



SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 167

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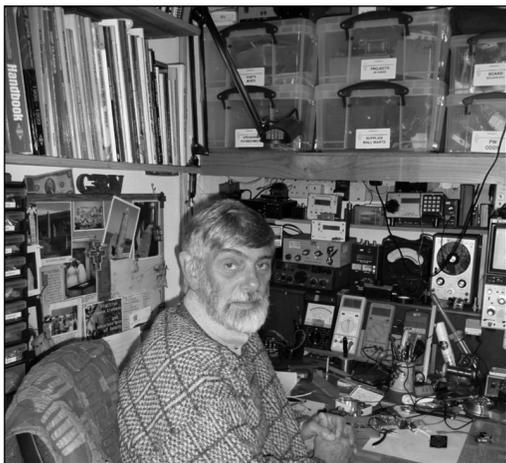
SUMMER 2016



Happy Birthday GM3OXX – See Page 39

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Frequency Agile Paraset ~ 160m AM ~ Easy 4-6 Converter
Adjustable HT from 12v ~ Antennas, Valves and Vintage
Valve QRP Day ~ Membership News ~ Antennas, Valves and Vintage
VHF Report ~ Communications and Contests ~ Members News**

JOURNAL OF THE G QRP CLUB



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Rev. George Dobbs G3RJV

Each year we award a special plaque for the winner of the W1FB Award. This is a special award, linked to SPRAT and member's own practical projects. The W1FB Trophy for 2016 is on the topic "Useful items and tips for Test Equipment".

As with all items for SPRAT (almost) any format or medium may be used. Ideally I would prefer items in MS WORD and in the preferred SPRAT format but we attempt to use any articles we receive. Contact G3RJV for a SPRAT formatted page. SPRAT is a forum for members, with all levels of technical expertise, to share ideas.

Please read carefully the follow-up item by G3MFJ about the future of the Rishworth Convention. We would like it to be special in this year final.

72/3

G3RJV

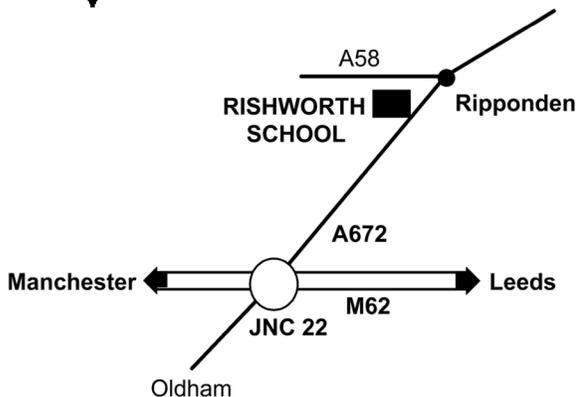


FOR THE FINAL TIME! THE G QRP CLUB MINI-CONVENTION

(in conjunction with the Halifax Radio Society)

Saturday 22nd October 2016

The Rishworth School, Ripponden



OPENS AT 10.00am

ADMISSION £3.50

DOORS OPEN 10am

LARGE SOCIAL AREA

LECTURES ON

QRP SUBJECTS

BRING & BUY - SURPLUS

JUNK - COMPONENTS

KIT TRADERS

FOOD & DRINK ALL DAY

WITH THE FAMOUS PIE AND PEAS



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

**Look for the G QRP Sign on the left
after you have passed all the sheep!**

CONSTRUCTORS EVENING (Friday Evening before the convention)
Including a Buildathon to be held at the Premier Inn, Salterhebble Hill,
Halifax, HX3 0QT. (Tel: 0871 527 8486)
www.premierinn.com/en/hotel/HALPTI/halifax-south

Our suggestions for local accommodation:

The Premier Inn, Huddersfield West. Junc 24 on the M62 : HD2 2EA
www.premierinn.com/en/hotel/HUDNAG/huddersfield-west

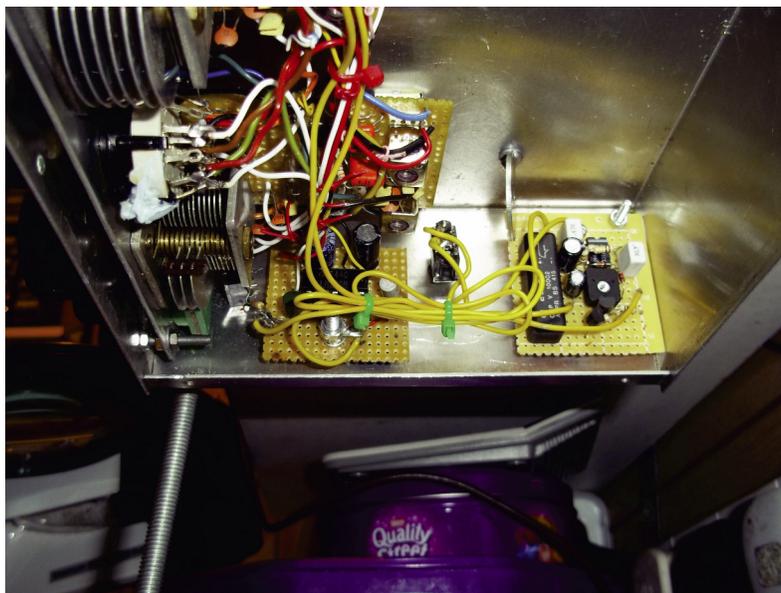
The Premier Inn, Milnrow. Junc 21 on the M62 : OL16 4JF
www.premierinn.com/en/hotel/ROCTHE/rochdale

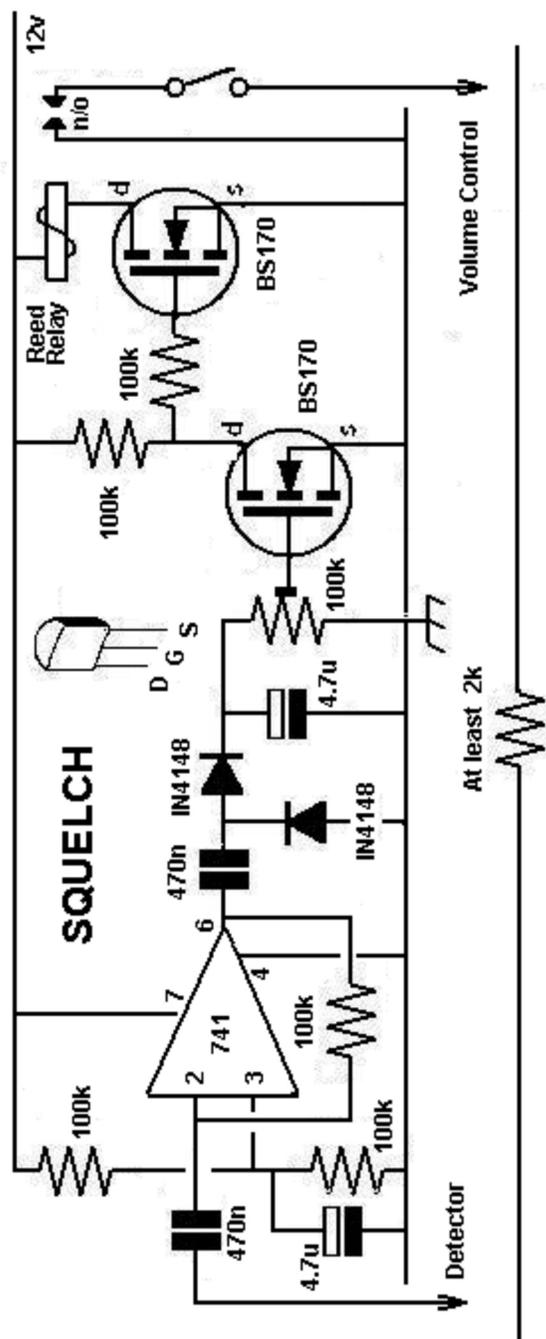
The Turnpike Inn, Rishworth, excellent but quite expensive.
(01422 822789) www.turnpikeinn.com

Add-on Squelch

Peter Howard, G4UMB, 63 West Bradford Road Clitheroe Lancs BB7 3JD

I have been listening to AM and FM using my homebrew 160m80m AM receiver (See Sprat No.138 page 21) but have been annoyed by the amount of QRN it picks up lately in comparison with a proper commercial rig which has FM with squelch. So I built this simple add-on Squelch circuit to mute the QRN on my receiver. It's a circuit that I had to tailor to my requirements so if you build it and are not bothered about messing with your receiver you will need to experiment where best to fit it. It needs to go after the detector and before the volume control and have at least 2k of resistance between the input and output so that the muting effect does not overly reduce the wanted input signal. To set up you must carefully adjust the preset resistor so the circuit is at the right sensitivity. Instead of having a Squelch level control like a proper receiver does I found that adjusting the RF gain control on my receiver gave the same effect. FM and AM are the best modes to use it with. but if you use squelch on CW reception it does work and sounds similar to auto break in. The circuit is just a straightforward AF amp using a 741 IC The signal is then rectified into a DC voltage that powers the BS170 transistors. I chose the muting switch as a reed relay to stop any sound breaking through the circuit. I have included a switch in series with the mute switch to turn it off. The circuit has been useful to me in listening to FM on 160m using my simple AM Homebrew receiver by slightly off tuning to the edge of the signal to achieve a form of FM detection.





RF Voltage Source Test Generator

Mark Dunning, VK6WW marcommd@tpgi.com.au

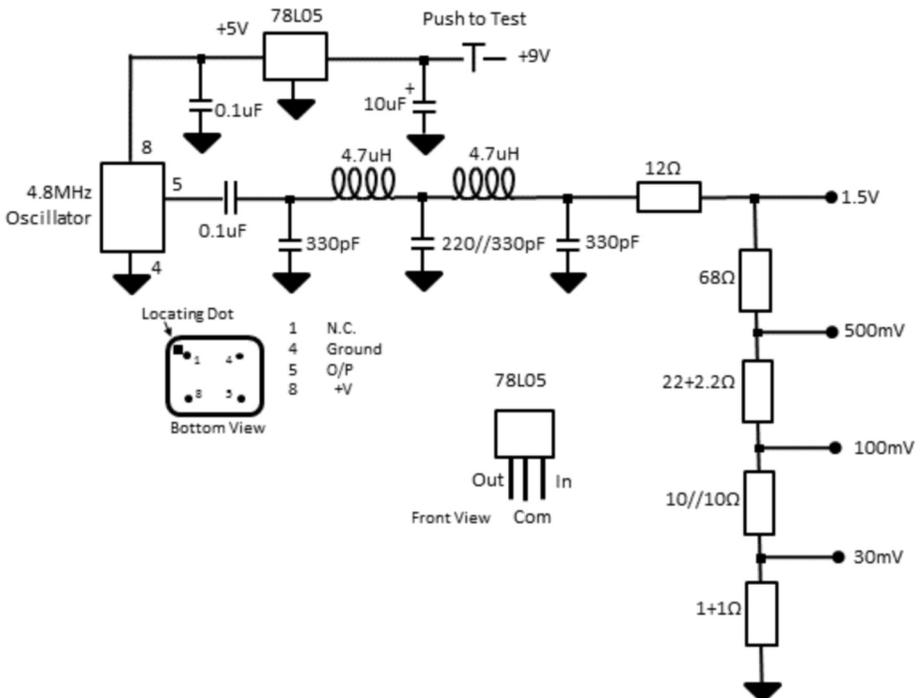
RF Voltage Source Test Generator

I wanted to test some ideas and diodes for RF probes. I soon got tired of setting up my signal generator and I was not 100% confident that it was a sine wave anyway. I looked in my junk box and whipped up a test generator. It is based upon a surplus 4.8MHz CMOS oscillator I acquired some time ago. This sort of module seems widely available now quite cheaply. Just be careful to check what the supply should be. They used to all be 5V but 3.3V or lower is becoming more common.

The square wave output was filtered back to a sine wave and a stepped attenuator and termination load for the filter provided using screws as test and mounting terminals. The choice of 4.8MHz was based upon what I had on hand and the fact that QRM from it would not interfere with any background listening while I was tinkering. Another frequency would be fine but the filter would need to be scaled to suit.

I have been surprised at the different performance of diodes of nominally the same part number from different suppliers. It seems that 1N34 is now a catch all for anything Germanium. The best performers seem to be some diodes I scavenged from old computer boards I was given 30 years ago.

73 Mark VK6WW



20th RED ROSE QRP FESTIVAL.

Sunday 3rd July, 2016.

NEW VENUE The Rose Centre (Lowton Civic Hall)

Hesketh, Meadow Lane, Lowton, Warrington. WA3 2AH

Times 11am to 3pm. Admission £2.00 Children under 14 free.

Easy access from all directions. M6, M61, M60, A580

Trade and individual stalls. Club stands, inc. RSGB, GQRP. Very low cost “Bring & Buy”. Sales of new and surplus equipment /components.

Large spacious halls at ground level. free car park, disabled facilities.

Delicious refreshments at QRP prices! Comfortable, well stocked lounge bar. Some tables available at £8 but please book early.

Contact Les Jackson, G4HZJ g4hzj@ntlworld.com 01942 870634

Many thanks once again for your support. Les G4HZJ GQRP 3443

QRP Labs

Kits & modules for QRP enthusiasts!

