



# SPRAT

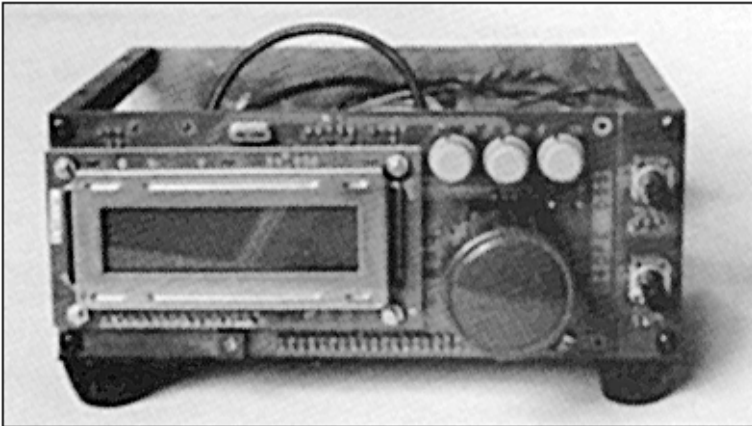
THE JOURNAL OF THE G QRP CLUB

DEVOTED•TO•LOW•POWER•COMMUNICATION

ISSUE Nr. 99

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SUMMER 1999



**EXPERIMENTAL ALL BAND RECEIVER BY G4OPE  
BASED ON THE DDS3 VFO DESCRIBED IN SPRAT 97**

**ROCHDALE CONVENTION - 160M AM TRANSMITTER  
PENNING CRYSTALS - VXO FOR 136kHz  
FINISHING FRONT PANELS - STEREO FILTER  
CMOS SWITCHED SUPERHET - OK2PZL TRANSCEIVER CIRCUIT  
PARKING LOT VERTICAL - GQ-PLUS PART 2 - HAMCALC  
CMOS MIXER - GETTING ON THE G-QRP LIST  
A.A.A. - COMMUNICATIONS & CONTESTS  
ONE WATT WEEK - NOVICE NEWS  
A 1KHZ PASSIVE FILTER - CELTICON 2000 - MEMBER'S NEWS**

# JOURNAL OF THE G QRP CLUB



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## EDITORIAL

Dear Member,

As this issue of SPRAT appears, I will still be in the USA as part of my Study Leave. So I am taking this space to offer my thanks.

Special thanks go to **Graham Firth, G3MFJ**, who has been kind enough to complete this issue and see it to the printing process.

My thanks also go to those members who have held off sending me any mail over this period. Naturally after two months away from home it will take some time to get back into the normal routine and catch up on the club business.

So thank you in advance for the patience some of you will have to show in waiting for letters, faxes and emails to be answered.

May I wish you all a happy and glorious summer with plenty of good weather for antenna building and portable operation.

72/3

G3RJV

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK  
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# THE G QRP CLUB MINI-CONVENTION

**SATURDAY 23rd OCTOBER 1999**

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# 160m AM Cross Town Transmitter

Albert Heyes G3ZHE 20 Walsingham Rd. Penketh, Warrington, WA5 2AQ

In recent months items in PW and RadCom have told of Daring-do and DX on top band.

It got me to thinking about my early days (early 70s) when I used a homebrew TX and an Hammerlund 129x RX on top band and the Warrington club had its midweek net on 160m AM. This thinking can get you in trouble, like when you tell the club a low power 160m TX might make a nice winter project, and you get the job of building one Hi.

The last time I built an AM TX it had those valve thingys in it. Time has moved on, so my thoughts centred on a simple low power TX that would cover part of the novice section of top band and use standard parts available from well-known stockists.

I had decided to test a ceramic crystal in the oscillator as I had read their frequency can be pulled far more than a quartz crystal. I obtained a 2 MHz ceramic crystal and with a variable series cap connected into a Colpitts oscillator I was amazed to find the osc freq could be pulled from just above 1.9MHz to just below 2.0MHz. After several mods coverage of 93kHz was possible.

I claim no invention for the circuit and give credit to items in the "SPRAT", Solid State Design for the Radio amateur by Doug DeMaw and Wes Hayward (the Bible to most constructors) and to George Fare G3OGQ for many suggestions and circuit mod ideas.

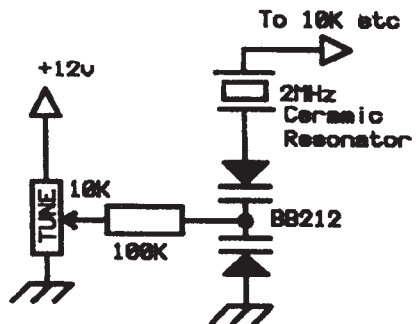
George played a large part in the final design. After he built and tested my prototype he discovered it was rich in harmonics and my modulation transformer was not man enough for the job. His mods, the final PCB design and especially his unusual modulator circuit has turned the TX into a fine little rig. Thanks George.

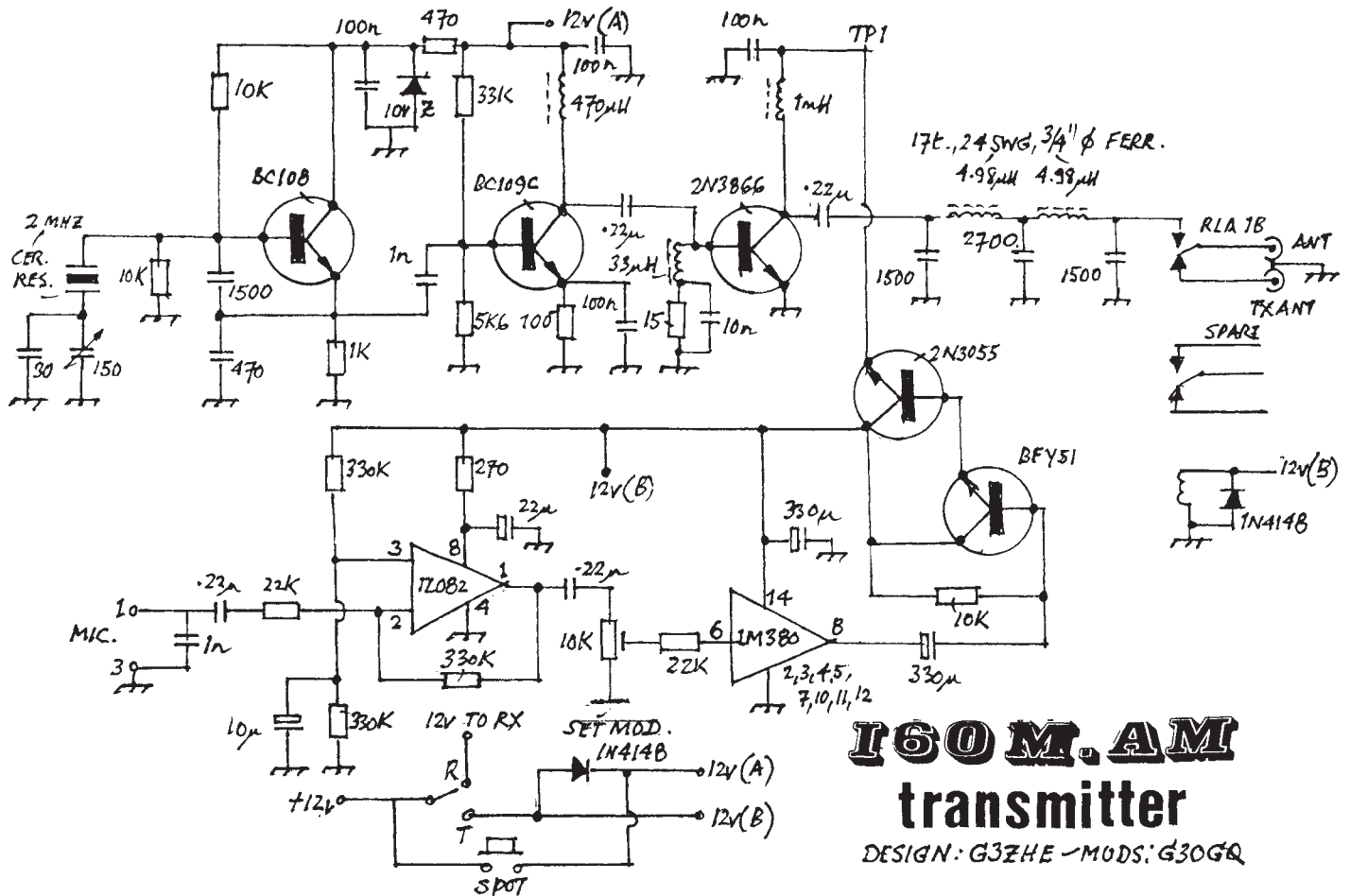
The TX consists of a ceramic xtal oscillator whose output is fed into a buffer amp and then into a PA. The modulator uses a standard 600 ohm mic into a TL082 chip pre amp which drives an LM380 audio amp chip as the modulator. The modulator is connected in series with the power supply rail to the PA via George's clever circuit, which is a Darlington pair, the input to it being audio and its output acting as a voltage regulator in the PA supply. The PA collector voltage swings in step with the audio and this create the AM envelope in the output.

Results with the first prototype running 250mW got good reports from Jim G3OGQ, Keith G8MKO, Mike MØACK, Dave GØRVW. 5 & 7 was a typical report. Ken G4BUX on his 1000ft mountain at Mellor gave me 59. The coverage was a good 10 miles plus radius of this QTH with Ken a good 35 miles away.

Results with the final design of the TX which gives 500mW was better with 59 reports from the same radius. We found it impossible to overmodulate the rig. The 2MHz ceramic xtal came from "Rapid Electronics" cost 38p each. The tuning cap is the "Maplin" AM tuner about 150pF. The 30pF across the tuner is to stop the osc cutting out at the top end. Final reliable freq. coverage is 1.9MHz to 1.96MHz. That's 15kHz of the novice section.

Modification using  
BB212 Varicap  
For Tuning





# 160M. AM transmitter

DESIGN: G3ZHE - MODS: G30GQ

## **'Penning Down' Crystals**

**Richard Wells G0RXH 33 Sandholme, Steeple Claydon,  
Buckingham, MK18 2QE. E-Mail Richard.A.Wells@btinternet.com**

'Penning down' crystals is not some new company but a method I have been using for some time to physically lower the frequency of quartz crystals.

The major cost of simple vxo QRP rigs has got to be that of the crystal and you may even want two or three 'rocks' for various frequencies, by using cheap 3.5794MHz and an indelible pen I have made a good collection of 80m crystals (Small can size)

The requirements for the penning down are simple, firstly a 3.5794MHz crystal (obviously!, but more on the types later), an xtal oscillator circuit and a method of measuring the crystals frequency e.g. frequency counter or 80m rx ,lastly you will need an indelible fine tipped pen.

Probably the trickiest part is actually opening the crystal up, and as there are three ways the manufacturers seal the cans to the base it pays to be able to recognise the different types. Fig 1 shows a welded type and this can be cold or resistance welded, the type numbers are HC-43/u and HC49/u and the only way to open them up is by carefully cutting around the can just above the base with a junior hacksaw or a hobby drill with a cutting disk, I must say that this is a very precarious task and is not for the faint hearted, after destroying about five crystals I managed to get it right!

Fig 2 shows the soldered type and this is by far the most easiest to work with, types are HC-25/u and HC-18/u, and all that is required with these is to apply a soldering iron to the clearly visible join and remove the can. Once the can is removed from the base you should have something resembling Fig3, the clear disk is the quartz crystal itself suspended between two wires, this is VERY delicate and you should never touch it, always handle the unit by the pins or base, I personally place the crystal in the oscillator circuit and then unsolder the can so avoiding any possible contact.

This is now where the fun starts, power up your oscillator and you should see a frequency of 3.579MHz on your counter, using your fine tipped indelible pen touch it onto the silver coloured centre of the quartz disk, and hey presto one of two things should have happened, either your crystal has died (very unlikely at this stage) or the frequency has begun to lower. A little at a time is what is required for success, small dots are the best method and a careful eye on the output frequency to ensure oscillation continues.

At times the crystal may die but wait a few moments for the ink to dry and it should spring to life again, if you can't get it to restart then you can start again by using a cotton bud soaked in surgical spirit or similar to clean the ink off, but use very light pressure or the crystal will break.

You should find it no problem to get to frequencies as low as 3.560MHz but you will find it hard to get exact frequencies e.g. 3.565000MHz (but what's a few kHz between friends) ,when your happy with your new crystal you can solder the can back on, this will change the frequency very slightly by a few tens of Hz, and there you have it, a homebrew rock for your homebrew rig.

Having used penned down crystals for over two years I have seen no adverse effects, the frequency never moves and the things never fail to start, I even have a 12MHz one in a 2m rig I use for packet! The only problem I have found is when I tried to lower the frequency of a 2Mhz clock crystal (large can size) this would only move down 5khz after vigorously 'painting' both sides of the quartz crystal with ink!

It would be interesting to hear from other members how they get on with this idea and how low/accurate they can 'pen down those rocks'.

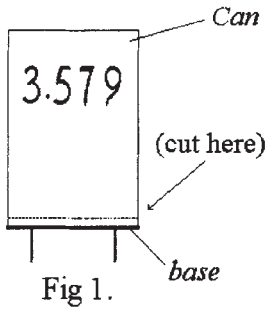


Fig 1.

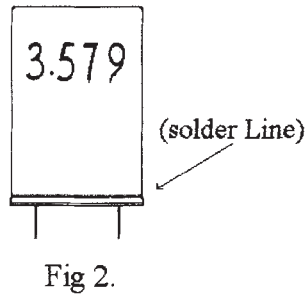


Fig 2.

