SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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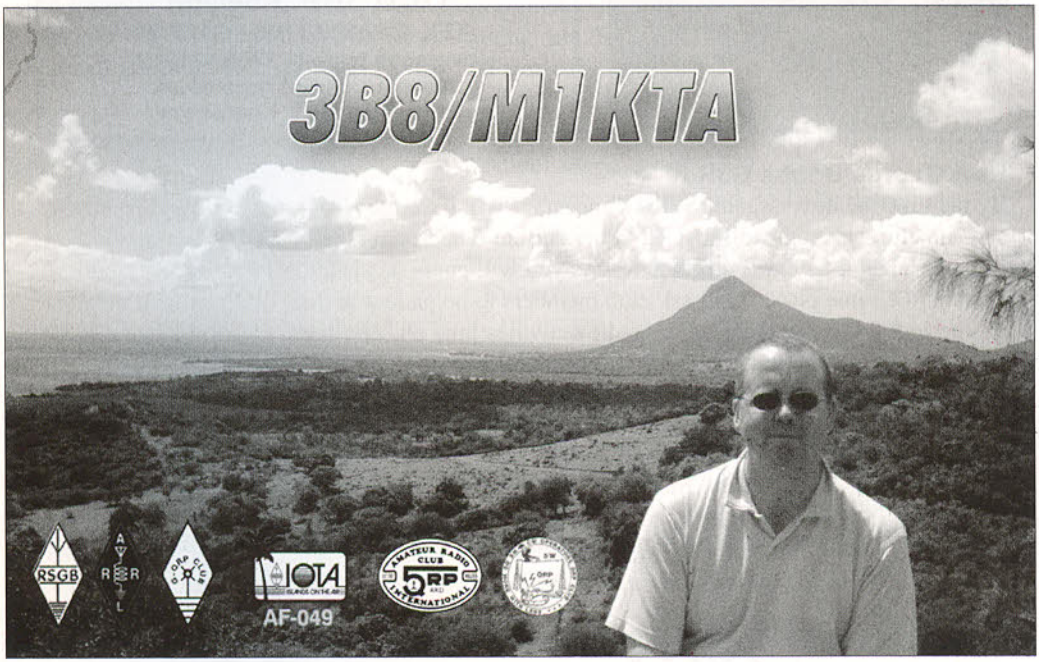

Dom Baines M1KTA on his QPR Expedition to Mauritius

The DDS60 ~ All Continents Tube Receiver
Experimental Crystal Radio ~ 160m Linear ~ Low Cost QSK
Active Receiving Loop ~ Hand Crank Power Part 2
Surface Mount Measuring Tweezers ~ Polyvaricon Knobs
USB Controlled Synthesizer ~ Different Type of QRP
Toroid Inductance Chart ~ 3B8/M1KTA in Mauritius
Antenna – Anecdotes – Awards
Communications & Contests ~ Member's News
THE G QRP CLUB MINI-CONVENTION 2008

JOURNAL OF THE G QRP CLUB

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Rev. George Dobbs G3RJV

By the time the next issue of SPRAT appears, I will have moved. I retire at the end of July and sometime in August I move from my current 6 bedroom house to a 3 bedroom house in Littleborough, a few miles from here. As you will guess this is a great upheaval after 24 years in the same place. So I ask club members to be patient in their dealings with me over this period. I have to organise my radio activities [and all activities!] to suit the new QTH. I will also be without internet for a while during a change of ISP. Graham, G3MFJ, has kindly offered to help with the autumn issue of SPRAT.

I am pleased to award the W1FB trophy for 2007/8 to Mitchell Lee, KB6FPW for his two interesting articles on using a hand crank generator as a power source. The competition for 2008/9 is outlined below.

Plan now for the new Mini-Convention in October – See later this issue

72/3

G3RJV

The W1FB Memorial Award 2008/9

For 2008/9, the project is to **Design a piece of Test Equipment of practical use in a QRP Station**

Please submit your design to G3RJV as soon as possible, with circuit diagrams, all values and brief notes.

The project will be published in SPRAT and the winner will receive an engraved plaque.

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The DDS60 Direct Digital Synthesiser

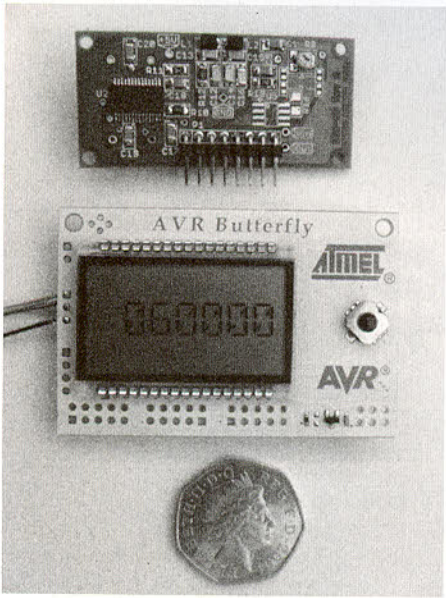
Mike Bowthorpe G0CVZ,

The use of this technology allows the construction of a VFO or signal generator for up to 60 MHz very cheaply and effectively

There are 2 parts on this project ~ an Amtel AD9851 DDS chip on a DDS60 board and an Amtel AVR Butterfly demo board.

The AD9851 is the VFO itself and the Butterfly board is the frequency display and controller

One of the simplest ways of controlling the Amtel AD9851 DDS chip is with free software from KD1JV. This provides a VFO for 160 to 6 meter band with QRP CW operating frequencies preprogrammed, user programmable IF offset frequency for use in superhet receiver, 10 Hz to 10 kHz selectable tuning rate, RIT / XIT, Iambic "A" mode keyer, receiver audio mute, transmitter keying and side tone outputs.



The Butterfly controller board is fitted with an Amtel Mega169 AVR PIC, memory, display; 3V battery, joystick and RS232 connection. For manufactures details see http://www.atmel.com/ and search for Butterfly

The Butterfly is available in UK from http://www.rapidonline.com/ part number 73-4264, Atmel Microcontrollers, AVR Butterfly LCD demo kit. Price £14 + shipping & VAT or in the USA from www.Digikey.com (BUT beware shipping to the UK has a $30'ish handling charge! I am not sure if this applies to the USA) or www.smileymicros.com

The software for the Butterfly demo kit for HF coverage is from http://kd1jv.qrpradio.com/butterfly/bflydds.HTM but make sure you read this first http://kd1jv.qrpradio.com/AVRbootloader.HTM

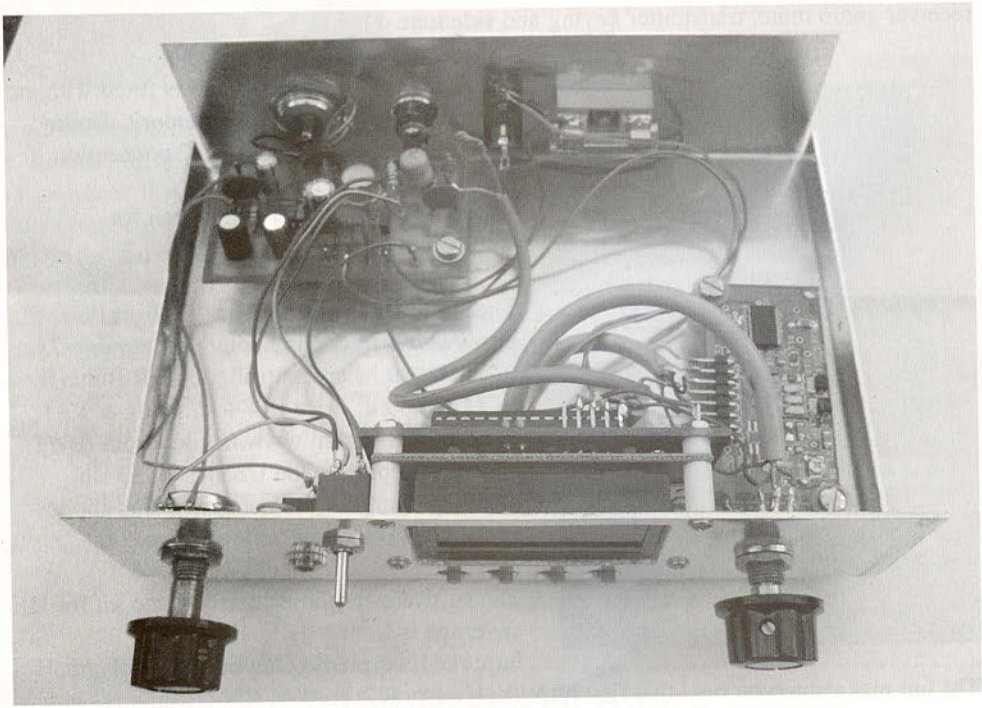
The DDS60 board and parts (excluding the AD9851) is $34 including shipping to the UK and is available from http://www.amqrp.org/kits/dds60/index.html or http://www.njqrp.org/dds/index.html

To get free samples of AD9851 (you can get 2 maximum) from Analogue Devices at http://www.analog.com/en/prod/0,2877,AD9851,00.html

Soldering the AD9851 to the DDS60 board is a little tricky. Make sure you have the chip the correct way round on the board and with 2 blobs of blue tack hold it down from the top, solder tack the 4 corner pins of the chip to the board, check everything is correct and

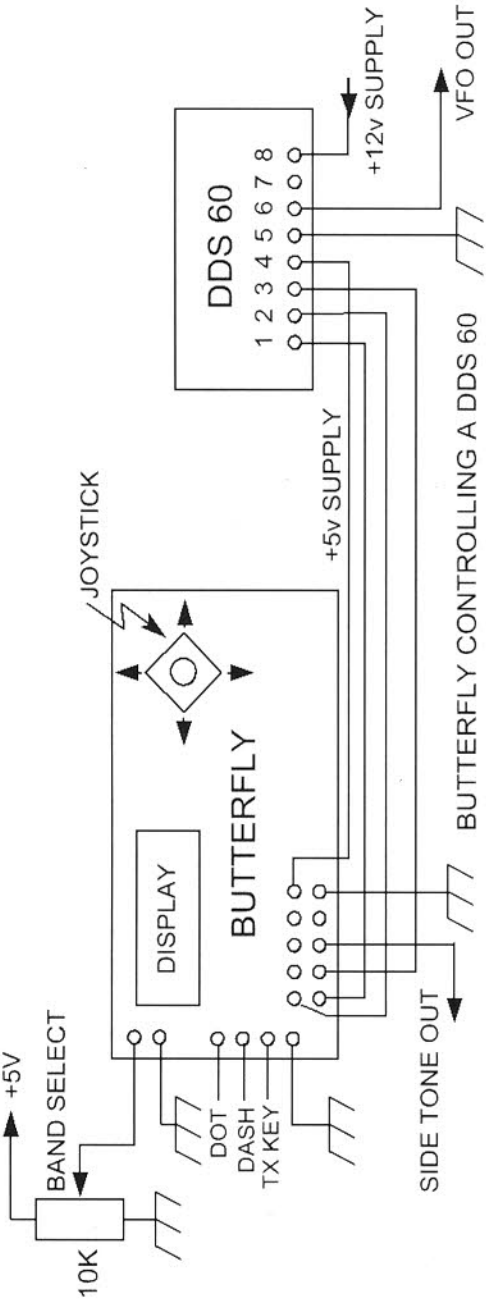
then lightly press the chip to the board and resolder each corner again making sure the chip is hard down on the board. Then solder all the pins together on one side and then the other ~ yes just flood each side and solder everything! Then using some Maplins RE94C (1.5mm wide with flux) desoldering braid soak up the solder between each pin ~ see this as a guide http://www.sparkfun.com/commerce/present.php?p=SMD-HowTo-2
I lay the desoldering braid all down one side and try to remove all the surplus solder in one go. Practice on a similar chip first if you are not too sure. The important tools are having quality fluxed desoldering braid and a temperature controlled iron preferably with a new tip!

Clean up with a toothbrush and some solder flux. Check that you have not left pins connected by looking at the chip from the side and looking behind the pins. From experience you are more likely to have left pins connected at the end of the chip than in the middle. So for about £38 you have a digital HF VFO including display and controls



For a slightly different slant on DDS from India see
http://www.hamradioindia.org/circuits/dds.php

When uploading the KD1JV software to Butterfly using your USB to serial interface ~ if you cannot communicate with the Butterfly then do not assume that your serial to USB lead in not capable of communicating ~ it maybe that your computer is not configured correctly ~ see http://www.windmill.co.uk/usb-serial.html



The Butterfly is programmed to suit any application. In fact the Butterfly comes pre-programmed with a demo to show what the board is capable of. The memory is a flash memory which can be re-written which makes it great for development. All we do is re-programme it with the software from KD1JV and then wire link the 2 boards together.

