



SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

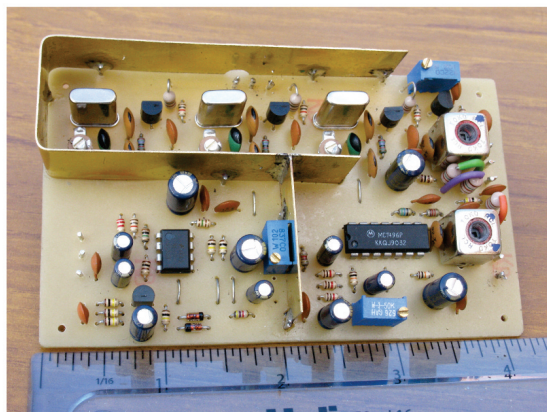
ISSUE Nr. 155

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SUMMER 2013



**VK3YE Chopping Board
Receiver**

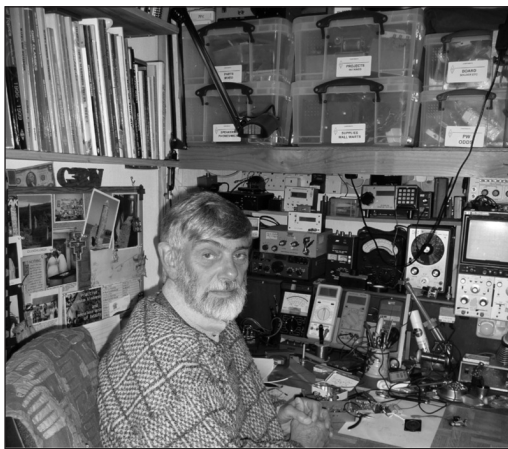


G4COE SSB Generator

In this issue:

Rishworth Convention ~ Experimental Loop Antenna
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Nano Traveller's Rig ~ Muting the LM386 ~ 1kHz Audio Filter
Club Sales News ~ American Member's News
Antennas, Anecdotes, Awards ~ Valve Day Report
Communications and Contests ~ Member's News ~ Club Sales

JOURNAL OF THE G QRP CLUB



Rev. George Dobbs G3RJV



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Many SPRAT readers have bought copies of the “Radio Projects for the Amateur” series of books written and illustrated by Drew Diamond, VK3XU. They are excellent books and most volumes are still available from the club. We are pleased to announce that Drew was inducted into the “QRP Hall of Fame” at the recent “Four Days in May” symposium at Dayton, Ohio. Those who have read his work will know how deserving he is of this honour.

The Rishworth Convention is on **Saturday 26th October**. (see opposite page) We hope you will be able to join us for the convention and the Constructor’s Evening on the Friday.

72/3

G3RJV



The W1FB Memorial Award 2011/2012

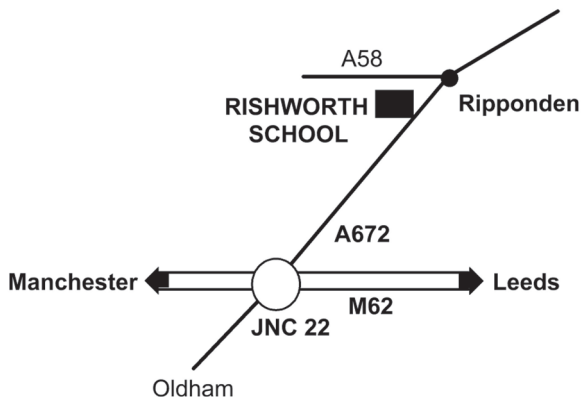
A simple theme : Beginner’s Receiver. An amateur bands receiver for one band, capable of being built by a beginner. Please supply circuit diagram(s), full component values and brief notes. Entries before August 1st 2013. A SPRAT formatted page (MS Word) can be supplied on request but any format including hand written may be used. A special plaque is presented for the best design.



THE G QRP CLUB MINI-CONVENTION

(in conjunction with the Halifax Radio Society)

Saturday 26th October 2013
The Rishworth School, Ripponden



OPENS AT 10.00am
ADMISSION £3
DOORS OPEN 10am
TALK-IN S22
LARGE SOCIAL AREA
LECTURES ON
QRP SUBJECTS
BRING & BUY - SURPLUS
JUNK - COMPONENTS
KIT TRADERS
FOOD & DRINK ALL DAY
WITH THE FAMOUS PIE AND PEAS



The Rishworth School is on the A672 (Ripponden) road from Junction 22 on the M62. [Postcode: HX6 4QA]

Look for the G QRP Sign on the left after you have passed all the sheep!

CONSTRUCTORS EVENING (Friday Evening before the convention)
Including a Buildathon (project to be announced) to be held at Premier Inn, Salterhebble Hill, Halifax, HX3 0QT. (Tel: 0871 527 8486)
www.premierinn.com/en/hotel/HALPTI/halifax-south

Other suggestions for local accommodation:

The Premier Inn, Milnrow. Junc 21 on the M62 (Tel: 0871 527 8936)
www.premierinn.com/en/hotel/ROCTHE/rochdale

The Malthouse, Rishworth. Almost next door to the school – only 5 rooms (Tel: 01422 822382) www.malthouserishworth.co.uk

The Turnpike Inn, Rishworth, excellent but quite expensive. (01422 822789) www.turnpikeinn.com

AN EXPERIMENTAL LOOP ANTENNA for 7, 10 and 14 MHz

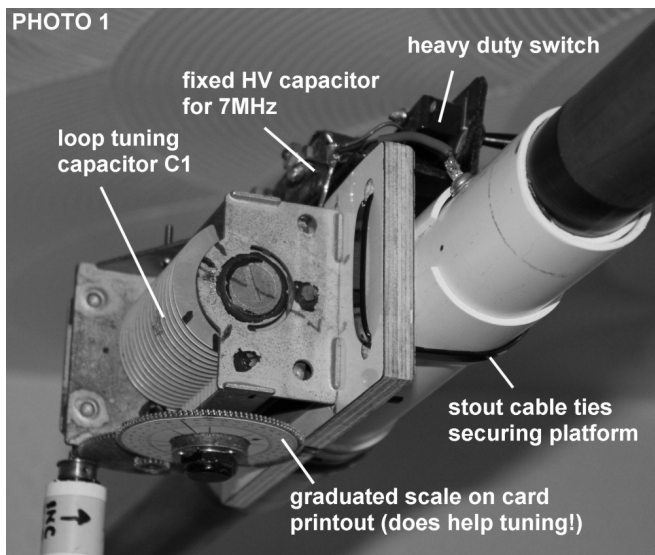
Duncan Telfer G8ATH/G0SIB(prev)

e-mail: dtelf@talktalk.net

LOOP CONSTRUCTION

Whether expanding antenna options, having a change from long wires and their variants, or even starting from scratch, practical loop antennas are an interesting topic for investigation. So here is my account of one particular antenna that began with an excursion into plumbing...

A recent visit to a local metal scrap-yard yielded a few short lengths of 35mm diameter copper pipe. This tubing was trimmed to size and furnished with elbows from a local plumbing store to make a metre square loop. Because of what was available, the sides deviated slightly from 1m (97cm x 112cm). The pipe sections were de-burred and smoothed with wet-and-dry to expose bright copper. The elbows were sweated on by feeding cored solder into the joints while heating them from a blowlamp. A gap in the centre of one side was sleeved with 6 ins of plastic pipe, within which was fitted an inner sleeve 2.5 inches long to act as a spacer. PVC insulation tape was used to stabilise the structure and prevent sliding before mounting the loop tuning capacitor C1 on its wooden platform, which was secured to the outer sleeve with stout cable ties (**Photo 1**).

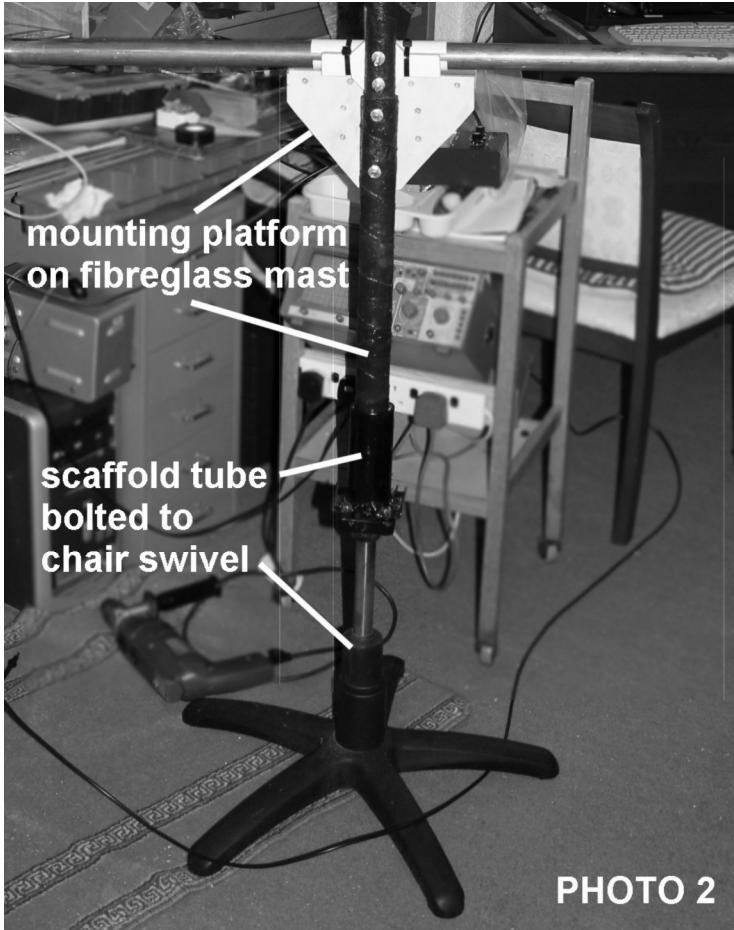


This tuning capacitor is a 150pF ex-transmitter high voltage single gang air-spaced type with reduction gearing, as tuning is very critical at loop resonance. Under these conditions, proximity to C1 is potentially dangerous as very high voltages are reached, even at QRP levels. Hence the length of plastic tube on the tuning knob. Across C1 is a switchable fixed 100pF capacitor, 3000V working, for when tuning

the 7MHz band. The switch is also heavy duty and to avoid destructive arcing should not be operated while actually transmitting. If you don't need a fixed capacitor and have a suitable larger variable one, then fine. So long as its operational voltage is high enough – if unsure, DON'T test it with your transmitter or damage to the capacitor, and/or your rig, may result. **Ref. [1]** indicates expected voltages for loop antenna capacitors for given RF powers. For C1, a 'butterfly' split stator type or a high grade vacuum capacitor, may give improved results.

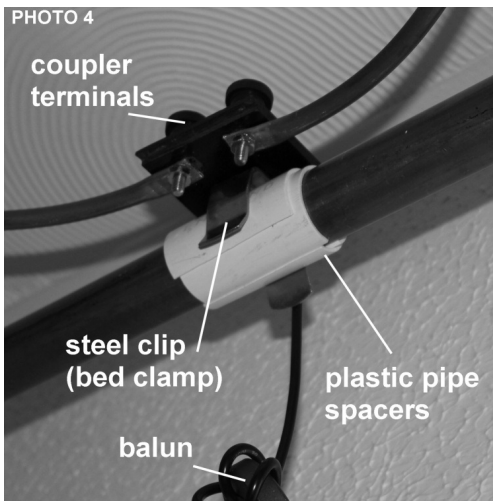
Size 35mm diameter pipe was chosen because on-line loop calculators, e.g., Ref. [1] and EZNEC™ modelling predict a radiation resistance that is very low (~ 0.2 ohms at 7MHz). Even small resistive losses can degrade antenna efficiency.

Initially, the loop was mounted vertically, supported by a central fibreglass pole fitted in a home-made socket made from a short length of scaffold tube welded to a bracket bolted to an old swivel chair base (**Photo 2**).





But now its favoured and safer elevated horizontal and omni-directional orientation is (**Photo 3**) near a corner of the ceiling, partly suspended by stout cable ties from hooks in the joists. [NB. Make sure the hooks ARE in the joists, not just the plaster! My joist detection device was supplemented by drilling pilot holes to check]. Preferably, tuning is performed first with an antenna analyser. It is helpful to have a scale of some sort on which to record or mark the position for minimal SWR. In use, loop tuning is performed for maximum noise (and/or signal) on reception, while re-checking SWR at the transmitter. But for safety, re-tuning should always be done with the transmitter off.



If your transmitter has a manual ATU, then switch it to 'direct' or 'bypass' path and simply use it as a reflectometer. It should not be necessary to invoke the ATU's filter components to get low SWR. That brings us to the next topic.

MATCHING UNIT (Photo 4).

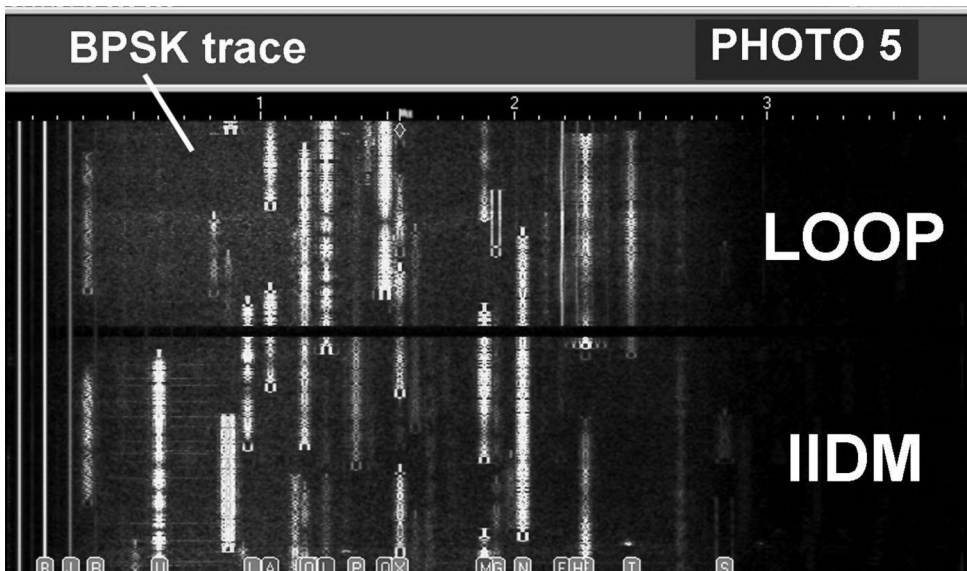
The feeder loop clip-on assembly is a steel bed clamp, drilled to accept cable ties securing the co-ax cable and bolted to the plastic mount carrying the feeder loop terminals. Different feeder loops were tested until a reasonable match was found on all three bands.

