



# SPRAT

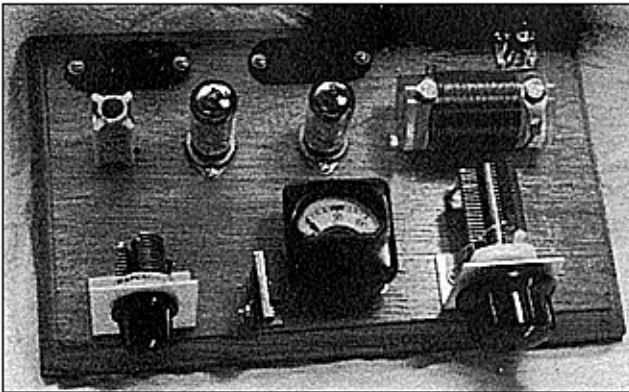
THE JOURNAL OF THE G QRP CLUB

DEVOTED•TO•LOW•POWER•COMMUNICATION

ISSUE Nr. 106

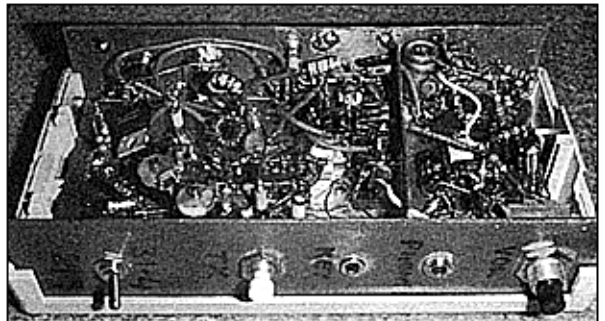
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SPRING 2001



The SM7UCZ  
DL33 Transmitter  
described in this issue

The Cracker Transceiver  
by G3CWI - in this issue



**THE CRACKER TRANSCEIVER – SINGLE CRYSTAL CW FILTER  
WEAK SIGNAL RECEPTION – DL33 TRANSMITTER – RECYCLED BITS  
THE TUNING WAND – HEARING AID ADVICE – PSK31~THE NEW CW?  
DAT20 DATA TRANSCEIVER [CLUB OFFER] – CLUB SALES – A.A.A.  
QRP MASTERS - COMMUNICATIONS NEWS – NOVICE NEWS – VHF NEWS  
SSB & DATA COLUMN – MEMBER'S NEWS**

# JOURNAL OF THE G QRP CLUB



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Rev. George Dobbs G3RJV

## EDITORIAL

Welcome to SPRAT 105,

This issue contains two articles on PSK31 – a mode that has proved ideal for QRP. The very narrow bandwidth and ability to read weak signals has commended PSK31 to many seasoned QRP operators. The practical article includes a **Club Kit Offer** for a dedicated PSK31 transceiver by Sheldon Hands. Dick, GØBPS has also expanded his column to include PSK31 and other data matters.

On a practical point – please note the change in Club Sales Officer. Although the change over to Graham, G3MFJ, from the late G3YCC was some time ago, Frank's widow still continues to receive some orders.

I hope that I may meet some of you at the summer radio events and do not forget to book October 13<sup>th</sup> for the Rochdale QRP Convention.

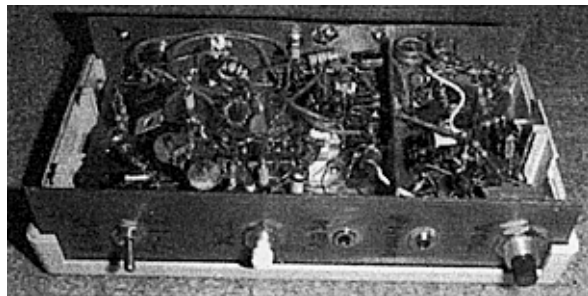
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G3RJV

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK  
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# The Cracker – a Basic CW Transceiver for 40 metres

Richard Newstead, G3CWI, 89 Victoria Rd. Macclesfield, Cheshire



Outline – a basic CW transceiver for 40 metres designed for keeping skeds from wilderness locations. TX runs 500mW using a single IC design. RX is a high-performance DC receiver. The idea for this transceiver came to me just before Christmas – hence the name.

## Transmitter

TX is based on a single IC design by N7KSB. This makes use of an octal buffer (74HC240) to perform the functions of oscillator and PA. The oscillator is a crystal controlled Pierce design. Careful attention must be paid to matching the “PA” output to the aerial. Two L networks in series have been used. The 4 buffer “PA” is keyed, leaving the oscillator running at all times. The transceiver has a built-in keyer.

## Receiver

Whilst it is a DC RX, that is not excuse for accepting poor performance. For good strong-signal handling, I have used an expensive high level mixer, needing 50mW of LO drive. The RF port is preceded by a slightly under-coupled pair of tuned circuits. The LO port is driven directly by a single buffer. The DC/AF port has been carefully terminated to ensure that it sees a reasonable match at all frequencies. The AF stages have been optimised for a best response at 600Hz. Several AF stages have been used to get a decent output level.

## TX/RX Switching

Simplicity has been the aim. A double-pole double throw switch is used. The aerial is switched directly between TX output and RX input. On TX, power is applied to an oscillator offset circuit. The keyer IC is also switched on – this means that you can only use the default settings of the IC as it has no permanent memory. The AF stages are left un-powered and side-tone comes directly from the keyer chip.

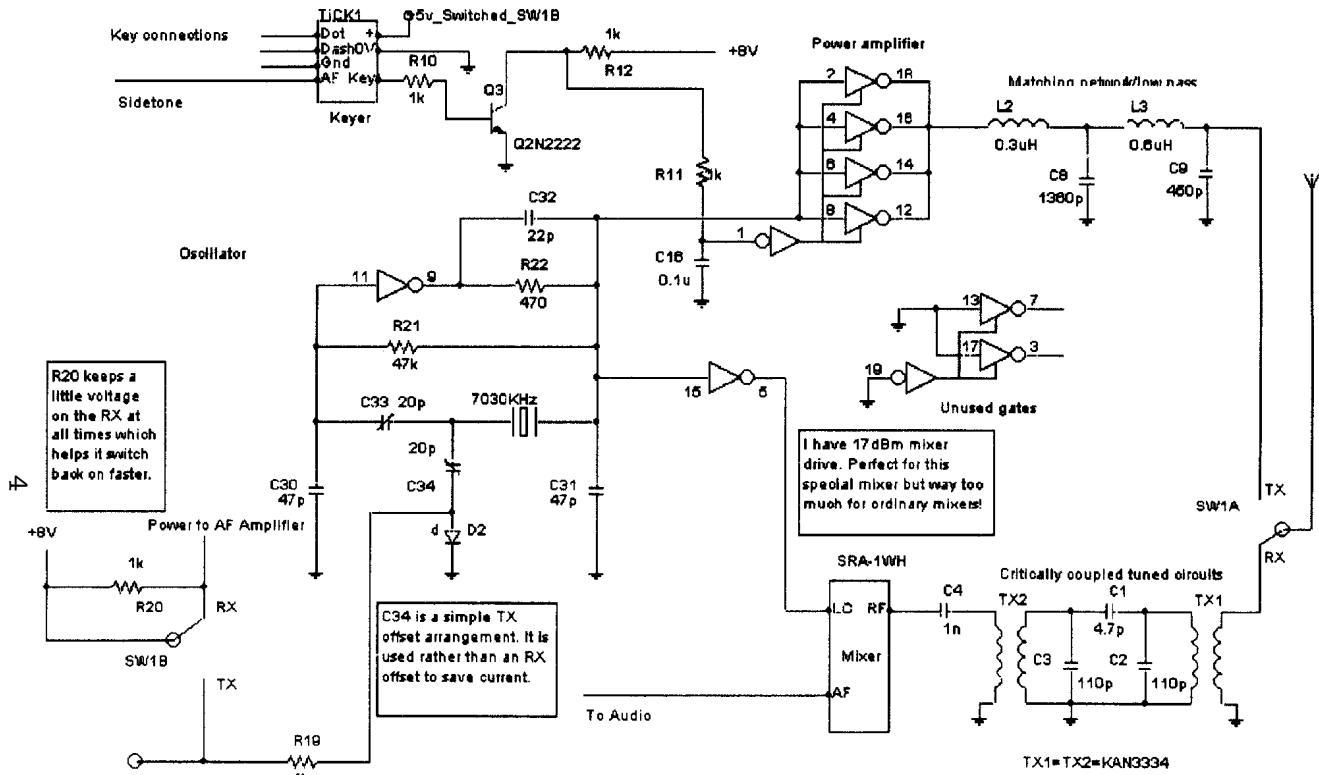
On RX, power is removed from the keyer and the offset circuit and is applied to the AF stages. A resistor keeps some power on the AF stages at all times which helps them switch on faster.

## Further developments

In my design, I have two switched “channels” using a crude VXO circuit. If you want to use a cheaper diode mixer, you will need to attenuate the LO drive (typically by 10dB to get 7dBm). More sophisticated keying could probably be achieved with a TiCK4 chip which has a permanent memory. The design could easily be adapted to other bands, the TX chip works up to over 30MHz.

## Results

QSOs have been easy to come by. Just using an 80 metre dipole and tuner, I have worked 7 countries and made 20 QSOs in no more than about 3 hours of operating. Two QSOs have exceeded 1000 miles per Watt. I even got a QRZ from a UA9! The design achieves my objectives for a no frills, high-performance sked radio.



R20 keeps a little voltage on the RX at all times which helps it switch back on faster.

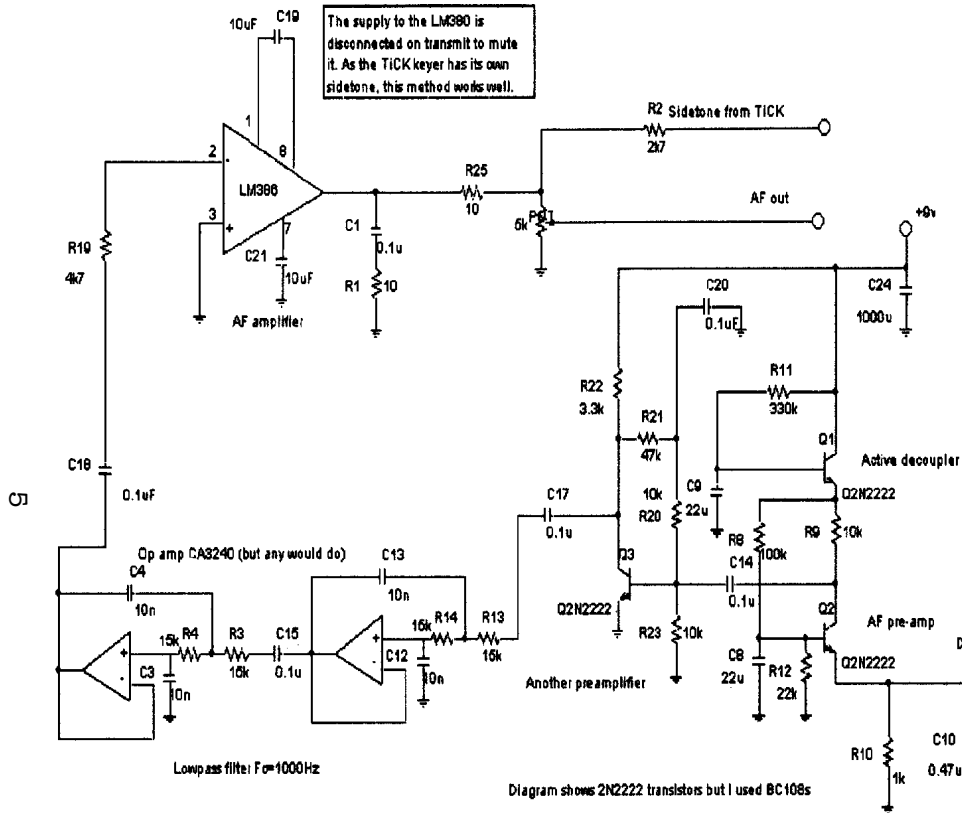
C34 is a simple TX offset arrangement. It is used rather than an RX offset to save current.

I have 17dBm mixer drive. Perfect for this special mixer but way too much for ordinary mixers!

The power to the TICK keyer is disconnected on receive. This stops the transmitter being accidentally activated. However, with the TICK1 it means that you can only send CW at the power-on default speed as it has no permanent memory.

Thanks to N7KSB for a neat single chip transmitter. To Bill KD4PWB for lots of encouragement and last but not least to W7ZOI and W7EL for great circuits over a great many years.

TX1=TX2=KAN3334



ABOVE: The Cracker

**Notes**

The supply to each AF stage should be individually decoupled with a 100 Ohm resistor in series and a 220uF capacitor to ground

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03CW1  
89 Victoria Road  
Macclesfield  
England

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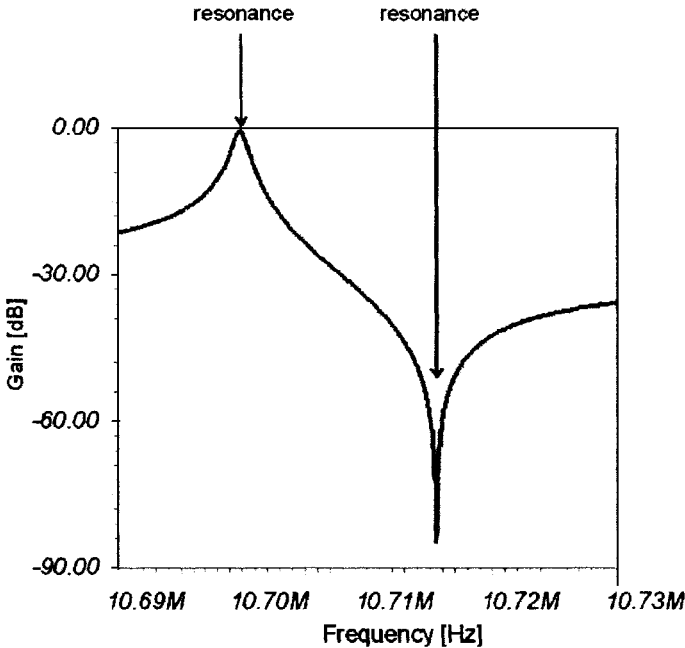
LEFT: AF Stages

Cracker - AF

# A Single Crystal CW Filter

Ian Braithwaite, G4COL, 28 Oxford Av. ST ALBANS. AL1 5NS

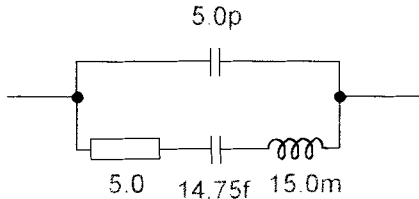
QRP-ers tend to delight in doing more with less. This single crystal filter exploits the crystal characteristic to the full, and while unable to give the steep cut-off of the ladder filter, it is very satisfactory in practice.



