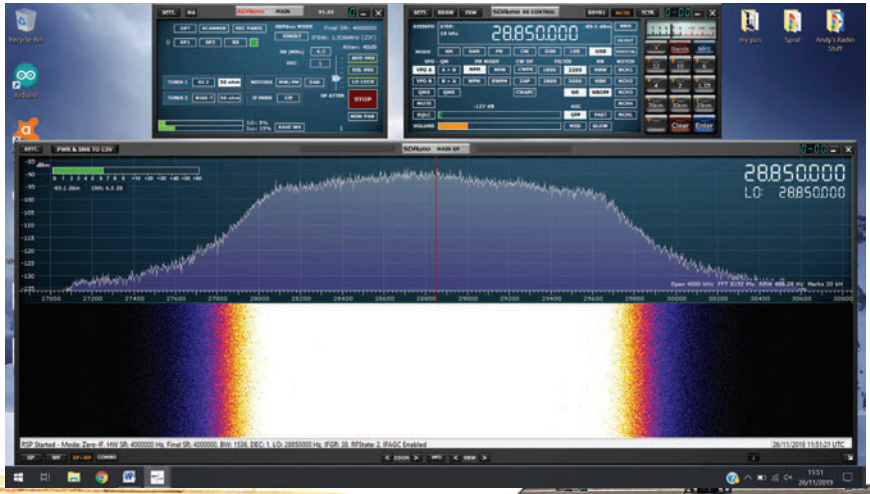
SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

Issue No. 182	© G-QRP CLUB	Spring 2020



Two receivers in this issue

Contents

Our founder George Dobbs G3RJV (SK)

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Recognising the great work of our members is always a pleasure and you will see on page 6 who our successful trophy winners are for 2019. We also have some very exciting news of a new trophy, specifically aimed at those who are keen on plugging in their soldering irons and partaking in some kitchen table technology.

Eagle-eyed members may have spotted that **Tony, G4WIF**, has added some more detail on our Awards & Trophies webpage. The idea is to add an 'honour roll' showing who has won each of the various trophies over the years.

Records are a bit thin on the ground but we are working through the archives. If you have been a past winner and do not feature on the webpage, please let me know.

Having adjudicated the 2019 operating awards, **Dom Baines, M1KTA**, has now stood down as our Communications Manager. We all owe Dom at least three cheers for doing a cracking job for us since December 2012.

Following on from that, I have great pleasure in announcing that Dom's replacement is also his predecessor, **Peter Barville G3XJS**, who has kindly volunteered to do a second term of office. I am sure you will all welcome him back and keep him busy with your logs.

With Spring upon us the convention season is starting. FDIM is still on my 'to do' list but it was great to hear that our good friend and member, **Dennis, G6YBC**, of Kanga UK will be speaking there this year. I will be at the Yeovil QRP Convention in May, and the Club Conventions at Telford (05-06 Sept) and Prestwick (26 Sept).

Peter G3XJS

A huge thankyou must also go to the **Telford ARS** for hosting us again and another three cheers for **Roy GM4VKI**, for making the arrangements for our event in Scotland. I hope to meet many of you at one, or all, of these gatherings.

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

Membership News

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

Well it has been a hectic few months what with all the renewals etc. If nothing else my postman and occasional postwoman was kept fit with all the extra letters. All the stamps on the envelopes will be donated to a local rest home charity for horses. I would also like to thank everyone who sent their good wishes and thanks.

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 myself 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.

USA Members using Dave Yarnes W7AQK.

At the time of writing Dave has moved, but he is still in the process of settling in and he cannot accept payments at this time. Therefore PayPal is the only option until Dave is ready to resume his role of USA Rep. Once Dave is in the position to accept payments we will make an announcement on the club website (***http://www.gqrp.com/memb–usa.htm***).

Privacy.

This is to remind you that the club holds a database of all our members' 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 your Sprat to you. 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.

Super Sudden Improvements
Improving the project's AGC action

I've had some feedback from **Charles G3OTH**, regarding the Super Sudden project presented in Sprat issue 181. He has suggested that the AGC action can be improved quite dramatically, by a few component changes.

In his email to me, Charles wrote "I successfully completed construction of the Super Sudden Kit from Spectrum Communications about two weeks ago, but although it was receiving very well, I was not happy about the restricted range of the RF gain control and AGC action and was concerned as to whether I had set up of the trimpot correctly

"After some experimentation and looking at the MC1350 data sheet I realised that I would have to make some resistor value changes if I was to be able to improve matters using the 78L08 regulator adopted for the Spectrum Super Suddden kits.

"The tests initially centered around reducing the value of R9 and R12, however I have since found that after reducing the value of the trimpot from 10k to 5k that R9 and R10 can be eliminated altogether.and the circuit thus further simplified.

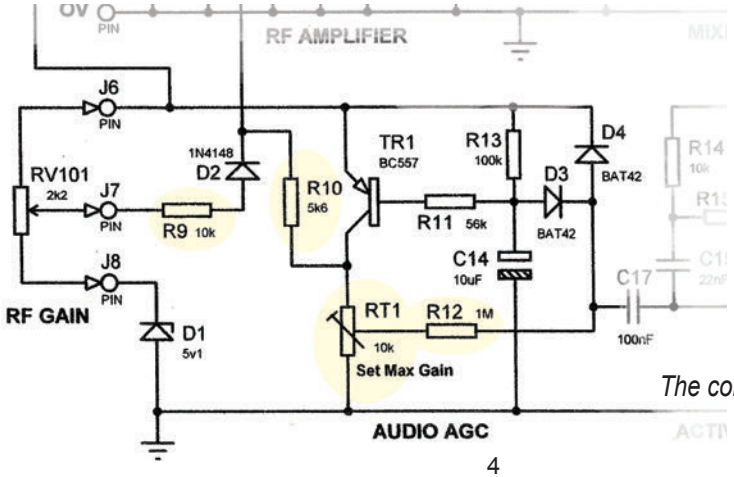
"After doing some calculations these modifications appear to be bomb proof as far as I am concerned and in practice the receiver is performing and responding to AGC and manual control now to my satisfaction. Kind Regards Charles G3OTH"

Scanned pages

There were also several scanned pages of the results of the test, that Charles carried out that allowed him to arrive at the changes suggested here. Another change suggested is reducing the value of R12 to 470kΩ that could, in some circumstances, improve matters too. The components affected by the suggestions are highlighted on the part scan of the circuit diagram supplied with the kit from Spectrum Communication.

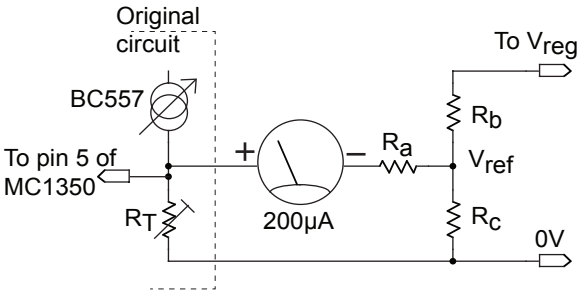
I'm indebted to Charles for taking both time and effort to investigate ways of improving my original circuit. After making the changes to my version, I must say that Charles' version certainly works more effectively.

Charles also has also added a simple S-meter to the circuit to improve it even more.



Thanks Charles.
G1TEX

The component changes are highlighted here



When Vreg is 8V
choose Rb = 3k3 and Rc = 4k7

$$\text{So } V_{ref} \text{ is } \frac{4k7}{3k3+4.7} \times V_{reg} = \frac{4k7}{8k} \times 8V = 4.7V$$

Then by setting the quiescent point of the MC1350's pin 5 to 4.7V no current will flow through the meter under no signal condition.
When under maximum signal condition the voltage on pin 5 will rise to approximately 7V and a current will flow via the meter and R_a towards the 4.7V V_{ref}.
The resulting current will depend almost completely on the value of R_a so, to give full scale deflection under these
conditions R_a will have to be:

$$\frac{(7 - V_{ref})}{200\mu A} = \frac{(2.3V)}{200\mu A} = 11.5k\Omega$$

But remember that V_{ref} has a source resistance of:

$$\frac{R_b \times R_c}{R_b + R_c} = \frac{3.3 \times 4.7}{3.3+4.7} = \frac{15.51}{8} = 1k94\Omega$$

As the total value of reistance to be added is much more than the internal resistance of the meter itself, it may be ignored.
We can choose a value of 10kΩ for R_a.
Other meters may need other values for R_a, R_b and R_c.
By careful selection of R_b and R_c, you could eleminate R_a completely.

CLUB TROPHY WINNERS 2019

The Club currently has seven trophies which are awarded annually. We also recommend who should receive the RSGB's G4STT memorial trophy.

The **G2NJ Trophy** is awarded for the best technical (non-antenna) article and this year goes to **'Tex' Swann, G1TEX**, for his 'Super Sudden Receiver', which appeared in SPRAT 181.

The **Partridge Trophy** is awarded for the best antenna article and this year it has been awarded to **John Leonardelli, VE3IPS**, for his article 'The Misunderstood T2FD' in SPRAT 178.

The best practical article receives the **Gordon Bennet Trophy** and it has been awarded this year to **Leslie Austin, G0NMD**, for this article 'Shack on a Pole', which appeared in SPRAT 180.

Simple articles are always popular with members and the best one receives the **W1FB Trophy.** This year it has been awarded to **David Smith, G4COE**, for his 'Ossy Box' crystal tester, from SPRAT 181.

The **Suffolk Trophy** is awarded to the best log submitted for operation on World QRP Day, 14 June, but no-one submitted a log in 2019 so the trophy has not been awarded.

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The Winter Sports is one of our most popular activity periods, running between Christmas and New Year. The best log wins the **G4DQP Trophy** and for 2019 and **Peter Barville, G3XJS**, takes it this year. Peter was active on several bands.

The **Chelmsley Trophy** is awarded for the best log covering the whole of the year, and at a time of minimal sun spots, working anything can be a challenge. For the second year in a row, the winner is **Carl Mason, GW0VSW**, and his log proves that you can still work with QRP even when propagation is not overly helpful.

Congratulations to all of this year's winners, who have been contacted.

The RSGB will be announcing the winner of their G4STT Trophy at their AGM in April, so we will not steal their thunder here, but the winner is truly worthy having contributed to the QRP world for many years.

And finally, as they say on the news, **Jo-Anna Dobbs, G0OWH**, widow of **George, G3RJV**, has asked that we remember our founder through a Club trophy and what else could it be if it's QRP construction but a **G3RJV Memorial Trophy**. So, the rules are very simple, bring, or send, one of your QRP projects, made in the last year, to the Club Convention at Telford and the project deemed to be 'best in show' will win the trophy. 'Best' is open to interpretation by the judges and could be for technical innovation, construction skill, or some other element of charm. It must come with a circuit and a bit of explanation, and it must work. Any postal entries will be returned in their packaging they arrived in.

Setup Band-pass Filters with SDRplay

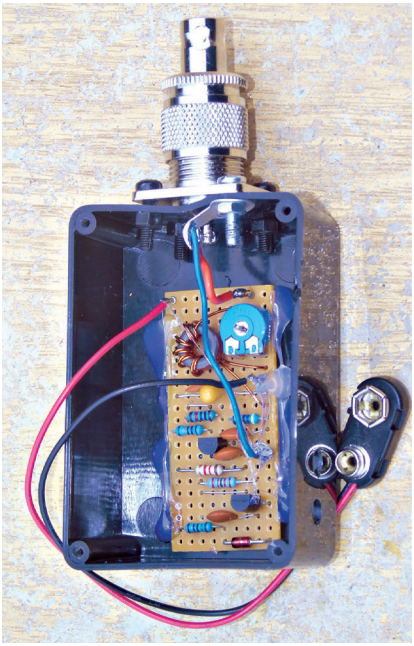
Andy Eustace M0RON, Cheltenham

I'm describing in this article my way of aligning filters using an SDRplay Duo and Sdrplay's software *SDRUNO v1.33*. You'll also need a wide-band noise generator, to inject broad-band noise, into the filter. This circuit is based on a modified noise bridge circuit with adjustable output made for me by **David Wright, G3VBQ**. The technique described here could also be used to align LPFs, HPFs, Band stop filters, traps, tuned circuits etc.

