SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 123	© G-QRP-CLUB	SUMMER 2005

Club Members F5DOG, F5CFN, F6EPW, F6GNK, F5RQG at ISERAMAT 2005

Mini-Convention 2005 ~ Audio Derived AGC ~ Linear Amp Revival
G3EJS 2-Tuner ~ XYF43 Valve VFO ~ LP Filter Simulations
CARS Construction Challenge ~ Fast Huff & Puff ~ Brencher
Talent Audit ~ Experimental Z-Match ~ Antennas-Anecdotes-Awards
Communications & Contests News ~ Member's News ~ Club Sales

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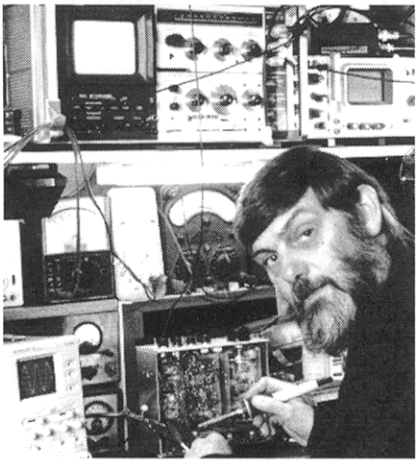

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Rev. George Dobbs G3RJV

Welcome to SPRAT 123 – I write this on a warm sunny day - just having returned from the Dayton Hamvention . The Four Days in May (FDIM) QRP event was particularly well attended and good this year. If you have never attended, it is something well worth considering.

Good luck with your antenna work and, perhaps, portable operation in the coming summer months. I hope to do some operating as GW3RJV/P so I may see you on the bands.

The W1FB Memorial Award 2005

For 2005, the theme is **Portable Operation**

Submit any design on this theme – accessories, antennas, measuring equipment ... or even a complete transceiver.

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

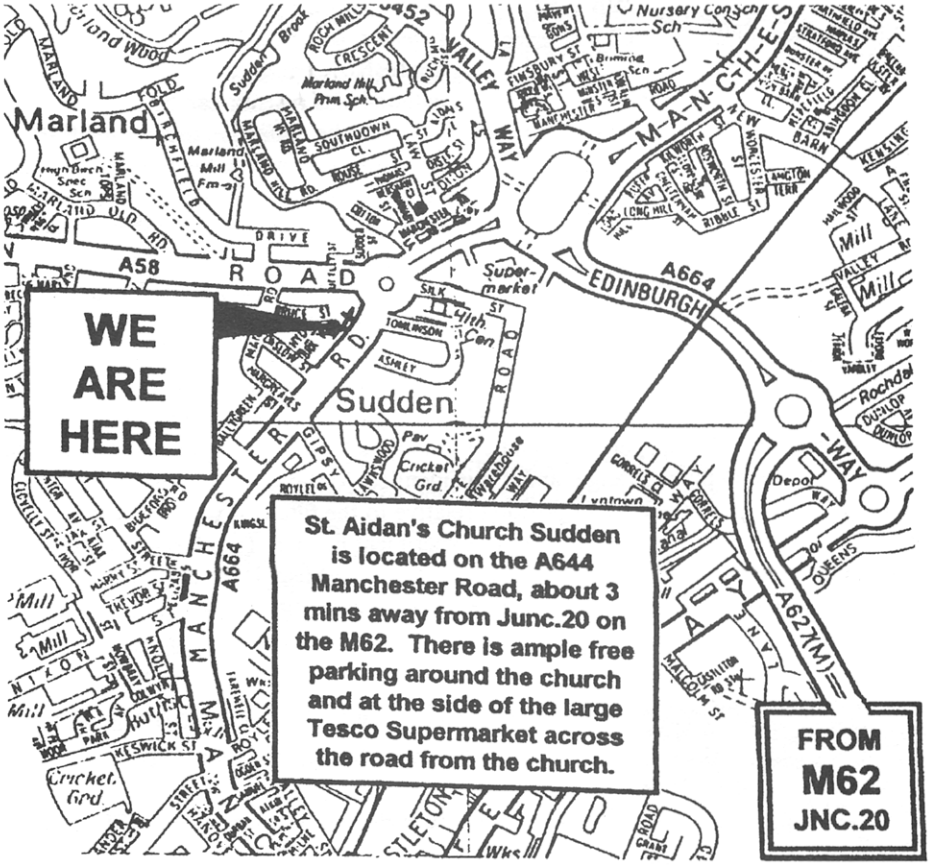
The project will be published in SPRAT and the winner will receive an engraved plaque.

72/3

G3RJV

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK
Printed & Distributed by G QRP Postal Mailing

THE G QRP CLUB
MINI-CONVENTION
SATURDAY 8th OCTOBER 2005
ST. AIDAN'S HALL SUDDEN ROCHDALE
ADMISSION £1 - DOORS OPEN 10am - TALKIN S22
LARGE SOCIAL AREA - LECTURES ON QRP SUBJECTS
BRING & BUY - SURPLUS - JUNK - COMPONENTS - KIT TRADERS
FOOD & DRINK ALL DAY - INCLUDING THE FAMOUS PIE AND PEAS

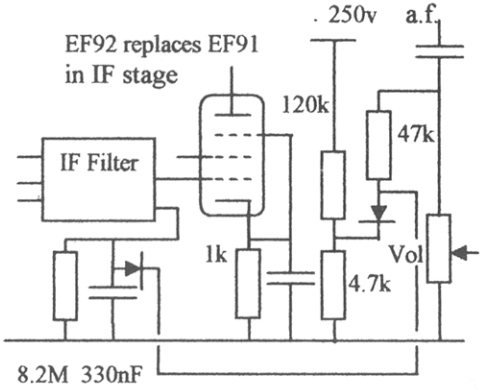


LOCAL ACCOMMODATION: The Royal Toby Lodge - Tel: 01706 - 861861.
Oakenrod House : 01706 – 642115 ~ The Norton Grange Hotel : 01706 – 630788
Also within close range of the site :
Travel Inn (Rochdale) about 10 min away 01706-299999. www.travelinn.co.uk
Couples/Families: www.hollingworthlake.com : lakeside guest house - edge of town

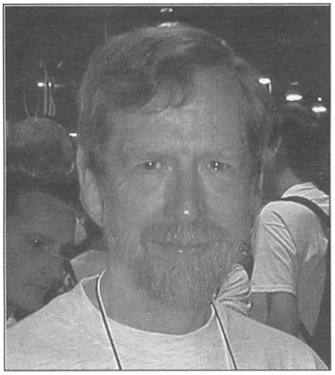
Delayed Audio-Derived AGC for the Retro Receiver.

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

Since the original 'retro' article was written, the author has had an opportunity to evaluate the receiver under a wide range of 40m band conditions. Th receiver is very sensitive, and the front end handles exceptionally strong signals fautlessly. But the original design has fixed IF gain, with the result that very strong in-band signals can saturate the 6BN6 second mixer, producing audio distortion. The IF gain could be reduced in a variety of ways, but a better approach is to add delayed, audio-derived AGC as shown below.



While reviewing the design of this receiver, some further details concerning the 6BN6 were noted. Firstly, a variable cathode bias resistor can be used to optimise the dynamic range of the SSB detector by adjusting the bias point to the centre of the linear range of the signal grid (g1). It is worth tweaking this resistor if the IF gain is fixed, but adjustment is probably unnecessary if AGC is used. Secondly, if an inductor is inserted into the anode circuit, and a crystal is connected between g3 and ground (with a shunt resistor), the 6BN6 will activate the crystal and become a self-oscillating mixer. This is useful if a 'proper' sideband crystal is available. But in this application the crystal has very limited pulling range, and if it is identical to those used in the IF filter it cannot be pulled down to the correct position relative to the filter for carrier insertion. What a pity ! Interested readers might like to experiment further. Two fascinating articles on the 6BN6 can be found at http://www.one-electron.com/Misc_Docs.html while data sheets for all tubes can be found at http://www.tubecollector.org/list.php



Rochdale QRP Convention 2005
Saturday October 8th

We are pleased to welcome Roy Lewallen, W7EL, as our special guest speaker at this year's Rochdale Convention. Roy is well known as the designer of the EZNEC Antenna Software and for his classic design "The W7EL Optimised Transceiver. Roy has been a member, and good friend, of the club for many years and is an avid QRP field day operator.

A Speaker not to miss!

15-20 Watt Linear Amplifier Revival.

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

This circuit was first shown in Radio and Electronics World Magazine in September 1973 issue and also appeared in 'kit form' by Cirkit Distributors, an electronic company that no longer exists, it's most notably used in G3TSO's HF homebrew rig in the Radio Communications Handbook, his articles promoted many an idea - his web site well worth a visit and later used by Hands Electronics. This design uses the cheaper 2SC1969 pa transistors instead of the 2SC1945 as used in the original, requiring a different layout, the amplifier has been around a long time and used by many.

I take no credit for the design here but felt a 'revival' was in order as I was looking for a 'linear amplifier' for use in a proposed HF rig, seeing that there aren't that many linear amplifiers about and that such details may be useful to other constructors.

The unit is capable of excellent performance and stability producing around 15 Watts of RF output into a 50 ohm load from 1.6 to 30 Mhz with as little as 1 milliwatt input, not being all that expensive to build, it's construction requires a modest amount of care and ability due to the compact size of the PCB (3" x 5").

In this design the collector leads of both driver and power transistors, that is the middle leg are carefully snipped or bent off (COE style at it's best) as the connections are made with a solder tag between the tab's and insulating washer's, both driver and power transistors need to be insulated from the heat sink with readily available insulating kits. The pre-amplifier transistor ZTX327 is no longer available, but do not let this hinder the design being used, a 2N3866 could be used without any loss in performance and no doubt a 2N2222A transistor could be used, if a Watt or so is available from an exciter there is no reason why Q1 can't be removed and the input then taken to T1, this could easily be done by adjusting the turns ration on T1 primary, the gain can be 'trimmed' somewhat by reducing the value of R3 in Q1's emitter to 5.6 ohms this will increase the gain whilst increasing the value will reduce it.

Q1 is usually fed from the band pass filters after the final TX mixer where the signal level is very low at around a milliwatt. A much better choice of transistors for Q6 & Q8 is BC547/8 rather than a rounded BC107, as the BC547 has a flat side and more easily mounted on the power transistor to aid thermal tracking.

Construction.

If you make your own board a good tip is to drill only the NON grounded holes first so you can easily counter sink the holes on the plain copper side so the component leads are not shorting to ground, when all these have been done all the earthing holes can then be drilled – these do not need countersinking, don't forget to cover the ground plane side prior to etching as this copper is wanted, I use modelling paint

To avoid drilling (a boring job) why not build the amplifier SMD style with standard components – that is with the components soldered on the track-side and the copper plane facing down. To do this the PCB tracing would have to be reversed before printing onto Press n' Peel, this can usually be done in the printer menu, the holes could be blacked out if one wished. Print reversal has to be done because the connections on the power transistors will be on the wrong side in this case.

Before mounting any components, ensure the 15 soldered thru links are made bending the wire flat to the board at both ends, don't use too thin a wire, the solid inner core of TV coax is most suitable, it's advisable to solder component's that are grounded both above and below the board to aid grounding.

R3 in Q1's emitter is mounted vertically. Do not omit the wire link marked X, this connects FB3 to the +VE supply and may be ran under the PCB keeping it out of sight. To keep the amplifier nice n' slim the BD139's can be mounted laying flat on the board with piece of insulating material between the transistor and the PCB, I used a piece plastic card glued to the board just to fit under the transistor, a bit of single sided PCB would do just as good so the collector is not in direct contact with the PCB, T1, T2 and T3 should be spaced from the board likewise. The ferrite links FB1 to 5 are made up of two beads to each link.

Leave the +VE 13V end of FB4 and FB5 disconnected

Before mounting the four power transistors to the heat sink all the surfaces must be clean, burr and scratch free, if you are using the mica insulating kits you need to use heat sink compound – just a smear to both surfaces and no more, those grey impregnated woven looking insulators you do not need any compound at all on these, but ensure they are new and not been used, using a little though will help keep the pads in place whilst mounting, you will need to use solder tags between the plastic washer and the metal tab and do not over-tighten

Mounting the four transistors appears to be difficult because they have to be soldered underneath prior to mounting – not so. You could bend the leads at right angles, poke them through the holes keeping them on a flat surface and first solder the emitter lead on the upper side to help keep them in place, or you can bend the leads into a 'inverted U ' formation and push them through the top side, another easy way is to bend the leads up and use 22SWG tinned copper wire links from the PCB, these links can come from above or below the board keeping them as short as practical, this way the transistors can be mounted on the heat sinks the board placed on top and then soldered, in all cases remember not to let the base leads touch the copper ground plane and ideally the emitters should be soldered on both sides of the board. Whatever method is adopted remember to use spacers when screwing the board down, when completed check again between collector and heat sink for shorts with a test meter.

Pre Checks:

Turn both VR1 and VR2 fully anticlockwise and apply power to the board, the current drawn should be around 100mA, if not switch off and check for faults, otherwise check the base voltage of Q2 & Q3, this should vary between 0.6 to 0.8V as VR1 is turned, Q4 & Q5 should do the same when VR2 is turned, this indicates the bias supply is working, turn VR1 & VR2 back fully anticlockwise.

If all is well current consumption should be less than 200mA with about 11.3V at Q1 collector with respect to ground with a 13.8 Volt supply, turn off and disconnect when completed.

Connect a multi meter to FB4 and HT and adjust VR1 for 20mA on the current range, leave this for ten minutes re-adjusting VR1 if required, turn off and disconnect when completed. Connect a multi meter to FB5 and HT and adjust VR2 for 100mA, again leave for 10 minutes re-adjusting VR2 if required. Turn off and connect both FB4 and FB5 into position. The entire amplifier is now ready for testing.

