SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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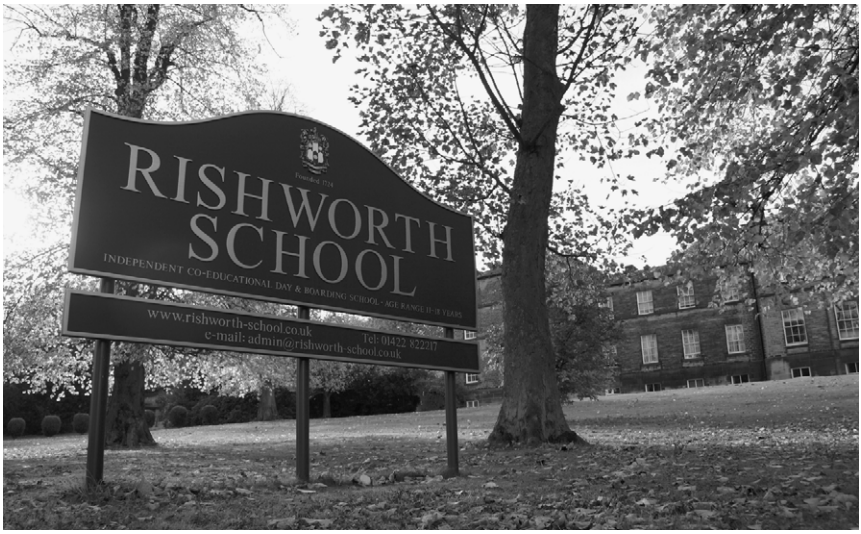
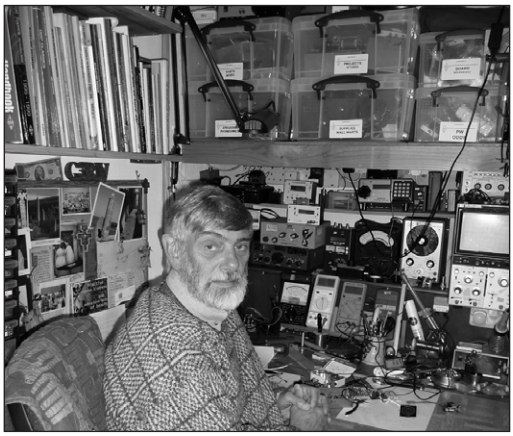


BOOK THE DATE

We are back at Rishworth on Saturday October 23rd

TDA7052A ~ Active Loop Antennas ~ SDR Vapourware Preview
KISS DC Receiver ~ JOTA-40 Superhet Receiver ~ FT817 Bracket
Down Lighter Key ~ Moxon to MMANA-GAL ~ Uses for Tie Wraps ~
Who says our Hobby is Expensive ~ New Tuneable Coils
Bath Buildathon Contest ~ Membership News
Antenna – Anecdotes – Awards ~ Communications & Contests
Member's News ~ Club Sales

JOURNAL OF THE G QRP CLUB



Rev. George Dobbs G3RJV

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I begin with a warning – **this could be your last issue of SPRAT**. Read Tony's [G4WIF] Membership News column. But, naturally, I know you have paid your 2010 subscription! Our subscription rate has been the same for more years than I can recall thanks to the hard work of club officers. Here I must mention the diligent work of Graham, G3MFJ, in his role as Club Sales Officer. The Club Sales are designed as a service to members and our mark up on the prices of what we sell is very low but it does help to maintain our low subscription rate. In addition Graham and Tony have put a lot of time into the production of the SPRAT CDs; another substantial way of offsetting what you have to pay to be a member of the club. On your behalf, may I thank both of them.

72/3

G3RJV

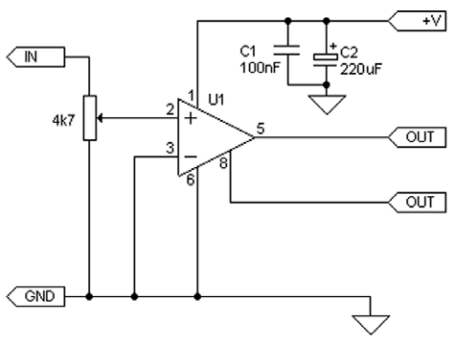
The W1FB Memorial Award 2009/2010

The project is to **Design a QRP station (transceiver or transmitter – receiver combination) using a minimalist approach. Produce a log of 10 QSOs** Significant improvements on existing designs could be accepted. Please submit your design to G3RJV by the **end of March 2010**, with circuit diagrams, all values and brief notes.
The projects will be published in SPRAT and the winner will receive an engraved plaque.

Printed & Distributed by G QRP Postal Mailing

Try the TDA7052A

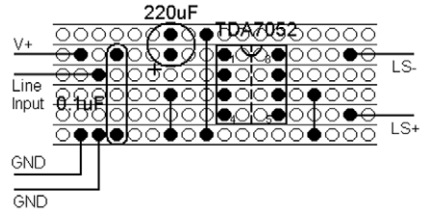
George, G3RJV



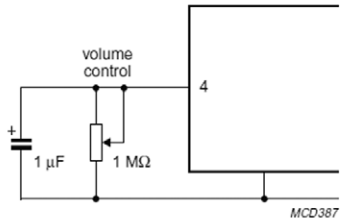
Many of our QRP designs use the LM386 as an audio amplifier. Recently there was some discussion on the club internet list about the TDA7052A.

The TDA7052A and TDA7052A/AT are mono amplifiers with DC volume control. They are designed for use in TV and monitors, but also suitable for battery-fed portable radios. The TDA7052A offers much better noise figures and stability than the LM386 with no external parts except two decoupling capacitors on the power line. It does offer somewhat less voltage gain than the LM386 (about 35 dB).

The club has bought a stock of the devices and I tested one recently using the basic circuit shown above and a veroboard layout suggested on a webpage.



It did prove to be much quieter than the LM386. One slight disadvantage may be the balanced output for the speaker that requires both output lines to be above ground; if jack sockets are used both sides would have to be isolated from any metal casing.



Application with potentiometer as volume control; maximum gain = 30 dB.

The test circuit does not use the DC volume control facility. This is shown on the left from the device datasheet. The input goes to pin 2 and the DC control is applied to pin 4.

The TDA7052A is available from Club Sales at 60p each – see the back page for ordering and postage information.

The G QRP Club Rishworth Convention 2010

We can now announce that the convention has been booked for Saturday 23rd October at the Rishworth School opening at 10am Further details will be announced in SPRAT and on the club website.

ACTIVE LOOP ANTENNAS

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i7swx@hotmail.com

Readers will remember the Active Loop Antenna article published in SPRAT - Summer 2008 by Des. Kostryca, M0AYF - "A Wide Bandwidth Active Loop Receiving Antenna". It was a long time I was wanting to experiment an active loop but never had the time. Following the article, at my Radioclub (ARI Sezione Cassano delle Murge - IQ7MU) we decided to do something for the SWL and also for those OM going QRP.

I assembled two types of loop antennas, one Hula-hoop and one Square Loop. I used the same basic design as in SPRAT but winded the transformer on a ferrite balun core and used two BFR96. For the remote control also used available components from my super-junk-stockroom...

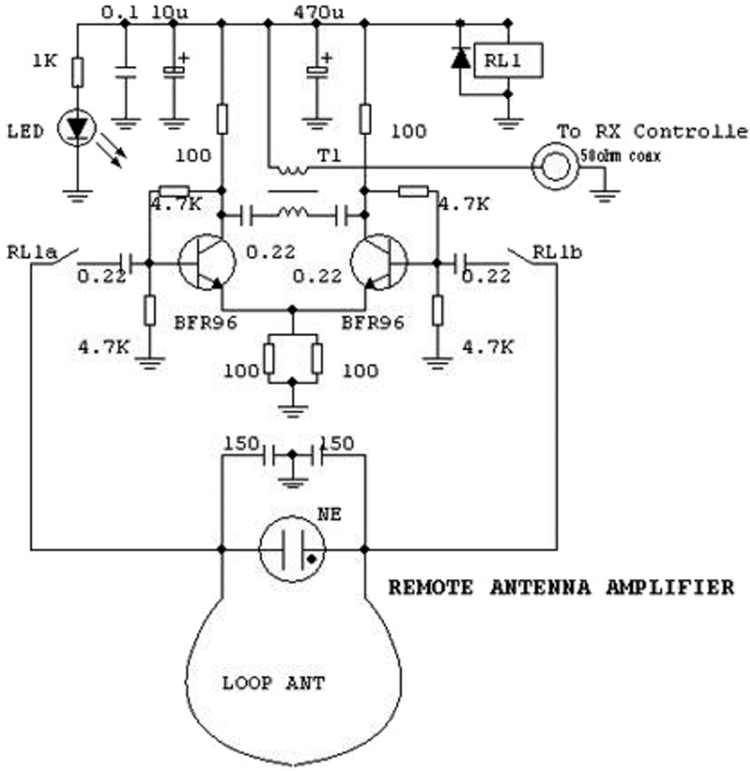
Pictures are showing the two loops, one of the amplifier and the remote power control. I published an article in Italian in our national ARI Radio Rivista, October 2009.
The loops are made of PVC, the Hula-Hoop uses one hula-hoop like the ones I bought for 3 of my YL grandchildren; the square one uses pipes and accessories for electrical conduits used in external installations. The electrical loop is made of electric pvc covered wire. The loop length is different between the two, being larger in the square one.
A comparison was made by a broadcasting SWL, Paolo Quintavalle from Bari, between the Hula-Hoop Antenna and an old active ARA 30. He reported comparison reception between the two antennas on same station, at the same time. The Table was published in my Radio Rivista article.

The article did wake-up a lot of interest from SWL and OM. Certainly the use of a 5GHz Ft transistor may help to have interesting gain in the V-UHF bands and bringing in spurious signal. I had no time to experiment with bandwidth reduction (LF to HF) but one of the hams that built a copy did found out how to limit bandwidth. .Roberto Della Torre, IZ2FOB, added two 150pF capacitors at the loop feed point. These are included in the present circuit diagram. The improvement in noise and spurious signals (certainly from high power TV and FM radio) is quite detectable.

The square loop is build for portable use and it is dismountable. It is possible to use plastic pipes for hydraulic and central heating.

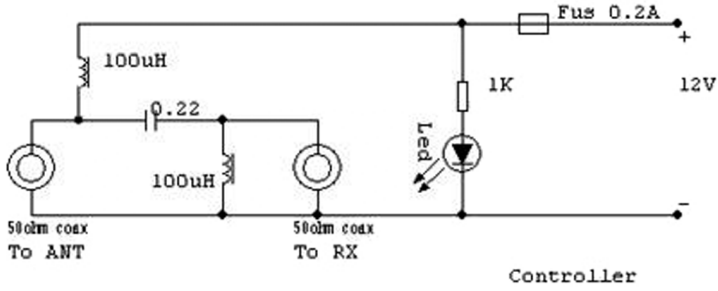
For those interested in more details I suggest to download the article proof copy with several pictures showing particulars. Sorry for the article being in Italian language but pictures are internationally understandable.

Please visit:
<http://www.hamradioweb.org/progetti/I7SWX%20ActiveHoolaHoopAntennaHamradioweb.pdf>



T1= 10 Turns Bifilar winding on balun #43-2402

The 2 x 150pF Capacitors limit the loop BW (F max)
as suggested by Roberto, IZ2FOB

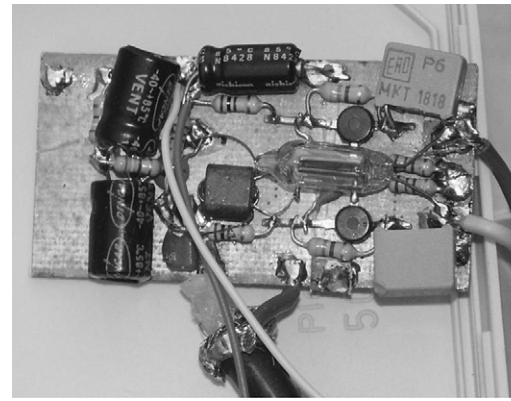


I7SWX - ACTIVE HULA-HOOP RX ANTENNA

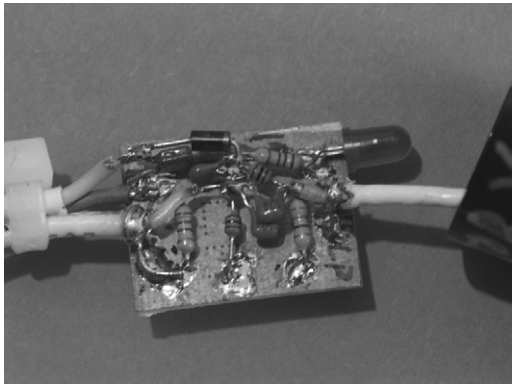
Gian - I7SWX
March 2009
Rev Oct 2009

I7SWX Pictures

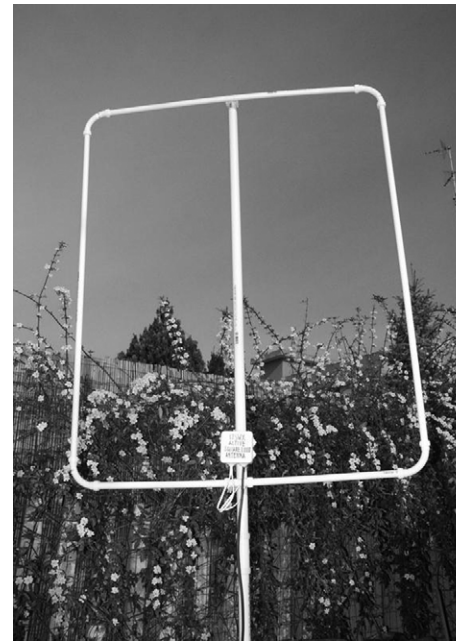
Hula - Hoop



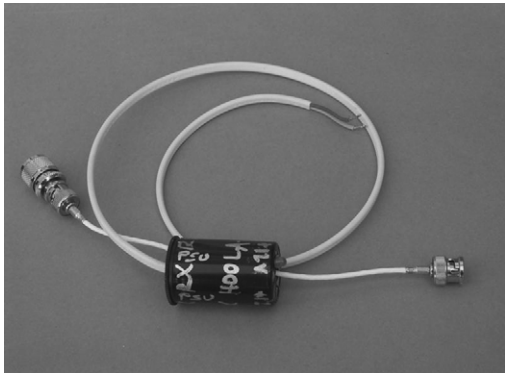
Loop Amplifier



Remote PSU



Square Loop



Remote PSU

SDR – Radio - A Vapourware preview

Dominic Baines – M1KTA. m1kta@arrl.net

In August this year, I was on a SKYPE call with Simon Brown, HB9DRV. His comment was he had seen in a few GQRP email threads about SDR so asked me about it and Tony Parks' (KB9YIG) SoftRock radios [1] and could I build one for him, to collect at the RSGB HF convention 21 days later. I said yes [2], then at the RSGB HF convention in October 2009 Simon presented "SDR and a £50 radio" (The RSGB presentation may be downloaded [3]) and he also demonstrated some prototype software he had started to write, he had also partnered with RFSpace [4], given his pedigree with Ham Radio Deluxe and DM780 there was a lot of interest at that talk and it was standing room only. Right in the middle of the presentation, he also pointed out that he was going to support the SoftRock SDR homebrew radios and asked for the SoftRock I had built for him in a nice Hammond diecast box. (The £20 were in the photo for size I didn't give them too)

