



# SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED • TO • LOW • POWER • COMMUNICATION

ISSUE Nr. 101

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WINTER 1999/00



**Fred G4HOM operates the Hands GQ-PLUS in the G3RJV Shack**

**EAGLET RECEIVER - RK3ZK 3 BAND RECEIVER  
UNIVERSAL VFO/EXCITER - SIMPLE SIDETONE - METER CIRCUITS  
MORE ON WALL WARTS - ACTIVE ANTENNA - ACTIVE CW FILTER  
THE QPR2001 EXPERIMENTAL RECEIVER - BELL PUSH KEYER  
A.A.A.- QPR CALENDAR 2000 - COMMUNICATIONS & CONTESTS  
NOVICE NEWS - SSB COLUMN - MEMBER'S NEWS**

**Subscriptions for 2000 - Details inside  
This is Our 25<sup>th</sup> Year**

# JOURNAL OF THE G QRP CLUB



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**Rev. George Dobbs G3RJV**

## EDITORIAL

Dear Member,

SPRAT 101 brings us into the 25<sup>th</sup> year of the G QRP Club and the first year of a new century. The future of the hobby is uncertain as less people come into amateur radio and more people use the internet and other alternative methods of communication. Although I am told that less people attend radio events, the numbers at the Rochdale QRP Convention were higher this year. Perhaps the future does lie within the more specialist branches of the hobby? May we take the enjoyment of QRP far into the new century.



Dick, G0BPS, presents G3RJV with a framed certificate at the Rochdale QRP Convention.

The text reads:

*"All members both past and present wish to put on record their grateful thanks to George Dobbs, G3RJV, for the founding of the G QRP Club and for 25 years of dedicated service as the club secretary and as editor of the 100 issues of the club magazine SPRAT!"*

72/3

G3RJV

**EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK  
Printed by G QRP Postal Mailing, 4 Hyde Square, Upper Beeding, Sussex BN44 3JE**

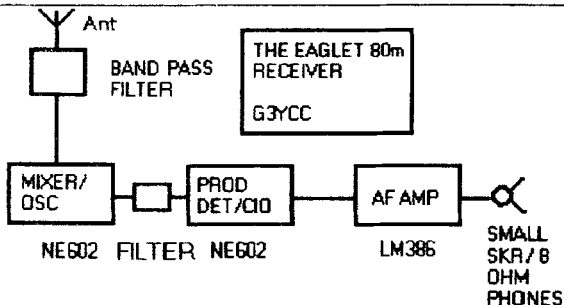
# The Eaglet 80m Receiver

Frank Lee, G3YCC, 8 Westland Road, Kirkella HULL HU10 7PJ



## WIFB MEMORIAL PRIZE ENTRY

This is the block diagram of the Eaglet receiver. It is a simple but efficient superhet designed for the 80m (3.5 MHz) band, utilising just three IC's.



Although simple in design, it is capable of good results even with a short wire as an antenna. Left is the prototype, your finished product will look a lot better than this, but it worked!

To the left is the band pass filter, followed by the oscillator/mixer NE602 IC, with the VFO coil below. Following on to the right is the product detector/carrier

insertion oscillator and finally the LM386 audio amplifier.

## SPECIFICATIONS

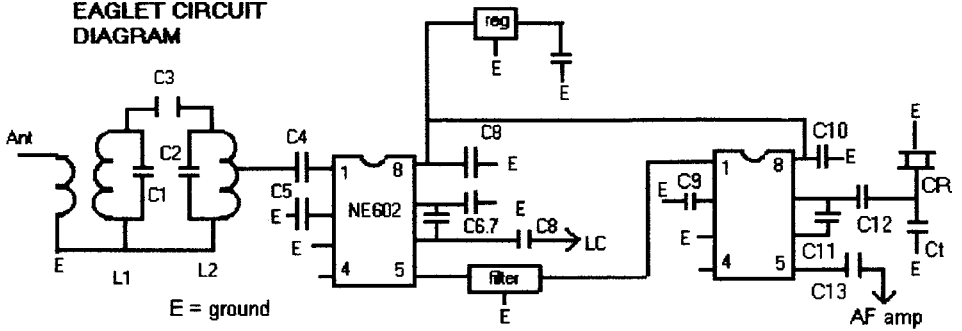
- Simple superhet receiver, covering a portion of the 80m (3.5 MHz) band
- Varicap tuned
- Sufficient audio for 8 ohm headphones or small loudspeaker
- Sensitive
- Economical to build
- Compact size, ideal for portable use



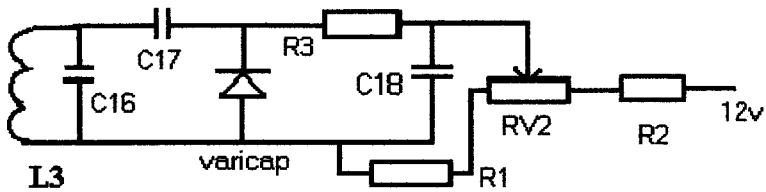
Eaglet Receiver

PCB  
Foil Side

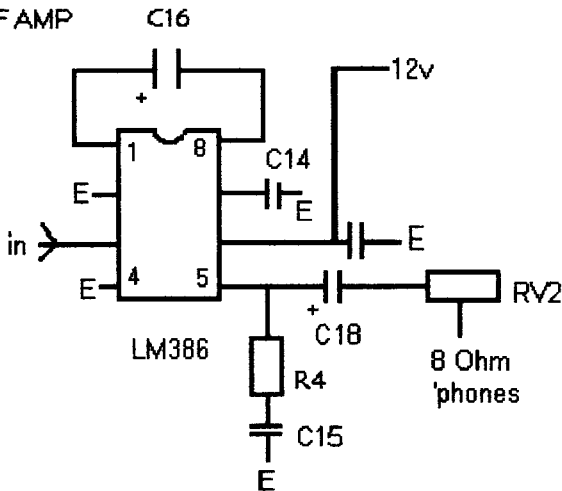
### EAGLET CIRCUIT DIAGRAM



### VARICAP TUNED VFO (LC)



### AF AMP



# COMPONENTS

## Integrated circuits

NE602 (2) IC1,2

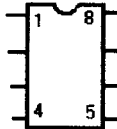
LM386 (1) IC3

78L08 (1)

## Inductors

TOKO K3334 (2) L1,2

TOKO K3333 (1) L3



Integrated circuit, top view  
note the notch at the top  
of the devices.

## Capacitors

100 pf ceramic (2) C1,2

5p6 pf ceramic (1) C3

1 nf ceramic (3) C4, 11,12

10 nf ceramic (2) C5,9

100 nf ceramic (5) C8,10,14,15,18

680 pf polyester (2) C6,7

47 pf polyester (1) C16

330 pf polyester (1) C17

marked N10

marked 5p6

marked 1N0

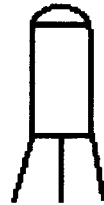
marked 103

marked 104

marked 680

marked 47

marked 330



1 = output

2 = earth

3 = input

1 2 3

78L08

Ct ceramic, adjust on test (270p)

## Resistors

4k7 log potentiometer RV1

10k lin potentiometer RV2

2k2 (2) R1,2

100k (1) R3

10R

marked red-red-red

marked brown-black-yellow

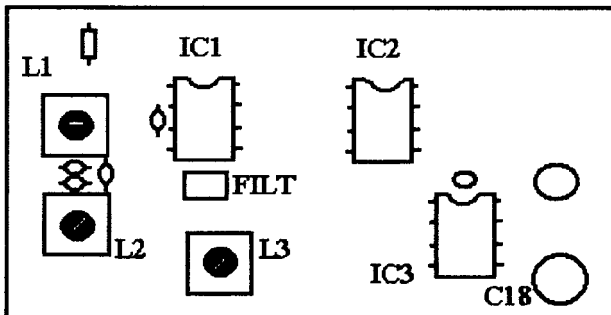
marked brown-black-black

## Ceramic Resonator

455Khz

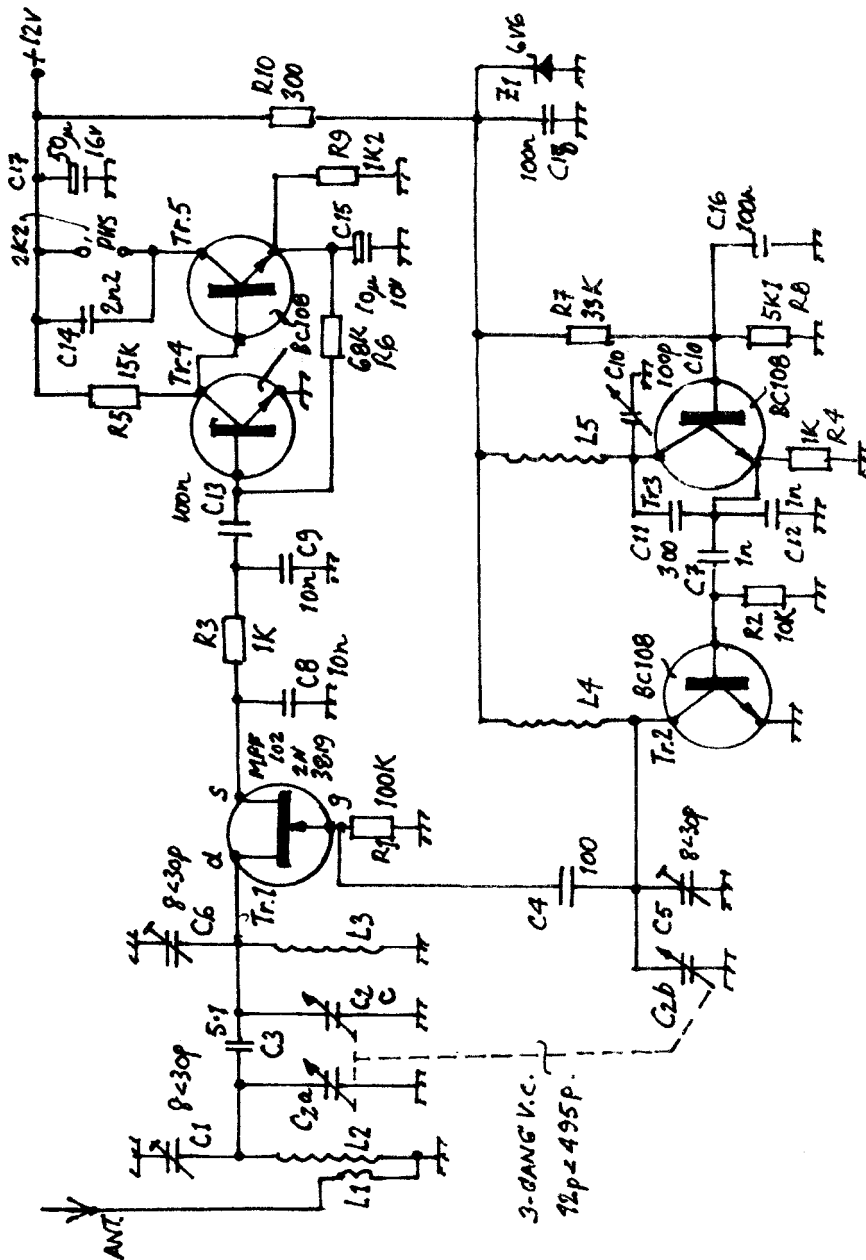
## Filter

CFU455IT 455 KHz



# 7-14-21 MHz Direct Conversion Receiver

Igor Grigorow RK3ZK Box 68 BELGOROD - 15 208015 RUSSIA





## W1FB MEMORIAL PRIZE ENTRY

This receiver was constructed in the style of W1FB - direct conversion and simple. The VFO [TR3] covers 6.9 - 7.2 MHz. The buffer [TR2] works on fundamental and harmonics - 7, 14 and 21 MHz. The low noise level mixer is TR1 and the audio stages are TR4 and TR5. This amplifier requires high impedance phones. If 16-32 ohm phones are used an audio transformer from a transistor radio will provide the match.

L2/C2, L3/C2, L4/C2 tuned the amateur bands 7, 14, and 21 MHz. From L2/C2 and L3/C2 the signal goes to the mixer TR1. L4/C2 give the required harmonics at the buffer TR2.

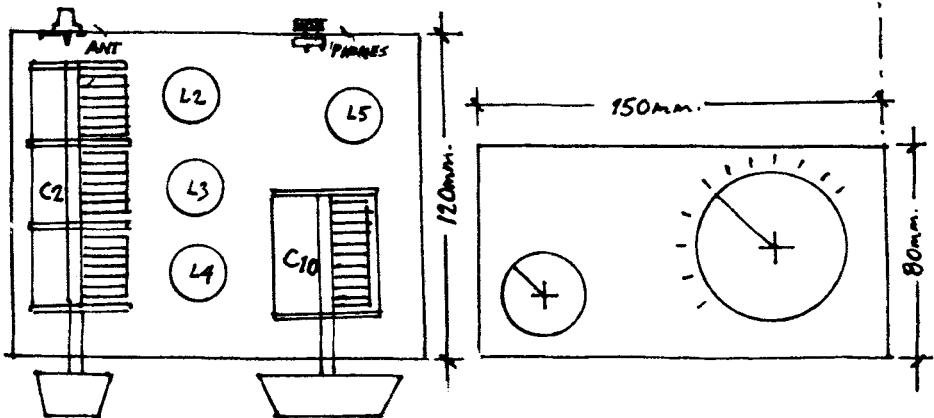
The coil information is given in the table. The coils are wound on plastic tubes, without a core. Frequency is fine tuned with C1, C5 and C6.

