



SPRAT

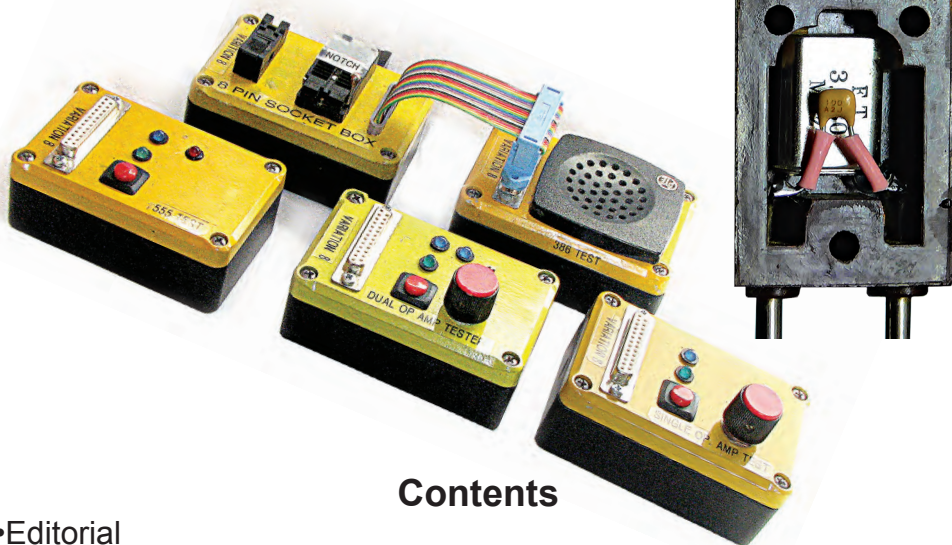
THE JOURNAL OF THE G-QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 175

G-QRP-CLUB

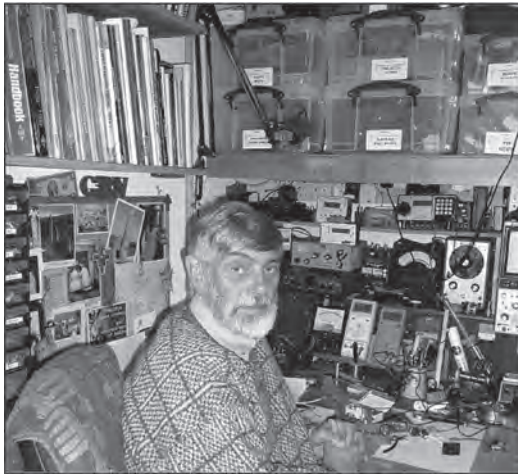
SUMMER 2018



Contents

- Editorial
- New Chairman – Steve Hartley G0FUW
- The future of the G-QRP Club – SOLVED!
- A Universal 40m Driver Amplifier Module
- Telford HamFest G-QRP Buildathon & Rally
- Ni-Cd and Ni-MH Battery Charger
- A Simple PIC Programmer
- Simple 1/2 cell constant current charger
- A high Q capacitor for low power loops
- Antennas Valves and Vintage
- For Sale: Ten-Tec Century 22
- Why QRP?
- Pulling FT243 Style Crystals
- 10kHz Crystal Calibrator
- Scavenging For Testing
- What is A Matched Aerial?
- Valve QRP Day April 2018
- Members' News & Advertisements

JOURNAL OF THE G-QRP CLUB



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As you will be seeing in the next few pages, there are a few changes to the organisation of the club. I am very pleased to welcome **Steve Hartley, G0FUW**, to the team as Chairman, We have been without a Chairman since **Gordon Bennett, G3DNF**, died a few years ago, I am sure that Steve will fill the gap admirably, and find things that need doing – particularly in the field of bringing youngsters into the hobby.

I am also pleased to tell you that **Tex Swann, G1TEX**, who has retired as technical editor of two ham radio magazines, will be the sub-editor for *Sprat*, this will take a great deal of weight off me as I am still having health problems. The format of *Sprat* will continue as before of course.

Finally, I would like to also welcome **Nigel Flatman, G0EBQ** to the team – Nigel will source the badges and *Sprat* awards that have been missing since our badge maker has closed his shop and moved on.

All the original contributors and helpers remain of course, and we thank them for their continued support.

Sprat is what it is, due to you, the members, and please, if you have any contributions, and we can deal with almost any format or medium that may be used. Ideally we prefer items electronically but we attempt to use any articles we receive, from expensive word processing to a note pad and pencil, as an example, one of the articles in this issue came on an MSDOS floppy disk. Please contact **Graham G3MFJ** or, look on the club website, for a *SPRAT* formatted page.

We welcome electronic diagrams in the more common graphics format, or, we can redraw them. I look forward to seeing your contribution, and, as before, please copy G3MFJ in, and now, Tex as well – tex@pawns.co.uk.

New Chairman – Steve Hartley G0FUW

When I joined the GQRP Club in 1983, before I was even licensed, little did I suspect that one day I would be offered the opportunity to be Chairman of the Club. It is a huge honour to be asked to serve in this capacity and I thought it might be worth me giving you a little back story, for those who do not know me.

I have no qualms in admitting that I came to radio communications during the CB boom. Like many others I soon wanted more and was encouraged to get an amateur licence. What convinced me to go for it was an article in *Practical Wireless* by the **Rev George Dobbs, G3RJV**, the PW Severn 7MHz QRP transceiver. The way George explained things made me believe I could build my own rigs and work the world, without breaking the bank.

Since passing the RAE in December 1983, and upgrading from G1KVY to G0FUW with a Morse test, I have been trying to emulate the members of this Club who helped me as a newcomer and asked for nothing in return. I have been training newcomers since the Novice RAE came along, co-wrote a few textbooks and manage the Bath Based distance Learning courses. Many will know me from my Buildathon exploits in Bath, the RSGB and GQRP Conventions.

I recently completed a four and a half year term as a Director on the RSGB Board, with one year as Chairman. During that time I managed the YOTA 2017 project and led the development work on the RSGB's Strategy 2022. I am sort of retired but do part-time work as a tutor for Portsmouth University and as an examiner for a national exam body. Working on the basis that 'if it ain't broke, don't fix it', I have no specific ideas on my role as Chairman, or for changes to the Club. However, if you have suggestions about how you would like to see the Club continue its success, I would be very pleased to hear from you.



The future of the G-QRP Club – SOLVED!
Graham Firth, G3MFJ, g3mfj@gqrp.co.uk

After my alarming piece in the last issue, I was really thrilled with the response I have had, as is George, and we would like to thank all those who contact us with offers of help. I am sure that you will have seen George's editorial, and also the piece by our new Chairman, **Steve, G0FUW**, on the previous page, but I would like to add my personal thanks to Steve for making this offer.

As you will also have seen, we now have a new sub-editor, **Tex, G1TEX**, who has now retired from *PW* and *Radio User* magazines, and I am thrilled with this as well. In fact, Tex has put together this issue of *Sprat* so you can all see his work. George G3RJV is still there, he has approved all that we have done, but he is still having the health issues which are slowing him down.

The final appointment from my earlier piece is that of *Sprat* awards/badges man. We have had troubles with these for a while and after I researched them, I found out that our long serving badge/awards man had closed his shop, and orders had got lost. **Nigel Flatman, G0EBQ**, has taken on this task and has already found another company who will tailor make these for us. If you want a callsign badge, please send the order to me at club sales, and I will sort it out. Here is a picture of the new badge, pictured below!

I am also consulting with George to find out what *Sprat* Awards are missing, and here you, the reader, can help. The template for all awards has also gone missing, and we can't find out what we used to use, so if you are an award winner, then please will you send me a picture of it, then I can sort out the missing ones.



Thanks again from George and I for all the offers – we have personally thanked all those offered, and you may hear from us in the future. Just to reiterate, the club has always been in a sound financial state, and with these changes, now has a more secure future. If you would like to discuss these issues further I can be contacted for information at: **g3mfj@gqrp.co.uk**

Meanwhile, please, for the moment, please will you continue to copy me in for all article submissions. You should also include Tex in.

His email is: **tex@pawns.co.uk**

A Universal 40m Driver Amplifier Module

Pete Juliano, N6QW, n6qwham@gmail.com,

Nick Tile, G8INE, juggie@cix.co.uk

This article describes a process that we can follow to develop our own equipment. It describes how even before the soldering iron comes out, we can develop and test ideas. Many of you will doubtless be aware of the prolific designer **Pete Juliano N6QW** and may follow his blog. He and Tony G4WIF have recently discussed the possibility of several building block modules that can be reliably reproduced by anyone embarking on their own design confident that they will work predictably and can be built from available parts.

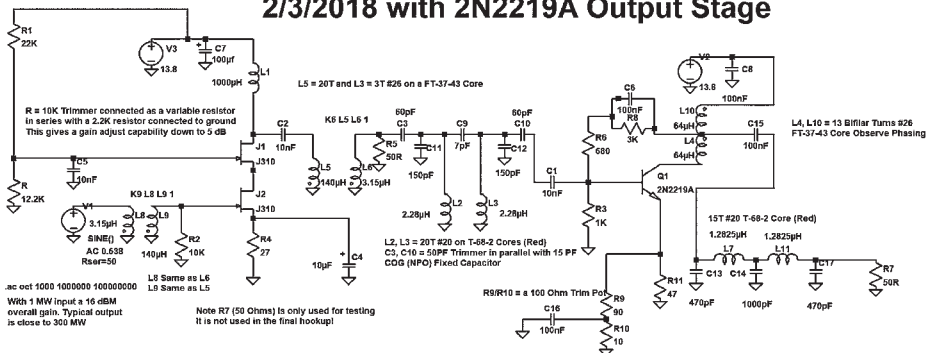
Most recently and having acquired an “old” article from “*ham radio*” November 1985 written by **K1BQT, Pete** has embarked on a project to drag it into the 21st century as the core devices, MC1350 IF amps, and MC1496 double Balanced Mixers are still available, albeit with some difficulty.

Pete’s technique is to model specific modules of the circuits that he is developing in *LTSpice* and determine whether they are worth pursuing in hardware, which he duly did for the 20m and 40m driver amplifier stage and which is where I started to experiment. He had to develop a replacement for the original stage as the primary component, the 40673 dual-gate mosfet is now almost unobtainable. His initial design, partly developed from earlier designs looked like :

For anyone not familiar with *LTSpice*, it is a free programme that lets you breadboard without ever picking up a soldering iron and experiment on your design. You can either copy the circuit shown or ask the designer for the file and work on it.

This circuit shows an essential element of Pete’s design in the twin J310s used to replace the single 40673 and how they can be configured. Gain is set by R4) and C4 and the

40m Driver Amp ~ IC Transceiver N6QW Modified Redesign 2/3/2018 with 2N2219A Output Stage



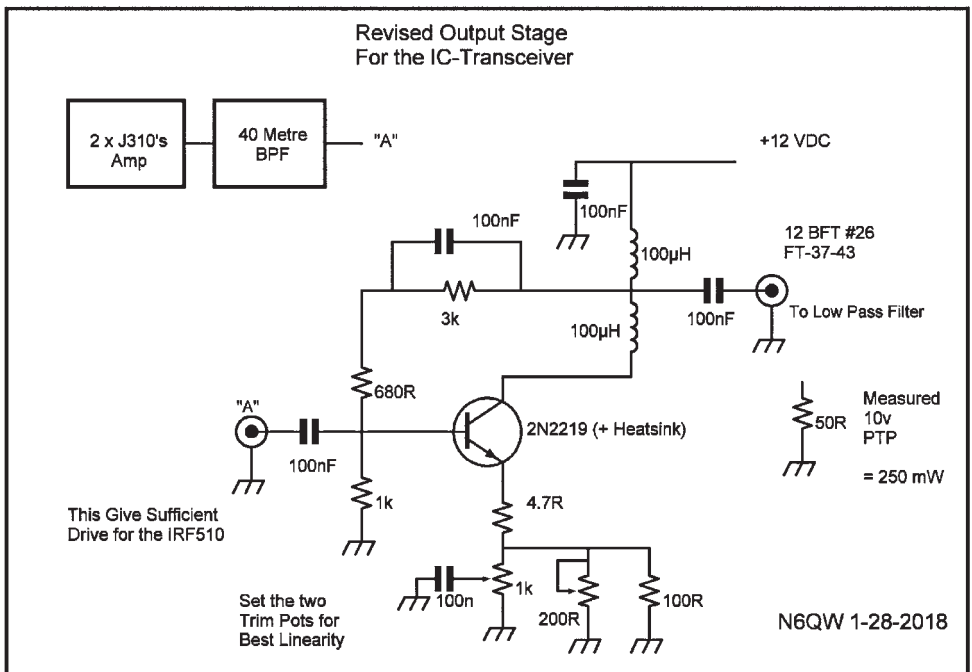
resulting output coupled to the bandpass filter (c3, 11, 9 and 12 & L2 and L3) via L5 and L6 which provide the impedance matching. This part of the circuit worked very well, but when built, an issue with the final stage emerged.

At this point and taking advantage of the difference in the clock with me in the UK, and Pete on the West Coast, he was designing, and then retiring for the night as I was getting up, modelling the actual circuit in CAD, milling it in a small CNC machine and building and testing it as a real circuit.

