SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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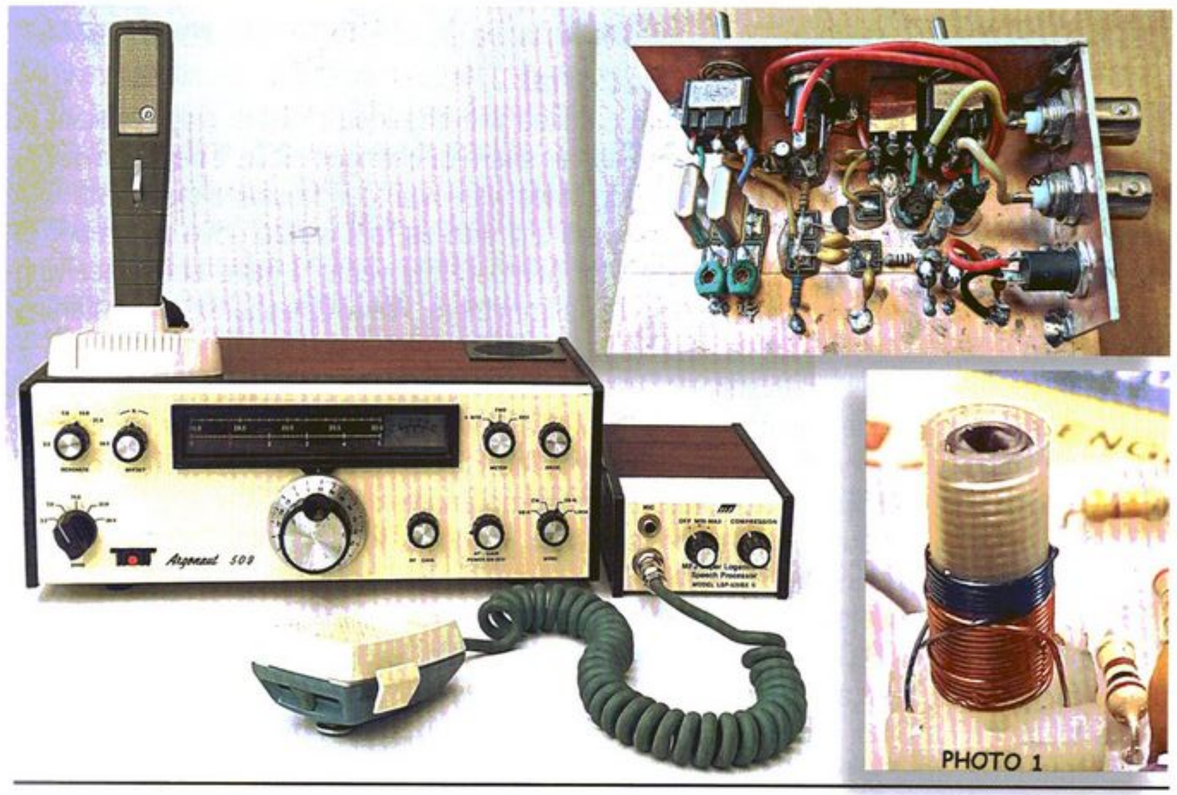

PHOTO 1

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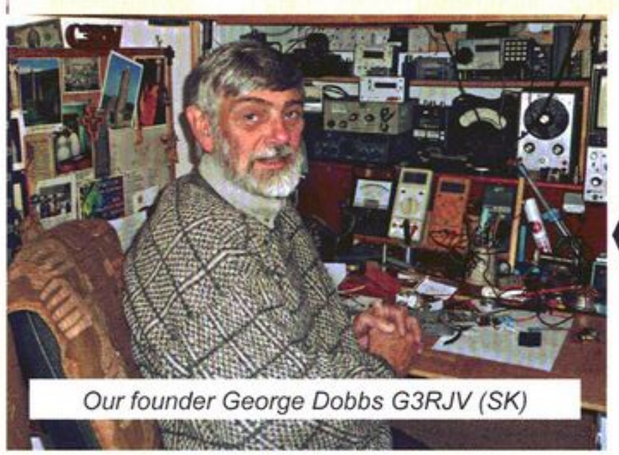
JOURNAL OF THE G-QRP CLUB



Our founder George Dobbs G3RJV (SK)

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Editorial

The Greek philosopher Heraclitus is often credited with the idea that the only constant in life is change. The G-QRP Club has seen its fair share of changes since it began in 1974. Despite those changes, the Club continues to thrive with over four thousand members.

None of the original 'management' team are still with us, but we do have a number of members who have been fully subscribed for (almost) fifty years. I have been receiving anecdotes and recollections of favourite projects from them. We will be sharing them starting with SPRAT 200.

We have a number of golden anniversary projects in the pipeline. We are pulling together a SPRAT 'extra' magazine with some of G3RJV's QRP writings from Practical Wireless (PW) and Short Wave Magazine. We are working with the RSGB so they can publish a 'Best of SPRAT' collection. **Phillipe F5SDT**, has designed an anniversary logo for us and you will be seeing more of that during our anniversary year. It should soon be available on the Club website for members to use.

Returning to the subject of change, I am pleased to announce that we have a new Secretary; Martin, M0HKG, has volunteered to step in behind Dick, G0BPS. A warm welcome to Martin, who has been a regular at our Convention Buildathons, and is keen to contribute to the future of the Club. Dick will be missed but he is still a Club member and continues to operate QRP from his retirement community. Our best wishes go to Dick and his wife Daphne.

Also changing, is our Treasurer. **Graham, G3MFJ**, has given notice that this will be his last year in the role. Graham's on-going eye-sight condition is increasingly difficult for him to work with spreadsheets. We therefore need someone who is comfortable with numbers, preferably who has done a bit of book keeping in the past. The idea is to work alongside Graham this year so as to make the transfer next year as smooth as it can be. We are not looking for a qualified management accountant, just someone who can keep track of money in/money out, and pay the bills. Due to some of the external connections it needs to be a UK member.

Interested? Then please drop me an email and I can explain more about what is required.

Steve Hartley, G0FUW (Chairman)
email: *g0fuw@gqrp.co.uk*

Easy 60m addition to an 80m OCF

Bill Tracey GM4UBJ email: gm4ubj@aol.com

My 80/40m off-centre fed (OCF) dipole is an efficient aerial albeit low and bent to fit in to my garden. My daily 80m sked at 13:30 has had to move to 60m as the solar cycle progresses and the Nvis signals were impossible on the 80m band. (GM to GM and GM to G all within about 100km)

Unfortunately for me on 60m the 80/40m OCF was found to be woefully inadequate with the tuning unit eating up most of my poorly propagated RF.

I have a high local noise on the low bands so getting low noise from the OCF on 60m was a sure sign of a poor performance, confirmed by poor signal reports

My OCF aerial is U shaped as I squeeze it in to the available space and farther away from the local noise source. Of course the aerial is better suited to being flat top and in a straight line so like most amateurs I need a bigger garden !

To be clear about my existing feed arrangement, I have about 40m of Westflex 103 feeding my auto atu, from there we have another 15m of RG8X to a telescopic mast in the bottom corner of the garden. So this is a coax fed 80m OCF dipole with a 4:1 balun at the feed point and a total of 55metres (180 feet in old money) of coax.

To get the aerial to perform more efficiently on 60m the addition of a single wire connected in parallel to the long side of the OCF will effect a solution .

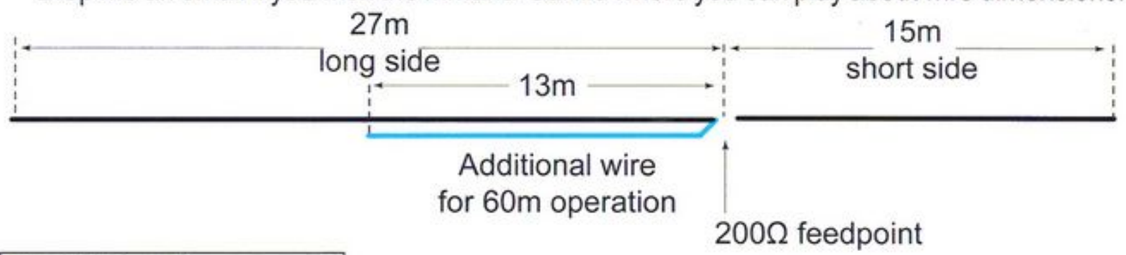
On the opposite side of the feed point no additional wire is required as the existing OCF short side wire operates as the other side of the 60m dipole .(not quite the correct dimensions but close enough)

By simply adding around 13.5m (45 feet) and hanging approx 10cms (4 inch) or so below , I use open wire feeder spacers and then connecting this wire together with the long side of the OCF to the feed point at the balun

I modelled the additional wire initially on Mmana-Gal ,this allowed me to alter height above ground , wire length , spacing etc

Your aerial setup will be different but by a bit of experimentation I`m sure you will be able to get much better 60m performance from your existing 80m OCF by the simple addition of the extra wire

Drop me an email if you wish the Mmana-Gal file where you can play about wire dimensions.



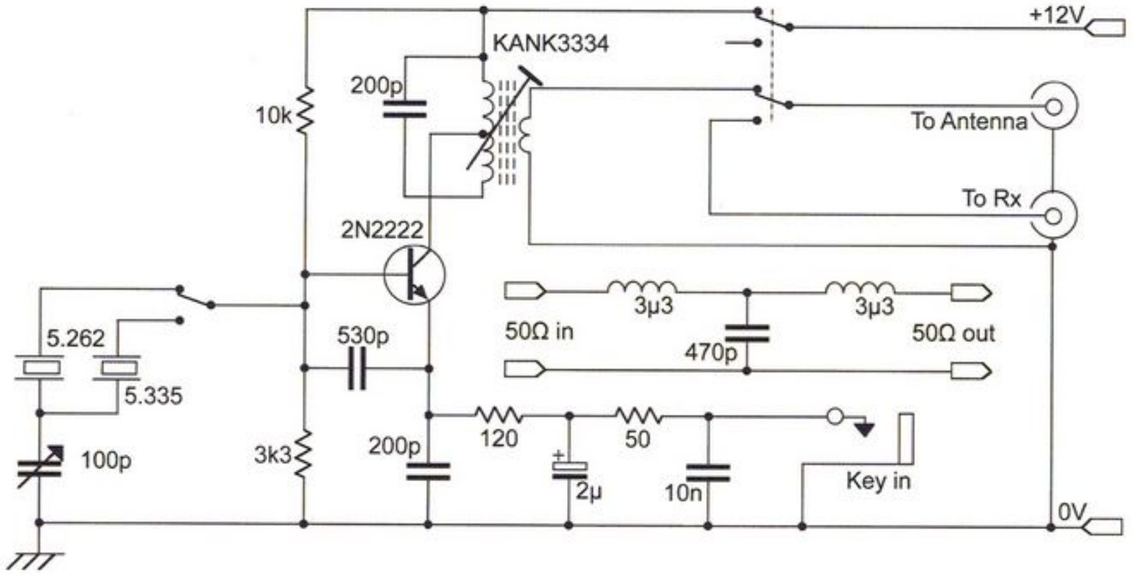
My SWR readings are	
3.650MHz	1:1
5.301MHz	1.5 :1
7.15MHz	1.8:1

65 Kirkland Street, Motherwell, ML1 3JW

QRPP VXO Transmitter For 5MHz

Kevin MW0KXN email: mw0kxn@gmail.com

This all began for me with a fortuitous QSO with Steve, G4ALG, on 2m CW. Steve's QRZ page has a link to a 'Home made 40 mW transmitter for 5MHz' with the circuit diagram and accompanying notes.



The circuit seemed simple enough to construct and included some nice features: a key click filter; combined antenna and power switching to prevent me from transmitting without an antenna; and switched crystals. Something caught my imagination and the project was laid out with room to experiment, or at least there was room until I put the sides on! It worked on the first power up and my second QSO was with Steve, the creator.

Flushed with success I sent a photograph to Graham, G3MFJ, thanking him for running the club sales, and letting him know that the crystals that he supplied had been put to good use. I wasn't expecting him to ask me to write an article for SPRAT!

I encourage you to have a go at building this circuit. Using a single small-signal transistor and a handful of other parts, you can build a QRPP transmitter capable of making short wave radio contacts over a significant distance.

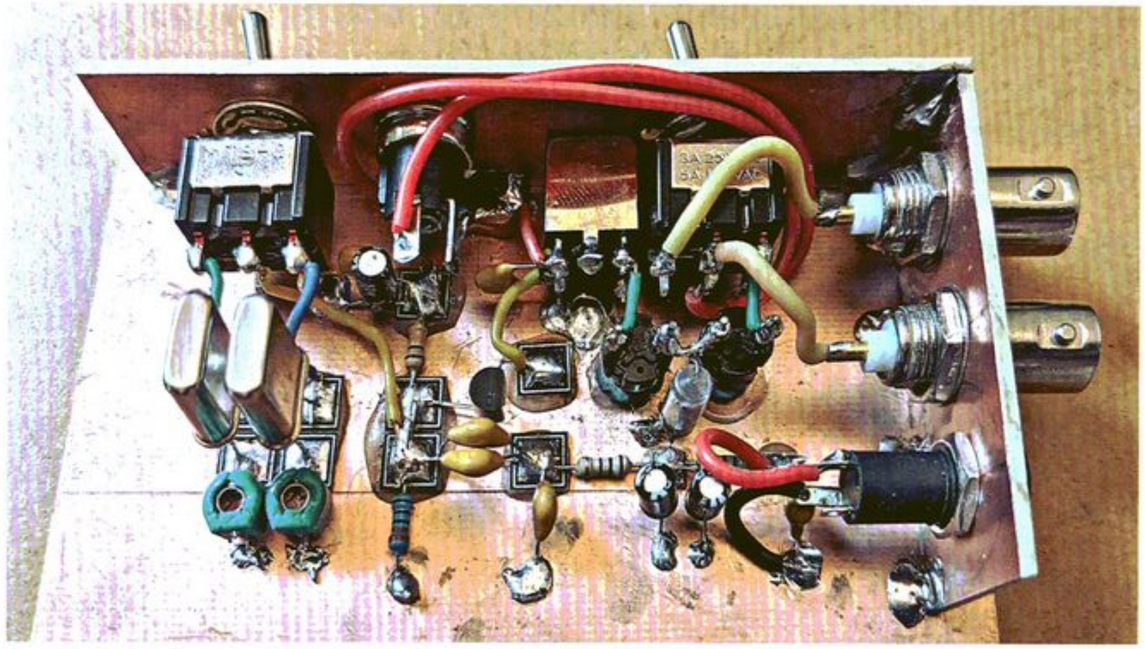
It can be used with your home station as the receiver which will provide a sidetone when transmitting, conveniently identifying your frequency. I used component values that I had to hand. Substituting a 100 ohm resistor in the key filter circuit increased the emitter current to around 15mA, giving about 60 mW output with no apparent adverse effects, looking at the datasheet I believe that this is probably close to the sweet spot.

The 530pF and 200pF capacitor values are not critical, I am using 400pF and 200 pf. Adjusting the Toko coil slug for maximum output, gives a fast and reliable startup of the oscillator. At maximum output power the 2nd harmonic was about -30dB and the 3rd harmonic about -40dB. Be aware that it is possible to set the Toko coil to a position which prevents the

circuit from oscillating, and my batch of 2N2222 transistors have the pins reversed.