A layout is shown in the drawing. The receiver requires 8 to 15 volts at 15 to 25 mA. I use a small indoor antenna with good results

	L1	L2,L3,L4	L5
Inductance uH	As L2	1.1	1.8
Diameter mm	-	10	10
Length mm	4	15	15
Number turns	4	15	19
Wire s.w.g.	30	22	22

### DATA FOR COIL WINDING RK3ZK THREE-BAND RECEIVER

### PROTOTYPE RECEIVER LAYOUT

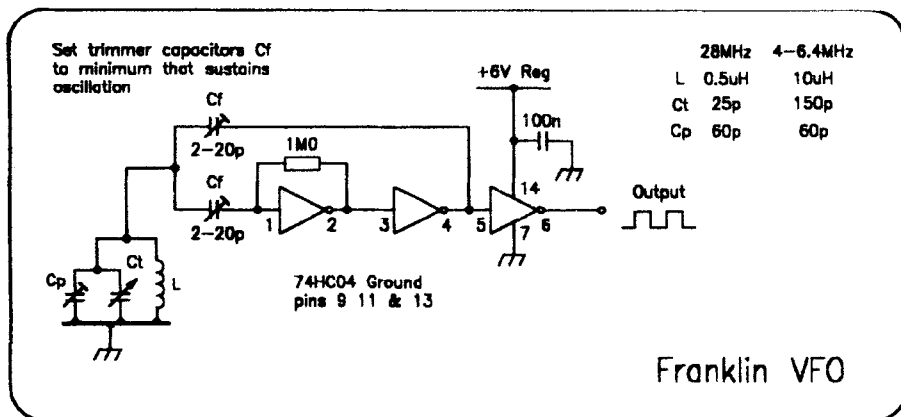


# A Universal VFO / Exciter

**Bill Currie VK3AWC P O Box 5197 Mordialloc Victoria 3195**  
**Reproduced from LO KEY : Journal of the CW Operators' QRP Club Inc**

For some time now I have needed a VFO for testing direct conversion receivers and for experimenting with transmitter circuits. My main bands of interest are 80 and 40 but I thought it would be nice to have output on other bands as well. Drew Diamond VK3XU wrote a three part article "QRP CW Transmitter with Break-in" in Amateur radio for December 1981, January and February 1982. This transmitter used a VFO on 28 MHz and divided down with flip-flops for outputs on lower bands.

More recently, an article 'A New Look at a Simple VFO/Exciter' by Ken Cornell W2IMB appeared in 73 magazine for October 1993. This VFO used a FET as an oscillator on 28 MHz and a single CMOS divider to give outputs on 7, 3.5 and 1.8 MHz. Deciding that this was the way to go, I tried various oscillator circuits and finally ended up with the Franklin circuit as shown in Fig.1. This oscillator is noted for its stability due to the tuned circuit being very loosely coupled to the feedback circuit. This VFO could be constructed with FETs or bipolars, but for simplicity I used a high speed CMOS chip, the 74HC04 (there will never be another 'U'). This VFO tuned from 28.0 to 30.4 MHz.



**Fig. 1 Franklin VFO**

**Circuit artwork by Harry VK2BHT**

While the VFO and divider circuit worked OK, the stability was not as good as I had hoped. It may be possible to improve the stability at 28 megs but Harold VL3AFQ suggested that use a 4 to 6.4 meg VFO and beat it with a 24 MHz xtal to get 28 to 30.4 MHz. When he produced a 24-Hz TTL xtal oscillator module (ex computer board), I was hooked. Changing the 24 meg Franklin VFO over to 4 megs was no problem.

I now had square waves at 24 and 4 to 6.4 megs. As Harold has been relentlessly bending my ear about the virtues of switching type mixers using the 4066 Quad Analog Switch, I decided to try that. A high level mixer using a 74HC4066 and a tuned circuit around 29 megs gave excellent results and needed only one more chip to drive the divider.





The divider uses a 74HC4024 which is a 7 stage binary counter. The 28 meg input and some of the outputs are switched to buffers and BNC sockets, to give outputs on the bands as shown in the panel at bottom of page.

The last 'band' was included for experimenting and because it was there! There are unswitched outputs of 875 - 950 kHz and 228.75 - 237.5kHz also if you want to use them. Fig. 2 shows the mixer and divider circuits and switching. Provision is made for keying the divider chip for you (shudder) CW types. It must be realised that the outputs of this VFO/exciter are square waves and therefore may need smoothing for feeding high power finals. The unused inverters in the second buffer chip were used to provide outputs which can be used for driving single ended or push-pull stages.

You will need to take care when constructing the VFO and use top quality components. A diecast box is almost a must and a good reduction drive is essential. I intend to use a digital readout, so a dial is not really necessary. When you think about it, the stability of this exciter on 28 megs is as good as the 4 - 6 meg VFO and each time you divide down, the stability will increase by a factor of two.

The VFO was built on a DSE H-5600 16 pin PC board. The 10 uH coil uses 40 turns on an Amidon T-68-2 toroid but a ceramic slugless former may be more stable. The Exciter was built on an Experimenter board. 14 pin IC sockets were used for the IC's and TTL oscillator module. If you can't find an old computer board with a 24 MHz oscillator module then try Radio spares or Farnell. There are some additions that can be made to this VFO/Exciter. Some that come to mind are....

1. If the Exciter is going to be used to tune a DC receiver as well as Xmtr on CW then the keying will need to be changed.
2. RIT could be added to the VFO circuit.
3. Provision for quadrature output (90 deg. phase shift) at 1/4 the switched frequency can easily be added.
4. Huff & Puff stabilisation of the VFO could be added, as half of the circuitry is already there (See Radcom December 1997 'Stay Put' the improved huff and Puff VFO).
5. A low power final using a pair of, say, 74AC540's in push pull for CW could be added to make a multiband CW QRP Xmtr.
6. Sine wave outputs on each band and an attenuator could be added so that the unit can be used as a signal generator.

I may eventually get around to writing up these 'pipe dreams', but if you need information or have any suggestions then drop me a line.

1.	10	(28 - 30.4 MHz)	included	10 metre band
2.	20	(14 - 15.2 MHz)	"	20 " "
3.	40	(7 - 7.6 MHz)	"	40 " "
4.	80	(3.5 - 3.8 MHz)	"	80 " "
5.	160	(1.75 - 1.9 MHz)	"	160 " "
6.	455	(437.5 - 475 kHz)	"	455 kHz Intermediate Frequency

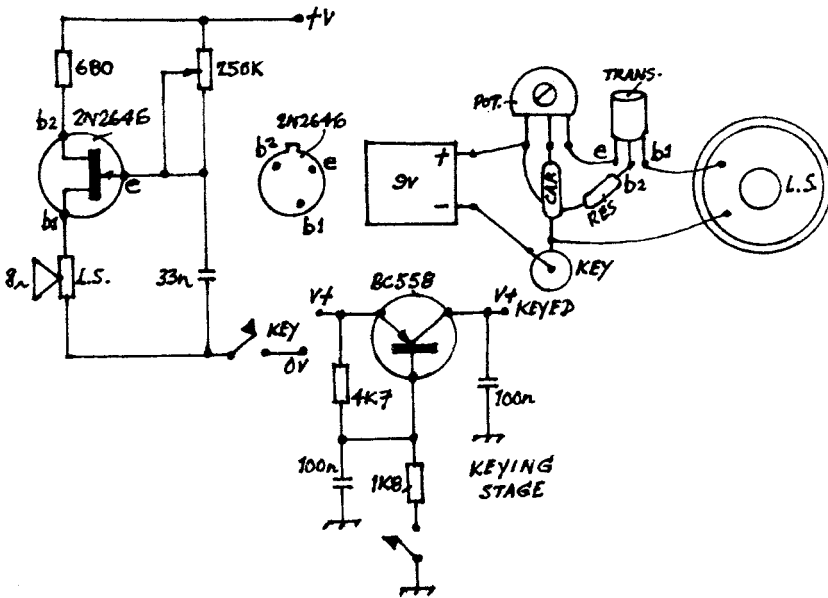
# A Simple Sidetone

Andre Massieye F5JDG Campagne Laugier, Route de Grans, Salon,13300, FRANCE

Only five components, including the loudspeaker! A sole transistor. Who can beat it? Surely not the NE555.

A relaxation oscillator using an unijunction transistor is one of the easiest ways to build a sidetone for a CW transmitter. This can only incline us to try to build it. This can be done without the plague to build a printed circuit board. We have only to solder the three little components around the potentiometer and the connectors.

The construction of printed circuit boards seems to repulse many amateurs from trying to build something by their own. I speak about the standard ham operators not about QRP operators which are often homebrewers. If we want to attract these operators to home building, we have to propose easy projects which can be assembled by average people, not necessary "electronics". This little project can also be a school or student project, trying to attract their interest in science, physics or communications (and later on radio amateurism).



But let us come back to our sidetone. Its volume is fixed but it can be variable by simply changing the power supply voltage between 5 and 24 volts. A 9V dry battery is enough for feeding it because the current drawn is low. The tone pitch can be adjusted by the potentiometer. The loudspeaker can be of any type. You have just to try those under hand and to select the one giving the best results. I have good results with a simple phone speaker salvaged from a telephone set of the 60/70s.

This sidetone can be used as a code practice oscillator. In this case, it can be mounted inside the loudspeaker's cabinet. If the sidetone has to be located inside a transmitter, you certainly have to build a little PNP transistor switching stage with the base is connected to the key.

## Two Useful Meter Circuits

John Hey, G3TDZ, 8 Armley Grange Crescent, Leeds. LS12 3QL

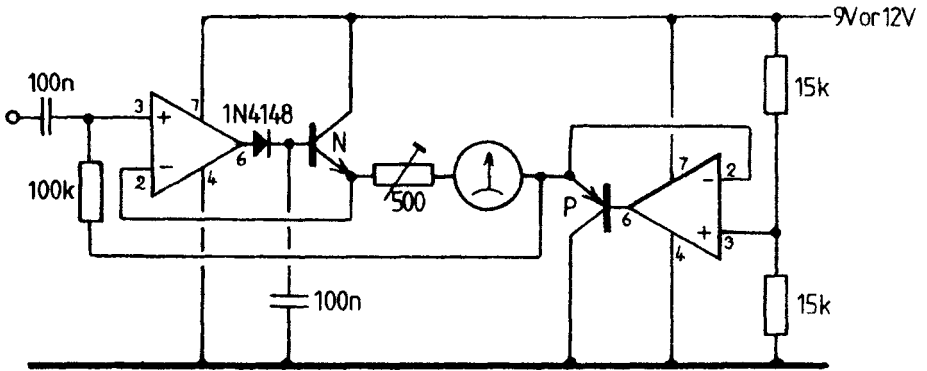


Fig. 1 AC meter

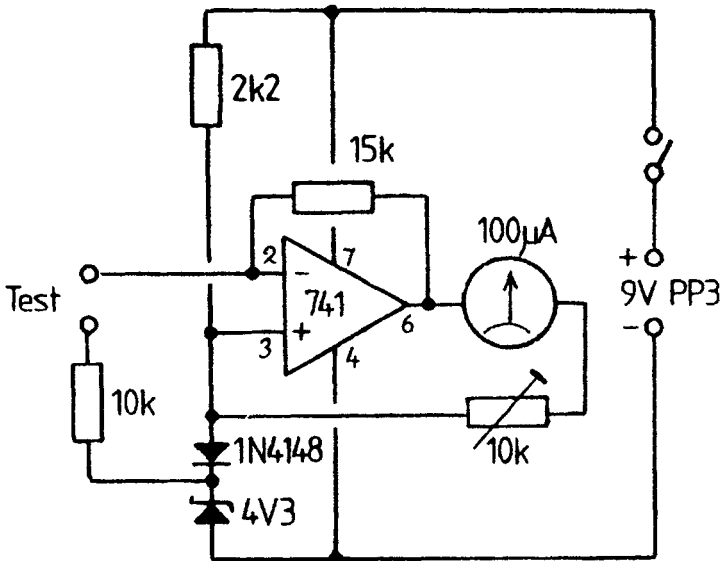


Fig. 2 Resistance meter.

## TWO USEFUL METER CIRCUITS

In a number of amateur designs where a meter indication of some AC signal is required, one sees simple diode detectors and more frequently voltage doubling circuits just to get up enough steam.

The problem is the diode drop giving cramped readings and nonlinearity. Connecting the diode within the feedback loop of an op-amp overcomes this problem. It was recently necessary to drive a large meter which needed 5mA for full-scale deflection. The circuit of Fig.1. will easily do this with lots to spare.

This circuit has been used in an AC meter with switched ranges from 10mV to 300V; in an S meter, and in a field strength meter where gains up to 80dB preceded the circuit of Fig.1.

Junk box meters of any sensitivity may be used with the guarantee of excellent linearity over the scale. Any op-amp will do at audio frequency but many of the well tried high frequency devices such as LM318, AD711, OP-37 will carry the operation well into the IF regions.

The circuit of Fig.2. was originally designed for measuring skin resistance in medical electronics. Its advantage is the very low excitation voltage: just one diode drop or 0.6V. Some instances in the workshop one might wish to measure a resistance where the usual 1.5V or even 9V in some meters would do harm or give silly readings. With the values in Fig.2, the centre of the scale is about 10K giving useful measurements from 1K to 100K.