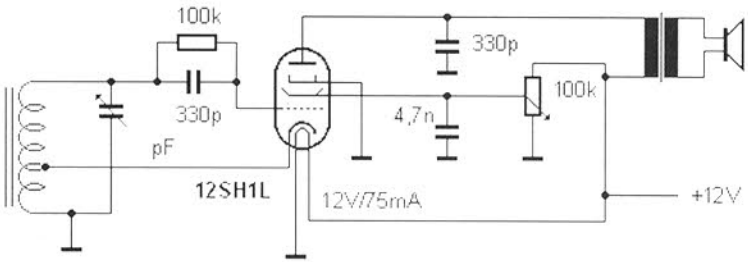
The complier for the Butterfly is available for free ~ so all you clever guys who can write software let's have some great ideas from you.

This is a very cheap way to get more from your QRP rigs, test equipment, plus all the other ideas you may have. So let's get creative guys!

"All Continents" - a one tube shortwave receiver, operating on 12 volts and matched for 32Ω headphones!

Klaus Kleinebekl DH3FAA, Feldbergstrasse 53b. D-61440 Oberursel. Germany

This is the one for you tube-novices and enthusiasts: Just 12 volts for filament and plate, just 75 mA of current (environment-friendly!), definitively no hand capacitance, great volume using just your regular stereo-headphones and no alignment required! I took the circuit from well-known schematics and finally added some modifications. Basically the receiver is a "pentode-audion", feedback is provided by a tap of the tuning coil to the cathode and the voltage regulation of the second grid. It covers 5+ up to 10+ MHZ, thereby receiving the worldwide active shortwave-bands ("All Continents") plus the cw and ssb portions. Build it, you will have impressive results!
I use very cheap headphones ("OVANN", = OV030V, 32 ohms, 108 db, China), which produce outstanding volume and sensitivity. So try your own favourites but also different ones...!



The circuit explains itself and requires no pcb, as all of the few parts are soldered to the solder-lugs of the tube socket and capacitor.
To start with the above mentioned output: A step-down transformer (220 volts : 6 volts, 1,8 VA) is used to match the headphones to the high impedance of the anode. Next comes the tube, which is a russian 12SH1L (NOS), a multi-purpose pentode, rock-proof, solid and reliable. Both, filament and anode voltage are taken from the same power-supply...battery, akku, wall-plug, solar....remember, this one needs just 75 mA - hard to beat!
The single tuned circuit employs a T-68-2 Amidon toroid - one of the major modifications (normally you find an air-wound coil in these circuits as a "must"). 20 turns of copper wire are just right, take what you have got, the thicker the wire the better! For the inductive antenna coupling two turns work great, for even more selectivity just try one turn!
The regeneration-tap of the tuning coil is at the second turn above the grounded end - try first turn (!) and third turn too, and simply check for best feedback and performance!
Antenna? About 5m indoors here in my room....I can't count the stations received in the early evening - but do not "forget" a ground connection ! Use the water-pipe, central heating or at least a couple of ground wires..at least!
The tuning capacitor has 385 pf and an integrated 8:1 reduction drive ("vernier")....do not try to cut corners here! The best is never good enough!

A quality capacitor like this one makes you tune in the stations "one by one"....free of any hand capacitance...thanks to Amidon! The 100k-pot? Linear, as it makes the regeneration so smoooooth....

The hardest part now - where to get the tube and its socket?

The 12SH1L: EBAY, the tube is sold quite cheap, shipping cost will exceed its price. The tube comes in an aluminium can....looks poor, unless you set it free...then you have one of the most beautiful ones ever seen!

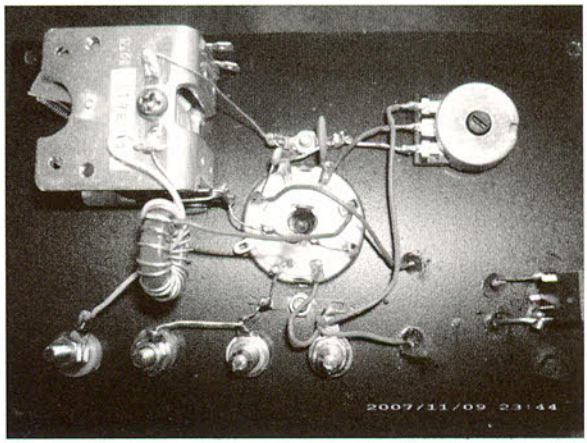
The socket: EBAY, but be careful - you will need a so called "loctal" socket for this tube and most tube sellers do not sell the sockets together with the tube! Be aware that the socket is often more expensive than the tube!

Due to a past group-project I have an amount of complete kits for my "All Continets" (yes, I named it!), including all parts and a very solid, bottomed bleechwood case (15 x 10 x 5 cm, unfinished), fitting mounting lid and English instruction - see advert below and the picture.

ADVERTISEMENT
"All Continents" -one tube (12 volts) shortwave receiver kit

Complete kit with 12SH1L tube, loctal-socket, variable capacitor with 8:1 reduction drive, large tuning-knob, Amidon toroid coil, transformer, solid bleechwood case (unfinished) with fitting mounting-lid and drilling pattern, R/C parts, mounting screws, solder-lugs, etc., english instruction:
50,00 EURO **plus** actual shipping cost (UPS only) - no handling/packaging charge!
12 volt power-supply, headphones and antenna-wire are **not** included!

Please do not ask for individual parts (tube/socket/variable capacitor etc.) only complete kits can be purchased!
All payment and ordering details and UPS shipping charges:
email audionradio@web.de

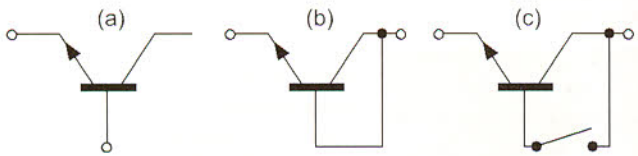


Experimental Crystal Radio

Rudolf Burse DK2RS, Zahringerplatz 2, 78464 Konstanz, Germany

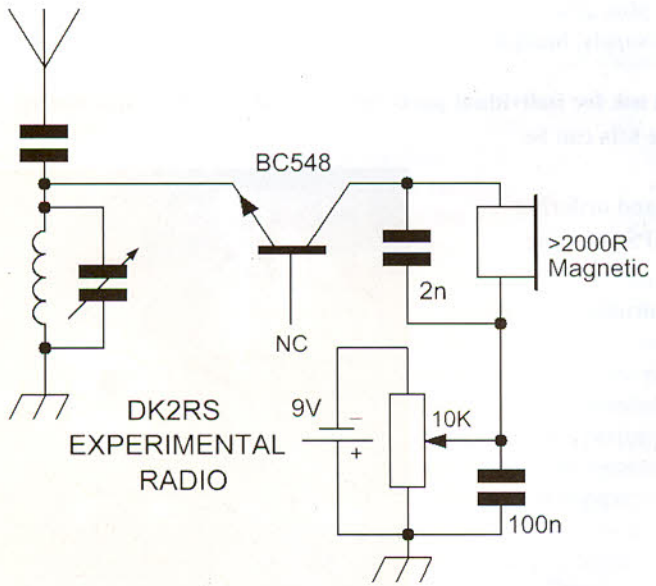
The crystal set is part of radio history since Dr. Greenleaf Whittier (1902). The extensive use of galena later eliminated the bias battery of the standard wireless apparatus.

I did a lot of experimenting with LEDs and Transistors in crystal sets. They need a bias voltage. Further experimenting led to reverse bias!



(a), (b) and (c) show the evolution of my experiments with reverse bias voltage.

The result is a crystal set with good performance. The demodulator is an NPN transistor (BC548) as in (c) switch open (off)
The coil and variable capacitor are as in other crystal sets. It is important to use a fresh 9 volt battery (9.4V!)



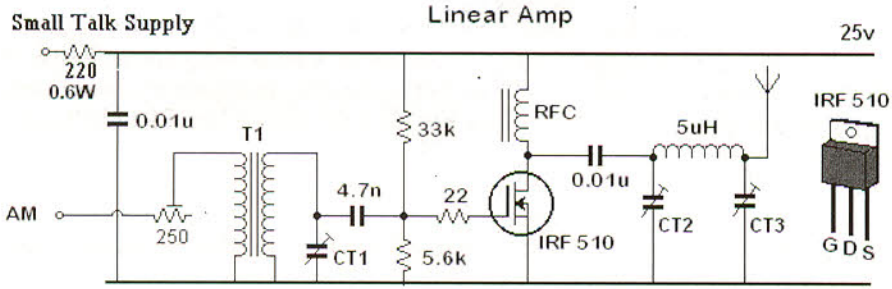
160m Linear Amplifier (for the Small Talk – issue 133)

Peter Howard G4UMB, 63 West Bradford Rd Waddington Clitheroe BB7 3JD

This is a circuit of a simple Linear Amplifier for 160M I made to go with the Small Talk AM Transmitter from Sprat 133. It is much safer and cheaper than the high voltage valve one in the original article and gives an output of 3.5W. The trimmer capacitors were actually made from a selection of fixed capacitors. T1 and the RFC are wound on jumbo ferrite beads from 26swg wire. The secondary winding of T1 is adjusted to suit the selected fixed capacitors. The 5uH coil is 15 turns of small equipment wire on a piece of 20mm plastic water pipe. The transistor is clamped to the 25x10mm iron bar underneath the PCB. Note that the tab of the transistor is also the drain connection so you may want to insulate the transistor from the heat sink.

Setting Up: With the Small Talk Transmitter connected and the input trimmer resistor set to half way CT1/T1 are chosen for maximum resonance (An oscilloscope is useful to show this) The same procedure is used to tune the PI Filter into a dummy load. Adjust the trimmer resistor for a supply current of 400mA. This should rise to 800mA on voice peaks

It is important to adjust the trimmer resistor correctly to ensure you get the right depth of upwards modulation. If it's set too low in value you will get higher carrier wave power (10W) and downwards modulation which isn't how it is supposed to work.



Low Cost Full-QSK T/R Sequencer

Gert de Gooijer, PA3CRC, St. Adrianusstraat 81, 5614 EN Eindhoven

Building receivers, transceivers and transmitters, the T/R switching is often a bit like: *"Oh yes, that we also needed"* and treated in that way. Especially when you want to go full-QSK, timing between several steps in changing over from receive to transmit and vice-versa is crucial. This simple circuit performs the functions in the right order. And it is low-cost too! There are some milliseconds between each step.

ON PRESSING THE KEY:

-1- RX-mute (and TX pre-stages) goes high, thus killing all thumbs
-2- Antenna relay closes
-3- Keying TX goes high *(=transmit carrier)*

ON RELEASING THE KEY:

-1- Keying TX goes low *(=stop carrier)*
-2- Antenna relay opens
-3- RX-mute (and TX pre-stages) goes low, the receiver revives

TIMING

When you close the switch you get semi-break-in, so pressing the key will switch immediately to TX-mode and will not return to RX but after you release the key for a second or so. The 22uF sets this timing. If you do not close the switch it is all full-QSK. Use a scope and make measurements on the actual timing with the relay you are using. If the relay is fast enough there will never be RF before the relay is completely closed. Ans RF is removed before the relay opens. (check key shaping). So you can use a small and fast (and cheap!) relay.

AGC

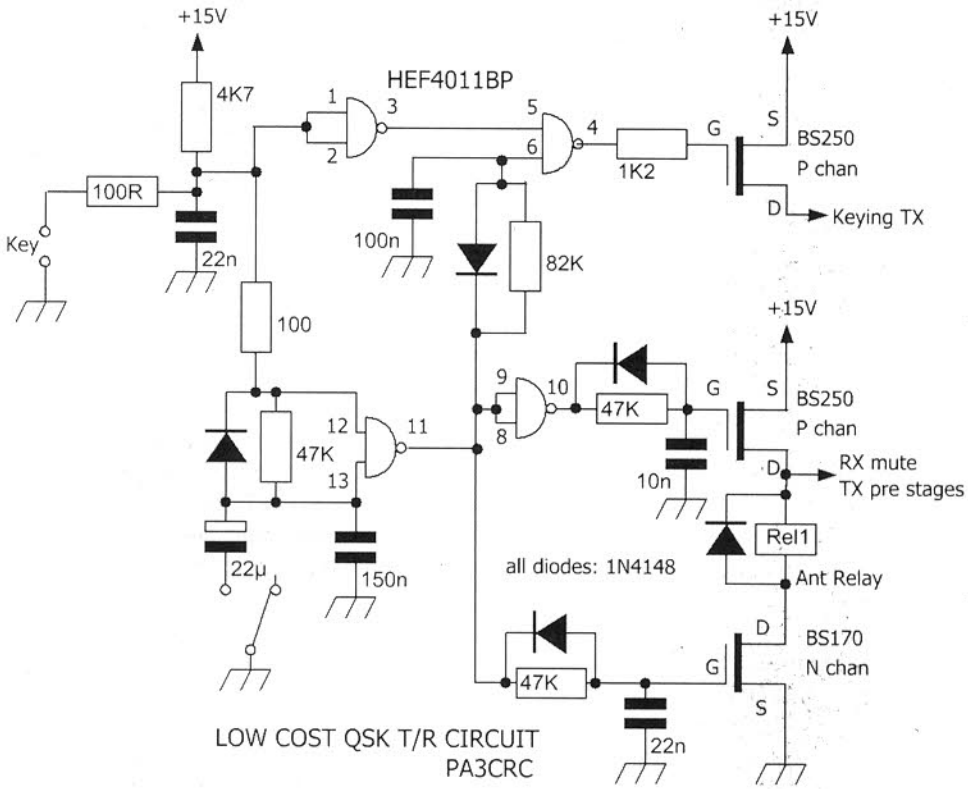
If you are using AGC, make sure you kill it during the muting and that "un-muting" does not trip the AGC-line. I find this the difficult part of QSK!

