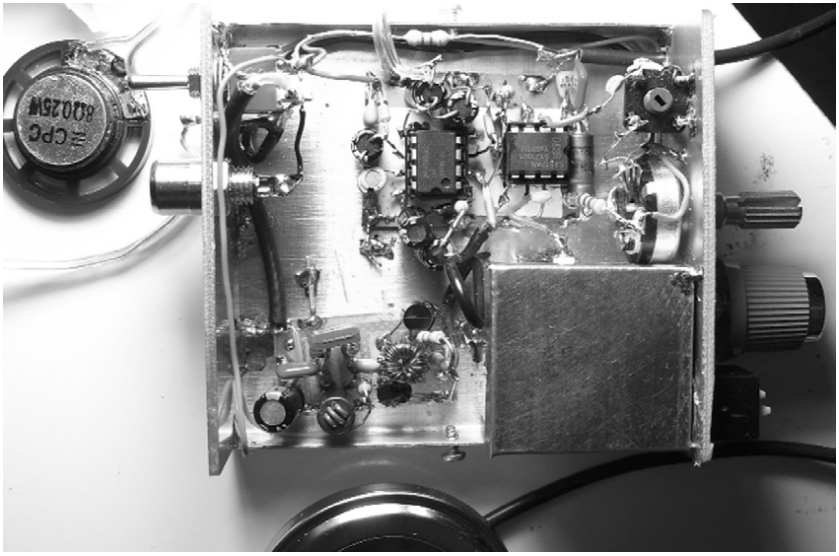
(Since the above was written – Phil ZL2NJ has drawn up a pc board. He etched it, dropped in the components and apparently it went “first time”. However, the aerial input coil and the interstage transformer used are more standard components, though you could still use the same as the original. The pc board and partial overlay are shown.)

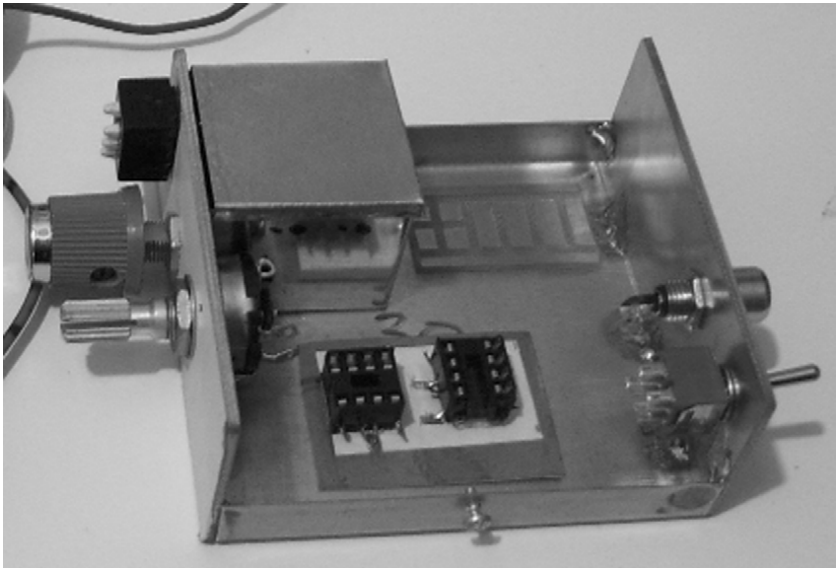


Notes –
1. Input receive coil wound on 5mm former (slug-tuned). Two earthed pins soldered to front panel for support.
2. NE602 voltage could be increased to about 7volts for a bit more drive.
3. Carbon mic – I intend to fit an electret with inbuilt 1-transistor amp in place eventually (or see Sprat 83).
4. Ceramic resonator in indicative only. Often there are multiple resonators and crystals switched in the "osc" box. It depends on what the user needs.
5. There are probably better ways of getting more gain from the LM386 with less distortion, but this worked. The 10uf cap on pin 5 to ground was to prevent oscillations. The unconventional "voltage dropper" (3.9v zener) meant that power was not wasted in a resistor. However, a 3-terminal regulator may be better.
6. The impedance transformer for the input to the rf amp seemed to work with almost any small ferrite core – I suspect that even a bead could be used with fine wire. I measured the Hfe of the transistors so that I did not need to keep adjusting the bias resistors for each new rig. If you use "hotter" transistors, you will need to check that the standing current in each transistor does not exceed its ratings and does not lead to thermal runaway. Total standing current on transmit (with no audio), is 50 – 70 ma. Remember, this circuit was designed for simplicity – I am aware there are better ways to do things but they usually result in more complexity! There were no heat sinks on the transistors. The rig is designed for passing messages over a fairly short time (battery power for a week has to be carried, together with all essentials for living!), rather than for rag-chewing. If you want long overs, check the finals are not getting hot.
7. Thin coax is used on rf input and output, as well as the link from the 602 to the rf amp board.
8. There is somewhat of a "feedback whistle" when going from transmit to receive, but this is minimized by keeping the mic well away from the speaker. Peter Parker has tried some interesting circuitry to overcome this.
Google Peter (VK3YE) and you get some idea of what he has been building over the last 25+ years.

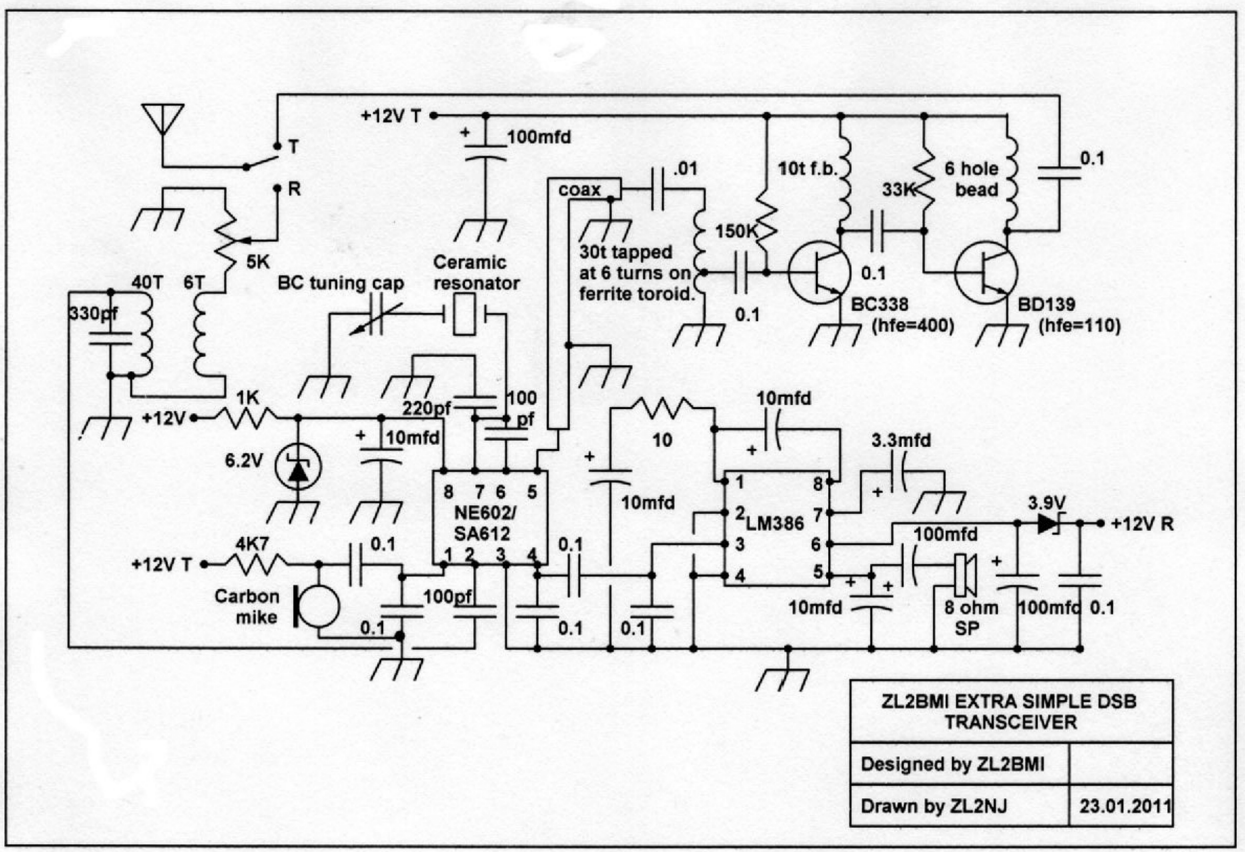
The pictures give a good idea of the layout.
I/c holders are either attached to small pieces of veroboard (copper side up) and glued to the base pc material, or just mounted on thick cardboard or other material with sticky pads. Once the other components are soldered, they are held firmly. The rf amp is on a separate board. These were actually milled by ZL2ASO, but failing that, a small piece of veroboard, with two hacksawed slots can do the same job. I used sticky copper tape to make the +ve and –ve rails in that case, but it could be formed from a wire soldered on. The "transmit/receive" board is just plain copper board, though I put a sticky "label" on the middle to prevent components shorting to the groundplane in the confined space. I just cut a hole in the label where a lead goes to ground (eg pins 2 & 4 on the LM386). The case is made from a folded tray with about 8mm edges turned up (either brass, copper or tinplate), to which the end-plates (copper-board) are soldered. The cover is then folded from the same case material.

## Top view of component layout





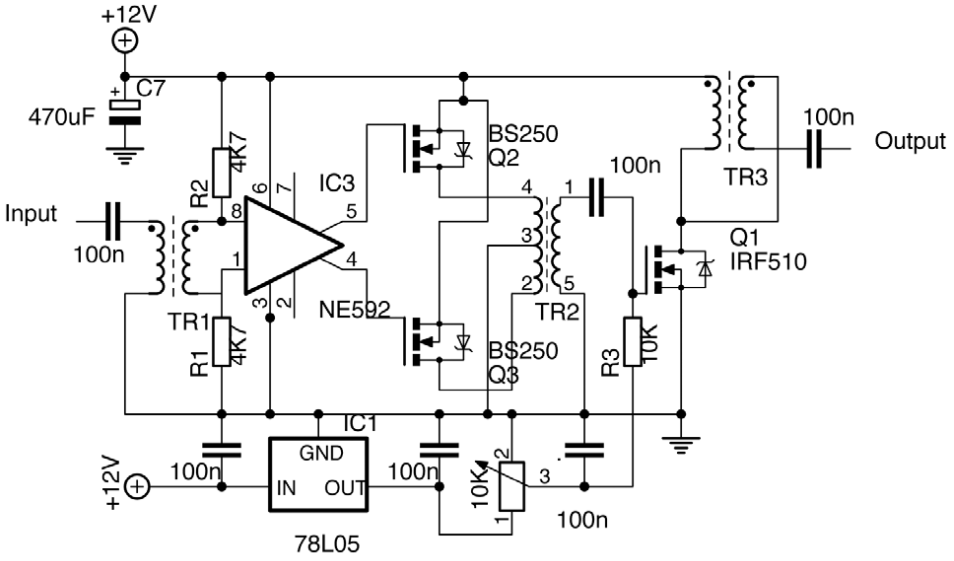
## Beginning construction


+12V T
100mfd
T
R
5K
40T
6T
330pf
BC tuning cap
Ceramic resonator
coax
.01
30t tapped at 6 turns on ferrite toroid.
150K
10t f.b.
33K
6 hole bead
0.1
0.1
BC338 (hfe=400)
BD139 (hfe=110)
1K
+12V
220pf
100 pf
10mfd
6.2V
10
10mfd
10mfd
3.3mfd
8 7 6 5
NE602/ SA612
1 2 3 4
LM386
1 2 3 4 8 7 6 5
3.9V
+12V R
4K7
+12V T
0.1
Carbon mike
100pf
0.1
0.1
0.1
100mfd
10mfd
8 ohm SP
100mfd
0.1
ZL2BMI EXTRA SIMPLE DSB TRANSCEIVER
Designed by ZL2BMI
Drawn by ZL2NJ
23.01.2011

# A Simple Yet Efficient Linear Amplifier

**Robert Seiler, HB9TSE, Route des Esserts 17, CH-1279 Bogis-Bossey**
**hb9tse@uska.ch**

Schematic




This extremely simple linear amplifier (less than 20 components!) works amazingly well. It is easy to get 5 Watts out of it on the lower bands with a -15dBm input signal, resulting in an overall gain above 50dB. Most of the credit should go to Udo Theinert DL2YEO (www.qrp4u.de) as it is on his great website that I have found the idea to use the NE592-BS250 combination (note that these are P-channel MOS-Fets and that their sources are connected to the +Vcc rail). My modest contribution as an experimenter has been to try several final stages and to find the best impedance ratio for the input and output transformers in order to have a good match for the classic 50Ω input & output.

The NE592 is a high gain video amplifier that works very well in the HF amateur bands. Udo has found many useful uses for this chip, including IF amplifiers, and I recommend visiting his website.

A few notes regarding the transformers. TR1 is 2 turns primary and 20 turns secondary (resulting in a 1:100 impedance ratio) wound on a FT37-43 toroid. TR2 is 8 trifilar turns on a similar FT37-43 toroid. Finally, TR3 is a classic 1:4 output transformer with 10 bifilar turns on a FT50-43 toroid.

