SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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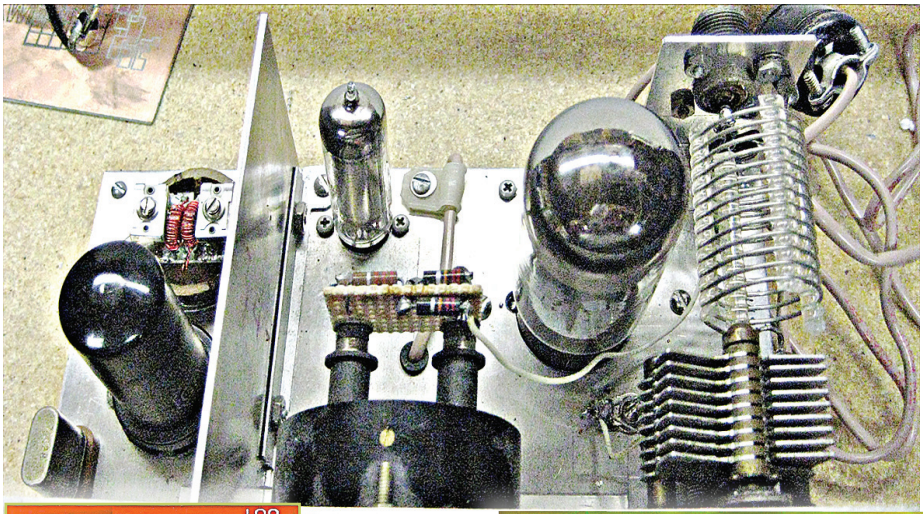

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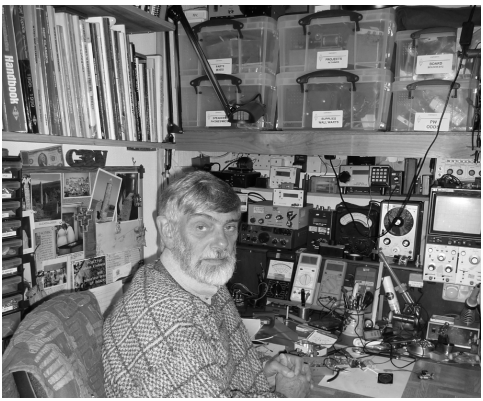

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From our Chairman – Steve Hartley

After a very nasty fall whilst in Wales a little while ago, George is now comfortable. He is being looked after in a residential care home as he is, sadly, also suffering from dementia. We all wish him well and send our love to Jo, his good lady, who is ensuring George gets the best care he can. Jo has asked that she is not inundated with calls at this difficult time, and she knows that they will both be in all your thoughts.

As you will see later in this edition, the Club Convention went very well again this year and the good people at the Telford Hamfest are already making plans for 2019. If there are any topics or activities you would like to see included in the programme, please contact Dick, G0BPS, our rally/convention co-ordinator.

I have had a few suggestions on how we might improve what the Club offers to its members, many of which relate to the website. For example, some have suggested adding 'how to…' tutorials, either as downloadable documents or maybe videos. If there are things you think should be on the website that are not already there, please let me know. The Committee will look at what the art of the possible is and hopefully report back soon.

Don't forget to take part in the Winter Sports (see Dom's column). Even if you just get on for a single session or two, it will add to the mix and allow Club members to work each other. It is not a contest, just have some fun on the bands!

Just as I was putting this editorial together I received the latest QRP Quarterly magazine. It was interesting to see mention of the low take up of awards. Ryan, G5CL, our Awards Manager also reports very few members claiming G-QRP Awards. I wonder why that might be? Is it that very few people are active on the bands? Is it that awards are no longer valued? Are they the wrong awards? I would be interested to know your views.

72/3 Steve G0FUW g0fuw@tiscali.co.uk

Awards

Nigel G0EBQ, looks after awards and badges for the Club, but is unsure of who might be owed an award. So, if you are waiting for a club award, please contact him by email at: *nigel.flatman@yahoo.com*

Simple JFET Tester

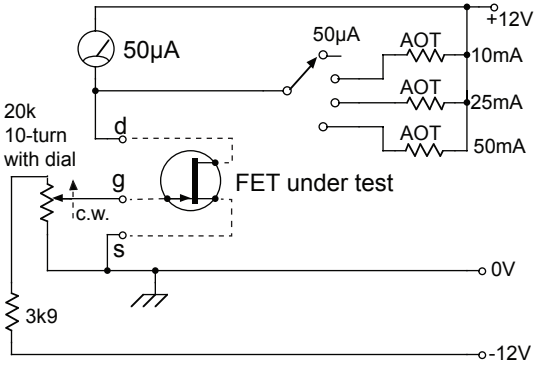
Phil Stevens, G3SES (philg3ses@gmail.com)

Although I have an AVO Valve Characteristic Meter I was very impressed by Chris' G3XIZ versatile valve tester in SPRAT 174. It reminded me of an instrument I built many years ago to test n-channel Junction Gate Field Effect Transistors, n-JFET for short. When these devices appeared about 50 years ago they were the valve man's salvation, as they worked very like a valve.

Very popular in the UK was the 2N3819, and still available from GQRP Sales. It's been used in many designs since then, with circuits in many handbooks, magazines and of course *SPRAT*.

There are better FETs, such as the J310, but they are pricier and more difficult to obtain. The early FETs had a major problem; the characteristics vary enormously from device to device. The manufacturers state a spread of the Common-Source Forward Transfer Admittance, gain to us, as 2mS to 6.5mS (2.5 to 6.5mA/V). Also the Pinch-Off (Cut-Off) voltage can vary from -0.5V to -7.5V. All of which can make designing a circuit rather difficult.

The FET is connected up as a simple dc common-source amplifier, with drain current measured for a particular value of negative bias on the gate. The maximum bias applied is –10V obtained from a 79L12 regulator. The rather elaborate Dial-pot enabled me to read the bias voltage directly and save a meter but you could use a single turn wire-wound pot and connect a DMM to measure the gate-source voltage.



I have a large selection of moving-coil meters and a 50uA item was used, though a DMM may be used. If you use an analogue meter you must determine the internal resistance and then calculate the values for the various shunt resistors (*see elsewhere in this issue*).

Before applying power connect your FET and ensure the meter is in the least sensitive position, set gate voltage to 0V, to read Saturated Drain Current (Idss) which may be 2–20mA for any one device. This is the maximum possible current from that FET.

Now increase the gate voltage causing the drain current falls to a few microamps, switching the meter to its most sensitive range. This gate voltage is the pinch-off (Vp). Setting -Vgs to give half Idss, is the gate bias you need.

To find the FET's gain figure, vary Vgs above and below the half Idss value and note the change in drain current for a change in one volt on the gate. Suppose you get a change of 3mA in drain current then the gain is 3mA/V. This instrument could be improved to measure p-FETs, enhancement mode FETs and even dual-gate devices but I leave that to others.

Please contact me if you have problems. Happy soldering!

GQRP Covention 2018

Steve Hartley, G0FUW, Chairman

It came as a bit of a shock to us all when we realised that this year's Convention was the 30th. If we had realised in advance we could have had a cake and some champagne, or something. The first was in 1989 and was held in George's church facilities in Rochdale. It later moved to the Rishworth School near Halifax and in 2017 it was co-located with the Telford Hamfest. It was there again this year and we are most grateful to the member of the Telford ARS who have made us very welcome and provided us with some very good accommodation.

The convention format has stayed pretty much the same for the last decade with a Buildathon on the evening before the main event which has a trade hall, a Bring and Buy section and a series of talks.

This year the Buildathon featured a new kit, designed by Heather Lomond, M0HMO, who called it her 'HF Swiss Army Knife'. It's an all-in-one test set covering voltage, resistance, frequency, power, SWR measurements as well as showing the current UTC time, and Maidenhead Locator, all displayed on a small TFT screen.

The processing is carried out by an Arduino Nano with firmware that provides for calibration of the power/SWR readings, which are accurate right across the HF spectrum and usable up to 50MHz.

On the Sunday, we had three talks. The first one by Barry Cook, G8PHG was entitled 'The Flying Laptop' and gave a great insight into the building of a satellite which is now in orbit and sending back useful research data. It was fascinating to hear about such a large scale 'homebrew' project.

Vic Winton, GW4JUN, then looked back at the achievements of the late George Burt, GM3OXX, famous for working over 300 countries with no more than one watt. Vic reminded us all about the GM3OXX memorial challenge (see *SPRAT* 174, p3). Vic also announced that the end date for the challenge has been moved to 31 March 2019 and provided good advice on learning, or re-learning, Morse.

The final 'talk' was a real treat, in that we linked Telford to Washington DC and Newbury Park, California for a live episode of the Soldersmoke podcast. Bill Meara, N2CQR, and Pete Juliano, N6QW, talked about the influence of the G-QRP Club on their amateur radio exploits.

Bill and Pete also paid tribute to the technical and spiritual guidance provided by George, G3RJV. Part of the live show was in the podcast number 206. The Soldersmoke guys were challenged to take part in the GM3OXX challenge. Will they join in?

Several QRP friendly traders were selling their wares at the Hamfest and a good time was had by all judging by the comments on social media. It would be great to see even more members there next year. Look out for it during the first weekend in September next.

Portable end-fed-half-wave antenna

Richard Tomlinson, G4TGJ, 25 Beverley Rise, Ilkley LS29 9DB
email: rpt@rpt.me.uk

I was first licensed as a teenager in 1982 and passed the Morse test the following year to get my A-class licence. I was active on HF with an ancient valve Heathkit SB101 but, although I joined the GQRP club in December 1983, I don't think I ever really tried QRP or made anything from Sprat articles. I was active for a few years but after university I left home and got a job and I forgot all about amateur radio.

Last year (2017) the RSGB sent me a copy of RadCom asking if I'd like to rejoin the society. I was inspired by SOTA – while off the air I've been a very active hill walker (although I don't get to do much of that either now that I have a family).

So I'm now back on the air although I haven't done many SOTA activations, and then only on 2m FM. As I want to be able to try HF activations I have been experimenting with portable antennas.

My first effort was a 20m GP which is supported by a Sotabeams 10m travel mast (see ***https://www.sotabeams.co.uk/content/20m%20GP%20Instructions.pdf*** for instructions) and I've also made a 30m version. These antenna setups give a low angle of radiation suitable for DXing with lower power. I've not only tested them in my back garden as you can see in the picture above. The end-fed wire runs to the top of the vertical, guyed pole that is behind the left-hand chair. I've also tried the setup out on the beach while on holiday in Scotland. However, it was a camping trip that made me realise that they are not always very practical.

The radials and guy ropes are very long and there was no way I could erect it by the tent that we were using at the time. But there was a tree – if only I could just throw a wire up and get on the air. So when I got home I experimented with an end-fed half-wave (EFHW).

The end of a half wave wire is very high impedance so it needs to be matched to the 50Ω commonally used for the amateur transmitter. With an EFHW antenna the feedpoint voltage is high with the current being low. So, in theory, only a short counterpoise is needed. I've seen plenty of designs for EFHW matching transformers but they always incorporate a

capacitor in various combinations of fixed/variable and across the primary or secondary of the tuning/matching circuit.

I'm never sure why the capacitor is needed so, I thought I'd just keep it simple and see if it would work with just the transformer. I had a spare FT140-43 ferrite toroid and wound 16 turns for the primary (antenna side) and 2 for the secondary (transmitter side). I just used ordinary stranded wire and used a 3A connector block to make the connections. For the antenna I cut about 10m of wire for the 20m band and just 1m for the counterpoise.

Beginning with my experiments, I supported the wire on a 4m fishing pole and initially just pegged the end in the ground. This gave an SWR of about 3:1. Raising the end of the antenna and securing it to a convenient bush, brought the SWR down to about 2:1.

I then changed the primary of the transformer to 14 turns and found this brought the SWR slightly lower, down to 1.8:1. This made my FT817 very happy and I managed a few contacts at 5W. I also managed a Bulgarian station with just 1W. So the concept was clearly sound.

I decided it would be handy to have a choice of bands so I next added support for 30m. I added about 4m of wire to the antenna and connected it with crocodile clips. By tying the ends of wire with nylon cord you can easily change bands with the antenna erected. I also added about 2m of nylon cord to the end of the antenna so that it can be pegged into the ground without a high SWR. I didn't have time for any contacts on 30m but the SWR was similar to that on 20m and I was picked up by the Reverse Beacon Network (RBN).

The next job was to make it a permanent solution. I rewound the transformer (14 turns primary and 2 turns secondary) with 20swg enamelled wire and mounted it in a plastic box with two 4mm binding posts for the primary and a phono socket for the secondary. Note that there is no earth connection between primary and secondary.

Further experimentation showed that although my SWR meter showed the same SWR on both bands the FT817's own meter was not so happy on 30m. I also noticed that removing the external meter caused the FT817 to see higher SWR. I experimented with longer counterpoises and finally settled on 2m which now gives a consistent reading on both bands.

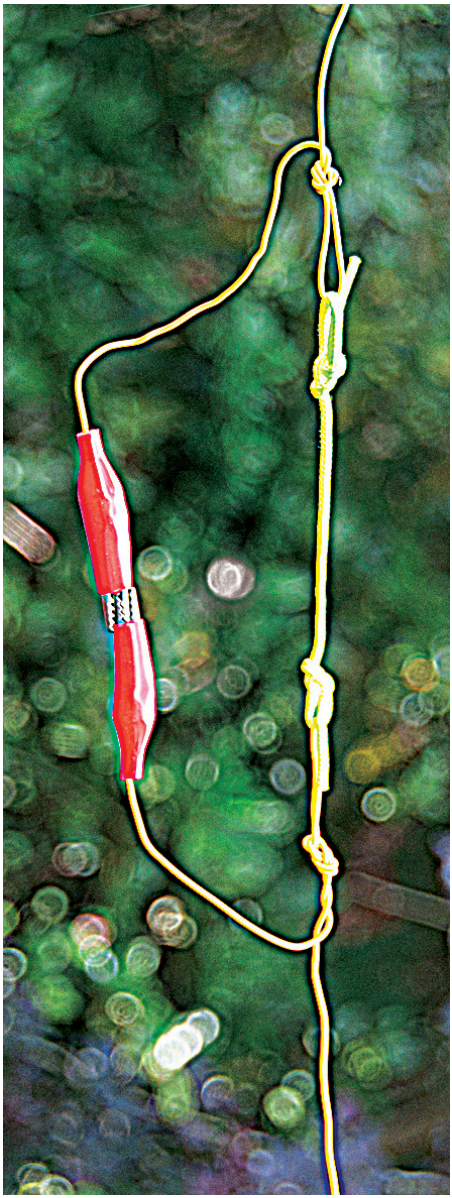
For the antenna and counterpoise you will need:

16.1m wire
2.7m nylon cord
2 crocodile clips
2 banana plugs (optional but suggested)

For portable use I recommend bright orange wire and cord as it is very easy to trip over or lose plain stuff. These again are available from Sotabeams.

