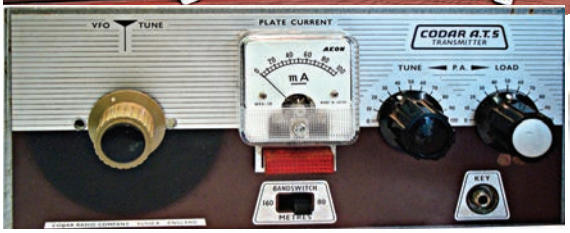
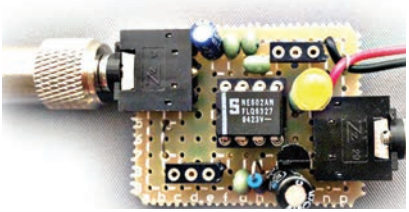
SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

Issue No. 184	© G-QRP CLUB	Autumn 2020





Contents

New Sprat-on-DVD – see page 40

Our founder George Dobbs G3RJV (SK)

Tel: +44(0)113 267 1070
Homepage: *www.gqrp.com*

Many thanks to the members who provided feedback on the draft Constitution that we featured on pages 20-24 of Sprat 183, the summer issue. Based on your thoughts and suggestions, the Committee has made some changes as a result.

The proposed final wording is now on the Club website (About G-QRP page) together with a link to a poll where you can vote to accept, or reject, it. Please cast your vote by the end of October. If you don't have the means to view and vote on line, please contact me by post and I will send you a paper copy.

By the time you read this the Club's virtual Convention will have happened. We are incredibly lucky to have members who have been willing and able to get stuck into such a project at fairly short notice. Witnessing the collaboration, including weekly on-line progress meetings with members on both sides of the Atlantic, has been a real pleasure and is a fine example of all that is good about the G-QRP membership. I hope we can include a full report in the next *SPRAT*.

An update on how the **G3RJV Memorial Trophy** is to be run and judged this year is to be found elsewhere in this issue.

Finally, I must ask everyone to give three rousing cheers to **Colin, G3VTT**, who has written his regular *SPRAT* column of *Antennas Valve & Vintage* since the Summer of 2007. Whilst Colin will still be contributing, he has decided to call it a day with his regular column. We will all look forward to Colin's Valve Day reports, Convention talks, etc. in the years to come.

Steve Hartley, G0FUW
Chairman GQRP Club
g0fuw@gqrp.co.uk

Another Etch Resistant PCB Pen!

Paddy G0JED – GQRP-4402

So what you may ask, why do I need another etch resistant pen when I have Staedtler Lumicolour pens and similar that seem to sort of work or even photographic and iron-on systems which are well tried and widely described.

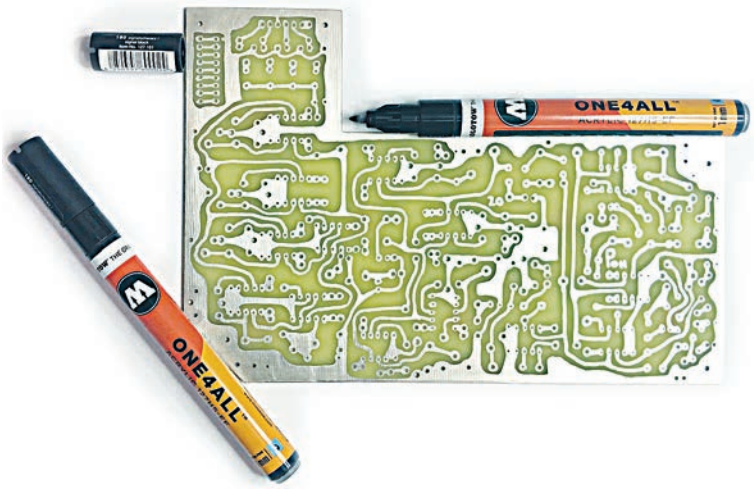
The simple answer is, that if you want to draw your PCB design on copper clad board and don't want to use iron-on methods or photographic UV then you are stuck with marker pens of whatever kind which I find are not that good in my hands. This was not always the case when the "Dalo" pen was still available and free-hand design, drawing onto the copper was a dream with the pen dispensing a dilute blue varnish that was truly etch resistant compared to a marker pen.

Here is where the "Molotow One For All" acrylic paint pen has helped me continue to make PCBs now "Dalo" is not available.

These pens are available in a variety of colours and nib sizes right down to 1mm, they are similar to "Dalo" pens in that they have a fibre nib which dispenses fluid via a clever pump action responding to pressure on the nib. Instead of dilute varnish this pen dispenses quick drying acrylic paint which has a mixed alcohol and water base, I understand they are often used to paint fine designs on glazed ceramics hence their great adhesion and durability.

I chose a black 1mm variant which I used to produce the PCB in the picture with no evidence of undercut or breakthrough. The single application is so opaque as not to need repeated drawing to achieve etch resistance and removal is by acetone or just simple rubbing with a rough cloth.

As with all methods surface preparation is key. Start with a fine rub using 1200 grade wet and dry followed by rinsing and a wipe with isopropyl alcohol to ensure perfect adhesion. I float my boards copper-side down on ferric chloride using surface tension to hold the board. I find this gives a clean quick etch with no need to agitate as the debris falls away from the board.



I have only used ferric chloride so can not vouch for effectiveness with other chemicals, try the pens for yourselves on a small scrap piece of board before you spend time on the final PCB just in case.

Substituting For a 40673

Alan Troy G4KRN emails: alantroy49@gmail.com

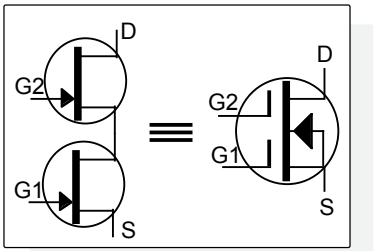
A favourite radio book of mine, for many years, has been *50 (FET) Field Effect Transistor Projects* by **F.G.Rayer**. Although it dates from the 1980s, it contains plenty of useful circuits and thankfully most of the components, including junction FETs (JFETs) such as the 2N3819 and MPF102, which are still available. However, the 40673-numbered dual gate MOSFET which features in many of the circuits, especially as a mixer, is no longer readily available.

Even back in the 1980s it was relatively expensive and needed careful handling. This device quickly became unobtainable. So a series of alternatives were quickly suggested, which included the 3SK51, 3SK85, 3SK88, 3N204 etc. But even these too became more difficult to find.

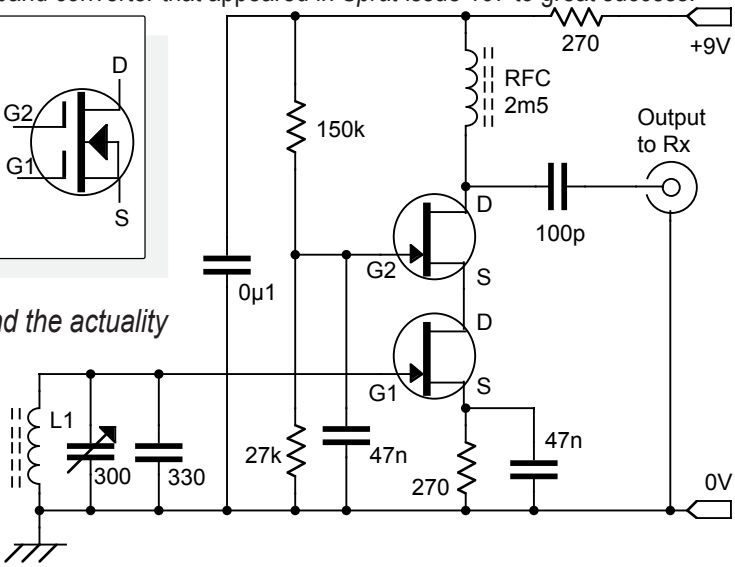
I had wondered whether one could simply parallel two JFETs by connecting the source to source and drain to drain, leaving the two gates separate to create a dual gate MOSFET. I did try this in a circuit but got confusing results. In **George G3RJV**'s "*Carrying on the Practical Way*" article in the June 2006 issue of *Practical Wireless*, he describes combining two N-channel JFETs in cascode configuration with the source of the upper device fed from the drain of the lower one to substitute in circuits using the 40673.

This arrangement, using 2N3819 FETs, works well in a number of circuits that I have tried, directly replacing the original 40673. The circuit shown here is a receive preselector taken from *50 (FET) Field Effect Transistor Projects*. But in the circuit here, I have replaced the 40673 with two 2N3819s in cascode and it works fine.

The reason there is apparently no antenna connection, is because in this circuit of a Top-band active antenna, I've used a ferrite rod for L1. I have also used the same circuit with an antenna coupling coil for general HF receive. The same cascode arrangement has also been used, in a 4m band converter that appeared in *Sprat* issue 167 to great success.



The equivalent and the actuality



More on substituting for the 40673

Steve Hartley, G0FUW

Some of you may be aware that I have been updating the G3RJV SCD transceiver project. Many of the parts George used back in the 1980s are no longer readily available, not least the 40673 dual-gate MOSFET used in the receiver product detector.

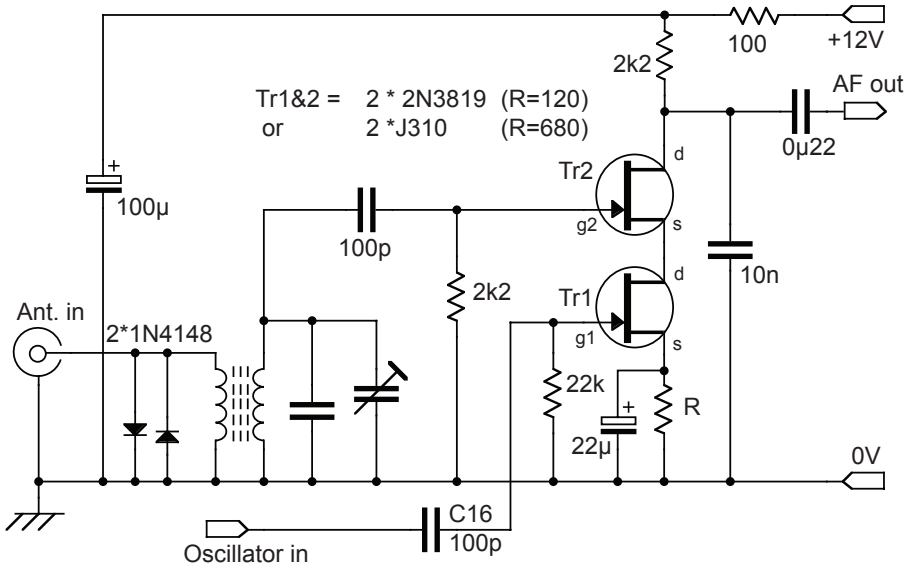
I tried using the BF981 which is available form Club Sales and it worked but a third prototype would not co-operate. Having tried another on a test board I found there was a large variation in working voltages even with identical biasing.

Following some research I found several different biasing configurations for the old 40673 and I tried a few. The best (most repeatable) was that from W1FB's QRP Notebook. However, even that was not 100% reliable with the BF981. I concluded that the transistor was not really up to the job.

Seeing the article by **Alan, G4KRN**, article in this issue of *SPRAT* on substituting the 40673 with a couple of JFETs as an RF amp, I remembered **Pete N6QW**, had done some work using two JFETs for the product detector in his Simpleceiver project. Further digging and an exchange of e-mails with Pete had a test bed version set up and working. Replacing the J310s (getting rare/expensive) with two 2N3819 (from Club Sales), and following Pete's biasing advice, had another working model.

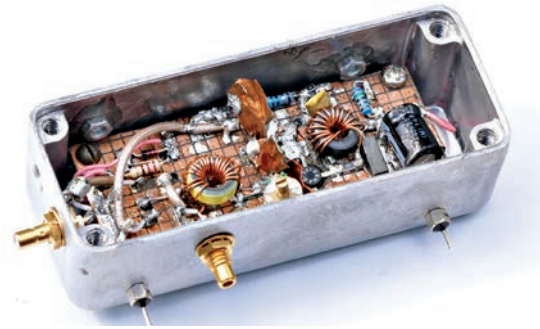
Best of all, the success was repeated in two further prototype receiver boards and the SCD 2020 project is now nearing the point where it can be published. With a fair wind, a set of commercial PCBs will be made available. Thanks to Pete, N6QW, **Vic, GW4JUN**, and **Heather, M0HMO**, for their help with this project.

The circuit of the updated SCD front end is shown below.



MOSFET Low Noise Six Metre Amplifer

Tony Wallbank G4CIZ, tony.wallbank@yahoo.co.uk

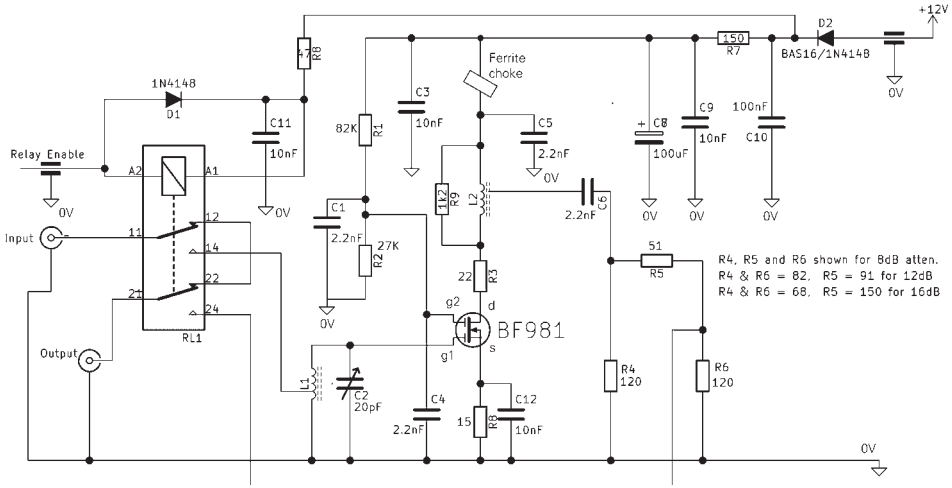


Getting onto six metres during lockdown I found my receiver somewhat 'deaf'. Adding input filter and mixer losses to post-mixer amplifier performance, I estimated its noise figure at 14-16dB. While I could modify my homebrew rig, building a low noise amplifier was easier. Web research showed bipolars, fets and MMICs popular as preamps, however my 4m receiver has happily used a BF981 dual-gate mosfet for longer than I care to remember. Finding them in club sales, the die was cast.