There are two ways to set the bias for the IRF 510 N-channel MOS-Fet in order to ensure linear operation: a) measure the drain current (cutting the +Vcc rail just before TR3) and

tweak the trimmer to get around 50mA with no input signal; or b) measure 3.79V on R3. This operation is a bit tricky and becomes easier with a multi-turn trimmer.

Obviously a good heat sink is required for the IRF 510, even if it doesn't tend to get too hot. This cannot be said for the two BS250 which do get hot quite rapidly in the absence of any limiting resistor (hence the high drive power). Their plasic casing does not allow them to get easily cooled down, but I recommend at least trying to build some sort of metal heat sink for both of them.

Finally I give below a few measures to give you an idea of what you can expect:

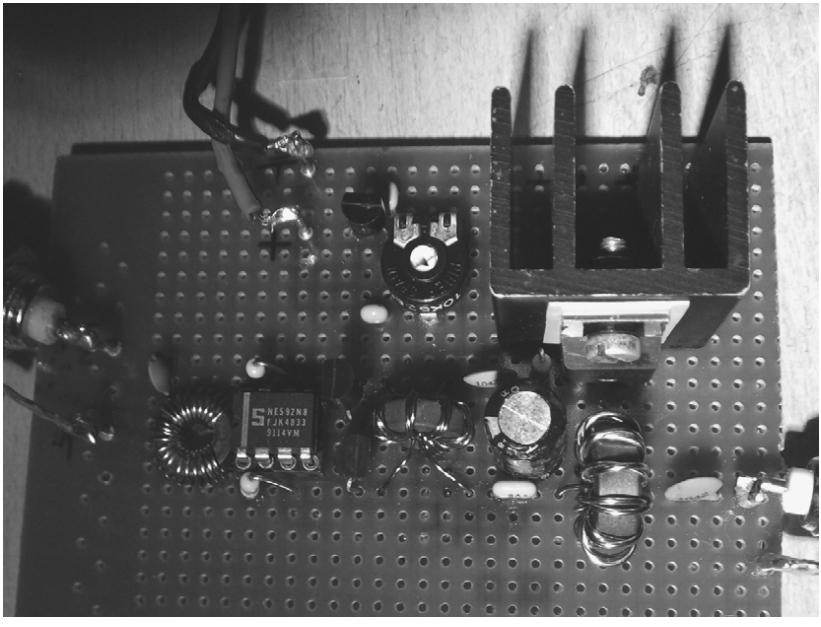
Vcc = 12.0 V Input= -15 dBm

| Frequency | Ouput | Gain | Current | Efficiency |
|---|---|---|---|---|
| 3.60 Mhz | +38 dBm (6.4 W) | 53 dB | 1.03 A | 52 % |
| 7.05 Mhz | +37 dBm (5.0 W) | 52 dB | 0.90 A | 46 % |
| 14.20 Mhz | +36 dBm (4.0 W) | 51 dB | 0.90 A | 37 % |
| 21.25 Mhz | +36 dBm (4.0 W) | 51 dB | 0.80 A | 42 % |
| 28.50 Mhz | +34 dBm (2.5 W) | 49 dB | 0.48 A | 43 % |

I hope that some of you will find this little KISS amplifier useful.

73s Robert

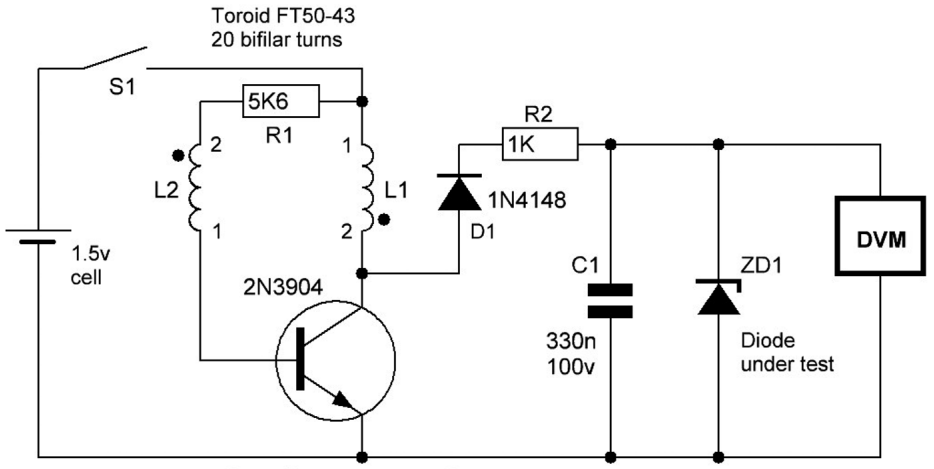
Picture of my prototype



February 9, 2011

# Simple Zener Diode Checker

**Richard Wilkinson, G0VXG, 139 Church Rd. Jackfield, Telford. TF8 7ND**




**G0VXG Zener Diode Checker**

Having a quite a number of Zener diodes in my junk box, I thought it would be useful to know the values... Most constructors have a PSU that will go up to 12volts so it is relatively easy to check the values of low voltage diodes. However when it comes to checking voltages above 12 volts you finish up stringing a few batteries together to reach the Zener voltage and it all gets a bit of a mess!

George, G3RJV, wrote an article in PW of September 2009 about driving a 2.6v white LED from a 1.5v cell. The "Joule Thief" blocking oscillator was used and it worked very well. I removed the LED and noticed that the peak voltage went up to over 45volts. If this voltage is rectified via a signal diode, and smoothed via a capacitor, a steady 45volts can be achieved. If a DVM and test Zener diode are connected across the capacitor the Zener voltage can be measured.

The voltage measurement of 400mw diodes seems good but because 1watt diodes require more current I noticed that they were reading about 5% down. The circuit will measure any voltage up to 45volts. This voltage is the maximum Vce of the 2N3904, so it is probably best to always have a Zener across the capacitor when the circuit is switched on, or use a transistor with a Vce > 50volts. Please take note of the dots on the circuit diagram indicating the phase of the coils. The circuit takes just under 20ma from an AA cell so you should be able to test many Zeners!

# A Graphical Aid for Measuring Inductance and Capacitance Using the MFJ-259B

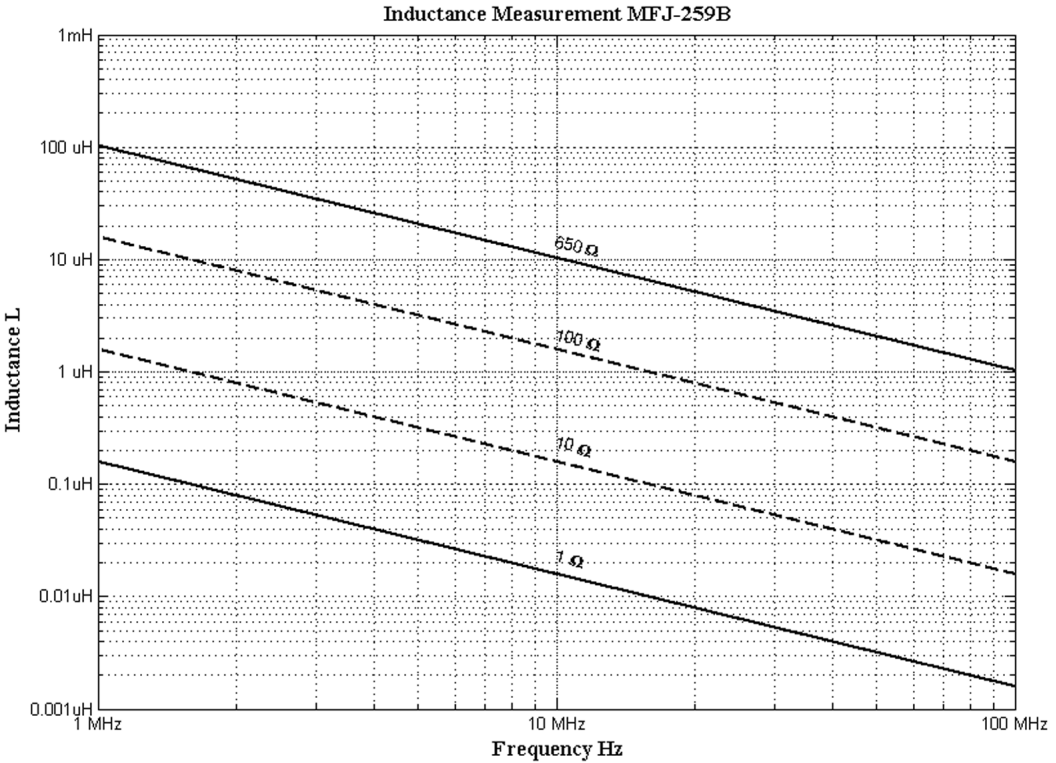
**Mark C. Readman, G3YTZ , 365 Wilmslow Road, Manchester, M14 6AH**

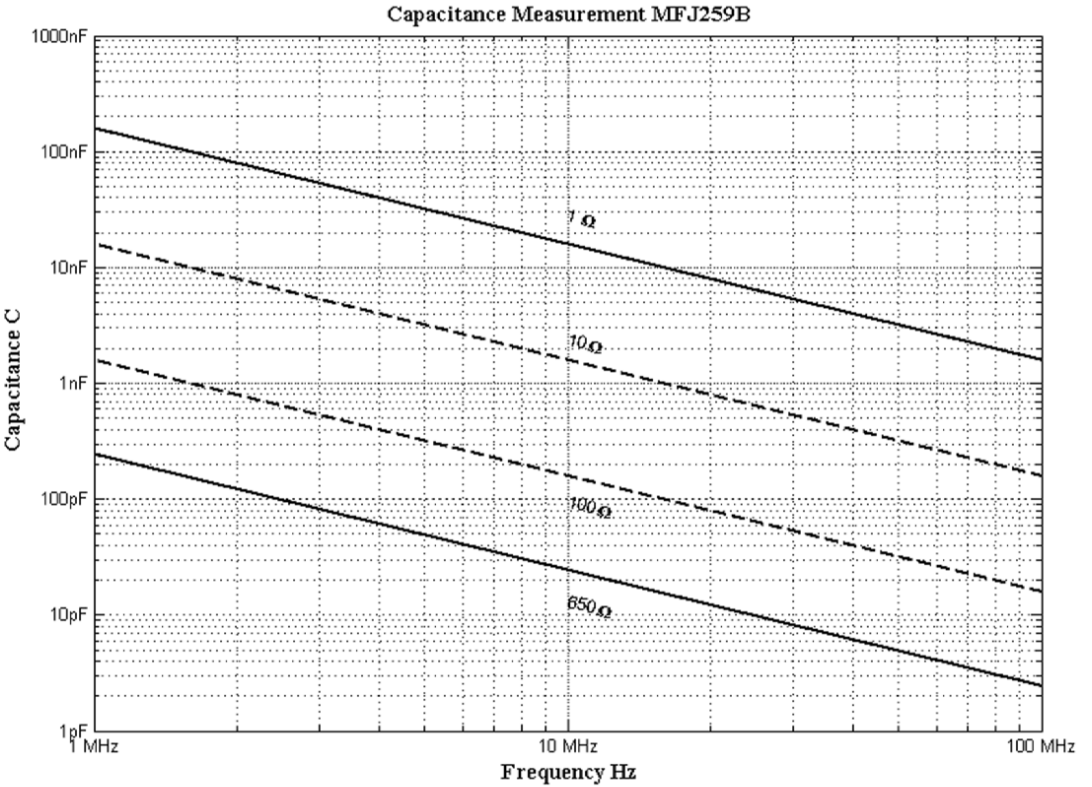
The MFJ-259B will measure capacitance and inductance provided the reactance does not exceed 650Ω. The following nomographs can be used to choose the approximate frequency when measuring a component value. Lines of constant reactance for inductance (L) and capacitance (C) reactance are computed using

$$X_L = 2\pi f L \quad \Omega$$

$$X_C = \frac{1}{2\pi f C} \quad \Omega.$$

The solid lines show the maximum (650Ω) and minimum (1Ω) reactance while the doted lines are lines of constant reactance for 10Ω and 100 Ω on a log scale. So for example an inductance of approximately 20$\mu$H then 3MHz might be a reasonable choice of frequency. While for a 100pF capacitor, 10 MHz is an initial choice. Mount the component as close as possible to the antenna analyser to reduce the effect of the feed line. When making any measurement it is always a good idea to cross check your results at a number of frequencies or using a resonant circuit. Another thing to bear in mind is that the lower frequency on the MFJ-259B is 1.8MHz so making measurements below this frequency is not possible using this instrument. The nomographs also show the possible range of component values that can be measured.