For experimenters, and in answer to those who might claim that the feeder loop size is ‘non-critical’, SWR figures appear in **Table 1** for different circular feeder loop sizes (10mm copper tubing). The measurements were made with the MFJ 259B and a short run (4m) of RG58U to each loop feeder bolted to the clip in position on the antenna.

TABLE 1. SWR at frequencies:

Circumference (cm)	7.035 MHz	10.140 MHz	14.075 MHz
60	2.7	3.7	6.5
70	1.8	2.7	5.0
90	1.0	1.6	3.5
110	1.3	1.2	2.8
110 (oval)	1.5	1.0	2.3

The choice in this case was a distorted (oval) version of the 110cm feeder loop, which turns out to be 40cm x 25cm, with long axis parallel to the antenna tube. By all means experiment further with your own feed loop geometries.



RESULTS

For NVIS (near vertical incidence skywave) propagation on 7MHz, the rotatable vertical loop was a respectable performer. But since I'd then be ‘doubling up’ with my multiband IIDM * (**Ref. [2]**), the preferred orientation for this loop antenna is horizontal, being ‘out of the way’ and omnidirectional at the same time. **Photo 5** shows

the reception of BPSK signals at 10.140 MHz on cable swapping between the loop and IIDM antennas. Both antennas have effective heights of ~4.5m above ground. Many signal strengths appear similar, bearing in mind differences in far-field lobe geometries and feeder lengths. About 20m of co-axial connects the outdoor IIDM and less than 5m to the indoor loop antenna whose efficiency at this frequency is calculated in Ref. [1] to be 67%. Verdict: A worthwhile permanent feature of the shack. Good experimenting!

ACKNOWLEDGEMENTS

Thanks are due Brian, G0GSF for helpful discussions on loop antennas, Roy Lewallan W7EL for his excellent EZNEC™ software and to the efforts of other background workers in the literature, notably in **Refs. [3, 4 and 5]**. Google these titles for worthwhile further reading on small loop antennas.

* ‘Inwardly Inclined Dual Monopole’ - near equivalent to a low dipole antenna.

REFERENCES

- [1] http://www.66pacific.com/calculators/small_tx_loop_calc.aspx
- [2] ‘Multibanding the IIDM’ in Pat Hawker ‘Technical Topics’, RadCom, Feb. 2008.
- [3] ‘Small Transmitting Loop Antennas’ by Steve Yates AA5TB
- [4] ‘An Overview of the Underestimated Magnetic Loop HF Antenna’, Leigh Turner, VK5KLT 2009, 2010.
- [5] ‘Loop Antennas’ by Glenn S. Smith, Georgia Institute of Technology.

LEGENDS for Photos.

Photo 1 – Main tuning capacitor, 150pF wide airspaced variable transmitting type, with switchable parallel 100 pF capacitor (mica, 3kV wkg) for 7MHz. Note the graduated scale (printout of a copied protractor image) and plastic insulator on the control knob.

Photo 2 – Portable floor mounting for rotatable vertical configuration, using an old chair swivel and section of scaffold pole to support a fibreglass mast.

Photo 3 – Elevated horizontal configuration for loop antenna, showing C1 opposite the feeder loop and its 50 ohm coaxial cable with current balun. Note the built up (plastic pipe covered) region to allow a firm fit for the clip-on feeder loop.

Photo 4 – Clip-on feeder loop assembly built on a suitably drilled bed-clamp bracket, incorporating a plastic terminal block for the feeder loop. Trailing coax is wound on a toroidal core to form a current balun.

Photo 5 – Comparing BPSK signals on the 30m band segment (s/w Digipan 2.0).



The Chopping Board Receiver

Peter Parker, VK3YE. <parkerp@internode.on.net>

Features

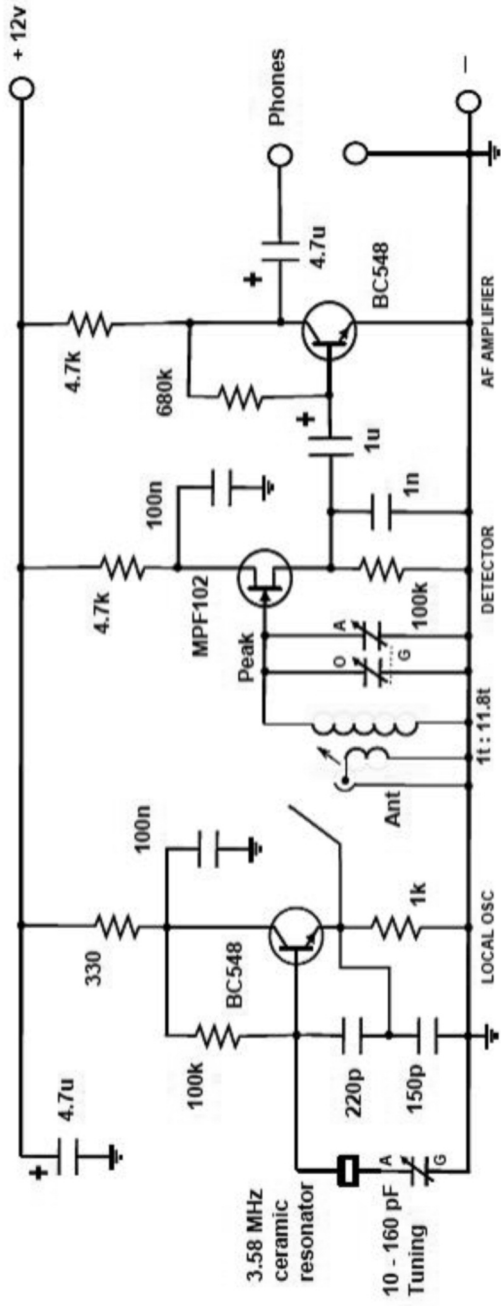
- Tunes 80 and 40 metres, providing SSB, CW & AM reception
- All-discrete 3 transistor design with just 22 parts
- Sufficient output to drive low or high impedance phones
- Swinging link antenna coupling optimises sensitivity and selectivity
- No frequency pulling on strong signals or touchy regeneration
- Chopping board case forms front panel, carry handle and coil former

Circuit stages

- Selective front end with spiderweb coil
- VK4FUQ infinite impedance FET detector (MPF102)
- Audio amplifier (BC548)
- Colpitts variable frequency ceramic resonator local oscillator (BC548)

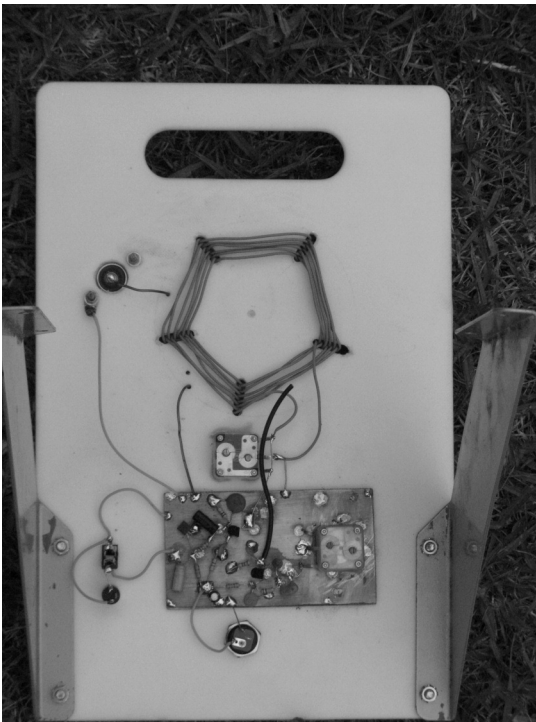
Construction notes

- Mark two concentric circles below handle of chopping board, approximately 6 and 8 cm diameter. With a jigsaw or hot soldering iron cut five slits between the two circles, equally spaced. Then drill holes for variable capacitors, sockets and antenna coupling winding.
- Wind detector coil with thin plastic covered insulated wire. Thread wire through slots, alternating in front and behind, like a basket weave, to form a spiral (see photos). Work from inside out, finishing after 13 or 14 turns (you'll probably remove some later during adjusting).
- Form antenna coupling loop about 7cm in diameter over the detector coil, using stiff but still bendable wire. Pass through holes and connect to antenna socket.
- Glue peaking capacitor near the centre of the board below its coil. Drill hole for tuning capacitor in piece of blank PC board material, glue, and solder centre connection (G) to it. Bridge outer terminals (A and O) to provide a 220pF maximum capacitance.
- Assemble the circuit board, dead-bug style, following diagram. Start with local oscillator. Then build detector and audio stages.
- Glue or screw circuit board to rear of chopping board. Make connections to remaining sockets.



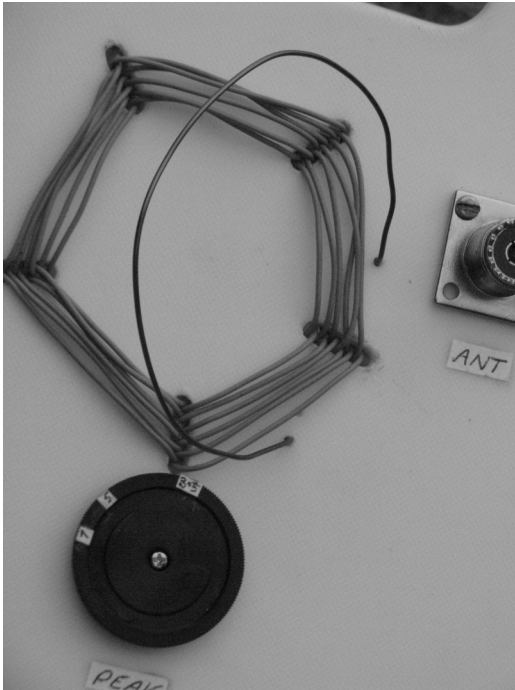
Testing and use

- With an HF receiver find the local oscillator's output. Check that it covers approximately 3.5 to 3.62 MHz when tuned. Vary 220 and 150 pF values if required.
- Connect outside antenna and tune peaking control slowly, listening for AM shortwave stations preferably at night. Reception proves the detector and audio stages are working.
- Listen for noise peaks near both ends of the peaking control's travel. This should be the detector picking up the local oscillator's fundamental on 3.5 MHz or harmonic on 7 MHz. Confirm with a local test signal and then try receiving CW/SSB amateurs.
- Can't tune 7 MHz? Remove turns from the detector coil. Or add them if 3.5 MHz isn't reached. When it's right you'll cover both bands; 11.8 turns on the prototype tunes 3.5 to 10 MHz.
- To use, peak the front end for the correct band, tune in stations with the local oscillator and re peak the front end if required. Moving the antenna coupling loop away from the detector coil sharpens the front end and helps avoid broadcast overload.



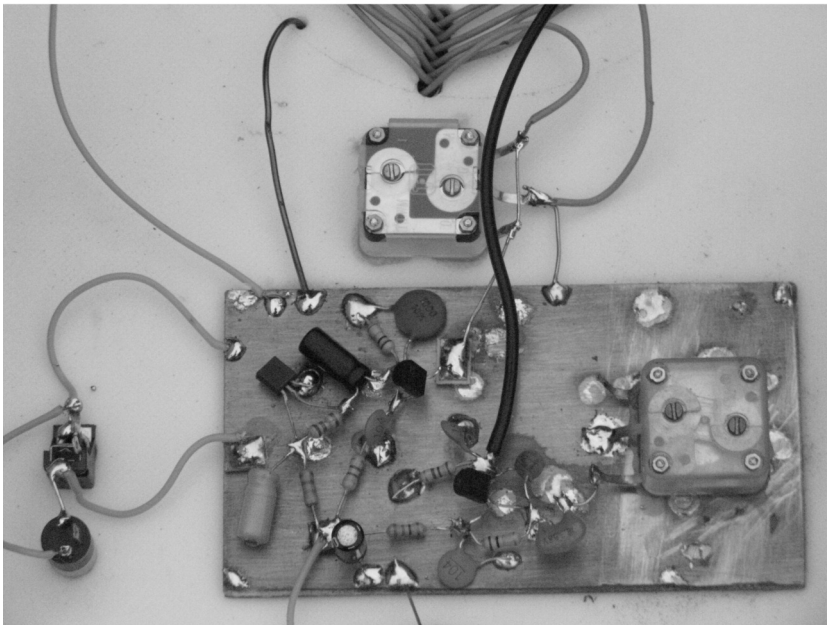
**Underside of
Chopping Board Receiver**

**Showing coil, circuit board
and controls**



**Left:
Detail of Coil**

**Below;
The Circuit Board
(Ugly Construction)**



Universal SSB Generator

David Smith G4COE, 54 Warrington Rd. Leigh, Lancashire. WN7 3EB
davecoe@blueyonder.co.uk

Jandek produced a DSB generator kit that used 10.7Mhz (see Sprat issue 76 Autumn 93, page 25~26 for full details). This is a modified version for 9 Mhz, the SL6270 vogad chip done away with being far too expensive and hard to get, an op-amp vogad is used instead.