The circuit

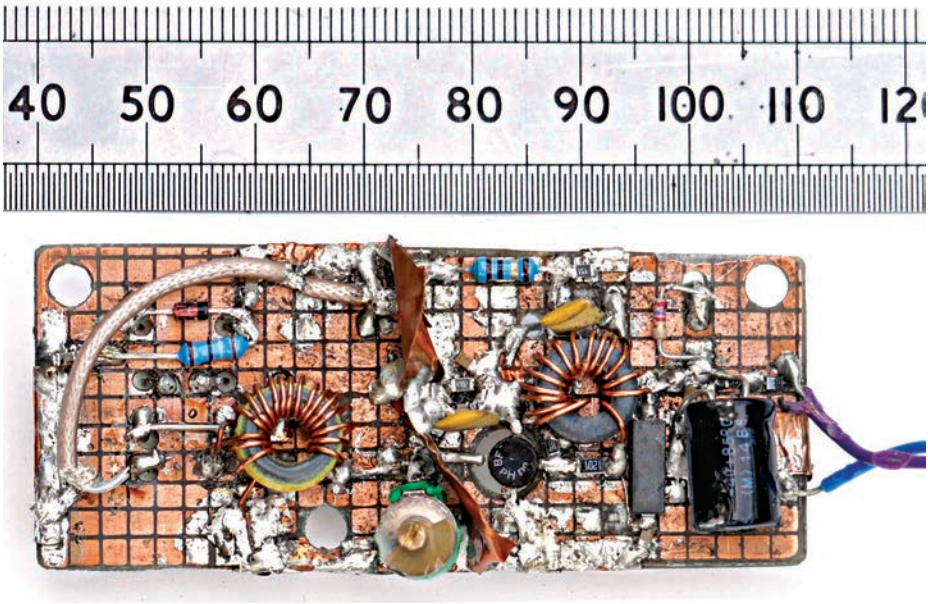
There is nothing new here. Noise figure is specified at 10mA, the same as typical IDSS*, suggesting the source is grounded. Unfortunately IDSS can exceed the maximum continuous current, so R8 provides a small negative gate 1 bias. Drain current is independent of voltage allowing operation from the unregulated 12-13.8V rail.

For the input, an L-network is low pass rather than bandpass and much like the proverbial barn door. A parallel tuned circuit has improved selectivity with no real drawbacks, so I chose this. I experimented with a double tuned circuit but decided the complexity did not warrant the improved out of band rejection.



A powdered iron toroidal inductor simplifies construction. I used a T37-6 core; 3 turns, then a tap, then another 14 turns. (17 total). A T50-10 core, with the same turns, gave comparable results. The output has a ferrite transformer. At this frequency the permeability of type 43 ferrite has dropped considerably becoming similar to type 61, so use either T43-37 or T61-37; 3 turns, then the tap, then another 10 (15 total). All used 0.5mm enamelled copper wire. The ferrite choke is non-critical, e.g. two turns through a type 43 or similar bead. The photos show a Fair-Rite 2743021446.

For best noise performance the amplifier is run at full gain then attenuated. Use the most your rig can take, 8 – 16dB, to avoid compromising its strong signal performance. With 12dB attenuation my relatively poor NF rig still hears 4dB of antenna noise in a quiet location.



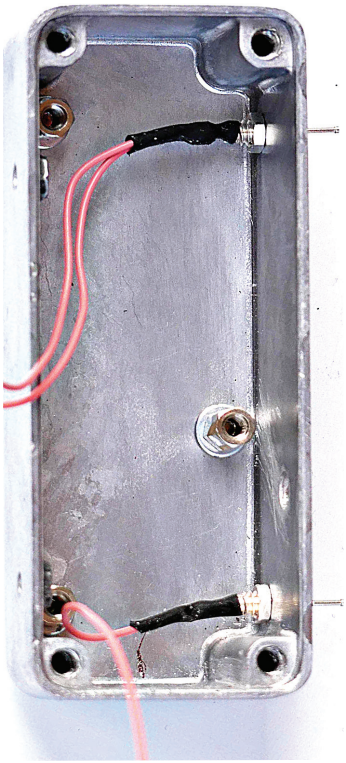
Construction

These mosfets have some protection, but do take static precautions including fitting resistors and L1 first. I accidentally exterminated one by shorting drain voltage to gate 2. Remember to switch off before poking the iron in there.

Double-sided board with ground plane underneath and isolated copper squares on top works for surface mount and leaded components. I used both but there is room for all leaded parts if preferred. Just the relay and R1 live underneath. Thin copper foil, mine was taken from M&P Extraflex coax, is used to join pads and edge-wrapped for grounds. A double through-wire near gate 2 grounds and holds down a foil area. Gate 2 is well bypassed here with two same value capacitors.

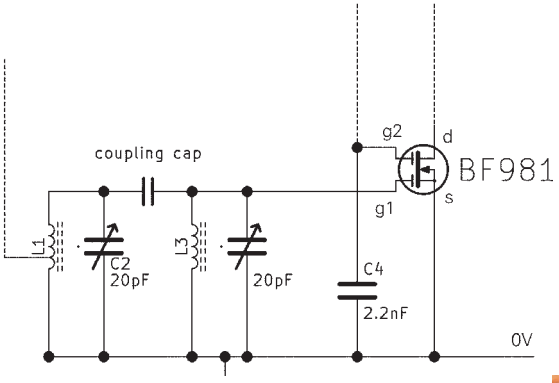
The BF981 has only 10-20 femtoFarads (fF) feedback capacitance and a copper or brass screen helps minimise strays. Thin PTFE coax - RG178 - connects attenuator output to relay. Fit L1 a few mm clear of the board with its tap direct to relay. See photos of my now slightly messy prototype, a result of testing several variants.

The amplifier fits a die cast box approximately 89x35 x28mm. Feedthroughs bring 12V and relay ground into the under-board space and two nuts are epoxied on for fixing screws. My relay is 8.4mm tall, so 8mm threaded spacers with 0.5mm washers are fine. The closest currently available is the Omron G6A-274P-ST-US. There are also lower profile relays, e.g. Panasonic TQ2-12V and Kemet EA-12NH, just 5mm tall.



Experimenting

A double tuned circuit narrows the bandwidth considerably. My lash up gave +/- 5MHz at -20dB against +/-20MHz. If your location has very strong out of band signals this version would give the amplifier much better overload protection. The toroids could be vertical, mutually at 90 degrees, or perhaps fit one under the board. The coupling capacitor is 12mm of twisted PTFE covered stranded wires, gate inductor as above but without tap. Noise performance remained good.



My junk box yielded a BF960 that, despite poorer noise spec, gave good results. A BF964, BF988 and others should work, but check datasheet to ensure you stay within maximum ratings. The BF998 is available new from Mouser but has a worse noise spec.

at low VHF than older Telefunken or NXP/Philips BF998s. To reduce drain voltage with a BF998 try R7 = 330Ω, or a series LED on the incoming supply.

Recent dual-gate mosfets are enhancement type (require positive bias on G1) and most are low voltage, for example the Toshiba 3SK29x series.

Setting up

I suggest preliminary testing before mounting into the box. Check current and G2 voltage to verify your build, however you're unlikely to see much difference changing R8 and/or R1/R2 to get nearer 10mA

and 4V. Noise figure isn't critical on drain current, and anyway ultimate NF is unnecessary. More current does increase gain, but there is already plenty.

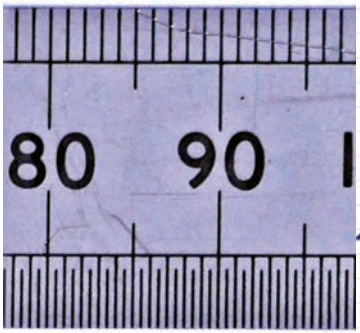
The mosfet G1 should 'see' a slightly capacitive impedance, achieved by running on the high side of L1/C2 resonance. A noise figure meter is nice but you don't need one. Find a signal on 6m and peak C2. Expect at least 20dB gain, minus attenuator loss. The prototype has 16.5 dB gain after 8dB attenuation, 16dB using a BF960.

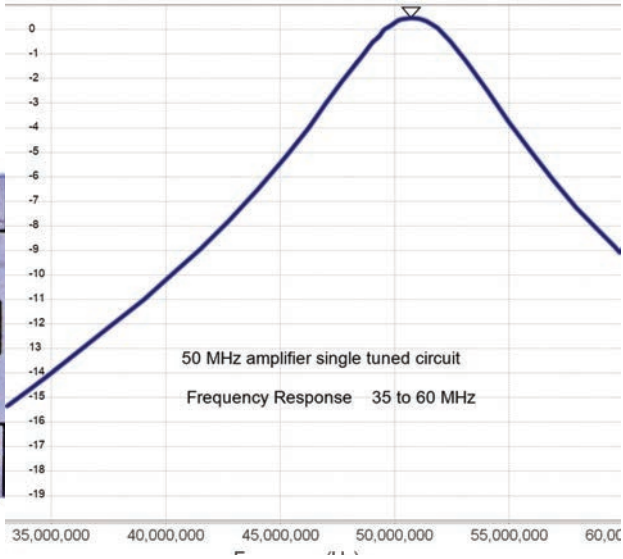
Next tune C2 slightly LF. 1-2dB down should be plenty. It will become external noise limited and is not critical. Alternatively, just tuning for max. gain at 48MHz should be about right. I installed the finished prototype in the receive feed after the rig's antenna changeover relay.

Enjoy six, a fascinating band especially in summer when there is sporadic E (Es) you can easily work across Europe with 5W or less.

* drain current at : 0V on g1–source and 4V on g2–source

I used an F4GOH VNA to obtain gain and frequency response curves at VHF:





Details of the 'top-coupling' capacitor in the double-tuned input circuit

Web references:

www.robkalmeijer.nl/techniek/electronica/radiotechniek/hambladen/qst/1991/12/page29/index.html

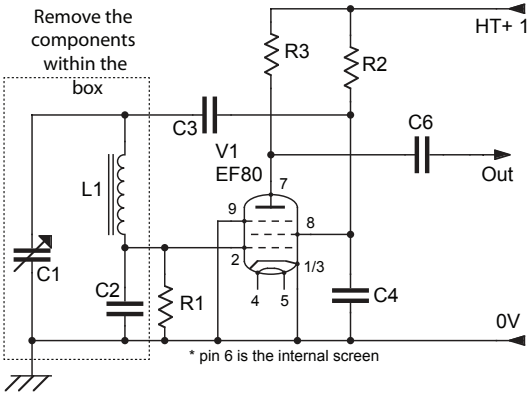
https://hamprojects.wordpress.com/2016/02/21/hf-arduino-vna-english-version/

The Codar AT5 on 5 MHz.

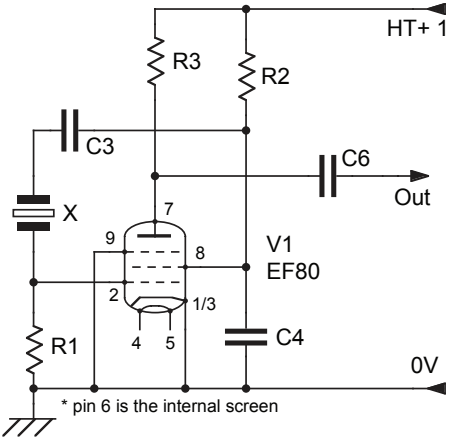
Mike Cotton G4HBY, 113 Belvedere Road, Burton on Trent

I recently came across an article describing a three valve CW transmitter for 3.5MHz, by **Richard Q Marris G2BZQ**, I noticed the circuit was a very close copy of a Codar AT5 transmitter, minus the modulator. It was crystal controlled as opposed to the VFO controlled AT5.

Now I own two of these very nice AT5 transmitters, one fair to good, the other is a little tatty in condition, so I decided to modify that one to crystal control on 3.560MHz, using a club crystal, as I rarely use any other frequency on 80m CW.



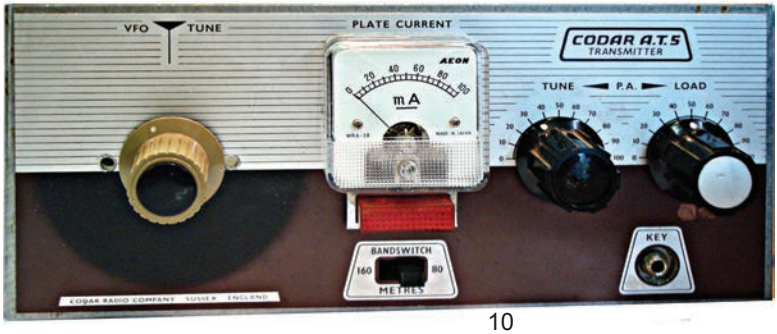
The original Codar VFO circuit



Circuit with just the one crystal fitted

This is an easily reversible mod, for any purists who feel I shouldn't tamper with this lovely valve transmitter. I first carefully removed the VFO components and safely stored them, coil, variable capacitor etc. I then wired the crystal as shown in the circuit diagram and powered the rig up into my dummy load, all was well with about 5 Watts output.

I used the transmitter for a few contacts and all was well. I then decided to add another crystal for 3.615MHz, the 80m AM frequency and this worked fine too. I used a two position rotary switch mounted where the variable VFO capacitor sat, with a short extention shaft to the front panel, to select the required crystal, this saved any alterations to the metal work of the chassis.



Later on it occurred to me that as this mod worked on 80m, it may work on 60m. I purchased a crystal for 5.262 and later another for 5.317MHz for the spot AM frequency to replace the 80m ones. I tested the oscillator and all was well.

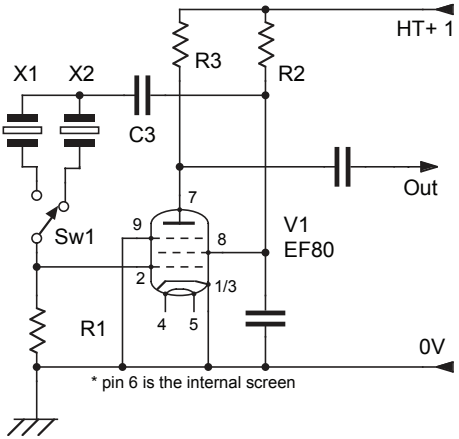
The next stage was to change the PA coil for 5MHz working, the original was removed and stored. A coil of 30 turns close wound of 22 SWG on a 20mm plastic former, was wired in place of the existing PA coil, and power was applied. All was well and a power of just over 5 Watts was measured into a dummy load. To keep to the 5 Watt QRP limit, I reduced the loading control slightly.

My first ever 5MHz QSO was with **Colin** running **G5LOW**, on 5.262MHz on the Valve QRP Weekend in July 2020. If like me, you do not have access to 60m, and have an AT5 gathering dust, this is a easy way to get on the band, with the advantage of being able to convert your AT5 back to original if desired.

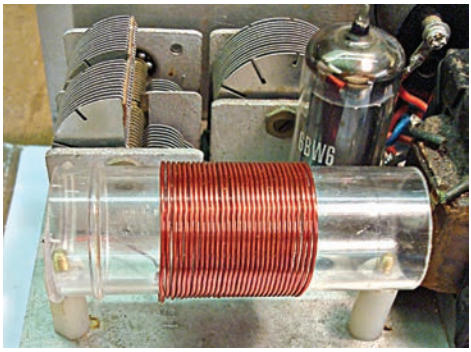
I use my modified Codar in conjunction with my nearly 80 year old AR88D.

But, if you do decide to give this idea a try on air, I recommend using an ATU to help reduce any harmonic output.