I had built nine BPFs from 160 to 10m using the documentation, available from the GQRP club website's technical pages. They were built as a preselector in an effort to combat the high level of noise at my home QTH. Inductors were sourced from club sales. I won't go into details about how they were built other than to say two 12–way rotary switches were used for band selection with pin 1 on both switches linked to each other to bypass the filters if needed.

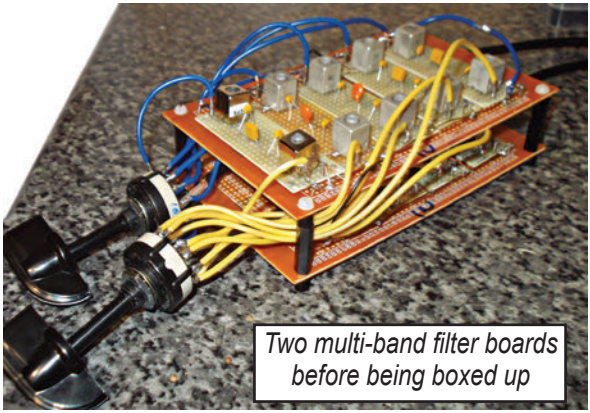
Having built the filters I then needed a way of aligning them. As I do not possess, or have access to, an oscilloscope, spectrum analyser or other such pieces of kit, I was left with tuning to a strong signal in the middle of the band in question and trying to peak the filter that way.

However this seemed an unsatisfactory method as not all of the bands are open or have strong signals on them at a time to suit me, so I had to find a better way. I decided to try and use my SDR and the SDRplay's software *SDRUNO*. This software can show up to 10MHz of spectrum at a time on one spectral display so I spoke with David G3VBQ, and he made me the noise generator shown here. This produces lots of wide-band noise across all the HF bands and possibly further.



A look inside the Noise Generator

I thought that by injecting noise into the filters input and connecting the filters output to the SDR I would be able to see the results on the PC's monitor. It was a succcess, it worked better than I expected.



Two multi-band filter boards before being boxed up

The *SDRUNO* software, though impressive, has quite a steep learning curve but is a very powerful tool with lots of features. It also has lots of windows and settings associated with each window, for what I wanted to achieve. Though, all I needed were the main, 'RX 'and 'SP1' spectral display windows, all other windows can be minimized, allowing the SP1 window to be resized to fill the screen.

The method.

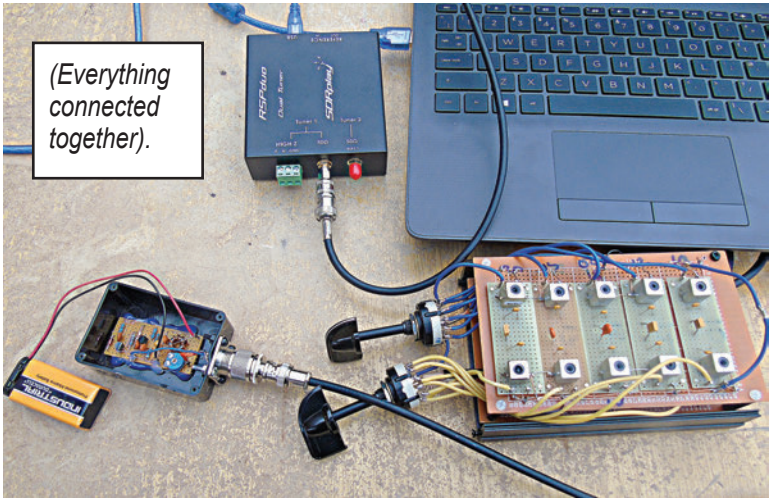
Firstly connect the SDR to the PC by way of a good quality shielded USB cable. As I am using an SDRDuo, in the main window of *SDRUNO* I used 'tuner 1' and the '50Ω' port. In the 'RX' window I selected the 10m band using the keypad buttons, a green light appears on the button indicating that the band has been 'framed'. This is no good as the waterfall only displays the 10m band and I wanted more than that.

By pressing the 10m button a second time the green light disappears, now the RSP has to be placed in Low IF mode. There is a check box in the Main window to enable this now an option in the main window. This is a box named SR (MHz), left clicking on this allows a choice of spectrum from 2MHz up to 10MHz, I selected a 10MHz chunk of spectrum with the centre of the 10m band in the center of the spectral panel and 5MHz either side.

Next the SDR stream is started with nothing connected to the input, this shows on the spectral display the noise floor of the sdr. In settings of the SP1 window there is a setting named spectrum base where the baseband noise can be altered on the vertical axis. In effect the noise can be placed at the bottom of the spectral display.

SDR Connection

Then the noise generator was connected to the SDR input and switched on. An immediate increase of noise was seen on the spectral display and noise was displayed in the waterfall in a combination of orange and blue colours. The noise level was adjusted to a satisfactory level by way of a variable resistor in the noise generator, or the sdr's gain could be reduced. SDRplay recommend that 0dbm can be used constantly and +10dbm for very short periods, the noise injected was well below the safe level. The spectral display has further settings whereby the range displayed on the vertical axis can be altered to show down to 1dB /div if required. Once set the noise level can be read off on the screen in dB's by placing the cursor level with the top of the noise, the level in dbm is displayed next to the cursor, to give a start po-



sition for making measurements.

Then the filter box I had made was inserted between the noise generator and the sdr, position 1 on both rotary switches on the filter box was selected which gave me a bypass function. Noise generator, SDR were switched on, now in the spectral display the noise level had dropped by a measurable amount.

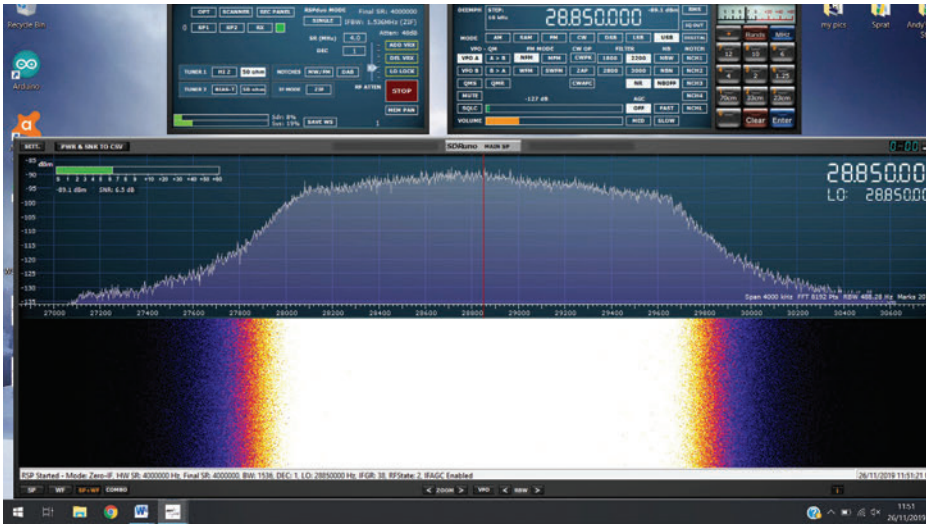
By noting the new noise level in dB and subtracting that from the start position the insertion loss is found. After this the filter in position 1, 20m, was selected by switching both rotary switches to position 2. The shape of the filter could now be seen on the monitor. Also by looking at the waterfall display it was noted that underneath the filters shape the noise was still present. directly underneath the filters shape the noise is higher being shown as a bright colour, as the skirts of the filter drop the colours change to orange and then blue. Outside of the passband the waterfall showed nothing indicating that the passband filter was doing its job of attenuation of out of passband signals.

Once the passband shape is on screen the chunk of spectrum can be reduced to give a closer look at the filter. It is also possible to see exactly where the cut off points are and at what frequency.

Now the real cool thing about all of this is that the shape of the filter can be seen in real time on the monitor. By altering the inductors at each end of the passband the shape and centre frequency of the filter is altered and this is seen instantaneously and measurements can be made accordingly.

Obviously depending on what type of filter is being looked at the shape on screen and noise displayed in the waterfall will be different. Although I haven't tried it, it should be possible to feed the noise generator into a tuned circuit via series impedance if necessary and use the SDR and software to tune the circuit to resonance.

Any of the SDRplay radio spectrum processors will work with the SDRUNO software and give a 10MHZ chunk of spectrum on screen, if other sdr's or software is used the results are likely to be different.



10m filter showing shape and attenuation

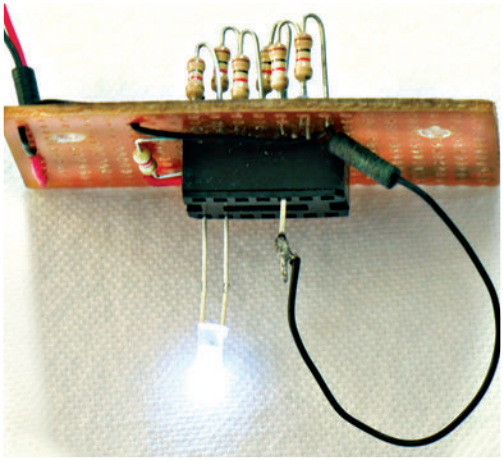
Gremlins in the system.

G1CXE John Palmer G1CXE 11180

It appears that a gremlin has been busy with my article 'G1CXE's Test Add-ons ' that apprered in *SPRAT* issue 180 (pages 16 & 17). The most important missing infomation is that the photos, were again by **Philip G6DXH**.

Half way down page 17 the photographs (reshown here) are nothing to do with the variation test system, but they're part of another item. This is a series resistor 'guessdimator device' when using LEDs. It came about as I finally got fed up when yet another LED with the prescribed resistor was far too bright for simple indicator use, so I made up the following simple test jig. I suspect the cause is improved LED technology rather than a `wrong' value.

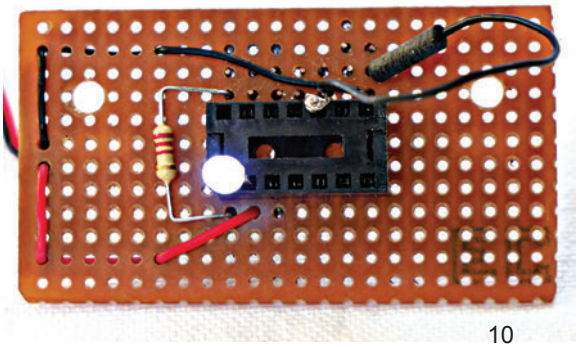
LED RESISTOR VALUE TEST BLOCK



An IC socket onto a piece of Veroboard, with the copper strips removed between the opposite pins. Then a 2k2 across the two end pins. In my case pins 1 and 14. This is the minimum resistance for the trial. Then several 1k resistors between each adjacent pair of pins down one side. 14 to 8 in my case.

Connect the last resistor, pin 8, to zero volts, together with another short wire, this with a small pin on the end. Small enough to push into the contacts in the socket.

My pin was recycled from an inter board connector. Connect a PSU, I used 12V, but a variable voltage would have advantages, wire to the so far unused pin 2 connection next down from the 2k2 resistor. Pins 3 to 7 have no connection. Connect the LED on test into pins one and two on the socket, negative lead to the resistor on pin 1, apply power and the LED should light. Using the pin ended wire, work your way along the resistor chain until a satisfactory brightness is obtained.