Inductance Measurement MFJ-259B
1mH
100 uH
10 uH
1 uH
0.1uH
0.01uH
0.001uH
Inductance L
650 Ω
100 Ω
10 Ω
1 Ω
1 MHz
10 MHz
100 MHz
Frequency Hz


Capacitance Measurement MFJ259B
1000nF
100nF
10nF
1nF
100pF
10pF
1pF
Capacitance C
1 MHz
10 MHz
100 MHz
Frequency Hz
7 Ω
10 Ω
100 Ω
650 Ω

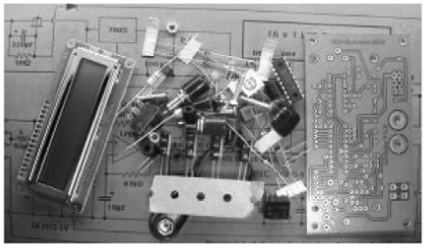
# Modern Test Equipment Kits You Can Build – Part 2

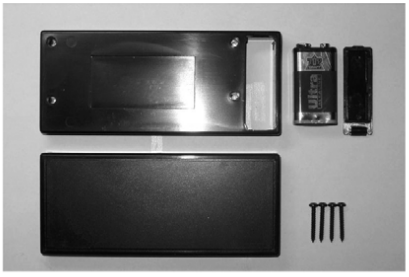
**Gereon Ostermann – DJ1WY – Hauptstr. 35, D-55568 Staudernheim, Germany**

**Part 2: LC-Meter from BDM-Electronics**

This small kit is exactly what its name implies: A device to directly measure the inductivity (L) or capacity (C) of inductors and non-polar capacitors outside of a circuit. It does this accurate and fast from about 0.1pF – 1µF and 10nH – 100mH with an accuracy of about +/- 1% in the usual ranges for typical discrete components. The double-frequency method is being used to ensure high measuring accuracy. The exact unit (pF, nH etc.) is also displayed, a very nice feature indeed. No more lengthy range-selection and sensitivity-tweaking of bulky measuring-bridges or using a DigitalVOM with considerable error when measuring small capacitors.

The inductors and capacitors need to be able to work at frequencies between 20-740kHz, however, as this is the range of test-frequencies. Some audio-coils and/or mains transformer windings etc. therefore will not be measurable with this LC-meter. But the main application is for HF work, and here this little gadget really shines.
The kit contains some 40+ parts; the case has to be supplied separate (an undrilled case can be bought from BDM-Electronics). A fully coloured assembly- & operating-instruction helps to fit all the parts to the pcb easily. No SMD components to worry about – but still a very compact unit measuring only 14 x 6 x 5cm (L x W x H) when installed in the optional box.



Calibration is straightforward with a precisely known calibration-capacitor being part of the kit. After that the unit is ready for service. I found that adding two rigid test-clips helps a lot when handling small components, the rigidity prevents altering the “null”-calibration better than the normal soft test-leads. When operating the unit draws around 12-15mA, thanks to the automatic power-off after 2 minutes a battery should last many weeks even with frequent use of the LC-meter. While the accuracy is around 1% in the normal operating ranges, very low values (like 0.1pF or 10nH) are measured with about 15% of error and the high display resolution fools you in indicating an accuracy which cannot be achieved by such a simple design. In comparison: 10nH is roughly the inductivity of about one inch of straight wire – which is close to nothing in the HF-world, right?

I mainly use this LC-meter to check components before soldering them in, just like a Digital VOM is used for resistors in this application. Fast and trouble free – but very helpful when it comes to endless numbers of small capacitors or inductors in a complex rig. SMD-capacitors bear no markings on their capacitance at all, so a measuring capability is almost a necessity. My only complaint is the lack of a predrilled case, as my own mechanical abilities to fabricate a decent-looking case are virtually absent. I installed the finished kit in the optional case, but the rectangular hole for the display didn’t come out too well – now my device sure became an “ugly duckling” but with a “heart of gold” inside.

The kit can be bought new on ebay from BDM-Electronics ( www.bdm-electronics.de ) for 35,_EUR plus S&H, the optional case is 6,-EUR, test-tweezers for SMD-work are 17,-EUR, and optional 2-line displays (green or blue) cost 15,-EUR extra.

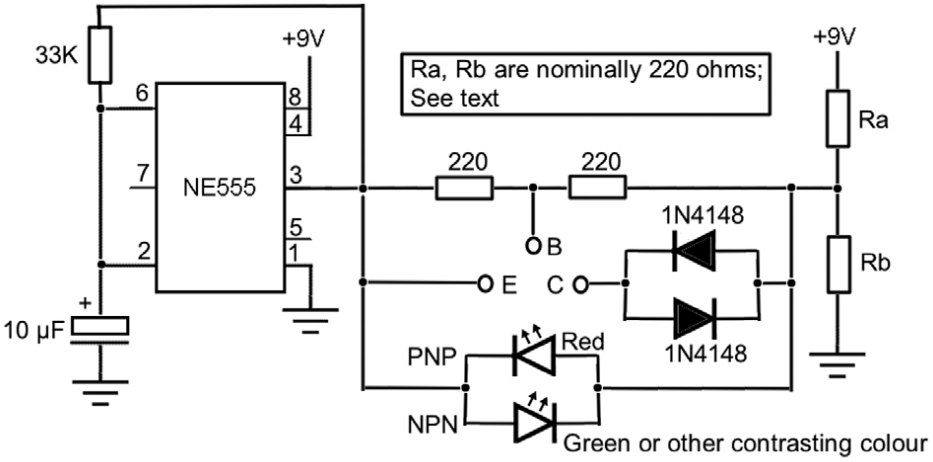
An alternative to this LC-meter kit with virtually identical technical specifications (but with a fitting nice case and a slightly different user interface) would be the “LC-Meter IIB“ from AADE, sold in Germany by “Box 73“ ( www.box73.de ) for 115,-EUR plus S&H.

## 15th RED ROSE QRP FESTIVAL.

**Sunday 5th June, 2010. 11am to 3pm. Formby Hall, Alder Street (off High Street), Atherton, Manchester. M46 9EY. Admission £2.00 Children under 14 free.**
Easy access from all directions. M6, M61, M60, A580
Features: Trade and individual stalls. Club stands, including RSGB, GQRP. Very low cost "Bring & Buy. (No sell, no pay!) Sales of new and surplus equipment /components. Hassle free. Large spacious halls at ground level. Huge, free car park, disabled facilities. Delicious refreshments at QRP prices! Comfortable, well stocked lounge bar. Some tables available at £8 but please book early. Ideal opportunity to sell those unused items. **Contact Les Jackson, G4HZJ g4hzj@ntlworld.com 01942 870634**
***Due to uncertainty over future ownership of Formby Hall, please check at www.wmrc.org.uk for any possible changes, prior to attending.*** (G4HZJ)

# A Simple and Inexpensive Bipolar Transistor Tester

**Mike McShan, N5JKY, n5jky@me.com**




Perhaps many of you have, as do I, a stash of various bipolar transistors that you've acquired over the years from salvaged electronics boards, grab bags, or other sources for these goodies. Quite often, I've found that the labels are unreadable or have some poorly documented manufacturer code. So, I wanted to find a simple and inexpensive tester that could tell me whether a transistor was an NPN or PNP (or indeed whether it was functional at all). The following circuit has been around for a while in various versions (1) and can be built from new parts for very little money. Mine was built entirely from my junkbox, and the most expensive component was the Altoids tin I mounted it in. Further, creating this tester also turned out to be a lesson in LEDs for me.

The heart of the circuit is the inexpensive and venerable 555 timer IC. My version was built ugly style on a scrap piece of printed circuit board with a couple of isolation pads cut into the copper for mounting the LEDs and diodes. I used a diamond-tipped circle cutter drill bit to create the pads; these are available Rex W1REX at QRP Maine (qrpme.com) and other sources. Layout is not critical. I started by positioning the 555 timer upside down on middle of the board. Carefully bend pin 1 so that it flat and perpendicular to the other pins and solder it to the ground plane. I also find it is helpful to mark the location of pin 1 on the underside of ICs with a drop of nail polish or paint so to prevent confusion later. Once mounted, the other parts are mounted from the IC outward. Three leads with alligator clips were attached to connect to the transistor being tested. A transistor socket or other means could be used, too.

The original circuit called for red (for PNP) and green (for NPN) LEDs; I was out of green ones so I used a blue LED that was left over from another project. When the

tester is powered up without a transistor connected, both LEDs are supposed to flash in alternation, but only the red one was lighting up. I carefully inspected the circuit and found no wiring errors; so, what to do? The schematic shows that Ra and Rb form a voltage divider circuit, providing current limits for the LEDs as the 555 reverses the direction of current. It occurred to me that perhaps one LED had a larger voltage drop than the other. Removing Rb and hooking up my resistor substitution box showed that I needed to replace the 220 ohm resistor at Rb with a 100 ohm one. Now, both were flashing properly. I lashed up a test circuit with a 9V battery and 1K limiting resistor to measure the voltage drop across each LED and found that there was a 1.8 V drop across the red one but a full 3.2 V drop across the blue. A little reading on LEDs confirmed that these are typical values for these colours. So, the moral of the story is that you may need to adjust the value of Ra or Rb depending upon the LEDs from your junk box. Here are typical reported values for LED voltage drops (2):

| LED colour | Typical voltage drop range ($\Delta V$) |
|---|---|
| Red | $1.63 < \Delta V < 2.03$ |
| Orange | $2.03 < \Delta V < 2.10$ |
| Yellow | $2.10 < \Delta V < 2.18$ |
| Green | $1.9 < \Delta V < 4.0$ |
| Blue | $2.48 < \Delta V < 3.7$ |
| White | $\Delta V = 3.5$ |

Using the tester is straightforward. With no transistor attached, the two LEDs will flash alternately. If a PNP is attached only the red one will flash while a NPN will cause only the other one to flash (blue, in my case). If you reverse the emitter and collector leads then both LEDs will continue to flash (swapping the leads like this can help you sort out the orientation of unknown transistor pinouts). If the transistor is open, both LED's will flash regardless of orientation, and if the transistor is shorted out, neither LED will flash. While this tester is only for testing bipolar transistors, it is a very inexpensive and handy piece of test equipment for the builder's bench. I find that I use it frequently during project construction.

(1) The circuit I adapted was from http://www.555-timer-circuits.com/transistor-tester.html.

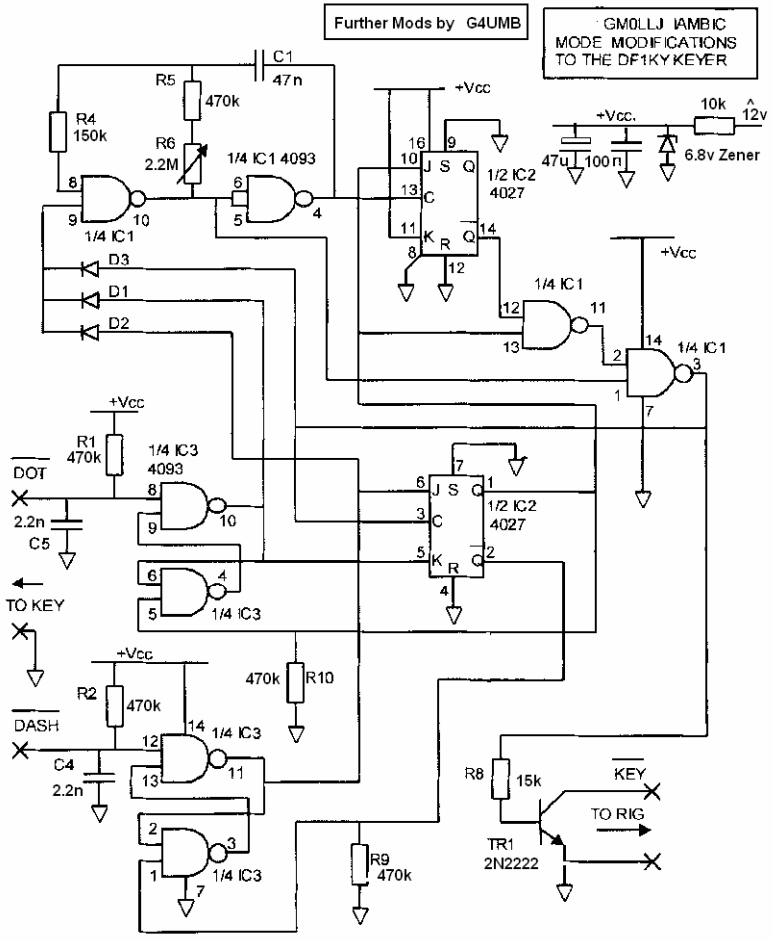
(2) http://en.wikipedia.org/wiki/Light-emitting_diode

# Parts list for SSB Exciter by YU1RK (SPRAT145)

I regret to say I omitted the parts list for Dusko's project in SPRAT 145. Tony has kindly put the information on the club website (under Sprat Magazine). I can supply a printed copy on request.
G3RJV

# The Clippy Keyer

**Peter Howard G4UMB 63 West Bradford Rd Waddington Lancs**



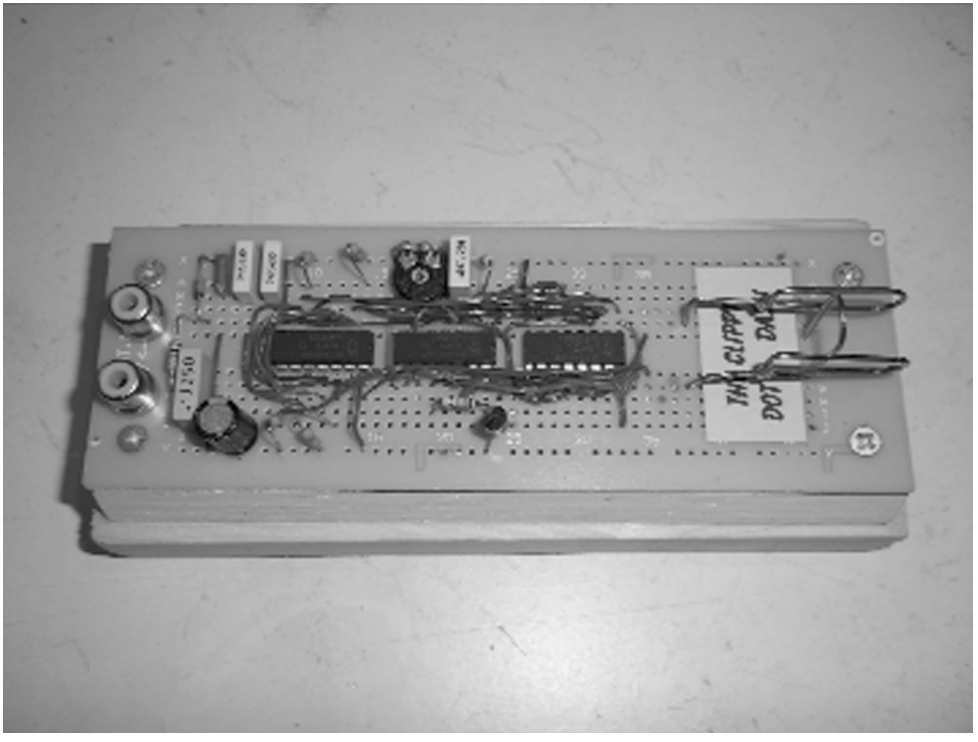

**Taken from Sprat No 97**

## The Clippy Keyer

This keyer as seen working at the 2010 convention is built around GM0LLJ ‘s circuit (Sprat 97) & (Sprat 92) With other Ref to FE1MOG keyer Sprat 69.
GM0LLJ modified a circuit by DF1KY. I have added a few more slight alterations.
The original circuit was only made with 2 IC’s but this simpler approach would not memorise the last paddle movement. In other words this circuit is able to send a dot after a dash even if the dot paddle is moved during the sending of a dash.