### More On Using Wall Warts

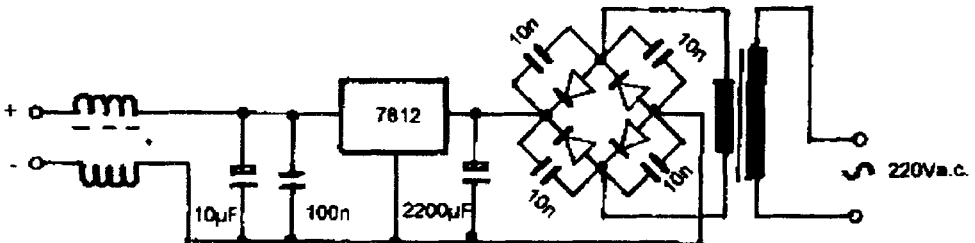
Giancarlo Moda, F-I7SWX, Residence "Le Panoramic",  
35 Av. Vincent Scotto. 83700 ST. RAPHAEL, France

An interesting article with the title "Working with Wall Warts" by W5QJM, was published in SPRAT #98, Spring 1999 issue. I would like to add the following information that is particularly useful when using this type of power supplies, and others, with Direct Conversion Receivers and equipment with high gain audio stages.

To reduce hum it is necessary to fit, in parallel to the rectifier bridge diodes a single ceramic capacitor of 10 nF (nanofarad). It is a simple modification and usually the voltage involved is quite low so we can use small size capacitors.

The drawing reports the mod I have applied to one of these PSU I am using with my DC Receiver. If the space permit it, I suggest to add a couple of RF Chokes to the dc line or a double winding on a ferrite toroid or bead. For a DC Receiver, a wall PSU is very important as it will be far from the equipment itself thus helping a lot to reduce audio hum.

The diagram shows a PSU design using the principles outlined above



## **HF Active Antenna for Reception**

**Marco Eleuteri, IK0VSV, Via Paolo Rolli 18, TODI P) I-06059 ITALY**

Many radio amateurs begin their interest in radio through short wave listening and many short wave listeners remain SWLs. Although I am a ham my main interest, for 25 years has been short wave listening. In our towns it is often difficult to install a good antenna system so active antennas are used.

Most of them are only amplifiers, broadband and high gain BUT still only amplifiers. In these cases when the antenna is turned on the signals increases but the noise increases too. In particular during the night when MW transmitters are arriving from nearby countries, with many KW, and in the day if the SWL is unfortunately located in MW transmitter area. How do we solve this problem and achieve high gain for weak signals without being overloaded by a local station? By using an active BROAD BAND ANTENNA that doesn't amplify the MW region. I have used many types of active antennas but last year I got the December issue of "Electronic Design" which described this circuit. This is my version of the circuit - which works very well.

The theory says that a short dipole's polar pattern isn't a "8" figure as in the quarter wave dipole, BUT has much sharp nulls that allow you to null-out the undesired signal by rotating the dipole .

At other hand the short dipole (less than 1 meter) has a too high impedance to drive the 50 ohm receiver's input direct.

Therefore, dual FETs are used to translate the high impedance to the low rx impedance but with the FETs, we receive a low signal level .

This level is amplified by a dual input wide band video amplifier (LM733) and the dual output of the IC must be transformed from dual to single ended.

As presented, the circuit gain can be selected:

For strong signal some amplification amount (9 db) is selected by SPDT switch in the LG position.

When high gain is needed (20db) the SPDT must be switched on HG position.

When we need high gain in the short wave range BUT need eliminates MW interference the FS position must be used. In fact in this case the amplification is 9 db up to 1,6 MHz and 20 db at upper frequencies.

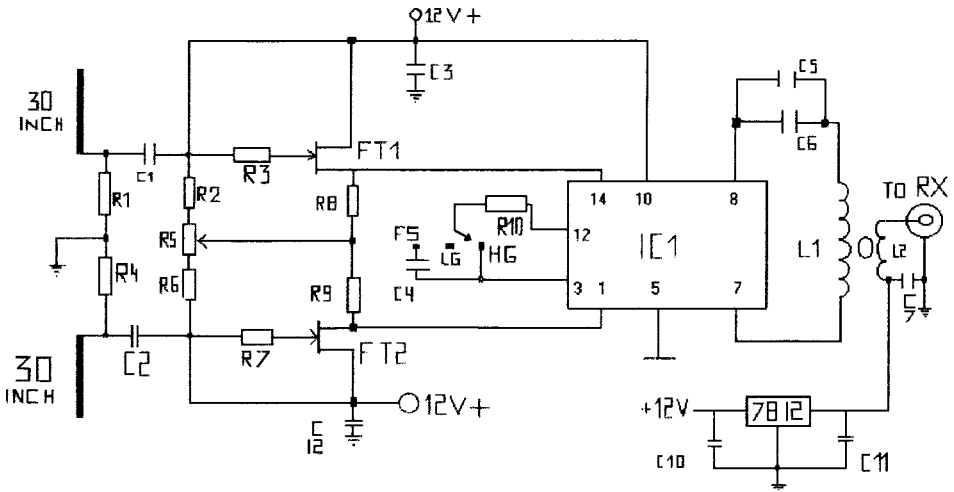
VERY NICE! - you can get high gain SW amplification and low MW amplification.

The frequency response is very flat from 200 kHz to 35 MHz (+- 0,2 db) and +- 0,4 db down up to 60 MHz. The gain is flat up to 25 MHz and -3db at 50 MHz. The maximum signal level is 500mV(!) rms in to 75  $\Omega$  load.

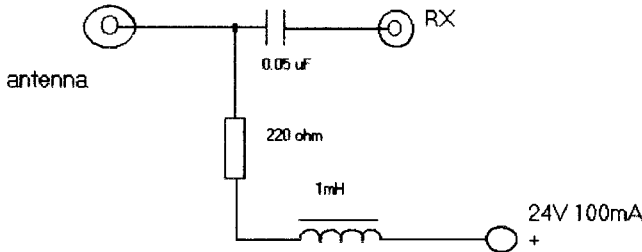
My version of the antenna is for external installation, I used a pair of dipoles switched by relays and is N-S E-W oriented (ideal for Italy) but maybe a small TV rotator is better.

The power is supplied a separate multipole cable (in this case) but for single dipole version the power can be supplied by coax cable as shown.

Alignment: the 47 k trimmer must be rotate for equal clipping of the signal just past the maximum level.

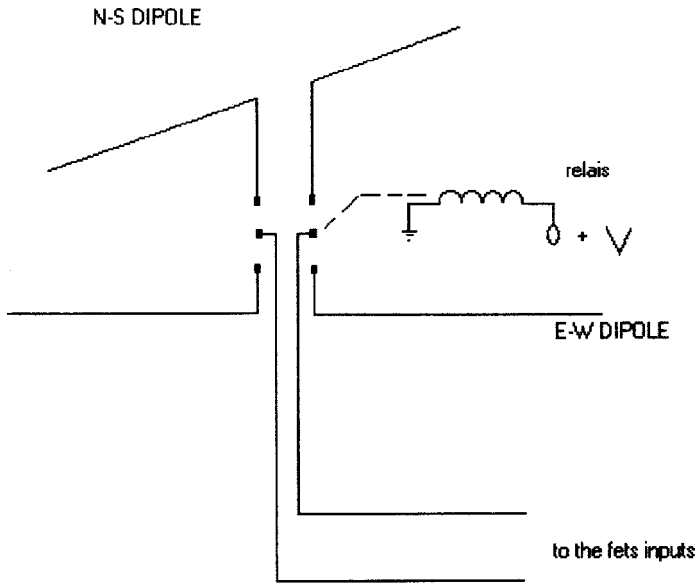


**POWER SUPPLY SYSTEMS VIA COAX**

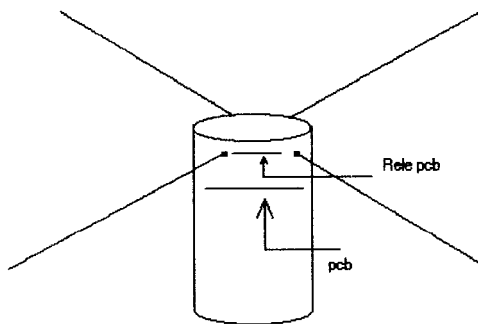


**components list**

- |      |        |       |   |     |  |
|------|--------|-------|---|-----|--|
| R1-4 | 5 M    | FT1-2 | fet n channel 2N5246 or any similar whit Idss<2mA (BF245)     |     |  |
| R2-6 | 330K   | IC1   | LM733 or LM733C (C versione is for civil use 0° to +70°range) |     |  |
| R5   | 47K    |       |   |     |  |
| R3-7 | 330K   |       |   |     |  |
| R8-9 | 4.3K   |       |   |     |  |
| R10  | 330    |       |   |     |  |
| C1-2 | 100P   | C6    | 0.05 uF   | C12 | 0.1 uF   |
| C3   | 0.1 uF | C7    | 0.05 uF   |     |  |
| C4   | 33P    | C10   | 1.5 uF  | L1  | 36 truns of n°24 enameled wire                     |
| C5   | 0.47uF | C11   | 0.47uF  | L2  | 9 turns same wire on T50/2 or better toroidal core |



### Practical details of the Active Antenna

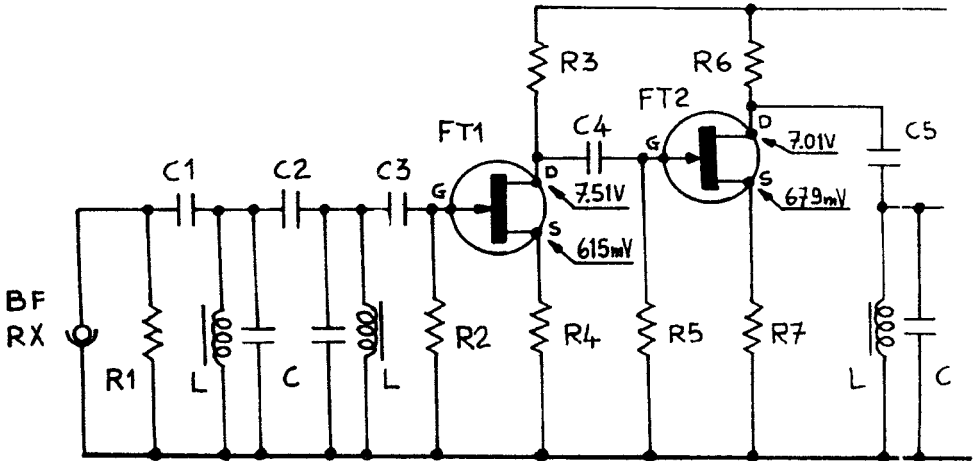


A POSSIBLE LAYOUT FOR EXTERNAL USE.  
 ( my antenna's photos available)

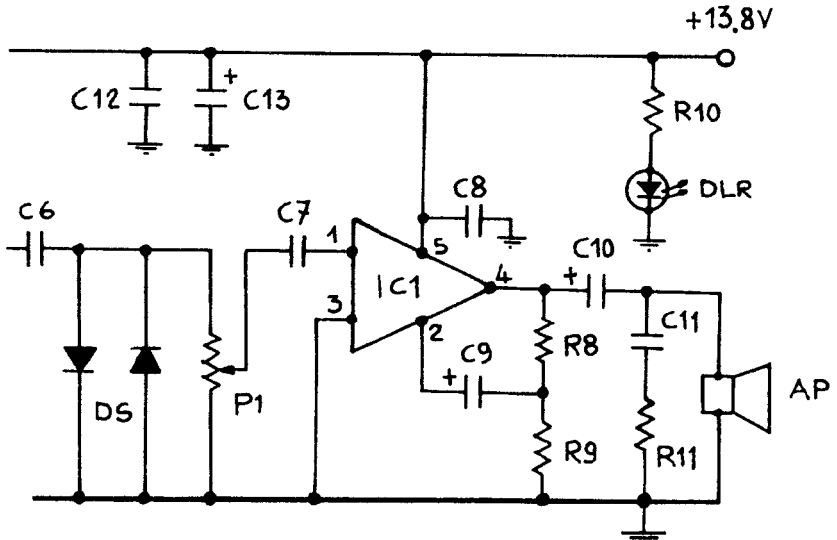


# Receiver CW Filter

Luigi Adriatico I0KWK Via Nomentana ROMA I-263 0016 ITALY



CIRCUIT DIAGRAM OF RECEIVER FILTER



## COMPONENTS LIST:

R1	8R2 - 1W	C	600n [6 X 100n in Parallel
R2, 5	1M2	C1-5, 8, 11, 12	100n
R3, 6	6K8	C6	39n
R4, 7	680	C7	220n
R8	1K	C9	470 $\mu$ 50v elect
R9, 11	10	C10	1000 $\mu$ 50v elect
R10	5K6	C13	47 $\mu$ 50v elect
P1	22K LOG		

L	100mH [RS228-371]
FT1, 2	2N3819
IC1	TDA 2002
DS	1N4148
DLR	RED LED
AP	Speaker 10W-4 $\Omega$

$$f_0 = 628 \text{ Hz} \quad B (-3\text{dB}) = 90 \text{ Hz}$$

The circuit shows a simple CW Filter complete with audio amplifier. I have used the filter to great success with my Howes 20m Dc Receiver.

The chart shows the measured results used to plot the selectivity curve of the filter.