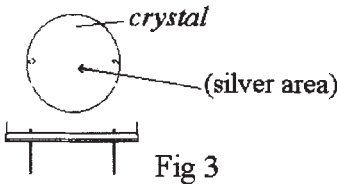
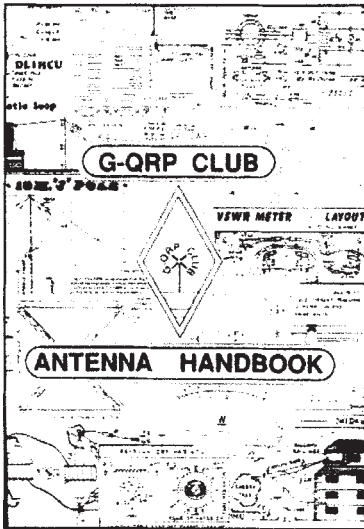


Fig 3



# THE G QRP CLUB ANTENNA HANDBOOK

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## PICKETTS LOCK RADIO RALLY – 27 & 28 November 1999

It is hoped that the club will run a stand at this event in the late autumn.

We are looking for a few members to volunteer to staff the stand on the two days of the event. The stand depends upon on help of members.

If you can help please contact

DICK PASCOE G0BPS, SEAVIEW HOUSE,  
CRETE ROAD EAST, FOLKESTONE. KENT CT18 7EG

## A VXO for 136kHz

Ian Brown G3TLH, 45 Greenham Wood, BRACKNELL, Berkshire. RG12 7WJ

This circuit was developed after trying various other techniques for generating a signal on 73Khz and later on 136Khz. Dividing a 7290Khz crystal by 100 gave me a stable 72.9Khz signal, but this was very inflexible. A free-running VFO was then constructed for 73Khz and later converted to 136 kHz. It seems just as hard to build a stable VFO at LF as it is at HF. The VFO was difficult to key, drifted, and led to accusations of chirp and radiating a spacer wave the first time my signal was heard further away than the bottom of my garden. There is no excuse for radiating a bad signal, even if not many people are hearing it. Clearly, something better was needed.

HF QRP constructors well know how to make VXOs with quite wide frequency swings. See almost any issue of SPRAT over the years. I reasoned that if I could find 2 HF crystals approximately 136 kHz apart, put them in 2 oscillators one or both of which could be a VXO, then put the outputs through a mixer and take the difference frequency, I would end up with a VXO on the whole band. After all, the band is only 2.1Khz wide and this range of frequency swing is quite easy to achieve with an HF VXO.

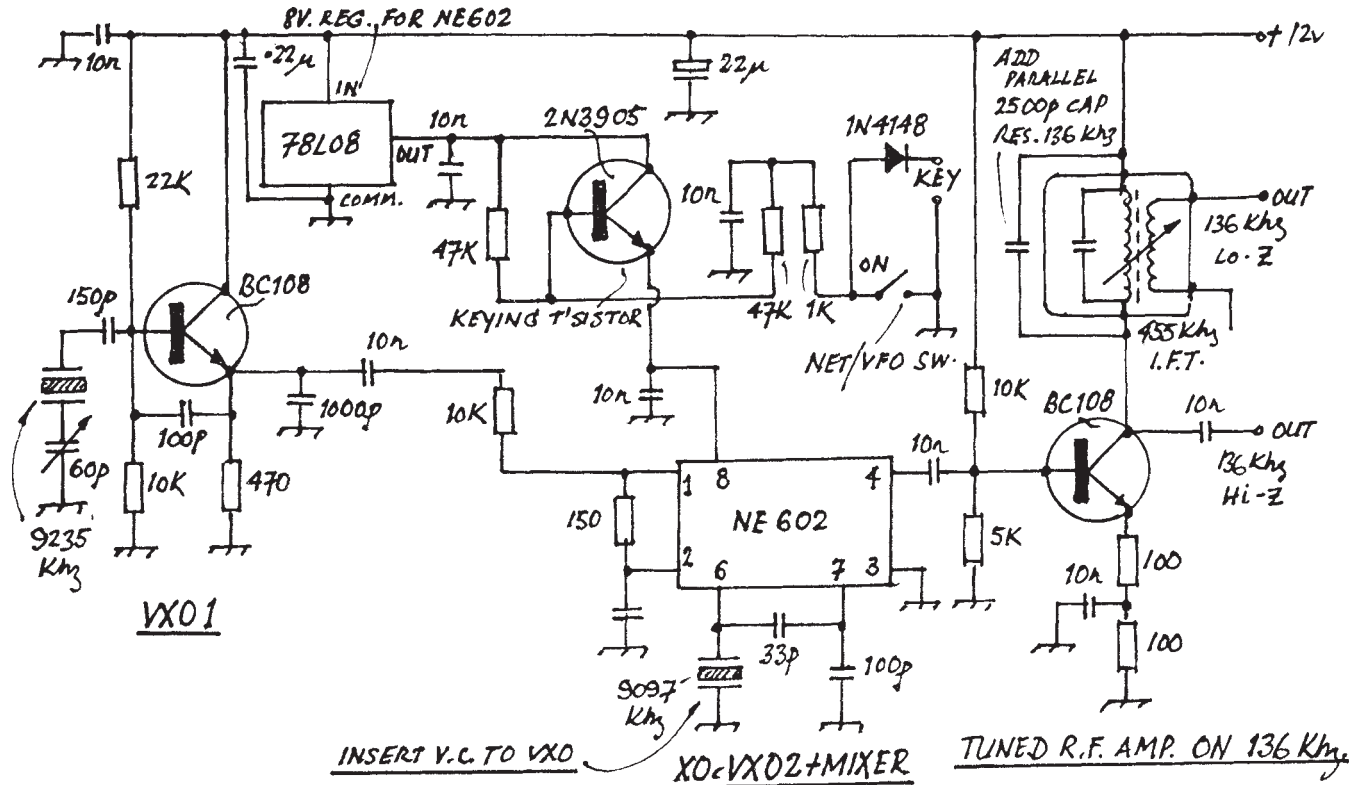
So I turned to the box of miscellaneous crystals accumulated over the years to look at the possibilities. I found 3 pairs of crystals, which were about the right distance apart. (I always meant to write a computer program to maintain a database of crystals in stock and to automate this selection process - have not got round to it yet). I settled on crystals for 9235 and 9097 - a difference of 138Khz. A VXO tends to move the frequency down so this looked about right.

The circuit uses one crystal in a classic discrete transistor VXO mixed in an NE602 with the other crystal used with the internal oscillator. The mixer is due to NN1G (Sprat 68). This is a good circuit which keys well and there is no output on key up. I used it in my 7 - band Mixer VFO (SPRAT 77) and have received compliments on the keying of my signal.

The difference frequency at the output is selected in a transistor rf amplifier, tuned using a standard 455Khz IF transformer with added parallel capacitance. This makes peaking of the output easy using the tuning slug. Both high and low impedance outputs, from the collector and the IFT secondary winding were provided. This was to assist in obtaining the best match to my TDA2005 audio amplifier PA, and also because I thought I might want to build a direct conversion monitor receiver into the transmitter, driven from the VXO. This signal source worked well giving me about 2 volts RMS covering the whole 136Khz band plus a bit either side. I needed to attenuate the output somewhat to avoid overdriving the PA. The signal is clean and, best of all, is not there when the key is up. The "Net" input can be used as a net switch or can be enabled on receive to drive a direct conversion receiver.

I could not think of any standard off-the-shelf crystals that could be used in this way. Perhaps another member can? So it is a case of looking through the junk box to see what you have. Higher frequency crystals will swing more than lower frequency ones and this will compensate to some extent for the crystals being too far apart. Another way of doing this would be to make the NE602 oscillator into a VXO by inserting a trimmer or variable capacitor between the crystal and ground. The well-tried technique of inserting an inductor in series with the VXO variable capacitor will also help in bringing the difference frequency closer to the band, if this is still a problem. If you do not have any suitable crystals then the NE602 oscillator can be made into a VFO with reasonable stability.





# VXO FOR 136 KHZ

IAN BROWN  
-G3TLH-

# Finishing Front Panels

## A Collection of Ideas from the G QRP-L Internet List

*It all begin with a question from G3MBN on the G QRP-L internet list*

*Below is the question, followed by a collection of answers*

Here's a straightforward question - I have a number of working qrp rigs, both homebrew and made from kits. They could do with the finishing touches to their aluminium (aluminium) panels and cases. My question is, does anyone on the list have a pet way to make 'em look beautiful? Maybe there's a method that does not use paint or other special treatment. I'm sure this must be a much asked question, and information on how best to do this will likely be of use to others reading this. Hope someone can suggest something really neat! I'm all ears.

**Brian G3MBN**

I use a wire brush in an electric drill. This gives the soft aluminium surface a texture that does not show subsequent scratches. As to labelling the controls - this is still a problem. Dymo tape is OK for some things (but not tuning scales for example), but looks pretty naff! If you have the patience (and you'll need it) and have access to a PC with a simple drawing software package (or maybe even 'Word'), then the entire front panel can be designed and labelled and printed out on to thin card. The tricky bit is getting the holes in the chassis to match up with the scales on the card if you do it in the wrong order! A few coats of varnish will protect it from dirt and damage, and then stick it onto the aluminium front face. If the surface was already treated as described above, Pritt Stick type glue is sufficiently strong to stick it on. If you then need to change it, it can be peeled off and any bits still adhering can be removed with warm soapy water.

**Ian Liston-Smith G4JQT**

You would think someone out there would have made, perhaps they have, a clear sticky backed film for use with computer printers. For a long while A4 sheets of acetate have been available for use with Overhead Projectors (OHP's) and marker pens. They also come in versions which are heat tolerant for putting through photocopiers and laser printers, and there's a variant for inkjet printers (so the liquid ink doesn't run off!). Vinyl cutter printers attached to Pee Cee's use stock which is like sticky backed plastic. Perhaps someone knows of a source of this material which is clear and suits the range of printers out there?

**Glen G0SBN**

MS Paint, Word etc. will all produce the required text on coloured paper from a Laser or photo copier. This can be laminated with a clear and very tough plastic film by using overhead transparency sheets. Coat the transparency with white PVA wood glue and apply to the printed sheet. The PVA dries clear, a little more applied to the laminated panel can also be used to glue it on. The sheet should be glued on WITHOUT any holes cut. Once dry a scalpel will pierce any pot/mic hole etc. and allow a very clean cut to be made around the circumference. Inkjets are not suitable for this application as both varnish and glue will cause the text to bleed.

To give alloy cases a nice finish, with out the hassle of paint, use Fablon from your local DIY outlet. Fablon is a coloured plastic sheet (paper thickness) with a sticky back. Do not attempt to remove the carrier completely, instead just start a strip about 10-15mm wide and then place and peel.

**Sheldon Hands GW8ELR**

In my apprenticeship we used the following high tech method, to get that once popular circular effect on aluminium. Depending on the size of the circle you need, cut off a piece of dowel about two inches long, into one end cut a fine slit about one quarter of an inch deep, across the diameter,

into this slit goes a flap of emery paper, use the grade of emery to suit the finish, the flap is folded across the dowel (rough outermost). The dowel is held in the chuck and lowered onto the panel. Experimentation on an offset may be useful. Our panels were fixed to the bed of the machine and we could wind them across with the vernier adjustment for an even, accurate placing of the circles.

**"N. C. ALLISON" G0JOH**

With regard to lettering of the panels I have had a good deal of success with the Brother P-Touch labelling system (not sure if you have them in the UK). Here in the USA the basic machine can be gotten for about \$50 with a couple of tape cassettes. I use the clear tape for the lettering, which puts black letters against the panel surface. There is a choice of fonts and font sizes, so you can be a little creative. Perhaps the price for the machine is a little high for some, but I use it for other things too in my home office so that handles the expense side for me.

**David Gwillim KB2TQX**

When I visited the Grass Valley Group factory, in the days when they made video equipment with "brushed aluminium" panels, they simply fed the aluminium under a huge drum sander to get that 'brushed' look. Seems to me they made two passes, then they anodized the panels. Maybe for QRP you could just spray the sanded panel with clear flat Krylon.

Another lo tech approach that gives a nice finish to take the finished panel to a shop that cleans spark plugs and use the glass-bead sand blasting machine they use for cleaning the insulators. Many operators will let you drop in during off hours and use the machine. This technique gives a very fine-grained velvety look that takes rub down letters well. Overcoat with flat lacquer for durability.

**Bob Bruner WB4TAJ/9**

I believe the effect that NC Allison described of producing lots of circular patterns regularly on a panel is called 'engine turning', and used to be common on quality brasswork for clocks, for example. I have long wondered how it was done, and thanks to Allison's post (qv) I have at long last found out. I bet it's not as easy as he says! Years ago I used to achieved a similar effect, though not as precise no doubt, with 600 wet & dry paper and three-quarter turns made with pressure from either finger or thumb. A mixture of too mean to pay for paint and too impatient to wait for it to dry anyway (-

**Peter, G3PDL**

I can remember my metalwork teacher showing me how to get a similar effect (if, that is, I am thinking of the same thing as Peter, et al!) by dipping the end of a piece of 1/2 inch dowel in some grinding paste, fitting dowel into the chuck of a pillar drill and making lovely 'circles' all over my work! In appearance it was similar to the dashboard of some Bugattis - is this what you are thinking of, or have I got the wrong end of the dowel?