<http://qrp-labs.com>



Si5351A VFO kit, rotary encoder, IF offset etc.	\$33	£23.74	€30.28
Si5351A Synthesiser breakout kit	\$7.75	£5.58	€7.11
OCXO/Si5351A synthesiser – kit-built OCXO	\$16	£11.51	€14.68
Arduino shield for Si5351A kit, LPF/relay/etc. kit	\$14	£10.07	€12.84
Ultimate3S QRSS/WSPR/etc. TX kit	\$33	£23.74	€30.28
7-ele Low Pass Filter, any band 2200m to 6m	\$4.60	£3.31	€4.22
6-band relay-switched kit for plug-in LPF kits	\$16	£11.51	€14.68
Ultimate3S cut/printed AI box, accessories kit	\$22	£15.83	€20.18
QLG1 very sensitive GPS receiver kit, patch ant	\$23	£16.55	€21.10
Shack clock kit with optional GPS discipline	\$19	£13.67	€17.43

Order online at <http://qrp-labs.com> using PayPal.

Note: prices are based in US \$. Prices shown in £ or € are correct at time of writing but will vary depending on exchange rate fluctuations.

Three “Moxo” (modified OXO) QRP Transmitters

by Revd. Keith Ranger G0KJK G-QRP-C #8040

When Keith first submitted this useful article he offered an overview of his experiments and the development of the “Moxo” transmitter. This was followed up with a set of circuit diagrams and attendant practical notes. Rather than make life more complex, I have kept the material as it was submitted – enjoy Keith’s circuits!

In the Spring of 1987, licensed as VS6US as I worked with my XYL Catherine with the church in Hong Kong, I decided to try my hand at building a small and simple transistorised QRP transmitter, previous attempts having used valves. I came across a circuit I still think absolutely brilliant – the OXO transmitter by a man I’m sure we all hugely respect – George GM3OXX. I built it exactly as featured except for the PA transistor: a 2N4427 or 2N3866 device was not readily available so I used the locally easy to procure 2SC756, not a perfect equivalent but the best I could then find.

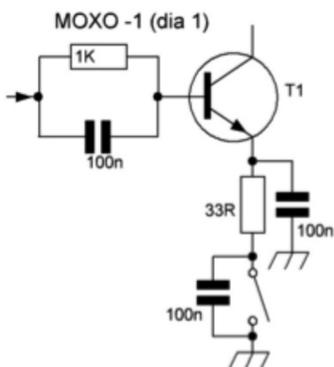
As in George’s original article (please see Diagram 1) I took the output from the PA collector via a ferrite bead with some ten turns of wire and a .01 capacitor to a homebrew ATU and an end-fed wire some 30 feet in length suspended by a bamboo pole to resist Hong Kong’s sometimes ferocious winds. I then called CQ countless times with no reply – and Hong Kong is a quite rare entity! Finally, Hiro JF4EPN in Hiroshima came back to a 14060khz CQ and gave me a RST329 report! The QSO was difficult but I still have his beautiful QSL card, featuring peaceful lakeside pagodas, so appropriate when one recalls how that city had to suffer the dreadful effects of the first ever atomic bomb.

After this, I looked again at G3OXX’s output circuitry and decided to shift the ATU into the collector circuit as per Diagram 2. Then I wound it as pictured and tried this new configuration on 21mhz. My very first CQ drew an instant reply from Ryo JA6SDR in South Japan, some 1,200 miles distant, my report was 539 and an excellent, easily maintained QSO followed. I used the new ATU arrangement on 14mhz and had similar success, with a few more turns on the ATU coil but again with a 1:3 turns ratio. I called the new transmitter “The MOXO Mk 1” and worked all the call areas of Japan with it, from JA0 to JA9, the furthest some 2,000miles away and I still have all the QSL cards from them. Other entities were also worked. The ATU tuning is sharp, I never received complaints of RFI or TVI, and recommend its experimental use if the original OXO circuit (with which I am so impressed) lures you into heating up your soldering iron!

Returning to the UK in 1989, and with the call G0KJK, I found things much harder. A W7 station who worked me in Hong Kong wrote – “My first VS6 in 58 years of hamming!”, but now I was just a small signal G station whom folk did not fall over themselves to work. So it was back to the drawing board again and the result was MOXO Mk 2 (Diagram 3). The idea is so straightforward that I imagine others must have tried it, but sometimes we human beings do not see the obvious! Someone has said that “an inventor is someone who sees what everyone else has seen but thinks what no one else has thought” (I imagine our respected George G3RJV who is an expert on quotations must have used it himself somewhere!). So the idea came to me of using 2 PA transistors in parallel, as per the diagram. The ATU arrangement remains the same but with more turns on the coil at 1:3 ratio. Two 2N3053 transistors were the PA devices used, their FT of around 100mhz makes them ideal for 40 metres, the 2N1711 is a possibly even better choice. The new MOXO was connected to a 66ft wire and tuned sharply. I got QSO after QSO with it at around 2 watts output and the commonest report was 579.

My problem here in the UK has been that the only QSO outside Europe I have ever achieved with a MOXO Mk 1 or 2 is with an EA8 station in the Canary Islands who gave me 339 and QSL-ed me. So I decided to add a further stage to George G3OXX’s original design (Diagram 4). This used a BD139 output transistor and with 12-18 volts input power easily generated 2-5 watts on all bands from 17-80 metres. It wasn’t long before QSOs with Brazil, Ivory Coast and the USA were in my log. I still use a variant of this circuit today, my recently published in SPRAT’s KR80.

Good luck if you try any of these OXO mods, please feel free to contact me if you have any queries, at keithcath@ranger144.fsnet.co.uk. Keep experimenting if initial success seems elusive, I did and it has reaped good dividends and given great pleasure. Good QRP hunting!



The original circuit of the OXO transmitter as featured in SPRAT. One change – I left out the keying transistor (BCY70) and placed the key in the PA emitter – as shown. The transistor is the 2SC756, but there are many alternatives like 2N4427 or 2N3866. See note below on the 2N3866 from the club sales

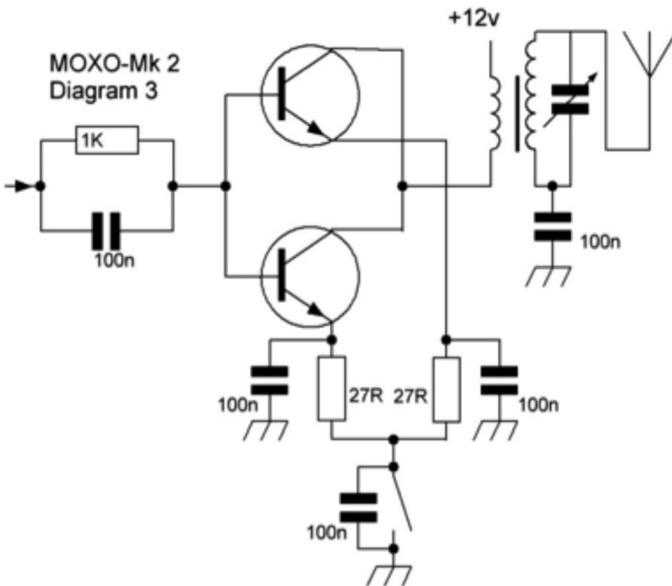
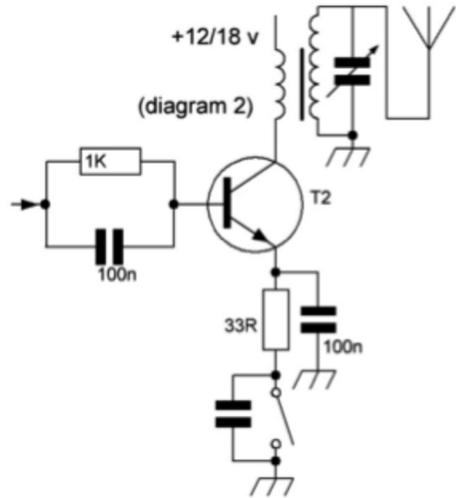
Diagram 2 is the Moxo Mk1 with the PA stage but no outboard ATU. 150pF polyvaricon variable,

1:3 ratio transformer.
 Try 3t/9t for 15, 4t/12t for 20, 10t/30t for 40, all on T68-2 core. Try 2N 4427, 2N3866 or 2N3053 OK for 20/80, But not so good for 15 or 17m.

PLEASE NOTE:

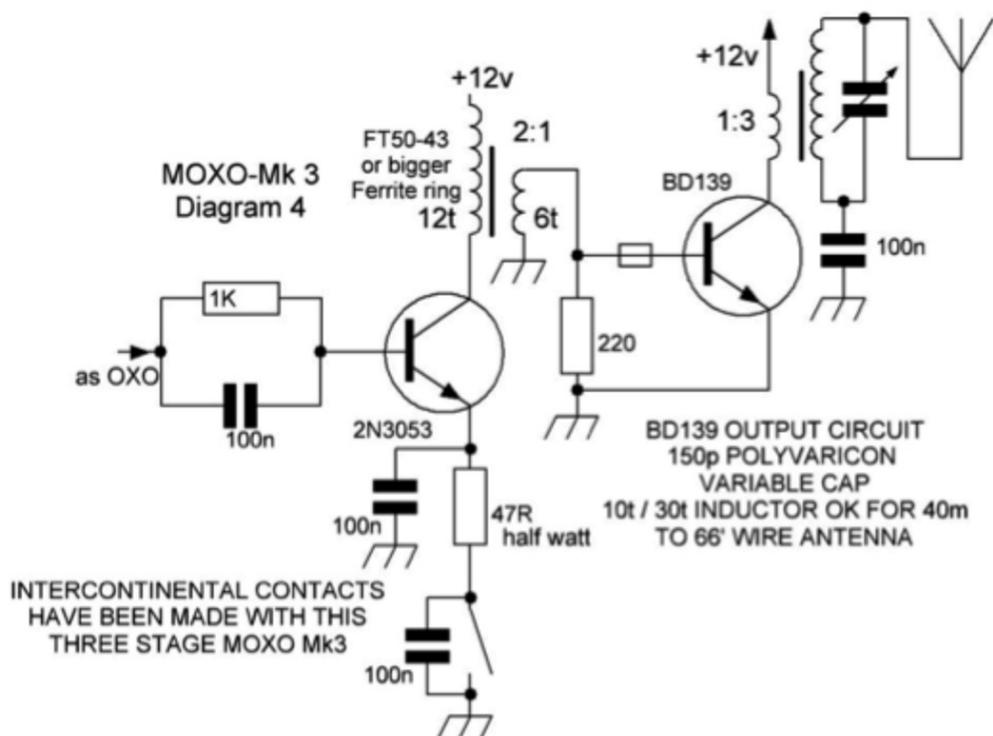
The club has a stock of 2N3866 transistors - 5 for two Second Class stamps

Or post free as part of a larger order



This is a very effective mod for 40m. Expect at least 2 watts out with 12 volts in and a 2N2222A as exciter. More RF power is available with 15 or 18 volts.

Four 40m ATU 10t/39t on T68-2



THE ZL2BMI DSB TRANSCEIVER

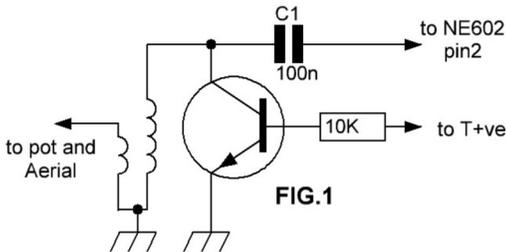
Update, tips and sourcing components.

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

Since the publishing of the circuit in Sprat some 5 years ago, many variations of it have been built around the world.

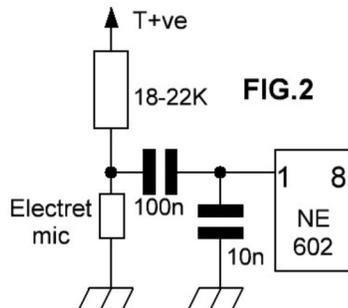
Although a short article describing some changes appeared subsequently, it is perhaps time to draw some of these together, along with successes and failures in obtaining components.

One of the first issues was the unbalancing of the NE602 which occurred on transmit with no audio. The fix is in fig 1, and involves adding a general purpose transistor (BC548 etc) to short the input to pin 2 (receive) during transmit.



A second issue relating to a “whine” when going back from transmit to receive, caused by audio feedback, I have not fixed - though Bob (ZL2ASO) and I discussed it and he added yet another “shorting” transistor. It cured the problem but leaves the mic “dead” for about 2- 3 seconds when going back to transmit again.

Another issue relates to carbon mics, which are now almost unobtainable or in bad condition. I have only just come up with a slight and simple modification (which still works fine with the carbon mics). See figure 2 - until I changed the rf bypass cap to 0.01 (rather than 0.1), it always sounded bassy and distorted - but now it seems fine. I think the 0.1 was acting as a high-cut filter in what was a higher impedance circuit.



The issue of “distortion” when using ceramic resonators, I had assumed was an inherent problem with resonators, since it didn’t occur with crystals. I had tried many things - but the frequency shift when grounding pin 1 or 2 via a 10k resistor persisted - though some rigs were better than others. Recently, after making the mod for the mic, someone told me the “fm-ing” was not there with a resonator and it sounded “perfect”. So I compared 2 rigs (one good and one bad) and finally discovered that the capacitance on pin 6 to 7(NE602) was VERY important; it needs to be large. However, if the capacitance 6 -7, and 7 - gnd were too big, the 40m crystals would not oscillate, though the 40m resonators were ok (80m was fine with either). Now the larger the caps, the further down the band I could tune with the resonators, and I really wanted to get the 7.2 meg ones to 7055. I just succeeded, but the 40m was down a bit in output with crystals, so I will eventually build another rig with a switchable cap on pin7 to gnd.