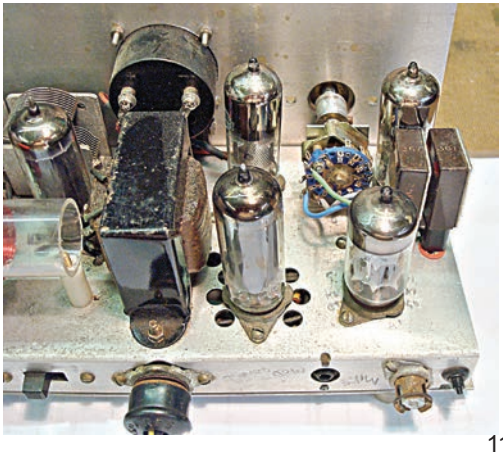
72 Mike email: *g4hby@yahoo.co.uk*



Then there were two crystals fitted

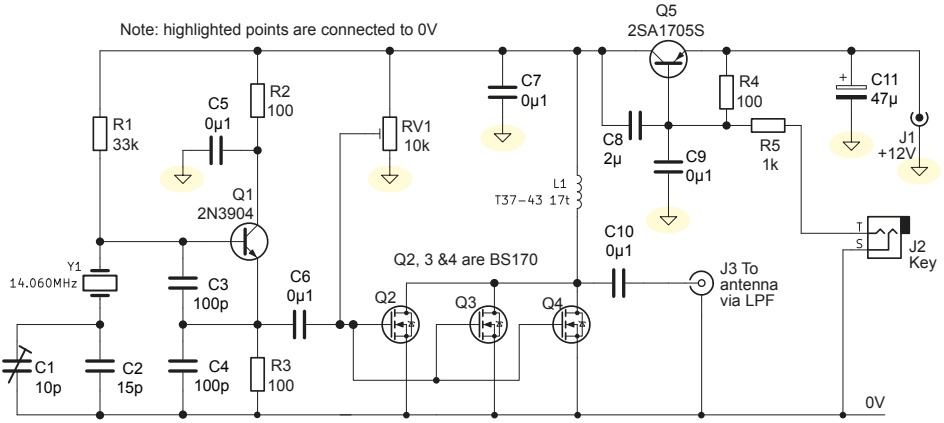


The new coil wound for 5MHz



TLX-1 20m Transmitter

Richard Tomlinson G4TGJ, 25 Beverley Rise, Ilkley LS29 9DB



This little transmitter started out as an Oxo (Sprat 28) for the 60m band. I got about half a watt out but I was not happy with its very low PA efficiency (around 30%). After some discussion on the GQRP Club email group I decided to replace the 2N3866 PA transistor with 3 BS170 MOSFETs in parallel. I've been playing with class E PAs so already had 3 of these devices available to use together.

After suitable circuit modifications I had about 1.5W on 60m with almost 60% efficiency so I was happy. But I really wanted to make this work on 20m and the finished circuit is presented here. The higher frequency makes it harder to drive the MOSFET gates so it isn't as efficient giving about 1W with 50% efficiency.

Q1 forms a Colpitts crystal oscillator. To oscillate on its marked frequency the crystal needs to be shunted by the correct load capacitance – usually around 20 or 30pF. Without C1 and C2 the crystal is loaded by the series combination of the feedback capacitors C3 and C4 (both 100pF). This 50pF pulls the oscillator down to 14.055MHz. I used the parallel combination of C1 and C2 to trim the oscillator to exactly 14.060MHz but you could use a single trimmer of around 30pF instead. If you don't have a trimmer to hand then using 30pF for C2 will get you just below the QRP calling frequency.

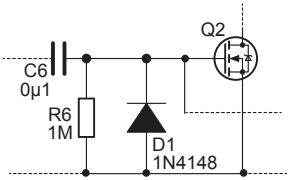
The oscillator output is coupled through C6 to the paralleled MOSFETs. RV1 sets the bias – for highest efficiency Q2-Q4 need to be driven hard on – so adjust this while transmitting into a dummy load for the highest output, ideally while watching the current consumption. L1 provides the load for the PA transistors. I used 17 turns of 30SWG wire on an FT37-43 toroid but it isn't very critical. C10 couples the output to the antenna (obviously via a low pass filter).

The circuit around Q5 is a miller integrator and provides key shaping. C8 is two 1uF capacitors in parallel but you could use a standard 2u2F capacitor here. Q5 is a *pnp* transistor capable of carrying about 300mA (I used the 2SA1705S because they are cheaply available from RS). Q1 is powered from the keyed 12V supply so that it isn't audible in the receiver when not transmitting but if you want to use it as the oscillator for a receiver then you could connect the top of R1 and R2 directly to the 12V supply.

Other bands

This circuit can be used on other bands but may need a few modifications. The MOSFETs are harder to drive at higher frequencies so these notes are for how to make the circuit work at lower frequencies.

C3 and C4 will need to be increased. I used 470pF (for both capacitors) for 80m but 100pF was still OK on 60m. If you do change C3 or C4 you will need to change C1 and C2 for the correct load capacitance for the crystal. You can of course make C1 a variable for a VXO. You can also increase the value of R3 and still get sufficient drive for the PA. For 60m this was 1K which lowers the current drawn by the oscillator.



Instead of using RV1 to set the PA bias voltage you can remove it and add a 1M resistor and diode as shown. Without the diode the waveform at the gate of the PA is, say, between -3V and +3V. The negative swing is wasted and the positive is not enough to switch the MOSFETs on hard. But the diode ensures that the waveform is between 0V and 6V which is high enough to fully switch on the PA transistors. (It is actually the combination of the coupling capacitor and diode that does this DC restoration. On negative signals the diode conducts and charges the capacitor. On positive signals the diode doesn't conduct and so the signal is the sum of the waveform and the charge in the capacitor).

[The transmitter name by the way, is from 'TGJ Lockdown Xmitter number one].

email: rpt@rpt.me.uk

G0FUW's 'Oner' Correction

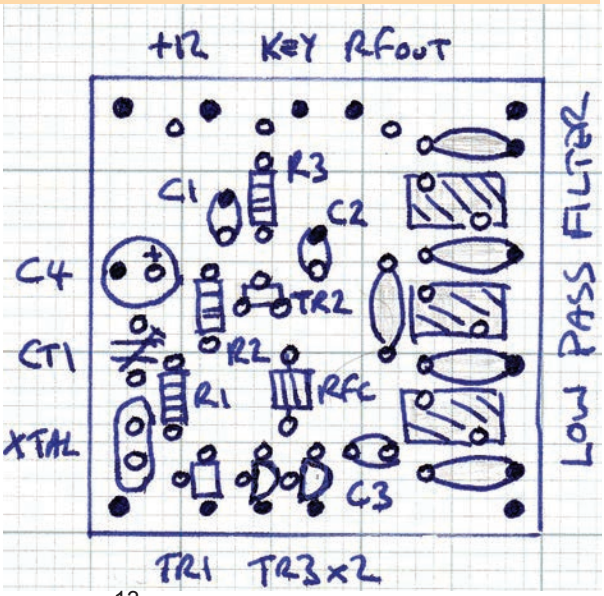
Steve G0FUW

Oner Revisited, SPRAT 183, page 19

My thanks go **Chris Wood G4CWS**, who said that the BS170 PA FETs in the Oner Revisited layout diagram appearing on page 19 of SPRAT 183 were shown the wrong way round.

The diagram of the overlay has been corrected and is shown again here. The BS170 flat sides should actually be facing TR1 with the gate (centre pin) slightly towards it. See the diagram.

My apologies, Steve, G0FUW



Electronic Tuning of Loop Antennas

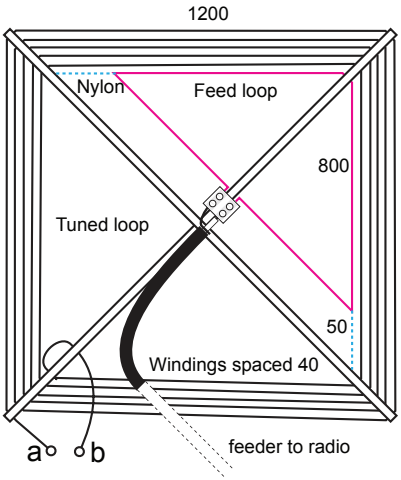
Chris G6XDI email: chris@g6xdi.net

I have recently been playing with a frame antenna design of SM0VPO for 80 and 160m. In common with most loop antennas this antenna has a fairly small operating bandwidth causing it to need regularly retuning. The usual way to tune one of these antennas is with some form of motorised variable capacitor. Sadly the large transmitting type variable capacitors needed are not cheap or easy to find. Additionally the frame antenna had some rather awkward tuning needs. On 80m it needed about 5–20pF and on 160m 90–100pF. Such a capacitor capable of this range and power & voltage handling is a vacuum variable. But these are expensive, large and not easy to find.

I had seen quite a few designs for electronic loop tuning on the Internet wondering if they could be made to do the job. An initial test circuit was constructed out of Vero board. For a 'varicap' a 500mW 6.8V Zener diode was used, which gave quite a good tuning range. Whilst the Zeners range was good it had too much minimum capacitance and was never going to handle 5W of TX power.

A bag of mixed diodes was purchased from the local Maplin, which contained many useful diodes including many 1N4007s. Sources on the Internet suggested that these had a really good tuning range and a 1000V PIV rating. I tried one and it worked well with slightly less range than the Zener. The circuit was modified to try to increase the tuning range this worked quite well but still did not produce enough range to get to 160m. The circuit of was then tried, this had a reduced tuning range as expected but a much lower minimum capacitance thus enabling me to tune the whole 80m band.

Sources on the Internet also suggested that 5W Zeners work well as varicaps. Some were purchased off eBay. Whilst they had loads of capacitance it just wasn't very variable! I found that the value of the resistor feeding the bias to the varicap affected the SWR of the antenna. Experiments showed a value of 100–200kΩ to be the



The basic layout of the SM0VPO loop antenna

best. I found that I could solve my 160m tuning problem by switching an 82pF capacitor in parallel with the diode pair. I now had good tuning across Top band and 80m.

I wondered if this circuit would work in transmit. The diodes were high voltage types so hopes were high so I tried it. With about 1W of TX power the SWR became very variable changing as I transmitted.

I realised that the RF was getting through the diodes and altering the tuning. An RF choke was tried in the feed to the diodes but this didn't help. A diode was then put in the feed to the diodes considerably improving the SWR and the TX power handling.

I found that 5W was now usable before the SWR problems happened again. Some tests on 80m, with WSPR were done and to my amazement the first TX came back straight away from Holland at a reasonable level. After about half an hour I removed the electronic tuning element and replaced it with a variable capacitor.

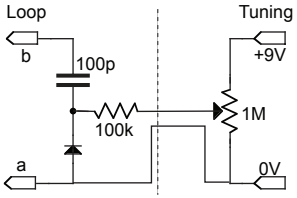
Transmissions with the loop in this configuration were found to be 10dB better than those with the electronic tuner.

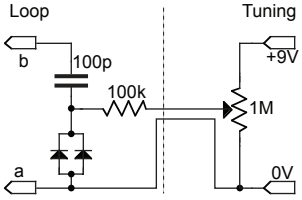
Unfortunately I think that the diodes are rectifying the TX output and I can't see any way out of this. The circuit works very well in receive with a really good response and SWR as can be seen from the plot from my VNA.

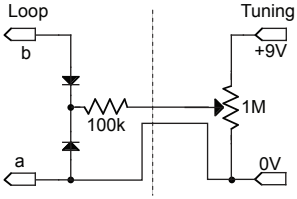
The major advantage of this circuit over a variable capacitor is the cost. It is very cheap and easy to make which with big TX variables around £100 new, this is a big selling point!

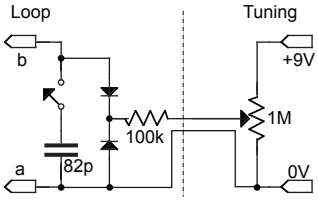
The SM0VPO loop has proven itself to be a good performer with contacts on 80m JT65 into HB9, PA, ON and DL. It has also enabled me to take part in a local Top band net.

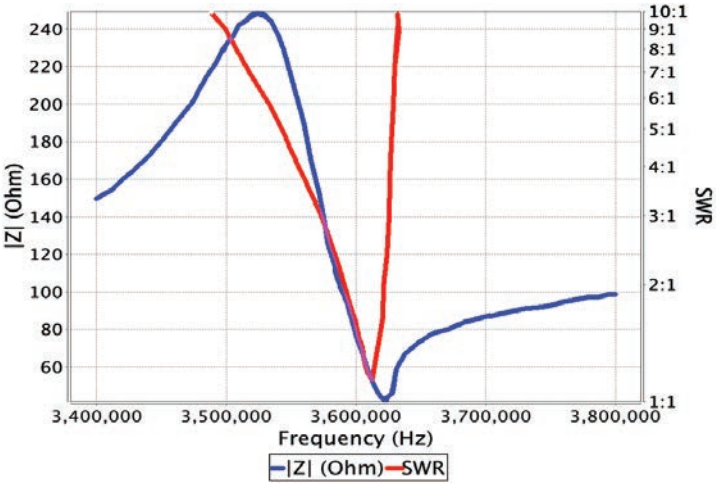
Fed from a single 9V battery that lasts months, and its small size and easy construction it really works very well.





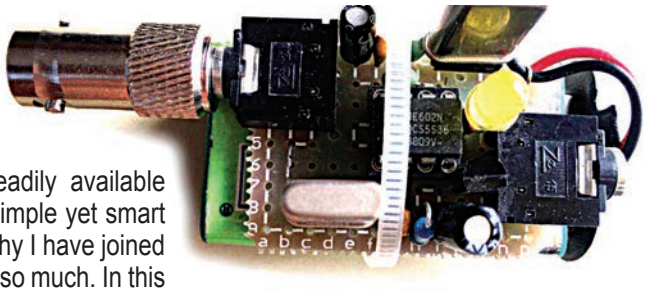






LCR: Little Choc Receiver

Adam Rong, BD6CR, China, rongxh@gmail.com



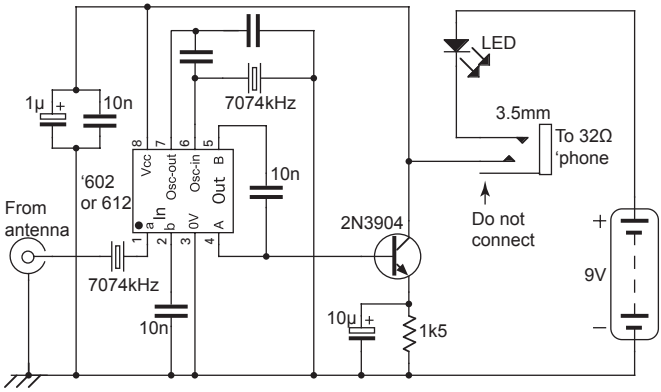
Hello world! I am the one who first introduced the Pixie into China about 20 years ago when I was in university. Now Chinese Pixie kits are extremely inexpensive and readily available to anyone in the world. I like simple yet smart designs like Pixie, and that's why I have joined GQRP club and enjoyed *Sprat* so much. In this piece, I would like to introduce a simple receiver designed by myself, which can be built on one unit of my 'Choc' perfboard.

Why 'Choc receiver' and perfboard? Because I have always wanted to cut the perfboard easily, just like the way you break apart a big bar of chocolate. The V-cut is one way, but it would cut through the common grounding of different units, so I opted for the stamp holes. The following is the pattern of one unit, whereby several units can be combined using stamp holes. For more information about Choc perfboard, you can read my article Build an SSB Transceiver with Choc Perfboard published in the 2018 Sept/Oct issue of Amateur Radio magazine in Australia, or online at *http://crkits.com/chocperfboard.doc*

Design Idea & Circuit description

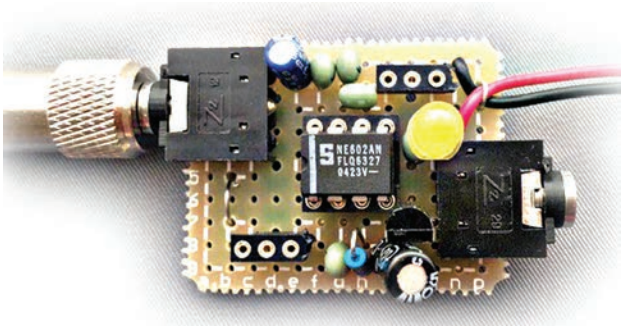
I remember the late Rev George Dobbs quoted in his foreword for the Rich Arland's book *Low Power Communication* (ARRL's): *The Art and Science of QRP 3rd edition*: "It's vain to do with more what can be done with less."—William of Occam 1290-1350. If you just want to monitor a hot CW frequency like 7023 kHz in China, you don't really need to switch on your main rig.