Rather than have resistors standing up on end I used the tinier 0.125 Watt types, they make a neater appearance but most importantly no long leads. Some eyes may frown not using double-sided pcb. I feel you get allsorts of added sporadic capacitances that does more harm than good – never ever build VFO's on them for sure except ugly construction style!

One catch, unless someone finds an alternative, there are three Toko coils you need to rewind, the hardest part of the whole project is getting the coils apart, I used KANK333R types with a red core. A direct replacement is the Spectrum Communications 45u0L coil available from Club Sales. There are only two used on the board, the third one being on the ssb filter board.

The whole lot, mic. vogad amplifier, MC1496 balanced mixer, crystal oscillators and the first fet amplifier that drives the balanced modulator all sits on a 4¼ x 2½ inch single sided pcb.

Because of varying filters sizes, the filter and the second fet amplifier was left off the board and its layout left to the constructor. This makes it more 'universal' and adaptable for a wider choice of filters and other filter frequencies. One has just to alter the crystals and the three transformers – no reason why ferrite cores shouldn't be used here, I prefer them being 'tuned' which means using a trimmer capacitor, the broadband types I feel isn't as good in this application, because tuning helps to keep our signal clean and making far better filters.

By building an off-board filter unit we aren't being limited, we could make the filter part of the receiver, a defunct commercial rig ought yield other SSB filter frequencies of varying sizes, we then only need to rebuild the filter board and retune the transformers.

With our 9Mhz signal coming out the filter board we can really go to town... mix this with a 5.0-5.5 Mhz VFO followed by a band pass filter for either 14 or 3.5 Mhz we have a SSB signal ready for amplifying. Nature dictates the 3.5Mhz band will tune backwards in this case.

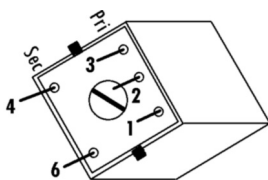
To solve this 'backward tuning' we could build a mixer vfo, not only will this solve our problem it'll enable us to add other bands as well. We could go 'all mod cons' and use a synth vfo module.... who said building an ssb transmitter was difficult?

Building a ssb transceiver sounds like one heck of a task, do it in stages and it's like shelling peas, start off with the basic transmitter then add a receiver. For cw you could key a 9 Mhz crystal oscillator insert it before or after the ssb filter, another way is to key a audio 'ossy' into the mic socket or audio input of the balanced modulator itself depending on it's level.

Only two things to worry about, well three really, setting the signal level, vfo stability and the third..... not ending up in casualty getting them 'Sonnuffa guns' apart to rewind!

Winding the transformers:

Two T1's and one T2 Toko 10K KANK3333R (or Spectrum Communications 45u0L) are required, the hardest part is getting them apart... no reason why you can't get loose bobbins, cut the casing off one to obtain the red coloured cup but it means having some casings handy, the red cup must not be damaged in anyway. We need to remove all the wire on the former before we can start rewinding, in the component section a link is given to obtain an excellent article on rewinding Toko's and how to 'get at them' by G4HUP in pdf format. The wire used must be around 40~38SWG, these can normally be had from relays and transformers. All windings should be done in a clockwise motion. OK, let's identify the pins:-



Primary:
Pin 1 Start
Pin 2 Tap
Pin 3 Finish

Secondary:
Pin 4 Start
Pin 6 Finish

T1 and T3: Primary 1 turn and secondary 16 turns.

With some 40swg e.c.w, bare and tin the ends secure to pin 4 by a single loop and solder, feed the wire to the bottom pile and wind 1 turn feeding this to pin 6, again bare and tin apply one loop round the pin and solder. Secondary windings are always wound first.

Now for the secondary, again secure the wire but to pin 1 this time, feed the wire to the second pile apply 8 turns then feed it to the next pile and wind another 8 turns feeding it out to pin 3, bare, tin and secure as before then solder – that's it!

At this stage I temporarily soldered an 82pF capacitor across pins 1 & 3 and checked with a gdo, no need to put it in its case at this stage but do put the red cup on top! Dipping it at 9Mhz, if all is well put it back into its case. To identify them I marked them with a spot of paint, remembering these two coils the same.

For T2: Primary 8+8 turns and secondary 2 turns.

Wind as for T1 but using 2 turns on the secondary, the only difference is the extra turn.

The secondary is the same but requiring a centre tap. Starting at pin 1 wind 8 turns in the next pile then lead this to pin two – the centre pin, by being very careful we can bare and tin a portion where it loops round pin 2 in a figure eight style to allow us to solder, far better than using two separate lengths of wire, after our first 8 turns have been securely attached to pin 2 we can continue, feeding and winding another 8 turns in the third pile, lead out, tin and secure to pin 3. Just like we did with the other transformers we can now check this with a gdo and an 82pF capacitor after popping a 'Red top' on before sliding the casing on.... That's it!

Important: When winding ensure the wire goes securely into the correct pile and hasn't snagged or jammed on the sides and that there isn't any slack or kinks in the wire, keeping it nice and taut. Ensure the 'Red top' is pushed down firmly before checking and fitting the case. No wax or glue is required anywhere to aid fixing. Pin 2 is only used on T2 for the MC1496.

The tuning range was just beyond 10Mhz and down to about 8Mhz on all coils I wound checking with a gdo, poking the gdo coil through the capacitor leads was enough.

38swg and 40swg wire did the trick admirably. To give an idea of the length of wire needed, 18 inches of wire for one secondary left enough for the ends, have a 'practice wind' first if this is your first attempt... no need to solder the ends though.

The alignment.

First of all with no power, check you have the highest resistance with a test meter between R3 end nearest PR1 and ground by adjusting PR1, turning it the opposite direction will reduce the resistance, this point is common to all the oscillators and gives maximum rf output.

Apply power to the relevant crystal, not forgetting the '+12V always' terminal must be powered as well, check the oscillators are running on a receiver, then with a rf probe or oscilloscope connected to CIO out & TP (test point) peak T1 for maximum output with the 9Mhz crystal. Applying a frequency counter to our TP will now allow us to set the correct crystal frequencies with TC1, 2 or 3 and should be set for CW - 9.0000Mhz, LSB - 8.9985Mhz and USB - 9.0015Mhz, the crystals can be fitted in any order to suit the builder's preference.

The next step is to adjust the drive level at TP with a oscilloscope, RF voltmeter or on a rcvr, adjust PR1 for 300mV RMS or 850mVp-p appx. this may need a 'tweak' should you use the output for the product detector in a transceiver configuration, this point also feeds the balanced modulator via C34 as correct drive level is required for proper operation.

Setting Carrier balance, to begin with ensure PR3 is set to one side of its travel, any side will do. The +12V TX terminal now needs to be powered leaving the other two powered up as well. Now connect an rf voltmeter or oscilloscope to the dsb output terminal near T2 and peak T2 for maximum output with a crystal selected, after T2 has been peaked adjust PR3 for minimum output, this affects the carrier suppression.

Finally, set the microphone level by adjusting PR2 for 71mV rms or 100mVp on pin 1 of IC2. We can apply a 1.5Khz signal to pin 1 of IC2 or a low level signal to the mic. skt.

Condenser microphones require a small dc bias, this is achieved by linking the bias pin to the mic. input pin on the pcb. The overall gain can be controlled somewhat by varying R12 1M ohm resistor, this will vary between microphones. Since R19 is in series with PR2 this can also be used to 'tailor' the audio level to the balanced modulator. We can monitor our dsb signal on a receiver, by hooking a length of wire as an antenna to the dsb output terminal as an antenna.

Now that we have our dsb signal the builder needs to build a filter board for the filter being used. The ssb filter will feed the second fet amplifier, being like Q4 and T3 as the tank. T2 and T3 cater for filters with a 500 Ohm termination. We don't have to use a ssb filter we could transmit dsb but does mean half the transmitted power is wasted through the unwanted sideband - an awful waste!

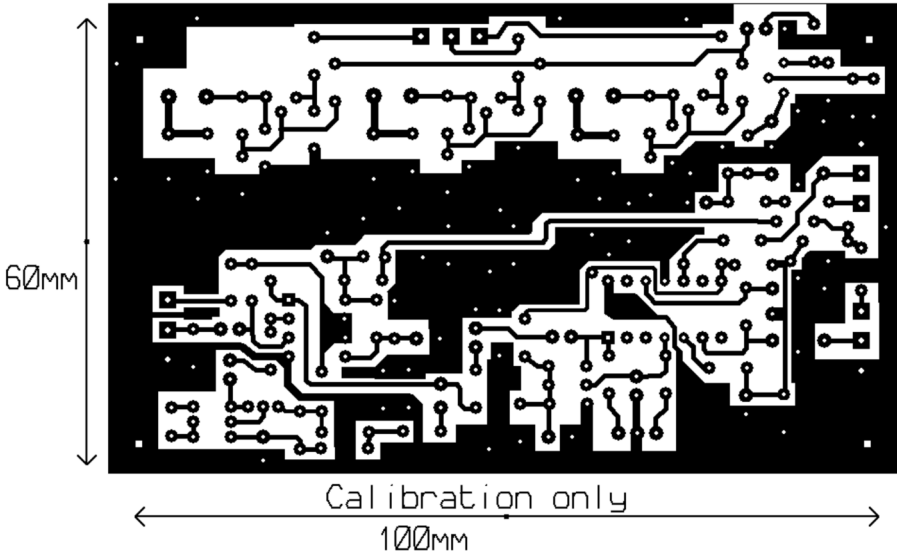
Bits n' bobs.

Three pcb's were made successfully with 'Press and Peel' toner transfer. A link to ground is made on pin 14 of IC2, this can be on either side of the board to aid earthing. J8 link is obviously not required if using a metal screen, I used 0.5mm brass for the screens soldered to solder pins, to aid soldering I applied a tiny bit of solder flux. There 'could be' two problem areas on the pcb caused by 'close passes', this is around the secondary pins of T2 and the tracks between pins 4 & 5 and pins 11 & 12 of IC2. There were no problems resulted when soldered but they are close!

Playing with the crystal oscillators I discovered those polypropylene trimmers were 'yak' regarding frequency stability, same with those mini. Philips ceramic plate capacitors, so I used the NPO disc types and ceramic trimmers here and the stability was far better than those 'poly wobblers' that produced a curious cyclic up and down drift cycle on the frequency counter, we're talking hertz here!

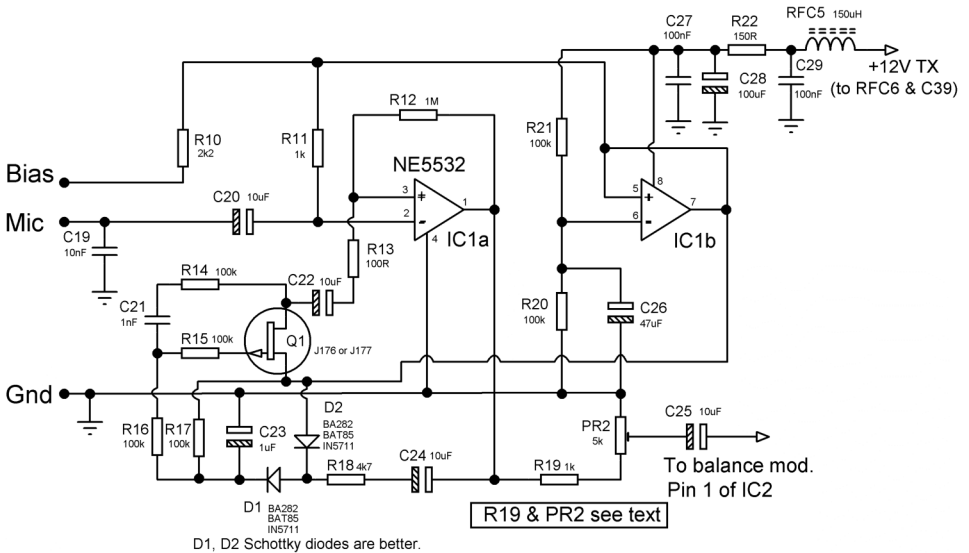
The 'fat resistor looking' 150uH rf chokes aren't critical but don't go below 100uH, finally pins 3,7 and 9 of IC2 MC1496 are not used they're blanks!