To make the antenna:

- Cut 10.1m of wire. At one end attach a banana plug (if using). At the other end attach a crocodile clip, then fold back 20cm of wire and tie a figure of eight knot.
- Cut 4m of wire. At one end attach a crocodile clip, then fold back 20cm of wire and tie a figure of eight knot. At the other end fold back 10cm of wire and tie a figure of eight knot.
- Cut 20cm of cord. Use this to tie together the loops at the crocodile clip ends of the wires. I used bowline knots for this.
- Cut 2.5m of cord. At one end fold back 10cm and tie a figure of eight knot to give a loop that can be used with a tent peg. Tie the other end to the remaining loop of wire made in step 2. Again, a bowline knot is best.
- Cut 2m of wire and attach a banana plug (if using). This is the counterpoise.

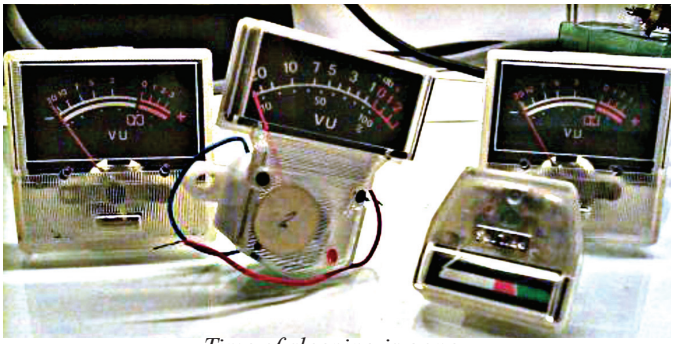


In use, attach the antenna wire to one binding post of the transformer and try to get the other end of the wire as high as possible – throwing in to a tree would be ideal. But it still works with the wire supported by a pole and the end pegged into the ground. For 30m the crocodile clips should be clipped together and for 20m they should not be connected. The short counterpoise wire can be positioned anywhere but if you find the SWR is too high you may need to adjust its position or even lengthen it.

In principle this should work on any band if the wire is a half wave but I haven't tried it. The toroid needs to be ferrite and not iron dust as it is a broadband circuit, but other sizes or mixes may work too.

How to use old ‘galvanometers’

F6GLZ,Jean-Claude GERWILL, G-QRP 7423

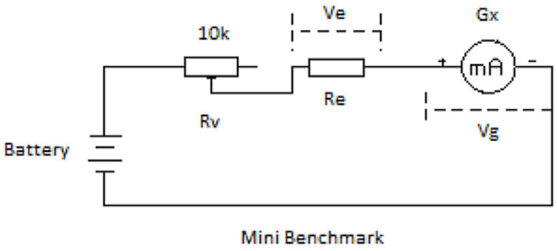


Time of sleeping is gone ...

Galvanometers are often recovered pieces found in old tape recorders. They are just ‘sleeping’ during a long, long time on the workbench, and have nothing to do. Really? In fact, they are actually reusable as voltmeters ammeters, even as milli or even microammeters (the latter with care!). To do this effectively, their characteristics must be known. This is simply done by using Ohm’s Law. After that, they are reusable by applying...Mr Ohm’s Law again…

So how to we do this? What is needed?

- Well, we start with a simple battery, preferably new, of about 1.5 to 3 or 4V. The voltage doesn’t need to be higher. An adjustable regulated power supply is also ideal, due with the voltage stability.
- We will need a digital multimeter with the minimum of Volt and Ohmmeter functions. The accuracy and minimal circuit loading of the digital types are preferred to the analog ones (but with good eyes, the latter will do a good job too).



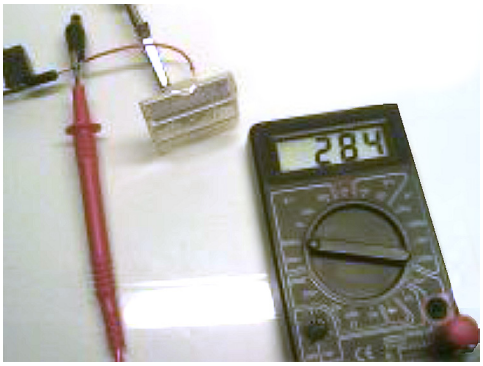
Mini Benchmark

The first thing we need to know about the old meter, is the full-scale deflection (maximum reading) This very simple circuitry enables us to determine the internal resistance and the maximum current needed for a full scale deflection of the tested galvanometer. Resistor Re has a well known value preferably with a 1% tolerance.

Putting it into practice:

You’ll need a variable resistor, I chose a 10kΩ one, and a 1% resistor Re. Not forgetting the galvanometer under test. of course. These are the steps needed:

- Determine the value of Re (unpowered) using the DVM’s resitance range. In my case, Re, which was marked as 4.34kΩ, gave the same reading on the DVM.
- Connect the circuit up, and turn the power on and adjust the variable until the needle is reading full scale. If needed, play with both the voltage and the potentiometer until a full scale deflection is obtained.



Then, the voltage across the galvanometer is noted (again at full scale deflection). In this case it was noted at Vg = 284mV.

At full scale deflection, the voltage across Re is noted. In my case, the value shown is Ve = 1026mV.

That's the measurements done.

Now all we need to do to use the meter, is further application of Mr. Ohm's law. Applying Ohm's Law, we have now access to the characteristics of the tested meter.

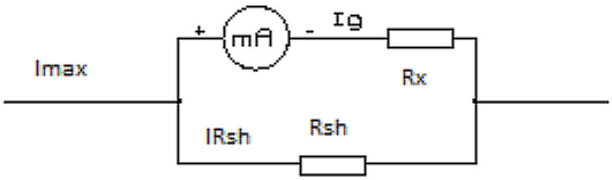
- Galvanometer's Imax (FSD) = Ve/Re = 1.026/4340 = 236µA (microAmperes).
- Galvenometer's internal resistance Ri = Vg / Imax = 0.284/0.000236 = 1199Ω.
- These values can be rounded to 240µA and 1200Ω and then noted on the back of the galvanometer.

How do we reuse it?

Let us take as an exemple, that I wish to reuse this galvanometer as a 3A meter in a power supply. Taking a look at the schematic below, it must appear that 3A flowing through this circuitry must produce a full scale deflection on the meter.

But my galvanometer has a full scale deflection for only 240µA ! The remaining curent must flow through a paralleled shunt resistor Rsh. This means almost the complete current flows through Rsh, Thus, IRsh = 3-0,00024 = 2.99976A.

A second factor must taken into account: This circuitry is placed in series with the voltage output of the power supply. Thus, the voltage drop across the Rsh leads must be as low as possible. There is no need to use such a shunted meter circuit absorbing some 5V when trying to measure the ciurrent flowing in a 12V output voltage!



Ideally the shunting resistor, will have a forward volt drop

at 3A, the same as the meter's volt drop at full scale deflection, ie 284mV or 0.09467Ω).

But this rather unusual value of slightly under 0.95Ω probably isn't available. Which means we would need a resistor value that's readily available.

Let us take as an exemple, a shunt value for Rsh = 0.22Ω. The voltage drop will be:

- VRsh = 0.22*2.99976 = 660mV. This is an acceptable value to work with.

We also need to make sure the resistor chosen can dissipate the heat that will be generated with up to 3A flowing through it.

The dissipated power in Rsh at 3A flow is:

- PRsh = Rsh * IRsh² = 0.22 * 2.99976² = 1.97 Watts.

A 5W model will be suitable.

We now have to find a meter series resistor, allowing measurement of the 660mV across the shunt resistor, This is the series resistor Rx in line with the galvanometer. Its role is to absorb, or drop, the surplus voltage. The meter needs only 283mV at 240µA for full scale deflection, so the remaining voltage must be 'shed' at 240µA.

We have VRsh = Vg + VRx.

- Then VRx = VRsh - Vg = 660 - 283 = 377mV.

Finally:

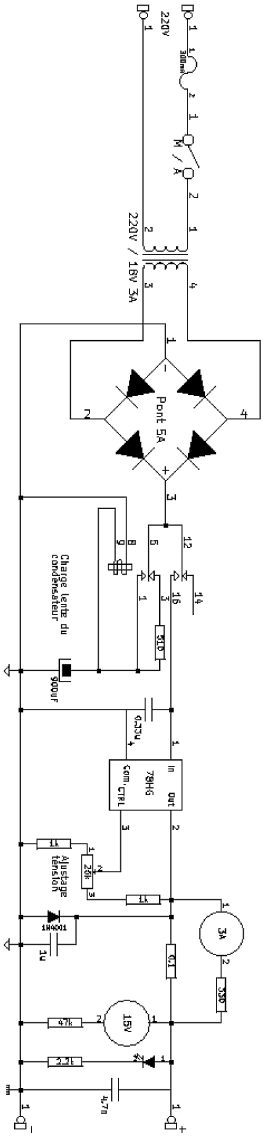
- Rx = VRx / Ig = 337mV/240µA = 0.337/0.00024 = 1404Ω.

A standard value of 1.5 kΩ can do to job, though the reading shown at full scale on the meter would be around 7% low, Bear in mind that such small meters may only have a scale linearity and accuracy of around 10% or perhaps even worse. The above calculations are therefore largely sufficient.

Such an error might not be acceptable. If a more acceptable accuracy of current reading is needed then a combination of 1k+390, 1/4W resistors would be far better.

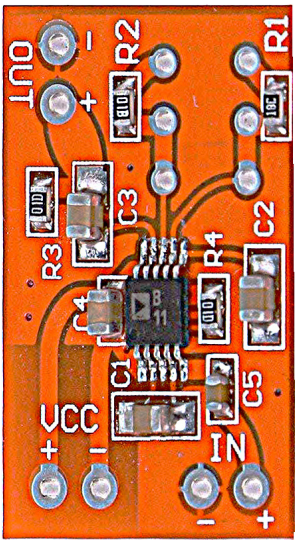
When dealing with a meter such as the one described here as a voltmeter, with a ful scale reading representing say 15V, then a much larger series resistor must be put in line with the meter to drop the excess voltage at the full scale current of the meter.

In this case we would need to drop some 14.717V at a current of 240µA. In this instance a series resistor of 61.32kΩ (56k+5.6kΩ or perhaps 39k+22kΩ) would also do a suitable job.



A cheap audio compressor & noise gate

Dave Cossar GM3WIL email: davecossar@virginmeda.com.



I use a Yaesu FT–290R Mk2 as a microwave QRP IF and for 2 metre talkback. I always wondered why rigs like the FT–290 and the FT–817 don't have some form of compression on their designs. Even though there are of course some commercial units available.

Then I saw on eBay a little module using a SSM2167 speech compressor and noise gate integrated circuit. As you can see from the main picture, there's both an input and output. And of course the leads to and from these points should be screened.

The unit is quite small at 15 by 22mm. in fact this is a size, that may fit inside some fist microphone housings. The unit works from a supply of 3.3–5V. And the FT–290 R2 there is a convenient 5V available on the microphone socket to power the module.

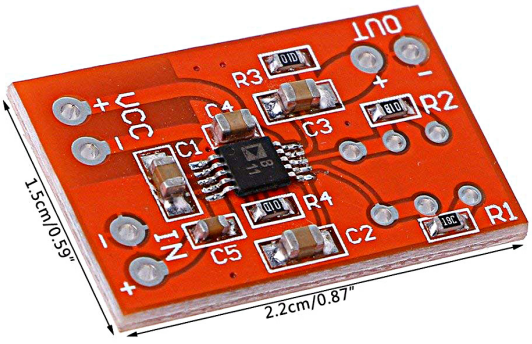
I made up another installation for an Icom rig, but beware Icom, and some other manufacturers use an 8V supply on their microphone sockets. In sucha case, you will need to add in a small 3.3V regulator or an LM78L05 regulator to power the module in this case. However, although the FT–817 seems to have a 5V supply available, I don't have an FT–817 to verify what voltage level. The mantra is check carefully before trying the wire it in, don't assume that the supply is correct.

A double pole two–way switch was used to switch the unit in and out, as I've found that there's little advantage of using it on FM. it's really only effective on sideband.

Mounting the unit in a small metal box, I use an 8–pin microphone plug into my rig connecting with a cable carrying the 5V to power it the PTT line microphone out from the switch grounds for microphone PTT etc.

The other end of the small metal box has a 8 pin chassis mounted socket to take the Audio in to the switch it has the routed through unswitched PTT and the 5/3.3V for electret microphone elements.

As well as using a latching push button 2-pole, 2–way switch, there are a couple of things you could play with the compression level which is set by changing the value of R1 for the compression levle. The noise gate level is set by R2's value. Bear inn mind though that care is needed when making any changes on sucha small board. It's not for the faint–hearted or less capable soldering iron wielders.



The results that I have found, are that a 3:1 compression is very loud and gives an "S" point increase over the default settings. The default as it come out of the box gives an apparent increase of three "S" points and is good. But don't go for the extra talk power all the time, as you will only become unpopular with many nearby stations.

So it's perhaps better to stick with the 2:1 default level.

As far as I can see FT–290 Mk1 does not have 5V available at the microphone socket, but you could always add one to the free pin.

All you have to remember is route the PTT and power through the unit. All thatis to be switched is the microphone in/out and a by-pass line to switch the microphone stright through when its not in use.

The cheap price direct from China makes me think of ordering others. I was at one stage going to build it into my FT–290 but an external one is so easy make sure you decouple the PTT and Power lines with 1nf capacitors aalong with ferrite beads on the audio in/out leads, as is good construction practice.

GATE: (R2)

Noise Gate (dBV)	Value of R_{GATE}
–40	0 Ω (short to V+)
–48	1 kΩ
–54	2 kΩ
–55	5 kΩ

R2 default 1K resistance, can be modified as needed.

COMP: (R1)

Compression Ratio	Value of R_{COMP}
1:1	0 Ω (short to V+)
2:1	15 kΩ
3:1	35 kΩ
5:1	75 kΩ
10:1	175 kΩ

R1 default 15K resistance, can be modified as needed.

If you shop around and are prepared to wait a month (sometimes more) the modules cost £2.80 yes that's right! The little unit certainly seems to give better talk power some internal processors.

Rally dates

Let's make a date for sometime next year

The following rally attendances are booked at the time of going to press:

Daphne, G7ENA will be going to the Horncastle rally on 27th January next year.

Roy GM4VKI, Dave, GM3WIL, and G3MFJ will be at the NARSA rally in Blackpool on April 28 2019.

Other dates will be released as soon as we have had them confirmed.

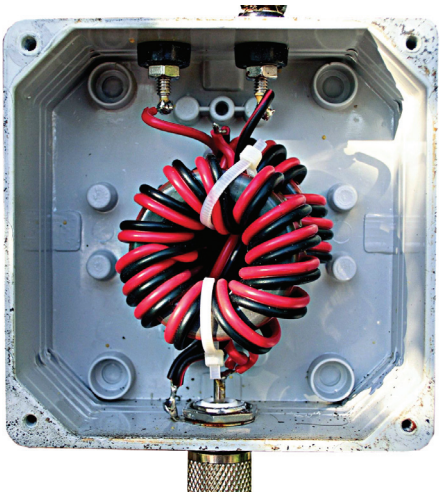
An OCF dipole for small gardens Part II

Bob Towers, MM0RKT, mm0rkt@gmx.com

Continuing from Part 1 (SPRAT 176).

In this second part of my article, I'll flesh out details of the balun that was shown in the first issue (and shown again here). The 4:1 balun at the bottom of the ladder line must be a current (Guanella) balun. It's in effect two 1:1 baluns with the windings connected as shown on the below.