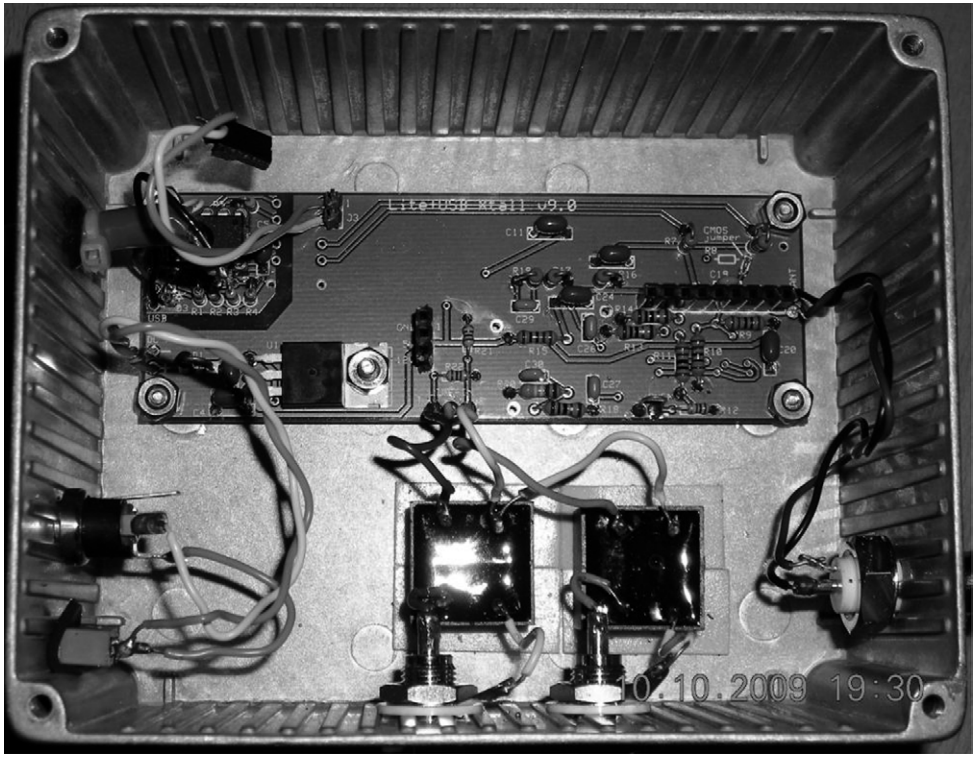


Figure 1. The SoftRock V9.0 Motherboard

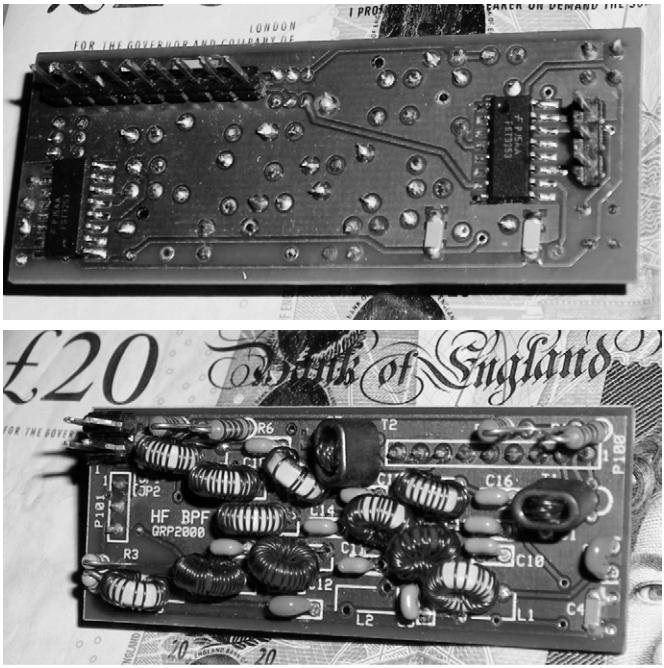


Figure 2 &3. The Switching Band Pass Filters

In the intervening weeks from our first chat to that presentation Simon had gone from nothing to a working SDR prototype that already showed enormous promise, hence the 'Vapourware' title.

As I write this today not quite 4 months later Simon has just released a technology preview of the software and over 1,500 downloads occurred in the first 24 hours.

I have been lucky enough to be an alpha tester and I have seen the additions to software functionality as it was being developed but the take up of the beta was surprising.

Potentially a lot of different hardware used for SDR radios could be used (I believe Simon will not support the Flex SDR radio or some that use the FireWire interface for some time to come) and as these are covered in many other places I'll not compare specs here but the combination of that hardware and this software will create a very usable RX.

Although not everything is available now the posted specification of the software is:
Transmit and *Receive* support
Designed for fasted possible performance using Windows 2000 and higher
Optional client-server architecture:

a Windows service is installed on the computer connected to the radios (a LINUX daemon could be supported later in 2010),

Communications using secure / asynchronous TCP/IP,

All data / settings use XML.

Optional transverter displays
Support for SDR radios using:
- Soundcards,
- USB,
- FireWire (to be confirmed).

Full integration with:
- Ham Radio Deluxe logbook,
- Digital Master 780 (PSK, RTTY, Olivia etc.),
- Other programs using fully-documented interfaces.

Advanced scheduler for automatic reception and recording
Control of HF radios (Kenwood, ICOM, Yaesu, etc.) using serial ports:
- Synchronise the HF radio frequency with the console VFOs
- Control the HF radio VFOs using mouse and keyboard
- Uses the famous Ham Radio Deluxe engine (support for over 70 radios)

Once you have downloaded [3] yourself a copy and run through the installation, what do you get? The technology previews of SDR-Radio (and the final release is expected to be similar) consists of two parts a client and a server; you do not need to run the server at all if you do not want to and I suspect many will probably not use it. The console appears to be designed to add as much of a real radio as possible with buttons to select the bands and other options such as filters etc; there are sliders that provide for all the usual level and width refinements. As this is SDR all the modifications to the signal is done in the software layer. Almost every element of the console is user configurable although you can stay as it is set initially, you can alter the layout, colour and fonts sizes to suit you.

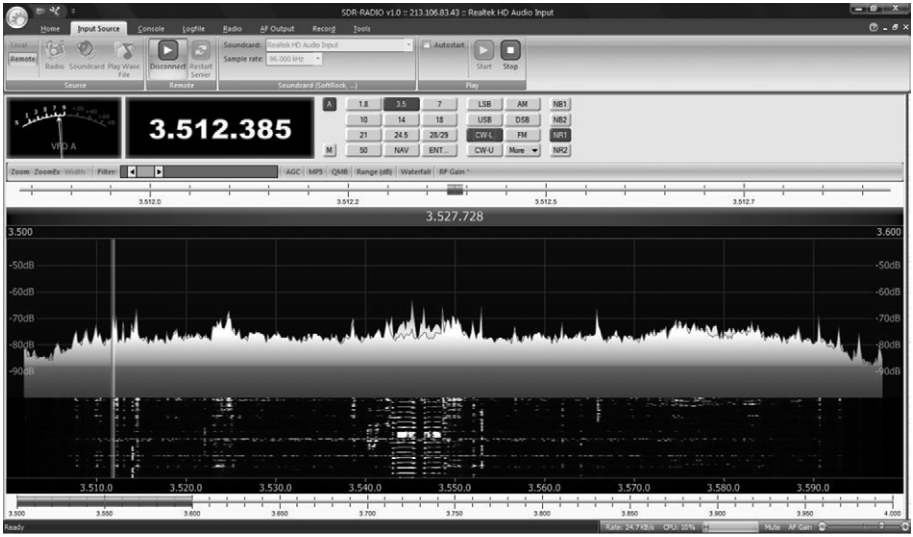


Figure 4. The console

I have installed and run the console and server on Windows XP, Vista 32 bit and Vista 64bit and Windows 7, no it does not run under Wine and Linux, and I do not think it ever

will. Tuning the radio is not with a dial but either using the mouse to select a signal or the arrow/direction keys to move a cursor, and yes you have an option to alter the tune step sizes. After that the use is very instinctive as you have both a frequency panorama and a waterfall or either (you choose). Depending on how much frequency you can use you might have an instant picture of what activity is like on any particular band. You can adjust the dynamic signal range displayed and the frequency range covered and there is also a zoom function which makes zeroing into a signal buried amongst others rather easier than it might be otherwise.

One thing I noted from comments passed over the weekend following the technology preview was the number of users that had never even used an SDR radio before and had connected to one of those that was running a remote SDR radio and mentioned the ease of use. I should note that Simon had gone to great lengths to make sure that the console is very user configurable so you can modify much of the setup, especially for those with vision or colour problems.

Instead of using a local SDR radio the idea of using a remote SDR radio is interesting. These can be seen by browsing a list (Figure 5), through the console, or on the web [5] at this stage the numbers are very few but this will grow. You might recognise the first three in this list. I put up a server for the week following the preview and there were hundreds of connections to it globally.

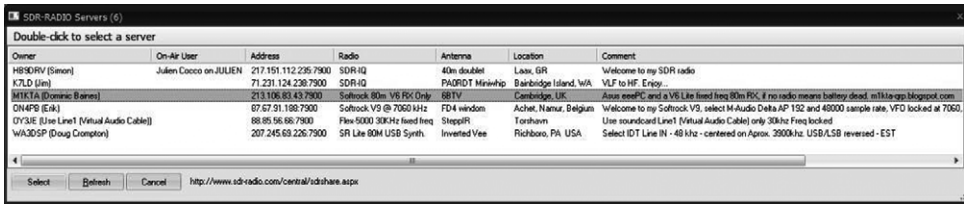


Figure 5. Remote SDR-Radio Servers

I can see that some DX or remote station might be well placed to run a number of different SDR covering a number of bands. In fact I have seen my own signal from the UK appear on one of the remote servers' real time. I expect use for DX chasing and contesting will be very high on the use list also.

For those that might want to host an SDR radio server, the PC hardware requirements are not complex, and I ran my server test on an XP Asus Netbook (an early 4G 701 model with 900MHz CPU) however a broad band internet connection will be required to provide anything like a usable radio at the other end. There is a configuration option in the software to restrict the bandwidth used. The server component interface is clean and simple, this is the on air status information screen from my server.

Figure 6 Server Interface

As more of us would like to keep a note of 'THAT QSO' or a special event station one thing that was added to the software from day one was an ability to record the radio audio and Simon has added extra functionality and extensions to the Wav format so that you can record hours of operating in reasonable sized files, there are also options to record just the audio being monitored too as an MP3 file instead of the whole IQ audio.

Add to the software an RFSpace SDR-IQ or almost any soundcard based homebrew SDR radio such as a V9.0 SoftRock and you will have an all band all mode RX.

The road map is very ambitious but given what has already been released the extra functionality will appear in time. The integration that will come with other radio rig control and digital modes that exist now within HRD and DM780, and a fully functional logging package and ARRL LoTW integration would probably be enough reason to try it out. I especially like the possibility of breathing new life into another radio, be it a TX or TCVR, even an old boat anchor by adding a second high performance RX. SDR appears to be the future and I believe this will become the SDR software radio package to have in the shack.

References

[1] http://www.kb9yig.com
[2] http://m1kta-qrp.blogspot.com/2009/10/softrock-v90-with-electronically.html
[3] http://www.sdr-radio.com
[4] http://www.rfspace.com/SDR-IQ.html
[5] http://www.sdr-radio.com/OnAirServers/

BTW in October 2009, Ken Evans, W4DU asked me to become the UK/EU Associate editor for ARCI-QRP QQ so I'll be writing more about technology that effects us in QQ coming from EU in future issues.