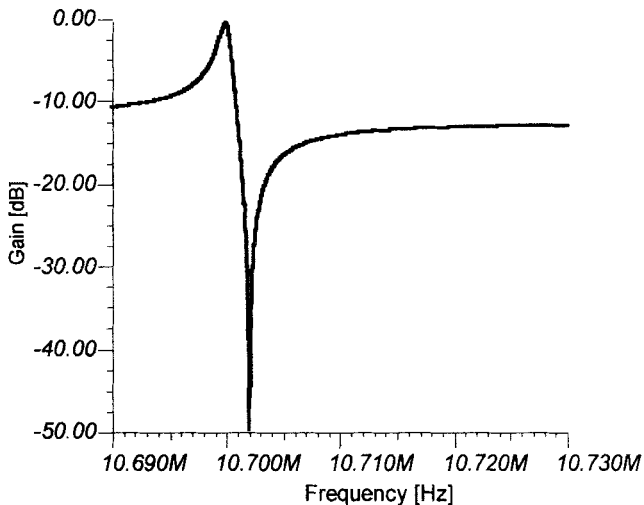
If you put a crystal in a 50 ohm test and measure the frequency response (loss versus frequency) by sweeping the frequency upwards through the crystal frequency you obtain a maximum at series resonance, followed by a sharp dip to a minimum at parallel resonance. On a graph, the response looks like this, measured on a 10.7MHz crystal I used in a 14MHz cw transceiver

In the traditional half-lattice filter, the crystal parallel resonance is regarded as a nuisance, and is nulled out using a trimmer capacitor. My design exploits this parallel resonance.

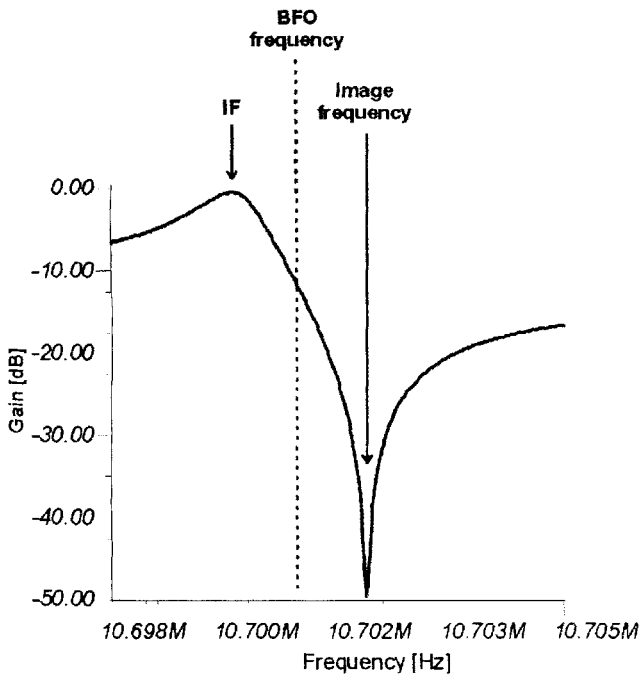
Close to the crystal frequency, the crystal can be represented by a simple circuit model. Here's the one for the 10.7MHz filter.



Placing a capacitor across the 5pF capacitance, shifts the parallel resonance lower in frequency, while leaving the series resonance largely unchanged. Here's the effect of a 33pF capacitor across the crystal:

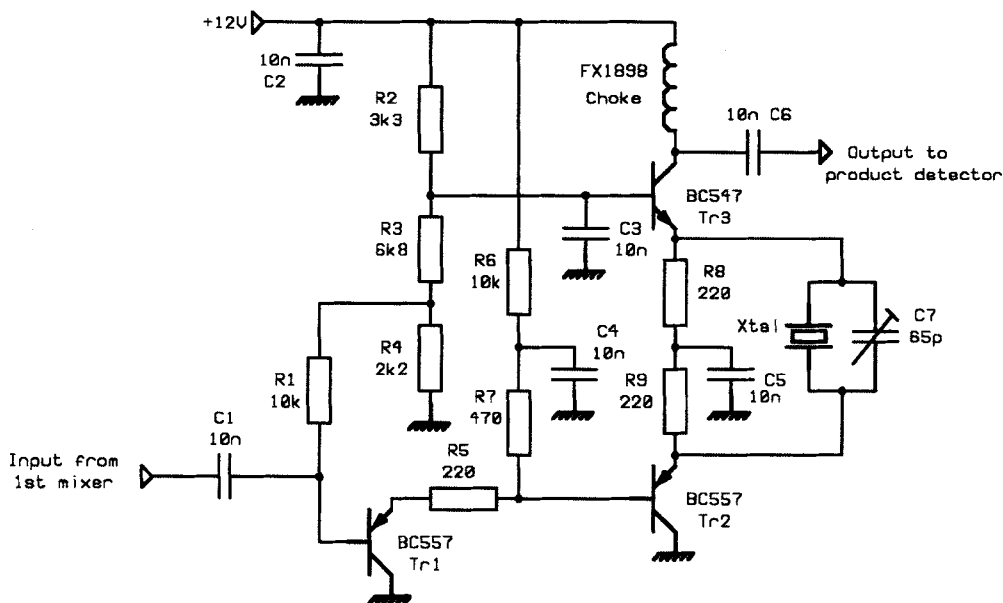


The series peak has become a little unsymmetrical, and the -3dB bandwidth stays much the same. The parallel resonance dip is less deep, at about -50dB, and it is now only about 2kHz above the series resonance. This means that it can be placed at the image frequency where the beat frequency oscillator is around 1kHz above the series resonance, giving a single frequency filter:



The circuit diagram of my implementation is shown below. It is actually very straightforward, but may look a little disconcerting so is described in some detail. It is essentially a double emitter follower, feeding a common base amplifier via the crystal. The circuit looks unconventional because the second emitter follower and the common base stage share the same supply current, another case of trying to do more with less. Resistors R2, R3 & R4 set the bias voltages. In my transceiver, the crystal filter followed a tuned circuit, so needed a fairly high input impedance. That's why there are two emitter followers and R1, used to reduce the loading of the bias resistors. If you don't have this requirement, possibly because you have a diode mixer, R1, and possibly one emitter follower, could be omitted.

I found it necessary to add R5, R7 and C4 to stop oscillation. C7 adjusts the parallel resonance frequency. In my transceiver, the product detector (a 1496 ic) presented a 100 ohm load to the filter circuit. The output collector choke should not be critical. I used a 6-hole ferrite core, type FX1898, giving around 4uH inductance. The gain of the circuit depends on the output load, the transistor impedances (low) and the crystal series resistance (a few ohms). The higher the output load, the higher the gain. With a 100 ohm load, a gain of around 4 (12.5dB) can be achieved.



### Setting up:

This is most conveniently done with a signal generator of some sort, but can be done with strong off-air signals. Tune the signal generator, or the receiver if the filter is built in at this stage, to find the filter peak, where the signal is strongest. If possible, don't use audio filtering for this, since it could make finding the true crystal filter peak more difficult.

Next tune the BFO to obtain a beat note of around 1.2kHz. A counter or musical instrument can help here (two octaves above D next to middle C is nearly 1.2KHz).



Finally, tune the generator or receiver around 2.4kHz higher in frequency, to get the same beat note, and adjust the trimmer for minimum signal.

**In use:**

The bandwidth of the filter depends on the crystal and to some degree on the circuit. My 10.7MHz filter had a -3dB bandwidth of around 160Hz. The filter peak is quite sharp, but the roll-off of the skirts is quite gentle. This means that the wanted signal can be brought out well, but nearby signals can still be heard in the background, which I find quite pleasing.

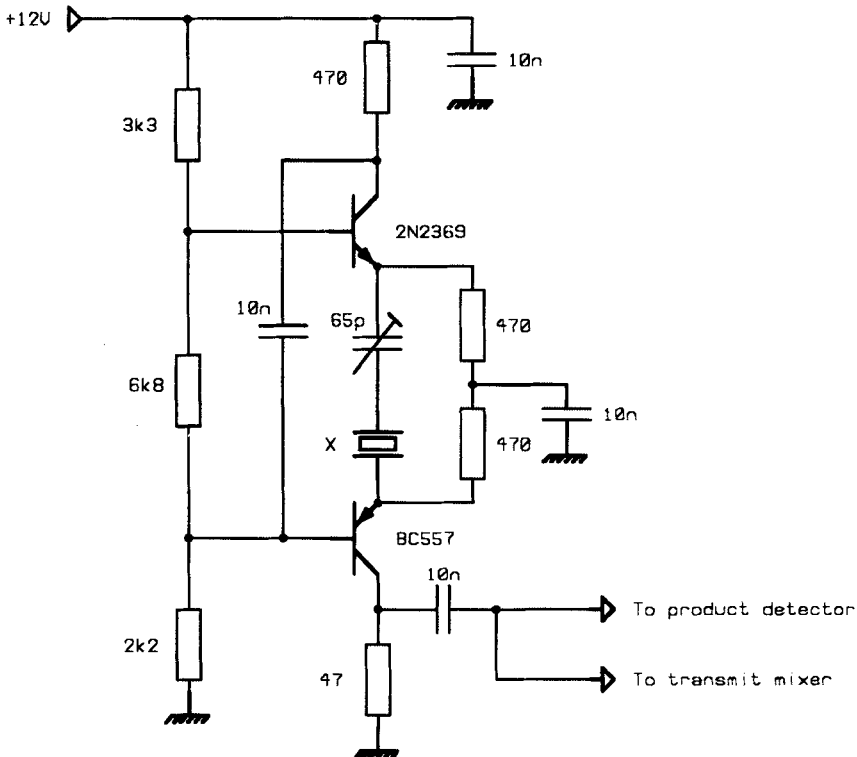
**Other possibilities:**

It is also possible (I've done it), to make a single crystal filter with the crystal in a high impedance circuit, across a FET gate. The filter peak is then the parallel resonance, and a trimmer in series with the crystal is used to position the notch, which is now on the low side of the wanted frequency.

**Finally:**

Here's my BFO which uses the Butler configuration, and again looks odd, because the two transistors share current. Strictly, the "upper" transistor should have a higher current, but it works well in practice.

Butler oscillator circuit diagram:



## VERY WEAK SIGNAL RECEPTION

Peter Dodd, G3LDO, 37 The Ridings, East Preston, West Sussex BN16 2TW

With QRP operation received signals are often very weak. Is there a way, with all the modern technology around that we could dig out the very weak signals from the noise? On the 136kHz band, where the signals to noise problem are more severe than on the HF bands, amateurs have developed techniques for weak signal detection. This article briefly describes these experiments. The dominant and most efficient mode used by QRPers is CW. A 12WPM CW signal takes only 10Hz of bandwidth. The signals to noise ratio of an incoming signal can be increased by reducing the receiver bandwidth, however if you tried to listen to the signal with a filter only 10Hz wide it would sound very uncomfortable. The reason is that any noise within the passband is converted to a tone the same as the signal you are listening to. In practice the best compromise between signals to noise and comfort is 100kHz to 200kHz bandwidth.

One way to use very narrow bandwidths to obtain a much better signals to noise ratio is to use Digital Signal Processing (DSP). DSP is one of these rather technical expressions that seem to be the domain of specialized electronic engineers and some 'techy' hams. Until very recently special (and often expensive) hardware was needed to perform DSP. These days you may already possess all the equipment necessary. All that is required is a Pentium PC with soundcard; the software you need is available for free#.

Using a computer and this FFT (Fast Fourier Transform) software the signals are displayed as a graphic where one axis represents time and the other frequency. Signal strength is indicated by signal intensity as shown in Fig 1.

These programs use the A/D circuits of a soundcard to convert the analogue signals into a digital form for processing and to use the rest of the computer to process the data and display it on the screen.

The FFT can be regarded as many filters in parallel, whose individual 'bandwidth' is set in software parameters. In this way the display can be used to monitor a section of the spectrum spectrum and several signals simultaneously. Some very interesting experiments have been made on 136kHz that enables signals that are 15 or 20dB below the normal CW noise background to be received. This is achieved by using very slow CW, with dot speeds of 3 seconds or more. This mode of transmission has been dubbed QRSS, derived from the Q-code QRS (reduce your speed). In practice this allows sub-Hertz bandwidths.



Fig 1. QRSS signal received from 15TGC using the Spectran program. This station only runs 20mW erp. Frequency is displayed on the vertical axis and time on the horizontal axis. The signal on 136.71kHz is showing a slight LF drift of about 5Hz. The other horizontal lines are sidebands from Loran on 100kHz, 36kHz lower in frequency!. The top display is an uncalibrated spectrum analysis of the viewed image.