**Mike G0ROT**

I see some good ideas popping up on the qrp net about making front panels looking good for the home projects, well now I will like to give a tip or two as i am a car paint sprayer and i have done some nice spray jobs on a few boxes from time to time, for those who want to put rub on letters and numbers on the front panels and boxes get some very fine wet / dry paper about 1200 grade and some soap washing up liquid // and under a running tap rub the shine off the paint work slightly but don't rub to hard or you will rub back to the bare metal just to take the shine off the paintwork, then dry it off for a while then put on the letters and numbers, having done that ,then give it a coat or two of clear coat lacquer and leave to dry over night, next day polish it up with some car polish ...there we have a nice front panel and you wont rub the letters away as they are under the lacquer...you can get all the wet/dry and a can of spray lacquer from all car shops even B & Q keep them but don't use no less then 1200 wet / dry.

**Martin G0MVP**

The following is the way I finish my front panels thought it may be of some help.

1. Try to make the front panel detachable if possible, this makes any artwork easier to apply.
  2. Apply spray paint primer, white primer for a white finish or grey if a dark finish is required. Apply sparingly repeating coats at fifteen minute intervals. When the panel is covered allow to dry thoroughly rub down with fine wet and dry paper and wash with soapy water.
  3. Apply finished colour as above. if the finished panel is to be black or white matt spray paints are available from car accessory shops. When finished use cutting polish 'Tcut', 'Brasso' etc to provide a smooth surface to apply artwork
  4. Apply rub down lettering is available at all good art shops, I use 2.5mm high 'Decadry' lettering which is available in both black and white for about £1.50 a sheet. I have also used 'Letraset' lettering but this is expensive as the sheet size is larger. Be patient when applying lettering any mistakes can be removed using a sharp scalpel. To ensure lettering is straight fine pencil lines can be used these can be removed following completion.
  5. If lines are required on the panel. e.g. RIT and Vol indication I use a 'Rotring' lining pen 0.7mm dia. Rotring ink is available in both black and white.
  6. When artwork is complete it can be sealed using clear lacquer, again available car accessory shops. Again be patient applying several thin coats. A word of warning, test the lacquer with the lettering I once used some lettering that reacted with the lacquer turning the lettering to liquid!
  7. When complete the lacquer can be polished to a gloss finish using cutting polish.
- What you will end up with is a hardwearing panel and although time consuming it is well worth it giving a professional finish providing the process is not rushed.

**Peter G4TCQ**

I know I've already made comment on the above, but if your like me once I start thinking I can't get it out of my head. Where I work its very picturesque with ornamental gardens. I noticed at the weekend the plants were all clearly labelled with 3"x4" plastic sheets, a 2 colour laminate the top black and lower white, and by using what I think is called a 'pantograph' the top layer is scored away to reveal the lower white. It produces a very neat result. I haven't found out if circles/dials can be cut, perhaps others know?

This started me wondering if an X-Y plotter, that you just happen to have lurking in your junkbox, was cobbled together with one of those engraving tools or mini drills could a thin plastic or metal surface be drawn out to produce a front panel, a bit like a do-it-yourself CAD/CAM (Computer Aided Design & Computer Aided Manufacture). I've never done any etching, all my stuffs stripboard, but would replacing a pen on an X-Y plotter with one of those 'etch-resist' pens and drawing out your design on double sided board, would that give a reasonable result and screening as well? Unfortunately I don't have the necessary X-Y plotter, or etching, but it would be nice to try it out. Perhaps even a little side-line opportunity if you've got access to CAD/CAM.

**Glen G0SBN**

Plot to PCB works OK. Staedtler LUMOCOLOR 317 permanent is acid proof and just fits HP7475 holder. 7475 moves paper as well as pen. To avoid possibility of pen catching PCB design must have outer bounding box. Plot this first on sheet and select pen up half way through. Attach PCB to sheet with tape and then continue plot.

FLASH OF INSPIRATION. Maplin now do iron on pcb artwork, also available from printers for Tee shirts. Would this iron on to front panel??

**Sheldon Hands GW8ELR**

# HW8 Audio Matching Filter Goes Stereo

**Malcolm Eales MØAJL, 137 Heron Way, UPMINSTER. RM14 1EE**

Having just acquired a new-fangled HW8 transceiver (there are still pockets of resistance to new technology in Essex!) I was searching for an LT700 transformer, which I knew I had somewhere, when I came upon a couple of 88mH toroids and so set about using these instead to match the 600 ohm audio output to low impedance headphones. Fig 1 is the result, the tap on the toroid provides the medium impedance input and the capacitors in series both resonate the inductance and provide the low impedance output. The 15 uF capacitor can be 10 to 20 uF (the larger value might be better for use with a 4 to 8 ohm speaker), it should be non-polarized but I only had a normal 15 uF/40V electrolytic and it seems to work fine. For  $C_x$  I used 0.562 uF (0.22 + 0.22 + 0.1 + 0.022), with my trusty old valved Advance generator and Daystrom AC millivoltmeter warmed up, this gave a centre frequency of 740 Hz and a -6db bandwidth of 80 Hz. The sides of the filter are not too steep so there is minimal ringing and a useful improvement in audio selectivity.

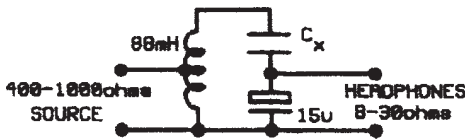


FIG. 1

By now the other 88mH toroid was looking lonely and a small bell was ringing about stereo filters. Back issues of Sprat showed a crossover approach but what about two resonant circuits at slightly different frequencies? So I changed the capacitor values in the first filter to give resonance at 720 Hz and made a second filter with a resonance at

800 Hz. I connected the two inputs together, fed the outputs to separate sides of the headphones and the little bell went CLANG! The centre taps of the toroids give too much coupling and each circuit pulls the other to a single frequency. Inserting resistors to reduce the coupling only increased the loss through the filter so I separated the inputs and fed them in anti-phase from the source i.e. the common line of the headphones is now not connected to the source ground, see Fig 2. With  $C_L = 0.462$  uF (0.22 + 0.22 + 0.022) and  $C_R = 0.587$  uF (0.22 + 0.22 + 0.1 + 0.047) the effective centre frequency is 760 Hz with an overall effective -6 db bandwidth of 140 Hz. Tuning through a signal, it appears to move from one side to the other with increased 'presence' at 760 Hz and any interfering signal is either off to the left or right and easier to ignore.

Because the source ground is not common in this circuit I decided to build it in a plastic box that I already had (100 x 80 x 40 mm gives a comfortable fit) and lurking inside was the LT700

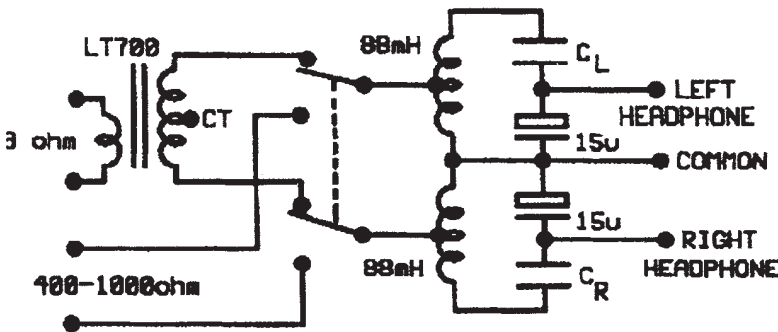


Fig.2.

FOR 88mH TOROIDS - SEE CLUB SALES PAGE IN THIS ISSUE

transformer that caused all of this! I soon soldered it into circuit as shown in Fig 2 and now the stereo filter can be used with both low and medium output impedance receivers.

# A CMOS SWITCHED 80m SUPERHET

Aron Sandstrom HE9VXB, Geissfluuhstr 3, SOLOTHURN. CH-4500 SWITZERLAND

This receiver has an IF of 455kHz. The idea was to use two filters - one with wide selectivity and the other with a small bandwidth to suppress QRM. The technical problems were not the two filters but how to switch them. After reading information about digital switching, I obtained the CMOS MC14066B Quad MOS Analogue Switch for the job. The noise figure was much better than the silicon diode option. The preselector filters are wound on L33-2 cores with BC type 2X320pF variable capacitors.

The IF transformer is a Toko 455 type with yellow core [or similar].

If filters can be obtained in different type with different bandwidths. Check that the input/output resistance is in the range 1 - 2K and adjust the bypass resistor to suit the manufacturer's value.

This receiver has no AGC but the Dynamic Range is relatively high, larger signals being handled by the attenuator pot in the input. Sensitivity was good - 0.4uV was measured with no breakthrough using large outdoor antennas.

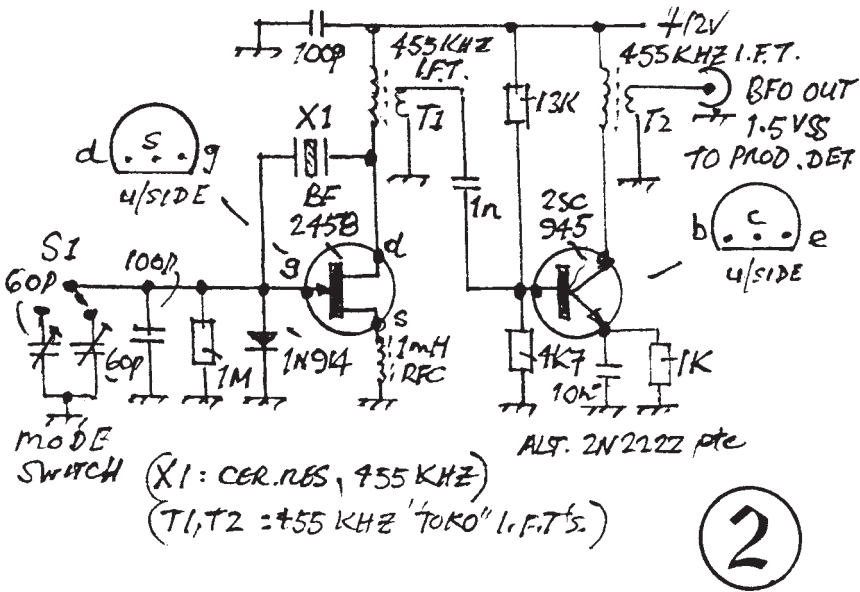
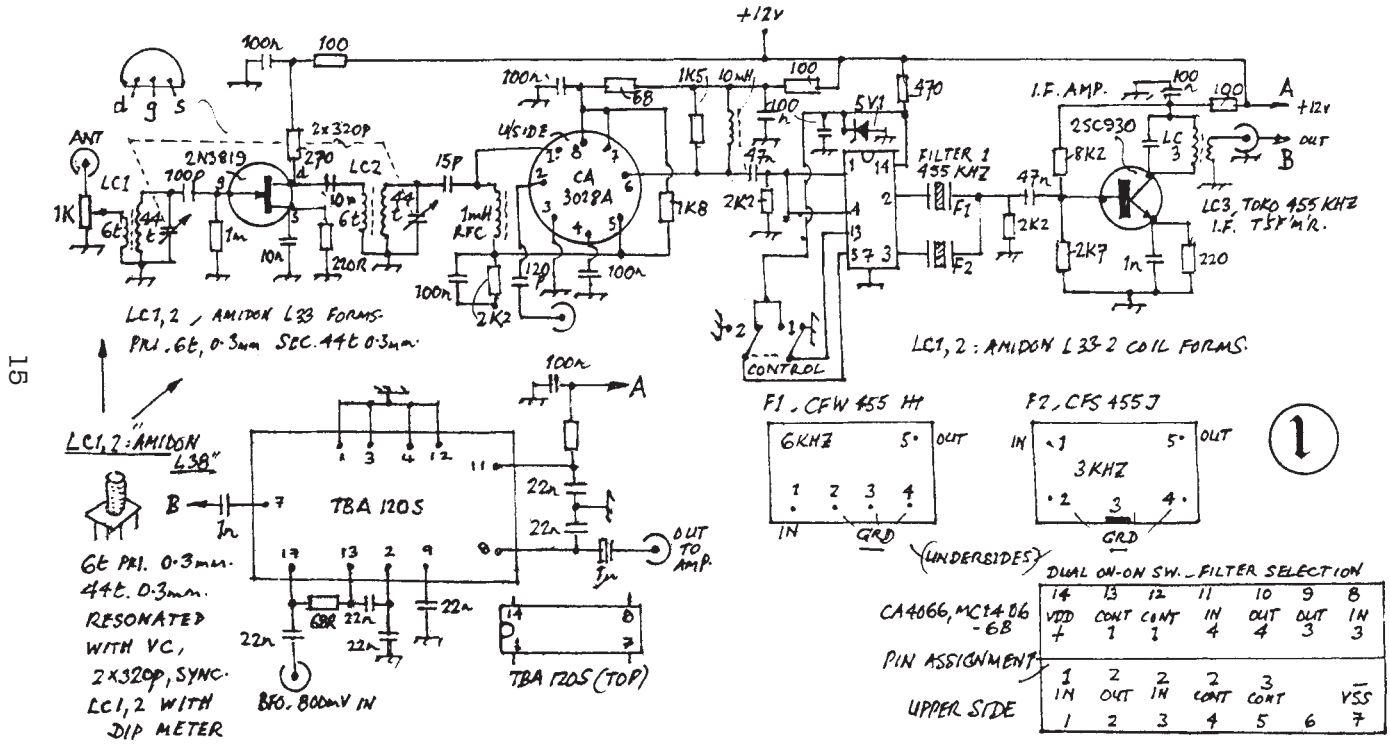


