



# SPRAT

THE JOURNAL OF THE G-QRP CLUB  
DEVOTED TO LOW-POWER COMMUNICATION

ISSUE NR. 43    © G-QRP CLUB    SUMMER 1985



Chris (G4BUE) and Colin (G3VIT) at the Dayton Hamvention, Ohio.

THE G3YCC 80M TRANSCEIVER - 004 TRANSCEIVER - THE MICRON REVIEWED  
80M VMOS TRANSMITTER - HW8 TIP - RF RELAY DRIVER - ADDING READOUT  
THE SKELTON CONE REVISITED - SAVING SOLDERING IRONS - SMALL ADS  
MAKING TRANSFERS - TWO 2 METRE DIRECT CONVERSION RECEIVER CIRCUITS  
TWO BOOK REVIEWS - QRP NEWS - AWARDS - MEMBERSHIP NEWS .....

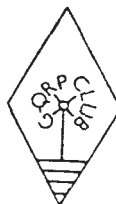
SPRAT NUMBER 43    SUMMER 1985

# 10TH YEAR

# JOURNAL OF THE G QRP CLUB



Rev. George Dobbs G3RJV



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DEAR MEMBER,

THE TIME FOR SPRAT HAS COME AROUND VERY QUICKLY THIS TIME. THIS ISSUE WILL ARRIVED A LITTLE LATE DUE TO VARIOUS CIRCUMSTANCES. CHRIS AWAY IN AMERICA, AND MY PRESSURE OF WORK INCLUDED.

ONCE AGAIN I ENJOYED MEETING MANY MEMBERS AT THE RSGB CONVENTION AND NOW LOOK FORWARD TO MEETING MORE AT THE G4BUE EVENT ON AUGUST 16TH.

I HAVE BEEN VERY PLEASED BY THE NUMBER OF MEMBERS APPEARING ON 80M ESPECIALLY LATE IN THE EVENINGS. PERHAPS SEE YOU ON 80 SOME NIGHT.

73 FER NW

G3RJV.

**QRP POWER LIMITS - A REMINDER:** As stated in SPRAT 36, the club is changing from INPUT POWER to OUTPUT POWER for the purposes of awards. Until December 31st 1985 members applying for awards may certify that their power did not exceed either (a) 5 watts DC input, (b) 3 watts RF output or (c) 5 watts DC input or 3 watts RF output (for those who change over measurement systems whilst working for an award). From January 1st 1986 the power input provision will be dropped, and only power output will be used. The SSB limit remains at 10 watts PEP.

## Subscriptions

Renewals (rates: £4.50 or \$10 US to Alan Lake, G4DVW, 7 Middleton Close, Nuthall, Nottingham, NG16 1BX. PLEASE QUOTE YOUR MEMBERSHIP NUMBER. Cheques: G QRP CLUB. A reminder should appear in membership number sequence on the address label of SPRAT. Please ignore the reminder if you have already paid. Overseas members might like to pay by direct transfer from their bank to: National Westminster Bank plc, Town Hall Square, Rochdale, Lancs, OL16 1LL. Account: G QRP CLUB. No: 04109546. Please inform G4DVW whenever such a transfer has been made.

THE G3YCC QSK TRANSCEIVER FOR 80M CW  
FRANK LEE                    G3YCC

Although many circuits have been printed for transceivers employing direct conversion receivers, very few are available for CW only, employing mixer type circuitry with IF filtering. The rig described takes this form and is the result of years of experimentation and adapting of circuits from various sources, including SPRAT.

Modular construction is used to allow ease of construction, testing and modification of circuits. Break (QSK) operation is employed with side-tone, and the rig can be used for any HF band. The RX alone would be a good project for a SWL. A minimum of test gear is required for setting up the rig, and for the sake of clarity the circuit is illustrated in small sections, rather than one complicated circuit diagram.