Mine was made with two T150-2 (red) powdered iron toroids stacked on top of each other with 14 turns of bifilliar wire in each balun. I wound 7 turns one way, a crossover and then 7 turns the other way which gave me inputs and outputs on opposite sides of the toroids.



I originally made it for my Elecraft K2 which is 10m - 80m, so red toroids have an ideal operating frequency range.

For QRP you could put both bifilliar windings on a single core, say a T100-2 or smaller, and use finer gauge wire.

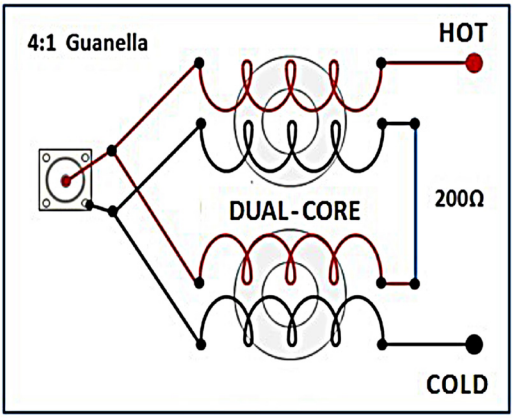
It's definitely not an aerial for 160m - it's far too short - nor 60m (neither of which my Elecraft K2 covers). Otherwise 30m and 20m are the worst bands.

Two possible options for improvement were:

Firstly, to adjust the aerial length to try and get better SWRs for the bands. As both ends of the OCF dipole are quite high up, this option would have involved running up a ladder, snipping a bit off the length, running down the ladder, doing a new plot with my analyser, then going over the same path perhaps many times.

There was, of course, no chance of a guarantee that there would be any overall improvement. Some bands might have had a lower SWR reading, but others might have higher SWR readings. I suspect it might have been a pointless exercise!

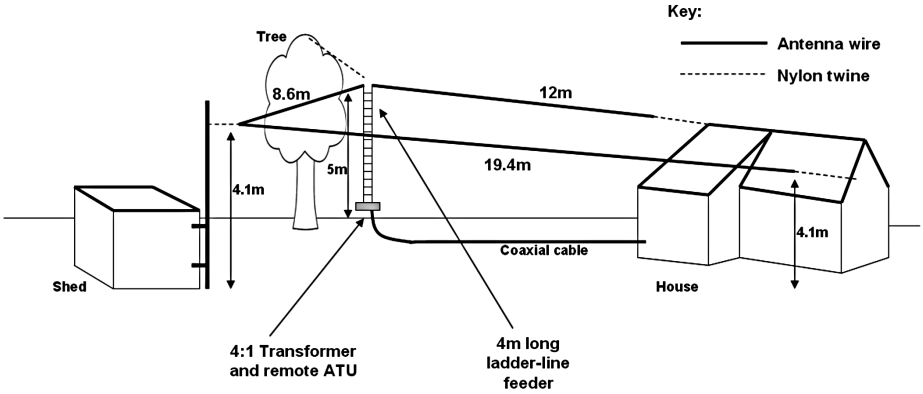
My second idea to improve the antennna, was to move the aerial tuner at the rig to the bottom end of the ladder line feeder to ensure that the SWR was as close to 1:1 in the 60 foot RG213 to the rig.



Moving the ATU's position to the feedpoint of the antenna, required a change from a manual tuner to a battery-powered autotuner. And to reduce the need to go and check on the batteries, I set it up to run it off a solar panel-charged gel cell battery.

The auto tuner I chose was an LDG Z11 ProII which can handle 100 watts and only needs a 12 volt supply when the latching relays change bands. A 3-4Ah gel cell battery was quite sufficient for the task and is run off a 10"x8" 12 volt solar panel.

The only modification was a 1N5819 Schottky diode in the solar panel power lead to prevent the gel cell battery trying to charge the solar panel.



The whole lot was contained in a TupperWare style waterproof plastic container. The two SO239 connectors are screwed in and sealed with single-pack polyurethene glue. You could use silicone sealant, but make sure it's neutral cure to avoid corroding the fittings.

In operation, the SWR at the rig is close to 1:1 for all bands, so losses in the coax to the rig are minimal, apart from normal frequency-dependent attenuation. The new setup looks like the above diagram.

Well, that's it, until I get a notion to try something new!

These are the SWR readings at the coaxial input of the 4:1 balun together with calculated feeder losses in the 60 foot coaxial cable.

Frequency MHz	SWR X:1	ERP 5W at TX
1.836	57.03	2.5
3.560	1.33	4.7
5.262	11.09	3.7
7.030	3.55	4.4
10.116	4.85	4.1
14.060	5.05	3.9
18.096	2.63	4.2
21.060	2.22	4.2
24.906	1.80	4.3
28.060	1.31	4.3

USB Rig Interface for FT-817 and others

Guido HB9BQB

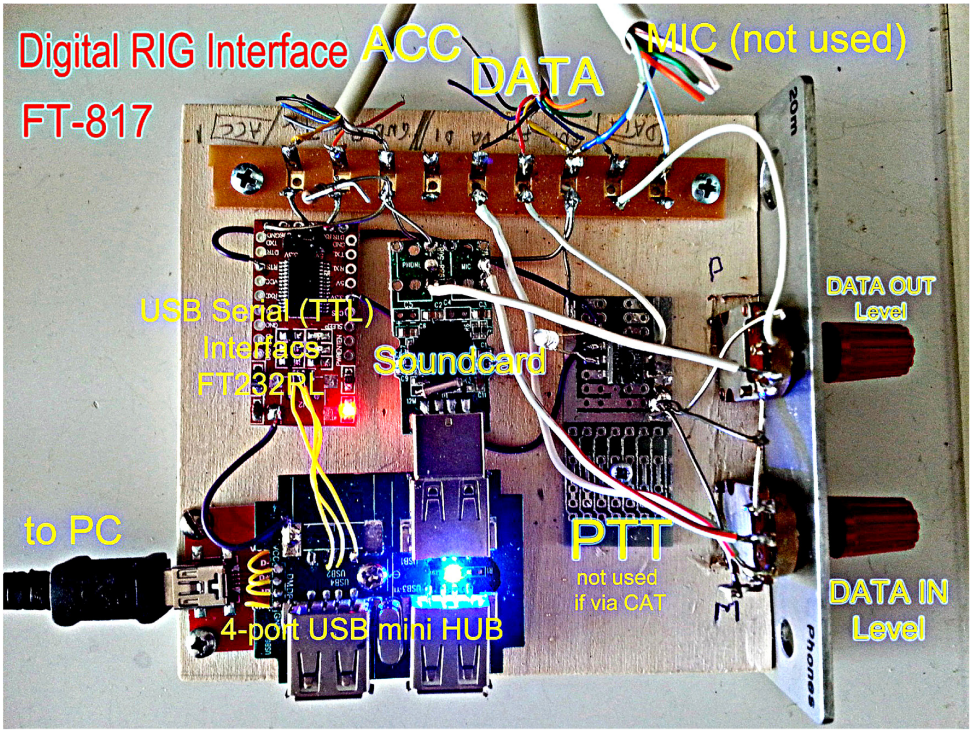
"CW4ever" or "CW first" yes but what about this FT-8 hype? Why not give it a try? My mcHF and other newer RIG do it easy with only one USB cable. What about older RIG's? Build a homebrew RIG interface for less then 20£. No need to buy an expensive RIG Interface.

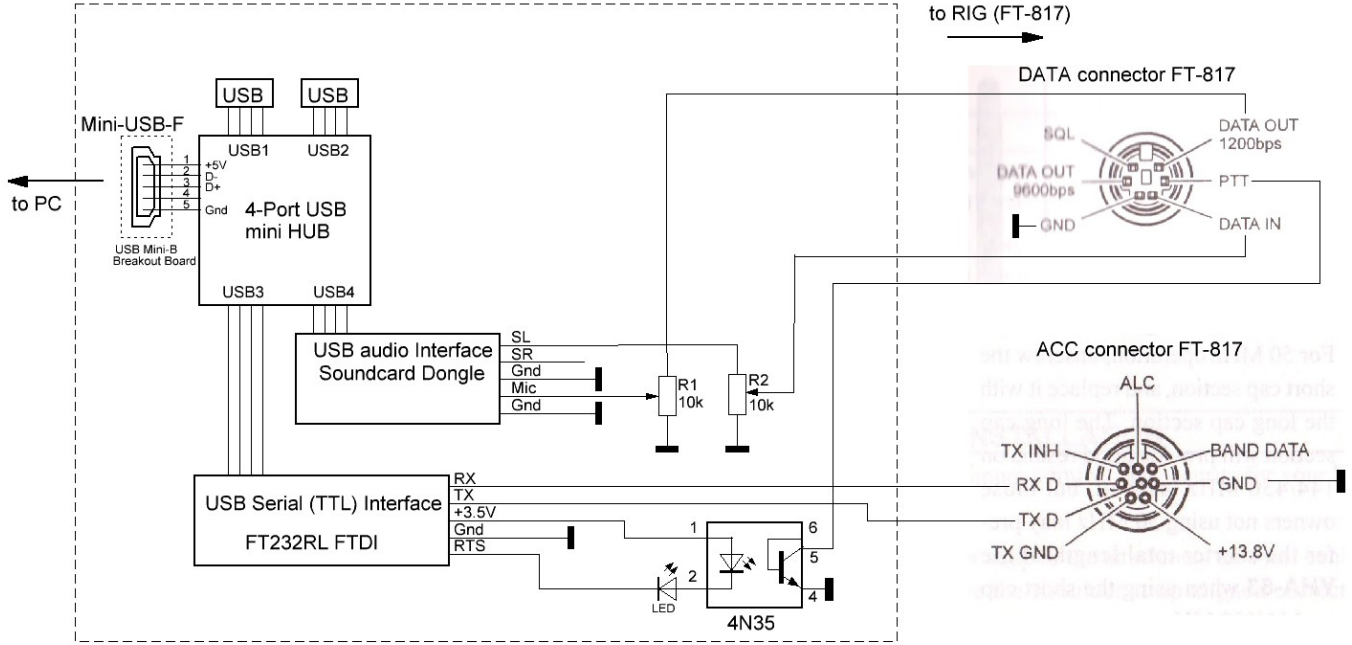
Idea and Schematic is after YO3GGX, see his webpage: (https://www.yo3ggx.ro)

Rig Interface:

You need (cheap from China, eBay etc):

- FT232RL USB Serial to TTL Interface
- USB 2.0 4-Port Hub
- Soundcard Dongle
- USB Mini-B Breakout Board
- ACC connector
- DATA connector
- Two potentiometers 10kOhm





USB RIG Interface für FT-817

HB9BQB, G.Giannini, after YO3GGX

20.8.2018

Remarks:

RTS to PTTcircuit only needed if not via CAT

I built the interface on a breadboard but feel free to use a cabinet of your choice

The WSJT-X software is setup to acheive commiiunication through noise that can be many times greater than the available signal carrying the message. It's all about weak signal working, which of course as QRPers we're all so interested in.

The Software itself, WSJT-X, which has version to run on various operationg systems can be downloaded, from the WSJT home page to be found at Princeton Physics website:

https://physics.princeton.edu/pulsar/k1jt/

With versions available for:

Windows

Latest full release, Version 1.9: *wsjtx-1.9.1-win32.exe*.

Linux

Various versions including the Raspberry Pi, though you will need to look at the documentation to help install your particular version

Latest full release, Version 1.9

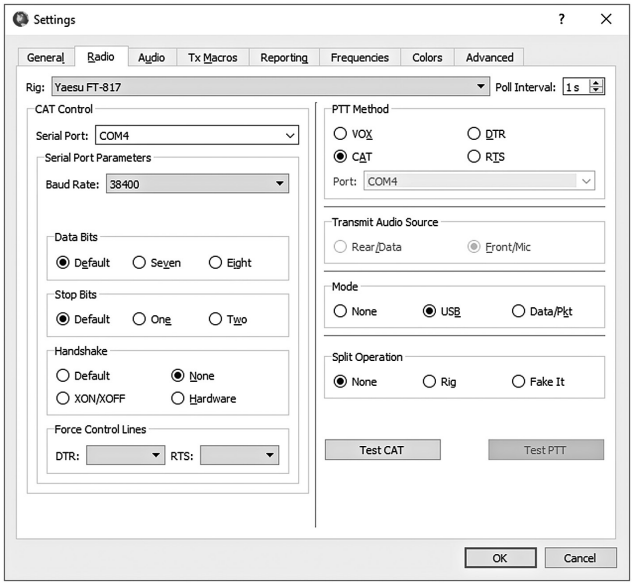
Debian, Ubuntu, ... (32-bit):	*wsjtx_1.9.1_i386.deb*
Debian, Ubuntu, ... (64-bit):	*wsjtx_1.9.1_amd64.deb*
Fedora, RedHat, ... (32-bit):	*wsjtx-1.9.1.i686.rpm*
Fedora, RedHat, ... (64-bit):	*wsjtx-1.9.1.x86_64.rpm*
Raspbian Jessie, ARMv6 ...:	*wsjtx_1.9.1_armhf.deb*
Macintosh OS-X 10.9 or later:	*wsjtx-1.9.1-Darwin.dmg*

The Configuration page for the FT-817 should look something like this:

#26 DIG MODE, USER-U #25 Sound Input 50

MTR alc about 3 bars #14 Baudrate 38400 or 9600bd

Filter set to wide – **Not Narrow**!



The software setting for rig control should look something like shown here, though your COM port will probably be very differnt.

‘New’ High Impedance Headphones

Peter G4UMB email: pahowd@gmail.com

QRP circuits sometimes use a minimum power audio stage which can only drive high impedance headphones or a crystal earpiece. I find a crystal earpiece is uncomfortable and will fall out of my ear sometimes so an alternative solution was necessary

With high impedance headphones now being hard to find and expensive I thought I would try to make some by converting a Pound Shop pair of headphones to take some crystal earpieces for £5.It was not quite so simple as I first thought, but with patience I managed it.

Here is what I did. First carefully unhook the foam ear cushions and then use a small screwdriver to push the tab clips that hold the magnetic insert housing, so it separates from the base. Then carefully remove the inserts and discard them with the cable. You are left then with a base which needs to be reshaped to take the new crystal earpieces. I cut a hole in them which takes the body of the earpieces and unscrewed the piece that is inserted into the ear.

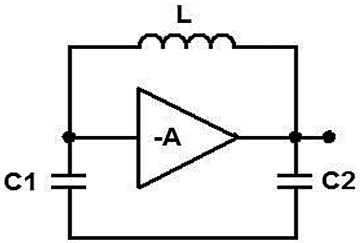
To act as a cushion I added some foam rubber to take up the space inside the bases. The head band now has to be cut and glued in because where it originally fitted the space is now taken by the foam and crystal earpiece. So it can no longer be adjusted to your head size. I then knotted the new twisted wire , and wired both together. The jack plug just pulls apart. The sound quality is toppy as you would expect.

Simple low distortion sinusoidal oscillator

Roger Green, MW0RJG: profrogerjgreen@live.co.uk

I set out to create a simple sinusoidal oscillator using a 455kHz resonator.
There are almost countless versions of oscillators around, but the majority of them do not produce good sinewaves at the output, but rely on filtering or tuned elements to get rid of higher order harmonics.