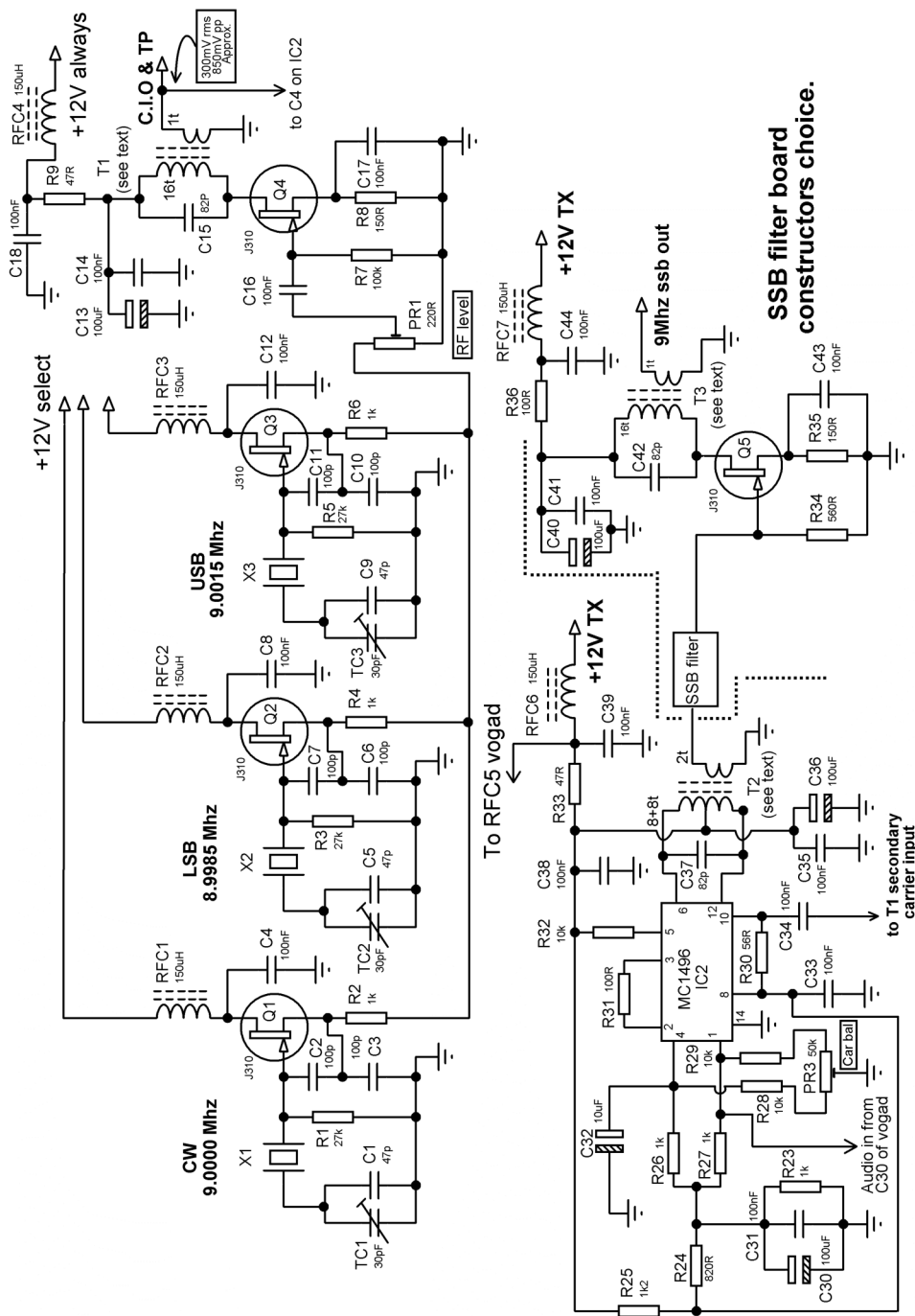
PCB tracking. Viewed from component side.



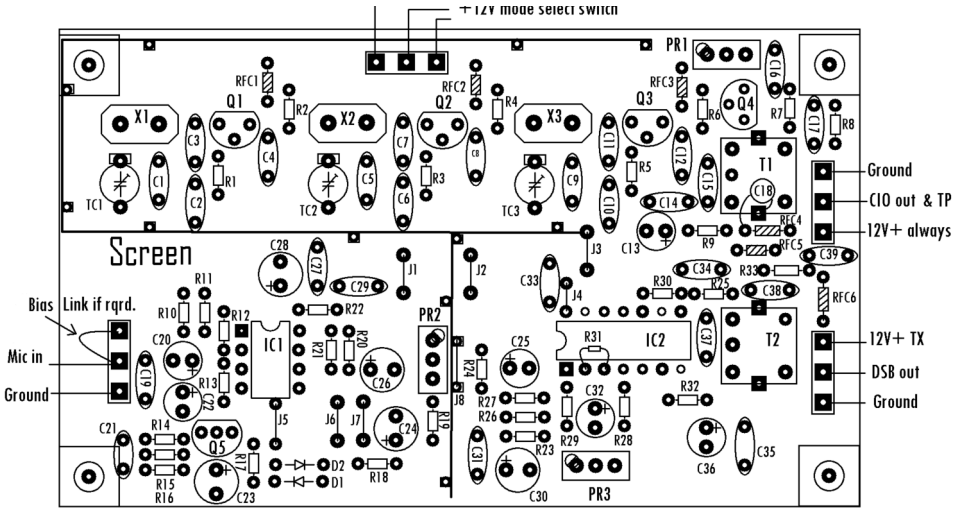
Vogad circuit.

This can be built as a stand alone unit for other uses and powered by a battery. R19 originally was 150K along with PR2 being 1K Ohm no doubt ideal for feeding into a 600 Ohm mic. input socket. In our case R19 is reduced to 1K and PR2 changed to 5k.



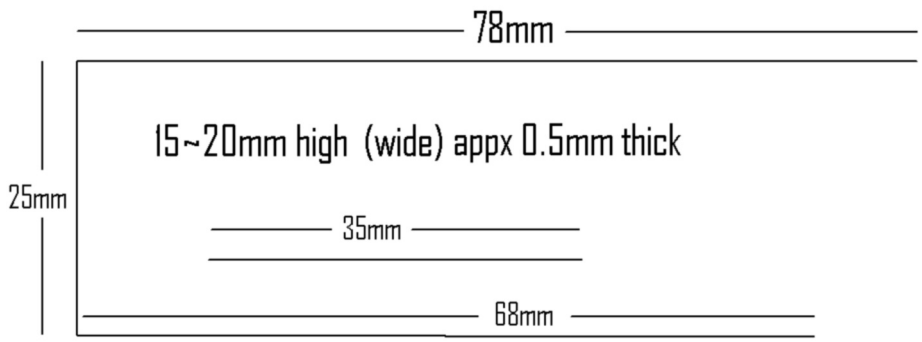


Component Layout.



Screen measurements.

Screen details



Component list:

(For 9 Mhz SSB filter)

X1 - 9.0000 Mhz (CW)
X2 - 8.9985 Mhz (LSB)
X3 - 9.0015 Mhz (USB)

Q1-2-3-4-5 - J310 or J104 (n type fet)
Q5 J177 or J176 (p type fet)

D1-2 BA282/BAT85/1N5711
(schottky are better)

TC1-2-3 30pf Cer. 5mm trimmer
T1-2-3 Toko KANK3333R (or 45u0L)
RFC1-2-3-4-5-6-7 150uH mini axial.

10 turn trimmers in-line pins.

PR1 - 220R (rf level)
PR2 - 5K (af level)
PR3 - 50K (car. bal.)

All caps 5mm Disc cer. (Jabdog)

C1-5-9 47p npo
C2-3-6-7-10-11 100p npo
C15-37-42 82p npo

C4-8-12-14-16-17-18

C27-29-31-33-34-35

C38-39-41-43-44 100N

C21 1N
C19 10N

Electrolytic capacitors 3mm pin spacing.
C13-28-30-36-40 100 uF

Electrolytic capacitors 2.5mm pin spacing.

C20-22-24-25-32 10 uF
C23 1 uF

All electrolytics 16V minimum.

NOTE: Capacitor pin spacing allows them to sit flush on the board.

Resistors mini 0.125W rating.

R9-33 47R
R30 56R
R2-4-6-11-19-26-27 1k

R31-36 100R
R8-22-35 150R
R24 820R
R25 1k2
R10 2k2
R18 4k7
R28-29-32 10K

R7-14-15-16
R17-20-21 100K

R12 1Meg
R22

R34 (filter matching) 560R

38/40swg enamelled copper wire
Solder pins.

Material for screens (if required).

Articles that inspired this project:

Jandek ssb Generator Sprat 76 Autumn 93
(pages 24~26)

Mic vogad: Radio kits and Parts:

For full vogad article see

http://www.radio-kits.co.uk/radio-related/agc_amplifier/index.htm

Thanks to Steve G6ALU at

<http://www.radio-kits.co.uk/>

For allowing use the circuit.

Rewinding Toko coils by G4HUP

PDF file download

g4hup.com/DFS/Rewinding%20Toko%2010k%20Series%20Coils.pdf

Component sources:

Jabdog for NPO caps and Toko coils
Ronlin Electronics for 'Press and Peel' film
Rapid Electronics for 0.125W resistors

PCB Proteus software by Labcenter was used to generate schematics & PCB.

40m Sudden “Italian Style”

Fabio Bonucci, IK0IXI. ik0ixi@ik0ixi.it

Last winter I worked around the famous Sudden Receiver, good DC receiver “*Made in G3RJV*” many years ago but still a nice small and simple way to receive on ham bands. It is still sold by our Club in kit form. I decided to build a Sudden receiver thinking about new comers who joined my Radio Club IQØHL. They are young and I hope to stimulate them about QRP and home brewing.

As you know, Sudden uses well known ICs like the NE602 and LM386 in a very simple schematic, employing the 612’s internal oscillator as “free running” VFO to convert RF energy coming from antenna to weak AF. The LM386 amplifies these AF signals to a good level, usable through small headphones (earbuds) or little loudspeaker.

Sudden employs three adjustable coils but these are not easy to find here in Italy, especially in my junk box... So I made some mods to the original schematic. I like to work with toroids and I own lot of them...Hi!

I used three yellow Amidon cores in both antenna filtering and tuning stages, adding capacitor trimmer to tune each coil. As in the original Sudden, L1 and L2 tune the input of the receiver on the desired band and L3 is the VFO coil to tune the receiver on the desired range.

The best results are possible using a T50-7 core for L3, it is more stable.

I used a 7812 and 78L06 in the supply side. As “final touch” I covered all “sensitive components” connected to pin 6 and 7 of the NE602 with hot glue. This is a simple and cheaper way to avoid thermal variations of the VFO during reception. The receiver results stable enough for easy use and the tuning range is 7000 – 7230 kHz using a 60 pF air variable capacitor.

Have fun !!

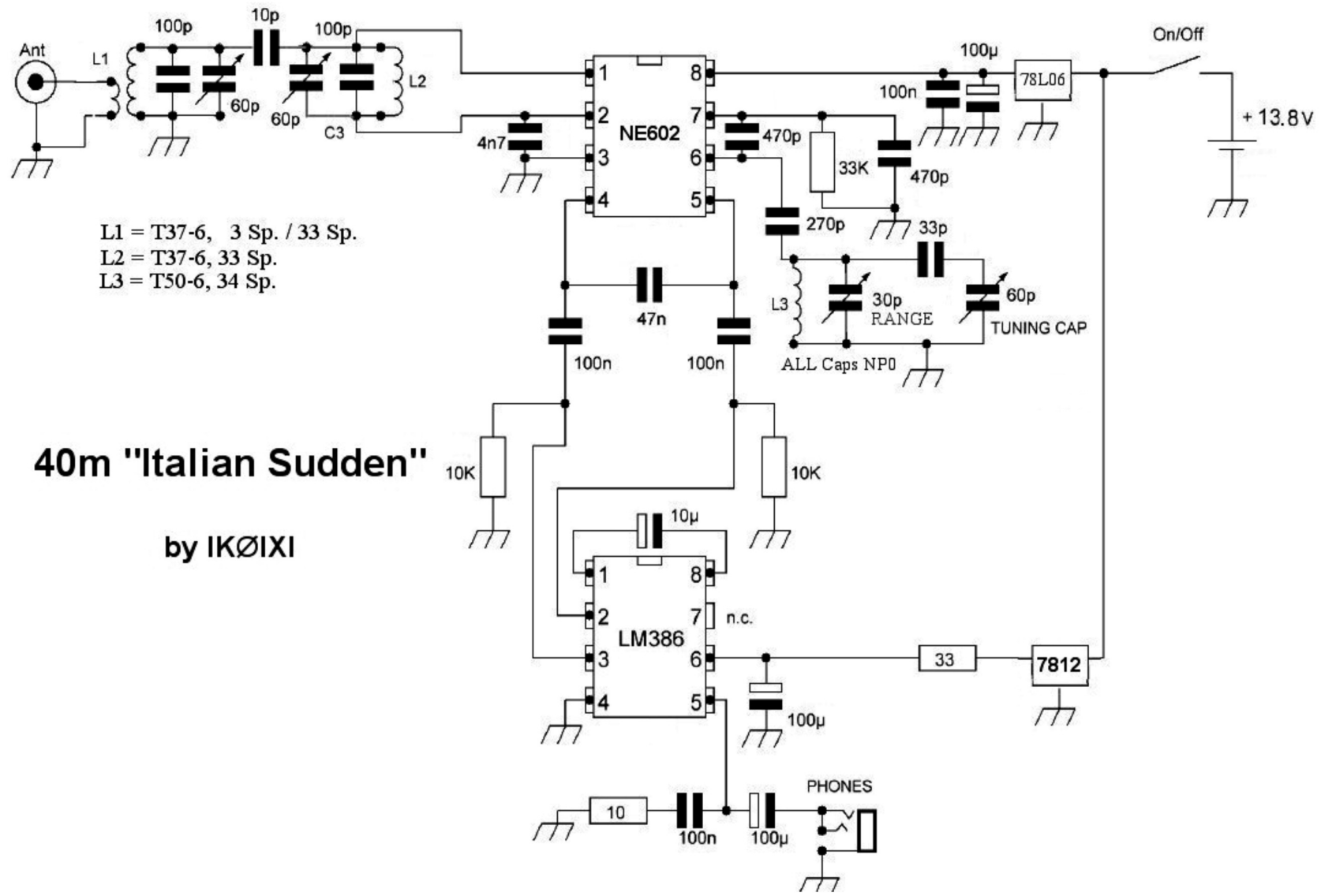
Note from G3RJV:

