



# SPRAT

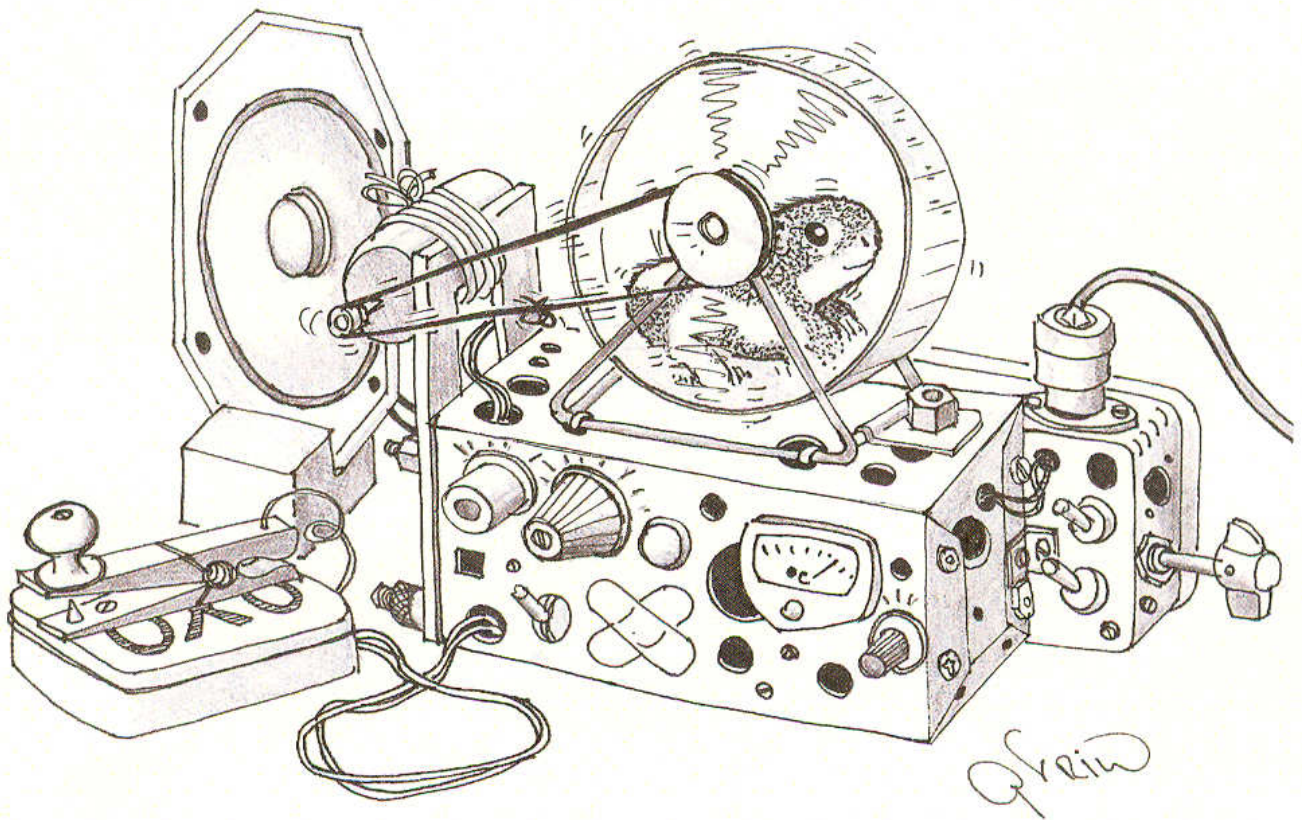
THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 132

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AUTUMN 2007



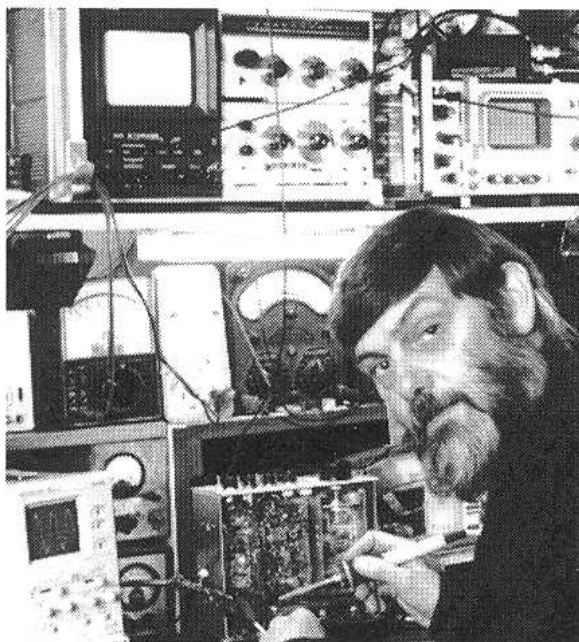
**The G8RIW entry for the W1FB Award 2007!  
A QRP Transmitter that is powered from a "natural source"  
Have you submitted your entry yet?**

Homebrew Variable Capacitor ~ Fun 5 Band VFO ~ Mini ATU  
DIY Valve Holders ~ Aligning the K2 ~ One Chip DC Receiver  
Baluns ~ Soldering Tip ~ Super Bloopers ~ Mounting SSOP ICs  
Remote Aerial Matching Unit ~ Meccano Prototyping  
SprintLayout 5 ~ Club Offers ~ Antenna - Anecdotes - Awards  
Gluestick Variable BFO ~ Bead Wire Antenna ~ Transmatch Mods  
Communications & Contests ~ VHF News ~ Member's News

# JOURNAL OF THE G QRP CLUB



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## **Rev. George Dobbs G3RJV**

Exciting times for the club – this issue brings members a new updated SPRAT CD and a new edition of the club Antenna Handbook. Both the result of a lot of work by club members in free time given to the club. I thank them on your behalf. The next issue will bring yet another club offer and an announcement about a new venue for the G QRP Mini-Convention in 2008. In times when amateur radio, like most active hobbies, shows signs of decline, it is heartening to see that our branch of the hobby marches on.

Keep sending us your articles about what you are building and doing, SPRAT is all about the exchange of ideas and your ideas are welcome. We can accept most formats, from pencil drawings and hand written notes upwards.



## **The W1FB Memorial Award 2007/8**

Design, build and operate a QRP Transmitter that is powered from a “natural source”. Please send details to G3RJV by Spring 2008

72/3

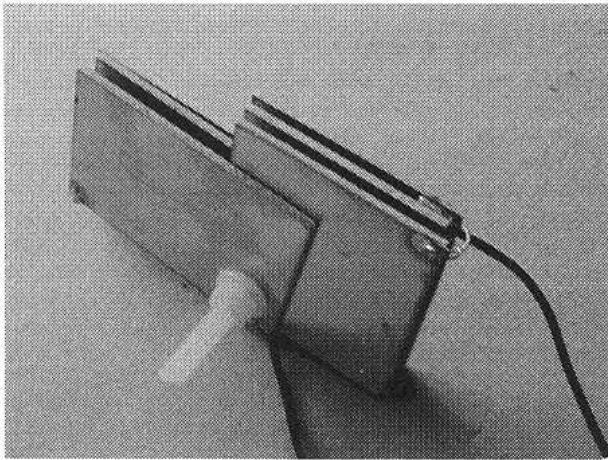
G3RJV

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# Homebrew Variable Capacitor

Chris Pearson, M0JRQ, 4, Brentwood Close, Thorpe Audlin, Pontefract WF8 3ES  
chris@m0jrq.com



I needed a capacitor to install in a tuner at the base of a reduced height vertical and knew a variable would make the job of matching the antenna much easier.

Having no suitable capacitor to hand, I cut six pieces of single-sided, copper clad fibreglass PCB - each 50mm by 40mm - as plates for a homebrew capacitor. These dimensions were determined as much by the PCB I had available as any other criterion.

Stacking the plates, I drilled a hole through them in one corner (Figure 1) Three plates were then connected together using tinned copper wire soldered to the drilled corner.

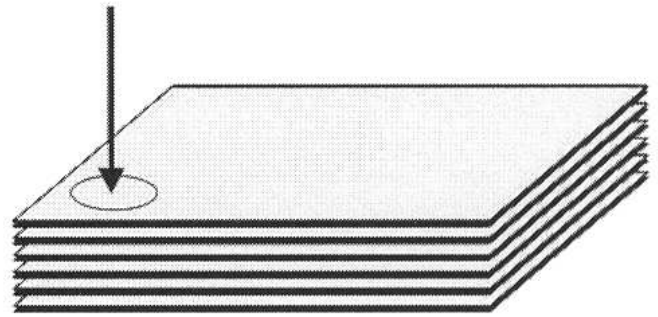


Figure 1

A hole through one corner

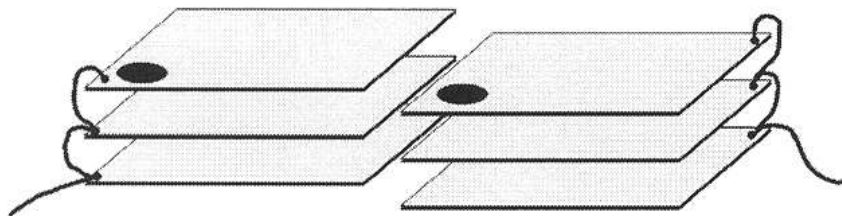


Figure 2

The plates are wired together

The other three plates were similarly connected at the diagonally opposite corner. (Figure 2) The plates were then interleaved and secured using a

piece of 3M nylon studding slipped through the holes, secured with two M3 nylon nuts; one on each side of the plate stack.

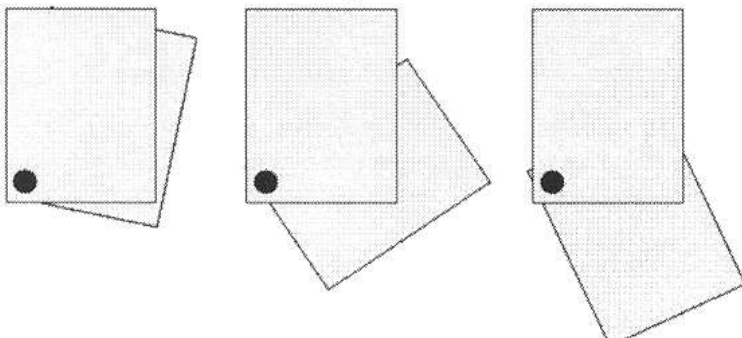


Figure 3

180pF

60pF

25pF

Opened, the capacitance is 25pF; half-way it's 60pF and fully meshed it provides 180pF.

Once the antenna was tuned the nuts were tightened and, with the match checked, a good blob of hot-melt applied to keep the plates in position.

# A FUN VFO FOR 5 BANDS WITH CHIRP SWITCH

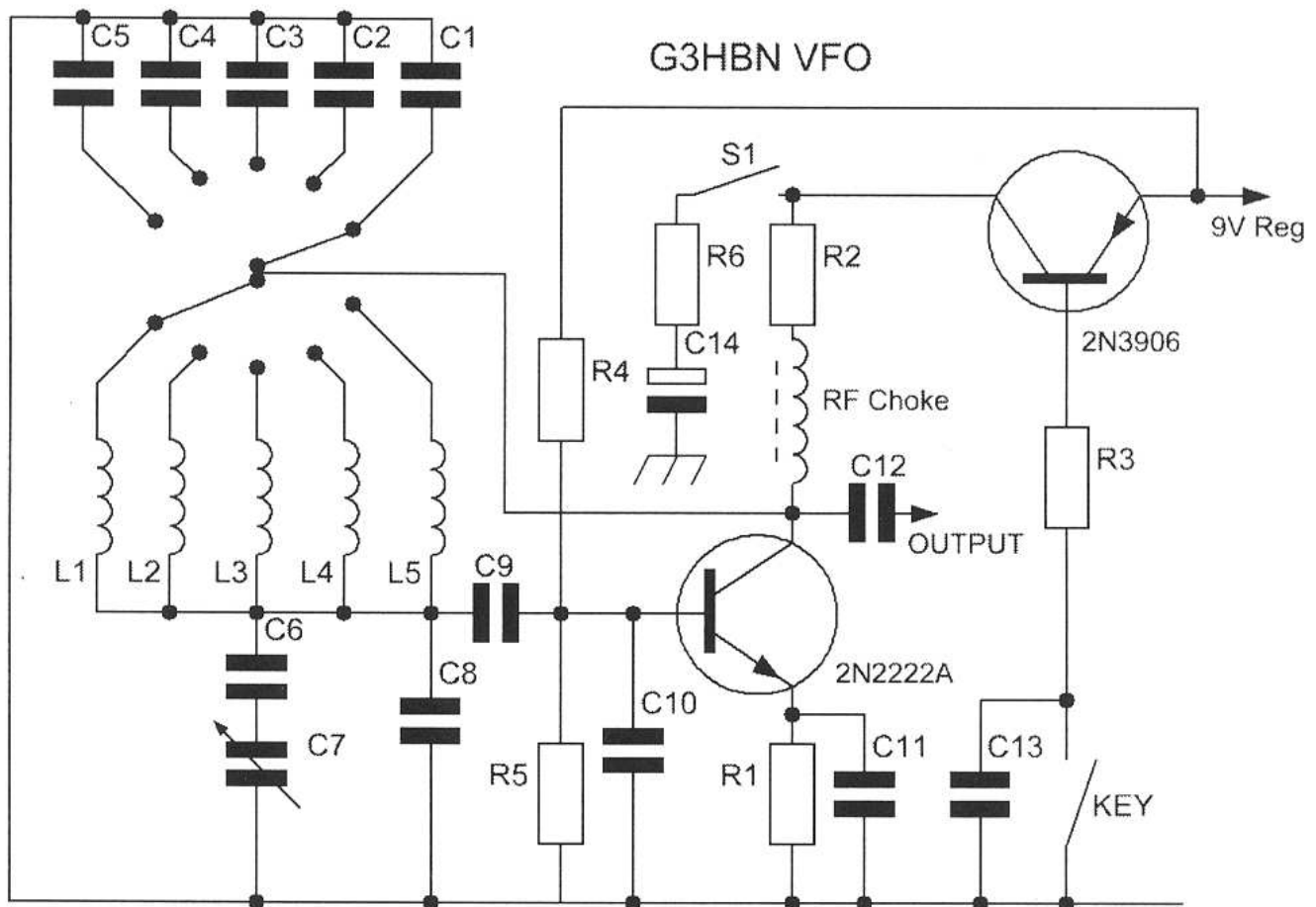
Jimmy Bolton G3HBN, Gordon Lodge, Vale View Rd.

Elms Vale, Dover, Kent. CT17 9NP

This is the heart of my 50 mw transmitter. It all began with the acquisition of an HRO dial

and gear box. The VFO is nothing spectacular except that it is stable and produces a good clean note without chirp up to 14 MHz, on 18 MHz there is a slight beginning of a chirp, but nothing serious. It takes about 10 to 15 minutes to settle down from switch on. The secret of clean keying with this VFO maybe due to the 2N2222A being biased continually and that the feedback capacitors are of stable quality. Ceramic disc capacitors are quite useless for C1 to C5. The Xc of these 5 capacitors seems to be about 48 ohms for a fairly uniform output on each band and stable keying.

The VFO is followed by a 2N3819 FET as a source follower (pinched from a W1FB design!), and that drives a 2N2222A buffer with wide band transformer output. A link couple from this stage drives a pair of 2N3819s in parallel in a Grounded Gate configuration. The output is a Variable Pi tank circuit which provides a suitable filter and match for 50 Ohms output. It has a built in antenna changeover relay too! Power output is measured with a built in 50 ohm dummy load and the voltage measured, before switching the output to the antenna socket.





