

SPRAT

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DEVOTED TO LOW POWER COMMUNICATION

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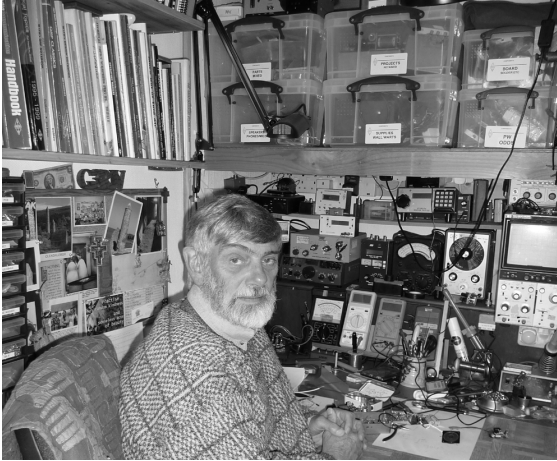
AUTUMN 2017



Two happy YOTA Bulgarian team members working on their QX Transceiver kits by QRP Labs (See the ad on page 43) *Picture courtesy of the RSGB*

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Antennas valves & vintage ~ Members' news

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**9 Highlands
Smithy Bridge
Littleborough, Lancs.
OL15 0DS, U.K.**

**Tel: 01706 - 377688
(overseas tel: +44 1706 377688)
Email : g3rjv@gqrp.co.uk
Homepage : www.gqrp.com**

Rev. George Dobbs G3RJV

I write this on returning home from attending our new joint event, the Telford Hamfest, a worthy successor to the Rishworth QRP convention. During the day we had three excellent talks in the old board room, and the hall below, was well filled with traders selling a variety of parts and surplus equipment in the tradition of the old “radio rallies”.

The Gordon Bennett Trophy is awarded each year to the member thought to have submitted the best article to SPRAT. The winner will be announced in the next SPRAT. If you would like to recommend someone for the award please contact me.

I struggled to fill this issue of SPRAT, my pot of articles is almost at the bottom, so we do need more material. As with all items for SPRAT almost any format or medium may be used. Ideally I would prefer items in MS WORD and in the preferred SPRAT format but we attempt to use any articles we receive. Contact me for a SPRAT formatted page, the appropriate file is on the web page for those who have internet access – look at www.gqrp.com/sprat.htm where you will find a sample page in an MSWord format. I have had a few computer problems recently, so if you have sent me anything and I have not used it so far, please can you send it again, and please, as a backup, will you also send a copy to Graham, G3MFJ, address on the back page, and his email is g3mfj@gqrp.co.uk.

Members in Germany. Please note that Tony G4WIF is looking for a volunteer to replace Dieter Klascha DL2BQD who has now retired. Please contact Tony for a list of what you would need to do at g4wif@gqrp.co.uk.

72/3

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60m Band Module for the NorCal SIERRA

Stefan Bauer, DM5TU, #8769, dm5tu@verschalter.de

(UK info by Nigel G0EBQ)

Since December 20th 2016 the 60m band from 5.3515 – 5.3665 MHz is now allocated to the German hams for the usages on a secondary base. Class A licence holders are allowed 15 W EIRP in all modes with maximum bandwidth of 2.7 kHz. So overall, a perfect CW QRP band. Compared to most other countries Germany is with Belgium, Andorra, Ireland and Slovenia a low power country on the 60m (1). The UK allocation is more complicated as we do not yet have access to these frequencies; instead, we have a number of small bands between 5.258 to 5.4065 MHz. Our (QRP) CW centre of activity is on 5.262 MHz. The full list of the UK allocations is on the RSGB website (2)

The Sierra is a multiband CW transceiver that uses a plug-in band module. It was originally sold by Wilderness Radio, and when they took it from their range, the Norcal club took it over and sold many more.

With the popularity of the 60m band increasing, the need of a new band module for my SIERRA was getting real. The band modules PCBs that were commercially available until now from across the pond did not suit my quality expectations at all. With the help of Dirk, DH4YM (4) the GQRP Club Sales is now able to provide the band modules PCB for the SIERRA in a very good quality (3). German hams can contact Dirk, DH4YM directly, (4) to get the new band module PCBs. All other international hams please contact GQRP Club Sales (8).

The SIERRA has an IF frequency of 4.915 MHz. The total bandwidth of the VFO is 150 kHz. With the allocated frequency bandwidth of the 60m band I was looking at the following VFO frequency range of 5.3 – 5.45 MHz. The calculated crystal frequency for the 60m band module for Germany is 13.300 MHz. For the UK CW section, we need 13.225 MHz, this gives a range of 5.225 MHz to 5.375 MHz which includes the required 5.262 MHz CW frequency, and this crystal is now available from club sales. (5)

The PreMix frequency for the German 60m band comes up to 10.215 to 10.365 MHz, whilst for the UK band, comes up as 10.29 to 10.14 MHz.

The components list for that 60m band module is as follows:

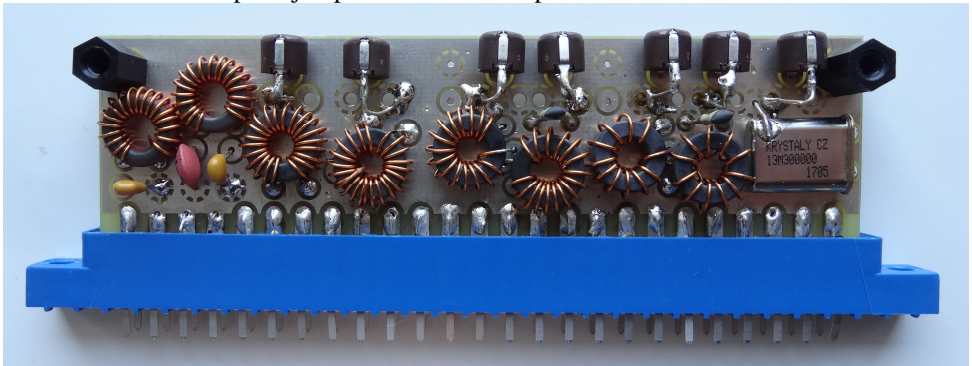
X8 13.300 MHz (UK – 13.225 MHz)

L1 FT37-61	25uH	21T 0.4mm wire	
T1 FT37-61	Pri: 25uH	21T 0.4mm wire	Sec: 0.50uH 2T 0.4mm wire
L3 FT37-61	14uH	16T 0.4mm wire	
L4 FT37-61	14uH	16T 0.4mm wire	
L5 T37-2	1.8uH	18T 0.4mm wire	
L6 T37-2	1.8uH	18T 0.4mm wire	
L8 FT37-61	7uH	11T 0.4mm wire	
L9 FT37-61	7uH	11T 0.4mm wire	

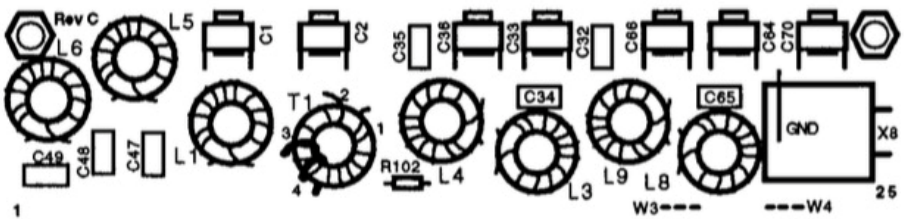
I suggest measuring the real inductance of each of your wound toroid if you can.

C1, C2, C33, C36, C64, C66, C70 Murata Trimmer Cs 9-60pf (6)

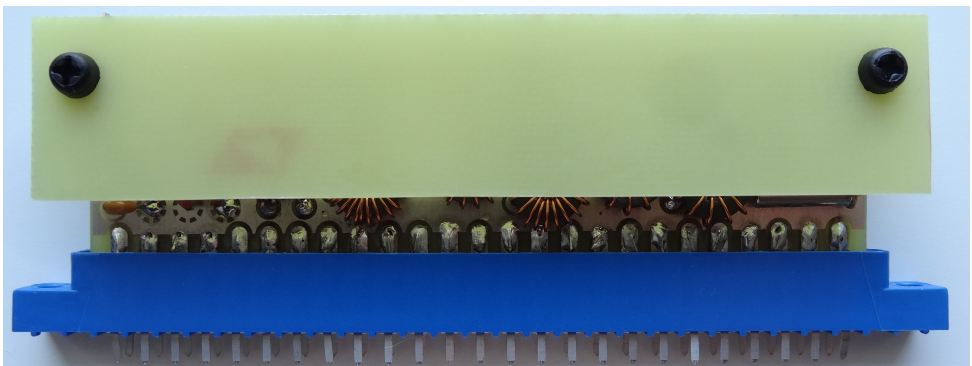
C32 do not use, C34 5pF, C35 do not use, C47 465pF, C48 910pF, C49 465pF, C65 5pF
R102 do not use. Keep the jumpers W3 and W4 open.



60m band module with the Murata trimmers mounted towards the top



NorCal SIERRA band module pcb with allocated parts



SIERRA band module with the delivered cover

The output power of my SIERRA on 60m is about 1.5 watts. The usage of the built in KC2 frequency counter is of great use. Credits to the basic 60m band module specification goes to Paul, WORW (7). I made my own modification at several sections.

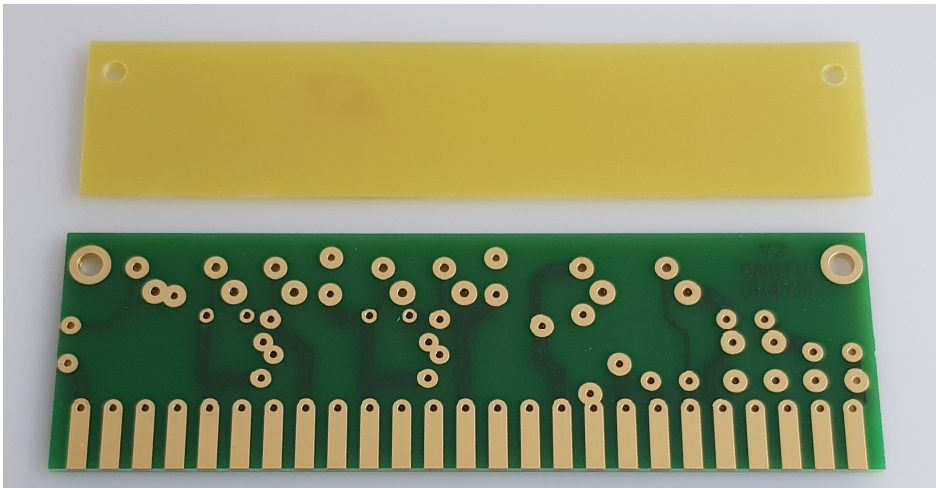
References:

- (1) <https://iaru-r1.org/index.php/spectrum-and-band-plans/hf/60-meter>
- (2) <https://www.thersgb.org/services/bandplans/#9>
- (3) The two PCBs – the band module and the cover are available as a pair from club sales at £8.00 – see the picture below.
- (4) Dirk Ruffing, DH4YM, www.dh4ym.de
- (5) Club sales has 13.225MHz crystals, and they are £1.50 each
- (6) Club sales has the Murata 9-60pF at 60p each
- (7) https://groups.yahoo.com/neo/groups/sierra_wilderness_radio/info
- (8) For club sales info – see the back cover

Notes:

For those interested, an article about the main Sierra board (with a limited supply of the main PCBs) is planned for the winter issue of Sprat.

For those members who already have the main PCB and want to add more bands, then these plug-in boards can be used for that. Most of the needed carrier frequency crystals are available from club sales – again, see the back cover.