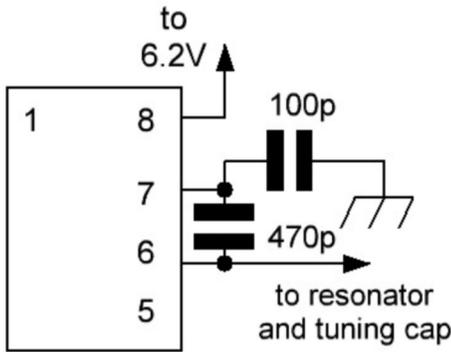


FIG.3

The final compromise for both 80 and 40m is in fig3. In some cases the frequency pulling when unbalancing is now almost imperceptible.

All the rigs are now 80/40m, which just involves switching the resonator/crystal (I use a socket, not a switch) and switching in extra capacitance for the receive tuned circuit. In our uncongested bands in NZ, I don’t usually use a filter on the final, especially when away in the bush - but simple plug-in filters for 80m and 40m could be used.

RF Amplifiers

I have spent a lot of time on rf amps in the last year or so, because when operating from the bush I need a bit more power for reliable comms. Fig 4 shows the general configuration for the 4 - 5 watt amp which is driven by the NE602. The key to getting the most out is careful matching of the stages as well as good finals! (more to follow).

The BC338’s are not the best driver. I managed to find some MPS6531’s, which are supposed to be equivalent to the 2N2222. However, I could never get the latter to perform as well as the former. I have recently come across a stack of 2SC2458’s, which are rated at 200mw. I left one running for 12 hours at 12v and 30mA, and it

didn't even get warm. So I'm using these now for the driver. I set the current to about 30ma, and watch it doesn't run away.

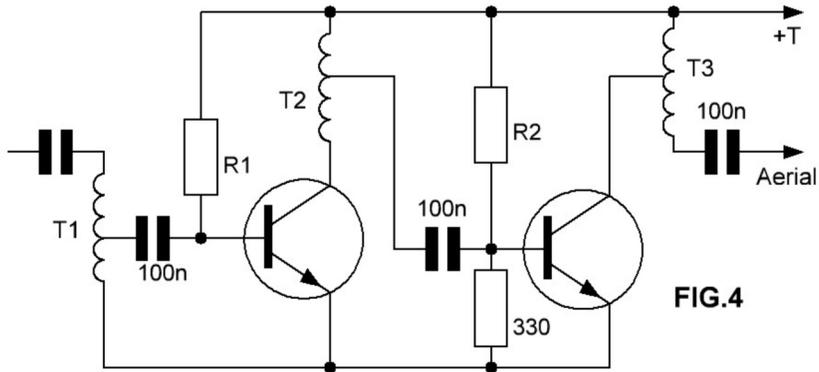


FIG.4

T1 is about 20 turns tapped at 5 turns on a SMALL ferrite bead. Using a larger bead, is more lossy I think.

T2 needs adjusting for the type of final you are using, but in general the lower the Ft of the final transistor, the higher the turns ratio. As examples, the VHF transistors like 2SC1971 (more on this later), and the SD1575 (NOT 2SD!!) and the 2SC2166 use a 3:1 step down winding ratio.. (Note - I had a number of the Thompson SD1575 but have not been able to get more). See below for the type of core for T2.

Others like the 2SC1984, 1096 1969 need about 4:1 ratio to get the best out of them. T3 is a 1:4 step up - a bifilar winding on a 6 hole bead (not a vhf type which looks about the same).

In the last few days I have landed a large quantity of ferrite beads - OD 6mm, ID 3mm and 3.8mm high. These were the same size as ones of no description which I have been using for the last 20 or more years.. However, the properties of the new ones are a bit different - very slightly less inductance and higher Q. They seem to work better than those I have used for years! One of the amps went to 7.5 watts output (from about 5 watts) on 40m when a new bead was use with the same number of turns So not all from China is bad! They also work well for T3 output transformer.

Buying components from "Ali-china".

I had many failures at first and have a boxful of transistors that just don't perform. I bought a bunch of cheap BD139's, thinking I could parallel them. Joke! They only did 0.5 watt on 80m!!

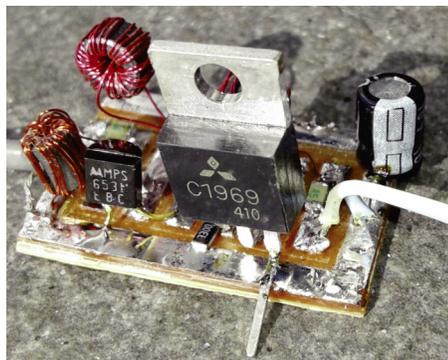
So I tried buying some vhf finals of which I had some good ones. 2SC2166 - useless. 2SC2078 - useless!

I had some 2SC1096 (which don't appear to be an rf transistor?), but they worked well and I managed to buy 20 of these (about \$US 40c each) which did 4 - 5 watts ok, but got rather hot. Fine under 3.5 watts or with heatsink.

So I spent a lot of time studying the photos on the website. You can't always tell, but I gradually learned what to look for. I also went through the TOWERS transistor book, looking at anything that seemed useful. And finally I got lucky!

Note David's comment in Sprat166, page 19 re the 2SC1971. I had no real idea how good it was or that it was equivalent to the SD1575. In trepidation I clicked the "buy" box, and 2 weeks later (for less than 40c each incl P&P), I received 10 of them. Oh joy! The leads were short and bent,

and had clearly been extracted from some equipment. That almost certainly meant they were originals. And they performed like magic - up to 6.5w on 80m and 5.5w on 40. So I ordered another lot from the same supplier. These arrived pristine (never used), but still rather dull like they had laid around for a long time. They also performed well. Out of the 20 there was only one dud. Note that the centre pin and tab are grounded (emitter).



I also managed to get some very good 2CS2166 (a bit dearer) which do 6+ watts. I bought other components the same way. About 50 electret mic inserts for \$US0.10 each. They were a bit variable in output, but at least a dozen were amazing. Pots - 10k miniature with switches. I had cooked at least 2 speakers while in the field - these were 0.25 watt and just wouldn't take the volume needed to overcome the background noise in a hut, or to be heard clearly outside. So I bought 20 of 27mmx0.5 watt speakers (about \$8 for the lot I think) and they have been really good. I got 20x 7200 crystals (HC18U) for a paltry sum - so decided to get another 20.

I have been moving crystals down in frequency using the inking technique. The 3686 go down to 3665 or lower; the Chinese 7200 go down to about 7170. I cut them open carefully around the base using a junior hacksaw and after adjustment, tack-solder the can so it can be removed again if needed. Some were done nearly two years ago and have not changed frequency. Note that the low profile cases (HC18/S) are no use for shifting.

I will try to put more details on the website of Richard Dyer, ZL2RDY at mightymessage.com (Yes, he's another vicar! You will need to scroll to the bottom of the page to click on the radio section)

Any questions - send me at the email at top of article. Have fun. ZL2BM

Frequency Agile Paraset

Nigel Evans, M0NDE, nigel.m0nde@gmail.com

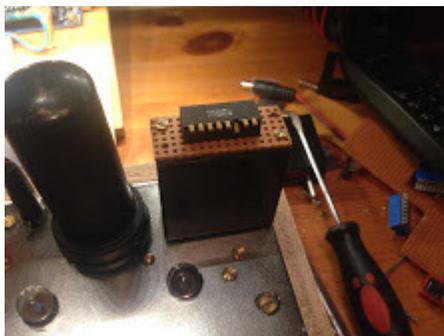
Having used my reproduction Paraset for some years I realised that, rather than hunting in boxes for suitable crystals, I needed them all in one box. I then remembered that Ian, G3ROO from Dover had put half a dozen crystals in a 10X crystal case. The problem with Ian's design that it used a rather rare to locate miniature rotary switch and the case had to be milled out to take the switch. I do not have such facilities in Burnham!

I then realised that DIP switches could be used with the slight disadvantage that on changing frequency to another switch position the previous switch had to be turned off.

My method of construction is now described

I purchased six HC49U crystals for 80M ranging from 3530 to 3580. Fred G4BWP kindly supplied me with a crystal case with screw on top and the correct size pins. Here is the method I used to I make a switchable crystal.

Remove the top of the crystal and take out the out of band crystal innards. Cut a piece of plain perf board the same size as the crystal lid ensuring that the dip switch will be located in the centre. Using the crystal lid as a guide drill the four holes in the perf board so it can replace the existing lid. Take a foot of 1mm copper wire from lighting cable and stretch it with a vice and pliers to make it straight and hard. Clean the switch pins and copper wire to ensure good solder joints. Bend the copper wire in an L shape making the length of the L the width of the switch. Carefully dress the pins over the copper wire and solder in place. Cut the copper wire leaving a stub of about $\frac{1}{4}$ inch. Stack the crystals in order and solder a piece of solid wire to the cases to hold these in place. I used some thin stranded wire for this being constrained by the width of the crystal case. One leg of the crystal needs to be soldered the switch pin the other ends of the crystals are all joined together. I shortened the crystal legs and used fine snipe pliers to form the crystal legs to make solid physical connections before soldering. Solder insulated wire to each leg of the crystal socket inside the case ensure it long enough to stick out of the crystal case by $\frac{1}{2}$ inch.



Train it with a kink to fold back in neatly into the case later when the lid is screwed on. Insulate the crystal cases with tape if the metal plates are still inside your case otherwise they will short the pins two connection pins. Tin these wires and solder to the line of joined crystal legs and the 1mm copper wire. Carefully ease the whole assembly inside the crystal case and screw on the lid.

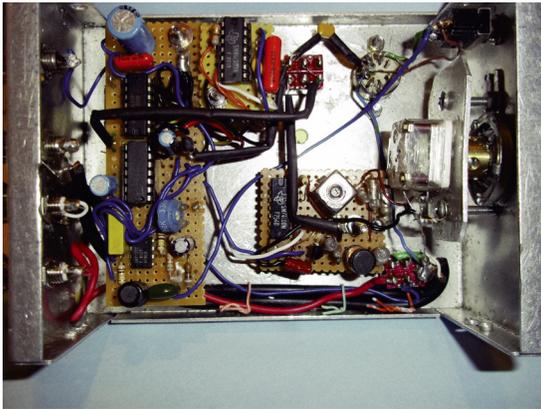
Small Talk 160m Transmitter on FM

Peter Howard G4UMB 63 West Bradford Rd Waddington Lancs

For the past 10 years I've have a regular chat on 160M every week using 5Watts AM using my Small Talk Transmitter (See Sprat 133 for extra details) with a station about 10 miles away. Recently because of QRN I have had to use a loop ant. to receive and a long wire antenna for transmitting. However AM is still noisy although the signal to noise ratio improves a lot using the Loop. We found the answer to getting rid of QRN was to use FM instead. With adjustment of the squelch control on my Yaesu receiver I can now hear a good clean signal.

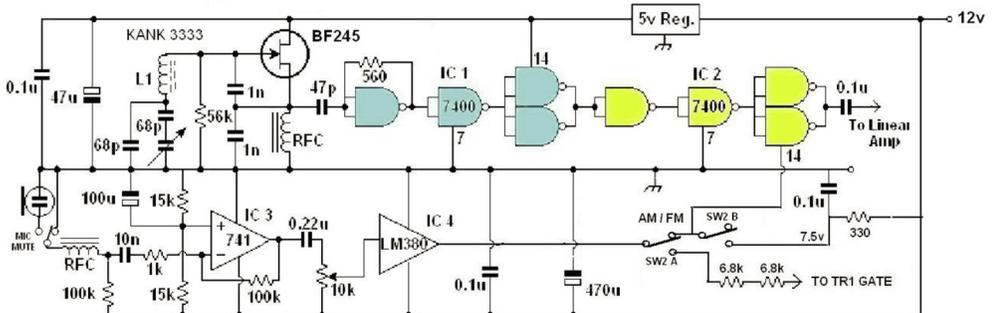
However the problem I had was I still wanted to run Homebrew but had no 160M FM transmitter so I set about modifying the Small Talk to make it suitable.

The circuit didn't need much work. It was a case of disconnecting the output of the LM380 mod. IC from the AM mixer IC to the gate of the VFO transistor. The two 6.8k resistors were chosen to allow enough audio through without stopping the oscillator. I had to supply the AM mixer IC with a new supply via the 330 ohm resistor. So a DPDT switch allows the transmitter to be used now on AM and FM. Unfortunately the only drawback is that the oscillator does not stay on the same frequency between switching because of the extra coupling on the VFO. So you can't switch modes during a QSO .