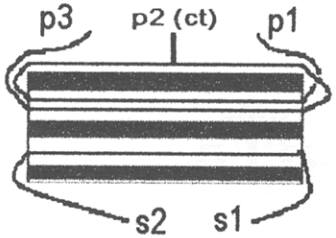
Connect a 50-ohm dummy load and power meter to the output, short the RF input to ground with a wire link and apply power. No reading on the power meter should be observed indicating that there are no spurious oscillations or instability. The power amplifier should be left on for 10 minutes to monitor the current consumption, which should not increase dramatically. The amplifier can now be connected to a low level signal and ready for use, not forgetting to use a low pass filter on the output for the band in use.

Coil Winding.

T1
Primary 6 turns

Secondary 2 turns

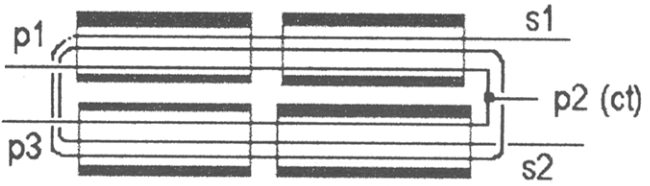
Use 0.25mm enamelled copper wire on Fair-Rite balun core type 28-43002402.



T2
Primary 2 turns centre-tapped

Secondary 1 turn

Use solid core PVC 1x0.6mm PVC insulated on Fair-Rite ferrite sleeve type 26-43006301



T3
Primary
1 turn centre-tapped

Secondary 2 turns

Use solid core PVC 1x0.6mm PVC insulated; cores used – 4 Fair-Rite sleeves type 26-43006301 arranged as shown (two by two). The cores can be cemented together or held in place by heat shrink sleeving.

Performance.

Power in (mW)	Power out (W)	Power Gain (db)
1.00	15.0	42
0.32	5.9	42
0.12	1.5	42
0.03	0.4	42

Parts List.

Components:

Resistors. All 0.25W unless stated.

R1, R5	100R	
R13, R14	100R	1Watt Carbon or metal film
R2	680R	
R3	12R	
R4	4k7	
R6	56R	
R7, R8	33R	
R9, R10	120R	
R11, R12	22R	
R15	10K	
R18	6K8	(was 10K in original circuit)
R16	150R	0.5 Watt
R19	100R	0.5 Watt
R17	330R	
R20	220R	
VR1, VR2	100R	Preset

Capacitors.

C1, 3, 6, 7, 11, 12, 16, 17, 19, 20	10nF disc ceramic
C13	220pF mica
C2	270pF
C8	68pF mica
C4, 9, 14, 24, 25	100nF disc ceramic
C5, 10, 15, 22	10uF/25V tantalum
C18, 21, 23	470uF/ 16V (ideally hi- temp low ESR types)

Semiconductors.

Q1	ZTX327, ZTX3866, 2N3866
Q2, Q3	2SC2166
Q4, Q5	2SC1969
Q6, Q8	BD139
Q7, Q9	ZTX108, BC108, BC548

Inductors.

RFC1, 2, 3, 4	100uH Axial RF choke
L5, L6	1.8uH (1u8) 7BS fixed inductor. Toko 283AS-1R8

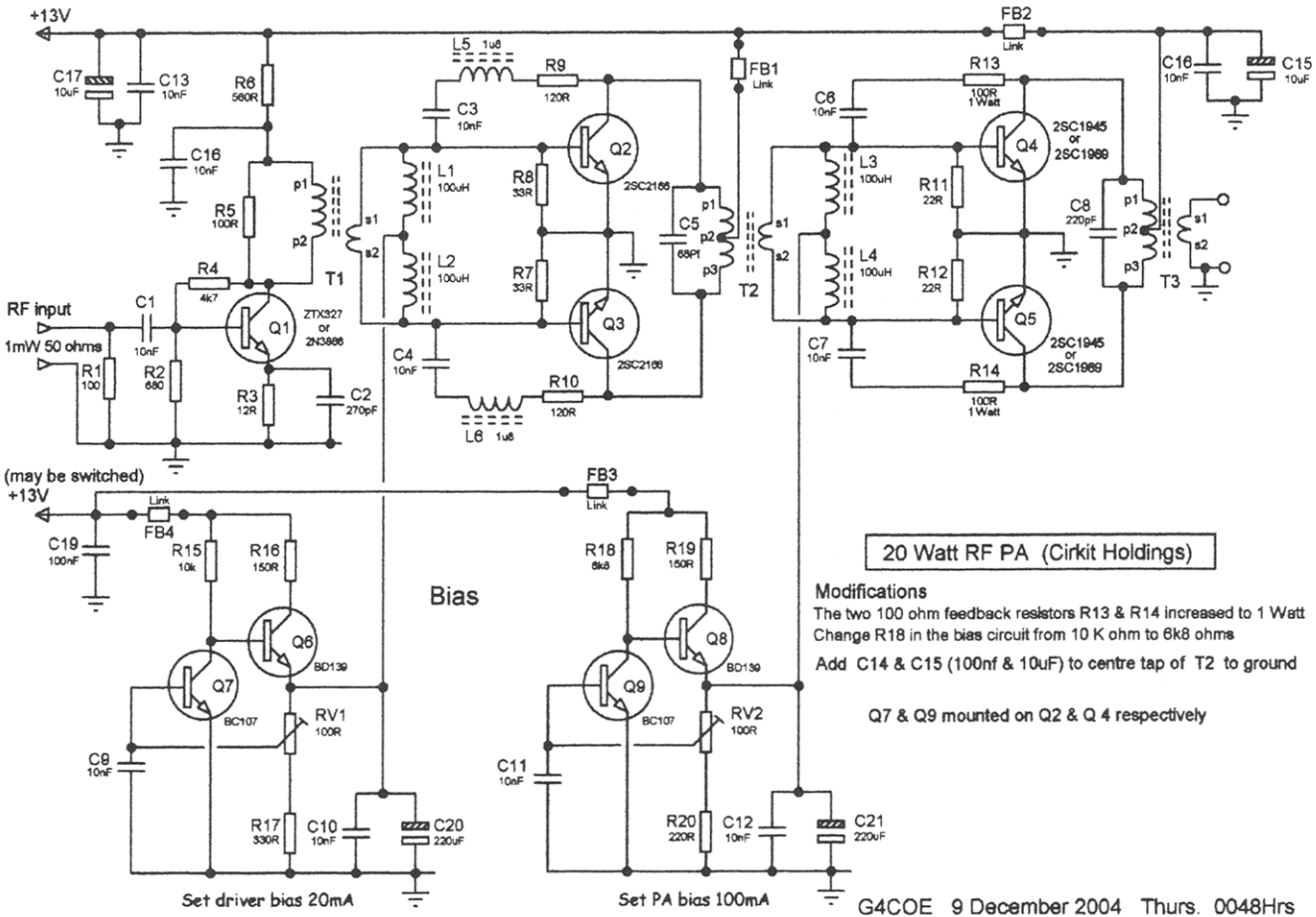
Ferrites.

Fair-Rite 28-43002402 Balun Core (T1)
Fair-Rite 26-43006301 (5 off – ForT2 & T3)
Fair-Rite 26-43000101 (8 off Ferrite beads – 2 used on each link).

Miscellaneous.

0.25mm enamelled copper wire: 1m
0.6mm solid copper wire PVC insulated: 1m
TO220 insulating kits 4 off
Heat sink (Prototype used type 4M-229.

Cores and beads available from Jab Electronics.



20 Watt RF PA (Cirkit Holdings)

Modifications

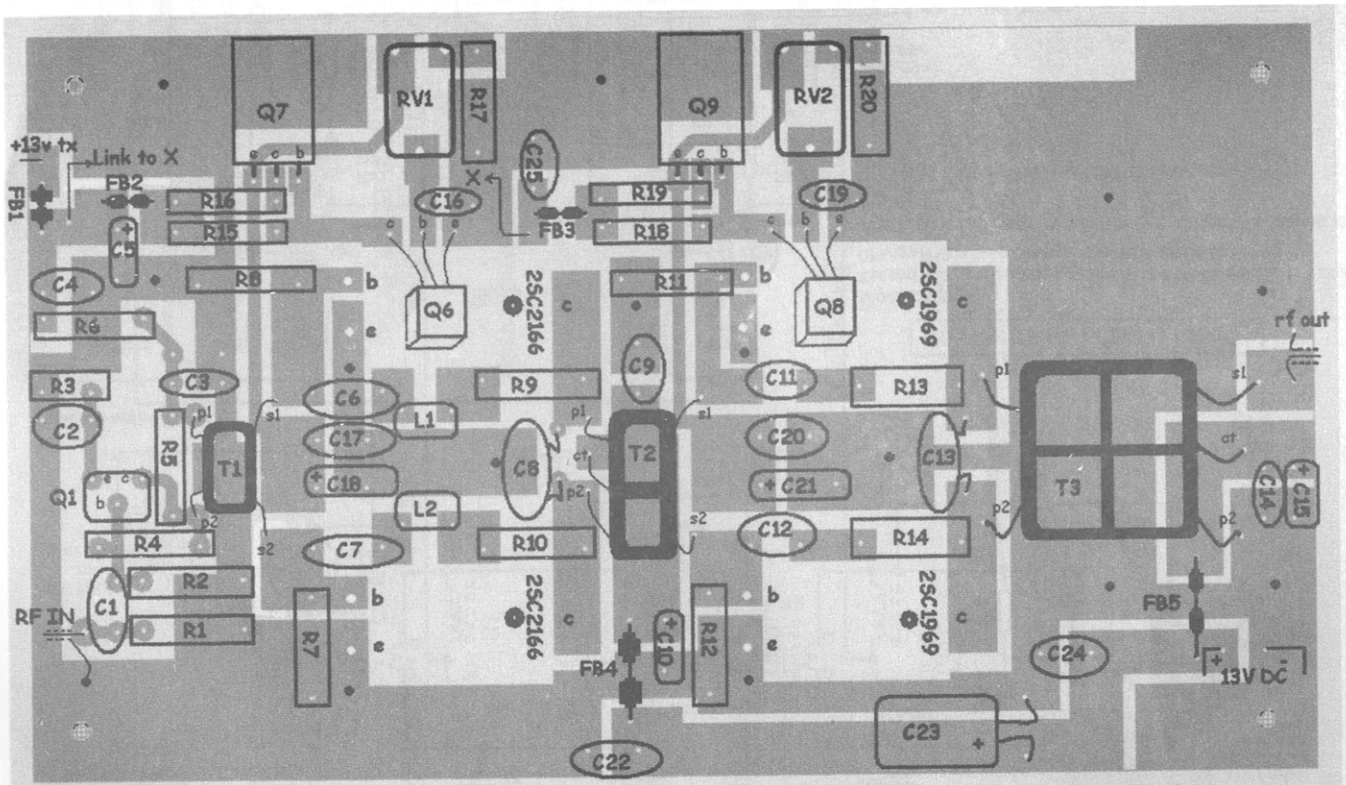
The two 100 ohm feedback resistors R13 & R14 increased to 1 Watt

Change R18 in the bias circuit from 10 K ohm to 6k8 ohms

Add C14 & C15 (100nf & 10uF) to centre tap of T2 to ground

Q7 & Q9 mounted on Q2 & Q 4 respectively

G4COE 9 December 2004 Thurs. 0048Hrs

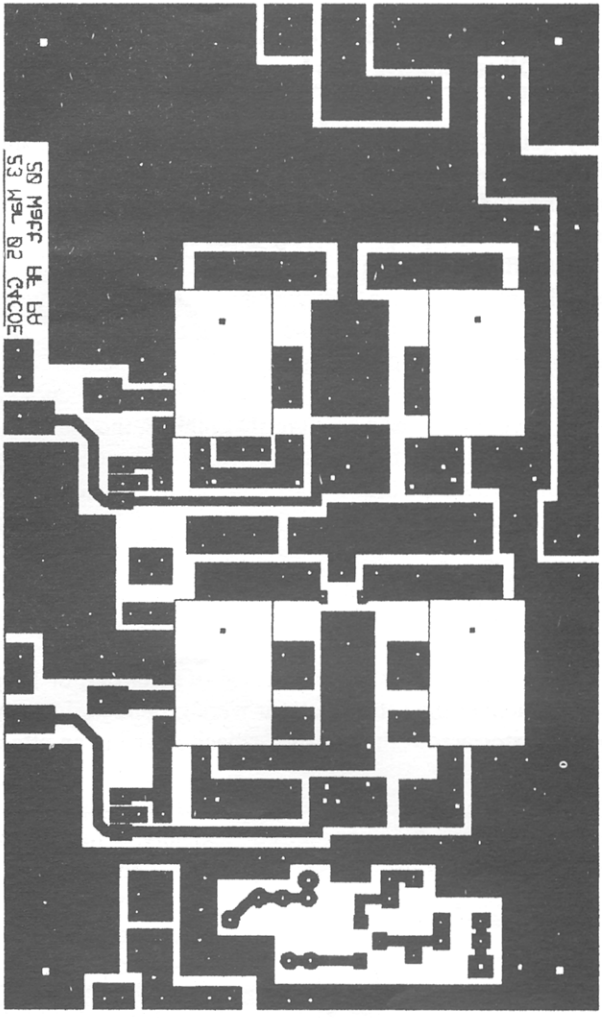


• indicates 15 thru board links. Link point X with wire link on underside (FB 3 to +ve), all FB's consists of two ferrite beads.

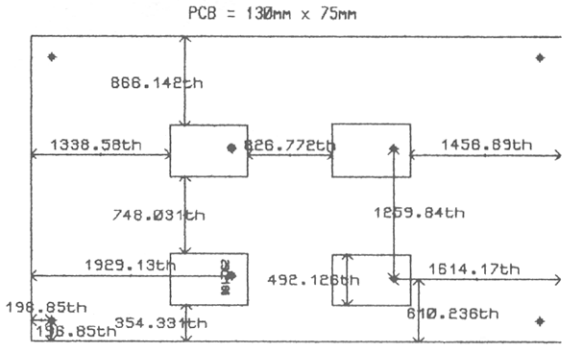
BOARD VIEWED FROM COMPONENT SIDE WITHOUT THE COPPER GROUND PLANE.