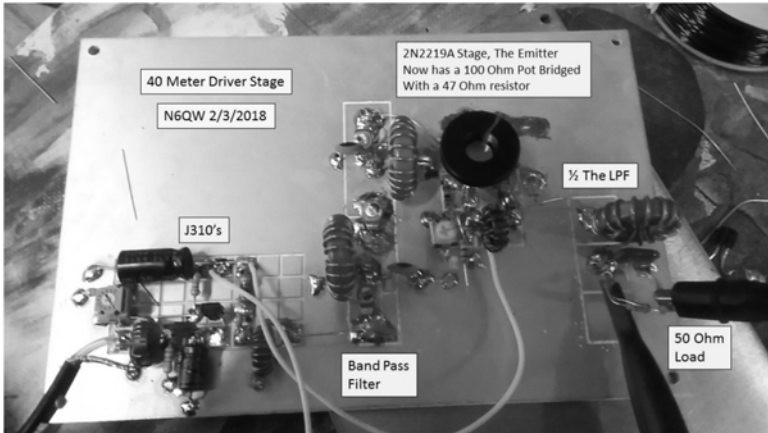
What failed to show us was that a significant voltage appeared on the gate of the final device from the drain. We experimented with other devices in that location, managing to get an IRF 510 working, but unreliably, as the operating point on the gate was hugely sensitive, even with a stabilised supply to it. Pete abandoned that approach and embarked on a redesign, shown below;

Pete uses a CNC machine to build prototypes, but his favoured technique, which he has developed over the years to allow a degree of flexibility, is to build on a grid of isolated squares. Whilst not always tidy, it's immensely practical in that it's very flexible and gives room to make changes which the CAD technique tends not to.

Building this design in *LTSpice*, Pete was able to predict its performance (shown over-leaf), and then measure it in a real-world implementation:

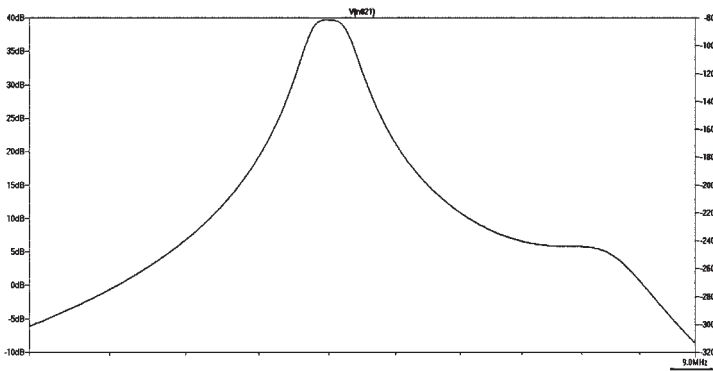


At the same time, I was able to build a version of it and experiment with different devices verifying that it worked as predicted, and to work with Pete to refine some of the practical details of the design, for example, Pete got it working on 20m but had to change the transformer in the collector and I was able to confirm that the winding was actually critical to optimise the output.



Pete has worked up a “final design” which anyone else can duplicate in *LTSpice* to experiment with and characterise using the components that they have to hand, confident that the

original does work. *LTSpice* allows you explore the circuit from the PC before embarking on building it, or maybe even refining it further and adding to the collective pool of knowledge.



Passband shape as predicted in LTSpice

My small contribution to the process has been to come up with a layout for the design in *Sprint Layout* which I can, and will, make available to anyone wishing to duplicate Pete’s design either on a milling machine or by etching a board. During vari-

ous email conversations, Pete has talked about a golden age when fantastically capable modules are available cheaply to all, but we are now in a position where the community can collaborate to work on predictable modules designed to obey a few basic rules, for

example, Pete has designed this module to be 50 ohms in and out, and to run on 12V using easily obtained components and flexible enough to work with what you have to hand.

The more experienced builder can duplicate the circuit using their own favoured technique or borrow Pete's just by studying the photos on his blog, The facility to be able to create your own board using CAD and etching or milling exists or the community can share practical designs as files that can be uploaded into a system and run to create boards locally with little conversion to local software or machines.

For example, many people use *KiCad*, or the free version of *Eagle*.

This article is mostly Pete's as he did the hard work but thanks also to Tony G4WIF for editorial input and helping get the images right too.

References;

"ham radio" November 1985 written by K1BQT: <https://goo.gl/m8mNeq>

Pete's Blog: n6qw.blogspot.com

LTSpice: <http://www.linear.com/designtools/software/>

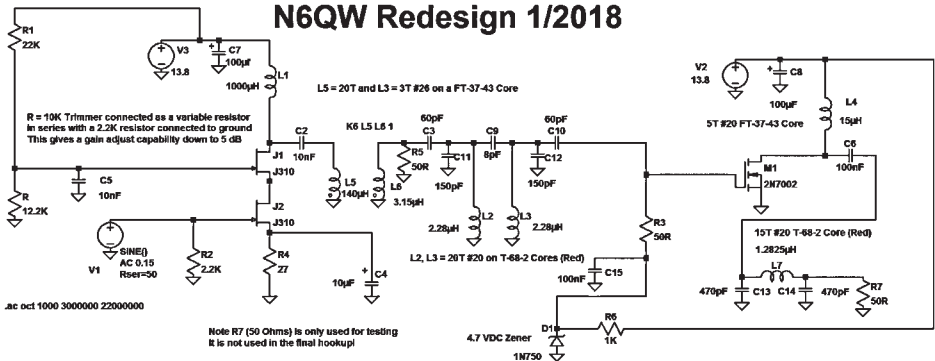
Sprint Layout: <https://goo.gl/55GT7H>

KiCad: <http://KiCad-pcb.org>

Eagle CAD: <https://www.autodesk.com/products/eagle/free-download>

Supporting files: www.gqrp.com/sprat.htm

K1BQT 40m Driver Amp N6QW Redesign 1/2018



G-QRP Buildathon and Rally at Telford HamFest

1/2nd September 2018

Martyn Vincent G3UKV (email: hamfest@ukv.me.uk)

The venue for the Telford HamFest (Sunday) has again been booked at the hands-on technology centre called “Enginuity” – which is just one of ten historic sites located in the Ironbridge Gorge area of Shropshire. We plan to have several notable speakers in the tradition of the Rishworth G-QRP event, and these will take place in the magnificent Board Room of the old Darby Company which was once the cornerstone of the industrial revolution of the eighteenth century.

On Saturday (Sept 1st) a block booking has been made at The **Park Inn Hotel** in Telford Centre (**TF3 4NA** Tel: **01952 429988**) for the Social and Buildathon side of the Convention to take place. This is a few hundred yards from last year’s very successful Buildathon/Social event, offering similar facilities. The Saturday evening Buildathon event will again be led by **Steve G0FUW**, and this year features a design by **Heather M0HMO** described as an “HF Swiss army knife”. Small digital, very portable device that will measure: VSWR, RF Power, DC Voltage, Resistance, Continuity, HF Frequency, GPS (Lat/long, Maidenhead and OS Grid ref) and UTC ... and anything else Heather can add in for under £30! Buildathoners should get in touch with Heather (Tel: **07802 548938** or e-mail: heather@myorangedragon.com) to book a place, as there are a limited number of places and we will be allocating places on a first-come, first-served basis.

So, once again, we invite you to come along in September and continue the G-QRP Convention tradition which began so many years ago. If you choose to take advantage of the special overnight block booking rates, you need to apply directly to the hotel, mentioning the **G-QRP Radio event**, as soon as possible, or within eight weeks of the event.

Two people sharing a twin room, including breakfast, is just £95, (£47.50 per person), or single room £85. I don’t think you will be disappointed. There are several other nearby hotels and B&Bs.

Perhaps look at our website www.telfordhamfest.org.uk



Ni-Cd and Ni-MH Battery Charger

Fabio, IK0IXI

Shown here, is a battery charger schematic. Nothing new, but it is an easy and cheap way to charge Ni-Cd or Ni-MH packs. But let me say why I've created this charger!

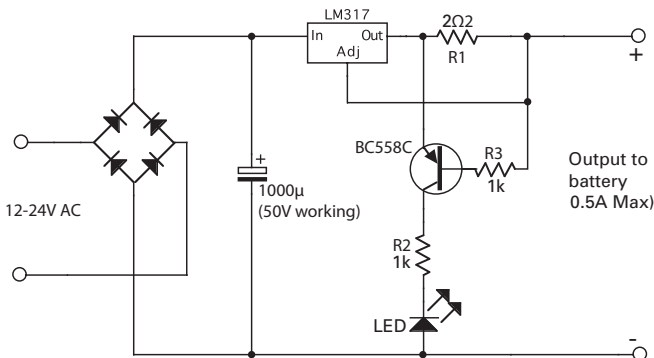
Recently I have been playing on 6m QRP FM using an old military VHF manpack PRC-77 (Vietnam war veteran). There are a lot of hams using military surplus rigs here (in UK too). I like to take this old manpack with me on hills top around my QTH. My personal QRB is 45 km talking with an OM using a similar rig.

The charger works fine up to 36 V input. As you well know, both Ni-Cd and Ni-MH need constant current flow to reach the proper charge level (Usually 1/10 capacity for 10 hours).

In my PRC-77, working at 15VDC, I used a couple of cheap and light-weight

Chinese Ni-MH battery packs, 7.2V each / 5Ah in series for a final voltage of 14.4VDC nominal. This charger allows around 500mA at

18VDC when you get 24VDC input. It works fine with those batteries and the LM317 doesn't overheat at its 30% of range (max 1.5A continuous).



Why QRP?

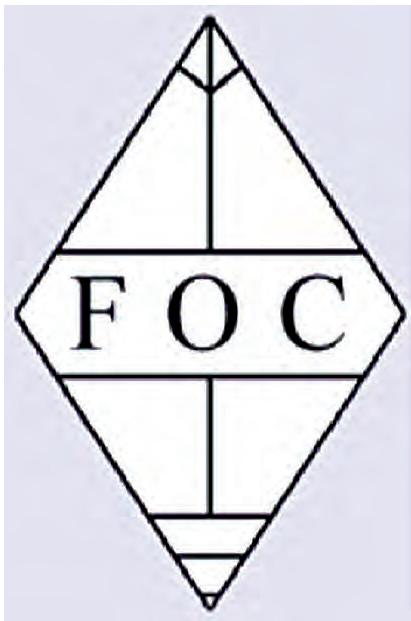
Roger Western G3SXW

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

For those that don't follow DX operations or the operators that go to some of these places then you might not know who **Roger G3SXW** is. That said I am sure we have all had interesting discussions about QRP vs QRO operating with others in local and national meetings. I came across this in CDXC Digest and it struck a cord with me especially as it is in the words of one that is not normally associated with QRP operating and I thought I would share it. First appeared in *FOCUS*, the magazine of First Class CW Operators' Club, anyway here it is. 'printed with permission from Roger G3SXW'.

Why QRP?

Perhaps you went down to the pub with your pals on 1st January and announced that you're going teetotal for the month. What did they do? They gently ribbed you while you sipped your soda and lime. It's somewhat similar with QRP: pals pull my leg. Oh, they say "Life's Too Short For QRP", with a friendly smirk.



So, what is it about QRP operating which motivates a small number of us to try it? Here I am to maybe explain. This is not evangelical, I care not at all whether you become a convert or not. It's just so you might perhaps understand what it is that I enjoy about QRP. I am by no means, like some, a full-time "QRPer": I only use it in contests and then only occasionally, but that's enough that I do 'get it'.

For example, in CQWWCW this year I just relaxed and enjoyed 500 CW QSOs, stress-free, only 17 hours QRV and had a ball!

Background

Firstly, I guess we might take on board where I am coming from. Not wishing to fly my own kite but I'm now 71, have loads of accolades, trophies, Halls of Fame etc etc and needed something different, a new challenge. Some of my pals have diversified into digital modes - but automated amateur radio is not for me.

I prefer CW operating skill. Then the RSGB 80- metre CC contests came along a few

years ago and I worked out that I could score more points for my “Three A’s Contest Club G0AAA” by going QRP. At first it was really hard work (and seriously masochistic on SSB) but I had found a new challenge.

And, y’know what? There was a new kind of buzz. Each completed contest QSO was fun, put a smile on my face. See, I seemed to have become somehow a little bored with ‘shooting fish in a barrel’ with my high power where nearly everyone heard me first time. I’ve made plenty of hours with 200+ contest QSOs per hour in recent decades. Time for change, a new challenge, to restore that prime objective: CW Operating.

A New Thrill

I remember it to this day: I worked VK4EMM on 40 metres with five watts. I literally whooped out loud. Such a thrill! OK, I had reasonable antennas and a good QTH, which surely helped. When I met John for the first time, at WRTC Boston several years later, he pointed at me, smiled and just said “Forty metres”. Wow, that was really some QSO! It reminded me of my first trans-Atlantic QSO as a teenager.

There are gradations of ‘thrill’, of course. To work a station on 80 metres with five watts who is only 100 miles away and S9 +40dB is more par for the course, but to work California really does put a big smile on my face. That sort of QSO doesn’t happen very often!

Operating Tactics

QRP requires a whole different mind-set and operating decisions and dare I say needs lots of operating skill. We have to accept that it most often requires an empty frequency, no QRM, no other callers so it is almost always pointless joining pile-ups. That’s why I usually chase DX with 100 watts. If calling with QRP against the competition then we usually transmit very slightly off frequency. Some stations will pick up a high- or low-pitch signal no matter the signal strength. But we have to keep calling with all the skill that we can muster: patience, persistence.

The main issue is of course signal strength. It is unusual for a station who is only S5 to hear me unless he (rarely) is also QRP. In a busy contest it is usually only worth calling stations who are S7 and preferably S9.

To double output is to add 3db, or so I am told. So, five watts up to 100 is a multiple of 4.5, makes 13.5dB - let’s call it generously three S units. Logically, a station, perhaps with only 100 watts, which I am hearing at S9 might still hear me at S6, or thereabouts. Calling a kilowatt station I am down 27dB or maybe five S units. If I call a station who is S9 +40dB he could still hear me at S9. Some American friends express astonishment that I was so loud with five watts - but it’s all relative, depending on propagation at that moment! The difference is less than you might think.