# COMPONENTS LIST

C1 1000pF\*  
C2 500pF\*  
C3 340pF\*  
C4 250pF\*  
C5 200pF\*  
C10 850pF\*

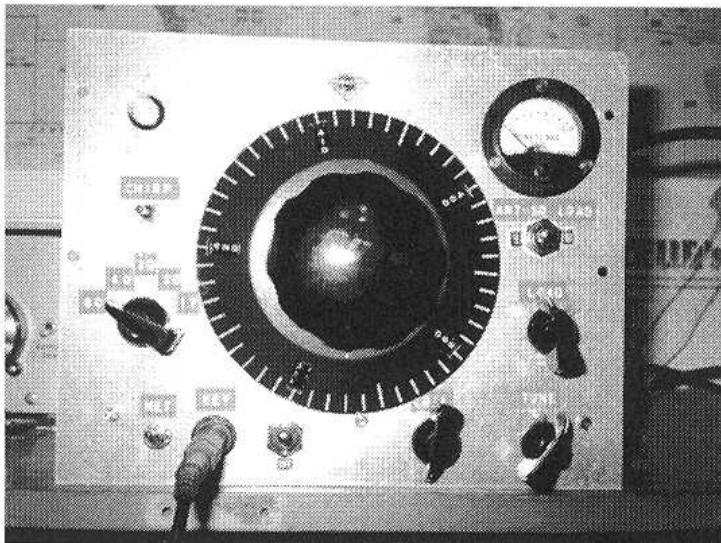
\* Polyester

R1 2k  
R2 2.2k  
R3 1k  
R4 18k  
R5 8.2k  
R6 100 ohms  
RFC 10 Turns on ferrite bead

C6 47pF ceramic  
C7 50pF Main Tuning  
C8 150pF ceramic  
C9 100pF silver mica or air spaced  
C11 .002mfd  
C12 20pF ceramic  
C13 .001mfd  
C14 2 - 8 mfd to suit chirp

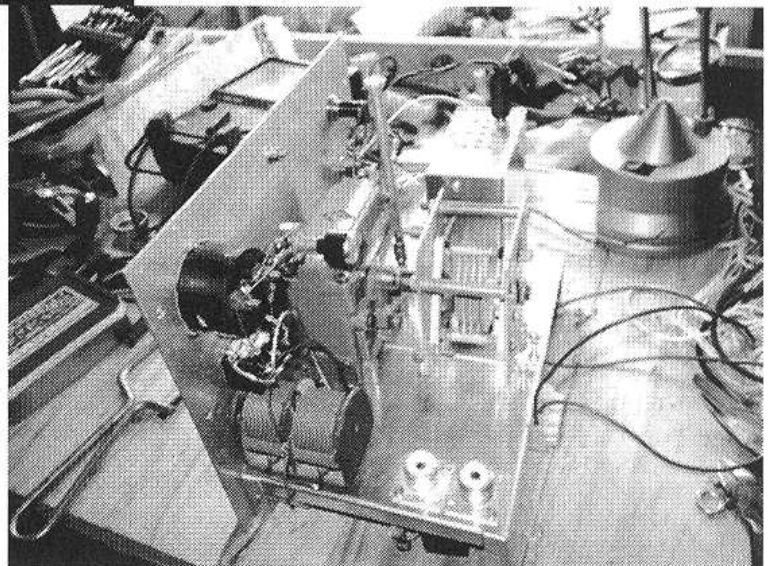
## INDUCTORS:

L1 to L5 should be made to suit the bands required. This VFO uses Aladdin formers with slug tuning to cover 3.5, 7, 10.1, 14, and 18 MHz. Toroids should be avoided as they lead to instability and poor keying.



Front panel of the  
G3HBN 50 mW Transmitter

The G3HBN 50 mW Transmitter  
under test



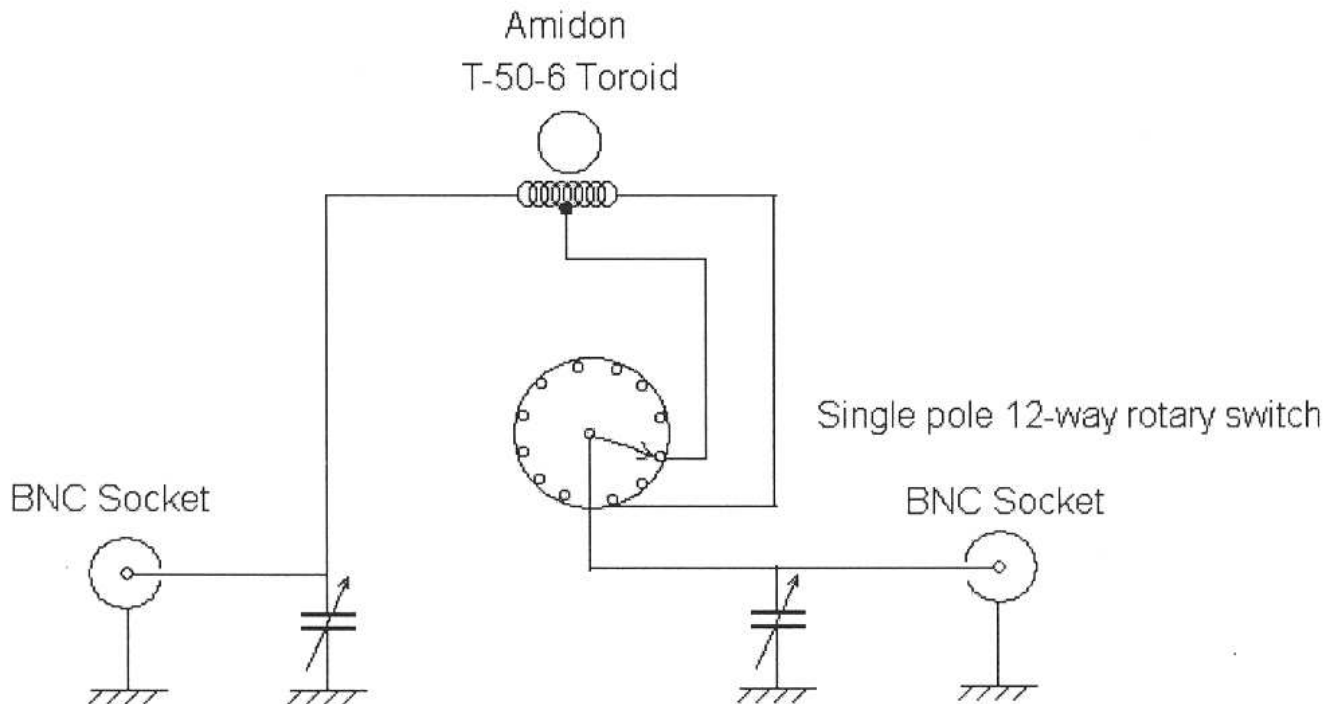
## Mini ATU with Toroid

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

This ATU was designed in about 1990 to allow QRP rigs to be used with portable antennas. The unit had to be small and light weight. Generally I am against using ATU's at all regarding them as a cop-out for poor antenna design. However, when portable operation is considered, it is not always possible to erect the ideal antenna. This ATU was designed with idea of achieving a better match to an antenna that was nearly right.

A later version was tried which had an additional coil switched in and also a balun to accommodate twin feeder. I was never happy with this version, as it didn't seem to work as well as the simple version. When it was deconstructed in 2007 to do some loss measurements, it was discovered that a constructional error during the mod may account for this.

The circuit is a simple Pi circuit.



### NOTES:

The toroid is wound with 28 turns. It is tapped at 6,9,12,14,16,18,20,22,24,26, starting from LHS.

Only one tap is shown for clarity.

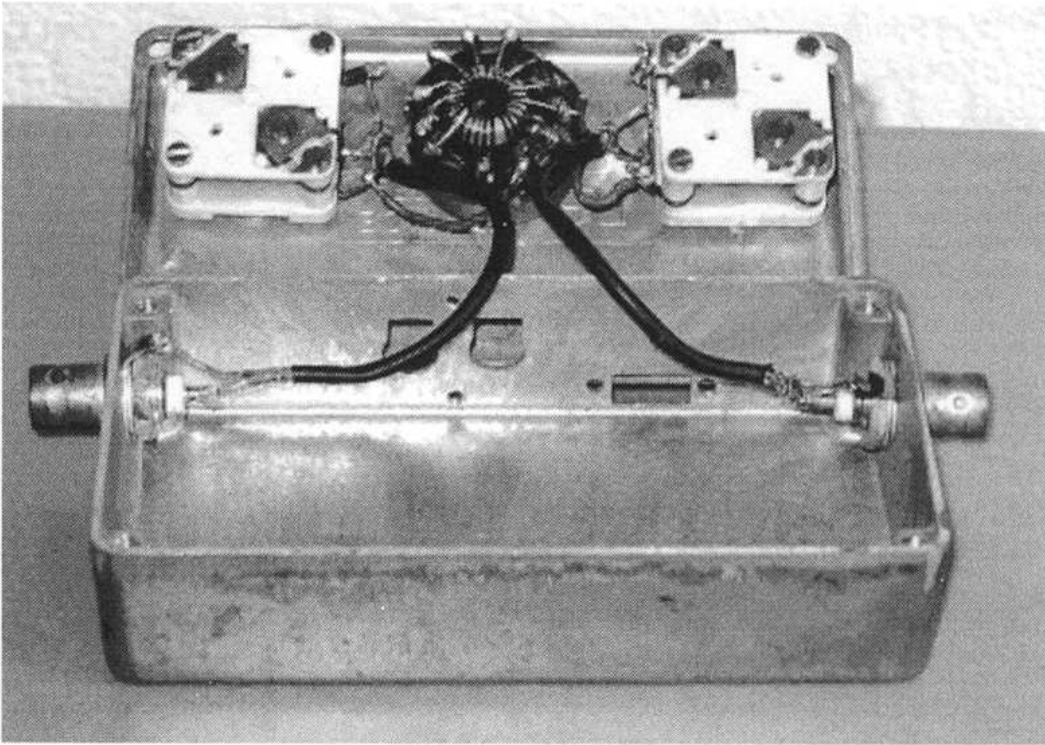
Capacitors are polyvaricons, with both gangs wired together to form a 500 pF variable capacitor.

Adjust all associated trimmers to minimum capacitance.

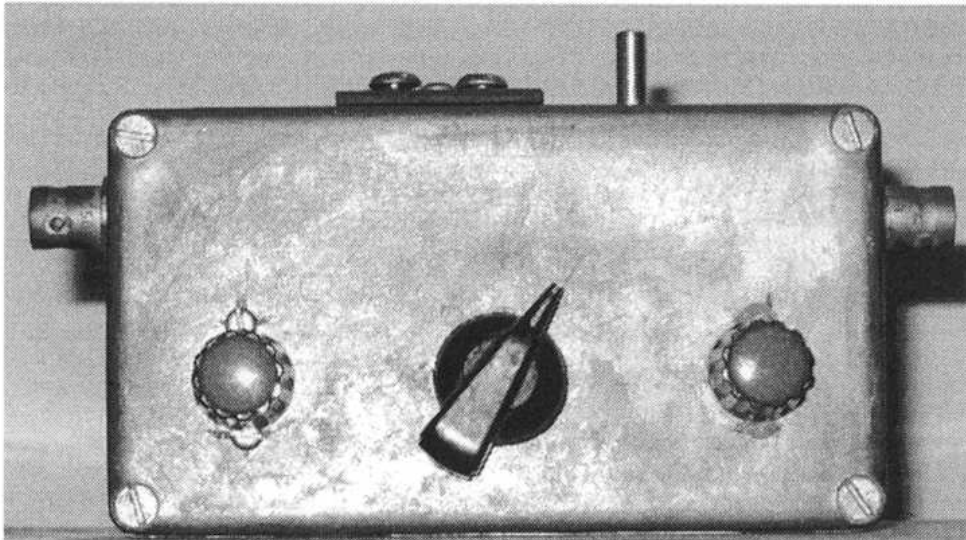
John G8SEQ



The layout was arrived at when it was realized that a T-50-6 toroid would just fit inside the ring of connecting lugs on a standard 12 way rotary switch.



The box is a standard STC diecast box measuring 110 X 60 X 28 mm and has it has rounded corners, has a nice feel to it and slips into the pocket easily.



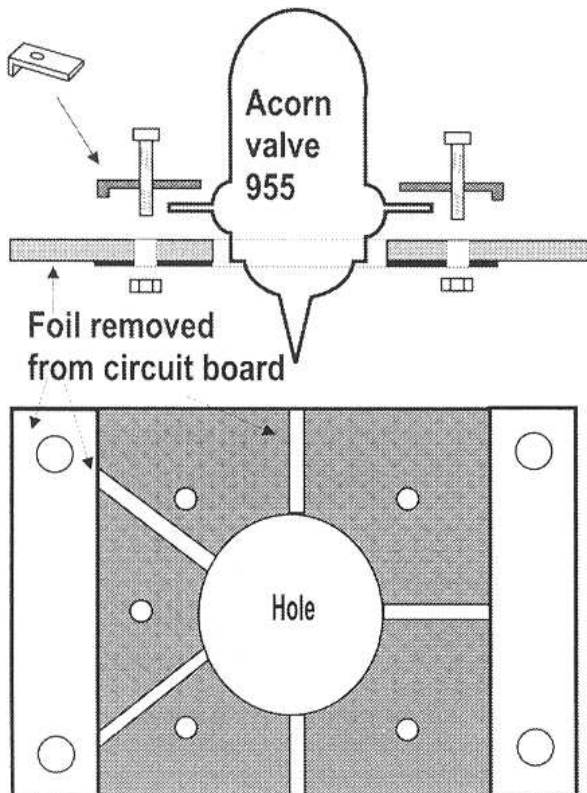
# DIY “EI Cheapo” Valve Holders

By Barry Harvey G8RIW, 56 Oakwood Dr. Wybers Wood, Grimsby, DN37 9RN

I read the two articles that used 955 Acorn valves in the summer 2007 edition of *Sprat* with interest. I recall that some (long) time ago I found a circuit that if memory serves me correctly, was for a grid dip oscillator that used one of these valves. This was at a time when there were still a lot of “War surplus” components around and the Acorn valve was sold for pennies (the real pre-decimal ones). I know I made my own valve holder. I cannot remember the reason, maybe no suitable valve holders were available, or possibly I had run out of cash to fund a trip to Johnny Birkett’s well known emporium in Lincoln, I was after all stationed at RAF Waddington at the time.

As near as I can recall the valve holder was made as per the diagram. The material used was sheet paxolin with bits of brass shim stuck on one face. A crude version of a modern printed circuit board plus tag strips and little insulated pillars. Paxolin sheet and black “bodge tape” being the staple components of advanced RAF ground engineering at the time.

The point of this article is to show that it is still possible to use some of those old valves that are still lurking in a cardboard box in the back of many a radio amateur’s garage or shack.