PCB size 130 x 75mm. Ready for printing onto 'Press N' Peel', for SMD type construction reverse design before printing and black-out holes (if required), this method require no drilling.

Ensure the copper edging is removed during cutting out - this was left on as a guide.



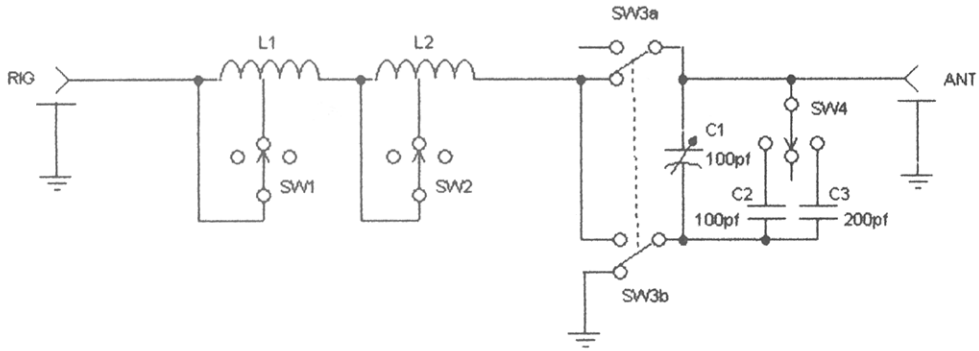
PCB ARTWORK AND DIMENSIONS



The G3EJS 2-Tuner

Steve Warwick-Olive G3EJS, 103 Lyndale Rd. COVENTRY. CV5 8AR

Having recently bought an FT-817, and immediately missing the internal tuner my IC-703 has, I started looking for an answer.
There are tuners around, but everything I saw was just about as big as the 817 itself.
Seemed a bit pointless then to have a very small rig, and have to double its volume to be able to use it on a different antennas.
I have my portable antenna for the 703, which is pretty close to having a low SWR on most bands, so my first thought was to build something to match that. But what about using my dipole at home,or throwing a wire over a tree?
It seems the biggest occupier of space in a tuner is the capacitor, Use an L network and you only have to have one. Then I thought that making the inductor more finely adjustable would mean that less variation in capacitance would be needed to obtain a match.
I considered having two banks of switches, one for the capacitor and one for the inductor, eight of each would give a huge range, but discarded that idea (for now) as not being intuitive to use.
I had an old die-cast box about 1 X 2 ½ X 4 ½ and decided that it would fit into that.
In order to be able to adjust the inductance reasonably closely to what was required, I used two switched inductors.
The capacitor had to be small, I had the choice of two, one of 140pf and one of 100pf, I chose the latter, as neither the rotor or stator were grounded. I can switch either a 100pf or a 200 pf fixed capacitor across the variable capacitor giving an effective range of about 10 – 300pf.
I didn't want either part of the capacitor grounded as I wanted to be able to switch the capacitor in series with the inductor to add flexibility. I use the tuner as a series tuned circuit most of the time, and only occasionally as an L network.



The resulting circuit

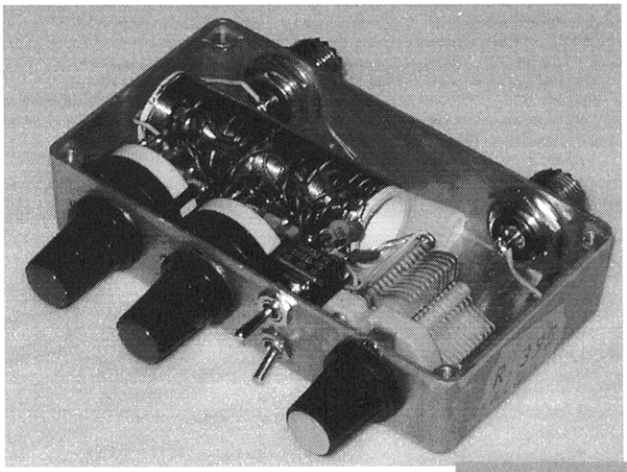
L1 and L2 are wound as one long coil of 96 turns of 24 SWG (0.56mm) wire on ¾ " electrical conduit, divided in half by a centre tap where the common pole of SW2 connects.

Each half of the coil is tapped as follows from the connection points of SW1 and SW2 common poles:- 32t – 24t – 16t – 12t – 8t – 4t – 2t – 1t

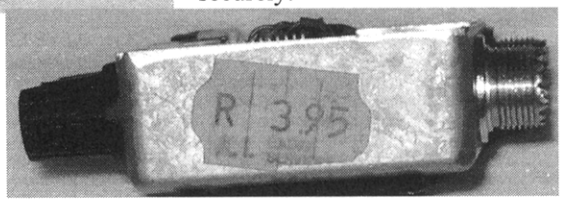
Each half of the coil is tapped as follows from the connection points of SW1 and SW2 common poles:- 32t – 24t – 16t – 12t – 8t – 4t – 2t – 1t

The ten positions of SW1 and SW2 are therefore connected to the following coil points:-

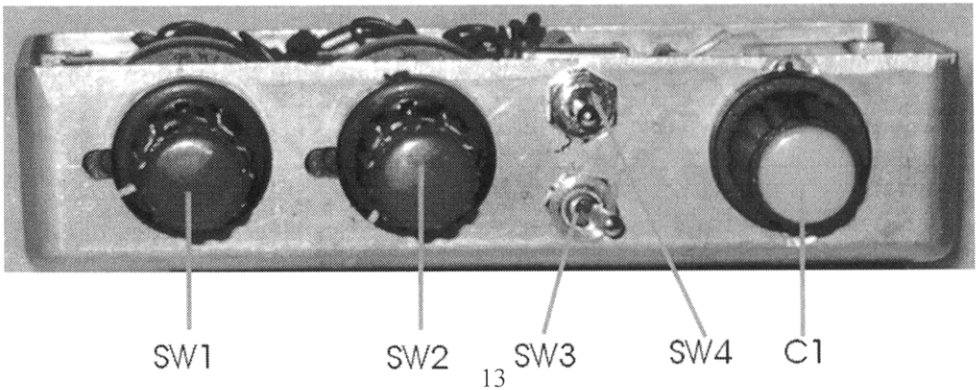
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Not connected, i.e. full coil	32 t	24 t	16 t	12 t	8t	4t	2t	1t	end i.e. coil bypassed



As you can see, the fit is fairly tight, in fact all the controls are touching each other, so there is no room for error when measuring before drilling.
Under the coil you can see the packing material I use to insulate and secure the coil to prevent it moving around, another piece fits between the lid and coil, positioning it securely.



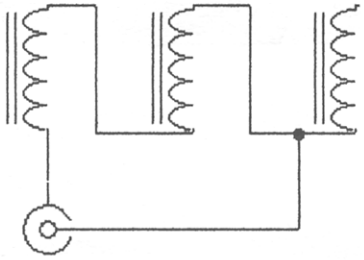
The side view shows clearly how the components are above the level of the bottom of the box, filling the space of the raised lid. The switches have a total of less than 1/32" total clearance between the top and bottom of the case.



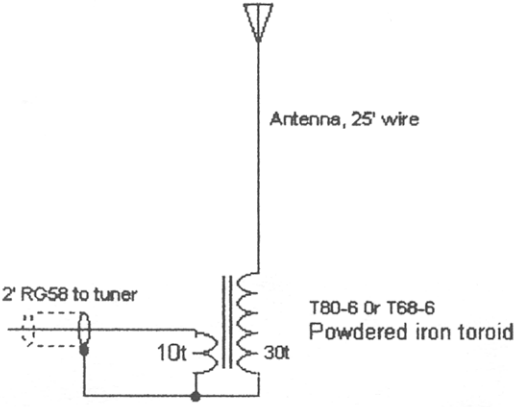
Operation is quite simple.
Set SW4 to the centre position, to isolate the fixed capacitors, set SW3 to the right (in my tuner) to configure as an L match.
Set SW1, SW2 and C1 to the centre positions, adjust SW1 and SW2 for maximum receive noise (try to keep them as close as possible to the same position on each, i.e. Not one at maximum and the other at minimum) and then peak with C1. You should get a definite peak, noise dropping off on each side.
Then check the SWR on low power, and fine tune (it's usually within limits after the receive tuning). On the 817, switch the meter to PO and peak, BEING VERY CAREFUL TO MAKE ONLY VERY SMALL ADJUSTMENTS WHILST PEAKING POWER.
If you then set the meter back to SWR, it may show 2 segments on the SWR meter, it seems that the minimum SWR reading does not always correspond to the maximum power out.
The tuner worked better than all expectations on the dipole in the house, and for tuning my portable antenna.

To connect it to a random wire, I tried a toroidal transformer with a primary of 10 turns connected to a short length of coax and a 30 turn secondary to the antenna.

I tried an ordinary 4:1 balun, and finally I tried the reputed circuit for the 'magnetic long wire balun'. This was interesting, as it seemed to increase the range of wire lengths I could tune, and could tune a 33' length of wire from 160m to 6m.



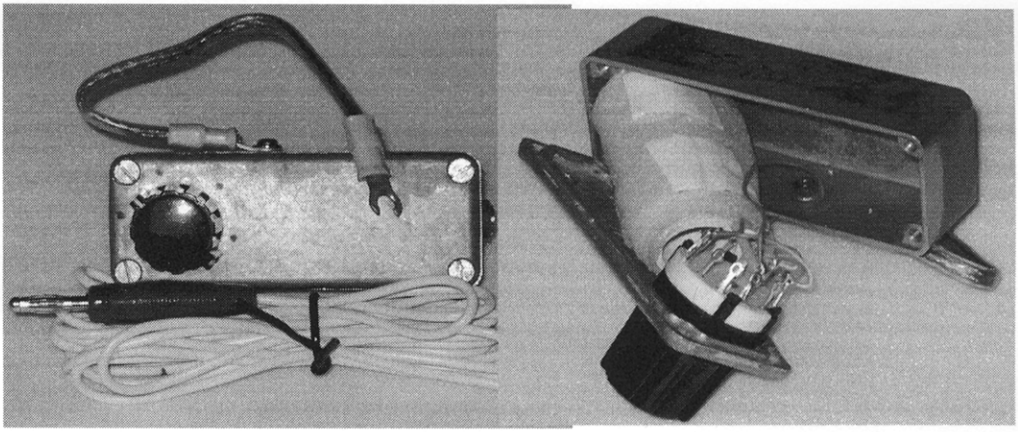
So called "Magnetic Longwire Balun"



This has turned out to be my favourite

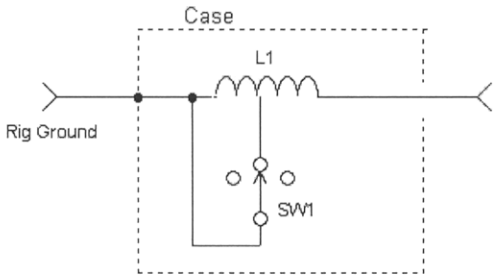
I found that about 10' of coax between the "balun" and the rig reduced the need for a counterpoise, but this is also influenced by DC power cables (or not if on internal batteries).

Tunable Counterpoise.



A counterpoise is most needed when running of internal batteries and using a "walkabout" antenna.
As soon as you add anything to the ground of the rig, DC power cord or coax, it seems to become less of a necessity.
Again I wanted something small, and I did not want to trail a tail if pedestrian portable.

The answer is quite simple, it's simply a ¼ wave wire on 10m, with a switched loading coil for other bands.



I have a 68 turn coil, wound with 24SWG wire on ¾" electrical conduit with taps at the following points:-

48t - 32t – 24t – 16t – 12t – 8t – 4t – 2t – 1t

The first switch position is open putting the whole 68 turns in series with the wire, and the last position goes to the end of the coil bypassing it.

The start of the coil and the common pole of the switch are connected to the case, and a braided earth strap connects the case to the rigs ground, or the ground on the tuner or antenna, depending on how you want to use it.
The counterpoise wire is around 9' long, I used 42 X .2 mm speaker wire, good amount of copper and flexible.

All that's left to do now is to build them with some decent front panels and some black crackle paint!

Winding the Coils

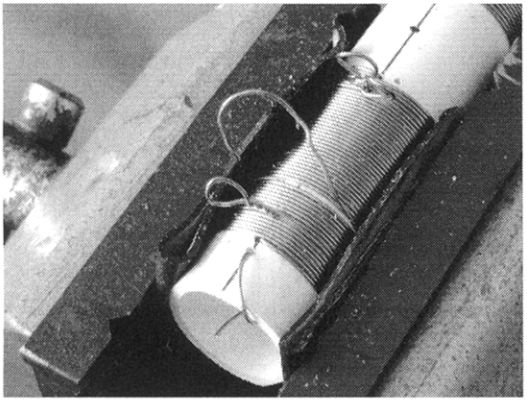
This is the procedure I used in both the Tuner and the counterpoise, and previously in my 703 antenna, where these photos are taken from.

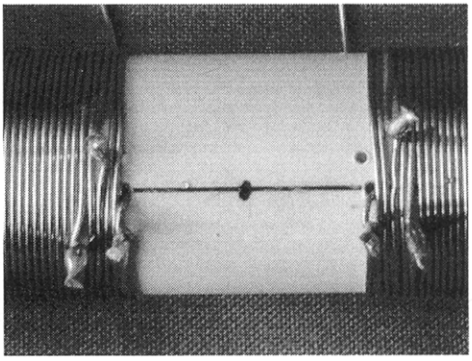
The length of the coil is roughly the number of turn times the diameter of the wire, and I allowed about a 1/4" extra on the ends.

Drill a hole at the starting point of the coil, and one where the coil should end.
Wind the turns on, making loose loops where the taps will be.
Once the winding is complete, you need to hold the coil while you neaten up the taps.
I used a piece of old bicycle tube, it stops the wire slipping and prevents damage.

One at a time, open up the taps, carefully scrape of the enamel, trying to only scrape it off the wire that will form the tap and not the wire that will lie flat on the former. Then twist it together, making sure the wire is taught on the former.

If two taps are close together, offset them from the centre line by about 1/8"





The taps can then be soldered and trimmed back to about 1/8" long.