This is a picture of the PCB and cover that we are selling on behalf of Dirk DH5YM

The G-QRP Social and Buildathon comes to Telford

Martyn Vincent G3UKV 04451

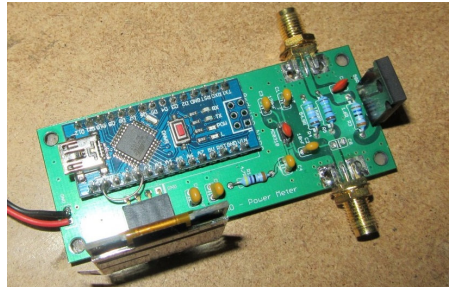
It was with some trepidation that I drove across from setting up the Telford HamFest stands etc. at Coalbrookdale ready for the next day's HamFest just a few miles away, to the Buildathon venue at Holiday Inn in Telford Centre. What had we forgotten or overlooked?



I needn't have worried, since the event was in full swing as I arrived at the Pritchard Convention Room, with quite a few recognizable faces present. Four circular dining tables were arranged around the room, with four Buildathon stations on each table, as you can see in the photograph. Beautifully laid out for an 'evening meal' of components and solder smoke. Steve G0FUW and his Bath cohorts, Lewis (G4YTN) and Mike

(G3VTO) really had things organised - and as far as I could see, everyone was enjoying themselves, whilst chewing the fat and getting down to the business of building the Arduino based power meter kits.

Heather's (M0HMO) excellent project was a sell-out, with several more due to be constructed when more parts have been ordered. Paul (G8AQA) and Heather undertook accurate calibration with suitable test equipment which was required as there was an



unexpected spread of specification within the supplied processor chips.



As far as I know, no holes were burnt in the carpet (or if they were, the table was quickly moved across to hide the evidence), and everyone got home, or to their hotel bedroom, safely. The hotel's bar and available food options were popular, I'm told. However, as I had to get up early the following morning, I left before the end.

The annual Telford HamFest took place the following day, Sunday (Sept.3rd) at its usual venue in Coalbrookdale. Despite rather indifferent weather (it did rain a little, some of the time), admissions were up on last year, presumably because of the arranged link with the G-QRP Social/Buildathon. There were a few more traders too, notably SOTABEAMS, DX-shop and LAMCO. Thank you Richard G3CWI of SOTABeams who generously provided a WSPRlite unit as a Lucky Programme prize, won by a Welsh visitor



GW6...



I must also publicly thank our guest speakers Dave Pick G3YXM, Dom Baines M1KTA and Paul Darlington M0XPD who were very well received by enthusiastic audiences at the HamFest. Their talks have been videoed, and we hope will be available to download from the Telford Club website sometime in the not-too-distant future.

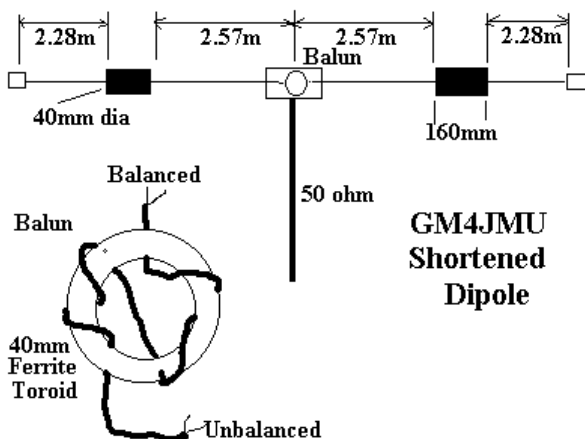


So, a successful and enjoyable weekend. Thank you to all those who supported either or both events, and hopefully we shall see even more GQRP members venture to Shropshire and Telford in September 2018. I don't think you will be disappointed.

An adjustable loading coil for short loaded dipole antennas.

Ken Maxted GM4JMU, Newton Mearns, Glasgow, UK

In Sprat No 74, I published a 40m shortened dipole which seemed to attract some attention with amateurs having small garden plots.



*(Diagram
from
Sprat 74)*

I wanted recently to put up this antenna in an inverted Vee configuration and make the best use of my 15m garden. The antenna I describe is a 14m version of the original but uses a coil design that permits easy adjustment of resonance.

Construction.

The antenna is constructed using SOTA-Beam green antenna wire (about 2.2mm diameter PVC covered). Two 10.5 metre lengths were cut and terminated at a dipole centre insulator. I used a 1:1 balun but this is not essential. The remote end of each wire was folded back through an end insulator and, using three small Nyloc cable ties was fastened back along its length for 300mm (this would allow for fine tuning if needed).

The coils formers are cut from 40mm diameter PVC waste pipe. However, the principal design feature is the fastening method: at each end of the 160mm length of

pipe is drilled a pair of diametrically opposed holes of a diameter to suit the press-fit of a 50mm length of plastic or fibreglass rod.

(I used 4mm fibreglass rod from B&Q but please note it is nasty to use as it sheds fine glass, and very irritating fibres and is probably best cut using a Dremel type tool rather than a junior hacksaw as the latter encourages fibres to split off). Thin wooden rod could be used, with the proviso that it is soaked well in paraffin wax.

The protruding rods serve as strain relief anchor points and all that is required to secure the coil is a large cable tie around both the former and the antenna wire, outboard of these strain reliefs. To adjust the coil turns or position all that is required is to slip the cable tie off the end, keeping it on the wire, remove or add turns and slip the same tie back on. The same can be repeated at the other end of the coil.

To make up the 14m (46') shortened dipole, measure out from the centre of the centre insulator a distance of 4 metres (put a small piece of tape on to remind you), hold the wire at this point to the middle of the length of the coil former and wind 12 turns towards the outer end of the antenna, keeping the turns close and under tension. At the last turn open the coil turn to pass just inboard of the strain relief pillar and fasten a tie-wrap (Nyloc) beyond the strain relief to hold that end of the coil. Wind the remainder of 13 turns towards the dipole-centre end of the coil and repeat the fastening. The coil should be perfectly secure and when under tension the wire will pull on the strain relief pillars, keeping the coil tight but also protecting the wire from sharp angles of bend. This process is repeated for the other leg of the antenna.

Tuning up

The antenna should exhibit a resonance in or near the 40m band. If the antenna is too far LF the coils can be moved towards the ends by taking a turn off the dipole-centre side of the coil and adding one to the dipole end of the coil. The ties are slipped off one at a time and slid back on to secure the new number of turns. I found that a frequency change of about 60kHz was made by adding a turn to one end and taking it off the other. If you wish to make a smaller change simply alter the length of the antenna end folds.

(To make the original half-size antenna, 40 turns can be put on the coils, the centre portion will be 2.57m and the outer section 2.27m. This will use all the space on the coil former- check a dummy winding before you cut a length of former and drill it.)

Performance

Each half of the the finished antenna will measure 4m to the centre of the coil and 7 meters overall length (with 300mm adjustment ends folded back). When supported with the centre at 7 metres above ground level and the ends 2.5m above ground the antenna had a resonant feed-point impedance of 48 ohms, so I get a very good match in the shack without an ATU. The useable antenna bandwidth is at least 100kHz, *the shorter version is closer to 30 kHz and its impedance is a little lower but still useable without an ATU*. The original half size antenna performed very well indeed, this longer one should be very useful as well, especially since it has a wider bandwidth, but radio conditions have been too poor recently to fully evaluate it. I have, however, regularly had good reports from PSK reporter out to 1400 km.

Club Sales News

Graham Firth G3MFJ

A few new items to tell you about this time.

Firstly, I have added a few new crystals to the range, mainly because of the Sierra band module, and the likelihood of a new main board article for the Sierra in the next issue.

Secondly, although I have had them for a while, thanks to a member, there is a new varicap diode – BB204 – which is a dual diode, common cathode, 15 to 50pF range. Designed for UHF TV tuners, so could be useful at VHF & above.

Thirdly, I was given a good deal on a couple of the transistors, (MPSH10 & BC517) so I have passed that on if you buy 10 or more of them. These are from a genuine source – and are not re-marks from the far-east!

Fourthly, after a suggestion by Steve, G1KQH, I have added a very low power audio amp – TDA2822. These are stereo low voltage amplifiers, and can be bridged for mono. They will work down to 3V. Data sheet available from www.gqrp.com/tda2822.pdf

Finally, we are hoping that there will be a new Sprat-on-DVD by the end of the year – this will go up to and will include this issue (172). Anyone who has purchased the old one (up to 160) after 1st September, can ask for an upgrade, just for the cost of postage, and any orders for the existing one will be sent the new one after they have arrived from the manufacturer. I will announce on the G-QRP Yahoo mailing list and the club website news page, when they are available.

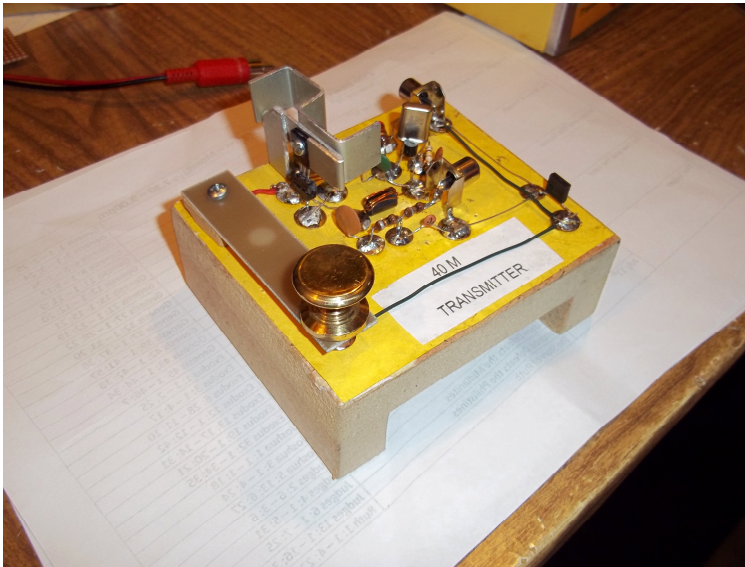
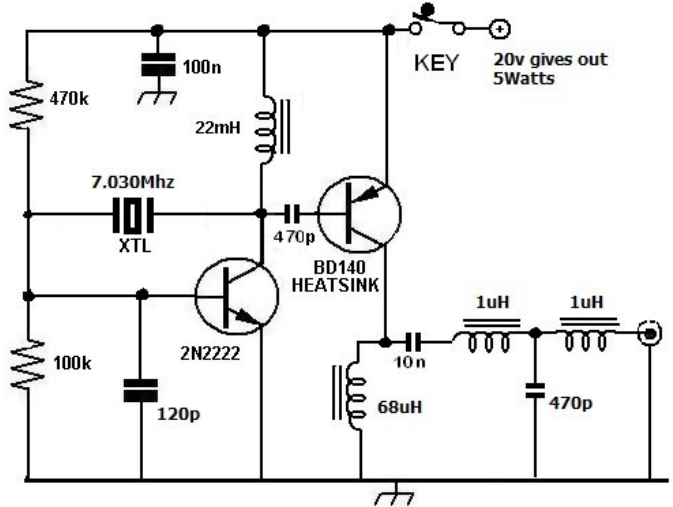
SIMPLE 40m Transmitter

Peter Howard G4UMB, 63 West Bradford Rd. Waddington. BB7 3JD

A couple of years ago I went to the Buildathon and made a 7MHz 200mW transmitter. I wanted something more powerful so I have used the wooden base and some of its components to build this new transmitter. It will run at 5W output with a 20V supply. The output filter matches into my ATU Ok; but you may have to experiment with other designs to ensure good harmonic suppression.

Soldering on drawing pins is not as easy as it sounds because when adding more components to the same pin the former parts can become loose and move. Note the novel key made with PCB and a wooden spacer.

This simple circuit has featured in a lot of my projects.



Youngsters On The Air – Kit Building

Steve Hartley, G0FUW, g0fuw@tiscali.co.uk

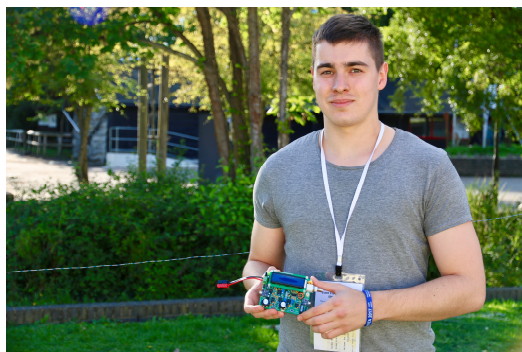
When I first mentioned that I was organising an event for young radio amateurs the G-QRP Club was very keen to support it and when I spoke to Graham, G3MFJ, at Rishworth last year he confirmed the Club was ready to help. In common with many other RSGB Affiliated Clubs, the G-QRP Club made a generous donation to the Youngster On The Air 2017 project (YOTA). Whilst there was no specific sponsorship, the donation was aimed at supporting some radio construction at the event, which had over 80 youngsters involved from no fewer than 26 countries including Japan.