There are also cultural differences. Forgive me for generalising but U.S. radio hams seem to mostly assume that maximum output power is the norm, that’s 1,500 watts if

they stay legal. Anything less is ‘for the birds’: they find it somewhat difficult to imagine that five watts can span the Atlantic!

Of course, there are also other factors at play, especially noise-level at the far end. If calling a station at S7 I might only be S4. But if he has a S5 or more local noise level he may not hear me. I quickly work out that this is the case when a loud S9+ station just CQs in my face. But there might be occasions when that loud station is not bothering to listen down to weaker signals. The gap between his CQs might be half a second but persisting with my calls can occasionally grab his attention. It requires patience! And of course it’s not just power output: there may also be a difference in antenna radiation efficiency. Not to mention QSB, requiring several calls to catch a peak. Then it becomes luck and persistence: a QSB peak plus an empty frequency. Eventually you sense that you’ve reached that sweet spot of QSB peak and empty frequency and he still does not hear me so it’s time to give up and try someone else - pah, his loss!

Yet again (my clarion call), I must emphasise that full break-in QSK is absolutely essential so as to stay in sync with the timing of the station that you are calling, and to know whether there are other callers on the frequency. The purpose of QSK is not to be able to decode the CW but merely to know whether there is any signal to be heard on frequency through my CW. By the way, I forgot to mention, my QRP is entirely CW – SSB really is hitting your head against a brick wall! I’m told that it works well on digital modes though.

Less Competition

So few stations enter QRP contest categories that it is easier to ‘win’, whatever that might mean. In another dimension this means that our scores can be respectable versus competitors but with only part-time participation.

It’s all about playing the numbers if you want to ‘win’. Look on the web-sites (eg CQWW) and find one where you might ‘win’ the contest or even make an all-time record. Or just relax and have fun – or work DX with QRP to hunt down other awards. There’s lots of choice.

The Station

I never forget **AI, G3FXB**, who replaced his ‘coax’ with hard-line to gain an extra dB or two. That is really serious competitiveness! But I suppose that the issue of losses is all the more important for QRP stations. Frankly, these days I’m no longer so extremely competitive that I worry about an extra db. Besides, I have the advantage of an excellent radio QTH (close to London, selected between marriages!).

But I do set the Elecraft at precisely 5.0 watts, nothing less, and I do bypass the ATU to minimise losses. The tuner is only used on 160 metres as all other antennas are tweaked for resonance in the CW bands. I don’t bother to wind the tower up these days because I have found that it’s hardly worth the effort: the beam and LF dipoles sit at about 30 feet on top of my little hill.

My rig is Elecraft K2, perfect for my purposes, great receiver and I don't need the K3 second receiver anyway because in contests you're almost never using split-frequency.

Fun!

Let's face it, it's all about having fun. I had reached the point in my amateur radio career when I needed a new challenge to stay motivated. Twenty plus years in West Africa in CQWWCW had filled my boots with pile-ups so I tried QRP as an experiment and it re-invigorated me, just occasionally (and only in contests).

There's no right or wrong. There's just 'different'. Try new things if you're starting to feel jaded, as I was. Y'never know what might occur! But don't call me a "QRPer" just because I've entered a few contests with five watts. Most of the time I drink pints of bitter, not soda & lime!

Pulling FT243 Style Crystals

Graham Stannett, G4VUX

I fit modern HC49U crystals into old FT243 cases for my Paraset and some of them operated slightly above their marked frequency. I suspect that the Paraset circuit does not provide the required 30pF parallel load. I tried fitting a 10pF capacitor across the crystal socket and it worked well for 80m crystals but pulled 60m and 40m crystals much too far, nearly 1kHz at 7030kHz.

The solution was to incorporate individual capacitors inside each FT243 case with the crystal (Photo). Using this method, I'm now able to come up on the exact frequencies that I want to operate on. The capacitor values range from 2.2pF to 10pF.

G-QRP Club Sales have an excellent range of HC49U crystals and other in-band frequencies are available on eBay from time to time. The FT243 cases are also available on eBay, often at very reasonable prices.



A Simple PIC Programmer for the 12F629/675

Ken Maxted, GM4JMU, Glasgow kmaxted@gmx.com

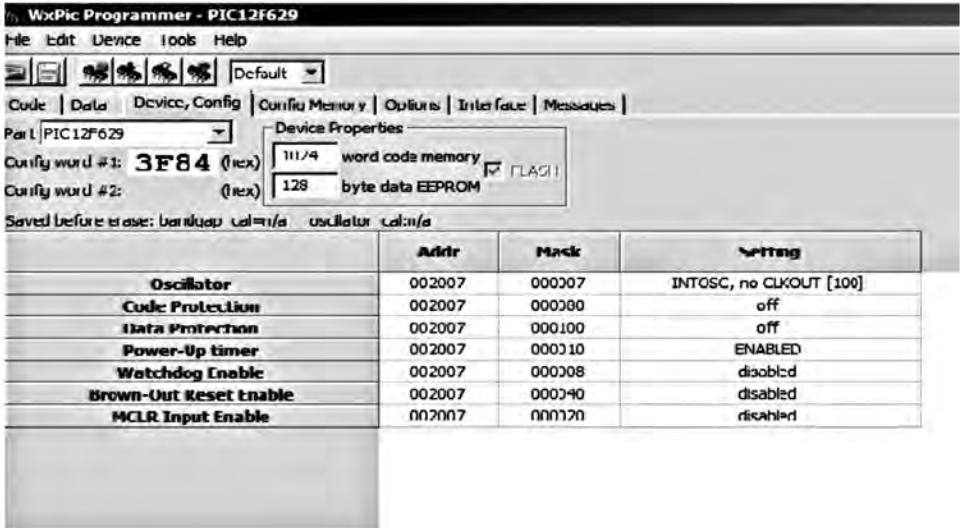
The Microchip Technologies 12F629/675 microcontrollers form the heart of some useful radio projects such as the PicoKeyer and the DDS VFO. Programming the chip is a problem because many hardware programmers apply the 5V Vdd supply upon switch-on and the chip starts up in “run” mode and will not then switch to program mode. To avoid this, the programming voltage Vpp must be applied first, followed by Vdd.

WxPic is the programmer controller used (sourced free over the net), it is a very simple interface that controls via the serial port of a PC (COM 1). The COM port provides the Vpp programming voltage as well as the program data. Diode D1 clamps negative voltages to -0.6 and the FET switches on the separate 5v supply providing Vdd. This sequences the microcontroller into program mode. The switch action can be tested using



MPASM screen showing selected .LST file and chip type.

a “switch” provided on the interface screen. LEDs show the external connection of the 5v supply and the switching by the FET.

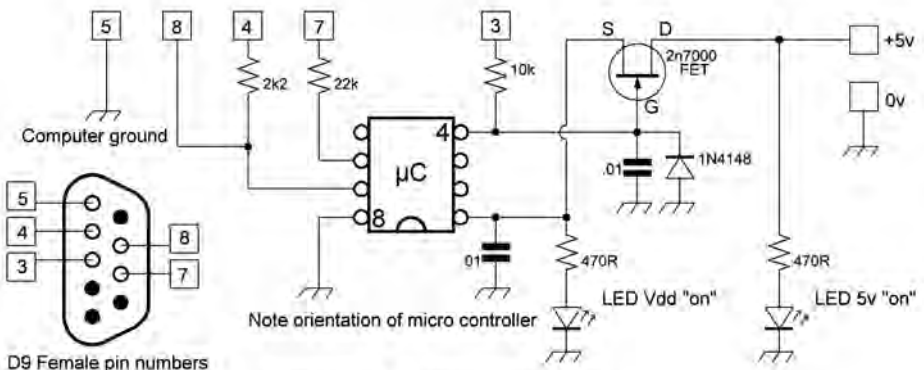


WxPic screen showing PIC selection and button (top left) for selecting the .HEX file.

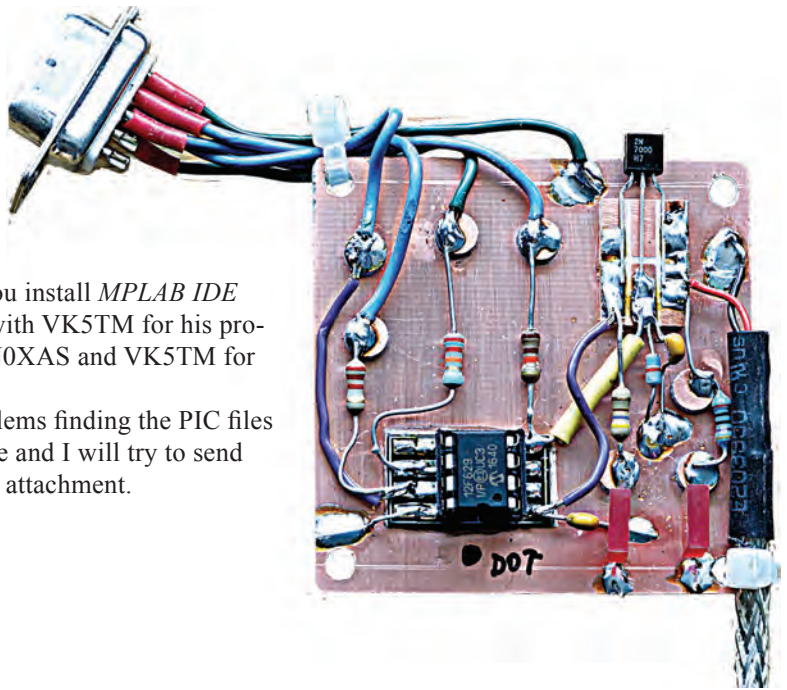
The 5V supply could be taken from a USB port on the same computer (select the black and red wires in an old USB cable cut in half), an external 5v supply, or three 1.5v alkaline cells.

To program you will need the .inc file for the PIC microcontroller used and of course the HEX program listing for the project. Ideally these can be in the same folder on the computer and conveniently you may also wish to run WxPic from this folder as well. If you have an uncompiled .asm file, a program such as MPASM is needed to convert the plain language .asm file to a HEX listing .hex.

To use a PC or laptop without a serial port (9 pin D-style), a USB to serial converter will be needed, these are inexpensive.



Simple PIC programmer



it is suggested you install *MPLAB IDE* v8.92 (checked with VK5TM for his projects). Search: NOXAS and VK5TM for the PIC projects.

If you have problems finding the PIC files please contact me and I will try to send them as an email attachment.

WxPic is to be found at: <http://wxpic.free.fr/Download.htm>
<https://www.microchip.com/development-tools/downloads-archive>

A very simple constant current 1 or 2 cells charger

Doriano Rossello, IW1PAG

I read with interest the “Switched range constant current charger” article written by **Phil Stevens G3SES** in the last 171 *SPRAT* that I received.

This article made me to remember that many years ago I needed a single Ni-Cd and Ni-MH cell charger to test each cell in order to make a well definite battery pack for my use in aero models (my other interest, other than radio, is in the R/C aero models - a natural consequence due the use of the radio to control them).

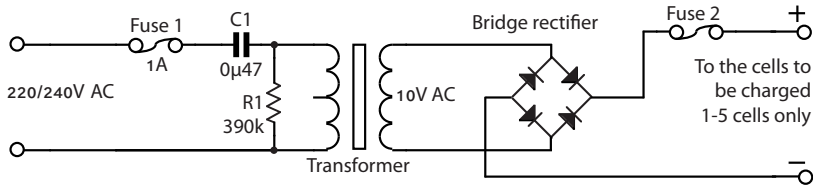
I read on documentation about the use of the capacitors instead of resistors to limit the alternate current, so was born the following very simple circuit to charge one or two cells at a time.

It is composed of one capacitor, one resistor, a rectifier bridge and, naturally, a transformer of about 10V output

The capacitive reactance limit the current and being connected on the primary of the transformer, give a rough constant current regulation at various loads on the output. The value of $0.5\mu\text{F}$ ($0.47\mu\text{F}$) was chosen to have the output current needed and the voltage more than 400V to securely sustain the AC mains voltage.

The resistor is necessary to discharge the capacitor and avoid possible shocks touching

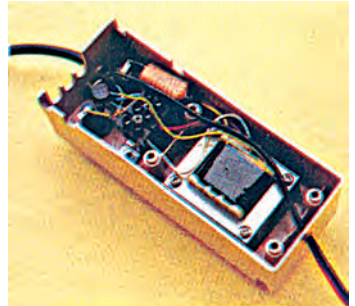
the plug-end when detached from the electric net. After the 1,5A diodes bridge there is not the usual levelling capacitor because, when on the past Ni-Cd cells was used, was suggested to charge them with pulsing current to avoid dendrites formation inside the cells electrolyte.



For safety, two fuses were used, one in each of the primary and secondary sides.

The circuit was useful for my uses and with the values in the drawing, a current of 0.3A was obtained to charge cells and the value changed of relative small amount between short circuit output (the circuit sustain it) or one or two cells.

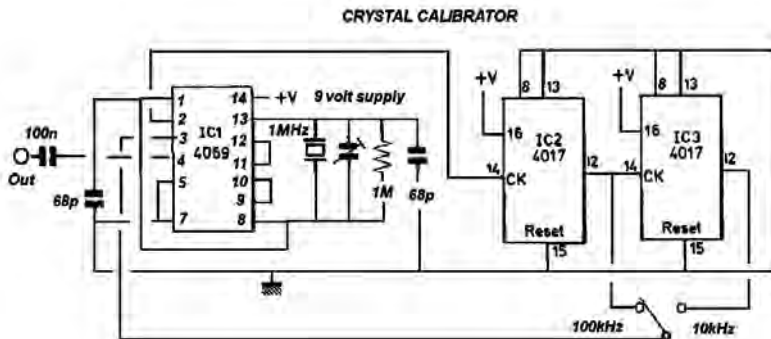
I hope that this circuit deserve some curiosity and recommend to the people interested to replicate it, to have very high attention about the AC mains voltage side.