When you solder on the wires that go to the switch, slip on about ¼" of heat shrink tubing, which neatens it up and insulates it nicely.

FEEDBACK - from Anthony Langton GM4HTU

Complementary Pair Push-Pull FR Power Amplifiers (Stef Niewiadomski) SPRAT 118

I have not used this circuit at the powers Stef suggests, but with a 2N3904/3906 pair running 10 – 30mA, it makes an excellent buffer and has become one of my standard circuits. It works really well with a VFO and will happily drive two 50ohm loads, e.g. transmit and receive mixers. Definitely worth a go in your next project. Even with wired components it will fit on a 1 inch square. [ONEBUFF?]

XFY43 VFO

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

This is not a nostalgia-driven glow-bug project, it is simply the best VFO I have made during 25 years of trying. Anyone who has tried to make a really stable bipolar or FET VFO knows how difficult this can be. Conventional wisdom has it that valves get hot, they heat up other components, they create warm-up drift, they are old hat; fets and bipolars dissipate only milliwatts and avoid all that, they are the way forward. You see this dogma expressed in the old books from the 60s and 70s, and I have never seen it challenged. So when I made a valve VFO for a receiver that *was* a glow-bug project I was amazed to find that a circuit with an EF95 was no more unstable than an ordinary bipolar design. This set me thinking. Temperature variations in a valve are extreme compared with a transistor - 2 or 3 watts of total dissipation, and parts at red heat, as against 20mW or so, and not even barely warm. If the warm-up effect is similar, valves must be basically much more thermally stable than semiconductors, in which everything involves exponential functions of temperature. So reduce the heating effect and you must have a winner. Next stop the junk box, and out popped a XFY43 miniature wire-ended pentode with a 1.4v, 10mA filament and a 0.6mA 23v anode, probably intended for a hearing-aid. It actually works on an 'ht' of 8v, 0.4ma, giving less than 20mW of total dissipation – no more than your average bipolar !

The result is a very simple VFO with spectacular stability. There is simply no warm-up drift at all. Listen to it on a receiver and there is an initial 'whoop' followed by an absolutely steady tone, and the frequency counter tells the same story – it reaches a steady condition in less than a second. It is the nearest thing to a crystal you can hope to find. What surprises me most about this is that I have never seen the use of miniature low-power tubes recommended for VFOs, even in text-books from the late valve era. So perhaps this idea is 'new'.

The thermal coefficients of the inductor and capacitors in the tuned circuit have the usual effect if you attack the circuit with a hair-drier, but these can be juggled. The inductor has a negative frequency-temperature coefficient, while polystyrene caps have a weak positive one, and selected ceramics can be more strongly positive. With care you can balance these to a considerable degree. Alternatively a simple compensating capacitor can be made using items found around the house (Fig 2); wire it in parallel with the tuning capacitor. The bitmetallic part can be flipped for positive or negative compensation, and can be bent upward to reduce the effect.

Don't be tempted to try using varactor tuning unless you want to ruin the whole thing, and also, of course, observe all the usual rules – solid construction, rigid screening, stable variable capacitor with proper bearings, etc, etc. The high anode impedance of the pentode makes this circuit relatively insensitive to supply voltage, but it is best to stabilise the supply if you intend to use this VFO in a transmitter. Also, resist the temptation to derive the heater supply from a pair of forward-biassed diodes; use a dry cell for best results.

I was lucky to find the XFY43 readily at hand; other possibilities include the 6088, XFW10, XFW20, and XFW30; the last three have 0.625v heaters. The DF96 and DF97 are very common B7G types, having 1.4v, 25mA heaters and are designed for a higher anode voltage, but might be worth trying at lower voltages.

This circuit is an electron-coupled Colpitts, requiring a pentode. The screen grid separates the output circuit (anode) from the oscillator (cathode, grid), preventing the buffer from affecting the oscillator. The directly-heated cathode makes it necessary to have two chokes (L1, L2), one in each filament lead. As an alternative, I wound a bifilar choke with 10 bifilal turns on a 8mm ferrite bobbin. The emitter-follower buffer is used just to drive a frequency counter, the anode resistor being chosen to give about 0.5vpk-pk output. The output waveform is a clipped sinusoid (it is a class C oscillator), so a tuned buffer should be used in a fully engineered design to reduce harmonics and give a larger output.

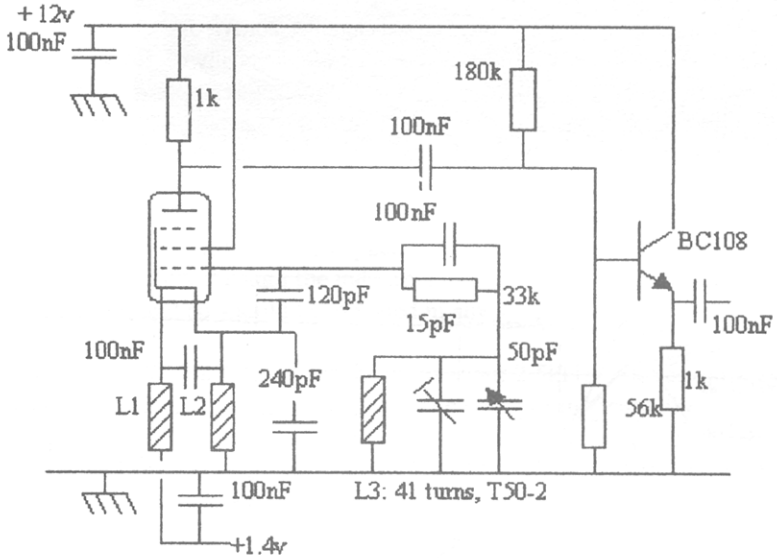


Fig 1. XFY43 VFO (5 – 5.5MHz)

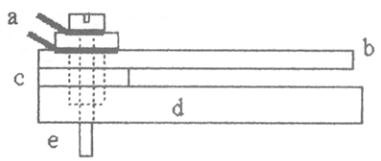
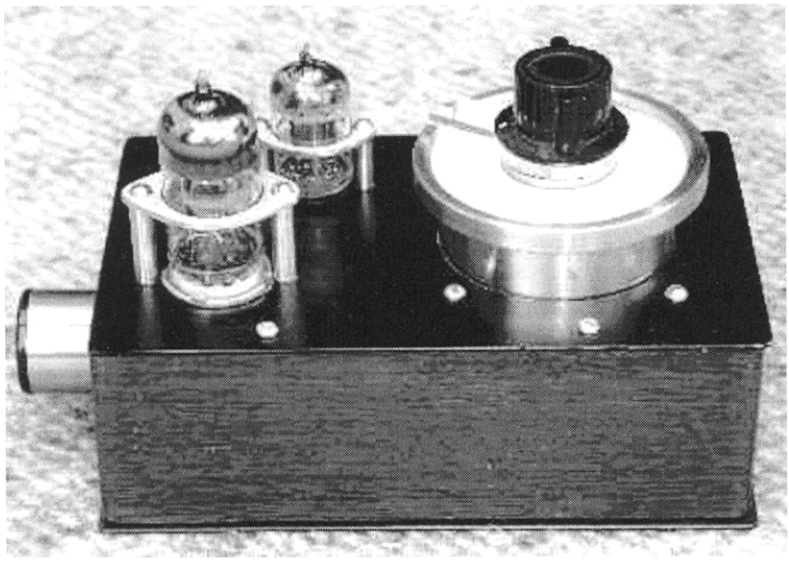
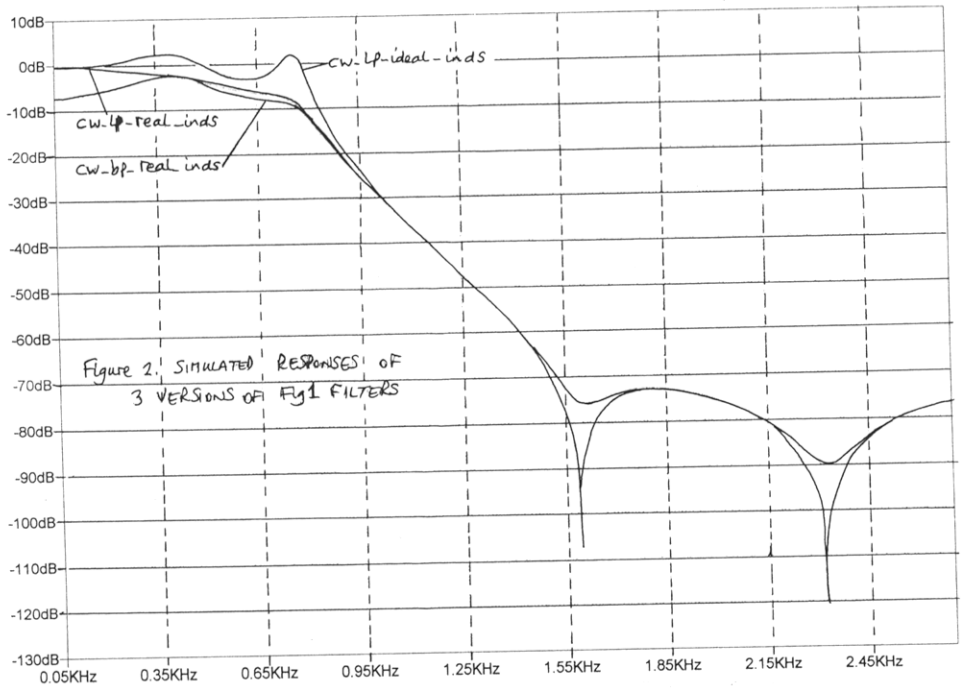


Fig 2. Thermal Compensator.
Dimensions – typically 5mm x 8mm

a) 6BA Screw, 2 solder tags, transistor mounting insulator
b) Piece of bimetallic strip from electrical thermostat
c) Mica
d) Aluminium block with counterbored and tapped hole
e) Screw protrudes for fixing



The XFY43 VFO



Low pass filter simulation – Figure 1.

GØEBP CW Lowpass Filter Simulations

Stef Niewiadomski, Saddlestones House, Faringdon Road, Stanford-in-the-Vale, Oxon.

In SPRAT 120, G0EBP's 14MHz CW Receiver includes a neat passive CW filter using Toko 10RB inductors, driven by a low noise NE5534N op-amp. I though I'd simulate the filter design to check its response: in particular I was interested in what the relatively low Q of the 10RB inductors would do to the filter's insertion loss and passband response.

I used a circuit simulator, waveform viewer and schematic capture package available from Linear Technology's website. See the end of this article for details of getting hold of this package.

Figure 1 shows the three versions of the G0EBP design I captured.

The top one uses ideal inductors, i.e. the wire used to wind the inductors is assumed to have zero resistance.

The middle version has the series resistance (82ohm) of the inductors included. This is achieved very simply by "right-clicking" on the inductor in the schematic and filling in its series resistance in a table.

The bottom version has the 2.2uF capacitor in series with the filter included in the simulation. At first sight a series capacitor looks like it's there as a DC blocker so that current doesn't flow through the inductors, but of course a series capacitor also acts as a highpass filter, and so should be included in any simulations.

Figure 2 shows the simulation results up to about 2.5kHz. The response using ideal inductors is shown as cw_lp_ideal_inds. The effect of modeling the inductors as real components with DC resistance can be seen (marked as cw_lp_real_inds). Passband ripples are smoothed and the response towards cut-off "droops", rather than being sharp. The peaks of attenuation at about 1.6kHz and 2.3kHz are also all but smoothed out, but the stopband attenuation still remains greater than 70dB.

The response marked cw_bp_real_inds shows the effect of the 2.2uF capacitor driving the filter. This gives some attenuation at 50 and 100Hz, which can be useful in eliminating mains hum in a direct conversion receiver. The passband insertion loss of the filter, including the potential-divider effect of the 270ohm drive and 10kohm termination resistors, is about 3-7dB, depending on the exact frequency. I suppose with a CW filter this isn't strictly passband ripple, since you are normally only receiving a single tone. The loss is easily compensated for by the gain of the NE5534N op-amp.

Conclusions

G0EBP's design is a great CW filter, as shown in the simulation results and no doubt reflected in listening tests. Even with real 10RB inductors the response rolls off steeply above about 800Hz and has greater than 70dB of stopband attenuation.

An analogue simulator is a good way of experimenting with circuit values, especially where a large number of "experiments" need to be done and the effects are subtle and need advanced test gear to measure in practice.

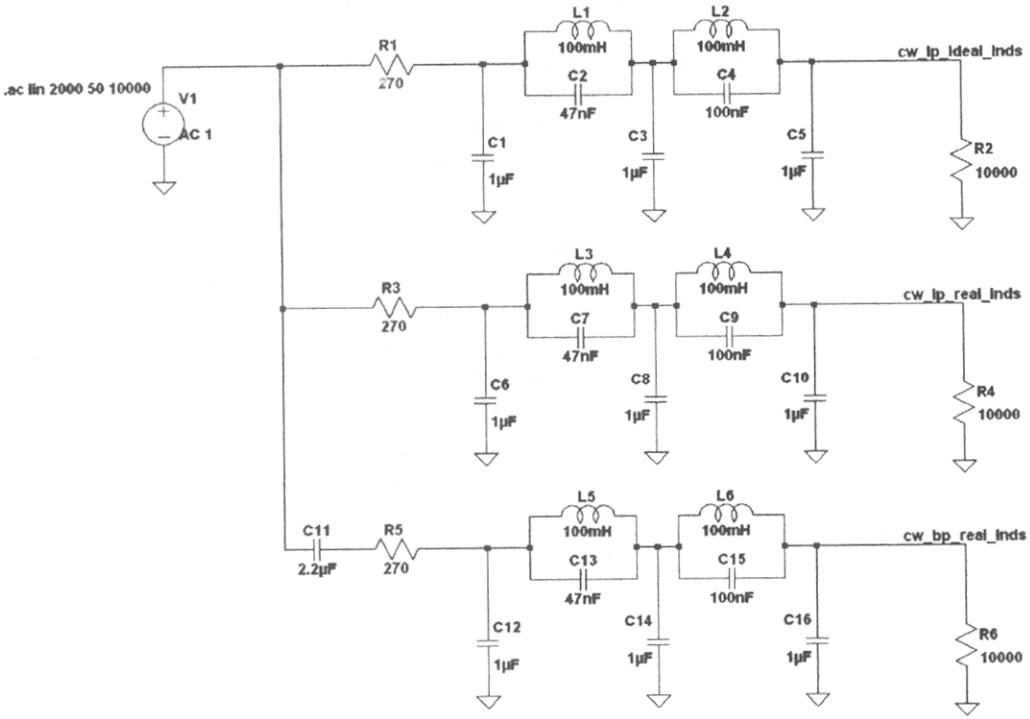
The Linear Technology simulator includes a circuit simulator, waveform viewer and schematic capture and is an easy way of getting into circuit simulation for free. Use of the simulator will allow the amateur to experiment further with these effective, cheap and easy to build filters.