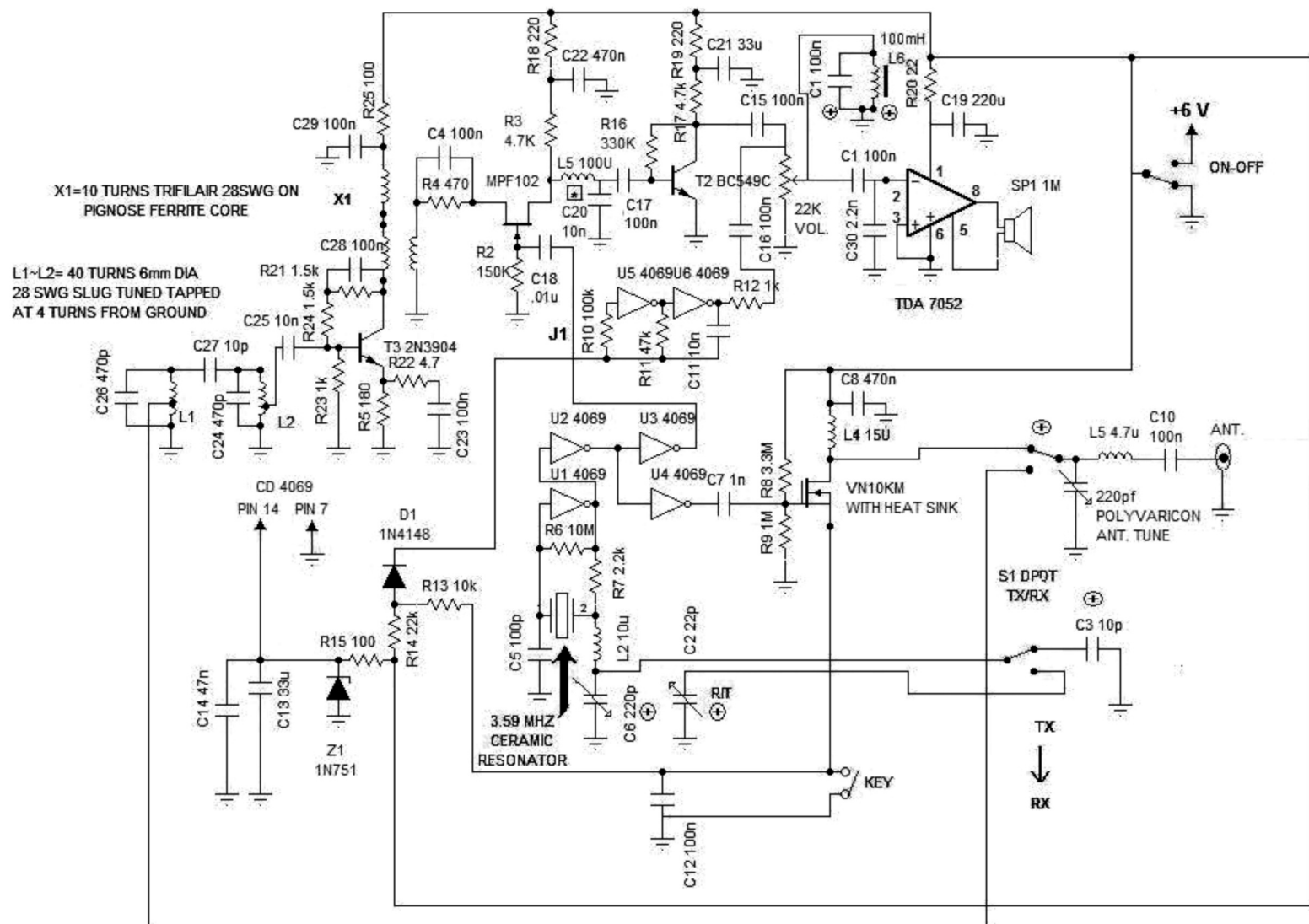
“Limerick style” Sudden receiver kits are available from the club.

See <<http://www.gqrp.com/sudden.htm>>

The club kits are available in 160m, 80m, 40m, 30m, or 20m versions

(The circuit appears in the Centre Spread)





X1=10 TURNS TRIFILAIR 28SWG ON PIGNOSE FERRITE CORE

L1-L2= 40 TURNS 6mm DIA 28 SWG SLUG TUNED TAPPED AT 4 TURNS FROM GROUND

- ⊕ = PARTS OFF BOARD
- ⊠ = PART DIRECTLY SOLDERED TO PCB PADS
- J1 = WIRE JUMPER ON PCB TRACK SIDE
- = INDICATES PHASING OF WINDING

**NANO
TRAVELLER'S RIG**
DESIGNED BY: KANG.K.P.S.

NANO-THE TRAVELLER'S RIG

A DIRECT CONVERSION HIGH PERFORMANCE MINI TRANSCEIVER DESIGN
KANG.K.P.S #409/9 ST.-19A Nr. LANGAR GATE TIBBA SAHEB
HOSHIARPUR PUNJAB. 146001 (INDIA). kangkps@gmail.com

Lately I had a feeling of necessity of an 80 meter portable rig for use during traveling and camping that proved to be the main impetus behind the development of this little transceiver for portable use. As the design was incepted I zeroed my choice for my favorite direct conversion technique for its simplicity added with the incentives of no-nonsense high performance (that of course SPRAT has always been for...!). After all real flavor of QRP advocates doing more with the least possible and I abide it. The design presented here is the final result of the efforts done.

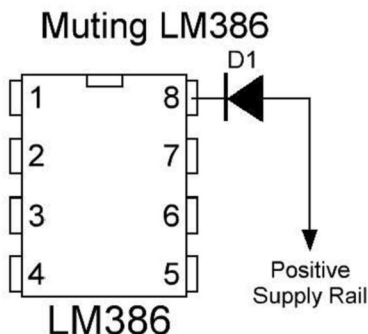
TRANSMITTER: I kept the transmitter section as simple as possible and to do that I used the CD 4069 gates for the oscillator and the driver sections of the transmitter chains. The oscillator uses a common 3.58 Mhz. ceramic resonator VXO that has a wider tuning range than a similar X-tal unit and covers a larger portion of the CW segment of the band. The VXO exhibits excellent stability. A VN10KM provides the final RF amplification and gives some good QRP power for real milli-wattng..!! However you can power the final RF stage from a separate 12 volt power source, if you expect more output. This way you can get about 2.5 Watts out. If you opt to do so mount an LM7806 regulator to the enclosure side to provide a regulated 6 volt to the rest of circuit. So there is considerable degree of flexibility for the varying QRP needs. I have included L5 a miniature molded RF choke to the circuitry that along with a polyvaricon capacitor forms a simple on-board antenna matching unit for long wire aerials. The idea actually came from an old issue of Lo-Key magazine of CW operators club, Australia. You just need a simple field strength meter to tune the transmitter to get on to air. It is simple enough. I have not included any LPF at the output but it can be incorporated if desired. The two spare gates of CD4069 are used to provide a simple type of side tone.

RECEIVER: The receiver is a simple direct conversion type. L1 and L2 form simple pre-selectors. However this simple arrangement proved sufficient to eliminate broadcast breakthrough of the close by local commercials. The stage following it is a famous W7ZOI RF feedback amplifier that ensures a linear input-output impedance and good dynamic performance. I used a simple single, common source JFET as mixer stage. Despite its simplicity it performed extremely well. The output of mixer is amplified to a reasonable level by the proceeding AF stage. A simple CW filter constituted of C1-L6 provides some degree of CW filtering. The idea came from G3RJV. Both these parts sit directly on the volume control terminals on the front panel. And of course my ever favorite TDA7052 provides the final AF amplification. It is chosen because it is quieter, louder and has lesser number of bulky components around it. Consequently, with a smaller foot print it is in-dispensable for QRP designs. The receiver, despite being simple and small; is very hot and sensitive. Even with a small piece of wire as an antenna it is capable of pulling in some good DX stuff. **(The circuit appears in the Centre Spread)**

Muting an LM386 on Transmit

David Rowlands G6UEB, Flat 3, 64 Pelham Rd Gravesend Kent DA11 0JB

A common problem with transceivers with an LM386 audio stage is muting during transmit. At best one can be left with acoustic feedback if albeit only briefly, while the power supply decoupling electrolytic capacitor discharges.



I have discovered a very neat and easy solution to this problem. I claim no originality as I saw it in the schematic of a CB 2 channel 200mW handheld. All that is required is a 1N4148 diode connected to Pin 8 of the LM386 as shown in the drawing. This mutes the LM386 straight away putting an end to those odd squeals when commencing transmission!

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MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

WANTED: Does anyone have an Epiphyte they'd like to part with? I've always wanted to try one out. Looking for the EP3 ideally, but an unused PCB, part made project or anything considered. Please e-mail me at simon@m5poo.co.uk

AUDIO FILTER 1 KHZ (CW) FOR DC RECEIVERS

Frank M. Zequeira CO2IR, RMITA #233 APTO 20, C. HABANA 10600 CUBA
ruben.bestard@infomed.sld.cu

Please Note: This is the article that should have appeared in the last issue, not the RF amplifier on page 3 – G3RJV

I built this Audio Filter for my DC receiver. It is no secret that an audio filter for DC receivers, mainly if you want CW signals, is very important. The following circuit is good for simplicity and no expensive components, but for SSB-CW filter I use another design.

All resistors are $\frac{1}{4}$ watts and not inductive (carbon resistors). The connectors are a BNC but you can use any type. All capacitors are silver mica but polyester is good. The variable resistor (potentiometer) is linear but I use a logarithmic and it is OK.

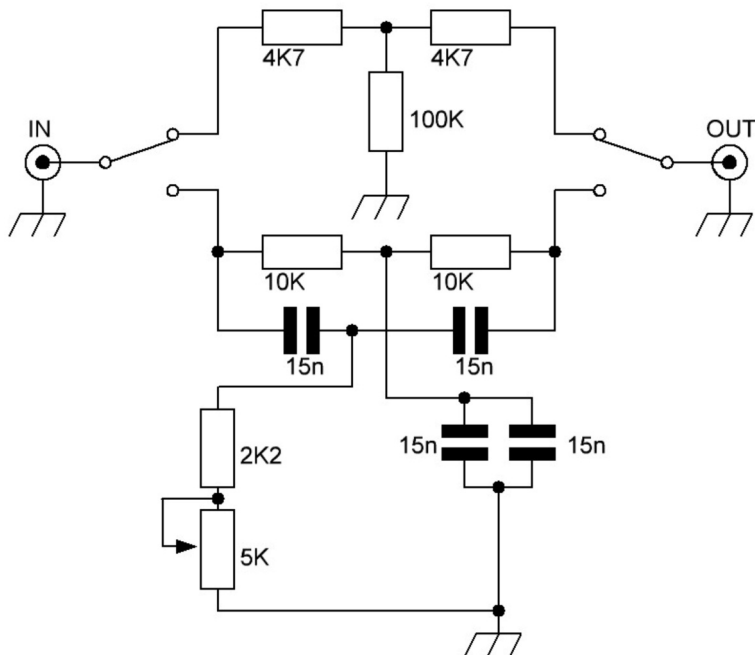


Fig. 1
Scheme Diagram of Audio Filter 1 KHz (CW) DC Receivers.

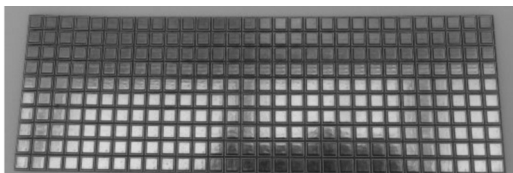
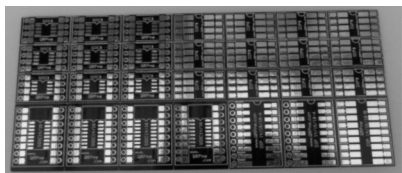
G-QRP Club Sales – a few new deals!

Graham Firth G3MFJ

We have managed to get a few special deals for members.

Firstly, I have bought a large number of 5.262MHz crystals – these are the centre of QRP activity on the 60m band. Due to the large purchase, I can offer these for 50p each to members, and you can have as many as you want!

Secondly, most of you will know about Rex, W1REX's boards for ugly (Manhattan) construction. Here are pictures of each board for the uninitiated:



MePads board – 5¼ x 2¼” – 13½ x 2½cm *MeSquares board – 7½ x 2½” – 19 x 6¼cm*

The MePads board is for mounting DIL, or SMD (SOIC8) parts when using ugly construction. All sections are scored both sides and will easily snap into pieces.

The MeSquares board is for connection points. It splits down to ¼ x ¼” squares – one up to as many as you need.

Rex & I have arranged a deal and I can offer one of each board for only £9.50 – they are normally £6.50 each! This offer does not include USA/Canada members as they can get the same deal direct from Rex (and the post will be cheaper!)

Finally, George has come back from Dayton with a small pile of TFM-2 mixers. These are level 7 mixers – RF = 1 to 1000MHz, IF = 0 to 1000MHz. 4 pins LO, RF, IF & ground. Due to the small quantities a max of 2 per order and the cost is £5 each. A data sheet is available here – www.gqrp.com/tfm2.pdf

Members who don't have access to the internet can get a copy from me – send me a stamped self-addressed (DL sized) envelope. Address on the back page.

All the above are plus postage per order – UK £1.20, EU £2.60, DX £3.80

News for American Members

Tony Fishpool, G4WIF, Membership Secretary

On Friday 8th March, our DX representative in the USA, Bill Kelsey N8ET had a stroke, but fortunately, he was quickly flown to the stroke centre in Columbus. Bill is making a slow but positive recovery. So in order to concentrate on his recovery, Bill will be taking a break from club duties and Dave Yarnes W7AQK will be filling in for him as “our man in the USA”. Dave's address is 12630 E. Cape Horn Drive TUCSON, AZ 85749 USA. Any payments by cheque should be made to “David Yarnes”.

We wish Bill a speedy recovery and also thank Dave W7AQK for stepping forward to help. Those who prefer to pay by PayPal - this is still available direct to the club – see www.gqrp.com/paypaldx.htm.