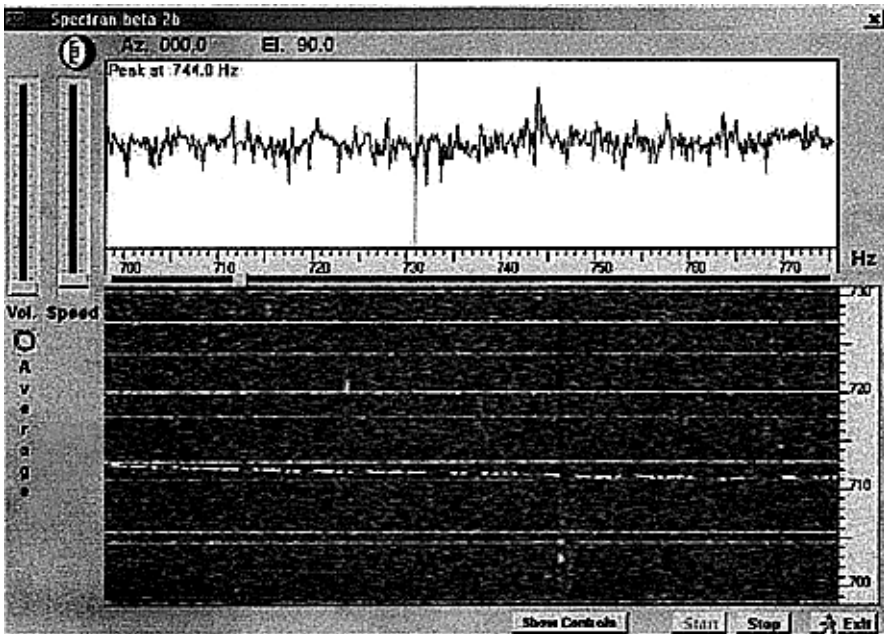


Fig 2.

Various signals using the Argo program. The right hand scale is frequency. At 500 (136.500kHz) is a QRSS signal from VE1ZZ using 3 second dots. (the time scale at the bottom is calibrated in 5 second ticks).

The broad signal is a relatively local CW station with a small amount of upward drift. Two other CW stations can be seen at the top of the screen. The blank space in the centre is cause by my test transmission.

To make the most of this very narrow band mode you have to send the CW very slowly. The simplest way of transmitting slow CW is to use a memory keyer with a modified speed control. This can simply be a resistor in series with the speed control. However, this is not a very convenient method from an operating point of view. A much better way is to use a computer with a very simple circuit on the output of the COM serial port. You will also require some software. Both the circuit and the software can be found on the Internet ##

Because it takes longer to transmit information using QRSS the procedure is simplified and the report system is the TMO system (similar to that used in EME):

T = signal traces seen but not good enough for a QSO

M = weak signal but good enough for a QSO

O = perfect copy

An example of a basic QRSS QSO is like this:

```
* CQ ON7YD K
* ON7YD G3RJV K
* G3RJV OOO K
* RRR OOO K
* RRR SK
```

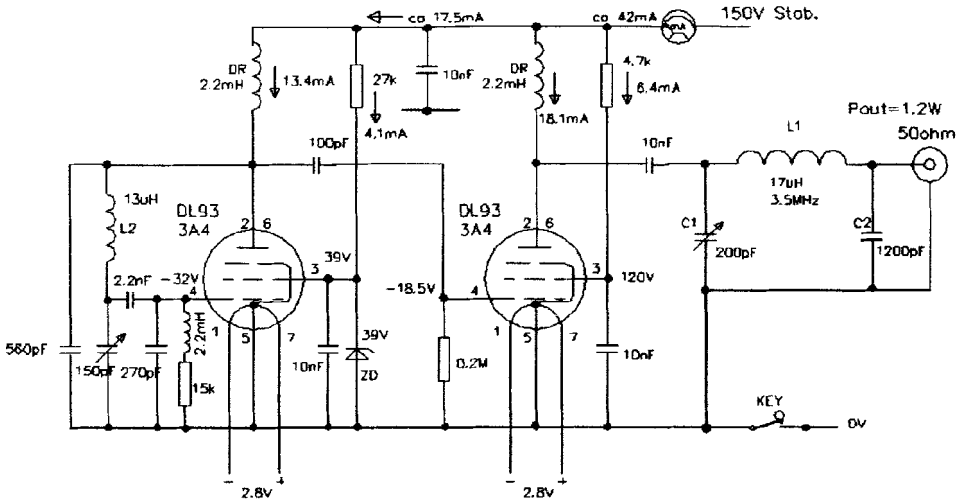
# The most user friendly FFT program is ARGO. It is available from

<http://www.weaksignals.com/>

## <http://web.ukonline.co.uk/g3ldo/>

# The DL93 Transmitter

Johnny Apell SM7UCZ Ekedalsvagen 11 JAMJO S-373 00 SWEDEN



DL93 / 3A4  
 Ua = 150V  
 Ug2 = 135V  
 Ia = 18.3mA  
 Ig2 = 6.5mA  
 Ig1 = 0.2mA  
 P out = 1.2W  
 Uf = 1.4 / 2.8V  
 If = 200mA / 100mA

Freq = 3.5MHz  
 Xc1 = 350 ohm  
 Xc2 = 40 ohm  
 XL1 = 380 ohm

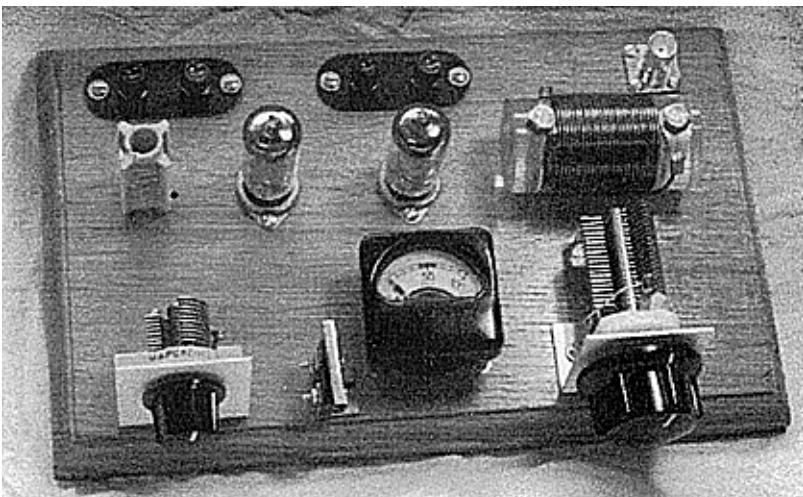
$$R_{anod} = 464 \times U_a / I_a = 464 \times 150 / 18.3 = 3800 \text{ ohm}$$

$$R2/R1 = 50/3800 = 0.013$$

$$R2/R1 = 0.013 \text{ diagram gives } X_{C1} = 350 \text{ ohm, } X_{L1} = 380 \text{ ohm}$$

$$C1 = 190 \text{ pF, } C2 = 1200 \text{ pF, } L1 = 17 \text{ uH}$$

After RSGB Amateur Radio Handbook, 1961, pp. 187-189



## RE-CYCLED COMPUTER BITS

Tim Ostley, M5TIM, 16 Old Field, Little Milton, Oxon. OX44 7PY

Computers and computing are renowned for rapid change and this applies equally to computer networks. One of the changes that has been happening over the last two / three years is a move from 10 Base 2 Ethernet connection (BNC on RG58) to 10 or 100 Base T (RJ45/UTP). This means that there is a lot of redundant 10 Base 2 infrastructure gathering dust. Have a word with your local friendly Computer System Manager / Technician and you may well be able to get hold of various length RG58 cables terminated at each end with BNC connectors, surface mounting plates with twin BNC sockets, 50 ohm terminators etc and very usefully, standard 10 Base 2 50 ohm terminators (A BNC plug with a 50 ohm load built into it). These make wonderful QRP dummy loads (I have used one with 1W continuously and 10W intermittently)! I can vouch for the usefulness of the above from personal experience !!

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### The W1FB Memorial Award

For 2000, the project is to

**Design a Useful Piece of Test Equipment  
for a QRP constructor's workshop.**

Please submit your design to G3RJV as soon as possible, with circuit sketch, all values and brief notes. The project will be published in SPRAT and the winner will receive an engraved plaque.

**MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS**

FOR SALE: KW204 TX & FRG7 £150 ono, both need attention. 01535 465 (Keighly Yorks)

FOR SALE: Westover aluminium tiltover mast 30ft in 3x10ft sections. £85.00. Diawa rotator (2 motors fitted) and controller with cable. £80.00. 10 ele. X yagi £15.00. Will sell as lot for £175.00. Buyer collects. e.mail [les@lesange.fsnet.co.uk](mailto:les@lesange.fsnet.co.uk) Or 01709 812000. Les.

FOR SALE: Kenwood TS50S & Kenwood TS120V, (unmarked non-smoker) QRP; Lake Electronics DTR 3 80m 3watt transceiver QRP; 2 off 80m traps (500w). All complete with manuals, QTHR/01752 700255 No reasonable offers refused.

HELP: Drake RV4-C VFO circuit diagram required. Bill. 0141-562-4571

## THE TUNING WAND

**Bill Cooper G4CIA, 20 Planton Way, Brightlingsea, CO7 0LB**

In bygone days, the tuning wand was a useful tool for checking the alignment of valve wireless sets. It was made from a length of ebonite tube into which was inserted a small piece of soft iron at one end and in the other a piece of brass.

To check a tuned circuit the iron end was held against or inserted into the coil. If the output of the set under test INCREASED, the circuit needed re-peaking down in frequency. If the brass end gave an INCREASE in output, the circuit needed retuning up in frequency. Brass lowers the inductance of a coil.

Re-tuning the coil slug or the trimmer capacitor until the iron end AND the brass end of the wand gave a DECREASE in output from the loudspeaker indicated that the tuned circuit was peaked to the correct frequency.

A wand can easily be made from an old ball-pen case with the ends squared off. Into one end glue a ferrite or iron dust core and into the other end a small brass screw. Experimenting with any tuned circuit and noting the effects will show what a useful tool it is. A larger version is useful when building aerial tuning units. This wand really is magic!!

### MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

WANTED: TenTec Argonaut 509, Heathkit HWA-7-1 12v PSU, Heathkit HW9 (no mods), Homemade JU6, OXO or any homebrewed TX/RX.

FOR SALE: KW Vespa Mk1 (single 6146) vgc £50, TRIO JR310 80/10 double conversion RX £70, TRIO JR500 80/10 double conversion RX £45. Many other items for sale. Contact: Rev. Adrian Heath, G4GDR, 01793-762970 or QTHR or aheath@serco.bzn.uk

For sale:- HF QRP rig: Mizuho MX14 -S 20M SSB/CW transceiver, with 4 xtals, complete with speaker mike, AN-14 Telescopic Ant, De-Dc converter, Sagent 20M end-fed dipole, QRP random-wire ATU, instructions and case. £300 ono. Contact George (G0HSV) (020 8789 8775) .email g0hsv@qsl.net

FOR SALE: MFJ-9020 (5w 20m cw) with PSU and CTU-3 atu. This rig has worked VK ! £160 (plus p & p). Richard Limebear G3RWL (QTHR), 020 8366 4297 (eves) or e-mail g3rwl@amsat.org

FOR SALE: Ten Tec Century 22 £135, Ten Tec Scout with all band modules 1.8 to 30MHz. £440. Brian Alderson, G3KJX, 43 Brompton Road Northallerton, DL6 1ED

FOR SALE: Ten Tec 1253 regenerative receiver, covers approx 1.6 to 22 MHz in 9 bands, internal batts or 12v, built, cased and working, £35. Ten Tec 1254 synthesised receiver, unbuilt kit, covers 0.1 to 30MHz AM/SSB/CW, includes UK spec psu, cost almost £200, selling for £120. Hora C408 70cms 300mW micro handy, boxed, includes rubber duck and 1/4 wave ants, £40. All above mint, no offers. Carriage extra. Mark G0OIW QTHR. 0118 948 3593 e-mail bartok@cwcom.net

MANY QRP BARGAINS, like Liner2, 5w PEP SSB 2m rig (£25), Lovely condx , Yaesu FL50/FR50/FV50 set £60 the lot. Much other good stuff. Pse email or phone for list, julian@pjiredale.freeserve.co.uk Tel 01473 314151 (Suffolk) for list, Julian G8HCZ

SURPLUS MAGAZINES: Free for postage only, the following: SPRAT 93, 94, 96, 97. RadCom Jan 99, Oct 99, Nov 99, Dec 99, Jan 00, Feb 00 Mar 00, Jun to Oct 00. Rev A Heath [see above]

## **FROM THE CLUB MEMBERSHIP SECRETARY**

**John Leak. G0BXO. Flat 7, 56 Heath Crescent. HALIFAX. HX1 2PW**

**Tel:- 01422-365025. Email:- g0bxo@ggrp.com**

**Thank you to members for prompt subscription payments.**

**Thanks also to those members who sent extra contributions to Club funds.**

Please remember that we do not issue receipts unless we receive an SAE with your payment. Your receipt is the updating of the subscription code on your SPRAT address label. For example, the code "2001" means that your subscription is paid to the END of the year 2001. Some members have paid by VISA or MasterCard using email. This is OK, but we do not send email acknowledgements. Again, your receipt is the updating of the subscription code. Please remember that there is a time delay of about 4 weeks between the printing of the address labels and the despatch of SPRAT.

Please write to, telephone or email me if you think we have made a mistake.

**PLEASE QUOTE YOUR CLUB NUMBER AND CALLSIGN.**

### **CHANGE OF ADDRESS**

Please remember to tell us if you change your address. Each quarter, several copies of SPRAT are returned to me by the Royal Mail as undeliverable because the member has moved and has not arranged for mail to be forwarded. Please remember that changes take time to work through the system.

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A standing order mandate form appears in the Winter issue of SPRAT each year.