10kHz Crystal Calibrator

Peter Howard, G4UMB

I wanted to calibrate the scale points on a homebrew receiver every 10kHz so I built this circuit to give me a signal to listen to that I knew would be accurate. It was also a good exercise in learning about digital counters. The crystal oscillator works at 1MHz using a crystal that can be tuned by the trimmer cap across it which can be tested on Pin 2 of IC 1. The next two ICs each divide the frequency by 10. The circuit can work from 5V up to 14V so can be run easily from a 9V battery.



Scavenging For Test Purposes

creating a testing setup

John Palmer G1CXE

I'm an inveterate scavenger, in that I have a growing collection of components in need of testing, both from failed builds and stripped down commercial kit. In many cases, I obtained it, just wanting the enclosure. It's this scavenging that has resulted in the following observation. Checking resistors, capacitors, transistors and inductors are easy using the wonderful Peak Electronics magic boxes, as well as several circuits from SPRAT. BUT testing ICs and opto-devices is a different kettle of fish, some specific testers are needed.

Starting with testing 'recycled' ICs, the following system was concocted. Based on two simple concepts:-

- 1) An IC either works or fails. (though a quad op-amp either works or fails up to four times)
- 2) Throwing potentially usable things away should be a criminal offence! re-use, recycling, re-purposing and keeping that mysterious entity, the junk box, going etc are much better options as well as being good for the world. I expect more intelligent readers will enlighten me over these misconceptions. So:

Variations 8

A (very) basic integrated circuit test system.

The whole plan divides the job into two parts. One object is to holding the IC to allow testing total place. The second object is the test circuit itself. Each is, in my version at least, in a separate enclosure (but like this whole idea, only to be used as a starting point).

One holding the IC. A through hole wide bodied DIL. (dual in line) ZIF. (Zero Insertion Force) socket with only the pins 1 to 8, wired as in the 1 to 8 of an 8 pin IC. is linked to pins 1 to 8 on an SOIC. ZIF socket, (Small Outline Integrated Circuit) and pins 1 to 8 on a 25way D plug.

The latter on a short length of ribbon cable. Also on this box is a battery holder and a push button and LED as nothing more than proof the battery has volts. Note that whilst





I used brown cable for pin 1. Red cable for pin 2 etc this falls apart on the IDC, (Insulation Displacement Cable), 'D' plug since the order on the cable is 1, 14, 2, 15, 3, 16 and so on.

The relevant cables are joined up on a piece of Veroboard. The battery is connected to pins 24,(positive) and 25 (negative). But not through the push button, which is a separate circuit in the box entirely. This completes box one. Though I might add that the ribbon cable has heatshrink and a piece of ribbed plastic to jam it in the exit slot and all unwanted holes in the re-used box were filled with two part hardening glue, such as Araldite.

Also the unused part of the ZIF socket has a bit of plastic (it's ex-milk bottle) glued over to blank it out. Given the cost of the ZIF sockets this is the expensive part, hence a single 'box' covers several variants of 'Box-2'. The parts shown here are merely my selection that I had to hand, there are other sources. That's with the possible exception of the ZIF sockets. But nothing is specific.

Usually what is in stock.

ZIF sockets came from CPC in 'sunny' Preston.

The boxes from the wonderful TETRA, by 'trawling' their tables at a rally LEDs. Came from Bowood or you could reuse or (heavens) buy at a rally.

Pushbutton switches, Some I reuse or from Bowood or from a rally.

Battery holder. Again, you could try Bowood, rally etc.

IDC. D plugs. rally (I paid 10p as brand new in its original RS bag)

Ribbon cable. purchased as a roll remnant at a rally.

Heatshrink. Graham Scragg or Mick Hunter at a rally.

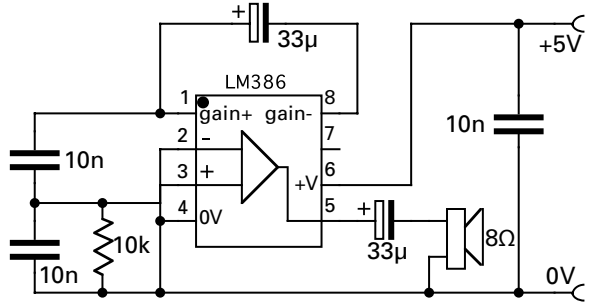
Veroboard. Bowood at a rally, if you can't find a sample Rest of bits, who needs a rea-

son to go to a rally though I would hope most peoples have accumulated bits in box that might furnish these simple bits.

Box-2 is more rather more involved, as it comes in several forms. So far I have concocted:- A LM386 tester, A 555 timer tester, A dual and single op-amp testers. Of course, you should feel free to come up with additional or simpler versions. (But. PLEASE tell us).

Box-2a – the LM386 test

So starting with the ‘386 test box. This uses the circuit from SPRAT 165 by the prolific Peter Howard, G4UMB, for a simple oscillator using a 386. The circuit is built up without any IC, instead those wires go to the appropriate pin on the 25 way ‘D’ socket. A power on LED. was fitted, I would hate



to think how many times I have chased a fault only to find no power on the board! Rather than drill lots of badly aligned holes in the box I cheated and used the top of a PYE PF2 speaker/mic. (6BA bolts) with the PTT space blanked with Araldite, as were the holes in the secondhand enclosure used.

The speaker completely odd impedance made no effective difference to the circuit. Connect the two boxes together, fit a battery and an LM386 IC. (only one at a time please) Press the button on Box-2 and if a noise emanates put IC in place, ready to use. No layout is shown since nothing is specific and your favourite method should work admirably.

PARTS. merely my selection. There are many other sources, again nothing is specific.

Usually whats in stock.

But I used:

Box from the wonderful TETRA LED, Pushbutton ‘D’ socket, Heat-shrink, all as above. The Speaker/microphone, may be whatever you have. Or use this project as a reason to go to a rally though I would hope most readers have accumulated bits boxes furnish sufficient items to use. (If not, perhaps, now is a good time to start!)

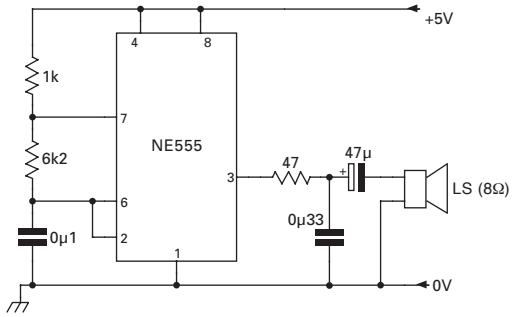


Box-2b – 555 test

The 555 timer, or the CMOS version, the 7555, is next. The test box again uses someone else’s circuit, inventing the wheel again seems a waste of time to a lazybones like me, in this case it is one of Georges, G3RJV, from PW. again built without the IC

but with the cables connected to the 'D' socket. As per the original except for the addition of a power LED to show that power is Ok. if the chip has failed.

Again the box, has all the unwanted old holes filled with araldite, and most of the components are reused. LED colours are to suit your stock, though I have tried to use green to show active power and blue to show the output state. Again no layout is shown since nothing is specific and your favourite method should work admirably. The parts were merely my selection.



There are other sources.

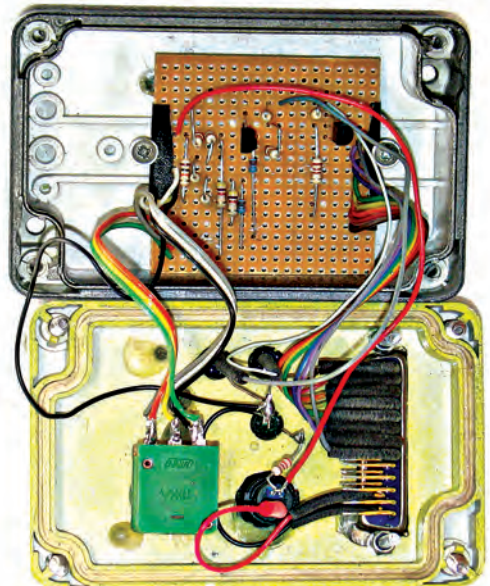
Box-2c – Single op-amp test.

This circuit started life in a school text book. Built with the usual addition of a power LED and as normal most of the components are recycled. A 'push for test' button is used rather than a switch in an attempt to prevent it being left on.

The circuit is again made up minus the IC, the various wires going to the 'D' socket instead. Plug into box one, fit IC, press button whilst rotating the pot. The LED should switch on and off in sympathy. If not first check power LED is on! No layout is shown since nothing is specific and your favorite method should work admirably. PARTS. merely my selection. There are other sources. Parts are, again as described initially.

The 8-pin dual op-amp, is a development of the single op-amp. And luckily most manufacturers have a single standard layout Simply repeat the test section of said single amp test. The different bit is the dual gang pot. Instead of a 4k7 resistor each side, a 5k6 and a 4k7 are used on each track.

But on opposite sides the of the pot. ie. one track has 4k7 to earth, the other 5k6. No better reason than each side switches at a different point and shows it is not an internal fault bringing both LED's on together. No layout is shown since nothing is specific and your favourite method should work admirably. At the risk of repeating myself, parts are as above! So, that's enough to give you some ideas of how you can create a modular testing system, for checking recycled ICs.



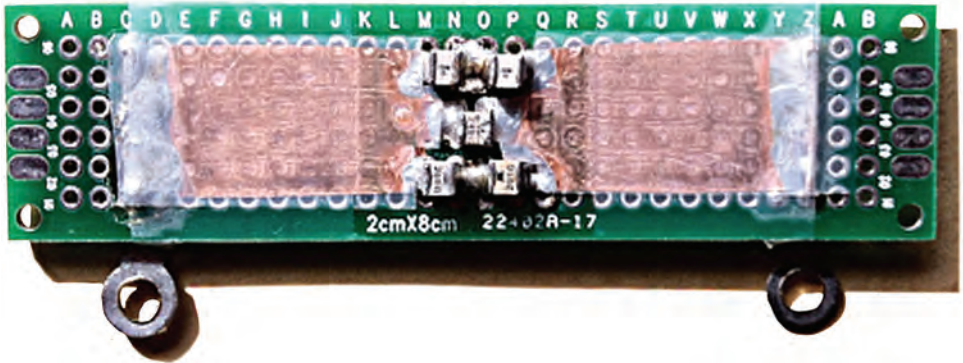
A high Q capacitor for low power transmitting loops.

John Seager G0UCP

Builders of small transmitting loops (STL) want them to be as efficient as possible. This is particularly so if the loop is very small and intended for use with very low transmitted power. A paper by Austin and colleagues (1) confirmed that contact resistance in the variable capacitor is often the main reason for poor radiation efficiency in STL.

In their test set-up they used very high Q fixed value porcelain capacitors (type ATC 100E). The experiments they did were on a range of 'spot' frequencies, so the use of fixed values was no problem for them. For amateur use however we need not only the highest Q possible, but some way of varying the capacitance to tune the loop.

I have built several very small STL, often as little as 0.5m diameter. For safety reasons the power is generally kept to 1Watt or less. Cumbersome vacuum capacitors are expensive and out of place in these tiny loops. 'ATC 100E' capacitors are also expensive, but R.F. elettronica di Rota Franco have a wide range of the smaller 'Case B' capacitors at around £2.00 each.



Some of them are in the 'extended voltage' range with voltage rating up to 1500v. I decided to use these surface mount 'Case B' porcelain capacitors, with a small variable capacitor in parallel to tune part of the CW end of the 14 and 21MHz bands. One question was whether the capacitors could cope with the high voltages that develop in very small loops.

Software from Reg G4FGQ (now sadly a silent key) has a calculator that predicts that at 14 or 21 MHz, a circular copper loop made of 22mm tubing, with a diameter of 0.5-1.0m situated 2m above earth, fed with a power of 3 Watts, may have up to 1340v across the tuning capacitor. At 1 Watt it peaks at about 800 volts. At 200mW (entirely adequate for WSPR) the voltage across the capacitor would be under 360v. Using a loop of 1m diameter at these power levels, plenty of CW contacts can be expected in good

conditions on the higher bands.

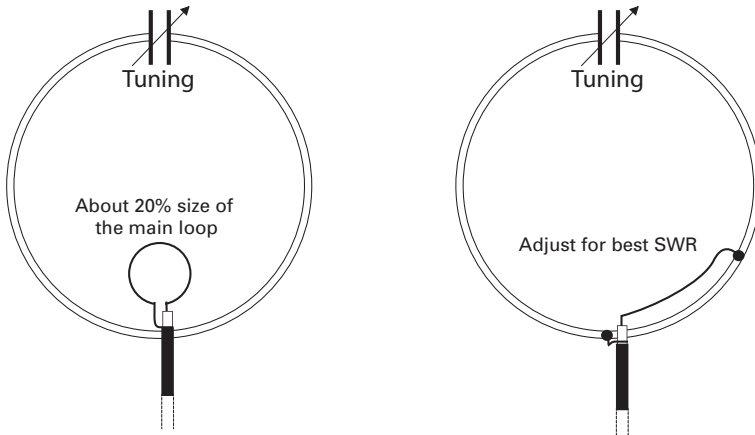
The photo shows how a series / parallel arrangement was used to make up the capacitance needed. Those in series can have lower peak voltage ratings. The total capacitance should be just short of the value determined beforehand with a temporary variable capacitor. A small variable can then be added in parallel for the essential fine tuning. Low value split-stator capacitors can often be found at rallies, but even a standard silvered variable of 5 or 6 pF would probably have little adverse effect on the Q of the antenna.