I have been intrigued by constructors using paper clips as paddles recently and decided to experiment myself. The paper clips I used were the large coloured types which were coated in plastic which I stripped off and found that they bent and soldered alright. For the PCB I have used a universal breadboard layout as this suits the IC ‘s better.
Connections are made at rear of the board for DC supply and output.
The transistor switch TR1 can be adapted to suit your requirements. I used stiff wire to interconnect the IC’s . It looks a mess but still works! The wooden base is held still on the bench with double sided sticky pads. I won’t go into explaining the operation of all the IC’s because I am baffled by J K Flip Flops myself!

A Programmable PIC has made this digital type of keyer circuit obsolete today; but this one is still quite a challenge to build.



# A(nother) CW Filter

**Paul Darlington – m0xpd – 8 Uplands Rd, Flixton, Manchester, M41 6PU**

I hope readers will excuse my addition to the already long list of audio frequency CW filters published in these pages and elsewhere. Although I will not claim novelty, I have not seen certain features of my design used previously in this application. That said, I am a newcomer to the hobby – so apologies if this is a reinvented wheel!

I have sought to provide independent control of bandwidth and centre frequency in a sub-system suitable for designing into a simple receiver or being built as an audio "add-on" for an existing rig.

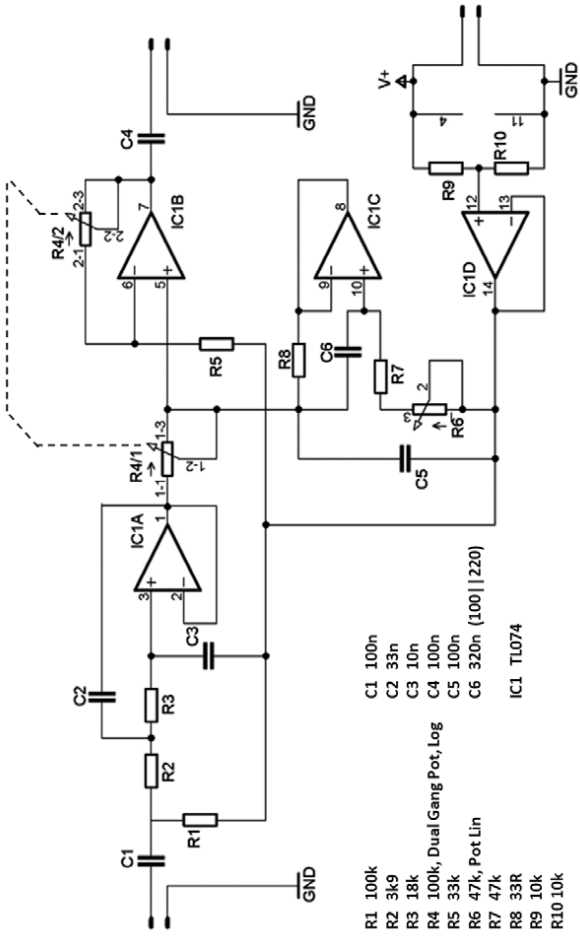
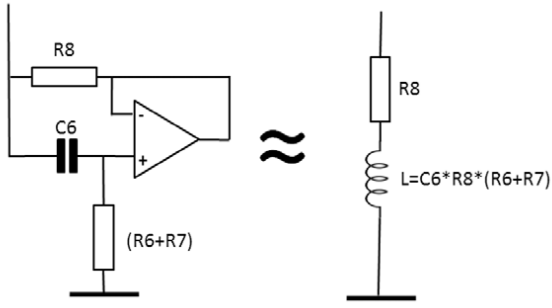



**Figure 1 m0xpd CW Filter**

In the circuit of Figure 1, IC1C, R5, R6, R7 and C6 act as a "gyrator". A gyrator is a scheme for inverting impedance. In this, its most common application, it performs a very credible impersonation of an inductor by inverting the impedance of capacitor C6. In fact, the gyrator produces a series combination of inductance and resistance, although I have tried to minimise the resistive element.

Figure 2 summarises the gyrator's action. The component values specified in Figure 1 generate a "virtual" inductor having inductance L=0.74 Henrys – suffice to say this wouldn't be convenient to achieve with a physical inductor!

**Figure 2 "Gyrator" simulating an inductor, L**




**(other component names refer to Fig 1)**

The inductive impedance presented by the gyrator is resonated with the 100 nF capacitor C5 of Figure 1, which is in parallel with it. This parallel "LC" network is driven by the output of voltage follower IC1A. The variable resistor R4/1 acts so as to change the input to the "LC" network from voltage (*i.e. low impedance*) drive to something approximating current (*i.e. high impedance*) drive – and all points between. When the "LC" network is driven by a voltage source (R4/1 at minimum value), the network doesn't have much effect on the voltage developed at the input to the non-inverting amplifier stage IC1B. When the "LC" network is driven by a current source (R4/1 at maximum value) the voltage developed at the amplifier input is proportional to the network's impedance, which has a resonant peak at ~600 Hz. Intermediate settings of R4/1 will produce responses between these extrema.

Equivalently, R4/1 can be interpreted as setting the damping of the "LC" network, with highly damped, wide bandwidth responses associated with low resistance values and under-damped, selective, narrow bandwidths achieved with larger values of R4/1.

In changing the value of R4/1, the voltage gain of the network at the resonant frequency changes as well as the bandwidth. This undesirable level change has been largely compensated by the action of the second gang of the potentiometer, R4/2, which controls the feedback around the non-inverting stage IC1B, such that the system gain at the centre frequency is almost constant for all settings of R4.

The overall effect is shown in the measurements reported in Figure 3 which shows the response at the extreme settings of the potentiometer (solid lines) and at four randomly selected intermediate positions (dashed / dotted lines).

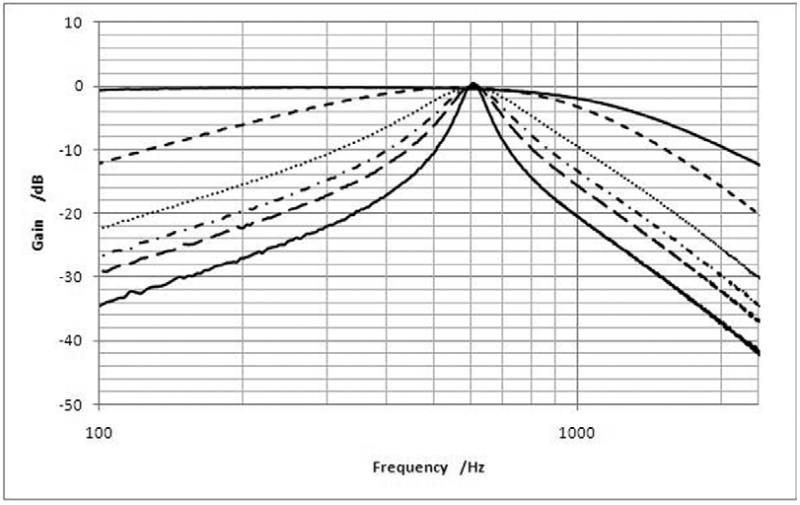



**Figure 3** **Measured Voltage Gain of the CW Filter, showing action of R4 (R6 in mid-position)**

In addition to making a (rather large) 0.74 Henry inductor easy to implement, the gyrator has the additional advantage of being easy to tune. Potentiometer R6 is provided for this purpose – the values specified in Figure 1 allow tuning between 500 and 700 Hz, as shown in Figure 4.

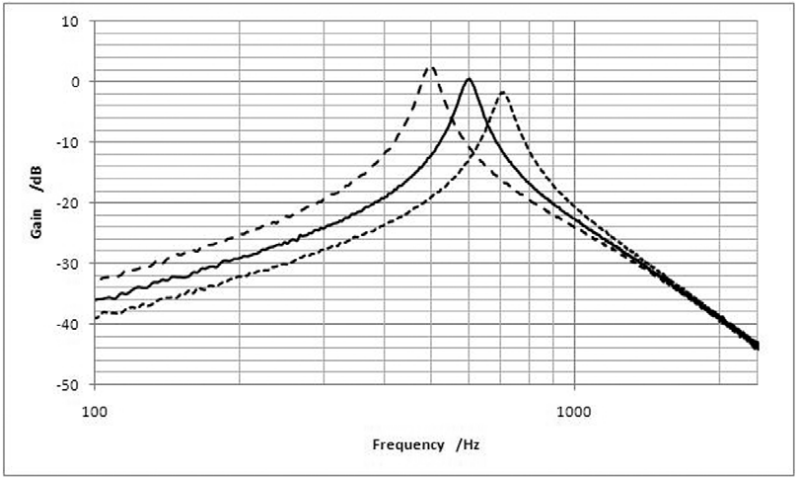



**Figure 4** **Measured Voltage Gain of the CW Filter, showing action of R6 (R4 in max position)**

In practice, I prefer to leave the filter tuned to 600 Hz and adjust RIT (which I try to fit to even my simplest rigs). In this case, R6 should be replaced with a trimmer.

The filter has been designed to run from a unipolar 12V supply – hence the last op-amp in the package, IC1D, is used to derive a low impedance mid-rail voltage. The TL074 specified in the schematic just happened to be in the junk box at the right time and other devices can be substituted. The components at the input (R2, R3, C2 and C3) add some fixed low-pass filtering with corner frequency a little over 1 kHz, the effect of which is seen in Figure 1.

The circuit is pleasant in use – unless your quarry is drifting around! I have found that a bypass switch (or, almost equivalently, a double pole switch shorting both active segments of R4) is useful.

Unfortunately, there is a known issue, which is unresolved at the time of writing; the system can oscillate if powered-up with R4 at low bandwidth settings. Momentarily backing off the position of R4 will stop the oscillation, after which the system can be used over the entire range of R4 without problem.

## What dy'a do with a load of blown fuses - Keep em..!

**David Smith G4COE, 54 Warrington Rd. Leigh. WN7 3EB**

A good radio amateur never ever 'clods' anything out not even blown fuses, they come in very handy indeed, after they've 'popped' we just have a glass tube and the end caps left, we don't want them black or silvered inside we want them clean looking, "but why"?

They make excellent stand off insulators and support for components etc, simply solder one end to the board and you have the other end as the solder tag – and they will stand a few hundred volts, with a little ingenuity one end could be securely fixed to a aluminium chassis to support that anode RF choke or what ever. So why go paying good money for stand off insulators?

The ceramic mains type fuses usually contains sand, these can be emptied easily by drilling a small hole at one end one end of the cap, these fuses can go with a 'fair bang' which may blacken the inside and make them become hi-resistance, you could always test them on a hi resistance range of a test meter.

Ok, ok I'll come clean… I ended up with 7 blown fuses repairing a TV, the PSU transistor was intermittently shorting to the heat sink, the idea came to me like a torch bulb on the output of a kilowatt linear when one of them stood up on it's end, do hold them with tweezers when soldering they tend to get hot for the fingers and rubbing the ends sandpaper aids soldering.

You could use them for that little RFC as well wires are easily soldered to the ends.

