SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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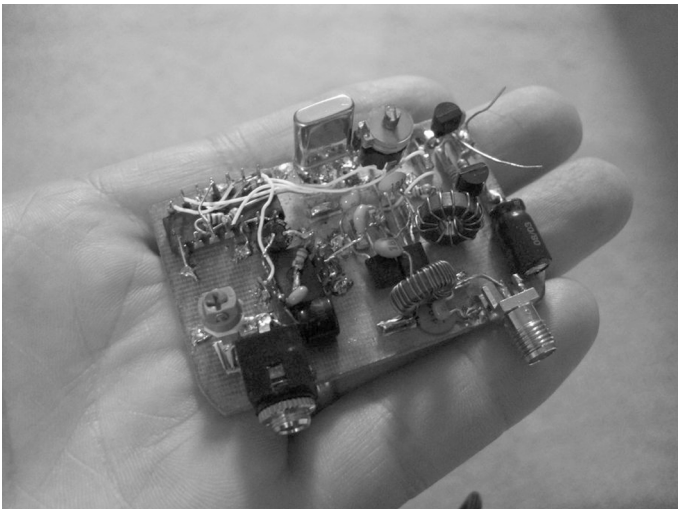
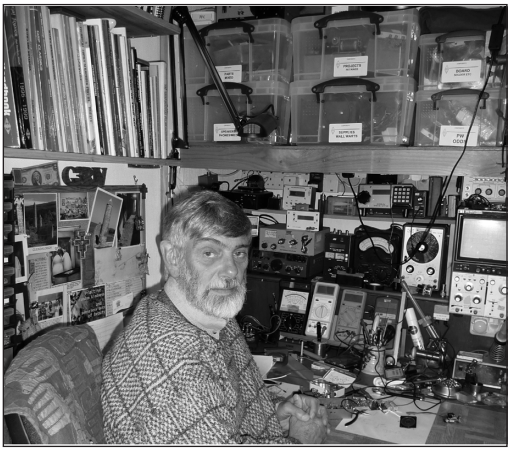


The “Classie” – Simple Class E Transceiver

Rishworth Convention ~ Homebrewed SBL1 ~ Digital AGC
Solder Paddle Thoughts ~ Leg Mounted Paddle ~ Pet Rock RTX
Credit Card Capacitor ~ The Classie Transceiver
Eden SSB IF System ~ Down Lighter Key ~ Zero Cost Dial
QRP in the Country ~ Subs and Sales ~ Buildathon 2010
Antenna – Anecdotes – Awards ~ Communications & Contests
Member’s News ~ Club Sales

JOURNAL OF THE G QRP CLUB



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Hopefully this issue of SPRAT will arrive before the Rishworth Convention. I look forward to seeing many members at what has become a more than worthy successor to the Rochdale Conventions. This year I am pleased to welcome Roy Lewallen, W7EL, as a speaker with his wife, Beth. I have known Roy for many years. He is well known through his antenna modelling software and that classic design; the W7EL Optimized Transceiver.

Please keep the material coming in for SPRAT. Every contribution, simple or sophisticated, is welcome. Any format from pencil and paper to a SPRAT-ready MS Word document is accepted. I can supply a blank SPRAT formatted Word document on request. It is the members' contributions that make SPRAT.

72/3

G3RJV

The W1FB Memorial Award 2010/2011

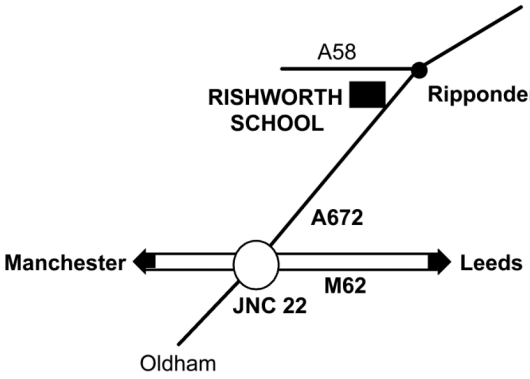
The project is to **Design a Useful Accessory for a QRP Station.** This can include any useful station addition with extra consideration given to innovation. Improvements on existing designs could be accepted. Please submit your design to G3RJV by the **end of March 2011**, with circuit diagrams, all 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

THE G QRP CLUB
MINI-CONVENTION

(in conjunction with the Halifax Radio Society)

Saturday 23rd October 2010
The Rishworth School, Ripponden



OPENS AT 10.00am

ADMISSION £2

DOORS OPEN 10am

TALK-IN S22

LARGE SOCIAL AREA LECTURES ON QRP SUBJECTS

BRING & BUY - SURPLUS JUNK - COMPONENTS

KIT TRADERS

FOOD & DRINK ALL DAY

WITH THE FAMOUS PIE AND PEAS

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

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

LOCAL ACCOMMODATION:
Look on the club webpage or ring G3MFJ [0113 267 1070] or G3RJV [01706 377688]

Large Hall Space for traders

Dedicated Lecture Theatre

On-site Car Parking

To book a table (or tables), contact Dick, G0BPS, on 01303 894 390, or by email to tables@g0bps.com

An Homebrewed SBL-1

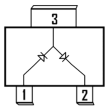
David Smith, G4COE, 54 Warrington Road, Leigh, Lancashire.

The price of a SBL-1 mixer is around £7 or so, we've have been making and using these for years in one form or another so let's make one… a 'drop in' replacement for our beloved SBL-1, for £7 you can make half a dozen or so!

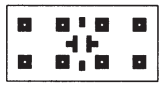
All we need is a scrap of PCB, two BAS40-04 (double diodes) and two 2843002402 binocular type cores or T37-43 cores, these are 43-type material made by FairRite. The whole lot can be obtained from RS Components, these being the main ingredients along with some copper wire… old transformers and relays etc. unwind them then clod em', my reason for keeping empty solder reels, they also make good coil formers!

About the Schottky diode BAS40-04 (40V, 120 mA max, Vf 0.38V @ 1mA).
The BAS40 comes in different configurations, wrong diode configuration and it will not work, so note the **–04** at the end, this is very important, other devices could be tried.

Yep looks like a creepy crawly, a surface mounted component. The secret, tin one connector pad on the pcb and lay the component flat down and hold it down with a tooth pick with the pointed end chopped off whilst soldering one connector only, or a strip of folded masking tape will hold them do the same with the other diode then solder the remaining, waiting a good few seconds before each joint to let the device cool using a earthed soldering using only a tiny spot of solder. These bugs need to be held one way or another whilst soldering or they'll run off.



BAS40-4 top view
Marked as 44

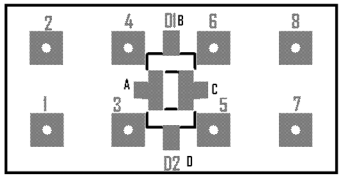


BAS40-04
PCB layout 10x20mm

LL4148
(actual size – top view).

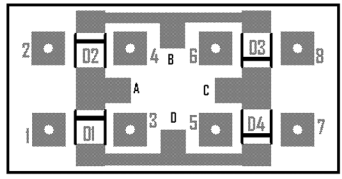
A PCB is also included for a 1N4148 SMD version. The end nearest the black band is the cathode, all that remains is to wind the cores which will serve both designs…. and make a nice little wrap-around case using a sheet of tin, brass, copper or even pcb material!

SMD component for the two versions (top view)



BAS40-4

These are soldered back-to-back.



1N4148

Connected as a ring. Note the cathode.

Before any soldering is done the first step is to insert eight PCB pins or use single core tinned copper to make it 'pluggable' bending the top end over to stop it falling out.

Now the gritty nitty:
The RF port of the SBL-1 was measured at 16uH on a Avo LCR, this would apply to all its windings, I intended this to be for a 9 Mhz IF so I aimed at around this value, for the lower frequencies a little more inductance might be beneficial for say 1.8 Mhz or below.

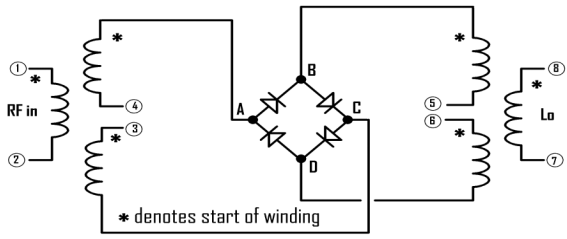
For each 2843002402 binocular cores, I used two pairs of 3 tightly twisted 30 – 34 SWG wire; 3 turns gave us 13uH whilst 4 turns give us 23uH. Here's a tip, solder all the ends together to make a fine point before winding, any problem getting the last turn through solder a piece of solid core tin copper wire to the ends and pull it through with that.

One could use just 2 twisted pairs, the third winding being a single winding immerging from the opposite end of the cores and put on last for pins 1,2 and pins 7,8 on the other transformer and must be the same number of turns used, this allows a neater flatter mounting and shorter leads rather than mounted vertically

The T37-47 core is far easier to handle but is a tight fit in the available space; we could make the PCB about 5mm wider. The wires can be increased to say 28 SWG and again twisted, 7 turns will give us 17uH whilst 8 would yield 22uH and 10 turns 35uH more than ample for our needs.

We need three 6inch wire lengths twisted for each transformer, Making the wire about 3 inches longer will allow us to tie one end to screwdriver and the other to something weighty, holding the screwdriver whilst spinning the weighty object did a nice job. When soldering the transformers tin all ends keeping them as short as possible. The transformers could be held in place with a drop of beeswax if required… always avoid glue with copper especially super glue!

The connections isn't complicated as long as you note the pin numberings are odds and evens and the diode connections being lettered A, B, C & D. Wind the cores then pair the windings off noting the start and finish, coloured wire is a boon here. For the connections see the diagram below ensuring the start and ends of the windings are connected as shown so they are 'phased' correctly.



Pin Connections:
1 RF in, 2 RF ground / 3 & 4 IF out (usually linked) / 5 & 6 ground / 8 osc in, 7 osc ground.
Welcome to the world of SMD, happy mixing.

Digital AGC
A PIC12F683 AF Derived AGC System

Ron Taylor G4GXO, Cumbria Designs

A microcontroller AGC generator offers comparable performance to a discrete full wave AF detection scheme but with significantly fewer parts. This design was originally conceived as an "add-on" for the Eden SSB IF system but is easily adapted for other receivers. The version described here is based on the 8 pin PIC12F683 although the software is easily adapted for any other PIC having an internal clock, analogue to digital converter (A/D) and Pulse Width Modulation (PWM) module.

Overview

Fig.1 illustrates the principal functional elements of the digital AGC system. The internal A/D samples the incoming audio to determine its amplitude either side of a centre rail bias point. A full wave detection process operates on the samples to produce a numerical AGC value which is used to set the duty cycle of a PWM waveform. The AGC voltage is generated by low pass filtering the PWM output with a simple RC filter. (This technique is identical to that described in the "Digi-Pot" article in SPRAT 139). To economise on parts and free up I/O pins, the PIC operates on its internal 8MHz clock giving an instruction time of 0.5uSec.

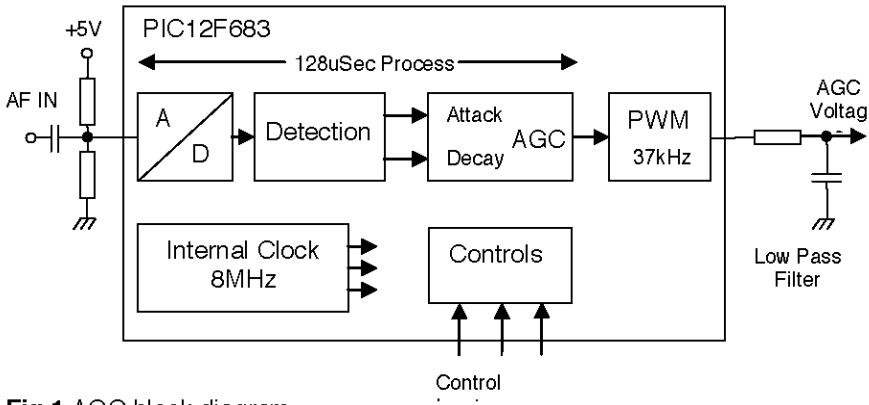


Fig.1 AGC block diagram

Detection

Audio from the receiver AF pre-amp is AC coupled to a resistive divider on the A/D input that sets a DC bias of 2.5V (mid +5V rail). The AF input is sampled by the A/D, the 10 bit result giving a resolution of about 5mV. For convenience a sampling rate of 128uSec is used (256x0.5uSec). Whilst arguably on the Nyquist limit for SSB audio, this rate has proved to be satisfactory. A simple analysis of the highest order bit of the A/D result determines whether the input is greater or less than 2.5V. The lower 8 bits of the A/D result are used to define the sample amplitude. This limits the measurable range to 2.5V+/-1.28V (2.56V p-p). Any voltage sample above the 2.5V bias point is treated as a positive

value and any sample below as a negative value. As the A/D measures from “ground up”, the 8 bit values of voltages below 2.5V are complemented to obtain their difference (i.e. amplitude) from centre rail. Thus, our AF input is converted to unsigned 8 bit values representing amplitude; in effect numerical full wave detection. Audio limiting of the input signal is required to prevent it from exceeding the 2.56V peak to peak limit. In the Eden IF system limiting is achieved by two back to back diodes across the feedback resistor in the AF pre-amp.