G4FGQ Software, is to be found at:
zerobeat.net/G4FGQ/

UK Microwave Group has a small supply of ATC capacitors.
<http://www.microwavers.org>

R.F. Elettronica di Rota Franco in Milan have a detailed on-line catalogue.
<https://www.rf-microwave.com/en/home/>

(1) Austin, B.A., Boswell, A., Perks, M.A. “Loss Mechanisms in the Electrically Small Loop Antenna” published in the IEEE Antennas and Propagation Magazine, Vol. 56, No. 4, August 2014.



Feeding the loop!

There are several ways of feeding a magnetic loop antenna, two are shown above. On the left is the secondary loop method, where the smaller loop is around one fifth the diameter of the main loop. It's position and size affect the matched SWR.

The other method shown on the right, is a direct feed, using a Gamma-match connection. A third method is favoured by **Tom Brockman G4TPH**, is a ferrite ring used to transformer couple to the main loop element directly.

Antennas Valves and Vintage

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

The Monday night activity periods on 5262kHz, from about 1830z local time onwards, have been generating a fair amount of activity with both users of commercial QRP equipment and homebrew valve rigs active. Why not make a point of listening on 5262 KHz and calling in? My thanks go to G3SES, G4ICP, G4HMC, GM4CXP and G4GDR for keeping things going.

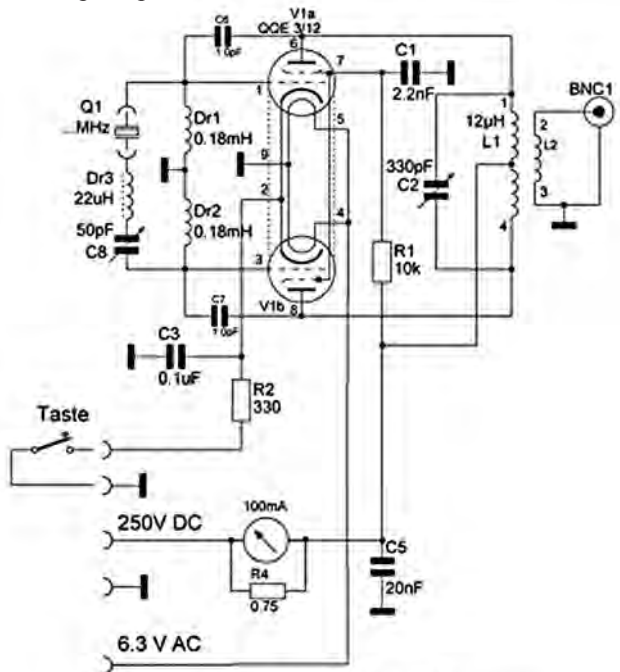
Two more valve rigs from HB9BQB

Here are details of a simple push pull transmitter using the QQE 03/12 valve often used in Europe and the UK as a VHF mobile transceiver output valve. In the UK an equivalent was the QQV 03/10. I've often seen these available at rallies around the UK, usually tucked away in the bottom of a cardboard box covered in fluff and dust. One amateur in Faversham has modified his Codar AT5 to take this valve giving a useful increase in power!

A Push-Pull TX with a QQE 03/12 for 80/40/30m with crystal control

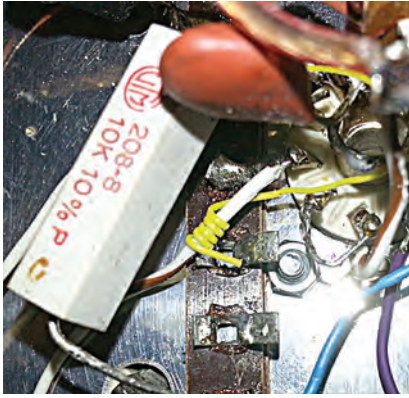
Guido Giannini, HB9BQB wrote 'Some years ago, I don't remember in which issue of Sprat it was, JA9MAT published a nice push pull transmitter for 30/40m with a double triode type 12BH7A and crystal control. The design looked so simple and beautiful I had to build it. The tubes Hehiko used were mainly receiving tubes of the series ECC8x variety and produce not more than 1 to 2 Watts. I wanted to upgrade to a little more power. After a nice CW QRP QSO with DL1HSI and a discussion about QRP transmitters with tubes I found on his page of QRZ.com a schematic of a more powerful transmitter.

He used a VHF transmitting tube, a double tetrode, the famous QQE 03/12. While upgrading from triode to tetrode there is something to consider. While triodes have a C_{ga} of about 1 to 2 pF the tetrodes

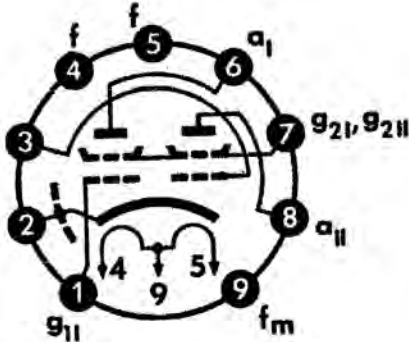


Push-Pull TX mit QQE 03/12

nach Jones Transmitter (1935) und DL1HSI (03/2005)



have a much smaller capacity of only about 0.1pF between grid one and anode. This is very desirable for amplifiers if you think about neutralization etc. As an oscillator this design does not work unless you add very small external capacitor between grid one and anode. How do you find such capacitor? You have to make it yourself, the so called ‘gimmick capacitor’! I wound 5 turns of wire over the anode wire and connected it to the control grid.’ (See picture) Don’t forget to check the valve base connections if you wish to try other valves.

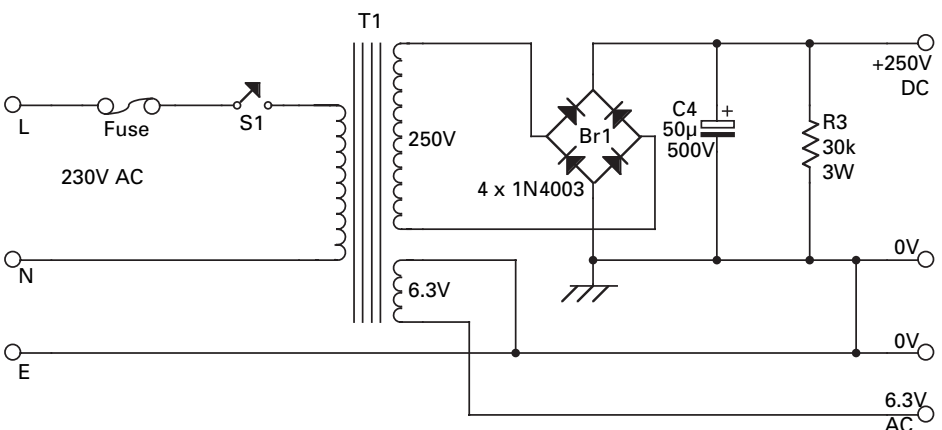


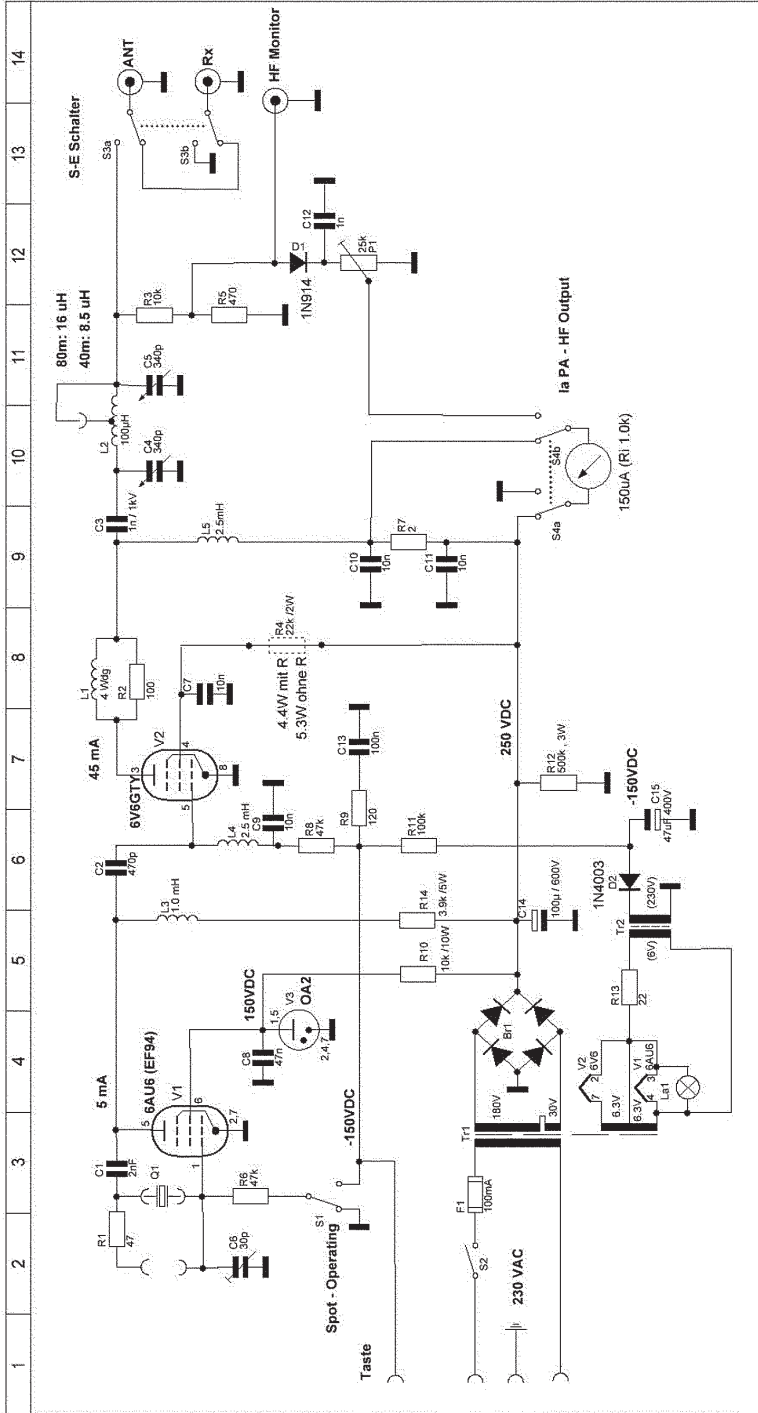
This small transmitter is very stable, being almost chirp free, and it gives about 4 to 5 Watts of HF – more than enough for communication – and – it has a VXO. A small power supply is shown but any supply giving 70 to 80 mA should work. Some experimentation of the tank coil and link coil windings is needed.

Another design from Guido is his MAS transmitter which is a CO/PA arrangement using a 6AU6 oscillator and a 6V6 power amplifier making a more

flexible arrangement. Guido has used this rig on the Valve QRP days and has drawn a nice version of the schematic.

The design is self-explanatory and has a VXO, grid block keying and an RF power monitoring arrangement. Some variation of frequency can be achieved by altering C6 and smaller less robust crystal could be inserted in the crystal socket in series with R1.





Änderungen		Datum		Name		Bezeichnung	
Datum	Name	gez.:	2.3.2014	G. Giannini	Blatt		
Vers. 28.5.2013	G. Giannini	gepr.:	2.3.2014	G. Giannini	von		
Änd. 27.1.2016	G. Giannini	Norm:			MAS - TX 80/40m HB9BQB		
				Zeichnungs-Nr.:			



Talking of crystals, the crystals we supply through club channels at rallies and direct to Graham G3MFJ are perhaps too fragile for some of the valve circuits and it would be advantageous to consider an oscillator driving a power amplifier arrangement for any homemade transmitters. I do

run a couple of single valve transmitters here at G3VTT but these use the older 10X, FT243 and some HC6U crystals. These older types will withstand higher crystal currents but you will have less VXO swing.

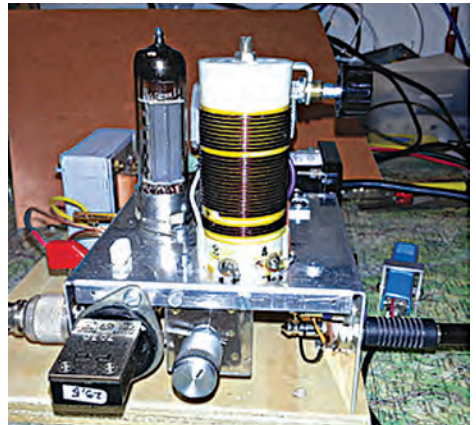
Finally here is a picture of a duck. Actually it is a duck standing behind a tiny Morse key made by **Adrian G4GDR**. The apple, (it's not a beach ball), gives you an idea of the scale and the key Adrian says is easy to use.

Gerry Horrox from 'crowthornetubes.com' has supplied many valves for our constructors over the years and has informed me via G0EBQ that his website is changing. 'I am closing down my website crowthornetubes.com and will be replacing it with a new one at:

crowthornetubes.co.uk.

I am not a member of the vintage Radio and TV forums but if you are perhaps you could put a message out on there for me.

Many thanks – Gerry Horrox'



Please let me have contributions regarding your antenna and vintage radio projects, particularly if using valves, and please support the next Valve QRP event in November 10th and 11th. So many people contact me and say they were planning to be active but either forget, don't build the equipment or set up beforehand. Next time I have details of coils for a TRF receiver and some feedback on low voltage space charge valves.

What is A Matched Aerial?