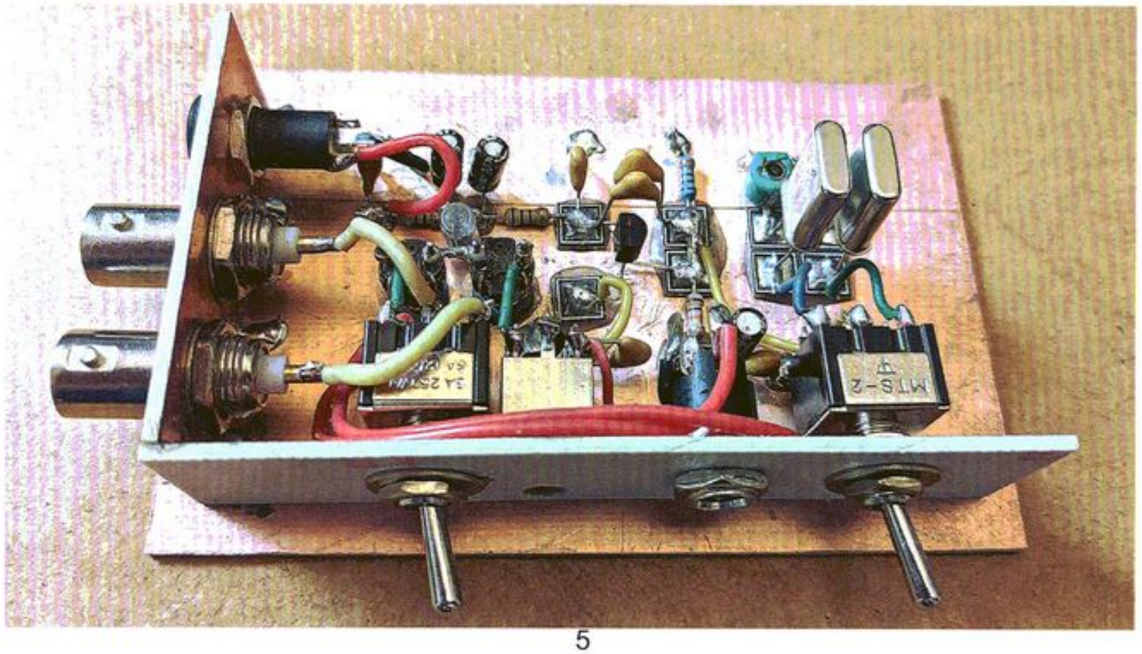
Low-Pass Circuit

Elsie, the wonderfully easy to use electrical filter design and analysis programme, produced a LPF design with components that I had to hand. Shown highlighted in the circuit diagram. With the LPF the 2nd harmonic is down to about -47dB at the expense of about 1dB insertion loss.



I am indebted to Steve, G4ALG, for sharing his design, providing encouragement and support, and giving me permission to share this in SPRAT. This little circuit has given me hours of fun and has been hugely instructive. It is easy to build and a pleasure to use.

My best regards, Kevin Nicholls MW0KXN



How I Got On To 23Cm Cheaply

Peter Parker VK3YE email: parkerp@internode.on.net

The microwave bands have long been a niche interest amongst amateurs. Most have been happy to leave them to those with high-grade test equipment or the skill and patience needed to construct precision equipment and antennas. Some commercial amateur transceivers feature 23cm capabilities but they tend to be the more expensive types beyond the budgets of many.

However there are cheap ways to get going on 23cm. Here's how I started. I hope it inspires others to get active on this fascinating band.

Step 1: Research local activity

Some areas have little or no 23cm activity so it's worth familiarising yourself with local 23cm happenings before making a significant time or money investment. I was encouraged by there being a beacon in my city. Initially I had to travel near it to hear it but when my receiving equipment improved I could receive it from home (about 30 km away). Local microwavers may have regular activity sessions or monitor certain frequencies on 2m or 70cm where there's usually someone around who you can arrange tests with. They will often have an email group or Facebook page to coordinate activity.

Step 2: Receiving equipment

You may have an FM scanner that tunes up to 1300 MHz. If you do then you're in luck. If you don't the cheapest way to get receiving capability on 23cm is to purchase a USB RTL-SDR and run the free SDR Sharp software on your laptop.

Not all RTL-SDRs are equal – there are a lot of non-genuine ones out there. They may work for the lower VHF bands but on 23cm you want good frequency stability, especially if you wish to receive SSB signals. This means getting a genuine type with a TCXO to ensure good frequency stability. You will also need a USB plug – USB socket extension cable so the RTL-SDR can be placed near or at the antenna feedpoint.

Step 3: A receiving antenna

The small whip antennas that come with cheaper RTL-SDRs aren't any good. Instead you need to make one that's optimised for 23cm. My favourite is a bi-quad as described at :
https://vk1nam.wordpress.com/2017/12/27/construction-of-a-23cm-1296-mhz-bi-quad-antenna/

This is basically two 1 wavelength loops wired in parallel across an SMA socket. An SMA male – SMA male adapter can connect this to your RTL SDR.

The first three steps will give you a surprisingly good multimode reception capabiltiy on 23cm. Listen for signals such as any nearby CW beacons or a pre-arranged test with another amateur. You might want to try a crossband contact where you are listening on 23cm but transmitting on another band.

Your location choice is critical to success. Anywhere with a good view is recommended, such as a hilltop or even a small mound overlooking a river, lake or beach. If you are not in a deep valley you may have success receiving from your roof or balcony. Unless very thick feedlines are lossy at 1296 MHz, so I suggest mounting the RTL-SDR right at the antenna and using a USB extension cable going down to the computer.

Step 4: Transmitting equipment

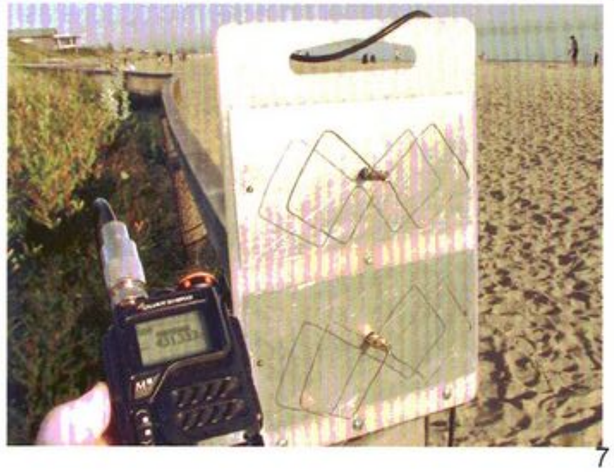
Assuming you're not going to get something with a direct 1296 MHz output, you'll need some form of exciter that generates a signal that can either be converted up or multiplied to 23cm. The former is the best approach as it works for all modes. A portable transceiver such as a Yaesu FT-817 and a small transverter is a popular option, with kits for the latter being available.

What if your tastes are even cheaper? Provided it can do fine enough channel steps, you could take a 432 MHz transceiver and put it through a diode frequency multiplier to get a signal on 1296 MHz. This would work for CW, AM and FM but not SSB.

Frequency multiplication was popular up to about the 1980s with the British company Microwave Modules making triplers for this purpose. These were completely passive, getting surprisingly high efficiency from high power varactor diodes. The MMV432 produces a 432 MHz signal from a 144 input while the MMV1296 produces a 1296 MHz signal from a 432 MHz input.

Few of these multipliers are likely to be in active use today. This is because 70cm equipment is either cheap and/or incorporated in gear for 2m. And ardent 23cm enthusiasts will be using either dedicated transceivers or a transverter to do all modes.

My 23cm journey actually started by purchasing a MMV432 at a hamfest for a few dollars. Already having 70cm gear the only way this could be useful was to convert it to 23cm. Most of the parts used could still be used on 23cm though I had to move the position of the tubular trimmer capacitors and varactor diode by drilling extra holes in the case. Also inductors had to be changed from coils to straight pieces of wire with spacing between other parts dictating their length.

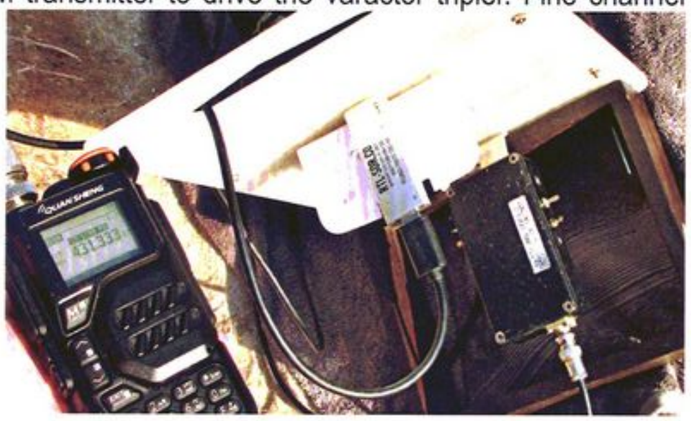


Possibly the trickiest job was making a low value coupling capacitor from two facing pieces of tinplate soldered to two of the tubular trimmer capacitors. It's supposed to be 0.5pF but my effort was pure guesswork and I'm unaware of the tripler's efficiency. However unlike tripler builders in the 1970s we do have SDRs to aid with adjustment. With the gain wound back on *SDR Sharp*

I was able to align the tripler (when connected to an antenna) for maximum output on 1296MHz and a null on the unwanted second harmonic at 864 MHz. More details of how the tripler is modified appears here:

https://www.youtube.com/watch?v=t_C7md_50Nk

You could use any 5W 70cm FM transmitter to drive the varactor tripler. Fine channel steps are desirable to be right on frequency. I used a Quansheng UV-K5 handheld with the IJV 3.13 firmware. The latter gives extra and very useful functions including improved menus, finer channel steps, CW transmit, AM transmission and even a form of double sideband transmission. More adventurous builders have reportedly modified the UV-K5 to transmit and receive directly on 23cm so this is something you may wish to investigate if you want something self-contained without the tripler.



Step 5: A transmitting antenna and case

Transmit/receive switching is difficult at 1296MHz without incurring losses. But the antennas are small. So I though it best to have a separate transmit antenna permanently connected to the tripler. This was another bi-quad identical to the first. A large kitchen chopping board is used to mount the rectangular reflectors (cut from a baking tray) as well as mounting brackets for the RTL receiver and the transmitter tripler.

The assembly needs some sort of base so it can be put on a ledge, or, if you prefer, a tripod. It is desirable that it can be tilted 90 degrees to change the antenna polarisation from vertical to horizontal if required. The two leads coming from this assembly are the USB connection to the laptop computer (for the receiver) and the cable to the transmitter (for the transmitter).

Despite the proximity of the receive to the transmit antenna I have so far not damaged my RTL-SDR. However you will hear yourself coming back through the receiver with audio echo caused by the SDR's delay. This is minimised if you reduce the receiver's volume before transmitting. If people report distorted audio on FM just speak further from the microphone as deviation will be tripled.

Results

I'm unaware of the output power on 23cm but it will be QRP, with 5 watts on 432 MHz going in and the tripler having a maximum efficiency of 50% (but likely much less). This is due to compromises including uncertainty over the 0.5pF capacitor and me using the same varactor diode as the original 432 MHz tripler (which has higher than desirable capacitance).

Notwithstanding these likely losses, I've had good signal reports over distances up to about 70 or 80 kilometres while transmitting from a lookout overlooking a bay. This includes 9 contacts in a recent microwave activity day. A video of this is here:

https://www.youtube.com/watch?v=MwbWnB6sHJM

G-QRP Convention & Telford Hamfest 2024

Saturday 31st August and Sunday 1st September – Venue: Harper Adams University Campus, near Newport, Shropshire

- Lots of car parking on site
- Overnight bed and breakfast accommodation available at very reasonable rates
- Date: 12:00 (TBC) Saturday 31st August to 15:00 Sunday 1st of September
- Saturday will include a Buildathon and social gathering with buffet supper. We also hope to arrange a bit of an antenna shoot out; Dipole or Doublet, Vertical or EFHW?
- Sunday will have 3 QRP talks and all the usual Hamfest attractions; Club Sales, trade stalls, Bring & Buy, boot sale, raffle
- Buildathon project looks like being a 5W CW transmitter, and will be around £10 per member. Non-members will need to join if they want to take part

Talks on Sunday 3 September:

- Something About Antennas by **Phil Miller-Tate G1GWZ**
- Something About Kit Building by **Hans Summers G0UPL**
- Why is the T41-EP Different than other Inexpensive SDTs? by **Jack W8TEE** and **Al AC8GY**

If you are attending, make sure you bring your membership number with you as you will need it to claim some anniversary freebies!

Advance bookings for overnight rooms, the social supper and the Buildathon will be via Club Sales; check exact costs and availability with g3mfj@gqrp.co.uk before sending any money.

We intend to stream the talks live via Zoom, and make them available via our YouTube channel at a later date. Booking for live remote access will be via Eventbrite. Tickets will be £5

.

Full details about the Hamfest, the location, how to get there, etc, are here:

http://telfordhamfest.org.uk/

Please note: the venue is 9 miles north of Telford and there is no direct public transport from Telford railway station. You either need to arrange for another member to pick you up, or grab a taxi. To be a UK member. If you are interested, please drop me an email and I can explain more about what is required.

I am very much looking forward to our 50th Anniversary Convention, which will run in conjunction with the Telford Hamfest on Saturday 31 August and Sunday 01 September. Details are elsewhere in this SPRAT, and on the Club website. I hope as many of you as possible will attend.

Steve Hartley G0FUW
g0fuw@gqrp.co.uk

VHF Managers Report

John Beech G8SEQ e-mail: john@g8seq.com

Using QRP with satellites

Orbiting Satellites Carrying Amateur Radio (OSCARs) can extend the range of your VHF/UHF operations for very little cost. Or if you are lazy you can spend £s on ready made equipment. This article was prompted by **Keith G7FSC** when he had recent success in working through the ISS repeater.

A couple of years ago at Coventry AR, we had a club project to build a suitable antenna for satellite ops.. This consisted of a three element yagi for two metres and a seven element yagi for 70 cms with the elements mounted on a common boom at right angles to each other. The boom was made from one inch square (25 mm) wood with hacksaw slots and self tapping screws to locate and hold the elements to the boom. The elements were cut from 10mm angle aluminium stock as sold by B&Q & the like. Total cost about £5.

The commercial version antenna, an Arrow model 11 146/437-10, that **Keith G7FSC** used is all aluminium and neatly screws together and also has a diplexer built into the boom, under the handle.

The radio: you can use either a single hand held which is capable of listening on 70 cms and transmitting on 2m or two separate hand helds. The former needs a diplexer but the latter just uses two feeders. The latter system has the advantage that you can hear your own signals coming back via the downlink as you are transmitting. **Brian G8GMU** has made several contacts using this system over recent years.

Antenna

Arrow: Model 11 146/437-10 handheld portable satellite operating with up to 10W transmit.