The variation is nowhere near as dramatic as I expected. Add 2k2 plus the number of 1k resistors and use the nearest standard value as your limiting resistor. Doing it again I would use at least a 20pin socket and/or higher value resistors in the chain. Like lots of things it is but a starting point.

Replacement key dust cover

Bill GM4UBJ

So new year and time to dust of that key and get on the air, but with this iambic key cover there is no dust so no excuse.

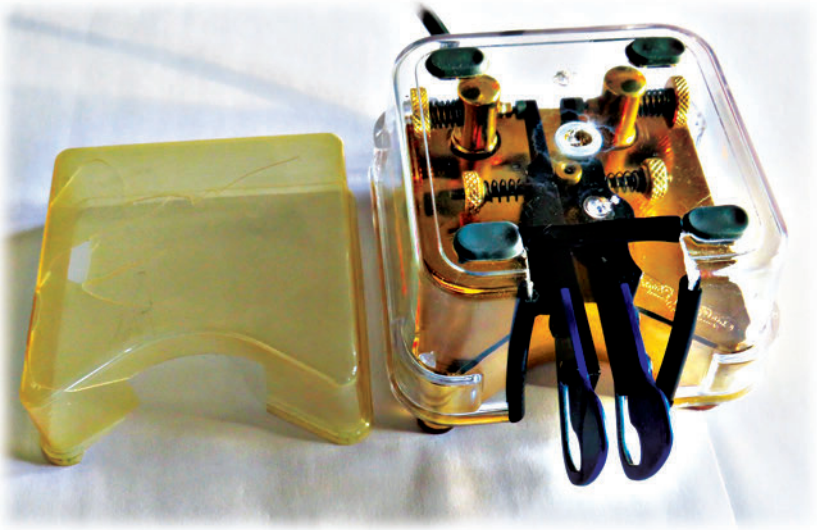
My Begali key is a lovely twin paddle but unfortunately the supplied dust cover is not and has disintegrated over the years. Replacement covers are hard to come by and expensive but not so the acrylic "Wilko small drawer organiser", it costs just one pound and measures 91 x 91mm (other sizes also available).

Conversion is easy, simply remove the internal non-slip base which is held in place by the four protruding feet, cut out these out and replace back into the holes. Now carefully measure (twice) and cut out a slot to accommodate the paddles. Rough edges can be filed smooth and the edges smartened up by stripping of the sheath of a piece of RG-58 or similar and fitting on the cut edges.

To fine tune the fit, a dot of hot melt glue can be placed on the inside corners of the cover as well as the two tiny holes on top (well actually the bottom !)

You now have smart durable protection for your key.

Any disadvantages of this cover? *Well actually yes it's not dishwasher safe!*

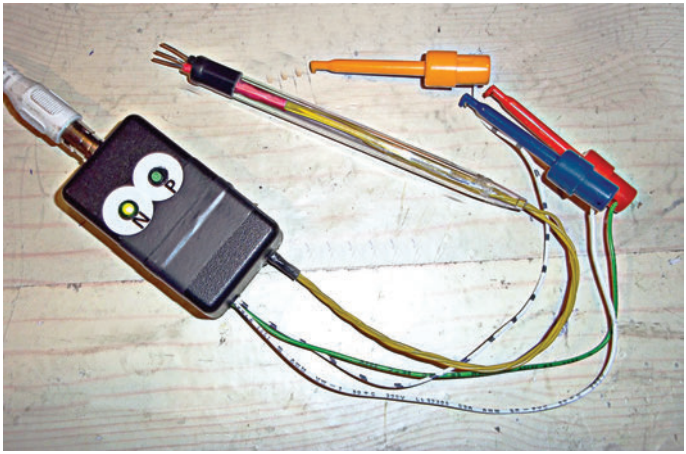


Testing Testing – two test projects

Peter G4UMB <pahowd@gmail.com>

No. 1: A simple Transistor Tester

This is a similar design to an "in circuit transistor checker" that I used in the 1980s which I found on the internet and available via the World Technical's 'blog'. [1].

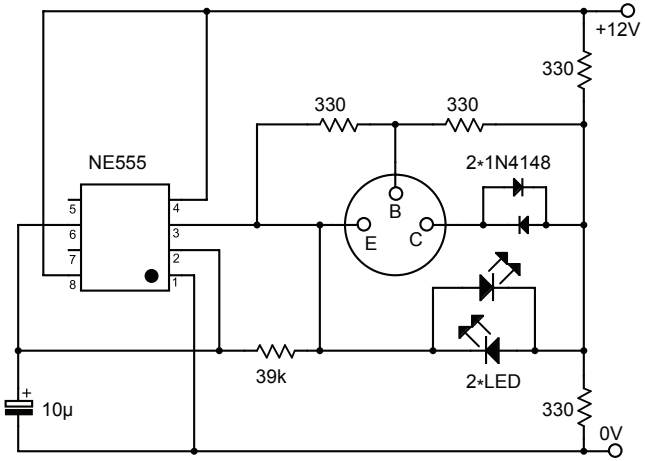


As it's an 'in-circuit' tester, it requires some form of probe, as most devices that need testing will still be on a circuit board.

I made the three pronged probe from paper clips, sleeving and the outer and inner parts of a ball pen. It's a method I thought might work with SMD devices. You have to concentrate on making sure the three tines are in the right places and are making good contact with the PCB.

Should the transistor that you're testing stand quite proud of the PCB, then there may be space to attached small 'self-holding' clips to the leads.

There is also an alternative to the single probe, which I prefer, it's made by using three separate hook probes and clip them on the transistor itself.

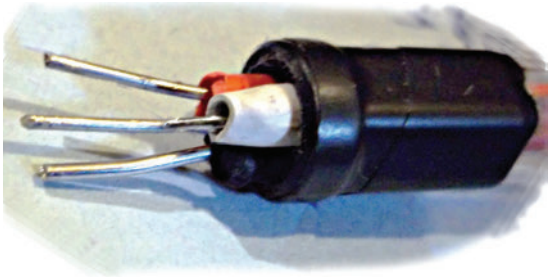


That version is also shown on the heading photograph. Another way is to make two probes, one single base probe and the other with collector and emitter connections, and used two handed. When on but not connected, the two LEDs light alternatively every second, as the output from the NE555 IC reverses the drive to them at this rate.

When a good transistor is tested only one LED will flash. So the LEDs can be labelled

NPN and the other PNP. Make sure the circuit under test is not powered.

They should ideally be different colours.

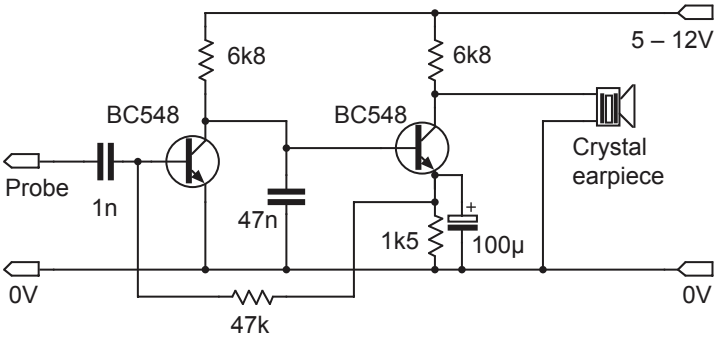


References

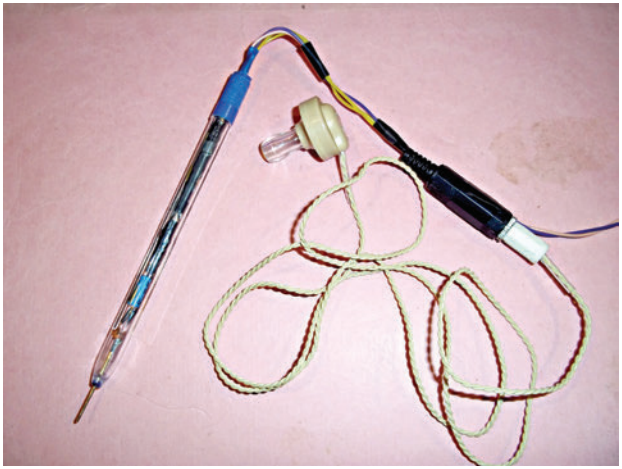
[1]
https://worldtechnical.blogspot.

No. 2: A probe for audio and RF signals

As with many pieces of simple test equipment, there's really little that's strikingly new. And that applies to this multiple detector probe featured here. in essence it's a small audio amplifier, that also acts as an AM demodulator when fed with any signal that's well above the audio frequency band.



The circuit is self-biassing, such that almost irrespective of the supply voltage, the emitter of the second BC548 is around 1.0 - 1.5V, so holding the base of the first BC548 just into conduction.



At AF, the first stage has a very high input impedance due to the 1nF blocking capacitor, but this drops to a much lower value at RF. This stage will now tend to act as an AM detector, with the 47nF capacitor filtering out almost all of the RF from getting to the second BC548.

The 2nd BC548 operates at maximum gain, and drives the single crystal earpiece to a more than adequate volume in a relatively quiet shack.

A 20m 'VXO' Transmitter

Five-transistors – 5W output

G4EHT

I felt it was time to submit something for Sprat, and so I was going to submit details of a 'Home-brew' 20m VFO Controlled Transceiver that I started building In 2018 (photos only are shown here).

The project, that I was hoping to submit has a 7MHz VFO followed by a frequency doubler to 14MHz, then several low-gain RF stages before the final 'PA' stage which used an MRF433 transistor.

Several Months

That project, being all 'Home-brew', took several months to build, as I was trying various ideas for the parts in the overall circuit. Because of this 'suck-it-and-see' method, the project became very time consuming. However I was delighted with the final outcome which gave me 'Two and a half watts' output and the receive side was fairly 'lively' too. Pleased with the outcome, 'RIT' was added to the VFO to make it even more useful.

Another add-on for that project, was also to include a 'side tone' that's fed to the audio stage on transmit. It all resulted in some great QRP QSOs on 20m. And having both VFO and RIT capability really did make it a pleasure to use and get plenty of QSOs easily.

So, perhaps having whet your appetite for the project, I must now lower the tone a little, as looking through all my notes and attempting to reproduce all my various bits of circuitry I realised it would have entailed lots of work which, unfortunately at the moment, I'm unable to undertake.

So, I decided to submit another circuit for consideration, but this article, is a really simple TX which shares many of the ideas developed in the earlier project. This new transmitter circuit though, is self contained, with a 'VXO' that's simplicity itself and still allows a small frequency shift.

FRG7 & EC10

This transmitter, I've used alongside both my FRG7 and Eddystone EC10 Receivers. It uses just five transistors and produces a good 5W of output power, when run from a nominal 13.8V power supply.

The 'VXO' and buffer stages use 2N2222 transistors followed by two 2N3053-based driver stages. I have also used 2N3019 transistors in these two stages with no discernible difference

The original 20m transceiver design was a complete VFO driven unit shown here. But lack of time precludes a design explanation this time.

This is a somewhat simplified version of the transmit side of the complete 20m transceiver that took me many months to develop. But other than the use of a VXO, rather than a VFO, it's basically the same circuit.
Note the highlighted 0V connections.

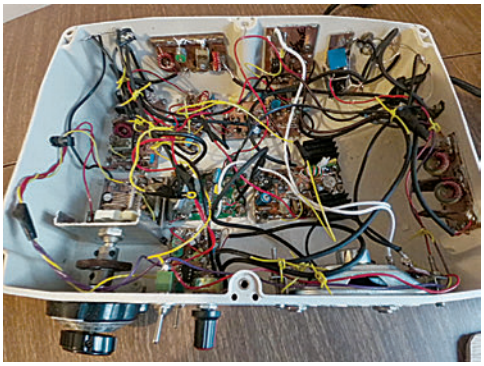
of operation. The 'keyed stage' at the 2N3053 emitter I use a mechanical bug key, although a simple 'straight key' would be fine too.The two binocular cores, I found at a rally, but they would seem to be BN-61-302 types, or at least similar.