Andy G3PKW andy3pkw@gmail.com

Reading through some old copies of ‘*Sprat*’ I came across a query about the so called ATU so here goes with an explanation. First of all I object to the name of ATU (antenna *tuning* unit) as it should be called an AMU (Aerial Matching Unit) for the following reason. An ‘aerial’ to give it its proper name from the Greek origins of our language as opposed to the Use of that Latin word which is the name of the feelers which a moth, or other insects have upon their heads. An aerial is a physical fixed structure. If you suspend sixty feet of wire out in your garden it has a fixed amount of inductance from the length of wire and also a fixed amount of capacity to ground. The only way to alter it is with a pair of wire cutters. So nothing in the shack can alter that physical entity. So that kills one myth about a device that tunes the aerial.

OK so what is happening with the AMU. The AMU has two jobs to do in order to transfer energy efficiently. The first job is to effect what is known as a conjugate match from the source. What this means is that any surplus reactance be it Positive or Negative (that is Inductive or capacitive) has to be eliminated by the AMU. It does this by introducing the opposite reactance into the system to correct the error angle of the current. Remember that too much L at the aerial causes the current to lag so the AMU introduces extra C. By the same token too much C causes the current to lead so the AMU introduces extra L to pull it back.

**Any wire which is shorter than an odd number of quarter waves is capacitive.
Any wire which is longer than an odd number of quarter waves is inductive.**

The excess reactance is eliminated from the system and we call this conjugate matching. Once we have satisfactorily eliminated any excess reactance the system is now ‘fly-wheeling’ with the correct timing as that of the driving power. If you do not believe me, ‘Google’ the “Tachoma Narrows Bridge” to see resonance and how energy can be built up in a system.

Don’t get confused. The current as shown in a dipole diagram is a massive build up and is much greater than the feeder current which is only replacing that which has been radiated away So now we have a resonant system which is being ‘topped up’ by the feeder.

The second job of the AMU is to transform the radiating resistance of the aerial to 50Ω to keep the rig happy. This is necessary to transfer all the power to the radiating resistance of the system. This is not so easy to explain as it needs an understanding of vectors (angles) but what it means is that an LC network has the ability to act like a transformer. This process is tied in with the conjugate process, as they do interact with each other.

The best way to think of this transformer action is to consider a pi network as an example which consists of an inductor with a capacitor at each end to ground. If the values of the capacitors are equal then effectively the coil has a pseudo ground point at its centre. So this would create a



one to one impedance match, not very useful, of course. If we reduce the capacity at one end and increase it at the other making sure that we keep it all in resonance, that effectively moves the tap on the coil from the centre nearer to the end of greatest C, which has the effect of changing the voltage of one end with respect to the other. An impedance ratio as it were.

This gives us an impedance change. The lower impedance being at the end where the largest C is to be found..

During all this process the pi network has to be kept in resonance by either adjusting the L or the Cs of the network. Such networks were common to match the valve anode impedance to the output say 75 ohm etc. As we all know and loved in the valve days !

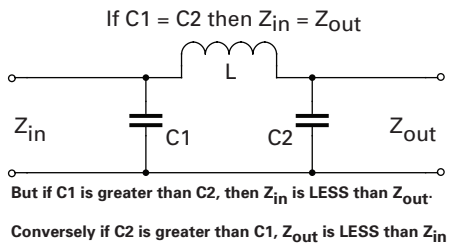
I hope this has explained the aerial matching process which is just correcting the errors of reactance and transforming the radiation resistance which the radiator presents to the rig.

The transforming of the radiation resistance is not as important as the conjugate matching because any stray reactance error will limit the amount of current that could be flowing in the radiator element. Often you hear an operator say he cannot get his SWR below say 1.5 to 1 This means he has probably a conjugate match OK but the radiating resistance is not exactly right, but this is not normally a problem as dipoles at a modest height will be close to that 50 ohm.

Generally the radiating resistance of any system is a function of its size. The bigger it is the easier it is to couple its energy into space. In the dipole case, in FREE space, it is 73.13 ohms, but when it's near to mother earth it is lower, hence 50 ohm is a compromise to feed.

For example a magnetic Loop aerial is physically small so it has a small radiating resistance. So Loop aerials have huge currents flowing even with low power. Obviously conjugate matching is even more important to maintain these huge currents which also create huge voltages at the capacitance part. Ye don't get something for nothing in this world.

If losses are kept low the Loop aerial can be very effective.



For Sale: Ten-Tec Century 22.

The set is in pristine condition, good working order, but may need a tune-up and eventually a change of dial cord. £100 ONO. Collect or postage extra. Contact:

Rev Adrian Heath G4GDR
227 Windrush
Highworth
Nr Swindon
SN6 7EB
01793 762970



Picture courtesy of RixPix.com

Valve QRP Day April 2018

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

Well done those of you who remembered to take part in the Valve QRP Days on April 21st and 22nd. If you battled through poor conditions, QRN, contest QRM, fast QSB and used your homemade or modified commercial equipment to make meaningful contacts then you were upholding the ideals of the GQRP club. The numbers operating were low compared to other years and in fact follow the trends of amateur radio in this day and age with reduced day to day activity and operating only for competitive events. The stalwart band worked mainly 80m and 60m but there were a few contacts on 160m, 40m and 20m to be had. The reports from participants as follows are:



G4GDR says *'it was the same old faces with GQRP membership around 4000 - where are they?'*

Adrian worked six stations with two of those QRP. Shown here is his CO/PA and BC348 combination in his outdoor shack. Chris G3XIZ used his homemade transceiver to work 30 contacts, (highest number of contacts), over the two days saying: *'Hello Colin. It was yet another interesting Valve Activity Weekend with many of the usual stations in evidence. A few of the regulars*

were missing but that may have been due to the exceptionally fine WX and/or the atrocious evening QRN. My valve TRX was made ready on the preceding Thursday when I had a single test QRP QSO with Tony GW4OQB.

*'On the Friday I had 6 QSOs: all QRP to QRP and 2 of which were valve to valve. Over the weekend I managed 13 QSOs on Saturday and 10 on Sunday so the total score was 30 QSOs, 26 of which were QRP to QRP and 14 being valve to valve. Valve stations worked numbered nine which is about my average for the spring event, those being: **G3MCK, G3NKS, G3TYB, G3VTT, G4GDR, G4GIR, G4VUX, G4XRV and G4ZXN.** It seems that these valve events are very much a G(W)3 / G4 activity and it would be great to have some of the other callsigns in evidence.*

*'Five QSOs were made on 160m, 14 on 80m, 10 on 60m and only one on 40m. My local pals **M0JXM** and **G4FGJ** supported me as usual with Gordon FGJ giving me a QSO on each of my four available bands'. From G4GIR I had: *'Hello Colin I just had to use the newly acquired AR88 (see picture next page) in conjunction with the Codar AT5 for the April valve weekend. It turned out to be a very enjoyable weekend operating, nothing serious you understand, what with the glorious weather!**

*'Conditions whilst not tremendous weren't bad, every time I tuned around 80m there was a signal to be heard. I managed 9 QSOs valve to valve, two of those with AT5s (**G3YHO** and **G4HWK**) and 15 QSOs overall 14 on 80m and three on 160m. Thanks to all those I worked and look forward to the next one. 72 Ian'*

From Derek G3NKS came: 'Hi Colin, I had 13 QSOs, mostly on the Sunday and all on 80m. I heard no activity on 40m. Stations declaring valve TXs were **G4ZZXN** (Paraset), **G4XRV** (CO/PA), **G3YHO** (Codar AT5), **G4GIR** (AT5), **G3XIZ** (homebrew transceiver) and **G3MCK** (CO/PA). I Heard and called but not worked: **G3VTT**, **M0VVC** and **G3TYB**.



'My rig was the usual CO/PA (2 x 6V6), a Drake R4C receiver and a G5RV at 15ft. Much enjoyed. Please let's do it again!' From I5SKK I received: 'Hello Colin, here is my Valve QRP Day report for SPRAT if you think it can be useful. There were a total of nine contacts, eight on 10MHz and one 7MHz. I used a two tube transmitter (see photo below) I made some time ago with a 6CL6 and 807 and a number of crystals. The power was around 8-10 W, (input?), depending on the crystals and frequency.

'I tried 3.5MHz but the noise was too high on the evening and no tube QRP stations were heard on my side. Anyway my three contacts were on 2-way QRP **F8APH** and finally yesterday evening **EA2EFO** and **Brian G3MBN**. I later discovered he is a GORP Club member too. This last QSO was really nice as in the evening the 10MHz band opened and I had a long chat with Brian and his 5W and my 8W we were able to keep us in contact for a quite nice chat. That's not so easy with QRP in this period. I received using a homemade receiver that uses a Drake R4 C chassis and some parts but is fully tubed. The antenna was the homemade 7m long vertical with a KW ATU from my silent key friend **I0XXR**'.72/73

Alex I5SKK wrote: 'Hi Colin, I came on at odd times over valve weekend but never made a contact! I have been restoring a Minimitter mobile transmitter from the 1960s. (Shown on the next page) I put out CQs on 80 AM but no takers and had to pack up as something was getting very warm. After a quick sniff around the various boxes I was expecting to find the inverter the culprit but was surprised to find it was my 12V 20Amp PSU too hot to touch!

'What frequency would be preferred for QRP AM on the next valve day? (I would suggest 3615kHz Mike as this is the VMARS AM frequency and there seems plenty of activity there with military AM operators – G3VTT). 'On CW I was using my "Paraset" and calling anyone near the QRP frequency. I was desperate to hook up with **G4ZZXN** who was also running a "Paraset" but no luck. I even called you but by then the TX went into "love-sick donkey" mode and sounded terrible.

'A slight tweak of the tank tuning cured that but you had gone by then. I heard quite a few of the regulars over the weekend despite the SSB near 3.56 and those continuous dots.72 from Mike G4AQS'



Gerald G3MCK came on both days with his 5 watt CO/PA but only worked a few stations. He packed up in disgust as the QRN was so strong. This was a pity as signals beneath the noise were strong. From Chris G3ZJK I had: *'I entered my first Valve QRP weekend in April! For the past 6-7 months I have been rebuilding my 160/80m valve TX that I originally built when I got my licence in 1970. In the 70s I sold it to a friend (to buy a KW2000) and he had it in a garage for must be 30 years where it deteriorated badly but it has been brought back to life and used for the weekend. I managed to spend some time on the air but not as much as I'd hoped. In the end I made just five QSO's on the Saturday on 80m. My TX was a homebrew G3OGR design from SWM (April 1970) with a 5763 in the final.'*



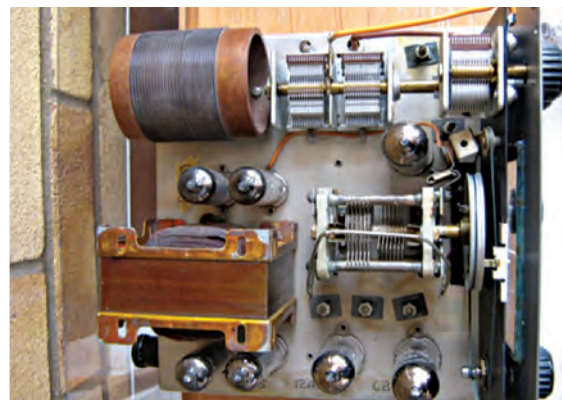
'The RX was an Eddystone 830 and my antenna was a 70m doublet with the centre at 10m and tuned with a PA0LL balanced tuner. Using this equipment after being used to my Kenwood TS-990 was hard work on the receive side and shows how much technology has progressed.'

'The RX was an Eddystone 830 and my antenna was a 70m doublet with the centre at 10m and tuned with a PA0LL balanced tuner. Using this equipment after being used to my Kenwood TS-990 was hard work on the receive side and shows how much technology has progressed.'

Finally from John G3TYB I had: *'Unfortunately it turned into a comedy of errors with Saturdays operating being curtailed by the failure of a Chinese switched mode DC/DC converter- that's two gone out of three, and Sundays by an intemperat knocking at the front door. That turned out to be a team of Gas Engineers attempting to trace a reported leak and needing to check the house.'*

'However I worked four stations on Saturday and four on Sunday. I used a variety of valve rigs at five watts and the bands used were Top Band, Eighty and Sixty'

Well, that wraps it up for this time. The next Valve QRP Days are November 10th and 11th 2018. You have plenty of time to either ready your equipment or make something. So



many people tell me *'Oh I meant to come on but.....'* and don't make it - so get weaving now and sort your rigs out!

Anybody is welcome to work these vintage stations with regular perhaps more modern QRP rigs and as the reports indicate these days can be great fun. If it uses valves then put it on the air before the filaments go out.

72 G3VTT

COMMUNICATIONS AND CONTESTS

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

Hi all, thanks for the comments (please keep them coming). Don't forget there are loads of large and small contests on right through the summer some with special QRP or LP sections. Check out http://www.hornucopia.com/contestcal/contestcal_qrp.html

Summer Sizzler

Hope everyone is looking forward to the August bank holiday week when the Summer Sizzler will be taking place. Dates are the week BEFORE the bank holiday, to Monday the 27th. I am hoping many members might take part and activate the WARC bands (12m, 17m and 24m) as well as the more usual HF bands of 20m, 30m, 40m and 80m frequencies.

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, 18130, 21285, 24950, 28360kHz

I recommend that if there are a few stations on frequency, spread out a bit if you can.

It is usual for operators to exchange their G QRP Club membership numbers when making QSO but it is not essential. 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, Dom Baines, M1KTA, 34 Bury Road, Stapleford, CAMBRIDGE. CB22 5BP.