I asked a number of kit suppliers what they might be able to provide and a few came up with ideas but Hans Summers of QRP Labs committed to designing a project that would be more than a ‘fun’ kit and something that would stretch the builders. It is important to

note that YOTA is aimed at young radio amateurs, rather than newcomers to the hobby, so many have a few years of experience already. What Hans eventually delivered not only excited the YOTA attendees and organisers but drew crowds to see it at Friedrichafen where he first showed it to the world.

Hundreds of kits have now been sold.

The kit is a single band CW QRP transceiver with lots of features, including DDS VFOs, DSP filtering, Morse decoder, memory keyer, WSPR and beacon modes, 3W output with key shaping and excellent low pass filtering. As the YOTA event was in 2017, we asked for the kits to be prepared for 17m and Richard at SOTABeams made up some 17m ground plane antenna kits so every youngster would go home with a transceiver and antenna to use.



The brief was to provide a kit that could be built in about half a day. When we first saw the kit we all thought it was too much; it has toroids to wind, ICs to fit, a microprocessor, an LCD display. However, we had not counted on youthful enthusiasm and of the 76 kits that were started at YOTA a good number were completed, and one completed in the session is shown above. The picture on the left shows a happy Bulgarian team member with his

completed kit. Some were completed in the half-day sessions, some were finished off in the shack afterwards, one was seen to have the microprocessor fitted at the dinner table, one was build, tested, reworked and retested so many times it just had to be put out of its misery, and some were taken away to be completed at home. That means YOTA is continuing beyond the week in August and the youngsters were all very up-beat about taking their part-built kits back to their various radio clubs where they had good support. The first kit to be completed and on the air was made by Peter Barnes, M0SRN, who had only passed the Advanced exam a few weeks before the event. A short video of Peter using his kit is available on the RSGB website: <http://rsgb.org/main/about-us/yota-2017/daily-diaries-2/> see Kit Special. A picture of two of the Bulgarian team members working on their kit is on the front of this issue of Sprat.

A massive thank-you to the G-QRP Club for its donation and to QRP Labs for providing the kits at a very generous discount, all very much in line with the message of International Friendship through Amateur Radio that YOTA is all about.

Bobbins & Chopping Board tips

John Williams, G4DYK

I have quite a few Toko 10k size coils with a ferrite bobbin and cup for lower frequencies. Trying to rewind these is quite a challenge as the bobbins are very small. After a while I realised that they would stick quite nicely to a strong neo magnet, such as those on a telescopic nut/bolt retriever – a useful tool in itself and now another use for it !



A polythene chopping board can make a good base for a project containing a number of circuit boards, keeping them all together. I usually get a couple from the local IKEA at £1 each. They seem to be thicker (8mm) and a lot cheaper than some of the supermarket types. It is easy to drill and to cut with a handsaw and I have also found quite a few uses for them in antenna construction etc.

Trap Dipole Antenna for 5262 kHz and Beyond

John F Alder G4GMZ johnalder1@btinternet.com

Having recently built an 8W TX for 5262 kHz, thoughts turned to an antenna built to match it. The principal target was a wire antenna resonant at 5262 kHz and any other frequencies that could be achieved would be a bonus. The junk box contained two well constructed antenna coils from a now deceased “Half-G5RV” antenna and these were measured to show near identical inductances and dimensions shown in Table 1.

Table 1: Dimensions of Trap Loading Coils

Former	38mm dia. x 100 mm long x 1.5 mm thick black plastic tube
Coil	60 turns 1 mm dia. enamelled wire over 75mm; varnished over
Inductance	82 μ H measured with a Peak Electronics LCR bridge
Connections	Screw clamp onto wire

Extensive reading and particularly the web page of KC9RG:

<http://www.i1wqrlinkradio.com/antype/ch36/chiave20.htm> who refers to “ARRL Antenna Book (1988, pp 6-6, 6-7, the “Loaded Antennas” section of Chapter 6, “HF Antennas for Limited Space”)” set me up with an idea of the initial dimensions with which to work. The two inner lengths of wire from the Half-G5RV were still available and these were used in the initial set up as in Figure 1.

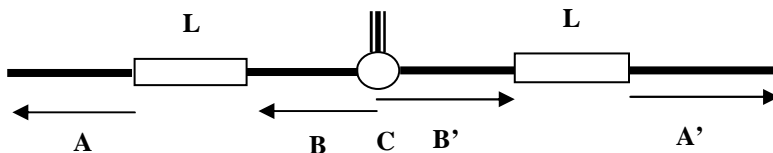
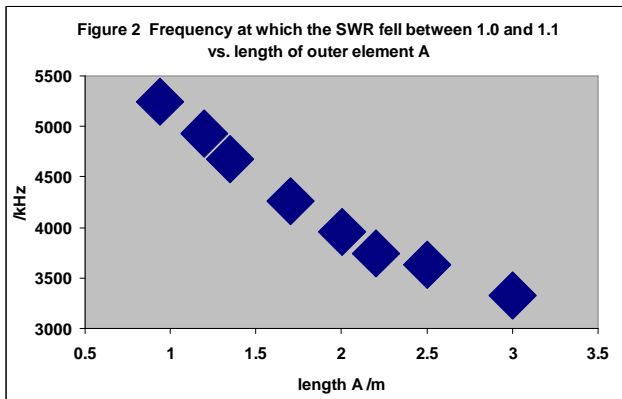


Figure 1: Dimensions A&A' are from end of formers L to insulators; B&B' from centre connector C to formers. The actual length of wire cut was slightly longer due to connections [see text]. The coax was 10m RG58/U terminated in connector PL259. Antenna wire in final construction was PVC coated 32 x 0.2 mm [1.0 mm²] tinned copper [SOTABEAMS UK]

An MFJ 269 Antenna Analyser was used, which measures and displays the resistance [R / ohm] and the reactance [X / ohm] of the impedance, and SWR of the antenna & feeder assembly at the set frequency. Readings were taken after varying the outer elements A&A' between 3.0 and 0.95 m with the inner elements B&B' at 4670mm. The antenna was strung up at 1.5m above ground level [agl] and wood-propped centrally to be nearly horizontal

The first set of readings recorded the frequency up to 15 MHz at which the SWR fell between 1.0 and 1.1; the results are plotted in Figure 2 for the range 3 to 5.5 MHz. It was

noted that a resonance [R~40; X=0; SWR= 1.1] occurred at 15 MHz for all values of A&A'. It was suspected, rightly as it transpires that this was a property of the inner part of the antenna LBCB'L. Such behaviour may be obvious to some but it was a revelation to me how well the inductors isolated the inner from the outer part of the antenna. It pointed the way to optimise the usefulness of the construction.



The next step obtained readings of the R, X & SWR at the QRP calling frequencies: 3560, 5262, 7030, 10116 & 14060 kHz; frequencies above 15 MHz are not reported here. The results are in Table 2.

Table 2 Values of R/X/SWR read from the Antenna Analyser for decreasing lengths A&A' at the chosen QRP calling frequencies; B&B'=4.67 m					
A&A'/m	3560 kHz	5262 kHz	7030 kHz	10116 kHz	14060 kHz
3.0	30/17/4.3	506/0/3.9	14/0/4.0	638/0/3.1	170/0/2.2
2.5	66/31/2.7	514/0/3.9	14/0/4.0	636/0/3.1	181/0/2.3
2.2	33/12/2.3	507/0/3.7	15/0/4.1	704/0/3.1	169/0/2.3
2.0	46/15/2.7	537/0/3.9	15/0/4.0	634/0/3.0	208/0/2.4
1.7	48/30/3.5	591/0/3.9	15/0/4.0	655/0/3.0	199/0/2.4
1.5	38/44/3.9	671/0/3.9	15/0/4.0	705/0/3.1	203/0/2.4
1.35	36/44/4.1	769/0/3.9	15/0/4.0	722/0/3.1	205/0/2.5
1.2	34/43/4.2	915/0/3.6	15/0/4.1	713/0/3.1	209/0/2.5
0.94	36/43/4.2	78/0/1.2	No data	No data	No data

A rather sharp dip occurs at 5262 kHz when A&A'=940 mm, whereas the parameters at other frequencies stay relatively unchanged by altering lengths A&A'.

The next step was to alter the 15 MHz resonance to 14 MHz for a better match before optimising the length of A&A' for good resonance at 5262 kHz. Using a few rough calculations scaling the resonant length at 15 MHz to a prediction for 14 MHz while maintaining A&A' at 940 mm gave the results in Table 3.

B&B'/m	3560 kHz	5262 kHz	7030 kHz	10116 kHz	14060 kHz
5.13	21/45/3.7	255/0/2.3	13/0/4.0	520/0/2.7	23/0/1.9
5.00	26/39/3.9	148/0/1.9	13/0/4.2	453/0/2.5	35/0/1.2
4.88	10/37/3.9	48/4/1.0	6/10/4.5	276/0/2.6	51/6/1.1

The results showed favourable SWR at 5262 and 14060 kHz together when B&B'=4.88 m. It was remarked also how the values at 10116 kHz were within the range of matching through an ATU. My practical experience is that values of $R \ll 50$ and of $X \gg 1$ are not conducive to good matching through my ATU whereas quite high values of R are OK as long as $X \sim 0$.

The final iteration was now undertaken holding B&B' at 4880 mm and varying A&A' between 940 and 880mm showing a good match when A&A'=940 mm. The results showed principally the scatter of results around the resonance at 5262 kHz, varying between $R=58 \sim 142$ $X=0$ and $SWR= 1.1 \sim 3.0$. It was decided that further optimisation would be pointless until the final construction was made.

The structure was rebuilt using all new antenna wire [see legend to Figure 1] and strain relief built in using cable ties. The antenna was put in place with the ends at ~4.0 m agl and the centre at 3.5 m agl using porcelain end insulators and 2mm woven nylon guying. The final measured dimensions were A&A'=920 (1000*) B&B'=4850 (4880*); L&L' 100, all /mm. The values* in brackets are the actual length of wire and the smaller value is the final measured length, the differences being due to the strain relief loops. Clearly my allowances for loops were inadequate! The optimisation process should really be repeated to overcome this discrepancy in order to have a perfect impedance match with no ATU; perhaps one day!

The tests were repeated near to the QRP frequencies and results shown in Table 4.

/kHz	R	X	SWR
5181	51	23	1.5
5190	47	12	1.2
5200	45	0	1.1
5210	50	3	1.1
5220	66	11	1.4
5230	84	3	1.7
5240	120	2	
5250	151	0	2.3
5262	230	0	2.5
5271	300	0	2.7
5284	420	0	2.8

10101	422	0	2.6
10106	420	0	2.6
10114	418	0	2.6
10116	418	0	2.6
10125	411	0	2.5
10145	399	0	2.6
14001	193	0	2
14014	173	0	1.9
14021	164	0	1.9
14052	126	0	1.8
14060	118	0	1.8
14067	111	0	1.8
14072	108	0	1.8
14089	96	0	1.8
14097	91	0	1.8
14203	48	0	1.6
14300	33	10	1.6
14350	27	0	1.6

The values near 3560 and 7030 kHz were much as they are in Tables 2&3.

It is noticeable just how critical conditions and environment are for the 5262 kHz resonance but less so for the 10116 and 14060 kHz regions where the impedance changes with frequency are more gradual rather than so dramatically resonant. In subsequent use, the ATU settings to achieve a good SWR match to the antenna were found to be quite critical for 5262 kHz but less so for the other two frequencies.