Antennas Anecdotes and Awards

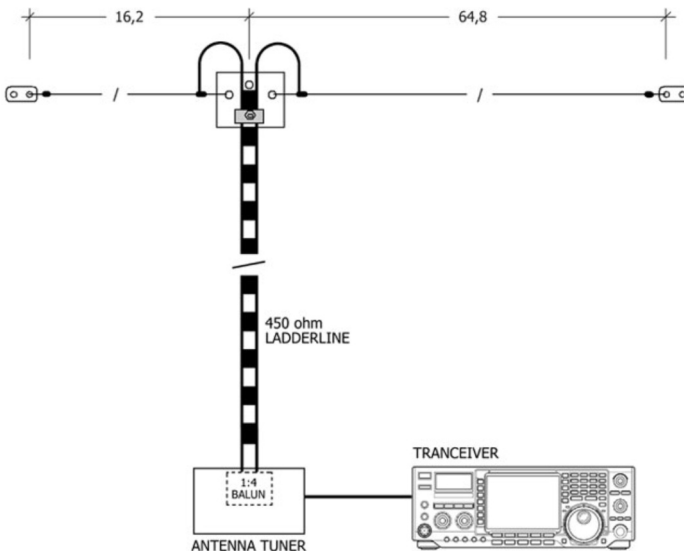
Colin Turner G3VTT

17 Century Road Rainham Gillingham Kent ME8 0BG
G3vtt@aol.com

There's more feedback on the Windom antenna this season along with a portable antenna or two. Read on and take your pick of ideas. Please let me know of any antenna experiences you have and any ideas. Please contact me at g3vtt@aol.com with your item preferably in Word and if you can produce a diagram electronically and e-mail it to me then so much the better. I am indebted to those that have contributed this season.

The Big Windom by MMORKT

I read with interest the feature in the latest SPRAT issue on Chris Baker's 66' OCFD for 40m to 10m antenna. (*Writes MMORKT*). I have something similar but 132' long, and the feed is different. Instead of a 1:1 choke balun at the one-third/two third feed point, I use a 22' length of 450 ohm ladder line terminated at the bottom with a 4:1 current balun which then feeds the coax to my rigs. The current balun is two 1:1 baluns on stacked T157-2 toroids using insulated power cable wire, capable of handling the full power of my K3 when I need it. The advantage for me of this arrangement is that the 22' feeder radiates and gives the antenna a pretty useful vertical section. It also has the advantage of not hanging a comparatively heavy 4:1 balun on the antenna. Some operators have found this arrangement to be noisy, but I don't have a problem, even though I live in a town.



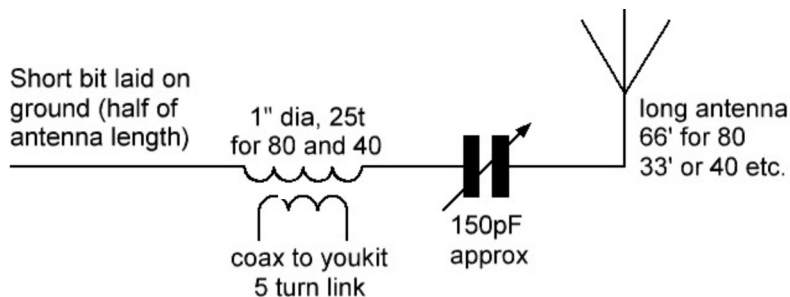
I have further improved the system by including a battery-operated LDG auto tuner at the bottom of the ladder line feeder between the 4:1 balun and the coax feeder which gives me

pretty nearly 1:1 SWR on all bands 80 - 6m in the coax. I hardly ever use top band (because of the noise!) but when I do, I tie the two ends of the ladder line together and feed them against earth through the 4:1 current balun. It works, but the efficiency is pretty poor.

73Bob Towers Hamilton MMORKT Note: The dimensions in the diagram may need adjustment as they show a 160m variant with the dimensions in Meters. This antenna will work on 80m to 10m with the original dimensions of 89 feet and 42 feet and the 22 foot feeder as Bob describes. (I always use feet and inches where possible for antenna work as they are much better by miles and are far more efficient than metric sizes!).

The Paraset Field Antenna

A few months ago G3YVF conducted some experiments at the Bredhurst Receiving and Transmitting Society club site to find the best antenna lengths for the B2 spy set and his You Kits HB1B. There seem to be a lot of the B2 clones around these days with their simple tank circuit and link winding and Geoff concluded the counterpoise wire should be about one eighth of a wavelength if laid on the ground. The antenna itself should be a quarter wave at the operating frequency. Note the link goes to either the B2 output or his YouKits.



The WUOL 2-WIRE 3-BAND GROUND PLANE

My XYL and I spend three months each winter in the Rio Grande Valley in South Texas, (writes WUOL), to avoid the brutal Dakota winters at my home QTH in South Dakota. Naturally I need a simple antenna for my QRP rigs at our mobile home court in Texas. I have had very good luck over the years with elevated ground plane antennae when doing portable operations, usually consisting of a vertical wire pulled over a tree limb and with four elevated radials,

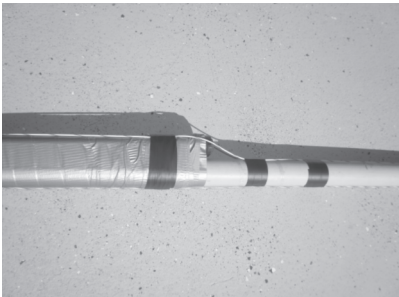
I used this as the basis for my multi-band ground plane. The mast consists of a ten foot and 5 foot pieces of steel antenna mast connected together. These sections are obtained in the States from Radio Shack. The sections have swaged ends to fit together. One top of the five foot section I duct taped a ten foot piece of PVC electrical conduit, over lapped by about five feet. Both of these units have an O.D. of about 1.25 inches. I used quality duct tape not the bargain rolls. Next I duct taped a 13 foot fiberglass extendable fishing pole overlapping by about two feet. The vertical element of the antenna consists of a 15 foot 7 inch wire on one side of the fiberglass pole and down on to the PVC for 20 meters and a 10 foot 6 inch piece of wire down the other side of the pole for 15 meters. Plastic electrical tape is used to fasten the wires to the pole. This is somewhat similar to a "fan" dipole in

concept. The wires interact with each other resulting in shorter lengths than predicted by the $234/f$ formula. I used 18 gauge (US) hookup wire. I started with longer wires and trimmed my way down. My antenna resonated at approximately 14.0 MHz and 21.050 MHz. A bonus was discovered with an additional resonance at 18.090 MHz which would make a nice match for the 17 meter band, but I don't have a 17 meter homebrew rig in Texas to try it.

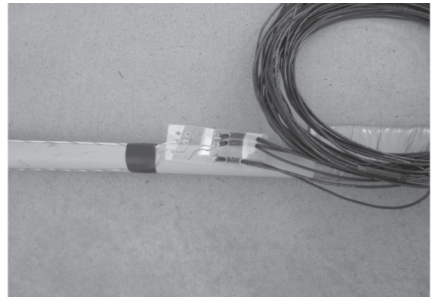
Four radials are used for 20M and 2 for 15M. They consist of 14 gauge (US) house wire and are cut to the $234/f$ formula. The radials all slope downwards towards a variety of supports with the lowest probably 8 feet off the ground at the low end. I used a piece of polycarbonate plastic with appropriate holes drilled in it to make the connect point for the verticals, radials and coax.

The coaxial cable is RG8X and a four turn choke coil about 5 inches in diameter is used right below the junction of the vertical elements and radials. The choke coil is probably not necessary, but I had excess coax.

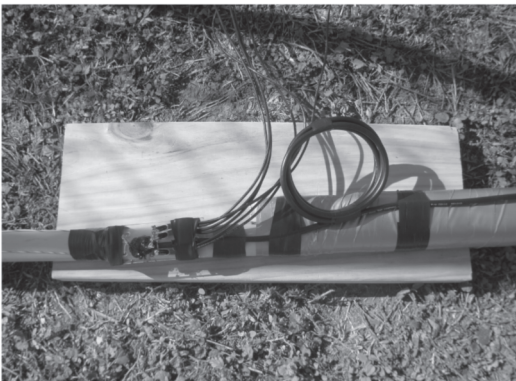
The bottom section of the mast is fixed to the ground with a concrete block and then the top is attached to my shed eave with a "u" shaped clamp. The whole assembly is easily lifted into place by one person. The results have been very encouraging with many, many QSOs all over the USA and Canada, plus the occasional DX in many places in the world, all QRP of course. The antenna survives in a very windy environment here in Texas but I take down when I go home in the summers. The pictures are self-explanatory. This antenna has a very small footprint and is not very noticeable to the neighbors.



Wire Taped to the Vertical



Radial wires in place and stowed



Another view – ready for action!
Thanks to WUOL for this idea which has been seen before but is a welcome and timely reminder with the summer portable season with us. It should prove an easy build with the right materials and an hour or so of time. It could be used as a main station antenna for those in somewhat more confined circumstances.

From Dave G4XNP 'Having returned to amateur radio after a seven year break I needed a multi-band dipole that was effective and value for money. After looking through some back issues of Sprat I found the article by Martyn G3UKV for the ZS6BKW multi-band dipole (Sprat 129) and decided to give it a try. I sourced the wire in my local electrical store. This is grey speaker cable which is easily split and has low visual impact when erected. (100mtrs £13!) I have been looking for some time for a suitable material for the spreaders for the feeder and have come up with a solution that won't break the bank or involve wooden dowels and boiling wax. I picked up some plastic plant labels from my local DIY emporium (£2 for 50). These are cut to size to suit the feed line impedance required, drilled and threaded onto the wires. With the wires held taught and parallel a small dab of strong adhesive is applied to hold the spreaders in place. I have set mine at about 300mm spacing. The antenna has been in place as an inverted vee over the winter and is working very well. My antenna pole may be of interest as it consists of an aluminium scaffold pole as the base with two scrap windsurf masts glued together topped with a section of a fibreglass fishing rod for flexibility in strong winds. The eye in the end of the fishing rod section allows easy raising and lowering for any adjustments. My ideas may not be original but will give an effective and "value for money" multi-band dipole. Sorry I couldn't get the photo in Dave as the editor has only given me four pages but your ideas are very useful and welcome.

More coax...what's he up to now?



Dayton! By the times you read this I will have attended the Dayton Hamvention, my first trip back there is nearly 20 years, and will have met many of our QRP cousins. I hope to bring back some ideas old and new for the next issue. I am always interested in your antenna experiences and invite you to contact me during the summer.



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Valve QRP Report April 21st 2013

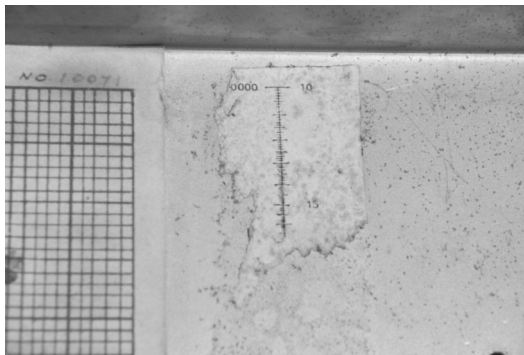
Colin Turner, G3VTT.

Activity seemed less this Spring event and I spent a lot of the day on the 5 MHz band using my one valve transmitter and a 5262 KHz crystal giving 5 watts from a 12A6. Power was derived from 12 volt DC via a transistor homemade inverter and keying was a homemade sideswiper. I also worked on 40m and 80m using the same transmitter and a Drake 2B receiver with a homemade Windom antenna. My most notable contact was to work David G4IPI, back on the air after a 15 year break, for a QSO using his magnificent Yaesu FR100/FL200 twins with not a trace of chirp at 5 watts. It was David who taught me the Morse alphabet one damp Saturday morning over 46 years ago! He has much to answer for.



Hi Colin this weekend I was very busy in EA QRP test after the contest I managed to do 10 QSO with my old but reliable AN/GRC-9 with about 5-10w on low power CW mode, 7 QSO on 30m and 3 QSO on 80m, 2 IOTA call (IM0MA and PA0WRS/p), 3 special event call (IM0MA, IQ5PO and DA0EIM). 5 Italian stations, 2 YU station, 1 QSO with PA, DL, OZ. Antenna is simple 2 band Inverted Vee with coax feed. 72 from Serbia Kare YU7AE

Wyn GW8AWT always drops me line at the time of the QRP Valve Day. He reminds us valve types that many of the simple oscillator rigs used for CW can be quite effectively modulated for AM provided the supply to the PA is reduced by a parallel resistor capacitor network of around 1K and a 1uFd non polarised capacitor to lower the HT from any modulating transformer thereby giving increased modulation percentage. He also states that any RF stage in a TRF receiver should have light coupling and zero gain, (or even attenuation!), to be of any use. *The event was poorly supported, (writes G3MCK), not much activity with G3VTT the only valve station worked. I worked ON, PA0, SM7 and G with my colpa. Finally a plea from G3YVF as Geoff has heard of a 'Paraset' being found in a loft in Italy, this is a real one not a replica copy, and asks if anybody can tell him and the other Paraset enthusiasts what the scale on the upper right-hand side of the picture would be used for. It was found on the inside box lid. Please contact Geoff at gw.woo@btinternet.com as soon as possible. My guess is a logging scale? (See the photograph below)*



The next Valve QRP Day will be November 17th 2013.

COMMUNICATIONS AND CONTESTS

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

As I hope a few others might have experienced as well we have just had our first good weather bank holiday weekend May 26th (in the UK at any rate). The previous one in May I was on a beach but it wasn't that great. I dipped into the CQ WPX contest that was on and had a bit of fun on the Sunday morning totally forgetting for a moment that it is a prefix not DXCC based contest and even though all I wanted to do was test an antenna M1 calls on CW are not all that frequent so a tiny queue of stations was worked over 30 minutes and 27 countries, sadly none were new ones.