**SMALL TALK (Sprat 133)
Modified for FM**

160m VFO & AM FM MODULATOR



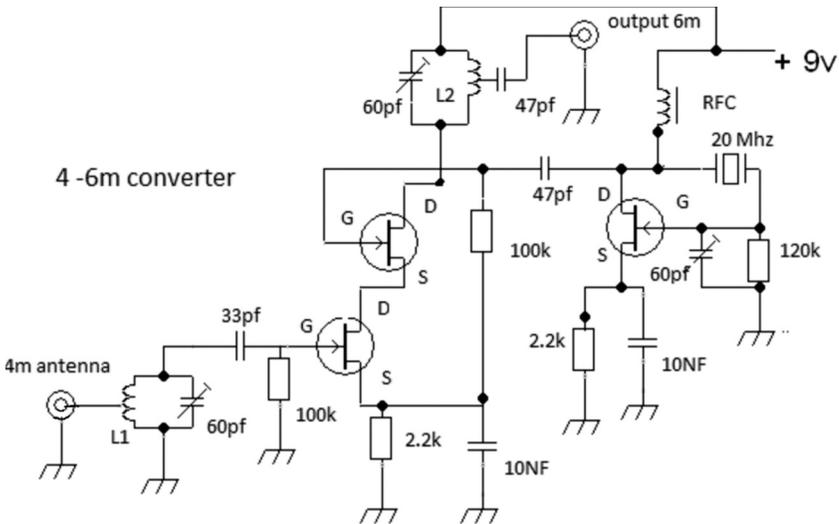
THE SMALL TALK

EASY 4-6 CONVERTER

Alan Troy G4KRN alantroy49@gmail.com

Many modern HF transceivers cover 6m but not the 4m band and here is a receive converter that will give 4m receive on 6m . This should be useful for monitoring any local or semi-local activity in normal conditions but is not suitable for anything more serious as 6m breakthrough is likely when that band opens up. The circuit is based on typical converter circuits from the 1980s that used a dual gate Mosfet but replaces this with two FETs in cascade. (see George's "Carrying on the Practical Way", Practical Wireless, June 2006).

All three FETs are 2n3819. The oscillator uses a 20 MHz crystal obtained from Club sales. Both coils are air core, self supporting, using 22 swg wire and centre tapped. Diameter about 8mm. They can be wound on a biro initially to get the diameter. Coil L1 (4m input) is 5 turns, centre tap and coil L2 (6m output) is 9 turns, centre tap. The coils may need stretching or contracting for best results. The RFC in the oscillator is 10 turns 32 swg on a ferrite bead. Do not forget the 47pf capacitor in the 6m output which blocks 9 Volts getting to the receiver. Note in the circuit diagram the drain to L2 line crosses over the gate to 100k resistor, it is not a junction. Make up the oscillator section first and check this puts out 20 MHz. Once the converter is made up, an oscillator on 7 MHz can be used to put out a tenth harmonic on the 4m band as a test signal.



A REGULATED ADJUSTABLE HT POWER SUPPLY FROM 12 VOLTS

Chris Osborn G3XIZ g3xiz@yahoo.co.uk

INTRODUCTION



Some of us are still interested in building and experimenting with valved equipment. Unfortunately mains HT transformers are quite rare these days and expensive, even on E-Bay

One way around is of course to put two mains to LT transformers back-to-back but this is not a very elegant solution and a fixed voltage HT is of limited use for experimentation purposes.

An adjustable and regulated QRP HT power supply, using easily available components is described here.

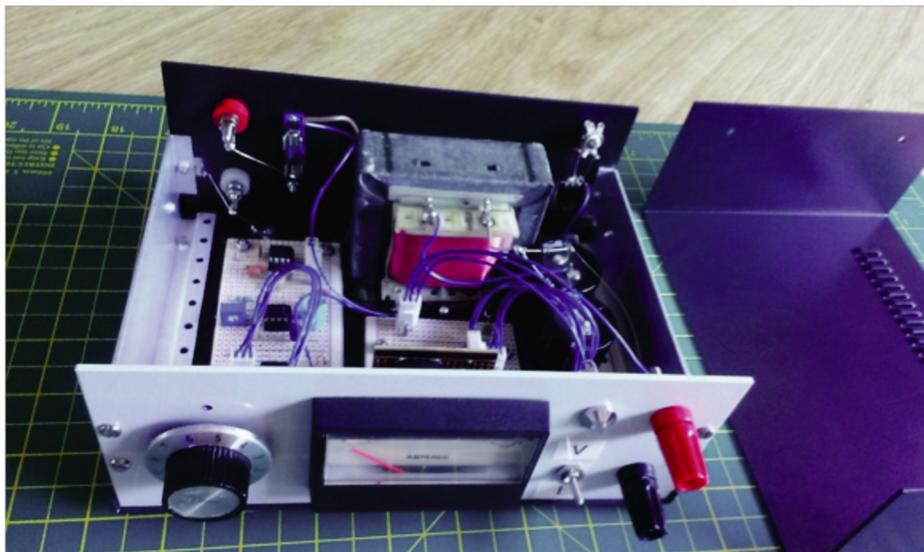
The unit is not powered from the mains but from a 12 V DC supply so may be of use for /P operation.

An ex-battery charger transformer was used 'back to front' but I have tested the circuit using a selection of mains to LT transformers and they worked well. Needless to say small, low current transformers will give less available power.

The output may be varied from around 80 – 250 V and is useful for loads up to 6-7 watts.

Regulation is good with zero to full load not causing a volts drop greater than about 0.5 V

Full load ripple was in the order of 0.4 V p-p



CIRCUIT DESCRIPTION

A 555 timer IC generates an audio frequency of about 300 Hz with a mark space ratio of 60%

The frequency may be adjusted over a limited range to minimize any transformer buzz and to optimize efficiency.

The HT output voltage is sampled via the potential divider R4 / R5 and compared to the set reference voltage on the inverting input of IC2. R4 may need slight adjustment on test to give the desired (or alternative) output voltage range.

When the sensed HT output voltage is lower than the reference voltage wider pulses are applied to the FET's gate via IC3. Conversely a higher HT output will cause narrower pulses and in this way is regulation is achieved.

The transformer secondary is rectified using a voltage doubler circuit and a simple R/C filter R11 / C10 removes the 300 Hz switching transients.

A meter is incorporated to display HT voltage and current and is of course optional.

An RF choke and decoupling capacitor may be inserted on the 12 V supply line to reduce any voltage spikes leaving the unit. I did not however find that this caused a problem.

R10 and C7 ensure that transients on the supply rail don't upset the pulse width generating circuitry.

CONSTRUCTION

An aluminium box was used to house the components (see photo)

The main circuit and metering components are mounted on veroboard and the IC's in DIL sockets.

Soldered header pins and sockets facilitated connections between the boards and the larger components.

High quality 4 mm binding posts were used for both input and output connections, the input being at the rear.

A 1 mA FSD moving coil meter gives switched 0-250 V and 0-25 mA indications.

CAUTION

As with all high voltage circuits care needs to be taken.

A sturdy metal enclosure with insulated terminal connections is recommended for safety and screening purposes.

The sensing circuit should bleed the smoothing capacitors to a low voltage within a few minutes.

Ensure that the fuse is a slow-blow type as the start-up current is considerable.

CONCLUSION

I built the unit three times with a slight variation of components and transformers and the design seemed quite robust.

A dual op-amp may be used in place of separate 741's

The other components may be 'tweaked' for optimum output and efficiency.

This a most useful addition to the shack's test equipment and has been handy for testing zener diodes, voltage regulators and varistors and for 're-forming' antique electrolytic capacitors.

It supplied HT to my home brew valve RX without any problems.



Antennas Valves and Vintage

Colin Turner G3VTT, 182 Station Road, Rainham Gillingham, Kent ME8 7PR
g3vtt@aol.com

Welcome to the Summer AVV. It was very nice to work those of you who took part in the April Valve QRP Day and also those who regularly support the Monday evenings at 2000z gatherings on 80m. There is some more aerial information this time and I must thank the contributors. Please keep sending your ideas and experiences in to me at g3vtt@aol.com and I hope to work you on the bands. Chris Meadows G4KWH has been experimenting with magnetic loop antennas and wants to clear up a point or two plus give an overview of their uses.

MAGNETIC LOOPS G4KWH

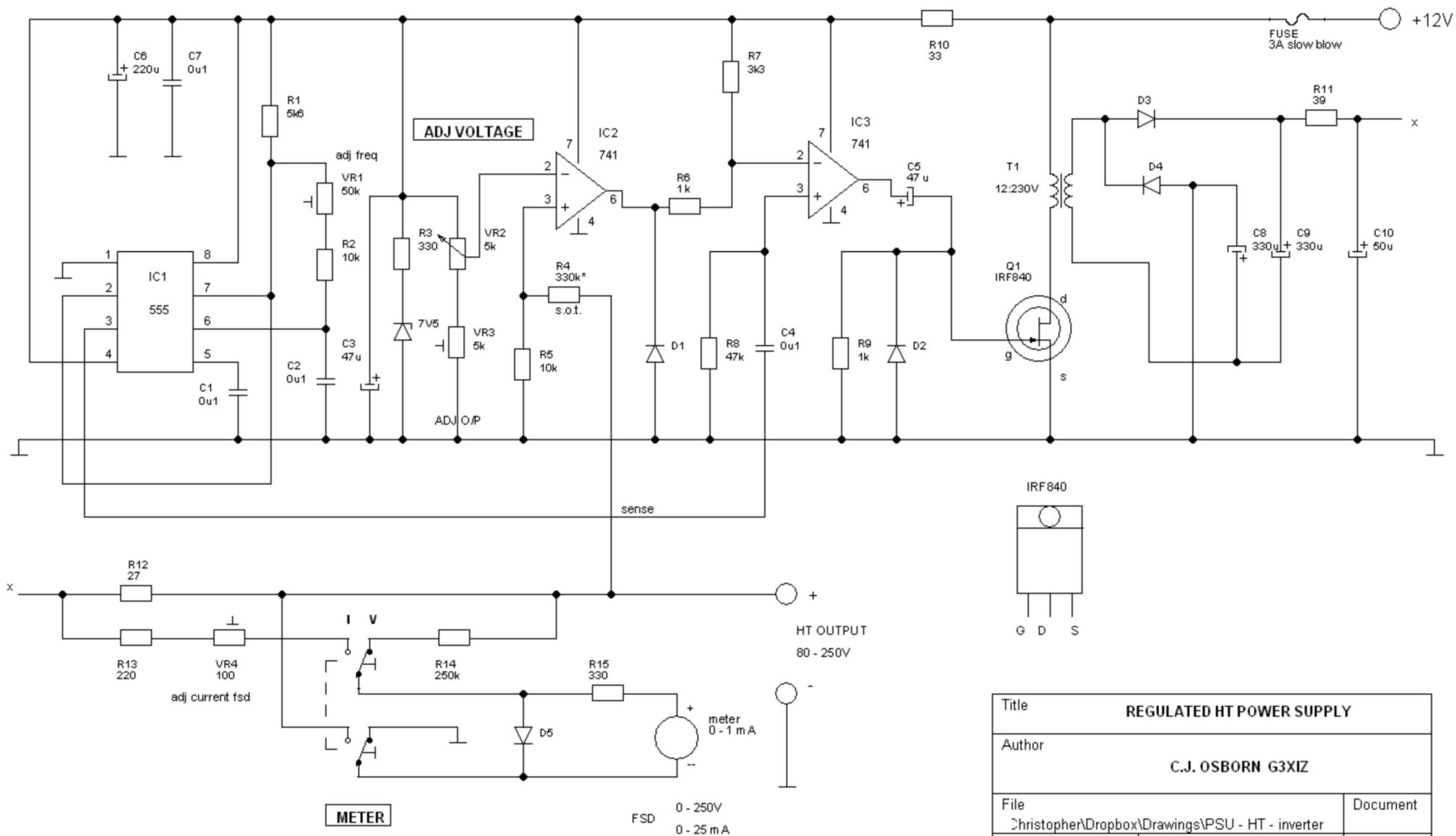
To mag loop or not to mag loop - that is the question. There are many articles and web sites offering construction dimensions and building know-how for these aerials. So these few words will not elaborate on this aspect.

Having built some 12 or 15 such loops with a fellow amateur David G4KYX, the big test is to find qualitative measurements against other aerials, in other words 'how good are they'. This was not an easy job. First, to get a misconception out of the way: They do not receive only the magnetic part of the radio wave. A radio wave is an electromagnetic wave (the same as light from the sun) and exists in time phase and space quadrature and propagates through space in this way. A magnetic field can exist round a magnet and an electric field can exist near a conductor but they are not e-m waves, although electromagnetic in nature. I think what is meant by this first statement is that they are horizontally polarised in the same way as a horizontally mounted Yagi aerial. So mag loops are less responsive to urban vertically polarized wave interference. Sandy Heath transmitting mast is vertical but the aerial is based on the Slot aerial which is horizontally polarized hence all the aerials in the catchment area are horizontal Yagi's.

Mag loops are efficiently fed by a smaller loop about 25-30% of the main loop diameter. The feeding loop is often mounted at the bottom or at the top of the main loop. Loops may also be fed on the sides of the main loop and produce a largely vertically polarized e-m wave. Because of the very high voltages present at the capacitor, to transmit a power of more than a few watts a capacitor must have a distance between adjacent plates of 3 mm, whilst a valve superhet capacitor has a spacing of 0.75 mm. The latter can still be had at radio rallies for £2-3. Larger spacing capacitors are now priced in a range £40 to £90 and are not easily found.

Is all this effort worth the candle? If you live in a flat where space is a premium the answer is an unreserved yes. If you like building things then yes again. Compared to a long wire aerial mag loops pick up far less noise but the signal picked up is also less. Considering signal-to-noise ratios they are much the same as far as non-professional test equipment can measure. Mag loop signal loss is found to be between 6 to 10 dB when compared to a long wire aerial. But a mag loop can be easily rotated to null out certain (solar panels or power line communication?) noise. You cannot rotate a long wire. These aerials make a convenient portable device and are superior to a mag mount which has been found to add a further 3 to 6 dB loss. A 1 m loop fits in most cars and can easily work 40 and 20 m bands.