Performance of the antenna on transmit was quite acceptable. Tuning with an ATU gives SWR of 1.0 over a range of rain, sun and wind conditions. It is difficult to make rigorous comparisons but I would put it as good as my rather larger 7-28 MHz Carolina Windom at the same height for these bands; which latter has by comparison, impedance parameters at 5262 kHz: $R=26/X=0/SWR=1.4$.

There is nothing novel about this design or construction but the trap dipole's compact size, a little under 12 m, makes it attractive and those three bands are good for interesting QRP operation.... and making it was most educational!

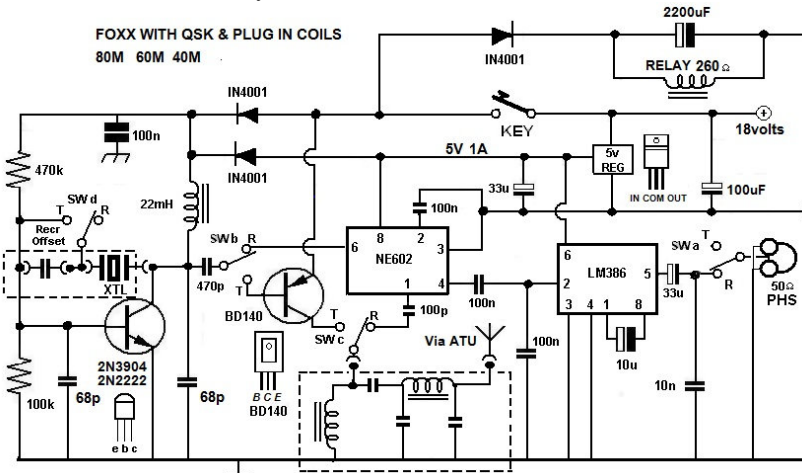
Postscript

Although not discussed here, values obtained for the final trap dipole at higher frequencies: 51500 /469/0/2.6; 52000 /148/0/2.1; 70000 /58/3/1.2; 70504 /55/0/1.0 [kHz /R/X/SWR] were reproducible, altering gradually between those frequencies and suggest perhaps further use for the antenna in the 4 & 6 m bands.

The Foxx with relay QSK

Peter Howard G4UMB

The FOXX TX/RX has been around for some time and I have found it to be a good QRP set. The one I have built here adds a simple QSK (Auto change over) by holding a relay on a second or so after keying finishes. So a 4 pole changeover relay does the switching. I wanted to make it suitable for the 80M 60M 40M bands as the Club sells the Xtls 3.560Mhz, 5.262Mhz and 7.030Mhz. The output at 18v in is 4 Watts. Note that on keying the voltage to the xtl osc increases making it more powerful to drive the BD140. If you wish you can use the spare switch on the phones to wire in a side tone circuit taking the positive feed from the key.



In order to reduce the amount of switching I built each tuned circuit on a plugin board. The xtl and offset capacitor are also plugged in a socket as are the transistors and IC's making it easily serviceable in case of a component failure. You can try a 10pF on 80M as an offset Cap and a wire link for the other bands. I used a stripboard PCB. An extra resistor across the relay coil could reduce the delay on switchover. With such a simple tuned in and out circuit a good ATU is a must. As the picture shows, I have mounted it cheaply on a wooden base unboxed, unshielded but results have been satisfactory.



WSPRlite

Propagation and Antenna Performance Analyser from SOTABeams Roger Dallimore MW0IDX

The WSPR (Weak Signal Propagation Reporter) programme has been around for a few years and was written by Joe Taylor K1JT as a way of transmitting and receiving low power signals to test propagation paths.

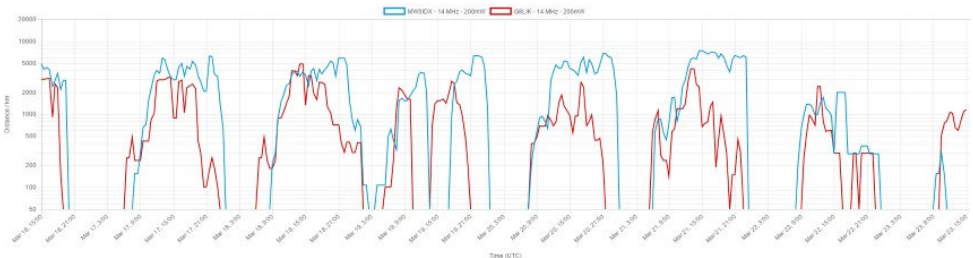
WSPRlite is a small (56x50mm) self-contained transmitter. It is initially programmed via a micro USB lead (which also provides the power) using a simple software interface. A stable, clean voltage of 5 volts (150mA maximum) is required, I found my iPhone charger worked fine. Once WSPRlite is set up with your call-sign and other information such as Maidenhead locator and band, it no longer requires a computer connection. With just a power supply and an antenna connected it is ready to go.



WSPRlite can operate on 630, 160, 80, 40, 30 and 20m. The unit itself contains filters for 20 and 30m only, but SOTABeams also sell a filter kit for 160, 80 and 40m bands. Power output of between 5mW to 200mW can be chosen and SOTABeams recommends its use with an antenna VSWR of below 3:1. A simple button press two seconds after the start of an even minute will “sync” the unit and thus starts the transmitting process. Simple!

In a short time (depending on propagation), received reports of your transmission will appear on the DXplorer web page. Data received from your WSPRlite can then be viewed in four different ways.

DX10 table - Your best 10 DX spots



DX10 Graph - The DX10 table shown as a graph (see above)

Spots map – Locations of the receiving stations receiving you as shown on a great circle map. See the picture on page 20. Callsigns are available by clicking on each spot.

Spots table - This lists all your spots

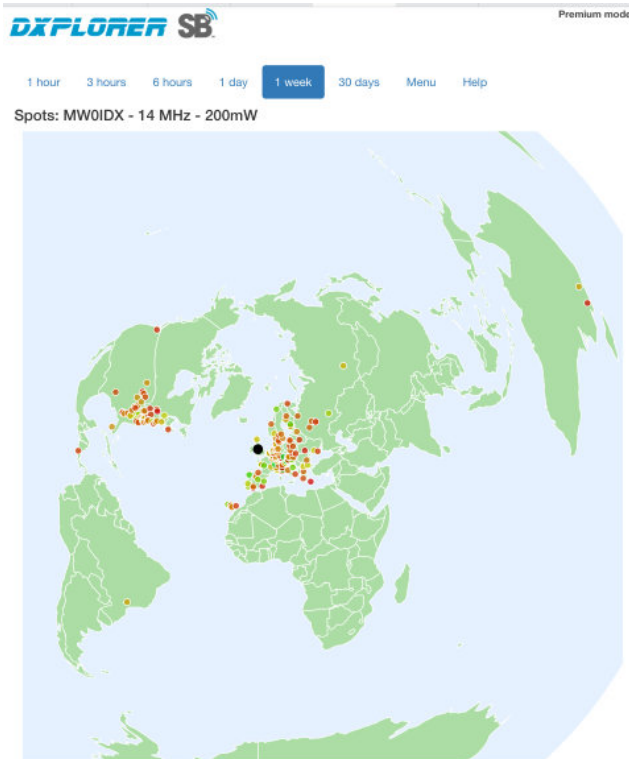
A list of other WSPRlite users are shown on the comparison page. You can also choose who to compare your results with using the DX10 table, DX10 Graph or Spots map listed

above. This is particularly useful to compare with other WSPRlite users using similar power levels with different locations and antennas.

WSPRlite comes with a one year's subscription to DXplorer.net which allows detailed comparisons with other users. WSPRlite transmissions can also be viewed on WSPRnet.

The WSPRlite is an invaluable aid for measuring antenna performance, propagation or beam paths. I found myself regularly checking DXplorer on my iPhone during work and was pleasantly surprised when my 200mW to a quarter wave vertical on 20m was received in VK3 land for the first time!

<http://www.sotabeams.co.uk/wsprlite>
WSPRlite Facebook Group
<http://wsprnet.org>



Future Rallies and a possible G-QRP club stall attendance Graham G3MFJ

The club stall has attended a number of rallies this year – more than usual, but the stall holder (me) is now having hearing problems, so unless I can get guaranteed help at each venue, then I will not be coming. I do have a few members who come and help, but I am now looking for more. Training will be given – 5 minutes on how to operate the till, and you will get into the rally free! You will not be stuck behind the table all the time either. If you fancy giving me a hand, I will be very grateful.

For the remainder of this year, the next rally that we will attend will be at Galashiels (22nd October) and Roy, GM4VKI will be in charge there. I may be able to attend the Rochdale Rally on 18th November subject to the comment about help above.

Club Information – Officers/Contacts

HON. SEC. & Sprat Editor

Rev. George Dobbs, G3RJV
9 Highlands, Smithy Bridge,
Littleborough, OL15 0DS
g3rjv@gqrp.co.uk

Communications Manager

Dom Baines M1KTA, 34 Bury Road, Stapleford,
Cambridge, CB2 5BP
m1kta@gqrp.co.uk

Membership Secretary (& Sprat distribution)

Tony Fishpool, G4WIF
GQRP Club, PO Box 298, Dartford,
Kent. DA1 9DQ
g4wif@gqrp.co.uk

Awards Manager

Ryan Pike G5CL. 63 Bishopstone Village, Nr.
Aylesbury HP17 8SH
rpike78088@btinternet.com

Publicity & News

Chris Page, G4BUE
Highcroft Farmhouse, Gay Street,
Pulborough. West Sussex RH20 2HJ
g4bue@gqrp.co.uk

VHF Manager

John Beech, G8SEQ
124 Belgrave Road, Wyken, Coventry.
Warwickshire. CV2 5BH
g8seq@gqrp.co.uk

Treasurer

Graham Firth, G3MFJ
13 Wynmore Drive, Bramhope,
Leeds. West Yorkshire. LS16 9DQ
g3mfj@gqrp.co.uk

Internet Manager

Tony Fishpool, G4WIF
GQRP Club, PO Box 298, Dartford,
Kent. DA1 9DQ
g4wif@gqrp.co.uk

Sales

Graham Firth, G3MFJ
13 Wynmore Drive, Bramhope,
Leeds. West Yorkshire. LS16 9DQ
g3mfj@gqrp.co.uk

QSL Manager

Mr D S Couatts, GM3VTH
29 Barons Hill Avenue, Linlithgow,
EH49 7JU Scotland.
gm3vth@gqrp.co.uk

Technical Advisor (Antennas)

Colin Turner, G3VTT
182 Station Road
Rainham
Gillingham, Kent
ME8 7PR
g3vtt@gqrp.co.uk

Technical Advisor

Ian Keyser, G3ROO
Rosemount, Church Whitfield
Dover. Kent. CT16 3HZ
g3roo@gqrp.co.uk

Note from Membership Secretary Tony G4WIF

The following page is for UK members only. It authorises your bank to make automatic annual subscription payments for your convenience. 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**. If you already have a standing order in place then you should **not** use this form. Check with your bank if you are in doubt.

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UK MEMBERS: PAY BY STANDING ORDER
FORGET ABOUT YOUR RENEWAL BY USING THIS FORM


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- Write in the Name and Branch where it says (1) & (2)
- Go to the bottom of the form and add:
- Name of your account in the box marked (3)
- Number of your bank account in the box marked (4)
- Add the date and sign (5 and 6)

MOST IMPORTANT:-

Put your club number in the box marked (7)

Now please take or send the form to your bank. **Do not** send it to the club.

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Bank (1)		(2) Branch	Standing Order Mandate	
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Bank	Branch Title (not address)		Sorting Code							
National Westminster Bank	ROCHDALE		01 - 07 - 44							
	Beneficiary's name									
For the credit of	GGRP CLUB NUMBER 1 ACCOUNT		0	4	1	0	9	5	4	6
	Amount in figures		Amount in words							
The sum of	£6.00		SIX POUNDS							

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15-1-2018		£6.00		ANNUALLY ON JANUARY 15th	
Date and amount of last payment		-----			
-----		(7)			
Quoting the reference		"GGRP"		Note to bank. Reject this mandate if membership number not provided.	
*until		-----			
Membership Number goes here		-----			
Special Instructions					
Please cancel any previous Standing Order in Favour of the beneficiary named above under this reference.					
(3) Account to be debited				(4) Account Number	
(5) Signature(s)				(6) Date	
* Delete if not applicable		Note: The Bank will not undertake to: (i) make any reference to Value Added Tax or other indeterminate element (ii) advise payor's address to beneficiary (iii) advise beneficiary of inability to pay (iv) request beneficiary's banker to advise beneficiary or receipt			

Send to your bank

Club Information – Services and Awards

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

Club Awards: Our Awards Manager is Ryan Pike – G5CL, **.

