SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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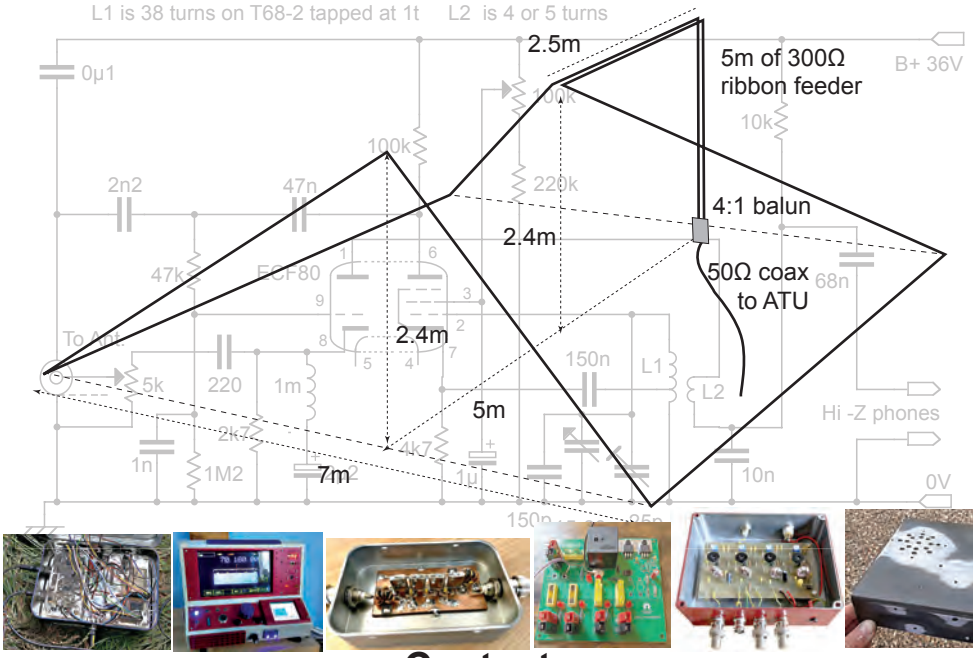

Contents

This could be your last SPRAT. Check your delivery label and please read the Membership Secretary's notes in this issue

Our founder George Dobbs G3RJV (SK)

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EDITORIAL

The IARU will be discussing Band Plan changes in June. The main aim is to expand the allocations for data comms. There has been some opposition to the proposals and concern that the QRP CW centres of activity would be affected. That does not appear to be the case. There is, however, a very real threat that 5.262MHz will be lost in a separate change to the UK 60m allocations. **Peter, G3XJS**, is keeping a close eye on developments.

We don't, as a rule, do obituaries for members, but when a Club officer becomes a silent key, it is only right that we note their passing. We were all sad to hear that **Dieter, DL2BQD**, passed away in 2021. Dieter was our representative in Germany for many years and helped us with membership issues for our DL members. He is sadly missed and our thoughts are with his family. We are grateful to **Dirk, DL1GKD**, For taking on the role.

We also need to give a round of applause to **Norm, VK5GI**, who has stepped down after serving many years as our man in Australia. We thank him for all of his work, and welcome his successor, **Terry, VK5TM**.

Many thanks to members who have joined our ClubLog account. We now have 120 members listed, although many have not uploaded any logs for some time. Please do not forget to upload your logs!

There has been much chatter on the G-QRP IO Group about the lack of QRP activity. See the On-Air Activity page for details of a survey we are running to judge how much support there is for more organised activity periods.

We are very much looking forward to two physical Conventions, in Northern Ireland in June and Telford in September. The Club Call will get its first airing as **GI5LOW** in the 10 days leading up to the GI-QRP gathering in June.

Would anyone like to activate it from Wales, Scotland, IoM, Jersey or Guernsey on World QRP Day, Friday 17 June? See Club website for details.

Late News

There's a change of date for the Blackpool rally **(Sunday April 24th instead of Sunday May 1st)** - due to the hotel changing their booking.

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

CLUB TROPHY WINNERS 2021

Steve G0FUW

The judging for the various Club trophies really does get harder every year. After much deliberation, here are our winners for 2021:

The **G2NJ Trophy** is sometimes awarded for a really good technical article, and sometimes for an outstanding contribution to international QRP. This year's winner has done both with great contributions in *SPRAT 187* and *188*, and through his excellent books (available via Amazon) and his entertaining and informative YouTube videos. The winner is **Peter Parker, VK3YE**.

For the best SPRAT simple article we award the **W1FB Trophy** and this year's winner is **Glen, VK3PE**, for his Simple Solar Panel Current Monitor in *SPRAT 186*.

The **Partridge Trophy**, awarded for the best SPRAT antenna article, goes to **Steve, G0KYA**, for his piece in *SPRAT 187* about his homebrew vertical and using it with QRP in the Commonwealth Contest.

The **Gordon Bennett** Trophy, for the best practical article in SPRAT, goes to **Paul, 9H1FQ**, for his ideas on using Project Building Blocks in *Sprat 186*.

The **G3RJV Trophy** is awarded for the best entry in the Club construction competition and this year it goes to **Richard, G4TGJ**, for his scratch-built SOTA transceiver. The judges were impressed by his attention to detail, current optimisation and construction craftsmanship, not to mention the on-air achievements made with the radio.

A runners-up certificate was awarded to **Gareth, G4XAT**, for his QRP digital TV transceiver that he used during the Convention activity period to make a 70MHz full-colour TV QSO across town. The bringing together of various modules, a Raspberry Pi and an SDR to form a self-contained transceiver was an extremely impressive project. Both projects will be covered in more detail in future SPRATs

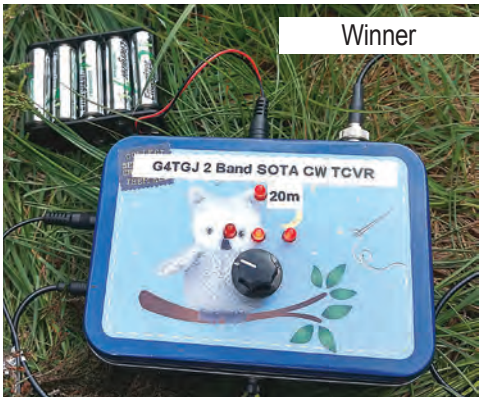
We have two more awards, the **G4DQP Trophy** for the Winter Sports and the **Chelmsley Trophy** for best log for the whole of 2021. Details of those are in Peter's On-Air Activity column.

The Club has made a nomination for the **RSGB G4STT Trophy**, which recognises significant contribution to QRP. As it is their trophy, the winner will be announced by the RSGB at their AGM in April.

Congratulations to all of our winners and three cheers to everyone that took part.

Two Band CW QRP SOTA Transceiver

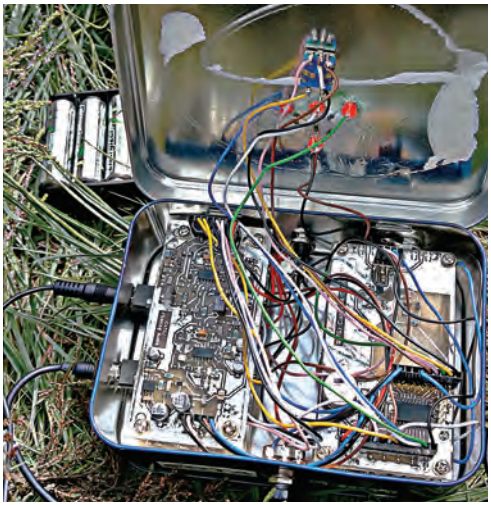
Richard Tomlinson G4TGJ email: rpt@rpt.me.uk



Winner

I got back to amateur radio a few years ago after many years away from the hobby. It was SOTA (Summits on the Air) that attracted me back as I am lucky to live in a beautiful part of the country and am a keen hill walker. For HF activations I started with an FT817ND but needed an external CW filter. I also found its form factor isn't all that convenient when sat on a hilltop plus it's quite heavy. So this was the inspiration for this project although it took some time to develop.

I had already built a 30m QCX kit so knew it was possible to build a high performance CW rig. Inspired by the QCX's design I prototyped over several months a 5 band transceiver. I built the final version on several home made PCBs using surface mount components: clock and control board, direct conversion receiver block, phasing audio filter and amplifier board and one transmit board for each band.



For SOTA I needed a small rig that covered 40m and 20m to give good European coverage plus the chance for some DX. It also needed a decent CW filter, a built-in keyer and full break-in. I decided to simplify the user interface and do without an LCD screen. I had a tin that was a "Gift in a tin" sewing kit that one of my daughter's had finished with. I realised I could just about fit 4 of my transceiver PCBs in so all I had to do was produce a two band transmit board and a small SOTA transceiver was possible.

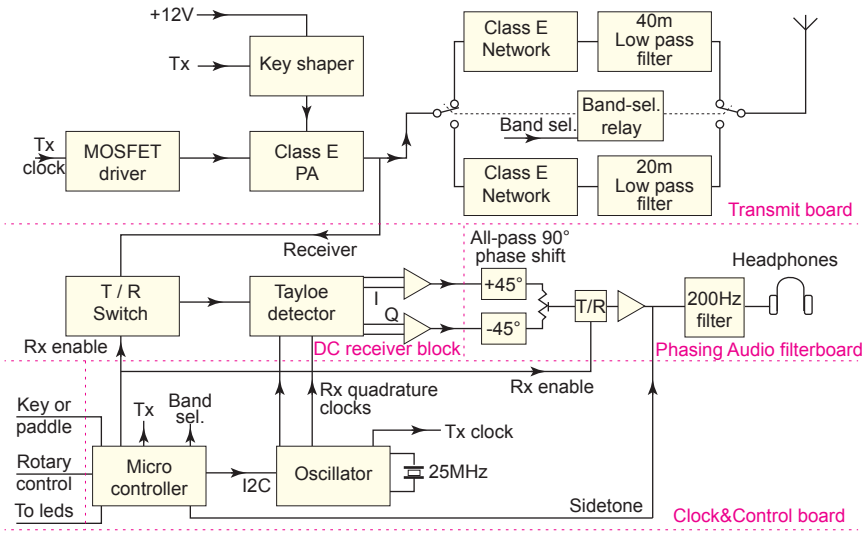
Features include:

Image cancelling direct conversion receiver with Tayloe detector
Full microprocessor control with stable Si5351A oscillator
40m and 20m bands, but could be built for any two bands
Full break-in
Class E PA with about 5W output
Internal morse keyer supporting Iambic A and B and Ultimatic
Requires 12V supply e.g. shack 13.8V supply or 10 AA NiMH batteries.
Open source software

Most SOTA activations take place near to the QRP centre frequencies. I always find a clear frequency near there to call CQ. Thanks to the Reverse Beacon Network the CQ should appear very quickly as a SOTA spot and you will get a nice little pile up. Because of this I decided that a simple interface would work quite well.

Instead of an LCD screen the rig has 4 LEDs. The top LED lights when 20m is selected, otherwise it is on 40m. The three LEDs above the rotary control show where in the band you are. The centre LED lights to show you are on the initial frequency which is the QRP frequency of 7030kHz or 14060kHz. Each click of the control is 100Hz so it's fairly easy to know what frequency you are on. As you tune up in frequency the right LED also lights. When you are 10kHz away from the start frequency the centre LED goes out. A short press of the rotary control takes you back to the start frequency. A long press changes band. If you were to tune all the way to the band edge then all 3 LEDs light and the rig won't transmit.

The transceiver is built on four surface mount boards:



The clock and control board is the heart of the transceiver containing the ATtiny3216 microcontroller and Si5351A clock generator chip. It generates quadrature clocks for the Tayloe detector in the receiver and the transmit clock for the class E PA. It also controls the LEDs, morse keyer, transmit/receive switching and so on. It takes input from the rotary controller and morse key or paddle. It has voltage requlators to provide 5V for the microcontroller and 3V3 for the clock chip, along with level shifters for the I2C bus that connects these devices.

The direct conversion receiver block takes the antenna input from the transmit board's low pass filter and outputs audio I/Q for feeding to the audio phasing and amplifier board. It includes a front end switch to isolate the receiver during transmit, the Tayloe detector (FST3253) and op amps along with a 5V voltage regulator.

The phasing audio filter / amplifier board is the final board required to build the receiver. It takes the in-phase (I) and quadrature (Q) audio from the direct conversion receiver block and applies a 90 degree phase shift to cancel the image, sends it through a 200Hz CW filter and amplifies it for headphones. It contains another transmit/receive switch to mute the

audio on transmit.

The transmit board contains a MOSFET driver, IRF510S PA and a key shaping circuit. There is a class E network and low pass filter for each band along with a relay to switch between the bands.

Configuration information is stored in the ATtiny's EEPROM and is set via a simple text file. This is the exact crystal frequency of the oscillator chip and the Morse parameters (keyer mode and wpm).

The receive current consumption is 60mA on 40m and 80mA on 20m. The difference is mostly the band change relay and extra front panel LED. On transmit it is 660mA on 40m and 820mA on 20m. In this case the class E PA is much less efficient on the higher frequency.

I have used this rig on around 20 SOTA activations now and is the only HF rig I carry. I use it with a 20m long EFHW (end fed half wave) and 49:1 matching transformer. This antenna is resonant on both 40m and 20m so I can change bands without getting up from my operating position.

More information including schematics and circuit explanations are on my website at https://g4tgj.github.io/Two-Band-CW-QRP-SOTA-Transceiver/ along with links to the software, configuration and build information. If you would like PCB layouts or the original Kicad files, or any other information, please get in touch.

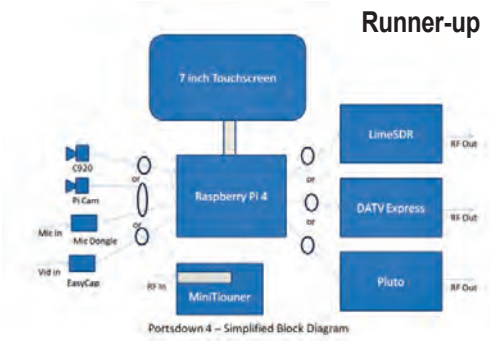
25 Beverley Rise, Ilkley LS29 9DB,

Across town on 1.5W 4m QRP DATV

Gareth Evans, G4XAT email:g4xat@ntlworld.com

Runner-up

The wonderful world of our hobby has so many avenues to explore it has kept me interested since 1984 when I joined the G-QRP club. Some of my first QRP dabbling's were with a single valve AM transmitter managing a couple of miles on 160m, followed by many of the **G3RJV** projects featured in *Sprat* and *PW*. I still have my 'Fag box' surface mount 'Sudden' complete with alkaline cells and tuning in a '20-pack'.