NOTES

You can use the circuit with 10...15 volt supply voltage with the chosen mosfets. Note that the BS250 are P-channel fets (compare PNP transistors, so source is positive and drain is negative!). The BS170 is a normal N-channel. With these fets you can go up to some hundreds of mA.

I used this circuit in several transceivers, never gave me problems, but I always check the timing of the relay. Used the HEF4011BP (=Philips, I live in Eindhoven). Some cmos might not work because the IC is used in "an analogue way". In doubt, use nands with schmitt-trigger action. With me the HEF always does the job.

You *must* use key-shaping timing constants in the keying-TX line. This all depends on the TX-circuit you use. Check the shape on the actual RF with a scope and than with a station nearby!



Derry Spittle – VE7QK

We regret to announce the death of Derry on March 22nd.
The G QRP Club will miss Derry as a real QRP enthusiast.
Many people had their first taste of building an SSB transceiver through Derry's fine work on the **Epiphyte Transceiver** series.
Those who attended the Rochdale convention will remember his enthusiasm and spirit ..... and his love of fine English beers.

FOR SALE: Hands RTX-109 80m-10m SSB-TRX w. DDS-VFO, 320.ooEuro. Hands GQ+ 160m-10m CW only-TRX w. DDS-VFO, 350.ooEuro. Collins 635U-2 preselector, tested! but no cables, 300.ooEuro. A. Knott, DD3LY, dd3ly@arcor.de, 0049-431-89353

A Wide Bandwidth Active Loop Receiving Antenna.

With acknowledgement to the original design by John (G8CQX).
Des. Kostryca (M0AYF) 9 Cherry Tree Road, Gainsborough, Lincolnshire. DN21 1RG

Until a few years ago my QTH might have been described as "quiet" but due to the local proliferation of computers and other "high-tech" gadgets the LF, MF and lower HF bands have now become "swamped" with local QRM. Receiving weak signals or having QSO's became very difficult.

The combination of local QRM coupled with a requirement for a wide bandwidth antenna suitable for general SW listening prompted experimentation with several types of "active" antenna. Tests with several "active whip" antennas proved unsatisfactory. While they possessed the wide bandwidth capability desired they offered little or no improvement in signal-to-noise ratio. In all cases the antennas had been located outside some 20 Metres away from the house as far away as possible from local noise sources. Correctly balanced dipole antennas offered a partial solution to the problem but due to lack of space a full sized dipole for bands below 40 Mtrs was not practical. Shortened or loaded dipoles would function well on receive but proved to be poor radiators for transmitting. By contrast, a long wire antenna resonated against a counterpoise proved to be an effective radiator on the lower HF bands but picked up high levels of local QRM while receiving. I decided an effective solution might be the use of two antennas, a long wire as a TX radiator and a separate receiving antenna in the form of a balanced active loop. The switching between the two antennas accomplished using an antenna relay controlled by the rigs PTT line.

The best performing receive antenna tested was an active loop design by John (G8CQX) upon which my receiving antenna is based. I was particularly impressed by the stability of Johns amplifier design regardless of the construction methods used. Initial daytime tests with a 1 Mtr diameter loop proved the loops ability to receive signals over several octaves and with much reduced local QRM levels. However, tests after dark revealed overloading of the loop amplifier from powerful SW broadcast stations. The cure for the signal over-loading was to increase the standing current in the loop amplifier devices taking care not to exceed the safe collector power dissipation. The resulting modified loop amplifier no longer overloads even with an increased loop diameter of 1.5 Metres or more. The loop diameter of 1.5 Metres was found to be optimal at my QTH. The active loop antenna has now been thoroughly evaluated over a two and a half year period with very pleasing results. A nice feature of the broad bandwidth loop is that no re-tuning or adjustments are required to the antenna when changing bands.

Circuit details and construction notes.

Minor modifications have been made to John's original design to protect the loop amplifier when used in conjunction with a transmitter and to improve the strong signal handling capability. The construction of the amplifier does not appear to be very critical and four versions have been successfully built using various methods of construction. The

first used breadboard construction, the second and third built over a ground plane while the current version is built on a scrap of strip board. I have successfully used various devices including 2N222, 2N3866 and BC337's. The current version is fitted with a pair of unmatched BC337's and has been in regular use for over two years. BC337 devices have been used simply because I have a good stock of these in the junk box. Both of the transistors run with 30 mA of collector current requiring a small heat-sink to be glued to each device. The loop itself is made from multi-strand (1.5 square mm) flexible wire supported on a pentagonal frame made from plastic electrical conduit. The relay shown in the loop amplifier circuit diagram protects the devices from strong signals due to the loops close proximity to the transmitting antenna. The relay has normally open contacts which close when the amplifier is powered up for receiving and open when the power is removed for transmitting or when the loop is not in use. The relay type is not critical though it should have low contact resistance. The diode (D1) across the relay coil protects the rest of the circuit from the relay coils reverse E.M.F. when the power is removed and also acts as reverse polarity protection. While nothing can protect the antenna from a direct lightening strike the open relay contacts do offer some protection from surges caused by nearby thunderstorms. The loop also has a gas discharge device connected across its terminals providing a second line of defence against surges. The discharge device itself was salvaged from an old modem. Provision has also been made to disconnect the coax cable at the antenna end to prevent currents induced in the coax from damaging the loop amplifier during thunderstorms. Transformer (T1) serves a dual function of both RF transformer and R.F. choke.

Because most of the local QRM is thought to be due to conducted and radiated emissions from the mains wiring it was decided to place the antenna outside at the bottom of the garden as far away from the local noise sources as possible. The signal is fed back to the shack via 20 Mtrs of RG58 A/U coax. The same coax provides a +12 Volts DC supply from the shack to power the loop amplifier. The supply unit to feed power down the coax follows standard practice except for the optional inductor "L2" (see loop amplifier supply circuit) which is to prevent "surges" or DC from entering the receiver antenna input in the event of the DC blocking capacitor (C1) failing. The loop amplifier is mounted in a "chunky" alloy box with all cable entry/exit points sealed with a waterproof sealant. Two small bags of "Silica-Gel" (desiccant) have been included to reduce residual moisture and condensation within the enclosure. An L.E.D is also fitted to the enclosure to confirm the power is present. When used for SW listening the loop is powered from a "wall wart" power unit, when the loop is used for transmit/receive activity power is taken from the rig's PSU via a separate unit (not shown) which provides both antenna and supply switching.

Possible improvements and things to try.

In order to improve the antennas high frequency performance it may be worth trying different devices with a higher frequency cut-off and/or a lower noise figure. Using a pair of matched devices may also give improved performance by virtue of the reduced distortion. Using devices capable of higher collector dissipation it should be possible to increase the standing current and further improve large signal capability. In an e-mail exchange John (G8CQX) pointed out that *"If you keep the collector resistors high and*

double the supply voltage you might find it works better as the increased open loop voltage gain will increase the feedback and reduce the input impedance further improving the linearity of the amplifier". During the testing phase it was found that a good test for overloading was to listen around 28 MHz after dark when the 10 Metre band is normally closed. Assuming you are using a receiver with good dynamic range then any trace of broadcast stations on that frequency might indicate overloading within the loop amplifier or distortion due to a pair of badly mismatched devices.

My loop antenna is at a height of 1.8 Mtrs and some improvement in performance might be expected with increased height. The loop also displays some directivity (particularly on the lower bands) making it possible to "null" some sources of interference or strong broadcast signals by rotation of the loop. Any directivity observed on broadcast signals in daytime all but disappears after dark as the sky-wave propagation increases. I would avoid making the loop much larger than the 1.5 Mtr diameter quoted, while a larger diameter improves the strength of lower frequency signals it risks overloading of the loop amplifier due to strong SW broadcast signals.

Closing comments.

Using the receiving loop described it is again possible to enjoy general SW listening and operation on the lower HF amateur bands thanks to the significant reduction in the level of QRM. As an example, using a long wire antenna noise on the 80 Mtr band was typically S8, the loop has reduced this to S1 or better. The loop has been successfully used to receive signals from L.F. (60 kHz MSF time signals) to 30 MHz. The receiving loop has also proved successful for receiving very weak signals associated with QRSS operation within the 30 Mtr band. If you are also troubled by local QRM sources on the lower HF bands then give this antenna a try, you may be pleasantly surprised at the results.

My thanks to John (G8CQX) for giving his permission to reference his excellent design.

73 de Des (M0AYF G-QRP 9788)

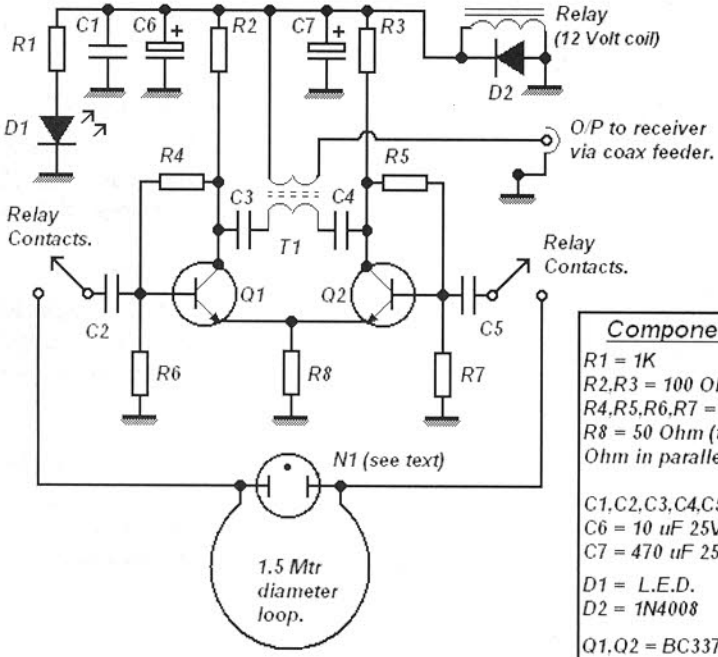
References.

Radio Communication June 1986 (Technical Topics column)
"HF active receiving loop antenna" by John Hawes, G4UAZ (now G8CQX)

http://www.qrss.thersgb.net/active-loop-receiving-antenna.html
A supplement to this article including several images of the final design.

Feedback & "heckles" to...

d29602960@yahoo.co.uk



Loop amplifier circuit.

Component list.

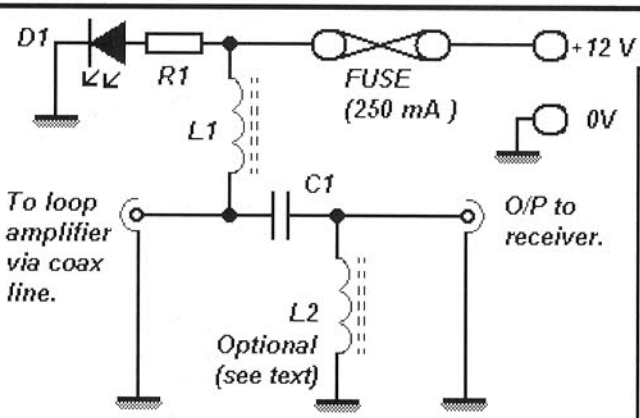
R1 = 1K
R2,R3 = 100 Ohm
R4,R5,R6,R7 = 4K7
R8 = 50 Ohm (two 100 Ohm in parallel)

C1,C2,C3,C4,C5 = 100 nF
C6 = 10 uF 25V (Tant')
C7 = 470 uF 25V

D1 = L.E.D.
D2 = 1N4008

Q1,Q2 = BC337

T1 = 10 turns wound bi-filer on FT37-43 core.



Component list.

R1 = 1K
C1 = 100 nF
D1 = L.E.D.
L1, L2 = 10 to 15 turns on T37-43 core.

Fuse = 250 mA "Quick Blow" type.

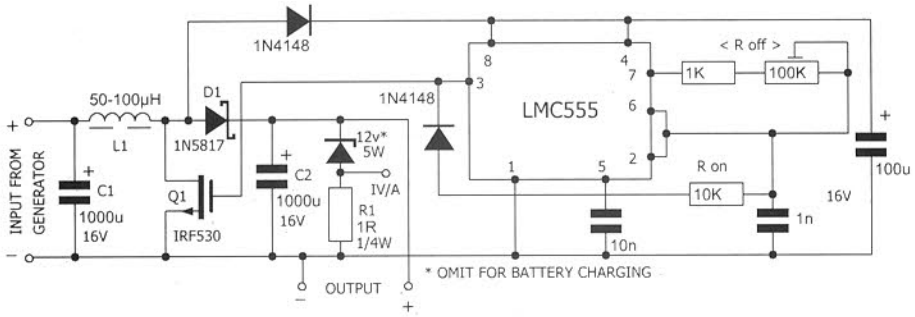
Loop amplifier supply circuit.