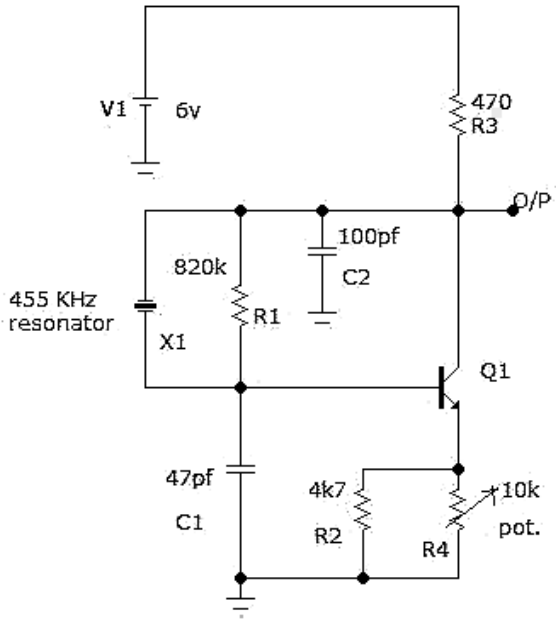
The circuit I'm describing uses basic ideas, but in a way which I believe may be of interest – I hope! If we consider the basic Pierce types of oscillator commonly used, especially in digital circuits, they often use inverters, or other logic gates, with feedback, acting as an inverting amplifier, as shown in the diagram here:-.



The output of such an oscillator can be a square wave, rich in harmonics, the latter which do not matter for digital systems, or for analogue switching purposes. However, if their output is used in a mixer or modulator, the harmonics themselves intermodulate with other frequencies used, resulting in a broad spectral mess.

Supposing, though, a sinewave is needed to avoid these problems, and in the minimum circuitry possible, requiring no inductors or filtering agents incorporated? The answer is comparatively simple, and that is not to generate the harmonics in the first place!

Now, most oscillators use devices with high gain, and, unfortunately, nonlinearity caused by basic device action, or limitations in their dynamic range.



Also, oscillators using crystals or resonators have the further properties of the resonating structures themselves.

If any such mechanical structure is energised sufficiently, it produces not only the fundamental frequency of resonance but also harmonics, should the level of energisation be sufficiently large.

Clearly, if one is going the avoid harmonic generation in an oscillator, these factors need to be addressed. An example circuit is shown opposite :-

I chose the bipolar transistor, in my case the ZTX108B, to perform as an inverting amplifier. So, what's the big deal, you may ask? It's the presence of the emitter resistors, R2 and R4, which are important in the following ways:

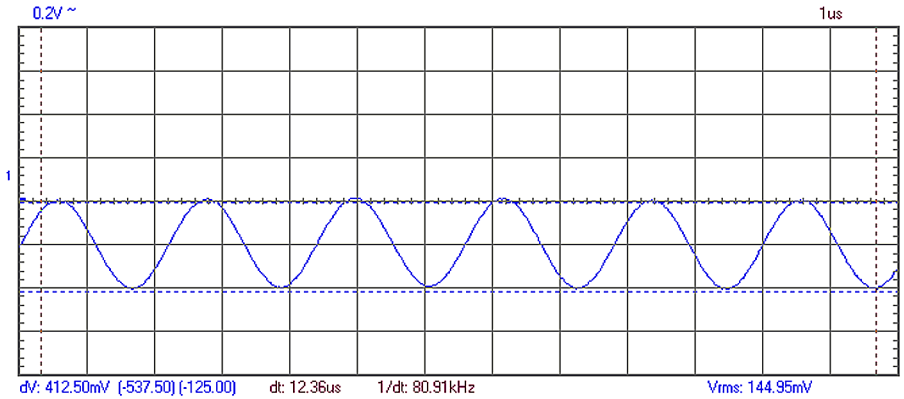
•They help to control the input impedance.
•They regulate the gain – which turns out to be crucial in order to produce the overall benefit.
•Their presence reduces the power consumption of the oscillator.

Of course, the circuit will oscillate and produce lots of output without R2 and R4. In this case, the output is a fairly large signal approaching a square wave with unequal mark-space ratio.

The fact that the mark-space ratio is not usually unity means that many diverse frequency components are present. Without R2 and R4, the circuit standing current is controlled by the transistor parameters (eg. current gain, base-emitter voltage), and the value of R1 is important to set the operating point at the output.

Depending on the individual transistor characteristics, R1 may need to be adjusted so that the voltage across R3 is at least 1 to 2 volts, to ensure that the transistor operates in a relatively linear mode as an amplifier.

I have adopted the "non-industrial" approach, whereby we can spare the time getting our own circuit just right, by accommodating variations. This is why R4 is included across R2. The combination should be adjusted so that a sinewave is present at the output at the collector, and, if a spectrum analyser is available, the best spectrum.

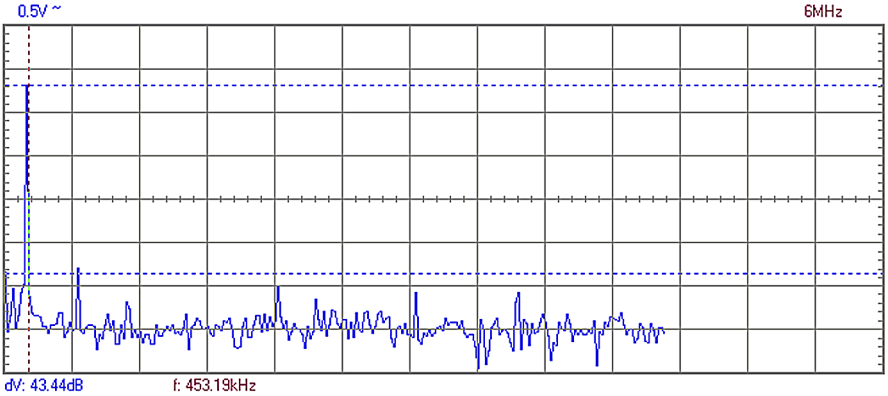


In varying R4, it is pleasing to see that, out of a waveform or spectrum with undesirable characteristics, good ones emerge when R4 is set to optimum. What's possible is shown below, in terms of waveform and spectrum:

A Vellerman PC scope was used for measurements, acting as a scope up to 50MHz but also a spectrum analyser up to 25MHz.

The second harmonic is around 40dB down on the fundamental. The remainder of the spectrum is in the noise, and to the right of the second harmonic, up to around 25 MHz. With an optimum setting of the R2 and R4 combination, the gain is reduced to a point where the resonator is driven only just enough to resonate, and little harmonic generation takes place in the resonator.

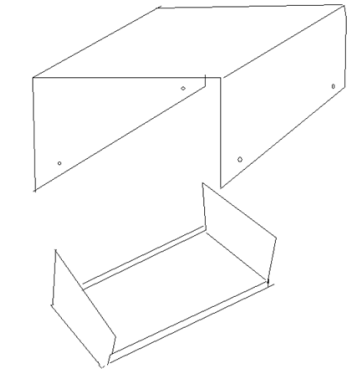
In parallel with that, restricting the signal amplitude means that less harmonic generation occurs due to device nonlinearities.



If the supply voltage to the circuit is varied by a volt either way, the circuit performance is maintained. Note that another output could be taken from the emitter of the oscillator, but it is a little more distorted, and, typically, around four times the output at the collector – which is worth thinking about. An amplifier with an apparent voltage gain from emitter to the collector of ¼ can provide oscillation !

Member request

This is really a question to gauge if other members would like the club to try and source some simple aluminium, boxes to replace the ones Maplins sold? The type I mean is shown here, a useful 'double-U' shape that I think is ideal for QRP RF projects etc. And if there's a call for the club to look into it, what sizes would be preferred?



73 Peter G4UMB – 6716

Club Information – Who Does What

(email & postal addresses are on the club website)

Sprat		
	Editorial	G0FUW
	Articles	G1TEX
	Members news for news column	G4BUE
	Communications news	M1KTA
	VHF news	G8SEQ
	Sprat Delivery	G4WIF
	Sprat Index	K7WXW
Membership		
	Membership queries, subscriptions (+ any QTH & call changes), Sprat distribution.	G4WIF
General		
	Club Secretary	G3RJV
	Chairman	G0FUW
	Treasurer	G3MFJ
	EUCW representative	M1KTA
SALES		
	General items & back issues of Sprat.	G3MFJ
SERVICES		
	QSL Bureau - in, out & sorting	GM3VTH
	Antenna advice	G3VTT
	Awards	G5CL
	Circuit & construction advice	G3ROO
	Club Trophies	G0EBQ
	Internet GQRP club reflector & web site	G4WIF

Please quote your membership number (and email if you have it) in all correspondence and include an addressed envelope with postage if you need a reply.

Membership Secretary News

Tony G4WIF (g4wif@gqrp.co.uk)

Sadly, our old printer/distributor closed their business and we quickly had to find a new one. Distribution of the Autumn Sprat went generally well - except (it seems) to the USA where they finally arrived with members a month after what would normally be expected. We have met with the printers and together with Royal Mail have been investigating the delay. Bulk mail isn't usually tracked, so much is supposition. Royal Mail has stated that Sprats to all countries were dealt with together, so in all probability, they may have been delayed by US Customs or US Mail. We just can't be certain. All we can do is apologise to members in the USA for the delay. We hope that is a "one-off". By now you should have received your 2018 Autumn Sprat. If you haven't, please contact me.

As usual, this is the issue of Sprat that reminds you it is time to renew your subscription. Please go find that label on the Sprat packaging and see if it says "expires end of 2018". For the various membership rates and method of payment please read the four page in this issue (or look on www.gqrp.com).

UK members with existing standing order arrangement with their banks need do nothing until your Spring Sprat arrives. If your expiry date (on the label) hasn't incremented by then, assume something has gone wrong and contact me. Your standing order mandate must quote your membership number or we won't know who has paid.

In the UK you pay me - not Graham G3MFJ in Club Sales or anyone else. It causes much extra work when members do not contact the correct club officer. If you write by post please always include a stamp (or an email address) if you expect a reply. If you send insufficient funds you will receive only one Sprat in 2019 with an underpayment notice on the label. You will receive nothing more until you make up the shortfall.
All members should be aware that the club will not accept payments that take your subscription beyond 2019. Paypal will be returned less charges, cheques will be destroyed and excess standing order payments will be assumed to be donations - but will be returned on request (at your cost).

UK Members: All cheque payments should be to "GQRP club". For UK members who wish to switch to automated payment there was a UK bank standing order form in the Autumn issue of Sprat to send to your bank (and not me) in time for your payment which must execute on the 15th January 2019. Always quote your club number as well as your name and callsign in all correspondence – it really does help.

Overseas members: Please refer elsewhere in this issue to the list of DX representatives to whom you can pay in your local currency. For the remainder of the world without PayPal access you can pay by international bankers draft (in UK Pounds) or cash in UK Pounds (to me). I cannot accept Euro or U.S. Dollars. Cash is sent at your own risk.

You can also save me much work if you pay using PayPal. Please see www.gqrp.com/paypal Only the use of the special form on the club website will be accepted. Any other method will be rejected. We do automatically add a little to cover PayPal administration charges – but only what it would have otherwise cost you to buy a stamp to post your subscription.

Finally my sincere thanks to all overseas representatives who give up their time to deal with local members throughout the year.

Finally, no stapled cheques in letters please!

SUBSCRIPTIONS FOR 2019 ARE NOW DUE

Your SPRAT label tells you your current status. Your receipt is the updating of your status code on your Spring 2019 SPRAT address label. The labels for your SPRAT are printed 4/5 weeks ahead of publication so if you pay promptly your Spring Sprat label will be correct.

SUBSCRIPTIONS FOR 2019 – please see options below.

UNITED KINGDOM	EUROPE	DX
• £6.00 Cheque / Postal Order sent to G4WIF (payable to "GQRP") • £6.00 - Standing order • Paypal	• £12 sent to G4WIF (Cash in GBP [no Euro or Dollars] *2, Cheque or money order*1) • €15 (to Euro rep.) • Paypal	• £13 to G4WIF (Cash in GBP [no Euro or Dollars] *2, Cheque or money order*1) • Send to DX rep. (see list) • Paypal
Paypal- (**Mandatory**) - only use www.gqrp.com/paypal Notes: (*1 Payable to "GQRP"- drawn on a UK bank). (*2 At own risk)		

You can pay by direct transfer but you must provide your membership number as a reference. Our bank account details are:- G-QRP CLUB NO. 1 ACCOUNT, NATIONAL WESTMINSTER BANK PLC, ROCHDALE BRANCH (SORT CODE 01-07-44 a/c 04109546).

UK *members can use the form provided in the Autumn Sprat (but see membership secretary news page) if they would like to pay by standing order or to amend their existing standing order to the 2019 subscription rate of £6.00. This payment must be in place with your bank to execute on the 15th January.* ***If your standing order does not quote your membership number then your payment can only be treated as an anonymous donation and your membership will expire.***

All UK cheques must be made payable to "G-QRP CLUB"
EU & DX cheques – see "Overseas Subscription" page.

✂- -

Please **enclose this form with your payment write your callsign & number on the cheque do not staple your cheque to this form. Send to GQRP Club, PO Box 298, Dartford, Kent. DA1 9DQ**

Membership Number ___________________ Callsign ______________

Name __________________________________

Number and road ______________________________ Name used on air _____________

Town ______________________________ Post code _____________

Country ______________________________ Email ______________________________

Changes or additions

. . . .

. . . .

Checklist for UK Cheques:
- Did you make your cheque out to the GQRP club?
- Did you date it correctly?
- Did you sign it?

OVERSEAS SUBSCRIPTIONS FOR 2019

Please send your subscriptions to the following overseas representatives:-
(for representative email addresses see www.gqrp.com – membership renewals page).
Please provide your email address and club number to overseas representative with payment.
Also check the GQRP website for updated information on renewals/subscriptions.