Trophies are managed by Dom Baines M1KTA. **

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

The club QSL Bureau is managed by - Mr D S 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.

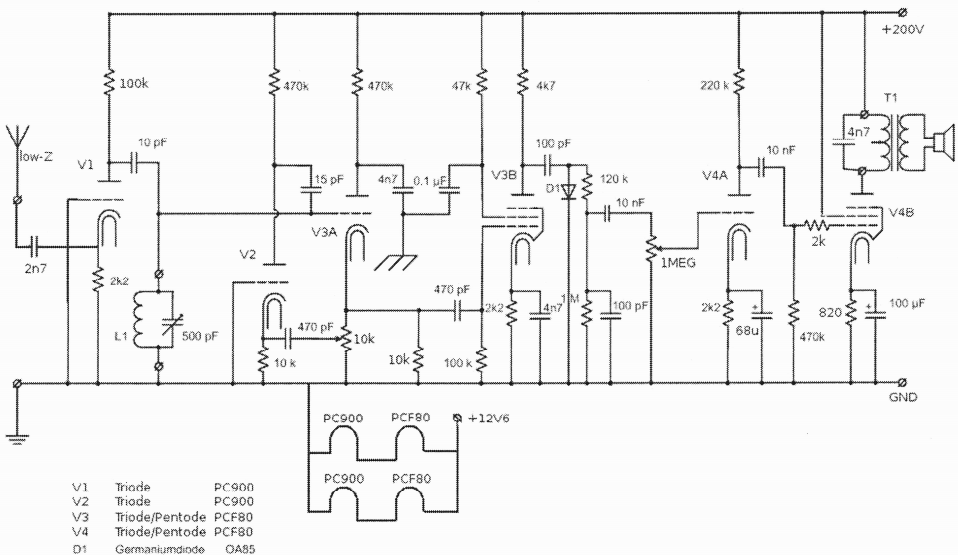
** (address/email on the Club Officers page in this issue of Sprat)

The AZG receiver

Aren van Waarde

This little project originated a few years ago, when I discovered a big box with unused valves in a waste bin of our university hospital. In a dim and remote past, the valves had been intended for the repair of video monitors but they were now discarded. I decided to save the dusty box from its approaching destruction. Upon inspection, I noticed that it contained more than 100 valves labelled “Philips”, “Siemens” and “Telefunken”, all P-types. Four of these I have now used to construct a stereo preamplifier and four others ended up in a stereo power amplifier (their stories may be told elsewhere, unless you are interested. Then I thought: What about a receiver?

The P-tube radio which resulted from my waste bin find is not my own design at all. The basis layout was published by OM Jan Poortman (PA3ESY). However, Jan did not use P-tubes but various pencil tubes. On the “Netherlands Forum about Old Radios”, I discovered that OM Henk van der Enden (PA5HE) re-calculated the part values in Jan’s schematic so that P-tubes could be used instead of pencil tubes. Thus, I decided to base my efforts on the proposal by PA5HE. My only contribution to the project is that I designed a PCB and constructed a working prototype. The schematic is shown below.



V1 (PC900) is an RF amplifier in grounded grid configuration. The rather low input impedance of this amp is a good match for loop antennas. The signal from V1 is passed to the tank circuit (L1 and 500 pF variable capacitor) and to the grid of cathode follower V3A (triode of PCF80). The output of the cathode follower is fed to V2 (PC900 via the 10k potentiometer (regen control). V2 takes care of positive feedback of the signal to

V3A. The RF signal of V3A is amplified by V3B (pentode of PCF80). Detection of the LF signal takes place by the germanium diode D1. V4A and V4B are a normal AF amplifier. The AF output is small (100 mW?) but with an adequate transformer and a sensitive speaker sufficient for normal listening in a quiet room. In my own copy of the receiver, all heaters are hard-wired in series (not via a PCB track) and are hooked up to a 26.0V 0.3 DC power supply for my tests I used a 170V rather than a 200V B+ (since this was available). Shielded wire was used to connect the volume and regen controls to the PCB.

Measured voltages were B+170.2V, anode V1 81.7V, anode V2 61.2 V, cathode V3A 1.66 V, cathode V3B 3.35 V , cathode V4A 1.45 V, cathode V4B 3.19 V. Overall current consumption 7.36 mA.

Thus far I have used the receiver only in the AM broadcast band, with an old ferrite rod antenna and a 500 pF air variable as tank circuit. Tuning is sharp and the receiver is quite sensitive. Although AM broadcasting has been largely terminated in continental Europe, many stations could be heard throughout the band in the evening hours, including Good News Radio, BBC Radio Scotland, some pirates and stations from the Middle East, using only a few feet of wire as an antenna. In summary: this was a fun project. It will definitely do some further experimenting in the near future!

In case you wonder: “AZG” is the old home of our hospital, the abbreviation stands for “academisch Ziekenhuis Groningen”. Right now we are known as “University Medical Center Groningen”.

<p style="text-align: center;">A Useful Tip Steve Evans G0EVJ</p>

Co-op salad portions plastic see-through bowls make absolutely brilliant Morse key paddles covers I got two one for my Begali key , and one for my home-made paddle.

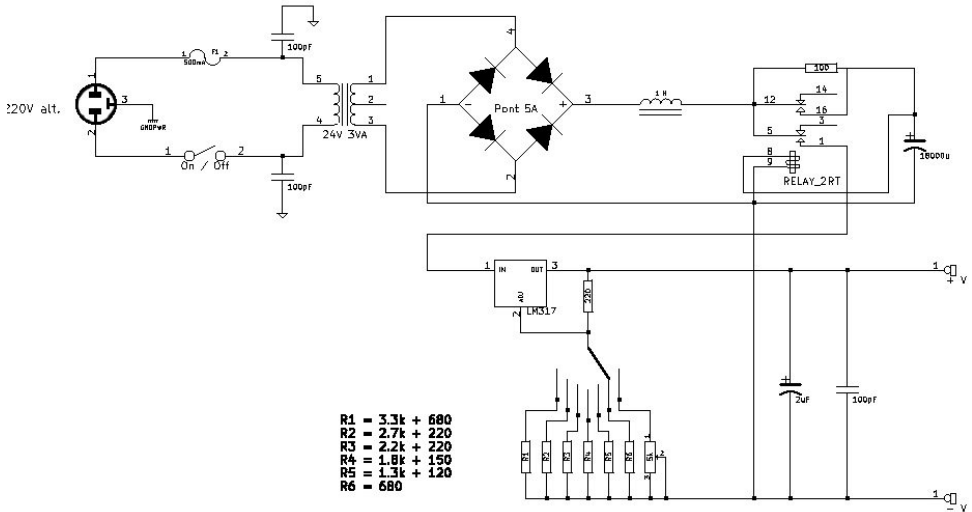
73

Steve

Power supply using a high value capacitor

F6GLZ Jean-Claude Gerwill, G-QRP 7423

For several years, I'm using a more than classic power supply for the workbench. It consists of an LM317 voltage regulator switchable with different voltage outputs. Filtering is done by using recovered parts issued from a power supply (50V / 3A), namely a coil of 1 Henry and an electrolytic capacitor of 18,000 uF as seen on the schematic :



Without the protection done by the relay circuitry, this filter needs a high current when the switch is just going on. This is due to the fact that the capacitor is completely discharged at this moment.

To avoid this high starting current, the capacitor is « slowly » charged during a few seconds through a low value resistor (100 ohms). After a short time, the capacitor is charged enough to excite the relay. The resistor is then shorted, and the voltage is fully applied to the regulator only after this short charging delay.

This protection can be used in any device using capacitors of high values for filtering the output voltage.

COMMUNICATIONS AND CONTESTS

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

Hi all, thanks for the comments (please keep them coming) I will pass these on to other sections in GQRP for their attention. Don't forget there are loads of large and small contests as the evenings start to close in.

Just a few I know about...(lots more listed in places like

<http://www.hornucopia.com/contestcal/contestcal.html>) you might want to take a look at:

RSGB Autumn Series Contests. SSB, CW and Data

<http://www.rsgbcc.org/hf/rules/2017/rautumn.shtml>

Just a few hours and there is a slow CW 'coral' for the slower op 3555-3560 kHz 15wpm maximum speed for 'running' stations. There is a special category for the station that always sends <15wpm too!

RSGB DX contest in October has always had 21 and 28MHz now it will include 80, 40 and 20m <http://www.rsgbcc.org/hf/rules/2017/rOctoberDX.shtml>

UKEICC 80m contest

<http://www.ukeicc.com/which-contest/which-contest-ukeicc-80m-contests-rules>

CQWW contests this Autumn/Winter SSB: October 28-29, 2017 CW: November 25-26, 2017 Starts: 0000 UTC Saturday Ends: 2359 UTC Sunday might give a few an option to try for the WAC challenge in an evening or morning.

Scandinavian Activity Contest, CW 1200UTC, 16th Sept to 1200UTC, 17th Sept logs due 22nd Sept. <http://www.sactest.net/blog/rules/>

I have noted that the LF bands have definitely started to see some more activity and as mentioned the same time last year the twilight hours will be closer to the centre of the day again.

I hope everyone had fun in the summer operating from base and portable both home and away.

Colin G3VTT and I have heard about an activity that might be of interest to some.

From: Alessandro Santucci (Alex I5SKK)

Subject: Homebrew-MAS-QRP and tubes

<http://annualmhq.blogspot.it/>

There is no planned GQRP activity during this quarter however if you are looking for other qrp ops then the usual International QRP Centre of Activity Frequencies are always there.

CW: 1836, 3560, 5262, 7030, 10116, 14060, 18086, 21060, 24906, 28060 KHz
SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360 kHz

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

It is usual for operators to exchange their G QRP Club membership number when making QSO but it is not essential.

The annual RSGB Spectrum Forum is in October. This time OFCOM have asked to attend. I'll report back afterwards.

Alternative power supply for your QRP valve rig

David Wright, G3VBQ

Building a QRP valve transmitter or receiver has a great retro feel about it, but the cost, size and weight of a conventional transformer-fed psu can be off-putting. As an alternative there are a number of cheap, efficient and tiny dc-dc converters around which will do the job. These will run off 12 volts - either a small battery charger or battery - and will give constant output even when the battery voltage falls. This setup also means the rig and power supply can be used /P if you wish.

Use an LM2596 or equivalent step-down regulator to give 6.3 volts at up to 2A for heaters (larger ratings are available). Cost for 5 is around £1 each.

Use a dc-dc boost converter (typically 8-35V in, 45-390V out) to provide a well-regulated (and variable) HT supply. Typical rating is 40W, with up to 200mA at lower output voltages, and cost less than £5 each. Some (not all) of these also have an unregulated - 350V output, which is handy for grid bias or keying. This chip will benefit from additional output filtering to kill hash at the chip switching frequency - a small toroid with a 0.1uF disc ceramic each side will do the job.

As always, be aware of the dangers inherent with voltages of this magnitude. The HT converter, despite its tiny size, will produce enough current to give a lethal shock.