Each new amplitude result is compared with the “threshold”; an 8 bit value representing the input voltage in 5mV steps, (5V/1024) above which AGC action is required to take place. Every time the input exceeds the threshold the “Attack” branch increases the 8 bit AGC value, every time the input is below the threshold the “Decay” branch decreases the AGC. The attack rate is set by amplitude rate of change, the two decay rates (Fast and Slow) are linear and are selected by a control pin state. The AGC byte range is 0 to 255 (0x00..0xFF) giving 256 possible values. For a typical 80dB AGC range this offers an average 80/256 = 0.3dB resolution, unnecessarily high for linear gain control IF amplifiers, but useful for “ironing out” the curves and kinks of the non linear AGC responses typical of simpler IF amplifiers.

AGC Voltage Generator

The 8 bit AGC value is converted to a voltage by PWM. The PIC’s internal PWM module is configured to run in 8 bit mode producing a continuous output at approximately 31kHz. The AGC byte sets the duty cycle of the PWM output to give 256 possible pulse widths. After low pass filtering by R4 and C5, the PWM waveform is averaged to a variable DC voltage ranging from 0V to +5V in approximately 20mV steps, (5/256V).

Buffer Amplifier

The filtered output is amplified by a rail to rail (or capable of near 0V output) Op Amp configured as a DC amplifier with a voltage gain of 2. This doubles the AGC range from the filtered output of 0V..5V to 0V..10V and increases the step resolution of about 40mV, suitable for driving the gain control input of a typical Cascode IF stage. Other output ranges may be set by adjusting the gain of the buffer stage. With most IF amplifier designs, the buffer amplifier will have plenty of spare current capacity to also drive an S-Meter circuit.

Controls

The remaining free pin count of the PIC12F683 provides 4 inputs of which two are used for controls and two are available for future development. Internal pull up resistors hold the inputs in a high control state, grounding a pin activates the low control state. Input GP0 (pin 7) sets the AGC Recovery Speed; high=fast, low=slow. Input GP1 (pin 6) sets AGC Direction; high=negative going, low=positive going.

Implementation

The schematic of the AGC system is shown in Fig.2. As this is digital circuitry, good decoupling practice should be employed on the supply and if necessary signal and control lines, to prevent noise from entering your receiver. The prototype is installed in an MDS -

136dBm 70MHz SSB transceiver based upon the Eden IF system, with no impact upon performance. Within the Eden IF, the AF input is taken from the output of IC4 the AF pre-amplifier. The AGC voltage is applied to IF Amplifier gain control input at R15. If desired manual IF gain could be retained with switching to over ride the AGC.

Software

The software for this project is available for free download at **www.cumbriadesigns.co.uk/resources**. Please read the conditions of use at the beginning of the program listing. To compile or edit the program you will require a copy of MPLAB available free from the Microchip website; **www.microchip.com**.

Future Development

A considerable improvement in execution time could be realised at the expense of a couple of I/O pins, by clocking the PIC with a crystal at its 20MHz limit. A better option might be to use a higher end device, such as the 18 pin PIC18F1330, capable of 40MHz clocking with a 10MHz crystal and its internal clock multiplier, or 32MHz on its internal oscillator. Additional benefits include a useful extended instruction set, a faster A/D and higher PWM frequency offering improved suppression with simple filtering. The extra I/O pins offer plenty of scope for further enhancements such as a bar graph S-Meter and Tx/Rx sequencing, (ideas proposed by Eden Constructor Martin Rigby, G4FUI).

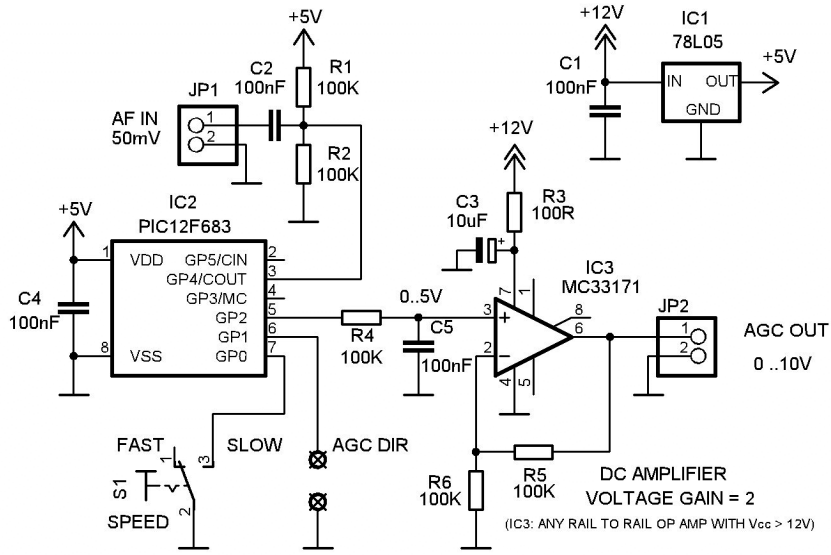


Fig.2 AGC system schematic

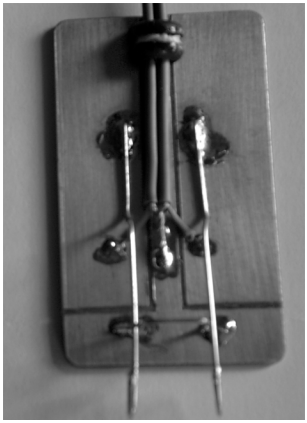
Further thoughts on IK1ZYW's 'The Solder Paddle'

Derek Alexander, G4GVM, 52, Brockington Rd, Bodenham. Hereford. HR1 3LP.

First of all, well done Paolo. It really is quite brilliant and great fun to use – pretty well on a par with any commercial paddle I have. Such a simple design, I just couldn't resist putting one together !

However, there are a couple of constructional observations I would like to make:

I found it very difficult to solder the paddles accurately and neatly. After some consideration, I drilled a 1 mm hole in the PCB at the fixed end of each paddle, about 10 mm from the centre line, bent the last 2 mm of the end of the paddle wire down 90 degrees to fit the hole (making sure the two paddles were the same overall length). Then, with paddle gripped in position with a clothes peg, soldered over the hole and up the wire about 10-12 mm - instead of the 'blob' shown. The bent wire ends needed to be filed flat with the underside for the board to lie flat on the plinth !



Also, I have fixed the three connecting wires underneath the front half of the paddles. This allows the cable sheath to be clamped where it was previously connected, as it leaves the board, and makes for a more secure connection. I bound it with thread through holes either side, about 10 mm from the end of the board. It needed a small channel cutting between the holes under the board to accommodate the thread and allow the board to lie flat on the plinth. Half a grommet over the top of the cable before securing the thread completed the clamp.

Thoroughly recommended- I can't stop using it all the time !

Children in Need at the Rishworth Convention

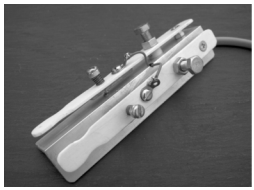
Richard G3UGF

Last year, "Bring-a-Book-Buy-a-Book" raised over £100.00 for the BBC Children in Need Appeal at the Rishworth Convention . We all have a Radio, Science or Engineering book on our shelves that we don't often use anymore. Maybe it's a Valve, Transistor, IC applications book, a service manual, circuit or Antenna handbook. Bring it or send it with a friend to the GQRP Convention at Rishworth. It will be marked with a minimum donation price and hopefully be sold for more on the day Books (not magazines) can also be sent direct to G3UGF QTHR

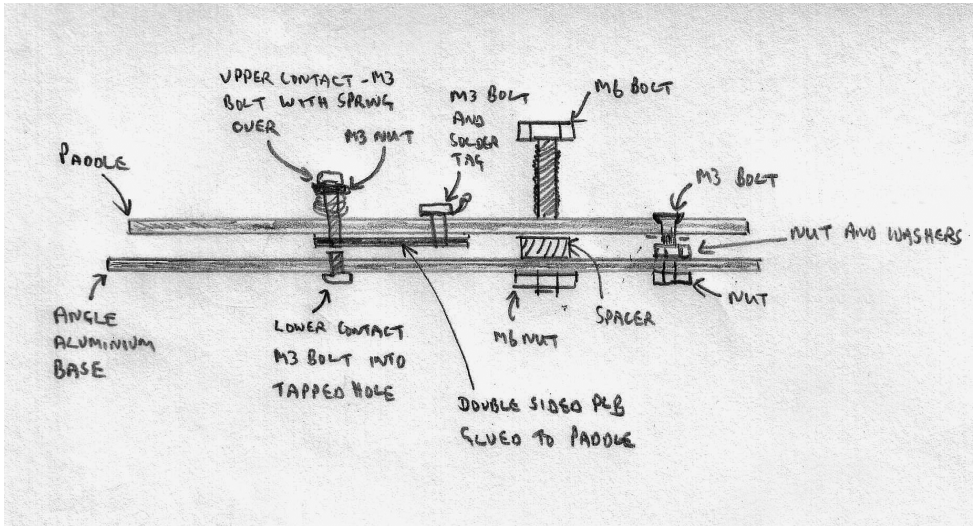
Leg Mounted CW Paddle

Robin Harris, G4GIY, 303 Northgate, Cottingham, East Yorks, HU16 5RL

Portable operations during an English summer are great fun, provide new challenges and a popular with QRP enthusiasts. However, CW operation depends upon having a key that can be used in a variety of make-shift positions, sometime without a flat surface. The twin paddle described here has made my portable operating much easier. Rolf, HB9DGV showed me his version and it worked so well I made my own. Construction is straightforward and requires no special skills. At first sight the idea of having paddles at 90 degrees to each other may look odd, but in use the feel of this paddle is very good. Another benefit is that is costs almost nothing to build and saves a fortune compared to commercial paddles for portable use!



The basis of the paddle is a 105mm length of aluminium angle 20mm x 20mm x 2mm (mine came from B&Q). The paddles are made from any plastic and are 100mm x 10mm. I used sections cut from a shatter proof ruler that are 2.5mm thick. The flexibility of the paddles affects the way the paddle feels in use so you may need to experiment a little. The thickness of the material as well as the length impacts the "springiness".

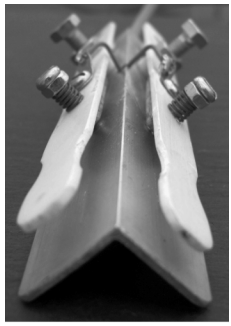


The paddles are fixed towards the back by two bolts. The foremost is larger and protrudes 15mm above the paddles. This provides an easy fixing for a length of button elastic (available from needlework and craft shops) which passes around your leg to hold the

paddle on your thigh. Button elastic has holes along the middle of its length so adjustment is trivial.

Contacts are made from M3 bolts. The lower one is screwed into a tapped hole in the base to protrude about 1mm. The upper one is left long and I added a nut near the head to make adjustment easy. A connection to the upper contact is made by gluing a 25mm piece of double sided PCB to the paddle and passing the contact bolt through it. At the other end of the PCB is another M3 bolt and solder lug. The holes in the PCB and the paddle are tapped to take this bolt.

Key points to remember:



- The paddles need to be mounted with spacers that keep them parallel to the base
- The length and thickness of the paddles provides the springiness so choose your material with care and be prepared to experiment
- All holes for the contacts need to be tapped to accept the bolts – mine are all M3. Remember to drill the holes the correct size for the taps – M3 threads require a 2.4mm hole
- Avoid spacing the paddles more than about 4mm above the base. Any more than this makes the two paddles feel a long way apart for operating

Dover Radio Rally - January 16th 2011

Make sure you get this placed in your diary as Whitfield village hall has now been booked for the event. Due to last years popularity we have booked both halls for the 2011 event. Traders book early to avoid disappointment.
Opening times: 9am - 1pm. Auction starts at 12.30pm, Admission £1
Further details at http://www.doverradiorally.com/

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

FOR SALE: Used Elecraft K2: £850 O.N.O. (Serial No: 2448, revision B, firmware version 2) Included: Fully Built 80 to 10m 15W CW Rig with SSB adapter, Analogue Audio Filter/Clock and Internal 20W Auto ATU - Electret Fist Microphone - Manual and associated extra module information - Carry case. Contact: Nick 2E1LOK / GQRP 11458 locksbury@hotmail.com / qrz.com

WANTED: Information on Operating QRP/M on Canal Boats. Do any members have experience of using HF/160m when on the UK canal system? Are there any nets in operation? Any advice would be appreciated! Dave G3PEN davepennyg3pen@yahoo.co.uk), Thanks, hopefully! Dave G3PEN

My Little (Pet Rock) Mate Transceiver

Steve Hartley, G0FUW, 5 Sydenham Buildings,
Lower Bristol Road, Bath. BA2 3BS

I wanted a 'rock bound' CW transceiver to take part in QRP-ARCI Pet Rock Celebration 'sprint' on 2 January 2010.