Getting Hold of the Simulator

The schematic capture and Spice simulator package used in these experiments was downloaded free of charge from

http://www.linear.com/software/.

My thanks go to Linear Technology for making this package available to all.



CARS CONSTRUCTION CHALLENGE

John Beech G8SEQ 124 Belgrave Road Coventry, CV2 5BH

This was held at the Coventry Amateur Radio Society on Friday 11/02/2005 . Three teams took part, one with 2 members, one with, 4 members and one with 5 members, with various advisers and onlookers! The object was to build working circuits by the end of the 2 hour session.

The components:

1 X MC3340 ELECTRONIC ATTENUATOR/AMPLIFIER/VOGAD/
1 X 747 DUAL OP AMP
1 X J304 N-CHANNEL FET
1 X BSX19 RF BIPOLAR npn
1 2SC1175 BIPOLAR TRANSISTOR (BC108 equivalent) npn
1 XZTX690B BIPOLAR TRANSISTOR npn
10 X DK13 Germanium signal diodes
1 X Zener diode 3v9
1 X 1N4003 diode

1 X FERRITE BEAD
1 X T-50-2 TOROID
1 X 23 mm, 6mm diam. Coil former
1 X TOKO YXNS 30450 NK 79327 Inductor.
1 X SC60 H10-K 100mH inductor
Plus a selection of various enamel wire gauges.

1 X 500pF compression trimmer
1 X 100uF 35v
1 X 100uF 10v
1 X 15uF tantalum 25v
1 X 220nF
1 X 100nF
2 X 100pF
2 X 4n7

1 X 220 K potentiometer
2 X 270R
5 X 910R
5 X 10K
2 X100K
2 X 680K

1 X 50mm 8R Loudspeaker
1 X Crystal earpiece
1 X PP3 battery
1 X 50mm X 50mm copper clad board
1 X 80mm X 19mm " " "
1 X 54mm X 19mm " " "
4 X Manhattan Island Pads
1 X 8 pad chip carrier, MI
1 X 14 pad chip carrier; MI

Under Construction:

The competitors were allowed to make unlimited inductors with the wire available though most chose to use the inductors/formers provided. Very few used the Manhattan Island parts as intended, though one group used the 14 pin chip carrier to build a complete sidetone oscillator! In any event, the competition proceeded in the spirit of the rules, if not to the letter and all those taking part thoroughly enjoyed themselves and probably learnt something in the process. They also provided some entertainment for the onlookers.

If any other club decides to run a competition along similar lines, then I suggest that they don't stick religiously to the component list. All the components I supplied were new but what I had plenty of so wouldn't miss them from my "junk box".

So what did they make?

Well one team managed to make a receiver. This was a crystal set for top band with an op-amp audio amplifier stage. A second group managed to make an 80m vlp transmitter. This was essentially a vfo preset to a centre frequency of 3.61 MHz. Power o/p was calculated to be about 4 mW.

The third group made two separate circuits between them, one was a side tone oscillator based on a multivibrator circuit and the other was a VLF transmitter, albeit very low power. This tuned to 136 KHz.

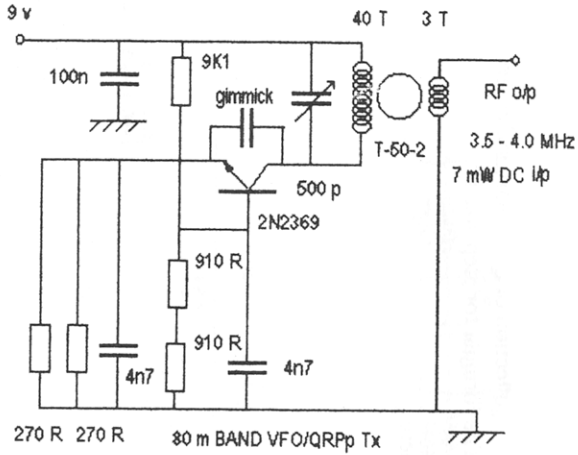
The competitors were given a weeks notice of the active devices which would be in the kit, so they could do their homework and have some idea of what could be built. This was also to save me time printing copies of data sheets. In the event only one team appeared to have done this properly, but didn't make much use of it on the night! They did lend a data sheet to another group, who were using an op-amp.

Post event, while waiting for my flight to Spain, I decided to see what it was possible to build and sketched out some schematics on a small notepad. The intention was to then build the circuits in under 8 man hours when I got back to England. All the circuits are published at the end of this article. What could you design & build in under two hours? (8 man hours for a team of four.) Various data sheets/books were available on the night including the bible: "Solid State Design" by Doug De Maw and Wes Hayward and various copies of SPRAT. The plan is to hold a re-run in October or November, probably with a different set of components and possibly as a challenge match against another club.

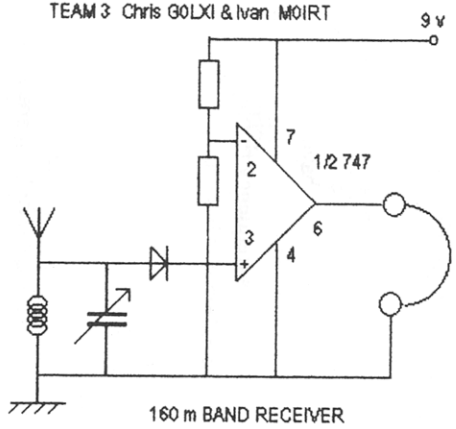
The circuit I managed was for a complete transceiver for Morse and AM, albeit you need to tune zero beat on the carrier to receive AM (I have done this on Broadcast Stations without problems.) I used ALL the components bar one! I must admit I was struggling with resistor values and could have done with another 4n7 capacitor in the mixer coupling circuit for the sake of symmetry.

I have re-drawn the circuits for publication and attached them. I have NOT included my circuit which is a posh computer generated one which took me about five times as long as it did to sketch on a pad while I was waiting for the plane. Who said computers were quick? Hopefully, others will take up the challenge and see what they can come up with, without their efforts being coloured by mine. I have a few "kits" left if anyone wants to have a go.

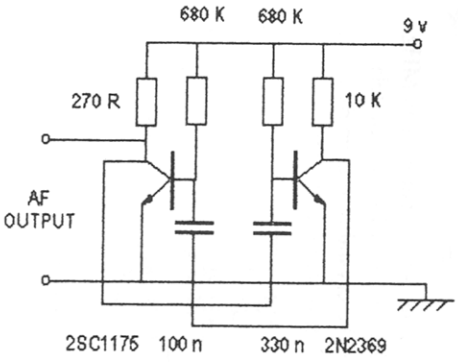
CARS TEAM 6 G4HHT; G4HRY ;G4GEE; G1ZSR



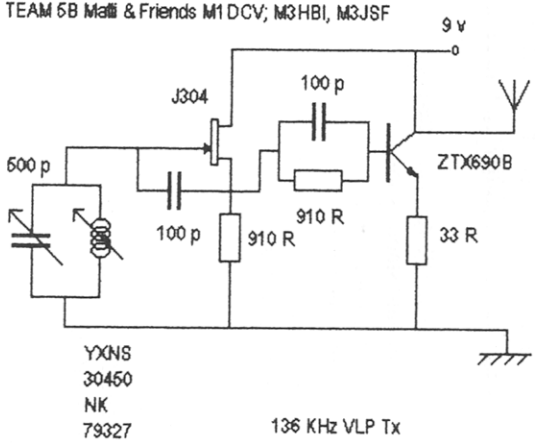
TEAM 3 Chris G0LXI & Ivan M0IRT



CARS TEAM 5A G8GMU & M3HBM



TEAM 5B Matti & Friends M1DCV; M3HBI, M3JSF



Simple "fast" Huff & Puff VFO Stabilisers

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

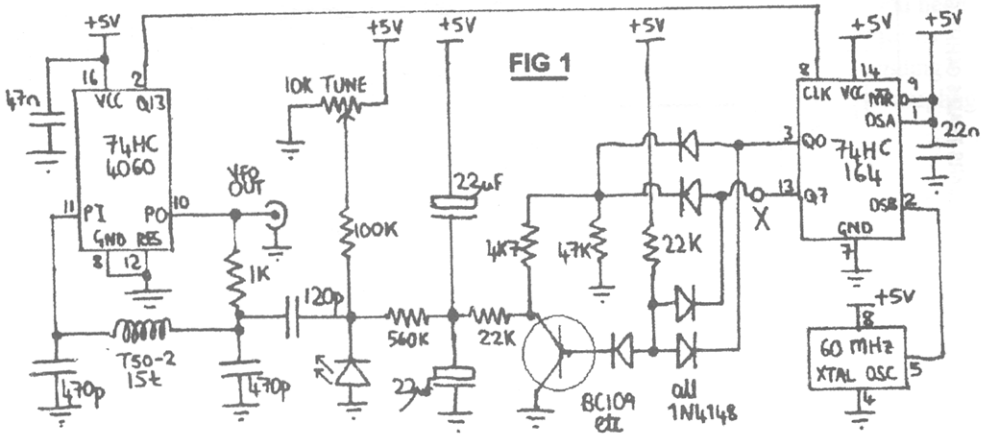
In my article in SPRAT 122 titled "Simple Huff & Puff VFO Stabilisers" I remarked that for the ultimate stabilisation performance, nothing beats Peter Lawton's "fast" stabiliser architecture, which he described in a QEX article in November 1998. I have now developed a simplified version of the "fast" circuit which uses just two logic IC's. It can stabilise a worse VFO, or stabilise a good VFO with much less frequency ripple. This also implies that it can stabilise much higher frequency VFO's, potentially even up to VHF!

The "fast" design incorporates a shift-register delay line and compares the current latched state of a crystal reference oscillator against its state Z periods previously. These two states are combined in a logical Exclusive OR gate (XOR) and integrated, which produces the feedback signal to control and stabilise the VFO. Note: a XOR gate produces a logic 1 output if either of its inputs are 1; but a 0 output if both inputs are 0 or both are 1.

This style of stabiliser provides a kind of statistical averaging of the up/down pulses from the XOR gate, compared to the standard Huff Puff stabiliser method. The correction pulses arrive Z times more frequently and therefore the accumulated error in the VFO before it is corrected, is much less. In other words, the stabilisation loop operates much more quickly. The "fast" stabiliser has been likened to a whole collection of Z ordinary stabilisers operating simultaneously on the same VFO. The formula for step size is:

Step = 10^6 x VFO^2 / (Z x M x xtal) where

VFO is the VFO frequency in MHz,
Z is the number of stages of delay,
xtal is the crystal reference frequency in MHz, and
M = 2^n where n is the number of divide-by-2 stages in the VFO divider.



NOTE: Use an onboard regulated (e.g. 7805) supply, dedicated just to this circuit!

In Fig. 1, I use the internal oscillator of the 74HC4060 as a VFO on about 10MHz. Varicap tuning is accomplished with a standard 5mm red LED as before. In this circuit I used a transistor with a few diodes and resistors to implement the function of XOR gate! The 1st and 8th outputs of the shift register are compared therefore the effective length of the delay line is 7 stages. The crystal reference frequency should be as high as possible: I used a canned oscillator. They can often be recovered from old computer boards.

An alternative implementation is shown in Fig. 2, in which a real XOR gate (74HC86) is used in place of my transistor-diode-resistor version. This adds a 3rd IC but allows use of one of the XOR gates as the VFO: my feeling is that this produces a superior oscillator to the internal 74HC4060 oscillator. Spare XOR gates can be used as VFO buffers.

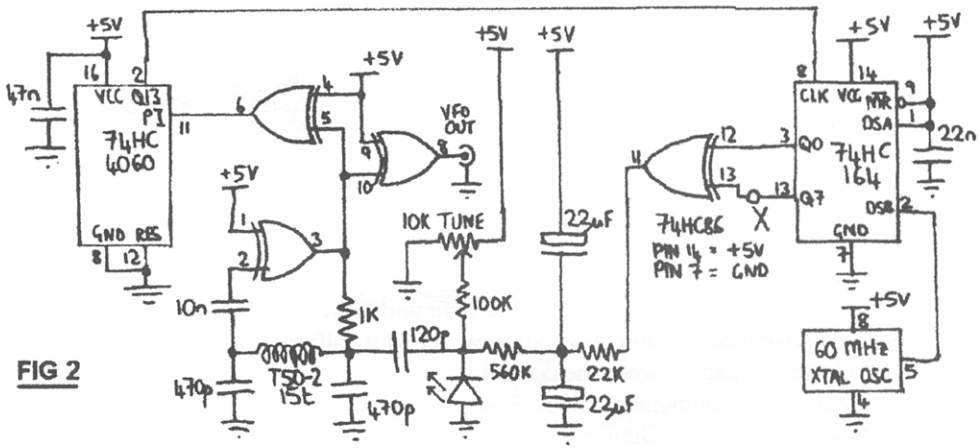
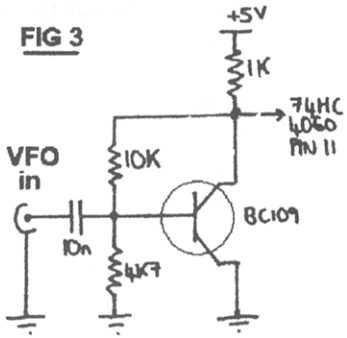


FIG 2

If an existing external VFO is to be stabilised, the input circuit in Fig. 3 can be used as a suitable buffer and should feed the 74HC4060 divider directly at pin 11, omitting the oscillator tank.