The adaptabilities of buiding an ATV setup

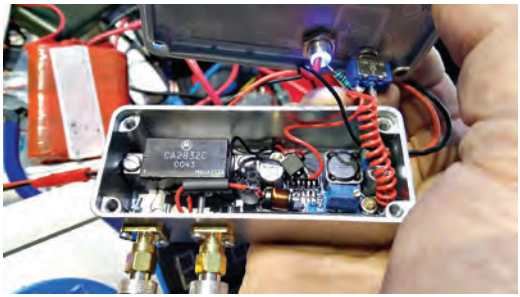
Other avenues were explored, including ATV using a 1 watt Solent transmitter on 24cms. Jumping forwards to 2018 the BATC (pursuing affordable digital TV for amateur use) launched a Raspberry Pi3 based Digital ATV transmitter (the Portsdown) and matching receiver (MiniTiouner - DVBS/S2 and now Knucker DVB-T) and at this point, having recently retired, I felt it was time to join in again.

Four years of progress and developments now provide an excellent opportunity to 'get going on DATV' and indeed, the wonderful world of SDR and the microwave bands (via the recently added 'Langstone' NB microwave transceiver) has never been easier. The provision of the AMSAT QO-100 geostationary satellite on 13cm means QRP narrow-band QSO can be had (via a 37,000km path) with over 1/3 or the globe! But back to my 4m QSO, on the morning of the

QRP convention activity day. Like any QSO, two stations are needed. Fortunately, Martin G4FKK is similarly interested in anything RF and has also built his own station DATV capability so an attempted contact was planned for the morning.

Using my 5 element LFA yagi and my small broadband pre-driver (based on a CA2832C CATV distribution amplifier - 35dB in a single package 1-200MHz) my signal was received and decoded (live colour and sound) by Martin over an obstructed path of 8km.

More recently I have installed a pump-up mast and was able to raise the beam to 10m AGL. This resulted in a huge margin of signal (generally +3dB over the noise floor is needed for a decode) so I progressively reduced my TX power. Live video was maintained down to an amazing 50mW.



Spurred on by this success, I turned my RF towards GB3JV, my local DATV repeater. With an input on 23cms and a double bi-quad flat-plate antenna my end, access was easy especially with the mast at full height. I was able to maintain input down to 20mW, this at the shack end of nearly 100 foot of feeder (a combination of LDF4-50 and Westflex 103). Similar results have been obtained with Justin G8YTZ (about 3 miles away) on 2m and 70cms, full colour and sound on QRP power levels.

The Portsdown project continues to grow and evolve, latterly with very useful test equipment add-ons being added. It really is an incredibly flexible system and as an avid builder and experimenter, provides incredible functionality and performance for the money.

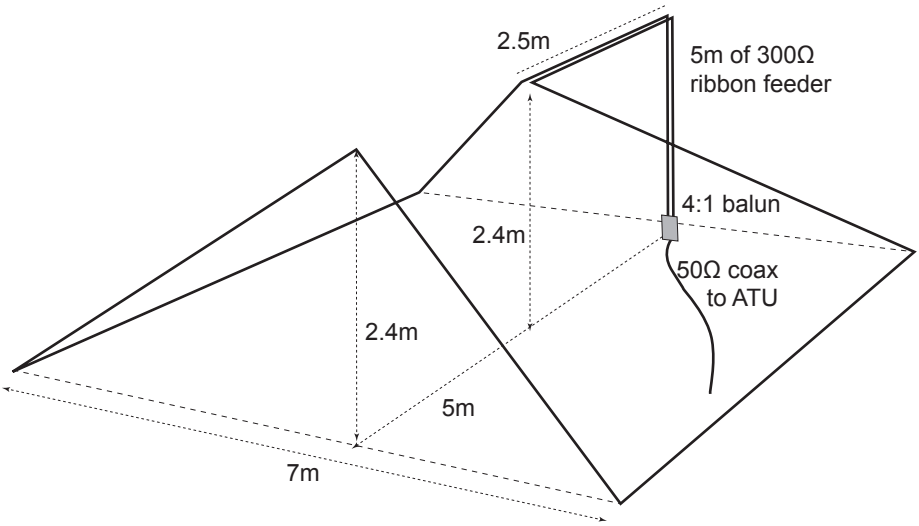
A huge amount of information can be found on the BATC Wiki pages, there is also a vast forum with supportive input at every level. Other than the ongoing silicon shortage, it's never been easier to get going on DATV. A Raspberry Pi 4, SD card, a touch-screen and a lime Mini or ADALM Pluto will sort the TX side, building a Mini-tiouner (*https://wiki.batc.org.uk/MiniTiouner_hardware_Version_2*) will give you reception capability from 144-2450MHz..

73 Gareth

A Lucky Loft Loop for several HF bands.

Enzo M0KTZ email: m0ktz@katolaz.net

Even a novice ham like me knows very well that antennas should be put as high as possible, and in the clear. But neighbours and local authorities seem to have a hard time grasping this simple concept. This is the reason why I have been experimenting with indoor full loops. My initial intention was to put in the loft a resonant loop for 30m, which would hopefully work on 15m as well.



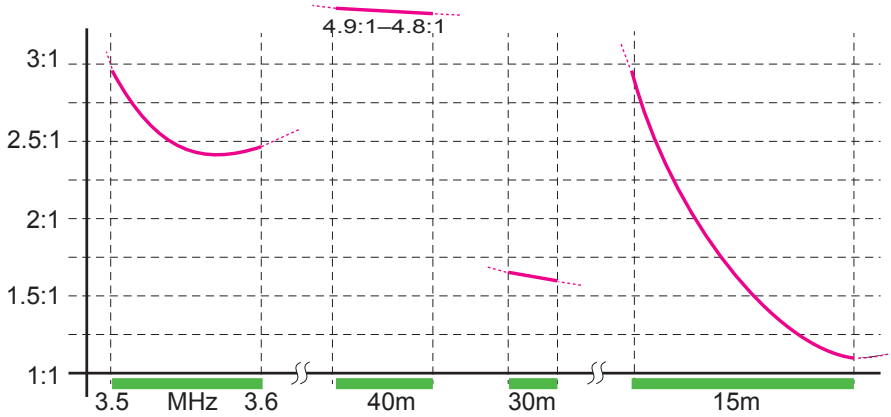
But after a few tweaks, I ended up almost by chance with a non-resonant loop that is easy to match on 40-30-20-17-15m. I call it "The Lucky Loft Loop" or "LLL". I have even managed to work several G-level QSOs on 80m, and I used it during the Winter Sports 2021.

(Just before publication, Enzo emailed me to say: *"The postman has just delivered a parcel, that contains a Runner-Up award for the G4DQP Trophy 2021 HI HI. I really did not expect it, to be honest, and I am chuffed by the news."* – Ed.)

The Lucky Loft Loop easily fits in the loft of a standard terraced house, like mine. A sketch of the installation is shoown above. The total length of the radiator is about 28 metres. It is fed with a 300 ribbon cable and a 4:1 balun, wound on an FT140-43 core.

In the table you can find the theoretical impedance on each band, before the balun. The SWR plot at the feed point (computed with NanoVNA) is shown over while the theoretical radiation patterns on different bands are also shown. The latter ones were computed in MMANA-GAL a few weeks after I started using the antenna. If I had seen those plots before installing the LLL, I would have probably given up, and you

Band	RΩ	±jΩ
80m	59	-49
40m	203	88
30m	36	-12
20m	99	126
17m	8	2
15m	107	-6
10m	99	16



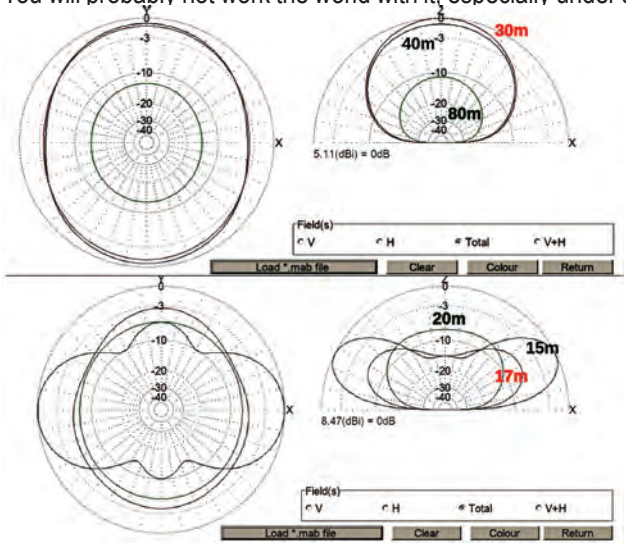
would be reading some other article now. The total cost of the materials is about £10 with the 300Ω feeder accounting for more than half of that.

I have been testing this antenna for about 7 weeks from my QTH in London, completing slightly less than 240 CW QSOs, all with about 4.5W of power. I worked 37 distinct DXCC entities, mostly in Europe, but including Russia, United States, Turkey and the Canary Islands.

The contacts were made across 6 bands, namely 80m (14), 40m (24), 30m (135), 20m (36), 17m (8) and 15m (19). About 40% of the signal reports were 579 or better, and only about 20% were worse than 559.

Beware: I am not saying that this is an ideal or efficient antenna. If you can hang a dipole or a doublet across your garden, you would most certainly be better off. I am not claiming that this an original idea, either, as similar designs have been seen in SPRAT and elsewhere (see the references below).

The Lucky Loft Loop is just an inexpensive, stealth coincidence, which happens to work much better than a rusty nail, and with the help of an ATU, will put you on air on several bands. You will probably not work the world with it, especially under solar minima, but it does not need any planning permission, and it will spare you useless arguments with your neighbours.



Comments and feedback are welcome. Errors and inconsistencies are my own. Before you blast me, consider investing a tenner and one hour of your time to give it a try: I did not believe it either, but it works.

References:

W9SCH – *SPRAT* 60, 15
G3GVI – *SPRAT* 102, 27
GW0VSW – *SPRAT* 142, 28

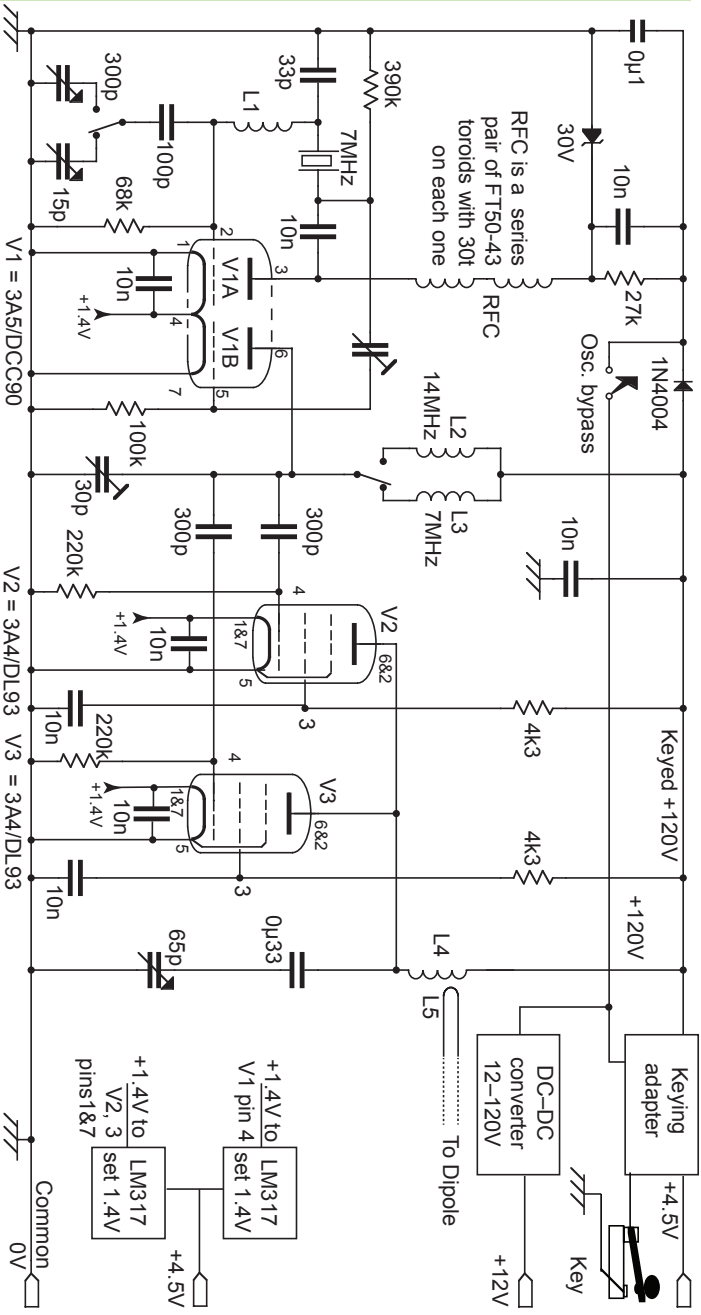
1950s style TX

John Seager G0UCP email:jseager2009@btinternet.com

Small directly heated valves lived on for twenty years after WWII in portable receivers on both sides of the Atlantic. They are still readily available. This circuit is based on typical designs of the time.

One half, V1A, of the twin triode 3A5 is a VXO on 7MHz and the other half, V1B a doubler up to 14MHz. Two parallel 3A4s, V2 and V3 in the PA put out a reliable 1W to a dipole antenna - and who needs more than a Watt on 20m? A kit-built solid state keying adapter* was used to key the HT line. No significant chirp was detected, even when keying the oscillator; a useful feature for semi break-in. The 120V. HT came from a 12V. sealed lead acid battery via a Chinese DC to DC converter**.

For stability, oscillator anode supply was kept at a Zener regulated 30 volts. The keying adapter and relatively high filament current of 600mA were taken from a bench power supply with separate LM370 regulators for oscillator and PA stages.



Note: The PA tank coil is at HT potential on 'key down' and as with all higher voltage circuits, care is needed to avoid dangerous electric shock.

Performance is best on 20 metres where the VXO has a swing of about 7kHz and six crystals cover the CW end. It will tune on 40 if you switch inductance in the V1B anode circuit and slip 3 ferrite bars inside the PA tank coil (plenty of room!).

Although not really built for contests, it managed 73 20m QSOs in the 2021 CQ WW CW including Madeira, Canary Is, USA and Canada.