Antennas Valves and Vintage

Colin Turner G3VTT

182 Station Road, Rainham Gillingham, Kent ME8 7PR

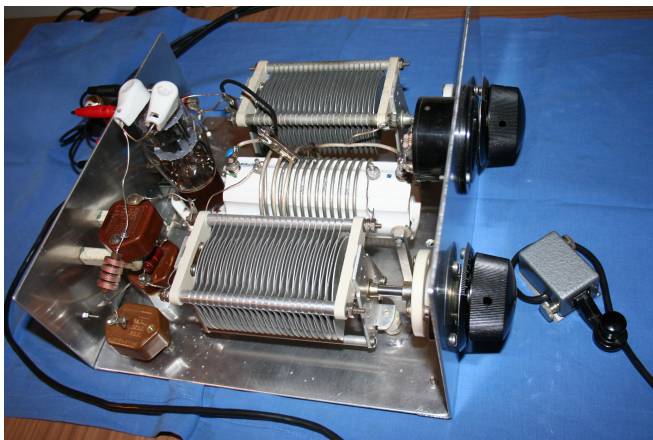
g3vtt@aol.com

Cris has been in touch again about another QRP valve transmitter. Gerald G3MCK tells me he has worked this station and it has an excellent signal for such old technology.

‘BIG H’ TRANSMITTING OSCILLATOR

by IZ3CQI - Cris

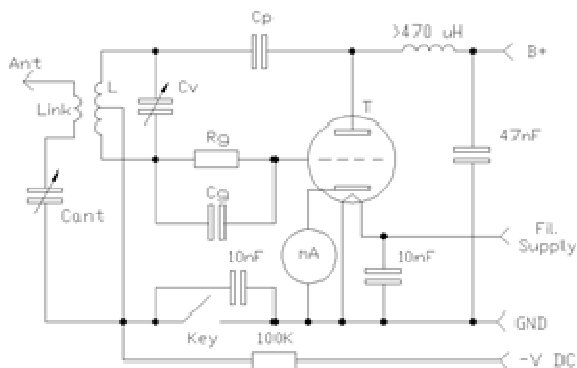
In its early days the technology of Radio was very simple. To make long-range radio contacts using ultra-simple devices the first amateurs had to be ingenious. The early schematics can still be reproduced today, either with old components or with modern ones, proving their age-old ability to generate reliable and reasonably high-quality CW traffic.



The HULL HARTLEY power oscillator transmitter, a little bit modernised, is one of those winning solutions, successfully used in my shack and allowing daily radiotelegraphic traffic across EU. The schematic is well known. All fixed caps are ceramic type, preferably not less than 1 kV DC. Cp & Cg should also be ceramic type, 2 kV DC or, better but not necessarily, mica. Cv is a high quality 500 pF variable capacitor driven by a 3:1 reduction drive. The antenna Load capacitor Cant is 500 to 1000 pF and does not need to be of the expensive type: it allows smooth load variations and, as a bonus, a very fine frequency tuning when needed, without impacting significantly the loading level. The negative bias -VDC should be a bit beyond the cutoff level. Usually, from -50 to -100 V will be sufficient. Rg should be chosen to have the proper grid DC current in the tube; you can measure this by closing the circuit at the key socket with a milliammeter. For VT-224/RK34 double triode, 10 kohm, 5W is just right and indeed it becomes also quite warm. The main coil L is usually tapped at 1/5 – 1/3 from the grid end, depending on the

tube sensitivity. The VT-224 likes hard driving and the tap is set at 5 turns over 13 to deliver about 10-12 mA drive.

The antenna link is 2 to 4 turns (or more), depending on your aerial impedance. Despite the many indications found in ancient articles, it may be placed across the feedback tap on the main inductance L. This is a low impedance point and stray capacitive coupling to anything around it is minimised by the lower voltage, close to ground potential. By having the ant. link there, you would minimise the frequency variations induced by your antenna if it swings in the wind (a well known issue at the time). In any case, the greater the Cv, the better the stability.



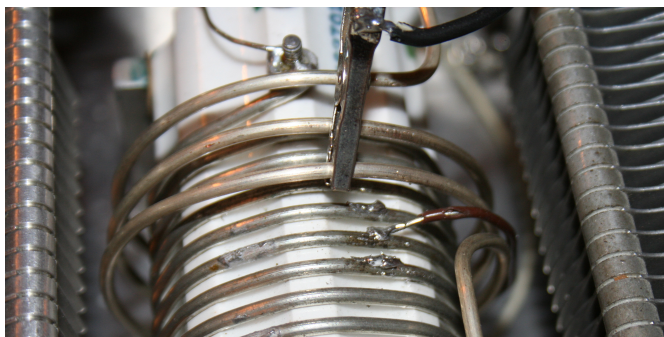
Data for 3.5 & 7.0 Mhz:

- Cv = 500 pF max
- Cp = 5000 pF, 2 kV
- Rg = 10 kOhm, 5W
- Cg = 500 pF, 2 kV
- Cant = 500 or 1000 pF

L : 60 mm dia., 13 turns, 2.5 mm Ø solid Copper, tap at 5 turns fm. grid side

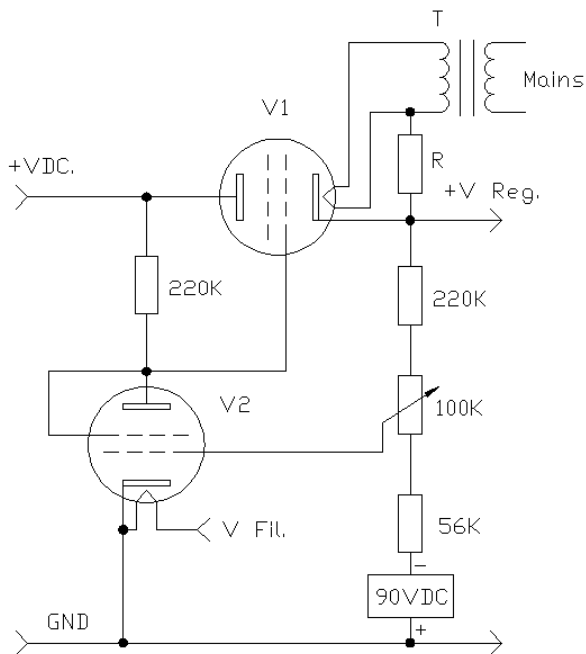
Link : 2 to 4 turns for low imped. ant. concentric to L, across IL tap

L does not need to be made using the thick copper tube of the old pictures. Solid Copper wire, possibly tinned or silvered, having a thickness between 2 to 4 mm depending on availability, would be perfect. However, a thick pipe would allow this coil to be self-sustaining. With thinner conductor, wind it over a solid support, ceramic or steatite preferably, but also bakelite could work well. The antenna link should also be supported in some way, but in my prototype I used 3 mm thick silvered Copper, soldered at a couple of free terminals on the L support; the number of turns is selected by a crocodile clip wired to a piece of flexible wire. It seems strange ... but this arrangement does not put at risk the overall frequency stability. It's cheap and quick. And it works.



Indirect heating tubes allow a much cleaner tone, as the filament only heats the cathode and its varying potential fed at AC is practically non-interfering?. Any triode could be used; also classical pentodes triode connected, either those meant for RF in the range of the 807, 6146 and sisters, or the most cheap and still plentiful ‘sweep’ tubes, like the 6DQ6 and friends. The VT-224 has a special look to me and it is a pure triode, so I preferred it mainly for aesthetic reasons ...

The transmitters in the 20s did not have any metal panel and metal bottom support, nor reduction drives. Those features made the tuning very hard so I put everything into a ‘C’ shaped piece of Aluminum sheet (2 mm thick). This improvement was extremely beneficial to make a comfortable frequency setting, without any ‘wobbling’ caused by hand capacity. The other feature of the original devices of the 20s was the chirping tone, essentially a matter of poor plate voltage stabilisation. This then is the next big improvement in the 2016 Hull Hartley circuit and provides stabilised yet variable anode voltage supply.



This circuit can be used downstream from any non-regulated B+ supply. In my prototype: +VDC = 600 V; V1 is a 6BG6G (could be an 807, 6DQ6 ... or noval EL84, 6GK6 ...); and V2 is a high gain pentode, EF184 (anything with a transconductance greater than 6000 mS is OK, like EF80, EF85, 6AH6, 6AU6 ...). T feeds separately the series tube filament; the regulated voltage is brought to it by a resistance R in the range 50-100 kohm. V1 needs its own supply which could be taken from the same transformer used for B+, ideally used also to feed the transmitting valve. The full swing of the 100 k potentiometer allows a choice of stable voltage from 120 to 400 VDC, at a maximum current that, multiplied by

the voltage difference across V1, is within V1 power ratings. The 90v DC is a stabilised source such as a neon string of high voltage zener diodes. The higher the gain of V1 & V2, the greater the stability. At 400 VDC B+, the Load capacitor Cant should be set to read about 28-35 mA plate current and in this condition the output power should be something above 5W. Higher power levels are achievable, up to 10 or even 15 W, but with some degradation in the tone quality. A solid mechanical construction and a stable plate supply are the secret of a tone quality that, wind permitting, is barely distinguishable from that of modern transmitters.. If your contact reports you are suffering from a few Hertz of drift, due to wind swinging your antenna (poor him), reduce the antenna coupling a bit.

This transmitter is used daily in my shack. About a hundred QSOs have been made since its introduction in Sept. 2016, paired with a surplus valve receiver. The operation mode is full break-in: the valve receiver can withstand the very high RF voltage induced by the transmitting antenna on the same change over switch. The setting of the transmitter takes a matter of seconds; operation is very pleasing and relaxing. There is no need to have it on a separate shelf as there was in the ancient times. The key is only a few centimetres away but the tone doesn't suffer !

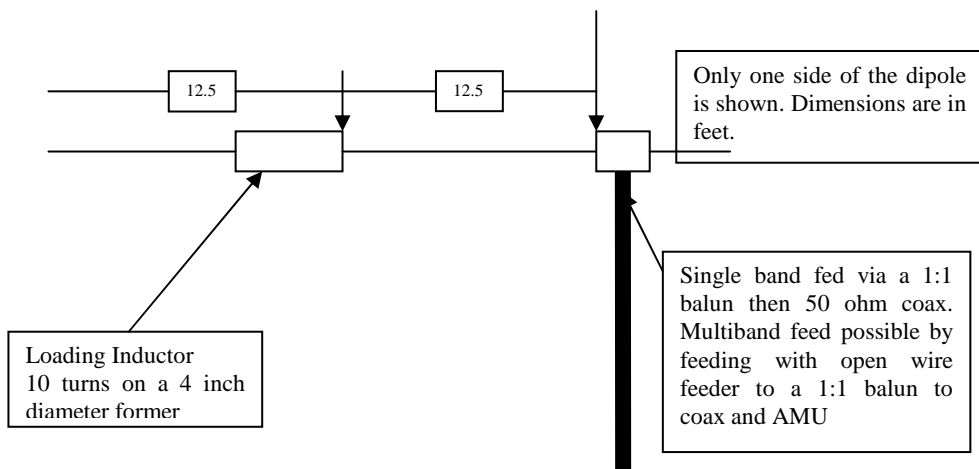
By changing the number of L turns and the L tap, I can use it from 3.5 to 10 MHz ! (A different coil allows use from 1.7 to 5.5 MHz.). Thus, local and DX bands are covered. What more do you need ?

The main purpose of this article is to remind us how much fun can be had with so little. This circuit is, obviously, open to infinite experiments and variants, particularly regarding the hardware. It can be reproduced with transistors or industrial mosfets, such as IRF-type and brothers. Also, instead of triodes, pentodes could be used with stabilised screen grid voltage and the rest of the circuit unchanged. I don't want to teach cats to climb trees, (remember poor Doris), but try yourself. Beware of the high voltages involved if electron tubes are chosen and spend some time learning how power oscillators work and how to improve them. The circuit is so simple that you can test many variations in a short time, with components of most qualities and origins. After your first QSO with this, your radio-activity will never be the same. My sincere thanks to my friends Charlie IZ4KBS and Alex I5SKK, for their inspiration and plenty of patience during on-air testing along this very successful and rewarding project. Keep an eye on my QRZ.COM page for updates, as variations on this theme are on their way. *Good work Chris! I'm looking for you on 80m.*

A Shortened Dipole Antenna for 5.262 MHz from G4ICP

Dick G4ICP has been a stalwart supporting the Monday evening GQRP net on 5.262 MHz and has sent details of his short antenna with a span of around 50 feet. He thinks of this antenna as two mobile whips back to back and has fitted it into a small roof place at his Braintree location. Be prepared for some pruning to improve the SWR by initially altering the number of turns on the loading coils, Dick used some square section trunking for these, and final tuning can be accomplished by changing lengths of the wire end sections. The bandwidth is around 50 KHz on 60m. Dick has tried using 75 ohm twin feeder from the dipole centre to the balun mounted some distance away and then 50 ohm coax to the rig. Using open wire line would give you operation on the higher HF bands but you would

need a balanced tuner. The 60m band has seen plenty of activity this year thanks to the Monday night gang.