Country & Representative	Amount
U.S.A Dave Yarnes W7AQK, 12630 E. Cape Horn Drive TUCSON, AZ 85749 USA. **Cheques to be made to "David Yarnes".**	$22.00
Germany: Dirk Krause, DL1GKD, Hauptstraße 4, D-78597 Irndorf**.** Konto: Sparda-Bank Baden-Württemberg, Dirk Krause. IBAN: DE17 6009 0800 0107 9124 16 BIC: GENODEF1S02 In der Zeile Verwendungszweck bitte unbedingt angeben: NAME, VORNAME, CALL, GQRP Nr. Schecks und Bargeld werden nicht entgegen genommen!	€15
The Netherlands Henk Smits, PE1KFC, Storm Buysingstraat 30, 2332 VX Leiden, Nederland. Tel 06-13267146. Maak voor 1 Januari 15 Euro over op rekening ABN NL62 ABNA 0450 4063 34 t.n.v. H.W.Smits te Leiden. Vergeet uw call en uw G-QRP nummer niet te vermelden! Een email ter bevestiging wordt op prijs gesteld.	€15
Belgium Jos Warnier ON6WJ, Kalendijk 28, B-9200 Dendermonde, Belgium. Tel. 052 220996. Vergeet niet Uw call en clubnummer te vermelden! N'oubliez pas d'indiquer votre indicatif et votre numero de membre! Contributie/cotisation: 15 Euros voor/avant le: 1 Jan op nummer/ au numero: BE21 9796 3930 7403	€15
Austria Johann Auerbaeck, OE6JAD, Kirschenhofersdlg. 120, Bitte den Beitrag bis Ende Jänner A-8241,DECHANTSKIRCHEN, Tel: 3339-23335 IBAN: AT82 3804 1000 0001 5156 BIC: RZSTAT2G041 In der Zeile Verwendungszweck	€15
France. Richard Sayer, F5VJD, Vignouse, 35380, Paimpont, France (cheque perso [SAYER Richard] avec votre indicatif, numéro de membre et adresse E-mail indiqué au verso).	€15
Denmark. Ole Rasmussen OZ1CJS: Fornyelse af abonnement af GQRP: Venligst foretag en kontooverførelse af 115 Kr. senest d. 1. Januar til : Ole Rasmussen Danske Bank, Haslev Reg. nr. 0575 Konto nr. 3531127749 Venligst vedhæft følgende information: navn, call, medlemsnummer Undgå venligst at fremsende kontanter og checks. Har du et problem mht. bankoverførelse, så kontakt mig så vi kan finde en løsning. Nyt abonnement af GQRP: Ønsker du at blive medlem af GQRP og modtage medlemsbladet SPRAT, så send mig venligst en email med dit navn, adresse og evt. kaldesignal. Så skal jeg med glæde sørge for at du bliver kontaktet.	115DKK
New Zealand, Phil Tarrant ZL2NJ, 7 Waitote Street, Castlecliff, Wanganui 4501, New Zealand. cellphone 0224031096. Account details :– Kiwi Bank -Account name:- P Tarrant G-QRP, Account No 38 9003 0186315 02	NZ $28.00
Australia Norm Lee VK5GI, The Vineyard, 28/170 Main Road, MCLAREN VALE, South Australia 5171. Account name: Norman Joseph Lee GQRP Club Account, Bank: ANZ Bank McLaren Vale. BSB number: 015 627, Account number: 1812 – 51764. Cell: 0402 446 453 (Call - don't text).	AUD $24
Italy. Fabio Bonucci - IK0IXI. Via Umbria 4, I-00053 Civitavecchia Italy. "La quota annuale per l'iscrizione al GQRP Club dall'Italia è di 15 Euro. I pagamenti possono essere effettuati tramite: 1) Direttamente sul sito GQRP tramite PayPal. 2) PostePay - € 15.00 3) Diretto (contanti € 15.00). Rischio di smarrimento a carico del socio. Si può effettuare la ricarica PostePay in ogni Ufficio Postale al costo di 1 Euro, oppure tramite le ricevitorie Lottomatica al costo di 2 Euro. Per informazioni inviare email a Fabio oppure SMS 320-4839771	€15
España. Jon Iza, EA2SN, A. Gasteiz 48-7 izq, 01008 Vitoria-Gasteiz. Cuota: 15 euros. Ingresar en: BBVA IBAN ES05 0182 1629 8802 0151 3020 BIC BBVAESMM. Envía email con la info o pon como concepto tu indicativo y número de socio.	€15

Any other overseas to Tony Fishpool G4WIF, GQRP Club, PO Box 298, Dartford, Kent. DA1 9DQ, England [Europe: £12 GBP / DX: £13 GBP]

20m Band SDR Upconverter

Alan Troy G4KRN alantroy49@gmail.com

Due to the influx of cheap digital TV and Radio 'dongles', software defined radio devices are available to almost anyone. One minor problem with these simple cheap devices is that they generally have a lower frequency limit of around 25MHz or so. Admitedly most of them can then receive signal up to over 1600MHz plus, but that's not much use, if you wish to listen to the signals on HF.

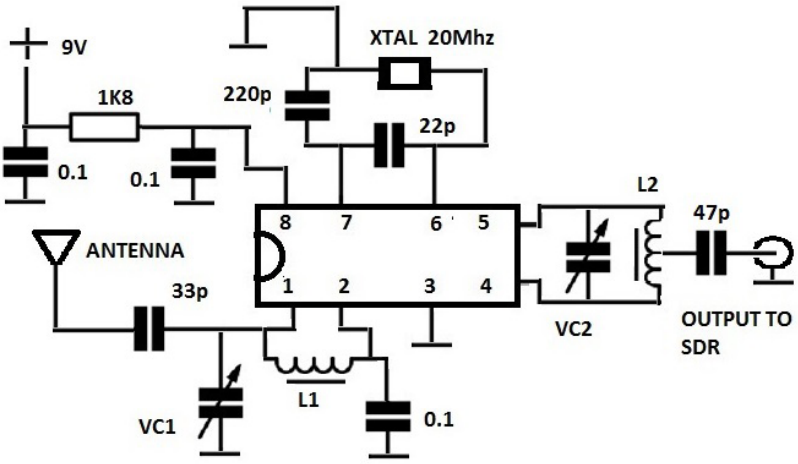
Although there's quite a bit of information about how to modify these dongles to allow receiving the lower frequencies, if your soldering skills, or eyesight, are no longer of the best, you need another option.

So, here is an upconverter which can be used with one of these dongles to allow SDR reception of the 20m band. The circuit is based on the NE602 (and equivalents) mixer/oscillator chip, and a 20MHz crystal to give an IF of 34 MHz for 14 MHz reception, which is within the range of the usual dongle types.

The circuit is "pick and mix" from various NE602 mixer/oscillator circuits depending on what I considered simplest and the components available. The variable capacitors are polyvaricon 140pF types. Coil L1, at the signal input, is 16 turns of 26 swg on a T50-6 (yellow) toroid and L2, signal output, is 12 turns of 22 swg also on a T50-6 (yellow) toroid. This coil is centre tapped at six turns.

Power is supplied by a 9V PP3 battery. Once constructed, check the current drawn from the 9V battery, which should only be a few mA. Also you may check the oscillator is on 20MHz with a general coverage receiver.

Connecting to the SDR dongle input and tuning from 34MHz up should provide signals from the 20m band with an antenna attached. Adjust VC1 and VC2 for best signal. The device should also be able to tune to the 40, 30 and17m bands by adding 20MHz to the desired signal frequency. Note that many of the components are available from Club Sales. The circuitry is very basic and could be improved, especially at the RF input.



Replacement of a C-connector

Doriano Rossello IW1PAG

I needed to restore a Telefunken E724KW Spez receiver and return to use. I like these old rigs very much and I esspecially love the nixie display on the E724 showing the frequency. The ‘old time’ soothing orange glowing makes me remember my first access to digital displays many years ago.

First I needed to substitute two switches that was broken due the fragility that has developed over the many years that hve passed since it was new. Another problem that arose was how to connect the receiver to an antenna lead?

This radio use a C connector that I found not only very difficult to find in the surplus market. But when I found a suitable one, the price asked was far too great And even more expensive if a new one was ordered.

The Telefunken E724KW Spez. radio

So I decided to build a similar device to permit me to connect my antenna and use this very beautiful (for me) receiver.

The C connector socket on the EK 724 that has to cope with a home-brew plug

First I measured the external diameter and depth of the connector mounted in the radio and verified the values and tolerances with the commercial counterparts from downloaded catalogues of connectors makers to be able to have access to the real dimensions of the C connector and to verify the accuracy that I’d made my measurements.

After this was necessary to find an easy way of constructing what is essentially a new plug. And once again, I’m thankful for the very useful help of friends in the radio Community.

I decided to use a printed circuit board as a base onto which I could solder the coaxial cable with a common BNC connector and a sheet of thin brass cut and bent to size for the body. The central pin is a copper wire of correct size for the plug on the radio.

A particular problem that I encountered was the necessity to cut the brass sheet that would form the outer of the plug instead of the continuous cylindrical shape of the original This came about because the C connector has two little lugs on it, needed to lock the two items together by a bayonet coupling. I found it rather difficult to reproduce the shapes of the grooves exactly on the connector I was making, This I found too difficult for me.

Bending the brass sheet into shape around a smaller cylinder with the help af a Jubilee clip

I gently bent the new C connector for the E724KW to cope with the differences of my home-brew antenna connector.

A 12,5 mm diameter compared with the measured one (13,6 mm), to get around the 'elasticity' or 'springyness' of the brass plate. A simple screw clamp helped in the bending operation,

I used the base photoetching mask on a square of printed circuits board. When etched and cleaned, I cut out the slots into which the tabs of the connector body were to be fixed and soldered.

Naturally, due the dimensions of my creation, impedance surely will not be the classical 50 ohm! But it works well.

The photos show how I proceeded with what might seem a rather difficult task. Though it was easier than you might think.

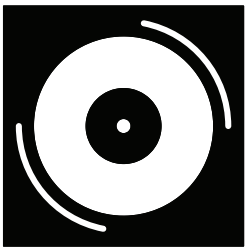
Anyone with the same, or similar, problems is welcome to copies of my drawings (in DXF format) of the mechanical parts in the hope that they may be useful to others

The result was as hoped and the receiver is now connected to antenna.

The Telefunken works great , it has sensitivity and selectivity: a wonderful radio, at least for me!

This was the PCB base that I used to recreate the C-connector

PCB mask



Actual dimensions = 16x16 mm.

The Sudden Transceiver Part II

Pete Juliano N6QW, email: n6qwham@gmail.com

Continued from part one pages 16-19 of Sprat issue 176 (autumn 2018).

In this second part of this article I describe the relay switching scheme that is illustrated in the full transmitter schematic opposite. You should also refer to the schematic of the mixing section described in part one of this article (page 18, Sprat 176). A block diagram view of the transmitter signal path is shown later:

Our relay switching scheme does two things: – 1) Switches modules on the input and output sides of the NE602s and – 2) Redirects the LO and BFO signals.

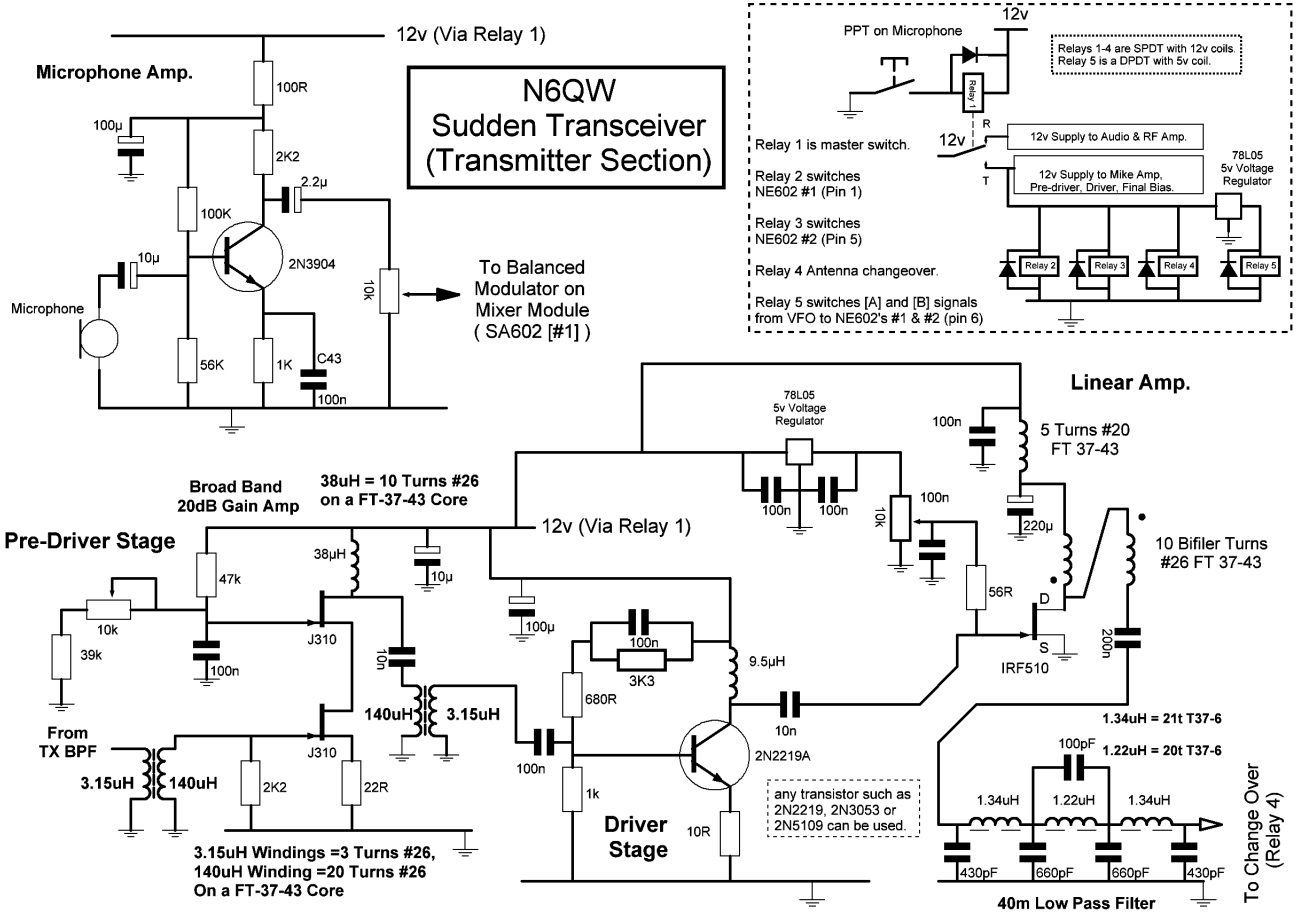
In transmit Pin 1 of NE602 No.1 has now been switched from the Receive BPF to the Microphone Amplifier and now Pin 6 is fed the BFO signal at either 8.998500MHz (LSB) or 9.001500MHz (USB). The signal coming out at pin 5 is really an interesting case study of DSB.

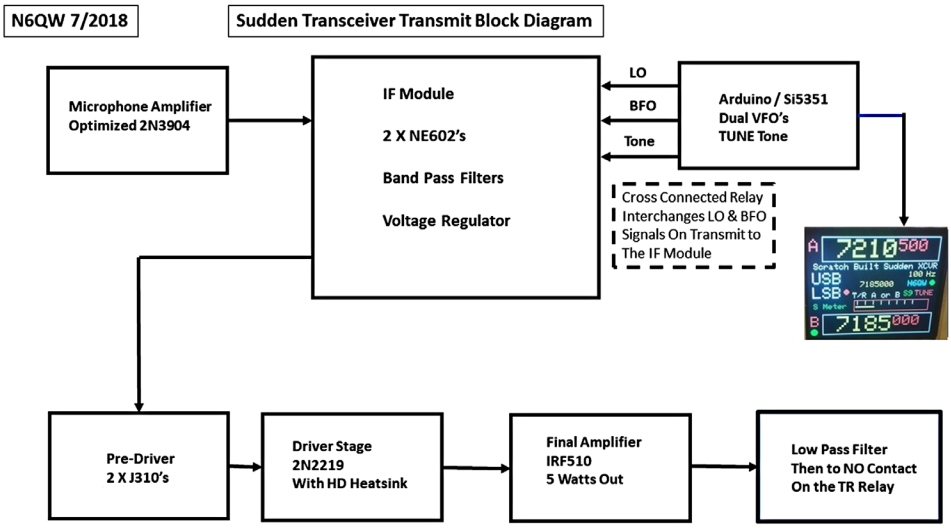
I'll assume that we are using the 8.998500MHz BFO signal and are feeding an audio signal from the microphone. The two products would be the (8.998500MHz + the audio frequency) and the (8.998500MHz – the audio frequency). But the filter with a Center Frequency of 9MHz would only pass the signals that are the (8.998500MHz + the audio) since the other component is **outside** the 2.1kHz pass band of the filter itself.