Hand-Crank Generator Power Supply [Part 2]

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

Imagine my surprise and delight when what should I find under Christmas tree? Another hand crank flashlight (torch). Just as last year, as soon as Santa Claus had made his exit the screwdriver was out and I peered inside my new flashlight. It had more features: two light levels, a siren, a scanning FM receiver, a real super capacitor and most importantly, a cell charger output with a 1.3mm barrel connector. A quick check of the charger output led to disappointment. This flashlight light contained a 6V, motor, not 12V. No amount of cranking would produce a usable output. Nevertheless, 3W was easily available at around 5- to 6V. A switching regulator would be necessary to boost the output to 12V where charging operating could take place.

Although countless integrated switching regulators are readily available, the hand crank generator called for a slightly different control algorithm. I wanted a voltage amplifier, one which took a 5 or 6V input and more than doubled this value to 12 to 14V. A fixed duty factor, shunt regulated topology took shape. If you were excited by Part 1 of this article, only to have your enthusiasm dashed by a sullen lack of voltage from your flashlight, Figure 1 is the solution to your problems.



The voltage converter comprises a '555 timer (CMOS version highly recommended) and a MOSFET. The timer is set up to produce a fixed on time of about 7 microseconds, followed by an adjustable off time. With Ron and Roff set to the same value, the circuit approximately doubles the input voltage to the output. Because the output is shunt regulated, a more accurate description is that the converter halves the output voltage to the input.

The overall effect is to translate the shunt Zener voltage to a lower input voltage, as controlled by the relative values of Ron and Roff

Roff is adjusted to change this relationship. In extreme, if Roff is zero the input behaves almost as a short circuit. If Roff is infinite, the will never turn on and the input is shunted

when it spills into the 12V Zener.

A test should be made of the prospective hand crank generator, to determine the open circuit voltage. Roff is then chosen to regulate a slight lower voltage at the input as defined by Equation 1.

In a way the converter serves as a continuously variable transmission, where Roff is the gear shift. If you set Vin to a low voltage, the generator will be slow to crank, requiring a great deal of torque. If Vin is set near the open circuit voltage of the generator, there will be a lot of crank speed and much less torque. Either way power may be had, although the efficiency of the generator and the converter improves as the crank speed increases.
The hand crank generator is a lot like a bicycle. Early in your cranking career you will favor slower crank speeds at the expense of torque; after building up some muscle you'll long for higher crank speeds and less torque. With is in mind, it is a good idea to use a potentiometer for Roff, allowing adjustment to suit different crank operators.
A few words about the converter are in order. Careful attention is necessary to contain the noise generated by any switching regulator. Here are some things you can do to minimize noise problems:

1) Use fresh capacitors for Cl and C2.

2) Keep Cl, Ll, Ql, D1 and C2 in a tight cluster, minimizing lead lengths.

3) Use a closed magnetic or self-shielding magnetic structure for Ll. is means a toroid or gapped pot core or E core. Open structure such as a rod constitutes an antenna.

4) It doesn't hurt to add some small ceramic or film capacitors (100nF) in parallel across Cl and C2.

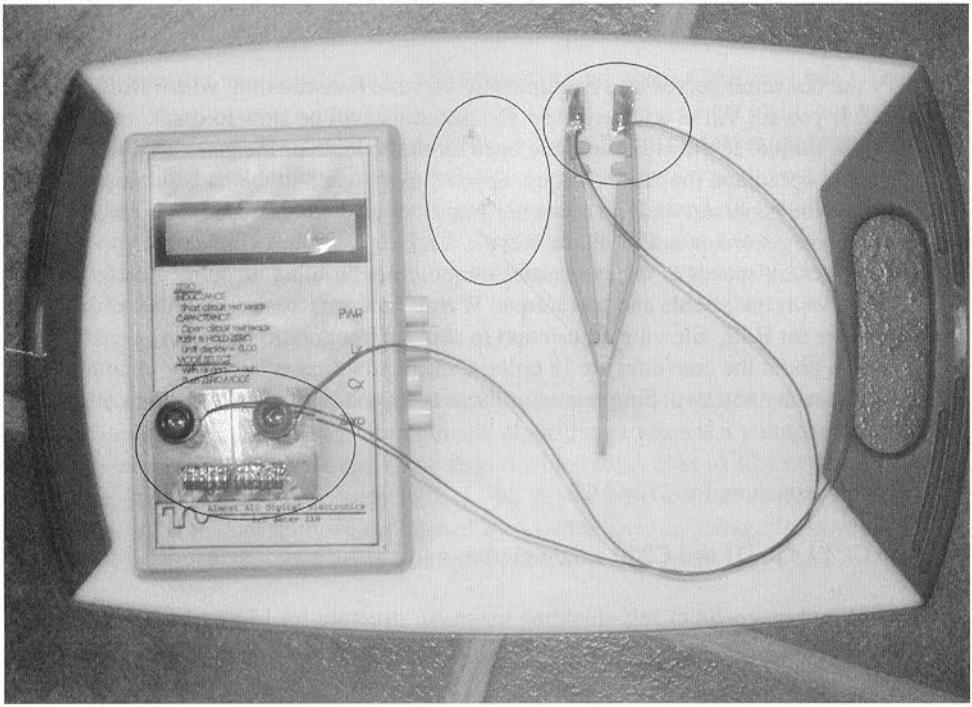
5) Package the finished converter in a tight-fitting metal box or casting.

I'll leave it to the reader and his junk box to experiment with additional input and output filtering. If you add filter chokes, make certain they are low resistance, otherwise you'll be wasting precious power. Moulded chokes are typically unsuitable. If this method of generating power proves popular, noise mitigation will certainly spawn follow-on notes from other readers.

Unexplained in Part 1 is a 1 ohm, 250mW resistor added in series with the 12V Zener. This somewhat softens the regulation point, but its real purpose is to provide a convenient point for current measurement. You can judge cranking and generator efficacy by simply monitoring the current spilled through the shunt regulator, in this case one ampere per volt. For example, it is easy to see the relative merits of different Vin regulation points by varying Raff and monitoring the result across the 1 ohm resistor. This is done with no load other than the 12V zener, so that all available output current is measured.

MISERS SURFACE MOUNT MEASURING TWEEZERS

Steve Farthing G0XAR, 54 Poringland Rd. Upper Stoke Holy Cross. NR14 8NL



I have been attempting to measure the capacitance of some tiny unmarked SM components using my AADE L/C meter. I made up the jig you see in the photo clamped on to the meter from an idea posted on the AADE site http://www.aade.com/lcmeter.htm by EA2SN. It is made from a piece of single sided PCB suitably mutilated to act as a jig. I used a nibbling tool to cut the slots so that the jig could go over the banana sockets on the AADE meter. At the bottom are a couple of connectors from my junk box which are used for leaded components. The idea for SM components was to lay them across the centre of the board which had had about 1 mm of the copper removed to achieve electrical separation of the two halves of the jig.

However when I tried to use it to measure some low capacitance SM capacitors I couldn't get consistent readings and those I could get were way too low. I wondered if it was due to oxidation of the copper on the PCB so I cleaned it and tried again - no difference. Then I painted some silver PCB repair paint on the edges to have a non tarnishing surface but this made no difference. The jig, however, works FB with leaded components.

I checked the AADE site for other ideas and noticed that they sell special Kelvin clips for the job at $20. Being an impatient tightwad at the best of times I improvised my own. I took a pair of spare plastic tweezers and some copper foil. I made a U shaped piece of foil

for each tip and used epoxy resin to glue the foil to the tips of the tweezers. To ensure that the tips were flush I used a rubber band to hold the arms of the tweezers together until the epoxy had dried. Then I soldered the leads on. The results are FB and I now get accurate and repeatable measurements.

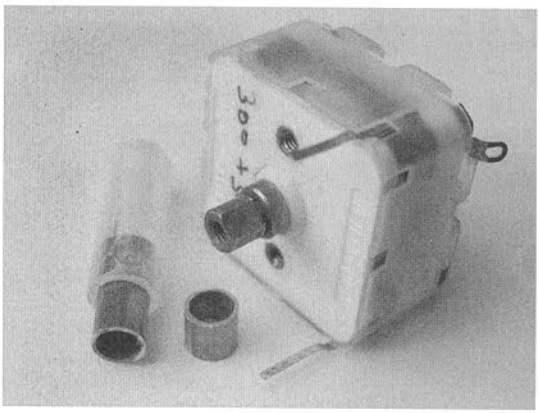
I guess the problem is that some SM components have contacts on the ends which do not come into contact with a flat horizontal surface. I have a set of "always shut" tweezers somewhere which I will modify in a similar way. This should make readings more accurate as I will not have to hold them whilst testing. I might also see it I can rig another set of tweezers with a pin on each end sharp enough to penetrate the tiny cells that SM components come in so I don't need to remove a component from the reel to find out what the value is.

Fitting Standard Knobs to Polyvaricon Capacitors

Barry Harvey G8RIW 56 Oakwood Drive Grimsby DN37 9RN

Most Polyvaricon type variable capacitors seem to be fitted with the smaller than normal drive shaft with two large flat surfaces. This type of drive shaft being used with the thumbwheel type knobs frequently used with the old style miniature transistor radios. The problem is that the standard types of knobs available do not use this size fitting. Some capacitors have adaptors supplied but these are often lost or are far too short to be of practical use.

I have found that there is a simple cheap answer to the problem. Thin walled brass tubing, 6 mm outside diameter is on sale in B&Q in metre lengths. A short length of this will fit over the reduced size drive shaft and is easily glued in place with a drop of superglue.



If you require the knob to be electrically isolated from the capacitor as required for say some aerial tuning unit designs then a short section of the outer plastic tube cut from the standard BIC ballpoint pen just happens to be just about the right size to fit over the brass tubing. A combination of the above bits of tubing should help solve all the problems of using Polyvaricon type capacitors.

USB-Controlled Synthesizer for Softrock RXTX and Local Oscillator Applications

Jan Verduyn G0BBL - QRP2000 Design Team - Jan.Verduyn@gmail.com

A significant development of the Softrock RxTX QRP transceiver since first publication in Sprat 130 is the use of the Si570 programmable Oscillator Module as a simple but stable Local Oscillator to provide full band and multi-band coverage. The Si570 programmable oscillator device generates a square-wave which is ideally suited for driving Quadrature Sampling Detectors used in simple SDR equipment. In the original version the Softrock RXTX QRP transceiver a crystal was used as LO source and coverage is limited to within a band of about +/- 22 Khz. The Si570 Local Oscillator source allows all bands from 1.8 Mhz up to 28 Mhz to be covered.

The Si570 device is described by as an Any-Rate I2C Programmable XO/VCXO. Measuring 7x5mm, it is somewhat smaller than the conventional Xtal Oscillator module. The device can be programmed to generate any frequency with a resolution of fraction of a Herz through an industry standard I2C 2-wire interface. The Si570 device is manufactured by Silicon Labs in several versions of which the Si570 CMOS and LVDS versions are popular due to the efforts of KM5H, who has been organizing several group-buys since beginning of 2008. The table below from the datasheet [ref 1] summarizes the main differences between the two versions.

Parameter	Si570CAC CMOS	Si570BBC LVDS
Stability	50 ppm	20 ppm
Frequency range – Manufacturer	10 Mhz – 160 Mhz	10 MHz – 215 Mhz
Frequency Range not guaranteed	3.5 Mhz – 400 Mhz	3.5 Mhz – 945 Mhz
Supply Voltage	3.3V	3.3V
Supply Current	90-98 mA	100 – 108 mA
Output Voltage Square wave	2.6V pk into 15pF	LVDS – 0.7V pk 100 ohm

Fig 1 Silicon Labs Si570 CMOS and LVDS Performance

Although Si570 does not deliver state of the art performance, Tom, DG8SAQ has shown that phase noise performance of the LVDS version is similar to that which can be obtained with the modern 14 bit DDS chip like the AD9951! For QRP experimenters the choice is simple, the AD9951 has 48 pins spaced 0.5mm, whilst the Si570 has only 8 pads spaced 1.8mm or 2.5mm, well within the soldering skills of an average constructor.

Si570 Interfacing: Several options have been made available by amateurs on either side of the Atlantic to set the frequency of the Si570. These vary from changing the frequency via dipswitches through a microcontroller as a standalone unit, to interfacing the device with a personal computer, through either a serial or parallel port. Indeed we have used the parallel port successfully in providing the Softrock RxTX 80-40 with full band coverage. Modern computers however no longer have these legacy ports so we decided to use the Universal Serial Bus, found on all modern Computers instead. Our aim was to design and

build a simple synthesizer project suitable as a LO source for the Softrock and other QRP applications. Tom DG8SAQ and Guido PE1NNZ, who also contributed to the Softrock RXTX project, joined our QRP2000 team and the result is the universal USB-Synthesizer circuit shown in fig 2.