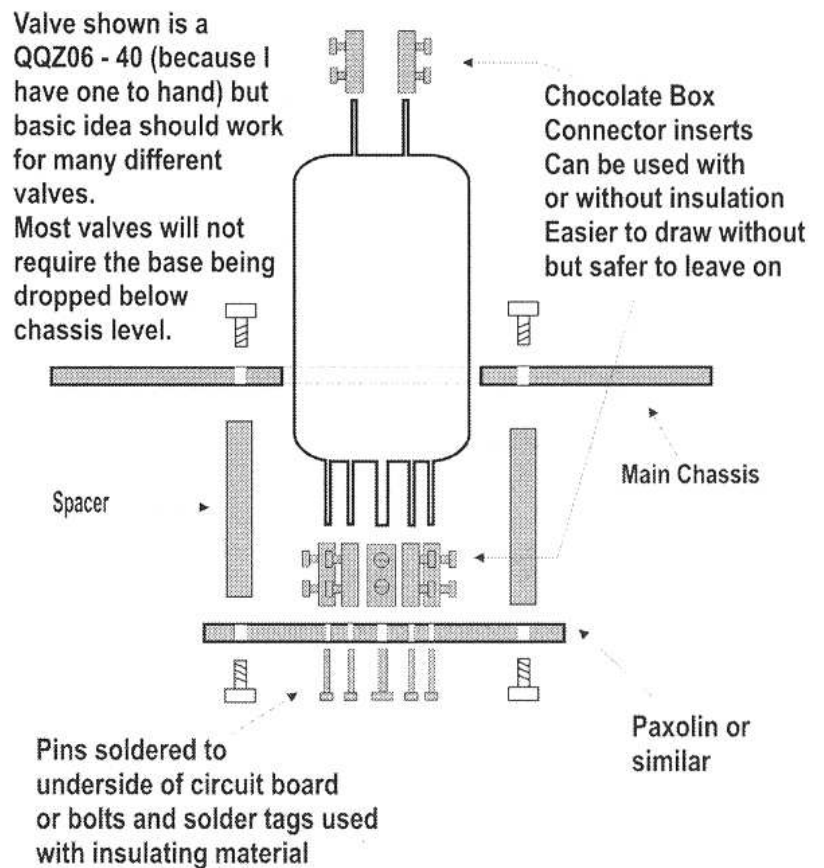
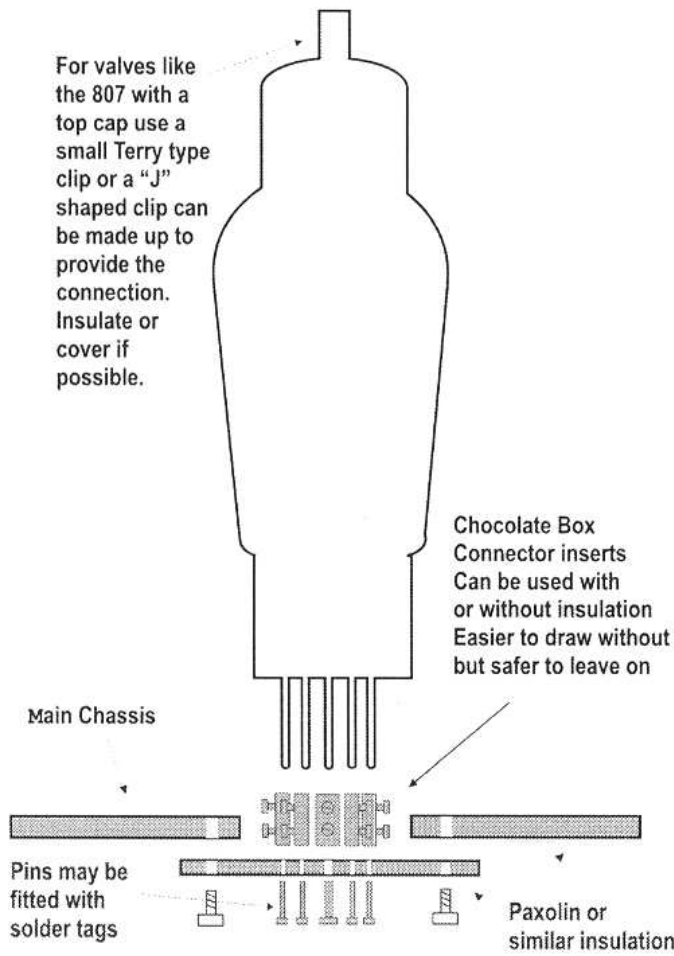


**N.B. For use at high frequencies much larger gaps in the insulation may be needed. Components may be soldered directly to the circuit board if required.**

In addition to the Acorn valve I have also included ideas for a valve holder for an 807 valve and a QQZ0640. These are by way of illustration only, as they are the only valves that still grace my shack, (an 807 may well be used, but a QQZ0640 is not the most suitable of valves for QRP use, but O.K. if you wish to start your own local radio station, – just kidding!).

These ideas can be used as per the diagrams, but can easily be used as a start point to get the little grey cells functioning as to how you can make valve holders from whatever you have to hand. Please do not forget that 100 - 250 volts DC plus can really give a nasty bite. Also insulation should be capable of working at these voltages. Insulating gaps between conductors need to be larger than you use for 12 volts. Safety first and sturdy construction are the keys. A cautious pedantic QRP constructor who uses high voltages will live to transmit for many more days.





# **ALIGNING THE K2 FILTERS BY EAR**

**Geoff Wooster G3YVF, Random House, 8 Marine View Street,  
Marys Island, Chatham. Kent. ME4 3LA**

## About the K2 Transceiver

When first built the K2 filters are aligned using default settings, which are selected from a chart and dependent on the frequencies of the xtals supplied. The result is very good and the K2's reputation says it all. Builders and most owners of a K2 know that the selectivity can be adjusted to suit ones desires by using the embedded controls. Some even observe the selectivity response of each filter (there can be quite a few in a K2) and using special software and a P.C. put the B.F.O. exactly where they want it in relation to the response curve. This is not possible for those without a P.C. or indeed those with one but not the correct operating system or the software to do it. Since the B.F.O. can be moved in relation to the I.F. easily using the embedded controls how then best to position it where it does some good without loads more electronics. Now follows a suggestion!

## Using your ears !

Wanting more from my K2 and getting very frustrated with a computer and my inability to get results in this area it dawned on me there is another way able to produce pleasing results. This way uses ones ears, and if you can add and subtract using your own brain a calculator is not needed.

You use your ears to locate a null, a bit like a zero beat, in the noise as you tune across the filter. The null indicates the centre frequency...once found it is a small matter to offset the B.F.O. by the correct amount using the display frequency readout.

## The noise source

If you don't have a noise generator then make one. Follow the circuit diagram in Fig. 1. Component values are not critical and as long as the zener diode is conducting it does not matter what its' voltage is, around 5v is fine. The diode makes the noise and the transistor amplifies it. Connecting the output of this wideband noise source to the antenna socket of the K2 should result in about an S9 noise level being shown on 7 Mhz receive. The signal level of the noise is not important only that you can hear it from the loudspeaker.

## Embedded controls and push buttons

One has to exercise care when pushing buttons on a K2. A tap means just that...a short tap on a push button lasting a fraction of a second. Hold means holding the button down for between half and one second. Holding down a button like this enables the button to perform its hidden function. A word written in upper case e.g. MENU describes which button is being used on the K2.

One cannot damage a K2 in making these adjustments, but you might like to make a note of various settings before adjustment. At least this means you can always return the rig to its original settings calming any thought of panic.

When moving the B.F.O. take care to lower, i.e. subtract, when in CW and raise, i.e. add, when in CW RV...it's all to do with the way the K2 mixers work.



Some simple maths is required and to make this easy we will first set the side-tone pitch to 50, which is a nice round number. Turn the K2 on, select 7Mhz and CW mode. Then...

Tap MENU.

Keep tapping BAND+ until "st p" is displayed.

Hold MENU. Side-tone will be heard.

Adjust the tuning knob until "0.50" is indicated. The tone pitch will change as you do this.

Tap MENU once then tap MENU again.

Job done, the side-tone frequency is now set to 500Hz.

#### How to set up a filter

Connect the internal frequency counter probe to TP2 (BFO) TP2 is near the bank of xtals on the main board.

Keeping the K2 on 7MHZ in CW mode and with the noise generator connected and turned on select the first filter to be optimised using XFIL button. Tap XFIL and select FL4 your narrowest bandwidth filter. Then...

Tap MENU.

Keep tapping BAND+ until "CAL" is displayed.

Hold MENU.

Keep tapping BAND+ until "FIL" is displayed.

Hold MENU.

Set the desired bandwidth of this filter now by rotating the tuning knob to the desired bandwidth.

Tap DISPLAY

Rock the tuning control to and fro to locate the null in the noise. Note the frequency exactly.

Now do the maths. Subtract 50 from the reading taken.

Using the tuning control move the display to the required reading. Don't worry about any wobble in the display as close as possible will do.

Tap MENU...wait...there will be a slight delay after which the K2 will return to normal receive mode.

Job done. One filter optimised. Carry on and do the others, setting the bandwidth of each filter as desired.

When optimising filters in CW RV (reverse) add the readings do not subtract!

Optimisation this way is easy but it will get slightly harder to locate the null as your desired filter bandwidth is increased.

#### S.S.B. Filters

S.S.B. filters might be optimised the same way...remember subtract/lower in L.S.B. and add/raise in U.S.B. You can play for hours and still return to where you started...if you remembered to make a note of where you started first. And the B.F.O. offset for S.S.B. should be? Well why not try half the bandwidth of the filter selected?

**Over to you !**

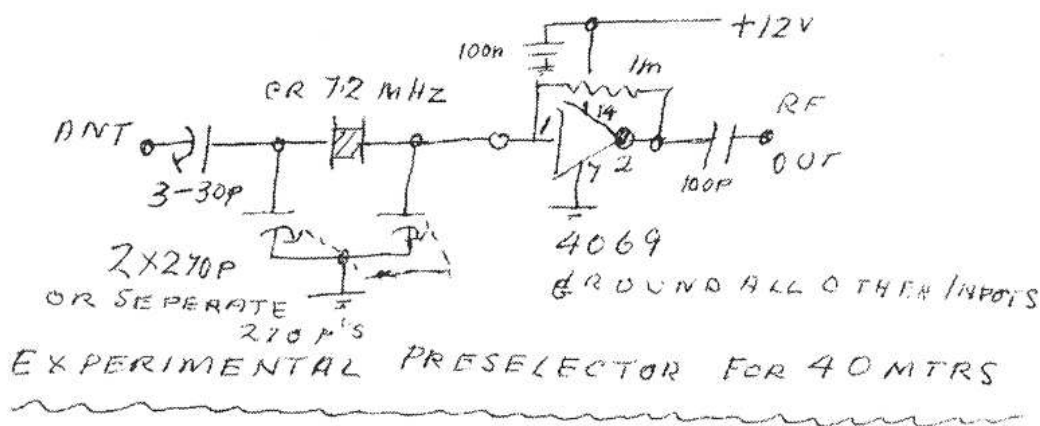
# The One Chip DC Receiver

Bill Currie VK3AWC, Box 5197, Mordialloc, Victoria 3195.

(Note by G3RJV) I was saddened to hear of the death of Bill Currie VK3AWC, in the June 2007 issue of Lo-Key (Journal of the VK QRP Club). I have always enjoyed Bill's articles in Lo-Key and several have been reproduced in SPRAT. Bill was G QRP Club member.

In his last letter to Barry VK5BLS, President of the VK QRP Club, Bill said "after a bout of illness I have gotten going again with construction"

.....adding a hand drawing of a little circuit idea.



*Circuit I am making on at the moment.*

Don VK5AL, christened him "Scrooge" after his article "The One Chip DC Receiver".

**I have reproduced that article in memory of VK3AWC – a fine QRP experimenter.**

I have always been a bit of a 'tight-wad' and when I recently acquired some 74HCU04 chips at ten cents each, I couldn't resist the challenge of making a receiver using one, and one only, of the chips.

The 74HCU04 is really a digital chip containing six inverters, the C denoting High speed CMOS and the U denoting 'Unbuffered'. CMOS inverters can be biased into the linear mode by installing a feedback resistor from output and a series input resistor similar to op-amp configuration.

Some experiments proved that not only would the inverters amplify audio frequencies but they would also handle RF signals. A gain of about 10 is available up to 10 MHz or so.



## D.C. Receiver.

The resultant direct conversion receiver for 80 metres contains an RF stage, a VFO with a buffer, a product detector and a high gain audio stage.

The product detector uses two diodes and is the only stage not contained on the chip.

The VFO uses a ceramic resonator and tunes from below 3.500 to about 3.620 MHz. This fairly large swing is obtained by using a two gang capacitor, one section at each end of the resonator. Incidentally, I find that two gang capacitors are easier to scrounge than single ones. I actually used a (shudder) plastic capacitor, but you may not be as big a tight-wad as I am!

The audio output is sufficient to drive a pair of 'el cheapo' stereo phones or an LM386 amplifier, such as Silicon Chip's "champ" (Feb. 1994 issue).

I built the receiver on a Tandy IC perfboard (Cat. No. 276-150). This board is 72 mm x 45 mm and is ideal for IC projects but requires that components be very small. VK3XU Drew Diamond's 'paddy board' method of construction would probably be an easier way to go.

The receiver runs best on six volts but works OK on five. One disadvantage is the high current drain of 60 mA or so, which rules out dry batteries unless your uncle owns Eveready (the Company, not the battery – VK5AIL)

A brief wander across the circuit diagram...

The 50 $\Omega$  input is from a tuned antenna. I originally tried 4 turns on the primary of the T-44-2 transformer, but found 5 works better on my set. The Hi input was intended for a high impedance input (a short length of wire) for 80 & 40 metres. There tends to be more BC(SW) break through from this input, but it is handy for those without resonant antennas.

The capacitor from pin 10 of the IC (the VFO buffer output) should be 0.1  $\mu$ F mono as are all the other 0.1's. The transformer feeding the 8  $\Omega$  phones should be the easily obtainable 500  $\Omega$  / 8 $\Omega$ . I've tried a 1k transformer here, but found it not as good as the 500. I really don't now what the output impedance of the buffers are, but guess the figure is less than 1k. The 'BETTER' circuit is worthwhile as it is cheaper than the transformer and has POWER gain, but no VOLTAGE gain.

I did not include a Volume Control in the Audio section as output is not very high. Of course with 'BEST' circuit and a gain of 20 – 200 than a V.C. is needed. A 1k or 500 $\Omega$  RF gain control could be included, but that's up to the individual homebrewer, I guess. Be careful to connect the positive side of the 1.0 $\mu$ F capacitor at the output of the AF stages towards pin 8 of the IC.

## Bonus Bits...

The receiver will receive signals on 40 metres also. The square wave 3.5 MHz drive to the product detector probably accounts for this. The frequency coverage is 7 – 7.2 MHz or better and all that is required is to retune the input circuit to 40 Mx. If you are troubled by SW-BC breakthrough you may need to install double tuned circuits and/or band switching in the front end. As the VFO is buffered you can feed a frequency counter and/or an “80 MX” transmitter.

## Afterthoughts....

To prevent problems with the VFO output getting into the frond end it would probably be better to use a separate VFO and buffer, but the thought of squandering 10 cents for another chip was more than I could bear.

The values of components have not been optimised; feel free to fiddle with what you will. I used hot carrier diodes (H.C.D.) for the product detector but 1N4148's work almost as well and cost a lot less).

In the unlikely event that signals are too strong, cut your antenna in half (heh-heh-heh!) or install 1 pot on the input as an RF gain control.

You may be able to use a standard CMOS chip such as the 4069 in this circuit but for the sake of a few cents (it's your money, not mine) why bother!