## WE NOW HAVE A CONFIRMED DATE....

# THE G QRP CLUB

# MINI-CONVENTION

**(in conjunction with the Halifax Radio Society)**

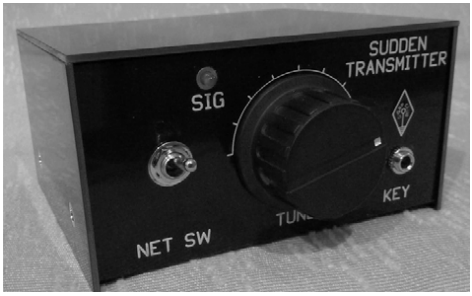
## Saturday 22nd October 2011

## The Rishworth School, Ripponden

Because of circumstances beyond our control, we are no longer able to use the laboratories where we held the Buildathon and Equipment Display. Currently we plan to move these to the Friday evening before the convention and have a **"Constructor's Evening".** We have secured the use of a church complex some 5 miles from Rishworth. It includes a comfortable room for a Buildathon and display of homemade equipment, it also has a lounge area for people to meet and share ideas (we could organise PowerPoint presentations if desired). There is a separate bar area and we plan to arrange a light buffet during the evening. The idea is to have an evening for anyone interested in radio construction – showing their projects, sharing ideas or joining the buildathon. The buildathon project will probably be a Z Match ATU. If you are interested in being part of the Constructor's Evening let George (g3rjv@gqrp.co.uk) or Graham (g3mfj@gqrp.com) know (postal addresses are also in SPRAT) so we can go ahead with our planning.

## The G-QRP Limerick Sudden Kits

**Graham Firth G3MFJ**





The two club kits are still available, the Sudden RX on 80 through 20 metres, although we hope to extend the range to include 160m soon. The TX is only available on 40 metres right now, although we are working on extending this to be the same as the receiver. They are available from Club Sales (see the back page), and they cost £34 each to members, plus postage. The postage - per kit is £2.50 for UK members, £3.50 for Eu, and £5 for DX.

## Corrections to the Easy Five Receiver – SPRAT 145

An email from a Club member and my own re-reading of the Easy Five article as it appeared in Sprat suggests some errors. Please note:-

1. There are two R4s in the circuit as published. The R4 in the drain circuit of the FET should read R3.

2. C3 and C4 decouple the entire receiver's +9v line but R11 and C2 should be placed between the top ends of R3 and R6, i.e. between the two RF and three AF stages. These two components provide decoupling isolation between the receiver's RF and AF stages to reduce the risk of feedback instability.This means that C3 and C4 are placed beyond the top end of R6.

3. Most important! The 30K in note 8 should read 30t. Knowledgeable members will no doubt realise this but anyone with less construction know-how could go ahead with this and be very disappointed by the result!

Only point 3, above is of likely really great significance as point 2. if not actioned will probably not cause a problem. The whole circuit is quite forgiving on the whole!

So sorry that I myself missed some of the above on first reading.

Mea culpa! Keith G0KJK

## Antennas Anecdotes and Awards

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

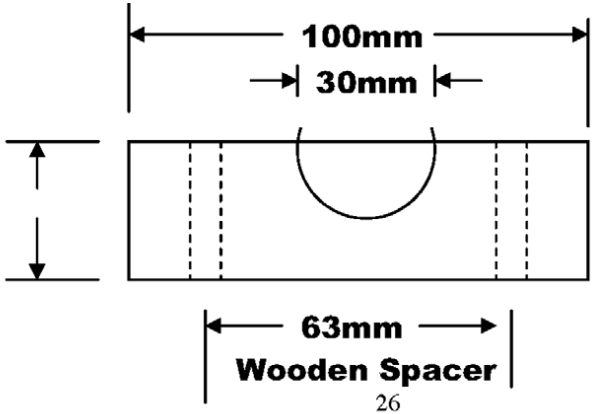
This quarter we have a couple of useful articles sent in by John G8LJO about an antenna hitch and a 70 MHz antenna. I've also received some e-mails and I'm always interested in what you have been playing with in the way of antennas. I know these articles inspire others so if you have anything you wish to share then please either drop me an e-mail or letter. Some items I've been sent take time to process and it would help if you could write to me in 'Word' with photographs and drawings as attachments.

## TOW HITCH ANTENNA MOUNT

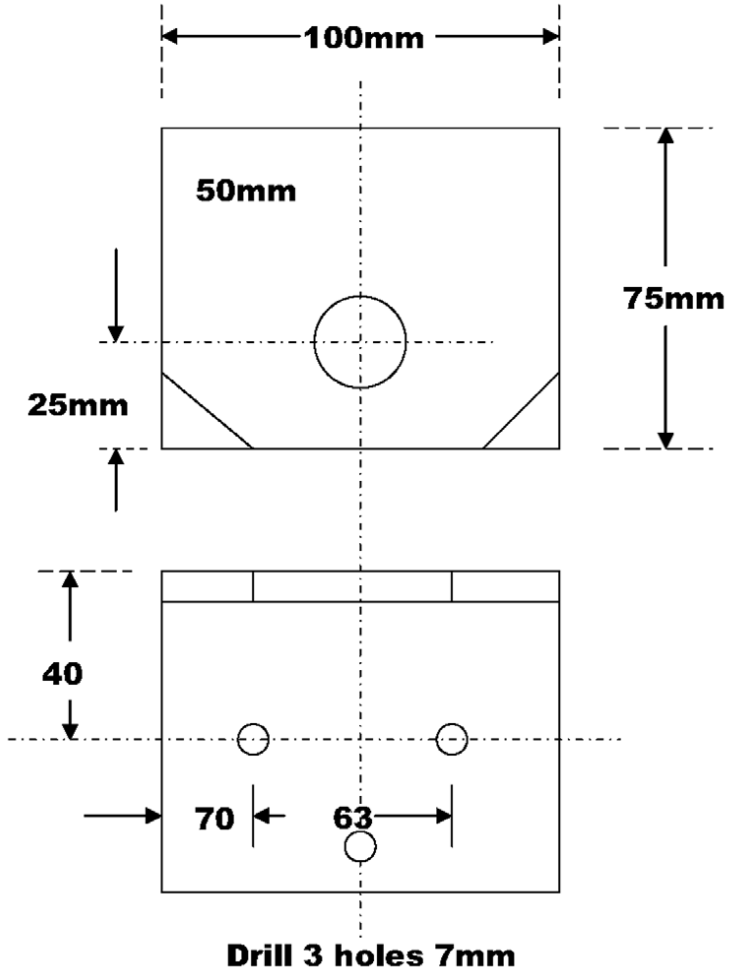
**G8LJO John Ricketts 4760 email: g8ljo.jon@googlemail.com**

Having retired and brought a new car I wanted a way of mounting a mobile whip without mounting anything to the body of the car, having suffered damage to older cars in the past using trunk mount bases. At one of the amateur radio shows one year I noticed a Tow bar aerial mount bracket for sale but did not purchase it as the time was not right. The following year the same trader denied any knowledge of the mount so I decided to make one. At this stage I must ***warn you that it should not be used mobile as it has no EN Standard nor has it been approved in its construction or use.***

The mount basically consists of 100 X 75 X 75mm of aluminium angle drilled to take a standard 63 X 6mm U bolt which can be obtained from the local TV aerial suppliers with two wing nuts. The protruding corners must be cut back to 45$^{o}$ to protect walkers legs that pass by. The aerial base hole shown as 16mm can be made to suit the base used, I used a DB27 3/8 base from Nevada and the above photograph shows the base being test fitted and the wooden packing spacer is not fitted. Without this the mount will swing about the tow hitch.



For safety reason cut the leading edges at 45 degrees to stop legs getting caught on the corners.

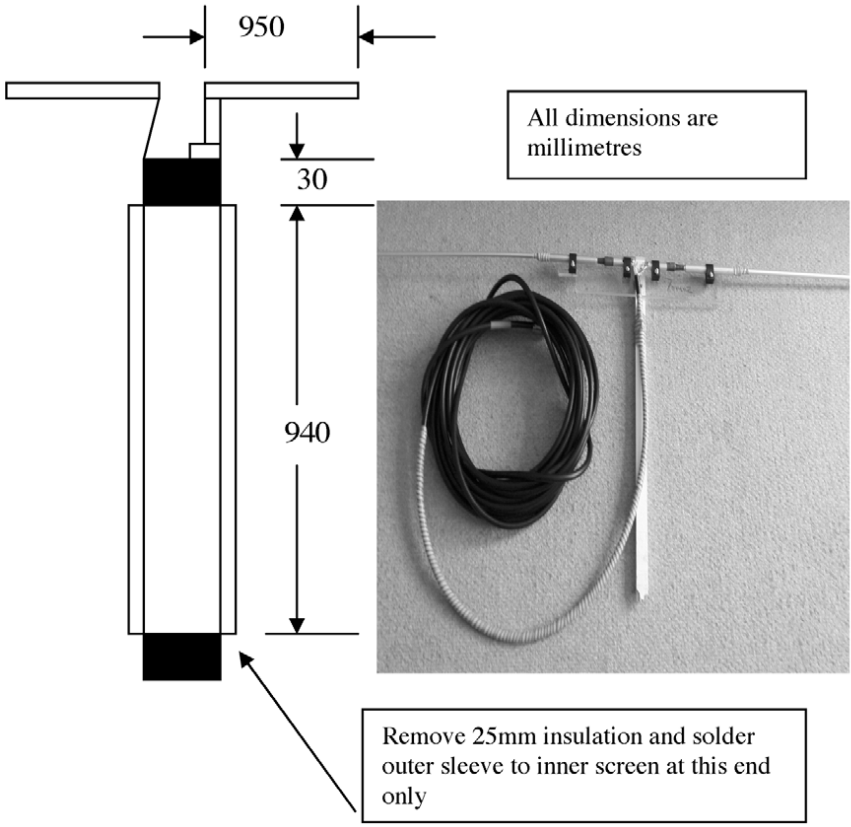



The third hole is for a 6mm nut and bolt to be fitted to pack out the base into the vertical. The metal work can be purchased from Metal Supermarket U.K. who has outlets around the U.K.

## Four Meter Portable Dipole

**John Ricketts G8LJO email: g8ljo.jon@googlemail.com**

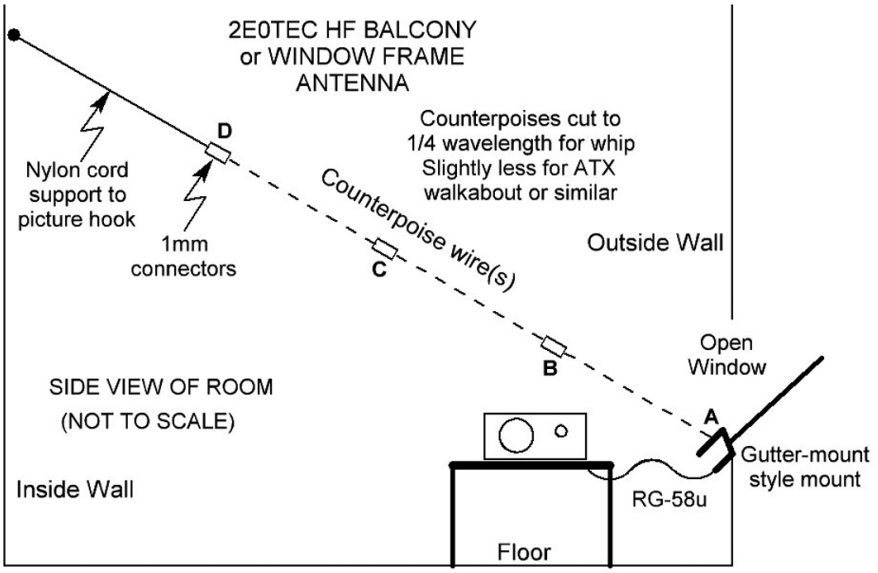
For a simple four meter portable dipole I built this aerial based on the project by G8OSN, but I built the sleeve balun from old coax cable outer screen as it needed to be flexible to pack it into the back of a car. Do not connect the top of the balun to earth. The whole length of the balun was then taped over with electrical tape to keep the damp out. Look at http://www.qsl.net/g8osn/content /articles/4mdipole.htm The SWR was 1.2:1 at 70.1 MHz. The photograph shows simple cable clamps used to hold the elements. The elements were made from 6mm tube taped in to 10mm lengths of tube to fit to clamps. The dipole is then taped to a 2m landing net pole as a simple mast. All of the dimensions are in mm.




*G3VTT*: I recently had a visit from Carl 2E0TEC who told me he was living in rather cramped quarters in North London and that he had managed to get on the air with simple vertical antenna. I've asked him to supply you with some information and Carl kindly produced this diagram. Carl says he's 'desperate' and 'devious'. I would say he's highly resourceful! The system would suit anybody living in high rise flats or other modern

buildings. You would need to be aware of possible RFI and TVI of course but with QRP this possibility could well be diminished.