V [dB]	f1 Hz	f2 Hz
-1.5	591	655
-3	577	667
-6	555	690
-10	534	717
-15	512	758
-20	491	817
-25	471	889
-30	449	999
-35	427	1162
-40	403	1455
-50	352	3122

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

WANTED: Bob G0NFO, is looking for Operating Manual or Circuit diagram for Sommerkamf FT 690 Mk1. all expenses reimbursed. G0NFO QTHR (Kidderminster). Tel : 01562 754296 E : Bob@g0nfo.freerve.co.uk

FOR SALE: Silent Key sale following the sad death of member Peter G4VZF : TS530SP with cw filter at £200 and TS130V with cw filter at £225. Both rigs in excellent condition and original boxes. Enquiries to John G4XTS on 01268-521915

## I-Q Electronic Design

69 Angus Close, Chessington,  
Surrey. KT9 2BN

### QUARTZ CRYSTALS

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10.106MHz/£3.50	10.7MHz/£1.75	11.0592MHz/£1.60	11.155MHz/£3.50
16MHz/£1.54	21.04MHz/£4.95	21.06MHz/£5.95	42.5MHz/£3.95

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# The QRP2001: An Experimental DC Receiver

Jan Verduyn G0BBL, 14 Ragleth Grove, Trowbridge, Wilts, BA14-7LE, UK

The QRP2001 was first demonstrated this October at the annual Rochdale Mini-convention this year. It attracted some favourable interest from fellow QRP-ers despite the fact that a lot of soldering was only done the evening before.... The design is still being changed to obtain the best performance, The information below should be of interest to the many amateurs who like experimenting with high performance HF receivers. This design is an effort to improve on the performance of the well known R2/T2 boards by Rick Campbell, KK7B (Ref 1) whilst attempting to retain the excellent Audio quality of the R2.

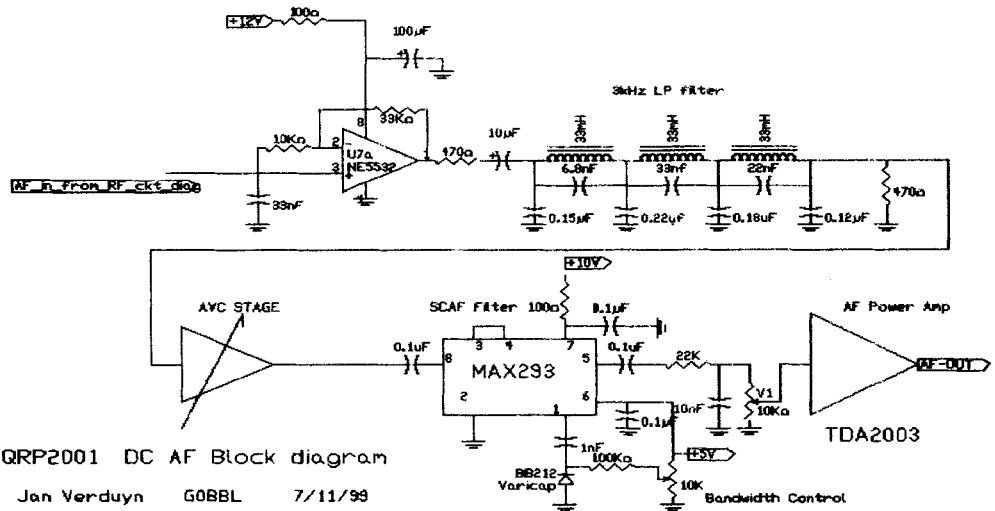
The QRP2001 is a direct conversion transceiver using the Tayloe N7VE product detector, which provides two AF output signals in quadrature, feeding into a 6 pole Polyphase network to obtain single signal reception. The desired sideband AF signal is filtered by a passive 3 kHz AF low pass filter, then goes to an AF amplifier with AGC, followed by another 8 pole active AF Low pass filter with variable cut-off frequency and a conventional AF power amplifier. The Tayloe product detector requires a Local Oscillator signal with either sine or square wave output at twice the Signal frequency. In the prototype a DDS oscillator is used, a design similar to the one Steve, G0XAR, Alan, G7PUB and I developed previously for the QRP2000 project (See Ref 2). With the DDS generating an LO between 0 and 30 MHz the current receiver coverage is all bands up to 20 Meters.

## The Tayloe Product Detector

This product detector (Ref 1) uses one half of the 74CBT3253 fast bus switch as a 1-4 analogue multiplexor. The RF input signal is continuously switched to each of the four Capacitors C1 - C4 and integrated over a quarter of the cycle. This IC has a low "on" resistance of around 5 Ohms, and offers a conversion loss of only -1dB compared with -6 dB for a conventional DBM like the SBL1. The sensitivity is therefore excellent at 0.3 uV (-117dBm) for 10dB SINAD and unlike the QRP2000 an RF amplifier is not required, thus preserving the strong signal handling characteristics which Dan Tayloe measured as +30dBm 3<sup>rd</sup> order ICP. This is considerably better than the SBL1. Also this product detector does not require a RF power splitter to feed both RF mixers as in the R2 design. The mixer also acts as an Switched Capacitor Filter (SCF filter) or Commutating Filter at the RF input frequency with the pass band set by C1-4 and R14. Using the specified values this translates into a -3dB bandwidth of +/- 2.6 KHz away from the RF input frequency. With the DDS LO generating on 28.2 MHz this translates into 14097.4 KHz to 14102.6 KHz, equivalent to a Q of 2700. Capacitors C1 to C4 should be good quality 5% polyester or equivalent. AM detection, often a major problem with DC receivers in Europe on 40 Meters, is about the same level as the R2 using SBL1 DBM's.

U1, a Schmitt trigger takes the Local Oscillator signal at twice the RF Input frequency at the input. R1, R2 and C49 are only needed if a conventional VFO with a sine-wave output of about 0.5 Volt pp is used. The output at U1 pin 6 is an almost perfect square wave at 5V TTL level. This is further divided through U2 by two into a second 5V TTL square wave with the same frequency as the RF input frequency. The use of square waves for LO instead of conventional +7dBm LO signals, results in the QRP2001 producing a number of internal spurious responses compared with the QRP2000. The majority of these are well below S2 level, but are

nevertheless very noticeable and the biggest problem in the current design. Further work in this area will be done to refine the design by improving the spectral purity of the DDS Module.



### Polyphase and Audio

The polyphase network is ideally suited to interface directly with the Tayloe mixer. Using standard 1% resistors and 5% tolerance capacitors values from John Heyes G3TDZ article (Ref 4) about 50 dB of sideband suppression is achievable. U3 and U4 are Low noise opamps (NE5532's or OP27's) with about 50 dB gain. U5 and U6 are unity gain inverters required to drive the polyphase network. Preset V1 is adjusted for optimum unwanted sideband suppression. The low level SSB/CW AF signal is taken from fig 1 junction R27/C34 and feeds into another NE5532 Opamp with 10dB gain (fig 2). It is then followed by a 3 kHz 7<sup>th</sup> order elliptical SSB Low Pass filter, taken straight from the KK7B R2 receiver and is amplified in another AF amplifier with about 50 dB of AGC. This stage currently works very well with signals up to about S9 + 10dB however more development is needed to deal with S9+40dB signals without introducing distortion. The AF output is then processed through an active 8 pole elliptic Low Pass filter with a MAX293 SCAF IC (obtainable from Maplin in the UK). This filter can be adjusted by a front panel control from ca 350 Hz to 3.5 kHz cut-off and has a -6dB/-80dB shape-factor of 1.5. This filter is well liked by amateurs who have used the QRP2001 and demonstrates that there is a cheaper alternative to obtain DSP-like performance. The SCAF filter contributes some extra noise, however measurements indicate that this does not degrade the MDS of the receiver. The final stage is a conventional TDA2003 AF amplifier. If your interest is solely CW, you may want to use the 1 kHz CW low pass filter design from the KK7B article and make some further simplifications by dispensing with the active SCAF filter.

## **DDS Local Oscillator**

In principle any stable VFO operating at twice the band of interest may be used as LO to drive the Tayloe mixer. The QRP2001 prototype makes use of the DDS Local Oscillator circuitry which we developed for the QRP2000 project and is described on our project WEB page (Ref 2). There are two major differences: Only one AD9850 chip is used to save cost. Also this module now generates a 0-30 MHz square wave using the AD9850's built-in comparator as per the manufacturer's Datasheet. Alan G7PUB has modified the firmware in the 16F84 to make the LCD frequency readout suitable for use with the Tayloe mixer. The DDS firmware features 10 Memories and now produces 20 Hz tuning steps which with the Bourne encoder provides 1.92 KHz coverage per revolution. Firmware for the QRP2001 is in the public Domain, courtesy of MPC Data, the owners of the rights of Alan's efforts. Programmed 16F84's are available from myself (Ref 5) at cost if required.

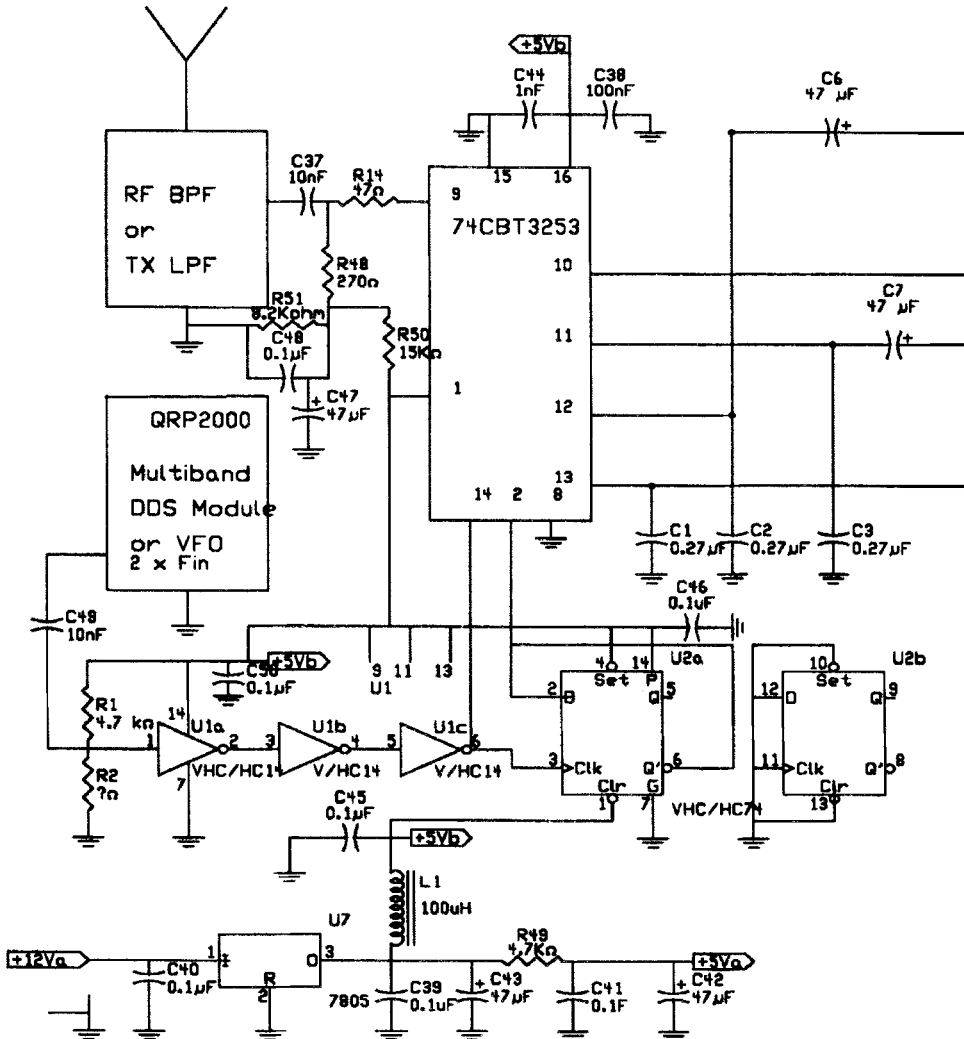
## **First impressions and future plans**