Small heat sinks are needed for these two driver stage transistors. The output of the second driver transistor is then presented to the base of the 2SC1969 PA stage. This PA transistor is a well known type, and it also requires an appropriately larger heat sink as you would expect.

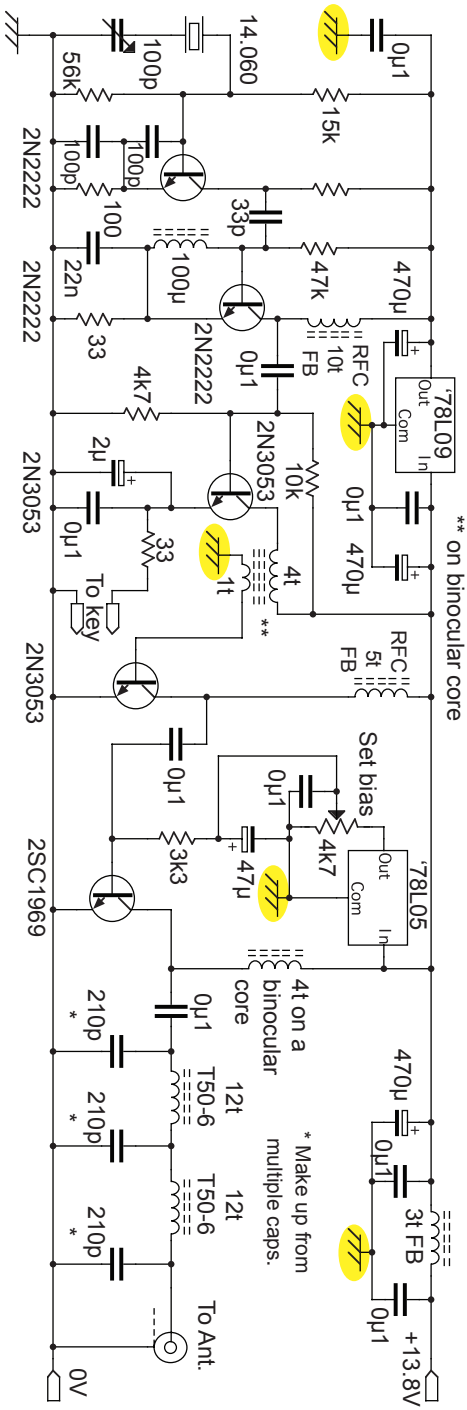
This later transmitter was built up on copper clad board, using the 'Island' approach which keeps all the leads short and neat. This is particularly important for all 'earthed' point leads. All components should be readily available and most 'junk boxes' should provide all of the bits to complete the project (like mine at the time).

I hope you enjoy building this simpler project, and having a go on 20m.

Vy73 Bill G4EHT - 558



A quick look inside the original design shows its complexity, and why I'm not describing it at this time – pardon the distortion in the photo.



Very high performance regenerative Rx

Olivier ERNST, F5LVG, 2 rue de la Philanthropie 59700
Marcq en Baroeul, FRANCE. Email: oernst599@gmail.com

This receiver is based on the principles outlined in another paper (Ref_1). It is made with components manufactured in 2020. The results are up to the task: it is possible to realize from France real SSB QSOs with America on 15m.

The design is based on the following six principles:

- Use of a low L/C ratio (high tuning capacity, at least 470pF). This improves the frequency stability and decreases the synchronization phenomenon and the hand effect.
- Use of an adjustable RF attenuator at the receiver input. This reduces the risk of receiving powerful out-of-band stations.
- Use of a buffer stage between the antenna attenuator and the feedback stage. This is essential to avoid the risk of background noise when tuning in (tunable hum) and to reduce the frequency variations that occur when adjusting the RF attenuator.
- Use of 10nF capacitors in parallel with the diodes of the power supply in order to eliminate the same noise.
- Low impedance for the 50Hz between the detector input and ground e.g. by using a high link capacitance (100nF). This eliminates the background noise induced by the capacitive coupling with the 50Hz mains.
- Use of an AF amplifier with high gain and low noise in order to obtain a satisfactory output power.

In addition, the coils and capacitors of the tuning circuit must be of excellent quality. We have chosen to build this receiver with bipolar transistors which have the advantage of being relatively solid, inexpensive and easy to check with an ohmmeter.

Signal input and RF amplifier.

A VHF choke coil prevents powerful FM stations from entering the receiver. Two 1N4148 diodes are used to protect the first transistor if the receiver is used close to a transmitter.

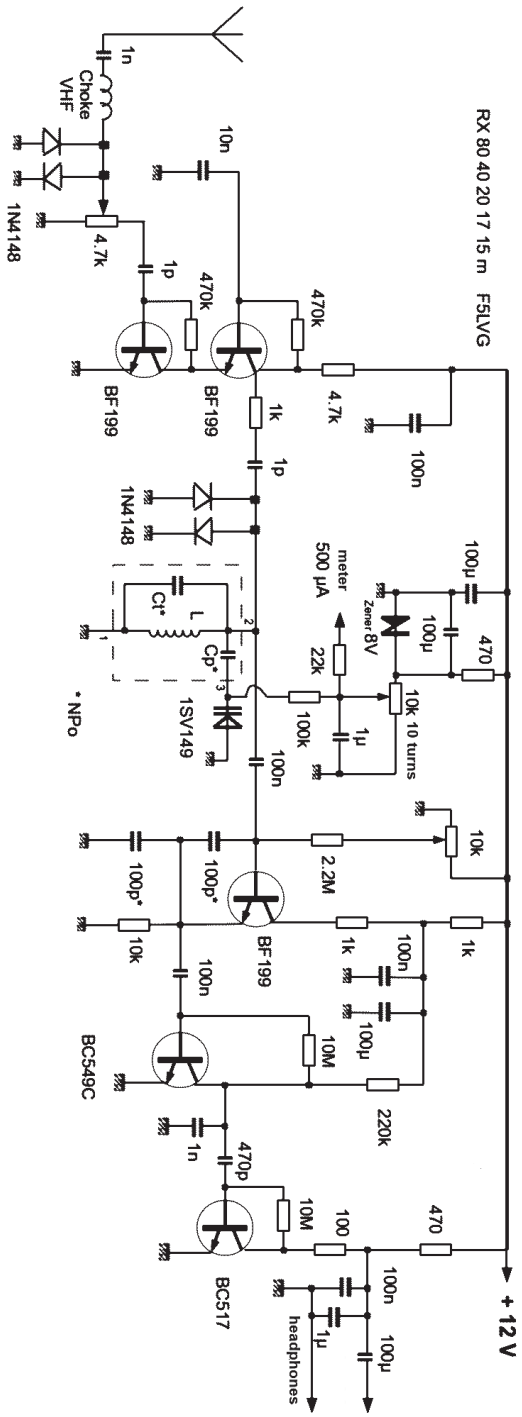
The buffer stage consists of two transistors in cascode circuit, which allows an excellent independence between input and output. Note the very low coupling capacitors at the input and output. They avoid saturation of the RF stage and the detector. The 1kΩ resistor is used to avoid VHF or UHF oscillations.

The regenerative detector

This part comprises of two transistors. The two new diodes 1N4148 are used to protect the transistors. The resonant circuit is composed of three interchangeable elements for each band: the coil, a high value parallel capacitor and a capacitor in series with a high capacitance varicap diode (480pF).

This series capacitor spreads each band to the maximum. The resonant circuit is coupled by a 100nF capacitor to a first transistor mounted in Colpitts to obtain the feedback. This is the role of the 2x100pF capacitors which together add 50pF to the tuning capacitance.

The 1kΩ resistor in the collector circuit is used as before to avoid VHF or UHF oscillations. The feedback level is adjusted by changing the base voltage with a 10 kohm potentiometer. Tuning is adjusted by varying the voltage applied



to the varicap.

A 500µA (or less) meter in series with an adequate resistor (approximately 22kΩ) makes a simple frequency dial. The detection is done by a second transistor crossed by a very low current, which is easily obtained with a 220kΩ collector resistance. The 1nF capacitor allows RF filtering.

AF amplifier.

This is a Darlington which allows a high input impedance, well adapted to the high impedance output of the detector. The 100 ohm resistor and the 100nF and 1µF capacitors prevent self-oscillations of the stage. The gain is sufficient for good headphone listening.

Receiver construction

The receiver is built in a wooden box of 12x22x2.5cm. Adhesive copper foils (5cm) are glued on the back of the front panel and on the upper side. These foils serve as shielding and ground plane. It is useful to make soldering points between the different strips. Resistors of 10MΩ 0.25W are used as connection points. Their high value equates them to resistors of infinite value.

The power and antenna sockets are on the left side, the headphone sockets on the right side. The coils with the **Cp** and **Ct** capacitors are fixed on three or four pin DIN plugs which are thus easily interchangeable. All capacitors marked with a star must be NPO multilayer ceramic capacitors. Only these have sufficient stability for satisfactory frequency stability. The connections between the DIN socket, the varicap, the 100nF capacitor, the 100pF capacitor and the transistor of the feedback stage must be very short.

Components for frequency setting

Band	Turns, Dia	Ct*	Cp*
15m	2 turns, 10mm	Ct 603pf	Cp 52pf
17m	2turns, 16mm	Ct 578pf	Cp 69pf
20m	2turns, 22mm	Ct 698pf	Cp 82pf
40m	4turns, 22mm	Ct 844pf	Cp 108pf
80m	9turns, 22mm	Ct 780pf	Cp 267pf.

- The capacitors with non-standard values should be made up of combinations of standard values from those values you have available.
- For the 15m, 17m, and 20m the coils are made with 20A installation wire (2.5mm²).
- For the 40 and 80m the coils are made with PVC insulated single strand (YV cable) with an outer diameter of the cable of 1.1mm and 0.5mm for the copper wire (section 0.2 mm²).

Ref_1

http://oernst.org/hamradio/rx/RX-2019/Rx-2019-c.html

Other receivers are available on my web page : ***http://oernst.org/hamradio***

ANODER.RX

Or "another RX" from PhilipG4HOJ
Email: G4HOJ@yahoo.co.uk

Background

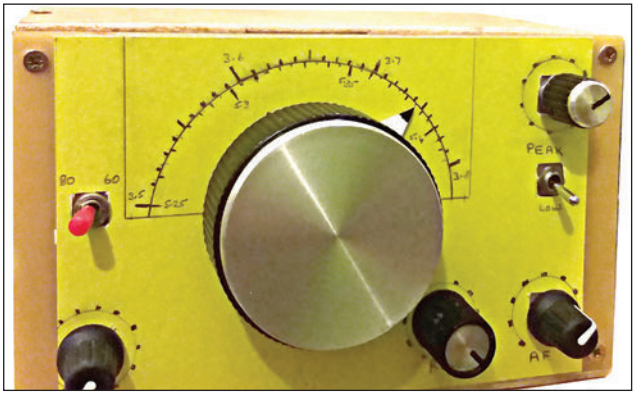
Those who read about my first successful receiver, Re:Si:Va, may recall that, before I built it, I tried a few differing regeneration circuits. They were certainly sensitive to signals…. but also to everything else! My main disappointments, in spite of reasonable attention to construction, were blocking/pulling along with critical regeneration control. There were other things I found frustrating but these two were enough to make me switch track and develop Re:Si:Va, a DC (direct conversion) receiver, which did not suffer from those issues – though, as with anything 'simple', there are always some compromises.