Now let's look at the case where the 9.001500MHz BFO is used, mixing again with our audio range signal. The two products would now be (9.001500MHz + the audiofrequency) and (9.001500MHz – the audio frequency). This time, only the (9.001500MHz – the audio) would pass through the filter with its Center Frequency of 9MHz as the USB product is **as before – outside** the filter pass band.

After going through the Crystal Filter, the 9MHz signal is directed to Pin 1 on NE602 No.2 and now the LO (16MHz) is fed to Pin 6. Here again two products with one at 25MHz and the other at , the desired signal of 7MHz The two outputs are fed to the Transmit Band Pass Filter where only the 7MHz signal pass through BPF on to the linear amplifier chain.

The redirection of the LO and BFO signals was accomplished using a small cross connected DPDT relay so that the cable feed Pin 6 on NE602 No.1 has the LO signal on it during receive but when in transmit that cable is now carrying the BFO signal. Likewise, for NE602 No.2 during receive the cable feeding its Pin 6 has the


N6QW
Sudden Transceiver
(Transmitter Section)
12v (Via Relay 1)
Microphone Amp.
100R
100µ
2K2
2.2µ
100K
10µ
2N3904
Microphone
10k
56K
1K
C43
100n
To Balanced Modulator on Mixer Module (SA602 [#1])
12v
PPT on Microphone
Relay 1
Relays 1-4 are SPDT with 12v coils.
Relay 5 is a DPDT with 5v coil.
Relay 1 is master switch.
Relay 2 switches NE602 #1 (Pin 1)
Relay 3 switches NE602 #2 (Pin 5)
Relay 4 Antenna changeover.
Relay 5 switches [A] and [B] signals from VFO to NE602's #1 & #2 (pin 6)
R
T
12v Supply to Audio & RF Amp.
12v Supply to Mike Amp, Pre-driver, Driver, Final Bias.
78L05 5v Voltage Regulator
Relay 2
Relay 3
Relay 4
Relay 5
Linear Amp.
78L05 5v Voltage Regulator
100n
5 Turns #20 FT 37-43
100n
100n
10k
100n
220µ
10 Bifiler Turns #26 FT 37-43
56R
D
S
IRF510
200n
Broad Band 20dB Gain Amp
38uH = 10 Turns #26 on a FT-37-43 Core
Pre-Driver Stage
12v (Via Relay 1)
38µH
47k
10µ
10k
39k
J310
100n
100µ
10n
100n
3K3
9.5µH
680R
140uH
3.15uH
10n
2N2219A
From TX BPF
3.15uH
140uH
J310
2K2
22R
100n
1k
Driver Stage
10R
any transistor such as 2N2219, 3N3053 or 2N5109 can be used.
1.34uH = 21t T37-6
1.22uH = 20t T37-6
100pF
1.34uH
1.22uH
1.34uH
430pF
660pF
660pF
430pF
40m Low Pass Filter
To Change Over (Relay 4)
3.15uH Windings =3 Turns #26,
140uH Winding =20 Turns #26
On a FT-37-43 Core



BFO signal and when in transmit the cable is now fed the LO.

To recap: In Transmit NE602 No.1 has the Microphone Amp feeding Pin 1 and the BFO feeding Pin 6. Likewise, NE602 has the LO being fed to its Pin 6 and the output is to the Transmit Band Pass Filter.

Starting with the Original Sudden PSK article and given the theory above... The first thing I saw that needed changing was that the 2N3819 would be replaced with an additional NE602 whose purpose now on receive would be the receiver mixer stage

The two-pole crystal filter was changed to a commercial 9MHz crystal filter sold through the GQRP club. So, now what has resulted is what I call a single pass IF Module comprised of two NE602s and the crystal filter. Signals are routed to the input and output of the module and pass in one direction as opposed to some currently popular topologies where in a similar module the signals are passed in both directions.

In the receive mode an off-board, receiver RF amplifier passes the amplified received signal through a Band Pass Filter (located on the IF Module board) to a SPDT relay, also on the board connected to the IF Module. The normally closed (NC) contacts of this relay connect the BPF to the Input side of the NE602 (Pin 1) via a 10nF capacitor connected to this relay. However, the BPF termination is 50Ω and the Input impedance of the NE602 is 1500Ω. Thus we need a 30:1 impedance transformation. This is easily done with a 2 to 11 turn broad band transformer connected right after the band pass filter to the NC contact of the relay.

On the output side of our IF Module we have yet another SPDT relay where on receive the output (NC) is connected to a healthy audio amp comprised of an NE5534 driving an LM380 (14 pin) audio amp. A point about gain distribution across the rig. Too many times high power RF amplifiers are introduced on the

front ends of receivers. So while you are boosting the signal you also are boosting the noise. Slightly less gain on the front end and more gain on the back end (strong audio amp) is more desirable to maintaining reasonable signal to noise ratios! Later you will see that my Receiver RF amp stage has a board mounted gain pot just so you can tweak the RF gain while holding back the noise.

On receive the LO signal (above the signal frequency by the IF) is fed to the first NE602, Pin 6 via 100n capacitor. In this mode this NE602 is a receiver mixer and the single output is taken from Pin 5 via a 10n capacitor. Matching to the 500Ω Input Impedance of the crystal filter is another broadband matching transformer. The Z out of the NE602 is 1500Ω and thus we need a 3:1 match. This is done with a 12-turn solenoid (single layer winding) transformer tapped at the 7th turn. The 12-turn winding connects to the 10n capacitor on one end and to ground on the other. The tap connection at 7 turns connects to the crystal filter.

A similar transformer is built on the other side of the filter and this connects (12 turn side) to Pin 1 of the second NE602 via another 10n cap. The wiring is almost the same as the 1st with the BFO connecting to Pin 6 via a 10n and output via Pin 5 via another 10n capacitor.

Pin 3 on both devices is ground and Pin 2 on both connects via a 100n capacitor to ground. There are no connections to pins 4 or 7. No more than 6V should be applied to the NE602 and that should be via a filter comprising a 1000µH RF choke and finally 10µF to ground.

On Transmit our two SPST relays would switch over to other circuit modules. On the front end in transmit we now have the first NE602 connected to the microphone amplifier and what was the receiver mixer, is now the Balanced Modulator. Following to the 2nd NE602 which was Product Detector on receive is now the transmit mixer. Following the 2nd is another matching transformer (11:2 turns) and a duplicate Band Pass Filter. Again signals are passing in a single direction.

The reason that we use the single pass is that the LO and BFO signals are swapped in the two NE602s. The first ‘602 gets the LO on receive and the BFO on transmit. The 2nd gets the BFO on receive and the LO on transmit. My initial thoughts was to do this all in software where I would have the outputs for the LO and BFO swap clocks.

A transmit command to the Arduino would change the CLK0 of the frequency synthesizer from being an LO to the BFO signal frequency and CLK2 on transmit would go from being the BFO to become the LO signal. I could get it to swap but somehow in the process the Si5351 would get confused and in going from R to T and then back to R – it was not on the same frequency. I decided I would not make that a science project and so resorted to a cross connected DPDT relay that would do that routing for me.

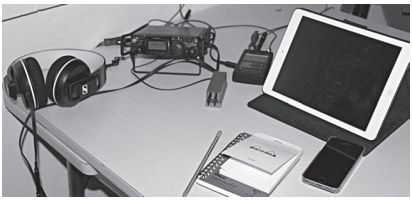
The performance of this transceiver has exceeded all expectations. Please do check my website for much more detail and some constructional photos and videos of the radio in action. [***www.n6qw.com***]

MEMBERS' NEWS

by Chris Page, G4BUE

E-mail: chris@g4bue.com

I have a nice problem with this column, 21 pictures to include, more than I have ever had before, so please bear with me if some of them are not as large as I would have liked. My thanks to everyone who sent them in and to **G3MFJ** for giving me an extra page this time.

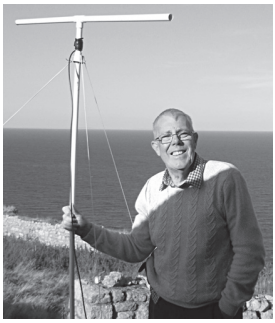


Every year in August **F5LUX** goes with his family to Corsica and uses an old FT817 at 4/5W to an Elecraft T1 tuner, Palm keyer, MFJ PSU (pictured left) to a 66 feet wire from the house to a tree. Chris had QSOs with 10 USA states, CE, FY, KP4, and for the first time ZL with a 559 report from **ZL/G4BUO** on 20m CW on his second call for his best ever QRP QSO. **GM4CXP** has never experienced such a sunspot minimum since first being QRV in March 1974 and says even his favourite mode CW is not working out too well with his shiny new FT818ND that he uses for CW and FT8. Del says his three FT817s are in constant use! He uses one to monitor 10m EU beacons, another to monitor 14060kHz or whatever else takes his fancy at the time, and the third lives in his rucksack for /A work from either the local pub or golf club! Del uses a Moonraker whizz whip or whizz loop for this, but says it's nice to be able to listen, even if QSOs are very rare on such compromise antennas. He never thought he would ever resort to FT8 but says it is keeping him sane until conditions improve enough for CW.

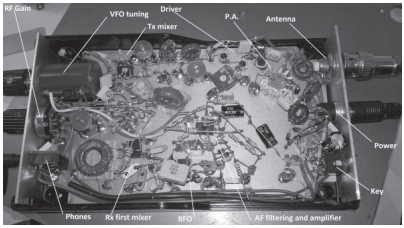
G4UDG recently received a gift of a hand built QRPp Vanguard TX built by **RX3G** of (mainly) 1950s Russian components into a Russian trinket box for the 'Sputnik Days' QRPp competition 4/14 October (see pictures), but Chris has used it 'in anger' on 14060kHz CW with just 50mW output to his home made Rybakov vertical. He has been spotted by several RBNs, and unbelievably, made a QSO with **OE6GUG** in Graz at 852 miles for 17,050 miles per watt. He says, "Amazing results given that HF conditions have been so poor, and just a miniscule 50mW of RF output, so, give a CQ, you never know!". **G3XIZ** built **G3SES**'s transistor tester from the last *SPRAT* and says, "It worked fine and the time I spent testing my assorted transistors will pay dividends as I found quite a few which would have given problems had they been used". Chris is half way through building a new 160m AM TCVR for use on his local Shefford Radio Society net (Mondays 1900z), and it will eventually replace the existing home made unit which is very large and getting somewhat past it. This winter he plans to use a balloon supported vertical antenna again on LF and MF and has dug out and serviced his lashed up hydrogen-making kit. Chris tried using a cheap drone to support an antenna but found it unstable in anything other than dead calm weather, so it's back to balloons and kites.

G4TGJ spent two weeks on Holy Island (EU-124) in August and was QRV after throwing a tennis ball with fishing line attached from the top floor balcony of their rented house,

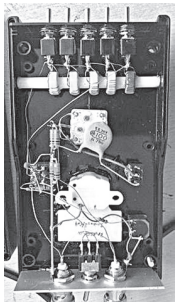
over the roof and pulling an end-fed wire over that he used with a home-made Z-match based on the design from *QRP Basics* with a 16 feet counterpoise to tune for 20 and 30m. Richard used his 30m 3W QCX most of the time and his FT-817ND on 20 and 40m. He also activated SOTA Holyhead Mountain (on Holy Island) and Mynydd Bodafon (on Anglesey) with the FT-817 and an end-fed half-wave antenna supported by a 13 feet fishing pole and matched with a 49:1 broadband transformer. Richard made 6 and 11 QSOs in his brief stay, including **HB9CBR/P** and **HB9BIN/P** who were on Alpine summits. Apart from three SSB QSOs his other 47 QSOs were CW, including two-way QRP with **IZ3SOI** and **IZ2QXG**, and 24 DXCC including EA9, TK, W and UA9. "Who says you can't make contacts with 5W at sunspot minimum with simple, homemade or second hand, equipment?".



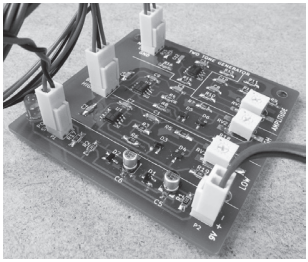
The picture right shows **G4CIB** holding his 2m dipole on a short mast 300 feet above the sea on Lundy Island in September. Brian used his FT-817ND at 5W, and on HF used a 19.6 feet telescopic glass fibre roach pole to QSO **UR5FA/MM** on a bulk carrier near Italy and **DK2FE** on 40m CW. He was pleased to QSO **GB2TOB** in Barnstable, special event station for the Tour of Britain cycle race that passed through North Devon. The UKAC series of contests were held while he was there and he made 19 QSOs in 10 squares with 5W in the 2m UKAC, limited success (with the same 2m antenna) in the 70cm UKAC logging just three QSOs, and three QSOs again in the 6m UKAC using an improvised wire dipole. Two visits are planned for 2019, the first in March which will be on the helicopter (so definitely lightweight QRP) and again towards the end of September on the supply boat *Oldenburg*.



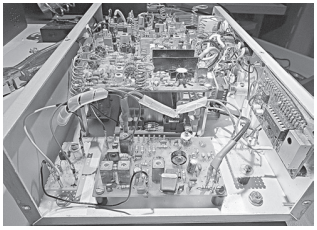
F6GLZ built the 40-40 superhet TCVR (pictured right) described by **NN1G** in his *QRP Power* article in the November 1994 *QST* using the 'dead bug' method. Jean Claude says, "In spite of its simplicity, the receiver is very sensitive and selective on 40m, covering 7020 to 7040kHz using a 10 turns potentiometer as the VFO tuning, and the PA (2N3553) delivers around 1W. I am using a 148ft long wire, thus an ATU was needed, and I built the **VK3YE** design from his *Hand-carried QRP Antennas* book (pictured right). Finally, I built an iambic keyer using a PIC microcontroller with **WA8SME**'s software from ARRL's *PIC Programming for Beginners*. More than 15 European DXCC were contacted in spite of the poor propagation".



The RSGB hosted a Buildathon on the Saturday evening of its Convention in October and **GØFUW** reports seven 'brave souls' got stuck into a new surface mount device kit from Kanga UK (pictured bottom right). One of the builders had never soldered before, most had soldered through-hole components but not SMD, and a couple had dabbled with SMD in the past. Two were Foundation Licence holders and the rest held full calls. The build used the RSGB loan tool kit with conventional soldering irons and headset magnifiers. **GØFUW** led the workshop, providing a hot air solder station and solder paste which proved very popular, and **G4YTN** from the Bath Buildathon crew, and **G6YBC** from Kanga helped out. Steve says the two-tone testers worked well and everyone enjoyed the workshop, agreeing that SMD is not that scary. Hopefully, the Saturday evening format will be retained next year.