It should be possible to use the 74HCU04 in at least some stages of superhet receivers, double and single sideband transmitters (e.g. as RF amps in a DSB Tx to drive a MOSFET O/P stage) and various pieces of test equipment. The chip has six AF/RF amplifiers available, costs less than a dollar and is easy to use.

It's over to you – and please don't reverse the charges!!

## Postscript ...

My rcvr is working well at the moment (and I hope to put it in a box one day), except that I recently discovered that it suffers from frequency hopping at one spot on the dial. This has been mentioned before about ceramic resonators by other ham home brewers. At about 3.918 MHz the frequency will 'jump' to 3.523 and vice versa.

I haven't tried other resonators in this set yet, but did have this problem with a similar receiver.

## Postscript 2...

The SPRAT circuit “A Digital Display for the Epiphyte” by Derry Spittle E7QK (SPRAT No. 83 p.22) should be great for this D.C. receiver. I have nearly completed a digital readout and will write an article about the version I have made. The original article is well worth reprinting.





# Baluns

Dick Arnold, AF8X, 22901 Schafer St. Clinton Twp., Mi. 48035. USA

If you like to experiment with antennas, sooner or later you will need a balun. The name balun means *balanced to un-balanced*. I think all radios now are designed to load into an unbalanced feedline. The reason I suppose is the popularity of coax cable.

Commercial balanced antennas, for example,  $\frac{1}{2} \lambda$  dipoles have a 1:1 balun at the center feed point where you may connect a coax feedline. The dipole antenna impedance is around 70 ohms, depending on the height above ground. That's not a bad match to the radio's 50-ohm expectation, but it's a balanced load. The balun will convert it to a coax and radio friendly unbalanced load.

Other balanced antennas have different impedances and if it is around 200 ohms or more a different balun ratio will be needed. The 4:1 balun is very popular in these cases. The price of commercial baluns run around \$24.00 and up. I found that baluns are easily home brewed and not near as costly as manufactured models.

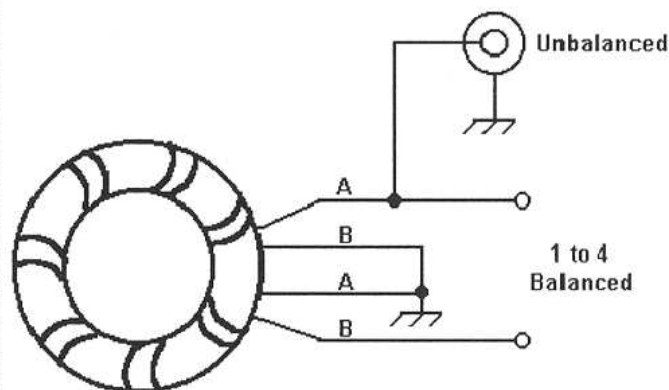
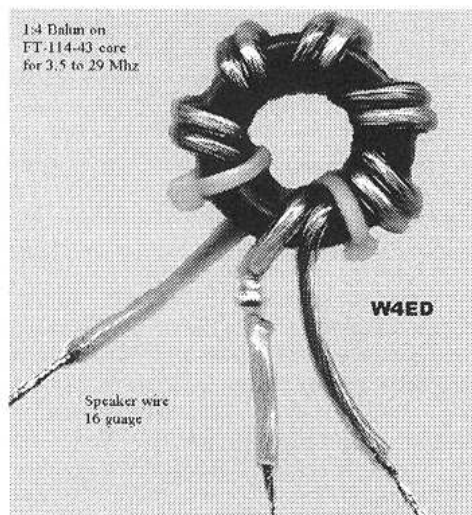
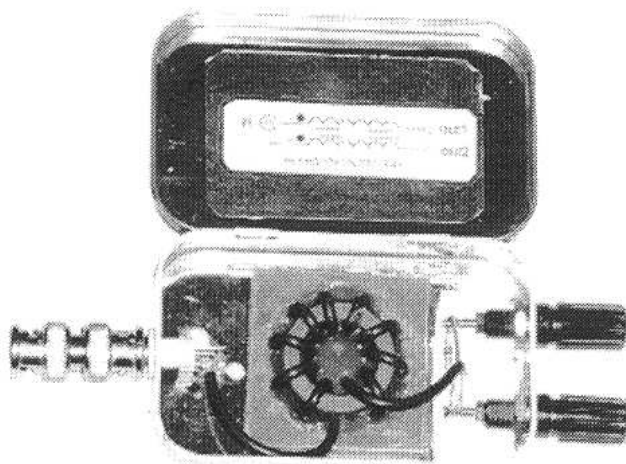


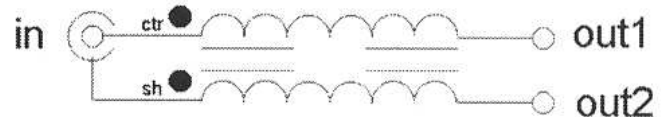
Figure 1

This is a favorite of mine that I found on the Internet. It uses a FT 114-43 toroid and is wound with six turns of 16-gauge speaker wire. As indicated in the diagram the silver and copper color conductors are labeled A & B. The conductor A from one end and conductor B from the other end are spliced and connected to the ground side of a coax connector. The other A & B conductors are the balanced line inputs. The coax connector (unbalanced output) is connected to the A conductor. The balanced line input is connected to two banana plugs; the unbalanced output is connected to either a BNC or SO239 connector. The connectors are mounted in either a metal or plastic box and the toroid is secured to the box with hot glue.

The 1:1 balun I use was made using the FT 114-43 toroid again and wound with ten turns of RG 174 coax. One end of the coax is connected to the unbalanced connector and the other end is connected to the two banana plugs. Again all this is mounted in a suitable sized box.



NSFC 2002



10 T RG-174 ON FT114-43

As you can see there is nothing too complicated in creating a homebrew balun. These two examples are only two of the many designs using smaller or larger toroids and wire.

The toroids I used were purchased from [www.kitsandparts.com](http://www.kitsandparts.com), but there are many other suppliers. **(They are available from Club Sales – see back page)**

If you have an interest in learning more about baluns, the ARRL has a book<sup>1</sup> available which will tell you more than you ever wanted to know about baluns.

Good luck with your balun experience.

<sup>1</sup> Building and Using Baluns and Ununs-- Practical Designs For The Experimenter By Jerry Sevick, W2FMI

## Soldering Tip

Gert de Gooijer, PA3CRC,

St. Adrianusstraat 81. 5614 En Eindhoven. The Netherlands

While trying to solder the thin enamelled wires, I suddenly remembered an old -1949 or so- tip from a Dutch magazine Radio Bulletin. They advised to always have a piece of resin (from the pine tree) on your bench to use as flux. So I took a piece of resin, normally used to put on the violin bow.

After scraping the thin wires with a thin knife it is not always easy to solder a nice layer on the wire end. Just try to solder the wire and *while it is hot* immediately put the wire against the solid bit of resin. This will melt just a little bit. Next time you put your soldering iron against the wire the small amount of resin that stuck to the wire will make the lead/tin to form a beautiful layer. This resin is readily available at any music store where they deal in violins. Of course if you live near a pine tree forest.... A small bit will last a long time.

# Super Bloopers – some observations

Des Vance G13XZM, The Eaves, Reagh Island, Comber. BT23 6EN

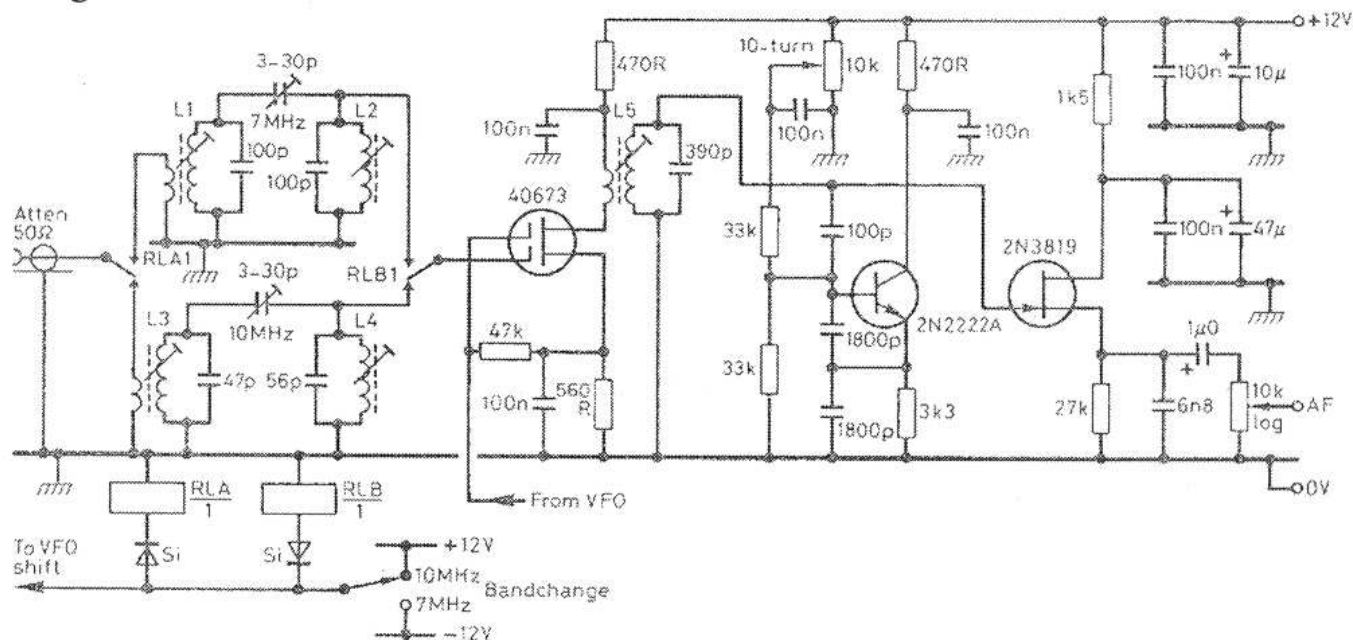
Pat Hawker on occasions called the regenerative receivers formerly in general use "bloopers", so when I found it possible to improve performance by separating the detector and feedback functions I used the name "Super Blooper". The idea was introduced in Technical Topics October 1987. It is encouraging to note that many operators have liked the idea and devised useful changes and improvements.

GM4HTU's Super gainer, [TT Feb '91] and G3RJT's Ultimate KISS TCVR, [TT Nov '92] are particularly interesting. The Autodyne RX of JA9MAT [Sprat Winter 04/5] uses the same principle, possibly reached independently.

Now my original design was intended for general coverage, built for a young SWL, and since AM was required an envelope detector [infinite impedance] was used. All subsequent variations appear to have retained an envelope detector, like the old bloopers. However for amateur use today a product detector is more appropriate, something which seems to have escaped everyone's notice, including my own!

If the 2N3819 infinite impedance detector [drain bend detector in the case of G3RTJ] is biased to half its measured pinch off voltage and provided with [say] a drain load such as an 88mH toroid tuned with .47uF it will become a typical FET mixer circuit with "BFO injection", of course, coming from the Q multiplier as before. The tuned drain load should provide adequate filtering for CW although for SSB a band pass arrangement would be needed.

Tony Langton's super gainer would seem a good place to start, with good isolation provided by the mixer stage. I hope to try this soon but would be delighted if someone else gets there first .....



GM4HTU's Super-gainer from Technical Topics, February 1991

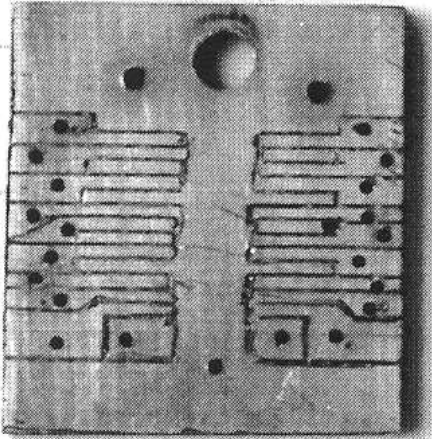


# Mounting SSOP ICs

Eric Christer, Z21FO <christer@zol.co.zw>

The pictures will give some idea on a method I have used for mounting a shrink small outline packaged (SSOP) IC having 0.65 mm pin spacing.

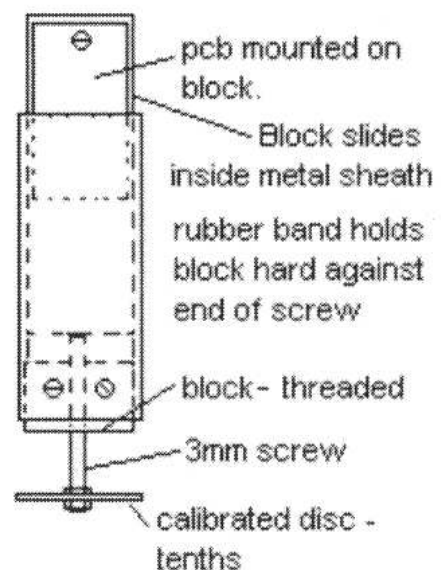
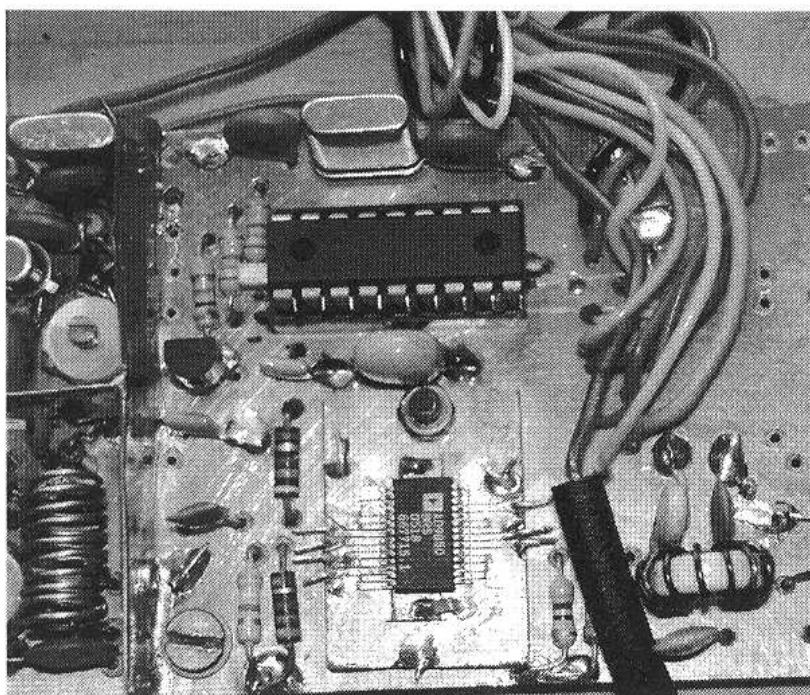
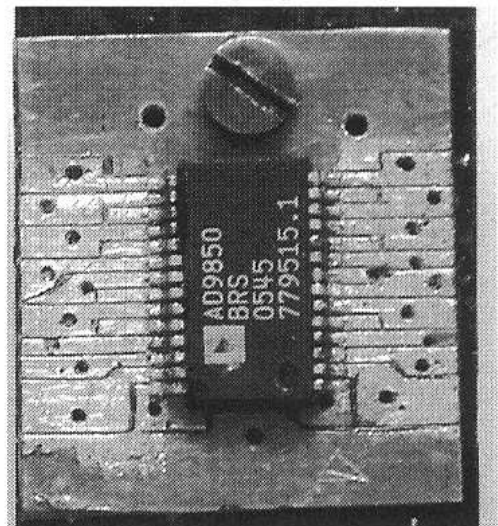
A small pcb (about 18 X 25 mm) is covered with etch resist and using a jig, the lands are formed using a sharp scribe.