Chris **G4KWH**

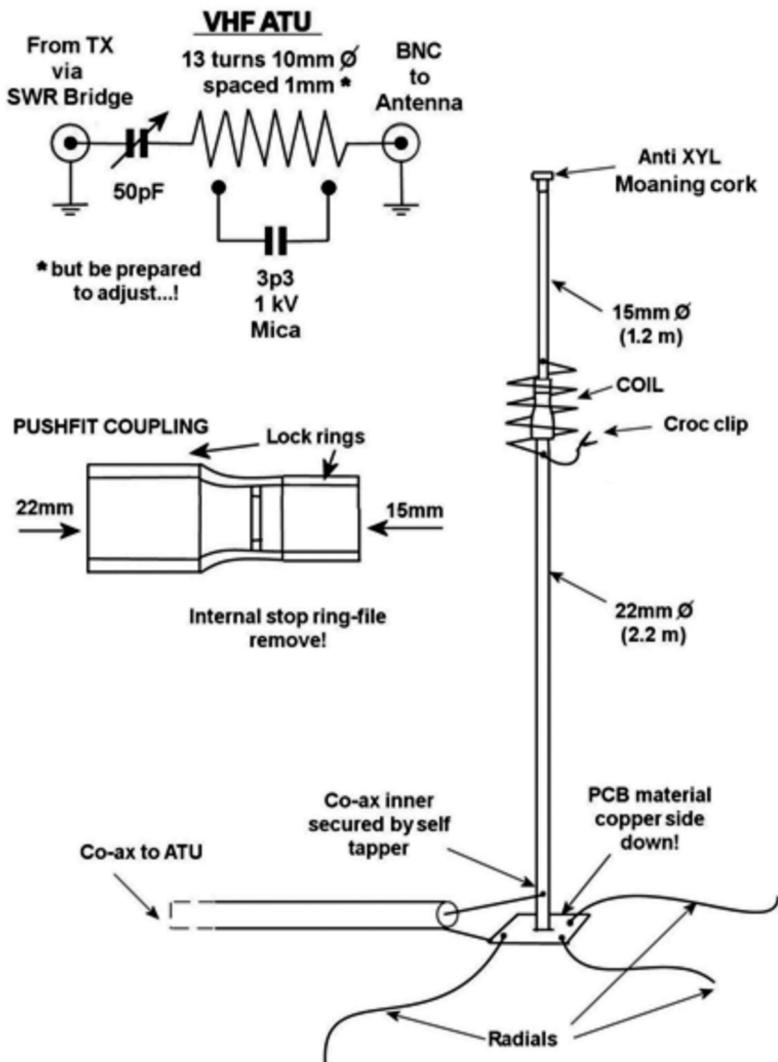


Title			REGULATED HT POWER SUPPLY		
Author			C.J. OSBORN G3XIZ		
File		Christopher\Dropbox\Drawings\PSU - HT - inverter		Document	
Revision		Date		Sheets	
1.0		14 August 2015		1 of 1	

Phil G6NGR has sent me details of a simple vertical aerial he has been playing with based on a design by Bill Orr W6SAI.

The "Up the Pole" 10 band Antenna (with thanks to Bill Orr W6SAI)

"Up The Pole" Antenna P. THORNTON G6NGR



I don't have room for a dipole on 40m or lower, neither do I have a convenient lead in for a centre fed antenna of any sort, so I decided to try Bill Orr's "Pole" antenna which uses a tubular support with a central loading coil as the radiator and 3 or 4 radials scattered

about below. (Note this aerial can be used outside if suitably waterproofed but Phil has used it inside the house). I made mine from some offcuts of 22mm and 15mm water pipe I had to hand. The offcuts of pipe didn't quite match Bill's drawing as the coil wasn't in the middle it was more toward the top. I made the insulator between the top and bottom pipe sections with a plastic "push fit" reducing coupler, modified by filing out the stop flange inside with a 3/8" round file, so the 15mm pipe can slide down into the lower 22mm section allowing easy adjustment of overall length. The lower end of the 15mm pipe needs wrapping with insulating tape once fitted through the reducer coupling to avoid shorting on the inside bore of the 22mm. The bottom 22mm sits on a small piece of dowel mounted centrally on a piece of single sided PCB material and the copper side (beneath) has bolts through to connect radials for the band in use. The co-ax cable centre feeds the bottom of the 22mm pipe and the braid goes to a convenient radial bolt. The 15mm top section is extended by releasing the push fit coupler and the 15mm section raised to wedge neatly under the ceiling. Any XYL moaning about damaging the ceiling is prevented by fitting a wine bottle cork trimmed down a bit in the top of the 15mm pipe.

The loading coil I made followed Bill's guide and I needed a turn or two more as the loading is further "Up the Pole" - and now you know why the name! With such a short radiator on the lower bands you will have a bit of cut and try but it's easy to do via the croc clip jumper. I wound the coil on a 3" drain pipe former and used hot melt glue to lock the turns into a solid unit with three lengthwise generous runs of glue (put furniture polish on the drain pipe first - it stops the hot melt glue bonding the coil to the drain pipe). Note the coil performs better with the drain pipe former removed and the tuning noticeably sharper. The chart above shows my selected turns for each band. I used some small self-tappers to secure the coil to the 15mm and 22mm pipes. The assembly is a tad wobbly but secure enough for interior use. For exterior you'd have to beef it up a bit and the push fit coupler could be replaced with a wooden or Tufnol dowel suitably turned down and waterproofed to fit and support the pipe sections. The coil is spaced to 9" long and the turns are shorted with a croc clip jumper to leave the number indicated. On lower bands the antenna is fed with a standard "L" section ATU. I get an SWR of < 2.0 on all bands by juggling taps and capacitors except 6m - this is my HF ATU not the antenna.

Band	Coil turns
80m	90 - the whole coil in circuit
60m	45
40m	30
30m	22
20m	17
17m	12
15m	9
12m	4
10m	1 or shorted out
6m	shorted out

On 10m the antenna is around quarter wave and is quite low impedance and on 6m it's just under half wave and is quite high impedance so the series tuned VHF ATU makes a proper job of that loading up nicely.

On the lower bands the tuning is quite critical as a transmitter shift of 15 kHz means an ATU retune but my L match does the job nicely.

I don't pretend the antenna will outshine a 3 element beam or a Les Moxon "Special" but it gives a good account of itself on all bands and being in the house is completely covert. You can run open wires from the ATU to the baseplate and 22mm pipe to save coax. The open wires become part of the radiating system and probably add a bit of mixed polarisation on higher bands which can be useful in some circumstances.

QRP Valve Day **November 12th and 13th 2016**

The QRP Valve Days have turned into a weekend it seems and I get plenty of reports. You will see other pages in this issue devoted to the last April event. Many thanks for these reports and the photographs but please send them as soon as possible after the event. I will always try and include something from everybody but it depends on the editorial constraints of each issue.

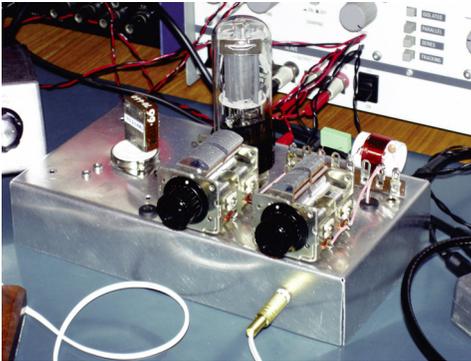
The next QRP Valve Day will be November 12th and 13th. You can operate on any of the GQRP frequencies you have equipment for at the 5 watts level and use a valve (tube) transmitter or receiver or both. Call 'CQ Valve QRP' or 'CQ VQRP' on the day and be prepared to tune a little either side of your frequency in case somebody calls you off frequency. The OK/OM DX contest will be running as usual on this week end but hopefully we can work through the QRM as we did last year. It will be easy to spot the QRP operators – they are the ones giving sensible reports!

Valve QRP Day April 2016

Colin Turner G3VTT, 182 Station Road Rainham Kent ME8 7PR
g3vtt@aol.com

There were plenty of stations on the bands this time so thanks for the great turn out chaps. There were also large numbers of valve QRP transmitters heard which proves once again QRP is a major role player in real radio incorporating homebrew equipment and activity.

This was my first Valve QRP Day. I built a couple of rigs earlier this year (see my QRZ page) but was embarrassed about the chirp. However, despite a busy weekend I managed to sneak into the shack from time to time and power up my 4W MOPA (see photo). My only FT243 crystal is on 7030 kHz but I managed enjoyable QSOs with DL1HSI, G0SSZ, F8FFI, GB4MBP, IZ3SOI, G4MFN, EA4ESP and EC2AHL who was running QRPP at 200mW. I even received an email from an amateur who said that my chirpy signals made him smile while he was listening on a Web SDR! Many thanks for organising this Colin. I look forward to the next time. 72/73 Graham **G4VUX** G-QRP 8823.



Those declaring the use of valve transmitters were G3XIZ, G4GIR, G4AQS, G0ILN and G3VTT. On 80m I employed a CO/PA using a couple of 6V6s producing 5W and on 40m a single 6V6 running 2W both feeding a G5RV aerial at 15ft. The receiver was a Drake 2-C. See photo. Many thanks again to the organiser for another enjoyable weekend!

72/73 Derek **G3NKS**

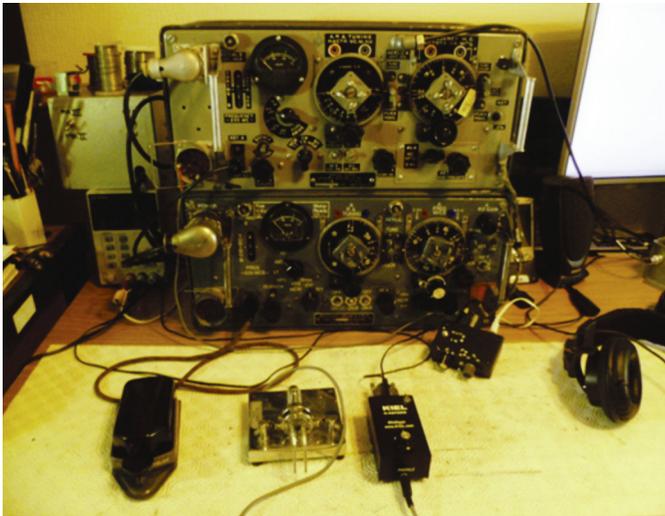
Hi Colin, I'm pleased to report more success than last November. On 40m the skip was very long for much of the time and the usual weekend contests caused problems. 80m was good but local noise caused me difficulties with many hearing me better than I was hearing them. I made five QSOs on 80m, with G3XIZ, G4GIR, G4AQS, G0ILN and G3UNC and six on 40m with G3VTT, IK0YVV, PD0HRS, F6DIP, GM0PJD/P and F/M0ZSM.



Hello Colin, First of all my apologies, I think you may have called me on 80m but unfortunately due to local QRM you were down in the noise. When my QRM is running (at seemingly random times) any signals below about S7-8 cannot be copied. Anyway thank you for organizing another enjoyable valve activity weekend. I had my usual share of problems with the above local QRM, the ubiquitous contest writing off 40m and a constant carrier sitting exactly on the QRP calling channel at 1836 kHz. Pulling in QRP stations using my simple home brew regen RX under crowded band conditions is far from relaxing but is good character-building I suspect. I was tempted to go the easier route of using a HB TX in conjunction with a 'decent' commercial RX but I like to do things the hard way! I had a 31 QSO's with 21 individual stations, 8 QSO's were with QRP valve stations and another 11 were with non-valve QRP stations. Three QSO's were with valve stations running higher than QRP.