**CONSTRUCTION:**

Five printed circuit boards were used for the AF filter, RX strip, TX strip, change-over board and VFO. Whereas the first four utilise the principle of double sided board with one side as a ground plane and the reverse for tracks, the last one, (the VFO), uses single sided board with tracks uppermost, allowing it to be rigidly bolted to the cabinet for stability. The attenuator is self-supported behind the in/out switch. Veroboard is employed for the IRT circuitry, and side-tone oscillator, and could be adequately used for the change over module. The PA section of the TX board is etched on the top (ground plane) side of the laminated board.

**THE RECEIVER:**

The heart of this receiver, which has been used successfully on the 160, 20 and 80 metre bands, is the 9MHz crystal filter. An SSB filter was used because it was to hand, originating from frustrated attempts at the ZVC system. A CW filter would be an advantage if this mode is envisaged. Terminating resistors can be added directly adjacent to the input and output connections of the filter. AGC is not used in this circuit, neither is an 'S' meter fitted.

The resultant receiver performance is comparable to the excellent Argonaut rig. It is selective and sensitive, and is a joy to use. The -12dB attenuator is useful under QRM conditions, as is the audio filter. Both of these items can be switched in and out of the circuit. The bulk of the RX is on one PCB, with separate boards for the audio filter, IRT and attenuator. The antenna connection is via the back to back diode switch, commonly used in SPRAT. Some adjustment of the 100pF series capacitor to the antenna socket, to hit a compromise between adequate RX gain and loss of TX power, maybe necessary.

The IRT gives +-1.5KHz swing and again is modified from a SPRAT idea. Setting up of this circuit is dealt with separately. The 100 ohm resistor in the emitter of the AF pre-amp was found necessary to avoid over driving the LM380N amplifier, but may need experimentation for optimum results.

**THE VFO:**

A well tried circuit which gives excellent stability and tunes 5.5 - 5.4MHz if the CW portion only is required, or, as in the prototype for this version, 5.5 - 5.2MHz for all the 80 metre band, CW and SSB.

The varicap diode must be chosen with care, as many diodes tend to drift alarmingly. No doubt a pukka varicap would be preferable. but various surplus unmarked diodes were tried until a suitable one was found. This, along with the 5pF series capacitor, is mounted inside the screened VFO compartment, with the remainder of the IRT components mounted on a small square of veroboard, external to the VFO compartment. Good quality components are used for the variable capacitor, along with switchable slow motion drive and dial.

#### SIDE-TONE OSCILLATOR:

The 555 circuit has proved reliable in other projects, and the output goes direct to the phone socket. By altering the value of one resistor, the output tone can be adjusted to taste.

#### CHANGE-OVER BOARD:

The only component of note is the 68uF capacitor, which should be a 16V tantalum bead type, as electrolytics do not work well here in my experience. The delay can be adjusted over a reasonable range by the preset resistor.

The change-over relay can be mounted exterior of the PCB mounted on the cabinet, and switches the 12 volt to the transmit or receive boards. Note that the 12 volt supply remains on the RX pre-amp and AF amplifier continuously. There is no mechanical antenna change-over.

#### TRANSMITTER:

The transmitter can deliver 4 watts of RF to the antenna. The emitter resistor of the driver stage is adjusted for the required output. The SL series of ICs were bought from Messrs. Birkett of Lincoln as untested, but all appeared to function well. No doubt the newer in-line types, e.g. SL1600 series, can be used.

The mixer and amplifier stages up to the PA are aligned using an external RX, GDO and FET voltmeter (home made of course!), and the only adjustment to the Class A PA is to set the standing current to 400mA by the 47 ohm pre-set. A band pass double pi-network ensures a clean signal to the antenna.

The carrier oscillator could be switched out of circuit if required, and replaced with a DBM for SSB use, but this would also necessitate additional sideband filtering, and has not as yet been tried (only CW is used at G3YCC!). The construction of the transformer in the PA stage can be of various forms, including the use of twin holed ferrite formers, but the toroids mentioned work well. An adequate heat sink is required for the PA conducts a fair standing current during transmission periods.