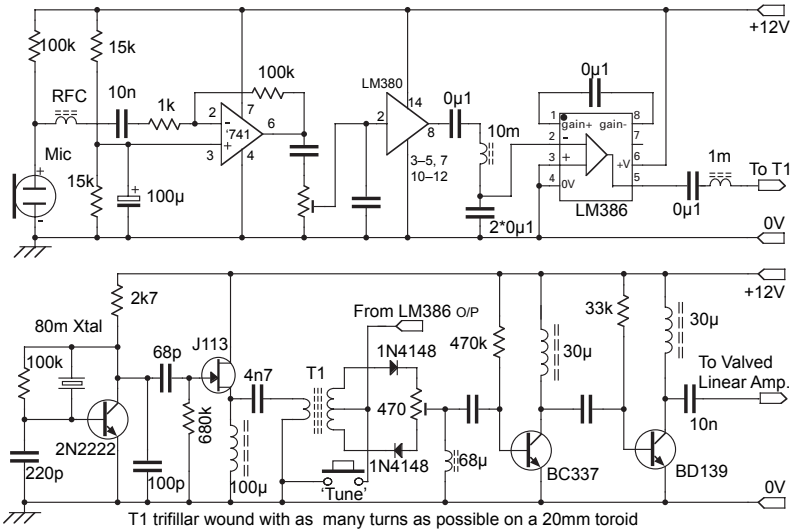
Coil Details:

L1 57 turns T50- 2, L2 24 turns T50- 6, L3 7 turns FT50-43, L4 10 turns 18g enameled copper wire on paxolin former 1.5" (4cm) diameter, 1.5" long, L5 2 turns insulated single strand wound over the 'earthy' end of L4. RFC A pair of FT-43 with 30 turns on each, connected in series.

- *Ham Gadgets UKA-2 kit. I have built other adapters operating on as little as 1.4v. using the Vishay LH1525 solid state relay, rated up to 400v.
- ** Clever unbranded boost converter. Entering 'DC 8-32v to 45-390v power supply' on the mighty Amazon or the market place brings up a wide choice of price for the same thing. Caveat emptor (and user). You can get 2 for less than £20.

A simple 80m DSB modulator

Peter G4UMB email: pahowd@gmail.com



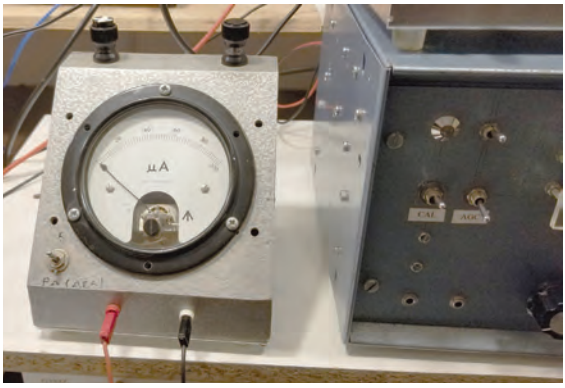
T1 trifillar wound with as many turns as possible on a 20mm toroid

I'm happy to know more people are making stuff, though I sometimes wonder if I'm stuck in the 1970s. I'd like to encourage some with this small project, using the audio section with the 741 & LM380 combination because I know it works. However, when I tested it on air, I was told it was far too wide @20kHz, hence the LM386 stage afterwards to compensate for the low pass filter. I wanted the audio strong enough to drive the power level up to the carrier level . With 80m so noisy it means good audio is essential. I had a good report from ON7OFF about the audio.

So that cheered me up.

Some Thought on Metering

Chris Osborn G3XIZ



It's useful to monitor what's happening in a circuit, especially a home made one. The installation of a panel meter can take up valuable space and using a separate meter for each unit proves expensive.

My solution is to have a 'universal meter unit' which may be plugged in to various pieces of equipment as required.

The heading photo is of an old army surplus, 0-100 µA FSD (full scale deflection) moving coil meter with a resistance of 1300Ω. It's mounted on a sloping base for ease of use

For many applications and where extreme accuracy is not necessary an analogue meter is the preferred option over a digital one. To recap on the use of moving coil meters:

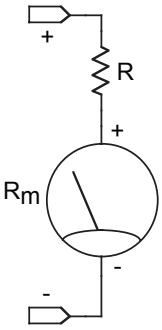


Fig. 1

USED AS A VOLTMETER

A series resistor is required (Fig. 1 left) and its value may be calculated thus

R = (V / Im) – Rm

USED AS AN AMMETER

A shunt (parallel) resistor is required (Fig. 2 right) and its value may be calculated thus

Rs = (Im / I) * Rm

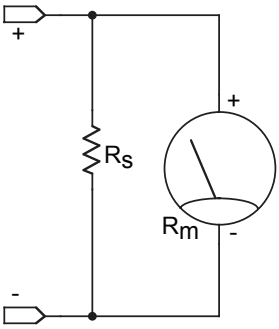


Fig. 2

Where

I is the required meter's full scale deflection (ammeter)

Im is the meter's sensitivity (i.e. its FSD) & **R** is the required series resistor (voltmeter)

Rm is the meter's resistance & **Rp** is the required protection resistor

Rs is the required shunt resistor (ammeter)

V is the required meter's full scale deflection (voltmeter)

Note: formulae values are in volts, amperes and ohms,

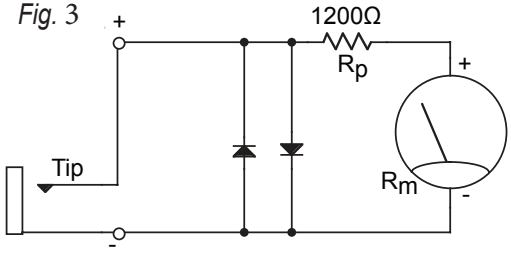
METER PROTECTION

A moving coil meter is a delicate instrument so will need some protection from an inadvertent over-load. My unit is designed to start current limiting at about 200% of its nominal FSD and have significant protection above a 300% overload.

The meter being 100µA and with a resistance of 1300Ω it therefore has a voltage full scale deflection of 0.13V (Ohms Law)

To protect the meter I used back to back silicon diodes to bypass excessive current. Two

Fig. 3



diodes are used in case the meter's polarity is accidentally reversed.These will start to conduct around 0.5V so the meter circuit will require sufficient total resistance that will develop 0.5V when passing twice its FSD i.e. 200 µA This calculates to 2500Ω so the meter unit's series resistor would need to be 1200Ω. Generally this series resistance may be calculated thus:

Rp = (0.5 / (2 *Im)) - Rm i.e. **Rp = (0.25 / Im) - Rm**

Where Rp is the series resistor required for the above mentioned meter protection. Silicon diodes saturate at about 0.7V so the maximum current that my meter should 'see' is:

0.7 / 2500 = 280µA i.e. less than a 300% overload.

So, my 'universal' unit comprises a meter, a series resistance and two protection diodes. It has a full scale deflection of 100µA and a total resistance of 2500Ω. (see Fig. 3)

IN PRACTICE

Fig. 4 show the realisation of how the meter unit is used with one of my transmitters. It measures the supply voltage and the PA current. The range selector switch is mounted on the transmitter's front panel together with the associated meter sockets.

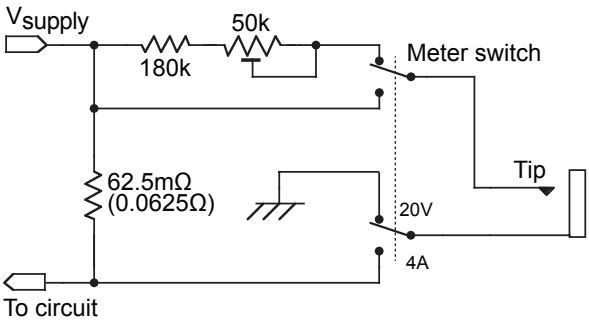
Ensure that the sockets are isolated from chassis ground.

OTHER FUNCTIONS

An **S-meter** may be realised by tapping into a receiver's AGC voltage line and using the meter unit as a straight forward voltmeter of suitable range.

RF (e.g. aerial) current measurements may be achieved using a circuit similar to Fig. 5 and Fig. 6 shows a simple RF power meter. There are many more possibilities.

Fig. 4



CONCLUSION

Thus with a little wiring effort and the application of Ohms Law some of the guesswork may be taken out of a circuit's performance. This should increase one's confidence that all is well or otherwise give due warning that something needs attention.

Fig. 5

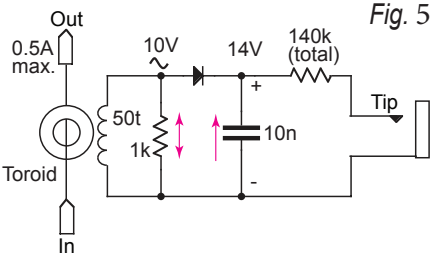
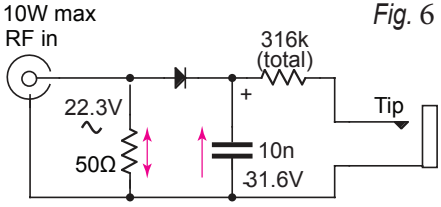
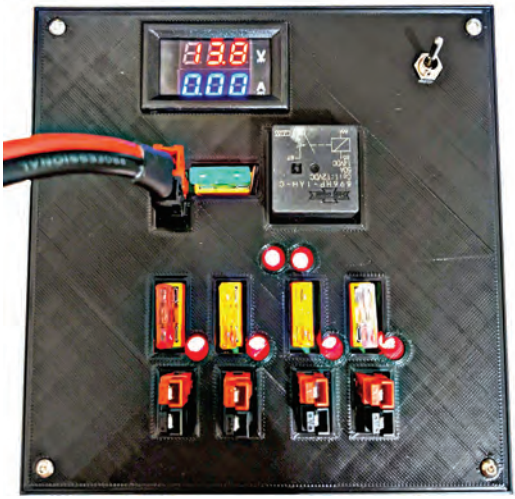


Fig. 6



PowerPole Distribution Module

Gareth M7GRB email: misc@gbnetwork.co.uk



I have been using a Watson W-30AM linear power supply which is known not to have any output protection and the voltage adjustment potentiometer failing could cause a high output voltage. I looked online for any devices which offered additional protection but could only find standard crowbar protection circuits which could be fitted inside of the power supply but an alternative solution would still be required for field day use.

There are multiple powerpole power distribution boards available but these don't have over voltage protection. I did find an article by AD5X (Ref 1) but in some cases the triac could overheat before the fuses blow so I decided to design a protected powerpole distribution board myself.

First it may help to consider common methods and what their limitations are:

1 Fuse and a TVS diode

These diodes are good at conducting away brief voltage spikes and gross over voltage situations however they don't suddenly start conducting at a fixed voltage but instead conduct more current as the voltage exceeds their value. Therefore in slight over voltage conditions the TVS diode will conduct to clamp the voltage but this will cause the diode to generate heat.

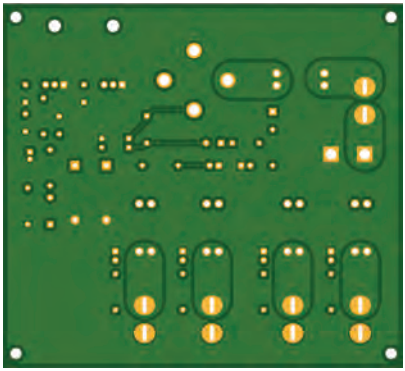
There is no heat sink so the diode will get very hot very quickly and will fail and no longer offer any protection. If a low current power supply is being used and the fuse hasn't been changed to a lower rating the power supply output voltage may just drop and not blow the fuse. The diode will overheat and burn out resulting in the radio being damaged.

2 Crowbar circuit

Adding a crowbar circuit will cause the supply to be shorted in the event of an over voltage condition which will be a lot more reliable at blowing the fuse. However it does not offer reverse polarity protection. The crowbar circuit still relies on blowing a fuse and the time it takes for a fuse to blow can be highly variable until you get up to currents which are multiple times the rating of the fuse.

Dave Jones from the EEVblog did a video on this (Ref 2). If you use a 30A fuse to match the continuous rating of your power supply and the crowbar circuit activates the current may only be 45A for example and the fuse will typically take 10 seconds to blow which is

a significant amount of time for the SCR to be conducting and producing heat. In order to be able to cope with different power supplies and their output characteristics the SCRs will likely need significant heat sinking which adds to the cost, size and weight.

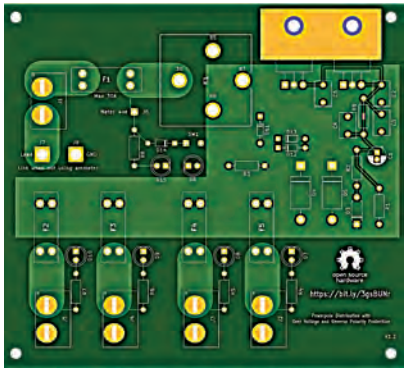


For illustration only NOT to scale

3 Crowbar plus relay with positive feedback

Adding a relay enables the output to be disengaged in the event of the crowbar circuit activating typically in around 20mS which eliminates the thermal issue of the SCR. This addition does require a button to enable the output whenever the supply is connected but by putting a diode in series with the button reverse polarity protection can be added.

The final circuit is shown here. Diodes D4 and D5 are the TVS diodes to remove any momentary voltage spikes and will also clamp the output voltage in the brief time it takes for the crowbar circuit to activate.

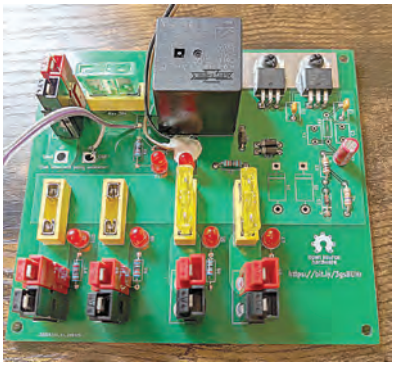


D1 and D2 are the SCRs. They are rated at 60A each but as it is possible in some cases for the current to be greater two are used to increase the current capability.

R1, R2, C1, C2 and C5 form the filter circuitry for the gate of the SCR. R9, C2, C4 are unpopulated and enable end user modifications to be made if false triggering in high RF environments are still an issue.

K1 is the relay. It has a contact rating of 50A which is a little less than ideal however higher ratings are significantly more expensive and larger.