FIG 3



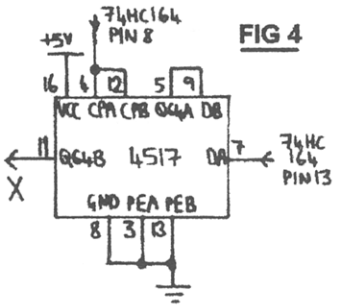


FIG 4

To increase the number of delay stages, more shift registers can be inserted in series at point X, clocked by the same output from the 74HC4060. An ideal candidate is the 4517 (sometimes called CD4517, or HEF4517 etc.) which provides 128 shift register stages. Note that this IC is not available in the modern high speed 74HC-family so it must come AFTER the 74HC164, such that the '164 faces the high speed edges of the 60MHz signal.

References: http://www.HansSummers.com/radio/huffpuff

WIFB MEMORIAL ENTRY

"The Brencher"

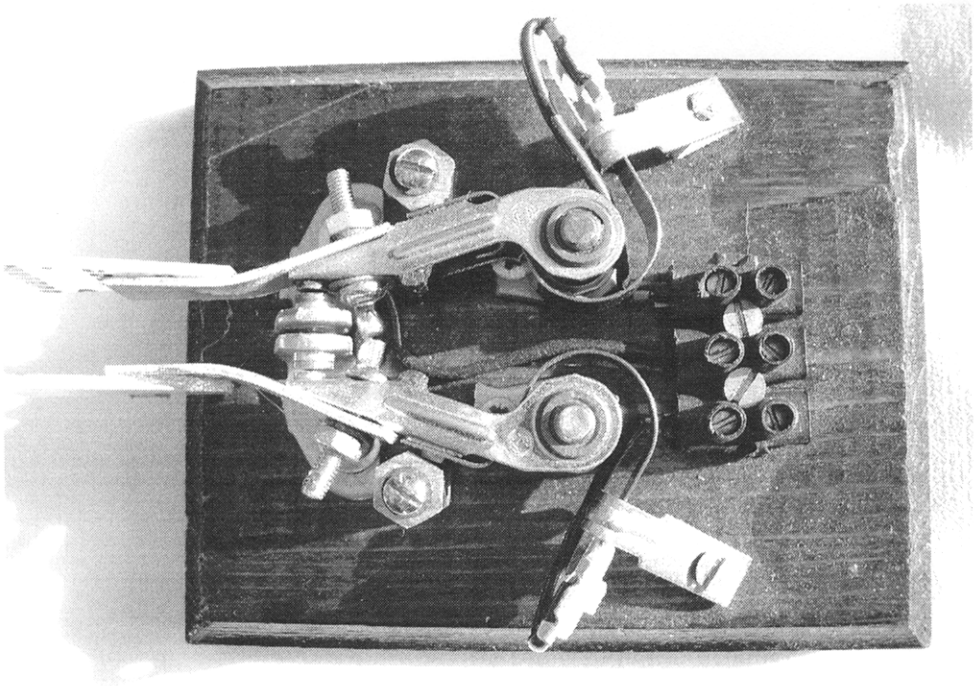
An electronic key manipulator made from breaker points.

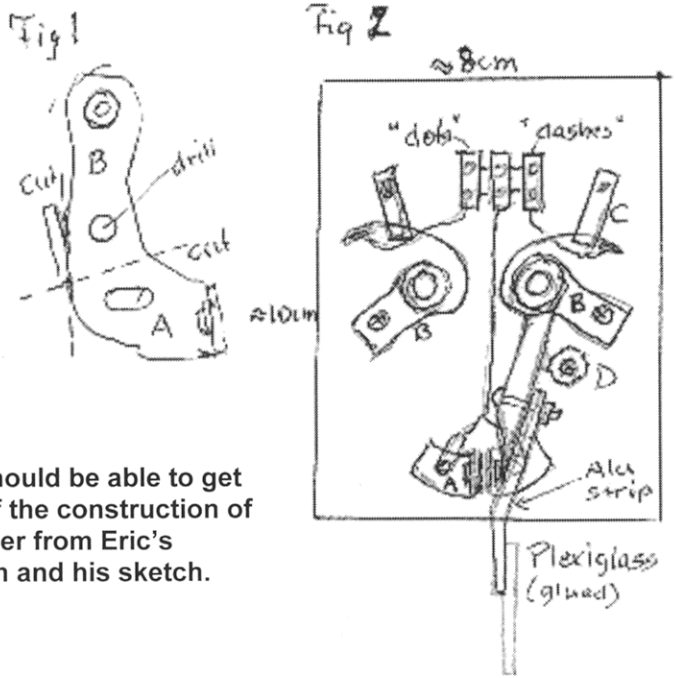
Eric Lindberg, SM6AWZ, Korngatan 3, SE-464 30 Mellerud. Sweden

The idea isn't new – I have a vague memory of having seen a sketch in our Swedish QTC mag. some fifty years ago. What's new is perhaps my solution. So here goes:

1. Find two sets of used breaker points at a car garage, preferable one left-turned and one right-turned (to make it more symmetrical) N.B. Breaker points are "endangered species" in these days of fuel injection and electronic ignition in our cars, so hurry!
2. Take them apart, clean them and file the contacts smooth and even.
3. Cut (hacksaw) the bottom part acc. to fig 1(dotted lines) and drill a 3 mm hole.
4. On a wooden bottom plate (mine is 100x80x15 mm) place the two A pieces back to back (fig 2.) and fasten with wood screws, washers and soldering lugs. Solder a connection from the A pieces to the middle of a three-terminal block at the other end of the bottom plate (ground)
5. Find the correct placement for part B (to get a good contact between points) give the spindle a slight blow with a hammer, drill a shallow 5 mm hole where the spindle fits (to fix the position) fasten it tight with a wood screw in the 3 mm hole.
6. Screw a six-edged nut onto a woodscrew, screw it halfway down at D (fig 2) This one adjusts the gap between the contacts.
7. Cut two 1.5 mm aluminium stripes, 8x40 mm, drill a 3 mm hole in one end, bend slightly and fasten with 3mm screw and nut to the arm.
8. Make two paddles, (plexiglass, game markers, plastic etc)....."every ham to his taste"....and glue to the alu strips.
9. Buy two brass picture hangers (you probably have some lying around at home) turn them upside down, hook on the springs and screw them (after having enlarged the nail holes) to the bottom plate. C fig 2. They can be moved back and forth to find the most convenient tension of the spring.
10. Use the existing wires from the springs to connect to the remaining holes in the three terminal block (dots and dashes)

That's all – try it! I have fastened my keyer with two stripes of double-sided tape to my desk-pad





Readers should be able to get and idea of the construction of the Brencher from Eric's photograph and his sketch.

ADS AND ODDS

FOR SALE: Ten-Tec Argosy 11 Model 525D HF transceiver switchable 5 or 50 watts c/w power supply and Mike.£250:00 also matching ATU. £50:00 if required . can be seen working .Ron G0FGW 01249 658880 arcy31@btopenworld.com

WANTED: Old Trio filters, for TS-430S, type YK-88C and YK-88SN. Also wanted: Kenwood YG455-1. FOR SALE: YK455C-1 bought in error
FOR SALE: Timewave DSP-9+ Audio Noise reduction Filter, version 3.03A, £70. Icom IC-245E 2m multi-mode with IC-RM3 computerised remote controller – which also works with IC-211E and IC-701, £175. The dual VFO's with any split and 10w o/p are suitable for use with a transverter. RN Electronics 6m transverter, £90, or with rig, only £245.
Keith Burrows, G0OZK, 10 Basil St. Stockport, Cheshire, SK4 1QL.

WANTED: Circuit diagram or handbook for Hands RTZ50 6m transceiver. Mike G0CWM, Tel: 01744 820415 or cwainwright1@hotmail.com.

FOR SALE: Icom 745 HF transceiver with general coverage rx, manual, mic, box and leads £220. Wanted PSK Mini-20 kit Mike Bowthorpe G0CVZ, 01733 324411 or g0cvz@bowthorpe.org

WANTED: Heathkit Mohican GC-1A Receiver, Heathkit HW30 Two metre AM Transceiver. Tel Mobile 079068 45257. email g4llw2003@yahoo.com

FREE books for novices - you only pay postage! Radio Amateurs Examination Manual (16th Edition). The Novice Licence by John Case: Student's Notebook. RAE Revision Notes by George Benbow. Amateur Radio for Beginners by Victor Brand. Radio Amateurs' Examination Manual by George Benbow. How To Pass the RAE. Introducing QRP by Dick Pascoe. Chris, M0PSK: tel 0151-924-1525 or email c.g.gibson@liv.ac.uk.

Press n Peel

Press n Peel (blue) £1.75 per sheet including postage for club members. No minimum order.
Varicap diodes BB121A, BB142 50p each.
Other components available. See www.ronlin.co.uk or email qrp@ronlin.co.uk.
Postage on component orders exceeding £10 is free,
Please include your membership number with all communications. Ron, G6BMY.

From one of our members - G4ILA:

Reddish Rally, Saturday 26th November 2005. St. Mary's Parish Hall, Reddish Road, Broadstone Hall South, Reddish, Stockport. Doors open at 10am. Admission £1. Refreshments, talk-in.
Contact John, G4ILA, 0161 477 6702

Correction

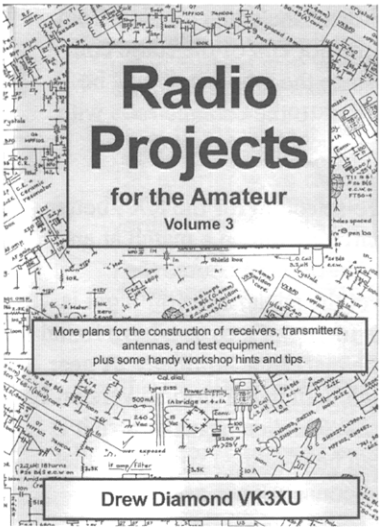
In the last issue of SPRAT the name of PA0KSB is misspelled, Klaus should read Klaas.

Amateur Radio Licence Proposals

Peter, G3PDL, and I had a short discussion at Dayton with Peter Kirby of the RSGB about the their concerns with some of the Ofcom proposals for the future of amateur radio licensing. The chief concern is about the possibility of complete deregulation and the risk of amateur radio licences on demand. The RSGB invite radio amateurs to personally respond to the Ofcom consultation.
Tony has added the document to the club webpage at http://www.gqrp.com/aradio.rtf. This is a rtf documents which can be used in most word processing software.

G QRP Talent Audit

Recently the QRP ARCI has formed an "Action Team" a collection of members who are willing to help the club when the need arises. It occurs to us that the G QRP Club is full of talented people who may, from time to time, be able to help the club. Although, at present, we have no specific tasks in mind, it would be good to have a list of people who could offer their talents to the club. We are invited interested members to offer the club whatever skills they may have. These may be technical, financial, legal, administrative or just a desire to offer time when this is needed. Those who are interested in joining a list of would-be helpers are invited to write to (or email) G3RJV, stating their name, call, club number and possible skills. This will probably not result in being offered an immediate task. At present we just want to know who is out there and what can offer.



Radio Projects for the Amateur Volume 3

by Drew Diamond, VK3XU

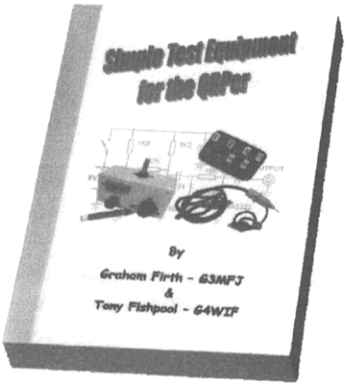
- which follows on from "Radio Projects for the Amateur", Volumes 1 and 2, is now available. The book offers "more plans for the construction of receivers, transmitters, antennas, test equipment and some handy workshop hints and tips" in a similar style and presentation to Vols 1 & 2. Lots of projects and full construction details. 135 Pages, A4 format. Available direct from the author and publisher; **Drew Diamond (VK3XU), 45 Gatters Road, Wonga Park, 3115, Australia**. Price is $30.00 (Australian dollars) which includes air-mail to Europe.
A limited number of Vol.2. are available at same price

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 mislead 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 for U.S. orders.