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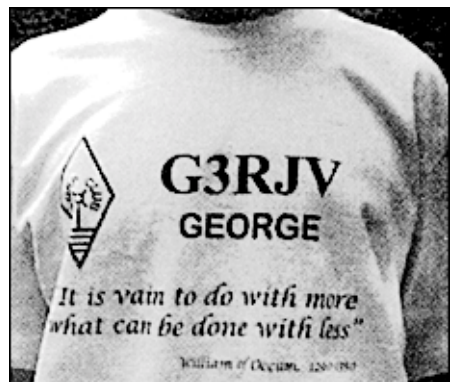
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## More Hearing Aid Advice

Brian Alderson G3KJX, 43 Brompton Rd. NORTHALLERTON DL6 1ED

Following on from the item on page 18 of SPRAT 103 - My XYL has major hearing problems and over the years I have tried many variations of loop systems for her. The snag we have found with Bill's idea of hanging it round your neck is that you are liable to forget about it and walk away with it still in place causing all sorts of chaos. The round the room loop has dead spots. The current favourite is a large loop stretched round the back of her favourite chair. The loop is a large degaussing coil removed from a scrap TV. Opened out it forms a loop some 2 feet in diameter and will press to the shape of the chair. It has stayed in position for many months now. A phono plug and socket near the chair allows it to be disconnected when the vacuum cleaner comes out. It is fed from a small amplifier connected to the scart socket on the TV. I haven't checked the impedance of the loop but it works OK. Anyone wanting a coil should be able to acquire one from any TV service department, but will probably have to take the whole set and dispose of the remainder. The large amount of wire in these coils is very useful for /P aerials too.

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75 1N4001 Rectifier Diode	20 BC639 NPN Transistor	10 PP3 Snaps High Quality
50 1N4002 Rectifier Diode	20 BC640 PNP Transistor	20 8 Pin DIL Sockets
50 1N4007 Rectifier Diode	20 Asstd. Above Transistors	15 14 Pin DIL Sockets
30 1N5401 Rectifier Diode	4 741 OP.AMP	15 16 Pin DIL Sockets
5 W02 1.5A Bridge Rectifier	4 LM1458 Dual OP.AMP	1 28 Pin Zif Socket
30 Ass. Zener Diodes 400 mw	4 LM324 Quad OP.AMP	4 Stripboard
5 7805s Voltage Reg. In. Tab	2 TDA820M Audio AMP	(9 tracks x 25 holes)
5 7812 Voltage Reg.	10 4013 Dual Flip Flop	5 3A 12 Way Connector Strip
20 BC 182L NPN Transistor	10 4049 Hex buFer	100 100mm Cable Ties
20 BC212L PNP Transistor	8 555 Timer ICs.	10 Ins. Croc. Clips Red, Black
20 BC327 PNP Transistor	25 4u7 25v Rad.Caps	(Blue, Green, Yellow)
20 BC337 NPN Transistor	25 10uF 25v Rad.Caps	*****
20 BC547B NPN Transistor	25 22uF 25v Rad.Caps	250 gm. Ferric Chloride £1.99
20 BC557 PNP Transistor	20 47uF 16v Rad.Caps	*****
20 BC548 NPN Transistor	20 100 uF 16v Rad.Caps	Mail order only.

P&P £1.45

7 Bakewell Road, Baslow, Derbyshire, DK45 1RE. Tel: 01246 583777

email: enquiries@bowood-electronics.co.uk

## SEQUENCE ELECTRONICS

*Due to changes in personal circumstances, I am unable to offer kits any longer and reluctantly SEQUENCE ELECTRONICS ceased trading as of 31st December 2001. 73 de John G8SEQ*

*PS hopefully I will be able to publish the complete designs of the kits that were offered on my website at sometime in the future. These will be free of charge.*



## PSK – The new CW..... or maybe not?

Richard Constantine G3UGF, The Old Exchange Burnley Rd. MYTHOLMROYD. HX7 5PD

Data is boring – not a patch on the skill of live CW!

But....Amateur Radio is a huge and diverse hobby, with room for everyone. that's why I like it so much.

I must confess, technical articles on data often leave me cold; I tend to skip over them, looking for something potentially more interesting.

That's why I missed details of, PSK 31 by Peter Martinez in RADCOM magazine, in December 1998, and January 1999 issues.

Oh yes, I know all about, AMTOR, PACTOR and PICCALO. In the dim and distant past I even struggled with RTTY, lugging an old Creed 7b mechanical wonder, half way round the world, trying to figure out how seven digit start stop code worked.

All to no avail, it simply holds no magic for me, - nothing beats the thrill of live contacts in real time ...until now!

PSK31 is amazing and most people's initial reaction is the same.

Peter's article – which is actually quite fascinating to read, describes in detail how PSK 31 (Phase Shift Keying 31.25 baud) works, using a new system christened, "Varicode" Varicode owes more to Morse theory than it does to RTTY and is ideally suited for use with computer sound cards. – Interested?

### What's so good about PSK 31?

Peter lists its benefits as,

**Narrow Bandwidth** – You only need to set your receiver to a single frequency to see almost all the stations on that band, happily exchanging independent live contacts, within a range of about 30hz. - Rx Bandwidth is not an issue an optional digital audio filter would be a nice luxury

**Excellent Signal to Noise Ratio** - Decodes weak signals on screen when propagation is poor, or you only have simple receiving equipment and antennas.

Performance can be almost unbelievable, with near perfect screen copy coming from stations that can neither be seen on the tuning bar, nor heard on the monitor speaker! Great stuff for QRP and a match for CW.

**Live contact** – A combination of not using error correction, plus a common start/stop character between letters, (just like the space in CW), means only a minimal 150ms delay in the flow of conversation.

The system works well up to typing speeds of around 50 wpm with acceptable accuracy, simulating an almost natural two-way exchange.

It's amazing to see the other operator makes a typing error, backspace and change the letter, right in front of your eyes!

Varicode has an average character length of 6.5 bits of signal information, sent at a speed of 31.25 bits per second. The highs and lows, (or dots and dashes) of each character are sent by reversing the waveform of the RF signal.

- Hence the name PSK 31 *Phase Shift Keying, 31 baud*

That's enough theory

### What does it do, How do I start, what will I see – how will it change my life!

PSK has quickly blossomed into a major system and once you see it for yourself, it's like the latest must have gadget. But this one is available almost for free!

Signal decoding, is easy, connect an audio lead a PC sound card input – tip and screen on a 3.5mm stereo plug and you're in business.

A PC microphone plugged into a soundcard, placed near the speaker also works for a quick test!

### **What Software do I need?**

There are several good programmes such as WinPSK by far the most popular is, "Digipan v1.5" available free, from where else but ...the Internet.

It easily fits on to a floppy disk at 600kb and can be obtained from, [www.digipan.net](http://www.digipan.net).

Once loaded the screen has four parts. The tool bar with 24 push buttons, in two banks of 12

Configured for easy transmission and slow typists, CQ, Call Sign, QTH, Rig details, Date and Time Stamp, plus optional logging facilities.

Below this the receiving screen where the decoded conversations magically appear.

The third part is for TX messages and the bottom window is the Waterfall or Panoramic frequency display.

Once the radio receiver has been tuned to the data channel, this last part of the screen becomes your receiver-tuning dial. Signals appear as a moving Red lines tracking side by side down the screen.

Simply click on to a Red line, with the mouse cursor, and decoding is automatic.

You will be amazed at how weak the signals can be or how heavily they are interfered with to the human ear and still give acceptable copy

This easy but comprehensive programme, with multiple decoding windows, auto scanning and monitoring of signals, is all you need. - Its compulsive so be warned

I often leave mine scanning all day on what appears to be a "dead" band; it's like having your own worldwide beacon chain, with logging facility,

On 28 MHz, stations come and go throughout the day and are recorded automatically by my unmanned station.

From this running log I can often determine the best time to call CQ on either, QRP PSK or CW.

Transmit is equally simple to arrange with an SSB rig by connecting the output of the soundcard to the microphone input AND RUN THE TRANSMITTER AT NO MORE THAN HALF ITS NORMAL POWER OUTPUT.

Initially change over can be taken care of manually or by VOX if available.

A much better idea is to build a simple interface to completely isolate the computer from the rig.

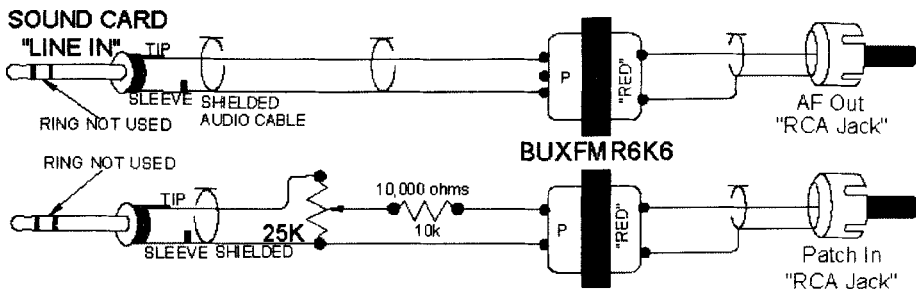
A quick and easy to build circuit, using two small isolation transformers and an opto coupler chip, is freely available on the Internet at, [www.packetradio.com/psk31.htm](http://www.packetradio.com/psk31.htm)

This site, run by Buck Rogers K4ABT (what a great name!) tells you everything you need to know and more.

It will also lead you to the original Radcom articles and lists all of the available software programmes to download, including, Digipan.

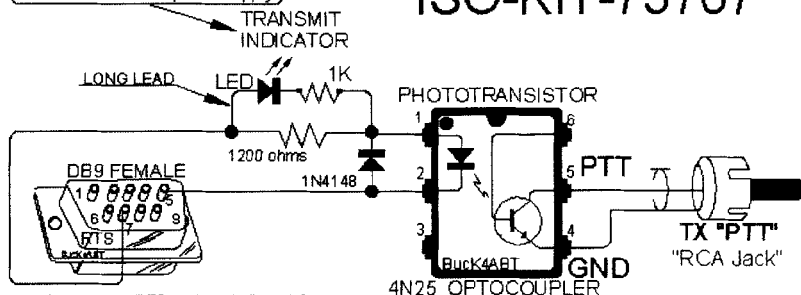
It also shows an easy to build isolation and PTT circuit, together with all of the wiring interconnections for most common radio transceivers, model by model, you just click on the one you need.

My first interface took approximately one hour to build, on strip board and all the major parts came from RS components at approximately £10.00. – NB: iso transformers can often be robbed from old modems. This now gives me added benefits such as, level adjustment; on screen send/receive and it can be used as an interface for other modes, including Slow Scan Television (SSTV).



Transmit LED not recommended for use with Laptop PC, due to current limitations in power supply.

## ISO-KIT-75767



For DB25 comport, use pin 4=RTS and pin 7=Signal Gnd.

As a starting point, go into the sound card parameters and set "LINE OUT" half open, and set "LINE IN" half open.

YAESU FT-757, FT-767, and Collins 380 rear panel RCA Phono jacks to PC Soundcard interface.

**Typical universal interface for both receive and transmit, with isolated transmit switching**  
**It can be easily constructed on strip board & connectors changed to suit the available equipment etc.**  
**Almost any small 1:1 isolation transformers will work e.g. R.S. components 2106223**  
**Opt coupler device is 4N25 - R.S. components 597 289**  
**For more details see the PSK 31 web site .**

### DX is easier to find

Using PSK is easy and what you see is even more amazing.  
 Stations running QRP, or near QRP, often in DX locations much sought after on other modes can be contacted easily, mainly because the world and his wife doesn't know they are there.

Once contacted a simple request to turn the power down to 5 watts is often enough to get a two way contact confirmed.

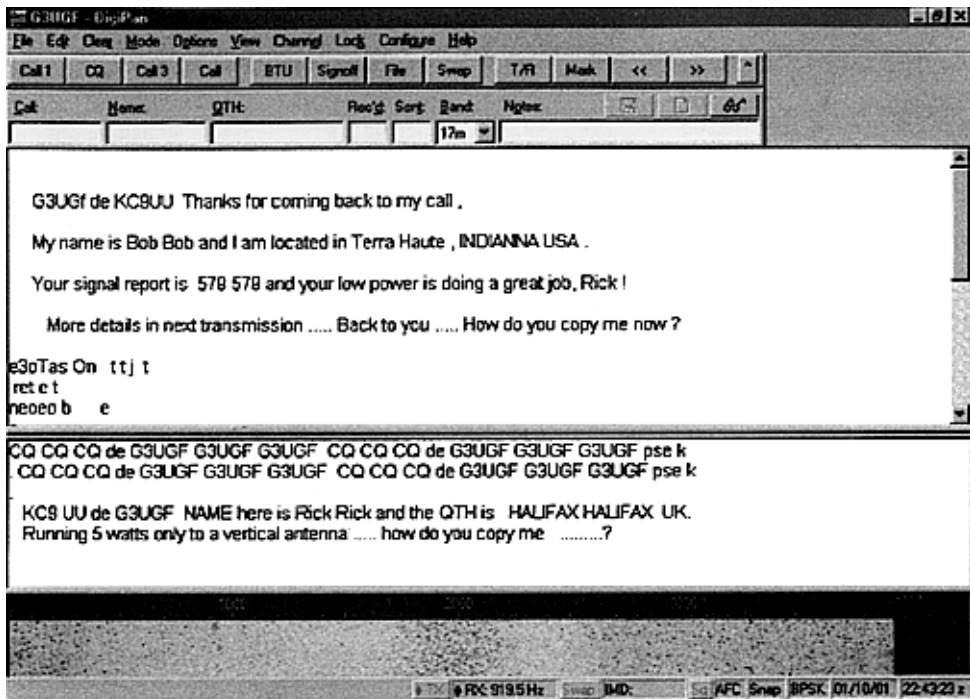
I am especially proud of my first 5 watt QSO's with ZP5 and many US states.

Right now I am musing over a small box, QRP/P, SSB rig with no external tuning controls, built in interface, plugged directly in to my laptop. ...Offers?

For more info also see Practical Wireless February 2001

## HF Amateur Data Frequencies. PSK31 and other modes.

1838.150, 3580.150, 7035.150, 10140.150, 14070.150 +.14.071, 18100.150, 21080.150 +21.071, 24.920.150, 28120.150 + 28.071



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≥Electronic QSK changeover ≥SSB superhet RX/TX for 80m

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Tel: 01282-774878 [Tony] or 01322-381303 [David]

### MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

FOR SALE: Drake R4-B [manual] £170, Global ATU2000 £35, Yaesu SP55 Speaker £5, Comet CFX-514 Triplexer 6-4-2m £45, Twin Duplexer TSA6001 £25, [both never used] Pye Power Unit 12v inc Speaker £10. Bill 0141-562-4571.