Enthused by the enjoyment and success of developing that RX, I wanted to use my test-bed chassis to explore another simple approach. My main focus just now is 80m and, arguably, receivers here are less demanding than for higher bands. I built a couple of simple superhets but had a few frustrations, such as quite significant pulling of the local oscillator frequency when tuning the front end…. there were a few 'birdies' and image frequencies that were often audible…..I needed more stages to achieve speaker output, etc., and it seemed that internal noise was always noticeable….all fixable with more complexity…but what else could I try? Something still simple but a little different from designs I had tried before?

Thinking

Well, I didn't want to be beaten by any simple approach so, what about trying the regen approach again? Historically, amateurs used many regens in the early days. I pondered on these old designs - really optimised for amplitude modulation and generally prioritising maximum output from minimum components. Some worked reasonably well for CW in ''autodyne' mode but still had to operate at a critical feedback point and many things could influence that point, whether the operator liked it or not! Thinking about the challenge, I aimed to keep the benefits but reduce the negatives as much as possible.

I wanted to: optimise for SSB/CW, reduce radiate oscillation energy and use my transmit antenna (most old-style regens will easily overload/block and 'frequency pull' on more than a few feet of wire). This is testament to their amazing sensitivity but not really helpful for me. I also wanted relative ease of use… no super-critical settings, etc.



An isolating RF stage would minimise oscillation energy escaping but the

downside is that a regenerative detector is already sensitive enough and prone to blocking/overload, never mind connecting a full size antenna through an RF stage! So, my most important challenge was finding a more resilient approach to the detector at the heart of a receiver. I tried several ideas around the universal grid leak approach by adjusting components and changing time constants but where I found better resilience it resulted in noticeably less audio output.

And, the detector still had to be kept only just above the critical regeneration point to work at all well. Disappointed again, I left the project for a while. It seemed there was no way I could achieve a single stage *Q* multiplier/BFO and a detector/mixer with any overall performance improvement….until I had another thought. Did I really have to work around a grid leak detector and traditional critical regen approach?

A Different Experimental Approach

I had been given some valves a few weeks earlier. One, an ECF82, I decided to see if I could use in this experiment. Eventually, after a few failures, I had a small success and then after various iterations, the Anoder RX, optimised for SSB/CW, materialised. Its mixer/detector function is less prone to overload (of course it can overload but simple tests suggest not until around 400uV to 450uV at the antenna input when run in 'advanced mode'), a *Q* multiplier function that still gives useful selectivity and signal boost, and a BFO function that I usually run at a high (so not at all critical) level.

The fact that this detector/mixer is more robust in 'advanced autodyne' mode means that the RF stage can be used to provide a modest amount of boost, rather than having to find a way to seriously attenuate the signal from a full-size antenna….which, in turn, means less audio amplification is needed.

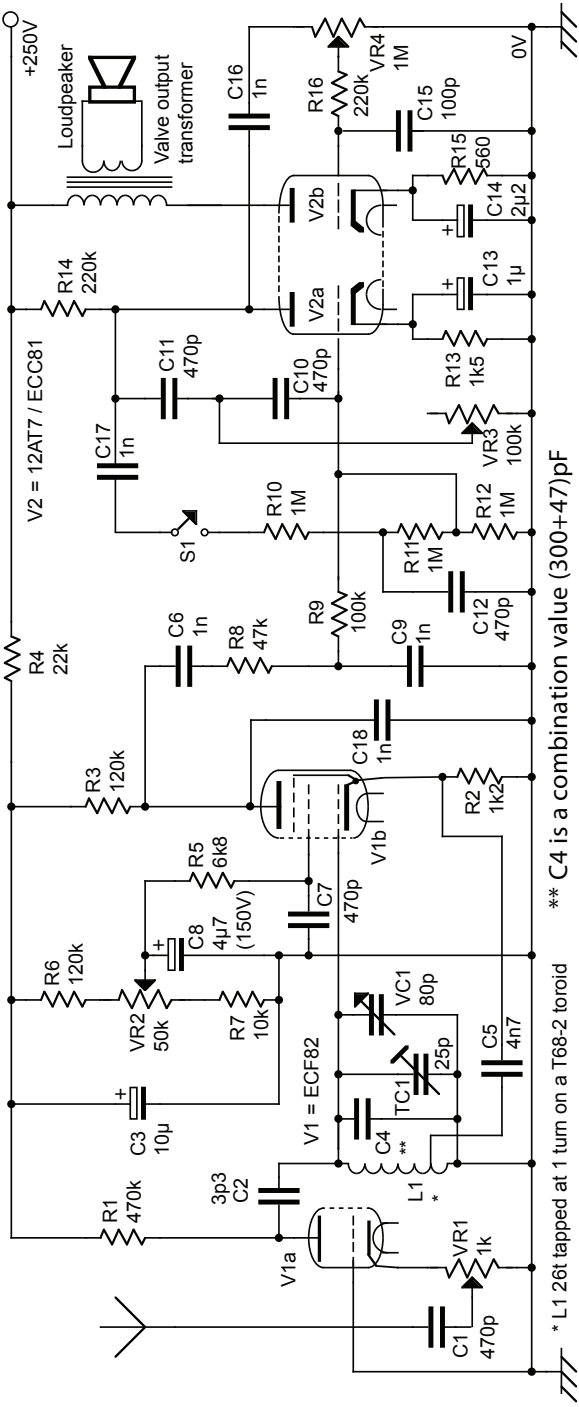
I like to be able to use a speaker to listen when pottering in the shack so the final part was to add a 12AT7 twin triode providing preamp and output stages. And, so, another two-valve (four stage) receiver came to life.

Some Detail

The ECF82 triode section is not high gain anyway so in grounded grid mode, with moderate anode voltage, gives a small but useful boost. The cathode impedance in parallel with the 1K antenna pot provides a good-enough termination for a 50Ω antenna and the 470k anode load means that no choke is needed on the output.

The ECF82 pentode seems very well suited as the heart of the receiver. It provides a combined *Q* multiplier/BFO and Detector/Mixer function. The *Q* multiplier/BFO/mixing level can be controlled by varying the voltage on the screen grid (this also changes all operational parameters) and no 'throttle' capacitor, etc. is needed.

Tuned circuit values are chosen for low reactance (around 100Ω each) across the 80m band. Coupling should be very light from the RF stage to the tuned circuit to minimise the damping on resonance. A screen line potentiometer (as per schematic) will allow the *Q* multiplier/BFO function to be adjusted but I tend to run in 'advanced mode', with a fixed screen voltage of around 60V (well above the 26V or so level where oscillation begins in my circuit) but I show the variable arrangement on the schematic in case some of you wish to experiment. As you would expect, if the screen voltage is reduced, there is a very smooth but criti-



cal gain point, where, just below oscillation, AM can be received. The lack of grid leak components damping the tuned circuit means quite sharp selectivity and setting can be more critical……slightly better than previous regens I have built….however, ramp up the screen voltage to 40V or more and a different behaviour seems to appear, where SSB and CW are easily resolved without pulling/blocking – even with quite strong signals from the transmit antenna. When experimenting, I checked across a wide screen voltage range for optimum cathode operating bias using a potentiometer, which I then replaced with the nearest suitable fixed resistor. It is not overly critical but I did find a relatively narrow range of values achieved the best balance between mixing/detection and *Q* multiplier function. I set the feedback tap as low as possible to minimise damping but still achieve oscillation at around 30V on the screen.

Initially, I used an air-cored inductor tank circuit but it was prone to detuning by proximity to chassis, etc. I then tried a T130-6 large(ish) toroid to better contain fields, I believe achieving better '*Q*' than the air-core in practice, but I subsequently used a T68-2, which works well, adjusting wire size/turns, for the schematic offered as these are more likely to be available. With the components chosen, my small 80pF variable capacitor covers 3.490MHz to 3.822MHz. I only had a 6:1 reduction drive, which gives me a just good enough tuning rate with a largish tuning knob. The

170° dial is marked in 10kHz divisions.

I use some simple high and low-pass filtering after detection, using components chosen to roll response off softly below about 100Hz and above 3kHz. There is a little insertion loss but I think it is worth it. Initially, I tried zero-bias for the first 12AT7 stage (developing auto-bias from the audio level input across a 10MΩ grid resistor) but there is so much audio from strong signals that some distortion was evident. I now use strong cathode bias which solves that problem.

You will also see that, in a similar way to my Re:Si:Va design, I have used anode-to-grid feedback around the preamp section of the 12AT7. With the switch shown in the schematic open, the network provides additional, variable 'knee', low-pass filtering (tuneable via the 100k potentiometer). Some may only wish to have this audio tailoring on board, in which case, the switch and associated series resistors and capacitors can be left out. With just the variable low-pass tailoring, the receiver is good for SSB and lower CW tones (I sometimes prefer 450–500Hz). If the peaking components are included, with the switch closed, the additional feedback loop provides some narrow peaking, variable of about 450–1100Hz, depending on the position of the same 100k potentiometer.

Variation:

If the peaking achieved by the resistive feedback loop is too sharp for your taste (or tuning rate), the peak can be broadened by placing a resistor of up to 10k in series with the capacitor to chassis. None of the feedback circuitry is essential to achieving good audio from the receiver of course.

This 12AT7 output stage is my favourite for small receivers – in fact, the combined preamp/speaker stages make a good standalone speaker amp for use with experimental receivers. The preamp stage provides over 30dB gain, with the second triode also amplifying and driving a speaker at up to 250mW or so – ample for me to reach for the gain control on strong stations. If you don't have a transformer, or only wish to use headphones, then wire the output triode as a cathode follower and there is ample output for low/medium–Z. headphones (simply done by connecting the anode directly to B+, placing a 10k resistor between cathode and ground and providing output from the cathode to 32Ω phones (600Ω works well too), via a 10µF capacitor of suitable voltage rating (the cathode is at about 45v).

In this design, the ECF82 triode draws around 0.5mA and the pentode between 0.7 and 1.6mA, plus a little more for the screen voltage divider. The 12AT7 preamp stage draws around 0.65mA and the output triode about 2.4mA. Heaters require: ECF82, 450mA; 12AT7/ECC81 300mA at 6.3v.

As with all simple designs, there are some compromises but, if built well, not many! There is lots of gain but no AGC (I did develop an AGC approach but the best system needed two transistor or triode sections and, for my use, I did not consider it worth incorporating) and such a simple design could never be a 'single signal' receiver but selectivity is absolutely fine for casual listening and CW QSO in typical 80m conditions.

In the evenings, I listen with RF and AF gain a third to half open, so plenty of gain there for weak daytime signals on 80m. I also tried a 40m tank and that worked well but did not try on higher bands. If an extra band would be useful (say 160m or 60m), it should be relatively simple to use a double pole switch to swap top and tap connections to a separate

tank circuit (with appropriate turns, tap and band-set capacitor) – leaving the bottom ends of both grounded. There are a number of ways to reduce gain and/or switch for use with a transmitter.

Conclusion

So, another 80m CW/SSB RX - two valve (four stage), with reasonable 'selectivity', easy to use, and within the reach of many potential constructors – even if, like me, there are sight and dexterity challenges! It does not use the least number of components possible but achieves good, useable results with the chosen architecture – and still relatively simple.