Circuit description: U2 is the Si570 device which generates a square-wave output. The circuit can either use the Si570 CMOS or LVDS version depending on application. The CMOS version is recommended to drive the Softrock RXTX transceiver as it does not need an additional buffer amplifier. The frequency of the Si570 is set through the SDA and SCL lines of the I2C bus signals from a small 8 pin Atmel microcontroller, which handles the communication with the SDR software program on the PC via a USB port. U3 is Voltage regulator supplying the Si570 with 3.3V. Provision has been made for an external CW keyer option. Note that the Si570 LVDS version has differential LO outputs and optional transformer T1 may be fitted to increase the output whilst suppressing common-mode signals. The USB synthesizer may be powered from the USB bus provided the PC can supply the 120mA current required. Alternatively a 5 -12V Power supply may be used depending on setting of jumper JP1.

Hardware: Updated information on the project will be made available through the internet[ref 2)], including the firmware required for flashing the Atmel micro controller. One of the challenges is availability of the Si570 devices. To date this device has only been available as a "group buy" from the USA through KM5H [ref 3)] In practice some delays are unavoidable with a group buy due to the wait to get to certain a minimum order quantity followed by delays due to delivery lead time. As result of an article written by Tom DG8SAQ, published in the popular German Journal Funk Amateur [ref 4)] a kit of parts including the Si570 CMOS device, printed circuit board and programmed ATTiny microcontroller will be available from July from SDR-Kits in the UK. [ref 5)] Construction of the USB Synthesizer PCB is straight forward. Apart from soldering 10 SMD capacitors (size 0805) on the bottom of the PCB, all other components are conventional size and can be soldered with a small 15W soldering iron.

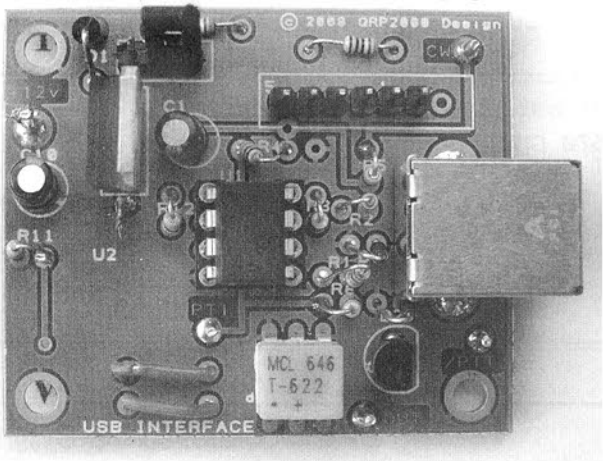


Fig 3. PCB layout of the USB-Synthesizer (fully populated PCB)

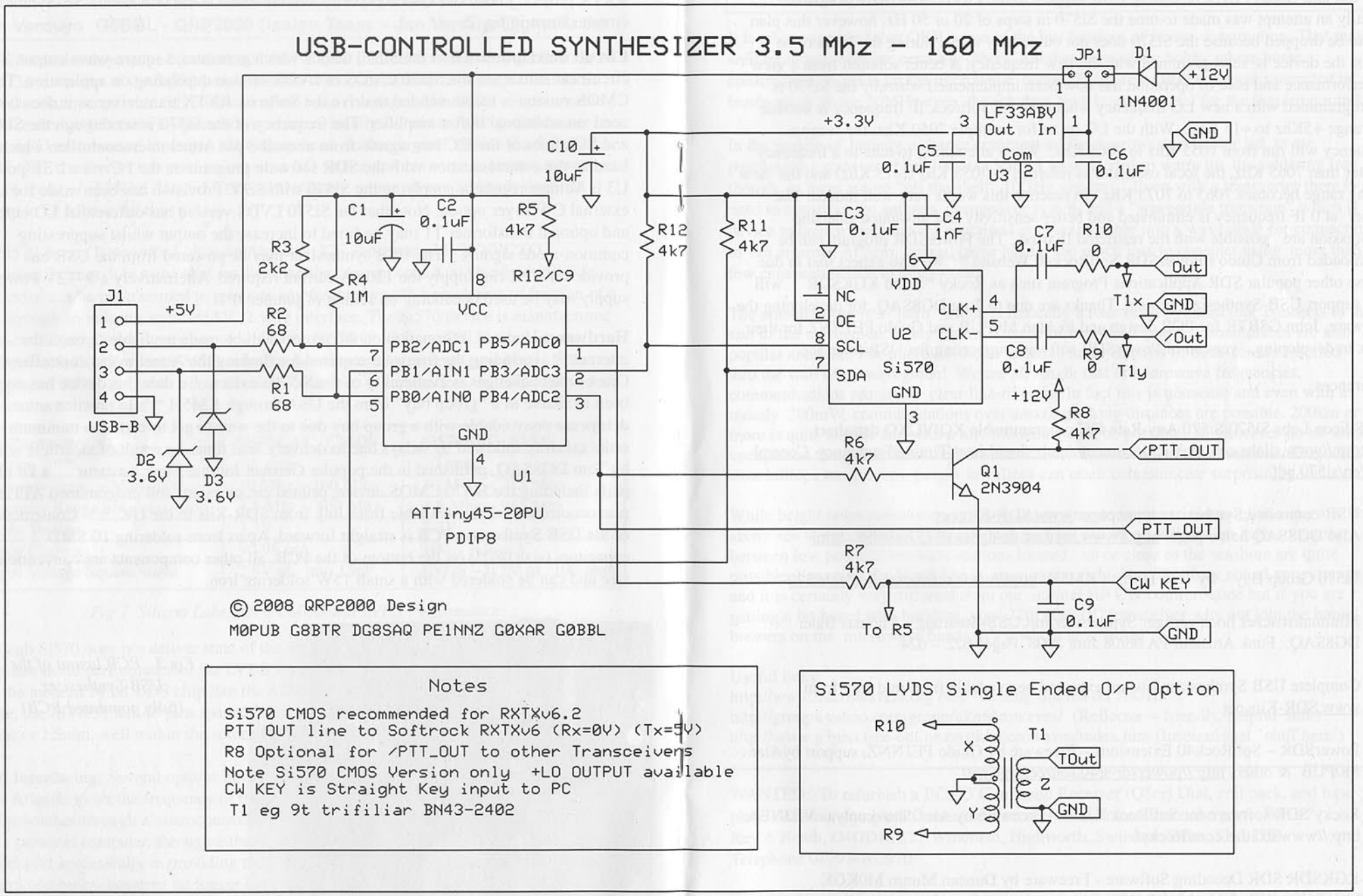


Fig 2 USB-controlled LO Synthesizer using Si570 CMOS or LVDS

Host Software: Developing the USB hardware and the firmware running on the micro controller is only one part of this project. Many hours of development are put in by Alan M0PUB and Guido PE1NNZ adding USB support to the **PowerSDR SDR program**. Initially an attempt was made to tune the Si570 in steps of 20 or 50 Hz, however this plan had to be dropped because the Si570 does not output any signal during the 10ms or so whilst the device is reprogrammed with the new frequency. A better solution from a view of performance and ease of operation has now been implemented whereby the Si570 is re-programmed with a new LO frequency whenever the Softrock IF frequency is outside the range +5Khz to +15 Khz. With the LO set to for example 7050 Khz, the receive frequency will run from 7055 Khz to 7065 Khz, When attempting to tune to a frequency greater than 7065 Khz, the local oscillator is returned to 7058 Khz (+13 Khz) and the new tuning range becomes 7063 to 7073 Khz. In practice this works very well indeed. The carrier at 0 IF frequency is eliminated and better sensitivity and unwanted sideband suppression are possible with the restricted IF used . The PowerSDR program can be downloaded from Guido's PowerSDR SoftRock40 Website [ref 6] We also expect that in due course other popular SDR Applications Program such as Rocky [ref 7] and KGKSDR [ref 8] will also support USB-Synthesizer project. Thanks are due to Tom DG8SAQ, for developing the firmware, John G8BTR for PCB design and to Alan M0PUB and Guido PE1NNZ for their work in developing a version of PowerSDR software supporting the USB-interface.

References:

1) Silicon Labs Si570/Si570 Any-Rate I2C programmable XO/VCXO datasheet http://www.silabs.com/public/documents/tpub_doc/dsheet/Timing/Frequency_Control/en/si570.pdf

2) USB-controlled Synthesizer homepage: www.SDR-Kits.net
Also DG8SAQ home page: http://www.mydarc.de/dg8saq/SI570/index.shtml

3) Si570 Group Buy – by Tom Hoflich KM5H: http://www.softrockradio.org/si570

4) Minimalistischer hochwertiger Synthesizer mit USB-Steurung – Thomas Baier DG8SAQ: Funk Amateur FA 06/08 Juni 2008 Pages 622 – 624

5) Complete USB Synthesizer kits are expected be available from mid July from www.SDR-Kits.net

6) PowerSDR – SoftRock40 Extensions – Freeware by Guido PE1NNZ, support byAlan M0PUB & others http://powersdr-sr40.sourceforge.net/

7) Rocky SDR software for SoftRock Radio - Freeware by Alex Shovkoplyas VE3NEA: http://www.dxatlas.com/Rocky/

8) KGKSDR SDR Decoding Software - Freeware by Duncan Munro M0KGK http://www.m0kgk.co.uk/sdr/index.php/

A Different Type of QRP

Richard Newstead, G3CWI, 89 Victoria Rd. Macclesfield. SK10 3JA

It is often suggested that QRP is one of the last bastions of home construction. That may well be so but there are certainly others. Another area of the hobby where home construction reigns is on the microwave bands. Sadly, few QRPers appear interested in bands much above 30MHz even though they have huge potential for the inquiring mind.

In the middle of January a chance comment on the microwave reflector led to me purchasing a transverter for 10GHz (3cm). I soon needed to warm up the soldering iron though, as there are no "off the shelf" 10GHz systems. Even with a transverter there is the need to construct the antenna changeover system and a "waveguide transition" which is a device to launch radiowaves contained in co-axial cable into a waveguide for connection to an antenna. At 3cm, coaxial cable has far too much loss to consider using more than a few centimetres of it in any system.

The antenna I use is a "horn" which is basically a four sided pyramid that connects to the end of the waveguide. In my case it is made of metalised plastic. Small dishes are also popular antennas. For microwaves, an antenna tuner consists of three screws inserted into the wall of a waveguide! We are all taught that at microwave frequencies, communications requires a clear line-of-sight. In fact this is nonsense and even with a measly 200mW, communications over amazingly long distances are possible. 200km or more is quite normal and with a lift, 1000km should be possible. Microwaves do all sorts of unexpected things like bouncing off aircraft, rain clouds or even snowstorms. They diffract over hilltops too so even people in valleys can often communicate surprisingly well.

While height helps sometimes, microwaves propagate immense distances in a narrow area above sea water called an evaporation duct. This can be as little as 2m high so contacts between low power microwave stations located on or close to the seashore are quite possible. Spanning the North Sea is easy on the right day. This may sound very strange and it is certainly very different from our normal HF CW comfort-zone but if you are getting a bit bored with building your 27th 40m DC transceiver why not join the home-brewers on the microwave bands. It's a whole new World!

Useful links:
http://www.microwavers.org (see "Getting Started on 10GHz")
http://groups.yahoo.com/group/ukmicrowaves/ (Reflector – friendly, helpful folk)
http://www.g3pho.free-online.co.uk/microwaves/index.htm (Inspirational stuff here!)

WANTED: To refurbish a BC453 Command Receiver (Q5er) Dial, coil pack, and base plate. Also any complete Command Receivers and Transmitters and parts. WHY?
Rev A Heath, G4GDR, 227 Windrush, Highworth, Swindon, Wilts, SN6 7EB.
Telephone 01793-762970

WANTED: 9MHz Crystal filter 2.4Khz bandwidth, 90db stopband like SEI QC1246AX or KVG XF9-B or similar. Geoff G4DED. Tel.01295 259766 **g4ded@ukonline.co.uk**

Toroid Inductance Chart

David Smith G4COE G-8621
54, Warrington Road, Leigh, Lancs. WN7 3EB

To save a little time from calculating and experimenting when winding toroid cores here a chart of the most commonly used cores, simply pick the inductance required and read the required number of turns for the selected core.

To keep things easy we'll stick to three most common cores, T37, T50 and T68 and we'll use the -2 and 6 mix, these figures are for single layer windings only, and the windings should cover the entire core evenly.