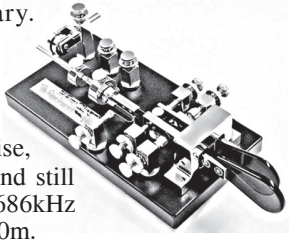


Once again the intrepid duo of **GM3WIL** and **GM4VKI** ventured east to Galashiels and were joined by **G3MFJ** again. Roy says it was obligatory they took their XYLs who headed off to Edinburgh for the day. "Nice touch as they couldn't complain about what we bought considering what they bought!", says Roy. The rally was extremely busy with 32 members signing in on the day. Graham was in charge of the G-QRP stock while Dave and Roy dealt with Kanga and QRP-LABs kits. **G4WIF** says some articles can be too huge for *SPRAT* and an example is when the G-QRP internet conference share *Tribal Knowledge* on a particular subject. This year we have discussed test equipment and etching printed circuit boards. Both topics were collected into documents which can be accessed via the club website at <www.gqrp.com/tech.htm>. Information about joining the conference is there too.



This spring, **DL1GKD** refitted his 2W 20m QRP TCVR by replacing the VCO with a state-of-the-art DDS (pictured far left) and says, "This is perfect now for portable use; no more warm-up, no more drift, and absolutely stable even in different temperature environments. Although this is not the minimal-art setup regarding dimensions of the TRX and key, nevertheless everything fits into a rucksack and is no problem to go on tour by bike". Dirk's 33 feet fishing-rod like telescopic mast, just two feet when reduced, is ideal for an end-fed 20m halfwave antenna with a little tuner helping to bring the high-Z coax level. His preferred position is against a stable platform with the antenna base about 26 feet above ground (pictured above right). Dirk says he is impressed how easy it is to contact stations all over Europe, often two-way QRP, or even in the USA when a 'big gun' with a good antenna is on the other end. The third picture shows the complete station.

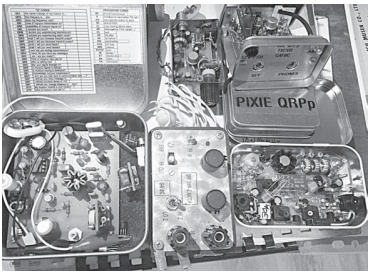
Pictured left is the new climate controlled shack of **IKØIXI**. Fabio also has new antennas, a hexbeam for 6-20m and dipoles for the lower bands. Husband and wife team **ZL2BMI** and **ZL2TFS** plan to visit the UK in May-July 2019 and would love to meet members as they tour around, <sears@xtra.co.nz>. Eric's main project is a simple 5W SSB TCVR, about 80x80x40mm weighing about 160gms - suitable for tramping (backpacking) in the remote parts of ZL, which he will be doing for seven days in February.



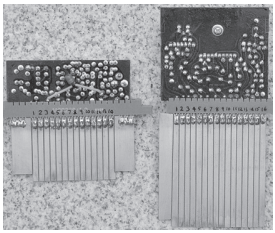
His latest 5W DSB rig weighs just 75gsm. Eric's other project has been 'inking' crystals. Using the HC18U style, he can move 80m ones about 50-60Khz, and 40m ones up to 100Khz. He says once they stabilise, they remain so, and some were done more than two years ago and still work fine. This means he has a great range of crystals using 3686kHz and 3579kHz crystals for 80m, and club 7122kHz crystals for 40m.

Pictured bottom of previous page is **ON4BCA**'s new Bug Magnetic Evolution Blackbase key made by **I1QOD**, <https://www.i1qod.it/index.php>. Patrick says, "Alberto did a fantastic job, not only in constructing this jewel, but his service is second to none, I have never experienced anything like it. The price of this jewel is •475 including shipping and the box also contained a set of spare parts: paddle, screws, damper rubber ring, a cloth to shine it and the connection to the TX". Because it is a bug, he had to 'relearn sending CW' and did this by recording his sending with a Tascam DR40, that can record in mono and is easy to connect between a TX headphone jack and the line-in socket of the recorder. It also has a built-in attenuator to deal with strong input signals.

F5VLF says he hasn't been on the air recently as they have had several visitors at Charity Cottage, <http://www.charity-cottage.org.uk>, most notably a family of three licensed amateurs who had seen one of their small-adds in *SPRAT*. John said they brought a Russian military service collapsible mast with them that they erected behind the cottage, attached antennas for various bands (pictured right), and much enjoyed themselves. **G3SES** asks me to remind members that we have a designated QRP frequency of 5262kHz which is a good QRM free channel for inter-UK QSOs. Phil says he is often there during the day but activity is usually nil. He also says the 7.30pm local time Monday G-QRP net has finished for the Winter as the skip is too long. During the Summer **G3VTT**, **G4ICP**, **GM3MXN**, **GM4CXP**, **M/W3TS** and others met on 5262kHz. Rigs have varied from one-valvers to the latest commercial rigs, everyone enjoying pleasant 5W CW QSOs.

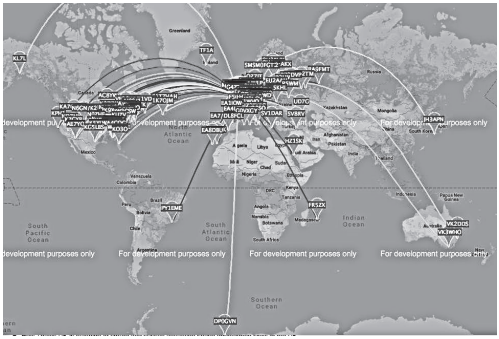


The sad loss of George, **GM3OXX**, and the Memorial Challenge, prompted **G4FBC** to bring out some of his 'OXX related QRP homebrew rigs. Pictured right are a few that have seen action in the field (l to r clockwise) is the Alva, Pixie 1 matchbox size, a Pixie 2 in a BBQ spice tin, below a 30m band FOXX3 and a mini Z match to complete the line-up. Bad autumn weather sent Ron back into the shack for some vintage and military 'make, do & mend'. One restoration project is to get a French army 'walkie-talkie' TR-PP-11 (pictured with Ron in his shack) working on 6m. It is a six xtal channel 850mW FM set with a steel tape antenna that wraps around the set when not in use. It will compliment the fully restored ER-95a manpack seen in the last *Members' News*. **F5NZY** also wanted to pay tribute to **GM3OXX** and spent the month of October running 1W like George used to. Steph made 61 DXCC, including all of Europe and North and South America, with his two element Hexbeam (20-6m) and inverted vee dipoles (80-30m) during the month and says, "Actually, it is a great fun!".

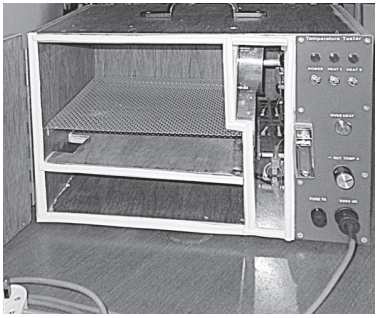


G4EDX has a Sommerkamp FT-7B that needs an overhaul and he plans to bring it back to full working order for its 40th birthday in October 2019. John says the TCVR was built using mother and daughter boards that made it very compact for its day, but access to the boards for testing is difficult. To help with this, he has made some extender boards (pictured left) that fit between the mother and daughter boards, raising the daugh-

ter board above its neighbours. He made the extender boards from single-sided fibreglass PCB material, cutting the tracks using two blades in a Stanley knife handle (No. 199) and a steel straight edge, leaving a very thin strip of copper between the tracks that can be peeled off using a sharp knife and fine pliers. John then soldered a tinned copper wire loop to each track for attaching test clips, and numbered them in accordance with the circuit diagram. He says, "The daughter boards come in three different shapes and sizes but I only made two extenders; the AM Mod unit is the only board of its kind so I won't make an extender for it unless I have to. The edge connectors can be single or double-sided. The daughter boards have contacts on both sides but are joined together through the boards. The tracks are on 0.156 inch centres, which was standard at one time, but rather unusual now. JAB Electronic Components can supply suitable high-quality 'new old stock' edge connectors, which can easily be cut to the required lengths using a junior hacksaw. To help align the daughter board in its extender, remove the unused contacts from the edge connector at either end of the daughter board and insert pieces of plastic or PCB material to act as end stops".

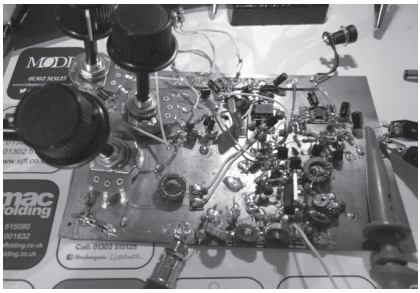


GØKYA recently took down a multi-band end-fed half wave (EFHW) antenna and replaced it with a home-made 40m off-centre fed dipole (OCFD) and says the EFHW worked, but he was never happy with its performance, that may have been due to the inverted L configuration or the compromise 49:1 ferrite-based un-un. Either way, Steve felt he was missing out on some DX and was keen to try something else for the autumn/winter. His 40m Windom is about 66 feet long and has a home-made 4:1 Guanella balun made with two ferrite cores. It is fed at the 41%/59% point so covers 40, 20, 15 and 10m with an SWR below 3:1, and on the other HF bands with an ATU. The apex is in a tree about 26 feet high with the ends down to about six feet, so not ideal. Nevertheless, in a WSPR test he thought he would leave it running at 5W on 20m WSPR for 24 hours to see what it could do with zero sunspots but a Kp index of 1, and was delighted to see he had been picked up as far afield as JA, VK, KL7, FR, PY and Antarctica (picture above). Steve was also picked up near San Francisco at the Maritime Radio Historical Society KPH receiving station at Point Reyes. On reporting the results, someone said he had been running too much power - at 5W!

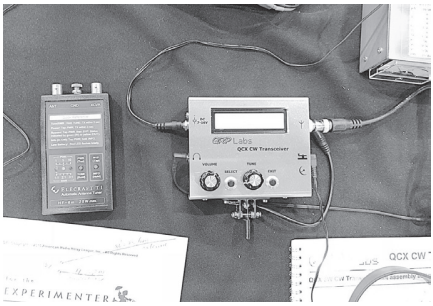


Pictured right is **G3OOU**'s new temperature test box to temperature test his home made electronic modules over the range 0°C to +55°C, anything colder will use the house freezer. Bob says the last thing to make is a simple metal frame in the lower compartment to hold freezer blocks to get the internal temperature down to 0°C for cold tests. **N2CQR** is rebuilding his 2m quad (first assembled in the Dominican Republic in 1994) so he can listen to the downlink from Farhan **VU2ESE**' new CubeSat, which will be launched in November. Using an RTL-SDR Dongle (thanks Tony Fishpool!), and HDSDR software, Bill has already heard (and seen!) signals from the Chinese XW CubeSats and the Brintish FunCube - all were transmitting at QRPp levels. **G3VTT** called CQ on 3560kHz on 22 September at 0615z

and was answered by **N2KW** for a report in the FOC BW Contest. Colin received 599 amended to 339 true. The transmitter was a two valve job with a final using an LS50 German WW2 tube stamped 'Kreigsmarine', and the oscillator was a 12BY7. The receiver was a 70 year old HRO and the antenna a 90 feet doublet.



The 40m TCVR pictured right is **G4FGJ**'s, "first time homebrewing anything like this and is very much experimental - more of a test bed than something likely to be put in a box". Richard says it started life as the Sudden RX from **G3RJV**'s book *QRP Basics* and he has been adding TX/RX switching, side-tone and TX driver, PA and LPF. It outputs about 1W but he hopes to increase this to 5W with some component changes. Richard has only tried the TX into a dummy load but hopes to try it on the air very soon, once he has sorted out some issues with the TX/RX switching. He wants it to be full QSK and says there are some clicks to deal with. **GM4CXP** will be QRV 5/19 January as **EA8/GM4CXP** from either the hotel he will be staying at in Corralejo, Fuerteventura or from the local pub using one of his FT817s, plus Whizz whip, plus 16 feet counterpoise, mostly on 14060kHz. Del says, "A very long shot indeed but I did work **GM3OXX** several years ago with such a setup on 15m, so it is possible under good conditions".



GØXAR went to the VERON rally with **G4UPL** and **MØPUB** on the first weekend in November in the beautiful town of Zwolle, about an hour from Schipol by train. They met fellow member **PE1NZZ** there and other pals from the Benelux QRP Club who had a table. Steve says, "As usual for Dutch events there was an extensive flea market full of radio goodies and a lot of homebrew items on display. On one stand people were making RX loop amplifiers to introduce them to home construction and there was a SOTA display with an impressively modified QCX TCVR by **PA7ZEE**". Pictured above is **PA7EE**'s QCX set-up for SOTA, apparently there are three eligible summits in the Netherlands! Steve commend the rally to members and is looking forward to it next year". He also says he is getting to grips with 3D printing in the shack and has made some nice project boxes that look a lot neater than his attempts at bodging ready made ones.

Many members have been talking about the poor conditions over the last couple of years but, despite that, during that time this column has shown that some members have still been able to make some good QRP QSOs, including many with DX stations. My own experience this autumn has been 5W CW QSOs with 9X, TU, Z6, ZD9 and (most surprisingly) **VP6D** (Ducie Island) on 40m.

Thanks to all the contributors of this column. Please let me know how your winter goes for the Spring 2019 edition of *SPRAT*; what you have been building, who you have been working, and any other information about QRP, by 12 February. Also, interesting pictures (despite the problem I had this time with too many!), 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 home during the spring and summer months, so I can let members know to listen out for you.

Antennas Valves and Vintage

Colin Turner G3VTT
182 Station Road, Rainham Gillingham,
Kent ME8 7PR email: g3vtt@aol.com

Welcome to the winter 2018/19 AVV. I've not received much in the way of antenna articles from members and I've only had one circuit and an email received this quarter about any valve based projects but I know there are a few folks out there regularly active with the old technology. Please send me anything you may have on antenna ideas or vintage projects to encourage others please.

One thing that did happen during the last few weeks was a visit from Mike W3TS, of the 'Super Tee' antenna tuner fame, and his wife to North Kent where we had a great time walking and chatting about QRP and our various projects.

I received an email from Fred G4BWP about a circuit, shown opposite, that he found in a German magazine that demonstrates another simple 'tube' transmitter and what can be done with flea power.

This transmitter uses wartime metalized valves, rather like the EF50, and judging from the valve data should give about two watts input to the EF14. The EF12 is used as a speech amplifier providing suppressor grid modulation and to limit the amount of FM from the AM transmitter the circuit is an electron coupled oscillator doubling in the anode.

I would estimate a watt of AM is available if the oscillator is a doubler and this technique was fairly common in the Second World War to provide better stability of single valve transmitters in the LF region.

I have seen Dutch single valve transmitters designed by PA0PN used both in the war and in peacetime for communication during the periods of flooding in Holland in the 1950's. Come to think of it the last time I saw suppressor grid modulation was in the 1960s on the coast station transmitters used by the Post Office.

The transmitters were very effective and the modulating power was low so conserving power. This could be an interesting circuit for a 160m transmitter for local work but you will need to get the grid circuit working on 950 KHz and the anode tuned to 1.9 MHz or thereabouts.