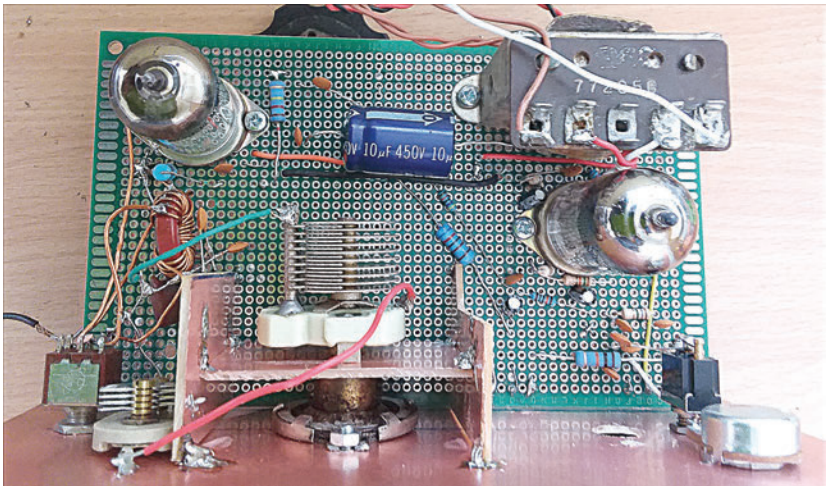
It seems that this approach allows the regen stage to go well into oscillation without swamping the signal and everything moves into autodyne/direct conversion mode but still with some good *Q* multiplier effect? It may be that there is more to explore? My 50Ω antenna connected via a 220pF capacitor to the cathode of the detector works well but, obviously there is a little more oscillator energy escaping without the grounded grid stage in line.

The output of the grounded grid stage is high and the easiest way to link to the detector stage was via the small capacitor to the grid but there may be other ways to explore? Anyway, allowing myself to think about separate functions helped me to develop something slightly different to try. Certainly, an interesting, and I think good performing, receiver…in both modes

Construction and cautions

Experienced constructors will have their preferred methods of building this type of receiver. As usual, my final version is built using a small prototyping board in which I make holes for valve holders. I tend to use pcb material for front panels and chassis stability rear and sides.

Obviously, be careful when working with the sort of voltages present, choose component voltage ratings accordingly and whatever build method used, keep all signal leads short and direct, particularly around the input to the audio preamp, and try to avoid audio earth loops by using common chassis ground points where possible. Use rigid wire for all connections around the tuned circuit. Generally, resistors are passing only low current.



GQRP Club Badges

Nigel Flatman G0EBQ – Email: nigel.flatman@yahoo.com

I have heard rumours that some members may believe that we no longer sell Club badges.

That is most decidedly not so! I have a very obliging and efficient local supplier and can offer a turn-around of less than two weeks.

The fine example shown here costs just £5 or $9 plus post £1.20(UK), €3(EU) or £3.80 (DX). Please order from myself at the above email address, but pay Graham G3MFJ at Club Sales as you would for components - or order from the Club stand at your local rally.

We have a few key fobs available at £3, please see the club website for a photograph.

Best 72/73 Nigel

Simpler frequency calculations

I've found that many proseptive examination candidates without a maths-based background struggle with the formula for resonance. Perhaps an easier way to getting very close to the answer quickly, lay in using a simpler formula. In my training (many years ago) we parroted:

$$f = \frac{1}{2\pi\sqrt{LC}} \text{ Hz} \quad [1]$$

Where C is in Farads (F)
& L is in Heries (H).
The answer is in Hertz (Hz)

$$f = \frac{159.164}{\sqrt{lc}} \text{ MHz} \quad [2]$$

When c is in picofarads (pF)
& l is in microhenries (μH)
The answer is in megahertz (MHz)

"Eff equals one over the two pirates of Elsie" [1].

That's easily remembered, but finding the value of the square root part is more of a challenge for some when powers of ten are involved.

Enter the simpler formula [2], where if the inductance is in microhenries (μH) and C is in picofarads (pF) then the answer is given in megahertz (MHz).

It's easier to work out even with simpler calculators, even those that have only a square root function.

G1TEX

The TWICE DAILY

A 75/80m Single-Crystal Mixed-Mode Transceiver

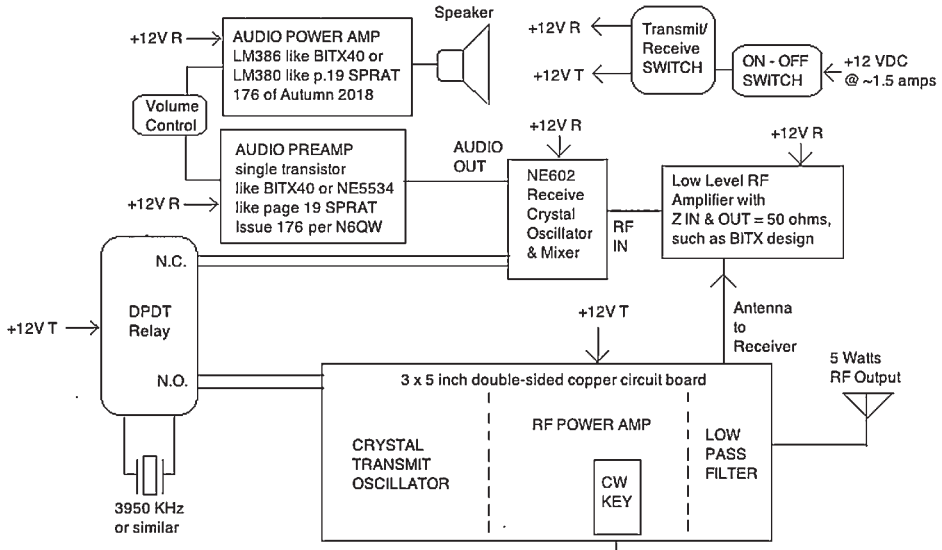
by Walter KA4KXX

As an old pensioner with reduced physical capabilities, amateur radio has become a large part of my life, so I like to make at least a couple of contacts every day, and I still get a thrill every time, especially with CW QRP.

Unfortunately, the only HF band currently with predictable, robust propagation here in the Southeastern United States is 80metres. However, participation on the CW portion of this band is so low that making contacts is too much like work, which I retired from eight years ago.

Spread out on the table, but ready to go

So with my life-long emphasis on building projects with a high degree of utility*, I noticed on the Phone portion of the 80m band (often called “75 metres”) an ARES (Amateur Radio

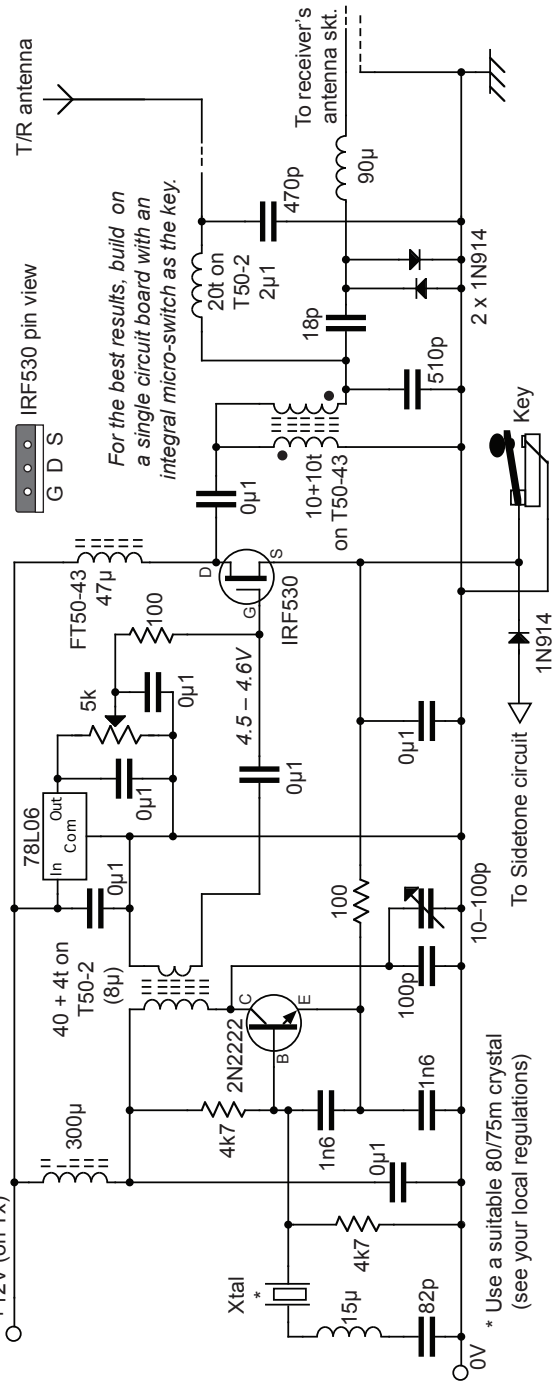


The TWICE DAILY

75M Single-Crystal, Mixed-Mode Transceiver

by Walter KA4KXX

--Block Diagram--



Emergency Service) Net that operates at convenient times in the morning and evening every day and not only accepts check-ins on CW QRP, but invites these at the very beginning of the net. so waiting time is eliminated.

Other advantages of this mixed-mode approach are easy copy for me, and also I can answer any questions very directly without all the usual CW-only protocol.

Although I could find no modern crystals manufactured at the frequency of the Northern Florida ARES Net, old style (such as FT-243) crystals which were produced at a much greater variety of HF frequencies can still be obtained from surplus dealers (such as:

nettyelectronics.com

and my friend Bry Carling at:

www.AF4K.com

or at ham swap-meets.

However, since these crystals can sometime be expensive, and it may not be possible to find more than one, I decided to switch both legs of a single crystal between transmit and receive with a DPDT relay as the basis of my Phone-Receive and CW-Transmit rig.

Of course the Receive oscillator is tuned exactly to the Phone frequency, while the Transmit oscillator frequency is about 900Hz below so my fellow ARES Phone Net members can hear the CW note on their lower sideband phone radios.

(Unfortunately, some modern commercial receivers cannot normally hear CW when operating in Phone mode, but I have found that most of the ARES Net operators

do not own equipment that is afflicted in this manner.)

All the circuits in this design as shown in the block diagram are originally by others, and very familiar to most home-brewing hams.

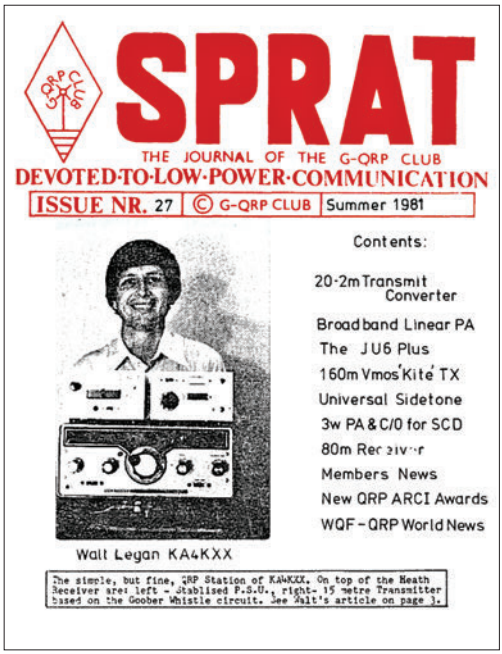
Therefore I have only included a schematic for the one circuit board (transmitter) that was customized significantly to make this rig a success.

This transmitter was inspired by several "twofer" sources, including the Iron Fist article by **Andy G0FTD** in SPRAT 174 of Spring 2018, and a 10W transmitter circuit found at:

www.qsl.net/va3iul.