#### SETTING UP:

The IRT is approximately adjusted by monitoring the voltage at the 27K resistor, and adjusting the variable resistors when the respective TX/RX voltages are applied until the two readings are equal, (approximately 2 volts). Finally the frequency in both modes is checked monitoring the VFO output with a frequency meter if available. Alternatively the TX/RX frequencies can be checked if an accurately calibrated external transceiver is available for the band, when the rig is complete.

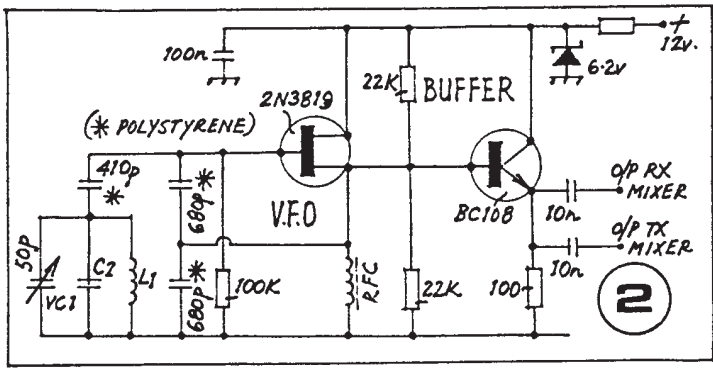
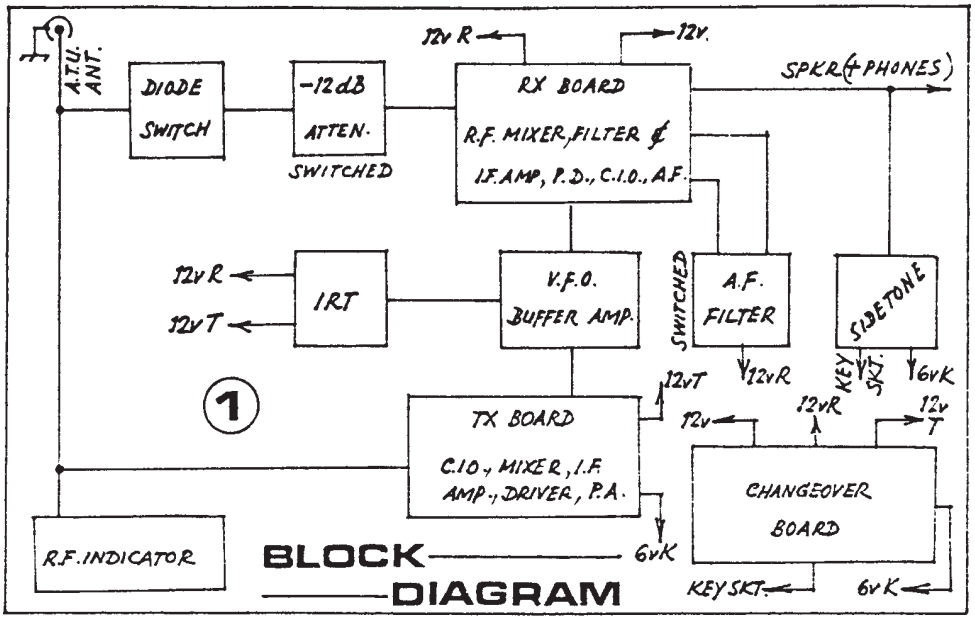
The PA has only one adjustment, the 47 ohm preset being set so that a standing current of 400mA passes under no drive conditions. The RX tuned circuits are peaked, either in the centre of the band, or at the favourite part of the band. One version of the RX utilised a panel mounted twin gang variable in parallel with the fixed capacitors of the tuned circuits to peak the RX front end (useful for 160 metres).