Valve/Tube QRP Events

The Monday evening gathering on 5262 KHz has been very successful this year with many stations using homemade equipment. I have received only one or two comments about changing the Monday activity evening to 160m next year so please let me have your views on this QRP activity spot. Don't forget the next **QRP Valve Weekend is November 11th and 12th 2017**. Just come on using your old style valve equipment and send a short report to me at g3vtt@aol.com. I can accept some pictures which I will try and fit in and please use Word to aid editing. Finally please take a look at the following link <http://annualmhq.blogspot.it/> as Allesandro I5SKK has devised a yearlong activity event that embraces the GQRP, Old Timers QRP and the Minimal components QRP events and has has devised a points scheme and a certificate at the end of year. This hopefully will encourage activity into 2018.

MEMBERS' NEWS

by Chris Page, G4BUE

E-mail: chris@g4bue.com



As a bit of summer fun, Banbury ARS member **MØIFA** organised a 'Pixie Challenge' over two evenings in July. The 'Challenge' was for other members to build the well known Pixie 7023kHz CW TCVR from a complete kit of parts provided for £15, including the Pixie kit, a 9V battery pack, an audio amplifier with loudspeaker, all connectors, a morse button and a six feet length of wire for the antenna! The Pixie is capable of just under 1W output when powered from 6 x AA batteries. The

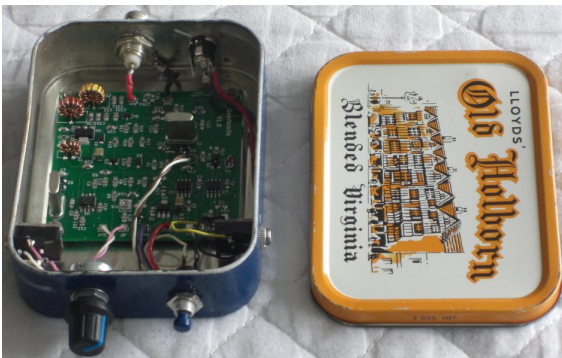


first challenge was for competitors to receive and decode a morse message being transmitted in the club room by **MØIFA**'s AD9851 VFO design (see *SPRAT* 171), outputting 10mW to a short antenna. The Arduino VFO controller was loaded with specially written sketch to repeat a short CW message every five minutes at 10WPM. On the second evening of the 'Challenge' builders were challenged to have a complete CW QSO up and down the garden at the club, exchanging call signs and reports and an individual secret code to prove the QSO had been made. This turned out to be chaotic with everyone on the same frequency! Anthony says prizes were donated by club

members. One prize was for receiving the secret message, a SDR receiver kit, which was won by the newest club member, a YL who is not yet even licensed and who beat the oldest member present who wired two transistors in backwards! A second prize for the first to make a QSO was two new soldering iron stations. He adds, "This proved to be a very successful event at the club and re-awakened members interest and skill in building QRP TCVRs and making CW QSOs. Full details of the 'Challenge' is on my web site at GanymedeHam.blogspot.co.uk and on the BARS new web site at <http://www.banburyares.co.uk/TechGroup/PIXIE/default.aspx>".

On 1 June **G4GDR** was testing a Pixie board on 9V with around 700mW out on 40m and QSO'd **GMØGCO** on a 7028kHz club crystal. Adrian received a 559 report but his signal was then swamped out by a higher power station, but says, "This contact was made as a TCVR which is quite amazing as the RX is very poor, being wide open to broadcast break-through. I used the Pixie into the station ATU feeding an inverted vee **G5RV** antenna (open-wire feeders)".

G8TMV has been busy with a new QRPP rig design and build. The 'Quartzmite', (pictured below) is a re-engineered all SMT update to the well known Rockmite design. The prototype is currently done and working and Colin has a few spare boards and parts if anyone is interested in building one, see <http://www.tuckley.org/qmite/>. **GØEBQ** operated **GB4SWR** at the Suffolk Rally on 11 June and worked several stations on 17, 20 and 30m with the Sierra, the best being HBØ through a pile-up, and OH using 200mW because he forgot to switch the Z-match from tune to operate! Nigel said he had the pleasure of meeting several members there, including **G4WIF**. He likes the *Tribal Knowledge* column and wonders if it's going to become a regular feature along the lines of *Technical Topics* or *Hints and Kinks*?



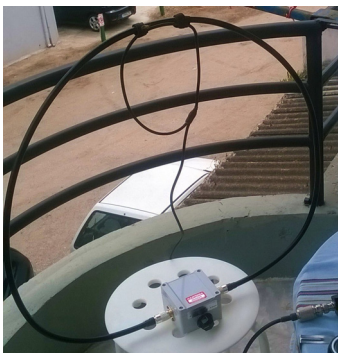
It has been a couple of years since **VK5TM** published the DDS Xtal Substitute project using the AD9850 modules and thought it time for an update. The update removes the original input switching arrangement in both the original and Mk2 version and replaces it with two push buttons to step up or down through the frequencies. Terry says, "Also, the calibration routine can be performed at any power on as opposed to having to reprogram the PIC (this caused some grief for some people previously). The update is on the original Xtal Sub page URL <http://www.vk5tm.com/homebrew/xtal_sub/xtal_sub.php> and the original page that was there is available to download as a PDF at the bottom of the page. I would like some feedback on whether anyone is interested in having the simple VFO use push buttons instead of a rotary encoder for frequency up/down".

This years mini-DXpedition for **G4UDG** was to the small village of Loutsna on the coast east of Athens in an apartment overlooking the beach. Chris took his well proven LNR Precision MTR5-B five-band CW only QRP 4W TCVR running off AA batteries (picture below), Alpaloop jnr magnetic loop antenna, only 24 inches diameter (below left) and the palm pico paddle. The station was set up on the balcony of the apartment (below right) on the second day, the rig turned on, and the antenna resonated on 20m (sitting on a stool with an upturned salad bowl for extra height!). A quick CQ produced a 599 from **LZ121SBS** (a special event station in Bulgaria). A good start he thought and over the next six days of casual holiday style operating, Chris made 42 QSOs in 24 DXCC, the best being with **RK9AY** at 2200 miles (see map bottom right).



The SOTA Mountain Goat is awarded for reaching 1000 SOTA Activator points and it

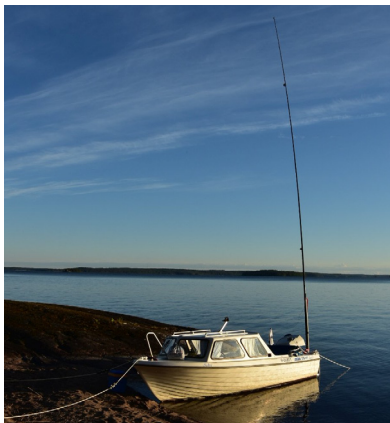
has become a bit of a tradition to do something a little bit special for the SOTA activation which earns the activator their 1000th point. So writes **M1BUU** who, for his Mountain Goat activation attempt back in January, decided to challenge himself to build the radio equipment actually on the summit. Colin built a Morse key, RockMite 20m TCVR kit and 20m GP antenna, and then used them to make the statutory four QSOs to achieve Mountain Goat. Despite the high workload, he managed to shoot some footage which he uploaded to *YouTube*, <<https://youtu.be/lacSNOEDSgQ>>.



In May **G8SEQ** worked 80m SSB with 5W using a co-linear fed 80m dipole suspended from a kite as a vertical. John says the results were quite impressive and interestingly a lot of the noise disappeared as the antenna was lifted off the ground. Design information is on his web page at <<http://www.g8seq.com/hfantennas.php>>. He says, "The 80 m version is scaled from the one



shown. It is basically a half-wave dipole, but what is not on the website is the coil (tuned trap) dimensions. For the 80m version I used RG174 throughout with a 10 turn coil nine inches in diameter. Connection to the rig was via a small cable entry BNC plug”. John later added, “Incidentally I achieved by best QRP DX ever using one of these antennas and 5W of USB from an FT817 in 2011 - **G8SEQ/VK4** to EI. This year in March I managed to work an EA from the same location in New South Wales using the exact same antenna but on 40m (lower efficiency). The antenna was erected as a sloper from a gum tree using a saltwater swimming pool as a ground reflector”.



OH5JL was testing a shortened end-fed half wave antenna for 30m on his boat this summer (picture right) and found it worked well although the conditions were not very good. The antenna has two loading coils and the pole is about 33 feet high. Tuomas's rigs were an AT5-3B and a Finnish Juma TRX2 (pictured above) and he says, “As always, operating outside was a lot of fun”. **IU0AHC** was QRV in the first half of July from a camping site in northwest Sardinia as **IU0AHC/IS0** using a FT-817, magloop and wire antennas, mostly on 20 and 40m. The G-QRP team of **GM3WIL** and **GM4VKI** took the Club stall to the last Crianlarich Rally which, unfortunately, isn't going to continue. However, all is not lost, says Roy, as two more rallies have been voiced, one with the Lomond Club (West Glasgow) and the other by the Perth Group at Pitlochry, so hopefully one down and two up. The next rally is the Galashiels rally on 22 October.

A while ago **G4WIF** asked for a volunteer to take on the job of updating the *SPRAT* Index and keeping it current and Tony thanks **K7VWV** who stepped forward and has completed the task up to issue 170. Bill's work is available at <www.gqrp.com/sprat.htm>. Congratulations to **G4ICP** on his first place for England in the QRP CW and SSB sections of the 2016 Oceania DX Contest, and to **G3OTK** for second place (the same as last year) in the 3W fixed section of the RSGB Low Power Contest is July. **M1KTA** reminds us the 160m frequency about which CW QRP signals are found is 1836kHz (not 1843kHz). **M0IFA** says the Dropbox link for downloading his sketches and Arduino libraries published in *SPRAT 171 Members' News* will not work (people need an invitation to access it), and suggests those interested email him <antonywatts@me.com>, or look out for code on his website at <GanymedeHam.blogspot.com> where code updates are normally listed in full.

G3OTK entered the this year's six 90 minute RSGB 80m CW Club Contests using his home-made 3W output CW TCVR and a dipole about ten feet high. Richard doesn't have a permanent outdoor antenna but the clothes line post in his garden has a pulley and so he just pulled the dipole centre to the top of the post and tied the ends of the dipole to bushes. He averaged a very creditable 60 QSOs per contest and his best DX was **OK1AY** and **LY2BMX**. Indoors, Richard has about 26 feet of wire strung around the shack and in February worked three USA stations on 20m with it (again in a contest) with the same TCVR, plus contacts around Europe on 40m. In February he gave a talk about his QRP CW TCVR to his local club (Itchen Valley ARC) and **G4JNT**, also a member, used the talk as a basis for his *Design Notes* column in the May edition of *Rad Com*.

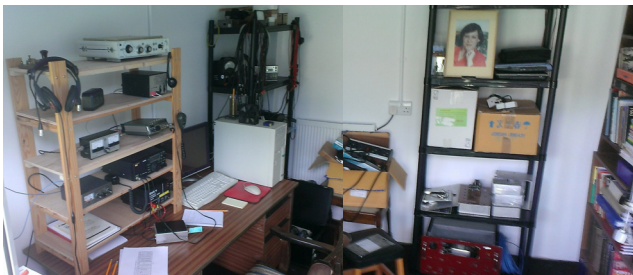
G0FTD managed to persuade quite a few stations to take part in some 10m QRSS activity for a change, and has got together a collection of the best screen grabs of signals received, that he has added to his website at <<https://sites.google.com/site/g0ftdradio/28mhz-qrss>>. Andy says this branch of QRP activity still holds a lot of appeal for him, adding, “It is real low power (circa 250mW) and still relies on human intervention and interaction with only a small amount of comput-

ing required". On 16 July there was some auroral propagation to 10m and using QRSS, Andy and others were able to observe it in a pretty unique way with this mode. He has made the results available on another webpage at <<https://sites.google.com/site/g0ftdradio/28mhz-qrss-aurora>>. He says, "I have 98% completed my amplifier designed for 5W QRP work for WSPR and QRSS modes. It is essentially a 160-10m device, but I'm in the process of tweaking it to work on the 136 and 475kHz bands too. The picture right shows the transmitter connected to the amplifier whilst being tested on 475kHz, and the whole apparatus is up in the attic!"