If you have any questions please feel free to contact me by email as listed on my page at ***QRZ.com***

**Note that my homebrew transmitter as pictured on the cover of Summer 1981 [SPRAT #27] is still operable 38 years later. The latest QSO having been in June of 2017 when 15m propagation was still good*


SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED·TO·LOW·POWER·COMMUNICATION

ISSUE NR. 27 | © G-QRP CLUB | Summer 1981

Contents:

20-2m Transmit Converter
Broadband Linear PA
The JU6 Plus
160m Vmos Kite TX
Universal Sidetone
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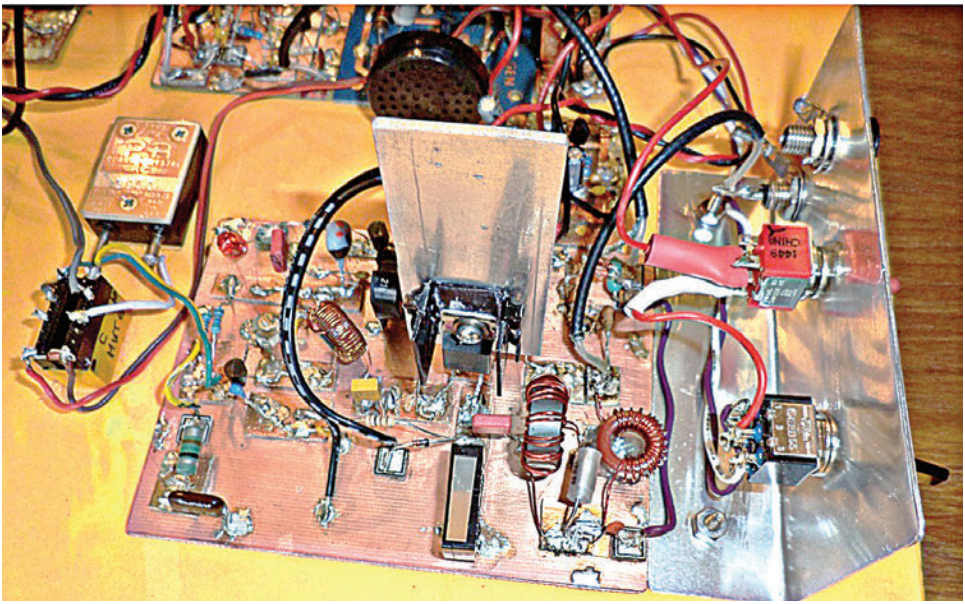
80m Receiver
Members News
New QRP ARCI Awards
WQF - QRP World News

Walt Legan KA4KXX

The simple, but fine, QRP Station of KA4KXX. On top of the Heath Receiver are: left - Stabilised P.S.U., right- 15 metre Transmitter based on the Goober Whistle circuit. See Walt's article on page 3.

The TWICE DAILY Transmitter section showing Micro-switch Code Key at bottom and Side-tone Speaker at top



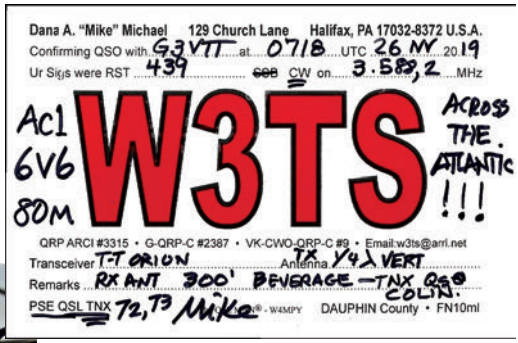
Antennas Valve and Vintage

Valve QRP Results – Colin Turner G3VTT

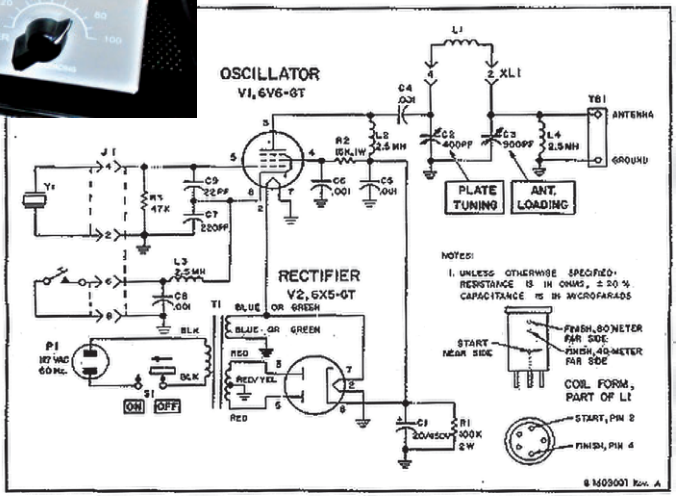
182 Station Road Rainham Kent ME8 7PR g3vtt@aol.com

How did you get on in the Winter Sports? Conditions were poor with little short skip propagation although in the late evenings on LF some long skip was apparent. I thought activity was down this year. Was it folks just giving up assuming poor conditions, not enough available time for operating in the long holiday or just waiting for the next contest to come along? I received just one report from the nostalgia valve QRP gang, from Derek G3NKS, who was using his two 6V6 valve transmitter and his newly acquired Drake R4C.

Derek writes, "Hi Colin, regrettably I didn't get much time in the shack during the Winter Sports, I managed only 7 QSOs, all on 80m. As usual I was running 5W from my 6V6 CO/PA but none of the stations I worked declared the use of a valve TX – even the regulars in the Valve TX weekends! Thanks for your efforts Colin, I'm looking forward, as always, to the next Valve TX Weekend. 72 de Derek G3NKS." Here at G3VTT I was active as G5LOW and with my own call and a new transmitter. "During the Winter Sports I operated using a single valve transmitter called the Ameco AC1. There's plenty of information on the internet about this little gem which was produced in the late 1950s and 1960s as a kit for the American Novice and certainly it got many budding engineers in the US into electronics.



I acquired this transmitter in November and rebuilt it and carried out a simple modification which was inserting an LF choke in the HT supply rail. The early versions used a single capacitor filter circuit but the inclusion of the



AC-1 SCHEMATIC DIAGRAM

choke, fitted to later models in the production run, improved stability. There is still a slight chirp depending on antenna loading and I've since constructed a transmit/receive box both keying the transmitter and changing over antennas. I must confess I couldn't get through the Christmas break without adding one more Eddystone box to the collection.

My best DX was working W3TS in Pennsylvania on 80m one morning just before the holiday at 0718z using 5W to a 66 foot inverted 'L' antenna and if you worked me as G5LOW between December 25th and December 27th this was the transmitter. A simple project like this will get you on the air and will give heaps of fun as there is nothing like contacting somebody with a rig crafted by your own hands as you all well know, using techniques harking back to the great days of radio.

Nick G4BMH has sent me some pictures of something he has built using valves and old

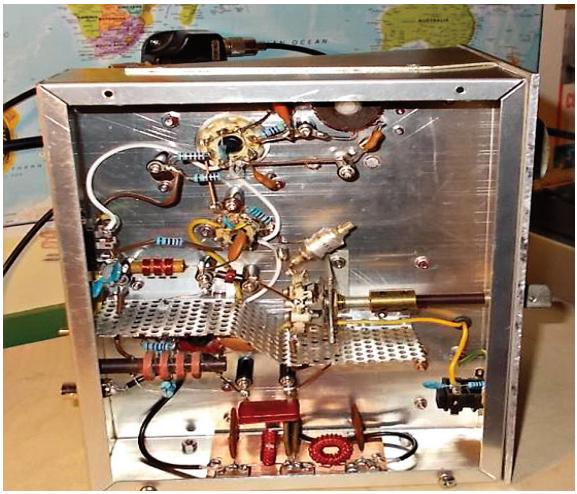
Just look at that dial!


Outstanding quality of construction and a well deserved win

style techniques. Nick writes, "Hello Colin, I recently built a 160/80m CW valve transmitter which works very well. It was entered in the Spalding and District Amateur Radio Society's construction contest last week which I won. I built it as a practical QRP transmitter to use mainly during the winter months and I will be certainly be on air during the November QRP valve weekend. By chance the first contact I had with it on 160m was with John G3TYB in Sittingbourne Kent. Used with a Yaesu FRDX400 receiver but I have just acquired a Drake 2B and Q multiplier which I'll be using once I have made a 160m converter for it. The transmitter uses

a 6AG7 vfo, an EF80 buffer/doubler and a 6L6 PA. The power output is 5W on 160m and 4.5W on 80m. Antenna and DC switching is in the separate power supply just as Codar did with the AT5. The power supply uses an EZ81 rectifier and a VR150/30 stabilizer for the vfo supply."

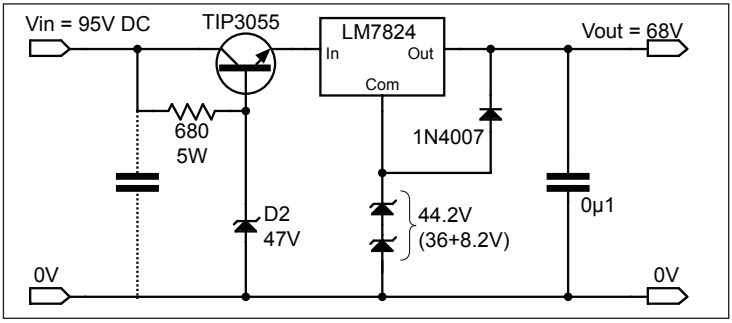
Pete Juliano N6QW has decided to start on a simple vintage transmitter project. He told me via email that an experiment worked for building the supply to power a 'toob' transmitter that uses a tube that originally was used in a battery powered receiver. The problem with using old battery valves (tubes) is that the filament and HT supplies need to be smoothed and regulated to a degree only really found with batteries – a tall order.



Note the use of screening using perforated aluminium sheet between the stages and the double section Low Pass Filter, not usually included in simple transmitters, affording excellent harmonic reduction.

Pete has obtained using junk box Zener diodes a supply giving 70V smooth DC and intends to uprate it to 120V in due course. Currently it is a 'proof of concept' and as can be seen from the diagram he used a selection of zeners and a 24 volts three terminal regulator to achieve high enough voltage regulation. In his circuit he used a 47V Zener in the base connection of the regulator pin 3 to ground and in the D1 position a 36V plus 8.2V in series.

Obvious some experimentation is required and it will be worthwhile taking a look at the data for both the regulator and the LM7824. The 2N3055 should be suitable at these voltage levels. Pete is still experimenting with the circuit and he has promised a follow up on its use with a small transmitter using a double triode in a future AVV.



Finally, the next Valve QRP Weekend in April will be the weekend of 18th and 19th. Just be active with QRP on the bands using any valve equipment at 5W and remember this is not a contest. Give sensible reports and notes on signal quality and try to encourage home construction and operating. Please send a brief report of your equipment and your contacts, but not a log, in MS-Word plus any photographs and circuits that can be used in AVV to:

g3vtt@aol.com as soon as possible after the event.

Sale of the remnants from George G3RJV's shack

Graham G3MFJ g3mfj@gqrp.co.uk

As I write this, it is now almost a year since the passing of **George G3RJV**. After he became a silent key, I was asked by his wife, Jo-Anna if I would dispose of his stuff, which I have been doing with a heavy heart.

The commercial radios went on eBay, thanks to **Roy, GM3VKI**, who did this for us. Some things went at rallies, and I still have a box of small circuit boards, like his COTPW articles that he made and we use as prizes in various competitions. However, there are still a few personal things left, and I intend to offer this to club members via Sprat. I should add that any money that we make from this goes to Jo-Anna of course.

So, here are this issue's offerings. As you can see from the pictures, there is a Palm Mini Paddle, plus a Code Cube for it, George's prototype of the 40m stable regen receiver which was offered as a kit in Sprat many years ago, And finally, George's build of the Epiphyte, Derry Spittle's 80m SSB transceiver, also from Sprat a long time ago. If you have any questions, then ask me please.

I have made them open to offers, I will not sell them cheap, and I reserve the right to refuse all offers if I think they are too low. Before I accept an offer, I will ask the club officers if they think the offer is reasonable, so it won't be just my decision.