The rig was made up from existing 'junk' and ended up being very similar to the 'Little Mate' CW transceiver by Drew Diamond, VK3XU, from his 'Radio Projects for the Amateur', Volume 2 [now available from G-QRP Club sales]. My version is for 40m only.

The oscillator was changed to use a general purpose NPN transistor (like 2N3904) with 3.58MHz ceramic resonator in place of free running FET VFO [see Carrying On the Practical Way by George Dobbs, G3RJV in February 2005 Practical Wireless]. I checked and ceramic resonators *are* classed as crystals, by the way. A red 5mm LED and 33pF silver mica cap used as varicap to give RIT [See Hans Summers, G0UPL, fine explanation on use of LEDs at: http://www.hanssummers.com/radio/varicap/led/index.htm]. Two further '2N3904s' were used in a doubler circuit with tuned output for 40m. I found that the RIT mid-point voltage was not 'even' across band so ended up with only one direction of offset with 12V across the 'varicap' for TX, variable 12 to 0V on RX.

The receiver was a Manhattan-style 'Sudden' as built at 2009 FDIM and G-QRP Rishworth Buildathons [see QRP Quarterly Summer 2009 and SPRAT]. VXO components were removed in favour of the off-board VXO. AF amp was modified as per 'Little Mate'; 12V DC supply rather than 9V, no series resistor to supply pin and no feedback components between pins 5 and 8. I may add CW filter stage between product detector and AF amp later also may replace single toroid input tuned circuit with double tuned filter, but for a simple circuit it works really well on air.

The transmitter board was built pretty much as per the original 'Little Mate', less the band-switching components; 2N3866 driver, IFR510 power amp, 2N2905 keying switch. The board will produce 6W but bias was adjusted to a little over 4W to keep it QRP legal.

Transmit/Receive change-over was quite crude with just a simple DPDT switch for DC and antenna; I may go for a semi-break in relay later. The whole thing was housed in a Maplin AB15 aluminium project case with 6:1 slow motion vernier drive on VXO tuning knob. VXO was housed in a Maplin AB28 project case with other boards screwed to sides. I am not a follower of the Altoids movement and prefer my radios to be radio sized! [Maplin is a UK electronics dealer, a Radio Shack kind of place, but not as ham friendly].

Final wiring was completed 5 minutes before start of Pet Rock event – a close shave after a couple of wiring errors were sorted. Just five contacts were completed over next 3 hours but they were spread across 5 different European countries. Not a performance to get the

hard core contesters worried, but I enjoyed myself and was amazed to find that I bagged third place.

Antenna was temporary half-size (centre loaded) dipole sloping from about 7m by the house to 2m down the garden and rig powered by 12V gell-cell battery.

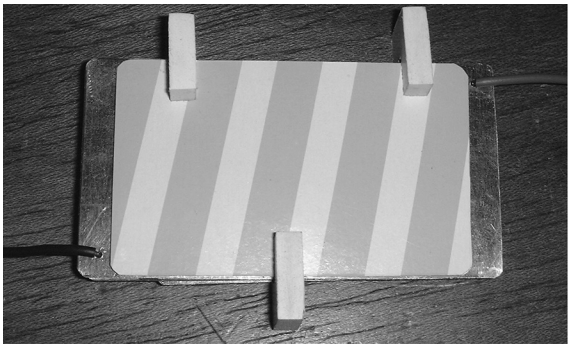
To cap it all, my Pet Rock transceiver was chosen as the winner of the homebrew competition at the QRP in the Country event run by Tim Walford on his farm on 18 July 2010.

Credit Card Capacitor

Richard Wilkinson, G0VXG, 139 Church Road, Telford, TF8 7ND

After constructing a loop for my 500kHz transmitter I realised that I needed a capacitor of about 350pF to tune the loop. I had a variable wide vane capacitor of 150pF so required a fixed value of 250pF at about 1kV. After looking through my junk box I found that I had nothing of that value and voltage.

After some experimentation I found that I could make one using credit cards and tin plate. 4 plates and 5 cards gave me the value that I required, the tin plate was obtained from a coffee tin. The tin is easily cut to credit card size using tin snips. I drilled a small hole through one corner of all 4 plates and assembled the capacitor as in the diagram. It is probably a good idea to cut out the chip in the credit card. The 2 holes at each end should be lined up and a wire soldered to each of the plates. It might be useful to use double sided tape to hold the plates and cards in place during construction. The capacitor could then be wrapped in insulating tape or as I did cut 3 clips out of plastic to hold it together. The capacitor is slightly variable and by compressing it a little can change the value by 50pF or so. I have been using it for a little while now and it seems to work without any problems…



Correction to “BITX on 12m”

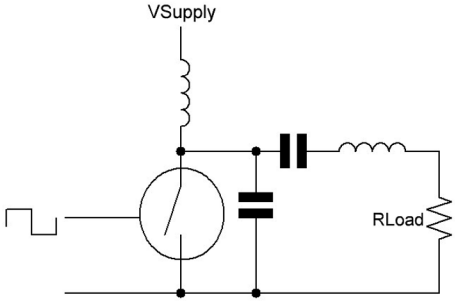
(SPRAT 143) Nigel G0EBQ

The capacitor values in the crystal filter should be 120p (not 68p) and 56p x 2. My apologies to anyone who may have tried it.

The Classie – A Simple Class E Transceiver

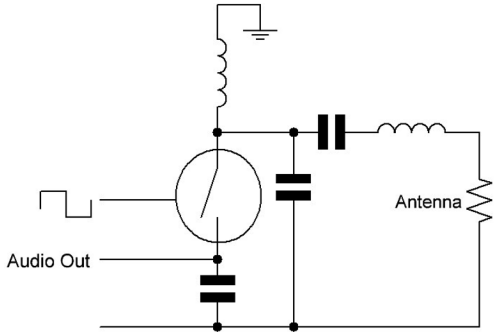
Rich Heslip, VE3MKC, 6656 Bluebird Box 19, Kars. ON K0A 2EO. Canada

Class E RF power amps have been around for many years. Their merits are simplicity, efficiency and robustness. While a detailed explanation of the class E circuit is beyond the scope of this article, the idea is to drive a resonant output network using a low loss switch such as a MOSFET. The network is designed such the switch closes when there is no voltage across it, thus minimizing power losses. The network design assumes the switch is on for half a cycle. I analyzed the circuit below with LTSpice and found it behaves as a series resonant filter centered on the transmit frequency. The resonant frequency can also be calculated by observing that the capacitor across the switch terminals is in the circuit half the time. The design of the output network is fairly complex because several design parameters must be taken into account including matching the output load. Fortunately there are free tools available to do this!



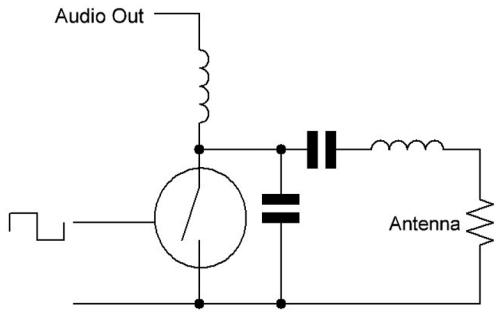
The Class E PA Circuit

The MOSFET can also be used as a mixer. If we reference the drain of the MOSFET to ground and add a filter capacitor to the source the circuit becomes a series switched mixer. With this simple modification we have created a direct conversion receiver with a tuned input network.



The Class E RX - Series Switch

I shared this idea with Wes Hayward W7ZOI and he suggested I try using the MOSFET as a shunt switch - this works as well. The T/R switching and muting is a bit more complex to implement than the series switch version. Experimentation is needed…



The Class E RX - Shunt Switch

A bare bones 40M transceiver using this idea is shown (**see Centre Fold**). I call it "The Classie" (pun intended). W4ENE's "Class E Designer" program was used to create the output network which also matches the PA to a 50 ohm load. I used BS170 MOSFETs because they are cheap, rugged and have low gate capacitance - 2N7000s will work too. In receive mode, power is removed from the PA MOSFET via Q1. R4 references Q2's drain to ground during receive and audio is recovered via C1. Q3 switches Q2's source to ground in transmit mode and also mutes the audio.

I experimented with various transistor VXO circuits but I couldn't come up with a simple design that would provide a consistent 50% duty cycle. I ended up using a 74HC74 to create a 14.060 MHz VXO – the use of a flip flop as an oscillator is borrowed from one of Hans Summer's clever huff puff designs. The second flop provides a square wave at 7.030 MHz to drive Q2. Audio gain is provided by an LM386.

Performance

The Classie RX is fairly sensitive and current consumption is only 17ma. Like most simple DC receivers it has a tendency to hum and there is some breakthrough of strong SW stations. The transmitter produces 1.8W at 12V while consuming around 260 mA. If you subtract out the quiescent RX current and the current wasted by R3 and R4 this works out to a PA efficiency of about 68%. I have achieved over 80% efficiency at 1.2 W out by changing the output network. The MOSFET barely warms up and doesn't need a heat sink.

The PA will tolerate transmitting into a short or an open load although it probably will not survive this forever. The output of a class E amplifier has some second harmonic but a resonant antenna system is usually enough to clean up the signal. A trap tuned to the second harmonic at the antenna port will clean it up as well.

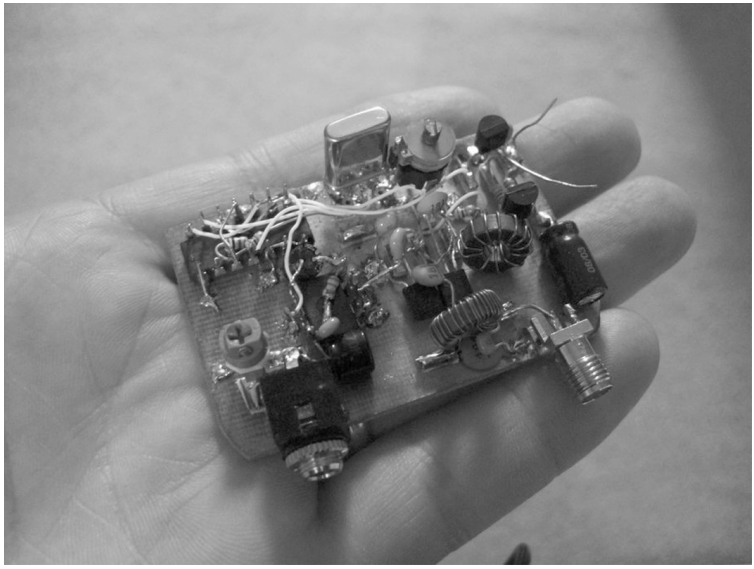
For Further Exploration

There is lots of room for experimentation with the basic Class E TRX circuit. Moving to different bands is a matter of fiddling with the VFO and redesigning the output network. I tested the original circuit using a DDS VFO and found the class E network will work over an entire band. A small capacitance from pin 4 of the 74HC74 to the drain of Q4 will provide a transmit frequency offset. Connecting to the collector of Q1 should work as well.

Class E Designer allows one to change output power, supply voltage and network Q among other things so the circuit can be optimized for the chosen operating parameters and MOSFET used. An IRF510 can handle much higher power levels than the BS170 but it's harder to drive due to increased gate capacitance.

Hopefully some of you will take the Classie transceiver concept to the next level !

I would like to acknowledge Wes Hayward W7ZOI, Mike Rainey AA1TJ and Hans Summers G0UPL for providing ideas and inspiration for the Classie. Thanks to James Tonne W4ENE as well for his wonderful free Class E design tool which can be downloaded at www.tonnesoftware.com.



Editor's Note:
The final circuit in this article forms part of the centre-fold pages and readers may detach the centre pages for the Classie circuit and the Eden SSB IF circuit on the reverse of the centre pages. I regret any inconvenience but both circuits are too large for our A5 page format.

The Eden SSB IF System

Ron Taylor G4GXO, Cumbria Designs

This simple IF system was designed for the Eden Valley Radio Society's "Eden" 70MHz SSB Transceiver project. The aim of the project was to "get people building" and more specifically introduce those who may have not previously built anything to basic electronic construction and RF techniques.

Though simple, the design offers good performance and is suitable as the core of an SSB transceiver from a few kHz to 144MHz. In balancing complexity against performance, some careful compromises have been made. The most obvious is the absence of an AGC system.

This is intended to form a later phase of the Eden Project and may use a PIC processor to keep component count low (and to serve as an introduction to PIC programming). For traditionalists, a regular full wave audio AGC scheme could be used here to good effect.