FOR SALE: FT7 HR Transceiver 10w [dial lights inoperative] £100, 2 Vibroplex keys [one in gold & presentation case), TenTec Argonaut 515 Mint Condition, Kenwood 130V Transceiver 15w with optional Kenwood 90w PA, All with Handbooks. Reasonable offers accepted.

WANTED: Alinco DX70TH. Ring Myles G2CYN on 01234-711-538 QTHR.

## **DAT20- A 20Mtr Mini Transceiver for soundcard data modes. WITH CLUB KIT OFFER Sheldon Hands, MW0ELR ,Tegryn, Llanfyrnach, Pembs. SA35 0BL**

Mention Data modes to a QRP'er and immediate visions of heavy QRM to the QRP frequencies come to mind. However with the latest data mode PSK31 the reverse is likely to be true. With correctly set up transmitters it's a very green mode and will pack in more signals per kHz than you could cope with on your average simple CW QRP transceiver.

PSK31 is best transmitted with an SSB transceiver, but for dedicated or QRP use some of the circuits are really redundant. Because reception is visual and that the sound channel has multiple signals there is little point in providing a LS amp. On transmit there is so much audio drive available from the sound card that there is little need for a speech amp. Most bad signals on the bands are a direct result of overdrive. The DAT20 presented here is a stripped monoband SSB tcvr with a built in interface ready for direct connection to your PC soundcard. With a suitable crystal change on the LO the unit will also produce MFSK using the Stream software or RTTY with MMTY program.

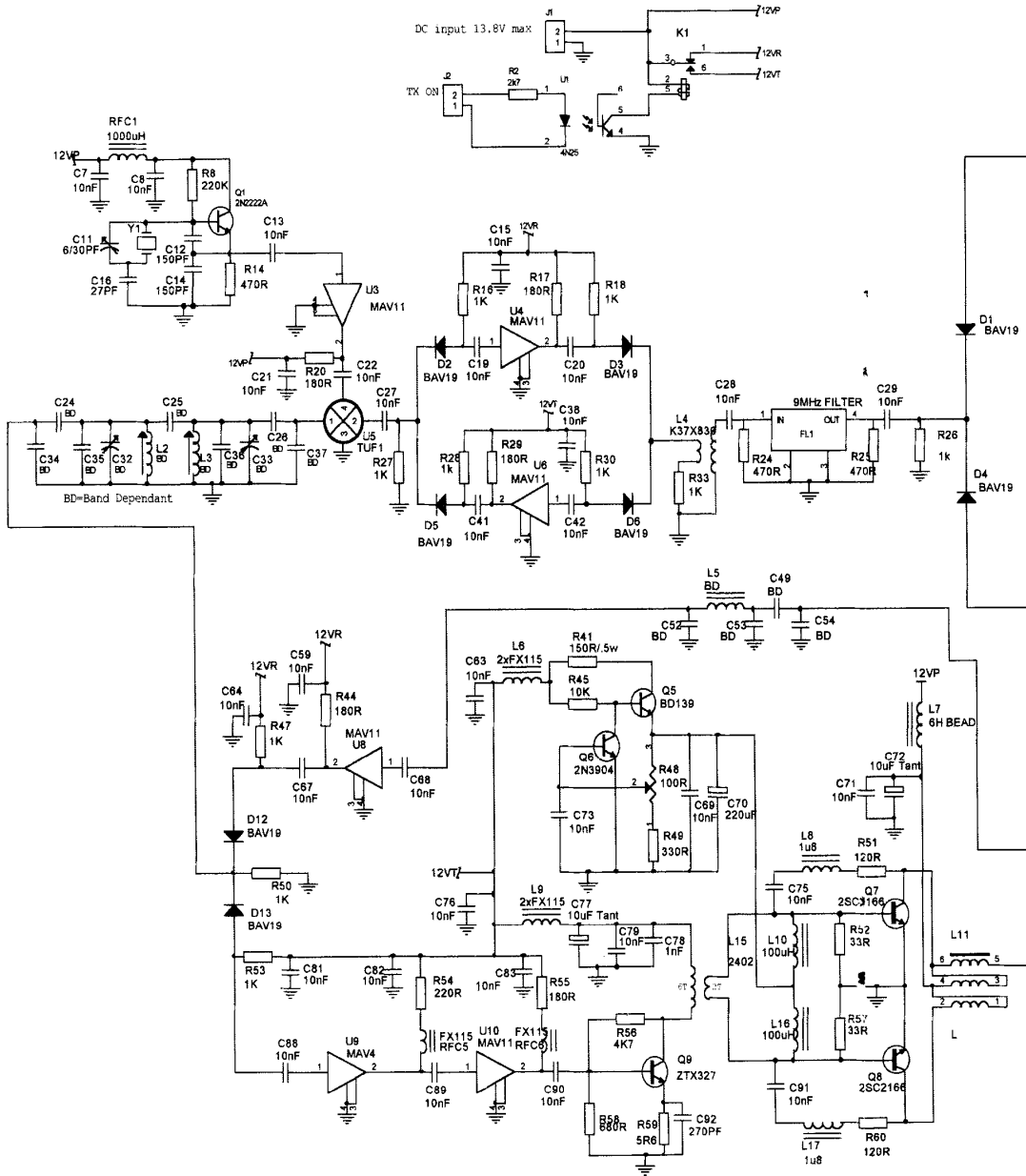
Looking at the circuit the received signal enters by K2 the antenna change over to the single tuned circuit of C56-58 and L6. Relay change over is used as we don't need qsk style speed. After the tuned circuit a MAV11 provides a modest 10dB of gain before the high Q 5 element bands pass filter of L3/4. The filter uses T37-6 cores to give a high Q and low loss. After the filter a TUF1 converts the signal frequency to IF by mixing a LO signal from U3 another MAV11. The use of MMICS as the buffer amplifier is ideal, as they are 50R circuits with a very wide bandwidth to correctly terminate the mixer LO port. The drive for U3 comes from a simple crystal oscillator configured around Q1. This can be VXO'ed if needed or replaced by a VFO for more band coverage.

The mixer output is terminated in another MAV11 then transformed to the IF filter impedance by L5. The turn's ratio can be adjusted to suit most filters. The Club 6 pole SHOWA will drop in nicely here or you can use the 6-pole ladder as shown. The filter output is terminated in another transformer to give a clearly defined match to 500R but is not needed with the Club Showa filter.

D4 routes the received signal to the T5/U7 where the main amplification takes place. U7 is a MC1350P and is provided with IF gain control by VR3 a panel mounted control. As the receiver works with typically 10 or more signals in the passband manual gain is used as a safer option to AGC. U7 has balanced output to a homebrew diode ring made up of four 1N4148 diodes, this is used as a product detector with carrier reinsertion by Q4 oscillator.

Recovered audio is filtered for any residual RF by the network around RFC2 and then amplified by Q3. The output level for the soundcard is adjusted by pre-set VR4 and isolated by T3 a small 600R PCB modem transformer.

For the transmit side of the transceiver sound card audio is feed to T2 another miniature modem transformer. Pre-set VR1 provides a level adjustment into the balanced modulator U2 a MC1496. Carrier insertion is from Q4 and VR2 provides a carrier null or balance. The signal is amplified by Q2 and routed to the IF filter by D1. After filtering the signal is amplified in a MMIC and mixed by U5 to the TX frequency. The mixer and band-pass filter are bilateral and feed a two-stage MMIC circuit then a ZTX327 feedback amplifier. R56 in the feedback amplifier can be adjusted to give the required drive for the final a push pull pair of 2SC1966 bipolar transistors. A 5R6 resistor gives the highest gain, a 12 or 15 R would lower the output.





Because PSK is basically a two-tone carrier it needs a linear final. Data modes are continuous carrier so there a fair danger of driving the final into thermal runaway if the heat-sink is not big enough, or if the set is overdriven. The Mullard bias circuit Q6,5 helps in this respect and will start to shut down the PA if it overheats. It does this by reducing the bias voltage when Q6 junction starts to get hot. As there is not enough drive to support class C the output just drops away. The PA has a standard 3 pole LPF to attenuate any harmonic content.

T/R control is normally a function of the PSK software and usually linked to one of the PC serial ports providing a positive voltage on TX. In the DAT20 this voltage is used to drive an opto isolator which switches K1 to provide the 12Vr/t switching.

Although presented for 20Mtrs the circuit will run from 1.8-30 with a change to the LPF and BPF. Changing the 2SC2166 in the PA for 2SC1971 (different pin out though) would also allow operation on 6mtrs.

#### Parts List

C1,2,4,6,7,8,10,13,15		D1,D2,D3,D4,D5	
17,19,20,21,22,27,28		D6,D12,13	BAV19/1N4007
29,38,41,42,50,51,56,		D7,D8,D9,D10,D11	1N4148
58,59,62,63,64,67,68,		FL1	9MHz SHOWA FILTER
69,71,73,74,75,76,79,		K2,K1	12V RELAY SPDT
80,81,82,83,88,89,		L1	Auto Transformer 6t R3/D1, 2t to Q2 on
90,91	10nF		2 hole 43-002402
		T5,L4	K37X830
C3,C18,C47	10uF	L6,L9	2xFX115
C5	1uF	L7	6 Hole BEAD
C9,C23,C31,C39	2u2	L17,L8	1u8
C11,C61	6/30PF	RFC3,RFC4,L10,L16	100uH
C12,C14,C60,C65	150PF		
C16,C66	27PF	L11 12T 27swg Trifiliar on Fair-rite 59-	
C30	NOT USED	61001101. Twisted 4 turns /core width.	
C40,C45,C46,C48,C57	100nF	L15	6t Q9/ 2T Q7,8
C44,C43	47nF		32swg on 2 hole 2402
C78,C55	1nF	Q1,Q3,Q4	2N2222A
C70	220uF	Q2	J310
C77,C72	0uF Tant	Q5	BD139
C92	270PF	Q6	2N3904
Q7,Q8	2SC2166	R12	2k2
Q9	ZTX327	R14,R24,R25	
RFC1	1000uH	R39,R42,R46	470R
RFC2	100mH	R15	68R
RFC5,RFC6	FX115	R17,R20,R29,R44,R55	180R
R1,R3,R35,R48	100R	R23	5K6
R2	2k7	R31	820R
VR1,VR4,R4,5,6,7,10		R56,R32	4K7
13,16,18,19,21,26,27,28		VR3,R34,R38,R45 10K	
30,33,37,43,47,50,53	1k	R36	560R
		R41	150R/.5w
R8,R40	220K	R49	330R
R9	6k8	R54	220R
R22,R11	100K	R60,R51	120R



R52,R57	33R	<b>20mtr band parts</b>	
R58	680R	<i>Band Pass Filter</i>	
R59	5R6	C34,37	120PF
T1,T4	FT37-43	C24,26	39PF
T3,2 Modem transformer	P3324	C35,36	68PF
U1	4N25	C25	5PF
U2	MC1496P	C32,36	6/30PF TRIMMER
U3,4,6,8,10	MAV11	L2,3	18t ON T37-6 27SWG
U5	TUF1	<i>Low Pass Filter</i>	
U7	MC1350P	C84,87	180PF
U9	MAV4	C85,86	390PF
VR2	50k	Use Phillips 100vw 2222/683 series	
Y1 Signal + or - 9MHz for Showa		L12,13	16t ON T37-6 27swg
Y2 9.0015 or 8.9985 to suit Y1		L13	17t -----

**Full Club Kits with manual, parts, through plated PCB and custom enclosure should be available late April. Expected price is £89.90. Check with G3MFJ or GW8/MW0ELR for latest info. We plan also to offer a DAT80 version.**

## GQR Club Sales

(For all items listed formerly from G3YCC)

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

**Currently available:**

**Radio Projects for the Amateur by VK3XU. £6 ) plus postage - £1.25  
UK**

**GQR Club Antenna Handbook. £5 ) £2.90 EEC, £3.50 DX**

**6 pole 9MHz SSB crystal filter 2.2kHz @ 6dB, 500ohm in/out £12 [50p post]**

**6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out £12 [50p post]**

**88mH Toroids - £1 each [+ post each - 30p UK, 50p EEC & DX]**

**NE602 at £1.75 each. MC1350 at £2.25 each [both inc post]**

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## ANTENNAS - ANECDOTES - AWARDS

Gus Taylor G8PG 37 Pickerill Road, Greasby, Merseyside, CH49 3ND

ECHOES FROM THE ROCHDALE MINI-CONVENTION 2000

AAA Technical Staff

We feel that this was the best Convention so far. Masses of amateurs, lots of Traders, much technical discussion, making new friendships and renewing old ones - it had just about everything. A few of the items which came up either on the Club Stand or later at the Vicarage will now be discussed.

Open wire feeders. Questions were asked about how the spacing between the wires and the gauge of the feeder wire affects impedance, and how important this is. Spacing and wire gauge do, of course, affect impedance, but the actual impedance is only important with antennas such as the Delta Match Doublet (rarely used in amateur work) or the three wire rhombic which has an impedance roll between 550 and 650 ohms over the range 3-30 MHz. Otherwise the important thing is that both feeder wires are made the same length; this is VERY important. Provided this requirement is met the spacing between the two wires can varied along the length of the feeder run. For example they could be spaced 8 inches on the run down to the shack, taken into the shack through two holes 3 feet apart, then spaced 4 inches apart on the run to the antenna coupler. The best wire to use for the feeder is a matter of opinion, but when run through holes in walls to enter the building some form of insulated cable should be used. If the wire to and from this cable is soldered to it, the soldered joints must be carefully weather-proofed. If built-in wall ventilators are available they provide a useful entry point for feeders (and also for end-fed wires.)