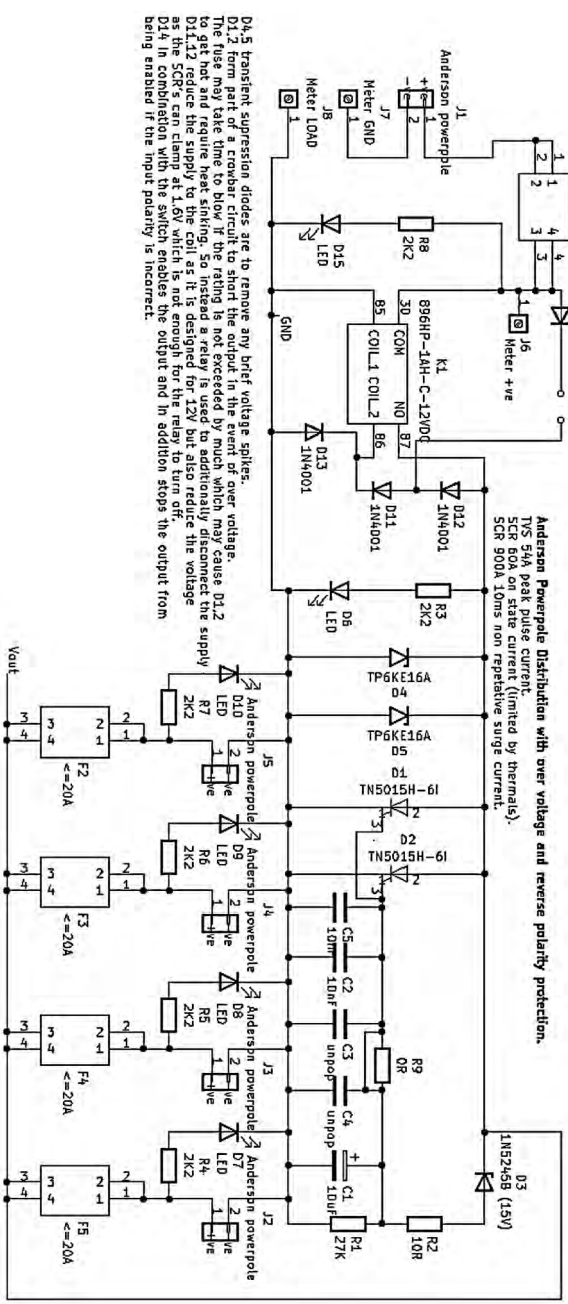
The crowbar circuit clamps the voltage to a level which is above the minimum dropout voltage of the relay coil and therefore D11 and D12 are used to drop the voltage further.



LIMITATIONS

If the relay is enabled while there is a fault condition then it will turn on and immediately turn off again when the crowbar circuit activates. This will result in the relay oscillating and will not be good for the long term life of the relay contacts. It is recommended to have a voltmeter in order to check the supply before attempting to enable the output.

The circuit has a provision for an ammeter. Note that any ammeter will have some resistance and therefore raise the 0V potential of the output. A typical 100A meter may use a 0.75mohm current shunt which is equivalent to a 32cm length of 4mm diameter copper wire.



PCB LAYOUT

A PCB was designed due to current carrying requirements and 1oz copper was chosen due to the significant extra cost of 2oz. (Ref 3) was used to calculate the required trace thickness for 1oz copper tracks based on carrying 30A continuously with a 25°C temperature rise.

PCB ASSEMBLY

When assembling ensure that the powerpole connections, relay and fuse holders have a good solder connection to both the top and bottom pcb layers.

TESTING

During testing the design trips at between 15.5V and 15.9V depending on the speed of the voltage rise which is well within the 13.8V+15% that an Icom IC-7300 is rated for as an example.

OPEN SOURCE

This design is fully open source and available (Ref 4).

Ref 1: *http://www.ad5x.com/images/Articles/Vprotect.pdf*
Ref 2: *https://www.youtube.com/watch?v=WG11rVcMOnY*
Ref 3: *https://www.7pcb.com/trace-width-calculator.php*
Ref 4: *https://github.com/RADARC/Powerpole-distribution*

Modern, simple, performance Regen Rx

Olivier ERNST F5LVG oernst599@gmail.com

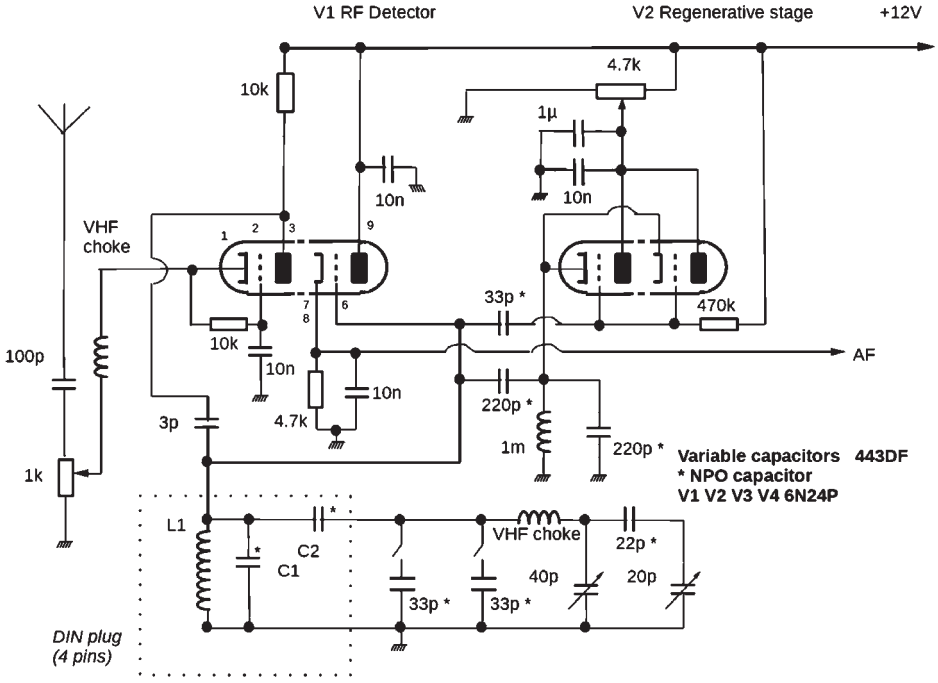
Modern because: All components are made in 2022, except the tubes (6N24P). However, if you are willing to pay five times the price of a New-Old-Stock (NOS) one, you can buy an E88CC from JJ Electronics and you will have a receiver with all components still manufactured.
The whole thing uses a single 12V supply, needing around 610mA from the supply, enough for the filaments and anode requirements.

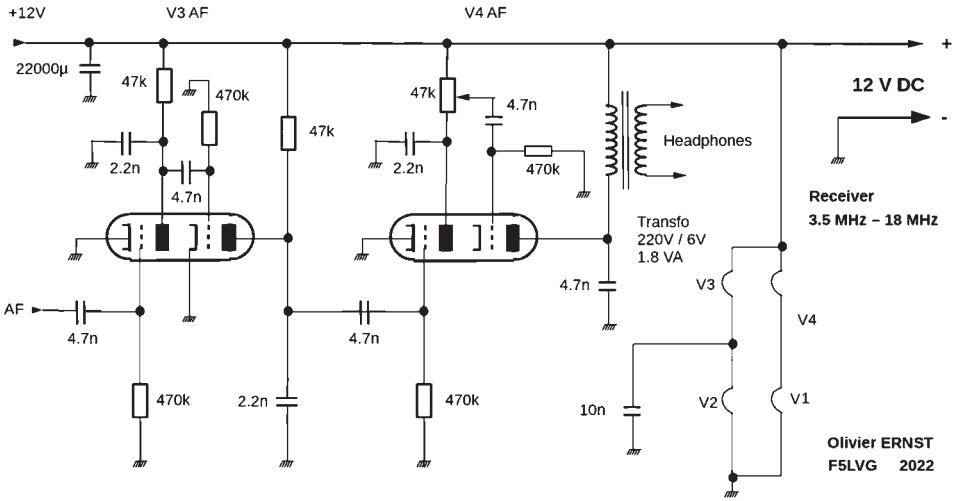
Simple because: - Only one plug-in coil per band, no intermediate tap.

High performance because: It has excellent signal to noise ratio due to the absence of 50 or 60 Hz AC in the receiver. The use of frame-grid tubes (mandatory), “without noise”.

The use of an infinite impedance demodulator (high RF impedance, low AF impedance).

Good selectivity. The use of valves running at a level of 12V anode voltage requires four AF stages to obtain a sufficient gain. It is easy to obtain a cutoff frequency of 3kHz for each stage. In practice, 4kHz is enough to separate two adjacent sideband stations.





Good frequency stability: Due to a high-C resonant circuit.

The receiver is built in a wooden box for handkerchief. Adhesive copper bands of 5 cm (for shielding) cover the inside. Resistors of 10 Mohms serve as connection points when needed.

The coils are made on 4 pin DIN plugs. For 40 m and 80 m, the coils consist of PVC insulated single wire (YV cable) with an outer diameter of the cable of 1.1 mm and 0.5 mm for the copper wire (section 0.2 mm²). These coils are fixed with 2 small twisted wires on a 20A electric wire welded to the ground pin of the DIN socket. This wire is 9 cm long, the bottom 4 cm are stripped and the top is folded back by 1 cm.

For the 15 m, 17 m, and 20 m the coils are made of 20A wire (2.5 mm² section). Two small twisted wires ensure its rigidity.

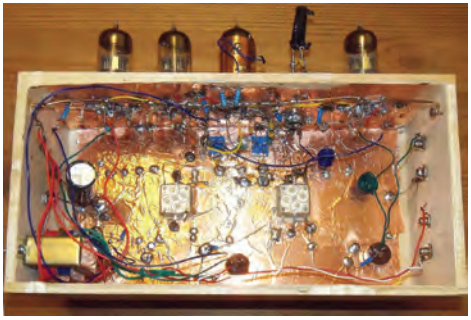
The coils are coated with cyanoacrylate glue.

Band	L (turns)	Diameter (mm)	C1 pF (pF)	C2 (pF)
80	9	22	470+220	Shortcut
40	5	22	330+100+12	100+33
20	3	22	220+82+8+8	47
17	2	22	330+22+5	22
15	2	19	220+47	33

C2 value is chosen to cover only the desired band. To avoid any reduction mechanism on the variable capacitors, I split each band in 3 by 2 switches, then I use a bandset capacitor associated with a bandspread capacitor. Large knobs are needed for the variable capacitors (A05).

Notes:

- V2 is shielded to reduce the noise induced by the mains current.
- Screws of 2.5 mm diameter allow the fixation of the knobs to the variable capacitors.
- The variable capacitors are glued to the board with cyanoacrylate glue.
- Build this receiver and you'll receive radio amateurs from the other side of the Atlantic! A 2022 thrill box!
- VHF Chokes 10 turns diameter 8 mm



GI5LOW

Preparations are well underway for the GI-QRP convention in association with the GQRP Club. The Convention will take place on the **25th of June 2022 at the Tandragee Golf Club, 11 Markethill Road, Tandragee, Craigavon BT62 2ER**, doors open at 9 am.

Presentations start at 10 am there will be Lectures/Seminars, a series of Build-A-Thons, Special Interest Groups, Talk-In, Trade Stands, Prize Draw/Raffle, Catering, and a Licensed Bar. There will be ample parking and disabled access.

The callsign ***GI5LOW*** will be in use leading up to and the weekend of the Convention. The organisers are extremely grateful to Kanga Products for their support of the Convention.

Philip MI0MSO
TeL: 078 4902 5760
email: **r8.giqrp@gmail.com**

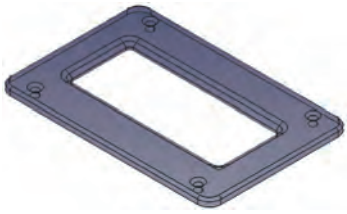
Bezels and Knobs

Toni Olewicz, G6XMO, Sheffield, UK, g6xmo@yahoo.co.uk

Getting back into amateur radio and home construction after several years away from the hobby it's easy to notice how some things you could find everywhere are now so difficult to get hold of. One of the things that I struggle with is cutting accurate and neat slots in cabinets for 16x2 and 16x4 LCD displays. A nice bezel makes the display look great, and it also hides those moments when the file decides to wander and take just that little bit extra off the corner. The other thing is finding a nice tuning knob that make the project look just that bit better.

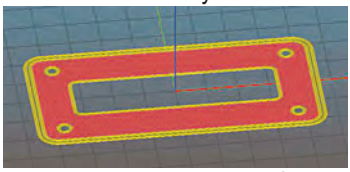
3D-Printing to the rescue.

Once you get the basics right you can easily design bezels and knobs using a CAD package. Various CAD programs are available, and I use *FreeCad*, which is free. Once you have your basic design on the screen you save the file as an '.STL'. This is a generic format that you then process to suit your 3D printer configuration using a "Slicer" program. Again there are various free software packages that do this for you. *Slic3r* is one of these.



A view of a 16x4 bezel viewed in *FreeCad*

Getting the slicer software set up and working correctly with your 3D printer can be most frustrating and rewarding, akin to getting a troublesome circuit working. The adage of 'change one thing at a time' echoes in the mind when you decide to change a load of settings in 'one go' and find that the print is far worse.



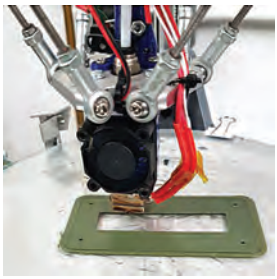
A 16x4 bezel viewed in *Slic3r*

The output of the Slicer is 'gcode' file, which are the actual instructions for the printer to move and extrude filament. You have the option of printing directly from your computer to the printer sending the gcode via USB, or saving the file to an SD card, then into the printer and running the print from there.

Experience has shown that printing from the SD card is better, because sometimes windows PCs decide to go and do housekeeping which can interrupt the data flow to the 3D printer long enough to spoil the print in progress. The whole thing fits together as a Toolchain:

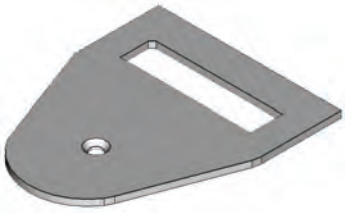
CAD Program > STL File > Slicer > gcode > 3D printer firmware > 3D Printed Parts.

You can homebrew your 3D printer using parts sourced from the internet. Being into home electronics as part of ham radio means that the electronics and wiring that some builders struggle with, is not such an issue. Many use Marlin firmware, which is also free. The printer firmware reads the gcode and translates this into movement of the stepper motors, extruder, and temperature of the heater that melts the filament which is deposited by the print nozzle.