K.I.S.S. my DCR

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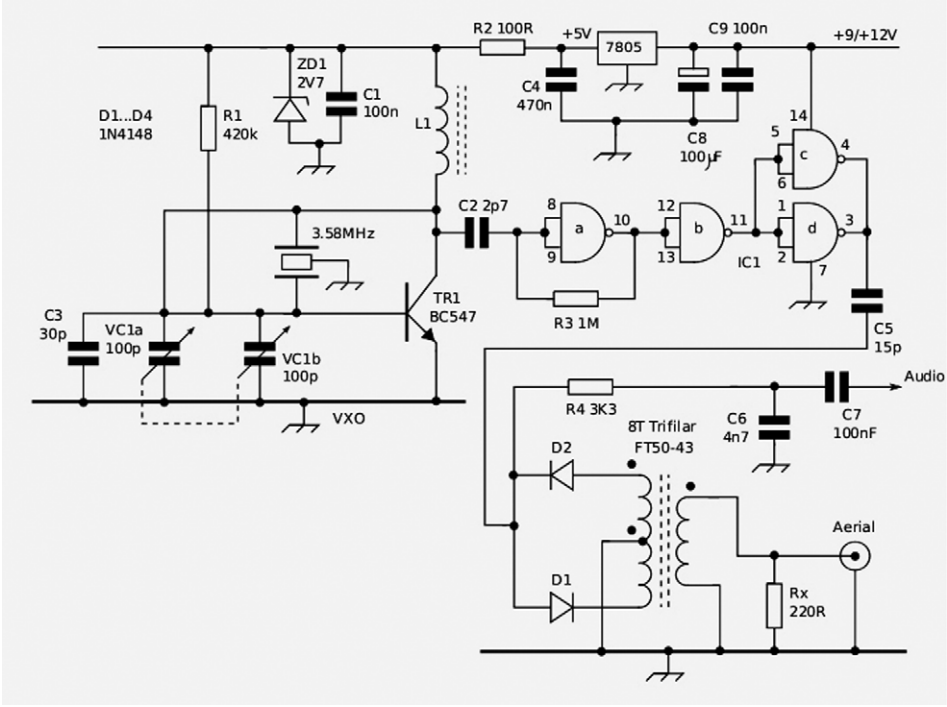
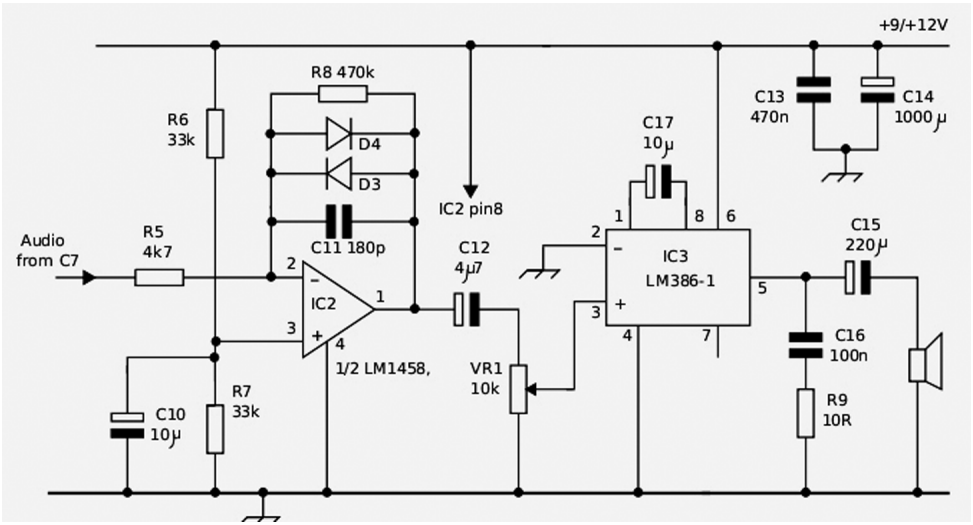
gerardkelly429@googlemail.com

This project set-off with the aim of providing a simple, sensitive, Direct Conversion Receiver, at modest cost, which could be constructed by a novice, hence the KISS heading. The aim was to minimize the number of stages and to be able to use a supply of 9V or 12Volts.

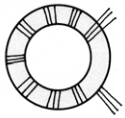


The VXO circuit covers approximately; 3.515MHz to 3.595MHz and although the receiver circuit shown uses a coil based VXO circuit, it could equally well be constructed using a couple of logic gates, but powering these from a 3V source. This would avoid the effort of coil winding associated with L1 but, almost certainly, would involve the addition of some inductance in series with the ceramic device, if high end frequency coverage is required. (G3DXZ -1). The VXO is buffered by IC1 which provides, through differentiation, a series of opposing pulses to the product detector diodes. Both diodes are thus switched in turn and signal demodulation occurs in T1.

Conclusion:
The circuit is sensitive, performs well, and takes little time to construct. If using a different ferrite core for T1, then be prepared to experiment as it is this that determines the audio frequency response of the receiver. The resistor Rx is in place of a B.P. Filter.



L1 T68 – 2 toroid 56 turns or T50 – 2 toroid 66 turns (0.19mm).
T1 FT50 – 43 toroid 8 turns trifilar wound, as a single layer. (0.45mm 26swg.)
IC1 4011B / 4001B etc.
IC2 ½ TL072, ½ LF353, 741 etc.
IC3 LM386N-1



T1

Reference:
(1) A 6-volt / 5-watt CW transmitter – International QRP Collection.

14th RED ROSE QRP FESTIVAL.

Sunday 6th June, 2010. 11am to 3pm. Formby Hall, Alder Street (off High Street), Atherton, Manchester. M46 9EY. Admission £2.00 Children under 14 free.
Easy access from all directions. M6, M61, M60, A580
Features: Trade and individual stalls. Club stands, including RSGB, GQRP. Very low cost "Bring & Buy. (No sell, no pay!) Sales of new and surplus equipment /components. Hassle free. Large spacious halls at ground level. Huge, free car park, disabled facilities. Delicious refreshments at QRP prices! Comfortable, well stocked lounge bar.
Some tables available at £8 but please book early. Ideal opportunity to sell those unused items. Les Jackson, G4HZJ g4hzj@ntlworld.com 01942 870634

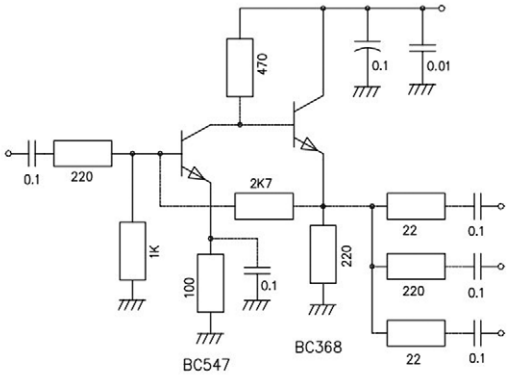
The 9th JUNCTION 28 QRP RALLY
Sunday 13th June 2010

at Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire. DE55 7AH
Just 10 minutes from M1 Junction 28 and A38. Fully accessible venue with Parking Amateur Radio, Electronics and Related Items, Bring and Buy, and Special Interest Group Stalls - Licensed Bar and Food - Open to the Public from 10.00 am
For further details please contact Russell Bradley (G0OKD) on 01773-783658
russell.bradleyG0OKD@ntlworld.com www.snadarc.com

JOTA-40 RX. MK-2

Dev Ramaprabhu VU2DEV and L.Venkatesh VU2VNK.
vu2dev@yahoo.com

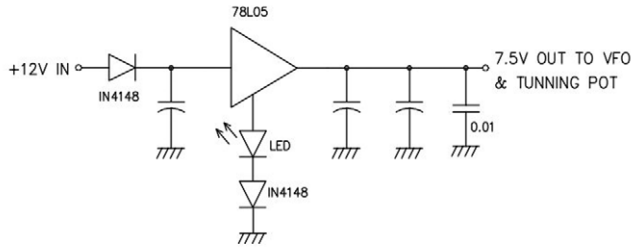
The JOTA-40 RX is a simple single conversion superhet receiver motivated by VU2KGN The general topology is based on 1985 ARRL handbook receiver. A 3-section xtal ladder filter at 12.0 MHz. IF is a little wider than necessary (about 4.5kH). The circuit does not use any integrated circuits for the sake of simplicity. The receiver consists of 3 single sided PCB assemblies: RF Amp, RF Main board & V.F.O



VFO BUFFER

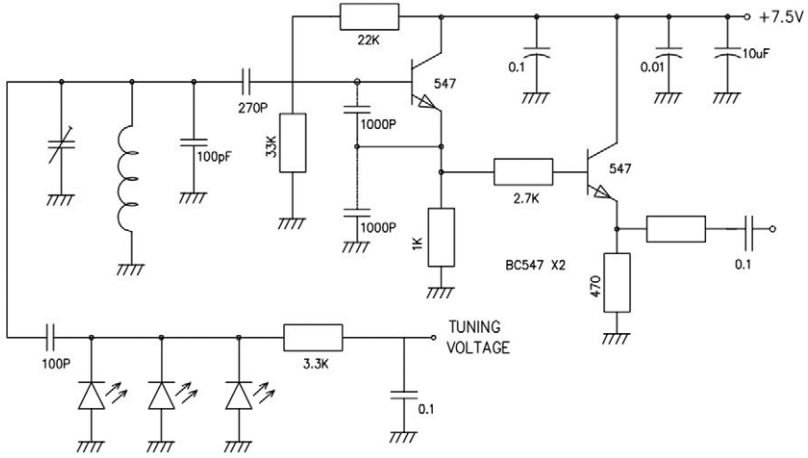
The VFO circuit is based on 1978 ARRL handbook info. The VFO gives three outputs for receiver, transmitter and a frequency counter. To cover 40m band the VFO covers 5.0 MHz to 4.9 MHz. VFO tuning is by ordinary zener diode's based on an idea by GØUPL. The VFO is bufferd by a two stage amp with feedback. This circuit shown left is adapted from a Hungarian radio.

The VFO is a two transistor circuit and runs with an unusual voltage regulator. As the radio works on battery, battery voltage can drop up to 11 volts, The regulator used requires at least 2.4V input output differential to maintain regulation and of course reverse voltage protection is a must. Hence we can get a maximum regulated voltage of 11V-2.4V-0.7V=7.9V and hence we have used a regulator 78L05 with centre pin [common] lifted above ground by 2.6V to get 7.6V. This is just to ensure ready available components with no adjustments.



VFO REGULATOR

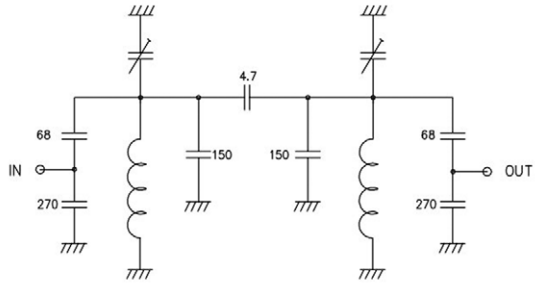
VFO



V.F.O

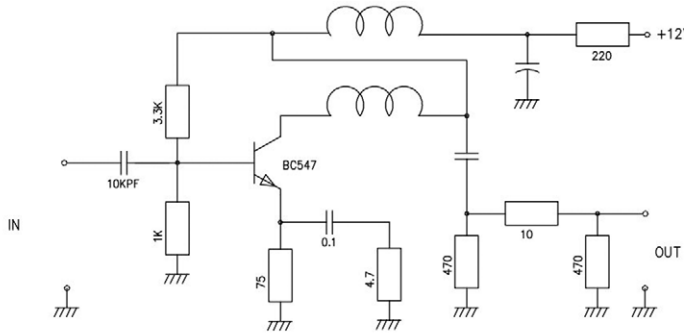
RF AMPLIFIER

7.0MHz signals received from antenna are passed through a 2 section Band Pass Filter to reject unwanted signals. The circuit idea is from an old Siemens Radio. The circuit gives good rejection to IF freq of 12.0 MHz and image frequency of 17.0 MHz. The Band width is kept intentionally high at 350 kHz hoping that very soon we would be able to operate. 7.0MHz to 7.2 MHz whereas presently we are authorized to operate only 7.0MHz to 7.1 MHz. The filter is low loss design and the Inductors are wound on ?10mm Teflon former with 24swg enamelled copper wire.



2-SECTION B.P.F

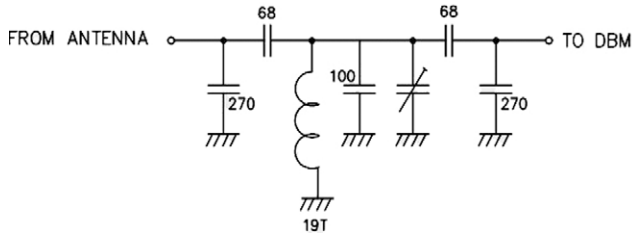
The RF AMP is general purpose amplifier with multiple feed back as given in ARRL handbook. This is a well proved design and there is scope for improvement. The general BC 547 is effective but experienced constructors could replace with more expensive devices for better performance. e.g. 2N3866 hi!



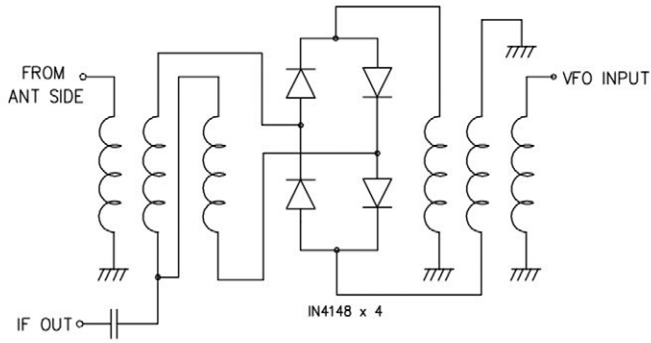
RF AMP

The receiver circuit is realised on a separate single sided board. As given in block diagram this is a single conversion, high IF [12.0 MHz] and for simplicity no A.G.C and no IC's. The image frequency is at 17.0 MHz [12.0+5.0] whereas wanted frequency is 12.0-5.0=7.0 MHz. So only a single section filter is used ahead of D.B.M [Double balanced diode mixer].

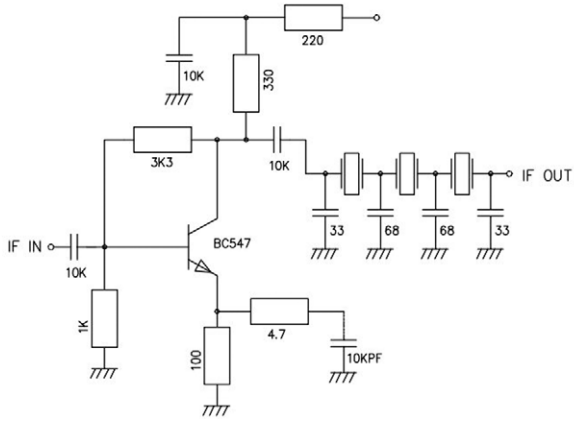
The tuned circuit is shown above .The antenna coil is made with ø10 teflon former and 24 swg wire is used for coil winding for low loss and high Q.



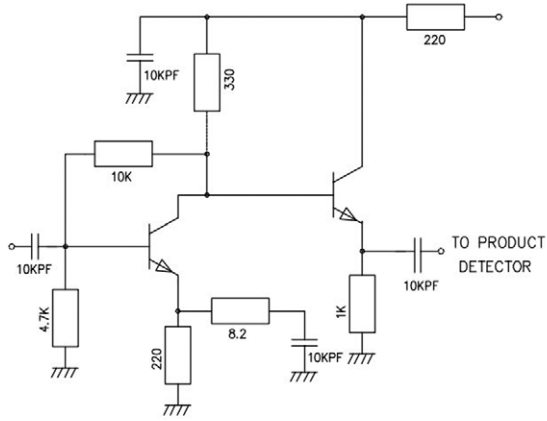
The DBM is realised using 2 trifilar transformers on T-10 Ferrite cores and 4 1N4148 switching diodes based on a1985 ARRL handbook idea. Diodes are picked-up from the same reel and no further matching is done. The circuit is given below.



The mixer output is amplified in a single stage IF-PREAMP using BC547. The is a very simple amplifier with feedback and no adjustments are necessary. The transistor collector directly drives the 3-stage xtal filter.