. Several QSO's were with the same station but on different bands i.e. G4GIR (160, 80, 60, 40 m), G4XRV (80, 60 m), GW3UEP (80, 60 m), G4FGJ (80, 60 m) and G4ZXN (80, 60 m). Finally my apologies to anyone who may have called me but whose signals failed to pass through my somewhat deaf RX and into my headphones. 72 / 73 Chris **G3XIZ**

Hallo Colin, as promised I tried to be on air for Valve QRP Day but unfortunately my job took me away from radio for a long time and so just Sunday in the afternoon I was able to be on the air just with 2 W with just ONE (local) QSO but it is very nice to be on air with my beginners TX, a Geloso VFO 4/102 with about 2 W and no SWR meter, just a lamp to tune for maximum. I'm finishing my two tube mo/pa and hope to be on air in a short time also if it will be not always a true QRP as there will be an 807 tube as PA but I'll regulate the grid bias in order to be QRP when needed. Colin have my best 73 and once more, thanks for your very interesting and always well done tube corner in Sprat.72 de Alex **I5SKK** ex I0SKK



Great weekend on Valve QRP Day using my 19 sets MK2 and MK3 stacked and bayed. This time I had made an audio peak/notch filter which made all the difference. Unfortunately the MK3 was running 15 watts! I fixed a fault in the TX ALC circuit and couldn't believe the output. The MK2 was running 6 watts think I need to find where the fault is with that one. There were good conditions during the period although Sunday was a washout on 40Mtrs due to the Helvetia Contest not that I had any QSO's on Saturday

on 40Mtrs. Highlight of the weekend was a 3 way with Rog GW3UEP and Rupert G4XRV on 60Mtrs. We even had a cross band 60Mtrs to 630Mtrs CW exchange although not using valves and a cross QRG on Top Band with G3XIZ as the 19 Set only goes down to 1963KHz and Chris was rockbound on 1836KHz. I made 21 QSO's with 15 unique contacts which were 3 on 160Mtrs, 6 on 80Mtrs, and 11 on 60Mtrs. The weekend left the shack (sitting room) with a wonderful aroma of tropicalisation. I'm look forward to the next event. 73 Ian **G4GIR** QRP 15012

Hi Colin, My set up is nearly the same as my last effort so I have not sent a photo this time round. My TX was the Peanut Whistle one valver and my RX is an FT 817. My antenna switch is built into the Peanut Whistle which is very handy. My antenna is a Doublet with a 90ft top section and 300 Ohm ribbon feeder. I use an MFJ 974B Balanced ATU. It may not be the beefiest ATU in the world but it does seem to tune anything! Conditions could have been better but at least I made some contacts. I have learnt so much about using separate receivers and transmitter. 73 Richard **G0ILN**

*The next valve QRP Day is November 12th and 13th so see you all then I hope. 72 Colin **G3VTT***

COMMUNICATIONS AND CONTESTS

Dom Baines, M1KTA, 34 Bury Road, Stapleford, CAMBRIDGE. CB22 5BP
m1kta@gqrp.co.uk

Hi all, thanks for the comments (please keep them coming). Don't forget there are loads of large and small contests on right through the summer some with special QRP or LP sections.

I note on the EUCW lists AGCW seem to have a few periods recently that are highlighting QRS cw operation.

Summer Sizzler

Hope everyone is looking forward to the Augsut bank holiday week when the Summer Sizzler will be taking place. Dates are the week BEFORE the bank holiday to the Monday. I am hoping many members might take part and activate the WARC bands (12m, 17m and 24m) as well as the more usual HF (20m, 30m, 40m and 80m) frequencies.

Operating for all these activities should take place on and around the International QRP Calling Frequencies.

CW: 1843, 3560, 5262, 7030, 10116, 14060, 18096, 21060, 24906, 28060
SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360 kHz

I recommend if there are a few stations on frequency spread out a bit if you can.

It is usual for operators to exchange their G QRP Club membership number when making QSO but it is not essential. Those taking part are invited to submit logs and comments to the G QRP Club Communications Manager, Dominic Baines, M1KTA, email at m1kta@gqrp.co.uk, Dom Baines, M1KTA, 34 Bury Road, Stapleford, CAMBRIDGE. CB22 5BP.

These I know might interest some GQRP members in no particular order:

RSGB NFD CW 5th June <http://www.rsgbcc.org/hf/rules/2016/rnfd.shtml>

UKSMG 5th June <http://uksmg.org/summer-contest-rules.php>

PW low power contest 144MHz VHF Sunday 12th June
<http://www.pwcontest.org.uk/144MHzrules.html>

RSGB Low power contest 17th July <http://www.rsgbcc.org/hf/rules/2016/rqrp.shtml>

ARRL FD 1800Z, Jun 25 to 2100Z, Jun 26, <http://www.arrl.org/field-day>

IARU HF World Championships 1200Z, Jul 9 to 1200Z, Jul 10
<http://www.arrl.org/iaru-hf-championship>

Marconi Mermorial 1400Z, July 2 to 1400Z, July 3,
http://www.arifano.it/contest_marconi.html

International QRP day 17th June.

See how many IARU Region 1 DXCC you can contact in a 6 hour period.

Open to all GQRP members, for the International QRP Day Plaque.

Briefly, the rules are as follows:

All authorised bands 1.8 to 28 MHz, Modes CW and SSB. Power not to exceed 5W RF O/P CW, or 10W PEP SSB. Operation for a maximum of 6 hours in not more than two periods. Stations contacted may be QRO, you do not have to have 2xqrp qso only. Contacts with any Region 1 country (normal QSO's, no rubber stamp qso please). Each Region 1 country contacted on each band scores 1 point. **Only one contact per band per DXCC is allowed, irrespective of mode. I'll go with different DXCC so G to GI or GW count!**

The total points scored is the total of IARU Region 1 countries contacted on all the bands used.

Logs should give name, call sign, address, power, equipment, and time/band for each contact. Summary to give band and overall scores. Trophy and a book token to the winner, plus runner-up certificates. Please send me your logs by 17th July, award to be made at Rishworth.

RSGB IOTA – 30th/ 31st July quite a few will be off to various places for this annual contest and you will see some rare and not so rare IOTA islands activated this summer. There is a QRP category to this contest which makes it interesting and it's both SSB and CW. I'm off to St Agnes EU-011 as MK1K. If you are off somewhere this summer, please drop me a note or let Chris G4BUE know about it, especially photos. I am sure some might also manage to operate and pick up a few of the other GQRP awards this summer.

<http://www.rsgbcc.org/hf/rules/2015/riota.shtml> I am sure many including me will be qrv whilst hanging onto the antenna pole and log sheet in the wind from some remote beach

WAB 144MHz low power phone contest. The date this year is Saturday 6th August and it runs from 1000 to 1400 UTC. Maximum power is 10W and exchange is RS report, Serial Numer, and WAB square.”

See

<http://wab.intermip.net/Definitions.php>

<http://wab.intermip.net/Contest%20Dates.php> and

<http://wab.intermip.net/Contest%20Rules.php>

Check out http://www.hornucopia.com/contestcal/contestcal_qrp.html

Did I hear a rumour there is some QRP SOTA marathon of some kind this summer.

I expect YOTA and JOTA (Scouting) will pop up on air too during the summer.

Some have advised on specific activities and activations that will probably suit G4BUE, Chris's members news section better. Any more with info please ask or drop me a note and can forward onto the GQRP email list.

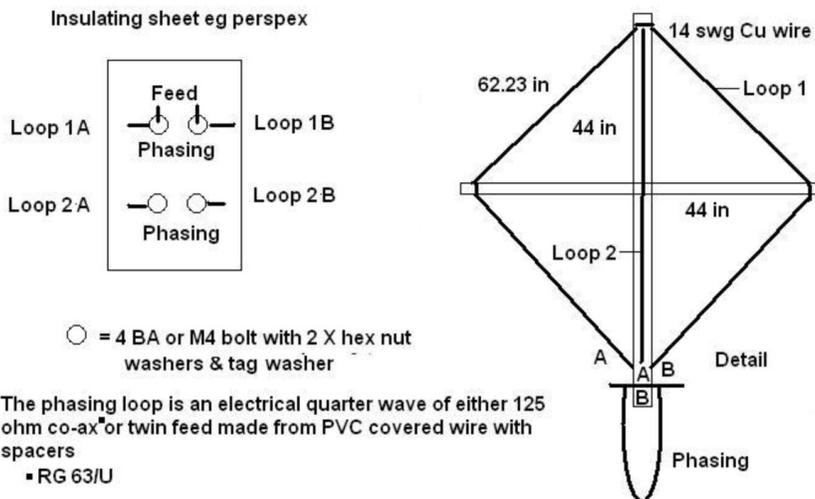
I am sure there are many weekends of activity both contest and non contest I have not mentioned right through to September that will be of interest to GQRP members.

VHF Manager's Report

John G8SEQ QTHR john@g8seq.com

Not having published anything in SPRAT for some time, I've decided now is the time to make amends. Basically I've had nothing much to report as I haven't done much in the way of construction and neither has anyone else judging by the dearth of copy I have had. However, in order to stir up some interest our local group Coventry Amateur Radio Society has started up a 6m SSB net on 50.175 MHz with the aim of weaning some of the newcomers off FM and attracting some Dx when conditions allow. The net has been running for several months now, usually with four or five stations in the net, all locals. We've had up to ten different callsigns on altogether & not all CARS members. The net runs on Thursday evenings starting at 20:00 local time and usually lasts for about an hour. Most of us are horizontally polarized, some just using simple dipoles whereas Bob G4GEE, the net controller are using omnidirectional antennas with gain. Bob's antenna is a quad turnstile or turnstile quad after Cebik W4RNL and uses two cubical quad elements point downwards so it looks like an octahedron. Shown below. The feed points are the corners of the two elements, coupled with a phasing loop. This set up has about 6 dBi of gain. The original used some hard to come by (in this country) 125 co-ax but we managed to fabricate some 125 ohm twin feeder using PVC covered wire. My antenna is a double turnstile arrangement with 8 dBi of gain which has been published previously in SPRAT 103 (go to www.g8seq.com for latest version)

One or two are using commercial vertical antennas (3 – band co-linears mainly) which seem to work well despite the cross polarization. We have also been monitoring the band for auroral propagation and Bob did manage to work and EI station via aurora using CW. We have also been on the monthly RSGB Tuesday night 6m contest where we seem to reach a propagation limit of about 100 miles under flat conditions, so no spectacular dx yet! So if you hear us on, give us a call.



The W4RNL antenna was first described in QST May 2002 and he gives detailed construction and operational notes there. The version below is a simplified construction, using cheap materials ie a wooden pole and wooden dowel cross arms. We also used flexible PVC wire and eliminated 3 X SO239 sockets (no point unless you are using RG 63 for the phasing harness & even then not really necessary. The insulating sheet was attached to the pole using a metal L-bracket. Bob G4GEE has also made a 4m version, with dimensions scaled to suit (1 loop = 1 wavelength).

Membership News

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

Would New Zealand members please note that your representative over there, Phil Tarrant, has moved.

Here are his new details:

Phil Tarrant ZL2NJ
426 State Highway 41
R.D. 1 Turangi 3381
New Zealand

His email address is philtar@snap.net.nz and new phone No is 07 386 0179.

Club Sales News

Graham G3MFJ

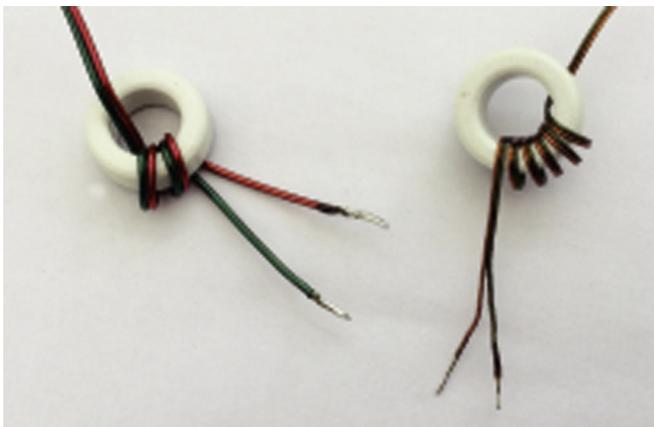
Some little time ago I found a source of Bifilar wire, so I bought some for club sales. Each size has two strands of red and green enamelled insulation bonded together – the insulation is the solderable variety, and of course, the fumes should not be inhaled whilst soldering, just like all the other magnet wires in our range.

There are 2 sizes and these and the costs are:

21SWG (0.8mm dia) –
2m for £1.00

26SWG (0.45mm dia) –
3m for £0.70

The picture shows both types – each wound on a T50-7 core. The wire comes flat, or almost flat, so if you wish to twist it, the bond will survive that, provided you don't twist it too tightly. I hope it will be a useful addition to the sales range.



All Good Things Must Come To An End Part II

Graham Firth G3MFJ

This is just a short update to the piece I wrote in the last Sprat on behalf of the organisers of the annual Rishworth G-QRP Club Convention. We have been heartened by all the nice comments that have come in to thank us for what we have done so far, and a lot of them expressed surprise that we had managed to do it for so long. Thanks guys from all of us.

As well as quite a few offers of help – thanks for those - but help is not what we want of course, we have also had a few offers to take over the convention and this is what we need, and we are actively considering them and we will be contacting them in the near future.

The convention – or mini-convention as George like to call it, is an event that is much more than just another rally. Just to emphasise it, this is what it consists of:

We have a buildathon the previous (Friday) evening – this is to organise, choose the circuit, get enough parts, and then find volunteers to supervise and help the builders. There will of course need to be a suitable room, adequate lighting, and a selection of tools for those who don't bring their own. Don't forget lots of power sockets for soldering irons if they are needed.

Then there are the trade stands. The traders have to be booked, and the tables (hired if necessary) placed so when the traders arrive, early on the convention day, they can assemble their wares, they will probably need helpers to help carry their stuff in to the hall. Also, of course, they may need help to carry out what's left afterwards.

Our mini-convention has always had three, maybe four speakers, they are to find and book, we have usually offered them a free night's hotel room the night before – unless they lived next door of course. This means there need to be a suitable lecture room to seat the expected audience, and the necessary sound/lighting/projection/computer equipment. Also, the speaker will need a suitable introduction to the audience.

One of the big things about the current convention, and has been ever since the first one, is the social area. This is an area where members/visitors can sit chat and exchange ideas, and where any recent or new members can meet the regulars. At Rishworth, we give up more than a third of the floor area for this.

Last but not least, don't forget that the punters will need to pay their admittance fee, and then they will need feeding and watering, so that needs planning and staffing. We were lucky in that several of our wives took on all these onerous tasks – and smiled all day long!