Bending an antenna to fit the available space can be done in several ways. If the height is suitable the inverted U shape can be used, with both ends brought down vertically towards the ground. Note that with a dipole this will make the resonant length shorter than if it were erected in a straight line. This shape can also be used for single wire antennas, with the antenna being fed at the bottom of one of the legs of the inverted U. The length **required** for dipoles, doublets and end fed wires can be greatly reduced by folding the wire into a series of equilateral triangles and supporting them by means of two catenary cords, one at the bottom and one at the top. This allows  $\frac{1}{2}$  120 feet of wire to be fitted into a 60 foot span for example. U shaped end sections can be used to load single wire antennas.

Loops need not be square or round but can be of irregular shape or oblong. If oblong the length-to-width ratio should be somewhere between 1.5:1 and 3:1; making it narrower tends to make it into a very wide folded dipole. The loop can be fed at any convenient point around its perimeter. Until entering the shack keep the two feeders well apart. They need not be the same length, as they are an extension of the loop itself. The above points apply to larger loops with a perimeter length of a quarter wavelength or more. A full wave loop has a radiation resistance of about

1f0 ohms. Each time the operating wavelength of the loop is doubled the radiation resistance will be reduced by a factor of 16, and each time the operating wavelength is doubled it will be increased by a similar amount.

G3JMZ produced a sample of his credit card feeder spacers. Cancelled credit or bank cards are cut into three strips, then two holes are drilled into the end of each strip and the feeder wires are passed through them. The spreaders are spaced at 16 inch (40cm) intervals, producing a strong but light feeder.

#### THE G4KRN 28 MHz MINI-LOOP

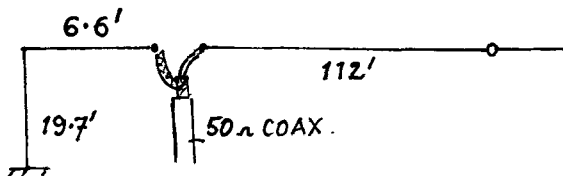
A.Troy, G4KRN, 29 longfellow Street, Liverpool, L8 0QU.

Based on the GM3MXN design (SPRAT 61) this loop consists of a 55cm loop made from the outer braiding of UR67 co-ax. The loop is cut at the top and a good quality 35p variable capacitor is carefully soldered between the two ends. The outer of the co-ax used to feed the loop is connected to the loop at 180° from the capacitor, and its outer is adjusted to the point on the loop which gives best swr. The antenna is mounted adjacent to the rig on a rotatable wooden rod. Once tuned a bandwidth of around 30 kHz is achieved. Despite only fm being available QSOs with Europe and America are achieved; cw would no doubt produce much better results. The loop will also tune to 21 MHz, but has not been tested there.

#### A LOW PROFILE 160 METRE ANTENNA

Submitted by Terry, K4KJP with acknowledgement to "Ham Radio".

Designed to cover 1800 to 1900 Khz without the need for an antenna tuner this antenna will give surprisingly good results with only a simple ground or counterpoise system. Note that it is essential that the co-ax feeder screen be connected to the grounded portion of the antenna. All dimensions are in feet. (A scaled down, vertical version of this antenna for an hf band could be an interesting experiment. This version is another interesting example of the adapting of the Windon feed system for use with a twin feeder. Incidentally, can any reader confirm the story that Windon was or had been a General in the United States Army ? )



AWARD NEWS

Congratulations to the following on their Awards.

QRP Countries

50; G4PRL ;25; GW3LHK, UR7IRL.

WORKED G QRP Club

1380; GM3OXX (What a man !). 540; G4NBI. 480 GokCA. 360 G3ZHE.

300;G4PRL. 240; G3JNB. 200; G4EIB. 100 2EoAOZ (Nice!),G3ZNR.

60; DL2BQD, MoCDP.

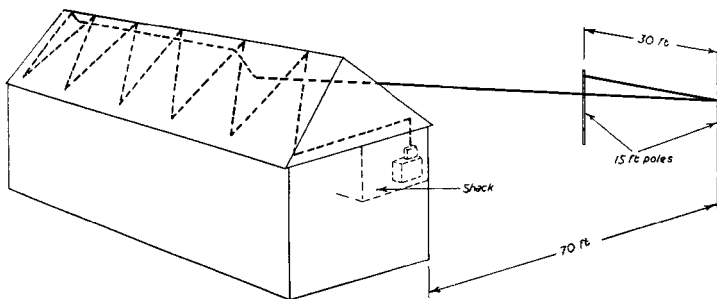
Two-way QRP

90; GM3OXX . 20;DL2BQD.

Are YOU encouraging your Novice friends to work for the  
CW NOVICE AWARD ?

A FLASHBACK FROM THE PAST

In a recent letter Dick, G4ICP tells us he is a Short Wave Magazine collector and loves reading old articles by G3OGR, G3KEP and G8PG. He encloses a copy of an article by G8PG published in the May 1955 issue of SWM which shows how a 100 foot outdoor antenna was made up to 270 feet (a full half wave on 160 metres) by using a zig-zag pattern in the 30 by 16 foot roof space. This removed the earth losses associated with the previous 100 foot Marconi type antenna, and improved signal reports by 1 to 2 S-points, allowing much improved working into Europe on 160 (remember in those days the 160m power limit was 10 watts input in the U.K.) The zig-zag antenna also worked well on the higher bands. There are many variations on the zig-zag wire idea, and it is well worth considering it seriously if antenna space is a problem. The diagram below shows the arrangement used in 1955. It is published with full acknowledgements to the Short Wave Magazine.



Thanks for all your ideas on antennas. We will use them  
in future issues of SPRAT.

## GQRP CLUB MASTER AWARD HOLDERS

1. GM3OXX	43. G4CFS	85. DL9CE
2. G4BUE	44. G3LHJ	86. G3ILO
3. G3DNF	45. G3DOP	87. G4VPF
4. G8PG	46. OH9VL	88. SM5CCT
5. OK1CZ	47. not issued	89. G3JMZ
6. G4CQK	48. Y24TG	90. SP9MLI
7. CT4CH	49. WNWV	91. ON5SE
8. SP5AGU	50. RV3GM	92. G3DOT
9. SMØFSM	51. SM6SLC	93. DL1JGA
10. OK2BMA	52. DJØGD	94. WB3JJK
11. F9YZ	53. GMØDHD	95. G4XVE
12. not issued	54. UA3APV	96. GMØUTD
13. G4EBO	55. G4AWT	97. GØTYM
14. G3IKF	56. G2HLU	98. G4XNP
15. F6FZL	57. KB1FK	99. G6NA
16. G4JFN	58. DL8KAZ	100. DF7IS
17. GM4HBG	59. G4JZO	101. W7CNL
18. YO6HQ	60. AA2U	102. LY2FE
19. G3BFR	61. GWØOSQ	103. DL2AVM
20. G8JR	62. SM7KJH	104. DF1NM
21. SM7KWE	63. DL2HCB	105. G4AOP
22. FE6FZL	64. LZ1SM	106. OM3CUG
23. G3VXJ	65. PA3FGI	107. EA1KC
24. G3YCC	66.	108. DL2MTX
25. FD6HSI	67. LY3BY	109. LA3BX
26. KH6CP	68. G3GVY	110. HB9XY
27. G3XJS	69. F6CRK	111. G3JNB
28. GM3MXN	70. G3FCK	112. HB9BQB
29. GM4YLN	71. GD3HDL	113. MØAVW
30. GM4UYE	72. G4LQF	114. G3LSW
31. G3LGH	73. GØNEZ	115. G3XNR
32. G3LJV	74. PE1MHO	116. DL7GK
33. G4ETJ	75. W2JEK	117. G4GJY
34. SM4KL	76. I3MDU	118. DL2LQC
35. OK1DKR	77. HB9DAX	119. GØMOU
36. G4MEW	78. F5MOG	120. GWØVSW
37. G4MQC	79. G8IB	121. 2EØAOZ
38. G4DQO	80. GØKZO	122. PAØRBO
39. GM4SXE	81. LY3BA	123. PA9RZ
40. GM4XQJ	82. I45SRD	124. G4NB
41. G2DAN	83. SM5DQ	
42. GØIFK	84. DL9GTI	

## THE FIFTH RED ROSE QRP FESTIVAL

is to be held on Sunday 3rd June, 2001, from 11am to 4pm at the Formby Hall, Alders St.[off High St.], Atherton, Manchester.

The aim is to promote interest in low power operating and home construction. The event is at a large spacious hall at ground level with Disabled Facilities and a large car park. Refreshments and Bar are available throughout the event. The stands will include lots of "junk" and radio parts and a large inexpensive Bring and Buy section.

Details from Les Jackson, G4HZJ, 1 Belvedere Ave, Atherton, Manchester, M46 9LQ. [01942-870634]



## COMMUNICATIONS AND CONTESTS

**Peter Barville G3XJS, 40 Watchet Lane, Holmer Green,  
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### Winter Sports

Other QRP events may come and go, but the G-QRP Winter Sports continues to be the market leader if you enjoy relaxed QRP operating, with the opportunity to have FUN working new (and not so new) QRP friends around the world. Judging by the number of logs I receive each year, it seems you share my enthusiasm for the event. My thanks to the following for sending logs, each of which is a small 'snapshot' of our recent annual festival of QRP: 2E0ATZ, G0BCT, G0BPS, G0KRT, G0NTR, G0TAK, G2HLU, G3BPM, G3CQR, G3JNB, G3LHJ, G3MCK, G3YYF, G3ZHE, G4ARI, G4BUE, G4JFN, G4XRV, G8PG, GM3OXX, GM4OSS, GM4XQJ, GW0VSW, GW3SB, AB8FJ, CT4CH, DL2BQD, EA3ADV, F5MOG, HB9JNH, I2IAL, IK2CGH, K5JT, LA7FF, LU7EE, OE6GWG, OK1AIJ, OK2BMA, ON7CC, PA0RBO, PA9RZ, RW3AI, SP6GB, VE3ABT, W2JEK, W3TS and W4/G0FSP. My apologies if I have omitted anybody (or can't count), but that's 47 logs from 19 different DXCC countries! I wish I could share with you all the interesting facets of each log (and there are many), but space limitations demand that I only bring you some of the 'highlights'.

Firstly, Dick G0BPS has the honour of being the first to submit a PSK31 log. There's no doubt that this comparatively new digital mode has caught the imagination of many QRPers across the world, and is proving highly successful, as demonstrated by Dick's log. He worked 37 DXCC countries (including 9K2, LU, PY and ZP) amongst his 107 contacts, using wire antennas and a TS520SE running 5 watts (sometimes 3 watts). Congratulations Dick for a super effort, and for pointing the way for others wishing to try the mode.

G4XRV suffered a power cut on 26th December, but continued to make QSO's (with his K2 running from its internal battery) by candle light. G3BPM worked into TA - the first he's ever heard in 50 yrs of operating - and had a QSO with OH9NB who was running just 10mW! CT4CH ran 2 watts into a helical quarter wave horizontal antenna outside the window, with the window frame acting as his counterpoise. Out of Ben's total of 96 QSO's, 76 were with Club members. SP6GB submitted an all 160m log. OK2BMA included all HF bands in his log, and was one of few to work ZS6KO QRP (20m). Pavel also worked GM3OXX and W3TS on 5 bands. W2JEK completed his QRP WAS by working KH6U, and was equally thrilled when VK6ADW answered his "CQ QRP" call. LA7FF had 7 QSO's with his FOXX3 and homebrew Kanga keyer (both in Altdids tins and battery powered). It was W3TS's 12th year in WS, and he is hoping for many more. F5MOG says how much he enjoys the event, with its relaxed rules (there aren't any, Hi) and lack of any pressure of time. His comments are echoed by many others. Carl GW0VSW used his Argonaut 2 at 1 watt for the first 20 of his 76 QSO's, and then at 800mW for the remainder, into an inverted vee G5RV. He found 80m activity to be not so good, despite his repeated CQ's. G0BCT sent an interesting log, much of it made during his stay in France.

There are two Dx members I would particularly like to thank for their efforts during Winter Sports. Tito, LU7EE, made 53 QSO's during the event, a high proportion of which were with members. He became a G-QRP member soon after WS had started, and was therefore

delighted then to be able to exchange Club numbers with the members he worked. Mike, VP8NO, had said that he'd do his best to give as many as possible a QSO, and when he answered my "CQ QRP" call on 10m (I will confess that I had my 2 ele deliberately in his direction!) I was thrilled to make the contact for a new 2-way QRP country. I know Mike worked other UK members, but I don't have full details to hand. If I may be allowed to blow my own trumpet a little, other entries in my log included LU7EE (15m and 12m), VK2BKH, FM5CW, EA8YU, TA1MM (all QRP/QRP) and ZL2JK who was QRO on 20m.

It falls to me to make a choice of 'best log', thus deciding who should win the G4DQP Trophy. What constitutes a 'best log'? Well, amongst the factors I always consider are the equipment used (is it homebrew/unusual etc?), antennas used (indoor/wire/balcony etc), power used and results achieved (doesn't have to be Dx). I also like to consider whether the operator has promoted the use of QRP by his/her presence on the bands.

Last year's winner submitted an outstanding log in every one of those respects, and has done so again this year. George, GM3OXX, uses homebrew equipment (built to the highest of standards) running one watt into a doublet antenna. He made well over 300 QSO's, spread across all bands 80-10m, working many Club members on the LF bands and much Dx on the higher bands. His massive one watt signal found its way into the log of VP8NO, LU5FZ, C31BO, JA6PA, UT0MK (all QRP), 5R8FU and ZS6AL (both QRO) - amongst many others. I'm not sure whether it has ever happened before, but I am delighted to say that GM3OXX retains the G4DQP Trophy. George - very many congratulations on your well deserved success!

### **/QRP**

May I offer a gentle reminder that, strictly speaking (under the terms of the UK licence), we should not use "/QRP" (eg G3XJS/QRP) as part of the callsign. If you wish to announce that you are a QRP station then I suggest "G3XJS QRP", with a suitable space after the callsign.