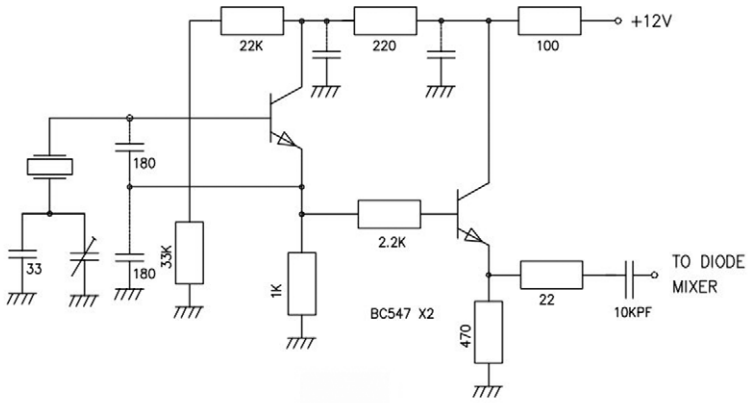


The output from xtal filter is amplified and buffered and fed to the product detector. In our receiver A diode D.B.M is used as a product detector. The IF Post Amplifier circuit is shown right. As the output is an emitter follower; it is low impedance and happily connects to the product detector.

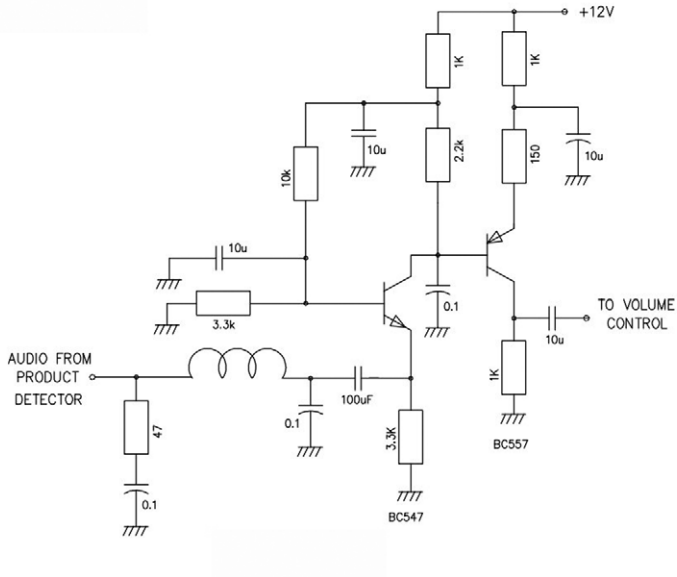


A single stage xtal oscillator with an emitter follower is used as a B.F.O. Now for same jargon (Please read this) The 40m band is full of LSB stations only [kindly ignore other than HAM stations who use USB/ISB]. In our frequency mixing IF = RF + L.O that means the signals at 12.0 MHz IF are also L.S.B. please remember we are using a ladder filter with xtals marked 12.0 MHz. The filter is fortunately a good L.S.B. Filter. But the centre frequency of ladder filter is slightly below the marked frequency by 2 KHz or more. So to receive LSB signals the B.F.O shall be a little below 12.0 MHz. [maybe 11.9985 or

thereabout] for a simple receive-only application B.F.O frequency is not very critical as the filter is kept intentionally WIDE. The circuit of BFO is given below.

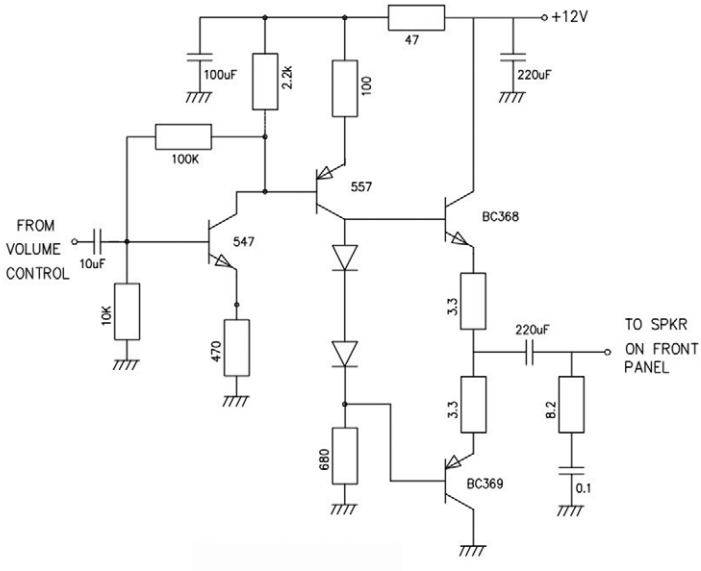


The product detector is driven by B.F.O and IF Post Amplifier. The output is filtered of high frequency components by the so called diplexer and a big RF Choke. The resulting low level audio is amplified in a low-input impedance audio preamp to match the D.B.M. This circuit is from 1985 ARRL hand book. This common base amp output is further amplified in PNP Amplifier stage driving the volume control.



A simple push-pull amplifier is used to drive a speaker. Transistors are used rather than IC's for availability of components. The output is more than 200 mW r.m.s good enough to operate JOTA activities. The output of amp can be connected to either 15 ohms or 8

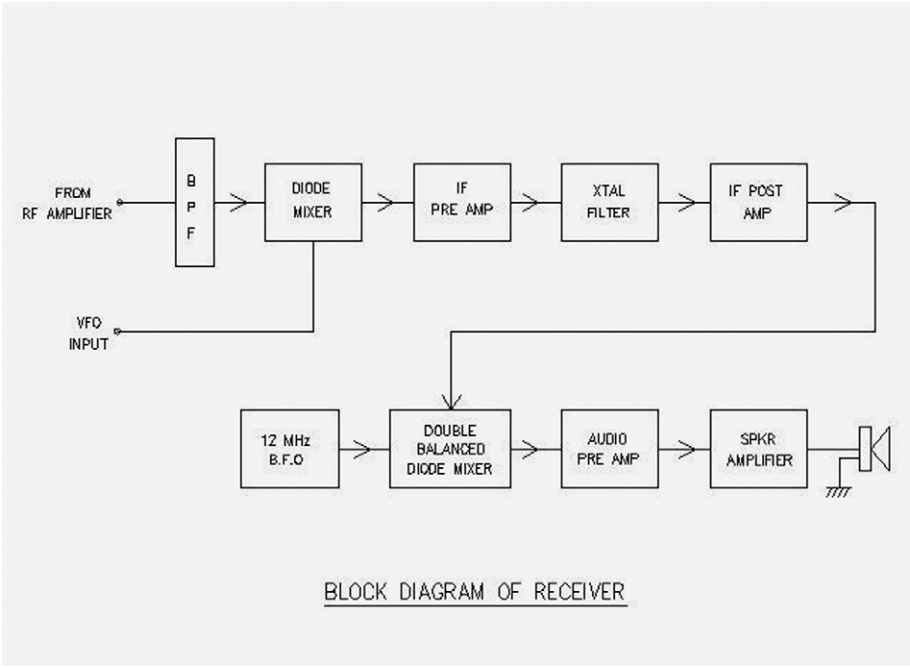
ohms spkr. 15 ohms spkr will reduce the drain on battery whereas 8 ohms spkr would give more audio output.



A few receivers have been built using these circuits. The VFO is on a separate pcb. Both the pcb's have built-in reverse polarity protection. Performance of the receiver is quite satisfactory while using a dipole antenna cut to 40m band. For normal shack volume settings the receiver draws around 130 mA current on 12A battery. Some hams have experienced using long wire antenna also. As this is meant to be a beginner's receiver the pcb's are slightly big to facilitate comfortable handling. There are no critical adjustments in the receiver. In fact antenna-coil trimmer was not mounted at all in a few receivers. We would like to express our gratitude to Nandarajan, VU2KGN for continuously encouraging us to take-up this project.

The Mark-1 Receiver did not have RF Amplifier Board. Based on field feed back RF Amp has been included in the Mark-2 Receiver which also has reverse polarity protection.

These Receivers are working well at a voltage of +12.7V which happens to be the terminal voltage of a good battery. The power consumption of the mark-2 Receiver is 150 mA @ Normal Volume. Due to the ambient noise at 7.0 MHz Band, the Mark-2 Receiver pulls all the stations including DX Stations as good as any commercial Receiver ! More importantly the measured sensitivity in the lab environment happens to be around 0.5 u RF signal for 15 db signal to noise ratio !



BLOCK DIAGRAM OF RECEIVER

Simple Bracket for the FT817

Mike Slater, G8ZEC, 20 Layton Ave. Malvern. WR14 2ND

For an FT 817 that doesn't leave the bench very often, a small speaker bracket cut through middle provides a neat stand. Feet could be attached for more clearance.

No painting required!
Some vertical adjustment can be made using 'flat' panhead M4 screws, butterfly nuts and reuse of the original speaker friction washers between the bracket faces.
The 817 strap brackets are removed briefly to mount screws in place. I have seen many solutions advertised for this rig application mostly at ridiculous prices. These brackets look like original factory equipment. Speaker bracket is recoverable albeit in twain!

The 26th Yeovil QRP Convention

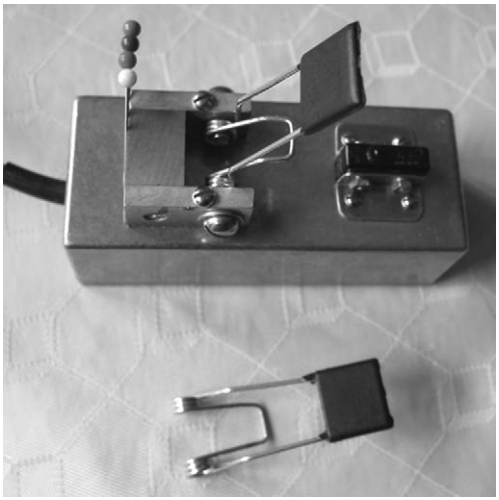
is on Sunday 25th April 2010 at the Digby Hall, Hound Street, Sherborne, Dorset, DT9 3AA, adjoining central shopping car park. It opens at 09.30am. There is "Talkin" on S22/V44 with adequate parking. The convention includes a Lecture Programme, Trade Stands, Bring and Buy, Catering and Disable Facilities. For details: Robert, 01935-706715, robert.farey@btinternet.com. Web: http://www.yeovil-arc.com

The Down Lighter Key

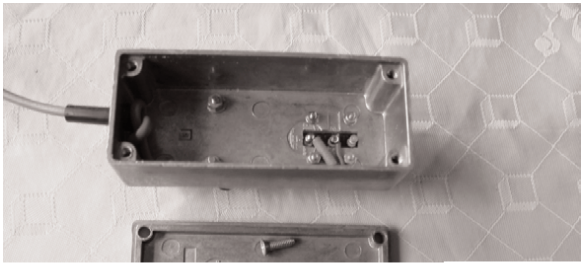
George Burt, GM3OXX, Clunie Lodge, Netherdale By Turriff, AB53 4GN

On throwing away some old electrical fitting's including a quartz down light, with clips for holding it against the plaster board on the ceiling and on undoing the clips and putting them on the bench, the first thing I did was play with a clip as if its was a Morse key, and an idea was born.

After one night of work using the clip and some bits of junk from around the shack a small hand key was built.



Found a magnet assembly from a meter that was a perfect fit for the spring, two 2BA holes were drilled and tapped, perfect job for holding the spring, next was the micro switch that was held in place by two small brass right angle pieces, job nearly done, next thing was to wire up the micro switch with suitable cable and plug to suit my rig, and a hand key was built, also one the benefits is that you can keep the xyl happy by lending it to her as a pin holder



….and all from one clip, what more do you want ……wont find another one. Hi.

See pictures for visual info, aye it's that easy.

Moxon to MMANA-GAL conversion spreadsheet

Dimitri Aguero, F4DYT, , Saint-Germain-en-Laye, France.
daguero@free.fr http://daguero.free.fr

Moxon antennas are excellent for monoband QRP operation. They are light, portable, easy to build with some wire and two fishing rods, and they have a good gain and better F/B ratio. A Moxon antenna definition can quickly be generated using the MOXGEN.EXE Windows application. Unfortunately, it does not generate antenna definitions for my favourite antenna modelling code, MMANA-GAL. To palliate this problem, I developed a spreadsheet which works with Microsoft Office and Sun Open Office.

	A	B	C	D	E	F	G
1	Enter Moxgen length (m)					Enter	Enter
2	A	B	C	D	E	Frequency (MHz)	Wire Radius (m)
3	0.7462	0.1076	0.0257	0.1411	0.2744	145	0.0005
4							
5							
6	Construction Wire length needs						
7	Reflector (A+2D)					1.0284	m
8	Upper half dipole (A/2+B)					0.4807	m
9	Lower half dipole (A/2+B)					0.4807	m
10	**TOTAL**					**1.9898**	**m**
11							
12							
13	Vertical Antenna space needs						
14	**Height**					**0.7462**	**m**
15	**Width**					**0.2744**	**m**
16							
17							
18	Horizontal Antenna space needs						
19	**Width**					**0.7462**	**m**
20	**Depth**					**0.2744**	**m**

Figure 1: Parameters worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	2.07m Vertical Polarisation Moxon antenna																
2	*																
3	145																
4	***Wires***																
5	6																
6	0 ,	0 ,	0.3731 ,	0 ,	0 ,	-0.3731 ,	5.00E-04 ,	-1									
7	0 ,	0 ,	0.3731 ,	0.1076 ,	0 ,	0.3731 ,	5.00E-04 ,	-1									
8	0 ,	0 ,	-0.3731 ,	0.1076 ,	0 ,	-0.3731 ,	5.00E-04 ,	-1									
9	0.1333 ,	0 ,	0.3731 ,	0.2744 ,	0 ,	0.3731 ,	5.00E-04 ,	-1									
10	0.1333 ,	0 ,	-0.3731 ,	0.2744 ,	0 ,	-0.3731 ,	5.00E-04 ,	-1									
11	0.2744 ,	0 ,	-0.3731 ,	0.2744 ,	0 ,	0.3731 ,	5.00E-04 ,	-1									
12	***Source***																
13	1 , 1 ,																
14	w1c,0,1																
15	***Load***																
16	0 , 1 ,																
17	***Segmentation***																
18	800 , 300 , 2 , 1 ,																
19	***G/H/M/R/AzEl/X***																
20	2 , 5 , 1 , 50 , 120 , 60 , 0																
21																	
22	Mod by																
23	Created automatically by Moxgen2MMANA Excel Spreadsheet - Dimitri Aguero, F4DYT																

Figure 2: Spreadsheet output

In the **Parameters** worksheet, you just need to enter the five MOXGEN output values, A, B, C, D, E, the frequency in MHz and the wire **radius** (not diameter!), in meters. Two auxiliary calculations allow you to estimate the length of wire needed, as well as the size of the finished antenna.