The 16x2 bezel underway

Yes, there is a learning curve but it all fits in with the spirit of ham-radio – self-training in radio and technology, with lots of how-to videos available on the internet. So once you have found someone whose presentation style you like, just follow along. You have to bear in mind though that 3D printing is built up of layers which can be visible, and mostly the finish is not up to the same level as moulded parts. The fact that you can make one-off serviceable parts that you need yourself on demand seems to make up for that in my mind. The first things most builders print are spare parts for the printer, and some enhancement accessories. Then move on to useful bits around the workbench, like socket spanners for potentiometer nuts.



A classic-Bezel design

Dimensional Accuracy

Once you have got the printer extruding correctly, the next thing is dimensional accuracy. Most enthusiasts will spend a lot of time with printing and measuring 10mm cubes. My preferred approach is to print the first few layers of something with known measurements with fixing holes. A bezel is great for this, as you have fixing holes and a slot to gauge the part accuracy.

The test print can just be the first 0.8mm thickness of the bezel to check the dimensions of the slot and hole positions. A glass printer bed makes a really smooth first layer. Whereas the top layer can have a textured or sometimes rough finish. So you invert your model in the Slicer software, so that the top layer is printed as the first layer.

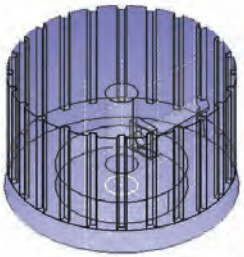
Printing with a brim also helps the model to adhere to the print bed without having to use painters' tape or prit-stick. It also helps with the shrinkage, as when the PLA cools the corners may curl up. Once you settle on the 'production version' – run the print job, let it cool and just trim away the brim with a de-burring tool. When this is trimmed the model will be 4mm shorter in width and length.

In similar way bezels of any shape and size can be printed. Really nice equipment knobs can be produced, I've shown a 'transparent' view of a tuning knob, and a view of the printed article in 'olive green' military look. The 'concentric' outline makes it have a nice changing 'moire' type pattern when in use.

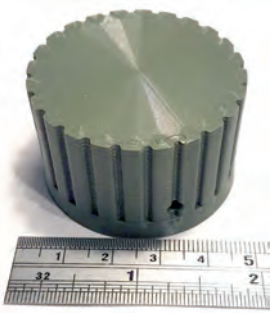
Hope this gives you food for thought on how you can enhance your homebrew projects. I haven't yet used 3D prints for anything load bearing like antenna parts, and will probably shy away from that on a safety basis.

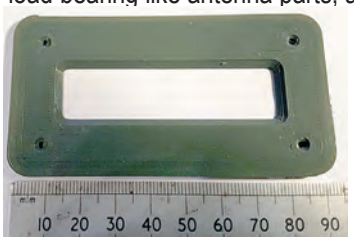
I understand that 3D printing is not for everyone, so if you'd like the odd bezel or tuning knob I'd be happy to look at your requirements at reasonable cost.

Prototype tuning-Knob



Finished tuning-Knob





A finished 'military' 16x2 bezel

Simplehet-X (with crystal filter)

Philip G4HOJ email: G4HOJ@yahoo.co.uk

Background

So you've all been waiting for my fight with a minimalist valve superhet design? What– you haven't?...Well I'll share with you anyway!

As most will know by now, my interest is in 'minimal but good enough' performing RX designs that aren't over-challenging for anyone to have a go themselves. Of course, the beauty of good regen and DC receiver designs is the ease with which they can be made to work and the quietness/'presence' of the receivers….and my experiments with simpler superhet ideas so far have been somewhat frustrating. But I don't give up!

So, in circling a few valve superhet ideas again, what outcomes and compromises should I focus on for this challenge? Perhaps a maximum of two valves?...or would I need more? I thought that any form or loudspeaker output would be unlikely, but I did want to aim for some sort of simple filter to give some opposite sideband rejection, otherwise I think would always prefer a good regen/DC approach (such as my Re.Si.Va. and Anoder designs), certainly on lower bands. Two band coverage could be a real bonus, but not at the expense of complication.

Of course, a key issue with superhet design is choosing an IF frequency. I had a look through my limited junk box. Aware of some old band-imaging designs for 80m and 40m that used an I.F. in the 1.6MHz region, I stumbled across a 1.725MHz crystal (well, two but they were not the same, or usefully separated in frequency). But there was also a bag of 1.735MHz ceramic resonators.

This combination seemed like a possible starting point as both 80m and 40m bands are two that I enjoy,. It was also might be achieved (3.565MHz + 1.725MHz = 5.290MHz and 5.290MHz + 1.725MHz = 7.015MHz) without switching.

In my search, I also found ECF82, ECH81 and ECC81valves, good candidates as each envelope hosts two sections.

Experimenting

So, a (very) long story made short(er)…. first I tried an ECF82 mixer/oscillator…worked well… the frequency wandered and pulled a bit but I wasn't too bothered initially.....just pleased it worked. Then I set about the next, arguably more important, stage(s). I figured that if two valves had to cope with insertion loss from a crystal filter and give decent headphone reception, there could be no I.F stage…so what to do?

Amongst various ideas, I tried a half-ECC81 ceramic resonator regen detector, with the other side as an AF amp. Then an ECF82 pentode regen with triode AF stage. Both worked well, with reasonable headphone volume, but, predictably, when I tuned the regen close to the crystal filter frequency on one side, it jumped to the other side. The effect was far less than I have experienced with a tuned circuit regen and would probably be quite useable, especially if switching capacitors to change sideband rather than tuning through, but, I decided to adventure on to see what else could be learned.

BTW, just as an experiment, I tried a simple high impedance, series, back-to-back, two di-

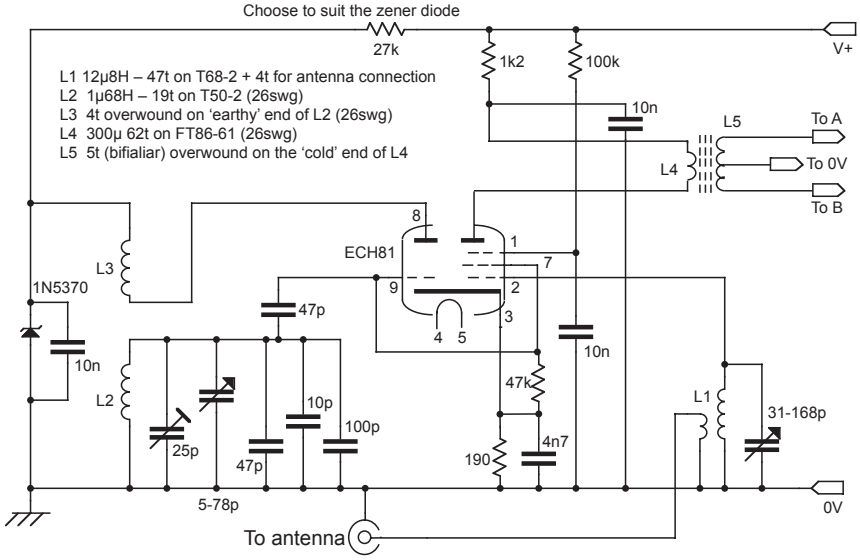
ode product detector, immediately after the frequency changer. I used the triode of an ECF82 as a BFO and the pentode as an audio stage. Interestingly, although that receiver variant had insertion loss from both crystal filter and passive product detector, worked remarkably well and was quite easy to get going. However, bravely, I decided to venture even further into the unknown to see what could be achieved.

Some Detail

After trying a variety of other approaches, I developed this SimpleHet design, which was better than any other. It provides a product detector/BFO, using the heptode of an ECH81, with the triode as AF stage. At first it was difficult to get things working (at all) as I wished, with things seemingly frustrated by the common cathode but, by insulting the oracle (.pdf data sheet), I worked out that the negative bias on the grids must be reduced/removed to get things working nicely. With better understanding of the interactions between the valve electrodes, it was much easier to make it percolate well, so I just needed to pull my ceramic resonator BFO down to the crystal filter frequency…achieved relatively simply.

The ECF82 front end had worked well and I ran it for some time but there was some oscillator pulling when peaking the RF input. So, I rebuilt, trying another ECH81 with little more conversion gain, less frequency pulling and good earbud volume from most stations on 80m. The intrepid experimenter really began to feel success!

And so, I measured, thought and tweaked to optimise my design. These adventures, always surprise a little by how so many parameters can be optimised…screen voltages, cathode resistors, coupling and bypass capacitors, etc. I found many small but collectively noticeable improvements and also noticed how it was possible to make a noisier but less sensitive superhet by moving in the wrong direction!



The I.F. load for the ECH81 frequency changer was a major dilemma. I have no I.F transformers, so I tried a miniature axial choke with a fixed capacitor and trimmer across to resonate at 1.725MHz. These cheap chokes (like small, slightly fatter, resistors) vary quite a lot from the

inductance their colour bands indicate so it is useful, not essential, to measure. I used 182uH, resonated by parallel fixed and trimmer capacitors, as mixer load/transformer primary. Two cross-coupled 80uH (as similar in value as I could find) chokes, centre earthed (and separated from the 182uH choke by between ¼ and ½ inch, as coupling was strong), formed the secondary, feeding my filter. At first, I resonated the secondary chokes (capacitor/trimmer) but decided that un-tuned gave better overall performance.

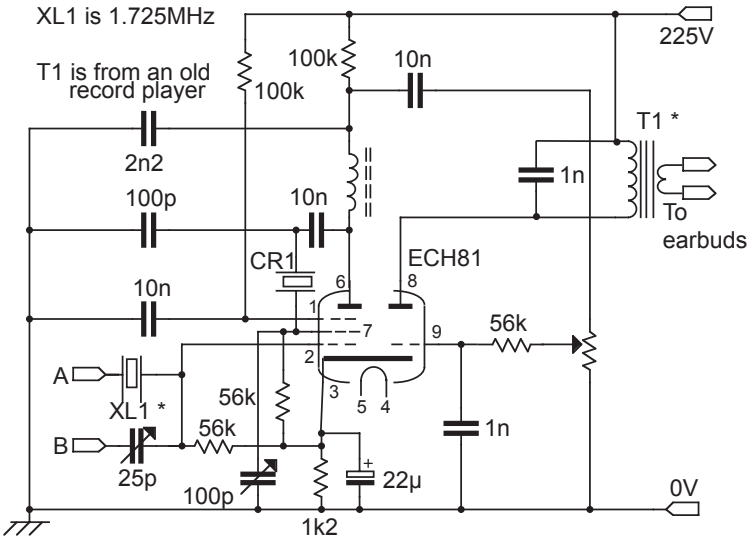
The 'R' of the ECH81 heptode anode is quite high so, although the chokes worked well at very low cost, I felt more experiment was needed. The reactance of the 182uH choke is medium but the Q is quite low so I decided to evaluate a higher Q approach. A quick way for me to do this with some certainty was to use a toroid. I tried a few with some success but the only type I had that could give significant inductance at high Q was FT86-61….so I filled one with a single layer of 30 S.W.G wire and achieved about 300uH. This inductance may be greater than optimum?....but I did try fewer turns with no increase in output, just the need for a larger resonating capacitance. Anyway, I found that higher impedance loads, especially when the result of higher Q, gave the best output voltage.

In summary, the FT86-61toroid transformer gave even better conversion gain and better overall filter performance than with the chokes. That is not to say that the axial choke method didn't work but a less output and, as I didn't screen the chokes, a little stray I.F. signal made it around the filter. By comparison, the toroid is self-screening and provides a higher Q inductor (and that inductance has higher reactance) so is a better load into which the mixer can develop its I.F. output.

Finally, the AF stage provides modest but sufficient gain. It only requires a volume pot. (you will need that!....way too much audio for my earbuds), which is also the grid resistor, and an output transformer (mine is from an ECL80 "gramophone" amplifier) for low impedance loads (replace with a resistor and isolating capacitor if you use high imp. phones). I do use a (non-essential) two component RC low pass filter between the volume pot. and the triode grid and a capacitor across the transformer primary to reduce very high frequency response. I use cheap earbuds or other low impedance headphones but there is also enough output to drive a speaker for quiet shack listening. I run the receiver at around 225 volts (draws only about 20mA), although it will work at lower. Changing the frequency changer to an ECH81 reduced total heater current to 600mA at 6.3 volts.

That Filter

As I said earlier, even though this was a simplest-receiver-of-its-type experiment, I wanted the bonus of at least some useful filtering to justify spending the time developing and optimising a superhet. I used a simple, very old-school, "phasing filter", partly because I only had one crystal and partly because this filter type actually gives good performance for such a simple/elegant design. Given that the un-tuned secondary had worked better with the choke-based transformer, I also tried a few experiments with different, bifilar twisted-wire, secondary windings over the end of the mixer primary winding that goes to the B+ supply. Here, I found that a five turn, cross-coupled, earthed link, bifilar wound secondary gave best performance in providing the balanced, phase-shifted, input for the filter, likely because series resonance of a crystal offers a low impedance path. I think the phasing capacitor works well but if you don't want to bother with one, just wind a single five turn link coupling, ground one end and feed the crystal with the other.



I found that, when used with my product detector input load of 56K, the toroid/crystal arrangement is wide enough to allow reception of SSB but also provides single signal reception of CW – a good result! However, I do have the transformer, trimmer and crystal filter on a separate lift-out board so I can continue to try and compare different approaches for the transformer and filter.

Frequency stability

I mentioned that the ECF82 local oscillator frequency wandered pulled a little. It would have become annoying over time as my valve regens and DC receivers, with oscillators at signal frequency, are actually very stable after warm-up. When I changed to the ECH81, things improved a little but not sufficiently for my liking. I had initially used typical L C ratios for the oscillator tank circuit so I experimented with an old trick of increasing C as much as possible. The theory is that having lots of C in the tank circuit swamps the inter-electrode capacity changes that seem to constantly afflict many devices – even after warm-up. I reduced L and increased C to the point where the anode 'tickler' winding had to be increased to maintain oscillation and now, although not quite 'rock stable', it is quite good (e.g., an SSB net stayed reasonably on pitch for 45 mins or so). I only roughly stabilised the anode voltage to the local oscillator with a Zener (the anode resistor should be adjusted according to the Zener you wish to use) and some say there may be benefit in also stabilising the supply to the frequency changer section screen grid…but I have not found that necessary. Obviously, mechanical stability and protection from air temperature changes should be taken for the best results.