The pcb is mounted on a movable block in the jig with a screw holding the board in position. For each IC pin track location, the board is moved 0.65mm by the use of a screw feed having a pitch of 0.5mm (a standard 3mm screw) so for each pin position, the screw is turned 1.3 turns. The board is scribed using the horizontal end of the fixed part of the jig as a guide. Vertical scribe marks are made down to the guide from the previous setting. An enlarged paper pattern helped to get the tracks correctly marked in proper sequence.

After etching, the scribe can be used to clean out places that have not been fully etched away. A 200 volt dc low current source was used to prove the separation of the tracks.

The smallest holes drilled in the pcb are 0.5mm dia. My effort is not as neat as I suppose it could have been!



# **THE RAMU (Remote Aerial Matching Unit)**

**Ian Keyser G3ROO, Rosemount, Church Whitfield, Dover. Kent. CT16 3HZ  
and Ron Taylor, G4GXO, Cumbria Designs,  
The Steading, Stainton, Penrith, CA11 0ES**

This is the cumulation of a years work, mainly by Ron of Cumbria Designs, to get a system working that I have always thought would be an asset to radio amateurs. So often we wish to control R,C, or L remotely, and sometimes L and C together to create a matching circuit. Auto Aerial System Matching Units (ASMUs), will do the latter, but lack the versatility of the manual system described here and also lack the ability to control resistance.

Last year, at the Rochdale convention I ran the idea past Ron and he volunteered to have a look at it 'in his spare time'. I think that it has taken a lot more than his spare time mainly due to me moving the goal posts during design! The result is very rewarding allowing remote control of switched L and C values over at least 150ft of cheap LAN cable.

## **Circuit Description**

The RAMU comprises of two parts; a control unit and a remote "head unit". At the heart of the RAMU control unit is a PIC16F877 which scans the controls, responds to changes, updates the LCD, formats control data words and sends them serially to the remote head end. The control unit features two rotary encoders for emulating rotary controls (such as variable capacitors, inductors or pots), four push button switches for user set up and auxiliary controls and a 16x2 line LCD for displaying settings and unit status. Communication to the remote head end is by a serial format over a five wire interface; two for power and three lines for serial data. The remote head end converts the received serial data stream into relay operations which can be used to provide incremental changes in R, L, C or anything else that you may wish to control remotely. We have also made provision for control of four additional relays in case your application requires more control. These 'Auxiliary Outputs' are selected by two of the front panel buttons.

The head unit consists of a shift register to convert the serial data to parallel logic outputs which drive relays. Each serial data channel provides control of 20 relays arranged in two groups (10 for L, 10 for C) and four auxiliary outputs. Each relay group is used to switch lumped constants providing 1000 combinations. For example, if combinations of capacitors were switched by the relays in the sequence 1, 2, 4, 8, 16, 32, 64, 128, 256, and 512pf a very accurate 1000pf variable capacitor having a resolution of 1pF could be simulated. Using inductors of 0.1, 0.1, 0.4, 0.8, 1.6, 3.2, 6.4, 12.8, 25.6 and 51.2uH a variable inductor between 0.1uh and 100uH, plus strays, is available. Of course, more than one 'capacitor' or 'inductor' may be used in any matching circuit, with the RAMU you achieve this by using another relay board and driving it in parallel with the first. You can even make a differential capacitor by putting the capacitors in reverse order on the second board. Alternatively, with slight changes to the software and at the expense of

slower data rate, relay boards could be cascaded serially to 'expand' the outputs available on a channel.

## Operation

There are two modes of operation; Setup and Operate. In Setup the controls are used to configure the key functions of the RAMU such as rotary encoder step sizes. Once complete, all settings are saved to EEPROM within the PIC and are recalled when next switched on. In Operate mode the operation of the controls is interpreted by the PIC to produce serial data words which are sent along the cable to the head end where they are converted into a series of parallel outputs which control the relay states.

In Setup, the four control unit push buttons are used to program the step sizes by range allowing a progressive 'tuning law' to be introduced. It is possible to setup the RAMU to 'tune' the capacitor or inductor outputs in unit steps from 0 to 1000. This would correspond to steps of 1pf from almost ZERO (depending on the stray capacitance of the relay circuits) to 1000pf. Whilst a 1pf resolution is great up to say 100pf, 1pf steps at 1000pF make little change and would make it time consuming to go from 0 to 1000 pf. For this reason the option to program in a 'tuning law' is provided to allow fast tuning at ranges where unit changes makes little difference to the resultant value. The tuning law allows the RAMU to use greater incremental values of capacitance or inductance at the high tuning ranges. For convenience five ranges have been chosen against which incremental steps of L or C can be programmed;

Tuning count	0-63	step size 1
	64-127	step size 2
	128-255	step size 4
	256-511	step size 8
	512-1000	step size 16

Both channels use the same tuning law as it was considered an unnecessary complexity to program each individually.

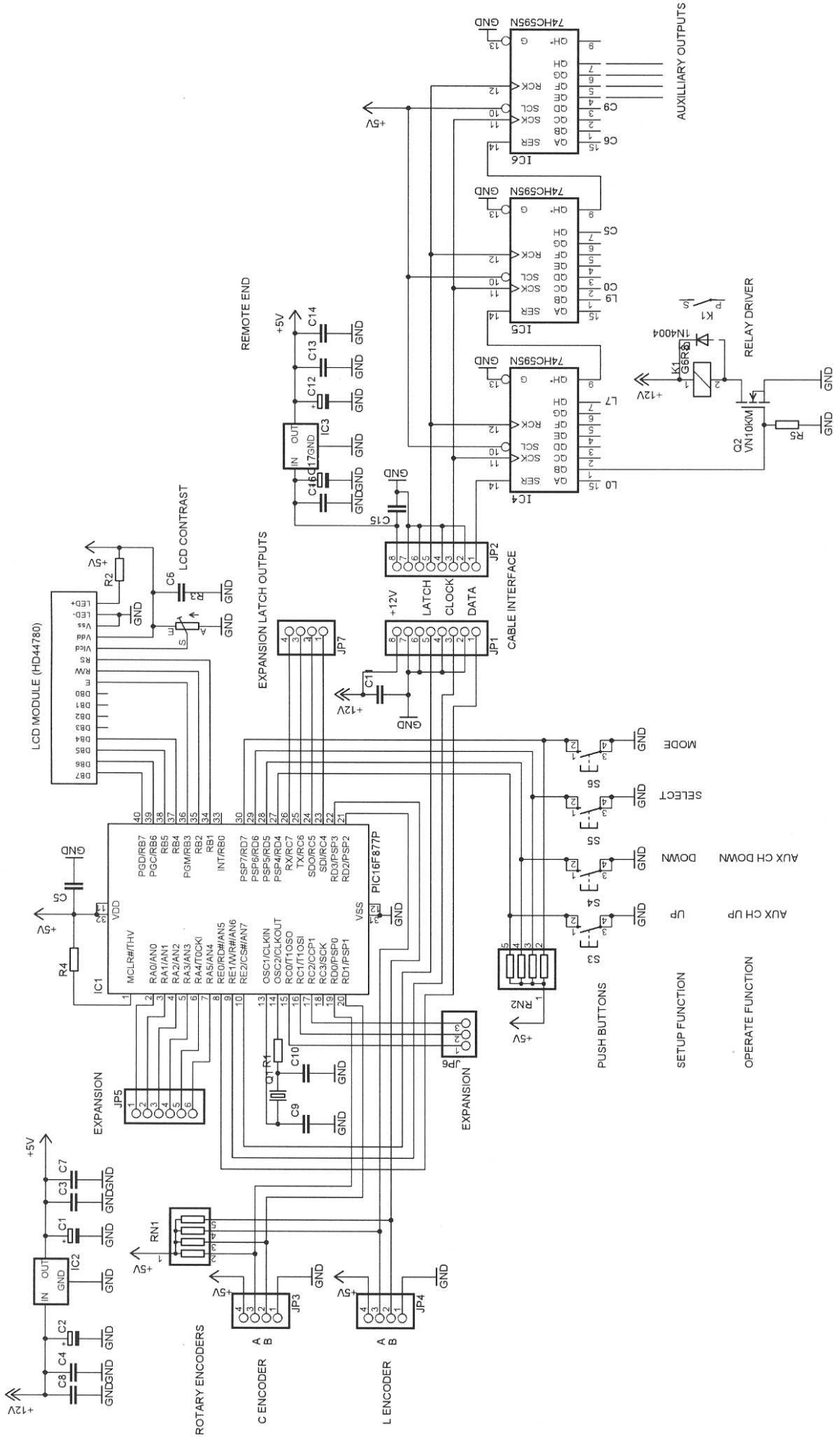
The control unit is able to control more than one head unit. The data stream is passed to all heads in parallel, but the only unit to respond will be the unit whose latch line is held high. This is done with a simple rotary switch on the front panel of the control unit. The uncontrolled units will maintain their settings for as long as power is applied. In my unit I am maintaining power to all heads even when the station power is turned off so removing the requirement to retune every time when going on air.

## Components

I have been experimenting with high voltage capacitors and have found the best are made using short lengths of coax. For QRP, silver mica capacitors are fine, for 100w RG76 cable can be used, but for really high voltage applications RG67 would perhaps be a better



CONTROL UNIT



choice. However, if you do have a burn up it is a simple matter to cut another length of cable!

(Since this article was written, a company [TAB Components Ltd] have advertised in Radcom, Sept-07 p.87, the ideal capacitors. <[www.tabmica.co.uk](http://www.tabmica.co.uk)>

A capacitance and inductance meter greatly simplifies component selection and set up. For ease of use you need a 'real time' meter. The 'PEAK' meters, although excellent, make life difficult and slow. On ebay from time to time 'JJJ' inductance and capacitance meters are available... I bought mine when they were about £12, but now I see that they start at £17, still an excellent buy though. Whilst these meters are thirsty on batteries, they are a very useful tool and can be powered by 12v for bench use.

### **Future Development**

The source code is provided free on the G-QRP website and extensive line commenting has been provided to clarify the program operation and encourage development and adaptation. The software is highly modular so that blocks of code can be easily 'lifted' as required and used in other projects. In the interests of clarity the program flow has been kept simple, at the expense perhaps of some efficiency, making it a useful source of self tuition material for PIC assembler language programming. The choice of the 16F877A for this project, with its range of useful internal peripherals and large number of I/O lines offers considerable flexibility and scope for future development. A glance at the circuit diagram shows that there are still a good number of spare I/O lines available, some of which have an analogue capability. There are several clear development opportunities which would further enhance the RAMU;

1. Memories for storing and recalling tuning settings.
2. Variable length tuning words to accommodate longer relay "chains" in the head unit.
3. Variable rate tuning as an alternative to fixed law tuning.
4. An automatic setting for antenna matching. This could make use of the PORTA analogue inputs and a VSWR sensor at the Control Unit end. Past settings would be stored against a frequency value (say 100kHz resolution). On auto tune, the RAMU would first measure the transmitter's frequency then check to see if there are any stored settings held. Any settings would be applied and a fine tuning routine would attempt to improve the VSWR. If no settings are held then the RAMU would start from scratch using VSWR measurements.

If you develop the RAMU software to include these or any other features that add useful functionality please submit it to the club for publication on the website. We ask that the program is kept as a single ASM file to simplify distribution and compilation.

## Using plastic Meccano to build prototype supports

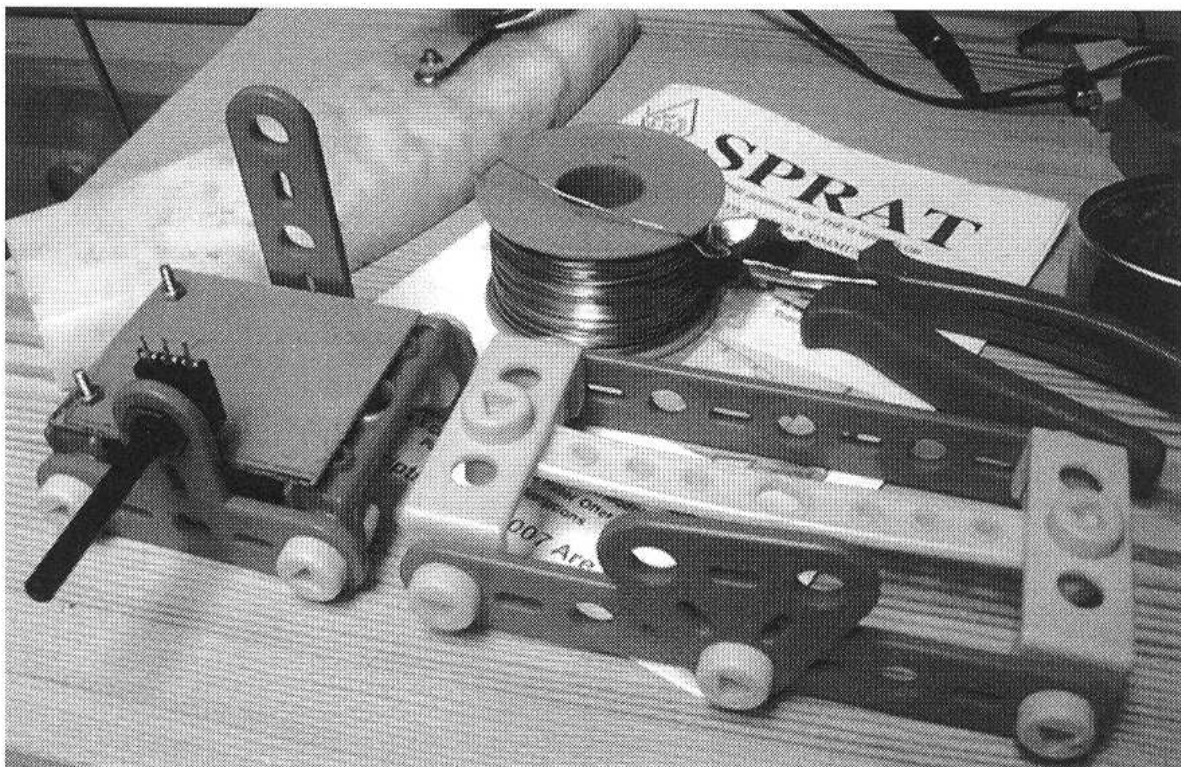
Dimitri Aguero, F4DYT, 2 av. Taillevent, 78100, St Germain. France

One of the problems I face when I build my (mainly unsuccessful) toys is that I dislike solder two cables to external potentiometers which are expected to be later fixed away from the circuit. It is ugly and it is not practical. I use Manhattan-style building, so direct potentiometer soldering to the board it is not possible.

My daughter is at the University, my second son aged 16 is more interested in parties than in playing with Meccano and my 8 years old son playing computer games. But my attention fell into the plastic Meccano I once bought for them at a garage sale. I imagined that a potentiometer could go through the bigger holes and a 3mm screw could pass through the smaller openings.

To prove my idea, I built a prototype board, which I show in the photos. Potentiometers can also be added under the board. Under the board there is also enough space for 9v batteries. Meccano parts come in various sizes, so you can build bigger board holders, as shown in the photographs. Note the 3mm-compatible small holes in the big board holder.

Maybe this gives you some ideas.