As I scanned down the GQRP and SM3CER calander I see the summer has a number of weekends of activity both contest and non contest right through to September. The RSGB is also celebrating it's 100th year and you will hear plenty of 100th anniversary stations on the air and the special event station call Gx100RSGB where x will be a regional prefix can be worked as it moves from club to club about the UK and some will be operating field day style (are you involved in one of them?). This summer it will be going through the different UK regions:

21st May – 17th Jun	7	South Wales
19th Jun – 15th Jul	9	London & Thames Valley
16th Jul – 12th Aug	12	East of England & East Anglia
13th Aug – 9th Sep	6	North Wales

In addition a Notice of Variation (NoV) to licences for those who are full licencees to use a 'V' prefix during July will be available. I do not have details of how you can apply just yet but I'll post them on the reflector when I hear more. If anything like last year when the 'Q' Jubilee and 'O' Olympic prefixes were available you can generate a lot of interest from DX stations with them. It can make any activation that little bit special.

There is a request though please do not use it during the RSGB IOTA contest last weekend in July.

Summer Sizzler

I am especially looking forward to the Augsut bank holiday week at the end of August when the Summer Sizzler will be taking place. I am hoping many memebshr might take part and activate the WARC bands (12m, 17m and 24m) as well as the more usual HF (20m, 30m, 40m and 80m) frequencies.

Graham G3MFJ has just sent me a couple of 60m crystals for the QRP Centre of Activity (CoA) on 5.262MHz and I have been looking at at easy way to modify the GQRP Sudden

RX and TX line up and I hope to have a 60m setup active during that period. I'd like to invite you to join me and lets see how many different stations can be active with only basic equipment. I'll personally offer a GQRP Sudden TX or RX for 60m to the one that includes the most 60m qso during the summer sizzler.

I'm off to Sweden for the last two weeks in June and will be operating /P field day style from EU-037 and other places. Please let me know if you managed to get out and operate somewhere aware from home this summer.

I will also be putting the finishing touches to my own homage to vintage radio with a 1929 Design for a Tuned Not Tuned TX based on a type 27 valve. It is basically just an oscillator, no crystals but big 2" diameter coils and plank construction. I have to key it on a separate table or the frequency varies due to the coils vibrating! I have had some vintage style QSL cards made up for it as well so during G3VTT GQRP Valve day this summer I'll be grv on 80m and 40m. Please see the reflector for date.

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

CW: 1843, 3560, 7030, 10116, 14060, 18096, 21060, 24906, 28060

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

I recommend 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 number 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.

PCB Cutting Tip

Dave Penny, G3PEN (davepennyg3pen@yahoo.co.uk)

PCB, particularly fibreglass and especially the thicker stuff, is notoriously difficult to cut, although as you say one can use snips etc (although only on small or thin pieces, I suggest). I usually have used nibblers, which I bought back in 1959, and still use the original blade (and still have the spare I also bought with it!).

However, cutting long strips, or multiple pieces, is a chore. I have found that a motorised tile cutter, fitted with a diamond-coated blade running in a shallow water bath, not only cuts ceramic tiles beautifully but also cuts all PCB precisely and quickly. I have used the blade last used to finish my kitchen tiling (I only used 2 in total) to cut some 60 feet of PCB so far, and it seems everlasting. New blades are as low in price now as £3, which is very reasonable. At £30 the machine is absolutely essential for tiling work, but just a bit expensive for PCB cutting alone, unless doing a lot. I wouldn't be without it now though.

MEMBERS' NEWS

by Chris Page, G4BUE

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Pulborough, West Sussex RH20 2HJ

chris@g4bue.com



Congratulations to **G3XJS** for winning the RSGB's **G4SST** Award for 2013, announced at the RSGB AGM on 20 April. A new QRP operating event is being organised by **K6BBQ** on 20 July called SYBO (Scorch Your Butt Off!) to take the place of FYBO (Freeze Your Butt Off!) that hasn't been held for several years. Rem has a web page at <<http://www.qsl.net/sybo>> and you can participate from anywhere. **EA5ACA** mentions the EA QRP CW Contest held annually on the third weekend of April.

WA0ITP reports the Four State QRP Group have introduced a new kit, the **NM0S 4S-Link Digital Interface**, priced \$40 at <<http://www.4sqrp.com/kitIndex.php>>. Terry says it is a low part easy to build interface that connects your computer to the digital radio world, and with proper software all sound card digital modes can be employed. **G0UPL** announces a new stand-alone QRSS/WSPR kit **Ultimate2** <<http://www.hanssummers.com/ultimate2.html>>, which is an improved version of the **Ultimate** kit announced last June. New features are a pre-assembled DDS module (no SMD soldering!) to provide output on any HF frequency and a plug-in LPF, which is also available as a separate kit for all nine HF bands. The kit supports WSPR, QRSS, DFCW, FSK/CW, CW, Hell (full speed and half-speed), Slow Hell, and customisable FSK patterns. The price is £17.50 (€20 or \$27 approx) plus shipping.



Left is **IK0IXT**'s new 40m 2W CW single conversion rig. Congratulations to Fabio for receiving Certificate #43 from **RV3GM** at Radio Club 72 on 22 March, the first I station, and for the *Milliwatts Per Kilometer Award* #26, CW Section F (0.16mW per km - 6.21km per mW) on 9 April from the CW Operators' QRP Club of Australia. **M0VVC** built his first VFO on 10 March, featured in *SPRAT* 141, *Temperature Stabilized VFO* by **9A2HL**, originally sourced from *Ham Radio India's* **VU3NSH**. Matt is very impressed with it; only about 20Hz drift per hour and 180Hz overnight. His version uses polystyrene capacitors, air wound inductor and BC549B transistors. Its frequency is 4.174MHz but will adjust this when he has decided on an IF.

M1KTA was /P from Gogamgog Hill (650ft) on 14 April with his kite antenna, which he kept up for an hour, long enough to make two JA QSOs on 15m SSB. Dom says it is a, "Very simple 141ft vertical insulated 18SWG stranded wire and four 33ft ground wire counterpoise. The feed point was about 18 inches above ground into a un:un wound on a T200-2 and, of course, the antenna is grounded via some one megohm resistors before it goes to the un:un. I might go to Beachy Head and try it, and also try a 33ft pole fed over the edge of the cliff allowing a 160m vertical to fall down the cliff towards the water".

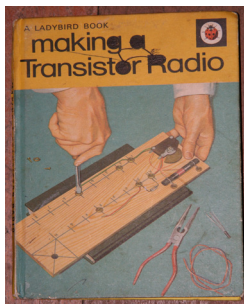
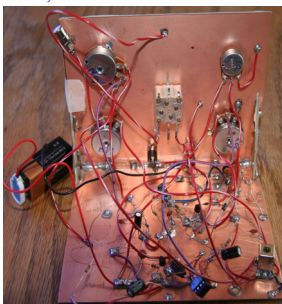
F6HIQ was QRV for ten days in March from his daughter's flat in London. The photographs show Hervé's station (FT-817, MFJ 16010 ATU, SignalLink USB interface and laptop) and antenna (33ft wire sloping from the top of a 20ft pole through the door down to the ATU). Despite poor conditions, Hervé made 20 DXCC using digimodes (PSK and JT65). Back home in France he has increased his QRP DXCC to 124 and says, "I've discovered JT65 mode this year, it's amazing with low power. Watching the PSK Reporter website is magic to see your QRP digi-signals being monitored in VK, ZL, 3D, YB, 9V, KL, CE, W6 etc". Hervé says his next overseas operation will be in the autumn from northern Japan with a JA8 call.



On 9 March **G0UCP** said he couldn't resist reporting that he was the happy owner of a fully functioning Eden DSP module as demonstrated by Ron at Rishworth in October. John writes, "Using the 'Receiver' program simply as a filter-with-gain between the output of a rather average transceiver and the phones, the effect is magical. The change as the FIR filter kicks in is far greater

than was apparent during the difficult conditions of the demonstration at the Mini-convention. Construction was easy enough with a x10 dissecting microscope and homebrew solderwick. Most demanding was getting to grips with PicKit3 and MPLAB.X. Orwell moment was discovering that I love MPLAB.X (XXX...)." **G4GXO** commented, "Just for clarity, John is using one channel of the I and Q 'back end' of the DC receiver program that I put together for **G3ZOH** for use with his Softrock receiver front end. This is an audio application and is not to be confused with the DSP IF system which serves as a low frequency (13kHz) 2nd IF in a superhet system".

GM4XQJ has spent lots of time around 5262kHz and found the following members: **G3ICO**, **G3TLH**, **G3XJS**, **GU3TUX** and **GM3MXN**. **M5AML** has been taking part in the RSGB 144MHz UK Acitivity Contest on the first Tuesday of each month running 5W SSB into either a 3-el wire yagi or a dismantlable short-boom 5-el yagi, both homebrew and indoors. John says he still hasn't got any further than the Isle of Wight but hopes to soon. Outside of the contest he has had QSOs with **2EØCHV/P** on Callow Hill in Salop and **2WØBTR/P** on Black Mountain. His best contacts on HF were **WP4AZT** and **K1ZR** on 15m and **7T9A** and **SV2CLJ/P** on 17m, all with 5W SSB to an indoor inverted vee and ATU.



G4YVM has built **G3RJV**'s Regen RX (above left and centre), recently published in *Practical Wireless*. David says, "Readers might scoff at my untidy build, but this is genuinely deliberate. I wanted to see how a circuit builds into Manhattan style in practice: now I know I shall rebuild the set with shorter, tidy leads! The point is, my radio receiver works and works well. It is a fascinating thing to resolve signals with and most satisfying! Thanks to **G3RJV** and thanks to all the QRPers who gave me advice when I asked stupid questions with this project (like how to wire a polyvaricon!)". David has only recently returned to homebrewing and has just discovered the first thing he ever built, some 40 years ago, was also by **G3RJV**, a crystal set from the Ladybird book that George wrote (above right). He only realised this when he recently found his old copy of the book in his mum's house!

CO2KK sends two tips: "1. Each and every computer monitor that uses a cathode ray tube is the source of three NPN silicon transistors that are located at a printed circuit found at the connection of the base of the CRT. They are useful as QRP amplifiers, at least up to 40 and 30m, due to the transition frequency required to pass the video signal! 2. Many of the more recent UPS units use MOSFET type devices that we are using here in Cuba to build QRP, and in some cases, even higher power linear amplifiers. Also, the Compact Fluorescent Light (CFL) Bulbs circuit boards are a nice source of electronic components, including 1N4007 silicon diodes that are good as high voltage rectifiers and also as variable capacitance diodes. My good friend **AA1TJ**, following a suggestion I sent him, successfully built an 80m QRP rig using the NPN power switching transistors as an oscillator and RF amplifier stage. But be aware that all my efforts to make that circuit design work on 40m, which is the most popular amateur band in Cuba after 2m, have failed so far!".

G4SDW's current project is a 'speccy' to help set up a 1960s style communications RX, for which he is cutting the gears for the dial drive, but says, "Some of that might just remain a pipe dream!". Gareth has also built a capacitance meter and a transistor tester, and last year 'knocked together' a Vibroplex keyer (photographs below). He copied the dimensions but otherwise made it from bits in his junkbox.

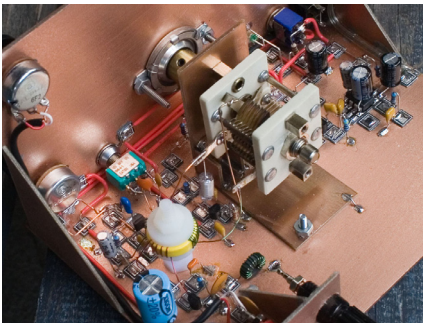


G4CUS sends the sad news that **MØNLD** (12140) became a Silent Key on 4 November following a brave battle with cancer. **G4GXO** became QRV again in March when he put up a stealth antenna comprising an insulated wire run behind the plastic guttering of his house extension just 10ft high and tuned against a counterpoise by a Smartuner inside the integral garage. Ron says from the outside there is no evidence there is a radio station lurking in the house but in just a few days of casual operating this ad-hoc arrangement has taken him across Europe and into North America! His interest in operating rekindled, Ron decided to build a new software application for the Eden dsP card to create an outboard filter unit for his FT-817. This will comprise a mono audio input with banks of low pass and high pass filters selected by rotary encoders followed by an LMS de-noiser, an auto-notch and 'stereo code' output to spatially spread CW audio. He says, "Most of the code already exists for this, it's just a case of stitching it all together. I'm wrapped up in another project at present but once this is out of the way I'll turn my attention to the filter project and, of course, post the finished software onto my site once it is all working". **MØGGK**, <dave.2e0ncb@blueyonder.co.uk> has been experimenting with a **W3EDP** end fed antenna and is wondering what experience other members have had with it?

NA5N's Desert Ratt RX design intrigued **AA7EE** to build one (photographs right) and finds it a useful little RX for listening to the SW BC bands. Dave says, "It doesn't do well with SSB/CW but it's quite good at AM. I do enjoy my more sophisticated receivers, but there's something about plucking signals out of the ether with a handful of parts that is fun!". **G4YVM** borrowed a You Kits HB1b four-band 4W CW TCVR from a friend and was very impressed with it. David says, "Ergonomically it is like a K1 and so much nicer to use than an FT817 that it makes the 817 look like a dinosaur!".



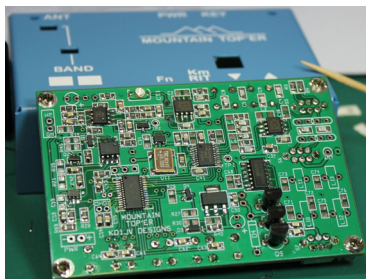
M3KXZ had a nice surprise on his way home from work on 28 February when he heard **LU7YS** calling CQ on 10m CW. Apart from the pile-up for **XT2TT** the band was otherwise 'dead quiet' but Pete called and easily exchanged reports. He says, "Just goes to show, as usual, that it's worth giving quiet bands a chance". **GM4XQJ** had a surprise on 10 March when he QSO'd **9M4SLI** (Spratly Island) with his first call on 15m CW using his K2 at 5W to a three element yagi, and **G5CL** QSO'd **VK2BJ** with his first call the previous day on 20m in the BERU Contest using his K1 at 5W, and a VP9 later for an all-time new DXCC. The following day Ryan QSO'd **9K2/SP4R** for a new 12m DXCC.