2 Inline gamma matches for 2m and 70cms

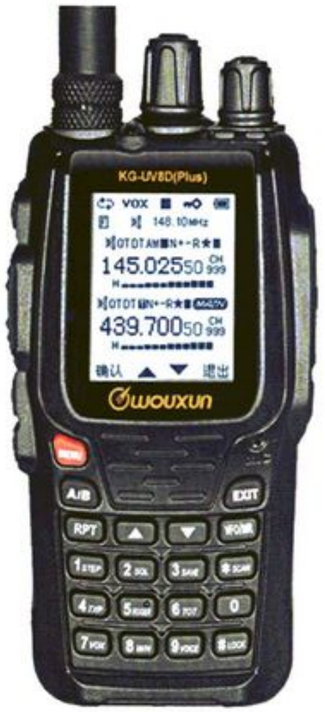
3 Element VHF and 7 element on UHF.

With a Duplexer installed in the boom.

A homebrew version of the antenna is to be found at:

http://www.andrewphotographic.co.uk/g8gmu3.htm

Keith on the other hand has only recently started operating and managed his first QSO at the third attempt spread over several days. Here is his comment on his first contact: "Just recieved a '59' report from a DK9 station via the ISS. Forgot his suffix in the excitement. It can be done from the back garden"



Radio

Wouxun KG-U88D dual band 2m-70cms dual watch. It has an output of 5W.

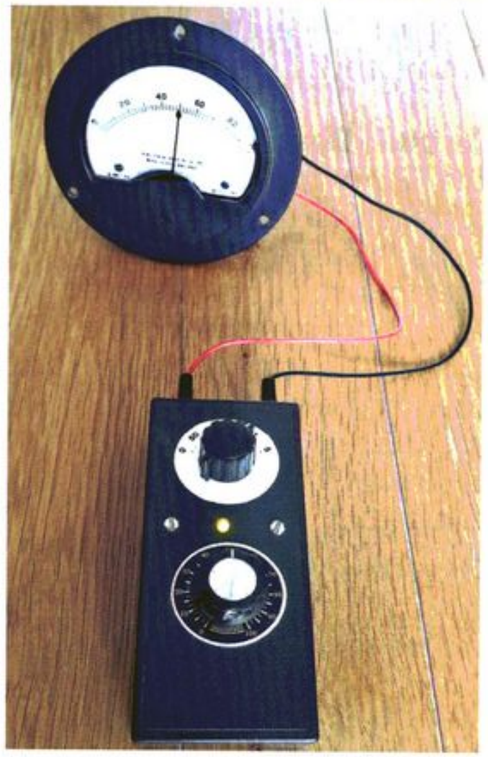
And by setting the tuning increment set to 5kHz, allows frequency adjustment to follow doppler shift.

With a smart phone App to give details of satellite pass called 'Heavens Above' along with a mapping application set to give your global position.

124, Belgrave Road, Wyken, Coventry CV2 5BH. Tel. 07858 777363

A Portable Tester For Moving Coil Meters

Chris G3XIZ email: g3xizchris@gmail.com



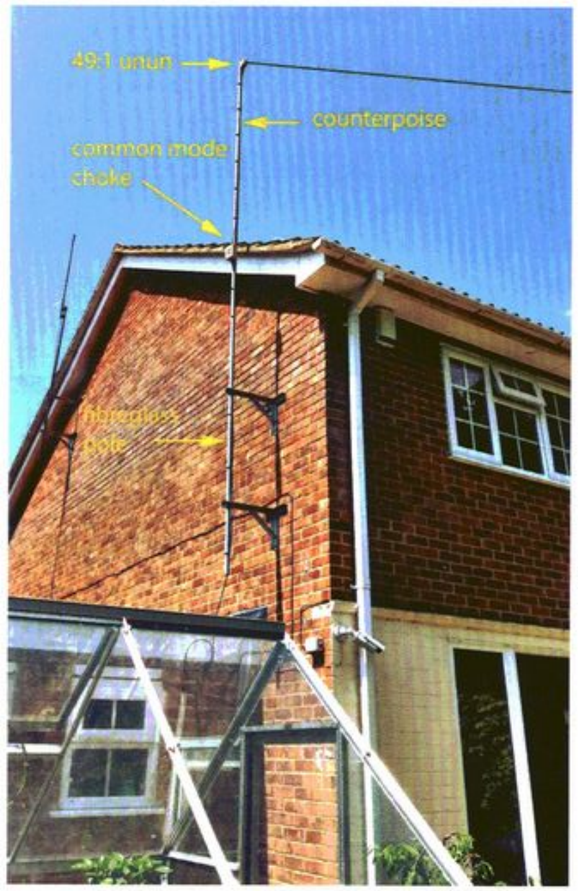
Many of us old (and not so old) hands still prefer a moving coil meter to a digital one for many applications. Before inserting a meter into one of your projects it is as well to give it a comprehensive test to ensure that

- it works
- it has the full scale deflection that you expect
- the pointer doesn't stick as it is slowly swept across the scale.
- its response is reasonably linear

Also when buying meters at a radio rally or club junk sale it can be most annoying to find on returning home that they are defective, so a quick and easy means of testing them on site could prove useful. The unit described here is compact, portable, uses readily obtainable components and will take the guesswork out of using and buying moving coil meters.

A Multiband HF Aerial For Small Garden

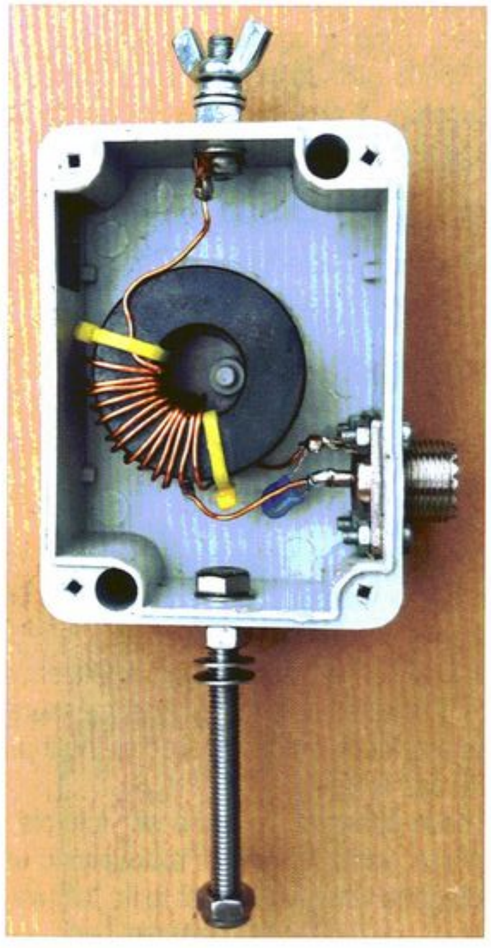
Mike G8GYW email: g8gyw@dunstan.uk



Our back garden measures 20 metres long by 12 metres wide. It is my wife's pride and joy and I am banned from erecting any towers, beams or centre fed antennas with dangling feeders.

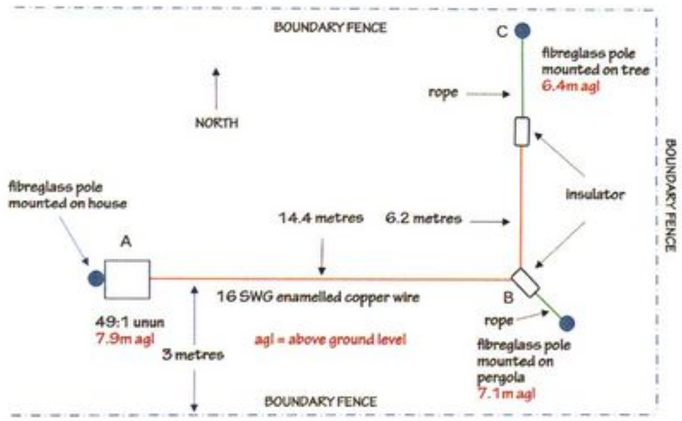
My options are therefore limited to a random length end fed wire or an end fed half wave. After some research I decided the latter would provide the best performance on four bands (40, 20, 15 and 10m).

A conventional half wave dipole has a source resistance of around 80 ohms (depending on its height above ground). If the source is moved towards the end of the wire the resistance increases and there is a point at approximately 10% from the end where it becomes around 2450Ω. The significance of this number is that it can be matched to 50Ω coaxial cable with a 49:1 transformer, known as an **unun** (unbalance-to-unbalanced transformer).



Conventional wisdom has it that these should be wound with the primary twisted around the secondary and a crossover turn halfway along, but in reality a simple autotransformer works just as well with 14 turns tapped two turns up. A 100pF 3kV ceramic capacitor across the primary reduces the loss at higher frequencies (*see photo on the right*)

I experimented with a number of different type 42 cores and concluded that the most efficient for this application was a Fair-Rite 2643251002. (If you are interested, you can find details of my measurements



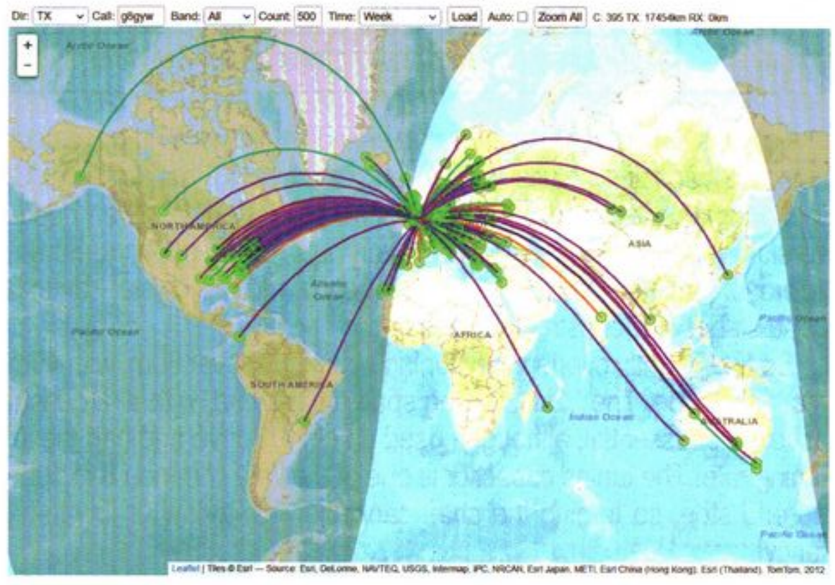
in the October 2023 issue of *Practical Wireless*).

Simulating the antenna using EZNEC and AutoEZ gave the lengths of the short and long wire elements as 2m and 20.6m respectively. As my garden is too short to accommodate this in a straight run I bent the long wire at a right angle as shown in the drawing. The function of the short wire (sometimes called the counterpoise) is performed by the outer of the coax running vertically down from the unun as shown in the photograph.

Because the counterpoise forms part of the antenna and radiates, the supporting pole must be non-conductive. I used a 6m x 38mm fibreglass tube mounted on the house wall. The unun is bolted to the top of the pole and a common mode choke is attached below the 2m length of coax. The choke defines the length of the counterpoise and prevents RFI from reaching the shack along the outer of the coax. The coax is attached to the pole with Scotch 33+ tape, which unlike most cable ties is UV resistant.

The intermediate support is a 6m x 32mm fibreglass tube attached to the leg of a wooden pergola while the end support is another 6m x 32mm tube strapped to a tree trunk. All three poles have a 1m long wooden dowel inserted at the bottom of the tube to provide rigidity at the mounting points and a plastic cap at the top to keep the rain out.

I made the wire slightly longer than the calculations suggested and folded the end back on itself to ensure I had enough adjustment range. If the antenna is made to resonate at 7.1MHz then the frequencies of the harmonics will be too high. This can be corrected by inserting a capacitor in series with the wire, but this required too much experimentation to get the position right so I adjusted the fundamental resonance to be 6.9MHz which brings the SWR of the harmonics down far enough for my transceiver's internal tuner to match. The graph shows that the simulated and measured SWR in the shack are very close.



SWR is not an indicator of an antenna's efficiency so I ran a 200mW WSPR transmission and the resulting plot is very encouraging for such a simple installation.

W32KENDER-RX.

PhilipG4HOJ email: G4HOJ@yahoo.co.uk

Another 3 Band, 2 Valve Receiver

(for Valve Weekend use?)

So, I continue dabbling with simple(ish) valve receivers (I know.....on and on and on!) and I felt it necessary to bother you with this one – initially designed just for the CW segments of 80m, 60m and 40m.

I call it the "Weekender" (well, the mutilated version) because this RX could work very well alongside a simple valve transmitter for the internationally famous, casual operating, GQRP Valve Weekends and it offers three bands - achieving good performance from just two valves. This receiver is a basic superhet and, like my EAT32 design, it employs a version of my self-detecting oscillator design as a tuneable IF at its heart. I know it is might be a bit niche but.....

Circuit Description

I use the hexode of an ECH81 (great valve with high imp. input - useful for simple RX ideas) as a self-oscillating freq. converter. The easily-obtainable crystals provide band-segment conversion to the I.F frequency and the wide-sweep (3.2MHz to 9MHz or so) grid input tuned circuit is quite selective. I use half of another good workhorse, an ECF82, as my self-oscillating detector, tuning a narrow I.F. band.

The crystals used in the mixer provide the following coverage:

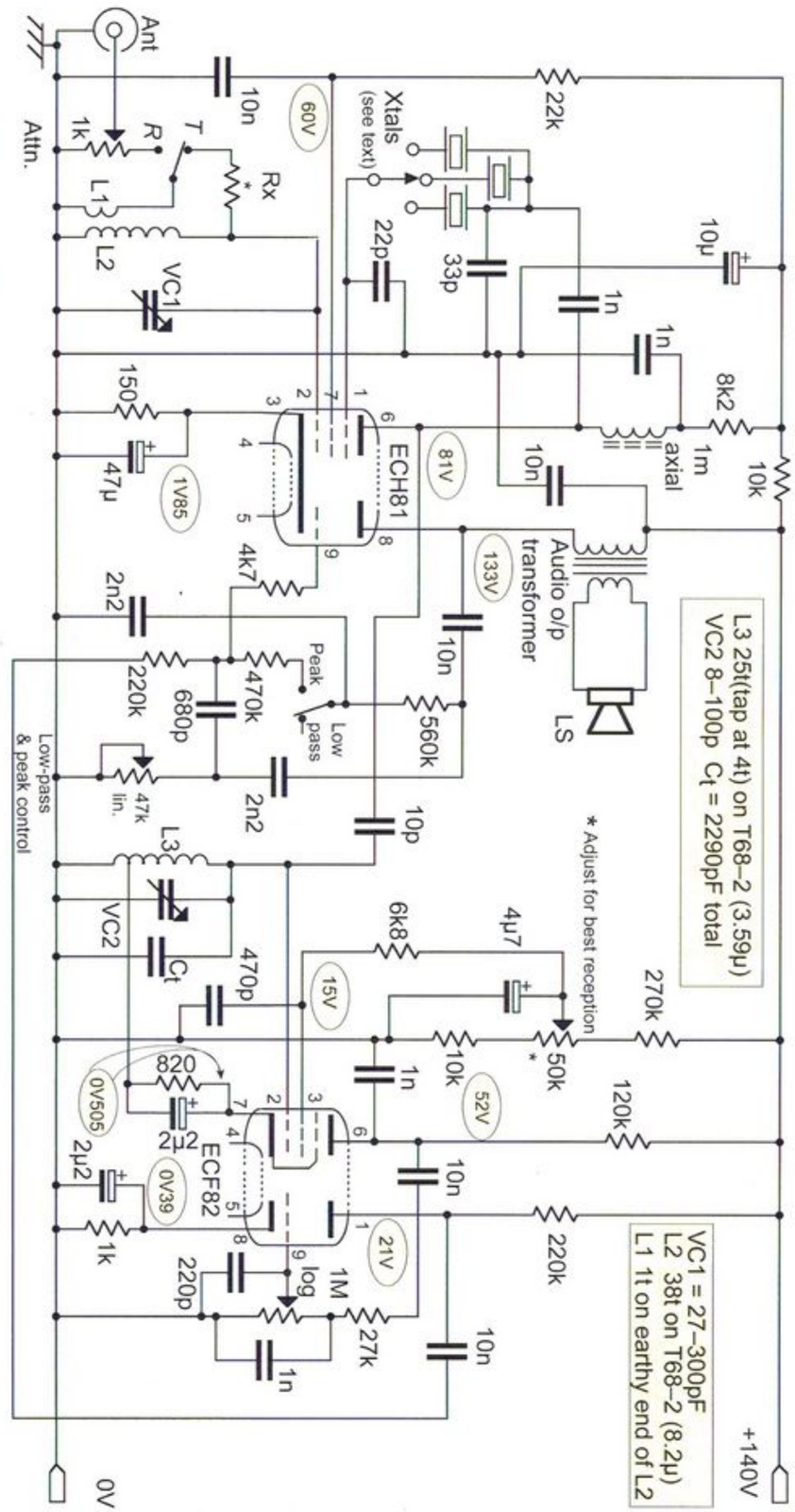
BAND	Xtal Freq.	I.F. 1.750 – 1.718MHz		*Note*
80m Low	5.262MHz	3.512MHz	3.544MHz	*Reverse Tuning – 32KHz tuning range*
80m High	5.290MHz	3.540MHz	3.572MHz	*Reverse Tuning*
60m	7.000MHz	5.250MHz	5.282MHz	*Reverse Tuning*
40m	5.290MHz	7.040MHz	7.008MHz	*Forward Tuning*

I always use low-reactance value tuning components in my detector/oscillator - in this case, standard capacitor values in parallel to achieve to total value of C_t (then squeeze/separate toroid turns to reach required tuning end points) - didn't even need a trimmer capacitor! This version of my 'receiver heart' works very well, giving good, hum-free, conversion gain and this approach, with the low I.F. tuned frequency and the crystal-controlled converter, means very good stability...if constructed sensibly.