# SprintLayout 5 – Printed Circuit Board Software

Brian Baker GM0JRQ, The Ridge, Peat Inn, Cupar, KY15 5LH

I was introduced to homebrew PCBs during November 2006 and, having participated in a small way, was bitten by the bug. In my mind I visualised all my pending projects, no longer on Veroboard or constructed dead-bug on plain copper board, but with a custom-made PCB. I needed PCB design software to move to first base!

Thus began a trawl through catalogues and internet sites, rounded off by a great response when I posted a request for assistance on the G-QRP Yahoo! Group. (<http://groups.yahoo.com/group/GQRP>) I followed up the suggestions provided by group members, downloading freeware, shareware and demo versions of several offerings, including the demo SprintLayout 4.

This software turned out to be exceptionally easy to use – mostly because of its intuitive user interface in Windows. Making comparisons with the alternatives and weighing the comments of other G-QRP members, I decided to buy SprintLayout.

I then encountered the first – and only – problem: A new version of the software, SprintLayout 5, was announced by ABACOM. But not until December! I decided to wait. During the first week of December, my early Christmas present was ordered, paid for and downloaded from the ABACOM website, all without a hitch and in less than half an hour.

For anyone thinking about upgrading from version 4 or earlier, the benefits of V5 will depend on how you use PCB design software. For anyone wondering which software to go for as an initial purchase, SprintLayout 5 offers as much as most of the alternatives and, at EUR 39, is competitively priced. Most importantly, the product benefits from a decent included Help system and it provides everything an amateur would probably want without obscuring it with frills, bells and whistles.

What does SprintLayout 5 let you do?

It comes with a large and useful Component Library. This used to be called the Macro Directory. It's a library of ready-made components that can be dragged onto a PCB design and dropped into place. The components are grouped by type, so finding the right one in the right size and orientation is quick and easy. Both the provided components and any that you create can be rotated and flipped just by clicking on buttons.

One thing I found very useful, being a user of other graphics software, is the mousewheel zoom feature. Turning the mousewheel while hovering over the PCB design zooms in and out, improving design views greatly. This is always a feature that you take for granted and only miss when it is absent. Similarly, the new Properties Panel shows the properties of any currently-selected PCB element: This means the information is always visible without recourse to drop-down menus and specific dialog boxes.

Base units can be swapped between metric and imperial units – I know I am baffled by imperial measures these days and I'm sure many American users will appreciate an alternative to mm!



The test function – which allows you to trace continuity around the tracks – now includes enhanced groundplane testing. Together with excellent groundplane processing (a feature of earlier versions) this allows rapid, reliable groundplane development.

SprintLayout 5 also supports multi-layer PCBs, SMT and thermal pads on the groundplane, amongst other features I haven't needed to use. But, most refreshingly, these (and many other more advanced features) sit comfortably alongside the basics without obscuring them.

SprintLayout Version 5 is available from ABACOM; see <http://www.abacom-online.de>. An English-language demonstration version is available as a free download from <http://www.abacom-online.de/uk/html/demoversionen.html>

All SprintLayout versions are claimed to run on Windows from Windows 95 onwards; I installed on Windows 2000 Professional without incident.

#### **EDITORIAL NOTE:**

Many of the circuit drawings in SPRAT are done in sPlan by ABACOM, the schematic drawing companion to SprintLayout. I also have SprintLayout available. G3RJV.

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

FOR SALE: Brand new TRW Motorola 2 x 2N6456 transistors HF RF PA's rated to dissipate 75 Watts to 60 MHZ £15 each £25 the pair ONO plus postage. These transistors have never been used. Contact David Rowlands G6UEB 7 Broomfield Road Swanscombe Kent DA10 0LU Email: davidrowlands@mail.ru Tel: 01322 381303 Mobile 07942 270007.

FOR SALE: Elecraft KAT2 built and ready for use (I bought two by mistake). Duty and VAT paid. £80 or 120€ price including postage EU. Also video cassette recorder JVC HR-J460MS, little used, all cables, book etc. £18/25€ plus postage. Hugues, F6GPA [hl-ba@aliceadsl.fr] Tel: +33 [0]5 49 04 65 96.

FOR SALE :-- MFJ HF/VHF 259Z SWR ANALYZER as new condition sell for £130. plus postage etc. contact <g0hin@aol.com> 02392461982 Hayling Island.

### **Telescopic Fibreglass Poles**

**Great for antenna experiments – 23ft (6.9m) £17.95, 30ft (9.1m) £25.95**

**Telescope down to 4ft. Light and easy to carry. Quick to erect.**

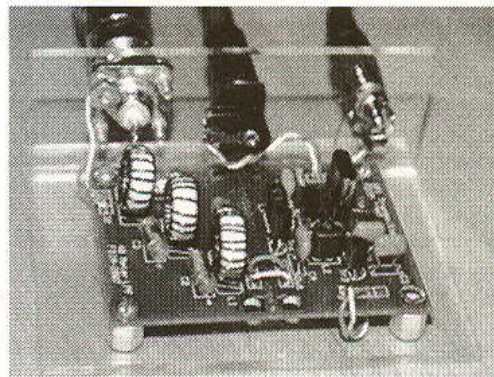
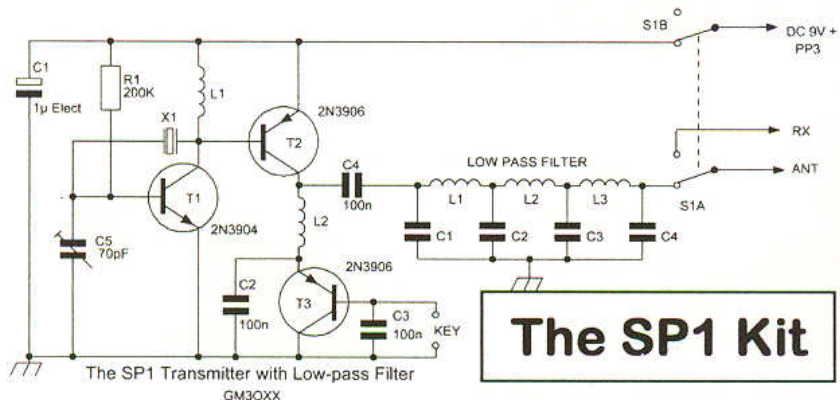
**Prices include UK P&P and VAT.**

**Cheques to: SOTA Beams, 89 Victoria Road,**

**Macclesfield, Cheshire, SK10 3JA.**

**Lots of other items for portable radio at [www.sotabeams.co.uk](http://www.sotabeams.co.uk)**





The "Buildathon" construction event at the Four Days in May event prior to the Dayton Hamvention featured the building of the GM3OXX "SP1" Transmitter from SPRAT 129. Extra kits were produced to make the price viable. These spare kits are now available to club members.

The kit includes a screened, through-plated, printed circuit board and all the parts including the low-pass filter and a crystal on 7.030MHz.

**The kits are available from G3MFJ (see back page of SPRAT) for £12 plus 80p UK postage - £1 EEC - £1.50 DX (Please note methods of payment on back page)**

**In the USA from Kanga US, 3521 Spring Lake Dr. Findlay OH. 45840-9073**

**Tel: 419-423-4604 <kanga@woh.rr.com> for \$25 (shipping charge of \$5 for orders shipped to the US).**

## SIMPLE TEST EQUIPMENT FOR THE QRPer

"A wonderfully useful book by G3MFJ and G4WIF ....

A must for any QRP library .. in fact, I wish I had written it!" – G3RJV

"Don't be misled by the title, this book will be useful for any amateur... excellent source book" - Review in R.S.G.B's January 2003 Radcom.

20 projects in a 58 page book. The U.K. price is £6.00 post paid. The EU & DX price (surface mail) is £6.50 post paid. Airmail £7.50 post paid. EU & DX orders International Money Order only. Make cheques & money orders payable to "G. Firth" and post to 13, Wynmore Drive, Bramhope, Leeds, LS16 9DQ UK - see [www.fishpool.org.uk](http://www.fishpool.org.uk) for U.S. orders.



## Circuit Ideas

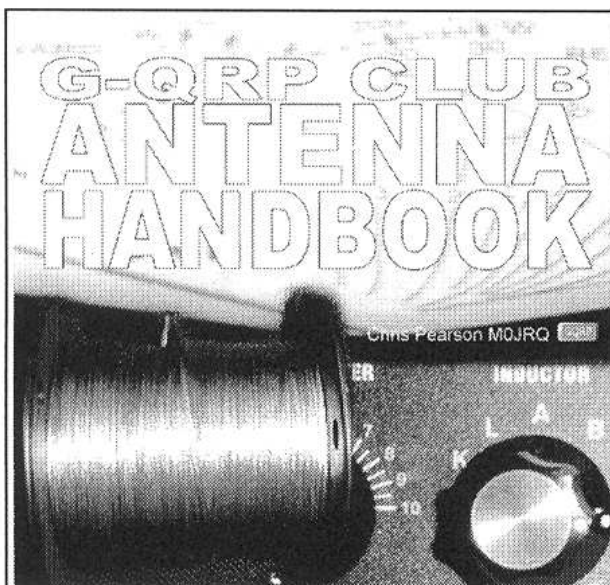
Jesper, OZ1XB, has suggested we could perhaps run a "circuits requests" section in SPRAT where members could seek circuit ideas (schematics and construction details) for items they may wish to build. e.g. "Simple 6m stuff, VXO circuit with two transistors (butler circuit)" etc... If anyone has such requests, I would be pleased to print them, and perhaps even use the suggested ideas in SPRAT. There must be plenty of ideas that we could share. (G3RJV)

# New Antenna Handbook – and a new Sprat-on-CD

Graham Firth G3MFJ

G- QRP Club Sales

I am pleased to announce two new items from Club Sales.

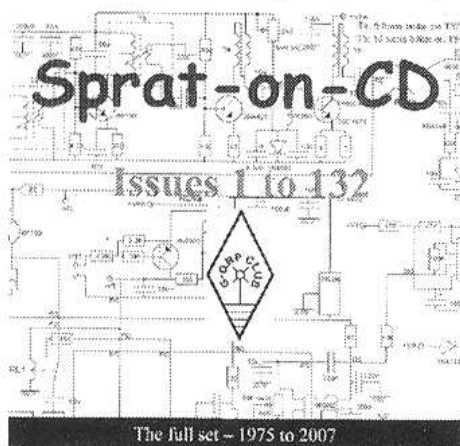


After a lot of work by Chris, M0JRQ, in which he has searched through past issues of Sprat and our Internet Reflector for new items, he has produced a new edition of the Club Antenna Handbook. As well as all the new things, there are still some of the valid items from the past issue. The book is 2/3 A4 format (210 x 210mm), and has over 150 pages. By the time you read this, we should have taken delivery of considerable number of copies. The book will be available at the Rochdale mini-convention, and then will be available by mail order.

members can buy it for £6.00. If you wish to get a copy at Rochdale, be prepared to be asked for your club number. Postage will be an additional £1.00 for UK, £2.00 for Europe, and £3.00 for DX.

Because we have invested a lot of Club funds in this, there will be two prices for the book. The non-members price will be £10.00, but club

Secondly, after a lot of work by Tony G4WIF, assisted by band of volunteers scanning Sprats, and with a little help from me, we have an up-to-date version of the Club's Sprat-on-CD. It is



so up-to-date that it even includes this issue of Sprat! This time, instead of the bespoke software that was used by Funk Amateur in the previous two incarnations, it is standards based HTML. I'm sorry, but it still will not work on your Sinclair Spectrum, or BBC B, but it will work on most Linux distributions and it has been tested using Firefox which is freely available.

Again, by the time you read this, we should have taken delivery of a lot of copies, and it will be available for the first time at Rochdale. After Rochdale, it will be available by mail order. A similar type of price structure applies for

the CD – the member's price is £5.00, and the non-members price will be £10.00. Again, your club number is essential to get the member's price! Postage will be UK - £0.60, Europe - £1.00, and DX - £2.00. Mail orders (after 15<sup>th</sup> October) should be sent to me – address as per the club sales ad on the back page.

As you will appreciate, I am writing this well before we have received delivery of either item, although we have been promised that they will be here in time. If there is a delay with your mail order, it might just be due to late delivery – or maybe just due to a large number of orders.

The club's thanks go to Chris and Tony who have put a massive effort in on our behalf.



# Antennas, Anecdotes and Awards

Colin Turner G3VTT

30, Marsh Crescent, High Halstow, Rochester, Kent ME3 8TJ

G3vtt@aol.com

## Welcome to AAA

Thank you to all of you who wrote to me to say how much you enjoyed AAA in the last issue. George G3RJV once told me he enjoyed producing Sprat and meeting people through QRP related contributions. For me AAA has put me back in touch with two old friends including a former school chum of mine who, as a 15 year old, taught me CW one Saturday morning. Another friend has made a contribution about loop antennas which I shall put into a future issue. First take a look at some contributions that have been in the files for a while.

## The G4VPF 'Sky Walker'

I have never ceased to be amazed at the ingenuity of home brewers and QRP constructors, particularly in the field of antenna design. At the AAA office two months ago I received details via G3RJV and G3DNF of a portable antenna by Owen G4VPF for the 40m band. This antenna is a variation of a helical vertical and is just 13 feet high but is resonant low in the 40m band and it has an unusual method of support using, of all things, a discarded walking exercise frame made from some unknown metals which his neighbour threw out!

Owen found it unsuitable for walking so he took a GDO reading and found the frame to be resonant on 7045 KHz and then decided to use the frame as the lower half of a vertical antenna and a combined frame to hold the mast section. The mast was made from grey plastic water pipe using two sections, one of 2 inch and the other 1.5 inch, and a reducer coupling. The total length of 10 feet was more than adequately supported by the frame and the radiator element consisted of 19 turns of 16 SWG wire on the top pipe with a further 58 turns on the lower pipe section. The vertical radiator was attached to the frame by a pipe 'Tee' piece.