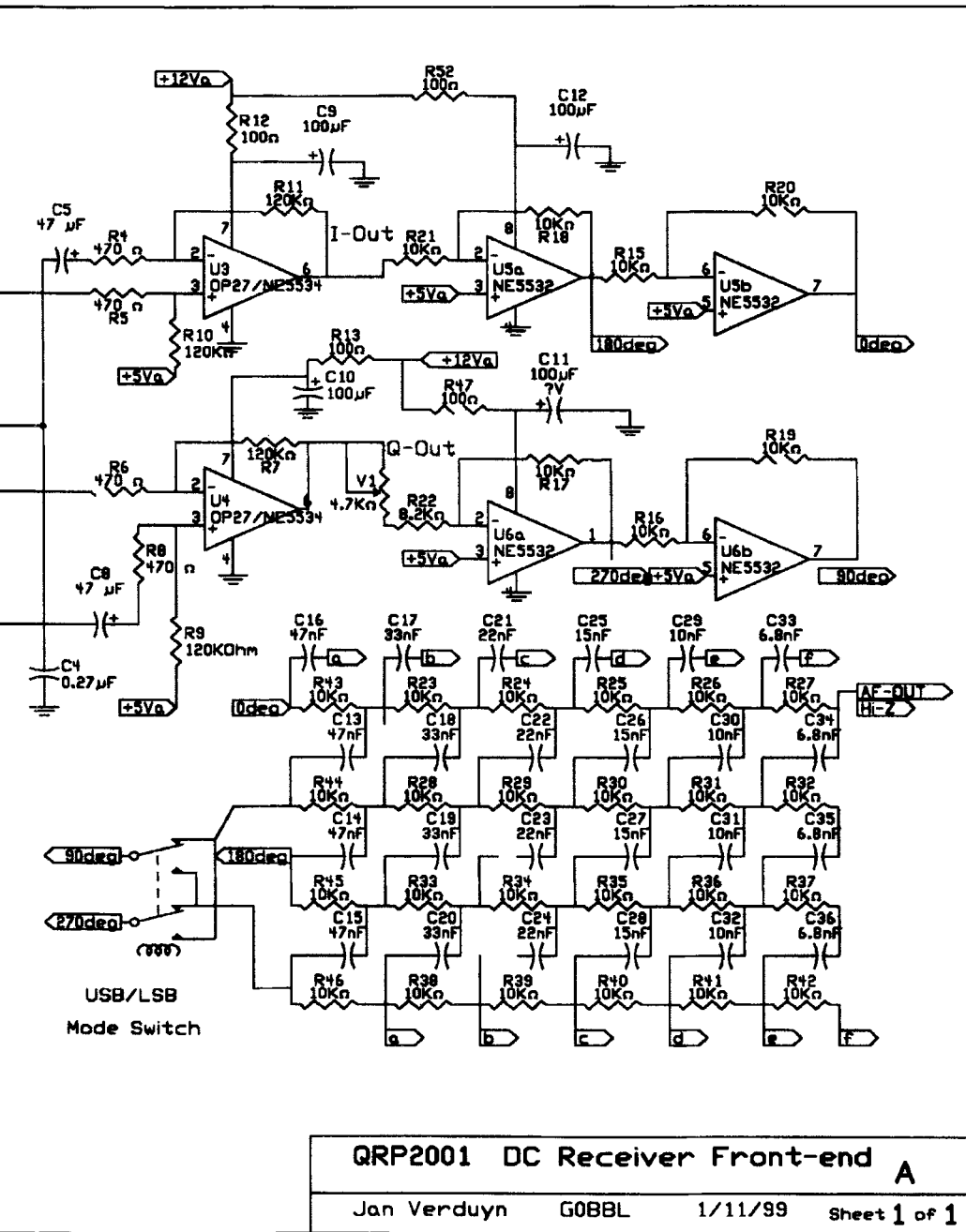
First impressions of the QRP2001 are very encouraging. Sensitivity and performance on the HF bands is very respectable and compares well to the IC725 with good and clear audio output. The receiver does not suffer from some of the weaknesses that Direct Conversion receivers often suffer from, like hum or microphony or low gain. The provision of AGC means that the receiver can be used to monitor the various Nets on the band without adjusting the AF gain control whilst homebrewing!!! The overall gain is some 15dB higher than the R2 and a 0.3 uV input RF signal produces at least 50mW audio into an 8 ohm speaker. I intend to address the problem of the internally generated spurious signals by redesigning the DDS oscillator module, currently the limiting factor in extracting further performance increases in the design. At the same time I would like to increase the frequency coverage to include all HF bands up to 10 meter. The proposed transmitter will make use the polyphase network with up-conversion carried out by the unused section of the 74CBT3153, followed by a standard Hands or Cirkit 20W PA module, already fitted in the prototype. RF selectivity for the Receiver is obtained by switching in a 7 element Chebyshev Lowpass filter for the band in use. These TX filters were designed by W6BLD and offer a minimum of 50dB 2<sup>nd</sup> harmonic suppression. The PCB and components for this module was provided by Hands Electronics. Work is also underway by the QRP2000 team to redesign the DDS control board and make use of the new 16F877 chip. This would simplify interfacing to the TX LPF board and the additional memory would allow development of new features in the firmware as currently only 3 bytes of memory are left unused in the 16F84!! Altogether plenty of work to keep QRP home brewing going in 2000. Would you like a challenge if your interests are more PC based? How about connecting the I and Q outputs audio from the Tayloe front-end to your PC and use the soundcard for all the Audio processing? Good luck experimenting. Best 72's. Jan

1. Radio Communications Feb1999 page 79/80, and correspondence with N7VE
2. <http://www.stevf.demon.co.uk/qrp2k/qrp2000home.htm> QRP2000 homepage
3. Single-Signal Direct-Conversion Receivers by Rick Campbell KK7B, described in most editions of the ARRL handbook and QRP Power (ARRL) Pagina 4-10
4. Practical Polyphase, SSB for shallow pockets by J.R Hey G3TDZ, Radio Communications September 1976 page 656
5. My email address is: Jan.Verduyn@motorola.com

**NOTE: THE DIAGRAMS IN THIS ARTICLE ARE SOMEWHAT SMALL AND MAY HAVE TO BE PHOTOCOPIED AT MAGNIFICATION FOR A CLEARER IMAGE**

# Taylor N7VE Product Detector

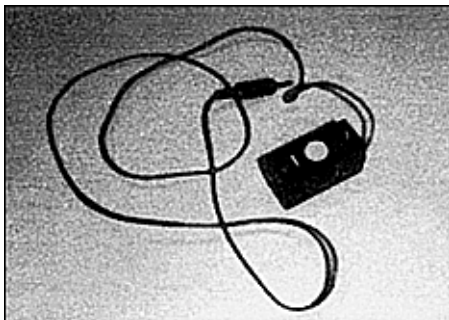




## A Hand Held Bell Push Paddle

James Bolton G3HBN, 40 Queens Gate Terr. South Kensington, LONDON. SW7 5PH

The bell pushes are ordinary cheap black plastic type with a white button. Underneath the button is a return spring of two turns. This is held in place by nothing much and should be removed from each push.



The tongues of the pushes then become very light return springs for the 'paddle' part of the key. Adjust each arm for the required tension.

The arms are joined to form the common connection. The two fixed contacts become the 'dot' and 'dash' connections respectively.

Wire the three connections. Mark each paddle with a dash or a dot with 'tipex' to save confusion later.

Bolt the two pushes back to back and presto, you have a very lightweight hand held paddle for /p use. It can be used as a sideswiper or electronic key paddle as required. A couple of minutes practice to get the feel of the tension is all that is required.

The key has been in use at G3HBN and all his /p operations, as well as demonstrations, for over 3 years with thousands of QSO's to its credit.



## The G QRP Club Millennium Winter Sports December 26<sup>th</sup> to January 1<sup>st</sup> [inclusive] A QSO Party to end the century

Call "CQ QRP" on the International QRP Calling Frequencies

CW: 1843, 3560, 7030, 10106, 14060, 21060, 28060 kHz

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

Although the Winter Sports is not a contest, you are invited to submit logs and comments to our Communications Manager, Peter Barville G3XJS, 40 Watchet Lane, Holmer Green, HIGH WYCOMBE. Buckinghamshire. HP15 6UG.

The G4DQP Trophy will be awarded to the operator thought to contribute most to the overall success of the event.

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

FOR SALE: FT-726R Triband Rig in pristine condition with 2m and 70cm module £495 (collected) Optional extra - HF module - which is a triband module in itself - supplied and fitted free at this price only. G0OZK. QTHR. 07974-953018 (after 6pm)

FOR SALE: Comm RX All HF bands, Mains or 12v, Ideal QRP portable, room for small QRP TX inside. £75. IC2E. gwo, 2 batts. charger, powerpack & adapter for mains + cigar lighter, small power output meter £100. FT101ZD, gwo £300 no offers. G3JES QTHR 01227 - 451441.



## Some Modifications to the JBS Transmitter

**Gerald Stancey G3MCK 22 Peterborough Ave OAKHAM Rutland LE15 8EB**

The JBS Tx arrived at an opportune time as I was wanting a 80m QRO (!) QRP rig. However no QRPer worth his salt can resist tampering with any published design, even when it is by the master himself!

1. Not having a variable voltage PSU I reduced the value of the PA base resistor, 50 ohms (2x100 ohms), to reduce the output on 80m. This is may not be feasible if you are going to use the rig on more than one band.
2. To get a bit of frequency shift I removed the 10-12pF trimmer and replaced it with a panel mounted 50pF variable in series with an inductor, NB the variable must not be earthed. The TOKO 100 micro-H RF choke part umber 187 LY 101 gave good results.

If the crystal does not key well when the variable capacitor is near minimum value, then put a bit of fixed capacity across the variable. The old dodge of two wires twisted together works well.

3. Key clicks were reduced by putting a 3K3 resistor in series with the key and the base of the keying transistor.

### **LOADING A LW WITH G3WQW'S ATU [Notes from G3JNB]**

Victor G3JNB reports excellent results with the Z-MATCH by G3WQW (SPRAT 95) with his HW 8. Needing to use a long wire for temporary QTH work and obviously finding the Hi Z winding insufficient coupling, he tapped onto the top of C3 for a very good match. Use of the earth terminal depends on the length of the antenna/band. Tuning for minimum SWR is a bit sharp but no real problem.

## 10-4 Offers From J.A.B.

ICL7660 10 For £10.00	NE555 10 For £2.00	2N7000 10 For £4.90	7805 10 For £3.00
LF351 10 For £4.25	TL062 10 For £4.37	BC182 10 For £0.50	7808 10 For £3.20
LM318 10 For £8.00	TL071 10 For £3.10	BC184 10 For £0.50	78L08 10 For £2.70
LM324 10 For £2.30	TL072 10 For £3.80	BC546 10 For £0.75	LM317T 10 For £3.45
LM358 10 For £1.75	TL074 10 For £3.80	BD140 10 For £2.80	LM723 10 For £4.15
LM386 10 For £7.50	TL082 10 For £2.76	BS107 10 For £2.50	79M12 10 For £1.50
LM741 10 For £1.90	Z8530 10 For £28.00	TIP32A 10 For £2.80	
LM748 10 For £5.20	2N3055 10 For £7.90		

Valid until 01.02.2000 or wsl

**SSAE for a bigger list of 10-4 offers of other components**

**New items special 1 off pricing for G-QRP Club Members:-**

2SC1971 Each £3.20 2SC1972 Each £4.10

FILTERS:- CFJ455K5 Each £14.06 CFJ455K8 Each £15.10 CFM455J1 Ea £9.70

CFW455F Each £2.25 CFW455HT Ea. £2.25 CFU455E2 Each £1.90 CFU455F2 Ea £1.90

**Post & Packing £1 UK (Export at cost) on items for any order from above list. NO VAT.**

**Prepaid By post- J.A.B Electronic Components. PO Box 5774, Birmingham. B44 8PJ**

# ANTENNAS - ANECDOTES - AWARDS

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

## THE MOAJL COMPACT 5 BANDER

M.A. Bales, 137 Heron Way, Upminster, Essex, RM14 1EE .

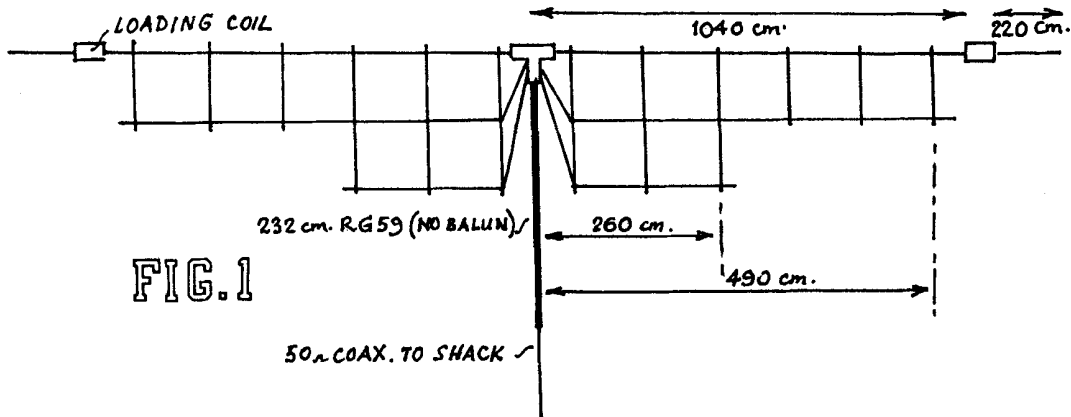


FIG. 1

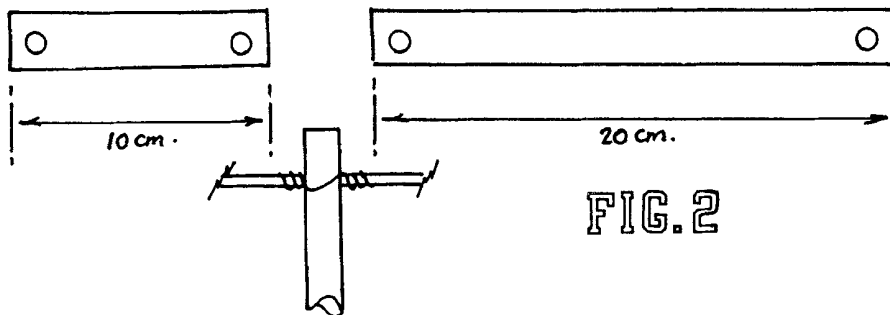


FIG. 2

This antenna was developed to allow 5-band operation with no ATU. Owing to space limitations the flat top is only 15m long, the ends forming an inverted U. It is a nest of dipoles with the wires spaced to give minimum interaction; wire lengths are not what you might expect. The top wire uses loading coils and wires to allow 80m operation, the coils acting as isolating chokes on 40m. Experiment with coil size to get the right inductance for your particular site. The top wire also resonates near 15m and the quarter wave of 75 ohm co-ax transforms the impedance for this band. The remaining wires cover 20m and 10m. The spacers are made from plastic A4 size paper binding strips (Fig 2). Make the wires 10% longer initially, then adjust to resonance by bending the wire back on itself. Adjust the 10m wire first, then work down to the 80m wire as this provides minimum interaction between wires. In my model I achieved an SWR of 1.2-1 or better over the CW portion of all the bands covered.