To enter the values into MMANA-GAL, we will use its Antenna Definition facility. In the spreadsheet, click on one of the two output worksheet, depending on vertical or horizontal polarisation; 2m VHF repeater antennas will be vertically polarised, while 2m CW VHF antennas will be horizontally polarised. Select the grayed values, and press Ctrl-C to copy the contents.

Open MMANA-GAL, press Ctrl-F to show the current antenna definition, erase the existing antenna definition text and do Ctrl-V for pasting the spreadsheet values, then press OK. The antenna definition should be loaded into MMANA-GAL, and you should be able to run a simulation. Close the antenna definition window, and run the simulation. You will need to adjust the parameters to match your real environment: height, wire material, and so on.

This spreadsheet may be also a nice starting point for people wanting to learn about antenna modelling, or for those wanting to automatically generate the MMANA-GAL definition for other complex wire antennas, like a helix or a halo; you just need to change the algorithm for generating points, and the number of points.

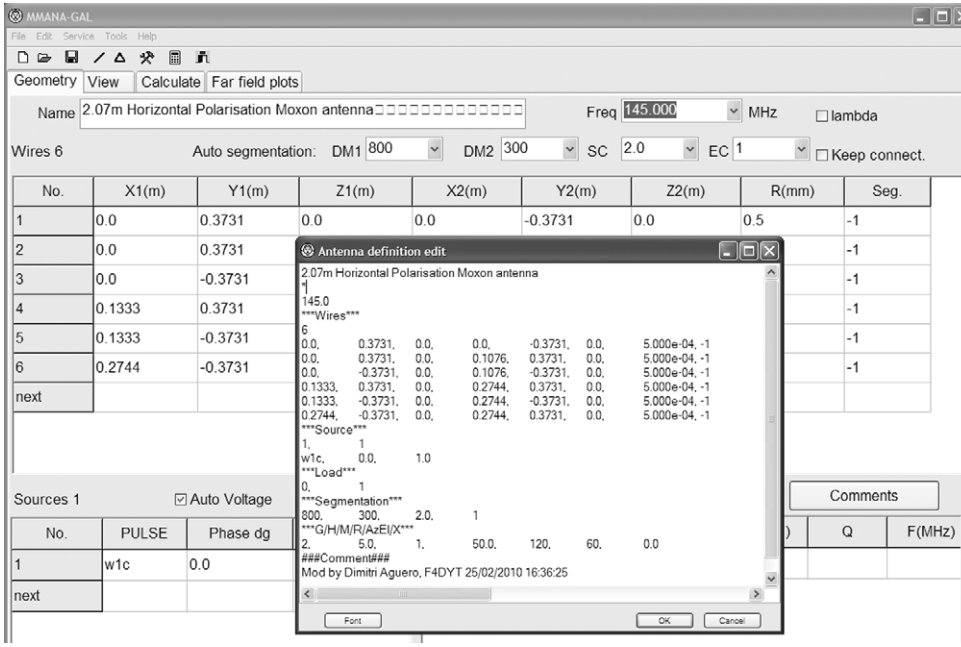
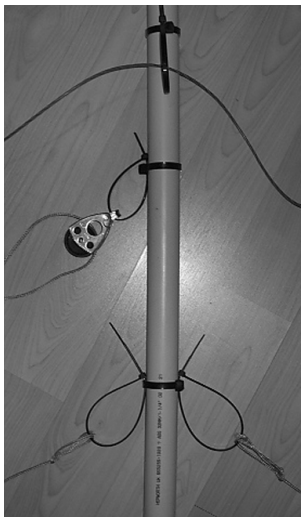


Figure 3: Pasting Spreadsheet output into the Antenna Definition editor

The Moxon2MMANA spreadsheet can be found on **www.gqrp.com** Enjoy!

Some uses for Ty-raps (Tie Wraps)

Jerry Gerard G0AED. henrynfk62@aol.com

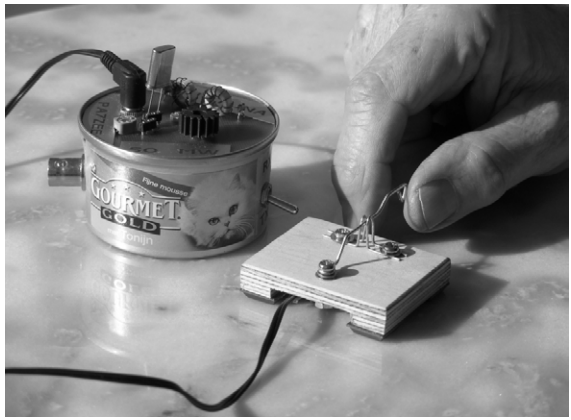


I use fibreglass fishing poles / plastic pipe for a lot of my antennas. The idea of drilling a hole in them is not best as it weakens them and renders them useless after a time ..use Ty-raps. They come in various sizes and have amazing strength as well as being easily obtainable. The idea is to tie the Ty-rap around the pole and loop one through it. The photo is self explanatory. I have used them to make Quads and other antennas. It is best to place them further out on the rod / pole and use the second wrap to tension your wire. They can also be used to put a pulley on a mast / pole and to fasten guy ropes to your mast. See photo. I have even used them as insulators on wire antennas with no apparent problems. If you should encounter any slippage just place another wrap behind the first one and that will usually cure it. The demo / photo used a piece of 1 1/4 inch plumbers pipe for clarity.

Who says our Hobby is Expensive?

Geert Paulides, PA7ZEE, Amstelveen, The Netherlands. pa7zee@hccnet.nl

Looking at magazines for Hams, one must draw the conclusion that our Hobby is only for the rich. If you don't have to spend hundreds of dollars, or euros in our case on the other side of the pond, you can forget it. Is that really the truth? Maybe because I was born in a poor family, I have learned very young to be creative. The challenge for me is always to do a maximum with a minimum of stuff. My other credo is KISS: Keep It Simple Stupid!



I will tell you my story of an empty cat food tin and three paperclips. After building the famous Tuna Tin 2, and have had much fun with this transmitter, I was re-reading W1FB's Notebook and there it was: "I can assure you that there's no greater thrill than to receive an RST 569 signal report from a station 300 miles away when your transmitter output power is 30 mW!" And there it was: a new challenge!
So I looked for a design on the Internet and found The Micronaut on the site of Steve McDonald, VE2SL; **http://members.shaw.ca/ve7sl/tuna.html**
I made the design suitable for the 30 m-band. It is quiet there and in my opinion primarily used by experienced operators who have in general good ears needed for QRP-signals.

The housing had to be smaller than the Tuna Tin, since the output of this rig was much less compared with the 350 mW of the Tuna Tin. A tin with cat food seemed to be the perfect housing. The cat of our neighbours had a good day and I had an inexpensive housing for the Micronaut. On a piece of copper clad I soldered the parts in Manhattan style. In total 14 parts with the 2N2222, the crystal, the output filter and a trimmer for the VXO on top.
After completing the rig I wanted to build a matching paddle. Again on the Internet I found the paddles of Verner Blindheim, LA5YNA; **http://home.online.no/~verner/Clippers.pdf**.
One big paperclip and two small ones, some bolts, nuts, rings and a piece wood was all I needed. No cost at all and I can assure you that this is music in the ears of a Dutchman, hi.

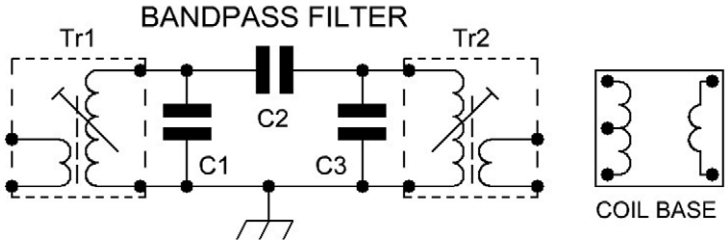
After completing the rig, it was time for the smoke test. No smoke and my watt meter showed an output of 50 mW by 13,8 V. The moment of the truth had arrived so I connected my inverted vee to the rig and listened for a suitable signal. On 10,118 MHz I heard HA3OD having a QSO with a French station. After the "dit dit" I called three times his call and waited. A moment it was quiet and I thought that it is a fairy tale that one can make a QSO with such low power. Than he came back for me and my report was a 569. At the end of the QSO there was the question about my rig and what power I used. My answer was: "rig mini tuna hmbrw pwr 50 mw". A "ufb sigs wid ur 50 mw qrpp" was the reply.
Till now I have worked HA, UY, OK, 9A and EW. The distance between Mike, EW8O in Belarus and my QTH is 1,061 miles. That is 21,214 miles per watt! We have a fantastic Hobby at almost no cost!

Tuneable Core Inductors are back.

Available from Club Sales

George G3RJV

For at least 25 years constructors have been able to use Toko 10K tuneable core coils in their projects. In more recent years these have ceased production and become difficult to find although JAB Electronics still has a few. Recently Spectrum Communications have had a range of 10K coils specially made. For full details see www.spectrumcomms.co.uk/. Below are calculated values for a range of HF bandpass filters using the Spectrum coils.



BANDPASS FILTERS – AMATEUR BANDS
Using Spectrum 10mm Coils

BAND	Tr1 / Tr2	Coil Marking	Former Colour	C1 / C3	C2
1.8	45u0L	45u0L	Red	160p	12p
3.5	45u0L	45u0L	Red	39p	3p3
7.0	5u3L	5u3L	Yellow	100p	8p2
10.1	5u3L	5u3L	Yellow	47p	6p8
14.0	5u3L	5u3L	Yellow	27p	3p3
18.07	2u6LC*	KAXS1509	Blue	33p	3p3
21.0	2u6LC*	KAXS1509	Blue	22p	3p3
24.89	1u2H	FCPL3335	Pink	39p	3p3
28.0	1u2H	FCPL3335	Pink	27p	3p3

Notes:
* Remove internal capacitor from 2u6LC [designed as 10.7MHz IFT]. 1u2H has high impedance link winding, perhaps matching could be better with capacitive tapped C1/C3

We are pleased to announce that the coils used above are available from the club at 75p each. Order as per the back page of Sprat – postage (any quantity) is £1 (UK), £1.50 (EU), £2.00 (DX).

Please note the minimum order is £5 for cheque and PayPal orders. It will probably be easier to specify the coil type by coil former colour as that is how G3MFJ has them stored.

We hope to expand our range of Spectrum Coils and will announce other values in future issues of SPRAT

Bath Buildathon Contest 2010

Background: This contest is primarily intended to activate the radios built at the Bath Buildathon events but is open to all UK radio amateurs. Stations may be operated from any fixed location within the UK; operation from a vehicle or as a pedestrian is permitted, as is Maritime Mobile, so long as you stay put during each session!

When: There are seven sessions over the course of a week. Stations may take part in as many sessions as they wish:

- 14:00 to 16:00UTC, Sunday 30th May
- 18:00 to 20:00UTC, Monday 31st May to Friday 4th June inclusive
- 10:00 to 12:00UTC, Saturday 5th June

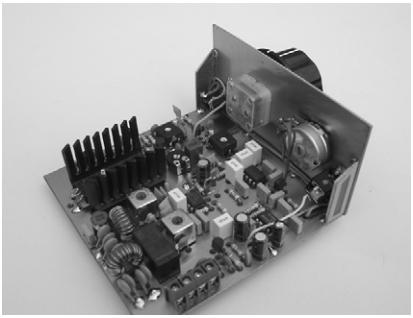
Band & Mode: 80m telephony contacts only. Suggested frequency range is 3.60-3.70MHz.
Power limit: QRP only (maximum ten watts pep output from transmitter).
Contacts: Any QSO with another voice station is allowed. Duplicates only count once per session.
Equipment: Any QRP radio equipment may be used but bonus points are awarded for using homebrew equipment. Only one radio may be used each session.
Call: 'CQ Bath Builders Contest'
Exchange: Signal Report (RS), TRX make & model, and output power.
Scoring per QSO:

- With a QRO station (over 10W) = 1 point.
- With a factory built QRP station (max 10W) = 10 points.
- With a homebrew QRP station (max 10W) = 20 points.
- With a the 'BBC' (Bath Buildathon Crew; G0FUW, G3VTO, G4YTN) = 50 points.

Bonus Points:

- Entrants using homebrew transceivers = add 100 points to total.

Multiplier: Your total points per session will be multiplied by the number of stations you worked who were using Brendon transceivers constructed at one of the Bath Buildathon events. **Note**: the adjudicators will apply the multiplier after the contest.
Entries: Separate RSGB-style log sheets for each session. A separate RSGB-style cover sheet stating radio(s) and the output power used during contest. Entries to G0FUW by post or e-mail (details correct in RSGB Yearbook and QRZ.com) to arrive by Friday 25 June 2010. Cross-checking of logs and adjudication will be carried out by the 'BBC'.



Awards: The leading station on each evening will receive a certificate. The leading station taken over all seven sessions will receive a certificate and a voucher worth £50 off any Walford Electronics kit (no cash alternative will be offered). Results will be announced and awards presented at the Walford Electronics '*QRP in the country*' event at Upton Bridge Farm, Long Sutton, Langport, Somerset, TA10 9NJ on 18th July 2010.

Walford Electronics Brendon Transceiver used for the Bath Buildathons

Membership News

Tony G4WIF, PO Box 298, Dartford Kent. DA1 9DQ

Last year was a particularly good one for the club. In partnership with the American QRP-ARCI, our club put 20 radios in some deserving places. There is a full report at www.gqrp.com/india/ for those that missed it. The second QRP convention away from our roots in Rochdale took place in Rishworth and was a spectacular success. We even managed to stream the fascinating lectures onto the internet and the resulting publicity boosted both club sales and membership. The club produced the fourth version of the Sprat CD "in house" containing all issues of the magazine up to (and including) issue 140 – **and** we got the price down to just £4 for members. There have been several new books too. The sales of these items helps keep your membership subscription down. There has been no increase yet again!

As George mentions in his editorial, this could be your last Sprat if we have not received your 2010 subscription.

I would ask that all members please rescue the Sprat wrapper from the bin and check the "expiry end of" date. If it says "2009" or "membership expired" then this will be your last Sprat. Please contact me or your local representative right away to renew for 2010.