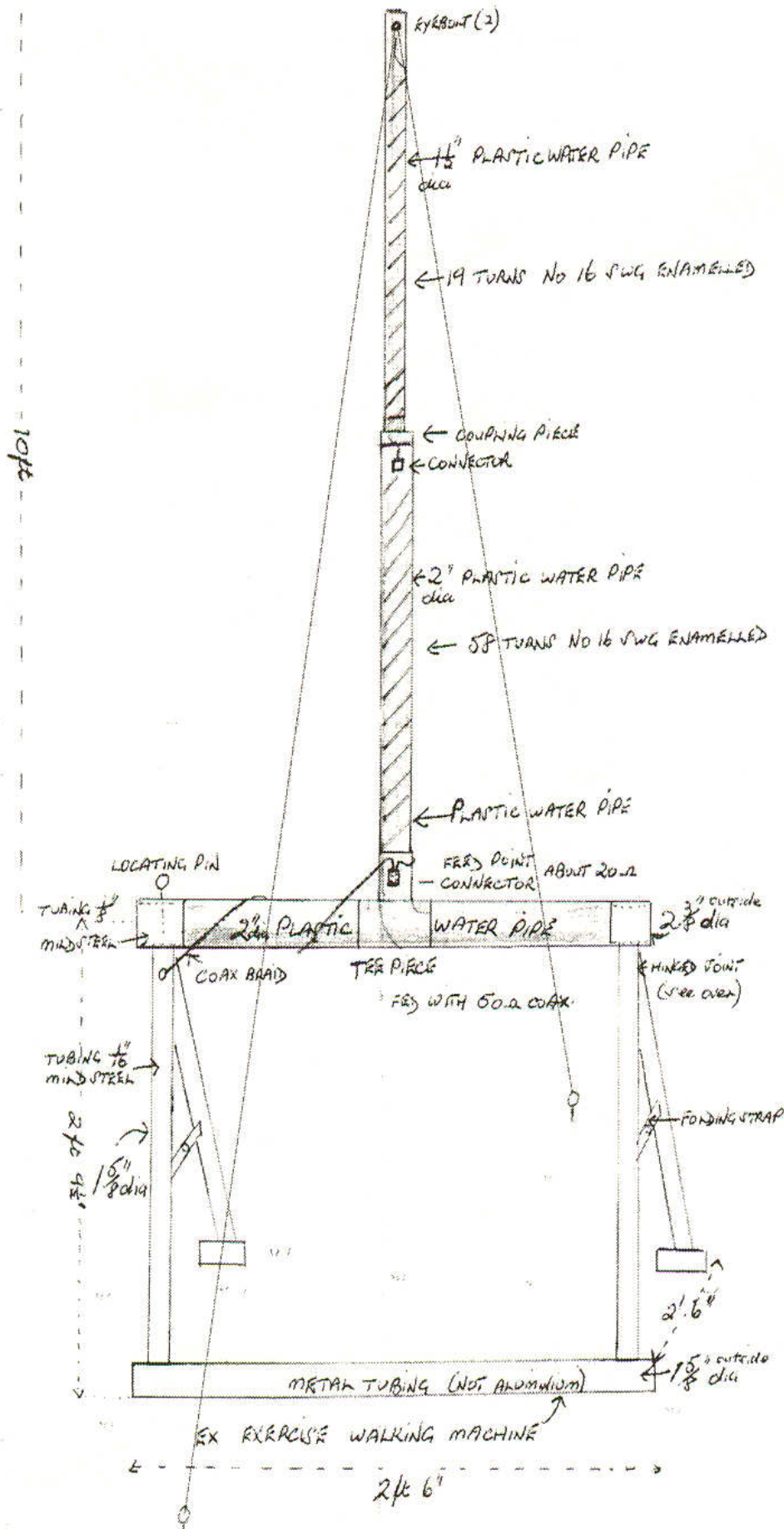
The whole frame, derived from the exercise walker, permits the radiator to be lowered down for adjustments which no doubt consist of trimming the top helical coil to resonance. Using a home made noise bridge Owen found the feed impedance to be 20 ohms which matched his cable, along with an ATU and DTR7 transceiver quite well. Being portable he can move it around the garden although guying ropes may be needed in strong winds to steady the frame.

Owen has had plenty of contacts around Europe with his Lake DTR7 with its precious 1 watt output and is to be congratulated at his ingenuity and constructional skills in making a useful vertical antenna for a few pounds outlay and a keen eye for useful rubbish!



CHLVPF 'SKY WALKER' FOR 40 METRES

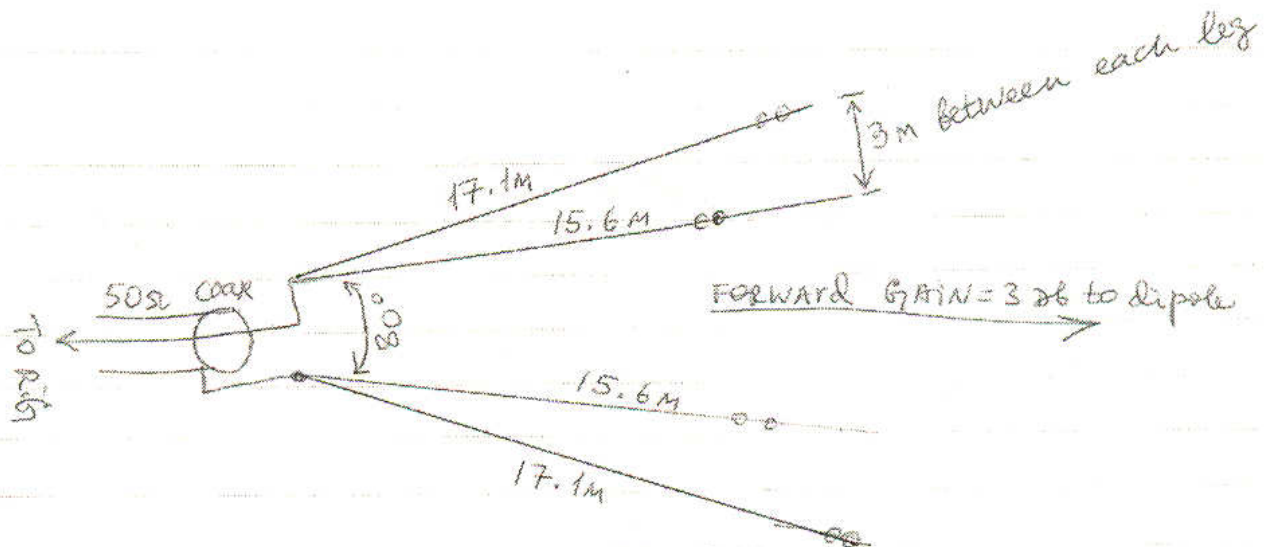
14/4/2007



## The US7IJW Vee Antenna

Victor has sent in this antenna design he has found very successful along with his NorCal 20. He found the details of it some years ago in a radio magazine and says it works well on 10m 15m and 20m.

The antenna is in effect a simple vee beam and should be aligned in the most favoured direction with careful adjustment of the apex angle. Using two wires gives a low SWR on the HF bands and of course it should be installed at the maximum height possible. Incidentally there may be some benefit in sloping the antenna from the feed point downwards to further improve directivity.



Many thanks Victor for taking the time to write to the GQR Club with your antenna idea and also telling us something of your activities in the Ukraine. Victor has worked UA0 and JA with 1w, a very credible effort. His letter came to AAA via G4WIF and G3RJV.

## The Clunie Loop

I am pleased to report that since the last issue of Sprat I have been to the north of Scotland with my wife to stay with George GM3OXX to tour the Banff coast and to closely observe the features of George's antenna. (We also saw the mouth watering wire HF arrays used by the RAF to work the fighters patrolling the Northern skies towards Norway).

As many of you know George is working DX regularly, despite the current poor conditions, with a power not exceeding 1 watt. The secret of course is in the antenna and George has done something which we should all do which is to erect the best antenna you can taking into account local conditions and garden layout. The antenna should be efficiently constructed with good quality connections and suitably thick multistrand wire.

George has an outstanding location and he has used the trees around his property to erect a loop of 130m (450 feet) at a height of around 10 – 12 m (30 – 40 feet) and he is feeding the antenna with 450 ohms plastic coated open wire line, typical of the line imported from the USA.

Low loops can give excellent NVIS propagation permitting operation, at least from here in the UK, around Europe and should be good for up to 1000 miles. By hanging the loop higher and feeding it with a low loss high impedance line George has an efficient DX, more than 1000 miles, antenna by virtue of it being at a height of one half wave on 14 MHz, around 35 feet. Height is vital for any log distance work with a horizontal antenna.

I remember some years ago Ian G3ROO used a large loop on HF quite successfully which was also well above ground. So if you want to try a horizontal loop consider its height to suit your operating requirements.



'Make your loop as big as you can and keep it high'

### **Awards**

I have been considering what to do about our awards programme for some time now as I have the problem that I have not received any records of precisely who has what award! Neither do I have any certificates. I would be interested to receive any comments either by e-mail or letter on which direction you would like the programme to take. I am considering running a yearly awards system for countries worked, distance worked, members worked and miles per watt. If you wish you continue with an 'all time' system please let me know. Please let me have your ideas, input and requirements as soon as possible so that I can design and produce certificates, devise rules and generally set up the programme.

**Congratulations** to G4PRL in working 480 members on QRP. A sticker should have been received by now. Roy kindly sent me his cards for checking with return postage.

### **Next Time**

In the next issue of Sprat I shall look at another loop antenna, sent in by Les G0NMD, and another antenna for 502 KHz by G4GDR, an award sponsored by G3MCK plus whatever else arrives in the post. Until then keep your wires in the air and the wee watts throbbing through the ether!

72 Colin G3VTT



## International QRP Holiday "Seaside Rendez-Vous 2008"

"Seaside Rendez-Vous 2008" is a shared holiday for all World's QRPers devoted to friendship between QRPers in the World. Oleg RV3GM (member of QRP-ARCI, G-QRP and more than ten QRP Clubs of the World) and Lipetsk Tour Company "Olga" organized this event in June 9 to 20, 2008. We are happy to invite all World's QRPers to have an excellent holiday at Russian Caucasus Black Sea coast!

Full details can be found at <http://rendez-vous2008.narod.ru/>  
or Oleg Borodin, RV3GM, P.O. Box 229, Lipetsk, 398043, Russia.  
<rv3gm@mail.ru>



Plan now for the  
**GQRP CLUB WINTER SPORTS**  
**EVERYDAY – DECEMBER 26<sup>th</sup> to JANUARY 1st**  
Call "CQ QRP" on the International QRP Frequencies

CW: 1843, 3560, 7030, 10116, 14060, 18096, 21060, 24906, 28060  
SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360 kHz

The Winter Sports is not a contest, although it is usual for operators to exchange their G QRP Club membership number. Those taking part are invited to submit logs and comments to the G QRP Club Communications Manager, Peter Barville G3XJS, Felucca, Pinesfield Lane, Trottiscliffe, West Malling, Kent ME19 5EN.  
email: [g3xjs@gqrp.co.uk](mailto:g3xjs@gqrp.co.uk).

The G4DQP Trophy is awarded to the station making the best overall contribution.

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West Malling, Kent ME19 5EN. E-mail [g3xjs@ggrp.co.uk](mailto:g3xjs@ggrp.co.uk)

## SUNDAY MORNING QRP SSB NET

This time last year the column started with an item about the fledgling 40m QRP SSB Sunday morning (10am clock time) net, with the expressed hope that it would become well established over the following weeks. Sad to say that conditions on that band have not been best suited to inter-G propagation, with the result that I suspect the net would not have been successful. However, an alternative frequency of 3690kHz was suggested, and I wonder whether any members have been meeting regularly on (or near) that frequency on Sunday mornings? If so, perhaps you would like to drop me a line and I will be able to give the net more publicity. Or drop me a line if you would like to support a similar net on a Sunday, or any other day of the week.

=====

This time of year is generally a quiet one for this column, and I tend to take the opportunity to remind members that December, with the associated winter weather and Christmas card season, is not as far away as we might like to think. But the good news, of course, is that December also brings the favourite QRP event of the year – **Winter Sports**. HF conditions may not be good at the moment, but (as George, GM3OXX, points out) that does not preclude us from getting on the bands and making a QRP noise. There are always contacts to be made, and even the odd juicy Dx to be chased, so please don't assume that "there's no point"! Maybe try bands like 17m and 30m, which are both ideally suited to low power and offer potential for QSO's around Europe, or further afield, without the high levels of QRM often found on some of the more popular bands.

If rag-chewing is your scene, then 160m and 80m will always provide more local contacts (although Dx is possible on these bands), and a chance to meet plenty of friends, old and new.

Set yourself a target of making more contacts than you made during Winter Sports last year – how about making twice as many? For those that didn't have any Winter Sports QSO's last year, well, it shouldn't be too difficult to achieve a significant improvement! If you send me a copy of your log you will not only give yourself the chance of winning the G4DQP Trophy, but also give others the chance of sharing some of your fun and experiences by allowing me to include them in SPRAT. It really is genuine FUN for all.

I am now lucky enough to have an antenna at this new QTH that is quite efficient and, assuming it isn't brought down by high winds in the meantime, am looking forward to seeing many of you on the bands during the week of Winter Sports activity.

I hope we're due a late "Indian Summer", together with spell of good Autumn HF conditions. The deadline for the next issue is the end of October, by which time we'll know whether my hopes have come true!

72 de QRPeter



## VHF Manager's Report

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

I make no apologies for this feature of SPRAT being somewhat erratic over the last few years, the reason being that I haven't had much feedback from you, the readers (the reason why my predecessor gave up the job). However, a couple of revivalist groups are trying to revive VHF interest by promoting the use of AM on the bands especially on 144.550 MHz and 70,260 MHz. There has also been a revival of FM operating (at least locally to me) on 4m. After complaints about my rather poor signal on 4m, I have put an additional 4m antenna up (a vertical J-pole), courtesy of Dave G1ORG. The locals didn't like the horizontally polarized half watt from my Dx antenna, despite me being able to work IoM from Coventry with it.

On the construction front some people have expressed an interest in making valve equipment, so I will expect to see some designs using nuvistors and acorn valves appearing in the near future. Personally I wouldn't contemplate this at all being weaned on semiconductors from a very early age (10 yrs in 1959). What puts me off is all the chassis bashing that is necessary before you can put a circuit together. With transistors it is the other way round – build the circuit, test it and then make the chassis (box) to contain it. If the circuit didn't work the way you wanted it to then you haven't wasted a lot of time, effort and metal/money on the way. The other thing to consider is the power consumption. One commercially made set I looked at recently used 150 Watts plus (mainly heater power) to produce just 10 W of RF! Having said that about chassis bashing, I noticed that Johnny Apell SM7UCZ, solved the problem with his design shown in RadComm, using just PCB, something which is not apparent in the SPRAT 131 article. So who is going to be the first to put his design on 6m or even 2m or 70 cm?

Also, has anyone experienced problems with Spectrum Communications 4m transverters? We have three in the Coventry area which will not work on AM. After some tests I did recently it turned out that the stations that could copy me were slope detecting the FM it was producing! Incidentally, my FT-817 when in AM mode & slope detecting, will detect far weaker signals transmitting FM than when in FM mode.

I've also been experimenting with satellite operation – just listening so far. If you are an FT-817 owner did you know you can tune down from the lower edge of the 2m band to receive Wx NOAA satellites on 137.5/137.62 MHz? If you use WxtoImg software, remember to select FT-817 NFM from the receivers list (Options>Recording Options). There are several useable passes a day and useable results can be obtained just using your 2m colinear.

.....After an e-mail exchange with Tony Nailer G4CFY & going through the paperwork with a fine tooth comb, I found a construction error in the 4m transverter 1K8 fitted instead of 1K!. A quick on air test last night would suggest this has cured the problem though I haven't had chance to measure anything with instruments as yet.

.....de John G8SEQ.



# MEMBERS' NEWS

by Chris Page, G4BUE

Highcroft Farmhouse, Gay Street, Pulborough,  
West Sussex RH20 2HJ.

E-mail: <g4bue@adur-press.co.uk>



Elecraft have announced a delay in shipping the first batch of the new K3 transceiver, they are now due on 17 September. I would be pleased to receive reports from any members who take delivery of one, particularly from the QRP aspect, to include in *Members' News* in the next SPRAT.

Congratulations to **G3XBM** who worked **KITOL** on 6 metres on 25 June with his 5W to a vertical (about 2.5W ERP with feeder loss) for his first ever transatlantic QSO on the band. Paul later confirmed the QSO by e-mail and said he was running a kW to a 4 x 9 element array that Roger thinks, "This must have helped him winkle out the QRP signal from my end". Roger said that evening was one of the best he has heard on 6 metres and at times you could tune from about 50700 to 50200kHz and hear literally dozens of VEs and Ws, some being a good S8-9 on the FT-817 meter and that with just a small colinear vertical.