GØUCP agreed on the good condition for this year's BERU Contest when he QSO'd 16 VE stations and VU2, C4, 9H, J8 and ZF2 with his 1W from a SoftRock to a doublet on 20m. John says a bonus was a BV7 just after 11pm. He finds there are often useful diversions during a contest; two years ago a JT station turned up as a welcome change in BERU.

IZ5ZCO used his FT-817ND and 10ft whip antenna tuned with a LDG Z-817 in April/May to make SSB 5W QSOs with W1 (20m), JA (17m) 9M2 (15m) YB (12m) and ZS (10m). **MM6ISM** (**MMØIMC**) has been QRV with a FT-817ND from home and /P from WAB squares. Ian has made "numerous contacts" into North and South America on 5W SSB on 20 and 40m, plus **VK3MO** on 20m and PA on 10m with 500mW, using his inverted vee fan dipole. **2EØSDR** says the new **G6LBW** Si570 based VFO with automatic LP and BPF switching is now available from DX Kits.

GØODP has been building **KD1JV**'s Mountain Top'er two-band 5W HF rig (right). Paul says, "It's a limited edition, micro-processor controlled CW rig about 2.5 x 3.5 x 1 inches, mainly surface mount components and definitely not for the faint hearted. Note the tooth pick for gradual placement of the ant sized parts in the photograph". **PU2CLR** says those who liked his youtube video *Magnetic Loop Antenna Controlled by Arduino and Infrared* may also appreciate his latest one *Arduino, IR and Encoder controlling Magnetic Loop Antenna Tuner* at <https://www.youtube.com/watch?v=zD-wKD19_8U>. Ricardo has inserted an encoder to increase the possibilities to handle the antenna



tuner. He also switches a Steppir Motor to a Servo. He posted another video on 26 March, *QSOs with Magnetic Loop Antenna* showing him making QSOs with **EA2ACK** (4964 miles) and **PU5DUD** (451 miles) with his FT-817ND at 5W, <<https://www.youtube.com/user/pu2clr/videos?view=0&flow=grid>>.

Right is **GM4JMU** using a newly rebuilt HW9 (new VFO/transmit amp and IF filtering) and his 40m 4W separates, Stockton power meter head (to Zetagi meters) and a latching antenna change-over system. On 19 May **DD0VR** was due to be QRV with his wife **DE3BWR** from IOTA EU-017 and in June from EU-31 with CW/SSB QRP on 20m. They will be QRV 21 September/4 October from S5, YU and Z3.

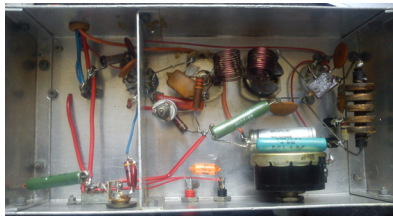
On 14 March **WB3AAL** found his favourite band 15m open to Europe and QSO'd **M0PNN**, **OH2BBT** (two-way QRP), **IZ0CCD** and **HA8LTQ**. The same day **M3KXZ** QSO'd **ZP6CW** and **W8NZW** on 10m CW with his 5W on his way home in his jeep, and on 20 March QSO'd **KC4ABC** and **WB2KSP** on 15m. On 3 April Pete QSO'd **LU2HGF** and **CE2AWW** on 10m CW with his 5W and on 10 April QSO'd 22 year old **YL LU2FLB** on 10m with 5W SSB and then 99 year old **W4AJT** on 15m 2.5W CW. He says, "It's great to see how this hobby can be enjoyed by people at both ends of the age spectrum, and all in between". Finally a morning/P session from Rottingdean Beach on 14 April gave Pete a QSO with **VK4ZD** on 20m with his 2.5W SSB and 16.4 feet long Rascal Clansman whip antenna fed against a 10 feet wire counterpoise. **G3YMC** QSO'd **JF1SQC** on 20m in the JADX Contest and heard **JA7NVF**. Two years ago in the same contest he easily worked him with his K2 at 1W but this year, despite loads of calls, he got nowhere. Dave says a web search shows **JA7NVF** has a, "Pretty monstrous antenna array but it didn't do the job today. He seemed to be asking for loads of repeats so perhaps it shows how poor conditions were. They keep saying the solar maximum is about to come, but it never seems to...".



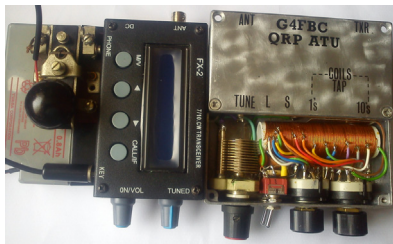
G4FBC recently found his very first homebrew TX (right) built when he was an electronics apprentice! Ron says the 10W 10m CW TX was from a 1975 **G3OGR Short Wave**



Magazine, has two 5763 valves in an xtal osc/doubler/PA line up and, despite the dust, works as good as new! Ron also made the **G3EJS** QRP ATU from *SPRAT* 123 (right) to use with his newly aquired LNR FX-2 40m/30m CW TCVR with a mini morse key to complete the setup for /P work.



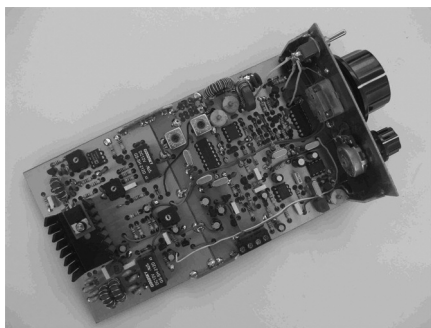
Finally, a report from **DL2BQD** about the DL QRP Convention on 27/28 April in Waldsassen City. One of the well attended lectures is shown below, but lack of space prevents Dieter's other photographs and reports being published this time. I will hold them over for the next issue of *SPRAT*.



Please let me know how your summer goes for the autumn edition of *SPRAT*, in particular what you have been building, who you have been working, and any other information, news, ideas, suggestions or



opinions about QRP, by 20 August 2013. Also interesting photographs please, so don't be shy in letting members see what you have been building and/or where you have been operating from, your antennas, who you have been meeting and even a shack photograph to let other members know what you look like! Let me know if you intend operating from somewhere other than home during the autumn and winter, so I can members know to listen out for you.



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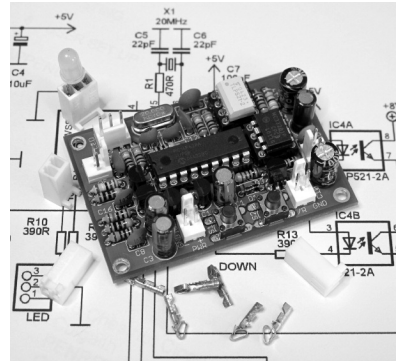
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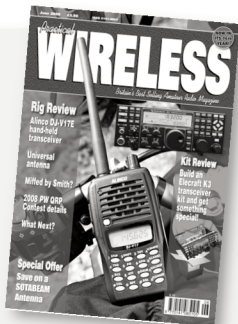
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– 2 gang – (both 8 to 295pF) c/w shaft extension & mounting screws – £1.40 each	} £3.80p (DX)
Pair LSB/USB carrier crystals HC49U wires - [9MHz ± 1.5kHz] £4 pair	} All components
HC49U (wire) crystals for all CW calling freqs – 1.836, 3,560*, 7.015, 7.028, 7,030*, 7.040, 7.0475, 7.122, 10.106, 10.116*, 14,060*, 18.086, 18.096, 21.060, 24,906, & 28,060 all are £2.00 each (* = also available in low profile HC49/S)	} plus postage
HC49U crystals- 1.8432, 3.500, 5.262, 7.00, 7.159, 10.006, 10.111, 14.000MHz – 50p each	} (ANY quantity)
HC49U crystals – 2.00, 3.00, 3.20, 3.579, 3.5756, 3.5820, 3.6864, 4.0, 4.096MHz	} £1.20 (UK), or
4.1943, 4.433, 5.0, 6.00, 7.20, 7.6, 8.0, 10.0, 11.0, 12.0, 13.50, 15.0, 16.0, 20.0, 24.0, 25.0, 27.0, 28.0, 32.0, 33.00MHz – all 35p each (Some of these are low profile types)	} £2.60p EU, or
Ceramic resonators – 455, 480kHz, 2.0, 3.58, 3.68, 4.00, 14.32 & 20.00MHz – 50p each	} £3.80p (DX)
Diodes - Schottky signal diode – 1N5711- 20p each; 1N4148 GP Si – 10 for 10p	} Post free
Varicap diodes – MVAM109 – 40pF @ 9v, 500pF @ 1v. 50p each } max of 2 of	} if ordered with
– MV209 – 5pF @ 12V, 40pF @ 1V 35p each } each per member	} with heavier things
SA602AN – £1.50 (note – I may supply NE or SA, 602 or 612 as available. All are <u>fully</u> interchangeable.)	} like binders.
MC1350 – £2.00 These are getting in short supply now so max of 2 per member	} toroids.
PICAXE-08M – 8pin – £2 each; CA741 op-amps 8pin DIL – 5 for £1	} polyvaricons
LM386N-1 - 4 to 15v, 300mW, 8pin DIL - £0.40 each	} or filters
LM386M-1 - 4 to 15v, 300mW, 8pin SMD [0.2" (4mm) x 0.25" (5mm)]- £0.35 ea	} Use just
TDA7052A - 4.5 to 18v, 1W 8pin DIL low noise & DC vol control – £0.60 each	} that
TA-7642 Radio IC – direct equivalent of MK484 (& ZN414) – 75p each	} postage
2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO +40V - 5 for 50p	} if ordered
MPSH10 transistors (npn) fT - 650MHz, hFE 60, VCEO 25V - 8p each	} with books
2N3904 transistors (npn) fT - 300MHz, hFE-150, VCBO +40V - 10 for 50p	} or CDs
2N3906 transistors (pnp) fT - 250MHz, hFE-150, VCBO -40V - 10 for 50p	} add this
FETs - IRF510 – 50p; 2N3819 - 17p; 2N7000 - 10p; BS170 – 8p - all each	} postage
Pad cutters – 2mm shaft – 7mm o/s, 5mm i/s diam – 5mm pad with 1mm gap £5.75 each	} as books
10K 10mm coils – 1u2H, 1u7L, 2u6L, 5u3L, 11u0L, 45u0L, 90u0L – all 80p each	} or CDs do not
Magnet Wire – 18SWG – 2 metres – 60p; 20 & 22 SWG – 3 metres - 60p;	} travel well
24, 25 & 27SWG – 4 metres - 40p; 30, 33 & 35SWG – 5 metres - 30p.	} with parts.
This 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)	} Postage
Axial lead inductors (they look like fat ¼W resistors) these are low current – a few hundred mA	} as for
4.7, 6.8, 10, 15, 18, 22, 33, 39, 47, 56, 100, 150 and 220 – all uH and all 18p each.	} components
Toroid Cores – priced per pack of 5 – max of 2 packs of each per member	
T25-2 – 50p, T25-6 – 60p, T30-2 – 60p; T30-6 – 70p; T37-2 – 75p; T37-6 – 80p; T50-1 – £1.00; T50-2 – 90p;	
T50-6 – £1.10; T50-7 – £1.20; T50-10 – £1.20; T68-2 – £1.80; T68-6 – £2.20; T130-2** - £1.50ea; T130-6** - £2.00ea. FT37-43 – 80p;	
FT50-43 - £1.20; FT37-61 - £1.20; FT50-61 - £1.20; FT140-43** - £2.50 ea; FT140-61** - £2.50; BN43-2402 - £1.20; BN43-202 - £2.00; BN43-302 - £2.00; BN61-202 - £2.00. Ferrite beads – FB73-101 (3.5mm dia x 3.2mm long, 1.2mm dia hole) – 40p for 5	
All toroids are plus postage – up to 5 packs = £1.20 (UK), £2.40 (EU), £3.50 (DX). Each additional 5 packs, please add 50%	
** Except ** items – they are heavy and each counts as 2 packs (ask for quote if you want more than 2 of the large toroids)	
SBSS PCB clamps – single - £12, two - £20 all plus post (£2.80 UK & EU : DX – order direct from Rex please)	
MeSquares & MePads – £6.50 each plus post (£2.80 UK & EU : DX – order direct from Rex please)	
(SEE DEAL in Sprat 155 – one of each board for £9.50 plus post – limited time offer!)	
Limerick Sudden kits RX (160 through 20m); TX (160 through 20m); ATU (80 through 10m) £36.00 each plus post	
UK - £2.80, EU - £5.20, DX - £7.80	
Sprat-on-DVD – 1 to 148. Only £4 each to members plus postage, UK - £1.20, EU - £2.60, DX - £3.70	
Sprat Binders – nylon string type – Black with club logo on spine -16 issues per binder – new stock - £4.75 each plus postage (one: UK - £1.60, EU - 3.00, DX - £4.00. More - add £1.10, £1.50, £2.50 each)	
Cheques (UK) and <u>payable to G-QRP Club</u> . Sorry, but cheques in other currencies are uneconomical to us due to bank exchange charges!	
MINIMUM ORDER for cheque or PayPal payments is £5 For orders less than £5 – please use postage stamps (any denomination) - any quantity of stamps is OK, or cash. 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 g3mfj@gqrp.co.uk – and pay us in GBPounds and you MUST include your membership number and address please.	