Fig 2  
455kHz BFO LSB/USB [LSB-454 USB-456kHz]

Fig 1 - Receiver Main Board



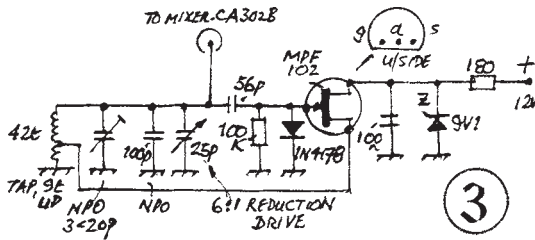


Fig 3 - VFO 3.955MHz >  
L1 = T50-2 42t, tap 9t up. Complete VFO in a can

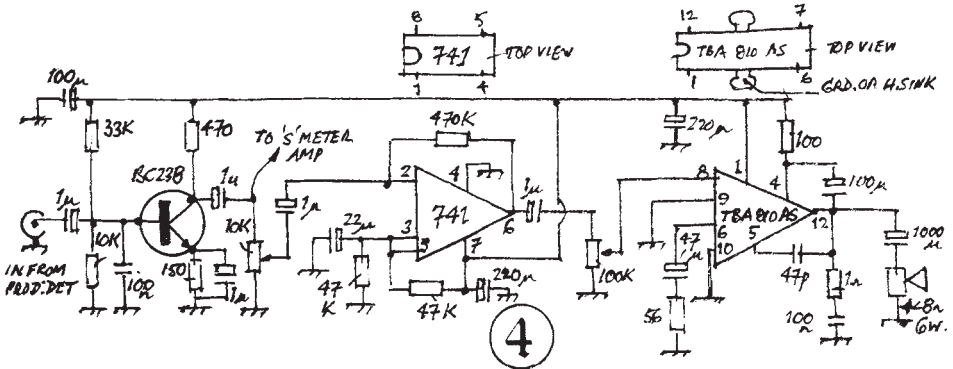


Fig 4 - Audio stages

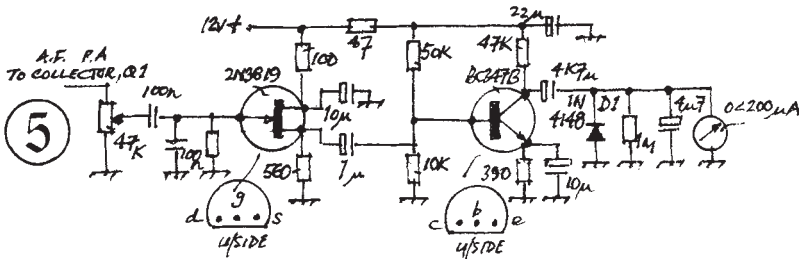
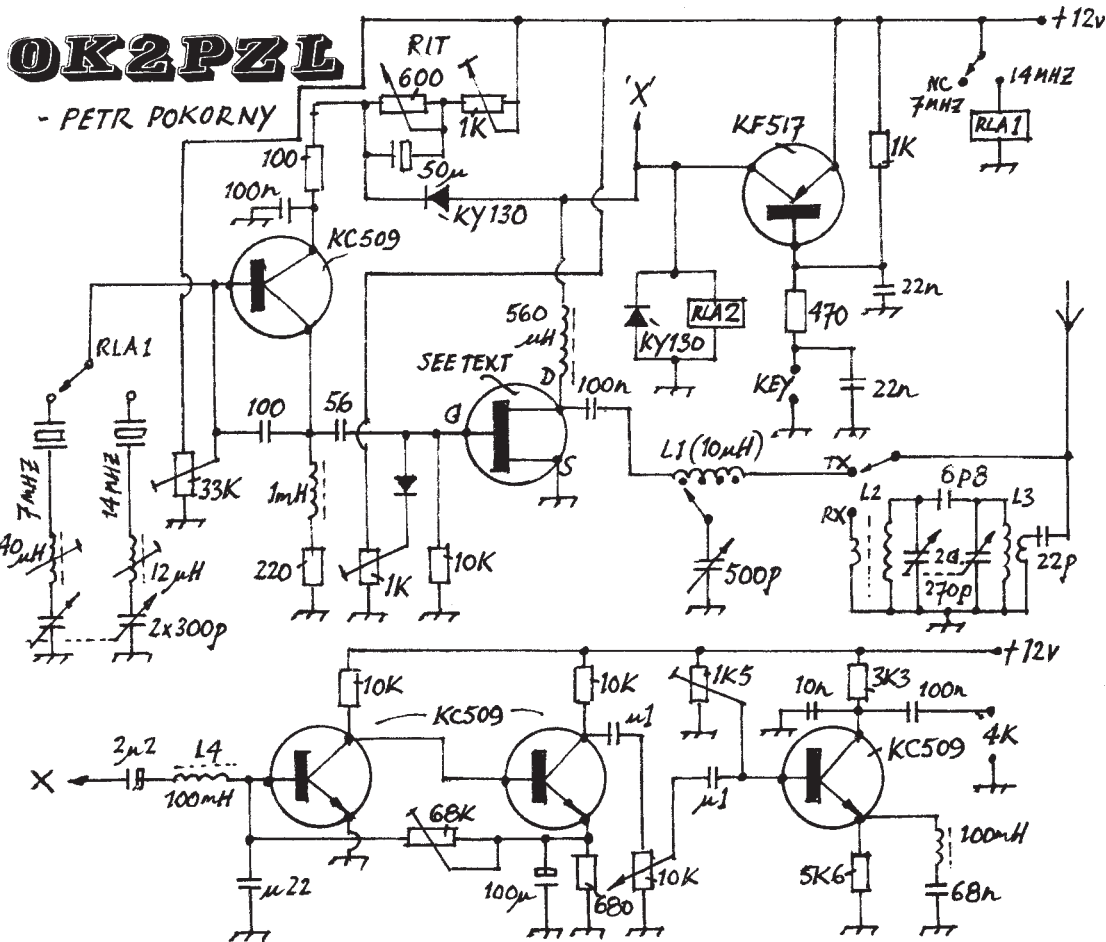


Fig 5 - Audio S-Meter  
Set 47k to read S9 at 30uV RF or set to compare with another receiver



OOPS!  
 Repeat of  
 OK2PZL  
 Transceiver  
 Circuit  
 From last issue

A Section was  
 missing from this  
 diagram.



## **Parking Lot Portable Vertical (PLPV)**

**Sam Billingsley AE4GX, 609 Old Ivy Rd. Atlanta. GA 30342 U S A**  
**email: sbillingsley@usaninc.com**

Many folks have asked me about the PLPV so here goes:

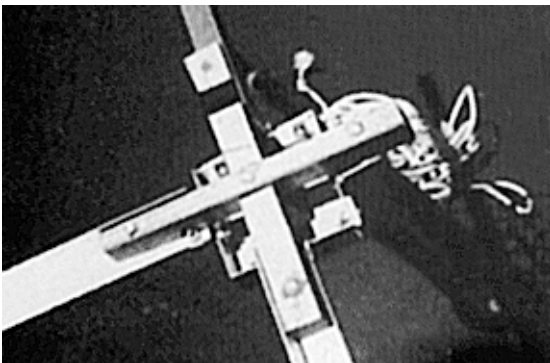
Like many of you I try to find the time to do as much QRPing as possible given the schedules of work and family. Although I have been a ham on and off since 1957 I never have been active during a sunspot cycle. I was bound and determined to be active this cycle and find a way to maximize my operating time. The only way possible for me to increase my operating time was at lunchtime near work. Since like many of you I work in an urban environment I am faced with lots of concrete. My one restriction was not to have a BIG antenna on the car permanently. Bob Edwards W4ED showed the North Georgia (NOGA) QRP group a portable set-up for his SLA vertical that showed promise but it did require a car and the antenna had to be adjacent to the car. He used a frame/stand that was held steady by a car tire resting on the antenna support frame. I was looking for something a little more flexible. Something that could be operated from a car, in the event of rain or bad weather but, also could be operated from anywhere it could be hauled. I like to bike ride and trail hike so I was looking for a method of setting up an antenna that was independent of trees and other local supports.

The design criteria:

1. Collapsible to less than 4 ft
2. Multi-band capability (at least 40,30,20,15,10 mtrs)
3. No tuner required
4. Coax fed (RG-58)
5. Light enough to be backpacked or carried on bicycle
6. Set-up or breakdown time less than 5 minutes
7. Self-supporting (requiring no external supports)
8. Low profile for storage - "small golf bag" size
9. Low Price - Less than \$40

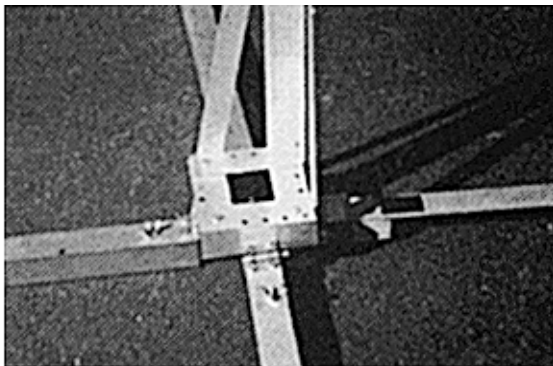
Using the idea of the SLA-type collapsible fishing pole as a vertical support I wondered how could I achieve the other criteria: self-supporting, quick setup/band change times and no tuner.

I came on the idea of a foldable wooden support structure that would hold the fishing pole erect and stable in reasonable winds. The fishing pole selected from a local Bass fishing store was a multi-section Carpie Pole made of black plastic that collapsed down to less than 4 ft and extended is almost 20 ft. I think any of the pole brands that have been mentioned on the various SLA articles would work.



I initially built a wooden foldable base that worked but was too heavy. At Home Depot I found some 1X1X36-inch aluminium angle that looked promising. Using four pieces I formed the base. Using a fifth piece I cut it in pieces and made a square base frame 3X3 inch and hinged the four 3ft pieces to the small square base. The remaining 2-ft piece I bolted to the small base (not hinged). I made a wooden Tee to screw the four base legs together so the base and legs were

fairly rigid and self-supporting. The 2ft section was vertical and the resulting structure looked like a four radial GP sitting on the ground. The fishing pole was cable tied to the 2-ft angle so the vertical when extended reached about 20ft. With the wooden Tee unscrewed from the four legs the legs fold towards the fishing pole. When then pole is collapsed and the legs are folded the entire structure is about 4ft tall and about 6-8 inches in diameter. It can easily be picked up with one hand. It's very light.



I had read that verticals with a limited number of above ground radials being more effective than verticals with a similar number of radials on the ground so I decided to have the base of the vertical be about 1.5 to 2 ft off the ground and that any radials would be slightly sloping downward towards to ground at the outer ends. I decided on initially trying two radials on opposite sides of the base.

The antenna would be coax fed with 50-ohm RG-58 and coax sections would be available to cover varying distances from 20 ft to 70 ft from the base of the antenna to the transceiver. This arrangement would accommodate a variety of set-up conditions with the shortest amount of coax.



The no tuner requirement meant pretuning the antenna for the bands of interest. Initially I tried the multi-wire parallel configuration with individual wires cut to each band but the interaction seems to be too tough to solve. So I cut a 1/4 wavelength for the highest band of interest (10 mtrs). One wire for the vertical section and two for the radials and attached them to the coax at the base in the classic inverted Y configuration. The vertical wire connected to the inter-conductor of the coax and one end of the radial wires to the outer shield of the coax. To decouple the coax feedline from the antenna I made a RF choke by wrapping about six turns 6 inches in diameter of coax and tapping them together. With my trusty MFJ SWR analyzer I checked the arrangement for freq vs min SWR. On all bands tried I could get a low SWR but using the book formula length where a quarter wave (ft) equals  $468/\text{freq}(\text{in MHz})/2$ .

The problem I noticed was that the frequency at the low SWR point was always lower than expected by the formula. But by careful pruning of the radials and the vertical section I could get the antenna to have a low SWR  $< 1.5$  to 1 in the frequency range of interest. I then calculated and added sections to all three elements to get to the next lower band and prune for SWR in the new frequency band of interest. I have done this for three bands to date (20,15,10). So you have one, second or three little wire segments depending on the band. How do you keep them together, yet apart, for the unneeded segments? My wife's sewing box had some lightweight elastic band tape (looks like stretchy string) that is used for making or mending expandable clothing. I took a four inch section and attached the end of the wire segments by simply knotting the wire and the elastic leaving about one inch of wire over the end of the knotted area. To the wire ends I crimped

on some small quick disconnects (from RS). When completed the connected wire segments can be pulled taut and the segments will be apart a few inches. To give the horizontal radials a little extra support I taped the segments to a piece of lightweight nylon rope. The vertical is clipped at the very top of the extended pole to a section of elastic connected to the last wire segment. When fully extended the segments are stretched a small amount. To change from band to band you simply collapse the pole and connect the needed segments and re-extend the pole. The radials are similarly connected. Since the all the segments are already in place the operation takes less than a minute. The pole can handle a 1/4 wave length vertical wire down through the 20 mtr band (i.e. 16.6ft). To accomplish the remaining bands (40 and 30 mtrs) you need to form a loading coil and an additional wire segment above the coil. These can be made in a quick disconnect manner previously described. The 40 and 30 mtr segments should be made separately to simplify the antenna. If these lower bands are rarely used I would keep them aside and not complicate the vertical or radial segments. But if operation is desired routinely you can have them in place just like the wire segments for the higher bands.

The results of the antenna have been better than expected. QRPTTF and ARS Bumblebee events have proven its effectiveness. More importantly I can go out at lunch and catch some QRP action.