The WARC bands could also be covered by using my T-match ATU, but the losses were obviously somewhat higher.

++ W2XM ,Hints & Kinks For The Radio Amateur p7-25.

+++ GONEZ, SPRAT 68, pl4.

#### THE G3ESP 3.5 TO 28 MHZ SINGLE FEEDER ANTENNA SYSTEM

Having got hold of a Kenwood RS50 with an automatic ATU I set about developing a single co-axial feeder antenna system for all HF bands. This is shown in Fig 3. Wire a is approximately 40m long, providing a half wave at 80m, approximately three half waves at 30m. five half waves on 16m and seven half waves on 12m. With a little pruning this proved to be the case and the automatic ATU worked nicely. A half wave on 40m is approximately three half waves on 15m, so a suitable wire, wire b, was connected in parallel with the first wire. For 20 metres a third half wave was connected in parallel with the first two (wire c). There was then an unexpected bonus. With wires a,b, and c in position and trimmed, it was found that the combination loaded up nicely on 10m with no need to add a fourth wire. My plot of land is small, so the longer wires had to be dropped from the masts as shown.

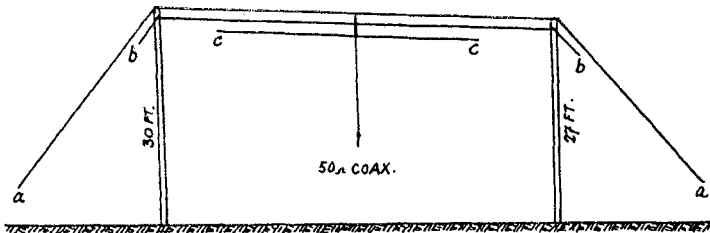


Fig. 3.

#### HOW TO GET FIVE WATTS FROM A TS 50 WITHOUT INTERNAL MODIFICATIONS

W. Farrar, G3ESP, 1 Barnsley Road, Ackworth, WF7 7ES.

With the normally used 13.8V supply the TS 50 will not go below 10 watt output. My Watson psu has variable output, however, and by adjusting the TS 50 to its 10W setting and then dropping the supply voltage to 11V the output comes down to 5W. But do not try milliwatting - anything lower than 11V and the rig stops working. ( Many other commercial rigs can be brought down to real QRP levles by dropping the supply voltage by a couple of volts. Ed.)

IF NOBODY IS THERE YOU CANNOT HEAR THEM ! Call CQ on the QRP frequencies regularly to let others know you are active. If we do not use our frequencies regularly others will.

## AWARD NEWS

QRP MASTER. Congratulatis to the following on being admitted to the Worshipful Company. HB9BQB, MoAVW, G3LSW, and DL7GK. One of the biggest intakes we have had for a long time. Are YOU working towards becoming a Master ? With perseverance any Member can do it.

QRP COUNTRIES. 75 G3LSW,G3ZNR, HB9BQB, MoAVW. 25 DJ3LR.

WORKED G QRP CLUB. 480 GM3RKO, 440 G3FCK, 320 G3ZHE, 200 GoEYX, 180 HB9BQB, 140 DL1HTX, DJ3LR,60 MoAVW.DL7GK,20 G4WQO

TWO-WAY QRP. 80 GM30XX (Here he comes again !), 60 G3DNF (Congrats Mr Chairman), 30 MoAVW, HB9BQB, 20 DJ3LR.

Congratulations to all the above on their excellent QRP work.

## TWO ANTENNAS CAN SOMETIMES BE BETTER THAN ONE !

R.van der Zaal, PA9RZ (ex-PA3BHK),Parklaan 89, 2141 ED Sassenheim.

(Besides being a GQRP C Member Robert is Chairman ,Benelux QRP Club.)

Until recently I used two doublet antennas , one 120 ft long for the lf bands and one 26 ft long for the hf bands. The shorter doublet is hung a few feet below the longer one, and both are fed via slotted ribbon feeder. The one snag was that the shorter, antenna gave very poor performance to the USA. To overcome this I modified the Z-match used with the lf antenna to cover the hf bands as well, and found my performance to the west and east grearly improved.The short doublet gives me areas at rightangles to the run of the antennas and the long doublet gives me good end-fire coverage . If you use half wave dipoles, you can get the same result by using two erected at rightangles to each other.

## HAS THE NEW SUNSPOT CYCLE SUDDENLY STARTED TO TAKE OFF ??

Over the last few weeks there has been a definite upturn in conditions with 10 metres open on most days and DX being workable on most bands (one nice surprise was on 7 MHz when a W1 came back to our 3 watt tail-end call), but working Ws and Asiatics on 28 MHz was even more significant. Hopefully this will be a good winter with lots of interesting stuff to work, particularly on the higher bands. For those new to QRP and looking for DX these bands are the place to try. But do not neglect the QRP frequencies on the higher bands. THE thrill in QRP is two-way QRP DX, and it is most often found around 60 KHz up on the hf bands. There is also the very important need to keep our QRP frequencies active to avoid encroachment by users of other powers and modes. If we are regularly active on the frequencies internationally agreed between QRP Clubs world-wide then we can legitimately complain of unnecessary interference from others, but if we only rarely use these frequencies our case for complaint becomes very weak indeed . So this is an area where the protection of our frequencies lies in the hands of individual members, not the Club management. Only by regular on-the-air activity as individuals can we show the world that QRP is a live and ever growing force in the amateur radio movement. Now that the sunspots are showing greater activity let us all do the same. See you all 60 KHz up !

## FROM THE MEMBERSHIP SECRETARY - SUBSCRIPTIONS 2000

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

Tel:- 01422-365025. Email:- g0bxo@BTinternet.com

Subscriptions for the year 2000 are now due. Please see the centre pages of this issue of SPRAT for details of methods of payment.

I can accept payment for more than one year at a time. If you wish to do this, please show clearly how many years you are paying for.

### STANDING ORDER PAYMENT

IF YOU ARE A UK MEMBER AND DO NOT ALREADY PAY BY STANDING ORDER, PLEASE CONSIDER DOING SO IN FUTURE. THIS METHOD OF PAYMENT IS THE CHEAPEST FOR THE CLUB AND IS THE EASIEST FOR US TO PROCESS.

A STANDING ORDER MANDATE IS INCLUDED IN THE CENTRE PAGES OF THIS ISSUE OF SPRAT.

### The Epiphyte 3 in the UK

Derry, VE7QK from Vancouver, BC brought an Epiphyte-3 80M SSB transceiver with him on a three-week visit to the UK in October. Prior to attending the Mini-Convention he gave a talk and demonstration to the Cambridge and District ARC, which hopefully has inspired some of its members to sample the joys of home construction and QRP operation. In Rochdale from the QTH of G3RJV during the "rare quiet moments", he was able to have some enjoyable contacts with a number UK and Continental stations - the most distant being S57RTH in Slovenia. But the highlight was a call from Roger, G0AOZ near Oxford. He had read of Roger's success using a modified Epiphyte - over 40 countries - in George's recent QRP page in RadCom and it was a delight to hear this potent signal for himself.

Stand-by for the EP3 in a coming issue of SPRAT.....

### The G3YCC QRP WEBPAGE

Is now located at : <http://www.g3ycc.karoo.net>

### Missing from the Member's Handbook:

DL9MTG Heidi G-QRP-C 8520 and DL3OCG Florian G-QRP-C 8521

### Two Way QRP QSL Labels and Blank G-QRP QSL Cards

**QRP Labels:** Black Lettering on Gold with Club Logo : 200 labels £2. Post inc.

**Blank QSL Cards:** You complete your address and call. Blue lettering on white card, 5.5" x 3.5". 100 cards £4. Post inc. Sample from : M.L. Prickett [Max] G3BSK, 260 Haslucks Green Road, Solihull, West Midlands. B90 2LR.

Cheques: "M.L. Prickett" [The G QRP Club benefits from each order]

## N.B.T.V.A

The Narrow Bandwidth TV Association (founded in 1975) is dedicated to low definition and mechanical forms of ATV and introduces radio amateurs to TV at an inexpensive level based on home construction. NBTVA should not be confused with SSTV which produces still pictures at a much higher definition. As TV base bandwidth is only about 7kHz recording of signals on mini cassette is easily achieved. A quarterly 12 page newsletter is produced and an annual exhibition is held in April/May in the East Midlands. If you would like to join, send a crossed cheque / postal order for £4 (or £3 plus a recent SPRAT wrapper) to Dave Gentle, G4RVI, 1 Sunny Hill, Milford, Derbys. DE56 0QR, payable to "NBTVA"

# COMMUNICATIONS AND CONTESTS

**Peter Barville G3XJS, 40 Watchet Lane, Holmer Green,  
High Wycombe, Bucks HP15 6UG.**

**E-mail: peter@barville.freemove.co.uk Packet: g3xjs@gb7avm**

My apologies that the wrong email address appeared at the top of this column in the last issue. I hope the correct information is at the top of the page this time, Hi. The Website address (<http://www.barville.freemove.co.uk>) quoted was correct.

## WINTER SPORTS

It's that time of year again, and (as I write this) hf conditions are really buzzing. Time will tell, but things may not get much better than this, and so I suggest you make the most of this opportunity to work plenty of overseas members, and 2-way QRP dx. It's also an ideal opportunity to put those under-used WARC bands to good use, for a change. Back in 1997 (SPRAT 91), I tried to address the problem of getting some agreement over the choice of suitable QRP frequencies for the WARC bands. Different QRP organisations around the globe quoted different frequencies (and still do!), making it sometimes difficult to find other QRP stations on those bands. After asking for input from members, we came up with the following suggested meeting places:

	<b>30m</b>	<b>17m</b>	<b>12m</b>
<b>cw</b>	10116 (10136 UK Novices)	18086	24906
<b>ssb</b>		18130	24950

These bands really are ideal for QRP, so why not make good use of them during Winter Sports, and call CQ QRP on (and around) the above frequencies. In addition, use 28060 and help keep the CBers away - have you listened there recently? Logs to me by 7th February - the G4DQP Trophy goes to the most outstanding entry.

## SOMERSET HOMEBREW CONTEST

This deserves to be one of the most popular events in the QRP Calendar, with the chance of winning a £50 voucher to be exchanged towards any current Walford Electronics product. It is also one of the few which actively promotes the use of homebrew equipment. The rules this year are very similar to previous years, but with one or two changes:

1. The Contest is open to all single operator QRP stations using homebrew equipment. Either Tx or Rx (or both) must be home-made, but it is not necessary to have built the equipment yourself.
2. Activity: around the normal QRP frequencies on 80m and 40m only. Any mode is permitted, and cross mode contacts are allowed. Any station may be claimed only once per band.
3. When: between 0900z and 1200z on Sunday March 26th.
4. Call: "CQ HBC Contest" (ssb) or "CQ HBC Test" (cw).
5. Exchange: RST, SC serial (you must start with any random serial number of your choice, not less than 100), Power. (eg 579/SC231/3W). Stations not in the Contest can send any serial number (eg 579/001/2W).
6. Scoring:

	<b>QRP/QRP</b>	<b>QRP/QRO</b>
Points	5	1

The final score is the total number of points (there are no multipliers), BUT deduct 25 points from your total if you did not build either the Tx or Rx yourself.

Entries by 30 April to G3XJS, with log sheets showing times, stations worked, reports sent/received, and points claimed. Please supply details of equipment used, power, and antenna(s), together with a declaration that your station was operated in accordance with the rules. In the event of a tie, the winner will be drawn from a hat.

### O QRP CONTEST

The 7th O QRP Contest will take place 1st - 2nd January (rules available from G3XJS, please). Coincidentally, the AGCW QRP Winter Contest takes place during the same weekend, and so it looks like being a busy weekend for QRP. The 1st January is also, of course, the last day of Winter Sports, and I suspect most of us would prefer these popular events not to share the same dates!

### G QRP CLUB Y2K CONTEST - Important Changes

One or two suggestions have been made, following the publication in SPRAT 100 of the Contest details, and so here are some slight 'tweaks' to the rules:

1. Perhaps I didn't make it clear, but the Contest will run between 1st January 2000, and 31st December 2000.
2. Only qso's where name and qth has been exchanged will be permitted. BUT qso's during specialist QRP contests (eg WS, Somerset HBC, O QRP, etc) **WILL** be permitted.
3. Each station may only be worked once per day.
4. Amplitude modulation is also a permitted mode.
5. 24 QRP/QRP qso's + 38 member QRP/QRP qso's x 20 QRP/QRP countries is not 2000 points, but (of course) 4000 points. Similarly, I'm afraid my maths in the other two examples was out by a factor of 2! You work it out ..

### CZEBRIS 2000

1. 1600z Feb 25th to 2359z Feb 27th
2. CW only, on 3560, 7030, 14060, 21060, 28060kHz (all +/-)
3. Power not to exceed 5 watts O/P. Stations unable to measure O/P can calculate using half their DC input (eg 10W DC I/P = 5W O/P).
4. Call: "CQ QRP".
5. Exchange: RST/Power/Name
6. Scoring: Stations may only be worked once per band.  
Only QRP/QRP contacts may be counted.

Your Location

QSO with QRP station in:

	UK	OK/OM Eu	Non-Eu	
UK	2	4	2	3
OK/OM	4	2	2	3
Eu	4	4	1	2
Non-Eu	4	4	2	1

No multipliers, final score is total number of points scored.

7. Logs: Separate sheets for each band showing (for each qso) date, time, call sign,

exchanges (rst/power/name) sent/received. Also include a summary sheet showing your name, callsign, claimed score for each band, and brief details of your station.