The following contests might also interest some G QRP members. And they're in no particular order:

RSGB Low power contest 22nd July www.rsgbcc.org/hf/rules/2018/rqrp.shtml

ARRL FD 1800 UTC, Jun 23 to 2059 UTC, Jun 24, www.arrl.org/field-day

IARU HF World Championships The second full weekend of July, beginning 1200 UTC Saturday and ending 1200 UTC Sunday. 1200 UTC, Jul 14 to 1200 UTC, Jul 15 www.arrl.org/iaru-hf-championship

Marconi Memorial Saturday 1400 UTC, July 7 to Sunday 13:59 UTC, July 8 www.arifano.it/contest_marconi.html http://www.arifano.it/contest_marconi.html

RSGB IOTA – July 28th 12:00 UTC - 29th July 12:00 UTC quite a few will be off to various places for this annual contest and you will see some rare and not so rare IOTA islands activated this summer. There is a QRP category to this contest which makes it interesting and it's both SSB and CW. If you are off somewhere this summer, please drop me a note or let Chris G4BUE know about it, especially photos. I am sure some might also manage to operate and pick up a few of the other GQRP awards this summer.

www.rsgbcc.org/hf/rules/2018/riota.shtml I am sure many including me will be QRV whilst hanging onto the antenna pole and log sheet in the wind from some remote beach

I expect YOTA and JOTA (Scouting) will pop up-on-air during the summer too.

MEMBERS' NEWS

by Chris Page, G4BUE

E-mail: chris@g4bue.com



Re the **GM30XX** Challenge organised by **GW4JUN**, **K5MGJ** alerted Vic to a very good compilation and history of various developments of one of **GM30XX**'s rigs, the **FOXX**, which was subsequently reworked by others and eventually became known as the **Pixie**. This can be found at: http://www.gqrp.com/The_Sprat_Pixie_File.pdf. Biggest news from **G3XBM** is 2m FT8. Nearly every time Roger transmits with 2.5W to his big-wheel omni antenna, he gets spotted at well over 185 miles. On 2m FT8 RX with the same antenna he usually spots over 370 miles and in six-seven DXCC most days. He still goes on the 2m and 70cm UKAC activity contests with 5W SSB and works up to 125 miles on 2m with the big-wheel antenna and over 60 miles on 70cm with just a 2m halo most sessions. Roger is still QRV on 630m TX (10mW ERP) and reaches Norway pretty often. He is still using the earth-electrode 'antenna' in the ground and says it is quieter now that the 'season' is over, and hopes to be back on MF in the autumn.

DDØVR reports his December/January Caribbean trip reported in the last *SPRAT*. Heli says it was difficult to make QRP contacts due to poor band conditions and he only made one 5W QRP QSO, from Barbados to **K1EEE**. Pictured right is Heli with Mr Bunte of the famous Bunte Gardens in Barbados and below his QSL. In September Bigi and Heli will be QRV only QRP from Greek islands as follows: 1/9 September from Kreta, 10/14 from Santorin, 14/17 from Ios, 17/21 from Naxos, 21/25 from Paros and 25/30 September from Mykomos. A trip to the south Pacific (Fiji, Samoa, Tonga and Aitutaki) is planned for 2019. **G4CIB** has been, "Re-discovering the thrill of QRP having fired up my old HW-8 after a long period of gathering dust!



Never really did lose the QRP(ish) bug having for the past ten years or so using an IC703, also recently buying an FT817ND. What prompted me to fire up the HW-8 was our latest Gloucester Amateur Radio and Electronics Society's (GARES) Club Challenge - working zones and countries. Since 1 April I have managed 21 DXCC in six zones". Brian will be QRV 1/15 September from Lundy Island (EU-120) with his FT-817ND and looking for G-QRP members on the QRP CW HF QRGs and also 6m (UKAC), 2m (UKAC and Backpackers) and 70cm (UKAC). This will be his 23rd year of activating the island.



After about six years of inactivity, **MØAYF** decided to make a return to amateur radio over the winter months by building a QCX CW TCVR kit for 80m. Des writes, "The QCX is a work of art with excellent performance. Indeed, if you didn't know it was a DC design you would assume it to be a superhet with a narrow BW CW IF filter. For me it has put DC receivers in a whole new light and no longer viewed as 'second best' to a superhet design. I would happily recommend a QCX kit to anyone. The only 'red flag' is that if you intend

using a QCX with an indoor (or very nearby) antenna, then mount the transceiver in a screened box. I experienced some feedback issues from my indoor loop antenna when I was within one loop diameter in TX mode (hardly a surprise), but this was completely cured simply by moving the rig to the far end of the shack most distant from the TX loop". His small loop antenna is suspended from 'A' frames in his attic. It has roughly two metre sides of RG213 coax and a smaller (70 ms x 10cms) rectangular coupling loop made from 1.5²mm hook-up wire used to feed the main loop via a voltage balun. A length of RG58 coax feeder and three core motor control cable go back to the first floor shack. Des says, "In a break with tradition, my loop tuning capacitor is in the lower limb of the loop so it can sit on the loft floor, thus making it easier to support. The variable capacitor is a twin variable (250-250pF) high voltage type used in a split-stator configuration. This gives around 125pF maximum capacitance, which would not be enough to bring the loop to resonance, so another length of RG213 is used as a fixed capacitor in parallel with the main tuning capacitor. Without the additional fixed capacitance resonance was just above the 40m band, which indicates that by changing the value of the fixed capacitor, it may be possible to make the antenna operate on more than one band (perhaps 40 and 60m), though this has not yet been tested".

VE3IPS says after a lot of hard work from the world-wide SOTA teams, VE3 Ontario is now activated for SOTA. He activated the first VE3 summit, which turned out to be a ski resort, and still had snow and icy winds at the summit to keep things interesting. John made 10 40m SSB contacts using a FT-891, a linked dipole and a Bioenno battery. He says to look for more VE3 SOTA activity coming this year. The full story is reported at <<https://sota.org.uk/Article/VE3/SO-101/22404>>. He was also thrilled to find a HiMound 705 key at the last boot rally! On 26 April **M1KTA** was QRV from Lindisfarne (Holy Island) (EU-120) and the following day from Longstone Lighthouse (EU-109). **GØXAR**, **G5BBL**, **G4WIF** and **GØUPL** will be meeting up at the DARC Friedrischaven Rally on the first weekend of June and Steve says he will try and take a group photo for the next *Members' News*. He says there is not much else going on at his end, although he was back in Budapest for a couple of weeks in May.



In January and February **GØHUZ** and his wife Suzanne, **GØLUZ** were on their 'nautical meanderings' and, if the weather allowed whilst crossing the Atlantic and then in the Caribbean, took every opportunity to be QRV from the open deck using their trusty KX3 and centre loaded G-whip stuck to the side of the ship. Tony says the conditions were so poor during their four weeks at sea, they only managed 50 QSOs between them, mostly on 20m QRPCW, whereas 12 months earlier they made over 400 QSOs during a similar period. Not to be defeated, during the final weeks of September to mid-October they hope to be /MM again crossing the Atlantic to the Canadian eastern seaboard, and in early 2019 plan to be /MM while

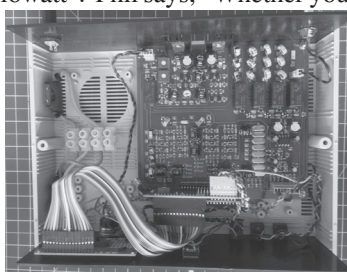
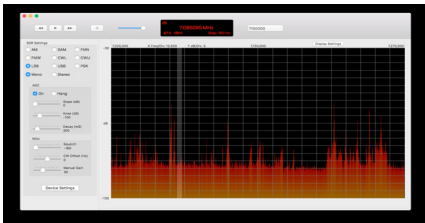
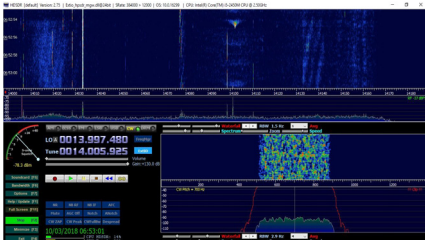
sailing along the west coast of Africa and round the Cape of Good Hope into the Indian Ocean. **G0AJC** plans to take multiple QRPP rigs out portable for the International QRP Day in June and the RSGB's Low Power Contest in July for the **GM30XX** Challenge. Giles may also try operating with a kite supported vertical (thanks **GW4JUN**).

Pictured right is the new shack of **OE7AFT** / **IZ4AFL** after a QTH move. After several years of inactivity, Enrico is QRV again with CW and FT8 with his old IC-735, a Softrock Ensemble RTX and several home-made rigs. In the last months Donà has developed and built his own direct sampling SDR receiver based on a FPGA board and a Texas Instruments ADC. It is similar to several projects on the internet based on Red Pitaya hardware: paired to HSDSDR it is able to show ~200KHz of band spectrum (lower picture).

M0VVC has been very busy developing an SDR application that is native to Apple MacOS, which currently supports SDRplay hardware. Matt says, "It's been my most challenging home-brew radio project to date, but well worth the effort. I'm currently working on adding a spectrum waterfall display to it, and then I'll call it finished, for now. I plan to release it in the near future, but if members would like a copy to test with their Apple Mac and SDRplay, then please get in touch with me at <zardozy@me.com>. For the curious: it is based on **AE4JY**'s CuteSDR DSP code, but uses Apple's Cocoa and Core Audio frameworks instead of QT. For best performance, it uses modern OpenGL for the animated spectrum display", bottom picture.

W3IU has been QRV with a QCX TCVR and has had many QSOs all around the USA, especially into the southern states, with it. On 14 March Jim worked **DL1NKS** on 40m CW whilst the QCX was running 3½ watts into a vertical antenna and says, "This is a fun rig!". **G3PEN** sadly became a Silent Key recently and **G3MFJ** says, "Dave and Pat his wife were lovely company at the club conventions for the many years that I attended them and were nice to talk to - he always had some good stories". Commenting on the Epiphyte, **GW4JUN** says, "I have only heard three of these little rigs on the air but they all had outstanding audio - crisp and punchy with no processing, and all put out good a signal". 'QRP Italian Style' is described by **M1GWZ** who was on 20m on 3 May and heard an Italian calling "CQ QRP and mobile only, please". A German using 10W complimented him on his clear and loud QRP signal, "Oh no", said the Italian, "I'm using a kilowatt". Phil says, "Whether you can use this in *SPRAT* in these politically correct times, I have no idea - but it made me smile! Absolutely true, I assure you".

MM0HVW has encased a uBitx 3-30MHz TCVR (picture right) and intends to load it with **KD8CEC**'s uBITX firmware rev 1.072 for CAT control (emulates FT817). Dave says it will complement his Bitx40 and K2 transceivers for CW, digital and SSB working. His QCX20/40 are used as WSPR beacons with 1-2W into a loft mounted 20m dipole and EFLW for 40m, and has been 'seen' by grab-



bers in North and South America and over most of Europe. Dave finds CW and SSB working to be more active on the HF bands during contests. **N2CQR** is happy to report that *SolderSmoke* will not have to change its name. Bill writes, “There was a report on 1 April about a trademark law suit filed by the California marijuana industry, but that report was completely bogus. The soldersmoke will continue to rise from **N2CQR** and **N6QW**”. Bill and Pete have been having a lot of fun with Farhan’s uBITX. **G4DMH** ordered a uBITX in the middle of January, received it on 15 March and is looking forward to getting it wired up and trying out alternative controllers. Malcolm has already made up a 3½ inch touch-screen TFT based on the work of **VU2SPF** and **VE1BWV** using an Arduino Mega2560 with the Adafruit Si5351A module.

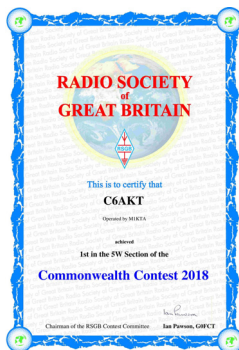


G4UDG’s four week winter ‘getaway’ in March was to Malta where he was QRV as **9H3FC** (pictures left) with an end-fed half-wave (EFHW) (20m) inverted vee supported by a fiberglass 14 feet pole strapped to their pool railings with a counterpoise wire, and tuned by his Emtech ZM-2 tuner. Using 3W

CW from his KX-2 and a Palm ‘Pico’ paddle key, Chris’s first CQ was answered by **S58MU** with 599 both ways. When time permitted he operated over the next four weeks between holiday outings and made 534 QSOs with 56 DXCC, the best being BG8, RX9, NY3, JH1, VE3, 9J2, VO1, 4K6 and TY7. The furthest QSO was to **J8EAT** at 6047 miles (9732 km) at 2015 miles (3244 km) per watt. Chris made 59 two-way QRP QSOs including one with 200mW each way with **DK1HW**. He said his equipment proved to be an excellent little DX station that packs down to very small packages for transporting, and running off rechargeable AA Eneloop batteries meant he wasn’t looking for an AC socket close enough to his operating position!

On behalf of the West Manchester Club, **G4HZJ** is pleased to announce their 22nd Red Rose QRP Festival is to go ahead on 15 July at St Joseph’s Hall, Mather Lane, Leigh, WN7 2PR. **G3XIZ** says to be beware of cheap IRF510s. Chris bought a bundle from *eBay* and they ‘don’t work at RF’. He wondered why he wasn’t getting any power from his latest TX and found the FET’s input capacitance was far higher than the specified value. In future Chris will buy them from G-QRP Club Sales. **GØFTD** has been trying QRPP (less than 1W) and noticed it is hard to get across to someone what your output power is when attempting to send 0.5W in CW, or 500mW. Andy says, “All those extra characters, or in the case of 0.5W, a punctuation character, seems to lead to a lot of confusion. I’m starting to wonder if it’s easier just to send ‘rig here is QRP 1W’? When ‘milliwattting’, as I call using less than one watt, or ‘microwattting’, using less than 1mW, I have found it best to send ‘500mW’ or ‘500uW’ as the case may be, and steer away from using the full stop character. **G30OU** suggests, “I would try 500mw or 0w5 using the same nomenclature as with components”, and **AA6AX** says, “If I’m operating ultra-low power on CW I would send ‘half a watt’ or ‘under 1W’. I agree that numbers and punctuation can be difficult for some folks, though 0.5 is pretty straightforward as long as you remember what a ‘period’ is in morse”.