## Radio Projects for the Amateur

by Drew Diamond, VK3XU

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### The W1FB Memorial Award

For 1999, the project is to design a Simple Receiver for one or more Amateur Bands, suitable as a construction project for a Novice. Please submit your design to G3RJV by the last day of November 1999, with circuit sketch, all values and brief notes. The project will be published in SPRAT and the winner will receive an engraved plaque.

## The GQ-PLUS - A Simple Multiband CW Transceiver - Part 2

### Sheldon Hands GW8ELR, Tegryn, Llanfyrnach. Pembs. SA35 0BL

The final version of the pa circuit is shown in the circuit diagram. This has a few changes from the description in the last issue. It was found that it is possible to get the bandwidth on the original push pull fet arrangement of the monobander by changing the output transformer inductor. The space saving also allows inclusion of six 7 element lowpass filters which is sufficient to cover all the current 1.8-30MHz allocations.

TXRF output from PCB1 mmic amps is routed on coax to the pa board at T1. The signal is first amplified by TR1 then TR2. TR2 output is peaked in the 20-30 MHz region by L5/C6 to improve the 3db bandwidth. TR3 a VN66 fet drives the P/P final TR4/5, these are also VN66 replacing the IRF510's in the monobander. The VN66 has the same TO220 package but a much greater bandwidth being rated to 200MHz, this allows a good 5-6w even on 10mtrs. T4 is unusually wound on T50-2 using a twisted trifilar winding. Phasing is done on the pcb so from the construction view point it's just three parallel wires.

The following lowpass filters are conventional 7 element designs. The cut offs are arranged so that 6 filters cover the 1.8-30 MHz allocation. 7/10, 14/18 and 24/30 use the same filters selected via steering diodes. The receive signal is also routed through the low pass filters to improve high side out of band signal attenuation. A high speed reed relay switches the input to IC1 a MAV11 pre-amp. The MMIC has excellent signal handling and gives optimum sensitivity on the higher bands. The pre-amp output has diode switch D5 to improve the tx isolation.

Also on PCB2 are high side drivers for the band pass and lowpass switching. TTL drive from the DDS goes to the ULN2003 acting as a pull down switch for TR6a-j bases.

Construction of the two main pcb's is on double sided boards of 150x133mm. Density is slightly less than the original GQ except in the BPF area. Wiring has been kept to a minimum and is mainly coax or the ribbons for the BPF's. It's easiest to build and de-bug pcb one first. This with the DDS will get the rx up and running quickly. The DDS means there's no VFO to set up, also the wide bandwidth allows you to find exactly where the BPF's are peaking and adjust accordingly. If your test gear runs to a scope or milliwatt power meter you can do this by keying the tx and reading the low level output from the MAV buffers.

### **Description of the GQPLUS Kit from the Hands Electronics WebPages**

*The super little rig is all bands 1.8-30 MHz cw with up to 7w output and crystal like stability from a AD9850 dds vfo. It features LCD readout to 1Hz with dual vfo, 8 step rates and 16 memories.*

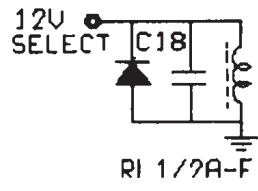
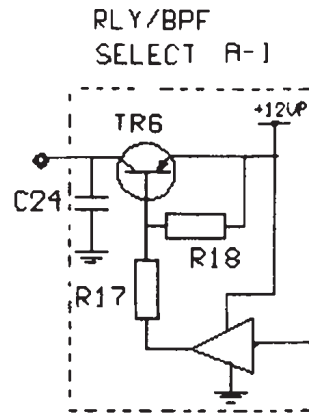
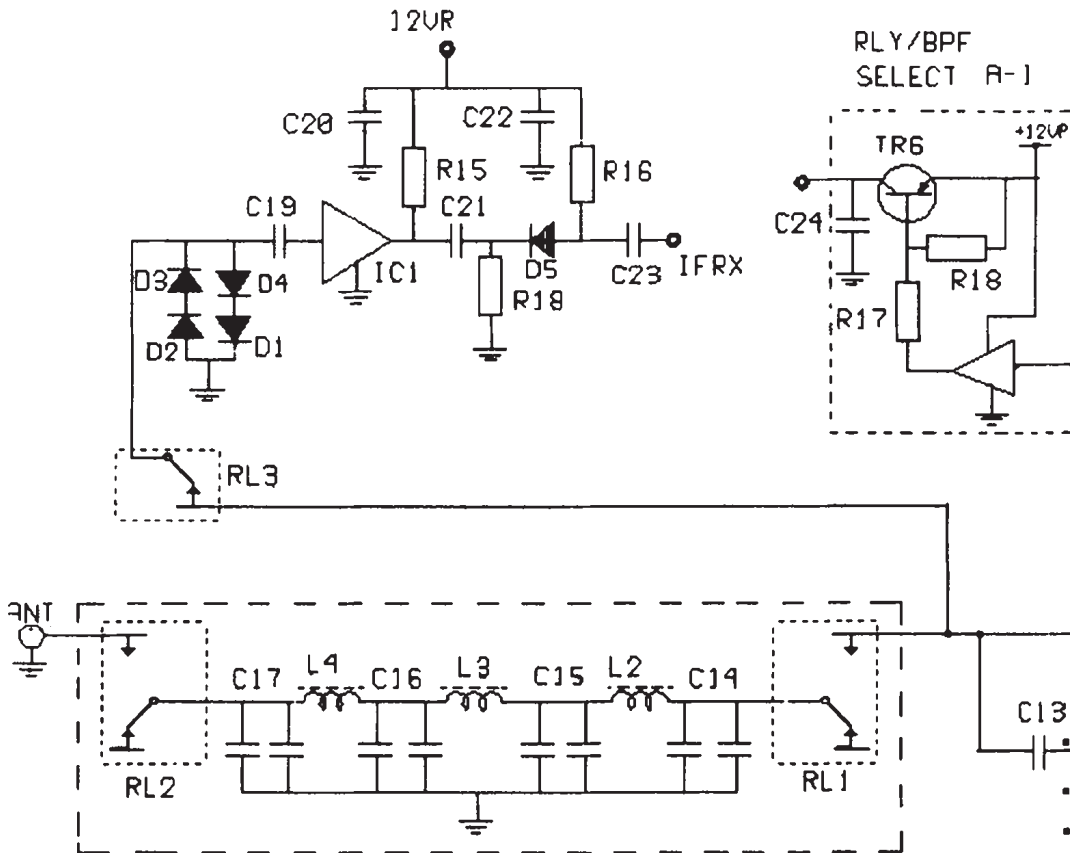
*The Tcyr has a strong front end with Level 10 and 17 ring mixer options with Hy Q toroidal input filters. The IF uses the well-proven GQ 6 pole ladder filter and a new Quad diode product detector with a trapped low pass filter. RX audio is by a super linear TDA2003 audio Pa with ample output to fill a very large shack*

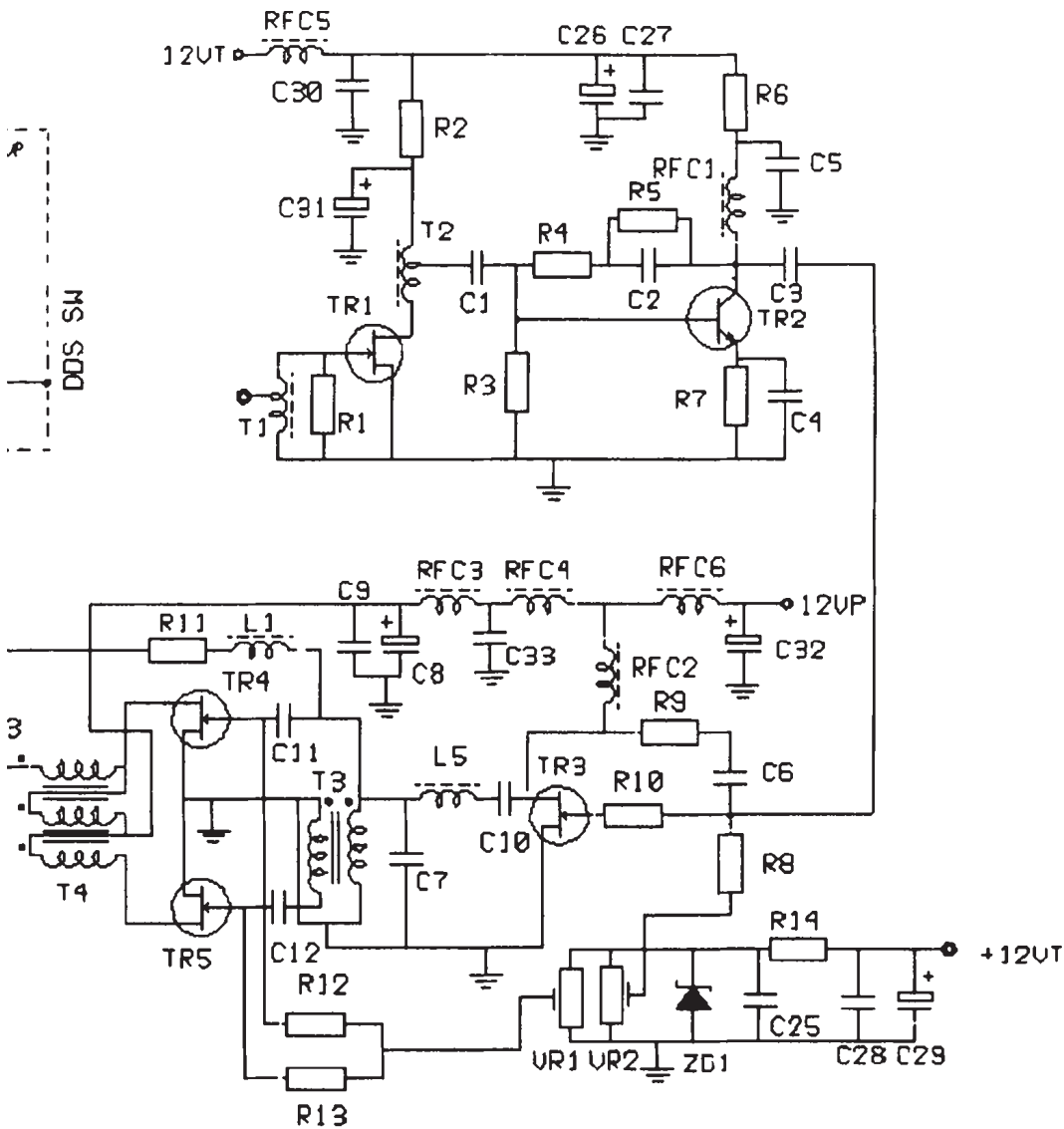


*RF output is from a push/pull FET amplifier with a hf peaking giving 5-6 watts out even on 10mtrs. Six 7 element low pass filters clean up the output and a high speed reed give optimum rx sensitivity on the higher hf bands.*

*The transceiver has two main boards of 140x150mm with front panel mounted DDS vfo/controller.*

### **QuickPic of Prototype GQPLUS**





## Parts List PCB2

R1	100K	TR1	J310
R2	100R	TR2	2N3866
R3	180R	TR3, 4, 5	VN66AFD
R4	680R	TR6	BC640
R5, 16	470R	IC1	MAV11
R6	10R	IC2A, B	ULN2003
R7	15R		
R8, 12, 13	22K	D1, 2, 3, 4, 6, 7	IN4148
R9	1K	D5	BA243 or similar PIN diode.
R10	27R	ZD1	4V7 400mW
R11	4K7		
R14, 17, 19	2K2 (R19X6)	T1, 2	2 hole balun type 43 mix or similar
R15	220R	T3	59-61001101
R(n)18	3K3 bussed with 1 common	T4	T50-2
VR1, 2	10K PRE-SET		
C1, 2, 3, 5, 10, 18, 19, 20, 21, 22, 23, 24, 27, 28, 33	10N	RFC1	FX115 BEAD
C13	10N 30V MIN	RFC2, 4	TOKO 0082K
C4	470P	RFC3	6 HOLE CHOKE
C6, 11, 12	1N	RFC5	2 HOLE BALUN
C7	82P	RFC6	43006301 FAIR RITE
C8	10U 25V TANT	BALUN	
C9, 25, 30	10N	L1	10UH TOKO 7BS (101J)
C26, 29, 31	10U 16V IN	L5	T37-6
C32	100U 16V MIN	RL1, 2	OKO

## Low Pass Filters

MHz	pF C17/14	pF C16/15	turns L1/3	L2	swg	core
1.8	820	2200	30T	34T	26	T50-2
3.5	470	1200	25T	27T	28	T37-2
7 /10.1	270	560	19T	20T	26	T37-6
14/18	110	270	14T	15T	24	T37-6
21	82	220	12T	14T	22	T37-6
24.5 /28	56	150	10T	11T	20	T37-6



## Band Pass Filters

MHz	pF	pF	pF	turns	CORE	TCF
	C63/67	C64/66	C65	L1/2		
1.8	1500	1000	180	23T	T50-2	1600
3.5	1200	330	33	22T	T50-2	390
7.0	330	50	4P7	25T	T50-6	150
10	270	56	5P6	20T	T37-6	120
14	330	56	4P7	20T	T37-6	33
18	120	27	3P3	13T	T37-6	100
21	56	33	5P6	11T	T37-6	56
24M9	39	22	3P9	13T	T37-6	56
28	47	33	6P8	7T	T37-6	100

Filters 3.5-28 have additional 30pf trimmer with TCF 1.8 has 60pf.  
All wire is 26swg enamel spread turns over the entire core.