Instead, you can build a receiver with a handful of parts and it will only drawa few mA of current. Of course, you have many good choices like MRX-40 or Sudden receiver, but I wanted to make it even simpler by eliminating the LM386 as well, and make it "plug and play" by switching power on/off with the headphones.

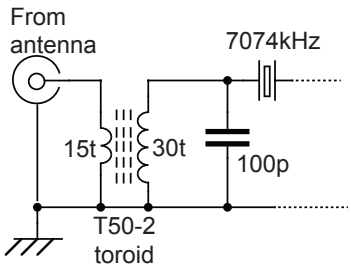


The NE602 is still our good friend to build a simple receiver, and NXP is still producing the equivalent SA602. The crystal in the front end will block strong broadcast signals

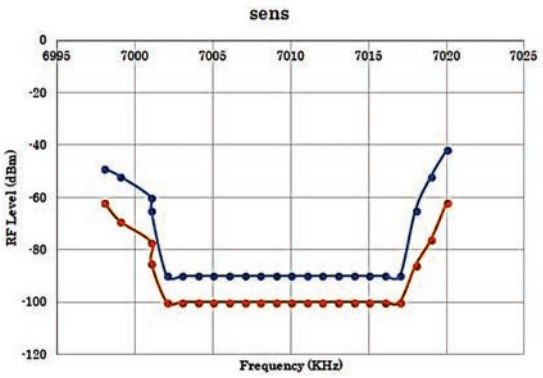
very effectively, although it might cause noticeable attenuation at the signal frequency. Someone might be curious about the frequency response as well. For a receiver, you really don't have to worry about it, even for SSB reception. The oscillating circuit consists of two capacitors and another crystal connected at pin 6 and 7 of NE602.



The load capacitance of most of the crystals is 20pF and you can use 47p and 27p here to oscillate at the marked frequency if you wish to receive SSB signals. If you wish to receive CW signals, you need to make it oscillate at side tone frequency (600-700Hz) away from the marked frequency. Here, you can try 68p and 39p to achieve that pulling. Connect the bigger value capacitor between pin 7 and ground. The audio amplifier NPN transistor is biased by pin 4 of NE602 and the headphones in series will serve as a bigger impedance load (typically, 32 + 32 ohms) for more audio output. Here, the headphone sensitivity is also very helpful. In my test, an iPhone headset works great as the impedance is over 40 ohm (remember: bigger impedance bigger gain) and the sensitivity is high, but a 300 ohm headphone like HD600 is not suitable here. The unique design here is the power supply of NE602 at pin 8. The LED will provide a dropout of about 1.8V to play safe and indicate power on, and the headphones serve as the power switch. To prevent possible audio frequency self-oscillation, the capacitors near pin 8 will effectively do the job.



An anonymous Japanese ham improved the antenna impedance matching to increase the sensitivity by about 10dB. Here an IF transformer will do the job as well. The blue line, in the diagram shown here is the sensitivity of the original design and the orange line is the improved design. The crystal used in the measurement is 7010 kHz, and you can see a very flat response near the crystal frequency.

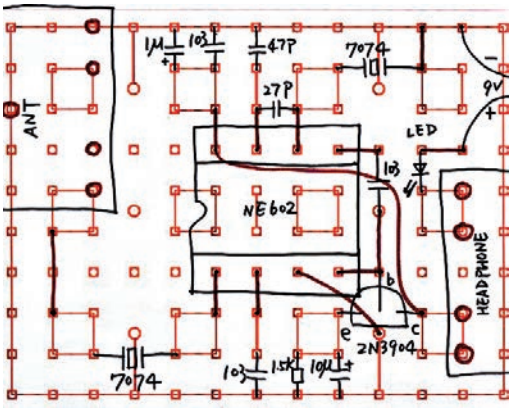


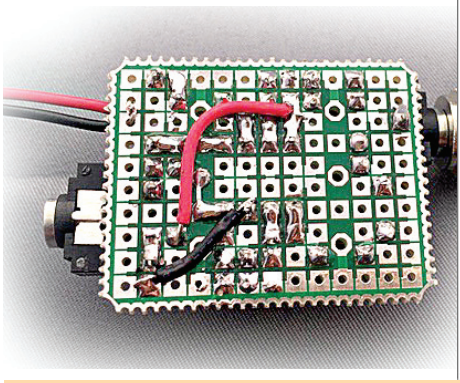
Perfboard Layout

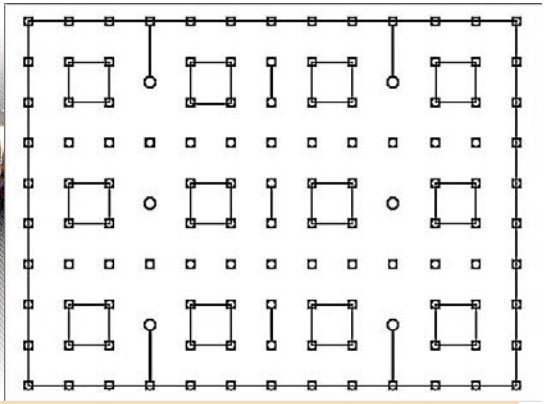
You can refer to the layout. On the top left is the antenna connector and on the right side is the audio connector. Both are stereo audio jacks and you can use an adapter for the regular antenna coaxial cable. The shorter jumpers can be made by the solder bridges, like the ones near NE602.

Construction

I assembled the board together with a 9V battery. The double faced adhesive foam is used to prevent shorting the extra pins to the battery case. The nylon cable tie is a simple way to bundle them, or you can consider other methods as appropriate. Now, let's plug in the headphone and enjoy some SWLing!







Free to good homes!

Mike GM0OXS

Mike, has three professionally made PCBs for the NorCal NC40 transceiver. There are comprehensive videos on YouTube for those building this project (just search for "QRPTech NC40"). If you are interested in one of these, send you name, callsign and contact details to our **Treasurer Graham, G3MFJ**, who will arrange one of his raffle draws to select who receives the the boards (only one 'ticket' per member).

Geoff G4ICD

Is known for manufacturing aerial systems and has a number of 49:1 EFHW transformers spare. Our Chairman has been trying one out and with 20.5m of wire he was able to make a 2-way QRP CW QSO with Colin, G3VTT operating as G5LOW on 40m. With 10m of coax the SWR on 40, 20, 15 and 10m is very usable without an ATU. Further info can be had from Geoff's QRZ.com page and *https://rfcomms.co.uk/* The units are available to UK members only, on a first-come-first-served basis, for £5 to cover the cost of the postage and packing. Contact Geoff by e-mail via *g4icd@btinternet.com* to register your interest.

Cellphone Pixie

L Robertson ZL2LJR email: lindsay@tech-vantage.com

A long-standing theme in the amateur radio community has been making the hobby both attractive and accessible to younger members. At the risk of perhaps stating the obvious, a defining characteristic of our younger members is ownership of a “smart” phone.

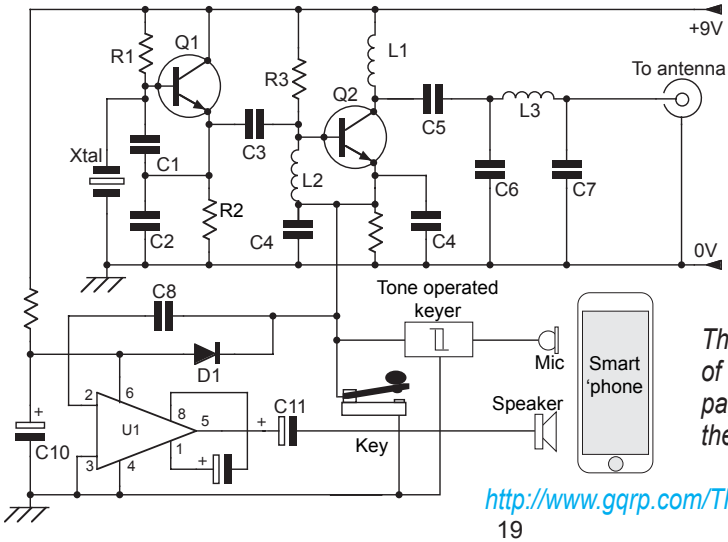
There are readily available Android “apps”, designed to provide narrow band audio filtering (e.g. of audio such as that which could be output from a simple CW receiver), and there are readily available apps for decoding CW transmissions that are provided in the form of audio tones.

There are also several Android apps that generate Morse code as audio tones (in many cases with a training focus), from text input to a cellular phone. So....it would seem to me that this is a case where a single “missing link” can offer a real opportunity. All that is needed is a simple FET or transistor (or op-amp) circuit-plus-microphone that can “key” a QRP transmitter when triggered by an audio tone from a cellphone. Some cellular phone apps generate Morse code by flashing the “flashbulb” of the phone, perhaps that way allowing a photodetector—based keyer.

A “pixie-plus-keyer” kitset (or perhaps an alternative to the venerable “pixie”), generally as shown in the following block diagram, would then offer any cellphone-owner a simple bidirectional access to the world of QRP CW, using a familiar interface and readily-available apps, yet while retaining complete inter-connectivity with all of our straight-key purists!

An alternative would be an approach that interfaces a QRP rig to a cellular phone, via a 3.5mm audio jack; this would offer better connection, but risking narrower application as phones (regrettably) abandon the 3.5mm audio jacks.

Does anyone have enthusiasm for refining a circuit and offering a kitset for this?



My idea is shown linked to a standard Pixie circuit

73 de ZL2LJR

The Pixie plus a variety of additional information pages are available from the GQRP website:

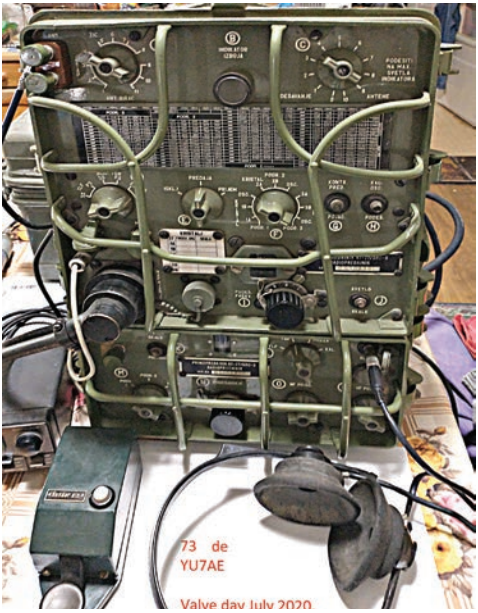
http://www.gqrp.com/The_Sprat_Pixie_File.pdf

Valve QRP Report 18/19th July 2020

Colin Turner G3VTT 182 Station Road Rainham Kent ME8 7PR

My thanks to all of you who supported the summer Valve QRP Weekend in July. There were some interesting QSOs ensuing, one of them being with **Mike G4HBY** on 60m using a Codar AT5 transmitter, described elsewhere in this issue. And after his modifications he's now QRV on either 5262 or 5317kHz, switchable from the front panel. **Bill G4GHB** was operating with a Wireless Set 19 and didn't have much success but he has made the suggestion that we concentrate our listening on the top of the hour to make more contacts.

This is a good idea and I suggest we implement this during the November session and Winter Sports. It sounds a bit like the old marine radio 'silent period' but we could try this idea next time perhaps staggering the calling over a five minute period? One of our regulars **Ian G4GIR** says he had a wonderful weekend as it coincided with birthday, (enough turns for a 160m tank coil), and he had a great excuse to spend more time on the radio. Birthdays are a time for indulgence he says. The weekend was great with QSOs on 160 through 40m including his first Valve to Valve QSO on 40m recorded in his log. The equipment used was the WS19 MK III and an 807 CO/PA with an AR88 receiver. **G4AQS** was worked using his Minimitter transmitter also **G3XIZ, G4FGJ** and **M0JXM** for a four way Valve to Valve QSO on 160m. (My intention with valve QRP was to encourage home brewing and activity although I seemed to have stirred up a hornets nest).



Our long time supported **YU7AE** was operating using his old reliable AN/GRC9 transceiver with reduced anode voltage to get the input down and 3.5–5W output. With an inverted vee dipole and a double-sized Windom antenna he had 12 QSOs on 80, 40 and 30m. Despite a little 'chirp', (well it sounded like a real wireless set), he had no complaints and was able to practice his zero beating netting skills.

Along the road from me in the famous barge construction town of Sittingbourne is **John G3TYB** who keeps 160m alive in Kent. He had 15 QSOs with his valved equipment. With the warm weather, he was only active early mornings and evenings. Unfortunately his 30-year old transmitter broke down which later proved to be a broken internal connector and he stuck to using his Mk119 spy set making a total of 15 contacts on the LF bands. The new valve receiver is a winner and details will soon appear in Sprat.

Derek G3NKS wrote he had another very enjoyable Valve QRP Weekend with lots of QSOs thanks to a happy clash with the RSGB's Low Power Contest on the Sunday. He made a total of 56 contacts but only 10 were 'proper' QSOs outside of the contest. (I know what he means!) Of these 10 the following declared valve transmitters **Colin G5LOW** (6V6), J**ohn G3TYB** (vfo/

bfr/pa), **Chris G3XIZ** (homebrew), **Gerald G3MCK** (CO/PA), **Martin G3ZXN** (Paraset), **Peter G3XJS** (T4XC), and Ian G4GIR (Wireless Set No19). He thought "valve" activity was down a bit and he missed a few of the regulars but perhaps he wasn't on at the right times.

In the contest he used crystals for 3520 and 7025kHz. Being on fixed frequencies he was limited to calling CQ but as he didn't join the contest until late morning it did result in a steady stream of callers on both bands. He used a pair of 6V6s in a CO/PA transmitter and a BC348N receiver for the 'proper' QSOs and a Drake R4C with its better selectivity for the contest QSOs. Gerald G3MCK used 5W into an inverted vee dipole. He found modest activity and worked a total of eleven stations in four countries.

Another active stalwart Chris G3XIZ was active before the weekend when he worked Ian G4GIR testing his WS19. He made a total of 31 contacts with 20 of these valve to valve QSOs and 11 of those being fully valved stations. He had local QRM making the going tough with an 'almost' QSO with **PA3ALX** who was in the noise and he is going to try an active loop on his valved transceiver. Another busy fellow is Peter G3XJS who worked on the Sunday only with his Drake 'B' line giving 3-5W out for a total of 10 contacts. He suffered from a low antenna after a dipole spacer failure last year but found conditions good even dishing out the odd 599 report on 80m during the day.

Finally, **Peter GM0EU**L had been working on a new valved rig all week but this was not ready by the Sunday. On completing the rig and managed a QSO with **Bill DF4KWO** on 40m. Better late than never! He went on to complete a tank coil for 80m as 40m was heaving with contest stations where he worked **G4YIL** and **G3RCE**. Suffering a mild shock using his straight key, he went on to try a Katsumi EK150 with relay keying and a Sota DSP filter for his FRG7700. He's hoping to try a VFO before the next session.