(See this issue page 6 ff – Editor)

There is deliberately no PCB, all construction takes place directly onto copper laminate. The skills imparted from mastering this technique will serve new (and not so new) constructors well in their future project careers.

Signal Flow

Anyone who is familiar with the G3ZVC/G4CLF Plessey SL1600 IF systems or the Belthorn IF Module, will immediately recognize the Tx/Rx signal flow. This topology uses bi-lateral circuitry to share several key stages for the transmit and receive signal paths without the complexity of signal or oscillator switching. The circuit is best understood by describing each signal path in isolation.

Receive Signal Path

The "Front End" is a double balanced mixer (DBM) comprising of two transformers and four 1N4148 silicon diodes. The DBM requires around +10dBm of local oscillator drive and converts the RF input to the 11.0592MHz IF. To ensure good balance in the DBM, electrical symmetry is paramount. Accordingly, the transformers are tri-filar wound onto FT37-43 cores and the diodes are taken from the same "tape band" or ideally matched for close forward voltage drop with a digital volt meter (DVM). (See the note at the end of the article regarding winding the transformers). The input to the DBM is via one of the DC coupled mixer ports. This ensures good RF performance down to almost audio, a useful attribute for LF/VLF operation. Be sure to AC couple the input to prevent any standing DC condition on the input from un-balancing the mixer!

A bi-lateral amplifier employing two J310 JFETs (Q2, Q3) provides the mixer termination and around 14dB of gain. The signal direction in the bi-lateral amplifier is set by single rail supply switching between the two JFETs. PIN diodes are used in the JFET drains to isolate the unused amplifier; PIN diodes are expensive, one constructor reports good results with the much cheaper and readily available 1N4148 or BAV21 diodes.

Crystal Filter

A simple 11.0592MHz 2.5kHz Cohn SSB filter with an impedance of around 180 Ohms follows the amplifier. Whilst this type of filter doesn't have the flattest of responses, the stopband is remarkable for such a simple filter and more than justifies the compromise of a "bumpy" passband. Crystals are selected from a batch and matched in frequency to within 100Hz or better using a simple oscillator and a frequency counter. If you do not have a frequency counter do not be afraid to experiment, just build the filter and substitute crystals until you have a "good" sounding filter. Other filter types may be used here including commercial filters such as the 6 pole SSB filter offered by the G-QRP club sales. (See later comments about carrier oscillators). The termination impedance is adjusted to the suit the chosen filter by changing the turns ratio of the matching transformers. FT37-43 cores are used for both transformers.

After the filter, the signal path branches into the Tx and Rx routes. The Tx route is not switched and so the internal 1.5k load resistor of the modulator (IC2), forms part of the filter termination and is accounted for in the transformer matching.

IF Stage and Product Detector

IF gain is provided by a single hybrid cascode stage formed from a JFET (Q4) and a bi-polar transistor (Q1). An LED in the source circuit "lifts" the source voltage to increase the gain control range. This amplifier has seen popularity with Russian constructors and was recently the subject of an IF design by W7ZOI published in QST. The hybrid cascode provides about 20dB of gain, which for the gain distribution in the Eden is satisfactory. More significantly, the gain control range of this stage is in the region of 80dB, offering the possibility of very effective manual or automatic gain control with little additional circuit complexity.

The IF stage is followed by an NE612 product detector (IC3). I confess to having always been wary of these devices because of their relatively poor strong signal handling ability. Whilst I certainly wouldn't use one as a front end in all but the simplest of receivers, as a product detector, with its view of the outside world "blinkered" by a crystal filter and regulated by a variable gain IF stage, the NE612 provides good service offering a useful conversion gain. Just to clarify, this device can be an SA602, SA612, NE602 or NE612 – they're all the same! The internal oscillator of IC3 is used as the receive carrier oscillator.

AF Stages

The AF output of the product detector drives a conventional low noise pre-amplifier employing an NE5534 (IC4). Diode limiting and a low pass response are used to tailor the audio for use with an AGC system. The AF power amplifier is an LM380N-8 (IC5). This was used because it was to hand. There are many other options here including the TDA7052A described in SPRAT 142.

Transmit Signal Path

If you visualize the receive signal path working in reverse, then other than the operation of the microphone amplifier and modulator there is very little to describe here! The audio input is terminated by R3 and amplified by the NE5534 microphone amplifier (IC1) to drive an NE612 balanced modulator (IC2). The internal oscillator is used as the transmit carrier oscillator. The upper sideband component of the modulator's DSBSC output is removed by the crystal filter and the resulting lower sideband signal is amplified by the bi-lateral amplifier which is now operating in the transmit direction. The lower sideband IF signal is mixed in the DBM with the local oscillator and filtered to select the upper or lower sideband RF output at the desired transmission frequency.

Supplies and Tx/Rx Switching

The circuit is controlled by three +12V supply inputs; +12V permanent, +12V Rx and +12V Tx. The Tx and Rx supplies are conveniently provided by a SPCO relay.

A 78L08 TO92 regulator (IC6) provides the +8V supply for the product detector and modulator. The +8V supply is also used to provide the bias voltage for the AF pre-amplifier and the microphone amplifier. Two 2N7000 power FETs (Q5,Q6) switch the +8v supply between the Tx and Rx stages. The FETs are controlled by the +12V Tx and Rx supplies.

In the absence of the DC load of a PA strip to quickly discharge the Tx supply line, there is a loud Tx to Rx "thump" from the speaker. An AF mute circuit overcomes this together with AGC options will be described in a future article.

Carrier Oscillators

Separate carrier oscillators are used for transmit and receive for two reasons. Firstly this arrangement saves a few components (low part count was one of the project objectives) and secondly, as the Tx carrier oscillator is switched off during receive, there is no risk of leakage around the common signal path into the product detector. Whilst this arrangement lends itself to home made filters where crystals are generally low cost and plentiful, it is not so convenient for commercial filters or where sideband switching is required. Should you elect to use a common carrier oscillator to drive the product detector and modulator, check to see if leakage is a problem and if necessary incorporate some form of signal switching between the NE612 oscillator inputs.

LO Frequency and Sideband Selection

The choice of local oscillator frequency will determine whether the resulting operation of the IF system will be upper or lower sideband. For example, with an 11MHz IF operating in LSB and a 25MHz LO, the 14MHz difference will be USB and the 36MHz sum LSB. With a 7.5MHz VFO the 3.5MHz difference will be LSB and the 18.5MHz sum will also be LSB. For USB place the LO above the IF and use the difference, for LSB place the LO above or below the IF and use the sum or the difference. If in doubt draw a frequency diagram, *Fig.1*.

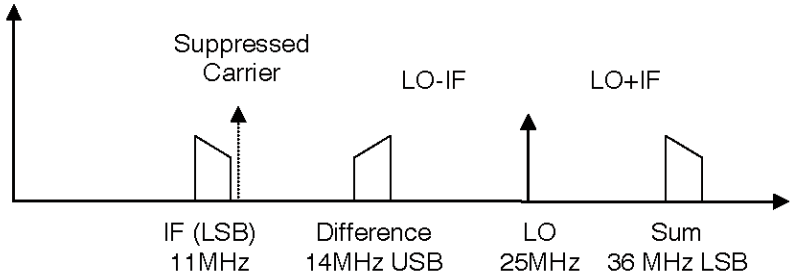


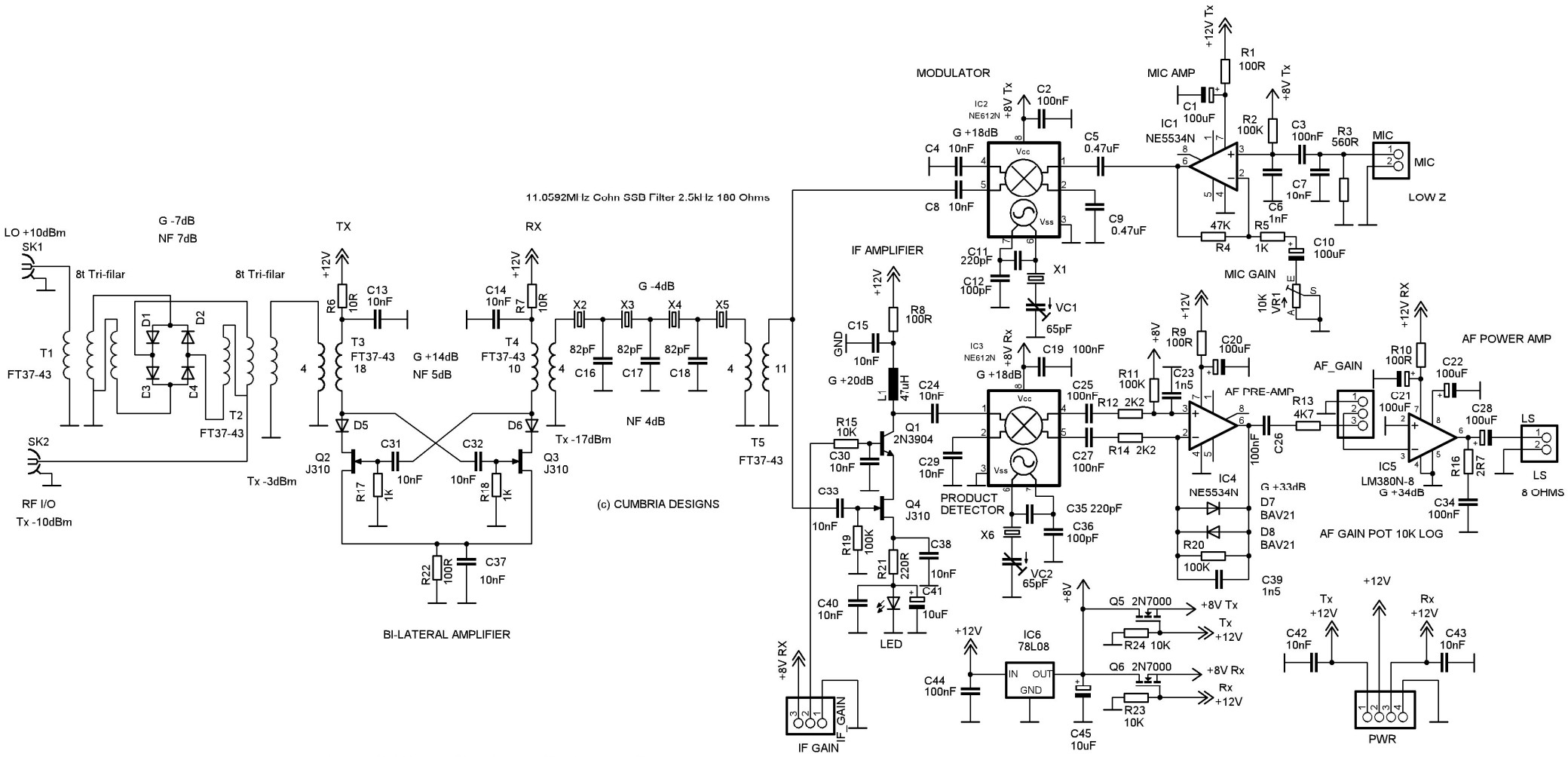
Fig. 1 *Frequency diagram for high side LO*