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### **The New UKRAINIAN RADIOAMATEUR QRP CLUB**

The UR-QRP Club has recently been started in the Ukraine: The President is Peter Grytsay, US1REO with Vladimir Tretyakov, UR7IRL, as Vice-President, Awards Manager and Bulletin Editor, and Vladimir Zholud, UT0MK as Technical Manager.

The club issue an Information Bulletin to all members and have an awards programme. Each member has an individual number and membership certificate. Radio amateurs world-wide are invited to join. The entrance fee is \$4 and then a membership fee of \$3 each following year. The contact address is: Peter P. Grytsay, US1REO, 15-B Moskovska Str., Apt. 58, Nizhyn, Chernihiv Region, 251200, UKRAINE. Packet: [US1REO@I6BNW.#MC.ITA.EU](mailto:US1REO@I6BNW.#MC.ITA.EU).

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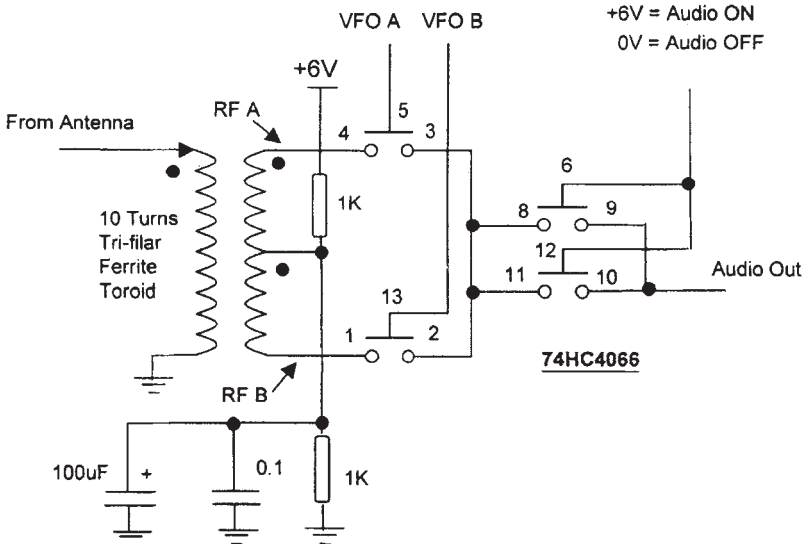
**For Sale:** 50 years of Radcom & The Bull. 1946 - 1996. Incomplete, a few issues missing. Offers, buyer must collect. 9MHz SSB filter TF-90F c/w USB & LSB carrier xtals. £10 G3EJF QTHR 01677 450068

**For Sale:** Walford Taunton transceiver for 40, 20, 17 & 15m bands, cased, £135. 2m 30W power amp, brand new, boxed, £24.50. Barker & Williamson portable whip for 40, 30, 20, 15 & 10m complete with all loading coils & instructions, hardly used, boxed, £49.50. 13.8V 3A PSU (transformer believed to be rated for 5A) £4.50. Open to offers, please call David G6UEB on 01322 381084, or write to D Rowlands, 7 Broomfield Road, Swanscombe, Kent, DA10 0LU.

# CMOS MIXER EXPERIMENTS

Leon Williams VK2DOB FROM THE VK CW OPERATORS QRP CLUB - "LO-KEY"

Recently I started designing and building a new 40M DSB QRP transceiver, I have built many such rigs over the years, and each time I try to do something a bit different. I have seen quite a few articles lately regarding CMOS mixers and so I thought I would have a look at them and see how they perform. I was always cautious of employing passive mixers in Direct conversion receivers following less than successful results with diode mixers. They require a high level local oscillator signal and tend to act as envelope detectors to strong AM broadcast signals. In superhet receivers however, these problems are much less serious.



The circuit diagram shows the setup I used. I chose a 74HC4066 because they are easy to get, although a 74HC4053 could be used having the advantage of requiring a single phase VFO signal. A tri-filar wound ferrite toroid couples the antenna signal to the mixer and provides the two 180 degree out of phase signals RF A and RF B. The centre tap of the secondary winding is grounded to RF by the capacitors and biased to 3V by the two resistors. I found that the capacitors needed to be big in values and the resistors needed to be low in value. The biasing is required to keep the DC voltage level on the CMOS gates between the power rails. The two gates in the mixer are alternatively turned on and off by the two VFO signals (VFO A and VFO B) which are 180 degrees out of phase. For this circuit I used a modified 80-2-40 VFO board to obtain the two signals. The two unused gates are used as an audio gate too disconnect the mixer from the audio amp during transmit. Most circuits I have seen parallel these gates with the mixer gates, but I found no noticeable improvement, and the audio muting system proved very handy.

Generally, mixer theory is explained with the use of complicated maths, but with switching type mixers it can be very intuitive to study them with simple waveform diagrams. I have included three waveform diagrams. I have included three waveform diagrams to show how this mixer works. I have used the term mixer, which is correct in that we are mixing two RF signals, by the configuration is more commonly referred to as a Product Detector as we are producing an audio output rather than an intermediate RF frequency. For ease of explanation the diagrams assume a Continuous Wave RF signal from the antenna and the RF signal level is exaggerated for clarity.

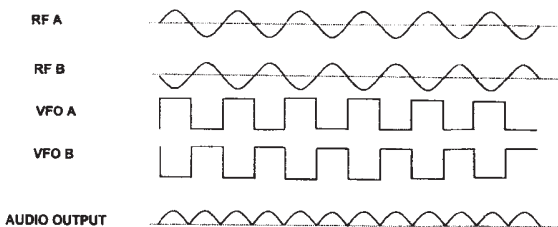
The top diagram shows the output produced when the RF signal from the antenna is the same frequency and in phase with the VFO signal. When VFO A is high, the top gate is turned on and RF A signal is passed to the output. When VFO B is high the bottom gate is turned and the RF b signal is passed to the output. The output signal now resembles a full wave rectified AC signal. The output signal has a constant amplitude and so no audio information is present. This corresponds to a Zero beat situation. A simple low pass filter eliminates the RF carrier component and we are left with a DC signal.

The middle diagram shows the output produced when the RF signal from the antenna is the same frequency but out of phase (90 degrees) with the VFO signal. The gates operate as above. The output signal this time still has a constant amplitude and hence no audio component, however the average DC level is Zero Once again a simple low pass filter eliminates the RF carrier component.

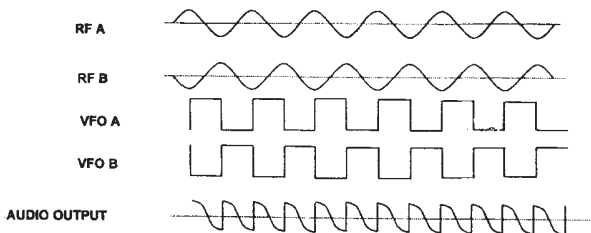
The bottom diagram illustrates the condition where the carrier frequency and the VFO frequency are different. Even though there is a high carrier level component, the amplitude of the output signal is not constant. It can be seen that at some points the average level of the signal is high, and at other points the average level of the signal is low. The result is a varying level signal, which after low pass filtering produces a sine wave with a frequency equal to the difference between the RF and VFO frequencies.

So how does this circuit perform? Well my initial results are very pleasing. There is no sign of receiver blocking or envelope detection. I can tune to a station a few kHz away from a broadcast station and have no problem resolving the weaker SSB station. The only negative is that I have to include 20dB or so of audio gain to compensate for the lack of an active mixer, but this is not impossible. So I am very impressed especially when all my tests were done with the antenna connected directly to the mixer without any pre-selection circuits!

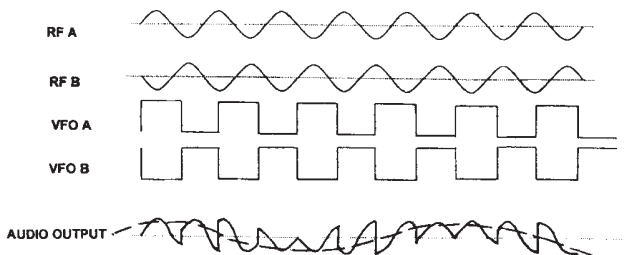
RF and VFO Same Frequency - In Phase



RF and VFO Same Frequency - Out of Phase (90 degrees)



RF with VFO Frequency Offset



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

**FOR SALE:** Epiphyte – 2 (EP-2), 80m SSB transceiver plus digital display, £75. "Hilltopper" 10/14 MHz VXO transceiver (SPRAT 52), £30. Craig G0HDJ, 01458 850373 after 1800.



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### **N.B.T.V.A.**

**The Narrow Bandwidth TV Association** (founded 1975) is dedicated to low definition and mechanical forms of ATV and introduces radio amateurs to TV at an inexpensive level based on home-brew construction. NBTVA should not be confused with SSTV which produces still pictures at a much higher definition. As TV base bandwidth is only about 7kHz, recording of signals on audiocassette is easily achieved. A quarterly 12-page newsletter is produced and an annual exhibition is held in April/May in the East Midlands. If you would like to join, send a crossed cheque/postal order for £4 (or £3 plus a recent SPRAT wrapper) to Dave Gentle, G4RVL, 1 Sunny Hill, Milford, Derbys, DE56 0QR, payable to "NBTVA".

# Getting on the new QRP Internet List - The Easy Way

Tony Fishpool - G4WIF

send to [gqrp-subscribe@onelist.com](mailto:gqrp-subscribe@onelist.com) – to subscribe to the list.  
send to [gqrp-unsubscribe@onelist.com](mailto:gqrp-unsubscribe@onelist.com) – to unsubscribe from the list.  
send to [gqrp-digest@onelist.com](mailto:gqrp-digest@onelist.com) – to switch your subscription to digest mode.  
send to [gqrp-normal@onelist.com](mailto:gqrp-normal@onelist.com) – to switch your subscription to normal mode.

## How to join the mailing list via the Web

Surf over to the web sign up page. <http://www.onelist.com/subscribe/gqrp>  
After registering, you can choose whether you prefer individual mailings, or the digest version.  
**PLEASE make a note of your password!**  
You will be sent an automatic e-mail asking you to confirm that you want to subscribe.  
To post to the mailing list send to [gqrp@onelist.com](mailto:gqrp@onelist.com)  
To leave or temporarily suspend from mailing list:  
Surf over to <http://www.onelist.com/> and after logging in with your e-mail address and password, click on the member centre button. You can change your preferences or unsubscribe from there.

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

**FOR SALE:** Tokyo HT-120 14MHz SSB/CW Mobile, fitted CW filter, ideal QRP £140. AR-1000 Scanner £99, Alinco DR-M06, fitted improved filters £140. All Mint. Boxed. No Offers Please. Mark, GØOIW, Reading. 0118 948 3593 or 070107 144 48.

**FOR SALE:** KW2000 (1 x 6146 PA) + AC PSU. Includes Shure mic, manual & circuit. 2E26 QRP PA valve. £85 ono. G3MFJ QTHR - 0113 267 1070 - [graham.firth@btinternet.com](mailto:graham.firth@btinternet.com)

**AMATEUR RADIO RALLY** St. Mary's Parish Hall Reddish, Stockport - Sat. 11<sup>th</sup> Sept. 10-4 Tables £7 [please book in advance] Refreshments - Talk-in on S22 – Parking, Ring John. G4ILA, for details: 0161-477-6702

## 10-4 Offers From J.A.B.

ICL7660 10 For £10.00	NE555 10 For £2.00	2N7000 10 For £4.90	7805 10 For £3.00
LF351 10 For £4.25	TL062 10 For £4.37	BC182 10 For £0.50	7808 10 For £3.20
LM318 10 For £8.00	TL071 10 For £3.10	BC184 10 For £0.50	78L08 10 For £2.70
LM324 10 For £2.30	TL072 10 For £3.80	BC546 10 For £0.75	LM317T 10 For £3.45
LM358 10 For £1.75	TL074 10 For £3.80	BD140 10 For £2.80	LM723 10 For £4.15
LM386 10 For £7.50	TL082 10 For £2.76	BS107 10 For £2.50	79M12 10 For £1.50
LM741 10 For £1.90	Z8530 10 For £28.00	TIP32A 10 For £2.80	
LM748 10 For £5.20	2N3055 10 For £7.90		

Valid until! 01.10.99 or wsl

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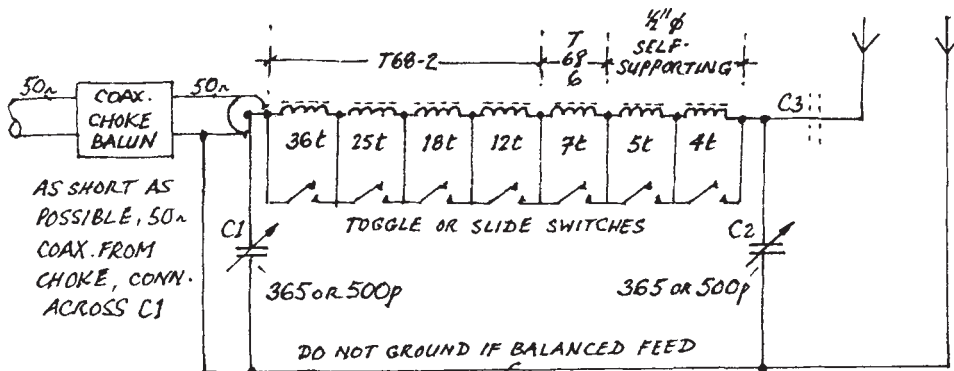
2SC1971 Each £3.20 2SC1972 Each £8.70  
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CFW455F Each £2.25 CFW455HT Ea. £2.25 CFU455E2 Each £1.90 CFU455F2 Ea £1.90

**Post & Packing £1 UK (Export at cost) on items for any order from above list. NO VAT.**  
**Prepaid By post - J.A.B Electronic Components. PO Box 5774, Birmingham. B44 8PJ**

# ANTENNAS - ANECDOTES - AWARDS

Gus Taylor G8PG     37 Pickerill Road, Greasby, Merseyside, L49 3ND

THE LARKHALL - A MULTI-PURPOSE 3.5 TO 50 MHZ ANTENNA COUPLER  
 Tom Sorbie, GM3MXN, 7, High Pleasance, Larkhall, ML9 2HJ, Scotland.