	Inductance in uH					
Turns	Red **T37-2**	Yellow **T37-6**	RED **T50-2**	Yellow **T50-6**	RED **T68-2**	Yellow **T68-6**
1	.004	.003	.005	.004	.006	.005
2	.016	.012	.020	.016	.023	.019
3	.036	.027	.044	.036	.051	.042
4	.064	.048	.078	.064	.091	.075
5	.100	.075	.120	.100	.140	0.12
6	.140	.110	.180	.140	.210	0.17
7	.196	.150	.240	.196	.280	0.23
8	.256	.190	.310	.256	.360	0.30
9	.324	.240	.400	.324	.460	0.38
10	.400	.300	.490	.400	.750	0.47
11	.484	.360	.590	.484	.690	0.57
12	.576	.430	.710	.576	.820	0.68
13	.676	.500	.830	.676	.960	0.79
14	.784	.590	.960	.784	1.10	0.92
15	.900	.680	1.10	.900	1.30	1.10
16	1.02	.770	1.30	1.02	1.50	1.20
17	1.16	.870	1.40	1.16	1.60	1.40
18	1.30	.970	1.60	1.30	1.80	1.50
19	1.40	1.10	1.80	1.40	2.10	1.70
20	1.60	1.20	2.00	1.60	2.30	1.90
21	1.80	1.30	2.20	1.80	2.50	2.10
22	1.90	1.50	2.40	1.90	2.80	2.30
23	2.10	1.60	2.60	2.10	3.00	2.50
24	2.30	1.70	3.10	2.30	3.30	2.70
25	2.50	1.90	3.10	2.50	3.60	3.40
26	2.70	2.00	3.30	2.70	3.90	3.20
27	2.90	2.20	3.60	2.90	4.20	3.40
28	3.10	2.40	3.80	3.10	4.50	3.70
29	3.40	2.50	4.10	3.40	4.80	4.00
30	3.60	2.70	4.40	3.60	5.10	4.20
31	3.80	2.90	4.70	3.80	5.50	4.50

Turns	Inductance in uH					
	Red T37-2	Yellow T37-6	RED T50-2	Yellow T50-6	RED T68-2	Yellow T68-6
32	4.10	3.10	5.00	4.10	5.80	4.80
33	4.40	3.30	5.30	4.40	6.20	5.10
34	4.60	3.50	5.70	4.60	6.60	5.40
35			6.00	4.90	7.00	5.80
36			6.40	5.20	7.40	6.10
37			6.70	5.50	7.80	6.40
38			7.10	5.80	8.20	6.80
39			7.50	6.10	8.70	7.10
40			7.80	6.40	9.10	7.50
41			8.20	6.70	9.60	7.90
42			8.60	7.10	10.0	8.30
43			9.10	7.40	11.0	8.70
44			9.50	7.70	11.0	9.10
45			9.90	7.90	12.0	9.50
46			10.0	8.50	12.0	9.90
47			11.0	8.80	13.0	10.0
48			11.0	9.20	13.0	11.0
49			12.0	9.60	14.0	11.0
50			12.0	10.0	14.0	12.0

For those interested in equations ($\sqrt{}$ L uH / AL value) x 100 will give us the turns required. To find the inductance of a pre-wound core, L uH = $(\text{turns}/100)^2$ x AL value of the core.

This list could be expanded to cover many cores and greater winding ranges but would probably man y pages of Sprat, this being pointless because many would not be used generally and any inductances greater than the range given above could be calculated with the above formula.

3B8/M1KTA - A QRP DXpedition to Mauritius Island

Dominic Baines, M1KTA <dominic.baines@gmail.com>

Operating QRP from 3B8 even at the bottom of the sunspot cycle was fun. I managed a little over 1,000 QRP QSO with 54 DXCC entries, 20 hours over two weeks, 3rd to 15th March 2008, and not always at optimal times as it was a 'normal' holiday too. If propagation was better I am sure DXCC might have been possible.

QRV SSB, PSK and CW on 40m, 30m, 20m, 17m, 15m (and 2m). I used FT817 for PSK31 and CW, FT897 for SSB. For data Asus eeePC running Windows XP, Ham Radio Deluxe and PSK31 with a G4ZLP rig interface and external USB sound card. SDX or SDC was used for logging. I also ran a backup paper log. Internet connection was via Jacky (3B8CF) who provided email contact.

I asked 3B8CF to be able to use his yagis on 20m, 17m and 15m and a rotary dipole on 30m/40m rather resort to a simple vertical or dipole on the beach.

Nothing could have ever prepared me for the pileup that first night operating and my operating was a mess as a result. I had started off operating and tried to use a frequency simplex as you might in a FD but it was simply hopeless and general carnage was the result, stations were calling as I was and visa versa. I took a break before trying again. 20m was always going to be THE main operating band but it was difficult to pick a frequency near 14260 where I could operate AND where I knew QRP operators back home might be expecting to find me. I should have picked a backup frequency. In the end I worked out running split up 2 was enough for SSB and up 1. CW, this worked well and the qso rates were reasonable. On 14th March conditions to EU were very good and a pile up built up I was picking out call signs even 4 kHz above my TX freq. I remembered a speaker at the RSGB HF convention last year who suggested to try and never work more than two or three stations in a pileup without saying who you are so I was sure I could not have been confused with another DX station. Early on in the trip I was told I had shared a calling frequency with a Caribbean station and I was even asked if I was TX5C at one point, sorry Wrong Ocean!

I operated CW during the BERU which was my first ever CW only contest. A pile up SSB was scary enough the first time you experience one; CW had me freeze up completely. Thankfully perhaps but embarrassing all the same my QRS CW put many off but I appeared in the cluster often enough.

Working a new country on a band or mode is a buzz I get, and in 3B8 it was a clean log to start with. The logs stated 40 countries by the end of the second night and 50 by the BERU contest in the middle w/e. In a contest you look for countries and multipliers, as a remote DX station I was doing my best to work as many of the stations as I could and I felt enormously privileged. I operate SSB mostly and I will say from the experience of this trip for anyone chasing DX it really is easier to pick out a station with a calmly spoken call sign given in full once using normal phonetics than someone shouting XF XF XF 10 times. Anyway by the 4th evening night operating I had gotten into a rhythm of sorts and was working well. As the DX station for many I felt a huge sense of responsibility to make sure I had the other station report and call sign recorded correctly as for some I know this might be their first time they have 3B8

or they have waited years to get it qrp (I have had a number of direct qsl stating this). Personally I never had 3B8 before I came, 3B7 neither although I heard the 3B7C operation of course. It did demand a lot of concentration at the end of what was a normally a normal holiday day to get the calls logged correctly.

Trip highlights:
First QSO to another QRP station in the Maldives (8Q7BC), this is turning into a tradition where the first trip QSO always seems to be a similar station.
OH9LV, in an email sent after trip "I have been using power less than 1W for 25 years and have worked 90 DXCC on two-way QRP but have only 85 confirmed so far so I was looking very much forward to catching you from 3B8! ". Our QSO was QRS CW through S8 noise.
Isle of Man club (GT3GWB/P) setting up for a FD type station called CQ, my signals were weak to UK just been given a RS 4/4 and it took another EU station to relay and advise the operator that I was 3B8/M1KTA and not M1KTA.

T6/KB1PVV (Afghanistan) who called me mid pile up. Only a handful of T6 operators.
G4BUE and I managed SSB and CW 2 way QRP QSO on 20m almost in the same minute.
Multiple pile ups occurring almost every time on the air, which was a new experience.
I took some SDR radio kits with me and some of the Mauritian ARS members now have them. I helped 3B8CF build his 20m RX, in between repairing a couple of older rigs and got it on air. Used Rocky and CW Skimmer and as a CW op Jacky (3B8CF) was interested to see what it could do.

The band conditions were very variable, 20m was open many afternoons but not all, 40m only once and that was very early in the morning. I usually always preceded an SSB session with PSK as the band conditions seemed to open for PSK operation well before SSB. Many thanks to Simon Brown (HB9DRV) explaining how to operate PSK31 in a pileup (whilst the pile up was happening) running split with a 500Hz CW filter I am sure many will be in the log because of his 11th hour assistance.

I had to shut down twice due to bad weather, major rain fall and threat of lightning strikes in the last week. The day following the first shutdown the VSWR of the YAGI was hopeless for operation as so much water had got into one or more of the elements and the antennas needed to dry out. A QRO operator would probably have just dumped another 100W into the antenna but with a VSWR >3:1 it would have been very hard work QRP and I might have lost the radio PA stages. I took my MiniVNA and analysed the antennas and waited for the sun to come out.

3B8 Licence you apply for it 3-6 months in advance. Contact 3B8CF or DL6UAA /3B8MM for details how (do a Google search).
Do not expect to turn up and get a licence as you will not. It takes a good _ day to collect your licence from Port Louis ICTA and you cannot operate without it.
Note that 6m not possible and /P is also not possible but ask about /P as 3B8 has some great /P locations, if visitors keep asking they may eventually say yes.

The trip was enormous fun and I think everyone should try a trip like this at least once.

Antennas Anecdotes Awards

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

Guess Watts up the pipe?

There is a useful little device that has been going around the Medway towns here in Kent for quite a few years now which I have attributed to Geoff G3YVF. It is a handy little meter that simple reads RF in an antenna to aid tune up and is known locally as the 'Hoo Guess Meter'. 'Hoo' is the name of the village where it was originally used. It consists of a resistor, diode and capacitor combination across a suitable meter and it is a variation of a broad band field strength meter circuit only it is placed directly in the antenna wire itself.

Suggested values for this simple circuit are a .01 uFd capacitor, an 18 ohm (or less) resistor and an OA79 germanium diode. Geoff notes that you can change the value of the resistor to alter the meter FSD, (full scale deflection), and it is frequency sensitive but it makes a useful tune up device for long wire antennas.

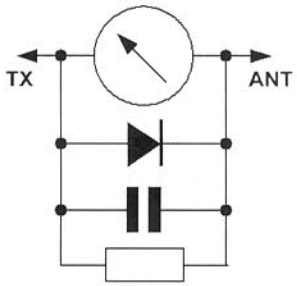


Diagram of the 'Hoo Guess Meter'

It is probably a good idea to take the circuit out of the antenna lead when you have finished tuning up – but then what other good ideas do you have for a short piece of wire with a crocodile clip on each end? Just think, with this circuit in use you will never burn out an RF thermocouple meter again. Don't forget some juggling of the values may be required to suit your particular meter. When its complete there will be another 'little box' project completed for your shack.

QRL?

This column is about anecdotes and antennas, not to mention awards, but here is a comment from my regular contributor Gerald G3MCK. As Gerald says, 'its bad practice as well as bad manners to transmit on a frequency that is not already in use. Hence before calling CQ a good operator not only listens carefully and sends 'QRL?' but only when he thinks that the frequency is not in use. Simple isn't it? However like many things there is ample scope for getting it wrong and this can lead to irritation, spoilt QSO's and sometime, regrettably, abuse.

Let's look at what can go wrong and clear up some apparent misunderstandings. Firstly the potential CQer may genuinely think that the frequency is clear when it is use. This is probably due to skip conditions or local noise levels. If you already using the frequency and are having an S9 plus QSO it

does not mean that everybody can hear you or your mate you are in contact with. Hence comments about 'cloth ears' and 'deaf receivers' only serve to illuminate your technical ignorance.

Next the potential CQer should leave a few seconds after he has called 'QRL?' to give time to reply. I suggest five seconds is adequate to allow the users to switch from receive to send to say 'yes'. If you think five seconds is too short just sit and watch the second hand on your shack clock crawl around! You may think now that it is too long however you must leave a suitable time for reply. Finally 'QRL?' is not a magical incantation that clears a frequency nor should it be a meaningless rite.

The current user of the frequency has the responsibility of replying immediately 'QRL?' has been sent. The word 'yes' is all that is needed or the more sophisticated may send 'si' or 'c' (geddit?). If you fail to respond then any subsequent QRM you suffer is due to you and you alone.

Life is never so straight forward, especially in QRP circles where people may be using simple receivers. Take the case of a QSO on 3560 KHz where one operator is using a direct conversion receiver with a 1 KHz audio tone and an image on 3558 Khz. A potential CQer checks 3558 KHz and finds it clear and sends 'QRL?' Yes is sent by the fellow on 3560 KHz, a frequency that is 2 KHz away and outside the pass band of many receivers. The result is QRM to the fellow on 3560 KHz'

These are wise and useful words from Gerald's years of operating experiences. I would add to that comment that although simple equipment is useful in the field, for QRP home stations it would be better to use the most sophisticated receiver you can in terms of selectivity.

That W3EDP again!

Jim, GM0NTR, has sent me a photocopy of a page from the March 1936 QST and has confirmed *Mr Siegel experimenting with this antenna prior to that date. If you are using 84 feet of wire and* a 17 foot counterpoise then congratulations – your antenna design is over sixty years old.

The MP-1 Super Antenna

Walt KF4YCQ has sent me a note regarding this commercial 'Screwdriver' vertical antenna which is available both here and in the US. It is tuneable from 40m down to 70cm and is reputed to handle up to 300 watts. Walt tells me the antenna is well constructed, tough and easily adjustable and he has made many regular contacts up to 3000 miles with it. He recommends it to those that are challenged for space. The price in the US is $99 which, using the UK amateur radio retailers formula of $=£, makes this antenna available at an eye watering £99(!) here in the UK. Why do foreign antennas have to be so expensive in Europe? We have seen the prices of clothing and consumer electronics fall in recent years why not so many amateur radio products?