Band-imaging

With the band-imaging approach I adopted, low to high tuning direction is the same on both bands but there is sideband reversal, so I tune the BFO low of the crystal frequency for LSB on 80m and high for LSB on 40m. I cannot detect any difference in filter performance between the two….but I am not being super-critical. I used a 1.735MHz ceramic resonator in my BFO

(bought very cheaply from a Polish supplier) and, with the 100pF variable, I can tune it from 1.722 to 1.728MHz …but I think it should be easy enough to replace with a tuned circuit.

There is no need to build this receiver as a band-imaging receiver for 80m and 40m. Many other combinations, including the old 80m/20m with a 9MHz IF, could be tried. Of course, there is no need to band-image at all…or to use any particular I.F. In fact, if only for 80m, then 455/465KHz could be fine (and you may find suitable I.F. transformers?), with the local oscillator operating at 3.955MHz upwards, rather than 5.225MHz and up – changing oscillator components to suit.

You will see that I use a single-tuned front end. That gives good enough image rejection but I do use an L match on my inverted L antenna. If not using such an arrangement, you may wish to use two, capacitance-linked (a few pF), tuned circuits as a tuneable bandpass filter or, indeed, one could use switched, fixed component, 80m and 40m bandpass filters.

Thoughts and Observations

Some might use a resistive attenuator on the antenna input but the ECH81 PD/BFO is quite robust and I have not noticed any overload from the strongest signals that my antenna can receive.

Adding a further pentode output stage would give very loud speaker volume even on the weakest signals – my double triode general purpose station amplifier had way too much gain. In most cases, I listen in a quiet shack so the ECH81 triode provides enough audio for me.

I am not a great fan of AGC but it is possible to use a negative control voltage (through a large value resistor) on G1 of the frequency changer ECH81 to achieve a gain variation (this requires that that grid be connected to the input tuned circuit by a capacitor (or the control voltage will be shorted through the inductor) and I did experiment with audio-derived AGC from the top of the volume potentiometer, which worked but needed a very strong signal for there to be any noticeable reduction in gain. I may continue to experiment with that BUT because I thought you were all hanging in there desperately waiting for this episode, I have rushed it to you as soon as possible ☺

My epic adventure resulted in an 80m/40 band-imaging superhet, CW/SSB, two valve (five function) RX, with good 'selectivity', not much internal noise and strong headphone output - and still relatively simple. An enjoyable receiver, I think about as simple as one can get for the performance, maintaining my minimalist approach but entirely useable as designed and tested…and also providing the basis for further experiment. Let me know how you get on!

Construction and cautions

The main thing to watch out in layout is to keep signal leads as short as possible, especially around the filter (if used). Heater circuits should not be too much of an issue but, by default, I use a centre-tapped transformer, twisted wire feed and, as a precaution, you will see that I placed a capacitor across the heat pins of the frequency changer valve.

Build the local oscillator robustly and use rigid wire for all connections around the tuned circuit.

Obviously, if you are not familiar with working with valves, be careful when working with the higher voltages and also choose component voltage ratings accordingly.

Membership News

Daphne G7ENA, 33 Swallow Drive, Louth, LN11 0DN

Welcome to the first membership news for 2022. Here is hoping things settle down and get back to some semblance of normal. It will be nice to get out and about and meet friends old and new at some of the radio rallies.

Your last Sprat?
This will be your last Sprat if your wrapper label says “membership expired” or “underpaid”. Please check your wrapper and contact me (or your overseas representative) if this applies to you. Please do not assume if that if you are a UK standing order payer that it can’t be you.

If I could not identify your payment then your membership has lapsed. Please everyone, check the wrapper now. If underpayment applies to you, there will no further Sprats until you send the balance.

Providing information with your payment: Astonishingly our overseas reps and I receive payments with no information about the member paying. We have no special gifts of prescience so please take the trouble to include your name, callsign, membership number and address. An email address is very helpful if we need to contact you about the payment.

Australian Representative: Norman (Norm) VK5GI has been our Australian representative for many years, he has decided it is time to step down and pass the reins to someone new. The committee and I would like to thank Norm for all his hard work. I used to enjoy Norm’s emails, they were often humorous and he had the courtesy not to mention the cricket.

A big welcome to **Terry VK5TM** who is taking over from Norm. The new bank account details are: ***Terence Mowles, Bendigo Bank, BSB 633 000, Ac# 189 951 429***.

Terry can be contacted at, *vk5tm@emailme.name*

Changes to Representatives Details:
A slight change to **Richard Sayer’s** address details:

F5VJD, 408 Vignouse, 35380, Paimpont, France.

Henk has a new bank account, the new number is at the ING bank in the name of:

H.W.Smits. Leiden NL36 INGB 0002 1552 94

Privacy.
This is to remind you that the club holds a database of all our member’s names, callsigns and addresses. It is implicit that every time that you renew your subscription, you are giving us active consent to record this activity in the club database. We only use your data to confirm your membership to send you Sprat, QSL cards, or fill your order in the club component store.

We only share your data with the printers who mail you your Sprat. If you are unhappy with us holding this information about you, then clearly you cannot, for all practical purposes, be a member of the G-QRP Club. If you contact us we will gladly refund your unused membership fees and delete your data.

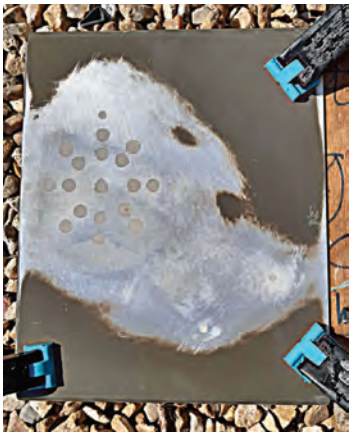
Heathkit Case Restoration

G4USI email: daimontilley@hotmail.com

I recently purchased this Heathkit HW-9 on eBay, paying just £75 including postage. As you can see from the above picture, it sported a few modifications! These included two holes on either side of the front panel, one for a potentiometer (number 7!) that was unconnected internally, and one for an 'ON' LED on the right hand side. The original brown dial was also missing, with a hand-written white dial in its place. The top and sides of the case were also full of holes which were not even round! These included holes for an internal speaker as well as other holes on the top and sides that seemed to serve no purpose.

Having completed a full re-alignment, I decided to fully restore the case to its original condition by filling the holes using ISOPON P38 car body filler and re-painting. To prevent the filler passing straight through the hole, I used thin aluminium tape on the inside which I left permanently in place and then clamped the inside of the case to a board for support whilst filling.

I carefully pressed filler into each hole and was sure to leave the outer surface of the filler a little proud. Within 20 minutes, it was hard and I then used various grades of 'wet and dry' sandpaper to level the surface of the filler, ending with 400 grit. Once this was sanded flush with the surrounding metal, I noticed one or two imperfections in some of the holes and so I



repeated the process where this was necessary.

I was particularly careful on filling the two fascia holes to try to minimise the area I took the paint back, but this was harder than it looked and I ended up with a much bigger repair area than the holes.

Extensive internet searching did not reveal any paint codes for the two-tone Heathkit browns. Off I went to my local decorating centre. They scanned both browns, but the colours they came up with were not great. Instead, I spent over half an hour outside the store with their enormous colour swatch book and found excellent matches. **The colours were DULUX Satin, the case is 10YY/14/080 and the dark brown on the fascia is 30YY/05/044.**

I found an online retailer who could take a Dulux colour code and put it in an aerosol can. I duly ordered the light brown for the case. I first used grey primer spray on the case giving it a couple of coats, followed by the lighter of the two browns. Experimentation showed that a satin paint was required and I obtained a beautiful finish which was a very good match in both colour and sheen.

For the fascia panel I tried to use my dark brown test pot to just 'touch-in' the two repaired areas on the fascia. It was a complete bodge. Again a satin finish was needed and the area was too big to achieve a good brush finish. I then painstakingly used masking tape and a new craft knife to mask off the lighter brown areas and the decals on the dark brown section – it was fiddly work. I then ordered the dark brown in a satin finish aerosol and used two coats of primer and two top coats. I was very pleased indeed with the results, which were not perfect, but pretty close.

The final bonus? Remember that tatty white, handwritten dial, well when I took it off, it was nothing more than the reverse of the original brown dial! I touched up some white chips on the brown dial and realigned the dial on the VFO for accurate frequency display. It looks just beautiful and is a joy to use.

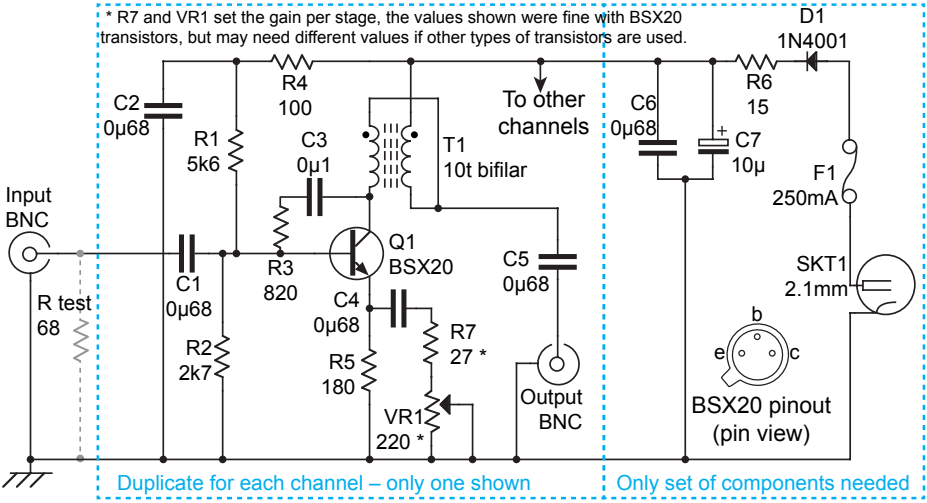
A Receiver Distribution Amplifier

David Johnson, G4AON email: dave.g4aon@gmail.com

This amplifier is designed to be used with an active antenna to provide signals for up to four receivers in the ham shack, giving the opportunity to easily monitor several frequencies simultaneously. Such amplifiers are often used in commercial installations, yet circuits are rarely seen, nor do such units often appear on the surplus market. Signal handling is more than sufficient when used with a PA0RDT type of active antenna and is low noise.

Commonly available parts are used and a PCB layout is available for home etching. The board is 122mm x 75mm and single sided. The design is based on a generic receiver preamp with each stage being adjustable over roughly a 10dB range, with a maximum gain of approximately +7dB. The measured 3rd order input intercept of the assembled unit was +15dBm with an input level of -20dBm for each of two tones, giving unwanted products of -90dBm. Isolation between channels is in the order of 20–25dB.

While I used BSX20 transistors, 2N5109 or similar transistors with a reasonably high f_T of around 500MHz can be used, in which case a single stage could be built "rats nest" style to check the performance. The Club free "2N3866-like" devices should also be ok. The print board layout uses a TO5 spacing to more readily accommodate alternative transistors.



The amplifier comprises 4 common emitter preamps in parallel, each designed for an input impedance of 200Ω giving a combined input impedance of 50Ω, with an output impedance also 50Ω. Each stage draws just under 20mA at a supply Voltage of 13.8V. Protection from

reversed supply is via a series diode with a 250mA polyfuse to limit the current in case of a short circuit.

If testing a single stage, use a 68Ω resistor across the input BNC socket to simulate the combined input impedance of the stage under test and the 3 "missing" amplifiers (3x200Ω in parallel = 66.7Ω).

The bandwidth is approximately 30kHz to 100MHz at the -3dB points. At the expense of a reduced lower frequency response, the more common FT50-43 cores could be substituted and will give a bandwidth from around 200kHz to more than 100MHz. There is no filtering to limit the upper frequency response, or to reduce broadcast stations, breakthough. If needed, an external filter could be added, although unless you have a nearby broadcast station, it is unlikely to be necessary.

There is no automatic switching to disable the amplifier when transmitting, at QRP power levels (and reasonable spacing of your active antenna from your main antenna), disabling the active antenna may not be needed during transmissions. If needed, there is a suitable switching circuit in the active antenna link below.

During construction, the design could be built "Manhattan style", or using a home etched and drilled board using the layout in the link below. Each transformer is wound using a pair of 0.25mm enamelled copper wires tightly twisted together using 2 or 3 turns per centimetre. It is important to twist the wires, parallel wires have less bandwidth. Take care to not damage the enamelled coating.

Single sided PCB was used with unused areas flooded with copper to provide sufficient ground areas. Lead spacing for the 0.68µF and 0.1µF capacitors is 7.5mm, smaller components will need their leads adjusted to fit.

Each stage should be checked for an emitter Voltage of around 3V, and the overall current checked (approx 75mA). Finally mask off the mounting holes, then spray the copper side of the board with print circuit lacquer and secure the transformer cores to the board with "704" silicon, or similar, non acidic fixative. The board is mounted using M3 (3mm thread) hardware. There are no ground connections to the board except via the mounting spacers, check the continuity of each mounting spacer to the negative pin of the board prior to fitting the board in the case. Note in order to avoid ground loops and possible noise pickup, the power input socket negative connection should only go to the pin on the board, not the case.

The gain preset control, VR1, when set to the mid point, should give around unity gain. If additional gain is needed, turning VR1 3/4 clockwise will give approximately 3dB of gain and close to 10dB when turned fully clockwise. Avoid the temptation of running all the channels at full gain, most modern receivers have a lot of sensitivity on HF and don't need additional gain from a preamp. Unused channels should be terminated in 50Ω using BNC 50Ω terminators, these are cheaply available from eBay suppliers.

GM4EVS developed the initial design of the 200Ω in, 50Ω out amplifiers. His **LTspice** *modelling accurately predicted the performance as measured with a spectrum analyser and tracking generator.*

Some useful links

Board layout and parts list: https://www.qsl.net/g4aon/resources/dist_amp.zip

A suitable active antenna with transmit switching, as used with this project: https://www.qsl.net/g4aon/pa0rdt_aa/

Enigma Components, a UK supplier of FT50-75 cores: https://enigma-shop.com/

ON-AIR ACTIVITY MANAGER

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

Winter Sports

Thank you to all who took part over the Christmas/New Year period, whether or not you submitted a log. As usual opinions differed a little with regard to propagation conditions but for the first time in quite a few years 40m yielded plenty of inter-G QSOs whilst there was Dx to be worked on the higher bands. I decided to put my small portable QRP rigs on the air (K1, MTR-5B and Sierra) and had great fun with them on all bands 80m to 20m. My 160m QSOs were made using my homebuilt Picastar tcvr. Unfortunately, the end of the year coincided with a change of internet provider for me with the associated email hiccups and I therefore hope no logs went astray as a result.