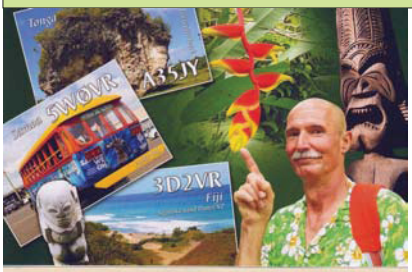
Offers please to me, either by email to ***g3mfj@gqrp.co.uk*** or, if you don't have email, then please drop me a line, use the address on the back of this issue of Sprat. I will not rush to make a decision to give everyone time to think.

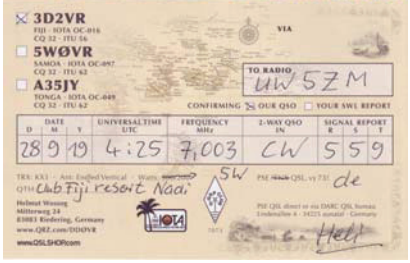
There is a little more, but that will have to wait for room in a future issue!

MEMBERS' NEWS

by Chris Page, G4BUE

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





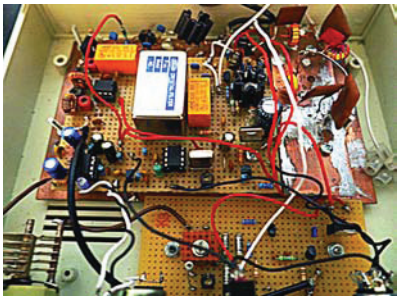
On the left is **DE3BWR**'s QSL for his 2019 **3D2VR**, **5WØBR** and **A35JY** QRP DXpedition. Bigi sent 400 QSLs through the bureau on 14 November, including this one to **UW5ZM** for their 40m CW QSO from Fiji, his best DX. In 2020 Bigi and Heli, **DDØVR**, are planning a trip to CE and LU. **F5VLF** and Rosy have been doing maintenance on Charity Cottage to prepare it for the coming season, and say it is open for bookings for 2020 (see their ad elsewhere in *Sprat*).

GM4VKI announces the first Scottish and Northern G-QRP Convention to take place on 26 September at Prestwick Community Centre, 50 Caerlaverock Rd, Prestwick KA9 1HP. Roy says it has excellent bus and train connections and free parking for lots of cars. More details will be published on the club reflector as they materialise. He was planning to attend the Glasgow/Braehead Rally that has moved location across the Clyde, but is having trouble manning the stand as it clashes with his golden wedding anniversary. Please contact Roy <rkavampsev@aol.com> if you can help.

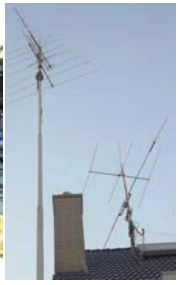
G4EJB sends pictures of his 40m Soap Box, built with a Sudden receiver (on strip board with ceramic resonator tuning), and the **G3RJV/W7ZOI** transmitter, including VXO tuning and semi-breakin keying. Lee says it gives 1W output and obviously is a very clean signal. For further audio processing, he modified a Howes SSB/CW audio filter, kindly given to him by **GØFUW** - now with switchable gain - and built in a sidetone oscillator. Lee says, "I'm now building a 30m version of the Soap Box in a slightly different box – biological washing tablets! So green is for 40m and purple is for 30m - colour-coded!".

G4TGJ has added a 20m PA giving 12W output to his homebrew TCVR. On 20m he had been suffering from common mode hum and fixed it by adding a preamplifier to reduce oscillator leakage. Richard has also added two new gadgets to his shack: a NanoVNA, which he has found very useful for characterising LPFs, and an SDRPlay RSP1a. He added a RX output to his TCVR so he can use the RSP as a panadaptor. He has also added CAT

control to the Arduino software so he can click on a signal and the TCVR goes straight to that frequency. Richard say he is now realising the benefits of SDR and likes the way he can combine the advantages with his homebrew TCVR.



GØEBQ finished his **N6QW** Paesano from the last *Sprat* (left) in December, thanks to a lot of helpful advice from Pete. Nigel says, "The PA is now working nicely giving 3W out. Mine is a simplified version, scratch built using the club filter; Pete has been kind enough to include details of my build on his Paesano website, <www.n6qw.com/The_Paesano.html>. I have had several EU QSOs, the best so far is 55 from **RW3NY**. The receiver is really hot and I have heard VK, HZ and TU, and can hear strong East Coast USA stations most afternoons - just a case of trying to get lucky when nobody else is listening!". The picture top left shows the Paesano (below) in Nigel's shack, that is fitted inside a built-in wardrobe and has the antenna coming down through the ceiling from the loft, and (right) the inside of the Paesano.



Above is **PA9RZ** pictured in his shack with some of his equipment and antennas (*thanks **M1KTA***). Thanks to **GØXAR** for telling us of an English translation from *Electron* at <http://www.pa3fwm.nl/technotes/tn07.html> explaining how the mini-whip antenna works. Steve says, "Those of you who have used the WebSDR at the University of Twente may not know it uses a slightly modified Miniwhip, the technical details of which are at <http://www.pa3fwm.nl/technotes/tn07.html>". Steve also tells us about an excellent article on passive loop antennas by club member **N7ZWY** at <https://pdfs.semanticscholar.org/bd27/2cd6f2f6bbda3ec3c3812a2e622d7b59c10f.pdf>. Steve says he is going to make some passive loops to see how they work with his SDRplay receiver and compare them with his active loop.

GWØVSW enjoyed chasing the recent Spanish and Belgium special event stations and managed to get two awards for his QRP efforts, the Belgian one pictured right. John says, "I used both SSB and CW at 4W from my Xiegu G90 to an inverted **G5RV**, plus the odd QSO on my indoor Crown loop. My best DX so far is **4Z5AD** on 20m CW with 4W and **EA6/DL2JRM** on 30m with 1W". Congratulations to **GØRQQ** for being listed in the results of the Practical Wireless (PW) VHF QRP Contest as **G5LOW**. Although Keith was placed 52nd, this was the first time **G5LOW** had been QRV on VHF (*thanks **GØFUW***).

G4UDG decided to spend his 63rd birthday away from the cold in the sun in the village of Loutsa, Greece, with some amateur radio. Chris took his Elecraft KX-2, 2.8W of CW, AKG headphones, Palm 'Pico' morse paddle, two sets of Eneloop AA rechargable batteries and charger, and EFHW wires for 30 and 20m plus counterpoise wires, Emtech ZM-2 manual ATU and a 23 foot fiberglass pole that folds down to fit in the case. He configured the antenna for inverted L style in the hope it would give a little low-angle vertical radiation. Chris made 50 QSOs as **SV1/G4UDG** with 19 DXCC, mostly around 14060kHz, of which 22 were two-way QRP. His best DX was **UN8PT** at 2516 miles and his best QRP with **RX3G** who was running just 72mW.

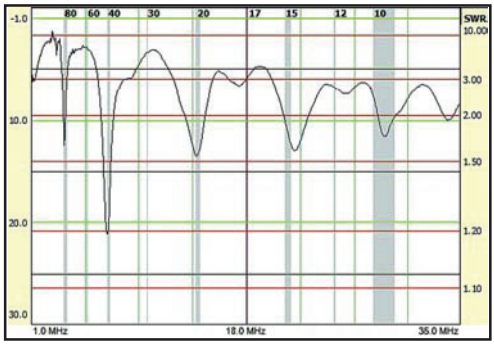
N2CQR has ended his QRPp operations with his ET-2 rig. A variation of the ET-1 and the FETer, Bill's rig had just two active devices - one FET in the regen RX and one in the xtal controlled TX. He made 20 contacts on 40m with it, usually running about 100mW output, and says, "It was built on a piece of wood, and sports the callsigns of all stations worked on it, and is now 'wall art' in my shack (perhaps waiting for more sunspots)". Retirement has prompted **EI7DF** to renew his club membership and re-kindle his interest in QRP with his FT-817, Mizuho and FT-7 rigs.

2EØFRU is working on a QRPGuys FT8 kit for 40, 30 and 20m ordered from the USA, <https://qrpguys.com/digital-transceiver>. Chris says, "I'm a Linux user (since 1997), and when I last looked at FT8, I couldn't see what all the fuss was about. I suspect I'm doing the mode a disservice, and thought I'd buy the kit and spend some proper time trying to understand it". **NG3P** is building the same kit and says it is a DSB TCVR that doesn't suppress one sideband, so it is going to radiate on both of them. This could very easily cause unintentional interference with other stations on the sideband you aren't using. I will probably build it, just to see how bad it can get, but once I understood it, I was concerned. **K1SWL** has designed a kit, similar in price, but is a true SSB TCVR that comes preset for the FT8 frequency on the band you choose, but has an ALT frequency that's initially set with the JS8 frequency, and can be easily changed for whatever other digital mode frequency you want to use. It's available for 80, 40, 30, and 20m and I chose 40m, <http://www.midnightdesignsolutions.com/phaser/>.

G4EJB wrote the *Starting Over* column in recent times in PW and says hopefully he will write a few articles remembering **G3RJV**'s work in PW as a tribute under the title *Carrying*

on the G3RJV Way. Lee says, "I hope people like them. I am also editor of the online *RadCom Basics*, obviously aimed at newcomers. Finally, there will be an article on home construction shortly and obviously our club will be featuring". **G4WIF** reminds us that **K7WXW** maintains an index to *Sprat* on the club website, click on the 'Sprat Magazine' link on the left hand menu. **G3CWI** has posted a review of the SW-3B TCVR on his *YouTube* channel at <https://www.youtube.com/watch?v=oZMpoMwTjcI>.

G4WIF has been working on an antenna project - a half-wave end-fed antenna covering 80, 40, 20, 15 and 10m using a 49:1 auto-transformer for matching. Tony says early testing on 40m using 5W and the RBN shows a good coverage of Europe. The picture right shows the match achieved on each band. He would like to hear from other members who have tried this antenna, <g4wif@ gqrp.co.uk>. Tony is also building the calibrated **G3ZIL** noise generator in the current PW. **G3CWI** has added a new video on using the RBN to compare antennas to his *YouTube* channel at <https://www.youtube.com/watch?v=lNS-yP_6ZvU&feature= youtu.be>.



GM4JMU used 4W CW on 30m to a magloop, and 5W on 40m to a loft doublet, with his QCX in the Winter Sports, but didn't hear any UK members despite being QRV each day, the skip being too long. Ken says FT8 has been very active on these bands and he made a few contacts using this mode for dearth of anything else, but says there has also been a huge drop in PSK31 activity. **G3KMG** likes to encourage newcomers and is often QRV above 14050kHz where QRS congregates. Dave says the RSGB Club Championship contests have QRS band segments and it would be nice if members joined in to give some practice. He adds these contests have QRP sections, but they are 10W, and wonders why not the standard 5W QRP? A good question, Dave.

Pictures right are from **KA9P**'s QRP North American Winter Field Day operation with his KX2 and Buddistick antenna. Scott also had the PRC 320 and whip out on the first day, but with no real luck at 3W. He managed a QRP satellie QSO and about 24 CW and SSB QSOs on 20 and 40m the second day, and no frost bite! **DK3RED** was QRV between 19 December and 4 January as **HBØ/DK3RED/P** from the Suecka mountain guest house 4600 feet ASL, with a KX3 at 5W and a 550 foot off-centre fed doublet antenna.

Thanks to all the contributors of this column. Please tell me how your spring goes for the Summer 2020 edition of *SPRAT*; what you have been building, who you have been working, and any other information 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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FT50-43 - £1.20 ; FT37-61 - £1.20 ; FT50-61 - £2.40; Ferrite beads – FB43-101 (3.5mm dia x 3.2mm long, } postage for all
1.2mm dia hole) – 40p for 5: BN43-2402 - £1.20; BN43-202 - £2.00; BN43-302 - £2.40; BN61-202 - £3.40. } small parts
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