### **Chelmsley Trophy**

Limited space and time mean that I will have to defer announcing the results of this Contest until the next issue. There might even be time for you to rush me a late entry!

### **Y2K Contest**

I can't tell you how many people commented to me throughout the year how much they were enjoying the event, and I know it promoted a great deal of activity - very often a quick QSO "just to gain those extra points"! I fully expected a large number of logs to weigh down the postman's bag, and my email in-box. Many asked that we run a similar event each year. Surprisingly then, I have only received 16 entries.

As you know, I'm sure, it was really pretty easy to achieve the magic 2000 points (and qualify for the Certificate), but to win the Contest was always going to demand a substantial effort.

Mind you, I've never regarded spending time on the air making QRP contacts anything but great FUN. DL2LQC called it "the famous event in 2000". Falco used solar power for some of his contacts, and plenty of homebrew equipment. G4NBI used all homebrew equipment, including Howes (80/40m), the small OXO Tx (80/40/30/20m) and a Lake 40m rig. DL1HTX was another who used plenty of homebrew gear, and asked for some detail in the results.

Well, here goes:

1.	RW3AI	848,934	9.	DL2LQC	17,574
2.	LY2FE	678,132	10.	G0BXO	15,300
3.	G0TAK	196,152	11.	G4NBI	15,120
4.	GW0VSW	68,816	12.	IK0VSV	13,130
5.	DL1HTX	54,288	13.	IK1RDN	12,420
6.	G4JFN	35,360	14.	DL2BQD	12,249
7.	G3JSR	24,500	15.	G4APO	6,458
8.	G4XVE	20,899	16.	G4MQC	3,696

You will appreciate that some logs represent a genuine effort to obtain a high score, whilst others were content to pass the 2000 score (often within a matter of weeks). Commiseration's to Roy, G0TAK, who put in such a fine effort, and was the leading UK entry, but nobody who spent any time on the bands will be surprised by the outstanding scores achieved by Valery, RW3AI, and Vitas, LY2FE. We would like to recognise the significant contribution they both made to this special event, and have therefore decided to award them joint first prize. Thanks to all who participated, and our congratulations, and lifetime membership of the Club, go to Valery and Vitas for such superb logs.

### **QRP SSB Net?**

A few members have offered their ideas and comments following the item in SPRAT 105, and I have passed them to our SSB Manager, Dick G0BPS.

### **2000 HF International "Spring Sprint" Low Power Contest**

I have been provided with the results of this event, organised by the Slovak Amateur Radio Association. G4GSA came 3rd in the 5W single band category, G3VIP was 3rd in the 5W 2/3 bands category and G4FDC was the winner of the 5W all band section. Congratulations to them all.

### **17th Yeovil QRP Convention**

I have some further details of this ever popular event to be held on 22nd April 2001 at the Digby Hall, Sherborne, Dorset:

Doors open 10:00am. 10:45 "Very Long Distance Propagation" Lecture by G3MYM. 12:00

"Benelux QRP Activities" Lecture by PA9RZ. 13.00 Lunch Break.

14:30 "Basic Test Gear for the Black Box Operator" Lecture by G3MCK.

15:45 "A QRP Forum" Chairman and Panel of QRP Club members.

Morse Tests from 10:15. PSK31 Demonstration 11:00 - 12:45.

### **1st EA-QRP Meeting**

Paco, EA5BVK, kindly sent me details of the EA-QRP Club's first meeting in Sinarcas, but unfortunately I don't think this will reach you in time for you to pack your bags and make the trip to Valencia. The meeting (on 24th March) was obviously going to be a fun event, with plenty of QRP related activities, including 2 special event stations (which you may already have worked) EF5QRP and ED5QRP.

If you see this in time, don't forget the **Yeovil FunRun** (2-5 April). You'll know by now that the deadline for the next SPRAT is the beginning of May. In the meantime, have lots of QRP FUN ..



# NOVICE NEWS Steve Ortmayer G4RAW

14 The Crescent, Hipperholme, Halifax. HX3 8NQ. Tel: 01422-203062

email: ortmayer@hotmail.com

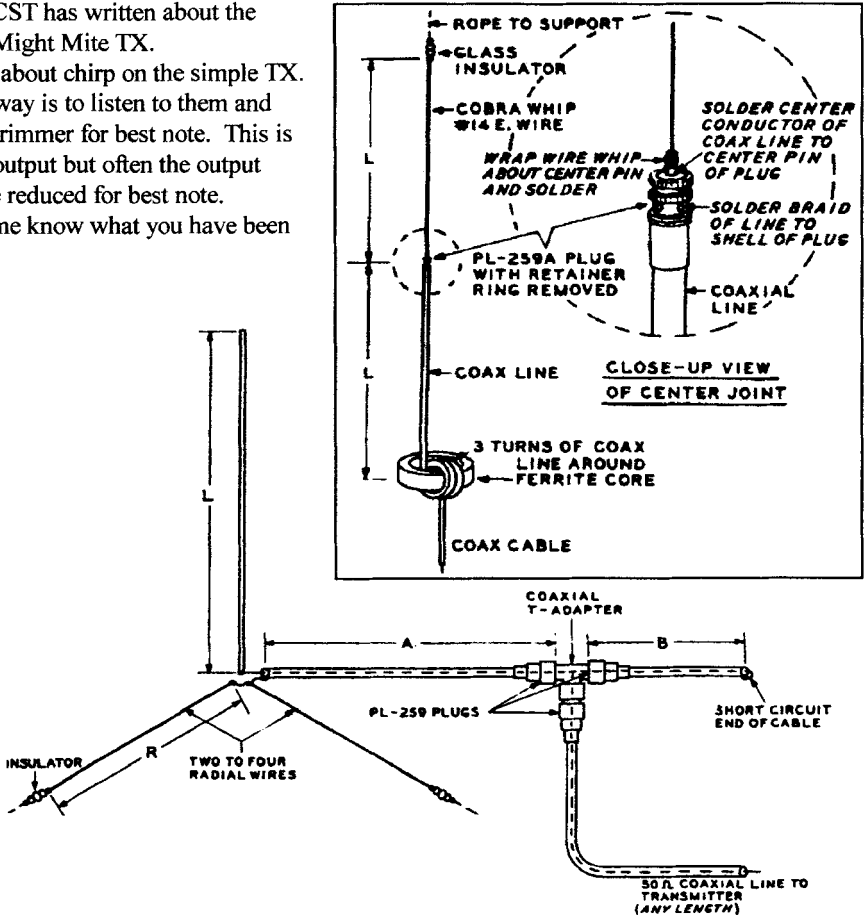
Ron 2E0AIS has written to ask about 5/8 GP antennas. The 5/8 offers a useful 3dB gain over a 1/4 wave GP but requires a matching section as shown in these details taken from 'Wire Antennas' by W6SAI.

Andy M0CST has written about the Michigan Might Mite TX.

Andy asks about chirp on the simple TX.

The usual way is to listen to them and adjust the trimmer for best note. This is not at full output but often the output needs to be reduced for best note.

Please let me know what you have been up to.



DIMENSIONS OF 5/8 WAVE ANTENNA									
BAND	L		R		A		B		
20	41' 6"	12.65m	16' 6"	5.31m	8' 8"	2.63m	2' 1"	0.64m	
15	27' 9"	8.47m	11' 0"	3.34m	5' 10"	1.78m	1' 6"	0.46	
10	21' 3"	6.50m	8' 3"	2.52m	4' 4"	1.31m	1' 1/2"	0.31	m
6	11' 8"	3.55m	4' 6"	1.37m	2' 5"	0.74m	8"	0.20	m

## VHF MANAGER'S REPORT

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**E-mail: john8seq@discover.co.uk; Packet: G8SEQ@GB7COV**

It has been over 10 years since I first started experimenting with alternative energy on a practical basis. I had previously played around with some kids toys (bought originally for my children) which used Solar Power, but at very low voltages. I had also made several wind generators of various sizes. In this series of articles on alternative power, I will start with Solar Power as this is the easiest and most reliable source of free (almost!) energy to use.

At a rally, I bought a novelty AM/FM broadcast Rx, built in a transparent plastic case. It even had a transparent LS! At the same rally I bought two solar panels, measuring 100mm X 65mm.

These just fitted side by side inside the radio case. They developed about 3v each off load in full sunlight. I wired them in series with four Schottky signal diodes in parallel (to prevent the battery discharging through the panel) and used 2 X AA NiCads for storage. I have recently replaced the batteries with a 4.5 volt pack of Nicads from a cordless phone. I found the radio worked better on 4.5v even though it was designed to operate on 3v. I also fitted a telescopic antenna as this improved VHF reception.

In direct sunlight, the radio will work at full volume without batteries, just on the solar panel. In Perth, Western Australia, I found it would work pointing at the sand on the beach or even at concrete, the reflected sun being so bright! For test purposes, a sixty watt tungsten filament lamp about 40 cm away is roughly equivalent to full sun in England. (Don't use fluorescent tubes these radiate coloured band spectra, more towards the blue end & very little in the infra red—see later.)

Since then I have had a 1 square foot panel (900 sq cm) on the south facing roof of my house, float charging a 12v lead acid battery. This generated about 3W in full sunlight, which powered the TRx on my packet radio station (2W VHF/UHF) continuously. It should have powered the TNC as well, but this draws 300 mA continuously at 12v, which is a power drain of about 4W. Theoretically it should operate from a 7 volt supply at the same current, ie 2.1 W, leaving enough capacity for the TRx (low Tx duty cycle; 40 mA on standby/Rx).

### FUTURE DEVELOPMENTS:

The plan was to use a switch mode supply to the TNC & Tx at 8v, to allow the battery voltage to droop to low level during darkness. This increases the overall efficiency, as the voltage drop across the series regulator is removed. However, I have acquired a small computer PSU (switch mode) which generates +5v,+12v & -12v, which is what the TNC wants & the Tx is happy with +12v, so the latest thinking is to bypass the series regulator in the TNC altogether and operate the whole at about 95% conversion efficiency. It also saves me building anything!

### SOME SUPRISING TECHNICAL STUFF:

The power available from Sunlight in the UK is: n 700 Watts per square metre! Photovoltaic panels vary from about 5% to 24% efficiency, but will work through cloud. Most panels are based on silicon and peak response is near infra red (880nm), but their efficiency drops if they get hot.

Whatever you decide the size of solar panel you need for your system, double it! Because, building a tracking system to maximize efficiency is rarely worth it. Too expensive & complicated. They also have a habit of freezing up in the winter when you need them most. And because Murphy's Law says that your system will be pointing the wrong way at sun-up when your batteries are flat, so it can't autorecover!

Angle your solar panels at a point about 5 deg. below the height of the mid-day, mid-winter sun for a fixed permanent installation.

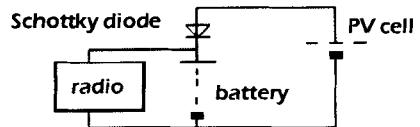
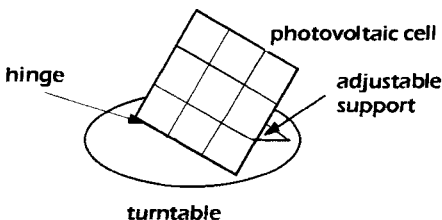
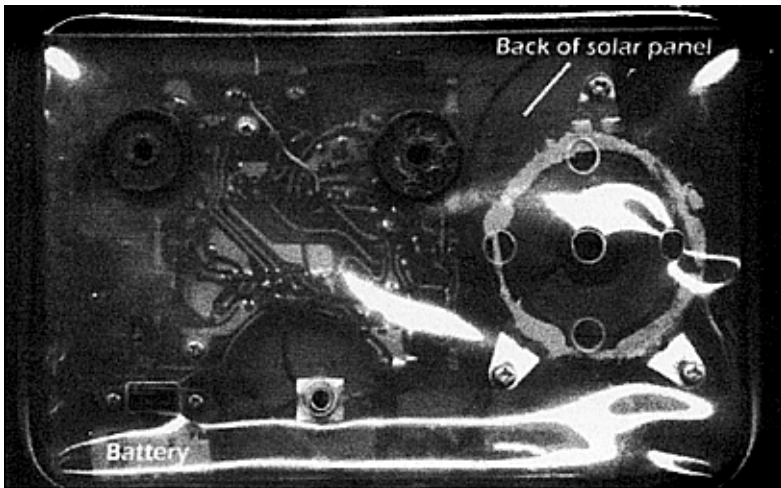
Mirror tiles can be used to direct sunlight onto your panels in a fixed installation — a cheap & cheerful way to increase effective capture area/direction.

For a portable installation, a hinged "lectern" on an old gramophone turntable or similar, will allow you to point at the sun wherever you are. Adjust by hand every 15 mins or at end of every contact. (Lying the panels flat on the ground only works properly in the tropics!)

You can calculate the exact angle to point the panels at provided you know your latitude, the exact time of day (local noon NOT UTC), the exact day of the year and have a knowledge of 3D geometry. Don't bother—just wait for a sunny day & eyeball it! (With yer shades on of course.)

Most roofs in the UK are angled about right to lay the panel on directly in summer sun but you need to make the angle steeper for winter use. ie point lower to the horizon.

Next quarter : Wind Turbines 3W to 300W. a website to visit: <http://www.solarpartners.org/>



# SSB & Data Report

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You will see from the title of this column that we are expanding the reports. Whilst SSB has had a steady following, there has never been a mode that has exploded onto the scene as much as PSK31 has. After a chat with George G3RJV it was decided to use this column to cover both SSB and the data modes. Primarily we will be looking at your PSK31 contacts, but RTTY and other data mode reports are very welcome.

Des M0AYF has been using WinPSK on 20m last summer and reports good results. Martin G4EFE tells me the he 'worked a WJ4 station during the week - my best dx so far on PSK31 - on 10metres using 5 watts to a dipole. First thought he was Florida - until he announced Puerto Rico - hurrah!' Martin had many PSK QSO's relying on the laptop's on-board Mic picking up the rig's speaker output and then just using the rig's Mic to pick up the laptop's speaker for the transmit side. Real KISS in action.