So two, slightly overlapping, tuning segments cover 80m, with 40m being the band-image on the higher one. The 32kHz tuning span means that, with a large(ish) tuning knob, a reduction drive is not essential, although I used an old 6:1 drive and had the luxury of an 11KHz per turn tuning rate! The tuning capacitor is one of the very common 8 to 100pF surplus types that have no end stop, so turning the shaft can tune high-to-low or low-to-high, whichever takes your fancy!

I use the ECF82 triode as an A.F. preamp, then feed the signal fed back to the ECH81 triode output stage to achieve good loud speaker volume. I used the prototype RX for a while just with my h/b CW resonant speaker, which worked quite well, but then added a version of my tuneable 'knee' low-pass and mild peaking network around the output stage.

The ECH81 requires 6.3V @ 300mA and the ECF82 6.3V @ 450mA. ECH81 HT current is about 13.5mA and the ECF82 detector/ preamp only asks for a quite frugal 1mA or so. I always use separate power supplies and built one with 6.3V and 140V HT outputs (HT not overly critical) and, as usual, connect with a flying DIN plug and a socket on the rear of the receiver. BTW, in an attempt to be unusually helpful, I have indicated a few measured voltages on the schematic.



Circuit of the W32KENDER-RX

Variations

I show a very simple (but effective) transmit/receive system is shown on my diagram. A switch (or relay contact) disconnects L1 from the aerial input and connects it to resistor Rx, in effecting connecting it to ground. A value for Rx is chosen that will heavily damp the input tank to leave just sufficient RF pick-up from the transmitted signal to allow comfortable monitoring - a temp. 1K variable R was useful for me to find a suitable value. Omit that switch and resistor if monitoring is not wanted.

My often used negative feedback audio-tailoring idea works well, especially for such little complication. With the switch set to "PEAK", the potentiometer provides CW signal peaking across a range of pitches. When set to "LOW PASS", it allows the operator to vary the "knee" frequency at which top-cut begins. The switch and 560K/470K/2.2n components can be omitted if peaking is not required (e.g., no interested in CW!). Of course, the variable low-pass response is not essential but I do strongly recommend keeping that function.

Yes, you are right: tuning the I.F above 1.750MHz, the harmonic will beat (quite loudly) when tuning the 80m and 60mbands but for wider 80m coverage from just one crystal, the I.F can be tuned lower (e.g., the 5.262MHz xtal can be used to cover the whole 80m CW segment by altering tuning component values to extend down to 1.692MHz). OR, a simple two-band version might just use the 5.290MHz xtal to cover 3.540 to 3.572MHz and 7.008 to 7.040MHz by band-imaging without switching.

Also, using a 3.579MHz xtal, it may be possible to cover 1.829MHz to1.860MHz?...but I didn't try this...and a 3.540MHz xtal could mix from the low end of the 60m band....but I couldn't find one to test!

Something for the W32KENDER – Version 2

Finally, what if CW-only isn't your thing? Well, simply by changing the crystal frequencies and tuneable IF frequency range, full-band coverage can be achieved, as per the original EAT32 receiver:

BAND	Xtal Freq.	I.F. 3.053 – 2.753MHz		Note
80m	6.553MHz	3.499MHz	3.80MHz	*Reverse Tuning – 301KHz tuning range*
60m	8.192MHz	5.138MHz	5.439MHz	*Reverse Tuning*
40m	10.00MHz	6.946MHz	7.247MHz	*Reverse Tuning*

This version does really require a reasonably good reduction drive should be used for the tuning capacitor because of the 300KHz tuning span from the half-turn of the capacitor. I used an old Muirhead drive (broken but salvaged - I think around 40:1?) for this prototype test, giving around 15KHz per revolution.

For my speed-wired prototype, I used an old variable capacitor which should have been around 365pF max but one of the 16 original moving vanes is missing. This measures around 347pF max to 12pF min. Again fortuitously, I used 1000pF plus 430pF fixed capacitors for Ct and a T-68-7 toroid with 17 or 18 turns [measures around 1.88uH – as usual, very low reactance], and tapped at 3 turns, to achieve almost exactly the IF tuning range required – just a little squeeze and spread of turns to get spot on! You will need to do a couple of calculations to arrive at suitable Ct and inductor values for a capacitor from your junk box and you may also need a trimmer capacitor across Ct to align things exactly?

Results

More of my receiver design experiments but, have a little respect for the higher voltage, build sensibly and these receiver versions will work very well for either CW-only or full-band coverage. They are stable and give very good results, especially considering the relatively low component count and simple(ish) design. Crystals for either version are readily available on the 'Bay, the valves are common and many other components will be in a reasonably well stocked junk box.

A final note: I have used my, I think unique, detecting-oscillator, "receiver-heart" in several of my published RX designs and some readers email me from time-to-time to ask about that "adjust-for-best-reception" potentiometer. The simple answer is: "once adjusted to the optimum point, that control doesn't usually need touching again. In all of my prototypes/proving-builds, it is a preset".

I placed a 1K pot. at the aerial input, just in case. I don't think I ever had need to attenuate the input but I guess it is just possible that if there are VERY strong stations nearby, it may be beneficial?

I know that the 'backwards and forwards' schematic of the W32KENDER might make it look a little more complicated than it is but I think it is easier to wire up than it is to draw! Have a go and let me know!

Are you hoping it's the end of variations on this theme?.....I'll try but I can't promise!

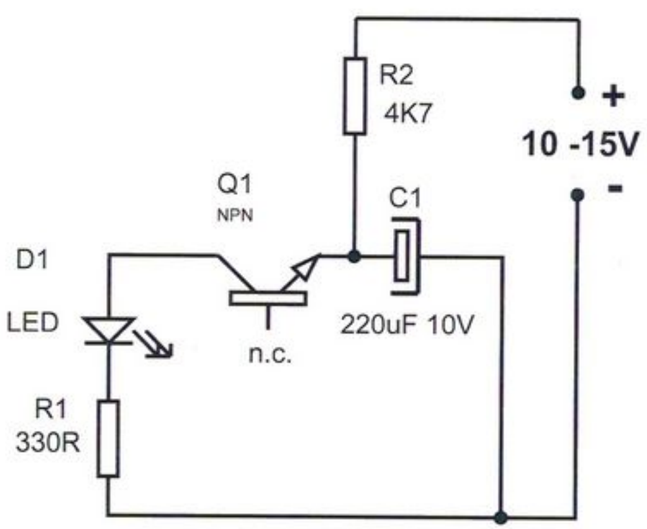
Blinkin' 'Eck – an LED Flasher

G4COE David Smith email: davecoe@blueyonder.co.uk

It's an LED flasher with just five components! Note that base of the transistor is left unused.

Transistor Q1 could be a BC107, 2N3904 or almost any small signal type NPN. Resistors R1 and R2 values are not critical. Although too low or too high it will not work. It is advisable not to make R1 too low or you'll 'pop' the LED. Reducing these resistors will increase the flash rate somewhat, but they've been OK with with as low as 47 Ohms in R1's position.

The unit will only work on 10V or more...and NO **it's not an error** sticking 12V 'up its emitter leg!'



Counterpoise Directionality

John Leonardelli, VE3IPS email: VE3IPS@gmail.com

Are two wires better than one?

Back in March 2018, I experimented with the elevated counterpoise concept. I started to use this with my compromise antennas started with the ideas of Chris and Budd at Buddipole. An elevated counterpoise will reduce ground losses and provide radiation as it is the other half of the Buddistick antenna. Many compromise antennas are the 4 to 10 foot variety.

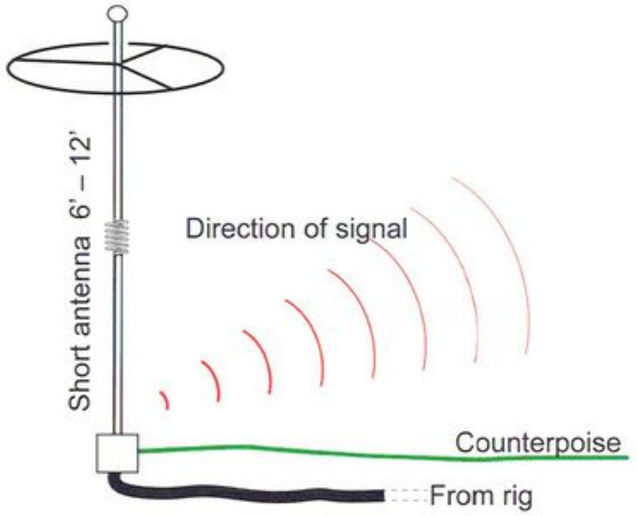
The Buddistick, SuperAntenna MP-1, REZ Antennas Ranger 80, JNC Radio MC-750, PAC-12 Homebrew, and a Chameleon (it has various variants) all offer a short antenna with multi band capability. You can add the HFJ-350M Toy Box to that as well. The key to these antennas is to have an elevated counterpoise. I have done several Field Strength Readings in the field and in a controlled location to try to understand if there is any directionality to its placement.

Using my SotaBeams WSPR, I was able to confirm that this idea does in fact work. Sometimes, I think that more signal radiates off the counterpoise than the vertical radiator itself. If true, then the vertical element acts as a reflector? Way too much mathematics for me and who cares at the end of the day. Just deploy as specified and go fill the log book with contacts.

YES I have found that there is some directionality. Not a huge amount but every few dB helps.

Towards the station

Point it towards the station you are trying to work. There is noticeable improvement in the transmit signal that it would be worth the effort to deploy the counterpoise accordingly.



I don't think I am seeing much in the way of reception of signals that I can hear but I feel it's about half an S unit. This is important with 5x1 signals and the difference can make or break the contact.

A gain of 3 dB is the equivalent of doubling or reducing by half your power which is not much but may be enough.

The key is to have the counterpoise elevated a few feet off the ground. I tried 2 feet, 5 feet and 8 feet and they all are similar. I tried resonant lengths for the frequency desired and it does work better than random lengths. Also shortening or lengthening the counterpoise affects SWR. I usually will shorten the wire to resonance then tie it off the fiberglass pole I use as the end point and go operate.

Second counterpoise

So in 2022, after further experimentation I found that having a second counterpoise at about a 45 to 60 degree angle also improves the signal by as much as 1 S unit or 6 dB. Hmmm two wires must be better than 1 right? This is like the Vee Dipole or Rhombic Dipole antenna mounted horizontally. The military found this useful in providing directionality out in the field in an easy deployment manner. I read recently, KJ6ER and his PREDator antenna that uses a full quarter wave vertical with 2 counterpoises deployed in the same manner.

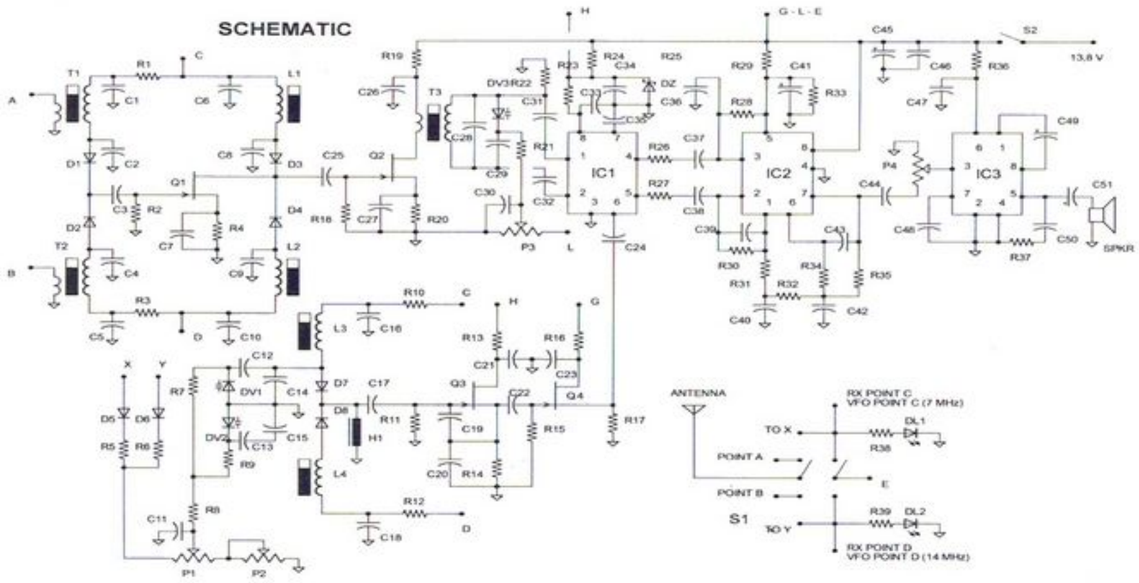
I am not alone in my experimentation and was happy to understand that he was seeing similar results. If you use 4 counterpoise wires then the antenna is Omni-directional and if you use 2 at 180 degrees it's also somewhat Omni-directional as well. With the addition of a second counterpoise there are improvements in the signals making this an easy hack to implement. The attached picture shows the addition of the second wire to the typical antenna deployment. YES, two wires are better than one.