Just like last year we have a high number of UK members that pay by standing order who we can't identify because your bank failed to include your membership number with the payment. Please do not assume that because your standing order payment worked last year, that the banks can't make a mess of it this year. Please check that Sprat wrapper.

You may have noticed that the Winter Sprat wrapper incorrectly identified the late John Leak G0BXO as the return address – a mistake by our distributor. Please do let me know if there is a distribution problem with the Spring issue – I would like the feedback.

For those that didn't send their subscription to John, didn't send it to George G3RJV, didn't send it to Graham G3MFJ, didn't write their cheque "pay G4WIF", didn't forget to sign/date the cheque, I thank you, and ask all members to please send all membership enquiries including subscriptions to me or DX representatives and no other club officers. I have also returned cheques and postal orders from countries including Italy & Canada this year because they were made payable to me and not "GQRP Club". DX members, please ensure that cheques/postal orders are issued from a UK bank.

Online subscriptions have been a marvellous success story for the club in the last 12 months and membership has grown as a result of the ease of payment. However, because Paypal levy a commission, the club has offset this with a small administration charge that is equivalent to the cost of the stamp which you would otherwise have used to post your payment. In other words, it costs you no more paying online. We do insist that members use the special online forms that we have created on the club website because it automatically adds the administration charge and send an email from Paypal in a format that makes life easier for me.
You can find one form for UK/EK members and another for DX members - both at www.gqrp.com/paypal/

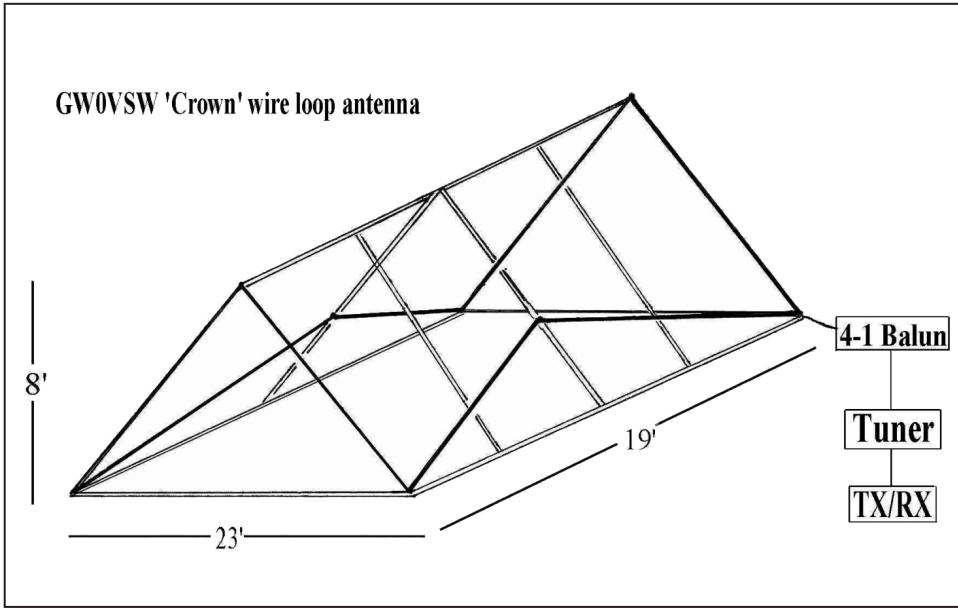
Antennas Anecdotes Awards

Colin Turner G3VTT
30 Marsh Crescent, High Halstow, Rochester, Kent ME3 8TJ
G3vtt@aol.com

Welcome to the Spring AAA. I write this after finishing the 2009 Winter Sports which was for me one of the best ever with QRP to QRP CW contacts across to the USA on 20m and 30m. Conditions are indeed picking up. As usual 80m was the band with plenty of traffic and stations worked using a variety of antennas, one of them being Carl GW0VSW. Carl has kindly sent me a couple of items for AAA which you should find interesting.

The Crown Antenna

I worked Carl on 80m during the Winter Sports using this antenna which will be of interest to those of you without a garden or limited space.



'I have had a few enquiries regarding the 'Crown' wire loop I have been using as my main antenna for the past year or so. Planning restrictions have prevented me from using anything outside so you have to do the best you can under the circumstances. I decided to run as much wire as possible in my loft space using the trusses for support. Some fine copper wire recovered from a skip was used and after some experimenting I eventually ended up using about 106 feet of wire around the loft space using cup hooks to secure the wire. In one corner a 4-1 balun was fitted which was connected to my LDG Z-11 auto tuner and QRP Plus or FT-817 with approximately 5 feet of RG-213 fed through the ceiling into the spare bedroom below which is my shack.

*This may not be an original idea but for me it makes the best use of the available space. Because of the antennas shape I called it the 'Crown' wire loop and so far I have been more than pleased with it so far particularly as the bands have not been in great shape. It does tune up on all HF bands but the performance on Top Band is very poor and I have yet to make a QSO there but it can be used for reception. The 80m band is not much better but contacts have been made inter 'G' with reasonable reports. 7MHz and up have been fine and many stations have been worked so far running 5 watts or less. Most of the contacts were made using CW but I have used SSB and PSK31 with similar results. It cost almost nothing to make, is invisible to my neighbours and has allowed me to get back on the HF bands. There is room for improvement and that is all part of the fun when you construct your own antennas.*73 Carl Mason GW0VSW GQRP 9581'.

A New Antenna from the UK

I don't usually recommend purchasing antennas, apart from being expensive they cost a lot more here in the UK than say in the US but here are a few notes from Carl regarding an HF antenna made here in the U.K. *'The SRC X80 HF Multiband Vertical Antenna is an antenna for small spaces. Many of us are not blessed with lots of space when it comes to erecting a HF antenna system and more often than not rely on compromises to get us on the bands. I am no exception to this as I found out when moving to my new QTH which had strict planning restrictions and was very restricted for space. I therefore decided to construct a simple indoor 'Crown' wire loop antenna and fit it into my loft space hanging the wire from the rafters. It crossed my mind to try out a vertical antenna as several contacts had been made using just mobile whips in the garden.*

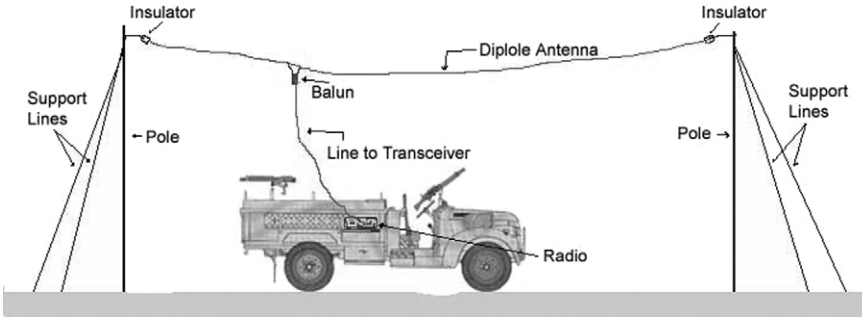
After looking around at the various commercial options I came across the Snowdonia Radio Companies SRC X80 vertical. This covers 3.5-28MHz with an atu, would handle up to 150 watts and had a reasonably low profile for a 5.80m vertical and it also had a 9:1 Un-un at the base so no radials were required! At only £46 plus £6 postage it seemed a real bargain so I decided to order one. A few days later a cardboard box about 4 feet long arrived containing the base support with Un-un transformer already attached and 5 aluminium poles of various diameters slotted loosely inside each other together with 5 jubilee clips, a plastic sleeve and some 'U' clamps, various nuts and washers. I will not bore you with construction details as it was a very simple affair and it was ready to be fitted to my fence post about 12" above the ground in under 30 minutes. It is worth mentioning that I did spend a bit of time sealing the joints for each length of aluminium tube with a liberal coating of silicone sealant to keep any moisture out. I was pleasantly surprised with the SRC X80 and the antenna was certainly on a par with my indoor loop on most bands. The antenna is light weight and easily carried which would also make it suitable for portable/holiday work and is simple to assemble, reasonably robust so for the price is very good value for money. It is available from The Snowdonia Radio Company, 44 Fron Fawr, Blaenau Ffestiniog, Gwynedd, LL41 3YD. Tel: 01766 831476 Email: sradioc@live.co.uk'

Running Open Wire Line through the House

From Gert PA3CRC comes this snippet about constructing open wire line. *'In the last Sprat Jerry G0AED told us about snap-on spacers for open feeders, very handy! When installing an antenna for a new ham, PA2CMD, we also used open feeders and most of the length runs inside just under the roof. There we used wood at intervals of 6ft to hold the line at some 8" parallel to a wooden beam of the roof. For the line, 2x 1mm stranded wire, we used cardboard spacer with duct-tape. This was an easy installation of course but only applicable for indoor use, emergency portable or sunny weather DXing. The spacing between the conductors was about 1" in order to keep the influence from nearby dielectric & conductors to a minimum. So there is a spacer every foot and though spanning is only 1", the line can be turned 180 degrees every 3ft without the wires touching each other'.*

A Windom Antenna for the 5 MHz and WARC Bands.

'An FD4 Windom or Carolina Windom will not match on 10 or 21 MHz, matching only on harmonic related bands'. Says Tom, GM3MXN and he has now developed his version of the FD4 Windom into a new version for other bands. *'Looking at 5, 10, and 21 MHz I noticed that they were not far off being harmonically related so thought I would give Windom a try for these bands. The total length is 26.97 metres feeding at one third (8.99 metres) through a 4 to 1 balun fed with 50 ohm coax. I have a reasonable match on all three bands although the other bands behave as they have a very high SWR. I think an improvement on the three bands could be achieved if the antenna was raised clear and horizontal which I cannot do at present. As I am unable at the moment get the antenna up in the clear and horizontal maybe some other member with a little work can improve the SWR'*. For a picture of this antenna look at page 73 in the GQRP Club Antenna Handbook.



(I found this WW2 Windom antenna in Google Images and couldn't resist it. Thanks to the Long Range Desert Group historians – bits of wire and a balun – 5 watts from the Wireless Set Number 11 so there's nothing new under the sun eh?)

Awards

Ryan G5CL is the recipient of QRP Master Award Number 149. Congratulations
G4NBI has received enough QSL cards to gain 'Worked All GQRP' at 640 confirmed.
Well done to you both Ryan and Les.

Anecdotes

I enjoyed the Winter Sports immensely using 4.7 watts from the K2 into 120 feet of wire using CW only but the following thoughts came to mind during the sessions.

- **Why** do British stations send '/QRP' after their call sign when it's illegal? Check your regulations British operators.
- **Why** do members call me, give me a report and swap GQRP numbers for a GQRP award when they admit they are running 10 or 12 watts on CW? ('QRP' on CW is 5 watts or less)
- **Why** is it when I ask a station to repeat **their** callsign in noise or interference they send **my** call three times and **theirs** **once**?
- If you remember, use your RIT to tune around for stations calling you off frequency when you call CQ, they may be crystal controlled, and switch your RIT off after the QSO.
- Finally, if you run a transceiver then work out your netting offset. When you receive just where **do** you transmit? You will need a second receiver to check this.

Valve QRP Day 2010 The next valve QRP day will be **Sunday April 18th** from 1400 until 2200 on all QRP frequencies. Just use a valve or tube transmitter, homebrew or commercial, crystal controlled or VFO or even a valve receiver. It's not a contest just an activity period. Please send any comments and photographs to me at g3vtt@aol.com by April 30th particularly the valve line up you are using, from wherever you are in the world. Have a great Spring and remember Summer is a coming in so see you down the beach with QRP.

Club 72

Club 72 is a new QRP group organized by Oleg Borodin RV3GM, who first introduced the "72" code greeting. The overall objective of Club 72 is to encourage QRP activity around the World. The club will sponsor an annual contest, promote a QRP Net and prepare an unusual award programme.

Full details can be found on the webpage

www.club72.su

COMMUNICATIONS AND CONTESTS

Peter Barville G3XJS, Felucca, Pinesfield Lane, Trottiscliffe, West Malling, Kent ME19 5EN. E-mail g3xjs@gqrp.co.uk

I started my SPRAT 141 column by saying that there were definite signs of improved conditions. This trend has continued, with solar flux figures climbing ever higher, which has resulted in good openings on the higher bands (eg 15m). If we're really lucky, the improvement might eventually mean better 40m conditions for contacts around the UK, so things are looking up!

WINTER SPORTS

As ever at this time of year, I will endeavour to give as much coverage to this event as space will allow. It remains hugely popular and is, for some members, the only event in which they like to participate, and then to share their logs with us all. Without their support, and the generally high level of QRP activity on the bands between December 26th and January 1st there would be no Sports in Winter!

My thanks to the following for sending their logs to me: Steve **G0FUW**, Snip **G0KQK**, Eric **G0KRT**, Charles **G0LVH**, Robert **G0WHO**, George **G3ICO**, Peter **G3JFS**, Derrick **G3LHJ**, Len **G3LHS**, Gerald **G3MCK**, Colin **G3VTT**, Chris **G3XIZ**, Tim **G4ARI**, David **G4HMC**, Roy **GI4CBG**, Mike **GM0OAA**, George **GM3OXX**, Brian **GM4XQJ**, Carl **GW0VSW**, Ted **AB8FJ**, Dieter **DL2BQD**, Tom **DM4EA**, Andy **I2IAL**, Pier **IK1RDN**, Johan **LA7FF**, Andrew **MI0BPB**, Pavel **OK2BMA**, Robert **PA0RBO**, Gert **PA3CRC**, Geert **PA7ZEE**, Robert **PA9RZ**, Valery **RW3AI**, Andy **SP9NLI**, Mike **W3TS**, Jack **W7CNL**, and Kare **YU7AE**. I hope I've not omitted any from the list, but my apologies if I have.

G0FUW "dusted off his first ever homebrew project", a PW Severn (2W) and submitted an all 40m log. **G0KQK** writes "I hope this event continues above all else. I am already looking forward to the next one!" In common with many others, Snip remarks on the consistent presence on the bands of the one watt signal from **GM3OXX** - "How does he do it?!" **G0LVH** ventured onto Bosley Cloud (1064ft asl) but only managed one 2m QSO before the persistent sleet forced him back down to the car. **G0WHO** used his newly completed K3 (finished on Boxing Day!) throughout the event, and enjoyed a 30min chat with **GM3OXX**. Contrasting the technology, **G3ICO** used his Michegan Mighty Mite 80m Tx running 800mW to work **GM3OXX** (1W), thereby creating the rare situation in which OXX was at the QRO end of the QSO! **G3JFS** worked PY2XB and V51AS on 17m, and N8RR on 40m. Another station to find Dx on 17m was **G3LHJ** who worked 5N3WQ. **G3MCK** used all valve gear (5W from a CO/PA with 80m superhet Rx). Several people commented on his spacer wave, which Gerald tells me was only 10mW! Who needs the dizzy heights of QRP when QRPp will suffice! **G3VTT** made 64 QSOs with his K2, logging 15 DXCC. Colin's highlights included N4AR on 30m, K0RU in Kansus 2-way QRP (20m) and "being called by my old chum **W3TS** on 20m". He also highlights "getting up at 0530 for early coffee & porridge with **GM3OXX** and putting more logs on the fire!" **G3XIZ** "had great fun" and logged AM contacts on 6m and 160m, and RTTY on 80m. **G4HMC** (like me) used his homebrew Picastar tcvr throughout the event.