Experimental Z-Match With An Extra Twitch

Henry Kaipert DJ6ZF, 17A Flachsroeppen, D-21684 STADE, GERMANY

This article addresses you lucky owners of old aerial variometers.
When preparing for a local flea market I was browsing through my junk box and found two apparently ex-USSR made ceramic variometers both tuning from 10 - 50 uhy each.
The inner rotatable coil was connected in series with the outer static coil but separately accessible. So- why not disconnect the inner coil totally to make it a variable link which would connect to the symmetrical 600 ohm antenna feeder of my doublet. I felt it was worth a try. Since the circuit is well-known all over, let's try without a graphical schematic: While the inner coil would become the „feeder link", the outer (fixed) coil would at the same time become part of the parallel tuned circuit of the conventional Z-match. The tap which connects to the series input variable capacitor can easily be found using the trial and error method. In my case it happened to be at about two thirds of the coil, counting from ground. To cover the full 3.5 - 28 MHz range 3 turns from the hot end of the static coil had to be removed. Take care when removing the windings since the whole coil may be somewhat under tension. It may be wise to fix the remaining coil to the ceramic rods with super glue or an alligator clip beforehand until the job is done, i.e. the new coil end is soldered to the binding post on the frame.
Performance so far has been superb, a fair degree of extra pre-selection for the RX , better than with hi pass or low pass type ATUs and the ability to virtually obtain a match at any given QRG with the help of the variable antenna link. The trade-off is of course the additional element (antenna coil) needing to be positioned, yet the advantage you'll get is amazing and will I think, easily outweigh the bother of extra tuning . Once you have found the exact position for your antenna the coil position should be marked accordingly. A gear drive for the main tuning capacitor should be helpful, although with my prototype version I am getting along fine without one. If you plan to include an SWR indicator make sure it is well shielded since a lot of RF will be „floating around" as can be imagined with a parallel tuned circuit in place. Needless to say that a solid RF ground connection is needed as is true for any ATU. Make sure you leave enough ‚metal free' room around the airwound coil. Hand capacitance may occasionally occur with the input capacitor being „hot". Proper positioning and a plastic shaft connection will cure the problem. The max. RF power applied on a trial bases has been 50 watts, without any problems.
With the other available variometer I have constructed a prototype top band version applying the same principles, but without removing coil windings. So far the results look promising.
The values of the variable caps are as follows:

Input C : 500 pf (½ of BC tuning cap)	160m version : 1000 pf (BC)
main TC : 350 pf (transmitting type)	160m version: 1500 triple (BC)
	alternatively 1000 + 500 air (fixed)

I didn't have a chance to test the system with random, loops or long wires but I would imagine it working equally well since the number of turns of the antenna link coil is 20 !
Please let me know about your QRP experience with this extra twitch Z-Match (drkaipert@yahoo.de)

ANTENNAS - ANECDOTES - AWARDS

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

RAMBLINGS FROM AN OLD TIMER

G8PG

We tend to use only copper wire for our antennas,but galvanised iron wire in good condition is also an excellent conductor of rf. So, if you are operating /P ,there is a nice shiny galvanised iron fence handy, and the frequency is right for NVIS,try hooking the rig on to the top wire of the fence. It is also worth seeing what happensif you use the bottom wire of the fence as a counterpoise for NVIS. Barbed wire in good condition also works well. Indeed just after the end of World War Two a guy stationed at a remote oasis on the Egypt/Libya border found enough junk to build a 14 MHz rig, built a two-element beam out of barbed wire, and worked the world Another example of its use was when a U.S. M.W. broadcasting station (WOR Newark ,N.J.?) had its entire 120 half wave copper wire radials stolen one night when the TX was off the air for routine maintenance. The system was replaced using barbed wire with no loss in efficiency and a big saving in cost. The barbs on the wire also made it very unattractive to thieves. The 120 half wave radial counterpoise is probably the most efficient there is, and it dates back to the early 1930s when it was introduced by the U.S. Bureau of Standards (later replaced by the FCC) as a standard for M.F. B.C. stations. A version using 120 quarter wave radials can also give useful results. It is used by an M.F. station on the small ,rocky island of Aruba in conjunction with a quarter wave vertical and despite the poor ground efficiency is over 50%. While the big radial system is ideal , smaller couterpoises can also be effetive. In QST for February 1983, pages 21-25, K6CFU,W3ESU, and K4HU describe the development of a 300x200 foot oblong counterpoise system for 1.8 MHz. It consists of an outer oblong of wire with 36 equidistantly spaced radials attached to it and run back to the base of the antenna. Using this sytem with a loaded antenna less than 40 feet high they made 1.8MHz W.A.C. with 100W of SSB. The article covers many,many other aspects of counterpoises and a lot of information on ground conductivity.The three authors were all retired radio engineers of great experience. The system can obviously be scaled down for the higher bands, for example on 28 MHz the oblong would be only 37½ x 25 feet. As the system is non-resonant it may be possible to make it smaller without too much loss of efficiency, so further experimentation would be well worth while.The article also covers measurements of ground conductivity and the results obtained. One important finding was that where grund has been cultivated and chemical fertilisers used over a period of time the ground conductivity is greatly improved. This is a really important result as it allows one to improve the ground conductivity while at the same time pleasing the XYL ! Returning to the subject of half wave and quarter wave radials , some work by Rockey,W9SCH, could be pertinent. In all old antenna books the "UpAnd Outer" (quarter wave vertical,quarter wave horizontal centre fed) is shown with the horizontal section high above ground. When Rockey erected it with the horizontal section only 4 feet above ground, however, he found that to balance the current in the two halves he had to reduce the length of this section by 25%. This raises the question of whether the same result would apply to a multi-wire counterpoise erected close to ground? If so, on 3.5 MHz for example, one could reduce the length of a half wave radial from 130 feet to 97½ feet . It would be well worth someone investigating this more fully and letting us have their results for publication. Rather a short AAA this time with no illustrations, but losing my XYL Margaret after 62 years of marriage has meant re-organising my life and this has taken a lot of time. Hopefully we will be back to normal in the next issue of SPRAT..

COMMUNICATIONS AND CONTESTS

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

I have now moved permanently to the new Kent QTH that, as I said last month, does not offer any possibility of an outside antenna. I've installed a small 'squashed' doublet in the roof space, and have been very surprised how well it performs on 60m and above. The one factor in my favour is that it is a three-story house, on high ground, and so things have worked out better than I dared hope. The shack is very comfortable, with plenty of space for equipment, components, and soldering iron.

Unfortunately, one casualty of the move was the Winter Sports log entry from Victor, **G3JNB**. It was an excellent log, with QRP QSO's on 13 bands with 19 different DXCC countries, using 8 different modes, including SSTV. My apologies Victor for leaving your fine entry out of the listings in the last issue, and glad you had lots of fun.

YEOVIL AMATEUR RADIO CLUB FUN RUN 2005

My thanks to George **G3ICO** for the results.

He says: Thank you for supporting the 2005 Fun Run. Some thirty five stations in six countries took part this year. Fourteen entries and two check logs were received.

Results:

	Points Claimed / Awarded			
	80m	40m	Both bands	Power used
G4PRL	590	460	1050	4
G3GC	551	438	989	5
G3YMC	538	399	937	5
OK1FVD	380	410	790	5
G3CQR	440	312	755	5
G4DDX	435	285	720	5
F5VJD	507	275	720	5
DL2BQD	389	255	644	5
G3MCK	572	0	572	5
G4ARI	550	0	550	3
PA0RBO	295	203	498	5
G3WNI	235	190	425	5
G3XQX	070	250	320	5
DL4NSE	0	60	60	10
G3ICO	295	365	660	5

The winners of each section are therefore:

40 metres G4PRL with 460 points.
80 metres G4PRL with 590 points.
Both bands G4PRL with 1050 points.

The Station consistently using the lowest power was G4ARI who used 3 watts throughout the event. DL4NSE's claimed score is included out of interest, but his power was in excess of 5 watts.
Thanks to GW4ALG and F6GGO for their Check Logs. There were no SWL Reports. Some stations did not operate on all of the evenings.
Thanks to the operators of the Bonus Stations, especially 2E0ATZ who took over when DL2WRJ had to withdraw. We did try to publicise the change of Bonus Station and apologise to those who did not receive the information. Participants' scores were corrected before adjudication. We are also sorry for the confusion caused by the typing error in one sentence, giving the wrong date.

Number of QSO's made by the Bonus Stations,

	40m	80m	Total
GB2LOW	52	54	106
2E0OOO	66	71	137
2E0ATZ	25	16	41

As all of the Bonus Stations had unusual call signs they were called by a number of stations not taking part in the event, taking up valuable contest time. 2E0ATZ suffered from very high noise levels.

WQF QRP PARTY (World QRP Federation) 2005

My thanks to Oleg **RV3GM** for the following results:

		Claimed				Confirmed				
	CALL	QSO	PTS	MULT	TOTAL	QSO	PTS	MULT	TOTAL	% CFM QSO
1	RW3AI	30	36	8	288	12	16	5	80	40
2	RU2FM	19	19	7	133	10	10	6	60	52
3	I2AZ	27	27	6	162	9	9	4	36	33
4-5	RK1NA	12	14	7	98	5	7	5	35	42
4-5	F5VHE	14	13	6	78	7	7	5	35	78
6	UN7SEE	3	9	2	18	3	9	2	18	100
7	LA8PV	5	5	3	15	4	4	3	12	80
8	UA4ARL	7	9	5	45	4	6	2	12	57
9	RV3GM	3	3	3	9	3	3	3	9	100
10-11	UA3AAP	1	1	1	1	1	1	1	1	100
10-11	RN6AL	4	4	3	12	1	1	1	1	25

160m QRP CALLING FREQUENCY

I'm not sure we are closer to resolving this question, but SPRAT 122 has prompted a couple of responses. The first is from George **GM3OXX** who says ," Just a wee point about shifting the qrp calling freq above 1.850mhz. I have just recently renewed my licence, and on reading the full terms handbook I noted that there two power levels allowed on top band: from 1.810-1.850 it's 400w (26dbw) and above 1.850-2.000 it's 32w (15dbw), which means all the 'normal' top bands ops will never go above 1.850 Hi, and the chances of being heard by the normal active stations are less if you move the QRP calling frequency above 1.850, so if possible can we have a frequency in the active part of the band."

Jimmy **G3HBN** says, "Well, we all know that 1843 is useless and quite out of the window. For years I have wondered about this. To me the obvious frequency is 1836. This would

keep it in line with the '6s' coz we seem to like having a 6 in our frequencies. It is usually clear and it is well away from the DX end of the band. As for the fone end, 'fraid I don't know much about that but would have thought that something around 1956 or up the top end somewhere would be suitable. Mebbe the SSB guys have got some input there." So, come on you 160m chaps, how do we resolve the issue? Answers please, on a postcard!

I know I've been a little lax of late in not prompting more of you to submit logs for the various G-QRP Club events. The only excuse I can claim is my house move, but two such recent events received disappointingly little support.

The first is the **CHELMSLEY TROPHY** for **2004**. I hope they won't mind me calling them "The Two Old Faithfuls", but Dave **G3YMC** and Steve **GW4ALG** have contested this award for some years now, and are the only two entrants this time around. Both had a good year, working plenty of DX, despite the less than wonderful conditions, and were able to submit first class (and fascinating) entries.

One of Steve's major projects during 2004 was to continue to collect information regarding his assertion that the ionosphere is not as effective as it used to be, and trying to answer the question "Is Ionospheric Propagation In Decline?" He thinks it is, but points out that finding objective evidence is proving to be difficult! In the meantime, he spent plenty of time with the soldering iron, and also worked a total of 89 DXCC. The rigs in use during the year were a scratch-built 80m 5W tcvr, a Multi-Four VXO 5W tcvr, a kit-built Elecraft K2 at 5W, and (occasionally) an IC756. Steve's antennas were an inverted V doublet (105' top), and a 10m vertical, remotely tuned.

Using his Elecraft K2, 5W CW into a 60' wire at 25', and loaded vertical for 160m, Dave totalled 148 different DXCC countries within a total QSO count of 3990! His two-way QRP QSO count was 94, with 12 DCXX. His efforts meant he finished about half way up the CW ladder run by G3WGV, where most of the other entrants are QRO. **G3YMC** is therefore the 2004 Trophy winner, and deserves our warm congratulations.
As he was the only member to submit an entry, the winner of **CZEBRIS 2005** is Brian, **GM4XQJ.** Using an Elecraft K1, with 5 watts of CW on 20m and 40m (into a TH-3 and W3DZZ) he scored 51 points on 20m and 35 on 40m. Well done Brian, and thank you for supporting the event!

If it weren't for the exceptionally poor HF band conditions, I'd be trying to fill a few more pages in the log, especially as I am keen to see what my compromise antenna will allow me to work, but it looks as if I may have to wait until the Autumn. However, I don't want to wish the summer away - and perhaps now will be the time for portable activity from exotic holiday locations. Pack that little rig in the suitcase and see what you can work while you are away.

Have plenty of QRP Fun – deadline for the next issue is the beginning of August.

72 de QRPeter

MEMBERS' NEWS

by Chris Page, G4BUE

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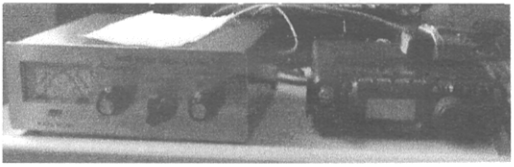
E-mail: g4bue@adur-press.co.uk

To those who have noticed my new photograph above, I haven't suddenly aged! I had used the previous one for more years than I care to remember and a recent move into a new shack prompted me to also have a new photograph. The new picture shows my present station, two Elecraft K2/100s set up for SO2R (I have sold the Ten-Tec Omni VI) with the Ameritron amplifier for QRO use (and which I anticipate replacing with the new Elecraft KPA800 amplifier which is rumoured to be available in the autumn).

I put the question raised by **G3MCK** in the Spring 2005 SPRAT *Members' News* about using /QRP to make a QRP QSO with a DXpedition after you have made a QRO QSO, to **G3SXW**. Roger is one of the UK's leading DXpeditioners and he replied, "The particular scenario described is perhaps the closest to being an 'exception to the rule' but I still feel that it is a bit unfortunate - operating QRP does not justify making duplicate contacts. QRPers should not expect special treatment. They must compete with the rest of them. A true-blue QRPer would make his first contact with QRP rather than having to resort to QRO. And he would not allow his QRP enthusiasm to disadvantage others in the pile-up by making duplicate QSOs and by using up valuable time sending redundant information (/QRP). The main point, of course, is that DXpeditions usually have limited time available on the bands. They almost always leave a pile-up unsatisfied when going home. It is therefore selfish of anyone to call a second time as this deprives some other DXer of his first QSO. One solution might be to make the QRP second QSO on a different band, maybe concentrate on getting the first (QRO) contact on a somewhat more difficult band. Another suggestion: on the rare occasion when a DXpedition is CQing without replies he may be glad of your duplicate QSO just to know that he is getting out and the band is open. It is a shame that /QRP consists of lengthy characters on CW, so that adding this to the callsign serves to make the transmission often twice as long". Lots of interesting and controversial points raised there. What do you think?

G3HBN writes, "Got SPRAT today and saw **G3MCK** is talking about using /QRP when working DX, which I don't agree with. QRP can be sent in three letters after giving the report to the DX station which is what I do and is always appreciated. I think Gerald's remarks are suggestive of 'having ones cake and eating it'. The operator must make up his own mind whether or not he wants to work the DX station with QRP or QRO. He cannot expect to have it both ways surely? If he gets through on QRP, fine he's worked the guy, if not he can go to QRO and still work them".