8. UK Logs to G3XJS. All other logs to OK1CZ, P Doudera, U1 Batterie 1, 16200 Praha 6, Czech Republic. All logs to be received by 17th April.

Please give this event your support - the number of entries for the last couple of years has been very low.

### 16th YEOVIL QRP CONVENTION

Once again 'the team' are putting together the plans for the next Convention, and FunRun. The Convention will be held at The Digby Hall, Hound Street, Sherborne, Dorset on Sunday April 16th 2000 (commencing 10am). The Construction Challenge (devised by last year's winner, G3KLT) is to construct the most efficient 1 watt DC input power 14060kHz transmitter, complete with low-pass filter (as would be used when the tx is connected to an antenna). The Yeovil Club will provide a 12 volt power supply (via DC Ammeter) to enable you to set the input power to 1 watt. The output power will then be measured across a 50 ohm dummy load. Please supply a circuit diagram of your entry.

### 16th YEOVIL FUNRUN RULES

Monday 3rd April to Thursday 6th April

3560 and 7030kHz, both +/-

Bonus Stations: GB2LOW (Op G3GC) 3558 and 7028 +/- 2kHz

G4EDG 3563 and 7023 +/- 2kHz

G0WMJ 3553 and 7033 +/- 2kHz

Call: "CQ FR"

Contacts to be between QRP stations with a maximum 5 watts output. However, contacts with qro stations are permitted but with a reduced points value (see below).

Stations may only be worked once each evening on each band. FunRun stations will be operating each evening randomly for one hour on each band.

Scoring: Each qso with another QRP station scores 10 points.  
Each qso with any FR Bonus Station scores 25 points.  
Each qso with a qro station scores 3 points.

Exchange: rst, serial number (see below), output power and name.

Serial number: The three figure number must start at any random number of your choice not less than 100, and must then be incremented by one for each qso throughout the WHOLE of the Contest. However, the three Bonus Stations listed above will all commence with 001.

Entry Sheets: Separate log sheets for each band, with sub-totals for each evening, preferably in the RSGB format plus a separate (signed) RSGB style cover sheet stating rig, power output and aerial. Entries to G W Davis, G3ICO, Broadview, East Lanes, Mudford, Yeovil, BA21 5SP to arrive not later than Thursday 13th April 2000.

Certificates will be awarded for the highest score for **any three evenings** out of the four, on each band and also for the highest overall score for **any three evenings** on both bands. These evenings do not necessarily have to be the same on 80m as 40m.

A certificate will also be awarded to the station consistently using the



lowest power. All certificates to be awarded at the Convention.  
SWL reports will be appreciated, and a certificate awarded to the listener with the most comprehensive report.

Further details from (and comments to) G3ICO (QTHR) Tel: 01935 425669

May I wish you all a very enjoyable Christmas, and Happy New Millennium Year!  
The deadline for SPRAT 102 is the beginning of February - in the meantime have plenty of QRP FUN. See you (I hope) during Winter Sports, and good luck in the Y2K Contest.

## 2000 QRP Calendar

<b>1 Jan -31</b>	<b>Dec G-QRP Y2K Contest</b>
<b>1 Jan</b>	<b>Last Day of Winter Sports</b>
<b>1 Jan</b>	<b>0900-1200z AGCW Happy New Year Contest</b>
<b>1-2 Jan</b>	<b>1500-1500z AGCW Winter Contest</b>
<b>1-2 Jan</b>	<b>1500-1500z O QRP Contest</b>
<b>5 Feb</b>	<b>1600-1900z AGCW HTP (Straight Key) Party</b>
<b>7 Feb</b>	<b>Last Day for Winter Sports logs to G3XJS</b>
<b>15 Feb</b>	<b>Last Day for Chelmsley logs to G3XJS</b>
<b>25-27 Feb</b>	<b>1500-2359z CZEBRIS 99</b>
<b>26 Mar</b>	<b>0900-1200z Somerset Homebrew Contest</b>
<b>3-6 Apr</b>	<b>1900-2100z each day Yeovil Fun Run</b>
<b>15-16 Apr</b>	<b>EA QRP Contest.</b>
<b>16 Apr</b>	<b>Yeovil QRP Convention</b>
<b>17 Apr</b>	<b>Last Day for CZEBRIS logs to G3XJS and OK1CZ</b>
<b>24 Apr (every Easter Monday)</b>	<b>1400-2000z Slovak Low Power Spring Sprint</b>
<b>1 May</b>	<b>1300-1900z AGCW QRP/QRP Party</b>
<b>17 Jun</b>	<b>IARU Region 1 International QRP Day Contest</b>
<b>1-2 Jul</b>	<b>1500-1500z Original QRP Contest</b>
<b>15-16 Jul</b>	<b>1500-1500z AGCW Summer Contest</b>
<b>17 Jul</b>	<b>Last Day for International QRP Day logs to G3XJS</b>
<b>2 Sep</b>	<b>1300-1600z AGCW HTP (Straight Key) Party</b>
<b>19 Nov</b>	<b>HOT Party (DJ7ST)</b>
<b>26 Dec - 1 Jan</b>	<b>G-QRP WINTER SPORTS</b>
<b>30-31 Dec</b>	<b>1500-1500z Original QRP Contest</b>

Please advise G3XJS of any errors, or omissions.

### **G QRP CLUB MORSE TRAINING TAPES**

The address for G3VTT given in the Members Handbook is incorrect  
The correct address is : Colin Turner G3VTT, Borkum Riff, 5 Hope Terrace  
Lower Higham, ROCHESTER, Kent. ME3 7LH

## THE 1-VOLT CHALLENGE - A FOUR DAYS IN MAY CONSTRUCTION CONTEST

A Challenge from Ken Evans, W4DU, inspired by Wayne Burdick, N6KR

Each year as part of the FDIM event at Dayton a construction contest is held. If UK members would like to submit a design, G3RJV will be pleased to take the prototype to enter the contest at Dayton.

This idea comes to us from **Wayne Burdick, N6KR**, the innovator (perpetrator?) of the famous 2N2222 challenge. Here is the "1 volt challenge" in his words:

"Just when we thought we'd all been very clever designing complete transceivers using only 2N2222 transistors, along comes another constraint. Can you design a transceiver that runs on as low as 1.0 volt?"

Believe it or not, you can design oscillators, amplifiers, mixers, voltage regulators and even keyers using very low supply voltages. We use higher voltages because it simplifies bias arrangements, reduces I<sup>2</sup>R losses over long wire runs, and increases dynamic range with typical low-power semiconductor devices. But with careful selection of components you can achieve respectable performance at 1 volt."

### So here's The 1-Volt Challenge:

Design a transceiver of any kind that will function satisfactorily over a range of about 1.0 to 1.6 volts. (This is about the working range of a single alkaline cell, i.e. AAA, AA, C, D.) We're specifically suggesting transceivers, not just receivers or transmitters, because it will get us thinking about both low-voltage radio \*and\* control circuits.

#### There are only two rules:

1. No ICs. Since the emphasis is on exploring low-voltage design techniques, you can use any transistor types you'd like but NO ICs. ICs hide the design details, making it hard to see what you did to get your design working on low voltage. Also, we hope that the designs will work with a variety of available transistors. Low-voltage ICs may be harder for the average builder to obtain.
2. No DC-to-DC converters. You can't simply step up the single cell's output to a higher voltage. That's not in the spirit of the contest!

**Hints:** #1: Use inductors and transformers. #2: For higher dynamic range, increase the \*current\*, not the voltage. #3: Use low-threshold devices (like bipolar transistors). There are some JFETs with very low pinch-off that might be useful, such as the J210. The average 2N7000 is pretty useless since it can take up to 3V at the gate to turn it on.

Extra Credit: Design a keyer that runs from as low as 1V, too. (Big hint: you don't need a microprocessor!) ICs are allowed for the keyer, but no DC-to-DC converters.

Good luck. 0.73 [the low-voltage salutation!] Wayne"

### HOW TO ENTER [see note above for those not attending Dayton]

Submit your design (schematic) to me by April 15, 2000 and you bring a working prototype with you to Dayton. QRP ARCI will award prizes for the Best Design and Best Construction and will ask the contestants that their designs be published in a future edition of the QRP Quarterly. Decision of the FDIM judges will be final.

Ken Evans, W4DU, 848 Valbrook Court. Atlanta, GA 30047. USA. w4du@bellsouth.net



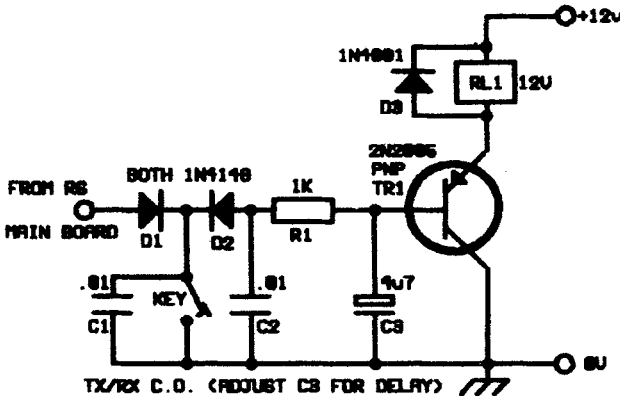
### Well Done !

Peter Haplin, PE1MHO has just received his 6m DXCC certificate. He has worked 105 entities, with 101 confirmed with QRP.

**NOVICE NEWS     Steve Ortmayer G4RAW**  
**14 The Crescent, Hipperholme, Halifax. HX3 8NQ. Tel: 01422-203062**

No news from members this time. I was hoping to hear about your successes on the new Novice Bands.

Ron 2E0AIS was hoping to be QRV on the new phone allocation on 80m. Ron needs an antenna that is not too obvious. I have used fine PTFE insulated wire to good effect. I have some dark blue coloured which is very difficult to see when it is up in the air. 66 ft fed against a 66 ft counterpoise made a good 80m skywire for me and it worked well with 2 watts.



**Change-over Circuit  
 For the G3WCE  
 "Easy Build  
 80 Transceiver"**

I have made the "Easy Build 80 Transceiver" by G3WCE in RadCom. It is possible to use a transistor to switch the rig from TX to RX. Check your relay does not already have an internal diode. Try reversing 12v to the coil and if it only works one way, it has a diode inside, across the coil.

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

**INFORMATION REQUIRED:** I have recently acquired an unfinished project from a silent key consisting of the following Jandek kits. Unfortunately no information on them could be found. Please can anyone help: JD002-C, LPF CW; JD002-S, LPF SSB; JD003, Product Detector; JD007-160, Double tuned front end; JD008, PSU; JD011, VFO T/R Switch; JD012, Sidetone & AF Mute; JD014 RIT; John Teed, G3WWT QTHR, 01784 458583.

**WANTED:** Plessey SL6270 i.c. to repair my QRP radio. ON9CAU, Viskensdelle 3, 3090 Overijse, Belgium (mike.whelan@skynet.be)

**WANTED:** KR1B/603 Keyer Paddle for Corsair II. Peter, 2E0ARF. Tel: 0161-320-8553 [Manchester]

G0CJM is on the lookout for a cheap cw tx/rx. Offers please to g0cjm@lineone.net

## SSB COLUMN : Dick Pascoe GØBPS

Seaview House, Crete Road East, Folkestone. CT18 7EG. Tel: 01303 891106

Email : Dick@bps.demon.co.uk.

via packet to GB7RMS

It is still very quiet on the SSB news front we could do with lots more letters on your efforts on the bands. The 'new boy' to SSB Dick GØRXH tells me of his exploits.

He only joined in February but has bagged such delights as T95A, UX0LZ, LA6REA, ON4CDZ, DL1PT with several UK amateurs as well and a couple of 2 way QRP contacts with G4MUI and GW3PEX. His ventures onto Top Band brought forth G4DAQ, G0EYZ and G0TBS all two way QRP.

Please note the new email address at the head of the column and let me have details of what you have been up to over the winter

### 'Introducing QRP' by Dick Pascoe GØBPS

An introduction into the hobby from the basics onwards including a history of the G-QRP club and its predecessor. Just £6.95 plus £1.00 p/p direct from Dick Pascoe, Seaview, Crete Road East. Folkestone. CT18 7EG

## SPRAT - The CD ROM

### ISSUES 1 - 100 on CD ROM

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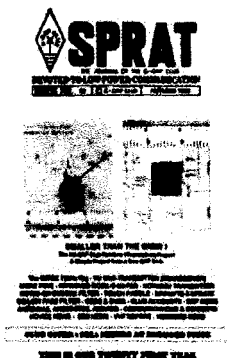
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# MEMBERS' NEWS



by **Chris Page G4BUE**

*Highcroft Farmhouse, Gay Street,  
Pulborough, West Sussex RH20 2HJ.*

*Tel: 01798 815711 Fax: 01798 813054*

*E-mail: g4bue@infirnet.co.uk*

*Packet: G3B7DXS on UK DX PacketCluster*

**G3NRW** has taken over the Data column in *RadCom* and has promised to mention my observations on Feld-Hell in his first column in December. Ian says "I'll also be glad to include anything else you send me about SPRAT, QRP, data comms, etc - keep it coming!". Ian can be reached at: A I H Wade, 7 Daubeney Cl., Harlington, Dunstable, LU5 6NF or via e-mail <ian@dowrmain.demon.co.uk>.