Construction

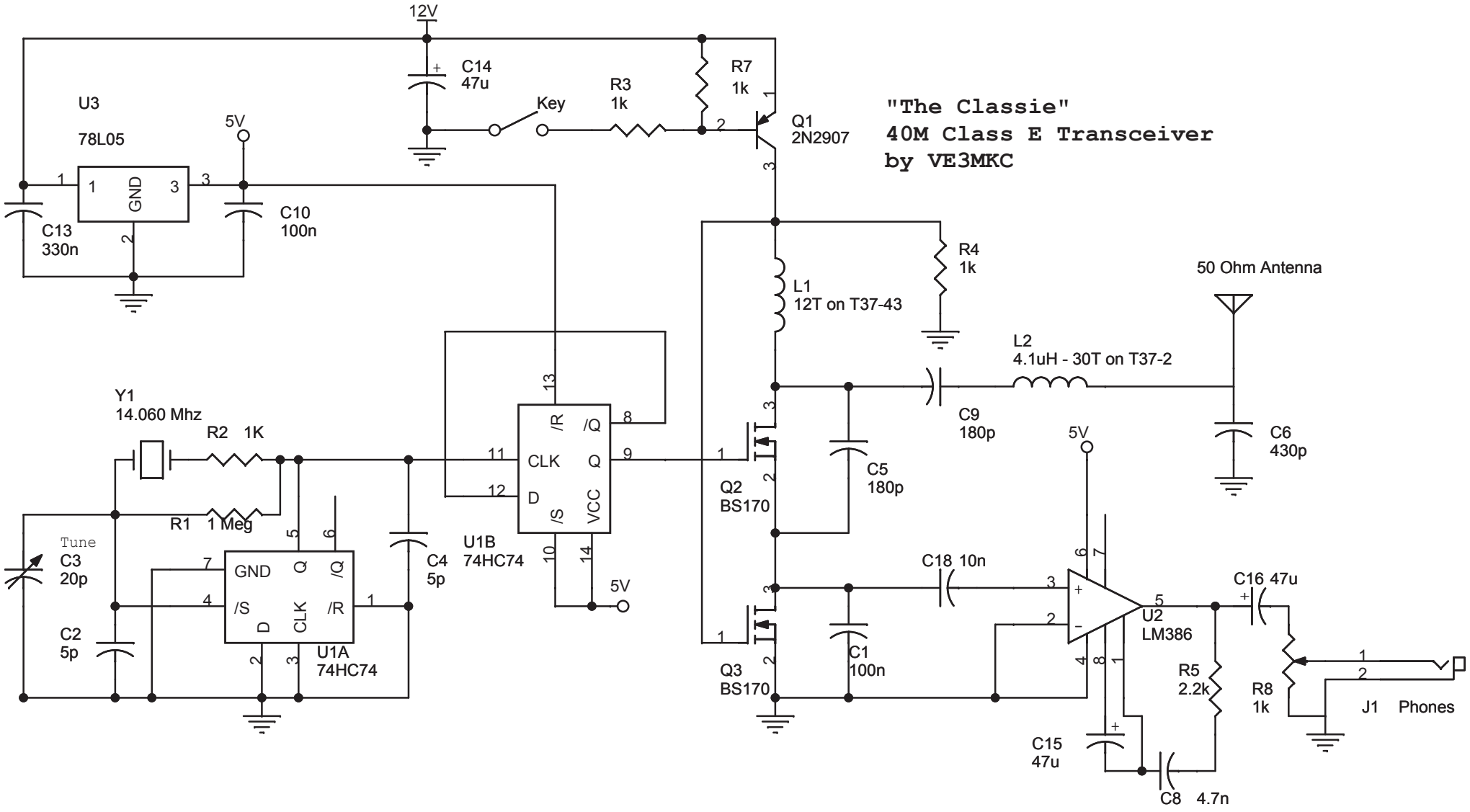
The IF system is built onto a piece of copper laminate measuring 160mm x 100mm. IC sockets and connectors are soldered onto strips of DIL pads cut from PCB laminate. The main copper laminate serves as a ground plane. All supplies are run as buses over the top of the circuitry using solid core copper conductors liberated from scrap 1.5mm house wiring. Use sleeving on close bus runs to avoid shorts. A strip of 6A screw terminal block, mounted onto the laminate, is used to terminate the bus supply lines and provide a connection point for the external +12V power supply lines.

How to Make a Tri-Filar Transformer

To make the tri-filar wound transformers used in the DBM, take three 200mm lengths of enameled copper wire. Form a bundle and twist one end together. Grip the twisted end in the chuck of a small hand drill. Smooth out the bundle so that each conductor is under the same amount of tension, pinch the loose ends together and grip in a small vice. Keeping a gentle tension on the bundle, turn the hand drill to twist the wires together. Aim for around 7 or 8 turns per cm avoiding kinks due to over winding or low tension. Release the twisted wires from the drill and vice and wind tightly onto an FT37-43 core. 8 turns spaced equally around the core will provide more than enough winding reactance to ensure good efficiency when operated at 50 Ohms. Trim and tin the ends and identify each conductor with a continuity meter. Connect as shown in the schematic.



Eden SSB IF System Schematic

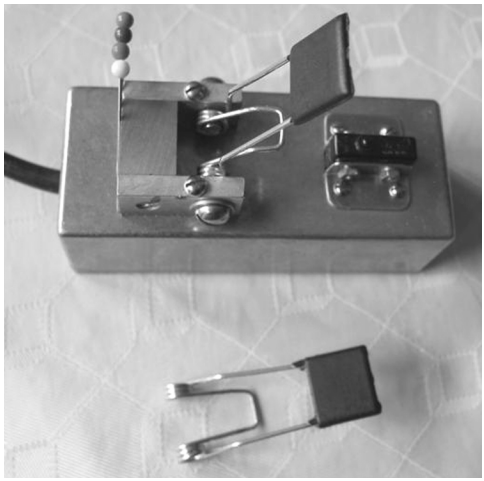

"The Classie"
40M Class E Transceiver
by VE3MKC
12V
C14
47u
Key
R3
1k
R7
1k
Q1
2N2907
U3
78L05
5V
C13
330n
C10
100n
R4
1k
L1
12T on T37-43
50 Ohm Antenna
L2
4.1uH - 30T on T37-2
C9
180p
C6
430p
Y1
14.060 Mhz
R2 1K
R1 1 Meg
Tune
C3
20p
C2
5p
C4
5p
U1B
74HC74
U1A
74HC74
Q2
BS170
Q3
BS170
C5
180p
C1
100n
C18 10n
U2
LM386
C16 47u
R5
2.2k
R8
1k
J1 Phones
C15
47u
C8 4.7n

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.

A “zero cost” transparent dial

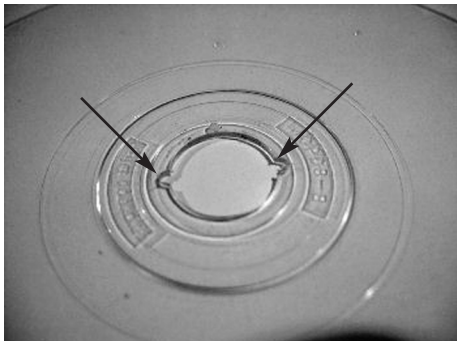
Luca Norio, IV3TEK, via Umberto I° 116, 33085 Maniago (PN) Italy

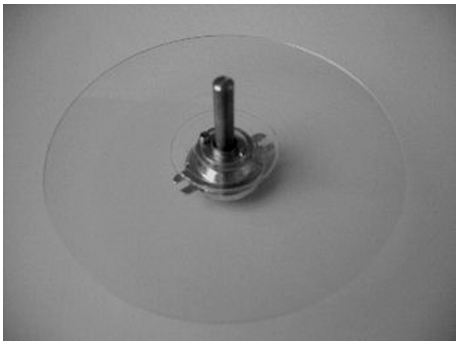
Sometimes it may be necessary to make a “custom made” dial. Some classic examples are a VFO, a tuner or a grid-dip. In this case a transparent disk coupled to the knob is the first solution.

I’m quite lucky to have adequate tools to cut a disk from a transparent plastic sheet (polystyrene, Perspex etc.) but I also know that it’s not a simple job.
Recently, opening a box of CDrom disks (the cylindrical packages that contain 25, 50 or more disks) I have found two protection disks, one on the top and one at the bottom of the stack.
They are of a good material, completely transparent and not too thin; more or less like a CDrom.
Their size is the same as a CDrom disk.

I thought immediately to their possible use as a dial and to the colleagues that do not have adequate tools to cut a disk from a sheet.
Unluckily, many but not all the CDrom or DVDrom disk manufacturers put these “blank disks” in the packages. A good idea could be to ask other who buy discs to save the blanks in they find any in CDs or DVDs

The transparent disk may be directly glued or fixed to the knob or, as I have done and here shown, fixed with the screws of a ball drive. The hole is a little bit too large but two simple notches (indicated by the arrows) done with a small round file do the job.
Markings may be done directly on the disk surface by using an adequate indelible pen or, having the possibility, designed with drawing software and printed on a self adhesive paper label. The market offers round pre-cut CD size paper labels.
The transparency of the disk allows to put a backlight (it could be a LED) to obtain an “old fashion” result. Although loosing the transparency, even a CDrom may be used. Their low cost allows the use of a new disk as well.





A Great Day in the Country!

Steve Hartley, G0FUW, 5 Sydenham Buildings, Lower Bristol Road, Bath. BA2 3BS

On Sunday 18 July Tim Walford, G3PCJ, opened up his farm for a new event called 'QRP in the country' and what a fine day it was. The weather had threatened to spoil everyone's fun but in the end it was a lovely summer day for a really 'radio friendly' gathering. In addition to an extensive display of Walford Electronic kits there were sales of 'junk' parts, a bring and buy stall, the local RSGB man was on hand with a stall and members of the Yeovil ARC were on air with some vintage radios.
The Blackmore Vale ARS were loaning out 80m DF receivers for a bit of 'hide and seek' and Roger Stafford, G4ROJ, had his kite aerials up in the air all day. The catering had a village fete feel about it with local fruit, sausages and beer all on offer. Tim's good lady Janet was offering guided farm tours, which proved very popular.

Rob Mannion, editor of Practical Wireless, officiated with the prize giving presenting certificates for the Bath Buildathon 80m contest (won by Tim, G4ARI), boxes of chocolates for the 'guess the weight of the transformer' competition (won by Peter, G4OST) and a good old raffle in aid of 'Send a cow to Africa' (won by Dave, M0SXZ).

Gerald Stancey, G3MCK, judged the homebrew contest and awarded first prize to Steve Hartley, G0FUW, for his 'Pet Rock' transceiver. There was room for many more people and it is hoped that more will attend next year if Tim decides to extend his hospitality once more. Look out for the next 'QRP in the Country' event, definitely not to be missed if you are into QRP and/or homebrew.

'and the winner is….' Rob Mannion oversees the prize giving at 'QRP in the country'.

Tim Walford G3PCJ is pleased to announce that, following the very successful first occasion for this event this year, he will be hosting it again in 2011 at Upton Bridge Farm, Long Sutton, Somerset. The date will be July 17th 2011. The theme will be low power radio operation and home construction, in a country setting! Outside in the field if it is dry, or in the farm barns if wet. Tim is particularly keen to increase the attendance by West Country Clubs or individuals who are able to show off their activities; just drop him a line at walfor@globalnet.co.uk

Subscriptions (and Sales)

From the Treasurer – G3MFJ

The subscription for the club has been £6 for UK & Europe and £8 for DX since 1994 – what other club or group has kept their subs at those levels all that time?

Ah, you say – he is going to put the subs up now!

Well, no I am not, at least, I am not going to increase the basic £6 subscription. What is beating us, is the postage costs. In real terms, the UK postage cost has decreased slightly as the British post office increased their rates a year or so ago, but at the same time, they increased the base weight, so Sprat actually costs us slightly less to post within the UK. However, and this is the big one, it now costs us £4 to post the 4 issues to Europe, and £6 to post them to the rest of the world.

What we are going to have to do now, is pass those postage costs on, so membership subscriptions for 2011 onwards (and effective immediately) will be as follows:

Europe, (and by Europe, I mean all the countries that the British Post Office call Europe - ask me, or Tony, G4WIF, if you are not sure) will now be £10. At recent average exchange rates, this equates to: €12.00, Danish Kroner 90.00, Swedish Kroner 120.00 (where we have a representative in your country).

DX (everywhere else) will be £12.00. At recent average exchange rates, this equates to US$18.00, AU$22.00, and NZ$28.00. (again, where we have a representative in your country).

The PayPal renewal rates remain in sterling, and will be £6, £10, & £12 plus a small admin charge to cover the commission that PayPal charge us.

I am really sorry to have to do this, but it has been forced on us by the circumstances.
The club finances are very healthy, the losses caused by these postage charges have, so far, been covered by the increased club sales. Our bank balance is good, although a little lower than it used to be, but we have a store room in Leeds full of books, CDs, and components
(I have enough SA602s and IRF510s etc. to last a long, long, time.

Now Club Sales. The new Limerick Sudden receiver kit has sold well, I have kits available on 4 bands – 80, 40, 30 and 20m, and the next kit, a matching 2 Watt CW transmitter, should be available at Rishworth in late October. The follow up to this, will be a matching QRP Z match ATU, early next year.

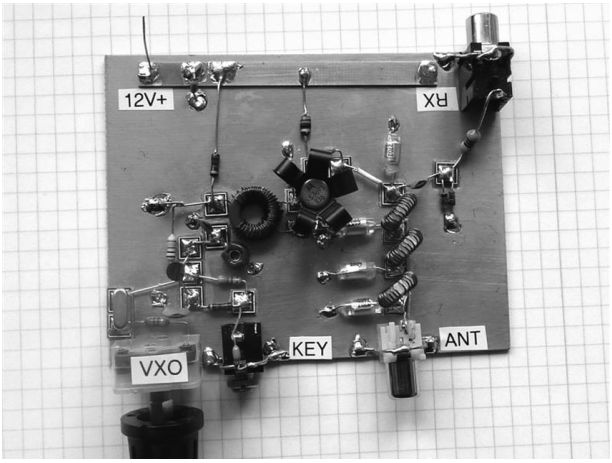
I have added a few new things to club sales:
1N4148 diodes – 10 for 10p
Axial lead inductors (look like fatter resistors) 10uH, 39uH, 47uH, 100uH – 15p each
2N7000 FET – 10p each
Magnet wire 20, 22 SWG - 5 metres for 40p
24, 25, 27 SWG - 5 metres for 30p
30, 33, 35 SWG - 5 metres for 20p
This is solderable enamel insulated wire – the enamel will melt with the heat of a soldering iron, also, it is an experiment – I keep being asked for wire, so I bought a few kg of it!