Operating from G5LOW I used an Ameco AC1 transmitter with a single 6V6 oscillator and a Drake 2B receiver. The valve is stamped 'Fender' and must have come from a guitar amplifier! If you have an AC1 or any valve crystal oscillator for that matter, try reducing the value of the grid resistor, usually 27k or 47k to around 6.8k. The note cleans up nicely. Both G3YVF and I have noticed this effect as has W9VES Dave Newkirk. I worked 14 stations in three countries using this set up.

That's it for this time. The next valve QRP session is the weekend of ***November 7/ 8th*** and please get reports to me as soon as possible after the event in *MS-Word* if possible and any photographs you would like to include. Remember to listen on the hour on the usual QRP frequencies and put out a call at that time tuning for any folks who may be crystal controlled. Have fun, stay safe and 'see you on the wireless'.

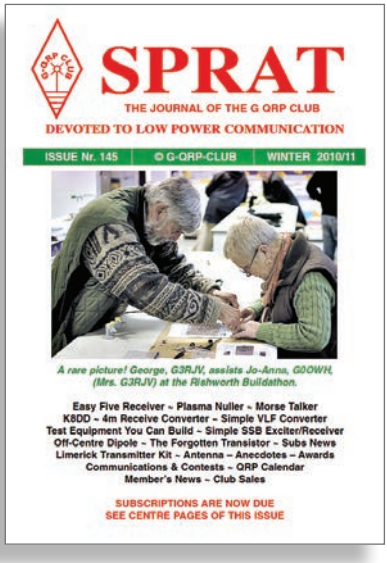
72 Colin G3VTT
Email: G3vtt@aol.com

A Success Story with a Noise Nuller

Eric Sears ZL2BMI email: sears@xtra.co.nz

In a 2010 Sprat magazine, there was a circuit of a noise nuller which **Brian ZL2AJA** decided to build as he had a high noise level at his place. In fact he built two, because the first one didn't seem to work. Unfortunately neither did the second, and they eventually came to me, both of which were beautifully built.

I tried both of them at various times over some years - but as Brian had found, they really didn't seem to do much to the kind of background noise I had at my place.


SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 145 | © G-QRP-CLUB | WINTER 2010/11

A rare picture! George, G3RJV, assists Jo-Anna, G0OWH, (Mrs. G3RJV) at the Rishworth Buildathon.

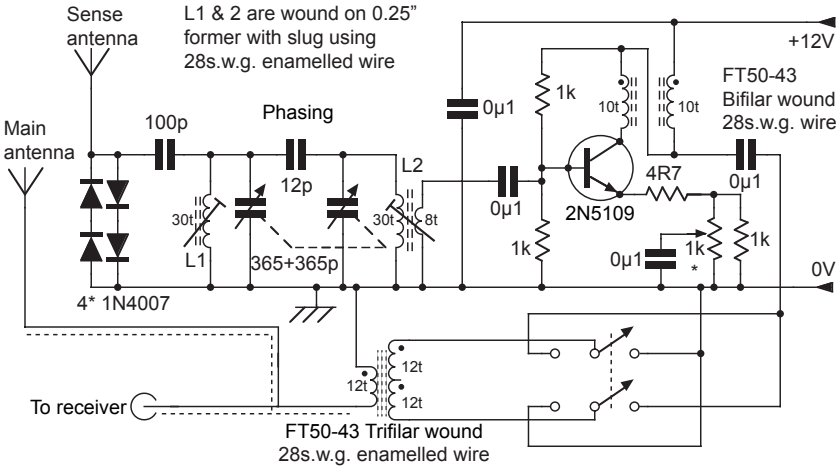
Easy Five Receiver ~ Plasma Nuller ~ Morse Talker
K8DD ~ 4m Receive Converter ~ Simple VLF Converter
Test Equipment You Can Build ~ Simple SSB Exciter/Receiver
Off-Centre Dipole ~ The Forgotten Transistor ~ Subs News
Limerick Transmitter Kit ~ Antenna ~ Anecdotes ~ Awards
Communications & Contests ~ QRP Calendar
Member's News ~ Club Sales

SUBSCRIPTIONS ARE NOW DUE
SEE CENTRE PAGES OF THIS ISSUE

Horrendous Noise

Then about 2–3 years ago, when fibre cable came into the area, a new horrendous noise appeared at my place. It cut in very sharply at about 3790kHz over the space of 2–3kHz, and went well beyond the top of the band (3900kHz here in NZ). So, I took a look at the frequencies available for restricted radiation devices in NZ, and noticed that a band from about 3640kHz and up is allowed for these screeches. With a level to be -70dBW. But -70dBW is a huge signal if you are close (crazy!).

Anyhow, to me the racket sounded like some sort of modem, as it was not like a switched mode supply. That was because of the way it cut in so discretely on the band. So from a base level of S5 for frequencies of up to 3790, it rose to more than S9 over the rest of the band - which happens to include our club frequency of 3890kHz. Even stations that were normally S9+10dB were difficult to copy.



So recently, after playing with some passive (and very simple) nullers, which seemed to have some effect either, I decided to re-visit the ones made by Brian ZL2AJA. I did find that Brian had added a toroid core to one of them - subsequently I removed it and that got it working along with the other.

But the main issue was getting enough signal on the noise aerial to get a null - the circuit has only a single transistor for the noise amplification.

Rather than try to re-design the circuit I did something simpler - I put a pot in the main aerial lead to reduce the signal - of course along with the noise. This had an amazing effect - and I then proceeded to add a relay which when switched off (with the power to the nuller) simply connects the aerial and radio directly.

Listening tonight to the Branch 22 net on 3876 was mindblowing. Signals about S9+10dB, which were difficult to copy without the nuller were completely noise free with the nuller. S8 to 9 signals which were discernible as present (but not copiable) were also almost noise free. Signals probably about S6 - 7, not discernible at all without the nuller, were slightly noisy, but R5 with the nuller. The tuning is extremely sharp and I am grateful that Brian used reduction drives on the tuning capacitors.

The added pot. does affect the S-meter readings so comparative readings are hard to make, but the effect has to be heard to be believed.

So what? Well I guess you don't really know what sort of noise you have until you try a nuller. Basically for background "white" noise it won't do anything. And of course you can only null one noise at a time. But even a reduction of two S-points of noise would make a difference in some situations. I think I am getting a null of 4–5S points in the noise compared with the signal.

G3RJV Memorial Trophy

Dick Pascoe email: g0bps@gqrp.co.uk

Plans to host the first construction competition for the **G3RJV Memorial Trophy** had to be put on the back burner as a result of the Convention becoming a virtual event.

However, I am pleased to announce that there will still be an award this year. Any member wishing to enter must e-mail details of their project to Dick our Secretary at: *g0bps@gqrp.co.uk* by the end of October. If you're short-listed you need to be available to demonstrate your work via video conferencing during the first two weeks of November.

The winner will be announced in the Winter SPRAT.

Members who are unable to communicate via e-mail can send project details by post and, if short listed, will then need to post their project to one of the judges who will carry out the demonstration.

Dick Pascoe G0BPS
12 Oak Rise, Terlingham Gardens
Hawkinge
Kent CT18 7FU

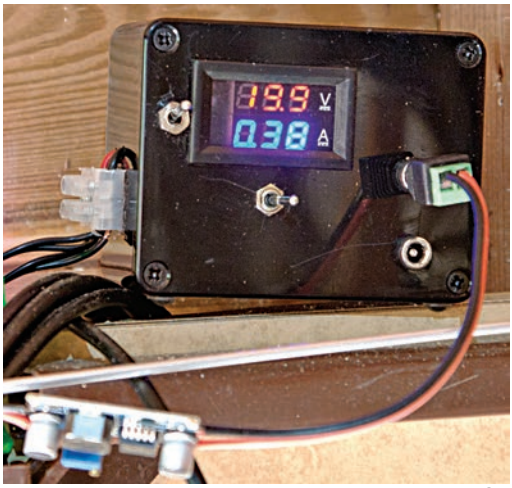
Starting with Solar Panels

G1TEX email: tex@pawns.co.uk

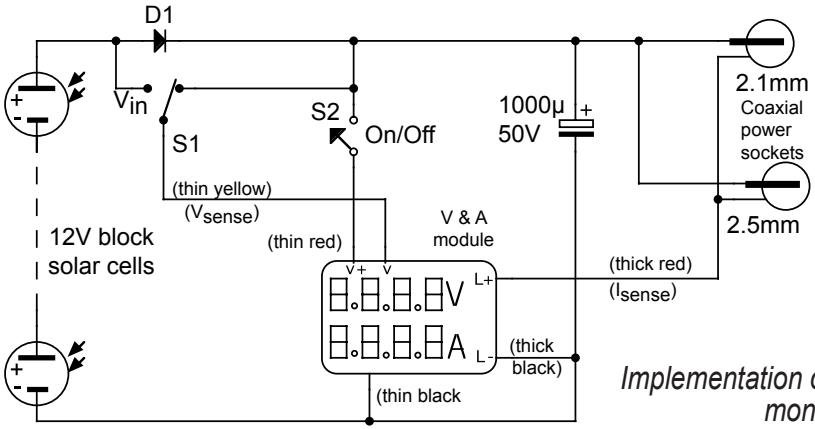
I wanted to fit solar panels to a shack (the garden shed). As I didn't want to spend a great deal, until I knew it was going to be viable, I started with two 10W 12V (nominal) units.

I fitted with brackets to fix them to the southern side of the shed, with a slight upwards tilt, and spread apart slightly to maximise the time that I was getting sufficient power to use one or other of my QRP rigs, on a floated LiFePo4 4-cell battery. I also wanted a supply indicator, to show when I was likely to be fully solar-powered or using battery energy.

I had an idea of the type of indicator that I wanted, in that it had to show both the solar panel voltage input to the system, as well as the load voltage for charging batteries to allow me to keep an eye on their state of charge. This proved useful as you'll see later.



I used one of the dual display V/A displays quite cheaply, as you can see here. The downside of these meter units is that the negative is common and the 'positive' current sense lead is to the **negative side of the load**, The load itself has its positive lead fitted directly to the positive of the supply. So the negative leads of the meter are actually some mV below the load negative lead. That means the most negative side of the solar panels is NOT the same potential as the load negative, meaning the panels **MUST** 'float' around the load, not be connected directly to it.



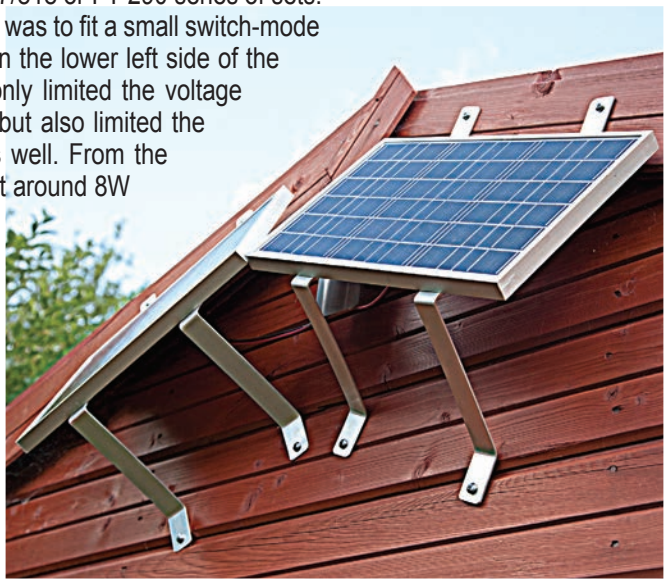
Implementation of the simple monitoring setup

The circuit that I chose to use monitor the battery charging setup is shown above. And initially I merely connected the LiFePo4 charge input lead to the output coaxial socket on the right of the above diagram. The batteries I used have what appear to be separate charging and load leads. However, it's a direct path, with the BMS disconnecting the battery from the common point as needed. This also applies if the battery voltage drops on discharge, or the load current is above a defined value.

This was fine for the batteries, as their in-built battery monitor system boards (BMS) stopped charging as the terminal voltages hit the maximum allowed, or if the leads were accidently shorted.

The real worry is that on full charge and direct sunlight on the panels, up to 22 volts appears on the output lead of the battery, and this could have rather disasterous effect on many QRP rigs, such as the FT-817/818 or FT-290 series of sets.

My answer to the problem was to fit a small switch-mode regulator, that can be seen in the lower left side of the photograph (left). This not only limited the voltage fed to charge the batteries, but also limited the maximum charge current as well. From the photograph, you can see that around 8W is being fed into the battery and rig combination.



A downside of using the metering module is that it can only show a charge current, it cannot show discharge from the battery, which could have been useful.

Well that might be the MkII version!

ON-AIR ACTIVITY

Peter Barville G3XJS email: g3xjs@gqrp.co.uk

Steve G0FUW kindly sent the following report on the RSGB Hope QSO Party No.2: The Club Call, **G5LOW**, was out again for most of the daily sessions of the second Hope QSO Party, which ran from 19 May to 25 June. In the overall listing we came 31st out of 206 UK stations and 43rd out of 391 world-wide. Considering many others were 'professional' contesters with all dials set to 11, this was not a bad show.

Well done to **Richard G3OTK**, **Nick M0MVT**, **John G8SEQ** and Steve G0FUW for putting G5LOW on the air. Our best performance was in the CW QRP section where we managed 4th place in the UK QRP listings and was a higher score than most QRO participants. This was all down to Richard G3OTK, who covered every CW session over the six-week period. Richard also was listed as 4th in the UK QRP SSB section.

In the overall results three of the top ten UK stations were QRP; congratulations to members **William GM4UBJ** (**GM4M**) (4th) and **Robert MW0CVT**, (6th) and to non-members G6EES, M5N (G0GJV) and G3VYI for making it a total of five QRP stations in the top 20 UK overall. It was really pleasing, to see that Nick, G4FAL, the Chairman of the RSGB's HF Contest Committee, reduced his power for the CW session on World QRP Day and still did really well operating as M5DX, showing that operating skill is every bit as important as RF power. The RSGB are to be congratulated for running such an innovative and popular event during lockdown, despite the variable band conditions. Is there anything we can learn for our Club activity periods?

GM5LOW

Roy GM4VKI, was our first member from Scotland to activate the club callsign. Roy took part in the PW 2m QRP Contest in June. The results have not yet been published but whilst the GM5LOW **log** will not break any records, it is rumoured to be in a strong position compared to other Scottish stations. Steve G0FUW, is intending to operate as GM5LOW from the Isle of Skye between 28 and 30 September.

International QRP Day

Very few logs for this year's event were submitted, but all were gratefully received. I suspect some may not have paid close attention the rules as stipulated on the Club website but I'd rather see the logs than not. **Ray G4AGE** sent a log consisting of dozens of WSPR reports which, although interesting, are not 2-way contacts and therefore cannot be considered for the **Suffolk trophy**.

The 6m Es FT8 log from **Chris G6XDI** was impressive, containing several QSOs at a distance of around 1700km and one QSO with UT5UGR at 2189km. Chris was using 5W into a

4-ele yagi. **Colin G3VTT** made several QSOs spread across 80m, 40m, 30m and 20m (his CQs on 60m went unanswered) using the club callsign G5LOW and deservedly wins the Runner Up certificate. Just top of the pile this year was **Valery RW3AI** who made QRP CW QSOs across 40m, 30m, 20m, 17m, 15m and 10m using 5W from a Xiegu tcvr and vertical antenna. My congratulations on behalf of the club to **Valery for winning the Suffolk Trophy**.