**2E0TEC ANTENNAS FOR THE DEVIOUS AND THE DESPERATE #1**
**An HF Balcony or Window Frame Antenna Mounting**
**for Hotels and Flat Dwellers**




***Carl writes**: The counterpoise is a number of wires connected with simple 1mm plugs/sockets, accumulating from A to B and so on culminating in the length required. i.e. 10m counterpoise was A-B, 15m counterpoise was A-B-C and so on. The insulating cord was run full length of the counterpoise to provide support. Counterpoise sections are joined to the support cord with tiny zip-cord ties. The antenna can be mounted on a window frame or balcony. A metal window frame will undoubtedly effect tuning. Ideal for flat dwellers, hotel trips etc. Better results might be experienced by hanging the counterpoise out of the window or balcony. The antenna was used without a tuner with an FT817 at 5W. Mobile whips work fine but can be a bit 'saggy'. I was impressed with the multi-band, coil tapped, ATX Walkabout antenna in this configuration. During contests CW and RTTY contacts into the USA and Caribbean were possible on 20m and 40m. During normal operation plenty of QSO's were had around Europe on CW, RTTY and PSK31.A compromise antenna is ever there was one, but it works (after a fashion) and over 200 logged QSO's in a contest weekend prove it!*

Like Carl Walt KF4YJQ has been playing with mobile antennas and asks the question. *'Can a quarter wave mobile antenna really be effective in launching our QRP signals? Having just logged my 5000th QSO, mostly QRP, I can say that yes, the short quarter wave vertical can be an effective QRP radiator. I have worked both coasts and several European stations with good signal reports using a quarter wave mobile antenna*

*mounted on my decking at the rear of my home QTH. The secret of success is the ground return system. I have a 10 foot by 5 foot section of one inch square lightweight fencing material secured to the underside of my wood deck. This, combined with an 8 foot ground rod, has proven to be quite effective. I have purchased about a dozen of these 1/4 wave mobile or portable verticals and find that the screwdriver types work best, with the "Hustler" mobile resonators a close second. At age 79, I am no longer inclined to climb ladders to erect a dipole which usually fails with the first ice storm of the season. My favourite antenna is Vern Wright's (W6MMA) MP1 Screwdriver antenna which sells for about $120.00 US. The PAC 12 performs about the same but the MP1 is sturdier and costs about the same. Are they as effective as a dipole? No, not quite, but very very close in performance and much more convenient to use. Moreover, the MP1 Screwdriver can work most bands and will tune to 1 to 1 without a heroic effort from ATU.*

Jerry G0AED sent me an e-mail – *'Hi Colin I do not know if you can use this idea for the column. It was seen on the GW0VMR website. It is an 'upper and outer' with 22 foot legs fed with 30-32 feet of 450 ohm feeder and a 4 to 1 balun then coax to the tuner. I made one and it worked a treat from 40 to 10. I taped it to a G3CWI 10m fishing pole and the outer wire was 8 feet off the ground tied to a tree. It tuned up on all bands at 1 to 1 with my IC703 internal tuner. I also worked an Italian station on 29.6 FM with 59 both ways with him on 1 watt and myself on 10 watts. Sadly I never tried it on 6. It would also make a good portable antenna. I've also seen on another site that it can be used with 25 foot wire legs. I have read somewhere that it was used by early Hams with 30 foot legs. I will try these ideas when I get a new pole, (as I snapped that one - my fault). I hope you can use this idea and will keep you posted as soon as I get a chance to try different lengths.'* The reference to an 'upper and outer' refers to a wire doublet antenna with one leg (wire) vertical and the other wire horizontally so changing the RF field from the antenna from horizontal in the doublet to vertical polarization. There are effective DX implications with using a vertical as there is enhanced low angle radiation. It would also be useful to take the horizontal wire in the favoured direction of working.

**Awards**. There were no awards applications this quarter so on to an **Anecdote** from Ryan G5CL. *Hi Colin just a small contribution to your SPRAT column. The other night on 40m I was tuning around to see what if anything was out and about. To my amazement at 1930 hrs, I heard VK3EGN on 7.005 working a pile up of EU stations so I wound the power up to 100w on my FT857 and gave him a call (well it was a VK!). I tried for 30 minutes with little success and the QRM was quite horrendous even though he was working a split frequency. Valiantly, I gave up after another 15 minutes and packed up for the evening. Next morning, I heard an OK station on 30m and gave him a call using my usual 5 watts but received no reply which was a bit unusual. The SWR on my LDG Tuner was a bit high as well. Initially I thought nothing of this but a wander outside 10 minutes later discovered that my long wire had come crashing to the ground and was sat in the flower beds with the pulley hoist to my 9m pole flapping around in the breeze. Perhaps this is a sign to all QRPers that it does not do good to meddle with the dark arts of QRO and that antennas that are used to QRP do not like the increase in power? The LW had sat happily up there for five years without complaint and at most had only been treated to 25 watts on special occasions, so I think there is a lesson to be learnt here. To add insult to injury, it was foul day weather wise as I began the ascent to string it all back together....*

Sorry about the failure of the antenna system Ryan. Perhaps you should instigate a regular inspection of the system, say once a month? I keep a pair of binoculars handy to inspect my system and replace the halyards every couple of years.

The next **Valve QRP Day** will be **Easter Sunday April 24th right** through the day**.** The event is to promote activity on the QRP frequencies and allow those of you with valve (tube) equipment to give it an airing. There are no specific operating times but just be active on 1836 KHz, 3560 KHz, 7030 KHz etc on CW. Even a single valve can easily give up to 5 watts. Of course if you have an SSB transmitter then try that out. Whatever you do please send me any reports of stations worked, what the equipment was and perhaps a circuit if it's a simple rig as it would make a nice article for Sprat.

## Membership News

### Tony G4WIF, PO Box 298, Dartford Kent. DA1 9DQ

As George mentions in his editorial, this could be your last Sprat if we have not received your 2011 subscription. As usual the clue is to be found on your Sprat wrapper. If the date says "2010" or "membership expired", then this will be your last Sprat.

UK Standing order payers should not ignore this simple check. We are still getting payments without an identifiable reference of your membership number. Please contact me or your local representative right away to renew for 2011.

If you are a European or DX member then you could possibly only receive three Sprats this year. There is a message indicating an underpayment on your Sprat label. You will not receive the Summer Sprat (the next issue) if you forgot the announcements that we had to raise subscriptions and you sent the old amount. Once you have sent me (or your DX representative) the missing dues your Summer Sprat will be despatched. Please do not send me coins in non UK currencies, the bank do not like changing them. UK coins you send at your own risk.

Online subscriptions continue to be a marvellous success story for the club last year and membership is still growing as a result of the ease of payment. Please see the club website at www.gqrp.com/paypal/ for more details.

Finally to members who didn't read page 28 of the Winter Sprat and included a note with their subscriptions saying they were missing from the member's handbook – you were incorrect, everyone who wrote at renewal time was in fact in the handbook. The member's entries are now a direct import from the mailing database. So unless I've spelt your name or callsign wrong there's no point in writing if you can't find your entry. There will be a new import next year which will correct any errors and well over 95% of those that wrote were listed.

# COMMUNICATIONS AND CONTESTS

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

Plenty of Winter Sports logs to report this year, and with space a little limited let's dive straight in:

**WINTER SPORTS**

I wish I could include every detail and every photograph that members have kindly sent; I am truly in a fortunate position being able to read through each log and the notes that accompany them. One is certainly left with a very good feel for the 'highs and lows' enjoyed by all. A total of 43 logs were received (more than last year), including an impressive 17 non-UK entries – from as far afield as ZL! The continuing outstanding success of this annual event is due entirely to all of you who take part and, in particular, those who send their logs:

**2E1RAF** Roy, **G0EBQ** Nigel, **G0GMA** Pat, **G0KQK** Snip, **G0KRT** Eric, **G0NMD** Les, **G0OTE** Eric, **G3ICO** George, **G3ILO/P** Steve, **G3JFS** Peter, **G3LHJ** Derrick, **G3MCK** Gerald, **G3VTT** Colin, **G3YPZ** John, **G4ARI** Tim, **G4EIX** Dave, **G4GIV** Robin, **G4ICP** Richard, **G4XRV** Rupert, **G5CL** Ryan, **GM0NTR** Jim, **GM3OXX** George, **GM4XQJ** Brian**, GW0VMR** Pat, **GW0VSW** Carl, **MI0BPB** Andrew, **AB8FJ** Ted, **DL2BQD** Dieter, **DM4EA** Tom**, F6FLH** Bert**, IT9CHU** Vincenzo**, K2JT** Joe, **LA1ENA** Aage**, LA1TPA** Mads**, LZ2RS** Rumi, **OK2BMA** Pavel, **PA0RBO** Robert**, PA9RZ** Robert, **SP9NLI** Andy, **W2JEK** Don, **W3TS** Mike, **W7CNL** Jack, and **ZL4TE** Pete.

**G0EBQ** describes his station (copy of MFJ Cub and G5RV in the loft) as "pretty basic"! **G0KQK** "enjoyed the event as much as ever" and asks "how about one every 6 months?" Not a bad idea, Snip – any views from anybody else? **G0NMD** said that the bad weather meant he was able to operate from home using his own aerials, instead of (as in previous years) throwing a plastic bottle and/or tennis ball over his mother-in-law's house to carry a wire over. They never did find the bottle, but the tennis ball detached itself from the string and her roof 2 years later! **G0OTE** had to move out of his freezing wooden shack and into the kitchen. Not so good for adjusting the ATU down the garden! **G3ICO** used his KX1 and K1 into his doublet and had 9 QSOs on 17m including 8 into the USA. **G3ILO/P** ran his K2 from the shack on his narrowboat Edna May into a 33ft vertical and worked W3TS on 20m. He also sent some stunning winter scene photographs (remember the snow and ice?) taken around his mooring on the canal. **G3JFS** used CW, SSB, RTTY, PSK31 & JT65-HF, and his best Dx was V5/DK1CE on 17m CW. **G3LHJ** was called by VK3EGNon 30m and had a 2-way QRP QSO with 4Z5NX on 20m. **G3MCK** used a CO/PA 1W Tx and valve superhet Rx to make 53 QSOs. His 10mW spacer wave was reported as being audible by a few of the stations he worked. **G3VTT** said "no /P this year due to danger of thermal linked life conclusion!" He was running his K2 from home with 4W into a 120ft wire wrapped around his postage stamp. "What else do you need for a bit of fun?" Mind you, he did raise K1JD on 80m at 0300z! **G3YPZ** sent one of the most

varied (in terms of bands/modes used) logs. He had one QSO on 12m running 1W to work an IT9, a few USA stations on 15m, on 17m CN8YR with 1W and K8CW with 500mW, on 20m several EU stations with 500mW and worked YT9PL who was running 100mW SSB. John worked G and OZ on 60m while running 500mW SSB, but overhead power line noise was a problem on 80m (S9) and 160m (S9+20). Despite the noise on 160m he had 2 ground wave QSOs using 2.5W of AM. He reported the power line noise which was investigated and the fault was due to be fixed following the necessary notice of shut-down period. As John says, "All in all another fun event!" **G4ARI** was given a Rockmite 80 half watt tcvr kit by his wife for Christmas 2009, but didn't finish building it until January 2010. He used the rig for this Winter Sports making 25 QSOs with reports ranging from RST529 to RST599. Tim says that he spends lots of time on 80m QRP CW throughout the year and looks forward to the band coming alive at Christmas time during WS. **G4EIX** was inspired by his success in WS and decided to 'give it a go' in AFS the following weekend. **G4GIV** says "I try to make time for at least one WS QSO each day, but once I get started I usually manage a few before my absence is noticed!" **G4ICP** runs an FT101Z with 5W into an indoor end fed in the loft (central heating as the earth) and only managed to work one GQRP station. Who else but GM3OXX! **G4XRV** spent a total of 8.5 hours in QSO, which included one QSO of nearly one hour with GM3OXX.

**GM0NTR** gave it his best shot, but with his 40m DC Rx station was unable to complete a single QSO. Better luck next time Jim. As usual, **GM3OXX** had outstanding results with his 1W homebrew tcvr and loop antenna. Nobody came close to matching the number of entries in George's log, or the variety of bands used and spread of Dx worked. His signal consistently attracts complimentary remarks from other stations, and he is once again to be congratulated on his superb log. **GM4XQJ** with his K2 (5W) and 3ele yagi was one of a few stations to work W3TS on 20m. **GW0VMR** may not have submitted the largest of logs, or one containing plenty of Dx, but his approach to the hobby has to be admired. He runs an entirely homebrew station consisting of a valve superhet Rx and single 807 PA 3W Tx – with hand ground crystals. His antenna is a 140ft end fed, but because of a high local noise level he has to use a null steerer (noise cancelling) in order to hear anything at all. To paraphrase a well know TV cooking programme, radio doesn't get tougher than this! **GW0VSW** tried CQs on 15m and 17m, but to no avail. **MI0BPB** restricted his WS activity to participating in the OQRP Contest, and had "good fun", although I will confess to having my doubts that the Contest sits well within the ethos of our friendly Winter Sports.

**AB8FJ** continued his annual 'get the rigs on the air' theme to WS and succeeded in airing no fewer than 10 rigs, including a Norcal 49er 100mW 9V battery rig. **DL2BQD** was another member to include pictures of the winter scene around his home, while **DM4EA** commented that he needs to 'grow' the bamboo stick aerial support in his garden. **F6FLH** was delighted to work "the grand master" GM3OXX. **K2JT** (using an HW9 and 132ft centre fed had 16 QSOs including AH6V on 40m. Almost every Dx station he worked was using a yagi or quad. **LA1ENA** worked W8KJ on 20m, loads of stations on 30m, one on 2m and had a 2-way QRP QSO with LA1ENA on 10m. **LA1TPA** also managed a QSO with VU2DSI on 15m SSB – 842 miles per watt! During the period, **LZ2RS** carried out

numerous QRPp tests, and sent details of many instances of being copied at power levels down as low as 1mW. **OK2BMA** was one of the lucky few to work 4Z5NX QRP on 20m, as well as LX/ON5QRP/P on 40m. **PA0RBO** worked K8CW on 17m, and was able to give LZ2RS RST529 with Rumi's 1mW. Having ploughed through 6inches of snow just before Christmas to re-instate his antenna, **PA9RZ** was delighted when W3TS came back to his one and only CQ on 14060. **SP9NLI** ran his FT817 from a small battery being charged by a solar panel on his balcony. **W2JEK** reports "not many QSOs, but a great start to the New Year". Despite the difficult conditions, **W3TS** worked 14 EU stations, while for **W7CNL** G3YPZ (with his 2ele quad) was the only UK station heard. For **ZL4TE** it was his first bash on the key for 18 months, and his first WS log. Only one log entry, but FK8FE is one we'd all like to have!