Logs were received from **G0BPS** Dick, **G0EBQ** Nigel, **G3MCK** Gerald, **G3VTT** Colin, **G3XIZ** Chris, **G4ALG** Steve, **G4ARI** Tim, **G4FGJ** Gordon, **G4GIR** Ian, **G4HMC** David, ***G4USI** Daimon, ***G4XUV** David, **GM0EUL** Peter, **GW0VSW** Carl, ***M0KTZ** Enzo, **M0RON** Andy, **MI0BPB** Andrew, ***DJ0IP** Rick, ***ON7DQ** Luc, **PA0RDT** Roelof, **RW3AI** Valery, **YU7AE** Kare, and a check log from ***K1WAT** Oleg. Those members for whom I know this to be the first time they have submitted a WS log their call sign is marked with "*".

Unfortunately, space does not allow me to reproduce all the interesting comments and highlights reported by members, but I will do my best to squeeze in as much as possible. The log from M0RON was unusual in that it was an 'all SSB' entry, and all on 20m using his FT817ND and end fed aerial. As ever G4GIR tried almost every band and mode imaginable, including "an SG Labs up-converter driven with an IC-7100 for QO-100 satellite @ 5W into a WiFi grid antenna", resulting in a cross-band QSO with G3XIZ and a QSO into PY. Ian was also pleased to work XV1TX on 12m and, by contrast, a 630m QSO using his TS-990S at 1mW output via a LPF into his inverted L with near neighbour G3XIZ. Working his first VK station with his K1 was a great thrill for MI0BPB.

G4USI used a variety of rigs and in particular had great success on the HF bands where he is lucky to have a Spiderbeam. He had 68 QSOs including 3B9FR (6331 miles) and PY5AMF (5973m). Using his uBitx which had no CW filter (just a wide SSB filter) he had QSOs with WB2SMK (3250 miles) and 4A3NU (5424m). DJ0IP rarely heard any UK stations but for Rick "it was fun getting back to QRP". All of G0EBQ's QSOs were made using his Sierra tcvr at 1W O/P which enabled him to work into the USA and Mount Athos (a rare one!). G4XUV was pleasantly surprised to hear/work so many UK stations around 7030kHz, and was using his homebuilt QCX Mini. Since January 2021 PA0RDT has been suffering with severe QRM from an offshore windfarm 35km away, making life on LF rather difficult, although he did manage 160m QSOs with G3VTT and G3XIZ.

Using a one valve TX (12A6 producing 5W to a trapped inv L) Colin G3VTT pulled off his now familiar 'wonder QSO' on 80m at 0722z with W3TS, and that is a remarkable achievement! RW3AI used his G90 to great effect making dozens of contest QSOs around EU along with a few relaxed WS contacts. Although not (yet) a member I should make a point of thanking Oleg K1WAT who provided a few members (eg G4HMC, G4GIR and G3XJS) with 2-way 20m QRP CW QSOs across the pond. Oleg was running 5W to his quad and was quite a consist-

ent presence on 20m. With his homebuilt solid-state transceiver, and doublet aerial, G4HMC also had a 20m QSO with AE1T. A Rockmite, a K2 and a QCX were the weapons of choice for G4ARI, while Gerald G3MCK used his homebrew valve superhet Rx and vxo/pa Tx to produce what he called his "modest" log.

Dick G0BPS now lives in a retirement village where outside antennas are not permitted Consequently throughout the operating time he only used a long wire aerial which was resting across the roof and in the gutters of the bungalow. Pouring rain all day didn't help. Dick says that his CW never was much good and with his hearing deteriorating too, WSJT-X was a boon. His FT8 log included 169 QSOs (35 DXCC), with the best being KB1EFS on 12m and PY5TG on 15m. Working under such demanding local restrictions Dick's log wins him the **Winner's Certificate for the digital section of Winter Sports**.

Enzo M0KTZ is a "total newbie" (his description, not mine) having gained his Foundation Licence in May 2021 and only discovering QRP in September 2021. Using 5W or less on 80/40/30/20/17/15m he worked 23 DXCC. He says, "I have operated CW only, and QRP only, by lowering the power on my old IC-718 and sending with a second-hand Kent straight key. I have been experimenting with indoor antennas, and all the contacts in this log were made with a homebrew indoor loop in the loft (a long loop folded through the roof, about 30m in length - not a mag-loop! - fed with a 4:1 balun and coax). I use a much needed X-phase QRM eliminator, with a length of wire down the external wall of the house as a noise aerial.". His efforts and approach to amateur radio are to be commended and he therefore wins the **Winter Sports Runner Up Certificate**. Before moving on to this year's winner, Enzo's further remarks are well worth reading:

"I know this log is not outstanding or impressive in any meaningful manner, but I wanted to send it anyway to show that QRP activities like the G-QRP Winter Sports are much needed and can be quite rewarding, even for total newbies like me. I did not manage to work any proper "extreme DX" in the set period, and the maximum distance achieved is about 3000 Km (SX and SY were a nice addition, though). But I have had LOTS OF FUN with CW and QRP, and I hope we as a club will continue to support casual and friendly QRP activity on the bands, especially for novice hams."

Steve G4ALG compiled his log using an all homebuilt station - his 6-band solid-state VXO tcvr, and a solid-state 80m tcvr. The aerial was a 110m horizontal loop. He made a total of 132 QSOs – highlights being K8GL and K3LU on 20m, and a memorable QSO with G3AGF who (at 96 years young!) is still sending great morse. Steve's contribution to this year's Winter Sports earns him the **G4DQP Trophy**.

QRM from **QRO** (and often inconsiderate) contest activity consistently appears on the list of main complaints! However, congratulations and thanks go to all who supported the event, particularly those appearing on the winners' rostrum!

Turning to **The Chelmsley Trophy** I am pleased to announce that Peter **GM0EUL** is the 2021 winner. He made a total of 391 QRP contacts with a DXCC count of 37. 40 QSOs (12 DXCC) were 2-way QRP, the best Dx being SQ9FWR and OM6AN. His overall highlight was when experimenting with a 20m QCX pushed to work on 30m and running about 4W to a dipole. He called CQ a couple of times (purely to look on the RBN and see if he was getting out at all) and was amazed to be called by Jeff TZ4AM in Mali! Having signed after his enjoyable 9 minute QSO with Jeff, who was running 1kW to a full size 30m yagi, the inevitable pile up descended and Peter has little doubt he would not have been heard if he'd had to com-

pete with the pile-up. The equipment used at the GM0EUL shack for his entry was: KX3, K2, QCX20 (30), QCX40, MCHF, homebuilt one valve xtal controlled Tx on 40m and 80m (with FRG7700 Rx and h/b DSP filter) and a HW100. Antennas (all homebrew) were 80m EFHW for 80/40/20m and a 30m dipole.

Suffolk Trophy. A reminder that this takes place on **International QRP Day** (June 17th each year) – rules to be found on the Club's website – and this year the event will mark the beginning of Summer Sizzler (see below).

Summer Sizzler. Those of us who 'go that far back' may remember this annual event but unfortunately it slipped from the G-QRP calendar of events. The Club feels that another activity period, very much along the lines of Winter Sports, might be welcomed by members (especially in the summer period when stations are out and about /P) and it therefore proposes that Summer Sizzler be re-instated. Like WS, the event will run for 7 days, starting on 17th June (International QRP Day) and finish on 23rd June. It is not a contest (ie no points per QSO) but just like Winter Sports is another relaxed activity period and a chance to hook up with like-minded QRP folk. May I suggest you make a note in your radio diaries now, before you forget!

Last year the Club ran its inaugural **Convention On-Air Activity** Period and would like to run something similar (possibly with some small changes changes) in 2022. The Convention will be held over the first weekend in September but, as was the case last year, the Club will aim for the activity period not to coincide with streamed talks and lectures. Further information is to follow, but please see below:

ACTIVITY SURVEY.

The Club is once again actively looking for input from members seeking suggestions and ideas for ways to encourage members to get on the bands. As you will see above there are plans to reintroduce Summer Sizzler, and an improved Convention On-Air Activity Period. My own view is that having too many activity periods is likely to be counter-productive, diluting what interest there is, and that Club members generally prefer low profile 'social' events without complicate rules and a '599 001'points scoring system.

G3VTT Colin's enjoyable Monday Activity Day flourished for a few months but support seems to have diminished. But what do YOU think? Now is the time to voice your opinions and possibly influence the way your Club runs on-air activity periods, and how often they take place. This column has asked for input before but, I have to say, the response has been minimal. Is that down to apathy or possibly that you are (by and large) happy with present arrangements? Please respond as soon as possible to me via email or snail mail and let's see if we can reach consensus on this important issue. On-air QRP activity lies at the heart of the Club's ethos but activity events can only ever be as successful as members make them, and without good support they will inevitably wither and die. "Horse - trough – drink", if you get my drift!

Keep the QRP flag flying and hopefully we will meet on the bands soon.

72 de QRPeter G3XJS

These are the International QRP Calling Frequencies:

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

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

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

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

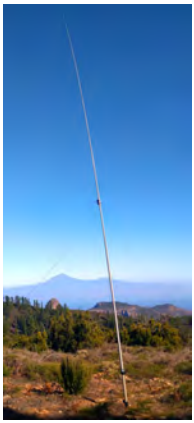
MEMBERS' NEWS

by Chris Page, G4BUE

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

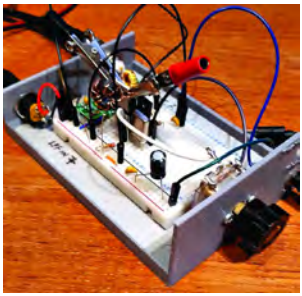
Some sad news from **EA2SN** who reports **EA8EY** became a Silent Key recently. Those of you like me, who were QRV using QRP in the 1970s and 1980s, will remember Aga very well. He was very active and gave many of us Africa for our various two-way QRP Worked all Continents (WAC) awards. In April 1983, he won the 6th DXCC Milliwatt award from **WØRSP** after working DXCC with less than 1W on CW. Also in the 1980s, with other friends from La Palma, he founded the EA8-QRP-DX-Club.

My apologies to **DF2OF** for getting his call wrong (**DF2QF**) in my last column when describing his QO-100 /P activity. Matthias was QRV as **EA8/DF2OF/P** last December (pictures right) and activated some summits for GMA and WWFF, making about 50 QSOs with his old PF3R TCVR at 5W. The rig has an ATU and touch Keyer and runs a very long time on eight Mignon cells, and the antenna was a monoband inverted T antenna for 20m. Matthias said, "The antenna works like a charm. It was a lot of fun, even with high winds and fog at 1300m [4265 feet] altitude". His best DX was **N9MM** in Texas at 4602 miles. **G5LOW** was QRV from the Scilly Isles for two weeks in January. **G3XJS** and **GØEBQ** are trying to establish a 30m European Sierra net on Sunday mornings at 1100z on 10116kHz, though they are finding it hard work with the QRO QRM. **G8NXD** has been 'playing' with a Hermes Lite 2 SDR TCVR, and building a QDX from QRPLabs. His 40m antenna is a loaded vertical using 20ft of alloy scaffold pole, a few feet of fiberglass scaffold pole as a joiner/insulator around which the loading coil is wound, and then a further 16ft of 1.75 inch alloy pipe held inside the fiberglass tube. Mike also bought a few a 5ft wingspan Cody box kites for experiments with kite antennas and has a few spare if anyone is interested, <pencoys@gmail.com>.



During 2021, **K8ZT** took part in the State QSO Party Challenge with the goal of working all 45 events. The problem was he would be on an Amtrak train trip on the California Zephyr during the entire California QSO Party, and so his opportunity to get the two required contacts would be on one of the platforms during one of the Zephyr stops (usually around five minutes, but with a few 10-minute stops) so there would be no way to set up an antenna. Anthony was using his Elecraft KX2 and purchased an AX1 for the trip. His first opportunity was 10 minutes at Glenwood Springs, Colorado Station where, using the KX2 and AX1 with counterpoise, he worked **K6XX**, **W6FRU** and **N6TV** in CA on 20m. During his next opportunity, now as an in-state station from the Sacramento platform, he worked two stations on 20m: **WØBH** in KS on CW, and **K2KR** in CO on SSB.

G4USI built the **VK3YE** TX from *SPRAT* 188 on a breadboard (right), his first 'scratch-built' TX, and was reasonably pleased with just under 4W on 40m, and just over 5W on 80m that gave him ragchew QSOs on 15 November with **F5LAW**,



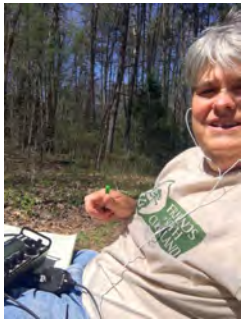
GØSTK and **OK1HCG**, with his EFHW antenna and SDR rig on RX. Daimon plans to build it into an Altoids tin as a permanent addition to the shack. Good luck to him taking over the HF Column in *RadCom* with **G3YPZ** in alternate two month blocks. It is their intention to try to promote QRP in the column as thus far it is dominated by DX reports. Damian also regularly writes for *Practical Wireless*.

Like me, **GØBPS** has recently down-sized, but to a retirement village where only satellite dish antennas are allowed. Dick entered the Winter Sports with his IC-7300 feeding an EFLW antenna with a 9:1 unun. The black antenna wires go over the bungalow roof resting on the black tiles and he has painted his multi-band vertical to match the bricks of the side wall - so far so good! He made about 160 QSOs in 35 DXCC in the Winter Sports. After a lot of soul-searching, **G3ZOH** took the decision to go 'dry' from 1 January 2022. For the avoidance of doubt, he explains this refers to ferric chloride - not alcohol! Brian's work on homebrew projects has slowed while he gets to grips with EasyEDA for designing and ordering professional quality PCBs, but he thinks it will prove to be a worthwhile investment of his time.

M1GWZ has also built the **VK3YE** TX but decided on a spam tin for his enclosure, calling the rig the 'Spam-o-dyne' QRP CW transmitter, albeit modified to transmit on 80m rather than 40m, note the integral morse key! Phil says, "As promised, the rig puts out a solid 5W with a clean sine waveform around 3579kHz. Now all I have to do is to get my morse up to scratch! I'm told that 'spam' is like Marmite or FT-8, in that people either love it or hate it - suffice to say that this is an enclosure I will definitely be enjoying again. Meanwhile, I've got my eye on a tin of corned beef for the accompanying receiver".