GI4CBG comments that he remembers how his (then) girl friend used to pay for her own cinema ticket in order to help Roy fund his amateur radio activities. As he says "The things a man has to stoop to for the sake of amateur radio!" but goes on to point out that she was very understanding and is now his XYL. **GM3OXX** heard nothing on 15/12/10m and no QRP stations on 17m, but otherwise thought the general level of QRP activity from non-members made up for slightly less from G-QRP members. All his Dx was from the West, with little heard from the East, but he had most fun on 160m. We can all learn from his positive attitude - "still taking the tablets and making the most of every day." **GM4XQJ** worked into the USA on 40m, and **W7CNL** on 20m. **GW0VSW** was yet another to comment on hearing **GM3OXX** several times. Carl had 28 CW QSOs and 1 with PSK. **AB8FJ** was not able to to do his usual "get the rigs on the air" this year, but used his Argonaut V (5W) throughout. **DL2BQD** had an unusual QSO on 80m, with 3V/KC7JE/MM, while **DM4EA** worked 4Z5AD on 40m. Tom enjoyed his 63 QSOs, with none of "that stupid 5NN rush!" **I2IAL** might just have summed up the event when he says that the only QSO he had was with **GM3OXX**, whom **IK1RDN** says he heard loudly every time he turned on the radio! **MI0BPB** worked into VK with 5W on 20m. **OK2BMA** worked HS0ZCY/4 and VU2PHD on 40m, and ST2AR on 30m. **PA3CRC** says that he is not good at CW, and yet CW rag-chew QSOs are his favourite. His rig was a MO/PA (sometimes CO/PA) with a 4 valve superhet Rx from SPRAT 139. Winter Sports encouraged **PA9RZ** back on the air after going through difficult times following the unfortunate death of his father, and he even found the enthusiasm to build a two band trapped vertical for the event. **RW3AI** enjoys contests at this time of year and used them to make 194 QSOs (including 29 DXCC) with his IC706 at 5W. **W7CNL** in Idaho found that Eu openings on 20m peaked around 1600z, lasting 30-45mins but, although he could hear a number of weak Eu QRP stations, not many heard him call. His only Eu contacts were **GM4YLN** and **GM4XQJ**. **YU7AE** made his first 12 WS QSOs operating from his works QTH, the MW Tx of Radio Novi Sad.

I hope the above extracts from letters and logs give a flavour of the event, as enjoyed by others. Comments on conditions and activity were generally very favourable, although some found it hard going. I'm sure individual locations, antenna installations and also probably the equipment in use will have a considerable bearing on the overall view we all have on conditions and activity, but perhaps I can offer a couple more quotations which may put Winter Sports into its true perspective. **G3VTT** says "Poor conditions? Nah! Next year? You bet! Once again the QRP gang were out in force using real radio for real meaningful communication, and passing real intelligence & not just 5NN!" **G0KQK** says "No other event on the calendar gives me the satisfaction that this one does, and is very special. Keep it going, no matter what! It is a friendly get-together of like-minded people at this special time of year." He adds that he would not like to see it become competitive, which is a view I whole heartedly share.

However, the Club offers The G4DQP Trophy each year to the member submitting the best log of QRP contacts made during Winter Sports. I know that nobody would argue that, once again, the outstanding QRP station on the air was George **GM3OXX**. He has a remarkable signal with his homebrew 1W transceiver and wire antenna, and has become the true internationally renowned QRP Beacon. His presence on the bands is unrivalled.

During Winter Sports he had a total of 276 QSOs which included over 30 on 160m, over 70 on 80m, over 50 on 30m and nearly 100 on 20m. Contacts included PY4ZO 2-way QRP on 20m and W6QUV (San Francisco) who called George on 30m. I'm sure you will agree, that is one impressive log and well deserving of the G4DQP Trophy. Well done George!

CHELMSLEY TROPHY 2009
As I've done in previous years, I will defer publishing the results until the next SPRAT. Time and space is at a premium!

QRP IN THE COUNTRY
Walford Electronics announces a new event to be held on July 18th 2010 at Tim Walford G3PCJ's Upton Bridge Farm, Long Sutton, Somerset TA10 9NJ. Full details will be provided in the Spring but a wide range of electronic activities are anticipated, including an opportunity to operate the G3GC replica 1938 TX, informal home construction competition and advice clinic, Somerset Range kits to operate, (and buy!), bring and buy stall, transformer throwing competition, with food and drink from local sources. For partners, Janet Walford will be leading short farm tours. The event is free and West Country clubs are invited to let me know if they would like a free table (numbers are limited) for displays or Club sales etc. If the weather permits it will be held outside, otherwise it will be under cover in the farm barns.

This new event looks interesting and fun. For further information please contact Tim Walford G3PCJ at walfor@globalnet.co.uk

EUCW BULLETIN 4/2009
If you would like a copy of this bulletin, dated 4th January 2010, please drop me a line.

Please remember to send your **CZEBRIS** logs to me – you did remember to participate, didn't you? – in good time for inclusion in the next SPRAT. Enjoy the improving weather, and the improving conditions. Combine the two and venture out QRP portable? In any case, have plenty of QRP Fun!

The deadline for inclusion in the next issue is the beginning of May.
72 de QRPeter

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

WANTED: Looking for a solid state h/brew ssb rig single band 80m ok would consider all bands up to about 20w out. Incomplete or unfinished project. Also need a CIRKIT PA kit or what have you to offer in way of 20w PA working or needs finishing.
Contact Geoff. 07775981088 email: g4ded@gmx.com

WANTED: 12 volt input plug and socket for an HW7 or HW8. reply to Rev. Adrian Heath, G4GDR, 227 Windrush, Highworth, Swindon. SN6 7EB. Tel: 01793 – 762970, Mobile: 07866 – 981 – 569.

WANTED: HF QRP TRCVR TS120v or similar. Contact John G4VPU on 0191-2522304 Tyne & Wear.

MEMBERS' NEWS

by Chris Page, G4BUE

Highcroft Farmhouse, Gay Street, Pulborough,
West Sussex RH20 2HJ.
E-mail: <chris@g4bue.com>

The third Bath Buildathon went ahead just before Christmas and the photograph below shows two of the attendees building a radio (Brendon kits) for the first time: Alan, **G1HHL**, (foreground) who has had his licence for 25 years or more but only just discovered homebrew, and Dave, **MØSXZ**, who has been homebrewing since before he did the three levels of exam with the Buildathon in Bath. **GØFUW** says a contest is being planned to encourage those who built radio to use them on the air, details in *RadCom* and *Practical Wireless* soon. Anyone can enter with a QRP 80 metre voice transceiver but more points go to homebrew stations and bonus points for QSOs with Buildathon rigs. Steve says a £50 voucher for Walford Electronics is offered and those interested can contact him at <hartley_steve@ hotmail.com> about it.

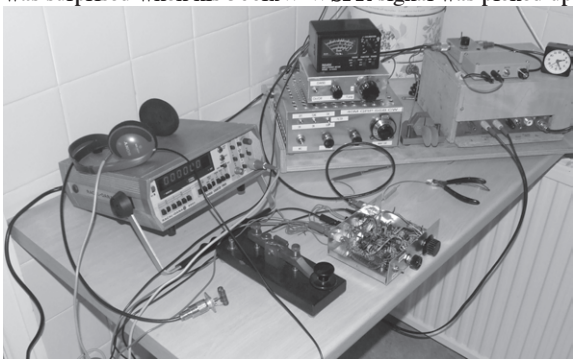
The photograph right shows the 62 attendees at the third ZL3 Radio Buildathon held on 30 January in Christchurch, New Zealand. **ZL3DWS** (**GW8WNY**) says the event is similar to the Bath Buildathon but the general public participate. On the day, 21 Mk484 AM receivers were built by school aged folk and ten 3560kHz 'ZL3 Pixie Twins' were built by local amateurs. For most, it was their first foray into QRP and home construction. David says he and Rory, **ZL3HB**, couldn't decide whether to offer the Pixie kits for 80 or 40m, so they created a PCB that accommodates two Pixies. After the Buildathon, another Pixie could be built on the second half of the board, or an NE555 sidetone, or any other published mod could be soldered in. To share out the fun of QRP, you could also cut off the second Pixie PCB and pass it along to a friend! Hence the name 'ZL3 Pixie Twins', see <http://sites.google.com/site/zl3pixietwins>. If you would like a 'ZL3 Pixie Twins' PCB, e-mail David at <ZL3DWS@nzart.org.nz>.

MMØGQA is working in Papua, New Guinea for three to six months and is QRV as **P29VAA** with his SW40+ 7008-7044kHz. Annas says his work will take preference over operating and for patience as he can only copy CW at 12-15WPM. **GØKOK** was QRV as **8P9CC** in December. To celebrate his 50th birthday, **SMØHPL** plans to be QRV from Gibraltar in late July and welcomes advice, etc from anyone who has operated there. **OK1CZ** was in the USA in November and entered the ARRL CW Sweepstakes in the QRP category with 5W and a three element quad at **W7XA**'s QTH in Arizona with his USA call **AA1TR**. **G3VTT** entered the FOC Marathon in the QRP Restricted Section for the first time this year with his K2. Colin used a 120 feet long antenna, 30 feet high and folded around his tiny garden and tuned against the radial system with a SGC230 tuner, and says, "QRP is not for the faint hearted and requires patience and the expected odd heartbreak when you get stamped on but, who cares? I had 48 hours of real radio and fun. I mean 35 countries and six continents including ZL, W, KP2, P4 and ZS on a little radio you can pick up with one hand, a pair of burglar alarm batteries and a piece of wire wrapped around the garden".

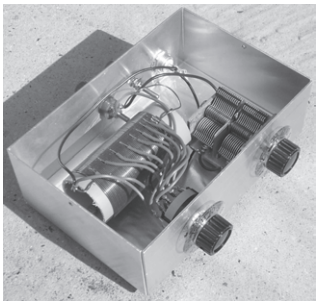
W2KJ in Wilmington, North Carolina, tried *Milliwatting* on 7 December during a QSO with **K5HDX** in Melissa, Texas on 14060kHz. Joe used his K2 (4W) to a centre-fed Zepp about 30 feet high and Sam was using a new TS-2000 to a homebrew vertical. Joe writes, "Sam wasn't sure if his TS-2000 would go down

to 5W so he reduced his power to 10W - still FB copy, and then found he could reduce power to 5W and was still FB copy here. I reduced to 2W, then 1W, then 500mW and was still good copy for him. I finally dropped to 100mW and he could still copy my signals. It always amazes me at how we can communicate over such long distances with such low power. I guess that's the fatal attraction of QRP - doing more with less and less! Imagine what can be done with some sunspot activity on the higher bands?".

On 20 January **G3XBM** exceeded his target of 100kms on 500kHz by a large margin when **OK2BVG** heard his 1mW ERP WSPR signal at a distance of 1229kms. This was a new country for Roger on the band who says, "Still picking myself up off the floor and I cannot begin to convey how exciting this is for me! Lubos must have 'good ears' and a quiet location to be able to do this". Later the same day **OK2BVG** decoded **G3ZJO**'s tiny 500kHz signal over the 814 miles path. Eddie was running about 200µw ERP which equates to 4,070,000 miles per watt! **M1KTA** comments, "Good work, it shows the power of weak signal software when you read in 500kHz references that in Terman's *Radio Engineering Handbook* (1943) stated the maximum working distance for 1kW 500kHz over salt water was 1500 miles!". **DA6TEC** was surprised when his 500mW WSPR signal was picked up by **VK6DOD**.

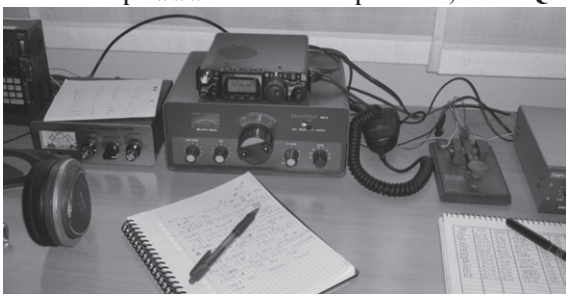


G4GLV is a keen homebrewer and sends the above photograph of his 'kitchen table station' comprising Small Wonder Labs SW40 and SW80 transceivers and Walford Bruton 40m SSB/CW transceiver (top right), Norcal keyer, Z match and homebrew L match (right).



MØNDE is one of the constructors who meet with **G3ROO** at Ian's Dover Construction Club. Nigel has built two MKARS80 rigs, one for himself and one for **M3RPN**, and then worked on a dead Norcal 20. Ian is building a replica Paraset, and Nigel has just started collecting parts to build his own replica of the same rig. So far he has about half of the front panel parts, "Just from looking around at the recent Dover Radio Club Rally which was a massive success this January". **G4NSG** says one of his local Birmingham club members has built the MKARS80 and everyone was surprised at its simplicity and ease of use. Stuart added the results are superb and he thinks many more will be built before long. **DA6TEC**'s MKARS80 is nearing completion. Carl says it is a joy to build, an excellent kit and fabulous value for money. He is desperate to find some vernier reduction drives, can anyone suggest a source for him, please?

YU7AE reports the results of the 2009 EA QRP Contest are at <http://www.eaqrp.com/concurso/resultado_test_cw_2009.pdf> and **EA4DAT** sends the rules for the 2010 contest on 17/18 April, full details from Juan (the 2009 rules are on the Internet at <http://www.radioham.info/?p=11850>). **DL2BQD** says a group of DL QRPers meet at 0730z on ±3560kHz every Monday calling 'CQ WS' which means Waldsassen, the town of the Annual G-QRP Meeting. **SM2BYW** says the his local club have celebrated their 50th anniversary by operating a beacon **SK5ØAU** on 1836kHz running 400mW. Jimmy invites reception reports be sent to <www.sk2au.org>.