John VE3IPS

7-14MHz DC Rx With Diode Switching

Giovanni Lorenzi, IT9TZZ, email: it9tzz@gmail.com

The basis of this receiver with diode switching was published in the September 1998 issue of Italian magazine *CQ Elettronica*, inspired by the receiver published in the *SPRAT* issue No. 69 Winter 1991. It was a direct conversion receiver whose VFO operated directly at 7MHz for the 40m range while for 20m it duplicated the signal. I wanted to revisit the project with the intent of simplifying the VFO, using a new amplifier, introducing an optimization circuit, correcting an error in the original schematic on *SPRAT* and designing a compact printed circuit board.



I don't hide the difficulties encountered, especially in revisiting the VFO, but the design phase was exciting and full of cognitive insights that made the need to have had to remodulate the electrical circuit and the consequent printed circuit board overshadowed twice.

Figure 1 shows the scheme which, in its apparent complexity, is very easily illustrated. The local oscillator, composed around Q3, is the classic Colpitts with separator buffer which guarantees maximum stability already when the device is turned on. The coils L3 and L4 come into play when points C or D are powered, alternatively. The power supply of the two branches produces the conduction of the diodes D7, D8 configured in opposition and the consequent connection of the relevant coils to the FET Q3. It is worth pointing out that when one of the two branches is activated the other remains blocked. The same physical principle is applied to the front end amplified by Q1. Note that the inductance H1 must be inserted under penalty of failure of Q3 to oscillate.

Transistor Q2 constitutes the so-called OPTIMIZER, meaning what a circuit that always guarantees the best signal to be presented to the mixer IC1 designed in a balanced version. The secondary of the T3 transformer is sized, together with C28, to tune the 14 MHz range. Through the C29-DV3 group, a further capacity is added to C28, useful for also tuning the 40 m band.

Followed by IC2 also in balanced configuration a robust amplification is obtained to obtain

a comfortable low frequency signal even in headphones.

On the far right of the circuit, the switching logic which occurs with a double pole changeover switch is illustrated. In one of the two positions one of the ranges is activated, at the same time the relevant LED lights up and voltage is sent to the potentiometers P1 and P2 which deal with coarse tuning and fine tuning respectively. The resistors in series with the diodes D5 and D6 serve to limit the voltages with the aim of obtaining the maximum limit of the frequency of the ranges, established by the band plan at 7200 kHz and 14350 kHz. The signal coming from the antenna is routed to points A and B with the parallel switch of S1.

The tuning is with varicap diodes, the one I prefer due to the small size and ease of maneuvering and setup. However, the printed circuit also includes the use of a double capacitor to be connected at the points indicated in the layout with W and Z; in this case, the components of the two varicap groups obviously do not have to be mounted.

From a construction point of view it will be necessary to wind the necessary coils. The characteristics are illustrated in the attached table. Once again I recommend maximum care in the composition of the coils because the success of the project depends on their efficiency. Take care to isolate each coil with the relevant metal shield and solder the latter to the circuit ground.

COIL	MIN µH	MAX µH	Turns & wire Dia.	Turns & wire Dia.
T1	3.6	12	6t 0.20 mm	32t 0.16 mm
T2	1.6	6.5	6t 0.20 mm	18t 0.20 mm
T3	1.6	6.5	6t 0.20 mm	18t 0.20 mm
L1=L3	3.6	12	32t 0.16 mm	
L2=L4	1.6	6.5	18t 0.20 mm	


PHOTO 1

I recommend checking the various voltages in the sensitive points of the circuit before inserting the integrated circuits into their sockets.

A note on wiring appears necessary. To avoid excessive development of exposed wires, I preferred to make some point-to-point connections underneath the printed circuit board. These connection points are indicated in the circuit with the pin holes shaded. Just to give an example, points G and H of the VFO (see bottom left section of the layout) receive power from respective points under printed board.. With the same system, once the receiver has been set up, the wiring with other points can be simplified as desired (photo left).

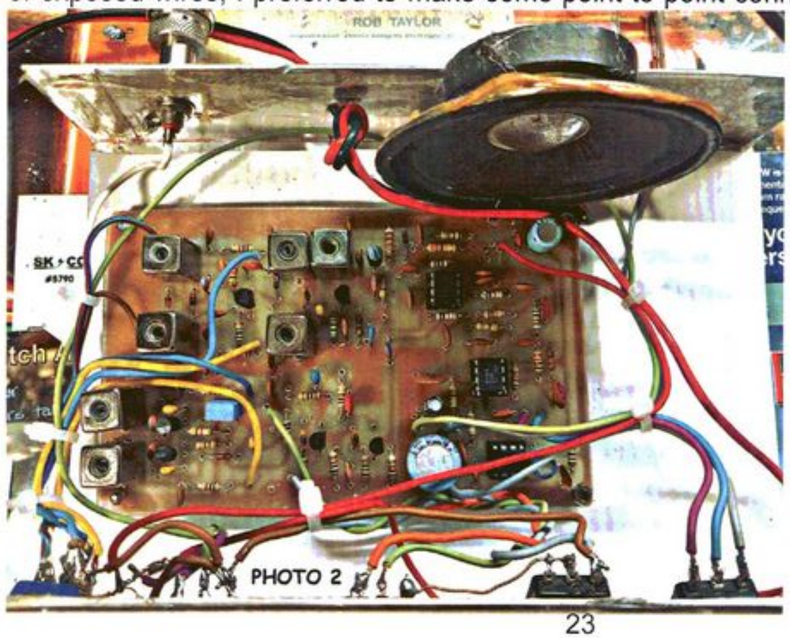


PHOTO 2

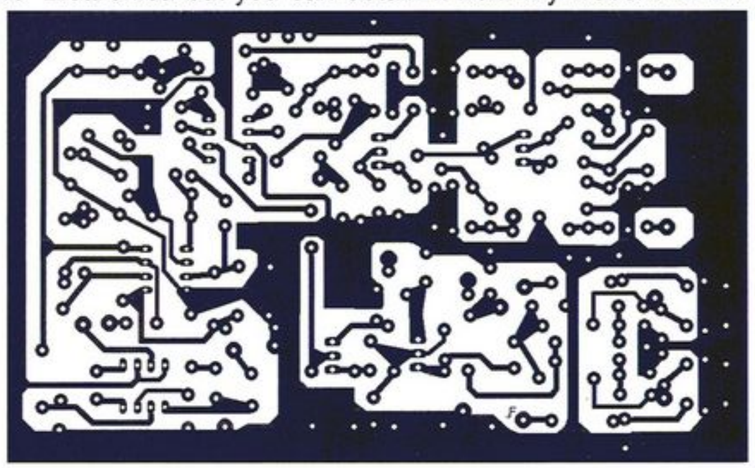
For fine-tuning it would be advisable to use a frequency counter. First of all it will be necessary to put the local oscillator in frequency starting from the 40 m band. Close the entire slider of P1, point the frequency meter to pin 6 of IC1 or C24 and adjust the core of L3 until it reads 7000kHz. Then bring the potentiometer slider to the maximum and check that the frequency read is 7200kHz. In the event that the value deviates from the canonical one, I recommend inserting, temporarily in series with diode D5, a 470kΩ trimmer and adjusting it until reading the frequency of 7200kHz. Replace the trimmer with a fixed value resistor, indicated in the circuit with R5 (R6 for 20m). With the same procedure the 20m branch will be fine-tuned where the two frequencies, minimum and maximum, are 14000 and 14350kHz respectively. On the contrary, by leaving the upper frequency limits for each band unchanged, you will be able to easily hear broadcast stations operating in the adjacent 41 and 19m ranges. This fact, for a broadcasting listener like myself, constitutes a real resource.

If you don't have a frequency counter you will have to operate with a continuously tuning receiver tracking the various signals.

Connect the antenna and select the 7MHz band. Adjust the T1 and L1 cores to achieve optimum. Proceed in the same way for the 14MHz band. With the P3 potentiometer you will easily manage the signal while also adequately limiting the noise. Finally I assembled the receiver in a self-built aluminum container which guarantees further insulation and stability (photo right).

The project is complete with printed circuit board (actual measurements 13x8 cm) and component layout. You can safely contact telemarcus@alice.it to obtain the impeccable printed circuit board of the receiver.

The superheterodyne version of the receiver was published in the January 2024 issue of the Italian magazine *Radiokit Elettronica* but you can obtain it from my website in the RADIANTISMO or TUTTE LE REALIZZAZIONI sections.
I apologize in advance for any omissions. For reports, advice and suggestions, please contact
it9tzz@gmail.com
Photographs and drawings will help in the realization. Some Youtube videos on my IT9TZZ channel will give an idea of how the device works.



PCB and overlay (not to scale)

CW 20m *https://youtu.be/8I5zxQu3zho*
SSB 20m *https://youtu.be/xhOS4VGQcJw*
SSB 40m *https://youtu.be/bVZbECgtzNs*

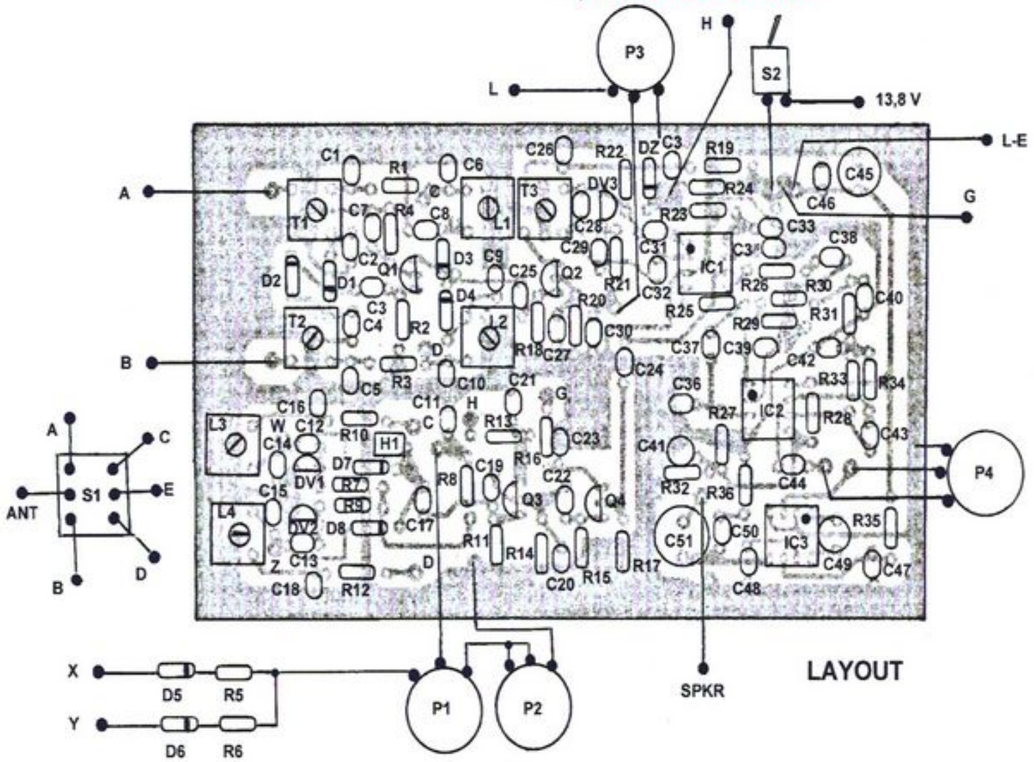
COMPONENTS
Resistors (Unless otherwise indicated, all ¼ W)
R1, R3, R5, R6, R10, R12, R14, R17, R25, R26, **1kΩ**
R2, R11, R15, R18, **1MΩ**
R4, R20, **220 Ω**
R7, R9, R21, **47kΩ**
R8, R13, R16, R19, R23, R35, **100Ω**
R22, **22kΩ**
R24, **330Ω ½ w**
R27, R29, **470kΩ**
R28, R30, R31, R32, R33, R34, **10kΩ**
R36, **10 Ω**
R37, R38, **1kΩ (Not shown in diagram)**
P1, **100 kΩ Tuning potentiometer**
P2, **1kΩ Fine tuning potentiometer**
P3, **10kΩ Optimizer potentiometer**
P4, **10kΩ Volume potentiometer**

CAPACITORS
C1, C5, C6, C10, C16, C18, C21, C23, C26, C31, C32, C33, C34, C35, C36, C37, C38, C44, C46, C47, C48, C50, **100nF**
C2, C8, C14, C20, C24, C29, **68pF**
C3, **3p9**
C4, C9, C15, C28, **33pF**
C7, C27, **2n2**
C11, C30, C40, C42, **10nF**
C12, C13, **220pF**
C17, **330pF**
C19, **27pF**
C22, **33pF**
C25, **100pF**
C39, **82pF**
C43, **4n7**
C45, **100µF Electrolytic**
C49, **10µF Electrolytic**
C51, **470µF Electrolytic**

INTEGRATED CIRCUITS
IC1, **NE612**
IC2, **TL082**
IC3, **LM386**

TRANSISTORS
Q1, Q2, Q3, Q4, **BF245 FET**

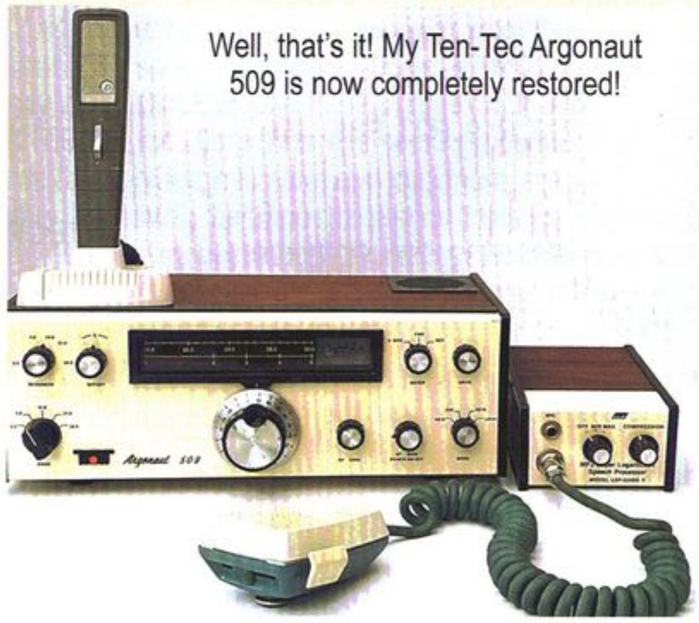
VARIOUS
T1-T2-T3-T4-L1-L2-L3-L4 , Leggi testo
D1, D2, D3, D4, D5, D6, D7, D8, **1N4148**
DV1, DV2, DV3, **BB112**
H1, **100µH Inductor Neosid (See text)**
DL1, **red LED (not shown in the layout)**
DL2, **green led (not shown in the layout)**
DZ, **Zener diode 8.2V**
S1, **DPDT switch**
S2, **Miniature switch**



LAYOUT

A 50 year old dream come true

Guy Marchal, ON5FM email: on5fm@edpnet.be



Well, that's it! My Ten-Tec Argonaut 509 is now completely restored!

On the left in the photograph, the Ten-Tec argonaut 509 itself. Sat on it, the original ceramic microphone. To the right, an MFJ speech processor of the same era, that was build in a genuine Ten-Tec enclosure.

Attached to it, an old Turner JM+3 hand mike.