G3XGY has been exploring **K1JT**'s weak signal modes, JT65 and JT9, and says they are ideal for a QRPer as most seem to run 10W or so. Brian's FT-840 has no VOX so he built **G4ILO**'s VOX-to-PTT interface on veroboard in a tobacco tin, that has seen a few other projects! The antenna is a half-size **G5RV**. He says the major problem is local noise and even the Wellbrook ALA1530 loop is no cure for it, but the WSJT-X program does seem to winkle out those hidden signals. Most of **G3XBM**'s spring and summer has been spent on 6m JT65 and quite a bit of real DX has been copied, including the USA, Caribbean and Japan spotted. Roger says, "Of late, I have been using a new digital mode called FT8 on 6m which is rapidly being adopted as an alternative to JT65. At the moment I am monitoring 6m MSK144 during the Perseids meteor shower, 16 countries copied so far with this mode". **G0XAR** says anyone building the valve tester in the *SPRAT* 171 (page 5) would be advised to insert a bleed resistor across the 150uF 400V capacitor. Steve says, "A 220k 0.5W resistor should bleed the cap to a safe voltage in a minute or two. It is a good article and has motivated me to make one. I sold an AVO valve tester for a small fortune a few years ago and have since wished I had kept it!"

Pictured right is **G3XIZ**'s remotely sited /A shack that is now fully QRV and enabling Chris the pleasure of working stations again with only a 'reasonable' level of QRM. He has been experimenting with a low, home-made 4m Moxon antenna and with 5W can work all the local stations on that band. He has resurrected his part-finished



80m TRX (flung aside in disgust a few months ago) and found it works much better with the correct crystals installed in the filter! The RX selectivity is far superior to his old DC RX and he will try to complete the job in the next few weeks. Chris says the Shefford Top Band AM net is still going strong after several decades (Mondays 1900 local time on 1985kHz) and has been attracting a few new participants. He gets good reports from all using his 3.5W home made TRX and 40m end-fed wire, his nearest contact is **M0PLT**, just 160 metres away and "real DX" he says!

G0XAR offers this link for beginners on the noble art of soldering saying it might prove useful as pre-reading for a club construction project: <http://mightyohm.com/files/soldercomic/FullSolderComic_EN.pdf>. **G0UPL** reports the Canadian C3 expedition celebrating 150 years of Canadian history with a 150 day voyage through the famous North passage, started from Toronto on 1 June, and onboard is a WSPR TX donated by QRP Labs. It consists of an Ultimate3S TX, LPF kits for 20, 30 and 40m, relay-switched filter kit, QLG1 GPS receiver kit and aluminium enclosure kit. **VE3BSB** leads the team who constructed, tested and installed the TX and **VE3EFF** provided a computer to host the tracking software. QRP Labs has a live tracking page at <

labs.com/c3.html> with photographs of the installation. Hans says the TX is doing a great job, getting over 3000 WSPR reports per day on average.

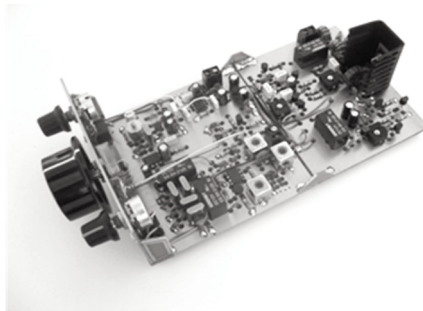
The picture right is **G4UDG**'s home-made Paraset for 40m, running 5W output. Chris says it is a modern day version of the Paraset using semiconductors, still with a regenerative RX, crystal TX and even a built-in morse key just like the original. He says, "As well as 'looking the part', it is also a very capable TCVR with 26 QSOs in seven DXCC after only three weeks of being on the air, the best DX being **R1591M** at 1587 miles distance. An excellent kit produced by 4 State QRP in USA and is called the 'Bayou Jumper', as they say, it pays homage to the Paraset".

Having worked with marine radio and navigation installations for many years, **LBØK** offers this double pronged advice for weatherproofing coaxial connectors: (1) don't spray inside the connectors with any oils or grease; (2) apply two or three layers of good self-vulcanising tape with good stretch (50-60%) and 50% overlapping. Start at the top, run down and then up again; (3) apply two or three, layers of 'good' electrical tape (*Scotch 88*) with stretch and 50% overlapping. Start at the top, run down and then up again. Peter says, "The self-vulcanising tape seals against moisture ingress and the el-tape shields against UV and atmospheric contaminants. Joints covered in this manner were opened again after up to five years and found to be almost as fresh as when they were sealed. If one is very concerned and wants to, one can apply several layers of *Scotchkote* to the outside over the el-tape. *Scotchkote* is a thin rubbery bitumous solution that dries and cures to a sealing layer when applied properly. Solvents in spray paints in our/my experience tend to hasten the decay of el-tape, and are even more aggressive when applied directly to self-vulcanising tape or putty. *Scotchkote* has to be used with care, in well ventilated work areas. Depending on the atmosphere(s) one has to install in, or sail through, Cable mantle material can deteriorate and require replacement over about 10 years or maybe as little as three. PVC-II is probably the better material against the weather, followed by Polyethylene(PE). One further observation - good branded tapes aren't often found at the local market at very low prices, I'm afraid!

Long term readers of this column will know my strong opposition to QRP stations adding the suffix /QRP to their callsign. I was therefore interested to read a recent thread about this on the Elecraft Reflector when **W4TV** referred to the IARU's *Ethics and Operating Procedures for the Radio Amateur*, that says in paragraph II.9.16: "Never send your call as 'G3ZZZ/QRP', this is illegal in many countries (eg Belgium). The QRP information is not part of your callsign, so it cannot be sent as a part of it. In many countries the only permitted call suffixes are /P, /A, /M, /MM and /AM". I rest my case! The document continues, "If you are really a QRP station, chances are that you will be *relatively weak* with the station you are calling. Adding unnecessary ballast (the slash and the letters QRP) to your callsign will make it even more difficult to decipher your callsign! You can of course always mention during the QSO you are a QRP station eg '...PWR 5W 5W ONLY'. If you call CQ as a QRP station and you want to announce that during the CQ, you can do it as follows: 'CQ CQ G3ZZZ G3ZZZ QRP AR'. Insert a little extra space between the call and 'QRP' and do not send a slash (DAH DIT DIT DAH DIT) between your call and 'QRP'. If you are looking for QRP station specifically, call CQ as follows: 'CQ QRP CQ QRP G3ZZZ G3ZZZ QRP STNS (stations) ONLY AR'. I urge all QRP stations to follow this advice.

Thanks to the contributors to this column. Please let me know how your autumn goes for the Winter 2017 edition of *SPRAT*; what you have built, who you have worked, and any information about QRP, by 10 November. Also, pictures please, perhaps 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 home during the winter and spring months, especially during the Winter Sports, so I can let members know to listen out for you.





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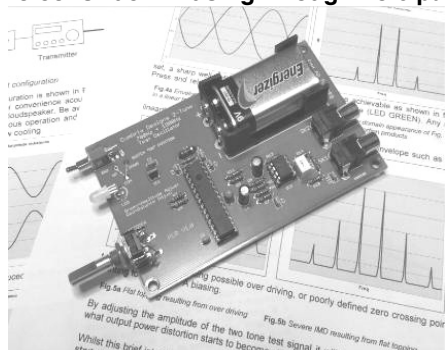
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LZ1YE has sent me details of some attractive QSL cards including the Club Log.

Members can make their orders by sending samples, explaining what they want to print, and sending the materials: photos, files...etc via e-mail: qsl@qslprint.com or qsl@kz.orbitel.bg or if no internet access via the postal address: Atanas Kolev, P.O.Box 49, 6100 Kazanlak, Bulgaria. Examples of cards and prices can be seen at www.qslprint.com

For people need QSL cards urgently LZ1YE dispatches three days after the payment is made. UK Members can pay via a UK address: Please send your cheque / cash via recorded delivery to: LZ1YE QSP Print service, c/o Melanie Rowe, St. Leonards House, 35 St. Leonards Road, Exeter, EX2 – 4LR, Devon. e-mail: m0mja@aol.com (make cheques payable to : Melanie Rowe)

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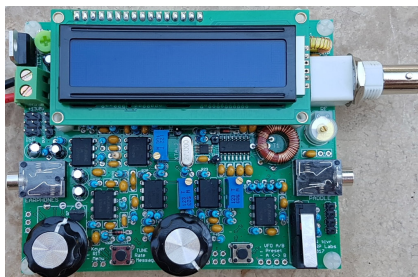
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Only \$49 / £38 / 41€ See <http://qrp-labs.com/qcx>

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

GQR 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

} £3.80p (EU); or

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

} £4.50p (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
7.122, 10.106, 10.116*, 14.060*, 18.086, 21.060, 24.096 & 28.060 all are £2 each

} plus postage

} (ANY quantity)

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

} £1.20p (UK), or

HC49U crystals – 2.00, 3.00, 3.20, 3.579, 3.6864, 4.0, 4.096, 4.1943, 4.433, 4.5, 5.0, 6.0MHz

} £3.50p (EU)

} £4.00 (DX)

7.2, 7.6, 8.0, 9.0, 10.0, 11.0, 12.0, 13.50, 15.0, 16.0, 18.0, 20.0, 24.0, 25.0, 26.0, 27.0, 28.0MHz

28.224, 30.0, 32.0, 33MHz – all 35p each (Some of these are low profile)

} Post free

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

} if ordered with

} with heavier

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

} things

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

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

} like binders,

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

} toroids

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

} polyvaricons

LM386N-1 - 4 to 15v, 300mW, 8pin DIL - £0.45, LM386M-1 SMD – 35p

} or filters

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

} Use just

TDA2003 - 10w Audio amp 5pin – £0.25 each

} that postage

TDA2822 - 1.8 to 15v stereo amp – can be bridged. 0.5W Audio amp 8pin DIL – £0.20 each

} that postage

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

} If ordered

2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO +40V - 5 for 50p

} with books

MPS140 transistors (npn) fT - 650MHz, hFE 60, VCEO 25V - 10p each, 10 for 80p

} or CDs

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

} add this

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

} postage

BC517 Darlingtons (npn) fT - 200MHz, hFE-30,000, VCBO +40V - 13p each, 10 for £1.10

} as books

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

} or DVDs

BF981 – dual gate MOSFET – 40p each

} do not

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

} travel well

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

} with parts.

Magnet Wire – 18SWG – 2 metres – 60p; 20 & 22 SWG – 3 metres – 60p;

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

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

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

Litz wire – double silk covered multi-strand wire 7.04mm -12p, 14/.04mm. 25p. Both for 3 metres.

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

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

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

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

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

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

} Postage for

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

} 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 - £2.00; BN61-202 - £2.40.

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

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

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

STIX board * – 3" x 1", 80 x 0.15 square pads plus 2 x SOIC pads. £3.75 each. Will post with parts for no extra postage.

QRPme Brass sets * – PCB feet to lift the board off the table - £10 plus post as for SBSS clamps - DX 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 - £5.40, DX - £8.00

Sprat-on-DVD – 1 to 160. Only £5 each to members plus postage, UK - £1.20, EU - £3.50, DX - £4.00

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

(one: UK - £2.00, EU – £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 numbers you will need to do that are - sort: 01-07-44 and a/c: 54738210

I can accept cash in GB Pounds, 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 GB Pounds 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