Congratulations to **MIKTA** for winning the 5W QRP Section of the RSGB’s Commonwealth Contest (BERU) in March while QRV as **C6AKT** (picture right). Dom used all homebrew gear to a two element vertical for 80m, a four-square for 40m, a VDA for 20m (that broke during the night when he changed to a GP) and a GP for 15 and 10m. He made 90 QSOs and writes, “Lightening started at 2am



and was scary, sparks off the coax, between strikes pitch black otherwise, coax thrown out and 80m and all 40m antennas were brought down". The front of Dom's tee shirt (right) says, 'Keep Calm. Carry on QRP DXing'. He says he made it up after seeing a USA contest guy with 'Life's too short for QRP' on his tee shirt. The back of Dom's tee shirt reads, 'Rules. #1 Use QRP to make QSO. #2 See rule #1'. **G4DBN** says he works a, "Fair number of stations in the 6m UKACs using 5W SSB/CW to an 80m dipole. Perhaps that is one step too far outside the box, but it is huge fun despite the massive constraint on my ERP".



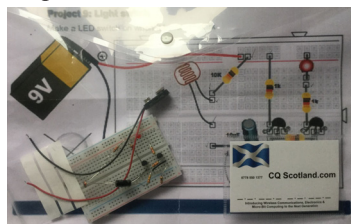
Pictured right is **M0IFA**'s QRP SWR meter (Arduino + AD8307 log detectors) that works from 100mW up to 10W. At the bottom in the photograph is a digital VFO (Arduino + AD9851 DDS + MMIC amplifier) and above it a low power 1-2W amplifier (using a Chinese MMIC module). Antony says he chose to display only the forward power, as a bar graph, and the SWR. A full description and all the Arduino code is at <GanymedeHam.blogspot.co.uk>.

G0FUW has been, "Blowing the dust off a project I started three years ago - the 'Let's Build Something' receiver/transceiver from *QRP Quarterly*. **N6QW** has been super helpful in reminding me of all the Arduino tricks I had forgotten. However, it was only after frying a second Nano that I remembered how I did it the first time - too much current for the LCD display through the on-board voltage regulator. Anyway, hearing JAs on 40m SSB with the DCRx stage of the project was very pleasing when everyone says the bands are dead". Steve is now working on the superhet stage with colour TFT display.



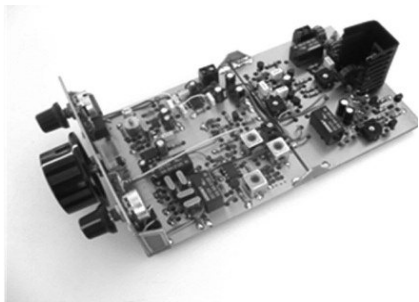
After an absence from QRP of almost seven years to the day, **GM4CXP** is back. Derrick made his first QRP CW QSO since 11 April 2011 on 10 April this year, and writes, "My first love is QRP CW and it's great to be back! I never let my club membership lapse, have rejoined FISTS (10871) and look forward to working you all on QRP CW. I now have a brand new FT818ND, two old FT818NDs and inverted vee dipoles for 80, 60, 40, 30, 20, 12 and 10m.

MMHQD writes regarding CQ Scotland Group's 'Kits for Kids' program that I featured in the last *SPRAT* and says they are busy making up the kits that can be put together in under an hour by a youngster, (picture right shows one that doesn't need a soldering iron). **G3XIZ** says, "I've had a positive response to my recent *SPRAT* valve tester article with several ops requesting further information. Hopefully someone else will have a go at building it. The valve tester came in useful again by checking some ancient grubby valves which I had bought at the Foxton Rally. I have been playing with an old Motorola 70 cm (2W) hand-held which is ideal for working the locals. The six element beam which I knocked up for it (in about an hour) works really well". Chris's latest project is a 40m TX using CMOS logic and a MOSFET PA, and is to be used in conjunction with his newly-acquired SDRPlay RX.



Thanks to the contributors to this column. Please let me know how your summer goes for the Autumn 2018 edition of *SPRAT*, by 10 August. Also, pictures please and let me know if you intend operating other from home during the autumn and winter months, especially during the Winter Sports, so I can let members know to listen out for you.

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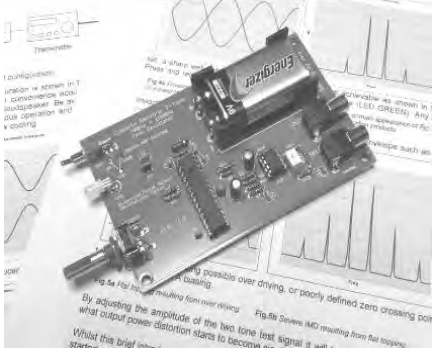
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PA0KLT Low Noise Synthesized VFO kit with LCD display uses high performance **Si570 ICs** covers **3.5 MHz** up to **1417 MHz**. Great for homebrew VFO or LO Projects - Signal Gen etc

DG8SAQ USB-controlled Vector Network Analyser VNWA covers 1 kHz to 1.3GHz - In stock Assembled and tested as reviewed Radcom Nov 2011 - Calibration Kits - Details on Webshop

Si570 ICs – Si570CMOS 200MHz only £10.50, Si570BBC 280MHz £15.50 Si570DBC £18.50 all + VAT

Mitsubishi RF FETs stocked: 175 MHz RD16HHF1 £4.50 RD06HHF1 £3.75 RD00HHS1 £0.95 +VAT

SDR-Kits, Office 11, Hampton Park West, Melksham, Wilts, SN12 6LH, UK Info@sdr-kits.net

Rig Broken or needs alignment?

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13 Dawn Crescent, Upper Beeding, Steyning, West Sussex. 01903 879526

Unadilla baluns & traps - Outbacker Antennas

www.adurcoms.co.uk

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www.amtoolsuk.com Virtual Amateur Radio Emporium!

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Favourites include fibre glass poles, Springy (Slinky element),

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email enquiries welcome. (amtools@ntlworld.com)

72, Les. G4HZJ Tel. 01942 870634

1 Belvedere Avenue, Atherton, MANCHESTER, M46 9LQ

QSL Cards from Nasko - LZ1 YE

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

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

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

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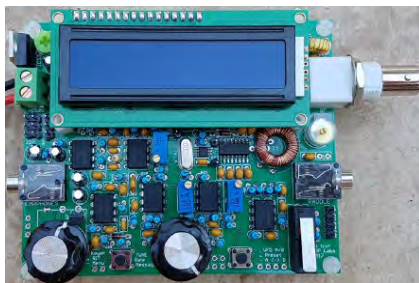
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Note: prices are based in US \$. Prices shown in £ or € are correct at time of writing but will vary depending on exchange rate fluctuations.

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 <u>per book</u>
6 pole 9MHz SSB crystal filter (2.2kHz) £12 plus post (max of one)	} £3.50 (UK); or
Polyvaricon capacitors – 2 gang (A = 8 to 140pF - O = 6 to 60pF) c/w shaft extension & mtg screws - £1.75 each	} £3.80p (EU); or
– 2 gang – (both 8 to 285pF) c/w shaft extension & mounting screws - £1.75 each	} £4.50p (DX)
A Pair of LSB/USB carrier crystals HC49U wires - [9MHz ± 1.5kHz] £4 pair	} All components
HC49U (wire) crystals for all CW calling freqs – 1.836, 3,560*, 7,015, 7,028, 7,030* 7,040, 7,045 7,122, 10,106, 10,116*, 14,060*, 18,086, 21,060, 24,096 & 28,060 all are £2 each	} plus postage
HC49U crystals- 1.8432, 3.5, 5.262, 7.0, 10.006, 10.111, 11.5, 14.0, 22.0, 29.0MHz – 50p each	} £1.20p (UK), or
HC49U crystals – 2.00, 3.00, 3.20, 3.20, 3.579, 3.6864, 4.0, 4.096, 4.1943, 4.433, 4.5, 5.0, 6.0MHz 7.2, 7.6, 8.0, 9.0, 10.0, 11.0, 12.0, 13.50, 15.0, 16.0, 18.0, 20.0, 24.0, 25.0, 26.0, 27.0, 28.0MHz 28.224, 30.0, 32.0, 33, 40, 48MHz – all 35p each (Some of these are low profile)	} £3.50p (EU) } £4.00 (DX)
Ceramic resonators – 455, 480kHz, 2.0, 3.58, 3.68, 4.00, 7.37, 14.32 & 20.00MHz – 50p ea.	} <u>Post free</u>
Diodes - Schottky signal diode – 1N5711- 20p each; 1N4148 GP Si – 10 for 10p	} <u>if ordered with</u>
Varicap diodes - MVAM109 – 40pF @ 9v, 500pF @ 1v. 50p each	} <u>with heavier</u>
– BB204 – twin diodes, common cathode, 15pF @ 20v, 50pF @ 1v 50p	} <u>things</u>
SA602AN - £1.50 (note – I may supply NE or SA, 602 or 612 as available. SA612AD – SMD SOIC-8 £1.40	} <u>like binders,</u>
MC1350 - £2.00 These are getting in short supply now so max of 2 per member	} <u>toroids</u>
LM386N-1 - 4 to 15v, 300mW, 8pin DIL - £0.45, LM386M-1 SMD – 35p	} <u>polyvaricons</u>
TDA7052A - 4.5 to 18v, 1W 8pin DIL low noise & DC vol control – £0.60 each	} <u>or filters</u>
TDA2003 - 10w Audio amp 5pin – £0.25 each	} <u>Use just</u>
TDA2822 - 1.8 to 15v stereo amp – can be bridged. 0.5W Audio amp 8pin DIL – £0.20 each	} <u>that postage</u>
TA-7642 Radio IC – direct equivalent of MK484 (& ZN414) – 75p each	} <u>that postage</u>
2SC536 transistors (npn) FT - 100MHz, hFE-320, VCBO +40V - 5 for 50p	} <u>if ordered</u>
MPSH10 transistors (npn) FT - 650MHz, hFE 60, VCBO 25V - 10p each, 10 for 80p	} <u>with books</u>
2N3904 transistors (npn) FT - 300MHz, hFE-150, VCBO +40V - 10 for 50p	} <u>or DVDs</u>
2N3906 transistors (pnp) FT - 250MHz, hFE-150, VCBO -40V - 10 for 50p	} <u>add this</u>
BC517 Darlington (npn) FT - 200MHz, hFE-30,000, VCBO +40V - 13p each, 10 for £1.10	} <u>postage</u>
FETs - IRF510 – 50p; 2N3819 - 24p; 2N7000 - 10p; BS170 – 8p - all each	} <u>as books</u>
BF981 – dual gate MOSFET – 40p each	} <u>or DVDs</u>
Pad cutter - 2mm shaft: 7mm o/s, 5mm i/s diam, gives a 5mm pad with 1mm gap £6.00	} <u>do not</u>
10K 10mm coils – 0.6uH, 1u2H, 1u7L, 2u6L, 5u3L, 11u0L, 45u0L, 90u0L, 125uL – all 80p each	} <u>travel well</u>
Magnet Wire – 18SWG – 2 metres – 60p; 20 & 22 SWG – 3 metres – 60p;	} <u>with parts.</u>
24, 25 & 27SWG – 4 metres – 40p; 30, 33 & 35SWG – 5 metres – 30p.	}
Bifilar wire – 2 strands - red & green bonded together. Solderable enamel.	}
21SWG (0.8mm dia) – 2metres - £1; 26SWG (0.45mm dia) – 3metres – 70p	}
Litz wire – double silk covered multi-strand wire 7/0.4mm -12p, 14/0.4mm. 25p. Both for 3 metres.	}
All our wire is solderable enamel insulated. Max of 3 sizes per member per order	}
QRP heatsinks - TO92 – 30p; TO39/TO5 – 40p; TO18/TO72 – 60p (pics in Sprat 148)	}
Axial lead inductors (they look like fat ¼W resistors) these are low current	}
3.3, 4.7, 6.8, 10, 15, 18, 22, 33, 39, 47, 56, 100, 150, 220 and 1000 - all uH, all 18p each.	}
Toroid Cores – priced per pack of 5 – max of 2 packs of each per member	}
T25-2 – 50p, T25-6 – 60p, T30-2 – 70p; T30-6 – 80p ; T37-2 – 80p; T37-6 – 80p; T50-1 - £1.00; T50-2 – 90p;	} Postage for
T50-6 – £1.10; T50-7 – £1.20; T50-10 - £1.20 ; T68-2 - £1.80 ; T68-6 - £2.40; T130-6** - £2.40ea. FT37-43 – 90p	} toroids includes
FT50-43 - £1.20 ; FT37-61 - £1.20 ; FT50-61 - £2.40 ; Ferrite beads – FB43-101 (3.5mm dia x 3.2mm long, 1.2mm dia hole) – 40p for 5: BN43-2402 - £1.20; BN43-202 - £2.00; BN43-302 - £2.00; BN61-202 - £2.40.	} postage for all
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%	} small parts
** Except ** item – they are heavy and each counts as a pack (ask for quote if you want more than 2 of the large toroids)	}
SBSS PCB clamps * – sorry – all sold out now, and no more expected.	}
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\$ / euros (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	}