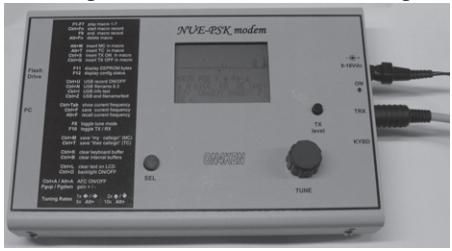


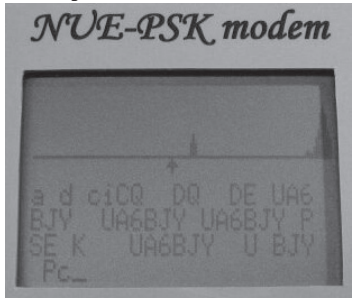
EA3FHC has built a new shack with less rigs than in the past. It is in two parts: (right) FT-817 and HW9 transceiver, and (top next page) some homebrew kits.

Miguel says he is active every weekend and afternoons on the CW QRP frequencies if propagation is open, using a 40 feet thin wire hanging from the window and coupled to a MFJ 971 tuner. He says, "When I need more 'push' I launch a wire to a tree 65 feet away. Normally it only stays there for a short time as the birds like to break it, luckily it's quite cheap!". On 13 February he worked a ZL on 30m with 4W.

G4WIF thanks **K4OAH** for reducing the 8mB SPRAT Index to just 700kB that can be downloaded from <www.gqrp.com/index.pdf>. It contains all articles from issue 1 to 140 and therefore the contents of the version 4 SPRAT CD (available from GQRP Sales). **G4ICP** mentions 'The In Practice Pages' website showing where to buy components and tools at <http://www.ifwtech.co.uk/g3sek/in-prac/components.htm>. Richard worked 11 of the 12 Dutch Provinces in the PACC Contest in February (missing FL) with his 5W to a doublet in the loft. A personal first for him was working through satellites AO51 and AO27 using 5W FM on the 2m uplink from his IC-706 and downlink on 70cms with a Kenwood mobile rig. Richard's antenna was a homebrew 'Arrow' which is a three element yagi on 2m and six elements on 70cms on a single boom, made from old coat hangers and scrap wood, and handheld!

Want to try PSK31 without a PC? At the beginning of 2009, **ON4KEN** bought a NUE-PSK modem kit with USB option from Midnight Design Solutions (**N2APB**, see <www.nue-psk.com>). Etienne says this is a very attractive system to make PSK31 contacts in portable or QRP operation without using a PC computer. You just connect an external PS2 compatible keyboard and the transceiver of course. The received text is displayed on the internal LCD display and can be recorded by the internal USB interface on an external USB stick memory (see pictures above)





Etienne writes, "I only bought the unpopulated printed circuit boards and the two programmed processor integrated circuits. As I use another LCD display that I has in my junkbox, I must add some components for the backlighting and the negative bias voltage. These circuits have been put on the green 'junction' PCB between the main board and the USB extension. This was also good to adapt the two boards to my box which is slightly bigger than the original one. For the front panel, I print the drawing on a white paper sheet and protect it with a plastic foil hot laminated. Then I used a double side self adhesive to fix it on the cabinet. Very nice design and working perfectly! The software can be easily updated and extensions are already foreseen for others digital modes".

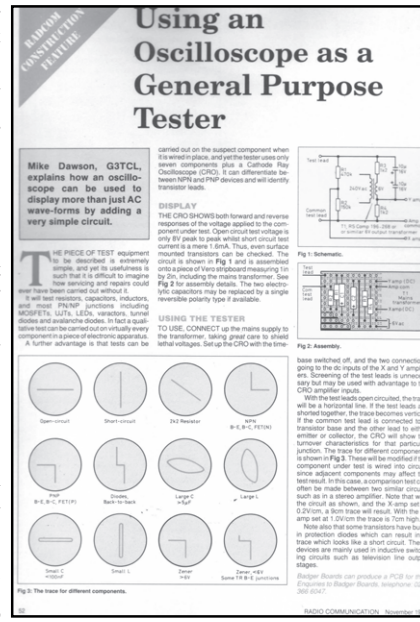
ZL4TE tried PSK31 in February, found the interface in a spares box and got it running with a G5RV and his old MFJ Travel Tuner. Pete worked into Alice Springs (VK8) on 40m and Asiatic Russia (UAØ) on 20m at 13000kms! He says he will have to get set up properly now and get some QRP going from 'down under'! **G5CL** reports **K3UK** has allowed the Club to use his sked pages on his website to arrange contact QSOs between members. The page is shared with FISTS and Ryan says hopefully it will help some members get those elusive QRP QSOs for the various awards the Club offers, see <http://www.obriensweb.com/sked/>.

The QSL card on the right is for Ryans' recent QSO with **VQ9LA** and is endorsed, 'VY FB QRP Station, Ryan!'. His FT-817 has, "Now made it past the 100 DXCC countries in style counting **ST2AR**, **A71QND** and **V51AS** as some of its early New Year 'victims'. However, on two occasions it has been a case of being in the right place at the right time as on 17m he has been scanning the band in the early morning/mid afternoon only to hear a DX station tune up prior to a pile-up. Ryan routinely hovers to see if it comes to something and recently this has paid off with QSOs with **JA4XRN** and **9J2FM**, both

of whom subsequently called CQ and Ryan was the first reply for a pair of 559 reports. On 18 January his current QRP DXCC stood at 103.

On 24 November **WB3AAL** QSO'd **9L1NH** on 15m with his K1 (3W) to a ground mounted HF9V Butternut with 132 radials. **AA1TJ** in Roxbury, Vermont, called CQ with his 'New England Code Talker' 20mW output on 80m on 1 December and was answered by **VE2FKZ** in Montreal. A second CQ resulted in a call from **AA1MY** in Bethel, Maine. Mike says, "I made a long, voice-powered transmission. I began by shouting in order to produce 40mW (telling him in CW, 'now 40mW' etc.) and then dropped down to 20mW, and finally 10mW RF output power (now using a normal conversational voice level). Seab came back on his Reggie (and I was still copying on my own Reggie receiver) saying that he had copied me all the way from 40mW down to 10mW! I know, I know - you would think it would be impossible to copy a (voice-powered) 10mW signal over a distance of 100 miles using the equivalent of a BFO'd crystal radio receiver, but that's what he did".

GØFCH was interested to read about the Octopus tester in SPRAT 141, as he, "Has a fascination for anything that confirms an electronic component is functioning correctly". Roger comes from a mechanical engineering background where components show some physical sign that they are doing their job but not very often in electronics, except for smoke signals! On the right is another version of the component tester, published in *Rad Com* in November 1991, that he built, used and found to be very useful. **G4NSG** says the Octopus tester devices were to be found in every pre-digital telephone exchange which had Crossbar or TXE4 type equipment and the technicians used them for fault finding on the PCBs. Stuart purchased a redundant one for 50p when an exchange was ripped out, and also bought a single sweep oscilloscope, which had just been returned from calibration and was declared redundant, for £15. He had to buy his own leads from Maplin as the official ones, "Are as rare as rocking horse manure!". Stuart retired from BT as an electrical design and development officer.


RADFORD CONSTRUCTION FEATURE

Using an Oscilloscope as a General Purpose Tester

Mike Dawson, G3TCL, explains how an oscilloscope can be used to display more than just AC wave-forms by adding a very simple circuit.

THE PIECE OF TEST equipment to be described is extremely simple, and yet its usefulness is such that it is difficult to imagine how servicing and repairs could ever have been carried out without it. It will test resistors, capacitors, inductors, and most PN/NP junctions including MOSFETs, UJTs, LEDs, varactors, tunnel diodes and avalanche diodes. In fact a qualitative test can be carried out on virtually every component in a piece of electronic apparatus. A further advantage is that tests can be carried out on the suspect component when it is wired in place, and yet the tester uses only seven components plus a Cathode Ray Oscilloscope (CRO). It can differentiate between NPN and PNP devices and will identify transistor leads.

DISPLAY

THE CRO SHOWS both forward and reverse responses of the voltage applied to the component under test. Open-circuit test voltage is only 9V peak to peak whilst short circuit test current is a mere 1.6mA. Thus, even surface mounted transistors can be checked. The circuit is shown in **Fig 1** and is assembled onto a piece of Vero stripboard measuring 1in by 2in, including the mains transformer. See **Fig 2** for assembly details. The two electrolytic capacitors may be replaced by a single reversible polarity type if available.

USING THE TESTER

TO USE, CONNECT up the mains supply to the transformer, taking great care to shield lethal voltages. Set up the CRO with the time-base switched off, and the two connections going to the dc inputs of the X and Y amplifiers. Screening of the test leads is unnecessary but may be used with advantage to the CRO amplifier inputs.

With the test leads open circuited, the trace will be a horizontal line. If the test leads are shorted together, the trace becomes vertical. If the common test lead is connected to a transistor base and the other lead to either emitter or collector, the CRO will show the turnover characteristics for that particular junction. The trace for different components is shown in **Fig 3**. These will be modified if the component under test is wired into circuit since adjacent components may affect the test result. In this case, a comparison test can often be made between two similar circuits such as in a stereo amplifier. Note that with the circuit as shown, and the X-amp set at 0.2V/cm, a 9cm trace will result. With the Y amp set at 1.0V/cm the trace is 7cm high.

Note also that some transistors have built-in protection diodes which can result in a trace which looks like a short circuit. These devices are mainly used in inductive switching circuits such as television line output stages.

Fig 1: Schematic.

Fig 2: Assembly.

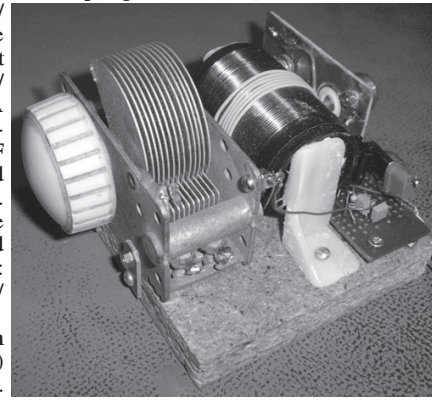
Fig 3: The trace for different components.

Badger Boards can produce a PCB for this. Enquiries to Badger Boards, telephone: 021 366 6047.

82 RADIO COMMUNICATION November 199

W4DU mentions the 'Four Days in May' (FDIM) 2010 QRP Challenge at the Dayton Hamvention. Ken says each year the FDIM attendees can bring their latest projects and enter them into the 'Building Contest'. There are six categories judged by the people attending Friday night's event. This year they will add a special category called the 'FDIM 2010 QRP Challenge', the rules are at <http://www.qrparci.org/fdim72>. **G4HZJ** says the 14th Red Rose QRP Festival will be held on 6 June at Atherton, Manchester, further details from Les. The New Jersey QRP Club (NJQRP) held their first quarterly 'QRP Dinner and Forum' in Princeton, New Jersey on 7 December organised by **N2APB** and **N2CX**. **GM4VKI** is hoping to have a Club stand at Scottish rallies, starting on 9 May at the Magnum Rally in Irvine. Contact Roy on 01563 850976 for him to book a stand.

If you enjoy fox-hunting then **ON6WJ** reminds you of the spring 2nd UBA QRP Fox Hunt to be followed by another in the summer, see <http://www.on5ex.be/foxhunt/>. **G3ROO** has set up a website for advertising the sale of vintage and homebrew gear (not Japanese) and components at <http://pub34.bravenet.com/classified/show.php?usernum=2902426017>. **M5AKA** says ROS, a digital spread spectrum mode but with a narrow total occupied bandwidth, looks a great mode for HF QRP working. Trevor says HF frequencies currently used for ROS are USB 3600kHz, 7053, 14101 and 28300kHz. The software has two Symbol Rates: 16 and 1 baud (the latter aimed at weak signals down to -35 dbs of S/N) and can automatically synchronise any Symbol Rate. Details: <http://www.southgatearc.org/news/february2010/ros.htm> and <http://rosmodem.wordpress. com/>.



The photograph on the right is **G3ICO**'s Michigan Mighty Mite transmitter (800mW output using a 2N2222) that he used during a Winter Sports QSO with **GM3OXX**.

George said he was running less power than George's (**GM3OXX**) one watt! **G3XBM** has been playing with ultra-simple transceivers and came up with his XBM80-2 design using just 14 parts. It puts out over 100mW on 80m CW, the RX can hear down to about -90dBm and the only RX/TX change-over is via the morse key. Several local QSOs have been made with it and **AA1TJ** built a version and has had several QSOs over 100 miles with his. More information on Roger's website at <http://sites.google.com/site/g3xbmqrp/Home/80_2t>. Roger is to resume work on 10m QRP building a simple CW/SSB rig, a project that should have been finished last year, says there is more impetus now the band is starting to come back to life. He has started a *YouTube* channel which has videos of his rigs, antennas etc, including the 500kHz transverter, XBM80-2, Sixbox and Fredbox.

MØJBA suggests an easy way to win a contest, or at least the QRP SSB 20m section for England - is to be the only entrant! John has just received his certificate for first place in this section in the 2009 CQWW WPX Contest. **GØLVH** was back on-air in time for the Winter Sports, following a ten-year break, using a 'vintage' TS-120V, SEM Z-match to a home brew ladder-line feeding a 135 feet inverted vee doublet at 27 feet. Charles' intention was to use SSB in the Winter Sports although local QRM from the Home Office ruled this out, so operation was on CW exclusively. The only band found to be serviceable when time was available was 80m. There is no CW filter in his TS-120V and with those that appear on eBay going for more than the rig is worth, CW filtering was achieved via a switched chain of four 741 operational amplifiers.

Despite reducing the size of the print, I have still not managed to keep this column to four pages - sorry George! However, that is a nice problem and one I would rather have than not having enough news to fill the pages. Thanks to everyone for their input. Please make a note of the deadline for the Summer SPRAT of 20 May to let me know how your Spring goes. Please note my e-mail address is now <chris@g4bue.com>, some of you are still using the old 'adur-press' one which will soon become defunct.

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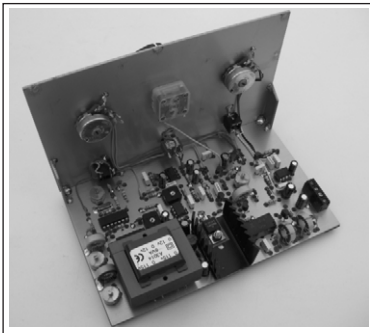

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QSL Cards from Nasko - LZ1 YE

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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