Finally, I now sell so many things that I cannot get everything on the back page, so you will have to look back at the previous issues – George will only allow me the one page! The sales page on the club website is nearly always right up-to-date.

Rishworth Buildathon 2010

G3RJV

Following the success of last year the G QRP Club Convention at Rishworth on October 23rd is to have another Buildathon. A Buildathon is where novice constructors build a project under the guidance of experienced radio constructors.



The details are:

Project:
A Manhattan style CW Transmitter for 40 metres

This could be a companion to the receiver of last year's Buildathon or a useful little transmitter in its own right.

Booking your place:
20 places maximum.
Total cost £15
- you leave with a transmitter

Pay at the G QRP Club stand on the day. The Buildathon will begin at 12.30 (after the pie and peas!) and last most of the afternoon. The actual finish time for individuals will depend upon how long it takes that person to complete the project.

Book by email to g3rjv@gqrp.co.uk or g3mfj@gqrp.com
stating name, callsign and membership number. Your booking will be confirmed by email. Postal mail bookings are also welcome.

What to bring:
If you can, please bring a soldering iron (ideally not a very low wattage iron as we have to make some ground connections to a piece of blank printed circuit board)
Wire cutters and small pointed pliers are also useful.
The Buildathon is open to anyone!

Rishworth Homebrew Display

As last year, we intend to have a display of homebrew equipment at the Rishworth Convention. There are no categories or prizes; just a chance to show your favourite homemade items. The display will open at 12.30 in the room next to the Buildathon. Exhibitors are asked to provide an A4 sheet with a brief description and/or circuit of the project. We will also ask exhibitors to join a rota to provide oversight of the exhibits. So bring along anything you have built, sophisticated or simple, beautiful or ugly, and share your construction with others.

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

I must start this month with an apology! Some of you have sent me some excellent articles but unfortunately due to a computer fault the files have been lost. If you have something for me please send it in Word format and I will do my best to include it as soon as possible. I would particularly like to hear from VE3KMC regarding his vertical antenna project.
Those two little rascal gnomes living in G3YVF's loft have been busy again and have got him to write up their idea for a remotely controlled loop tuning system in the roof space.

Bodgitt & Scarper's Famous
'MAG LOOP REMOTE CONTROL USING STATE OF THE ART'

The problem at Bodgitt and Scarpers

Trying to finely tune a magnetic loop variable capacitor remotely is difficult, (*says G3YVF).* Those that have experimented with home made magnetic loops have probably used either one of these drive systems, a cast off electric drill/speed controller or a BBQ spit control motor. The very small incremental changes needed cannot be done with these systems easily…fear not…just quote this famous 'Bodgit and Scarper' phrase:
'When it is vain to do with more what could be done with less…. Do this'

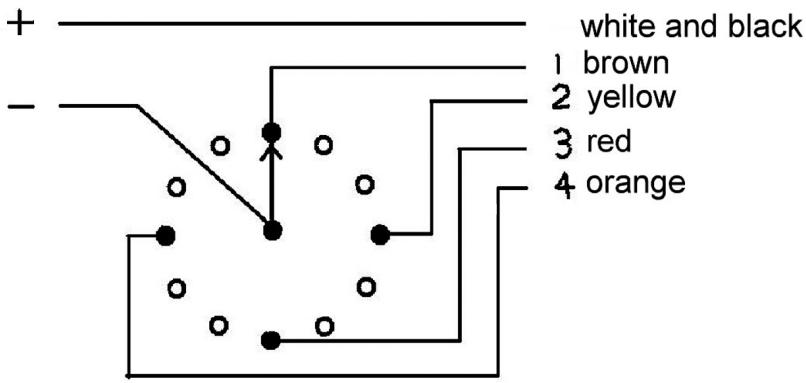
Get one of those Rapid 37-0506 Stepper Motors. Fit this to your tuning capacitor with a ball reduction drive (4:1 or similar) and an insulated coupling to keep RF away from the motor etc. Now find a rotary switch, which has any number of ways in multiples of 4…e.g. 8 way switches. Even 12 ways will do. Then remove the balls that locate the switch positions and cut off the end stops so the switch can rotate round and round. Make yourself some sort of crank to rotate the switch….a normal radio knob will not do….you will need some sort of crank, trust Bodgitt...he knows what's best. *('Rapid' are a large components supply company here in the U.K.).*

The white and black leads of the motor go to +12v. The Orange, Red, Yellow and Brown leads go to a rotary switch. Connect these leads onto the switch so that they are connected to the slider in this order if the switch is rotated: Brown:1…Yellow:2…..Red:3…..Orange:4 These connections to the switch should be 90 degrees apart when viewed from the back of the switch….leaving some switch positions unused between ones that are. This is good. The slider goes to 0v.

Testing the operation:
Stick a piece of insulation tape to the shaft of the motor so it sticks out like a clock hand and then connect the supply. Cranking the switch now should pulse the motor round in little steps. Hence their names "Stepper Motor" …… there are many ways to pulse a

stepper motor…forget them, just try this method. This motor will now step round in 1.8 degree pulses, which, when coupled to your tuning capacitor through a slow motion drive will give you exquisite control of the capacitor. If your motor does a waltz instead of quickstep and rotates in a jerky fashion, then swap the leads around until you get the phasing right. Then it will rotate forwards and backwards on demand….smoothly.

Stepper motors can normally run stalled no problem, but to save battery power, park the switch in any of the unused positions when not in use. Should your stepper motor struggle to move the capacitor through the ball drive just change the grease in the ball drive for something no so sticky. For those who like a schematic here it is:

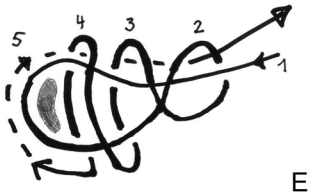


Here the stepper motor is used on a 48 feet circumference, 22mm cooper pipe stealth loop fitted in the loft of Bodgitt and Scarpers residence. So stealthy it cannot be seen from the outside! Have fun. By order. Bodgitt and Scarper. (p.s. Feed your loop via an unbalanced to balanced balun….another story). *Thanks Geoff G3YVF and give our regards to B&S!*

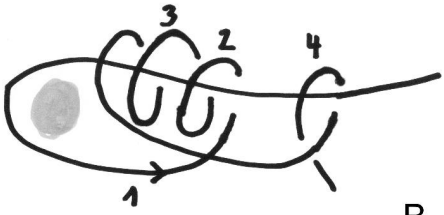
The Useful Knots from DL2BQD

As promised, *(writes Dieter,* you'll find the two knots I use. Sailors and carpenters often have another name for the very same knot and one finds some other suitable knots in the books.

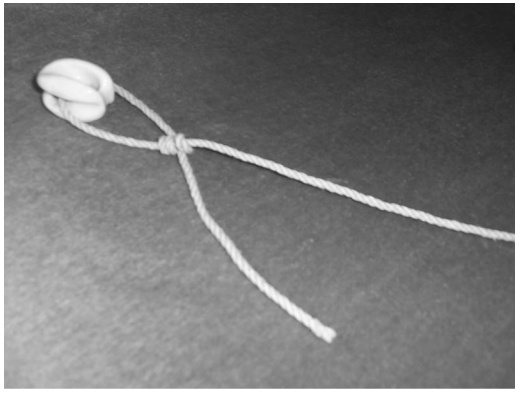
I call one knot 'E' = the end knot, which nicely teases the insulator, tough, and additionally looks nice. Knot 'B' = the break knot, which can be run along the line and holds itself. Possibly not best used for an insulator, but post, mast, tent... etc it is excellent. Saves a 'helping hand' maybe? 72, Dieter DL2BQD



E

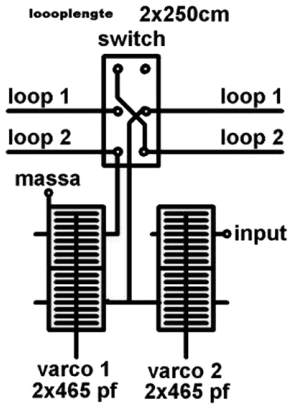


B



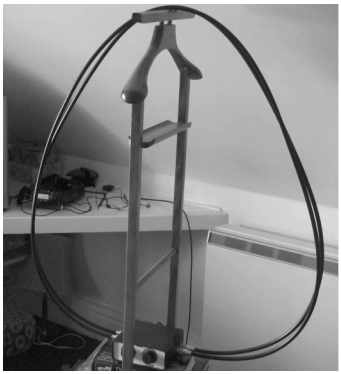
Dual Loop from PA3CVV

You might remember we had some fun on 80m. I was M/ in Lee on the Solent, near Portsmouth. Thank you for your patience in dealing with my very weak signal. I worked many members, mainly on 40m. I seem to remember you expressed an explicit interest in the indoor loop I was using. So here are some details. It is a double loop made of coax cable. The loops can be switched parallel or in series, depending on the band. It is supposed to be able to take 35 watts, but I think that is pushing it. I never use more than 20-25w. Real QRP is not really suitable for this set up. Hence I use it in combination with an FT857 which is small, but can produce anything between 5-100 watts. (The excellent Palm mini paddle with Code Cube completes the /p station) The loop tunes 80-10m. As with all loops, tuning can be a bit tricky, but you soon get the knack. With these power levels the thing can stand next to the operator, so the knobs can easily be turned. On 40m and higher this antenna performs very well, providing, of course, you're not in a concrete basement. In Lee on the Solent it stood on the third floor of a brick house.



On 80m the radiated power is, of course, minimal. But, as we experienced, contacts are possible even on that band. Such is the power of Morse! I attach some pictures: 1) The schematics (apologies for the Dutch. Guess you get the idea). *(Note the coax from the transmitter has its screen attached to 'massa' and its centre conductor to 'input' and the loop lengths are 250cm)* 2) The loop assembled. 3) The loop as it was for our QSO. As you can see the coax cables are now supported by a wooden construction, rather than the original plastic sticks. When I unpacked my things, I discovered I had forgotten these sticks. Panic! What to do? My eye fell on a wooden 'dress boy' in the bedroom. It proved an excellent substitute. The house also provided some British coffee table books to

prop up the control box to a suitable height (picture 5). I hasten to add I 'acquired' the loop from another ham who had access to the right capacitors and suitable plastic box. Thanks again for the QSO's, and hope to see you on the bands soon. 73 Miles PA3CVV



Dual Loop on the 'Dress Boy'

Loop with two capacitor tuner beneath

Anecdotes and Awards

No new awards were processed this quarter and there are no anecdotes, however, there will be another **Valve QRP Day** on **Sunday November 7th 2010** and this time can I suggest we are active the whole day? Say from 0800 until late evening? Hopefully this will be a quiet day after the 'crash bang wallop' of the CQ WW SSB Contest the week before.

As we tried in previous events be active with QRP using a receiver or transmitter using valves (tubes) from wherever you are in the world. It's not a contest but an activity period for old style radio either homemade or commercial modified for QRP. Please send me details of your equipment and a photograph and I'll do my best to fit them in a report here in Sprat. Previous experience here in Europe places most activity around 3560 KHz and provided the weather is good I intend to be out on the beach for this one but wherever you may be just be on the bands working whatever you can. Have a great autumn with plenty of contacts, wire cutting and pole erecting and let me know of your ideas.

72 Colin G3VTT

COMMUNICATIONS AND CONTESTS

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

Summer is usually the time of year when we think about /P activities, although poor conditions may have deterred us this year. I 'did my bit' and operated QRP /MM during July using a vertical antenna from a yacht in Turkish waters and, although I was able to make some contacts, will admit that results were 'variable'! It's been said before, but "roll on the better conditions" to which we continue to look forward!

INTERNATIONAL QRP DAY

This year I received logs from **Ryan G5CL**, **Oleg RV3GM**, **Valery RW3AI** and **Victor UA1CEX** – not sufficient to over-work the postman, but every log is (as always) very much appreciated. In addition, Valery also kindly sent me the logs from six other RU-QRP members who had supported their own 'affiliated' event.

Ryan was delighted to at least "get out of Eu" when he worked 5N7M on 15m with his 66ft end fed at 9m above ground. Oleg scored 12 DXCC, and Victor 19 DXCC, but Valery's score of 38 DXCC (achieved in a total of 5hrs 55mins operating time) means that **RW3AI** is the winner of the 2010 International QRP Day Plaque. In view of the prevailing HF band conditions, this was a very fine effort, and our congratulations go to Valery – along with my thanks for his continued support for this event.