I had read a presentation of the 505 in the French magazine "*Le Haut-Parleur*" in 1972 (I was 21...) and I fell in love with this small, QRP 'decametric' transceiver.

Twenty years ago, I was able to buy a box containing this 505 but in spare parts, at a flea market in Belgium. It was not complete and what remained was in very poor condition. I rapidly had to face the fact that I would never succeed in putting it back in working order.

And then, a few years ago, I found an advertisement on Internet for an argonaut 509, the following model. In fact, the one which corrected the bugs of the first edition and which had been released in 1973. I bought it and made a rapid inventory of his state: the bulbs were lighting up and I heard stations on one or two bands.

I worked on it at first to make it play again, but not all bands were operating. There was, in fact, a lot of work to do on it. I put it back on the table a week ago, taking advantage of an influenza state which forced me to... rest. Tonight, I closed the case, it was finished. This is a real page in our history which was active again

There remains to perform QSO with this ancestor with 3 W PEP out... But, for me, the most important thing was to have brought it back to life!

The circuit of this transceiver is extremely complicated, so you might as well think carefully before deciding to acquire one to undertake its restoration.

Complexity

A normal VFO includes a coil and 2 or 3 settings. In the Argonaut's permeability tuned oscillator (PTO), there are 13 coils and 17 settings. There is also a series of band filters in the transmitting path. These are under a shielding and, unfortunately, accessible from the outside. I say "unfortunately" because some owners don't mind touching it. To make an optimum adjustment of those, you must have a wobbulator. Once I tell you that you need a special plastic hex key (in inches, not metric!) and that there are two cores one above the other in the same coil holder, you will understand the level of difficulty a little more.

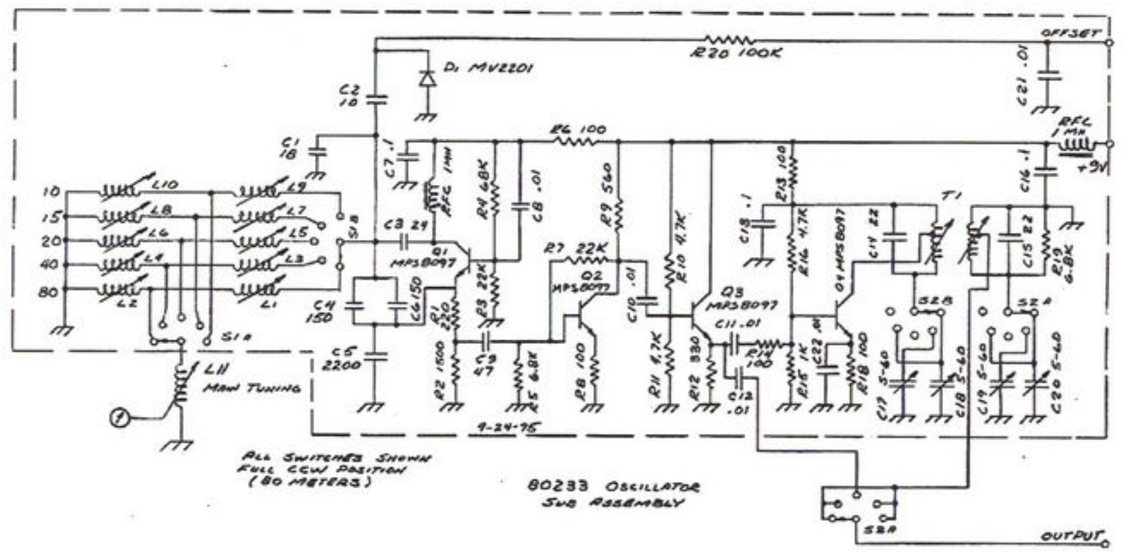
The PTO.

To show you the complexity of this oscillator directly covering all the bands I've included a section of the 509's circuit .

Heathkit transceivers also had such band filters. These cores are drilled right through and you have to access the bottom core through the hole in the top core.

There are no variable capacitors in this rig (apart from the adjustable ones), everything is done by "adjustable core" coils and a whole mechanical construction intended to ensure good synchronization, linearity and precision.

Surprisingly, some components are still available, such as the CA3053 integrated circuit (which can be replaced by the more common CA3028) or the LM380 (in a 14-pin package, however). Almost all transistors can be replaced by their current equivalent except those of the PA transistor, a PT3647 in TO39 package (like the well-known 2N3866). They are equipped with a special hat screwed from above onto a cooling plate.



Another problem that we don't think about at first: the capacitors. Not that their characteristics are particular but it is the spacing of the wires which was significantly wider at that time. There are even "Philips flags" from the 60s. There are also these excellent styroflex capacitors intended for precision tuned circuits and whose production is, today, completely abandoned.

Printed circuits are particularly resistant to the heat of the soldering iron; as much as those from Heathkit. We can therefore work on it with a 40W iron and insist on clearing certain pads. On the other hand, access to some solders can sometimes be very problematic: you have to unsolder other wires or unmount components that are in the way. Then put it back in place without forgetting any and without making a mistake. It is imperative to take as many photos as possible from various angles.

But afterwards, when everything returns to the original conditions, it is an extreme happiness. Imagine having the opportunity to walk the streets of Pompeii during its days splendour... Well, it's about the same feeling here.

Guy ON5FM

Valve QRP News

Paddy O'Reilly G4MAD email: g4mad@gmx.com

Another SPRAT, another Valve Column, and in April we had the first of this year's Valve Weekends, which attracted plenty of activity, despite variable propagation conditions.

Tim G4ARI was QRV with his Codar AT5 and managed 11 QSOs comprising of 5 QSOs on Saturday, which included two with Steve G4ALG, one on 80m and one of 160m, and the other 3 QSOs were with Alan, M0BWZ, John EI2FN and Chris G3XIZ.

On Sunday morning he made 3 more QSOs on 80 using the AT5, with Colin, G3VTT, Derek G3NKS, and Roy, G4PRL. And after sunset, another 3 QSOs, on 80m with Gerald, G3MCK, Mick, G4ZYU, and finally at 21:53 with Jean F5LCI.

Tim also spent some time on 160 calling CQ and tuning over the band, but wasn't able to make any QSOs on Sunday night.

Tim comments when he was first licenced in 1971, he was able to make QSOs in the daytime with locals on 160 and on 80, the band was always alive with inter-G activity, but not these days, which is a pity.

Cliff GI4CZW was QRV from Enniskillen. His Tx was a MK128 set giving 640mW's, with a DL93 as the PA. The heaters were fed from D-Cells, whilst a home-brew 12 to 135 V inverter provides HT from a 12V SLAB. His Icom rx played-up on Saturday but he got it going again Sunday. Weekend qrp stations worked were GM3VMB, G3XIR, G4XRV and G4ZXN.

Cliff was even on the air ahead of the weekend with the same set-up adding a further 9 QSOs to the log. Cliff said he had a great weekend, generally with good reports, including one for chirp and another for note-not-clear. The latter, he says, may be down to the HT inverter.

Chris G3XIZ reports a particularly good event with good band conditions, many of the regulars in attendance and low contest activity. He tells me it was a real pleasure for him to to hear those drifting, chirping and even a few stable T9 notes from 'real' wireless transmitters !

Chris used his home brewed 8 valve transceiver, giving 4W of RF on 160, 80, 60 and 40m and QSOs were had on each of those bands. His local QRM was slightly lower for than usual and so his valve activities continued into the following Monday, giving a total of 26 QSOs with 21 individual stations - and 13 of those were valve to valve with 11 unique valved stations, those being G3MCK, G3NKS, G3TYB, G3VTT, G4ALG, G4ARI, G4GIR, G4XRV, GI4CZW, G8ROD and M0FMT.

Derek G3NKS writes that he had another enjoyable valve QRP weekend. His tally was 14 QSOs of which 10 were with other filamenteers: G3MCK, G3VTT x2,G3XIZ, G4ARI, G4PRL x2, G4XRV x2, and G4ZXN. Six QSOs on 80m and eight on 40m. His TX is a CO/PA using two 6V6s running 5W max, with his Drake R4C as Rx plus a G5RV up at 15ft. He's already looking forward to the next one!

Rupert, G4XRV was active with his home-made 6J5/6V6 CO/PA transmitter, running 5 Watts output, to a 100ft Doublet. Receiver duties were performed by a Collins 75A-4 for all QSOs on 80m and 40m and a Racal RA17L for 60m receive. All QSOs were made using a 1940 McElroy model 600 bug key. He found 40m the busiest band and which for once didn't have any contest QRM so so he spent more time on 40m than the other bands. The photo on the previous page shows Rupert in action on 40m.

Rupert had a total of ten QSOs (5 on 80m, 1 on 60m and 4 on 40m) all of which were 2 way QRP with all but one being 2 way Valve QRP. Stations worked were G3MCK, G3NKS, G3TYB, G3VTT, G3XIZ, G4BLI, GI4CZW and G4DUC. Peter M0PJD came to operate his station for a while on the Saturday morning and he worked G3XIZ on 60m and G4APO on 40m. Rupert heard several more VQRP stations over the weekend but unfortunately not all were worked.

Rich, G0GGA reported he had limited time due to other domestic chores. However, running 5w on his homebrew Valve ART-6 (see SPRAT 198), into a small balanced delta loop antenna. On Saturday he worked G4ZNI (not VQRP), G4ALG (VQRP) & G3MCK (VQRP) all on 80m. And then on Sunday G4ALG (VQRP) but this time on 60m.

Rich was pleased to see the activity periods are getting quite busy, but, he found when he'd did get some operating time, he found the 80m QRP COA frequency was occupied. Which is good in that the activity was high. However, he could not put out a call :-(

Rich thinks it would it be an idea to "spread the joy" a bit and if many stations are able to move around from the 3.560 spot. He suspects this be difficult with a majority of those QRV using Xtal oscillators ? Please let me know your thoughts on this. As a solution, Rich says he may try to his the valve VFO next time!

Gerald G3MCK tells me he was only on 80m, running 5W to a home brew CO/PA and using a home brew superhet for receiver duties.He worked a total of 12 stations across 4 countries - DL, G, ON, PA, and even noted what power they were using.

Saturday QSOs were DL2RST 10W, G0GGA 5W, PG2W QRO, ON6CN QRO, G3VTT 5W VALVE, G3XIZ 4W VALVE, G4JQT HW8. On Sunday he added G4XRV 5W VALVE, G3NKS 5W VALVE, G4MAD 3W Valve, G4ARI 5W CODAR, & G0OER.

Paddy G4MAD (me!). Gerald was my only inter-G QSO; I had other distractions on Saturday, and having cleared some time on Sunday evening I found my inverted L had a very high SWR - beyond the capabilities of my remote ATU.

I hastily patched in my top loaded 40m/80m vertical and found Gerald - although he later advised me that local QRM made copy difficult. I expect the lack of NVIS from my vertical didn't help. However, I did work DK4AN on 2 x QRP 5W - having to use the vertical had it's advantages.

I was once again on Rich G0GGA's 3 valver with the trusty 9R-59DS on receive. My Rx dates from the late 60s, although I've only had it for about 4 years. It was a great find being in truly as-new condition - see photo

In summary, it was great to see so many joining in, and I hope we can see even more filamenteers on the air on the first weekend in November.

The "Widow Maker"

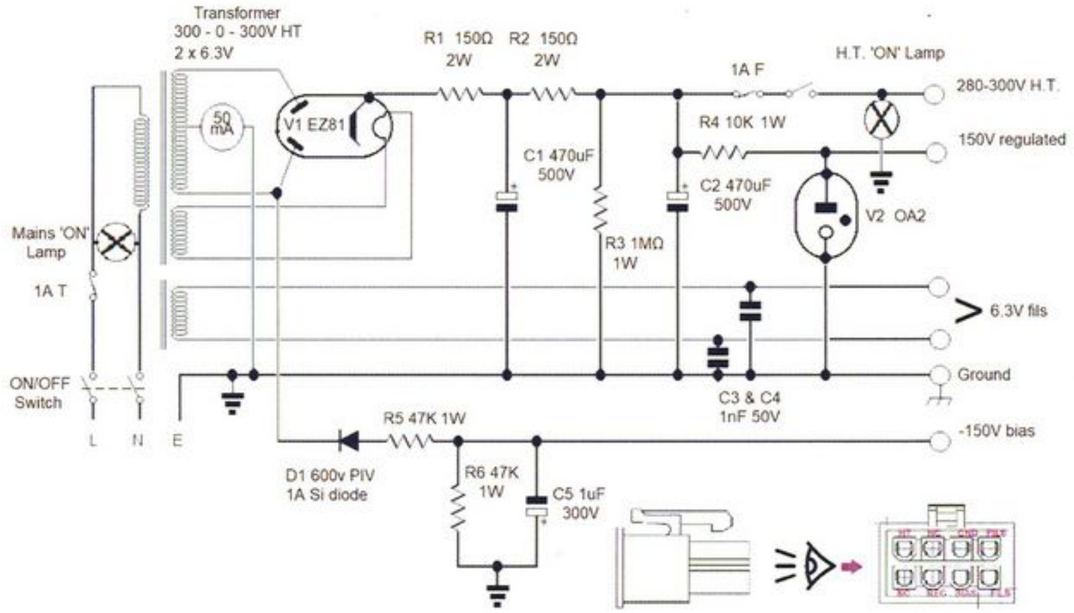
Paddy O'Reilly G4MAD

A simple HT PSU for QRP Filamenteers

I mentioned my HT PSU in my last Valve column, so I thought it time to share the design, and hopefully tempt a few more members from the path of solid state to the world of hollow state.

I will repeat the mantra from last time - I can't say this too many times....The HT voltages in a QRP valve PSU can be dangerous and POTENTIALLY LETHAL. Please read the last SPRAT and take great care when working on any opened equipment with anything above 12V (and even at 12V anything with more than a 5A fuse!)

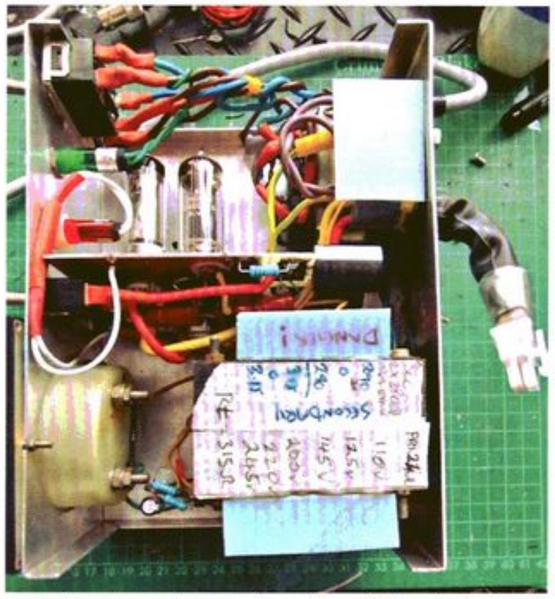
My components were sourced from rallies and junk boxes, while the transformer was from an online auction site. It's ex-valved broadcast receiver, so I estimated it's rating to be about 30W. It has a filament winding and came with a valve diode rectifier, which I used for this PSU (V1).



The PSU circuit is an amalgamation of ideas starting with a PW article in the February 1994 edition, plus ideas skimmed from various books and internet articles. Lacking an LF choke I opted for an R-C filter; this might seem counter intuitive to those raised on low voltage / higher current supplies. But even at an unlikely high current of 100mA the 150Ω/2W resistors would each dissipate 1½W and drop 15V.