G1WVK caught the radio bug, in 1979 after reading **G3RJV**'s inspirational *Ladybird* book, and became licensed in 1987, initially QRV on 2m and 23cm ATV, he went QRT until the first 2020 lockdown. The stay-home rule triggered Jeremy to buy an FT-818 and he became QRV using FT8 before moving to SSB. A Xiegu G90 followed and a FT-1000MP in a SK sale (right). He prefers QRP QSOs with the FT-818 and a recent QSO with **IK5YZZ** running 1KW into a beam made quite a contrast with his 6W into a **MØCVO** offset dipole, Giovanni found his love of QRP and his surname (Power) a funny combination! In December, **MØCZP** uploaded an index of all the **G3RJV** articles in *Shortwave Magazine* at <https://m0czp.uk/swm.php>.

In April 2021, **KD4PBJ** (right) did his first POTA at South Cumberland State Park, Grundy Forest near his QTH. Chris used 15W SSB with the KX3 into a low 88ft ladder-line fed dipole about 16ft high. He had 81 QSOs in a short time and said, "Most came back on my first call and it was like shooting fish in a barrel". **G4EHT** has moved QTH to Uttoxeter where he is using indoor antennas (a collinear for UHF/VHF, and tiny doublet in the attic that is almost resonant on 17m, but with an ATU can use down to 40m). Bill has bought an FT-818 and FT-991 and is very pleased with both, after working quite a few stations with his 5W QRP, including a two-way QRP QSO with **EA8/MØNGZ/P** portable on the beach, on Christmas Eve.



After being QRT for 14 months with health issues, **GWØVSW** (leftt) became QRV again in the Winter Sports. The vast majority of Carl's contacts are made with 1W from his G90 into a homebrew **G5RV** up about 30ft and folded into his small garden. His best DX this year is with 5W with **W4TJE** on CW. **GM4EIW** reports **MØBMN** has taken over Kanga Kits <https://www.kanga-products.co.uk/> in the UK and is marketing a kit of **GM3OXX**'s famous OXO. Paul sent John a pre-release kit that he built

and says, “An excellent simple kit with PCB, particularly for first time builders with soldering skills, or anybody wanting to remember George’s contributions, and very well documented”. **GØXAR** mentions a *YouTube* channel ‘Fesz Electronics’ that Steve says has, “A very informative set of instructional videos that some of you might find useful, are the best I’ve ever watched on electronics”. **GØPOY** also says, “I’ve been watching his videos for quite some time, and I agree they are very good”.

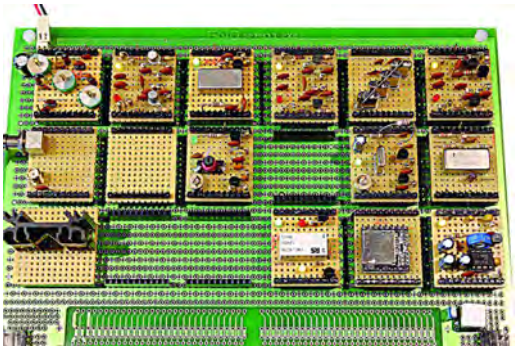
Pictured right is **G3TPV**’s build of **G4HOJ**’s ‘That’ receiver in *SPRAT* 189. One of the two boxes contain an LM 386 audio chip amp along with an audio filter for CW reception, also all relevant batteries, consisting of five AA rechargeable for heater supply lasting about six hours before recharge, four PP3 for HT supply and one PP3 for amplifier. Alan says the performance is first class with very good audio on SSB reception, making it one of the best simple circuits he has built (thanks **G6MNL**).

Pictured right is **R2AUK**’s new project, an improved version of his previous QRP CW 20-40m TCVR (page 29 of *SPRAT* 188) with improved selectivity by increasing crystals in the crystal filter from three to five. The original class AB PA design has been replaced with a more efficient class C PA using RD15 and KT3142A (=2N2369A) driver. The rig has a 40 x 28 x 12mm eight ohm 2W build-in speaker, which Alex says sounds very good for its size, and is all packed into a 165 x 110 x 55mm tin box. Besides the TCVR itself, the box also fits a 4S Li-Ion battery and Mini Paddle MP-817 key, the whole kit weighing 760gms. As a matching antenna, he built a 40/20/10m City-Windom that adds another 390gms. Alex has made a *YouTube* video and also published the firmware and the schematic <https://youtu.be/Xj_gt0U6YH4>. He is still using a trap dipole for 80, 40, 20 and 10m and usually calls CQ on 14058-9kHz weekdays for ten minutes around 1400 Moscow time.

The bands above 30m are virtually useless at **GØEBQ**’s QTH due to his loop in the loft that picks up everything. Nigel concentrated on 20m with his Sierra and had several pleasant two-way QRP QSOs, the best being with **YU7AE**. He finds the higher bands are starting to open up and managed USA and rare **SY8CDV** in Mount Athos on 15m. **G4THN** has been researching how a digital VFO might be made, specifically using an Arduino nano3 and a Si5351 frequency generator. Mike has also been making a HV capacitor leakage tester, the design ‘lifted’ off the Internet. He says, “250V AC from the transformer across a bridge and a C gives 340V DC. This is then applied to a high voltage MOSFET to give a variable voltage output and a 100 micro amp meter assisted by switched shunts, reads the leakage current through the capacitor under test”.

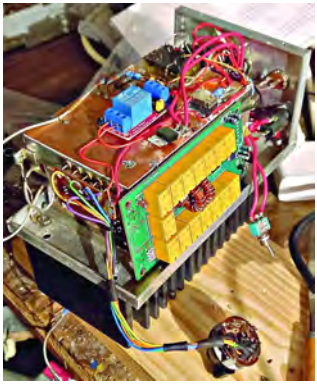
I4JXE recently discovered QRP and shares his /P (not /M) FT8, JS8call and SSTV (picture right) activity with us. All his equipment is stored in a shoulder bag that has to be walked to an operating location, and contains an EFHW antenna mounted in slope mode to a 23ft retractable fishing pole, 66ft feed line, Xingu G90 TCVR limited at 5W output, two Lip 4S 5000 am/h batteries, Raspberry Pi4b with seven inch touch screen enclosed in a plastic box (where also is a power bank for PS), and an external USB sound card. Gabriele says for FT8 and JS8, clock time of Pi4b must be synchronised to a NTP server via a mobile phone Wi-Fi hotspot, and to snatch photo to send in SSTV, the Raspberry mini camera works fine. The software is QSSTV. **2EØFWE**, another QRP SSTV operator (who was introduced to G-QRP by **G1TEX**), runs an IC-9700 and IC-7300 at home, and /M and /P with an IC-705. On 8 February, running 1W on 80m, Alan was received in Hamburg on a KiwiSDR and says, “Whilst not the best picture, it does show

that low power SSTV is possible. Once I have 'activated' the park, I will try SSTV on my next PoTA". He writes a regular blog at <https://hamradio.knipmeyer.co.uk /d41d8-neve-blog/>, that includes details of the SSTV QSO.

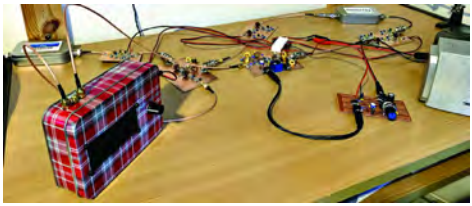


G4EDX recently returned to his modular BiTX-20 TCVR he is building on a prototype board (right). The top layer of the board is a ground plane at 0v and the underside is +12v. The plug-in modules are (l to r top to bottom): RF bandpass filter, bidirectional RF amplifier, first mixer (SBL1), bidirectional first IF amplifier, 10.000MHz crystal filter, bidirectional second IF amplifier, temporary RF input board, blank module for RF changeover, 4MHz LC VFO, vacant for PLL VFO, carrier insertion oscillator, second mixer (SBL1), TX power amplifier (unbuilt), absent, absent, transmit/receive power changeover relay, DFPlayer Mini, and receiver audio amplifier (LM386). The LC VFO is to be replaced with an Arduino Pro Mini and Si5351a clock generator occupying two module positions. Power enters at the top left. There is a momentary PTT switch at the bottom right, with a latching switch in parallel. The DFPlayer Mini can store spoken messages and two-tone test signals as .wav or .mp3 files on a micro SD card. These will assist with setting up and testing. Every module that needs power has one or more 3mm LEDs fitted, circuits powered for TX have a red LED, those for RX are yellow and those permanently powered are green. Birectional circuits have both red and yellow LEDs and the power change-over relay module has all three LEDs. John says it is very satisfying to watch the colours change when PTT is pressed. He still needs to build the microphone preamplifier, antenna change-over and TX PA boards

With some help from **G3ROO**, **MØNDE** has made his linear out of a defunct FT-707 PA and BPF modules. It is working and Nigel is adding an auto-tuner before finally boxing it up. Switching for the IC-705 is unusual with 7V positive on RX, so he added an opto isolator module from China on the top copper clad board. He and Ian removed the first drive transistor in the PA and have a resistor network on the top board to reduce the input. At one point they had 200W out! Nigel is now at a temporary QTH in Stoke with very limited scope for antennas and will be pleased with any contacts he can make. Fortunately, there is a park nearby, so some /P operation with the magnetic loop will be possible.



MØNTV's latest homebrew project (below right) is a SSB TCVR for 17m, in the hope that with improving propagation conditions, he might be able to use that band a bit more. It is currently configured as a Superhet with scratch-built mixer, product detector and crystal ladder filter. Nick's other pictures (bottom right) also show the product detector (with audio filter, IF diplexer etc) and the Cohn crystal ladder filter for 13.3MHz. Many of the modules are documented on his *YouTube* channel at <www. youtube.com/c/ M0NTV Homebrewing>.



G3VNT makes a few QSOs each week, mainly 80m CW, some SSB, but all QRP on either his QCX+ or JST 135 turned down to minimum, approximately 4-5W, into his inverted vee at 49ft centre. Lindsay amuses himself by calling QRO stations and getting 59 and 599 reports with his QRP. He hopes to be more QRV in the next few months with the QCX+ on 40m and writes, "I

provide PA, timing and other technical support for some equine competitions in Suffolk, so intend taking the QCX+ and the portable antenna with me. CW still needs a lot of improvement, head-copy still mostly eludes me!". Some ill-health and an operation on his eyes, has caused **VK5GI** to call it a day being the Club rep in VK after more years than he can remember! Norm is 'pushing 80' and says **VK5TM** will take over as Club rep, who he wished well. Norm has been 'firing up' his HW-8 with a Siemens key from the 1890s and working VK, ZL and USA stations.

GM4VKI is once again well into the restoration of another valve RX, this time a 1960s Minimitter MR44/2 (right). Roy says, "It's an all component change and new valves. Yes, all the cores have been twiddled but thankfully none are broken. The set is amateur only band, double conversion but differently, it's the front-end local oscillator that is tunable". He will be heading for the Blackpool Rally on 24 May with G-QRP stock, and hopes to see some members there. **G3XIZ** writes, "I am ashamed to admit it, but my winter project was a QRO TRX for the MF band and as it runs 300W, I shan't be sending you a photo! I was, however, inspired by the last *SPRAT* article by **G3OOU** on crystal filter design, and made myself a half-decent filter for the QRO TX, using cheap Club Sales crystals". Chris says his local QRP 4m net has been running for some time but after he lost his Slim Jim antenna during recent high winds, he dug out an old 1950s booklet on Band I TV antenna design and made himself an 'H' type antenna, a dipole plus a reflector. Although it is only about 13ft off the ground, he says it seems to work very well and has quite good directional properties.

G4TGJ writes, "I have been out almost every week (which is good considering the time of year), getting onto hilltops for SOTA activations with my homebrew 20/40m CW TCVR and EFHW antenna, working stations all over Europe and often to the USA. I have put my superhet RX project on hold, and have started building a five-band version of my SOTA TCVR to add 30, 17 and 15m. **VE3IPS** spent December focused on 160m using **CF3BP** special event callsign for 'The Transatlantic' test back to 1921 when Ed Rogers was **3BP** running 500W of spark. John writes, "Due to a vacation and horrible noise, I was able to make a few contacts using a quarter-wave antenna zig-zag from the garden to the ravine, but no UK Transatlantic RSGB callsigns. With POTA activations, and being QRV in the ARRL VHF contest on a hilltop with -31°C wind-chill, my hands started to freeze after 45 minutes". His workbench projects included an IC-705 tuner activation button, voice/CW memory switch box and a bias T. He found a SCD PCB board from a long time ago, so that will be next.

In a quest for miniaturisation for portable and holiday operation, **G4XUZ** has mounted a UMPP mini-paddle and a CWMorse straight key side by side on a small marble trophy base (right). Ray says, "Both keys are very good to use, and mounted together as a single unit, and wired together so there is a single lead to the rig, they make a very neat arrangement. Together with a QCX mini TCVR, this gives a tiny /P station offering a choice of SK or iambic keying". On 23 January, **GW4ZUA** wrote, "I have just updated the firmware on my Nano-VNA H4 (the latest Dislord version). In the menu for 'Markers', go to 'Measure' and there is an option to measure crystal parameters. I gave it a try and managed to build two very acceptable crystal filters using the Giangrandi software mentioned by **G3OOU** in *SPRAT* 189. On the nano-vna there is also two extra storage spaces for setups, plus other upgrades which I haven't yet explored". **N2CQR** recently put his version of a **G3YCC** SSB transmitter (*SPRAT* 48) back on the air. With Cycle 25 kicking in, Bill hopes to also build a 17/12m dual-bander with a crystal filter at 21.477MHz and the VFO running 3367 to 3512kHz. Please let Bill know if you see any problems (spurs) with this scheme: <soldersmoke@yahoo.com>.

Thanks to all the contributors. Please tell me how your spring goes for the Summer 2022 *SPRAT*; what you have built, QSOs you made and anything else about QRP, by 12 May. Also, interesting pictures please, don't be shy in letting members see what you have been building and/or where you have been operating from, your antennas, who you have been meeting, and even a shack picture to let other members know what you and your equipment look like. Let me know if you intend operating from somewhere other than your home QTH during the summer and autumn months, so I can let members know to listen out for you.

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You can also pay by BACS. The info you will need to do that is – THE G-QRP CLUB, sort: 01-07-44, and a/c: 54738210. I can accept cash in GBPounds, or US$/ €uros (at the current exchange rates) – but please send securely! You can order via e-mail and pay by PayPal - use sales@gqrp.co.uk – and pay us in GBPounds and you MUST include your membership number and address please. PayPal are getting greedy and charge us about 5%, so a contribution towards that is always welcome, or, send as a gift to friends/family – thanks. Maximum quantity of any item is 20.