It is suggested that the VFO and RX circuits are made up first and tested. The AF filter and attenuator can be added later. The change-over board can be built and tested separately. The IRT section can be added when the RX is finished, and finally the TX board can be made up and tested.

#### RESULTS

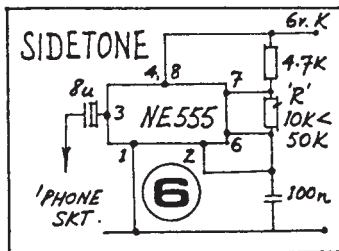
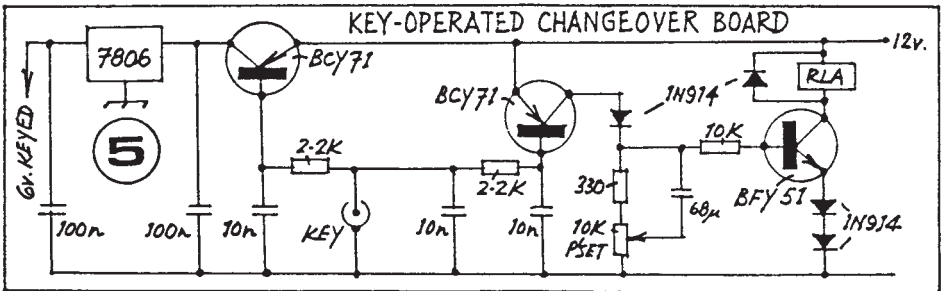
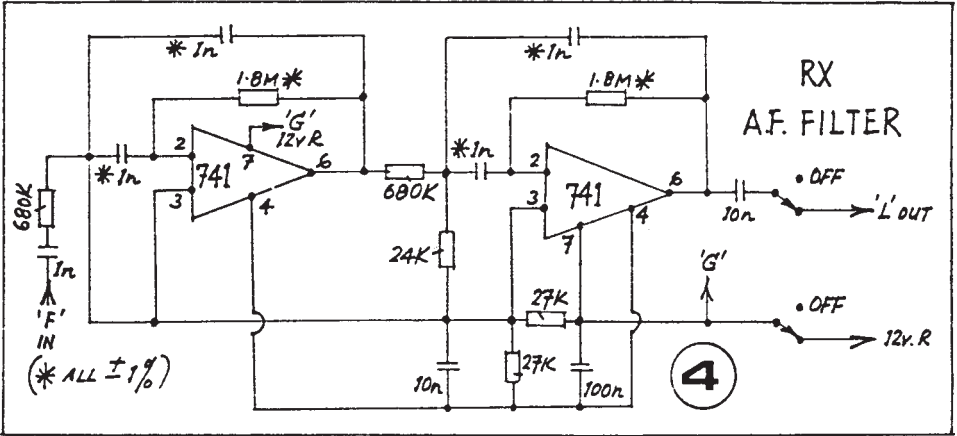
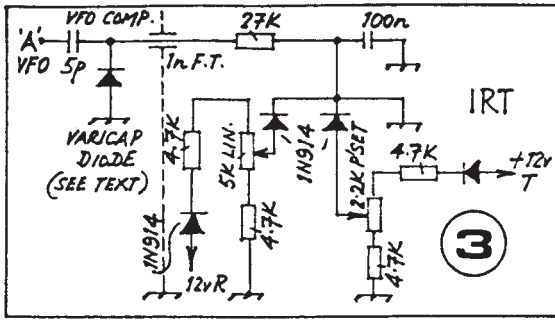
Although the circuitry is fairly straight forward, the rig works extremely well. The transmitter is stable and keys well, the side-tone gives a pleasant monitoring tone and good reports have been received from the usual European stations found on 80 metres.