Which brings us to this year's Winter Sports G4DQP Trophy winner. It is hard to argue against the sheer quantity (and quality) of the entries in the GM3OXX log. George has given tremendous support to this event over the years and has often been the much deserved winner. The log this year from G3YPZ also has much to commend it, with such a wide variety of bands and modes used. However, I am constantly aware that there are dozens of stations less able to achieve such dizzy heights because of aerial restrictions etc and I feel it right to recognise their efforts and achievements. Tim G4ARI used just two fixed frequencies with his recently built Rockmite 80m rig, running a mere 500mW into his dipole. If there were a Runner Up Certificate for this event, then Tim would certainly have been in contention. However, this year's overall winner has to be Pat **GW0VMR**, for his ability and determination to promote the "amateur" in amateur radio, and to overcome obstacles (such as high local noise), when others might so easily have given up, and often do. Our congratulations go to you Pat.

**CHELMSLEY TROPHY 2009**

As I've done in previous years, I will defer publishing the results until the next SPRAT. Time and space is at a premium!

**EUCW BULLETIN 3/2010**

If you would like a copy of this bulletin, dated 14th November 2011, please drop me a line.

Please remember to send your **CZEBRIS** logs to me – I'm assuming you didn't forget?! – in good time for inclusion in the next SPRAT. Fingers crossed (again!) for better HF conditions, and plenty of QRP Fun!

The deadline for inclusion in the next issue is the beginning of May.

72 de QRPeter

*MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS*

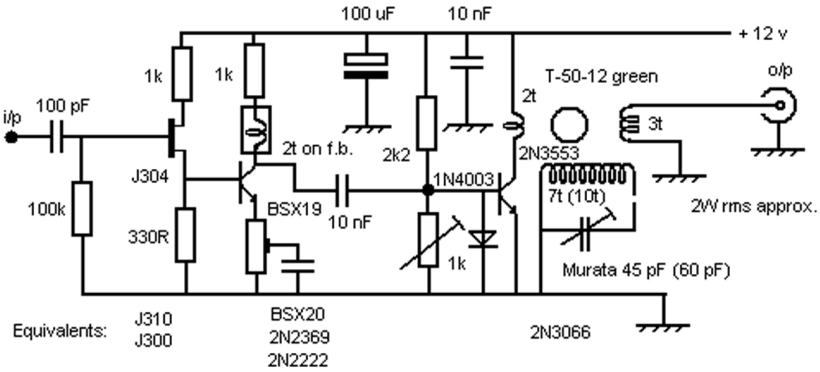
WANTED: Computer power supplies (within the Warrington area) I have items that may be suitable for exchange. Logan, M0LOG, Tel: 01925 234306

# VHF Managers Report

**John Beech G8SEQ 124, Belgrave Road, Wyken, Coventry CV2 5BH.**
**Tel. 07958 777363 e-mail: John@g8seq.com**

I've not been particularly active of late on the VHF bands ( or any others for that matter) and neither has anyone else judging by the lack of correspondence on anything to do with VHF. However, that will change later on this year when I visit Fair Isle with three others: Bob G4GEE, Judith G4IAQ & Dave G4IAR. The expedition will be a mixture of QRP and QRO operation on HF and VHF. We arrive on the Shetlands on August 16th and should be on Fair Isle the same day. We leave Fair Isle on 23rd August. On Fair Isle GS4WAB & GS7WAB will be used. (The two principle VHF bands will be 6m & 4m. We will probably try most modes i.e. SSB, CW, FM PSK31 & RTTY and will have a beacon running whenever operators are available. We are not planning 24/7 operations but are planning on activating all four WAB squares ( HZ16, HZ17, HZ26 & HZ27) using GS4WAB & GS7WAB as well being QRV during the Lighthouses On The Air weekend, activating both the North Light and South Light. Look on the WAB site and QRZ.com under GS4WAB nearer the date. If any high spot qualifies for SOTA, then we shall also activate that at least once. One of the reasons I haven't been very active is that the recent inclement weather has damaged a number of my antennas - a combination of UV, freeze-thaw and high winds. The UV has caused a number of cable ties to disintegrate which I'd used to attach the elements to my 6m turnstile. They lasted over eight years so I can't really complain. I'll try black ones instead of white next time & see if they last any longer. The transverter idea for 4m in last SPRAT has stirred up some interest amongst other members which prompted me to dig out some of my old designs. The circuit below is a re-jig of a small power amplifier I used in a 6m/4m FM rig some years ago. I've altered the biassing to make it work in class A/B so it can be used as a linear amplifier for SSB or any other mode requiring linear amplification. While on the subject of amplification there has been some discussion on the web about using an LM317 as an audio ( or indeed an HF amplifier). I'm considering using one myself as the modulating amp for a 6m xtal controlled AM rig I started building last year but I got distracted.

## 2 watt LINEAR AMPLIFIER FOR 4m/6m




Notes: The overall gain is about 30 dB, so the o/p of a diode mixer for instance should give the full 2 w o/p. The 2N3553 needs heatsinking. Set the bias current for best linearity ( Ic about 100 mA). Check there is no thermal runaway & fit larger heatsink if necessary. The 1N4003 should be in thermal contact with the o/p transistor.

Incidentally, the J304/BSX19 stage makes a good Rx preamplifier if preceded by a filter circuit like the one used on the o/p; the turns ratio can be adjusted for best results

( 6m values are shown in parenthesis)

de John G8SEQ

# MEMBERS' NEWS

## by Chris Page, N4CJ (G4BUE)

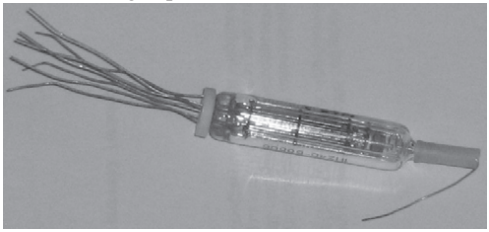
Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ
E-mail: chris@g4bue.com

Congratulations to Steve, **GØFUW**; Mike, **G3VTO** and Lewis, **G4YTN**, for running a very successful fourth Bath Buildathon in January with 13 superhet 20m receivers being completed in one day! The builders came from all over the UK and one even made the trip from France. Tim Walford did a special run of his 'Tone' kit for 20m. Gerald, **G4CLD**, was also in attendance with Ed, **MØOSM**, lending a hand with a Walford 'Brue' 80m CW TRX kit (the photograph below shows Gerald on the left with Ed).

Moan time says **GØEBQ**. Nigel writes, "I don't know if anyone else has noticed this but some people, and this includes some QRP stations, seem increasingly impatient and don't listen for more than a few seconds before calling CQ again. It is really bugging me lately! I can understand it in a contest to some extent but definitely not from a fellow QRP station who should be listening carefully for weak signals. Please listen, that's what I was always taught to do". What do you think about Nigel's comments? **GØNSL** found a website of e-books that includes an excellent 200+ page on QRP projects at <www.tech-systems-labs.com/books.htm>.

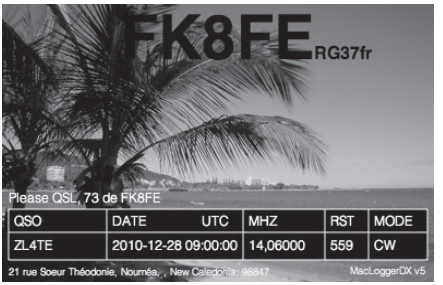
**G3XIZ** is one of several stations who have received a Special Research Permit from OfCom to perform experimental transmissions on VLF (8.7 to 9.1kHz) with power limited to 100mW EIRP. Chris has built a VLF exciter which uses a 2297kHz crystal oscillator divided by 256 in order to generate the required 8.97kHz square wave. His home brewed PA uses MOSFETs in series-parallel and will generate up to 150 watts of RF with a 24 volt supply. To load his antenna he has built a large wooden framed air-cored coil of two feet mean in diameter and wound with nearly 2000 turns of thin copper wire; its inductance is 1.3H. Chris has performed several experiments at lower power (about 20-30 watts RF) using his normal station's 131 feet end fed inverted L antenna and was received by his local friend **MØJXM** just under a mile away for the first official VLF cross-band QSO in the UK, Dennis transmitting on 2m. He then increased the height of the antenna with a helium balloon to launch a 164 feet vertical and was received by **MØFMT** at six miles and **MØBMU** at 23 miles, his best to date. Chris says that although his output power may appear not to qualify as 'QRP', **MØBMU** measured his ERP as being approximately 85 microwatts!

**G3XBM** has continued work on LF, with the 136kHz QRP transverter now completed and working well, and is now building a QRP transverter for 4m, a band he has never used with his own call, in time for the sporadic-E season. Roger is also continuing experiments on the Dreamer's Band (8-9kHz VLF) with definite reception on 8.97kHz of **DK7FC/P** (50-100mW ERP at 402 miles in December and February. On 4 December **DK7FC/P**'s 100mW ERP VLF signal was copied and recorded by **4X1RF** at an astounding distance of 1785 miles. Roger has also done some recent QRSS3 tests with **G6ALB**, 1.8 miles away on 8.76kHz VLF.



During the process of collecting 1.4V heater valves for a QRP project, **G3OOU** came across

the 1P24B on *eBay* late last year and bought ten (for £9 total including P&P) to play with. Bob says they were designed for use in Russian missiles and have an interesting reliability specification and what appears to be a hardened glass envelope. He suspects they were intended for 45-60MHz radar applications as they have a pulse rating as well as a continuous rating. They are wire ended, have a 1.2/2.4V heater (see photograph bottom of previous page) and will generate 1.4W continuous RF output with a Gm of 1.7mA/V minimum, which he says is quite high for a directly heated valve. Bob has a spec sheet if anyone is interested. He also found on-line references to a 1ZH37B, which is a wire ended low power receiving valve.



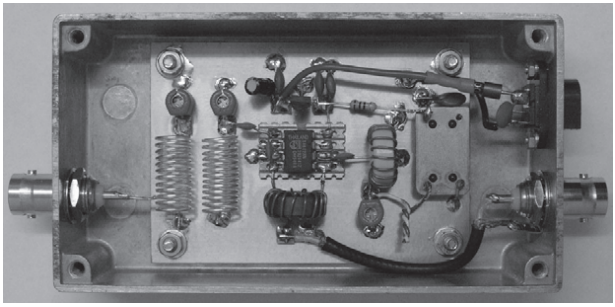

On the right is the QSL from **FK8FE** was received by **ZL4TE** for his 20m 5W QSO on 28 December. Pete says he was, "Terribly excited as I had just fired up the key for the first time in the best part of two years and made a slow and slightly creaky QRP QSO". In November, **LZ2RS** worked 5R, 5V, 5X, 5Z, 9Q, 9U, PJ6, ST, V3, VP5, VQ9, ZD8 and ZL8 on 10, 15 and 20m, and on 13 December **N2KW** heard his 10mW at 309 on 20m and at 409 on 15m! **W4DU** reports the QRP ARCI will celebrate its golden jubilee in 2011 by activating the club call **K6JSS** in all 50 states throughout the year. A special Worked All States certificate will be issued for QSOs with **K6JSS** in 20 states, see <http://www.qrparci.org/content/view/8371/118/>.

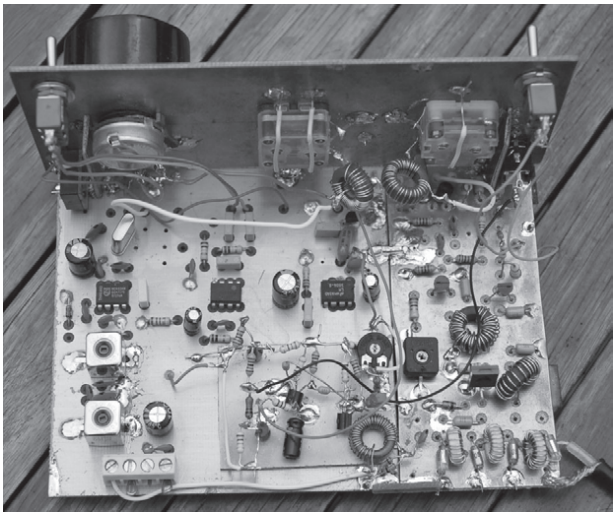
**K8WPE** finally got round to building the Sudden receiver kit he bought at FDIM in 2010 and says, "What a hoot! It works great and the audio is fantastic when the band it not too busy. Tuning it is a little touchy but very useable, even on SSB. I just received the Sudden transmitter kit and hope to have it built before the snow melts. I will use it at my cottage this summer with a Par Endfedz 40-20-10 antenna or a fishing pole vertical that I have on my deck there".

In September 2010, **RV3GM** and his wife Olga, **RA3GKB**, were invited by the Hawaii QRP Club and Big Island Amateur Radio Club (BIARC) to visit Big Island, Hawaii to celebrate their 30th wedding anniversary. Oleg, whose old friend **KH6B** supported them over the two week visit, writes, "We took part in the BIARC and Hilo ARC meetings where I made a presentation of the Russian Winter QRP Field Game 'Moroz - the Red Nose'. I enjoyed operating an Elecraft K1 as **ALØHA**, a special call sign from Moku Ola Island near Hilo Bay. Our next goals are a special QRP expedition to Moku Ola Island, Hawaii and Marshall Islands in July 2012 and meeting G-QRP Club friends at FDIM-2011". The photo above shows Olga and Oleg at the Waipio Lookout on Big Island, Hawaii.