Baluns and Dipoles

A letter from Chas Wilson M0CDD reminds us that a balun should be used with a coax fed dipole. Chas has included a photocopy from a 1966 RSGB Bulletin which states fitting a 1:1 balun to a dipole gave a 10 dB advantage in signal strength on dipoles for 80 and 40m.

The article gives details of the RSGB 1:1 balun shown in many of the handbooks using an FX1588 toroid. Chas says that he obtained improvement and has also noted that a magnetic loop has proved

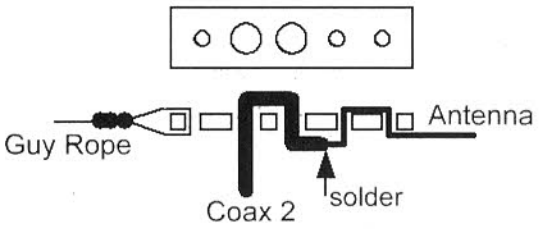
in valuable in improving reception, even in a steel clad building. These comments may seem obvious to some but could provide useful solutions to others.

DL End FedAntenna

An interesting endfed antenna has been submitted by DL7UWE which is shown in the diagrams below. As it is made from wire and coax cable it is a convenient lightweight design that can be assembled using one mast or slung over a tree. No atu is needed and all the parts will fit easily into a rucksack

The main part which requires careful adjustment is the coax stub, using RG174 cable, which suggests the power handling is limited at 25 watts and the antenna is design to use the cable as a form of ? wave stub. Lengths L1, L2 and LS should be trimmed for resonance on the required band and once the antenna is tuned it is ready to go – for ever. Originally the antenna was cut for 10.1 MHz, L1 first then L2 if necessary, with the length of LS (strahlerlange) determined from the chart below. The chart gives you lengths for other bands.

The antenna can be used horizontally or vertically, in fact I seem to remember a version of this antenna in Radcom many many years ago used with a 41 foot military vertical, and it is a cheap light and effective single band solution. DL7UWE suggests you solder the three pieces of coax quickly as they can melt!



The diagram shows how a scrap piece of plastic can be used to support the antenna end and the coax feed.

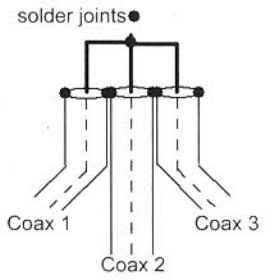
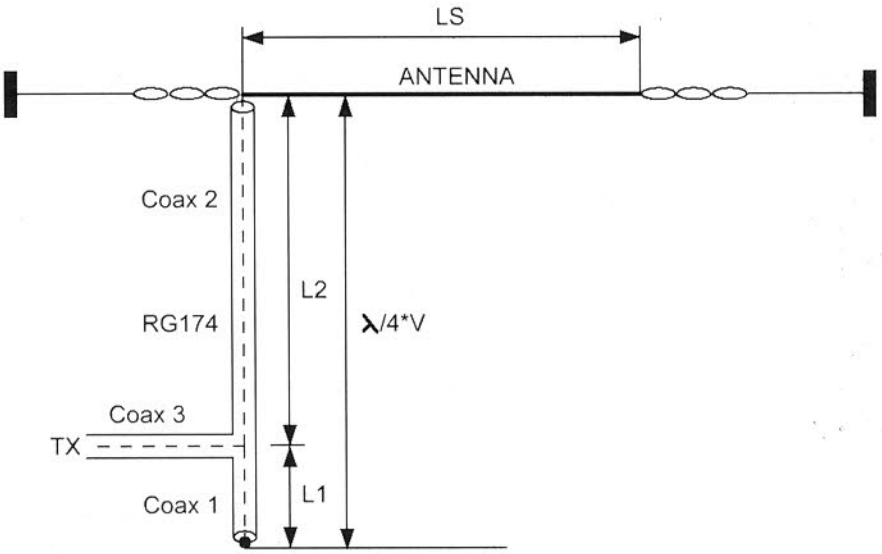


Table:

QRG [MHz]	LS [m]	L1 [m]	L2 [m]
3,60	39,58	1,25	12,52
7,05	20,21	0,64	6,39
10,12	14,08	0,45	4,45
14,05	10,14	0,32	3,21
18,80	7,58	0,24	2,40
21,05	6,77	0,21	2,14
24,92	5,72	0,18	1,81
28,05	5,08	0,16	1,61



Awards

I've not received any applications for award nor any updates on the G3MCK Worked All British Counties Award. Finally if you have been experimenting with antennas, particularly if you live in a restricted space, then please let me know what you are using. With the terrible weather we have been having here in the UK I am considering looking at the wire antennas used on WW II submarines and trying them out down the beach!

At least the damp conditions have made slotting in ground radials easy.....not good cat weather though.....

COMMUNICATIONS AND CONTESTS

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

Conditions on the HF bands continue to be very poor – probably as poor as anybody can remember – but that shouldn't deter us too much from our QRP activity. Even as I write this (20th May) I have just replied to a CQ QRP on 14060kHz by Ken **JA1KGW**. Although he did not hear me, it does at least show that there is QRP activity and Dx around.

CHELMSLEY TROPHY 2007

Just as last year, only two entries were received. It's a pity more members do not take the trouble to support this, and other, events but those who do stand more chance of winning! My thanks to Peter **G3JFS** and Anthony **K8ZT** for their efforts and fine entries.

Anthony's log must be considered in the context of his limited scope for antennas. His garden (back yard) measures only 30ft by 60ft, so the low bands antennas and radials are a challenge. The antennas Richard used were an HF2V Butternut Vertical (used mainly on 30m and 40m) and an Alpha Delta Sloper (mainly 80m and 160m). Nevertheless, a few of his 2007 operating goals were completed or nearly completed: Worked all States on 80m, "Got Across the Pond" on 160m, and his Worked all States total on 160m is now 49 with only North Dakota needed.

Anthony worked a total of 75 DXCC countries, with his individual band scores being: 160m 24; 80m 45; 40m 46; 30m 10; totalling 125 band 'slots'. The rigs used were an Elecraft K2 and Yaesu FT-817. He has discounted his 20m – 6m contacts, as they were made with a beam and therefore (under the rules) cannot be counted.

I quote from amongst Anthony's log highlights: "1st Greenland on 80m", "1st 160m QSO with Africa", "1st 160m QSO with Europe (**G3ROO**)", "1st Falklands on 40m", "VK on 40m", "3B7C on 40m and 30m". What a result with such limited antennas – well done!

Peter used his Icom IC-706 for most of his QRP contacts, but he also had the choice of a FT-1000MP, TS-450SAT, a homebrew 1W solid-state Tx, or a homebrew 5W valve Tx. He worked a total of 113 DXCC countries, and his individual band scores were: 160m 19; 80m 34; 40m 47; 30m 43; 20m 80; 17m 35; 15m 61; 12m 17; 10m 36; making a grand total of 372 band 'slots'. A very impressive score, particularly when you look at the totals for the three highest bands (under such poor conditions).

Coupled with his success in Winter Sports, a certificate in the Yeovil Fun Run, and winning the QRP section of the FISTS Straight Key Week (with a score one point higher than the winner of the QRO section!) Peter has every right to feel that he has had a

successful year. He can now include "winner of Chelmsley 2007" to his list of achievements. Congratulations to you, Peter.

He asks about the origins of the Chelmsley, and G4DQP Trophies. If anybody is able to help with the relevant information I will be pleased to include it in this column.

CZEBRIS 2008

Entries from Nigel **G0EBQ**, Alex **G4FDC** and Brian **GM4XQJ** means a total of three entries, just as last year. "Could do better" would be my report on the membership, if I were writing one, Hi! Anyway, my thanks to all three.

Nigel found it very hard going (making just one QRP qso), and wonders whether it is worth considering a move of date for this event in order to maximise the available conditions and qso's. Perhaps later in the year – what do you think?

Alex has to contend with his antenna being wrapped around the block of flats where he lives, saying that he dreams of a 50 acre plot with open fields all around. Don't we all, Alex! His band scores were 80m 24; 40m 12; and 20m 4; which makes his overall score 40. He used a TS-120V and 20m sloping wire, and an output power of 5 watts.

Brian used his Elecraft K2 (O/P 5 watts) into a 290ft loop for 80/40m, and a Hygain TH3 for 20m. Although he has an advantage on 20m with the beam, his LF scores are also good: 80m 38; 40m 12; and 20m 24. Brian's overall score of 74 means that he wins CZEBRIS 2008, and we offer him our congratulations.

INTERNATIONAL QRP DAY, 17th June

If you see this in time, please don't forget this important date, and do your best to cover the bands with QRP activity. In order to enter for the International QRP Day Plaque, I suggest you refer to the rules as stated in your Members Handbook, but basically you should aim to work (with QRP) as many Region 1 countries as possible on each band (160m – 10m). Normal qso's (no serial numbers), and the stations you work may be QRO. Only one contact per country per band is allowed, and each Region 1 country contacted on each band counts as one point. Logs to reach me by 17th July. Even if this reaches you after 17th June, have a look back in your log and see if you are able to compile an entry.

We're due a good summer – and good HF conditions – so I'm hoping to hear (and to hear about) lots of /P activity from many different locations. Chris **G4BUE** will be delighted to recount your stories in his column, and I will be pleased to receive any input for this column by the end of July.

72 de QRPeter

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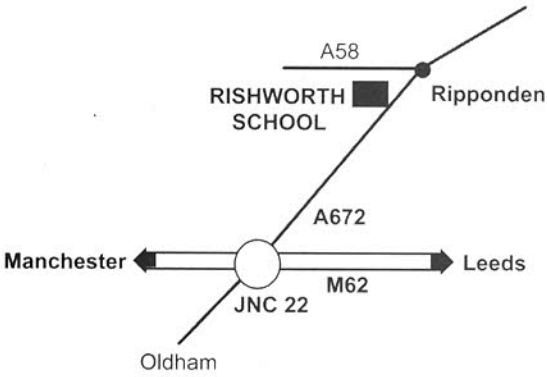
MINI-CONVENTION

(in conjunction with the Halifax Radio Society)

SATURDAY 18th OCTOBER 2008
The Rishworth School, Ripponden



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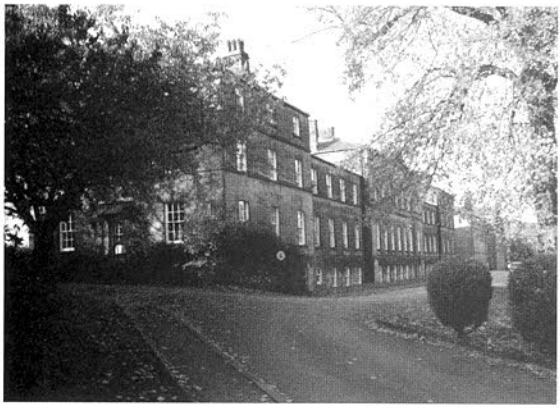
The Rishworth School is on the A672 (Ripponden) road from Junction 22 on the M62. [Postcode: HX6 4QA]

We have more floor space at the new venue – Interested traders please contact G3RJV [g3rjv@gqrp.co.uk] or G3MFJ [g3mfj@gqrp.com]

LOCAL ACCOMMODATION:
The Hobbit Country Inn, Hob Lane, Norland, Sowerby Bridge, HX6 3QL
01422 832202 (country hotel with panoramic views of Yorkshire dales)
Mention "Radio Amateur Event" for Special Room Prices



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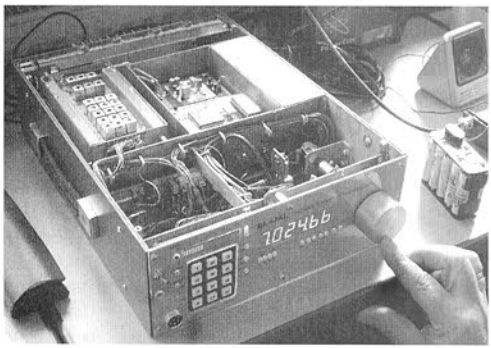
MEMBERS' NEWS

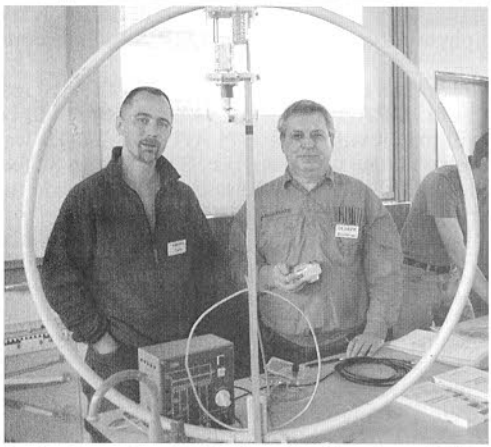
by Chris Page, G4BUE

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

DL2BQD reports on another successful annual DL G-QRP meeting at the end of April organised by **DJ3KK**, **DK3WX**, **DF6MS** and XYL Manuela. Dieter says there were a lot o interesting lectures on various topics, a good show of rigs and measuring equipment inspiring chats with DL, OE, HB9 amateurs, a lot of social contacts plus an entertainin programme for the ladies. **DL4JAL** displayed his software defined rig by **G3XJP** (see photo below), **DK4ARL** spoke on his patent of a new Network Analyser and showed his Mag



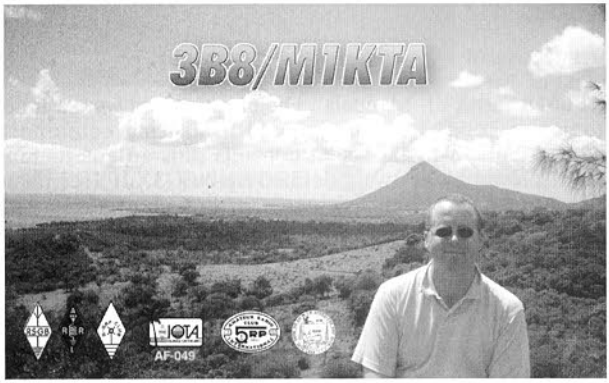
Loop (see photo below with Tom, **DM4EA** (left) the GPS specialist and Dietmar **DL2BZE**, in the loop) and **DL2BZE** had his VNA analyser with him. Dieter says it was an honour to be welcomed by the Deputy Mayor of the town Waldsassen and the Headmaster of the school which had the rooms we used for the meeting.