WORLD QRP OLYMPIC GAMES (Proposal)

These ideas have been proposed by **Oleg RV3GM**, and which I quote below in the hope that members will read them, and offer their opinions:

"Devoted for peace and friendship on QRP freqs!
I'd like to inform you my new "crazy" idea :^) and to have your opinion. Since we knew, there are many QRP Clubs in the World. But the most of any Club's events matched and interesting for only local or regional members. My new idea is to organize a World Olympic QRP Games! It's idea only and I have not any details so far. In common form I see it is follow: The World Olympic QRP Committee will be organized (WOQC). It will think about all Games nominees and regulations. It may be for example: QRP Sprint (maximum QSO for a short period), QRP homebrewing (a-la virtual exhibition), QRP Marathon (max WW-Grids or DXCC for all the Games period) etc... All the Games period and process will be published at all QRP forums and at special Web-page. The process of open and close Games may take a place as Round Table on QRP freq's as well as Olympic Fire may fire-on at all QRP Clubs Headquarters also. I think 1 or 2 weeks will be enough for Games. If all the World QRP Clubs will hold my idea, the 1st Olympic QRP Games may take a place at 2012 year because there are lot of organization works of course. All the Clubs or Countries must to prepare and training their "sportsmen" of course. 72 de Oleg, 'Mr 72', RV3GM."

If you would like to express your opinions on, or support for, Oleg's ideas, please drop me a line. I think you'll agree that there would be a lot of work involved in bringing any of these events to fruition and perhaps you would like to help to organise some of them, or even to take on the responsibility of running one?

I know I've been saying it almost every issue now for some considerable time, but surely HF band conditions will pick up very soon. Even though it is likely to herald a decline in the weather, the Autumn should provide us with something to look forward to by way of more exciting times on the Dx bands.

If we're really lucky, those (hoped for) good conditions may bless us with their presence during **Winter Sports** (26th December to 1st January inclusive). That's a whole week of QRP FUN to look forward to! The deadline for the next SPRAT is the beginning of November but, in the meantime, enjoy your QRP.

72 de QRPeter

MEMBERS' NEWS

by Chris Page, G4BUE

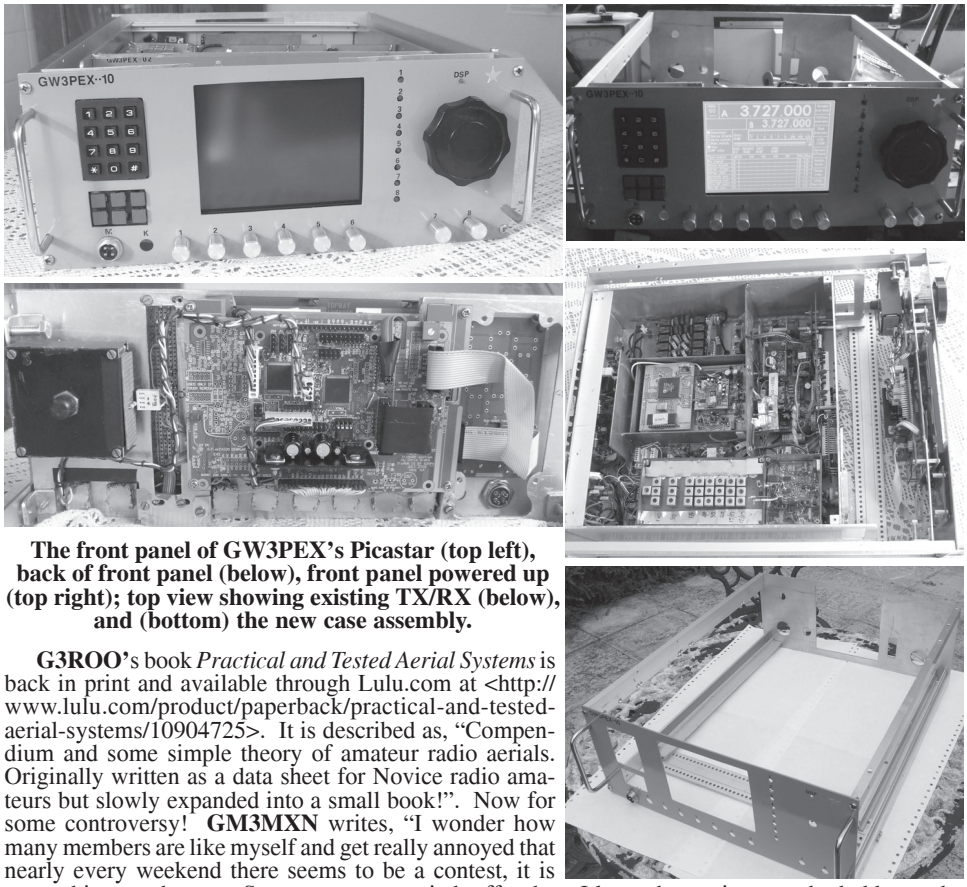
Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ
E-mail: chris@g4bue.com

Congratulations to **EI3JU** on his efforts to recruit new amateurs and G-QRP members. Gerry writes, "Way back in the cold, dark and wintry January of this year, I joined forces with **EI7ALB** and **EI4GXB** to provide a series of night classes at the Limerick Institute of Technology for aspiring radio amateurs. Over the following six months we had weekly two hour sessions of theory (and practical demonstrations) to prepare the group for the examination on 7 July. One of our sessions centred around the building of six 'Limerick Sudden' receiver kits supplied by **G3MFJ**, an activity thoroughly enjoyed by all. The exam results landed on doormats today and we have five new amateurs on the way and six new members of the G-QRP Club (including one already licenced and one 'near miss' who should pass on the next attempt). CW classes are next". **KDØFNR** says a newer version of his QSL locator and mapper program is now available at <http://copaseticflows.appspot.com> that allows you to log your calls and track the last few calls from *DX Summit* <DXsummit.fi> as well. Hamilton will appreciate feedback as it might still be, "a little 'buggy" and says, "It might be really good for getting people interested in amateur radio as they can see the variety of calls that are going on to different locations in the world".

G3OOU has just finished building the PSU (pictured left) to be used with his valve transverter amongst other units - not all QRP though. The unit weighs 44lbs so isn't likely to move very often! It is built in the Heathkit SB-Line style so eventually Bob should have a completely matching station. He has been collecting 1.4V battery valves for some while for an HF bands QRP transceiver but isn't yet certain when construction will start. Bob says he is currently under orders from his wife to seriously tidy up the radio shack, and with a collection going back some 50 years says that isn't an easy task! **G3XBM** is building a 10-20W (out of PA) 136kHz QRP transverter to try WSPR and QRSS3 on the band over the autumn/winter, with both the earth electrode antenna and a Marconi antenna being erected. Roger will re-erect the 10m halo in readiness for better conditions this autumn/winter.

Referring to **G4COE**'s short article in *SPRAT* 143 about fake 2SC1969 transistors, **VE3GTC** says he was always aware of 'fake' products, "Everything from home electronics to toothpaste", but not only from China. Graham points us to <http://www.youtube.com/watch?v=MMPvHb68aNo> which features fake toothpaste from South Africa! **G8BEQ**, also referring to the *SPRAT* article, says the warning about fake 2SC1969s also applies to the 2SC1972 transistor. Ken had to replace some 2SC1972 drivers in his IC-756PRO and the ones he bought from a cheap source in Hong Kong had the centre lead as the collector (and the tab), whereas it should have been the emitter. He is awaiting a reply from the supplier after complaining about them but warns that cheapest is not always best! **G1HSM** says Sparkfun have an interesting account of their investigation into fake microchips at <http://www.sparkfun.com/commerce/news.php?id=350>.

VE7NSD has the urge to build a simple valve rig that is not too minimal, capable of everyday operating in our crowded bands and capable of QRP. Stephen is looking at **UZ3ZK**'s 'multi-band valve 10W QSK transceiver' and wonders if anyone has built the rig or if there are any modifications to it? He says, "I think the **UZ3ZK** rig is a solid and basic design and I suspect it would serve most of my needs/wishes. I still have questions regarding building it, such as inductors that are wound on resistors, as I am not familiar with that. His QSK relay looks like it might be a reed switch that he has wound a coil on to actuate it? Any thoughts will be appreciated". During the last few months **GW3PEX** has built a new front panel for his Picaster based on a **G3VPX** design, and a new case to accommodate his existing transceiver and a larger front panel. Les sent the photographs on the next page showing his excellent work.



The front panel of GW3PEX's Picastar (top left), back of front panel (below), front panel powered up (top right); top view showing existing TX/RX (below), and (bottom) the new case assembly.

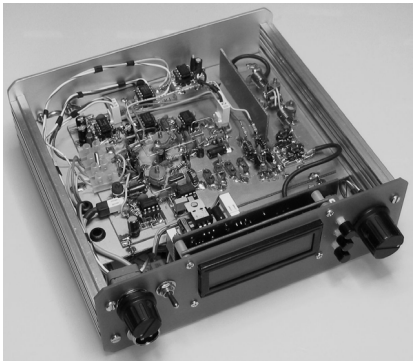
G3ROO's book *Practical and Tested Aerial Systems* is back in print and available through Lulu.com at <http://www.lulu.com/product/paperback/practical-and-tested-aerial-systems/10904725>. It is described as, "Compendium and some simple theory of amateur radio aerials. Originally written as a data sheet for Novice radio amateurs but slowly expanded into a small book!". Now for some controversy! **GM3MXN** writes, "I wonder how many members are like myself and get really annoyed that nearly every weekend there seems to be a contest, it is now a bit over the top. Some operators switch off, others I know have given up the hobby as the weekend is the only time they can operate. Could I suggest rather than switch off we call CQ QSO, it has worked for me". What do you think about Tom's comments? Please let me know.

GØFUW says planning for the 4th Bath Buildathon, which will be held in December, has started. Steve says this year's project will either be a superhet receiver or a 10W linear for existing QRP SSB rigs, depending on demand, and those interested are asked to contact him. The Bath Buildathon crew have also been asked to help out again at the Rishworth Convention Buildathon and are looking forward to that. **PA3GNZ** is building the Limerick Sudden receiver kit for 30m and will tell us more about it for *SPRAT* 145.

M1KTA and his wife cycled 1000 miles in June and July down the River Rhine from Andermatt to Rotterdam and Dom was QRV /P on the way from DL, F, HB, HBØ, OE and PA using only solar or dynamo recharged batteries using a FT-817 and minimal antennas (W3EDP and whip). They stayed with **HB9DRV** and visited Friedrichshafen 2010. After arriving home Dom started restoring a donated R1155. **GM4VKI** will be at the Galashields Rally on 17 October with the G-QRP stall. Roy says he won't unfortunately have any components but will have lots of books and CDs etc.

G4GXO reports the first of the 'Eden-9' 70MHz SSB transceivers (a construction project he described at Rishworth last year) are now appearing on the air (photograph top right of next page). Ron writes, "This simple design was produced as a club project for Cumbria's Eden Valley Radio Society to promote construction amongst its members. With 2.5W PEP output and a receive sensitivity in excess of -130dBm, this simple little transceiver is already producing remarkable results. The best DX result so far is held by **G7ITT** near Appleby-in-Westmorland. Using his 'Eden-9' with a four element Yagi, Seamus received a 5/5 from **IW4BÉT** in Bologna, Italy, a path of around 932 miles! What does the '9' stand for in the name? A schematic revision number was mistakenly taken as the

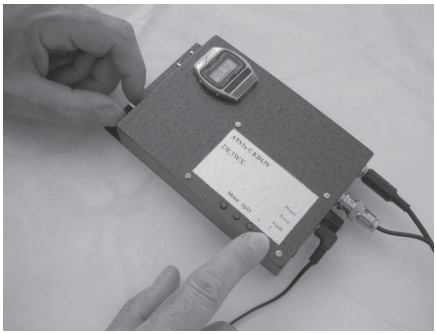
design's name when one of the club members created a *Yahoo* site for the project; and the name stuck!". The URL for the site is <http://groups.yahoo.com/group/eden9/>.



Congratulations to **GM4XQJ** who worked **E4X** on 6m with 5W to a five element yagi on 1 June. On the same day **G4GXO** worked into southern Germany and Austria on 6m SSB whilst using his FT-817 with its short front panel mounted rubber whip. "Very satisfying!", says Ron. **G3JNB**'s initial foray onto 6m reported in *SPRAT* 143 *Members' News*, running 4W CW to a dipole at 40 feet, gave him 31 DXCC in the log before the band closed for the 2010 season. **GWØVSW** tried the indoor 'Crown' loop mentioned in *SPRAT* 142 on 6m this summer and was pleased to find not only did it tune up ok, but he was able to work everything he heard! Carl used 5W to work 9H, CN, CT, EA, HA, I, ISØ, OM and SP on CW, and 9A, CT, F, HBØ, OE and S5 on SSB. **GM3FDM** is QRV from Grangemouth with a low 80m loop and a 20m vertical from a pre-1980 *Short Wave Magazine* and has been struggling with poor conditions this summer. When conditions are ok, John says he is able to work DX with both antennas but, "feels there is a force field at the border" when compared with stations further south. He is not alone because some members at his local club, **GM6NX** at Stirling, thought their rigs or antennas were faulty!