**GM3OXX** had a 'magic time' in the 2010 CQWW CW Contest when he decided to have an 'all nighter' at the start of the contest. After working a few stations on 80m, George went to 40m and found the band open from South America to North America and worked some new band slots. The photo on the right shows some of the recent QSLs he has received. **GØEBQ'**s first QSO with his repaired Cub clone was a two-way QRP QSO with **VE3DJX** on 20m. **LZ1GL** says the LZ Open Contest on 15 January had QRP sections and no doubt will do the same in 2012.

**G4EDX** is back on 4m after 25 years (ever since he sold his Avenger motor car with a Pye AM Vanguard in the boot!) with the 4m receive converter he has built from SPRAT 145 (see photo right) running to a FT-817. John has found several amateurs active on 4m in his area and this has inspired him to dig out his Pye MX-294 which he bought ready-converted several years ago and never put on the air. It is now feeding about 18W into a dipole at the side of his desk which will soon be replaced by an end-fed half-wave antenna outside. He thanks **G8SEQ** for his very helpful advice and is now going to build John's single-channel 4m transceiver from SPRAT 60 and 61.





**GØFUW** has converted a Walford Compton 80m DC RX for 20m and coupled it to a homebrew Twofer TX for a bit of 'rockbound' work between Christmas and New Year (see photo right). Steve says one EA station refused to believe that his 2W into a dipole could be 599 in the Mediterranean! Steve also worked a good number of DLs on 40m on New Years Day with his homebrew Little Mate/Sudden transceiver. Congratulations to **MØGGK** for making his first QSO with his first homebrew rig (1.5W) on 3 January with **F6FTB** on 80m. Dave says, "I am chuffed as punch, ok it's not the best rig, but I made it and it works!". Congratulations also to **MØJBA** who won the 20m QRP Section for England in the 2009 CQWW WPX Contest by being the only entrant! John says, "I have done it again in 2010 using the same cunning strategy! A similar strategy also got me first place in the CQWW DX Contest and third place in the IOTA Contest. Why are there so few QRP entrants from England?". Does anyone know the answer?

**ZL3DWS** reports that Radio New Zealand National, who transmit across New Zealand, visited the 9th ZL3 Radio Buildathon on 15 January, and featured it in their program about amateur radio transmitted on 19 January. David says the 1.5mB audio file of the program can be downloaded at <http://sites.google.com/site/zl3buildathon/radionzinterview> and information about the Buildathon is at <http://sites.google.com/site/zl3buildathon/>. **KDØFNR** has added a new feature to the QSO mapping app that lets you put maps of your QSOs on your favourite social networking page, (Facebook, Twitter). Go to <http://copaseticflows.appspot.com/newqso> and map your call. Hamilton says after you hit the 'Map It!' button, you will be presented with a set of three buttons that will place a link to the map on your favourite site.


**G3JNB** reports, "The arrival of a delightful little *'Limerick'* for 40m (photo left). Her lilting CW song was pouring out a speaker when

Victor noticed that she seemed to be fluttering her Irish eyes at an elderly gentleman in the rack behind him. Yes...the 20/25 year old Oner TX, the station's 'TX Emeritus', was instantly smitten and, following a little discreet surgery involving a change of sockets, he stepped down to be introduced. The small matter of selectivity was solved when a distant cousin, one of the David Howes' boys, muscled in to offer his dual bandwidth filtering capability and we were good to go! A one watt QSO with **PA1MWU** said all was well but, Victor says, he had forgotten just how tricky crystal control is these days when so few stations bother to listen each side of their CQ frequency". I like the QRP key Victor!

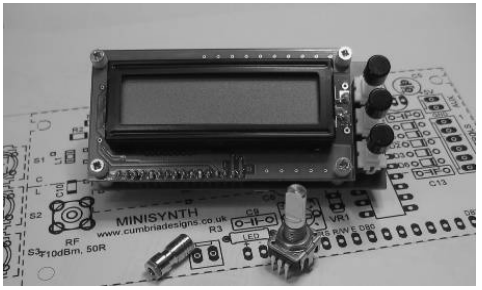
On 23 January **MØICW** was having his tea in the kitchen while listening on 80m with his Eton G3 portable and telescopic antenna, when he heard **G3ROO** calling CQ QRS at 599. Fred says he couldn't resist leaving a cup of tea to go cold and going through to the workshop/shack to tune up to make a, "Very welcome and unhurried QRS exchange of overs" with Ian. **G5CL** had worked 38 DXCC in 2011 as at 26 January with the best being **VY2NU** on 20m. The next day Ryan worked **1AØKM** on 40m and says, "I am overjoyed as in 25 years of radio, I have never ever heard a 1A station, let alone worked one with QRP!".

The Slovak Band of QRPers and Telegraphists will be organising their annual QRP rally on 14 May at Vrutky in northern Slovakia, details from G4FDC <alexanderkorda @hotmail.com> who says all are welcome. Alex attended the 2010 rally where much homebrew equipment was brought for display, including that of a Polish amateur in the picture above. The other picture shows OM6SA introducing another home made transceiver. **G4HZJ** reports the 2011 Red Rose QRP Festival will be held at Formby Hall, Atherton, Manchester on 5 June, and **W1REX** reports the Great Northern New England QRP Camporee & Sacrificial Crustacean Dismemberment of 2011, also known as 'Lobstercon2011', will be held at Brunswick, Maine 8/10 July. **GM4VKI** and the Scottish GQRP stall will be at the Magnum Rally in Irvine on 8 May 2011, but not at the Galashields Rally on 23 October as it clashes with the Rishworth Convention the day before. Roy says if any other Scottish rally would like them to visit to e-mail him at <rkavampsev@aol.com>.


**RV3GM** reminds us of the QRP Top Lists at <http://club72.su/qrplist/qrp.htm where there are world ratings for QRP DXCC Top list, Two-way QRP DXCC Top List, QRP WW Grids/Fields Top List and Two-way QRP WW Grids/Fields Top list. **GØFUW** says a couple of websites he has found quite inspirational of late are <http://kd1jv.qrpradio.com/>, especially the 'no chips' transceiver, and <http://www.theladderline.com/>, a nice application of dds with **W7ZOI**'s transmitter. **M5FRA** mentions the SDR Cube at <http://www.sdr-cube.com>. Colin says it is not simple or cheap but is innovative, small and QRP.

Thanks to everyone for their contributions and pictures, this column cannot exist without them. Please let me know how your spring goes, by 20 May, for SPRAT 147.

# KITS AND MODULES FROM CUMBRIA DESIGNS

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**Chesterfield, Derbys, S40 2QR**
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## 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)

**Look at 'www.celticpilgrim.com' for**
## 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.
Look on the webpage above or for leaflet write to G3RJV or email g3rjv@gqrp.co.uk

# 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 | } £1.50 (UK); or £3.60 EU |
| **Radio Projects volumes 2, 3 & 4** – by Drew Diamond – members £5, non-members £10 | } or £5.80 DX per book |
| **6 pole 9MHz SSB crystal filter** 2.2kHz @ 6 dB, 500ohm in/out **£12 plus post** | } £1.40 (UK); £1.60 EU |
| **Polyvaricon capacitors** – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft ext & mtg screws - **£1.20 each** | } £2.20p (DX) |
| **Pair LSB/USB carrier crystals HC18U wires -** [9MHz ± 1.5kHz] **£4 pair** | } **All components** |
| **HC49U** (wire) crystals for all **CW** calling freqs – 1.836, 3,560, 7.015, | } plus **postage** |
| 7.028, 7,030, 7.040, 7.122, 10.106, 10.116, 14,060, 18,096, 21.060, | } **(ANY quantity)** |
| 24,906, & 28,060 : DSB on 40m – 7.159MHz all are **£2.00 each** | } £1 (UK), |
| **HC49U** (wire) crystals – 1.8432MHz, 10.111MHz – **50p each** | } £1.60p EU, |
| **HC49** (wire) crystals – 3.500, 3.579, 3.5756, 3.5820, 3.6864, 4.000MHz | } £2.20p (DX) |
| 4.1943, 4.433, 5.00, 6.00, 7.00, 8.00, 10.0, 12.00, 13.50, 25.00MHz | } If |
| 27.00, 28.500, 32.00, 35.50, 43.00MHz – **all 30p each** | } ordered |
| **Ceramic resonators –** 455kHz, 2.0MHz, 3.58MHz, 3.68MHz & 14.30MHz **– 50p each** | } with |
| **Schottky signal diode – 1N5711** low fwd volts for up to vhf/uhf **20p each** } | } toroids, |
| **General Purpose silicon diode - 1N4148 10 for 10p** | } |
| **Varicap diodes** – **MVAM109** – 40pF @ 9v, 500pF @ 1v. **50p each** } max of 2 of | } binders, |
| – **MV209** – 5pF @ 12V, 40pF @ 1V **35p each** } each per member | } or |
| **SA602AN - £1.50** (note – I may supply NE or SA, 602 or 612 as available. All are fully interchangeable. | } filters, |
| **MC1350 - £2.00** | } use |
| **PICAXE-08M – as used in Rex's kits – 8pin - £2 each** | } that |
| **LM386N-1 -** 4 to 15v, 300mW, 8pin **DIL - £0.40 each** | } postage |
| **LM386M-1 -** 4 to 15v, 300mW, 8pin **SMD** [0.2" (4mm) x 0.25" (5mm)]- **£0.35 ea** | } |
| **TDA7052A -** 4.5 to 18v, 1W 8pin **DIL** low noise DC vol control – **£0.60 each** | } If |
| **CA741** op-amps 8pin DIL **– 5 for £1** | } ordered |
| **TA-7642 Radio IC –** direct equivalent of **MK484** (& ZN414) – **75p each** | } with books |
| **2SC536 transistors (npn)** fT - 100MHz, hFE-320, VCBO +40V **- 5 for 50p** | } or CDs |
| **MPSA92 transistors (pnp)** fT - 50MHz, hFE-40, VCBO -300V **- 5 for 50p** | } add this |
| **2N3904 transistors (npn)** fT - 300MHz, hFE-150, VCBO +40V **- 10 for 50p** | } postage |
| **2N3906 transistors (pnp)** fT - 250MHz, hFE-150, VCBO -40V **- 10 for 50p** | } as they do |
| **2N3819 N channel JFET – 12p each; 2N7000 N channel MOSFETs - 10p each** | } do not travel |
| **IRF510 FETs - £1.00** | } well together |
| **10K 10mm coils still available as the recent issue - all 75p each** | } |

**Toroid Cores** – **priced per pack of 5 – max of 2 packs of each per member**

**T25-2 – 50p, T25-6 – 60p, T30-2 – 60p; T30-6 – 70p ; T37-2 – 75p; T37-6 – 80p; 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 ; T50-43 - £1.20 ; FT37-61 - £1.20 ; FT50-61 - £1.20; BN43-2402 - £1.20; BN43-202 - £2.00; BN43-302 - £2.00; BN61-202 - £2.00**

**Ferrite beads – FB73-101 (3.5mm dia x 3.2mm long, 1.2mm dia hole) – 40p for 5**

**All toroids are plus postage – up to 5 packs = £1.00UK), £1.60 (EU), £2.20 (DX). Each additional 5 packs, please add 50% of the same postage. (Please note – if you order 2 packs of any type – you will probably get all 10 in one pack).**

| | |
|---|---|
| **Magnet Wire – 20, 22 SWG – 3 metres for 60p; 24, 25, 27SWG – 4 metres for 40p;** | } postage |
| **30, 33, 35SWG – 5 metres for 30p. This is solderable enamel insulated** | } |
| **max of 3 sizes per member (I have to measure and wind this!)** | } as |
| **Axial lead inductors** (they look like fat ¼W resistors) these are low current – a few hundred mA | } |
| **4.7uH, 6.8uH, 10uH, 15uH, 18uH, 22uH, 33uH, 39uH, 47uH and 100uH - all 15p each.** | } components |

**Limerick Sudden kits** RX (80 through 20m); TX (40m only) **£34.00 each plus post** UK - £2.50, Eu - £3.50, DX - £5.00

**Binders for Sprat** - the original 'nylon string' binding type! Black with club logo on spine **£3.75 each plus postage** (one: UK – £1.40, EU – £2.20, DX - £3.00. More – add £1, £1.20, £2.00 each)

**Sprat-on-CD V4 – 1 to 140** (see Sprat 140) – members price - £4 plus post: UK - £1.00, Eu - £1.60, DX - £2.20

**Please note -** I only have stock of the above items – I do not sell anything else. Anything in previous advertisements and not shown above (except coils) is out of stock – if it becomes available again – it will be in the next magazine. The PDF on the sales page of the club website is usually up-to-date (check the date at the bottom!)

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

**MINIMUM ORDER for cheque or PayPal payments is £5** **For orders less than £5 – please use postage stamps (any denomination £1 or less please) - any quantity of stamps is OK, or cash. I can accept cash in GBPounds, or US$/ €uros (at the current exchange rates) – but please send securely! You can order via e-mail and pay by PayPal. Use g3mfj @ gqrp.co.uk – pay me in GBPounds and you MUST include your membership number and address please**