Finally, when I wrote that piece a few months ago, we did not have the final date for this year's event. It will be, as I thought, the 22nd of October. Put the date in your diaries and then please come and help us have a great event. By the way, the buildathon on the 21st will be a simple solar powered transmitter.

MEMBERS' NEWS

by Chris Page, G4BUE

E-mail: chris@g4bue.com

My thanks to **DL2BQD** for his regular report on the DL G-QRP Annual Meeting at Waldsassen on 22/24 April. Dieter says, "Lots of amateurs from DL, OE and HB celebrated the 25th anniversary of these meetings, the last ten in Waldsassen. The Mayor of the city and the Headmaster of the school addressed the group and there were very interesting reports and experiments on antennas and above all - friendly talks and chats". **K5MGJ** draws our attention to **K7GO's** kit building page on his website at <http://www.k7go.net/k7go-kits.html> where Chuck has a full tutorial on the Chinese Crystal Checker and Frequency Counter kit (\$7.18 on eBay with free shipping), along with some important mods.



G3UD built the Kitsandparts.com 40m CW TCVR pictured left and was so impressed he also built the 20m version that he managed to 'shoehorn' into a smaller box, 100 x 75 x 35mm. Five minutes after boxing it up Graham gave a short CQ to check the RBN but before he could look, he was called by **IKØNOJ** in Rome who gave him 569 and then **RW3AA** who gave him 559. He says, "1592 miles not bad for 1W. I have already ordered the 30m version". **GØNVF** finished his Sudden RX in February and is using it with a **G5RV** antenna but no ATU. After a bit of experimenting Dave says it seems to work much better with an

earth attached to L2! After working in Italy for 20 years, **G4DNP** has retired and returned to the UK. Robin dug out an old HW8, got it working and has caught the QRP bug again, planning some /P activity while out walking.

Pictured right is **N6QW's** new Raspberry Pi3 driving a SoftRock V6.3 SDR TCVR with the display/keyboard and mouse all contained in a Motorola LapDock. Running only 1W Pete has made quite a few 40m QRP SSB contacts, but says, "Ashamedly I can run 500W with the same rig. The software is *Quisk* 4.0.4. While not in the league of the several thousand dollar commercial SDR radios, it does a remarkable job of sorting out the signals". Like me, **GW4JUN** spent some of last winter in Florida (South Clermont) and was QRV as **W4/GW4JUN** using an Alinco DX70 and 66ft doublet up 32ft, tuned 10-60m with a **G30OU** style Z match. Vic made his own ladder-line using 1/2 inch PVC pipe cut into four inch lengths and holes drilled in for the feeder wire to pass through. The antenna and feeder wire is 12AWG stranded copper PVC covered and the spreaders are fitted every 22 inches and fixed to the wire with hot melt glue.



G4GDR found a 1936 circuit for a one valve 6V6 or 6L6 TX, crystal control with plug-in coils and crystals for band changing. Adrian made coils on Eddystone plug-in formers for 40, 60, 80 and 160m (ignoring the HF bands in view of poor conditions!) and has been working members with the TX giving 4-5W output; 40 and 80m

in the Valve & Vintage Weekend and only **G3XIZ** on 160m (1837 and 1843kHz) where he would like to QSO more members. **MÖNDE** has all the parts to make a 12V battery PSU for his Paraset and is 'playing' with an Arduino and stepper motor to tune a magnetic loop. Best QSO this spring on 2m SSB for **M5AML** using his indoor five element yagi was **MWØXOT/P** two-way QRP whereas HF gave John **C31CT** and **OHILWZ/M** on 17m and **3V8ST** on 15m.



Pictured left is **IKØIXI**'s latest portable rig, a SGC SG-2020 HF TCVR 'Backpack Radio', military style setup for outdoor operation. Fabio will be QRV with the rig and an end-fed antenna 14/22 June while camping at Trasimeno Lake. **G6YBC** mentions the 'Super VXO' that uses two crystals of the identical nominal frequency in parallel instead of a single crystal of a conventional VXO. Dennis says there is a good explanation of the VXO at <<http://www.qsl.net/7n3wvm/supervxo.html>>. **G3XBM** would like to share his blog <<http://g3xbm-qrp.blogspot.co.uk/>>

that he says usually has something of interest to QRPers most days. Roger's main website at <<http://www.g3xbm.co.uk>> gives details of his projects and interests but sadly his poor health has rather restricted new field work in recent years.

At the last minute **DL7UGN** decided to use his experimental One-Valve VFO-PA built on a wooden chassis some years ago for fun, but never used on the air (pictured above), in the Spring Valve Weekend. Mike says, "Besides the Eastern German ECL 11 there are two Russian items from my junk box in the circuit: the 6H8C (cyrillic, that means 6N8S, equivalent type 6SN7) double triode in the T/R switch and an antique germanium transistor MP41A in the keying circuit. The output is 3.5W on 80m and about 500 mW when doubling in the PA. Unfortunately its chirpy sound hadn't got any better while it had been 'sleeping' all these years and so I didn't try 40m where the chirp is two times as broad! I made six QSOs (DL, LA, OK, and G) on 80m and had fun, but **G3HGE** was not amused and asked, "I guess you use that old WWII stuff..?".



It has been a long time since **G4EHT** did any construction (moving QTH, losing his components and poor eyesight) but he made an effort in March and built two 40m 5W rigs and then ordered some 'Pixies' and a 49er, both from China. Bill is very impressed with the RX side of it but could only get 300mW out. He built a separate VFO and replaced the crystal with a BPF to enable him to tune the whole band and tried several different transistors in the driver and PA to increase the output power, all to no avail. Bill then decided to use just the RX section PCB as a receiver and add his own QRP TX strip, which he did out of his two

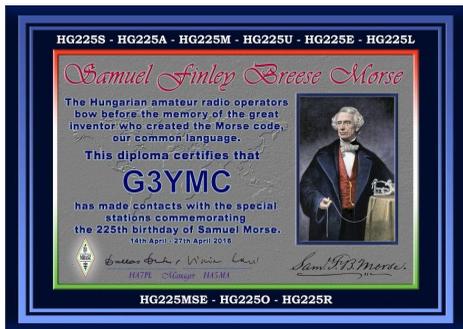


stage VFO fed into a BC108 and VN10 PA stage to give 500mW all

contained in an old Command RX case (pictured above). Only QSO so far is with **EA2EFI** on 13 April with his HF9V Butternut.

Pictured left are **G4FBC**'s latest homebrew projects, both from China via eBay - a 49er (left) and a Pixie 2. Ron is quite impressed with their performance for such simple circuits, after replacing the, "frankly useless" transistors supplied with the kit. He





used two 2N3904 transistors for the Pixie that increased output from 90 to 390mW into 50 ohms, and using a 2N2222A and BD139 in the 49-er which increased output from 100 to over 680mW. Quite a few wrong value capacitors were in the kit but it wasn't a problem as he had the correct parts in his junk box. Both rigs sound quite lively on 7023kHz RX.

G3YMC took part in the 2015 HA ITU Award and in April they had special calls to celebrate the 225th anniversary of the birth of Morse where the last letter of the call signs spelled out Samuel Morse, see <<http://mrasz.org/>>. Dave worked all nine of the calls in two days, receiving the Certificate shown left. Congratulations to **G3R00** and **ZL3AX** who completed a two-way B2 to B2 QSO on 20m CW at 0640z on 26 March,

both using about 10W, Ian to a three element Steppir yagi and Michael to a quarter-wave vertical on a large tin roof. Communication was established with Ian using a type 48/1 TX and Racal RA17 (Jedburg modified B2 TX with 5W output) and then changed to his B2 where copy was almost as good as the RA17. Michael was 449 with Ian and he was 559 with Michael. Congratulations also to **LZ2RS** on winning the World SO 10m QRP section of the 2015 CQWW CW Contest.

Pictured right is **W2APP**'s QSL for his **V47JR** mini DXpedition to Nevis in February when he made almost 500 QSOs with his KX3 and 88ft doublet up 35ft, fed with 300 twin-lead. In April Thaire was QRV as **EA7/W2APP** with the same set-up, but the propagation was not as good and there was a lot more sightseeing to do! **MØJGH** will

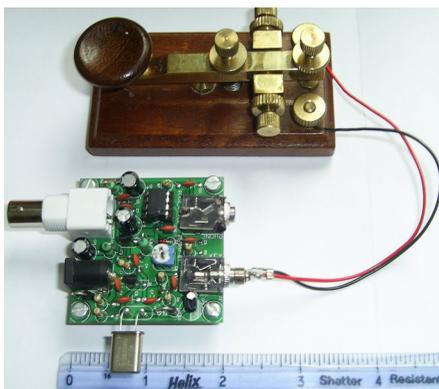


be QRV mid-July while on holiday at Lake Garda, Italy. Jonathan plans to pack his Italian-veteran 40m QRP CW station (**SPRAT** 166) and looks forward to working members from the shoreline and surrounding mountains. **GØFTD** went to the beach on the May Day Bank Holiday with his FT-817 and light weight Lithium Ion battery pack (better than a heavy gel cel), called **CQ** and was only answered by **G4LUO** despite the RBN showing his signals being received in VE2. He also struggled on 30m but did QSO **GØDZB/P**. Andy's other interest is WSPR and QRSS, mainly on 30m where his 1W TX and indoor antenna reaches KL, VK and ZL. He plans to be QRV from the Scilly Isles in the first half of September with a roach pole, probably just CW.



G3XIZ has now completed his pulse width modulated TX and has been getting favourable reports from the local Shefford AM net (Mondays 1900 local). Chris has been doing extensive tests on MF (474kHz) with **G4GIR**, with signal levels down to QRP. He has resurrected his old field strength meter (pictured right) and has been trudging over the nearby fields taking readings and trying to calculate his ERP. The meter has been calibrated using a home made Helmholtz coil arrangement, signal generator and switched attenuator. Chris now has a small 80m active loop which gives a significant improvement in signal to noise. It is wound on a two feet square wooden frame, can be remotely rotated and seems to combat his high local QRM.

G4GHB bought a Pixie TCVR kit for £10 at a recent rally and built it (pictured right with his new key), tried transmitting twice on 40m but nothing, despite hearing a few Gs and a DL at night. It had always been Bill's intention to try 60m and so he soldered a 5262kHz xtal in and called **CQ** using his 40m dipole at 22ft with 350mW output power. Right away **GW3UEP** answered for a 579 each way QSO and since then he has also worked **G4ZXXN**, **G4FGJ** and **G4XRV**. Bill says, "It is now in an Altoids tin and I want to switch crystals between 5262, 7030 and even 7023kHz if I can get the right switch. It works well on 60m without any



component changes. It is nice to get back to simpler real radio and proves you don't have to spend a fortune to make a QSO". A SWL report from Utrecht, Holland at the end of March gave him 549 over a 315 mile path. **G17RWT** also built a Pixie kit he bought for £2.50 and says the board is very good quality and all the parts were present, with the kit going together nicely within an hour. Andy bypassed the onboard LPF as he wanted to experiment with other bands. He has a selection of the **G0UPL** U3 LPF kits that Hans sells and being seven pole types they are better than the Pixie kit three pole filter. The driver and PA transistors provided produced 700mW on 40m but changing Q1 to a 2N3904 saw output increase to 1.2W. Andy says the RX is very lively but is, of course, very wide but for a kit of this price what do you expect? The kit works on 30 and 20m but the frequency difference from that marked on the crystal also increases, his 14.060 crystal ended up transmitting at 14063kHz where output is about 500mw. **N8AYY** built the NEQRP NEScaf audio filter kit and says it works great on his Pixie and most other QRP rigs.

G0EBQ is happy to report a successful Buildathon at his local club when seven Sudden RX kits were built. Nigel is really pleased with his Sierra which is now working on 12, 17, 20 and 30m. Despite putting out only about 800mW he has QSO'd four continents and 33 DXCC since late January, including CT9, ZB and TF and 'across the pond' on 12, 17 and 20m. **G8TMV** makes up and sells VFO kits for the Intermediate Licence Practical, see his website at <<http://www.tuckley.org/vfo/>>. **VK5GI** and **VK5GJ** took part in the South Australian Conservation Parks activation weekend on 2/3 April, being QRV from seven conservation parks in the Murray Mallee area, all really remote and some never been activated before. They made nearly 200 QSOs using a dipole and IC-707 turned down to 5W using li-po batteries. Norm says the noise level was totally zero, almost a primordial silence, and they had to check out the rig every now and again to make sure it was working!



At the beginning of May **K9JWV** received the **W8DIZ** One Watter for 20m (\$46 from <<http://www.kitsandparts.com/rftoolkits.php>>) pictured left with a SOTA end-fed half-wave ATU incorporated in the enclosure, to add to the 160m version he bought in February. The RX MDS is 0.1mV, the output power 900mW and Jim says he will add a Freq Mite CW annunciator shortly. He has QSO'd ID, NM and TX with it so far. **G0XAR** found **BH1RBG**'s website at <<https://sites.google.com/site/linuxdigitallab/rf-ham-radio/uf-receiver---the-begin>> and says his experimental ap-

proach and enthusiasm are an example to QRPers everywhere! **N2CQR** and the *SolderSmoke* podcast recently completed two very happy years with **N6QW** as co-host. As Pete moves ever deeper into the digital realm, Bill seems to retreat into the 1950s and 60s; he has been fixing up an old Hallicrafters S38-E and a homebrew superhet with just three 6U8s designed by **W1ICP**.