After translating the text of the circuit and calculating the inductance values, the oscillator would appear to working over the range of about 1.8–1.9MHz as shown, and coil L2 and variable would need some work on them, as they seem to be working in the 80m band as shown.

Pete N6QW is one of our US readers and he has sent a few photographs and comments about his activities. He writes:

"Hi Colin, My particular bent is SSB transceivers and today most of those are solid state but I have built some tube type transceivers and every once in a (long) while I have been known to build "toob" type CW transmitters.

"I wanted to share some photos of a rig I built about 10 years ago. There is one feature to this rig that I had not done previously but this actually came from a 1930s QST article.

"You will note there is only a Tune and Load Control. The interconnection between the

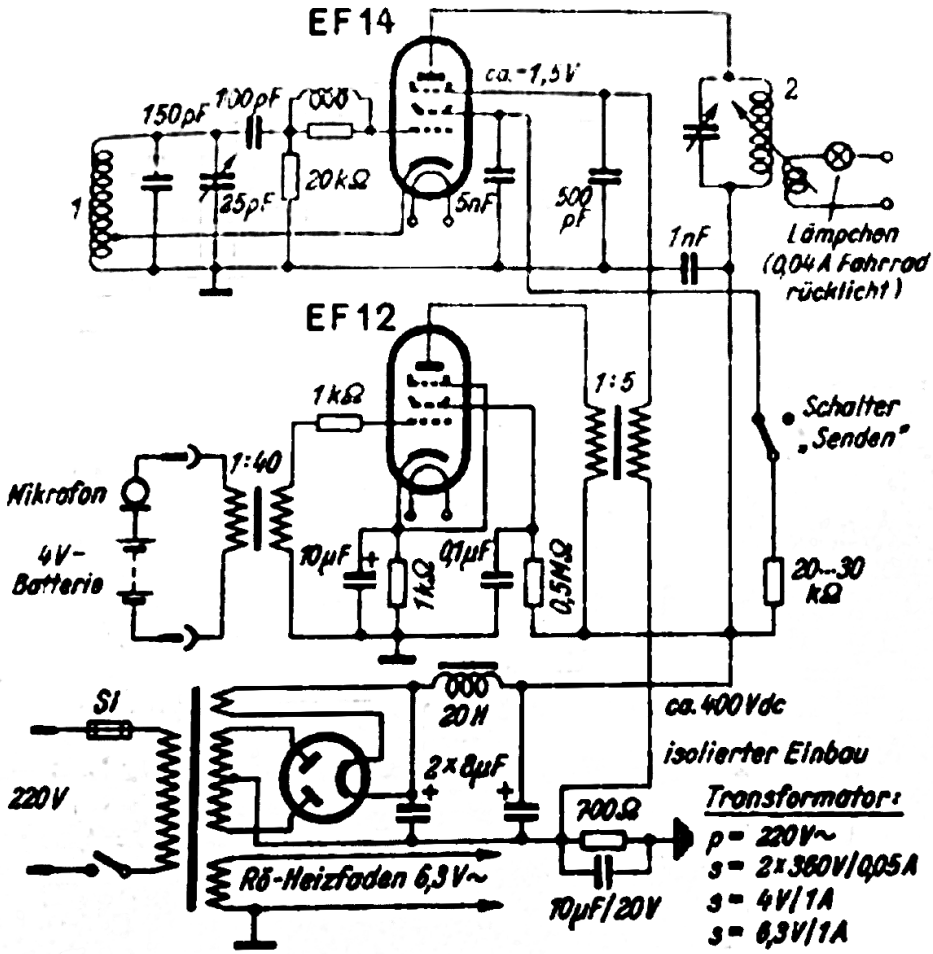
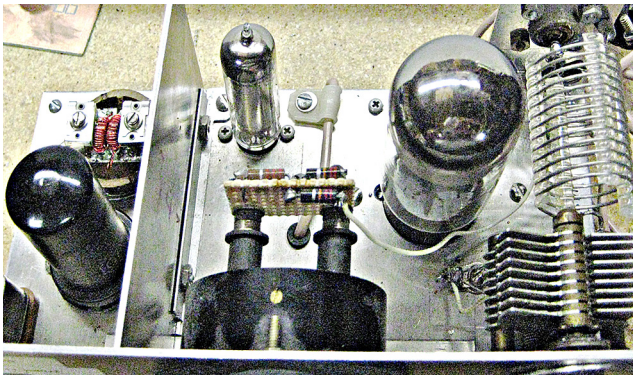


Bild 6. Einröhren-Zweikreis-Sender ECO/FDPA-„QRPeter". Input ca. 5 Watt, Output 2,5...3 Watt mit Gleichrichter und G-3-Modulation. Spule 1 = 25 mm Durchmesser, 60 Windungen, Abgriff bei 17 Windungen, Draht 0,5 mm Kupfer, 2 × Baumwolle. Spule 2 = 40 mm Durchmesser, Körper aus Hartpapier ca. 40 Windungen, 1,5 mm Kupfer, 2 × Baumwolle

Translating the text under the circuit: *"Fig. 6: one–valved double-tuned QRP transmitter (ECO/FDPA). Input about 5W, output 2.5–3W, with rectifier and G3 modulation. Coil 1, 60t tapped at 17t on 25mm diameter, 0.5mm double cotton covered wire. Coil 2 about 40t 1.5mm DCC wire on 40mm diameter phenolic resin impregnated paper tube."* Ed.

6AG7 oscillator and the 6LG power amplifier is a plug in Band Pass Coupler. I used several defunct 4 pin tube bases as the plug in band pass couplers.



"I am indeed fortunate to have a 7.030 MHz rock that serves well for the 40 and 20M QRP watering holes. In true homebrew fashion I even made the chassis for the matching power supply. With a recessed "toob" socket I have also had a 2E26 installed in there –so lots of options.

"The transmitter even has a regulated voltage to minimize chirp using an OA2 regulator. I actually did make one CW contact with the rig and I immediately moved on back to building SSB transceivers.

"I think there is another issue with today's homebrew construction and that is most hams who are nearly 50 years old were born in the 1970s an even by then a lot of the good old surplus tube parts were disappearing. Unless you have an extensive junk box of old parts its getting hard to build some of the "toob" stuff."

I agree Pete. Over here we have a group of constructor who regularly keep in touch and swap parts to make rigs. Thanks for the example of your project Pete.

G3XIZ Valve Tester - Improvements

"Since completing my valve tester in September 2017 I have tested about 400 individual valves of about 40 different types but there are limitations. A majority of the most common valves can be easily checked to their quoted parameters as found in valve data manuals but a few have given me problems.

"One example is the higher voltage/current valves like the KT88 although such as these may be given a reduced yet nonetheless useful test.

"Another problem was encountered with low HT valves intended for car radios and valves with a very low anode current. The meters on my valve tester are scaled at 0-300V for anode voltage and 0-20 mA for anode current and so it has only poor resolution at these low values.

"One of the most useful parameters derived from a valve tester is the valve's mutual conductance (transconductance) or gm To achieve this I had to make slight adjustments of the grid voltage, note the corresponding anode current change and do a calculation. The results therefore were fine but it was a trifle labour intensive.

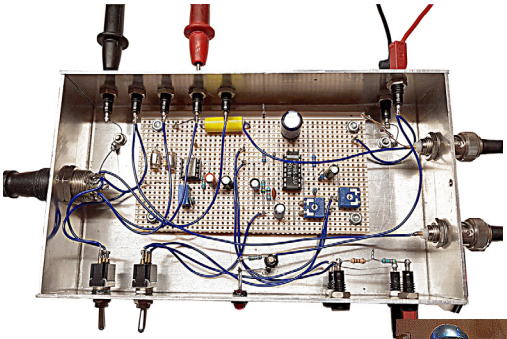
An Add-On Unit

" I have resolved some of the above limitations by making a simple add-on unit to the main tester. Connections to the unit are by means of a cable using DIN connectors. The only visible sign of addition to the main unit is a small DIN socket flush mounted on its side panel.

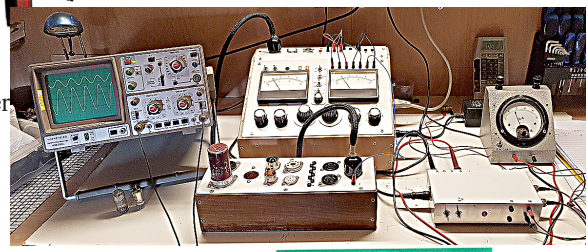
"This unit generates a low frequency sine wave by means of a Wein bridge oscillator and this is fed to the valve under test's grid. In the main unit an accurate 1kΩ resistor is

switched in series with the valve's anode and the resulting signal developed across this is returned to the add-on unit where it is peak detected and is available for an oscilloscope display.

"The peak detected output is suitably scaled and the valve's gm read off on either a DVM or a moving coil meter (see photo). Small 2mm sockets on the rear of the add-on unit allow DVM access to the grid, anode and screen voltages so that now any low electrode voltages or anode current may be resolved to a greater accuracy. The photo shows an old EF50 under test with its associated input and output displayed waveforms. The meter on the right is indicating the valve's gm with a full scale of ten." Chris has made a very useful addition to his valve tester and a schematic diagram will be available shortly.



The Nicky TRF receiver was developed into the Kanga Regenerative receiver and use in the Buildathon session at Rishworth a few years ago. David MM0HQD has sent me a recent photograph of the modifications he has made since building the original. Hopefully I'm not too late for this issue! "Attached is a photo of my completed GQRP Club Kanga Regenerative Receiver which I recently connected to a random wire on top of the fence and was I was impressed with how well it performed. I've now made a new cabinet for it using an Eddystone 598 dial and Sato drive for fine tuning. I'd be very interested in hearing from other members on how they've modified theirs." Please contact info@cqscotland.com



Finally, its Christmas yet again and we have had the Valve QRP event in November. Hopefully I would have received reports by now and this will appear as a separate article in the Spring Sprat. I am looking forward to working as many of you as I can on LF in the Winter Sports and may I take this opportunity to wish you all a Happy and Healthy New Year2019. Please note that I will not be producing AVV in Sprat in future but will continue to support nostalgia QRP and provide articles of a valve/tube nature from time to time so please send me any ideas and articles. It's business as usual but in a different form. My sincere thanks go to Tex who has provided me with sterling support over the last few months.

72 Colin G3VTT

COMMUNICATIONS AND CONTESTS

Dom Baines, M1KTA, 34 Bury Road, Stapleford, Cambridge CB22 5BP email: m1kta@gqrp.co.uk

Hi I hope everyone has had an interesting time on the air this Autumn and are looking forward to the Christmas holiday period. I note the conditions have been varied between downright dreadful and barely passable, but managed to hear QRP ops on the bands most of the time. I will be on the air, as I am sure several others will be for the annual fun:

G QRP Club Winter Sports

The G QRP Club Winter Sports is one of the most popular QRP operating events. Each year between Boxing Day (December 26th) and New Year's Day (January 1st) the club invites any operators to join in a QRP 'QSO Party' using 5W of RF output or less. Operating takes place on, and around the International QRP Calling Frequencies / Centres of Activity.

The Winter Sports is not a contest, although the G4DQP Trophy is awarded to the operator thought to have made the best overall contribution to the event. It is usual for operators to exchange their G QRP Club membership number. Those taking part are invited to submit logs and comments to the G QRP Club Communications Manager, Dominic Baines, M1KTA, email at m1kta@gqrp.co.uk, 'Snail-mail' as above

Operating for all these activities should take place on and around the International QRP Calling Frequencies.

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

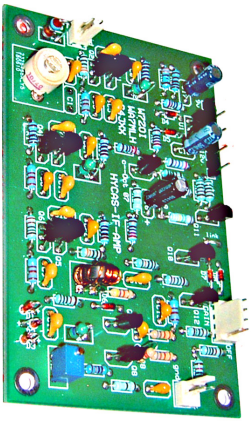
SSB: 3690, 7090, 14285, 21285, 18130, 24950, 28360kHz

RSGB Spectrum Issues:

A major issue raised was 60m (5MHz) and the QRP CoA. There is **no change** for now, use the QRP CoA on 5262kHz. Minutes at the following web address:

https://rsgb.org/main/blog/spectrum-forum-posts-overview/spectrum-forum-meeting-minutes/2018/09/01/spectrum-forum-meeting-2018/

Please do not forget to start to collate logs for the CHELMSLEY TROPHY for DXCC worked in 2018. It will be interesting to see how some have performed.



HyCas IF Amplifier

After talks with Wes Hayward W7ZOI it was decided to make available kits of parts for the once popular HyCas 9.0MHz IF amplifier.

There appears to be a renewed interest in this design so, I can now offer a completely updated PCB and full kit of components. The board is double-sided with plated through holes for wired components (no SMD)

Full supporting documentation is also supplied with copies of additional articles from EMRFD website on CDROM.

For further information contact Mike Hadley G4JXX email: ***mhadley157@gmail.com***

GQRP Club Sales

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

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

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

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

Polyvaricon capacitors – 2 gang (A = 8 to 140pF + O = 6 to 60pF) c/w shaft extension & mtg screws - **£1.75 each** } **£3.80p (EU); or**

– 2 gang – (both 8 to 285pF) c/w shaft extension & mounting screws - **£1.75 each** } **£4.50p (DX)**

A Pair of LSB/USB carrier crystals HC49U wires - [9MHz ± 1.5kHz] **£4 pair** } **All components**

HC49U (wire) crystals for all **CW** calling freqs – 1.836, 3,560*, 7.015, 7.028, 7.030* 7.040, 7.045 } plus **postage**

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

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

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

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

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

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

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

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

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

SA602AN - £1.50 (note – I may supply NE or SA, 602 or 612 as available. SA612AD – SMD SOIC-8 £1.40 } things

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

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

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

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

TDA2822 - 1.8 to 15v stereo amp – can be bridged. 0.5WAudio amp 8pin DIL – **£0.20 each** } Use just

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

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

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

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

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

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

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

BF981 – dual gate MOSFET – 40p each } postage

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

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

Magnet Wire – 18SWG – 2 metres – 60p; 20 & 22 SWG – 3 metres - 60p; } do not

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

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

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

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

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

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

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

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

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

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

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

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

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

All toroids are plus postage – up to 5 packs = £1.20 (UK), £3.50 (EU), £4.50 (DX). Each additional 5 packs, please add 50%

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

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

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

QRPme Brass sets * – PCB feet to lift the board off the table - £10 plus post as for components - DX order direct from Rex)

*** these items from Rex's stock are pictured on the website.**

Limerick Sudden kits RX & TX both single band (160 through 20m); **ATU** (80 through 10m) **£40.00 each plus post** UK - £3.50, EU - £5.40, DX - £8.00

Sprat-on-DVD – 1 to 172. Only £5 each to members plus postage, UK - £1, EU - £3, DX - £4.00

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

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

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

You can also pay by BACS. The numbers you will need to do that are - sort: 01-07-44 and a/c: 54738210

I can accept cash in GBPounds, or US$/ €uros (at the current exchange rates) – but please send securely! You can order via e-mail and pay by PayPal - use sales@gqrp.co.uk – and pay us in GBPounds and you MUST include your membership number and address please. PayPal charge us about 4% so a contribution towards that is always welcome, or, send as a gift to friends/family - thanks