Use of Digital Modes in Club events:

We recognise that FT8, and other similar data modes, can be seen by some as unfair, or 'not real radio', but we are keen to enable Club Members to take advantage of technical developments that are useful to QRP operators should they so wish.. This has prompted us to consider how best to include data modes in our awards and trophies. The outcome of those deliberations will be published on the website in time for the Winter Sports.

Colin G3VTT laments the lack of activity these days, not only amongst G-QRP members but generally across the bands. I agree with his thoughts and am of the opinion that the current stampede to FT8 has a lot to answer for. Let's not abandon the tried, trusted and much loved 'traditional' modes of CW and Phone which are still both very capable of providing enjoyable, satisfying and personal QSOs. I hope we, in this wonderful Club of ours, continue to encourage more on-air activity. Let's FLY THE QRP FLAG more often!

Roy GM4VKI has been thinking carefully about ways to encourage more on-air activity from members. Because of his northerly location he currently finds it difficult to work QRP stations in the southern parts of the UK and wonders whether more localised nets might offer a solution. Propagation is improving now (we hope) but he suggests we should consider introducing local evening activity periods on 160m and/or 80m using any simple phone equipment, and a similar daytime activity period on 40m.

Colin G3VTT has long since promoted Monday as 'activity day' and that has tended to be favoured by the CW ops. In order to avoid contests I am suggesting Tuesday and Thursday evening (at 21:00 local) for the 160m/80m activity and Wednesday (at 11:00) for the 40m activity. The choice of 160m frequency may depend on existing regular local nets and could be chosen at the discretion of regional participants.

The 80m and 40m QRP SSB frequencies (3690kHz and 7090kHz) spring to mind for any organised QRP phone activity, but my experience of using that end of the bands is limited and others might know of better options. Roy suggests the use of "valves or three-legged fuses!" but that the activity periods would be good for developing homebrew antennas for the lower bands.

Your views are sought! Please with regard to these ideas and so now is your opportunity to support and shape some new activity periods. The bands are now improving and so make sure you take the opportunity to get on the air and fly the flag (hopefully with simple homebrew equipment). Have plenty of QRP FUN!

72 de QRPeter G3XJS

Peter Barville G3XJS
'Felucca',
Pinesfield Lane,
Trottiscliffe,
West Malling
ME19 5EN.

These are the International QRP Calling Frequencies:

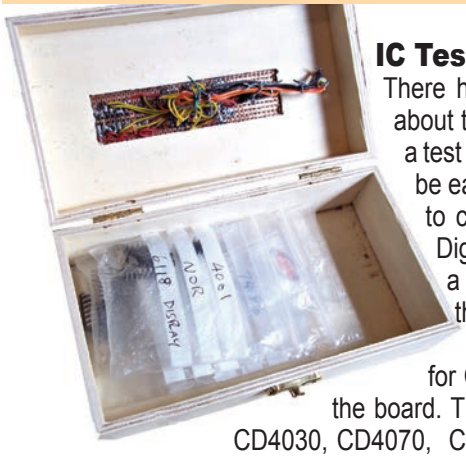
CW: 1836, 3560, 5262, 7030, 10116, 14060, 18086, 21060, 24906, 28060

SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360 kHz

But they are "Centres of Activity" so please spread out if activity levels are high.

Testpoint Corner

Peter G4UMB email: pahowd@gmail.com

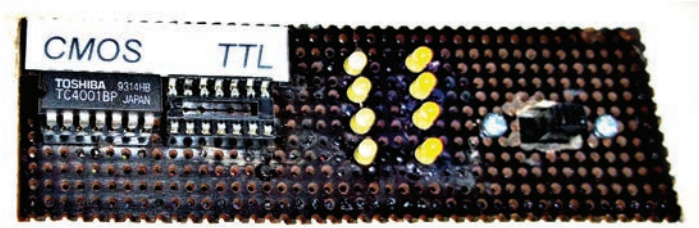


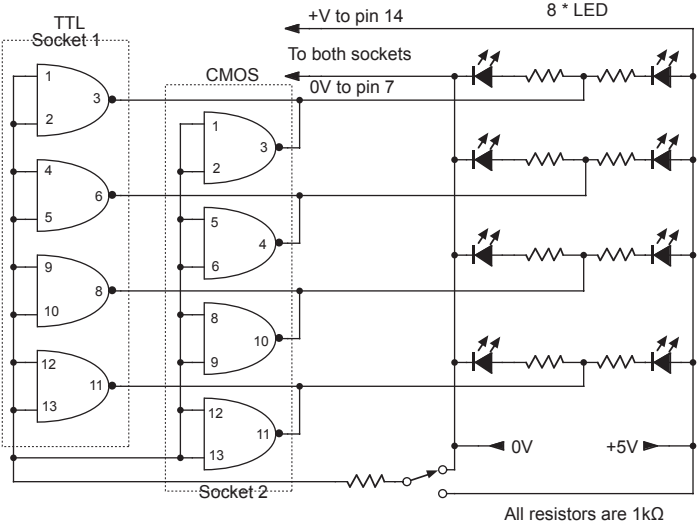
IC Tester

There have been a few circuits recently in the *Sprat* about testing Digital ICs. I thought rather than having a test rig with lots of switches and patch leads it would be easier to make one with prewired IC sockets just to cover the common TTL and CMOS Dual input Digital ones. From the IC data sheets I noticed that a lot use the same footprint The main thing being the CMOS ICs are different to TTL ones.

I chose two sockets, one for TTL, the other for CMOS . All the 1k resistors are mounted under the board. This wiring is suitable to test CD4001, CD4081. CD4030, CD4070, CD4071, CD4079, CD4093 7400, 7408, 7426, 7432, 74136, 7486 . The switch is operated to check the gates out. eg. a NAND or NOR gate will change over the lit row of LEDs

With either an Exclusive-Or/Nor Gate, the LEDs will remain the same. Without a IC in any socket all the LEDs will light. Unfortunately this tester is unsuitable for the 7402 IC Dual NOR gate because it has a unique footprint. I found a wooden box which I bought from "The Works" made a useful way of housing the tester and also to store my stock of spare ICs .





Logic Probe

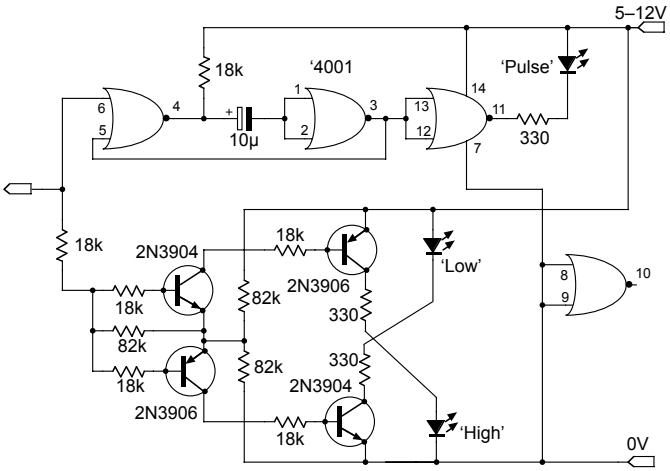
In this Logic probe I have combined two circuits from ones I found on the internet. I struggled getting the circuit to fit into an old felt tip marker pen body. The voltages switch points are as follows:

TTL 5V Supply = 0–1.5V Low and 3.5–5V High:
CMOS 12V Supply = 0–4.7V Low and 6.8–12V High

So there is about a two volt central floating voltage when both LEDs are unlit. The strip board needed to be only just wider than the IC and some components had to be mounted underneath the board. Several link wires were needed. The board became unstable because of the small areas left off the print and some bits became unstuck so I had three attempts at making it.

The three LEDs were mounted on another thin piece of strip board and fitted into the pen case first. This left less room for the main PCB to slide underneath. Small connecting wires were essential as the pen case soon filled up . I wrapped PVC tape around the PCB to avoid it touching the LED board.

However with patience I managed to get it all to fit. So although this project looks simple it's not easy to build in such a confined space. Perhaps I should have used surface mount components but I can't see them well enough! The pulse LED will flash once when a high reading is taken so this needs to be ignored. This is also the case with another professional probe that I bought.



Club Information – Officers/Contacts

Chairman Steve Hartley G0FUW 5 Sydenham Buildings Lower Bristol Road BATH, BA2 3BS g0fuw@gqrp.co.uk	**Treasurer & Club Sales** Graham Firth, G3MFJ 13 Wynmore Drive, Bramhope, Leeds. LS16 9DQ g3mfj@gqrp.co.uk
Membership Secretary Daphne Newsum G7ENA 33 Swallow Drive Louth LN11 0DN g7ena@gqrp.co.uk	**Sprat Editor** Tex Swann G1TEX 9 Alexandra Road Parkstone, BH14 9EL g1tex@gqrp.co.uk
Secretary Dick Pascoe G0BPS 12 Oak Rise, Terlingham Gardens Hawkinge, CT18 7SS g0bps@gqrp.co.uk	**Communications Manager** Peter Barville G3XJS Felucca, Pinesfield Lane, Trottiscliffe, ME19 5EN g3xjs@gqrp.co.uk
Awards Manager Ryan Pike G5CL. 63 Bishopstone Village, Nr. Aylesbury HP17 8SH g5cl@gqrp.co.uk	**QSL Manager** Dave Coutts, GM3VTH 29 Barons Hill Avenue, Linlithgow, EH49 7JU Scotland. gm3vth@gqrp.co.uk
Publicity & News Chris Page, G4BUE Highcroft Farmhouse, Gay Street, Pulborough. West Sussex RH20 2HJ g4bue@gqrp.co.uk	**Technical Advisor (Antennas)** Colin Turner, G3VTT – g3vtt@gqrp.co.uk **Technical Advisor (General)** Ian Keyser, G3ROO - g3roo@gqrp.co.uk
Website Manager. Tony Fishpool, G4WIF g4wif@gqrp.co.uk	**Technical Advisor (VHF)** John Beech, G8SEQ - g8seq@gqrp.co.uk

Other Contacts - limited space precludes including all contacts, please refer to the club "who does what" web page. Some of the above titles have changed, but the people are the same.

Note from the Membership Secretary Daphne G7ENA

We used to put the standing order form every year in this issue of Sprat but we felt that there was no need for 4000+ members who already pay by various methods, to have it to take up 2 valuable pages of Sprat. If you wish to set up a standing order. then do it online, and the info you will need is: GQRP Club account, 01-07-44, 04109546. **You MUST include your membership number as the reference**, and our preferred date is 15th January. If you do need the form, then I can email it to you, or, if you send an SAE to me, I will send you a copy. A standing order authorises your bank to make automatic annual subscription payments for you. It is not a direct debit. I cannot make alterations to the payment and I cannot even cancel it. It remains under your full control. This means that if the membership rate rises, **you have to alter the payment amount**.

Full information about renewals will be, as usual, in the next issue of Sprat.

Club Information – Services and Awards

We have a number of Awards and Trophies which are described in detail on the club website.

** (address/email on the Club Officers page in this issue of Sprat).

Club Awards: Our Awards Manager is Ryan Pike – G5CL, **.
Operating Trophies are managed by the Communications Manager, Peter Barville G3XJS, ** and the Sprat trophies are awarded by the club committee. Nigel G0EBQ ** manages the production and distribution of the actual trophies.

If you don't have internet access and you would like to find out more - then please write to Ryan (awards) or Peter (trophies) enclosing return postage.

The club QSL Bureau is managed by - Dave Coutts GM3VTH, **.

QSL cards are sent out at regular intervals, in February, May, August, and November, in stamped addressed envelopes, paid for by the club. We no longer need to receive envelopes or stamps from members. All cards for the bureau should be sent to GM3VTH at the address above. Please help to speed up the service by following the following dispatch procedure:-

1. Put the receiving stations membership number on the top right of the card.
2. Sort cards in ascending number order.
3. Do not include cards with no number, or for non-members.

Unclaimed cards and those of ex members will be destroyed after 6 months.

North American members can send cards to:-
David Gauding, NFØR, 137 Wyndgate Valley Drive, O'Fallon, MO 63367, USA
David will send these in bulk to the UK bureau for distribution.

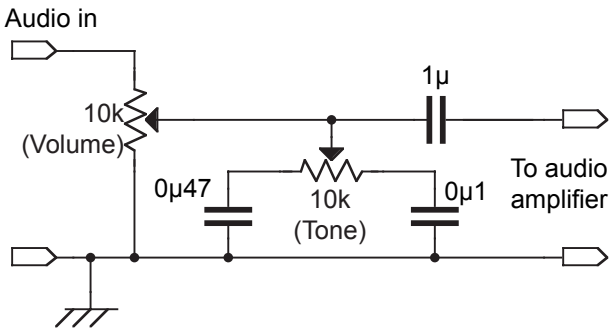
Technical Advice Antennas:
Colin Turner G3VTT ** will advise members on antennas to fit their location. Please send a plan, with dimensions, of your site and required bands, type of equipment and location of shack.

Technical Problems.
Ian Keyser G3ROO ** will give advice to members on circuit and construction problems. Please provide the fullest information possible.

Two way top cut audio tone control

Peter Parker VK3YE

If your junk box is anything like mine there'll be more potentiometers than toggle switches. These can be very useful if you've got some spare panel space in a receiver or transceiver and want a little more audio selectivity.



This tone control is easy to add to a new or existing project. It's wired between the volume control and the audio amplifier.

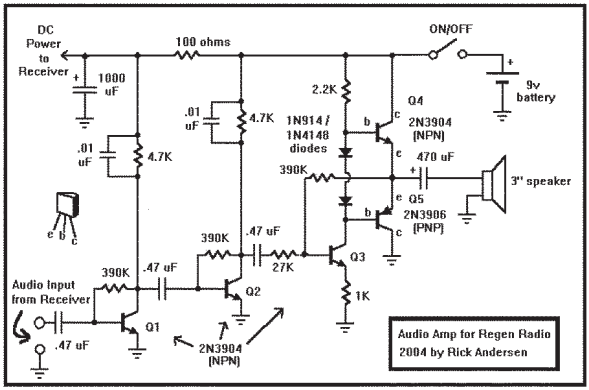
A twist with this control is that there are two levels of top cut with the most highs admitted when the tone control is set to the middle of its range.

It behaves like an analogue 'switch' with the ability of either to select the 470nF, 100nF, or a combination capacitance depending on how severe you want your top cut.

Values are not particularly critical. As with any passive filter circuit, some extra audio gain does not go astray.

An excellent amplifier circuit (more gain, more output and less distortion than the LM386) is the discrete transistor design described by KE3IJ at:

http://www.ke3ij.com/amp.htm .



http://www.ke3ij.com/amp.htm .

A demonstration of this control is on my YouTube channel at:

http://www.ke3ij.com/amp.htm .

Antennas Valve and Vintage

Colin Turner G3VTT 182 Station Road Rainham Kent ME8 7PR

The continuing poor activity on the bands could be linked to propagation but there have been occasions where contacts are made which are down to Sporadic E giving startling results. **Lee G4EJB** has been learning to use **Jim G3YLA**'s 'Propquest' when he was researching an article for RSGB Basics. He realised he could use his £10 worth of ancient CB radio converted to 10m work with his W3EDP antenna.

This 84 foot wire can be used with or without a couple of counterpoise wires and he managed to get an excellent match with the G3RJV matching unit that features in *Sprat* and *QRP Basics*. He used the 17 foot counterpoise wire. On May 28th he contacted CT1EHI with a 55 report using 4W giving him his first FM contact on 10m for 35 years. This antenna goes on and on.