Tim M5TIM says he had a 30+ minute QSO using PSK31 on 80M with each side running QRP. I was running 10W DSB, the other side 5W SSB. Mostly 100% copy throughout. The QSO was intra G (well actually G - GW) but thoroughly enjoyable nonetheless. The previous evening managed most of a QSO with IK once again 80M with me running 10W DSB. All good fun.

When a new mode like this 'hits the streets' there are a few problems that need to be sorted out. PSK31 is used in the SSB mode from your transmitter, thus many will be persuaded that as SSB is shown on your Tx the power limit should be 10 watts. I am not persuaded. With some difficulty I have been persuaded that the power level should be set at 5 watts from the transmitter.

As I am now the SSB & DATA manager for the club I propose to stick to the five-watt rule for ALL data mode contacts. You will see from the article by Richard G3UGF that specific frequencies are suggested for PSK31. I propose that encourage QRP to operate in one part of the passband, say at the top end, for example, to make it easier to find others. Let us give this a try and check later on its success or otherwise.

Sorry for the lack of SSB news this time, I got hooked into PSK31 over the winter sports with over 100 contacts into more than 50 countries.

Your reports on SSB and DATA to me as above please. TTFN – Dick GØBPS

## HobbyTrade

"The Radio Info Window"

A new and unique Amateur Radio website designed for  
Amateurs by Amateurs.

**Some of HobbyTrade's services:**

- HobbyTech - Interactive advice or information on radio related subjects.
- HobbyAds - Free private and commercial ads until further notice.
- HobbyViews - See our dealer price comparison chart for new rigs.
- HobbyWatch - actively promotes your advert to other interested users.
- HobbyLink - Links to software downloads and other useful radio related sites. Please visit [www.hobbytrade.co.uk](http://www.hobbytrade.co.uk) to see these & other services.

# MEMBERS' NEWS



## by Chris Page G4BUE

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Packet: G7BDXS on UK DX PacketCluster

The UK organised **D68C** DXpedition promised us they would try and let QRPers make at least one QSO with them and from the messages posted on the Internet G-QRP Club Reflector, they have done just that. This comment from our Membership Secretary, **GØBXO**, is typical of them. John says, "With only 5W into a half-size indoor G5RV, I did not think I would have much chance to work **D68C**, but thought I would give it a go. I heard them on 17m this morning (14 February) and after ten minutes calling, worked them at 0727z after several repetitions needed to get my call sign across. I then went up to 15m and worked them again at 0742z. I am sure I would not have managed the contacts without the skill and patience of the operators at **D68C**, so many thanks to them". Congratulations John and yes, many thanks to the **D68C** operators for their skill and patience with the QRP gang.

**G3UGF** is experimenting with PSK31 with 5W. Richard says, "It was so easy to start receiving, I just downloaded Digipan 1.5 from the Web site and stuffed a lead into the sound card on the PC. I built an isolated interface with two transformers and an opto coupler chip, which took all of an hour, and then I was trans-

mitting". **BA2BI** is QRV from NingAn near Harbin City with homebrew equipment and requests help with spare crystals, circuit diagrams for QRP transmitters etc. You can e-mail Wu-GuiZhong at <599@0451.com> and visit his Web site at <http://www.qsl.net/ba2bi>. **OM3CUG** has been QRV with PSK31 with his homebrew QRP transmitter (but with external DDS) and has worked 82 DXCC with it. Igor says PSK31 is ideal for QRP and invites members to visit his Web page at <http://www.qsl.net/om3cug> for more information.

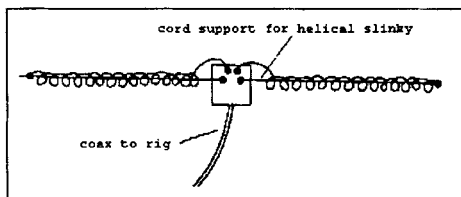
**DL2BQD** was in the CQ WW CW Contest at the end of November with his SST 20 running 1W on 20m to a FD4. Dieter made 29 DXCC in a few hours operating with an A6 "who had worked for a very long time just at the fringe of my QRG window" as his best DX. **G4EDG** was QRV for about 24 hours on 10m with his homebrew 5W rig based on the **G3TSO** design to a three element tri-band (DX33) Yagi at 35 feet. Steve had 529 QSOs with 31 zones and 99 DXCC, a super effort for just five watts. He said, "I called **HC2SL** as the band was closing on Sunday for one hour to get country #100, but no luck!". **N4UY** "also had a good time in the contest" with his FT-840 at 5W to a fan dipole stapled to the rafters of his attic for the HF bands. Jake had 140 QSOs with 60 DXCC. **G3LHJ** made 582 QSOs on 20m with 84 multipliers for 126k points with one of his home brew rigs.

**LZ2RS** is QRV with an Elecraft K2 and homebrew Yagis on top of a seven storey building. Rumi has just got the WAS QRP

<b>DL1ANSE/QRP GERMANY DOK Y19 J073DB CQ 14</b>					TO RADIO						
Tom Klaschka Mittelweg 20 10600-Berlin GQRN 7843					G4BUE						
It's a pleasure to confirm! Did you contact my father, Dieter ? 72! TOM											
DATE	UTC	2WAY	MC	RST							
						<table border="1"> <tr> <td>QATE</td> <td>UTC</td> <td>2WAY</td> <td>MC</td> <td>RST</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		QATE	UTC	2WAY	MC
QATE	UTC	2WAY	MC	RST							
DL1ANSE/QRP GERMANY DOK Y19 J073DB CQ 14					TO RADIO						
This is the back of DL2BQD's QSL card. Notice anything unusual about it?											

Award with 1W x 1W and says Utah was the most difficult State. Using 5W he has worked YJ, VK9, VKØMM, FOØ, ZK1, D2, HC8, 3D2, ZD9, HI, FR. 5R8, C6, CO, 6Y and SU - a very impressive list. Rumi has been 'milliwatting' with the USA and says his best QSO was on 20m CW with N4FNG in Florida while running just 1mW! Congratulations to MØCDP on "breaking my duck into South America with a QSO with LW3EOC in Buenos Aires on 10m. My 5W were only 519, but they still got there through a chink in the little pile-up". Ed, WA3WSJ, was planning to be QRV 12/19 February from Abaco Island (C6) on 40m with QRP.

WA6HHQ says the Elecraft Internet News Page at <<http://www.elecraft.com/news.htm>> has been updated and there is a new K1 Internal Picture Page at <[http://www.elecraft.com/K1/k1\\_internal\\_pictures.htm](http://www.elecraft.com/K1/k1_internal_pictures.htm)>, which "includes a link to N7TX's great K1 (and K2) step by step assembly pictures". GM4EWM has tried the Slinky antenna mentioned in my last column, in his attic in the form of a dipole. Eddie says he first heard of it in an article by G3ZPF in the October 1987 edition of *Amateur Radio* and was able to buy a Slinky from a local toy shop called Rainbow Science Toy / Magic Spring for £1.45. They are about two inches diameter and have a total length of



48 feet, though they will only stretch out to about half this length. He says, "I joined two coils with electrical screw connectors to extend the overall length for a compressed indoor dipole for 80 and 160m, but as yet have not been able to find resonance. This may be due to the detuning effect of water tank and plumbing, or the inductive nature of the antenna, as helically wound verticals are often wound with twice the length of wire for resonance. The spacing of turns on the Slinky dipole is an unknown factor.

GØUKB's idea of attaching Slinkys to a wire centre section is worth a try as I remember reading somewhere that physically shortened antennas are more efficient if the coils are at the far ends".

The VII EA-QRP Contest is held over the third weekend of April every year. In 2001, the first period is 1700-2000z 15 April on 14045-14065kHz, the second period is 2000-2300z 15 April on 3540-3570kHz and the third period 0700-1300z 16 April on 7015-7035kHz. QSOs with stations using a maximum of 5W output count one point and two points with QRPP stations using maximum of 1W output. EA stations will give RST and provincial car index plate letters and non EA stations give RST only. Each EA Province and DXCC (except EA6, 8 and 9) count as multipliers and total score is QSO points by multiplier. Entries, including log sheet, working conditions by 11 May to EA3BES, Jos Alonso Tobe, C/Joaquim Valls 71, 08016 Barcelona, Spain.

Do you use a G5RV with an ATU? If so, G4EDG suggests changing to a doublet. Steve used one in the last NFD with great success. It was about 90 feet with open-wire feeder to the tuner, which consisted of a set of individual relay switched Z matches, one for each band. The only pruning needed was to slightly lengthen the feeder to avoid an unmanageable impedance on one of the HF bands. He says, "With the apex at just 30 feet this antenna worked very well. The radiation pattern will be different on each band; on the lower frequencies it is similar to a half wave dipole, the lobes coming in nearer to the wire top as the frequency is



Juan, EA5XQ, QRV from his hotel as CU2/EA5XQ.

increased. If you are going to use a tuner anyway, scrap the G5RV magical lengths and use a length of open-wire feeder all the way”.

**KB2TQX** brought himself the new Yaesu FT-817 QRP transceiver for Christmas which he has been using in SSB. Dave (<kb2tqx@optonline.net>) is offering to provide any information about it from a QRP users perspective to anyone thinking of purchasing it. **EA5XQ** was QRV from OH2 at the end of last summer while working there for six months. Juan used a Howes TX2000+DXR20 with 5W to an indoor antenna (using 300 ohms feeder from an article by **G4DGX** in the June edition of *Short Wave Magazine* and called an ‘Espionage Antenna’) on 40m. There are pictures on his Web site at <<http://www.qsl.net/ea5xq/index.html>>.

**MØCDP** worked an OZ special event station for the first QSO with his Small Wonder White Mountain 20 kit. Paul says, “I worked out how to speak into the microphone without any help!”. **G3CWI** was QRV from the summit of Snowdon (**GW3CWI/P**) and Scafell Pike (**G3CWI/P**) in January with a FOXX3 on 40m. Richard made 20 QRP QSOs and more information and pictures are at <<http://www.qsl.net/g3cwi>>. **GØTAK** is running 5W on 12m with a thin dipole in the attic and a **G5IJ** 20m inverted vee monopole for the other bands and says “I have just got to share this log extract from 4 February with you”: 1320z **RX3MS** 24909kHz; 1357z **WB9AYW** 24901kHz; 1638z **RX3MS** 18077kHz; 1645z **RX3MS** 14060kHz; 1649z **RX3MS** 7040kHz; 1654z **RX3MS** 3540kHz. **RX3MS** was also running QRP and Roy says, “Well, I enjoyed it whilst it lasted”.

**GØUFH** was QRV as **GH4BJC/P** (the ISWL Club callsign and QSL via **GØDBX**) from Devil’s Hole, Jersey with SSB only on all bands using an Elecraft K2 and FT-817 as back-up to vertical antennas. Chris made 2090 QSOs but hopes to do better this year when he returns 17/31 October. He will then be QRV as **GH4BJC/P** again daily on 1845, 3700, 3780, 7045, 7065, 14180, 14260, 18135, 21260, 21285, 24950 and



The full-colour **GH4BJC/P** QSL card for the ISWL Club call operation by **GØUFH** from Jersey last year, showing the location at Devil’s Hole and the vertical antennas that Chris used. Chris will be QRV as **GH4BJC/P** again in October, see text for details.

28460kHz. The December *World Radio* QRP column reports K7FD announcing that the QRPacific QRP Club has a new callsign of **K7LOW**, which will be used in contests, outings and special events. More information about the club on their Web page at <[www.teleport.com/~cqdx/qrpclub/htm](http://www.teleport.com/~cqdx/qrpclub/htm)>. **DL9VSB** was QRV from CU2 in November with “less than 2W” from a SST Wilderness kit on 20m. Balthasar used a GP on top of the hotel roof.

That clears the files and e-mails again. A reminder that I can always use photographs for this column, which can be returned afterwards. Please let me know how your spring goes, by 20 May please?

73 de Chris

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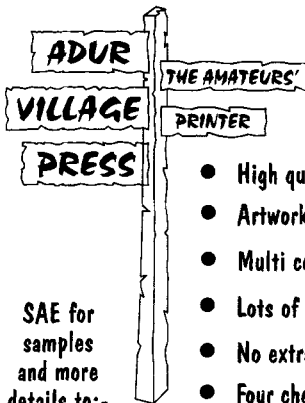


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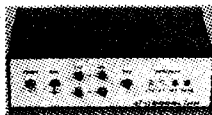


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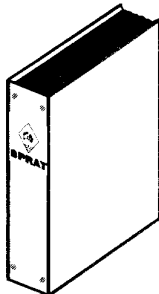
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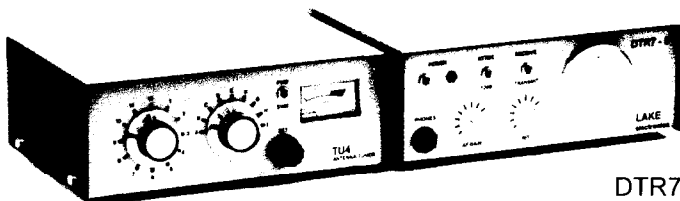
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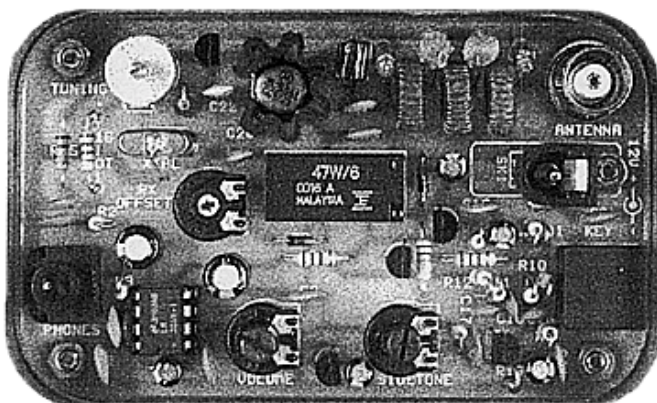
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