This design owes much to the influence of G3BDQ and W3TS, to whom full acknowledgement is made. The circuit will handle either balanced or unbalanced antennas over the range 3.5 to 50 MHz. To avoid losses the coupler is built in a plastic box. The switches are mounted on the lid of the box, as close to each other as possible. They can be either toggle or slide switches. Each inductor is connected across the terminals of its associated switch. The choke balun can be either an RSGB EMC core fully wound with RG 174 miniature co-ax, or a 3/8 inch ferrite rod wound with 28 turns of RG 58 U co-ax. For work at reasonable power levels C1 and C2 can be ordinary broadcast types. C3 may be necessary with certain direct conversion receivers to prevent broadcast station breakthrough. It can be fitted externally if desired. The coupler is currently used with a doublet antenna having a 105 foot top and 70 feet of 300 ohm balanced feeder. It gives a good match to this antenna on all the bands covered.

NO, HE IS NOT A FRUITCAKE !!!

Some time ago QST published an item on how to make a small battery using a lemon and a couple of pieces of metal. Val, EA1KC, liked the idea, made two batteries of this type, and used them to power a single transistor TX. The power output was too low to be measured, but contact was made with EA1EYH 2 kilometres away ! Can we claim this as a world first I wonder ? Val does not say whether or not the lemons were then sliced and used to flavour the odd gin and tonic ! During WW2 an amateur in Jersey, then under German occupation, used a potatoe and two razor blades to make a detector for receiving BBC stations, so we may yet see the first fruit and vegetable QRP transceiver !

### 300 MILES PLUS PER INCH - THE W5PVF STOREY

Frank, W4LJD, ex-W5PVF tells of a day in the spring of 1950 when he connected the antenna and ground terminals of a modified Command transmitter (40 metre version) together with a three quarter inch length of wire so he could check the keying. The TX was running around 35W dc input. To check the rig Frank sent "CQ de W5PVF" a number of times. Satisfied that the keying was ok he was about to take the phones off when he heard a station calling him. A solid 10 to 15 minute QSO resulted, the other station being in St. Louis, MO, while Frank was in Tulsa, OK, a distance of some 350 miles ! Sadly the recent hurricane in the U.S. took the roof off Frank's house and the resulting flood destroyed his records, so we do not know the call of the other station. We all wish you the very best in recovering from the damage Frank.

### AWARD NEWS

QRP MASTER. Congratulations to the following on being admitted to the Roll. DL1HTX, HB9XY, LA3BX. Well done !

Also congratulations to the following:-

QRP Countries. 200 G3DNF (Well done Mr Chairman !); 75 DL1HTX, LA3BX, HB9XY; 50; G3ZNR.

Worked G QRP Club. 500 G4NBI (Nice !); 220 G3LSW; 200 HB9XY; 160 G0UTF, 60; LA3BX, G3ZNR.

Two-way QRP Award. 40 HB9XY, 20; G3ZNR, LA3BX, DL7GK.

### THE G3OEP G5RV OPTIMISED FOR 7 AND 21 MHZ

David Buddery, G3OEP, 33, Addison Rd, Goreston, Great Yarmouth, NR31 OPA.

The antenna consists of two, 60 foot lengths of plastic covered galvanised iron garden wire (galvanised wire has a very low rf resistance and it is cheap!) In each length 34 feet is used for half of the top of the antenna and 24 feet for the open wire feeder. The two sections are separated by a 2 inch spacer at the centre of the top, and similar spacers at 2 foot intervals in the feeder section. Where each wire is passed through the centre separator it is bound in place with smaller gauge wire so that a continuous length can be used. The bottom of the feeder section is connected to the atu via a length of 72 ohm balanced feeder. Results are good on 7 and 21 MHz, and with the feeders strapped together it is quite good on 3.5 and 1.8 MHz. It is worth noting that galvanised wire is also good for radial systems.

WE NEED MORE INFO FROM YOU ABOUT YOUR ANTENNA SYSTEMS AND IDEAS !

Sorry AAA is rather short this time, but our Rev Editor is off to the good old U.S. of A and the deadline has been brought forward. We hope to resume normal service in the next SPRAT. 72 es 73 to everyone.

## COMMUNICATIONS AND CONTESTS

**Peter Barville G3XJS, 40 Watchet Lane, Holmer Green,  
High Wycombe, Bucks HP15 6UG.  
E-mail: peter@barville.demon.co.uk Packet: g3xjs@gb7avm**

I knew I'd leave out somebody, and I'm afraid that my first task is to apologise to Ted, KF8EE, for omitting to include him in the list (SPRAT 98) of Winter Sports entrants. I must also mention the AGCW Summer '98 Contest because Dave, PA3HBB/G0BZF (Club Nr 3677), is the proud winner of the QRP section, and our congratulations go to him. I don't have full details of results from AGCW, but can supply a copy of the December 1998 'O QRP' Contest results (and those from the November 1998 HOT Party) on receipt of an ssac.

I can also supply details of the 'Worked UR-QRP Club Award'. My thanks to Peter, US1REO, who has sent the information to me via a packet link.

### 1999 CZEBRIS

In common with some of the other events in our QRP Calendar, it would have been nice to see more members supporting this contest. However, it seems there **are** other things in life apart from QRP (can that really be possible?), and I was one of those unable to join the fun. My thanks, therefore, go to G3ESP, G4MQC, G4MRH and M0ANQ for their entries.

Ron, G4MRH, comments that this is his first entry in a Club event, but adds that he hopes to enter more later in the year. I hope he does, because it is a case of "first time lucky" for Ron, who is the CZEBRIS winner this year. He used his homebrew Howes 2000, and Ten Tec Argosy, with an 80m dipole to work 45 stations, scoring a total of 111 points. Many congratulations Ron; keep up the good work.

It would appear that activity levels during the event were not so good, with OK and OM stations sometimes hard to find. Should we keep this as a 'Friday to Sunday' event in the future, or might it be better to concentrate the activity into a shorter period? Perhaps you would like to let me have your opinions .. please.

Because the deadline for this issue has had to be brought forward a couple of weeks, I am unable to bring you the results of this year's **Somerset Homebrew Contest**, but will do so in the next issue.

I am (as I write this) about to spend what I am sure will be an enjoyable weekend in Sherborne, for the Yeovil QRP Convention (and Dinner). Space permitting, I also hope to include a report of this event in the next SPRAT.

The deadline for the next issue is the beginning of August. As the summer period approaches, it may be that you are planning a QRP operation from a holiday location. If you would like to let me know, I will do my best to give you some advanced publicity, so that as many as possible will have the chance to have a qso with you. Enjoy your QRPing.



## ONE WATT WEEK

Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Nr. Treharris, CF46 6DB

Since becoming an avid QRper, I have like many others often reduced power to milliwatt levels, sometimes in the course of an ongoing contact. but other times calling CQ with milliwatts. I've taken an interest in 'milliwatting' ever since discovering the 'delights of QRP'. and have carried out experiments particularly on the 160m band just to discover for myself what sort of distances can be covered.

However, at the end of last year, I decided to use nothing but powers of 1 watt and less for an entire week, to see what could be achieved with such low power levels. I tend to operate on four bands in the main, these being 160, 80, 17 and the 10m bands. The antennas here are a 60m long wire at about 50 feet at the highest point, plus 17m and 10m wire dipoles, both at around 5 metres up, with my operating times varying from 05.30 to 2200 or thereabouts.

I've built up a picture over the years as to what can be expected of milliwatting on the bands, although I must admit that 'QRPPing' has previously been a periodical 'break' so to speak from my high power work at 5 watts. So deciding to spend a week using only milliwatt power levels seemed like a bit of a challenge.

During the 7 day period, using c.w. on the 160m band I managed to work F5IN with just 50mW, DL1ROJ and GD4UOL with 100mW, OK1RP with 300mW, and SM4JS/QRP, HB9HFR, IR4T, and LX4B with 500mW.

Early mornings on the 80m band gave milliwatt c.w. contacts with W1CFZ in Florida at 1 watt for a nice surprise, as well as OH8AAS and DL8COG, both at 500mW.

Up on the 17m band, 200mW c.w. gave me a contact with OM6CH and DL7UDG, 250mW with OK1XW, while SM7CZL was worked with 500mW. On s.s.b., 1 watt brought a contact with IZ2ACZ

On the 10m band I gave sideband a go, hooking up with UR7QR at 500mW p.e.p., SV1CQN, Z31FK, and UR5EP, all with 1 watt p.e.p., while 1 watt of c.w. hooked up with KG2M.

All in all a total of 21 QRPP QSO's, not a great deal for seven days, but in that week I estimate that I didn't spend more than 8 hours actually operating. The country total was 14 countries, not bad for 1 watt maximum and a few wire antennas!

Lately I've been finding that my operating habits are becoming inclined to lower and lower power, and as soon as I switch on the rig, I find myself automatically setting the power control to 300mW or even lower! Not only that, but my subconscious keeps telling me that 5 watts is an disgustingly extravagant waste of RF power and I start feeling guilty about it! Can somebody recommend a good psychiatrist?!!!

## NOVICE NEWS Steve Ortmayer G4RAW

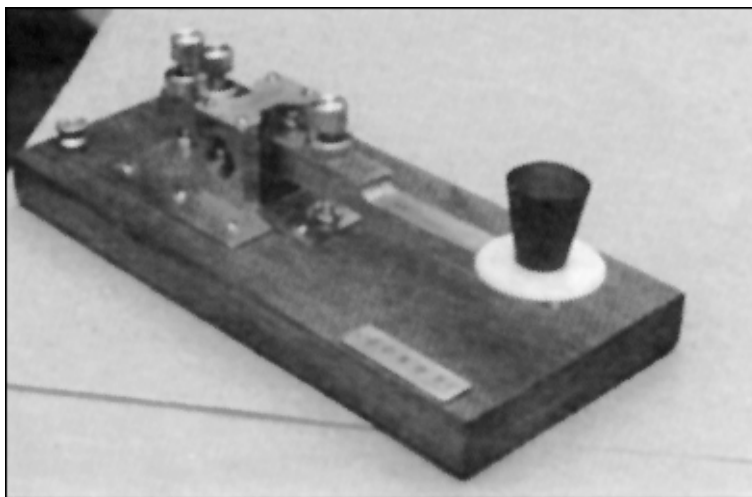
14 The Crescent, Hipperholme, Halifax. HX3 8NQ. Tel: 01422-203062

ERRATA CORRIGE : I7PXY indicates an error in the output filter of Pixie 2 in the last issue. It should have 13 turns, not 35 as shown.

Ron 2E0AIS has a slight problem with his personal audio equipment. This means that the sermon in church is often not clear. Well Ron - I have reasonably good ears and the sermon is not often clear to me! Ron was hoping to try a telephone pick-up coil to an amp and headphones, hoping that the coil would pick up from the church loop system. Ron is making an amp with a loop wound on a piece of wood, so would be interested to know if any other member has made similar equipment. Dare I suggest a switch between 20m CW and the sermon!! (only joking???)

Ron has sent a photograph - see below - of a fine Morse key he has made. Ron has made several similar keys and this one is used by G0RDF, the Morse Examiner in Chesterfield.

CQ DX - Now that the bands are on the up - I wonder if any novice member has worked some good DX - Please let me know.



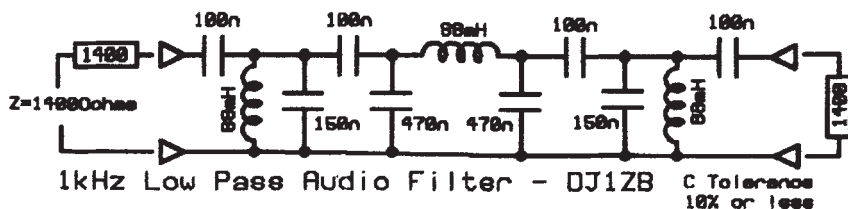
MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

FOR SALE: Ten-Tec Argosy II 50w/5w transceiver (Model 525 D), with original manual, power supply and (unused) desk microphone. Good CW rig with xtal/audio filters and full break-in. Price £440 plus carriage/packing at cost (but free personal delivery possible up to 75 miles). Tony Smith G4FAI, tel: 01263 821936 (Sheringham, Norfolk). E-mail: g4fai@connectfree.co.uk

FOR SALE: KW2000B, ac psu + spkr. Manuals and cct diagram, mic and some spare valves (not pa) - £130. MFJ portable antenna, complete - cables, base box and whip, see <http://www.mfjenterprises.com/antennas/mfj1621.html> for full details. £30 Contact Ken, G4SGF (0114) 230 2352 or via [ken@klat.freemove.co.uk](mailto:ken@klat.freemove.co.uk)

## A 1kHz Passive Audio Filter

Ha- Jo Brandt DJ1ZB Eichenweg 7, Frontenhausen, D-84160, GERMANY



I have designed (employing the ARRL Radio Designer) a passive a. f. filter for CW using 88 mH toroids, this time for 1 kHz with a passband of +/-100 Hz. The 1 kHz centre frequency was necessary because a SSB and CW HF transceiver (SEG15) of the former East German army, now being very popular among German radio amateurs and equipped with an SSB filter only, can really be operated in transceive only in CW if the a. f. output frequency is at 1 kHz. The filter should be fed and loaded with a 1400 ohms (+/- 200 Ohms) source and load. DL2RM, G-QRP-C member 5975, living in the vicinity of me, owns this equipment and has initiated this work. I have designed (employing the ARRL Radio Designer) a passive a. f. filter for CW using 88 mH toroids, this time for 1 kHz with a passband of +/-100 Hz. The 1 kHz centre frequency was necessary because a SSB and CW HF transceiver (SEG15) of the former East German army, now being very popular among German radio amateurs and equipped with an SSB filter only, can really be operated in transceive only in CW if the a. f. output frequency is at 1 kHz. The filter should be fed and loaded with a 1400 ohms (+/- 200 Ohms) source and load. DL2RM, G-QRP-C member 5975, living in the vicinity of me, owns this equipment and has initiated this work.