The spring for **M0HDF** has been to focus on HF CW contests (ARRL DX, UBA, RDX, BERU and UKEICC) and a bit of DX 'hunting'. Building wise, Angel implemented the sensitivity modifications on his MTR v2 tribander with the help of **M1BUU**, and is now looking forward to the summer when he will be back to EA5 Castellon to activate more SOTA summits and some beach operation.



Earlier this year **G0NMY** purchased a NightHawk 40m 10W CW radio all built, modded (multi-turn tuning pot added) and boxed (pictured above), but noticed some strange behaviour in that his SWR went up when he switched to the rig from his TenTec Argosy. Mark checked the spec of the PA devices (2SC1979 driving a RD15HFV1 FET) and found them to be for VHF/UHF so thinks he may have self-oscillation issues in the PA. The *SPRAT DVD* came to his rescue - page 9 of *SPRAT* 107 describes the problem almost perfectly. When that has been cured Mark intends to add a QRPguys frequency counter board.

G6HUI asked on the G-QRP Club Mailing Group for tips for cutting copper clad board for chassis and front panel use and **DL2BQD** replied, "If the material is glass fibre laminated, a large plate shears is useful. Smaller pieces can be scratched and then broken. I built a little device to press the plates in and scratch them from both sides. Even a circular saw might help when 'normal' material is used. Glass fibre makes teeth quickly blunt". **G300U** suggests, "A standard hacksaw will just about manage an 11 inch cut before it runs out of space. I did make a sheet metal saw from an old wood saw which you can see at <http://www.qsl.net/g30ou/usefultools.html>>,"

but the supporting blade must be thinner than the hacksaw blade or it will jam. I then discovered that a small and very cheap wood saw with a blade length of about 13 inches and fairly fine teeth, but without any thickening section to the blade, will do a reasonable cutting job on fiberglass and aluminium. However, fiberglass is extremely abrasive so the teeth will not stay sharp for very long but at the low cost this is not an issue. Keep the blade at around 20 degrees to the material being cut to get a smooth result". **G4WIF** says, "One of my better *e-Bay* purchases was a band-saw which makes short work of PCB. That and a pillar drill are seriously useful workshop tools. If I didn't have a band-saw I would use my jigsaw with a fine tooth blade and clamp battens as guides to keep the cut straight".

Still on the subject of cutting copper clad board, **M0CZP** says, "You can use a fine blade in a cheap three wheel bandsaw (Black & Decker or Burgess type) or even a 1mm disk in an angle grinder. If you are feeling flush then a fine blade in a Proxxon table saw would work well. Do remember that fiberglass dust is not very pleasant so if you use a power tool to cut it, wear a mask". **GW4PUC** writes, "A cheap electric tile cutter would be good. You can often pick them up at second hand shops and the diamond discs are quite cheap to buy new in some of the cheap shops. Also they have a water trough so the blade runs wet keeping the dust down", and **N7EKU** says, "I have no trouble doing even long cuts by scoring the board and snapping it. I find it faster, easier, and it makes straighter cuts. I use a heavy short knife with a sheepfoot blade, and keep a whetstone handy to re-sharpen the tip as needed. I score both sides heavily and then clamp the board in a long vice (or between two boards). Then just push the board sharply and it snaps right in two. If I need square edges afterwards, I use coarse sandpaper on a sanding block with the piece in the vice, or put the sandpaper on a flat surface and move the PCB across it". Finally, **MIKTA** writes, "A band saw can work but be prepared to blunt the band. I use a metal ruler and a new Stanley knife blade and score both sides where you need to cut. Do it several times carefully until through the copper and have scored the FR4 underneath. The board should snap easily over an edge and you will get a nice clean line. Use fine sand paper or a sanding block to smooth the edges. If looking for that clean copper look, use fresh wire wool and meths and clean the boards in circular patten and then spray with clear lacquer. If going for that weathered look leave it alone and let it age, clean any flux off otherwise you will get green spots".



For a rainy afternoon project **M0JGH** built a 7030kHz QRPP CW spy transmitter hidden inside a functional match box, improvised with whatever parts he could find around the house (pictured left). Discrete contacts set in the cardboard allow the TX to be keyed with a thimble, and a switchable pass-through enables easy teaming with an external RX. The circuit features two 2N2222A transistors, as per **W1FB**'s Pixie 2, and outputs approximately 170mW from a 9V PP3 battery. **G4DNP** says, "Wanted – a Heathkit HW8 push-button switch assembly (PN 64-775) even from a non-working/damaged tranceiver".

GM30XX spent over seven weeks in hospital at the beginning of the year and then returned for a shorter spell. He is now home but cannot solder any more and has bought his first black box - a KX3 that he says is a nice performer but awful to look at! George was 80 years old on Easter Sunday and his daughter arranged a surprise party for him with all the family, including the lovely birthday cake picture lower left.

G3XBM was QRV in the 2m and 70cm UKAC contests on Tuesday evenings, best DX was around 125 miles on both bands with 5W SSB and a 2m horizontal omni (3dBd from big-wheel antenna on 2m) antenna used on both bands. Roger says because of his poor voice (stroke) he doesn't use voice modes for long. He has also been busy with WSPR with several spots from Norway on 630m (472kHz) with 5mW ERP using his earth-electrode 'antenna' in the ground and in the USA on 60m and VK on 30m, both with 2W.

Thanks also to the contributors to this column. Please let me know how your summer goes for the Autumn edition of *SPRAT*, what you have been building, who you have been working, and any other information about QRP, by the 1 August. Also, interesting photographs please, don't be shy in letting members see what you have been building and/or where you have been operating from, your antennas, who you have been meeting and even a shack photograph to let

other members know what you and your equipment look like. Let me know if you intend operating from somewhere other than home during the autumn and winter months, especially in the Winter Sports, so I can let members know to listen out for you.



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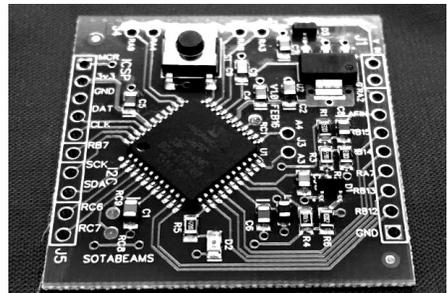
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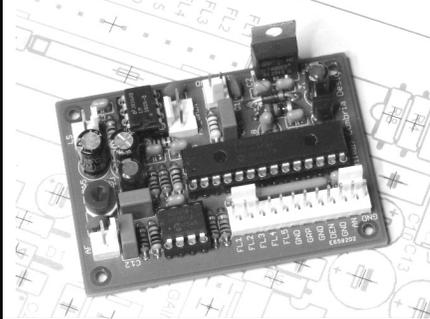
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Polyvaricon capacitors – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft extension & mtg screws - £1.50 each } £3.50p (EU); or
– 2 gang – (both 8 to 285pF) c/w shaft extension & mounting screws - £1.50 each } £4.50p (DX)

Pair LSB/USB carrier crystals HC49U wires - [9MHz ± 1.5kHz] £4 pair } **All components**

HC49U (wire) crystals for all CW calling freqs – 1.836, 3,560*, 7,015, } **plus postage**

7,028, 7,030*, 7,040, 7,0475, 7,122, 10,106, 10,116*, 14,060*, 18,086, } **(ANY quantity)**

21,060, 24,906, & 28,060 all are £2.00 each (* = also available in low profile HC49/S) } £1.20 (UK), or

HC49U crystals- 1.8432, 3.500, 5.262, 7.00, 10.006, 10.111, 14.00MHz – 50p each } £3.50p EU, or

HC49U crystals – 2.00, 3.00, 3.20, 3.579, 3.5820, 3.6864, 4.0, 4.096, 4.1943, 4.433MHz } £4.50p (DX)

4.5, 5.0, 6.0, 7.2, 7.6, 8.0, 9.0, 10.0, 11.0, 12.0, 13.50, 15.0, 16.0, 18.0, 20.0, 24.0, 25.0MHz }

26.0, 27.0, 28.0, 28.224, 30.0, 32.0, 33MHz – all 35p each (Some of these are low profile) } **Post free**

Ceramic resonators – 455, 480kHz, 2.0, 3.58, 3.68, 4.00, 14.32 & 20.00MHz – 50p each } **if ordered with**

Diodes – Schottky signal diode – 1N5711- 20p each; 1N4148 GP Si – 10 for 10p } **with heavier**

Varicap diodes – MVAM109 – 40pF @ 9v, 500pF @ 1v. 50p each } **things**

– BB204 – twin diodes, common cathode, 15pF @ 20v, 50pF @ 1v 50p } **like binders.**

SA602AN - £1.50 (note – I may supply NE or SA, 602 or 612 as available. All are fully interchangeable.) } **toroids**

MC1350 - £2.00 These are getting in short supply now so max of 2 per member } **polyvaricons**

LM386N-1 - 4 to 15v, 300mW, 8pin DIL - £0.40, LM386M-1 SMD – 35p } **or filters**

TDA7052A - 4.5 to 18v, 1W 8pin DIL low noise & DC vol control – £0.60 each } **Use just**

TDA2003 - 10w Audio amp 5pin – £0.25 each } **that postage**

TA-7642 Radio IC – direct equivalent of MK484 (& ZN414) – 75p each } **if ordered**

2SC536 transistors (npn) FT – 100MHz, hFE-320, VCBO +40V - 5 for 50p } **with books**

MPSH10 transistors (npn) FT – 650MHz, hFE 60, VCEO 25V - 8p each } **or CDs**

2N3904 transistors (npn) FT – 300MHz, hFE-150, VCBO +40V - 10 for 50p } **add this**

2N3906 transistors (npn) FT – 250MHz, hFE-150, VCBO +40V - 10 for 50p } **postage**

BC517 Darlington (npn) FT – 200MHz, hFE-30,000, VCBO +40V - 13p each } **as books**

FETs - IRF510 – 50p; 2N3819 - 22p; 2N7000 - 10p; BS170 – 8p - all each } **or DVDs**

BF981 – dual gate MOSFET – 40p each (special deal - 10 for £3.50)

Pad cutter - 2mm shaft: 7mm o/s, 5mm i/s diam, gives a 5mm pad with 1mm gap £6.00 } **do not**

10K 10mm coils – 0.6uH, 1u2H, 1u7L, 2u6L, 5u3L, 11u0L, 45u0L, 90u0L, 125uL – all 80p each } **travel well**

Magnet Wire – 18SWG – 2 metres – 60p; 20 & 22 SWG – 3 metres – 60p; } **with parts.**

24, 25 & 27SWG – 4 metres – 40p; 30, 33 & 35SWG – 5 metres – 30p. }

Bifilar wire – 2 strands - red & green bonded together. Solderable enamel. }

21SWG (0.8mm dia) – 2metres - £1; 26SWG (0.45mm dia) – 3metres – 70p }

This is solderable enamel insulated. Max of 3 sizes per member per order }

QRP heatsinks - TO92 – 30p; TO39/TO5 – 40p; TO18/TO72 – 60p (pics in Sprat 148) }

Axial lead inductors (they look like fat ½W resistors) these are low current }

3.3, 4.7, 6.8, 10, 15, 18, 22, 33, 39, 47, 56, 100, 150, 220 and 1000 - all uH, all 18p each. }

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

T25-2 – 50p, T25-6 – 60p, T30-2 – 70p, T30-6 – 80p; T37-2 – 80p, T37-6 – 80p; T50-1 – £1.00; T50-2 – 90p;

T50-6 – £1.10, T50-7 – £1.20, T50-10 – £1.20, T68-2 – £1.80; T68-6 – £2.40; T130-6 – £2.40ea. FT37-43 – 90p; FT50-43 – £1.20;**

FT37-61 – £1.20; FT50-61 – £2.40; BN43-2402 – £1.20; BN43-202 – £2.00; BN43-302 – £2.00; BN61-202 – £2.40. Ferrite beads – FB43-

101 (3.5mm dia x 3.2mm long, 1.2mm dia hole) – 40p for 5

All toroids are plus postage – up to 5 packs = £1.20 (UK), £3.50 (EU), £4.50 (DX). Each additional 5 packs, please add 50%

** Except ** items – they are heavy and each counts as 2 packs (ask for quote if you want more than 2 of the large toroids)

SBSS PCB clamps – single - £12, two - £20 all plus post (£3.50 UK & EU : DX – order direct from Rex please)

MeSquares & MePads – £6.50 each plus post (UK & EU as parts for up to 4) : will DX please order direct from Rex)

Limerick Sudden kits RX & TX both single band (160 through 20m); ATU (80 through 10m) £38.00 each plus post

UK - £3.50, EU - £5.40, DX - £8.00

Sprat-on-DVD – 1 to 160. Only £5 each to members plus postage, UK - £1.20, EU - £3.50, DX - £5.00

Sprat Binders – nylon string type – Black with club logo on spine -16 issues per binder – new stock - £6.00 each plus postage

(one: UK - £2.00, EU – 3.00, DX - £4.00. More - add £1.10, £1.50, £2.50 each)

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

MINIMUM ORDER for cheque or PayPal payments is £5 I can accept cash in GBPounds, or US\$/ euros (at the current exchange rates) – but please send securely! You can order via e-mail and pay by PayPal - use g3mfj@gqrp.co.uk – and pay us in GBPounds and you **MUST** include your membership number and address please.

PayPal charge us about 4% so a contribution towards that is always welcome, or, send as a gift to friends/family - thanks