Mike W3TS saw the article in the last *Sprat* and how CAT5 cable inner conductors can be used for winding toroids. He wants to point out that each pair of wires in CAT5 are of a different pitch to reduce inter-pair cross talk, a fact not often noticed. He's used the pairs for transmission line, hook up wire and toroid winding and suggests the string in the cable can be used with a pair of pliers and a strong arm to rip the cable jacket and expose the wires. He's also planning an article on low noise antennas for a future Sprat.

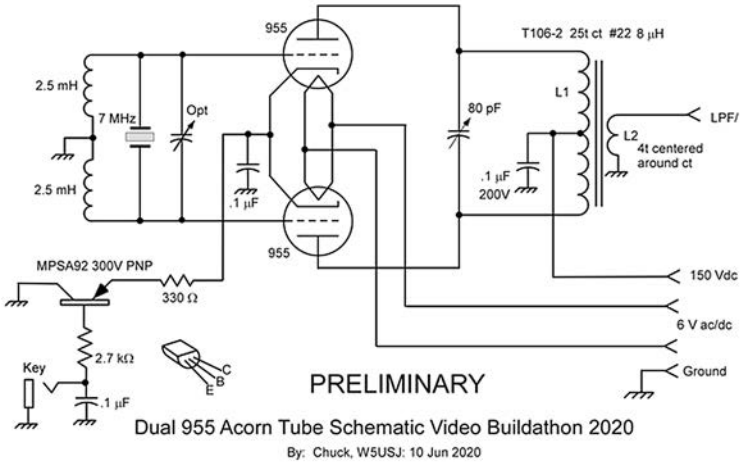
Meanwhile over in the US ***Rex W1REX*** has been producing a kit for the ARCI Buildathon using push pull 955 triodes. He also verified the circuit using a 12AU7 double triode and sent me a couple of photographs. Rex based his kits around the circuit of the **GM3OXX** transmitter featured in Sprat 112 but had problems finding valve/tube bases, RF chokes and connecting the pins. It looks like a lot of gas seals were destroyed in soldering so Rex devised a connector from a computer connector.

If you want to try using these valves take a look at the W1REX website at:

http://qrpme.com/?p=product&id=F20.

I also made a version of this transmitter here at G3VTT and managed to squeeze 1.75 watts out of the circuit; believe it or not I had two ceramic valve bases in stock, and can confirm the circuit values. Rex also proved the circuit with a 12AU7 valve and it's a sure fire circuit.

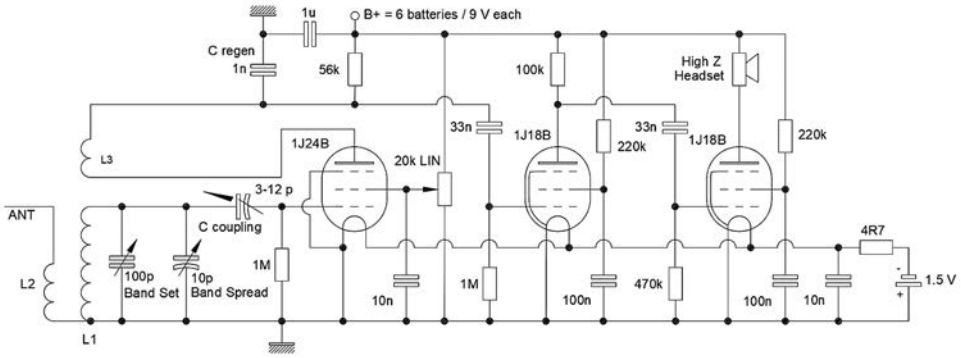
Cris IZ3CQI has also been using strange vintage valves available from eBay. A few years ago, thanks to the generosity of an American amateur, a number of these



Dual 955 Acorn Tube Schematic Video Buildathon 2020

By: Chuck, W5USJ: 10 Jun 2020

strange valves were shipped around the world and transmitters constructed. I used a pair to build a 21 MHz transmitter actually spanning the Atlantic and working W9RGB with a watt or so output. Cris has used these Valves to build a receiver called 'Tovarish' (friend) the details of which are below.



The construction and operation of a Regenerative Receiver is an old art, but, if properly built and operated, this simple circuit, alongside a transmitter, provides reliable radio communications.

The circuit is a '0-V-2', based on two types of Russian rod-tube: 1J24B and 1J18B. The schematic requires little explanation. The main coil/tickler/antenna link section can be copied from any one of thousands of circuits published in the last century. However, a few notes on this kind of receiver are worth a mention.

The total anode current is only 3.8 mA at 54V (B+); the filaments current is 61mA. A stack of five 9V alkaline cells plus a 1.5V LR20-type cell should allow at least 150-200 hours of operation. The receiver can work down to 36V B+ with the L1/L2/L3 coils of my prototype.

The filament battery polarity is important: if reversed, the audio section starts to whistle. The 4.7Ω resistor allows just 1.2V on the filaments, at which voltage these tubes are good for 5000 hours of full performance. Near battery end-of-life, the voltage at the filaments may drop to 1.0V, at which point the audio level tends to rise, due to an increase in amplification level through reduced negative bias at the control grid. (I have been very surprised to notice this; believe me...)

The best option would be a rotary switch for selecting a different voltage-drop resistor in the filament circuit, and a small meter to check the correct voltage throughout the life of the battery.

The antenna size need be no more than 1/8th of a wavelength. (i.e. the 'classic piece' of wire thrown out of the window...) The sensitivity is impressive , it's totally comparable to that of professional receivers with full-size antennas. An attenuator at the input would make reception comfortable when strong stations are tuned in, especially if a full-size antenna is used.

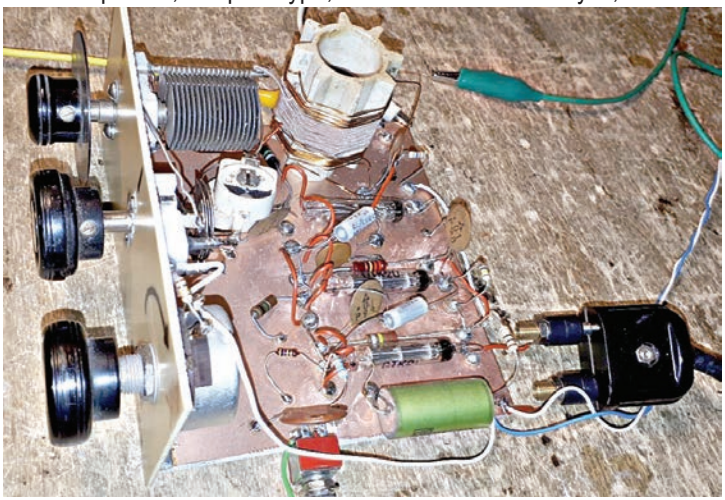
The input attenuator would serve also as volume, but, if a true volume control is preferred in the audio chain, then an easy option would be a logarithmic potentiometer, 10 kΩ, shunting the headset/audio output.

To reduce the HT current consumption even more, the regenerative detector could be triode-connected and 'C regen' replaced by a variable capacitor; this might require revision

of the tickler coil (L2), to achieve self-oscillation at a convenient setting of the new regeneration control. The 20kΩ potentiometer, in fact, takes about 2.0mA alone (of 3.8 mA total). If a variable capacitor is used as regeneration control, the HT battery pack would last for at least 600 hours.

Any attempt to amplify the audio output with an external, AC-fed amplifier would introduce a strong, annoying 'hum'; 50/60 Hz noise is almost unavoidable with this receiver, because rod-tubes lack the cylindrical plate of common EU/USA tubes, which is often made of ferromagnetic material (iron) and acts as both electric and magnetic shield. Rod-tubes need special care to avoid pick-up of environmental electromagnetic garbage, but, when fed by fully-isolated supplies (e.g. batteries), their performance, especially in terms of S/N, is unrivalled.

In the picture, the prototype, is made 'Manhattan style', and when listening to a CW station, any movement of your body close to the receiver is forbidden! The prototype has been a true success, and now the next step is to remake everything in a decent box, with a more rigid cabling and a passive audio filter, put somewhere in the circuit, to narrow a bit the bandwidth.



73 de Cris, IZ3CQI

Thanks to Cristiano for this circuit which regrettably will be my last offering. I have decided not to produce any further *Antenna Valve and Vintage* for *Sprat*. This has been a decision I have been considering for a while and despite the outstanding help from **Tex** our editor and support of **Graham G3MFJ** I am finding it difficult to source material and find the time to sit and type it all up. I well remember **George G3RJV** who spent almost all of his time writing Sprat and developing circuits whilst not being active on the air. But I am an operator/engineer and I need more time to devolop ideas and to operate of course.

I will continue to produce the *Valve QRP Weekend* reports, (the next session is to be November 7/8th by the way), in the future and will include as much circuitry or technical snippets that I can fit in. But the intention is to reduce the amount of time I spend huddled over this laptop with 'square eyes'.

If you would like to take over this column, perhaps changing its ethos and direction, then kindly contact our Committee via our Chairman **Steve G0FUW**. My thanks go to all of you who have contributed to AVV for the last 13 years and my thanks also go out to the numerous website owners whose articles I've pinched over the years! I write this in late warm July clad in shorts ready for the autumn issue so may I wish you all a Happy Christmas and a Healthy New Year. See you for Valve QRP and Winter Sports.

Colin : g3vtt@aol.com

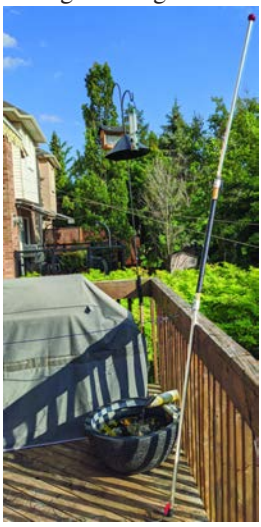
MEMBERS' NEWS

by Chris Page, G4BUE

E-mail: chris@g4bue.com
gc4bue@gmail.com

My thanks to **F5NZY** who reminds me of the excellent FISTS CW Club founded in 1987 by my good friend, the late George 'Geo' Longden, **G3ZQS** , see <https://fists.co.uk/>. Steph writes, "After a very interesting QSO with **OH5JJL** on 30m, I read Tom's QRZ.com page and found he was also a member of FISTS. I always thought FISTS was a club for straight key players (probably because of their logo), but when I went to their page I saw that it was about the preservation of our beloved CW. So I subscribed immediately and a few days later received number 20278. I deplore the lack of activity on our bands outside of contests and the chocolate medals to be won. Be active, there are plenty of good QSOs to do. At the moment, I'm doing a lot of 12m and a few watts in a wire are enough to do very good QSOs". **GØEBQ** worked 9 DXCC with his Paesano during the amazing Es opening in May. "No great DX", says Nigel, "But lots of nice QSOs to near Europe. Highlight was getting a report of 59 plus 5db from the Orkneys with just 2W". He still prefers CW and has joined FISTS, which he, "Thoroughly recommends to any CW enthusiast".

M**ØNTV**'s second scratch-built SSB TCVR is the Bread Bin 80 for 80m which, aside from the Arduino Uno microcontroller and Si5351 (plus LCD screen and rotary encoder), is very analogue using a lot of discrete components, and even an analogue S meter. It has a dual power supply; the main rig is fed 15V (regulated down to 12V) which is then further regulated down for some modules ie the Arduino. It pulls under 1A on TX and much less on RX. The RF PA has a separate supply which he is currently feeding about 19V and pulls about 2A on TX - giving 25-30W output. For QRP use, Nick simply reduces the PA voltage to 12V or below. More details are on his QRZ.com page. **VK1RJ** has two FT-7s that he wants to restore and, although he has a copy of the manuel, is looking for advice from members who have done this. Richard says it has been 40 years since the radio was sold

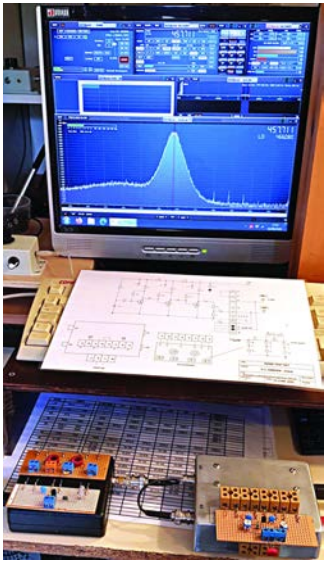


VE3IPS, who has been awarded the Partridge Award for the best antenna article in *SPRAT*, had no idea it was donated by George Partridge, **G3VFA**. John says he finally built his version of the Partridge Joystick (right) and found it works surprisingly well just leaning against the railing, with a tuner of course. John says he is also patiently waiting for the QRPme Dayton PP2 Buildathon Glowbug kit to arrive. He was disappointed his March trip to CU was cancelled and had planned a few SOTA activations but now looks forward to doing that in 2021. Since July 2020, **ON4BCA** has

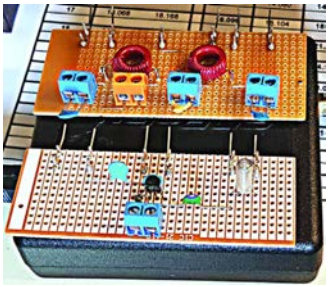
been chasing SOTA with QRP, trying to get the initial 1000 points. Patrick says that in being a SOTA hunter you also become a weak signal hunter, just like QRP! He is using, what he says is a rather poor antenna, a Chameleon Hybrid as a GP with three radials, and says using an 11 feet long milwhip on 40m is not exactly being a big gun with 5W! Patrick is anxious to make contact with other members who are SOTA chasers.

GM4VKI has not been looking forward to this *Members' News* as it is doom and gloom for him. Roy writes, "I think most members know that my partner in crime at all the rallies passed away recently, which knocked the wind out of my sails, but also with the lockdown and being in the shielding age of this, rallies are off. Consequently, as part of my stock of goodies belong to Kanga and QRP-Labs, and there is no indication of attending any future rallies, their stock has been returned to them. We, as QRP members, are grateful to Hans and Dennis for allowing us to have their stock on a sale and return bases. We will have the normal G-QRP stock which can be purchased from **G3MFJ** or in the West of Scotland from me at home (e-mail first). We can't see us attending any future rallies until circumstances change dramatically. However, on a brighter side, I was given the Hallicrafter SX24 belonging to **G3DNF**, our first Chairman, and have spent a good few hours making a matching loudspeaker and cleaning its switches and pots. It is now working a treat (above) and I will be using it on **G3VTT**'s Valve Days.

MØRON (yes, he chose the callsign!) has just built the Ham and Hale TCVR from Walford Electronics (right), a SSB and CW superhet capable of 5W from a 13.8V 1A supply, more with a higher supply voltage. Andrew says it was a very enjoyable build and worked first time, achieving 8W at 13.8V, but he wound it back to 5W to keep the heatsink cooler. In May **GØUPL** announced a new QCX+ CW 5W QRP TCVR kit to replace the QCX. Hans says, "The circuit and firm-ware are the same, but the physical layout is improved. In particular there is a lot more space, as well as a nice enclosure". More information on the QCX+ is at <http://qrp-labs.com/qcxp>. Since its launch in August 2017, 9937 QCX kits have been sold.