### The G3YCC QRP WebPage Has Moved....

Frank's very informative WebPage can now be found on <http://www.karoo.co.uk/g3ycc>  
His new email address [for club sales information etc.] is [frank@g3ycc.karoo.co.uk](mailto:frank@g3ycc.karoo.co.uk)

### New Post Code for G8PG - G-QRP CLUB AWARDS MANAGER

**Mr. A.D. Taylor G8PG, 37 Pickerill Road, Greasby, Merseyside, CH49 3ND**

**OOPS! ...** The article in the last issue on **Mad VFO Disease** ascribed to Ted, G3HKU, was in fact written by **Gerald Stancey G3MCK**.

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

**For Sale:** Brand new 88mH chokes - £1 each inc. postage (UK) – G4WIF – 01322 228429

**For Sale:** Howes VOGAD mike module built with instructions £5.00. Howes AP3 speech processor module cased, untested £5.00 Maplin cycle alarm cased untested £2.50. 3 watt germanium transistor audio amplifier £1.95. Kanga DSB generator unopened, unbuilt kit £4.00 VU mini Tx £4.50. Weller 40 watt mains soldering iron £9.50. YEOVIL transceiver manual £1.50. 8 Ohm 2" speakers 2 for 50p. Earphones 10p, mini walkman headphones 45p. Open to offers, please call David G6UEB on 01322 381084, or write to D Rowlands, 7 Broomfield Road, Swanscombe, Kent, DA10 0LU.

# Celticon 2000

**The Millenium QRP Event  
September 1 - 2 - 3, 2000**

**Marino Institute of Education - Dublin**

**QRP Programme by the G QRP Club - Hosted by the Marino Institute  
A Full Programme over Saturday/Sunday 2<sup>nd</sup>, 3<sup>rd</sup> September  
(Reception and Welcome on Friday Evening)**

**60 Residential Places available at the Marino Institute**

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**For information about booking please contact:**

**Sile Boylan, Marino Institute of Education, Griffith Avenue, Dublin 9**

**Tel: +353 [0] 1 8335111. Fax: +353 [0] 1 8369264**

**email: sboylan@mie.ie**

**web: www.mie.ie**

**Why not combine a holiday in Ireland with a QRP Convention?**



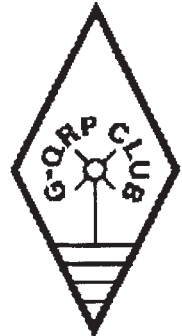
The Marino Institute of Education is set in its own grounds in the north of Dublin, close to the airport. It is the Dublin house of the Christian Brothers and a Teacher Training College with full conference facilities and single & twin accommodation.

There is a frequent bus service from the gates into the centre of Dublin - ideal for wives and family members to enjoy Dublin during the QRP events.

The G QRP CLUB is the largest QRP organisation in the world, drawing members from over 50 countries.

The club will be responsible for the QRP events at CELTICON 200.

This will include a full programme of lectures and workshop sessions. We hope to attract QRP traders to sell a range of kits and components. The resident amateur radio station at the Marino Institute will be available with a special callsign. Not least of all will be the chance to meet and talk with other QRP operators and enjoy good company in the attractive surroundings.



# MEMBERS' NEWS



## by Chris Page G4BUE

*Highcroft Farmhouse, Gay Street,  
Pulborough, West Sussex RH20 2HJ.  
Tel: 01798 815711 Fax: 01798 813054  
E-mail: g4bue@infinnet.co.uk  
Packet: GB7DXS on UK DX PacketCluster*

Please note my new e-mail address.

**G3SES** asked me at the beginning of May if I had listened between 14059 and 14063kHz recently? He was referring to the band occupied "by some form of data mode QSOs...and it has made QRP operating around 14060kHz very difficult". Phil correctly says the IARU Region 1 band plan below 14070kHz is CW only and while ago PSK31 started being used around 14070kHz, below RTTY. More recently Feld-Hell, a new mode, has started being used below 14070kHz, in fact right down to 14060kHz.

I have been in contact with **G3ZNU**, Chairman of the RSGB's IARU Committee; **GØRDI**, Chairman of the RSGB's Data Communication Committee (DCC) and **G3PSM**, the RSGB's HF Manager about it. Whilst they all acknowledge the 'problem' they disagree on how it should be dealt with. **GØRDI**, rather predictably, says "the problem is going to get worse (possibly much worse) before it gets better, and the resolution can only be to allocate more spectrum to digital modes. This means that someone is going to lose some allocation..." which would most likely be CW, including the QRP frequency). Iain adds that **MIØBME** (Secretary of DCC) "began a project to investigate what (if anything) RSGB and DCC

might do to alleviate the problem", but I have not been able to obtain a progress report from him to report here. **G3PSM** has asked for details of offending stations to be passed to him (which I have done) so he can be prepared for the next IARU Region 1 Conference in September, when the band plan will be discussed. Colin says "some fairly radical concepts are being put forward" at the conference..

I put a copy of **G3SES's** message, together with the replies from **G3XNU**, **G3PSM** and **GØRDI** on the Internet G-QRP Reflector and suggested other QRPers contact them to express their views about the use of 14060kHz by data mode stations and pass details of offending stations to **G3PSM**. Sadly I have to report that I received only one reply (from **G3XJS**) about the matter. Are **G3SES**, **G3XJS** and me the only Internet users concerned about the possibility of us losing the use of 14060kHz to data communications? And bear in mind that what happens on 14060 could also happen on 21060 and 28060kHz (I have already seen RTTY spots on the DX Packet Cluster down to 21070kHz).



**DL4OBN** uses a Hammarlund SP-600 JX21 receiver and a Collins R-390/URR receiver (see photograph above), both "excellent HF receivers", he says. Thomas uses the T-390 for the amateur bands and the SP-600 for broadcast DXing as "it is a real great bandcruiser" and says he has not shown his SG-2020 or Century 22 that he uses for QRP work in the photograph as everyone knows what they look like!

Do you use a straight key? If you do then



**Robin, G4GIY, in his shack, behind him (top shelf) is a DTR3 (behind his shoulder), sundry SWR meters and RF analyser etc, FT290 and TNC for packet and a balanced ATU. On the bottom shelf is an IC-756, OHR Spirit and MFJ tuner on top, FC-902 ATU and a converted CB rig for 10m FM.**

make a note of 17 September when the annual Edgeware Straight Key Evening is being held for the 18th time GØSTR says the event is to promote the use of the straight key and all amateurs are invited to join in. The Edgeware Club will be QRV as **GB2SKE** and **GX3ASR** on 3550kHz and above from 1800z. Further information from Bill (0181 958 1255).

Congratulations to **G4EDX** on his purchase of Kanga Products from GØBPS. John's address is Sandford Works, Cobden Street, Long Eaton, Nottingham. NG10 1BL; telephone 0115 967 0918 and e-mail <sales@kanga.demon.co.uk>. Congratulations also to John on his marriage to Kathy. We wish you both the best of luck. Another member we wish good luck to is **G4VPM**, who with his family flew to California on 15 May to start a new job. Andy says he will be QRV as "W6 or K6 or N6 something or other" as soon as he gets settled into a QTH.

**VE3JC** does most of his bike QRP mobiling (p.37 SPRAT 97) in casual after-dinner or weekend rides and has managed to have CW QSOs on all bands from 80-10m. John says the two-way QRP QSO with **G3MJX** was "the true highlight, however". **G4GIY** uses a IC-706 for mobile / caravan use and an IC-756 for home in addition to

his QRP equipment (see photograph). Robin says his most notable recent achievements are **QSOing LY2FE** with 1W on 80m and **K2QJ** in New Jersey with 3W on 30m, QSOing ZS on 15m SSB while driving home from work and completing the London Marathon in 3 hours and 4 minutes!



**GØSTR** will be QRV 0000-0500z 12/25 August as **J3/GØSTR** on 14060 and 7030kHz with 5W while visiting his wife's family. 'Spotted' on the UK DX Packet Cluster on 25 May at 2141z was **CX3EY** running 2W on 14004kHz and on 26 May at 0139 was **DJ7YP/OA7** running 5W on 14180kHz. **DJ7ST** will be QRV 2/20 August as **OHØ/DJ7ST**, QRP including the WARC bands. While **G3ESP** was searching for points in this year's CZEBRIS, he worked **WB3JKK** on 28060kHz who was running 1W from solar power to a 3-ele tri-band beam. Walter was using 5W to a dipole and was very pleased with his 579 report.

During a QRP DXpedition on the Core Banks, North Carolina, the KnightLites QRP Club were QRV as **WQ4RP** and made a successful QRPP test on 80m CW with a German team, **DF2OK**, in the Lower Saxony between 27 and 28 March. Between 0200 and 0600z they made two-way QRP QSOs on 3556kHz at 5W down to 1W using a K2 in the USA and a Sierra with DL-QRP-PA in Germany. Both reports started at 339 and ended with 559. The aim of the tests was to make a two-way QSO across the Atlantic with the SMiTE, the SMD-Kit-Version of the Pixie 2, designed by KnightLites. On the first day both stations



**PA3HBB** was QRV 1/8 May as **EA5/PA3HBB** and **EA5/GØBZF** with his SW-40 (by Small Wonder Labs) and dipole wrapped around the villa. David made 49 QSOs all over Europe running the entire set-up from a 7Ah dry-fit battery. He said the “QSK function really works well and the filtering was superb even late at night on 40m”. The RX was more sensitive than the TX had power for and he called a number of stations who never heard him, though they sounded 599 with him. David successfully connected the rig to a pair of amplified computer speakers (50W of audio!) and says, “it did seem ironic that I had 50 times more power in my speakers than in my rig!”.

alternately received with the 250mW signal of the SMiTE with the K2 and the Sierra. Reports from 119 to 219 were received on both sides. On the second day **WQ4RP** received the **DF2OK** signals from the SMiTe with their own SMiTe! The BCI in Germany made receiving with the SMiTe impossible. The distance between the stations was 4240 miles (6822km) and equates to 16,960 miles per watt for the 250 mW signal! **WQ4RP** used a two element phased vertical array directed at Europe and **DF2OK** used a 9m fishing rod vertical with 43m wire wound on it and both stations had a very good ground system.

Until **G8PP**'s local Council replaced the windows in his first floor bed-sit with modern uvc ones, Les operated with an AOG ('Act of God') antenna. The window was seven feet square window and divided into five panes by metal framework. Les ran a length of wire, four feet long, from his TS-140S to the metal window catch and found it loaded on 20m with 100W without any TVI (the TV was only 30 inches from the window!), but with TVI on the other HF bands. A CQ on 20m resulted in an answer from **WIDMD** and a 569 report. Nowadays Les uses a mobile whip which he pushes out of the window.



**PA3HBB's rig with which David was QRV as EA5/PA3HBB and EA5/GØBZF with.**

Have a nice summer (hopefully with higher suns pots), and let me know how it goes, by 20 August please.

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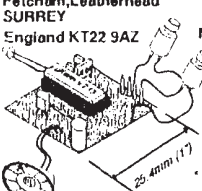
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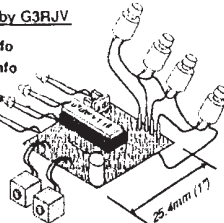
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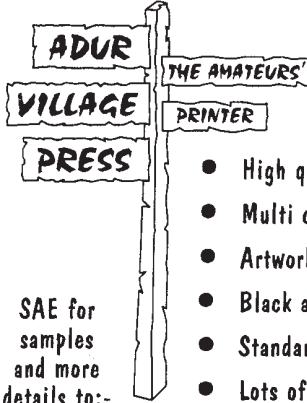


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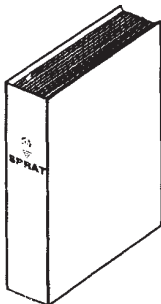
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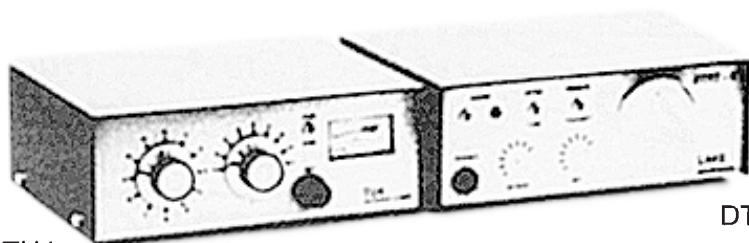
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