**IKØIXI** was QRV on 9 June with his 2W home-brew 20 metre transceiver and 16 feet GP antenna as part of the **IYØIMD** Marconi station, . Fabio made QSOs with an LU and some USA stations and to expect more QRP activity from **IYØIMD** next summer and autumn. **PA9RZ** says he was lucky to QSO **EA9IB** on 27 May on 2 metres while running the IC-202 barefoot (3W) into a four element cubical quad about 53 feet high. It was Robert's DXCC 20 on 2 metres and the picture below is of the back of the QSL card for the QSO, also confirming a QSO on 6 metres later the same day.

DXCC-50MHz- No 262  
WAR-50MHz- No 21

<input checked="" type="checkbox"/> <b>EA9IB</b> Pedro Jerez Ruiz P.O.Box 213 52080-MELLILLA (SPAIN)	<input type="checkbox"/> <b>EA9RY</b> Loli Dupias Garcia P.O.Box 213 52080-MELLILLA (SPAIN)
---	--

EA9IB confirming QSO  
TNX QSL

TO RADIO	DATE	UTC	RST	MHz	2Way
PA9RZ	27May2007	09.27	59	144	SSB
(to J022)	27May2007	16.23	59	50	SSB

QSO via FB  
TNX QSL

Many thanks for nice QSO. 73s

Congratulations also to **G3IOI** who also worked the USA on 6 metres on 25 June. Ray used a FT-817ND at 5W into a Moonraker log-periodic at 30 feet and about 100 feet of RG58 to QSO **K1JJ** who was running 1500 watts to a M2 9 x KHWs, which Ray thinks had something to do with it! **G3LHJ** made 310 QSOs in 55 DXCC in the CQWW CW Contest with his 5W on 20 metres. Derrick said, "Conditions and the going was much the same as last year, hard but good fun". **F5NZY**

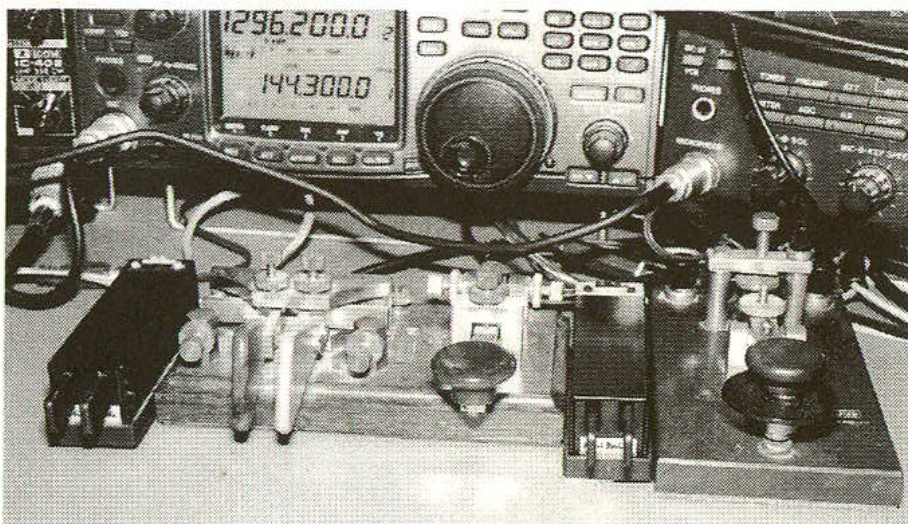
QSO'd **GM3OXX** on 12 metres when they were both using just one watt. Steph subsequently ordered George's SP-1 kit to build.

**GØEBQ** was QRV for two days in July from EA5 and QSO'd Club member **IK5SRD**. Nigel was only able to put up a 'bent' antenna because he was in an apartment and planned to be QRV again for two weeks August/September for his main holiday. He has just built the Sierra kit and, "can thoroughly recommend it". **MIKTA** was QRV from his bicycle while making his way round HB9 and HBØ in July. Dominic worked UK stations on 20 metres SSB. **GØFUW** planned to be QRV from Cyprus for ten days in September, including the QRPCI Data Contest.

**GØKTN** says for those who have an interest in Software Defined Radio (SDR), or perhaps just want to know what it's all about, the following links to four MP3 audio files are worth listening to. Trevor says the presentation was given at Dayton by Gerald Youngblood, **K5SDR**, head of FlexRadio and covers the differences between analogue and software radios, the SDR1000 and the new 5000, <<http://www.hamsdr.com/dnld.aspx?id=594>>, =595, =596 and =597. **G3XBM** has added a new 501kHz page to his web-site at <<http://www.g3xbm.co.uk>>. Roger says it includes recordings made off-air from **G3XIZ** and **G3XAQ** running 100mW ERP of normal speed CW received on his standard untuned 15 metres wire and unmodified FT-817.

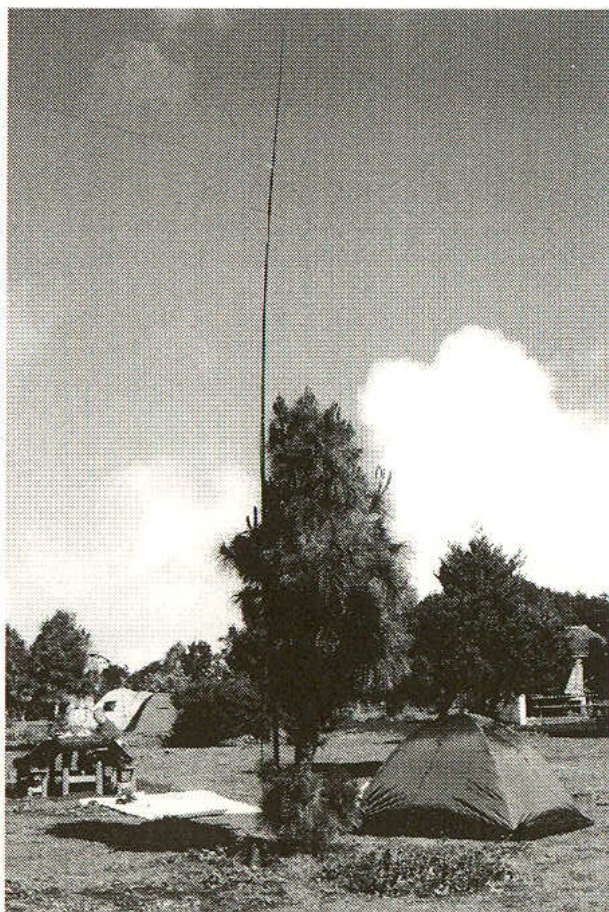


PA9RZ sends the picture on the right of some of his keys in front of one of his Icom VHF/UHF rigs. Robert says, "The Icom QRP Classics are wonderful! The IC-502 (3W 6 metres SSB/CW), the IC-215 (3W, 2 metres, FM), the IC-202 (3W, 2 metres SSB/CW) and the IC-402 (3W, 70cms, SSB/CW). The IC-30L is a 70cms linear (10W), built in a box comprising matching power supply and speaker.



IK1ZYW is building a 4 metre QRP CW 100mW transmitter and is planning an autumn /P operation somewhere in JN35 with a Moxon antenna and IC-706 for the receiver. Paolo says 70MHz has been allocated to Italian amateurs until 31 December 2007.

2EØRPF is now hooked on QRP after he built the Walford Electronics Midney/Kingsdon kit for 20 metres with the optional digit frequency counter and on 30 June/1 July, while away with the Stafford and District Radio Society in Anglesey, North Wales operating as GC3SBL, fired the kit up and using 3.5W and a 66 feet dipole, his first call got 9A3B. Robert thanks Tim Walford for his great kits and support while constructing it and to Graeme, G4NVH, from the Stafford club for his help in fault finding and calibration.



DDØVR's portable station at the campsite in La Palma using a 26 feet fibreglass pole (<[www.zk-antennen.de/](http://www.zk-antennen.de/)> to hold up either a W3DZZ or an 'Up and Outer' wire antenna from SPRAT 69.

G4EFE will be QRV 1/8 November as 9H3ML from Gozo (EU-023) with his FT-817, K1 and W3EDP antenna. Martin will look for two-way QRP QSOs on all bands but will concentrate on the 40, 30 and 20 metre QRP QRGs. F5NZY reports OKØEF is now QRV on 10134kHz with 500mW, 200mW and 100mW. Reports are welcomed by Petr, OK1FAQ, to <[ok1faq@volny.cz](mailto:ok1faq@volny.cz)>. G4GTU plans to QSY to VE7 land (Vancouver Island) in a few months time. M5AKA reports the first 40MHz amateur radio propagation beacon OZ7IGY is now QRV on 40021kHz.

GM4CXP was QRV 1/22 August as EA8/GM4CXP in Corralejo and says conditions have been the worst he has known on HF since being licensed in 1974! Derrick QSO'd GM4XQJ on 16 August on 20 metres with two-way QRP and 449 both ways. He will return to EA8 on a regular basis with his FT-817ND and simple antennas. GM4XQJ mentions the 20 metre QSO with EA8/GM4CXP on 16 August and says when he was calling Derrick the previous night, he was called by Club member 8P9BX. Brian hopes to be QRV from EA8 (Fuerteventura) in November and will be QRV on 14060 and 18096kHz with his K2 and dipoles.

DDØVR was QRV 24 March/7 April on Island La Gomera, Elhierro, La Palma, Tenerife with his FT-817 while camping (see photograph on left).

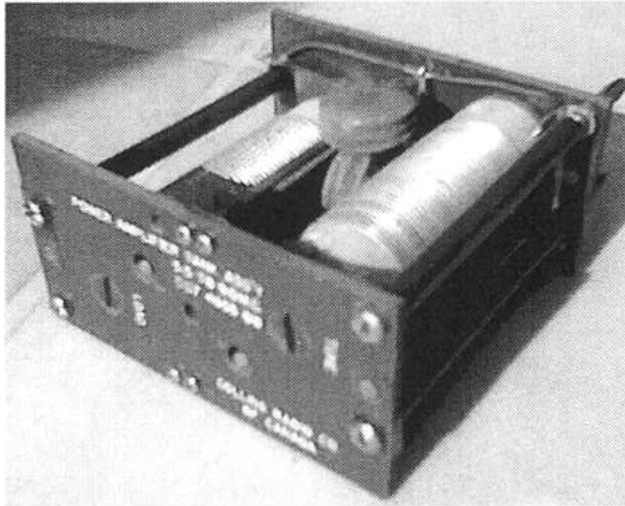


Helmut checked into the DX net every evening resulting in a SSB 20 metres long-path QSO with **VK2GWK**. His next trip is scheduled for 27 December/23 January to New Zealand when he will take the FT-817 and Z100 auto-tuner. Helmut will be QRV on the 80, 40, 20 and 15 metre QRP QRGs.

**GØEBQ** attended the Suffolk Rally on 17 June and manned the Club stand later in the day. Nigel took along his MFJ Cub copy and an old DC transceiver (Imp) to display and found it was noticeable that a number of people who might otherwise take up QRP are put off because a lot of activity is on CW, but he did his best to persuade them!

**GØFUW** worked a good number of stations while on holiday in France but the only two-way QRP QSO was with **OH7FF**. Steve also made some QSOs on 6 metres into Scandinavia during the RSGB's Backpackers Contest. **DL2BQD** says there will be two QRP meetings in September, one in the Black Forest area and the other in the Frankfurt area. Dieter planned to be QRV 6/14 September as **MD/DL2BQD**.

**F5NZY** corrects me on the description of his HexBeam in the last SPRAT. Steph says it is not a vertical but a two element working on 10, 12, 15, 17 and 20 metres. Referring to F5NZY's HexBeam, **G3TXQ** suggest those interested in the beam may like to look at <<http://www.karinya.net/g3txq/hexbeam/>> and <<http://www.leoshoemaker.com/hexbeambyk4kio/general.html>>. Steve says there is also a HexBeam discussion group at <<http://groups.yahoo.com/group/hex-beam/>>.

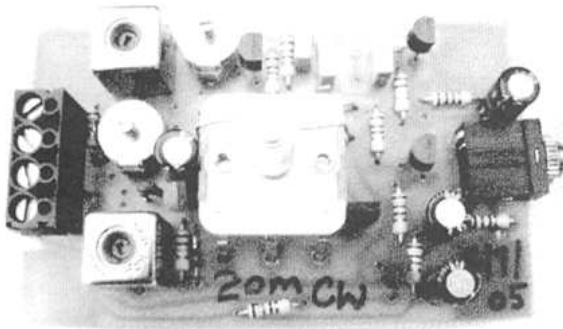


Above is a photograph of a Collins Radio power amplifier tank assembly. **G4HPI** has 28 of them that he doesn't need and anybody wanting them can have them for the cost of postage and packing or collect from the Northampton area. Contact Rick <[rick4hpi@hotmail.co.uk](mailto:rick4hpi@hotmail.co.uk)>. There are 17 marked 5.5-9Mc, seven marked 9-15Mc and four marked 3.3-5.5Mc. They all have two ceramic roller-coasters (tune and load) with the gold plated/flushed side bar and jockey wheel. The ones Rick is keeping are going to be used as plug in coils, one for each band, for his new AMU/ATU. With a little care and four insulated rods, each unit can be split into two.

That clears the files again. Please let me know how your autumn goes together with any QRP news and views, photographs, who you have been working with QRP and what you have been building and putting up in the air, and K3 users - please don't forget to let me know what you think of Elecraft's new transceiver, by 20 November, please.



**Helmut, DDØVR, QRV on SSB as EA8/DDØVR with his FT-817 and the collapsible fibreglass pole, while backpacking on Teide Mountain, Tenerife.**



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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](mailto:m0mja@aol.com) (make cheques payable to : Melanie Rowe)



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Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] £6 pair	} 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	} 50p (UK),
MAR-4 RF amplifier - £1.50	} £1.00p EEC,
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	}
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	} If
Ceramic resonators – 3.58, 3.68MHz & 14.30MHz – 50p each	} <u>ordered</u>
Schottky signal diode – 1N5711 low fwd volts for up to vhf/uhf 20p each } max of 5	} <u>with</u>
Varicap diodes – MVAM109 – 40pF @ 9v, 500pF @ 1v. 75p each } max of 2	} <u>heavier</u>
– MV209 – 5pF @ 12V, 40pF @ 1v 35p each } per member	} <u>items</u>
CA741 op-amps 8pin DIL – 5 for £1	} <u>use that</u>
2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO+40V - 5 for 50p	} <u>postage.</u>
MPSA92 transistors (pnp) fT - 50MHz, hFE-40, VCBO-300V - 5 for 50p	} <u>plus</u>
MK484 radio on a chip - £1.00 inc circuit diagram.	} <u>10%</u>
	} <u>of this</u>
	} <u>postage</u>

## 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

New – BN43-202 - £1.80; BN61-202 - £2.00

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

FT240-43 – £3.00 each (for postage 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 = 50p (UK), £1.00p (EEC), £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, EEC – £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 1<sup>st</sup> magazine – 50p, each additional magazine add 30p.

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

**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. Please quote full card number plus expiry date & security number. We can only send the goods to the card owner's registered address.

I no longer accept Visa payments where the member has an alternative method of paying, such as cheque, cash, stamps, PayPal or payment through one of our reps. For why – see Sprat 130.

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

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

For orders less than £5 – please use postage stamps (any denomination £1 or less please)

We can also accept cash in GB Pound, or US\$, or Euros – but please send securely!

You can order via e-mail to [g3mfj@gqrp.co.uk](mailto:g3mfj@gqrp.co.uk) Pay by PayPal please.

**NEW** – you can now pay by PayPal – send to [g3mfj@gqrp.co.uk](mailto:g3mfj@gqrp.co.uk) - show clearly what you want with the payment – and your membership number!