The HT doesn't require regulation, except for the oscillator stage of transmitters - for the latter I've provided a separate stabilised 150V line regulated by a cold cathode regulator (V2), while the main HT has been measured as a healthy 300V off-load..

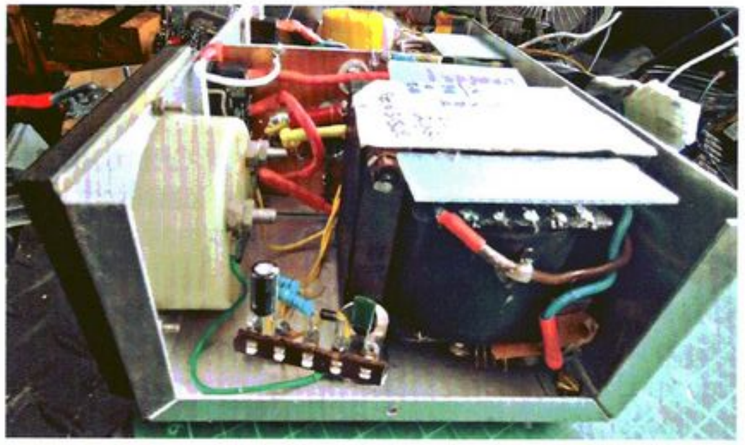
I added a -VE bias line of around -150V via a silicon diode (D1 and associated components). Although not being used in my first (and in progress) valve tx, it does provide flexibility for future projects.



I'm using a somewhat over-rated Ukrainian surplus valve for my tx PA - a 6P3S (copy of the 6L6GA) which is rated at nealy 20W anode dissipation. This has a filament requirement of 6.3V at just under 1A, so the fils winding on the HT transformer is only used for the rectifier and a separate 6V transformer provides fils to the outside world; with a couple of 1nF capacitors added to help reduce noise.

And speaking of the outside world; to provide an easy make / break connection to my valve projects I've used a locking modular connector - a TE Connectivity Ltd 'AMP' 8-way. These are rated at 600V, and as an additional precaution the HT has unused pins adjacent to it; providing physical isolation from other supply lines.

The incoming mains is switched via a double pole toggle; a separate switch is included for the HT. Fuses are included in both of these lines, as are 240V neon bulbs. The valve sockets plus the various other components are assembled on a piece of double sided copper clad board; the bias supply is on a some tag board. A 50mA FSD meter was added - in my case it was a micro-ammeter I had 'in-stock' so a shunt was made up to suit, while I added a diode across the meter to protect it before the fuse pops in case of short circuits on the HT.



The photos show the internal construction - with plenty of sleeving on terminals evident. I also covered live terminals with an off-cut of a plastic chopping board - there's another pieces not shown which is glued inside the lid of the case in the area above the PCB. It's all a bit belt and braces, but in the worst case your first HT shock could coincide with your last breath !

I hope this is enough to have some members search out a transformer and get building. I must now turn my attention to my valve transmitter project.

Watch this space!

Activity Report

Enzo M0KTZ email: m0ktz@katolaz.net

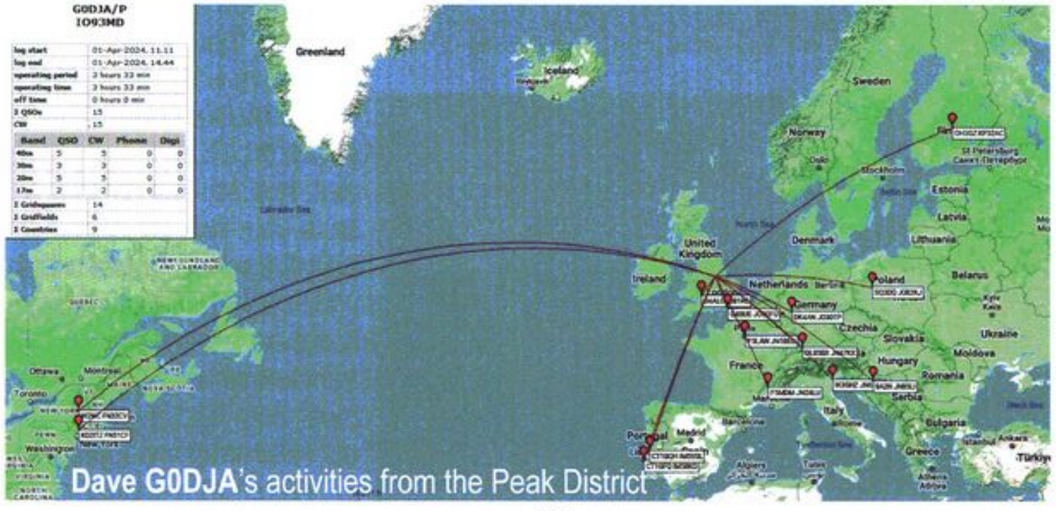
In the last few months the Sun has given us the highest solar spot number registered so far in Cycle 25 (266 in April 2024), together with what was probably the most astonishing aurora Borealis of the last 500 years, visible at all the latitudes down to 26 degrees. These extreme solar events are at the same time an opportunity and a challenge for QRPers. The immediate aftermaths of a solar flare or Coronal Mass Ejection (CME) will produce elevated ionisation, with sudden and unexpected intercontinental openings on all bands up to 10m and 6m, which allow long-range contacts with flea power for up to a couple of hours.

On the other hand, the associated Geo-magnetic storms which hit our planet a couple of days after a CME will cause extremely high D-layer absorption, associated to high values of the K indicator, and will make it harder for QRP signals to be heard on the HF bands. But QRP operators are used to taking the best of the current conditions on any band, and a lot of QRP signals have been heard every day on all HF bands, and beyond, whatever the solar activity forecast said.

I report below the results of the Easter Egg-xpedition Challenge, together with reminders about the imminent summer Club activities, including International QRP Day, the Summer Sizzler, the Suffolk Trophy, and the celebrations of the 50th anniversary of the club in September. There is room for all sorts of QRP operating styles in the Club events and activities. If you are staring at your log for 2024 wondering why there are only a handful of contacts, just switch your rig on and get on the air HI.

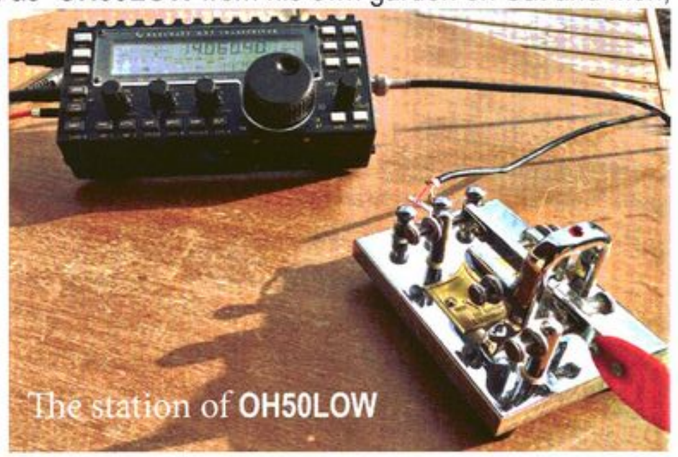
Easter Egg-xpeditions 2024.

Suboptimal weather conditions during the Easter break cast a light shadow on our Easter Egg-xpedition activity. Several members had announced their own Egg-xpedition, but had to cancel them at the last minute, due to rain, storms, or flooding. But many of our members managed to get out in the fields (or in their own gardens) anyway, to try out their /P setups and make contact with other QRP enthusiasts.



Dave G0DJA's activities from the Peak District

Dave G0DJA was active from the Peak District on Friday and from a picnic site in Nottinghamshire on Monday. Dave managed 14 contacts on each day, across 40m, 30m, 20m, and 17m. **Olaf DL4HG** erected his /P station in Hamburg-Kirchwerder, a 7m vertical attached to a fish-pole and 2 radials on the ground, to bag his 14 CW contacts across 20m and 10m. **Tuomas OH5JJL** operated as **OH50LOW** from his own garden on Sat and Mon, powering his KX3 with a 12V battery. **Alan G4KRN** took advantage of a rare sunny spot to operate from a local park on Sunday, in the old "rig-in-a-bag" spirit, with a 10ft base loaded vertical. Your scribe was active on Saturday and Monday from the rear garden, using either a 2.5m or a 5.6m whip and the Miser's Variable Coil for a base-loaded vertical, with activity on 40m-10m. The certificate for the best GQRP Egg-xpedition 2024 goes to **Dave G0DJA**, and the one for the best chaser goes to **Steve G0FMY**, who put again his Super Voxner on air to get other QRP enthusiasts in his log, before getting sucked in what he calls "the regenerative circle of Hell..." HI.


The station of **OH50LOW**

Imminent activities this Summer.

I have already announced most of the Summer activities in the previous SPRAT 198, so I report below only a reminder and a link to the corresponding page on our website:

- **International QRP Day**. Runs on Monday 17th June 2024. Watch the QRP Centres of Activity (CoA) on all bands, and look for the Regional Variations of the Club callsign Gx5LOW.
- **Suffolk Trophy**. Runs on Monday 17th June 2024. Normal QSOs, no serial numbers, score equal to the total number of IARU Region 1 countries on the bands used. Logs to be sent to Enzo M0KTZ m0ktz@katolaz.net by 30th June 2024. A trophy to the winner plus runner up certificates.

https://gqrp.com/awards.htm#Suffolk

- **Summer Sizzler**. Runs between Saturday 15th and Sunday 23th of June 2024. A relaxed activity to fill the bands with friendly QRP signals. Logs (and a short report of your experience of the event) should be sent to Enzo M0KTZ m0ktz@katolaz.net by the 7th July 2024, The best log submitted will be awarded **The GM3OXX Trophy**, we will also award **The Busy-Bee certificate**, **The Tiny-Flea certificate**, **The Old-Beetle certificate**, **The Iron-Knee certificate**, and the **The Ladybird certificate**. More news on the Reflector, closer to the date.

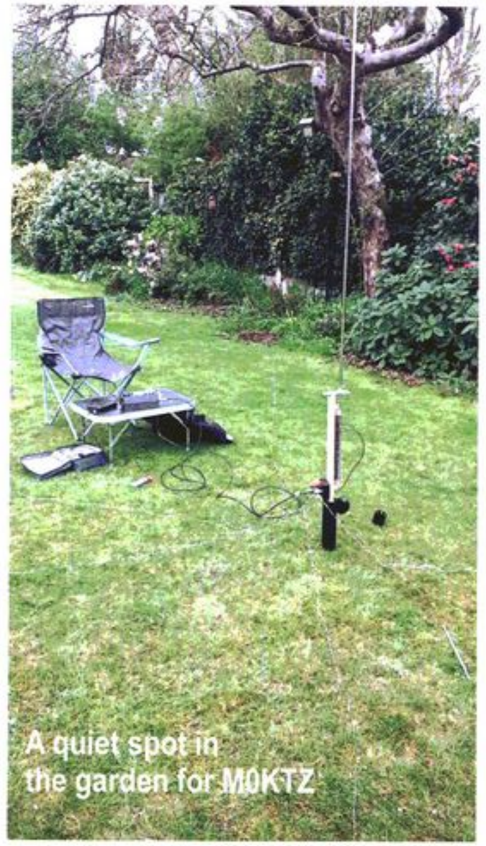
https://gqrp.com/awards.htm#Sizzle

GQRP 50th Anniversary Special Event Stations.

In September 2024 we will celebrate the 50th Anniversary of the Club with an international

activity and award, with certificates available to activators and chasers. This award will involve all the regional variations of the Gx5LOW Club callsign, plus a variety of special events callsigns run by GQRP members from abroad. We have already received news of Special Event Callsigns from Finland OH50LOW (thanks to Tuomas OH5JJL), Italy IR3QRP (thanks to Simone IU3QEZ), Austria OE50LOW (thanks to Enrico OE7AFT), France TM50LOW (thanks to Yannig F4IUJ, to be confirmed), and Germany DM50LOW (thanks to Lutz DM6EE and Klaus DL8TG, to be confirmed).

All those will be active throughout September 2024. If you are a GQRP member not residing in the UK and you can obtain and activate in your country a Special Event callsign during September 2024, containing the "LOW" or "QRP" suffix (possibly with a 50 mixed in!), then please send an email to Enzo M0KTZ to let us know.


A quiet spot in the garden for M0KTZ

Weekly QRP Activity Slots.

GQRP Club members convene on the bands twice a week to have friendly QSOs with fellow QRP enthusiasts. The two slots are as follows: "**QRP Activity Slot**" on **Sundays 17:00z-20:00z,** and a "**Mid-week QRP gathering**" on **Wednesdays 17:00z-19:00z**. All bands, all modes, any type of QSO, no scores, activity focused around (but not restricted to) the QRP Centres of Activity (CoAs, see at the end of the column). Logs and short reports are welcome.

Join the GQRP Reflector.

Members are welcome to join the GQRP email Reflector at:

https://groups.io/g/gqrp.

The reflector is a high signal-to-noise venue that hosts interesting discussions about all sorts of QRP-related topics, from antennas to circuits to components to operating techniques. This is also the place where many of our members announce their QRP activities, experiments, and results, and where periodic reminders about Club Activities are circulated.

72 de Enzo M0KTZ

These are the International QRP Calling Frequencies:

CW: 1836, 3560, 5262 (UK only), 7030, 10116, 14060, 18086, 21060, 24906, 28060 kHz

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

Notice that these are Centres of Activity, so please spread out when activity levels

MEMBERS' NEWS

by Chris Page, G4BUE

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

MØISK was, 'somewhat inspired' by **EI7CLB**'s magnetic loop antenna design from *Sprat* 197, especially using adhesive copper tape as a conductor. So much easier than trying to bend copper tubing, says Guy. He built the loop (left) from odds and ends in his garage and junk box, connected it to his FT-818 and at 2.5W, found it doesn't seem to upset the variable tuning capacitor he selected from the junk box. Guy used the ferrite ring suggested by **EI7CLB**, insulating it from the copper conductor by means of plastic tape and says it all seems to work rather well. Welcome to new member **G1BKI** who is experimenting with discarded gas canisters for use as 70cm cavity filters. Mick has a *YouTube* channel of this and other projects at <https://youtube.com/playlist?list=PLTfK2lg_vYBXmRevAi2etvEBluk9KTAxF&si=mKn8bh4mlsx8-9K6>.

G3YJE has been involved in scanning a number of Short Wave Magazines (SWM) that have been turned into PDFs to be read and down-loaded from <worldradiohistory.com>, and recently they managed to get the entire series on to the site. Peter was then given a box of *QRP* magazines, the journal of the QRP Research Group in the UK in 1949 and the 1950s, edited by J Whitehead. He has scanned them from issue 1 (above) to 71, except issues 3 and 35, if anyone has a copy they can let him borrow to scan. Peter says, "Interesting times, they were investigating what could be done with less than 5W, and just becoming aware of transistors!".


DEDICATED TO THE ADVANCEMENT OF LOW POWER RADIO.