**GM3MXN** confirms that Hellschreiber Mode is the main culprit in causing QRM to 14060kHz as he has been monitoring using the 'hell' program downloaded from the Internet. Tom says "It is easy to run and I have even called the 'hell intruders' on CW when they had finished their QSO, asking them to QSY off the QRP frequency. I can't say whether it is doing any good but it's better than sitting back and not doing anything! The program writer is **IZ8BLY** and I e-mailed him about the programme. He replied that they know of the problem with QRP operators and have suggested to Hellraisers not to operate below 14063.5kHz as they don't want to disturb QRP operations and don't consider that they are out of the data mode section as the mode is a CW mode, an on/off modulated carrier! I will leave our members to decide if it's a CW mode!".

**G4JBL** took his Hands GQ40 on holiday to France at St Hilaire de Riez in May and August and used a W3EDP strung between trees in a farmer's field to be QRV for a couple

of hours each morning. Cedric's best DX among the 20 members worked was **GM3MXN** and **EA3EGV**. He uses the field adjacent to his holiday flat as the building is made of steel and concrete and is no good for radio. **GWØLBI** has worked 22 DXCC (best is UA) on 160m with one watt and **VE1ZZ** twice with 5w, to a 60m end fed 50ft at its highest point. Leighton's 160m QRP DXCC is 47.

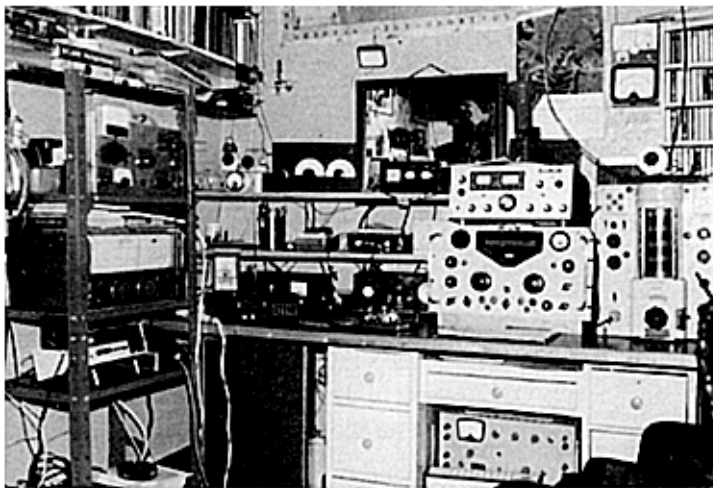
**MØAVN** has only been QRV since June with a Norcal 20 and is still feeling his way around 20m. Alan says "Just been reading your first two columns in *SPRAT* 100 and I think I've got this right; you are discussing all that rhythmic crackly, buzzing noise I can hear on 14062-3 (usually) but quite often down to 14059. I'm glad to read that old, wiser and more experienced heads than mine are on to the problem and well done to you all!". **G3XJS** mentions another type of QRM on 14060kHz, the pile-up for 3CØR spreading up to 14065kHz. Peter wonders why the 3CØR operators allow this when they are transmitting on 14025kHz and other DXpeditioners (**G3TXF** and **G3SXW** come to mind) only allow the pile-up to spread a few kHz at most. Peter says he shouldn't really complain about them as he QSO'd 3CØR on 15m with 3 watts.

The photograph below shows **CT1ETT** and **G3KJX** in Vilamoura, Algarve, last July when Brian was on holiday in Portugal. Roger's web site (<<http://www.qsl.net/ct1ett/>>) has details of his QRP station. **MØAWN** has now gone totally QRP with his Howes DC RX and MFJ9040 and is nearing the half-way stage building a GQ PLUS. Chris says "As a relatively newcomer to QRP (about two years) I cannot express the sheer joy and pleasure this aspect of the hobby has given me. My con-



struction skills are minimal (especially the theory) but I would say to anyone toying with the idea of making a kit of any type 'Go for it'. The help I have received from Sheldon Hands and many others in the Club has been outstanding and thank you one and all".

**MØBIN** got his K2 working on 10 September and made his first QSO with **3B8CF**. Charles was rather pleased with that as you can imagine! **G4DMH** says the K2 "is a little cracker" and "the beauty of the rig is that it combines superb RF performance with the bells and whistles from micro-controllers (firmware) that you can use to set it all up to your taste and make QSOs whilst retaining modest power consumption". Malcolm continues "the receiver is very stable and sensitive. The filters can be set up, four for CW and four for SSB, at any bandwidth from 2.5kHz down to 100Hz or so, BFO settings to suit each filter according to the receiver tone that you have chosen from 400 to 800Hz, with reverse CW settings also user defined".



After many rebuilds, **GWØVMR**'s shack is now "in a state to show people", (see photograph above) and "all the gear (including 6m and 70cm FM) that produces RF is home made". Pat "loves the old valve receivers" and uses a RA17 as the main station receiver. His best DX this year is **9M2ZA** on 15m with 1W and a double extended zepp antenna. **DJØPJ** has been QRV from FY again and **G3XJS** QSO'd Dave on 2 October on 28060kHz, and has also been QRV on 20 and 17m. **PA9RZ** has new antennas - a GP for 6

through 20m, a W3DZZ for 80 and 40m, a vertical for VHF/UHF and a halo for 6m. Robert says the GP is much better for working DX than the dipoles he had before: 9J, 9M, A6, HI, KL7, P4, PJ2, V2 and VU have all been worked on 10 through 17m with 3w.



**PE1MHO** writes in response to my mention of 6m in the SPRAT 100 column. Pete says "I have just received my 6m mixed-mode

DXCC certificate (#247) and have 105 entities confirmed (101 using a maximum of 10W PEP or 5W CW). I've also got QRP WAC with two-way QRP. I think that it's getting a bit more difficult to get these sort of results now because most people can buy a rig with 6m built in. I started off with a PW Meon transverter with an old IC202 and a PA made with a single VN66AFD with 2.75W. I then moved up a scale by using another

Meon/VN66AFD with 4W output coupled to an IC730. It has taken me 11 years to get the DXCC together, but it goes to show that for sheer bangs-for-your-buck, *Nothing can touch Six*".

**G1HDQ** uses a very simple homebrew 6m AM (yes, Ancient Modulation!) transceiver with about 1W PEP output on 50930kHz, and a fully tunable receiver section. Kevin is also looking at homebrew SSB (DSB?) equipment for 6m and would like to see a lot more 6m QRP activity, particularly using simple home-

brew equipment of the type which has proved so effective on the lower bands. He says "I have been wondering for some time (a) whether any members would be interested in skeds etc as a means of generating activity, and (b) whether nominating QRP meeting frequencies for 6m might be a good idea?" Kevin suggests 50086kHz for CW, 50190kHz for SSB "and (maybe!) somewhere around 50950kHz for AM. The parts of the band where AM could be used without violating the band-plan appear to be 50930-51200 and 51600-51930kHz. I have left out FM because it's channelised into 20kHz channels and most people use 'black boxes' starting off on 51510kHz and QSYing from there.

**W5XE** wrote at the beginning of October "It is truly amazing what such a little amount of power will sound like and perform like. I have had the pleasure this past few days of running my 700 milliwatts and being asked to turn it down by the other station, in one case over a path of 850 miles, to 9 milliwatts and just this week to 3 milliwatts with the other station (**W5JAY** in Arkansas) running 1 milliwatt. 52 to 559 or better on all transmissions". Ray continues "Not sure what the next level will be, but it can't get more exciting (maybe it can?) than that. I don't know how so little a power level (fiery power I call it) can avoid getting lost in the coax!"

Still on the subject of very low power, **M0AWN** had a QSO on 2 October with **Mil, OM3FZ** in Kosice Slovak on 14060kHz and although his signal was a weak 339 a firm QSO was established. Chris says "I proudly announced my power level (3 watts) and nearly fell off my chair as he gave his ERP as 50mw! This has got the old grey matter working. How many times more power was I running in comparison and what is this power expressed as a fraction of a watt? Either way it just proves what can be done with so little!"

**AA5TB** went camping with his wife and three sons at Cleburne State Park near Fort Worth, Texas on 15 October. After the family were all asleep Steve set up his militarised **NORCAL 38S** (aka **PRC-38S**) at 3.5W and an end-fed half-wave wire antenna up about 2-3m in the short cedar trees and had several enjoyable 30m QSOs with other QRP stations underneath a Milky-way filled sky. He says, "I was operating by flashlight and noticed three raccoons scurrying near my feet. They made for more lively QSOs (and an occasional bad

fists). We pretty much had the park to ourselves and we had a very enjoyable time. It never ceases to amaze me how fun QRP is and operating portable has always been my favourite mode of QRP operating".

**GWOLBI** is the Editor of the GW QRP Club's quarterly newsletter *The Mighty Milliwatt* (see below). The Club was formed in 1994 to encourage low power operation in Wales, the annual subscription is £1 (Membership Secretary is **GW0JUF**, 8 Barry Rd, Pwllgwaun, Pontypridd, Mid Glamorgan) and the Club Web site is <[www.gwqrp.free-online.co.uk](http://www.gwqrp.free-online.co.uk)>. Leighton also produces a superb pamphlet *Why QRP* giving an excellent introduction to QRP and the benefits of using it. A SAE to Leighton (33 Nant Gwyn, Trelewis, Mid Glamorgan CF46 6DB) will bring you a copy and he encourages it to be photocopied and distributed to encourage more amateurs to try QRP.

## The Mighty Milliwatt

Y Miliwat Gadarn

Newsletter of the GW QRP Club - Llythyr Newyddion Cymdeithas QRP Cymru

Issue 4, Autumn 1999

The GW QRP Club on the Net: [www.gwqrp.free-online.co.uk](http://www.gwqrp.free-online.co.uk)



A complete QRP radio station all fitting neatly into a suitcase - the portable/holiday set up of KECH

### QRP from SV8/GW0VSW

Zakynthos Island  
by Carl Mason GW0VSW

Our holiday from Zakynthos Island was not intended to be a QRP operation as such, but what the hell, I decided to look up the Pwllgwaun, Mid Glamorgan, half-30m V and battery pack in the back of my car. I hope that it will be able to photograph from the island as SV8/GW0VSW.

After entering the island I left the apartment over Caerphilly. If I could erect the antenna and with typical Greek friendliness the go ahead was given.

Conditions were not so good on the bands during the daytime and appeared to be in the middle of the night. The SWP was brought in from the UK and reports of 850-230 were made on the 30m band. The SWP was changed however, in typical QRP fashion, a telephoto lens, a telephoto lens, and before the battery finally gave up the ghost.

on the signals, but soon realised he was in fact working the Salsan area and we exchanged 30m reports.

30m gave me my first QSO with France when I was 2300. Conditions were very good and I was able to make several contacts. My first contact was with G400, followed by G400, followed by G400, followed by G400.

### POWER OUTPUT USED

Power output varied depending on the battery state, but it was usually around 3W. The tuner worked well and I was able to get onto the 15, 17, 20, 30 and 40m bands with the antenna up at just about 7 metres.

20 metres was by far the best band during my two-week stay and I was able to make several contacts with G400, followed by G400, followed by G400.

My first contact was with G400, followed by G400, followed by G400.

### SUMMING UP

In the two weeks of my first QRP operation, 105 contacts were made with 25 countries using QRP. 22 countries were worked using QRP and 100 contacts were made using QRP and 100 contacts were made using QRP.

20 metres was by far the best band during my two-week stay and I was able to make several contacts with G400, followed by G400, followed by G400.

## YOUR CLUB NEEDS YOU!

TO HELP US FILL THE PAGES OF THE MIGHTY MILLIWATT SEND YOUR LETTERS AND ARTICLES TO GWOLBI. The Mighty Milliwatt is sent to members 4 times a year, in January, March, July and October. (If we have enough articles that fill)

That clears the files again. Please let me know how your autumn goes, by 20 February please. Finally, a very Happy Christmas and New Year, and as **G400** has written in the latest edition of *OT News* (journal of **RAOTA**), "let us hope that the new Millennium will see the return of common sense, courtesy, compassion and peace of mind to all".

**Rig Broken or needs alignment?**

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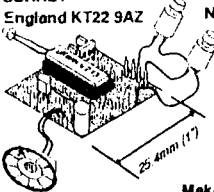
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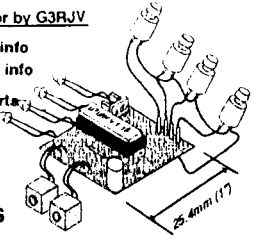
see March 96 RadCom for review of  $\mu$ Keyer by G3RJV

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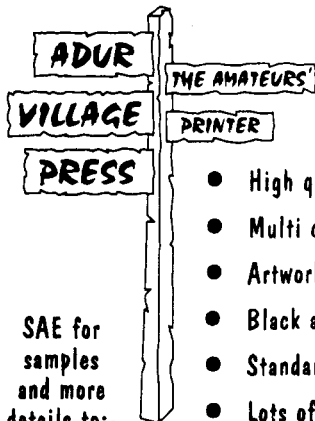
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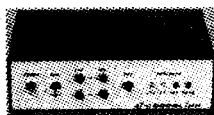
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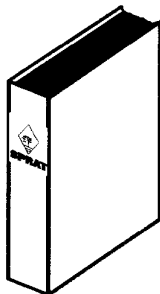
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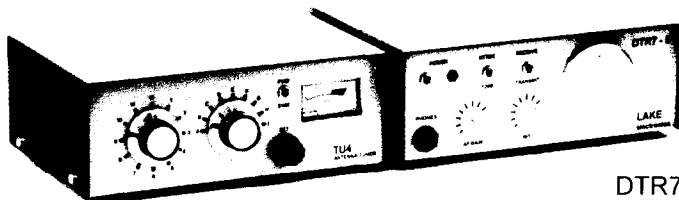
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