G3LHJ made 432 QSOs for 200k+ points in the WPX CW Contest with his K2 at 5W. Congratulations to **ZL4TE** who came second in the 40m section of the KDGM VK/ZL RTTY Sprint Contest (reported in *SPRAT* 143) with QRP. **G5CL** took part in the FOC's Bill Windle QSO Party (BWQP) on 12 June and made 49 QSOs mostly with QRP, including **N2KW** on 10m (although Ryan had to QRO from 5W to 25-50W to make it). **N2UGB** reports, "Last mid-November I had a nice QRP QSO with **GM3OXX** when I was portable in Vichy, France. After I received a nice note and cute puppy-dog QSL direct from George, I realised his 456 feet loop was responsible for our two-way QRP and not my MP-1 on a first-floor balcony over a busy street. He is a great inspiration".

This year **DK3WX** has tried to qualify for the Sea Of Peace Award (SOP) with QRP CW. Bernd says the award is a, "beautiful pennon and an eye-catcher in your shack". You receive it for working 15 prefixes or more around the Baltic Sea during the month of July each year, see <http://www.amateurfunk-mvp.de/inhalte/sopdipl.htm>. Bernd worked all these countries on the first three weekends of July sitting in his garden with an ATS3a and a dipole. Most QSOs were on 30m and only a few (shorter range) on 40m, and many were made on two-way QRP.



The picture right shows Bernd in his operating position outside, which was in a 91°F heat-wave. The picture above shows Bernd's ATS3a that includes a LiPo Accu, the PWR management, a keyer from an old relay and on the top an old watch – all you need for a field operation! He says, "The construction is specially designed for me, keying with the left hand and QRG up/down with the right hand".

Congratulations to **G5CL** for QSOs on 6 July with **XU7AFU** on 20m, and on 16 August with (new DXCC) **J28AA** on 20m and **9M2MT** on 17m, all with 5W CW. This brings Ryan's 2010 DXCC to 124. On 26/27 June **YL2IU** and **YL3GBC** were QRV in UDCF-2010 from Dynemunde Castle and

Pavel Fort, a QRP DXpedition on 40m CW/SSB. **YU7AE** was QRV 5/15 July from Herceg Novi as **4O/YU7AE** with his old, but favourite portable ATLAS-210x, SGC-230 ATU and some wires. Kare operates mainly CW but some RTTY. On 13 June **GØEBQ** ran a QRP station with his BITX on 17m at the Suffolk Rally. Nigel worked all round Europe with it and quite a few people were impressed with what simple and cheap equipment could do. **9A3FO** says if anyone needs a **9AØQRP** QSL faster than via the bureau to QSL him direct.

G3XBM reports **DK7FC** has received permission from the German authorities to use a 985 feet (300 metres) long kite antenna in daylight to transmit below 900kHz. With this antenna, 656 feet (200 metres) longer than Stefan's previous one, he should be able to run up to 16mW ERP, which is 10dB more than when he lasted tested on 897kHz. A stronger signal should allow more stations to copy his signal right across Europe. He was copied in the UK on his last VLF test.

Roger's own more modest efforts managed to get 3.8 miles (5.6km) using 4W into a 20m spaced earth electrode antenna (virtually nothing in the air at all) on 838kHz ULF using QRSS3 receiving signal on 80cm tuned loop antenna with a narrow-band preamp and *Spectran* PC software. He is awaiting a NoV for sub-9kHz tests (3.8 miles was by utilities assisted earth mode conduction/ induction, not radiation), see <http://sites.google.com/site/g3xbmqrp/Home/earthmode>. Roger used the same 20m spaced earth electrode antenna on 500kHz WSPR with 250uW ERP and has been received several times at 260 miles by **PAØA** and by others in the UK, and also used it on 136kHz with a QRSS3 (2W from PA) beacon and has been copied 9¼ miles away on a small loop antenna; ERP not measured yet, but at most only a few uW, see <http://sites.google.com/site/g3xbmqrp/136k>.

G3XBM also reports **DJ2LF** and **DF6NM** held what was probably the first two-way contact QSO on 897kHz on 4 June. The distance between them was 12.5 miles (20.2km), well outside the reactive near field zone (lamda / 2pi = 5.3 km). In each case the radiated power was about 5uW. They used a special QSO procedure using dual frequencies. Congratulations to both stations. **WEØH** reports two New England, USA amateurs are experimenting at 897kHz with good results and many others are following in their footsteps. Mike is just starting to experiment at 580kHz.

G7HEU's pal **GØDVB** returned from a USA holiday and knowing Steve had built a Pixie transceiver in an Altoids tin, brought him back an Altoids 'Smalls' tin. This new tin is about 2.3 inches long and after searching the G-QRP Reflector, Steve couldn't find any reference to it. He says the tin is in fact marked 'New' and he is thinking of using a 7030kHz crystal and fit a Pixie into the tiny tin - unless somebody has a better idea? **VE7SND** says the tins appeared in Canada a few years ago marked 'The Tiny Tin' and Stephen started looking for them after he saw an article on **N5ESE**'s 40m DX receiver built in one, see <http://www.docstoc.com/docs/24704609/40-meter-DC-receiver-proj>.

WAØITP says the Four State QRP Group announced a new kit in June, the Magic Box TR Switching system designed by **K8IQY**, cost $44. Terry says the easy to build and use Magic box is an all solid state, electronic, transmit/receive switching system that allows a separate receiver and transmitter to transceive with full (or semi) QSK. The very complete manual, specifications, and ordering information can be found at <http://www.wa0itp.com/mbmagicbox.html>. **W1REX** says QRPme will be closed for new orders for a month from 7 August to enable him to work on some new projects, including ZipBALL (80m QRPp oscillator), OddiZ Fireball (four band TTL transmitter), Zippie (Pixie clone), Tuna Tunah (ATU), Matchless Crystal Radio (crystal radio inside a matchbox) and a Matchless Audio Oscillator.

Finally, **ON4TOM** sends the picture on the right to show it is not only the 'daddy' who likes reading *SPRAT*! Tom's 19 month daughter Elfya is looking at the picture of **G3RJV'**s shack in *SPRAT* 143. Tom says, "Every time she enters the shack, a reorganisation of the component boxes takes place! When I leave the Morse key unattended, there is a 'little one' sending code. Fortunately I manage to turn off the 'break-in' on the transceiver before she starts to send code". Tom finds *SPRAT* is one of the most interesting amateur radio magazines. **WAØITP** says QRPspots went over 40,000 hits on 17 August. Terry says self-spotting is encouraged and can be accomplished via a Twitter message to QRPSPOTS, an APRS email message to QRPSPTS or by using the web page <QRPspots.com>.

My thanks to all the contributors, without you this column cannot exist. Please let me know how your autumn goes, and any other news and views about QRP, including photographs, by 20 November.

Look at 'www.celticpilgrim.com' for Amateur Radio in a Lovely Place

G3RJV has a Wooden Lodge situated in the Dyfi Valley in central Wales close to the Irish Sea and in the Snowdonia National Park. It has been completely refurbished with a large living area, conservatory, double bedroom, twin bedroom and a double bed sofa in the living area. Naturally there is a small amateur radio station with a QRP HF transceiver and a 2m multimode. An easy to use station in a quiet location.

Look on the webpage above or for leaflet write to G3RJV or email g3rjv@gqrp.co.uk

GQRP Club Sales

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

Antenna Handbook – 2nd edition – members £6.00, non-members £10.00 plus post } **£1.40 (UK);**
Radio Projects volume 2 – by Drew Diamond – members £5, non-members £10 plus post } **or £3.40 EU;**
Radio Projects volume 3 – by Drew Diamond – members £5, non-members £10 plus post } **or £5.80 DX**
Radio Projects volume 4 – by Drew Diamond – members £5, non-members £10 plus post } **per book**

6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out **£12 plus post** } £1.30 (UK); £1.50 EU
Polyvaricon capacitors – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft ext & mtg screws - **£1.20 each** } £2.00p (DX)

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] **£4 pair** }
MAR-4 RF amplifier - £1.20 } **All components**
HC49U (wire) crystals for all **CW** calling freqs – 1.836, 3,560, 7.028, 7,030, } plus **postage**
7.040, 10.106, 10.116, 14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each } **(ANY quantity)**
HC49U (wire) crystal for DSB on 40m – 7.159MHz - **£2.00 each** } £1 (UK),
HC49U (wire) crystals – 1.8432MHz, 10.111MHz – **50p each** } £1.50p EU,
HC49U (wire) crystals – 3.579MHz, 3.5756MHz, 3.5820MHz, 3.6864MHz, } £2.00p (DX)
4.1943MHz, 10.0MHz, 13.50MHz, 32.00MHz – **30p each** }
Miniature crystals (watch crystal size – very low power) – 7.030, 10.106, } If
18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each** } ordered
Ceramic resonators – 455kHz, 2.0MHz, 3.58MHz, 3.68MHz & 14.30MHz **– 50p each** } with
Schottky signal diode – 1N5711 low fwd volts for up to vhf/uhf **20p each** } max of 5 } toroids,
Varicap diodes – **MVAM109** – 40pF @ 9v, 500pF @ 1v. **50p each** } max of 2 } binders,
– **BB105** – 4.5pF @ 10V, 15pF @ 1V linear range **25p each** max 2 } or
SA602AN - £1.75 **(note – I may supply NE or SA, 602 or 612 as available. All are fully interchangeable.** } filters,
MC1350 - £2.00 } use
PICAXE-08M – as used in Rex's kits – 8pin - £2 each } that
LM386N-1 - 4 to 15v, 300mW, 8pin **DIL** - **£0.40 each** } postage
LM386M-1 - 4 to 15v, 300mW, 8pin **SMD** [0.2" (4mm) x 0.25" (5mm)]- **£0.35 ea** }
TDA7052A - 4.5 to 18v, 1W 8pin **DIL** low noise DC vol control – **£0.60 each** } If
CA741 op-amps 8pin DIL **– 5 for £1** } ordered
TA-7642 Radio IC – direct equivalent of **MK484** (& ZN414) – **75p each** } with books
2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO +40V **- 5 for 50p** } add this
MPSA92 transistors (pnp) fT - 50MHz, hFE-40, VCBO -300V **- 5 for 50p** } postage
2N3904 transistors (npn) fT - 300MHz, hFE-150, VCBO +40V **- 10 for 50p** } as they do
2N3906 transistors (pnp) fT - 250MHz, hFE-150, VCBO -40V **- 10 for 50p** } do not travel
2N3819 N channel JFET – **12p each** } well together
BF988A dual gate MOSFETs TO50 package – 20dB @ 800MHz **- 50p each** }
IRF510 FETs - £1.00 ***(NOTE THE PRICE DECREASE!)*** } **All components**
10K 10mm coils (TOKO or equivalent) - see inside this issue – all 75p each } plus **postage**

1.2uH	– (TOKO 3335)	– Spectrum 1u2H Pink	}
1.7uH	– (TOKO 4612)	– Spectrum 1u7H White	} **(ANY quantity)**
2.6uH	– (TOKO 1509)	– Spectrum 2u6LC Pale blue	}
5.3uH	– (No direct TOKO equivalent)	– Spectrum 5u3L Yellow	} £1 (UK),
11.0uH	– (No direct TOKO equivalent)	– Spectrum 11u0L Dark blue	} £1.50p EU,
45.0uH	– (TOKO 3333)	– Spectrum 45u0L Red	} £2.00p (DX)
90.0uH	– (No direct TOKO equivalent)	– Spectrum 90u0L Pale red	}

Toroid cores – all toroid cores are available as recent ads (no room this time!)

Binders for Sprat - the original 'nylon string' binding type back in stock again! Black with club logo on spine **£3.75 each plus postage** (one: UK – £1.20, EU – £2.00, DX - £2.50. More – add £1, £1.20, £1.50 each)

Sprat-on-CD V4 – 1 to 140 (see Sprat 140) – members price - £4 plus post UK - £1.00, Eu - £1.50, DX - £2.00

Please note - I only have stock of the above items – I do not sell anything else. Anything in previous advertisements and not shown above is out of stock – if it becomes available again – it will be in the next magazine.

Cheques (UK) and payable to G-QRP Club. Sorry, but cheques in other currencies are uneconomical to us due to bank exchange charges!

MINIMUM ORDER for cheque or PayPal payments is £5

For orders less than £5 – please use postage stamps (any denomination £1 or less please) - any quantity of stamps is OK, or cash. I can accept cash in GBPound, or US$, or uros – but please send securely! You can order via e-mail and pay by PayPal. Use g3mfj @ gqrp.co.uk – pay in GBPounds and you MUST include your membership number and address please