EDITOR: J.Whitehead, 6, Abbot's Tile, Hersham Walton-on-Thames, Surrey

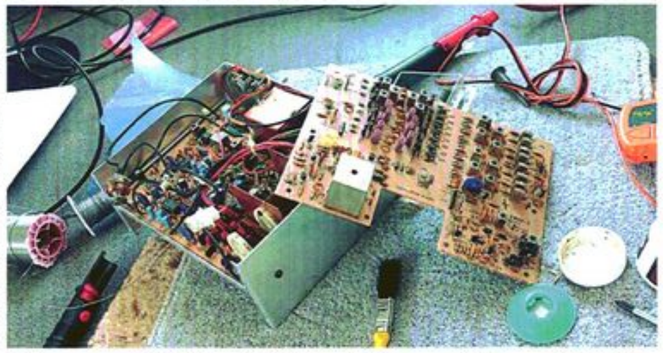
1 SEP 1949

QRP



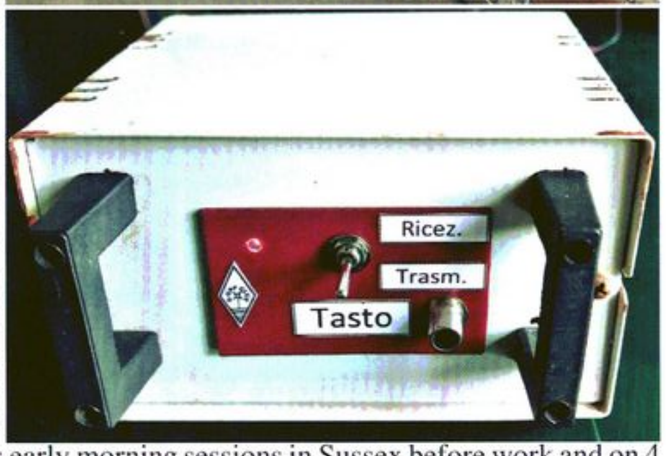
The last *Sprat* inspired **G4CIB** to get back on HF after a few years away, and after 'blowing the dust' off his old HW8, he was surprised it still worked, and within a few minutes had QSOs with EA, LZ, SM and SP on 20m and **G4WPS** on 80m. Brian's antenna is a 100ft inverted-vee doublet over the house fed with open-wire feeder. He will be QRV 7/14 September from Lundy Island with his xyl Leta, **G4RHK**, from the same QTH at Castle keep East

they used last year (previous page, that also shows Brian's 3 ele 2m beam). **GWØVSW** was QRV in the CQ WPX Contest using his G90 and 5W SSB to an inverted **G5RV**. Despite conditions being good with plenty of DX heard across all bands, Carl lost his voice to a virus after the first day and stopped operating early. He QSO'd HBØ on 80m, VE3, CN, D4 and K1 on 40m, 3V, A4, CN, D4, FM, HZ on 20m, 3V, C4, CNB, UA9 and ZB on 15m and 4X, C4, PY and TA on 10m.



Another Heathkit user is **G4JQT** who has been working on a HW9 (right) that had a blown transistor. Ian says, "The MRF237 used in the HW9 has the C-E connections swapped round from more commonly available MRF237s and other TO39 encapsulations - so beware! I did the usual mods (100uH choke across R423, proper de-coupling around the PA stage and U302, VFO LPF changes, etc) followed by a careful realignment." **N2CQR** has finished his second 15-10m TCVR, with crystal filter at 25MHz, and says one of the two will go to his HI8 shack starting in June. In an effort to do something different, Bill built a Wilson Cloud Chamber based on dry ice and Isopropyl alcohol and says, "It worked! Now, back to radios!" **MØNTV**'s new video at <https://youtu.be/E1LEE0wEAy8> documents the design, building and testing of Nick's little 10W PA for his homebrew QRP SSB rig covering 15 and 10m.

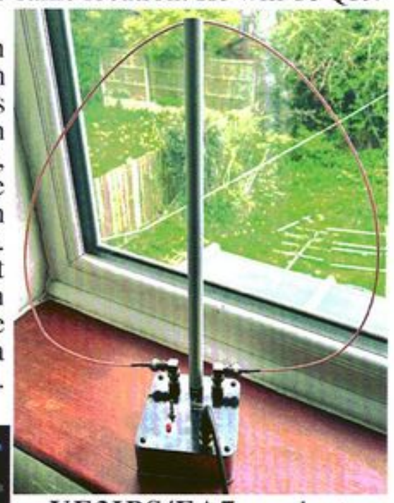
Pictured right is **OH5JJL**'s Ten-Tec 515 Argonaut that he used to make three QSOs on 20 April, two of which Tom says were quite remarkable. The first at 0410z was with **ZL4TT** at 14,236 miles on 20m running 4W into his doublet antenna. The second was with **PA3CWN**, also on 20m, but Oene was only running 10mW into a rotary dipole from a TTL 7400 IC using 1 nand gate from a 7403 as a final PA at 5V, measured with a scope and nanoVNA. Tom says, "In short: you never know what you can do with QRP. It may need patience and persistence but it's worth it. Have fun with QRP!" Tom later added, "I bought another Argonaut 515 from a fellow amateur in Finland, and couldn't resist buying this legendary QRP gem!" On 27 April, **G3XJS** QSO'd **5B/DK3RED** on 14060kHz.

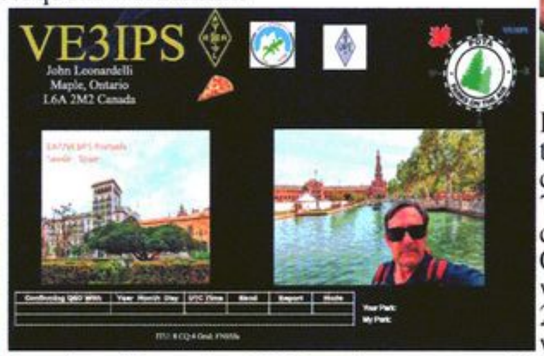


Pictured right is **IW1PAG**'s NS40 (No Simpler 40 Metres Transmitter kit) encased in an old box from his junk box (rust angle included). Doriano says it gives a little less than 5W on 7028kHz with his inverted-vee shortened dipole and hopes, "With your skill and patience, you may hear the weak signal during the weekly QRP activity slots." **M3KXZ/P** has continued his early morning sessions in Sussex before work and on 4 April at the Jack and Jill Windmills, Clayton, QSO'd your scribe on 20m (ground-wave) just before QSOing **ZL1RD**. Pete was using 5W CW to an Ampro 20 whip on a magmount. Two

weeks earlier, he QSO'd his first KL7, on 9 April had a two-way QRP QSO with **ZL3XDJ** and on 16 April QSO'd **VK5FIL** on Flinders Island and **VK3MJ** who was also running QRP but with a 16ft high dipole bent around his garden, all from the same location. He will be QRV from Tide Mills for International Marconi Day.

GØDJA/P was QRV during the Easter Egg-spedition weekend, making 14 QSOs on Friday running 5W CW from a KX3 to a base-loaded Slidewinder vertical with radials spread around the base – 11 QSOs on 40m, 1 on 30 and 2 on 20m, of which 11 were two-way QRP. With the same setup, but at a different location, David made 15 QSOs on the Monday – 5 on 40m, 3 on 30, 5 on 20 and 2 on 17m, of which 7 were two-way QRP, including one on 40m with your scribe. He doesn't have permanent antennas for HF at home but has made the Active Antenna Loop (right) by **MØOOZ** in *Sprat* 198 from the kit he supplies, but has yet to try it on the air. **GØKAY** has been looking at **MØOOZ**'s Active Antenna Loop webpage and says, "It is quite an entertaining read. He is quite an eloquent wordsmith."



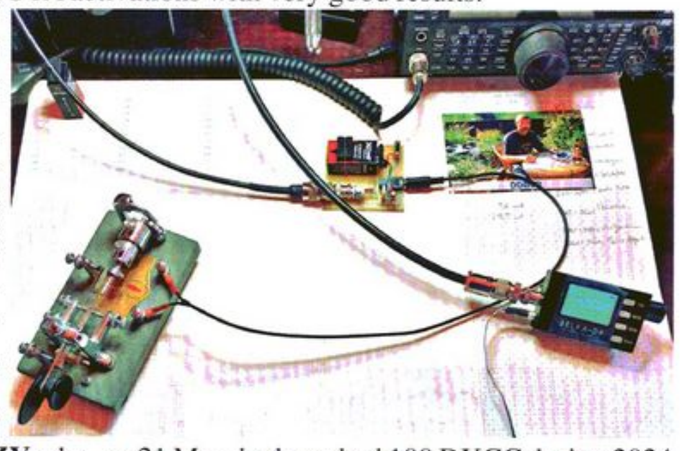


VE3IPS/EA7 made two POTA activations after six attempts due to poor propagation conditions. John took his IC-705, a Bioenno 6 Ah battery (no charger), 8m of RG-316 and the Chelegance MC-750 telescopic whip antenna (quarter-wave on 20m) and the Gabil GRA-7350T with a JAWS clamp (far left), and bought a Komunica HF Pro-1 antenna and RB-3WI tripod antenna mount at Sonicolor in Seville. He was curious to the LP conditions to VK in the early morning on 20m which hampered his 20m struggles. He worked various QRO Italians and other EU stations to manage the 10 contacts needed at a park to be activated. He also acquired a QRP Labs 20m QCX and a MFJ Travel Tuner and the focus is now on the SCD club boards and parts delivered from Club Sales.

Congratulation to **GMØHYY** who, as a vehicle for learning KiCad and 3D design, built a CW practice oscillator and keyer (below) and entered it in the RSGB's 2024 Construction Competition – and it won in the 'Most Creative and/or Elegant PCB Design' category. Jon has also built a QRP Labs QMX that he says will hopefully generate some contacts to write about over the coming months. In April, **MØNDE** was working at the level crossing at Idridgehay, Derbyshire and QSO'd **LA1CI** on 20m SSB with just 2.5W with

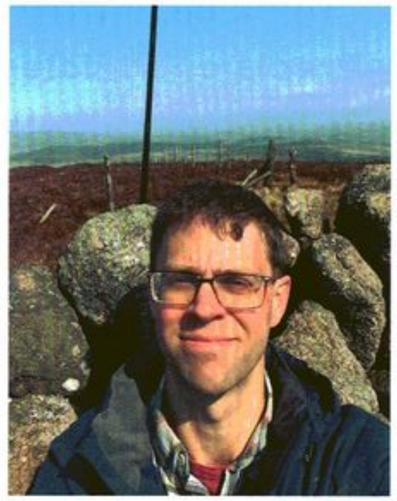
his IC-705. At the end of June, Nigel will be returning to his parent's retirement home at Royan, France and will be QRV from the balcony of a 9th floor apartment on HF and VHF.

MØXED has returned to amateur radio after a few years and is attempting to finish a Paraset for 80m, along with a prototype **SMØVPO** multi-loop antenna for the CW portion of that band (right). Colin says, "I tried to get both running in time for Valve Weekend but didn't make it. Hopefully next time!" He now has V2 of the Quartzmite prototype complete (for 30m) (above) and has made a QSO with it, see <https://www.tuckley.org/qmite/>. Other projects include a design for an iambic memory keyer in an Altoids tin for QRP rigs, that either only have straight keying or keyer without memory facilities. Finally, Colin has been experimenting with a /P seven-band EFHW antenna by **HB9EAJ**, and used it for several SOTA activations with very good results.



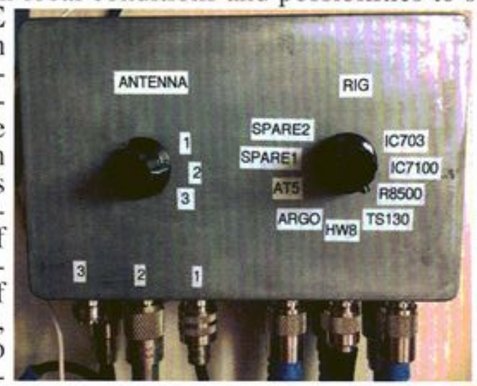
Pictured right is **DDØVR**'s set-up for the MAS Contest on 9 May for 40m using an end-fed vertical, and Belka-DX RX and T2FD antenna, in Class B with 12 parts only. In June, Heli and Bigi, **DE3BWR**, will start on the Cornwall Coast Trail and then go to the Scilly Islands with a KX3, CTX-10 and antennas for the difficult terrains. **GØFUW** attended the Yeovil QRP Convention in April, meeting many members and signing up new ones. Steve said there was lots of interest in the PW SCD Revisit project, and congratulates the organisers of the event. Congratulations to **F5NZY** who, on 21 May, had reached 100 DXCC during 2024 running 1W CW to his Hexbeam and dual dipoles fed at one third. **G3YMC** has reached 115 DXCC this year running 5W CW with his FT-710 into a long-wire.

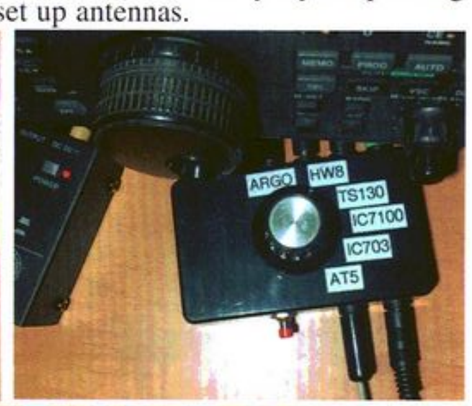
GM5ALX has started SOTA activations, just two so far – Bennachie and Kerloch, (top next page) and says the first was with a much too heavy kit of G90 and a 3kg battery, but the second was a more manageable KX2 set-up. Alex had two summit-to-summit QSOs with **LA9XGA/P** and **DB5RT/P** and with the **JW9DSA** DXpedition who, jointly with **Z36T**, gave him his best distance of 1500 miles. **G4TGJ** is continuing regular SOTA activations and, despite finding DX conditions worse now than earlier in the year, he had a QSO with ZL on 15m on 14 May. Richard is also continuing his Raspberry Pi Pico based SDR TCVR for SOTA activations and has built the RX board. **DM4EA** says by the time the Summer *Sprat* is published, his 6/19 June announced SV3 operation will be running or even over. Tom will



also be QRV 14/24 October as **CT/DM4EA** from Northern Portugal and 22/27 December as **SP/DM4EA** from the Baltic Sea coast in Poland. He will use QRP 'holiday-style' operating depending on local conditions and possibilities to set up antennas.

G4EFE has been building lo-tech switch-boxes. The RF switch (right) allows Martin to select one of three antennas to one of seven rigs, with two 'spare' positions for items temporarily on the bench. The Key switch (above right) directs the keyer output/straight key or paddle to one of six rigs, the red push-switch sits in parallel and is used as a very handy tune button. Martin says some of his rigs are stacked on one another causing the sound from internal speakers to sometimes be stifled. The solution was to buy a cheap four-channel stereo mixer (right) using the left and right channels on each input to select up to eight inputs. The mixer is powered from a USB socket on the radio PC and the mixer's output is fed direct to a powered speaker, and to the PC audio input for data decoding. He says, "The downside of all this new-found flexibility is that there are about a million more cables in the shack!"





Thanks to all the contributors. Please tell me how your summer goes for the Autumn 2024 edition of *Sprat*; what you have been building, interesting QSOs you have made and any other information about QRP, by 12 August. 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. Finally, please let me know if you intend operating from somewhere other than your home QTH during the autumn and winter months, especially during the Winter Sports, so I can let members know to listen out for you.

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