Congratulations to **F5NZY** on making his first QSO with the USA (**W8PBO** in Wes Virginia) using solar power on 27 February Steph received a 559 report for his two watts and Windom antenna. Congratulations also to **2EØAYQ** for making his first QRP QSO across 'the pond' on 1 March to **VC3E** in Ottawa. Martin was using a FT-817 and an end-fed wire. Referring to a half-hour QSO on 25 March with **K1HEL** on 20m using 2.5 watts, he says, "Oh, the joys of QRP" **MØJRQ** says he felt the same satisfaction on 24 March when he worked **W1MK** on 80m using his FT-817 to 115 feet of wire Martin received a 599 report but added "Mind you, everyone he worked got 599!" On 31 March **G3ROO** also worked **W1MK** on 80m and says, "He was like a local, 599 in the phones". Ian worked two USA stations on 80m with his WS62 at 3 watts and says, " guess it was the chirp that made them come back .... wondering what I was using!".

GOCJM says, "Since 1988 I have been very much into the Oner and any receiver that will work with it. I am looking for a QRP circuit diagram for a new build. The Chinnock RX/TX is very good but it does require some finishing touches". **VU2BDX** says those interested in building the ATS1 single-band HF transceiver (designed by **VU2IF**) can e-mail Gaurav, **VU2GTI**, <vu2gti@yahoo.com> to either obtain the layout to make the PCB themselves or purchase a PCB, and/or the crystals, coils, other components and a cabinet **IKØIXI** has built his first transceiver, a HF SSB/CW transceiver for 80-10m (including the WARC bands). Fabio has called it the KTR-1 (Kitchen Table Radio) named after where he built it!

G3NDS sailed from Lymington at the end of April on a two year cruise around the UK (anti-clockwise) for charity. Ray plans to operate/MM on 80, 40 and 160 metres, including QRP on the SSB and CW frequencies. He is hoping for support from QRPers to sponsor him to raise money for his charities (Rethink, Marie Curie Cancer Care and the RNLI). You can follow Ray's progress around the UK on his web-site at <http://journals.aol.co.uk/rayoliverhome/round-uk-cruise/>. The *Daily DX* reports **8J4P** and **8J6P** are special QRP stations in Japan QRV until 30 June. QRP Day on 17 June is the special focus of their activity.



G3XBM worked **J88DR** on 8 March for a new QRP entity and **G3YMC** worked **VQ5XF** (**G3TXF**), **VQ9JC**, **5X1NH**, **ZS1EL** and **9J2BO** on 20 and 15m in the BERU Contest. Roger reminds us that the BERU Contest is a great way for UK QRPers to, "chase some of the less common countries without the competition from the Europeans". **G3JFS** prefers RTTY to PSK for QRP and made 40 QSOs in 25 DXCC with 5W on 20m in a recent contest, including HZ, J3 and ZC4. Peter is currently on 177 DXCC with QRP and has recently added **VP6DX**, **TX5C**, **5T5DC**, **YK9G**, and **8R1PW**. **G3XJS** worked **3B8/M1KTA** on 30m on 4 March but had to go to QRO to get over Dom's S8 noise level. I was pleased to work Dom on 20m CW with 5 watts from my K2. Before that I had worked him on SSB with five watts, a rare event for me but poor Dom kept calling CQ without any takers and I couldn't resist dusting the microphone off to give him a call. The picture above shows Dom on the front of his **3B8/M1KTA** QSL.

M5CHH reports the sad passing of **VE7QK** on 22 March following a period in hospital following after a second stroke at Christmas. Clive says, "Derry was a regular at the Rochdale convention and was the originator of the Epiphyte 80 metre series of QRP SSB transceivers". Our condolences to his family.

GM4CXP was QRV 15 March for a month from EA8 and was going to try **G8PG**'s "10 feet long antenna for seven bands" published in an old SPRAT. Derrick says his version will be 16 feet long with reduced end loading and he will tune it with a MFJ971 ATU. **DL2BQD** was QRV while on holiday in CT3 for a week in March with one watt from his SST20 and an 82 feet thin black Litz wire from his hotel room down to a fig tree with the counterpoise inside the room and tuned with a MFJ tuner. Dieter's first QSO was with **G4EBO**.

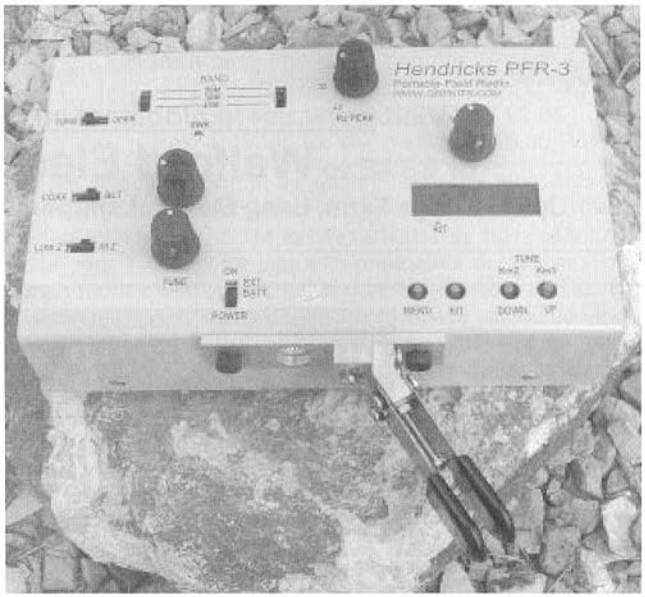
GØEBQ worked some European QRP stations during a short break in EA5 in April and planned to be QRV again for two weeks in May, including the CQ WPX CW Contest. Nigel says his BITX "continues to amaze me" after QSOs with W, CN, 7X and CT3. He hopes to meet members attending the Suffolk Rally on 15 June as he will be running a stall there. **G3XBM** is using his new Homebase 10 antenna for Sporadic E contacts on 10 metres. Roger says it is a wire halo antenna made very cheaply from a certain DIY shop! He has started a blog at <http://g3xbm-qrp.blogspot.com/> and welcomes comments. **G4UUV** has re-joined us after an absence of many years. Pete's favourite band is 80m and he is using a loop antenna in his loft.

IKØIXI worked **YK9G** twice but says the operator never repeated his callsign as **IKØIXI/QRP** and so Fabio is worried that his QSL will only show him as **IKØIXI**. In the long time that I have been writing this column, I have constantly urged QRPers ***not*** to use the /QRP suffice to their callsign. As well as not forming part of any official callsign, it is meaningless to the DX station as he cannot confirm you were using QRP; only you can do that when you sign the relevant declaration for whatever award you are applying for. Also, by sending / QRP you are likely to slow down the QSO rate of the DX station and **G3SXW** for one has

said (in a previous *Members' News* column) how this frustrates him when he is on a DXpedition. Please don't do it.

M1HOG and **GØWAT** are trying to start a 'local' QRP club, much in the vein of the American smaller clubs, and have decided to call it the 'Home Counties QRP Circle' (HCQRPC). The first meeting with some QRP based activities is planned for 21 September in the Stevenage area, and more information can be found at <www.hcqrpc.wordpress.com>. The Spalding Rally will be held on 1 June with special event station **G4OO** QRV.

A new portable transceiver from Hendricks QRP Kits has been announced: the PFR-3 (pictured right) covers 40, 30 and 20m CW only, the receiver MSD claims 0.2 uV typical and 300Hz selectivity, 5 watts at 12 volts, 5-35WPM built-in keyer and two memories, coax or balanced line output, built in balanced line tuner, size 7.3 x 4.4 x 1.6 inches. More information at <http://www.qrpkits.com/pfr3.html>.



Since December **G4OEP** has been developing VFOs based on the AD9851 and SI570 chips that he has written up at <http://g4oep.atspace.com/si570/si570.htm>. Andy says they are both very useful chips for the amateur constructor, particularly the SI570, and he is now working on a completely general VFO to produce any output frequency between 10-100MHz with crystal stability. **KB9JLO** has built the QRP2004, a major multi-band HF transceiver designed by **GØBBL**, **G8BTR** and **MØPUB** and has published a chronicle of the build at <http://on30ng.googlepages.com/qrp2004transceiver>. Dan says **M1KTA** has started a Yahoo group for the rig at <http://groups.yahoo.com/group/qrp2004/>.

MØNDE says the Dover Construction Club is still meeting Thursday evenings with six regular constructors. Winter projects included the **VK5JST** antenna analyser, an ozipole antenna, the new SOTA five element beam, the Hendrick balanced line tuner and the Cumbria designs Morse code reader. **GØFUW** and **G4ICP** have been exchanging notes while they each built the **G2DXK** transceiver from a 1984 *RadCom*, and met for a "thoroughly enjoyable QRP evening" when Nigel found himself staying overnight close to Richard's QTH. They would like to hear from other members who are/have built this transceiver.

Writing on 10 May, **PE1OIT** says, "Our club, **PI4THT**, at the University of Twente in Enschede, the Netherlands, offers the world's first on-line multi-user software-defined radio, called WebSDR. The project's chief architect is Pieter-tjerk de Boer, **PA3FWM**. You can reach WebSDR at <http://websdr.ewi.utwente.nl:8901> and it requires JAVA, which is available free from <http://www.java.com>. Currently, we offer parts of the 40m and 80m band and will be adding 20m soon. While not directly related to QRP, it is a useful tool to check your QRP signal as received at our club's QTH".

My thanks as always to all those who have contributed to this column, most of whom are regular contributors to it. The column can only exist with your input and so if you have never made a contribution, how about making one for the next SPRAT, please? Photographs are always welcome as in addition to breaking up the text, they really can convey a thousand words. Let me know how your summer goes, by 20 August, please.

QSL Cards from Nasko - LZ1 YE

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

GQRP Club Sales

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

Antenna Handbook – 2nd edition – members £6.00, non-members £10.00 plus post	} £1.00 (UK); £2.30 EU } DX - £3.90 per book
6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out **£12 plus post**	} £0.80 (UK); £1.00 (EU)
6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out **£12 plus post**	} £1.50 (DX)
Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] **£6 pair**	} **plus** postage
Crystals – HC49/U wire - **3.579MHz - 30p each; 10.111MHz - 50p each**	} (ANY quantity)
SA602AN - £1.75, MC1350 - £2.00, IRF510 FETs - £1.25	} 60p (UK),
MAR-4 RF amplifier - £1.50	} £1.00p EU,
HC49U (wire) crystals for all **CW** calling frequencies – 1.836, 3,560, 7,030, 10.106, 14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each	} £1.50p (DX)
HC49U (wire) crystals for DSB on 40m – 7.159MHz - **£2.00 each**	} If
Miniature crystals (watch crystal size – very low power) – 3.560, 7.030, 10.106, 18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each**	} ordered } with
Ceramic resonators – 455kHz, 3.58MHz, 3.68MHz & 14.30MHz – **50p each**	} heavier
Polyvaricon capacitors – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft ext & mtg screws - £1.20 each	}
Schottky signal diode – 1N5711 low fwd volts for up to vhf/uhf **20p each** } max of 5	} items
Varicap diodes – **MVAM109** – 40pF @ 9v, 500pF @ 1v. **75p each** } max of 2	} use that
– **MV209** – 5pF @ 12V, 40pF @ 1v **35p each** } per member	} postage.
CA741 op-amps 8pin DIL – **5 for £1**	} plus
2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO+40V **- 5 for 50p**	} 10%
MPSA92 transistors (pnp) fT - 50MHz, hFE-40, VCBO-300V **- 5 for 50p**	} of this
MK484 radio on a chip - £1.00 inc circuit diagram.	} postage

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM ORDER for cheque or PayPal payments is £5

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

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

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