GM4CXP's 1992 OXO works on 80, 40, 30, 20 and 15m and Derrick said his biggest thrill was to QSO the designer **GM3OXX** three times as **EA8/GM4CXP** over Christmas and the New Year (see picture below of Derrick's EA8 equipment). Writing on the *G-QRP Reflector*, he says George "is a super guy with a great sense of humour and what he can achieve with his 1W and loop antenna from away up in north GM these days is incredible! Good on yer George if you ever get to read this!". Another

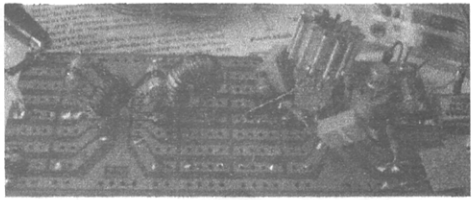


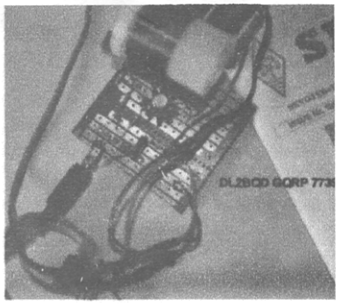
GM3OXX admirer is **ON4MIC** because it was one of George's articles that started Eric on QRP.

GØBON has been QRV since 7 April with his Brent transceiver at 2W, homebrew ATU and W3EDP antenna and is, "Quite pleased with the peformance so far". Ivan's best QSO is **OJØJ** and he has been really surprised at what can be achieved with QRP. Colin, **G3VMU**, says, "Congratulatations to **DJ3KK** on his PIC based frequency counter in SPRAT 122. Built by Bruce, **G4KZT**, and a spare for me. How does it do so much with so little code? I had it working up to 30MHz with the 12F629 PIC".

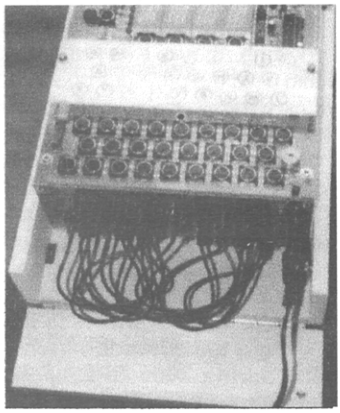
Too late to report in the Spring SPRAT, **RV3GM** sent details of the annual Russian DX Contest on 19/20 March which has a Mixed QRP category. Oleg says the RU-QRP Club sponsor a trophy for QRP winners. Oleg later reported making 250 QSOs on CW with 5W with his K2 including a few JAs, VK2, 9K and JW. **DJ7ST** reports logs were received from 25 countries for the 17th Original QRP Contest in January. Hal says they were disappointed with the small number of logs from G, "Since it is regarded as being the mother country of QRP". **M1RAL** QSO'd ZD8, D4, KP4 and PY with 5W from his FT-817 to a W3EDP antenna on 15m in the CQ WPX SSB Contest. **GM4CXP** made 36 QSOs in the EA QRP CW Contest in April with 4W from his FT-817ND an two x 16 metres inverted vee tuned doublet (open-wire feeder) at 25 feet.

IK2KBO reports the 5th Leonessa QRP International Contest will be held on 25 September (0600-1200z on 2m and 1200-1800z on 20 and 40m), CW/SSB, maximum 5W, various classes. Full details from Marino. The RU-QRP Club were QRV 9 May as **UE3QRP/1** from Pulkovo Peaks near St Petersburg to celebrate Victory Day. **G3XBM** reports 152 members of the VHF AM Group around the UK; join at <VHFam-subscribe@yahoogroups.com> and an amazing 653 members of the Miracle Whip Group; join at <miraclewhip-subscribe @yahoogroups.com>. Roger is using his Fredbox transceiver again, 10mW AM handheld for 2m, and has made two QSOs with it. He now plans Fredbox 2 with DSB.





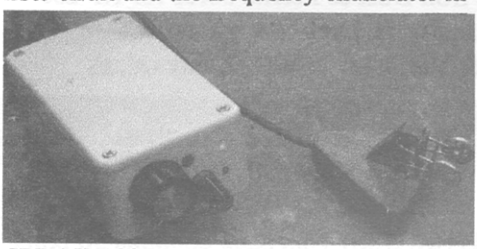
G3NFB attended this year's QRP Meeting at Pottenstein on 22/23 April along with 45 QRPers from DL, HB, OE and G. A nature visit for the wives, the technical programme, club station **DLØVLF** QRV, social events both evenings and discussions on adventure radio and the future of the Pottenstein Meeting made up the week-end. Jim writes, "It is evident that the DL section of the G-QRP Club is very strong and well supported. The equipment and technology demonstrated was, in many cases, state of the art and of a high standard of construction. Several of the rigs and test equipment displayed contained PICs and SMD. Even miniaturisation of antenna tuners was demonstrated". The photographs above from **DL2BQD** show (top) Dieter's Minimal Art Session (build a rig with minimal parts) entry based on a **DJ1ZB** design. It has 15 parts, gives 250mW output and Dieter made four QSOs with it in 20 minutes on 80m. The middle photograph is Dieter's One Transistor from



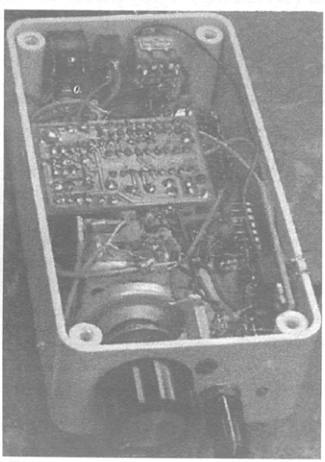
SPRAT 105 and the bottom photograph is the Enigma model built by Willy, **DJ6DU**.

On 21 March, while working on his computer, **GØKYA** was listening to an apparant dead 20m band when he heard a 599 CQ call on 14058kHz (the FISTS QRG) where he happened to have left the VFO. Steve was surprised to copy the call as **8R1J** and frantically called him while he worked a few stations before vanishing. He says the experience taught him (a) not to assume a band is dead, (b) the value of monitoring a single frequency and (c) the power of CW. After being QRT for 18 months, **G3PTO** is QRV again from Mula as **EA5/G3PTO**. John says he will be pleased to meet old and new friends on the 20m QRP QRG.

KA5ELD is building some Howes kits but needs the DCS 80 RX board to complete an 80m transceiver. If you can help Ken with a board or partly built kit, please contact him at PO Box 65135, Lubbock, TX 79464 or <ketner@arisbeassociates. com>. **G4NWJ**'s new 80m 1W rig (pictured below) incorporates the 'huff and puff' stabiliser ciruit and the frequency enunciator in



SPRAT 122. All the components came from Jim's junk box and he has used it to work 37 DXCC with it in the last few weeks.



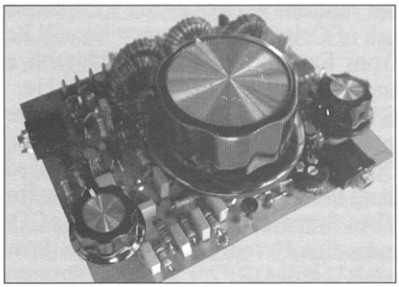
K 2 Q J, like me, often operates from Florida during the winter. Bob uses a SGC SG-2020 and random wire over the roof house just south of Orlando. In August he will be QRV from Farsund as **LA/K2QJ** with a HW9 and W3EDP wire around 7030kHz.

G4GTU has been QRV for a year after being more or less QRT for the last 20 years, and a QSO on 15m with **W1DMD** typified everything that is good about our hobby for him. When Steve answered **W1DMD**'s CQ, John immediately replied, "Hi Steve, how are you? RU still QRP? Last wkd 22 years ago". Steve reached for his first log book and it fell open for 26 March 1983 showing his last QSO with **W1DMD**! Steve was also very pleased to "Out-gun the QRO brigade" in a pile-up for **HC8L** using his K1 and MFJ1796 vertical mounted horizontally. He writes, "Listening and observing the DX station's operating behavour and then choosing your method and moment really pays off. In this instance, I practiced rapidly zero-beating with several stations that the HC8 was working (since he had to be listening exactly there) before finally 'tailgating' one of those stations and squirting my call in. The HC8 came right back and even acknowledged my 5W which I had managed to slot in".

Congratulations to **WB3AAL** who worked **FT5XO** on 30m with his K1 (5W) to a HF9V Butternut. Congratulations also to **G3ROO** who worked his first VK on 80m on 3 April. Ian couldn't sleep and after a nip of brandy, turned the rig on and heard **VK6HD** calling CQ. Ian worked Mike with 5W to a quad M antenna (a 40m quad loop hung from the 60 feet tower with 40m traps at the side mid-points and tails to resonate on 80m). I imagine Ian slept very well after doing that!

G3TLH has built the K2 with the 160m, ATU and internal battery options. Ian says he has made many contacts with 5W to his attic-mounted loop and now hopes to put up an antenna outdoors. Although he is very impressed with the K2, he still uses his old 'boat anchor' Racal RA1772 receiver which he says compares well with the K2 despite being 40 years old.

Don't forget to let me know how your summer goes, including pictures, by 20 August, please.



Three new kits!

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The Locking - major CW TCVR for 20, 40 & 80m. 5W on 13.8v - switchable filters, sidetone, muting etc. Cer res VFO for 80, + xtal mix for 20/40 - £99 + £2

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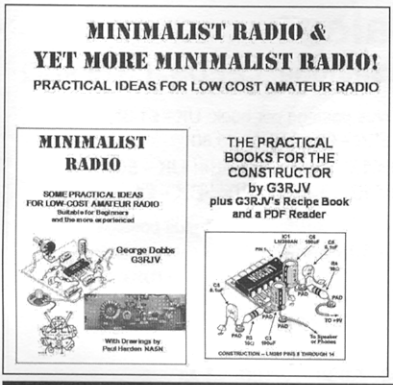
QSL Cards from Nasko - LZ1YE

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



Minimalist Radio books on CD

The two books **'Minimalist Radio'** and **'Yet More Minimalist Radio'** are sold out. But I have succumbed to the temptation to issue the material on a CD.
The CD contains both books plus the G3RJV Recipe Book – all in PDF format for reading and printing.
There is a PDF reader on the CD for those who need it.
Order from G3RJV – address on inside over
The CD is £5 including UK postage [€8 in EU]
Bill Kelsey has stocks in the US at $20.

N.B.T.V.A

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

GQRP Club Sales

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

HW handbook by Mike Brice – new edition. £10 } plus postage per book: UK - £1.35;
GQRP Club Antenna Handbook. £5 } EEC - £3.20; DX - £3.80

6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out **£12** } plus postage: UK - 50p;
6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out **£12** } EEC - 80p; DX - £1

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] £6 pair } plus postage
Crystals – HC49/U wire - **3.575MHz 3.579MHz and 3.582MHz - 30p each** } (ANY quantity)
SA602AN - £1.75, MC1350 - £2.00 } 35p (UK),
MAR-4 RF amplifier - £1.50 (limited stock) } £1.00p EEC,
HC49U (wire) crystals for all **CW** calling frequencies – 3,560, 7,030, 10,106, } £1.30p (DX)
14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each }
Miniature crystals (watch crystal size – very low power) – 3.560, 7.030, 10.106, } All
18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each** } post
Ceramic resonators – 3.68MHz & 14.30MHz – **50p each** } free
New item (thanks to GW0VMR) – 3.58MHz (limited quantity – 2 max) – 50p ea }
Varicap diodes – MVM109 – 40pF @ 9v, 500pF @ 1v. 75p each } max of 2 } if
– MV209 – 5pF @ 1V, 40pF @ 12v 25p each } per member }
CA741 op-amps 8pin DIL – **5 for £1** } ordered
IRF510 FETs £1.25 each; Electret mic inserts – 10p each }
2SC536 transistors (npn) T-100MHz, hFE-320, VCBO+40V) - **5 for 50p** } with
BFX29 transistors (pnp) T-100MHz, hFE-125, VCBO-60V) - **5 for 50p** } heavier
MK484 radio on a chip - £1.00 inc postage & circuit diagram. } items

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
FT114-43 – 80p each (for postage - counts as a pack of 5)
Plus postage – up to 5 packs = 35p (UK), £1.00p (EEC), £1.30 (DX); 5 – 10 packs = £0.70, £2.00p, £2.60 etc.

Sprat on CD (1 to 109) - £10 inc postage.

G-QRP Club mouse mats £3.50 each inc post – UK, £4.00 EEC & DX

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 55p, 80p, £1 each)**

Back issues of SPRAT are still available at 50p each. I have most issues from 78 plus a few earlier ones. UK Postage is 1st magazine – 45p, each additional magazine add 20p.

NB I am temporarily out of stock of the Drew Diamond book, also, I am out of stock of 7.2MHz resonators, Poly-varicon capacitors and NJ Club pad cutters (no more supplies expected), and 14.060 miniature crystals All the DDS kits are gone, but I still have some of the W8DIZ freq ref kits (Sprat 116) - £10.

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 Euros are uneconomical to us due to bank exchange charges! Visa/Mastercard. Please quote full card number/expiry date. We can only send the goods to the card owner's registered address. Sorry, we do not accept Debit Cards such as Switch or Connect.

MINIMUM ORDER for cheque or Visa payments is £5 – this will cut down on our bank charges.
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You can order via e-mail to g3mfj@gqrp.com and if you wish to send credit card details over e-mail, you can send them, split into two parts (for security), to me, via my two different ISPs – g3mfj@gqrp.com and g3mfj@gqrp.co.uk

You can check availability (or even order) on (+44) (0)113 267 1070 – But only if I am able to take the call!! Please do not expect my family to be able to discuss club sales matters or take orders – I will have to withdraw this facility if members keep calling and expect my wife, or my children, to know the characteristics of an SA602 – or even know what one is!!!!! You will have to call back when I am in.