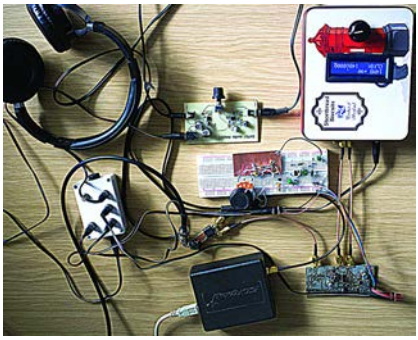


G3XIZ was inspired by **MØRON**'s recent article and made the noise generator (below) with an SDR interface unit. Using plug-in modules, Chris can now easily test TX LPFs, IF filters, crystals and ceramic resonators and says the frequency response display via his SDR Play RX and PC (far left) is excellent. To combat ever increasing noise, his local 'Biggleswade Triangle' Top Band net has gone over to using FM! Chris says the reception of all the local stations is now of a superb and noise-free quality and suggests others give FM a try.






G4ICD (ex **GJ4ICD**) is running a small commercial business mainly baluns etc and says **F1IET**'s article in *SPRAT* 183 about cores being simple to wind made him smile because his wife does about a 100 a week (second right above)! Geoff uses special cores that are custom made, mainly for a maximum of 125W PEP (all multi-cores). He is concentrating on low power units at present like 4/1 (for RX DF units) UN/UN, voltage and current units the latter most people have not a clue how to wind one. He says the 49/1 > 72/1 units are fabulous for QRP and produce superb resonant single or multi frequencies. He has a selection of QRP radios to test them on (IC-703, X5105, G90, FT-817, FX9A, FX9B and is awaiting a couple of IC-705 units to play with). Geoff says you can see more at <https://rfcomms.co.uk/gb1/> plus a one metre helical loop with no tuner, just a set of matching units at 1.2db insertion loss.



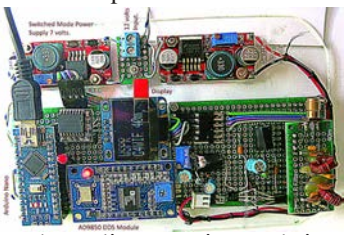
G4TGJ's latest project (right) is another DC RX. In the short bread tin is a clock generator with an ATTiny85 microcontroller and si5351a oscillator chip feeding the Tayloe detector board top left. Its I and Q outputs go to the breadboard which has a simple phase shift network to cancel the image and an op-amp HPF. On the copper clad board is a switched capacitor LPF and its output feeds the audio amplifier board with dual op-amp and LM386 to feed the headphones. The white box on the right feeds the PSU 13.8V to each of the boards and the black box at the top is an SDRPlay RSP1a used as a panadapter, fed from the splitter circuit just next to it.

The raw scores for the CQ WPX CW Contest show **G5LOW**, operated by **G3YMC**, in second place in the Unassisted category of the All-band QRP section, and **M7R**, operated by **GØTPH**, in first place - thanks *G3YMC*. **MWØRGM** had half an hour to spare on the Sunday morning of the IARU HF Championship and made 16 QSOs on 20m SSB, the best being **DXØHQ** in DU. Richard said it made a change from his usual CW operating with his IC-703 and 10 feet high EFHW antenna. **GØFUW** had a 'quick blast' on the Saturday afternoon setting up anw end-fed wire and 49:1 teansformer. Steve worked around Europe with 10W SSB on 40, 20 and 15m. **GØTPH** fell short of the G record he was chasing with 440 QSOs after 16 hours with 5W from his KX3 to a 131 feet doublet and auto ATU in the garage. Alan also has a Wellbrook loop, "Otherise I wouldn't hear much on top band or 80m". His best DX was FY and VP2V (twice).

G7CNM wanted to scratch build a radio and the lock-down gave him the opportunity. Clark has just finished a 40m DSB TCVR (left) loosely based on the ozQRP MDT 40. He gets around 2W from the BD139 output stage and the DC RX works well. Clark operates /P from a hillside near his QTH in Lincoln with a homemade dipole supported by a fishing pole. Reports from stations have been encouraging and many are surprised when he tells them what he is using. Despite the sometimes-poor conditions on 40m, Clark says he always seem to manage interesting contacts - the beauty of QRP!

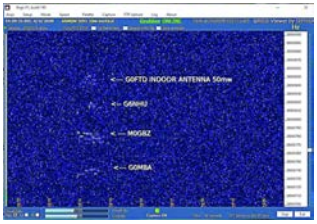
G3OTK took part in the QRP sections of most of the RSGB's 'Hope QSO Party' CW and SSB daytime HF contests held during the pandemic lock-down. Richard used **G5LOW** for many of the CW contests, including all ten of the second series, and achieved fourth place overall. He also managed fourth place in the SSB QRP section of the second series using his own call. Richard also entered the RSGB's Low Power CW Contest in July, one of his favourite contests, in the 5W Fixed section. He says conditions were good and he managed 118 QSOs, all but two being with QRP stations. He writes, "Of particular note was a contact on 40m with **G4PIQ** who was running just 10mW - part of the exchange for this contest was the TX power and I misread it (and lost points) because it had not occurred to me that someone might run such low power!".

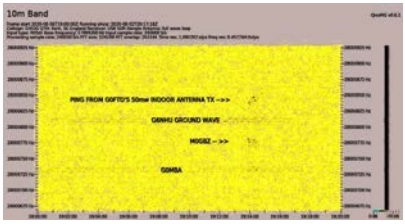
G4WIF's latest project (right), a 100mw 40m WSPR beacon TX that he says has been very illuminating as to the propagation possibilities with his half-wave end fed antenna. Using the online spotting websites, Tony says it was easy to see which countries he could reach at a particular time of day, the best distance so far is New York. He is now working on the code to make the beacon multi-band.



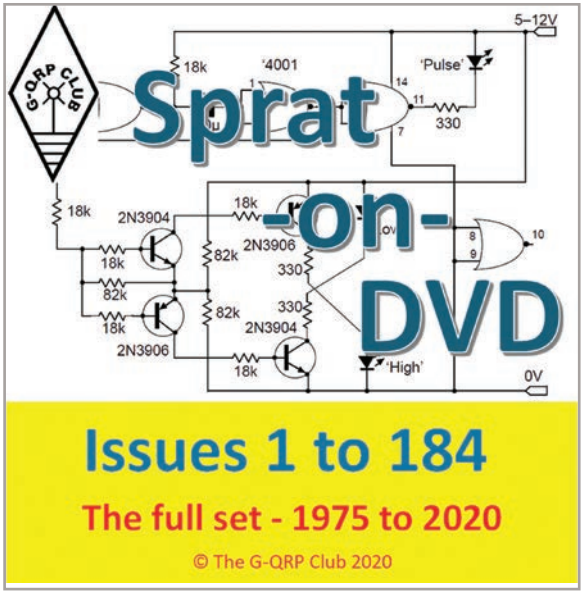
Writing at the beginning of June, **G4GHB** says, "Members who may consider using the Mitsubishi RD06HHF1 RF FETs for homebrew TXs, should know they have withstood my hamfisted attempts to destroy them in my homebrew rig! I had them working into a torch lamp load but did not realise the coax was faulty and so they were open circuit for about half an hour. When I had them lighting and adjusting things for half an hour, the bulb was an unknown impedance and likely a very low impedance. Probably several years of abuse rolled into one hour. They were running at 1W output and I think if they can survive these two extremes, they can survive any bad SWR thrown at them. They are said to be bomb-proof and survived both these tests. I recommend them".

GØFTD had a 'QRPp thrill' on 6 August! Andy uses QRSS transmissions on 10m and had just had evidence sent to him confirming his 50mW TX, feeding an indoor wire loop around the bedroom picture rail, had been received by two stations: one 12 miles away and the other 75 miles away, via meteor scatter! Pictured above are the screen-shots of the traces that a QRSS 'Grabber' grabs and he says he is, "Pretty stunned at the alternative QRP stuff". The RX stations were **GØMQW** (75 miles) and **G4IOG** (12 miles). In over 40 years of writing this column, I don''t think I have ever reported a case of meteor scatter QRP! **F5VLF** has been, "Battling with the Internet equivalent of the infernal combustion engine". John is working on rotatable loop antennas and will report for the next issue.





Thanks to all the contributors of this column. Please tell me how your autumn goes for the Winter 2020 edition of *SPRAT*; what you have been building, who you have been working, and any other information about QRP, by 12 November. Also, interesting pictures 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 picture to let other members know what you and your equipment look like. Let me know if you intend operating from somewhere other than your home QTH during the winter and spring months, particularly in the Winter Sports, so I can let members know to listen out for you.



As you may have seen from the front cover, we have a new *Sprat-on-DVD* that includes all issues of ***Sprat 1 –184***: that is, this one.

It's a huge team effort, Tony G4WIF, does the HTML DVD content, Graham G3MFJ does the artwork and ordering, and Tex our editor, now does what our printer Mike used to do, by supplying the PDFs of the issue as he readies it for printing.

Also included is an up-to-date index as provided by our index guy, **Bill K7WXW**.

We have kept the price the same, at £5 to members , and £12 to non-members.

Postage remains as before – UK:£1, EU:£3 and DX:£4.

Get yours by email: Graham Firth G3MFJ g3mfj@gqrp.com or at 13 Wynmore Drive, Bramhope, Leeds LS16 9DQ

GQRP Club Sales

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

Antenna Handbook – 2nd edition – **members price £6.00 plus post** } **£2.00 (UK) or £5.50 EU**

Radio Projects volumes 1, 2, 3 & 4 – **by Drew Diamond – members price - £6 each book + post}** } or **£8.00 DX per book**

6 pole 9MHz SSB crystal filter (2.2kHz) £12 plus post **(max of one)** } **£3.50 (UK); or**

Polyvaricon capacitors – 2 gang (A = 8 to 140pF + O = 6 to 60pF) c/w shaft extension & mtg screws - **£1.75 each** } **£5.50 (EU); or**

– 2 gang – (both 8 to 285pF) c/w shaft extension & mounting screws - **£1.75 each** } **£6.00 (DX)**

A Pair of 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, 7.028, 7.030, 7.040, 7.045 } plus **postage**

7.122, 10.106, 10.116*, 14,060*, 18.086, 21.060, 24.906 & 28.060 all are **£2 each (* also in LP)** } **(ANY quantity)**

HC49U crystals- 1.8432, 3.5, 5.262, 5.355, 7.0, 10.006, 10.111, 11.5, 14.0, 22.0, 29.0MHz – **50p each}**

HC49U crystals – 2.00, 3.00, 3.20, 3.579, 3.58, 3.60, 3.6864, 4.0, 4.096, 4.1943, 4.433, 4.5MHz } £1.20p (UK), or

5.00, 6.00, 7.2, 7.6. 8.0, 9.0, 10.0, 10.70, 11.0, 12.0, 13.50, 15.0, 16.0, 18.0, 20.0, 24.0, 25.0MHz} £3.50p (EU) or

26.0, 27.0, 28.0, 28.224, 30.0, 32.0, 33, 40, 48MHz – **all 35p each** (Some of these are low profile) } £4.00 (DX)

Ceramic resonators – 455, 480kHz, 2.0, 3.58, 3.68, 4.00, 7.37, 14.32 & 20.00MHz **– 50p ea.** }

Diodes - Shottky signal diode – 1N5711- 20p each; 1N4148 GP Si – 10 for 10p } Post free

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

- BB204 – twin diodes, common cathode, 15pF @ 20v, 50pF @ 1v **50p** } with heavier

SA602AN - £2.00 **(note – I may supply NE or SA, 602 or 612 as available.** **(Max of 4 per member)** } things

MC1350 - £2.00 **(Max of 2 per member)** } like binders,

LM386N-1 - 4 to 15v, 300mW, 8pin **DIL - £0.45** } toroids.

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

TDA2003 - 10w audio amp – 5 pin **£0.25 each** } or filters

TDA2822 - 1.8 to 5v stereo amp – can be bridged. 0.5WAudio amp 8pin DIL – **£0.20 each** } Use just

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

BC109B (metal) (npn) fT - 100MHz, hFE-320 **- 10 for 50p** }

MPSH10 transistors (npn) fT - 650MHz, hFE 60, VCEO 25V **- 10p each, 10 for 80p** } If parts are

2N3904 transistors (npn) fT - 300MHz, hFE-150, VCBO +40V **- 10 for 50p** } ordered

2N3906 transistors (pnp) fT - 250MHz, hFE-150, VCBO -40V **- 10 for 50p** } with books

BC517 Darlington (npn) fT - 200MHz, hFE-30,000, VCBO +40V **- 13p each, 10 for £1.10** } or DVDs

FETs - IRF510 – 50p; 2N3819 - 24p; 2N7000 - 10p; BS170 – 8p - all each } add this

BF981 – dual gate MOSFET – 40p each } postage

Pad cutter - 2mm shaft: 7mm o/s, 5mm i/s diam, gives a 5mm pad with 1mm gap **£6.00** } as books

10K 10mm coils – 1u2H, 1u7L, 2u6L, 5u3L, 11u0L, 45u0L, 90u0L, 125uL – all 80p each } or DVDs

Magnet Wire – 18SWG – 20 & 22 SWG – 3 metres - 60p; } do not

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

Bifilar wire – 2 strands - red & green bonded together. Solderable enamel. 3 sizes } with parts.

21SWG (0.8mm dia) – 2metres = £1; 26SWG (0.45mm dia) – 3m = 70p; 30SWG – 3m = 60p }

Litz wire – double silk covered multi-strand wire 7/.04mm -12p, 14/.04mm. 25p. Both for 3 metres. }

All our magnet wire is solderable enamel insulated. Max of 3 sizes per member per order

QRP heatsinks - TO92 – 30p; TO39/TO5 – 40p; TO18/TO72 – 80p (pics in Sprat 148) }

Axial lead inductors (they look like fat ¼W resistors) these are low current }

3.3, 4.7, 6.8, 10, 15, 18, 22, 33, 39, 47, 56, 100, 150, 220, 470 and 1000 - all uH, all 20p 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; } **Postage for**

T50-6 – £1.10; T50-7 - £1.20; T50-10 - £1.20 ; T68-2 - £1.80 ; T68-6 - £2.50; T130-6** - £2.60ea. FT37-43 – 90p } **toroids includes**

FT50-43 - £1.20 ; FT37-61 - £1.20 ; FT50-61 - £2.40; Ferrite beads – FB43-101 (3.5mm dia x 3.2mm long, } **postage for all**

1.2mm dia hole) – 40p for 5: BN43-2402 - £1.20; BN43-202 - £2.00; BN43-302 - £2.40; BN61-202 - £3.40. } **small parts**

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 **** item** – these are heavy and each counts as a pack (ask for quote if you want more than 2 of the large toroids)

Standard MeSquares (0,25"), MiniPads (0.15") & MePads - £6.50 each plus post (UK & EU as parts for up to 4) :

I can include up to 3 of these with parts for no extra postage.

Will DX please order direct from Rex These items from Rex's stock are pictured on the website.

Limerick Sudden kits RX & TX both single band (160 through 20m); **ATU** (80 through 10m) **£40.00 each plus post** UK - £3.50, EU - £6.50, DX - £9.00

NEW! Sprat-on-DVD – 1 to 184. Only £5 each to members plus postage, UK - £1, EU - £3, DX - £4.00

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

(one: UK - £2.00, EU – £4.00, DX - £5.00. More - add £1.10, £1.50, £2.50 each)

Cheques (UK) and payable to G-QRP Club. MINIMUM ORDER for cheque or PayPal payments is £5

You can also pay by BACS. The info you will need to do that is –

The G-QRP Club Account, sort: 01-07-44, and a/c: 54738210

I can accept cash in GBPounds, or US$/ €uros (at the current exchange rates) – but please send securely! You can order via e-mail and pay by PayPal - use sales@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