The RX is excellent and is similar to the version which I described some time ago in SPRAT for 20 metres, and is featured in the G-QRP-CLUB Circuits Book. Additions and modifications are possible, and left to the

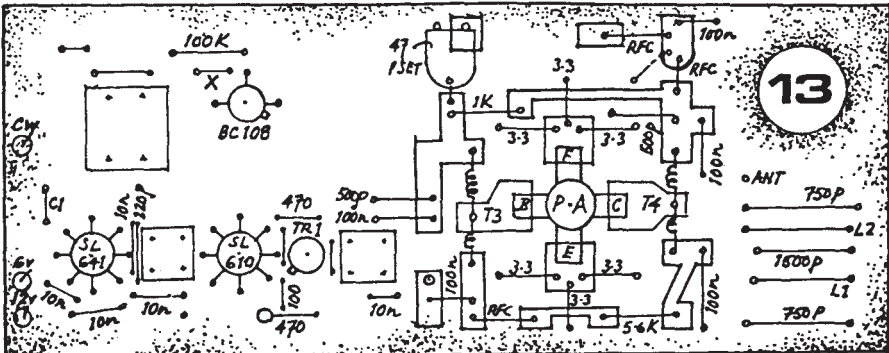
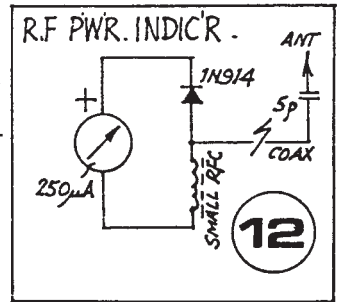
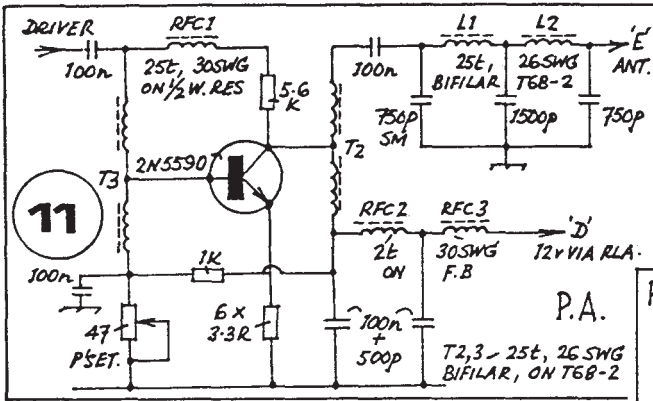
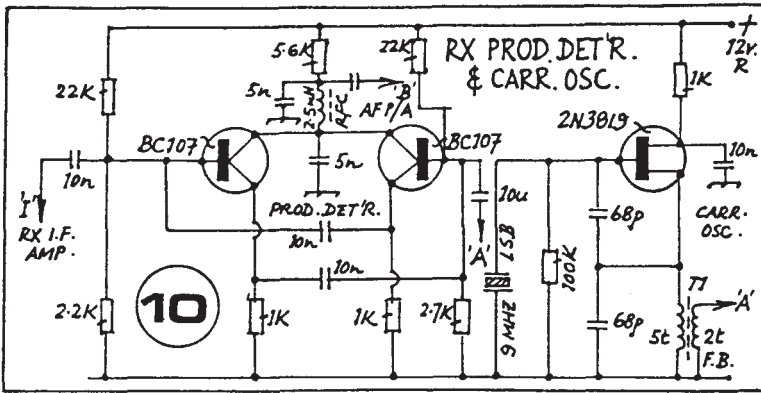


constructor. Some circuitry can be omitted, such as the attenuator and the AF filter, but as presented here the rig's performance is as good as many transceivers in the CW mode yet tried. The Argonaut is now relegated to being a standby rig, awaiting the next sun spot highs. Perhaps by then an all band version will be completed?

- 12v R = 12v applied to RX when relay de-energised
- 12v T = 12v applied to TX when relay energised
- 12v = 12v applied continuously
- 6v K = keyed 6v





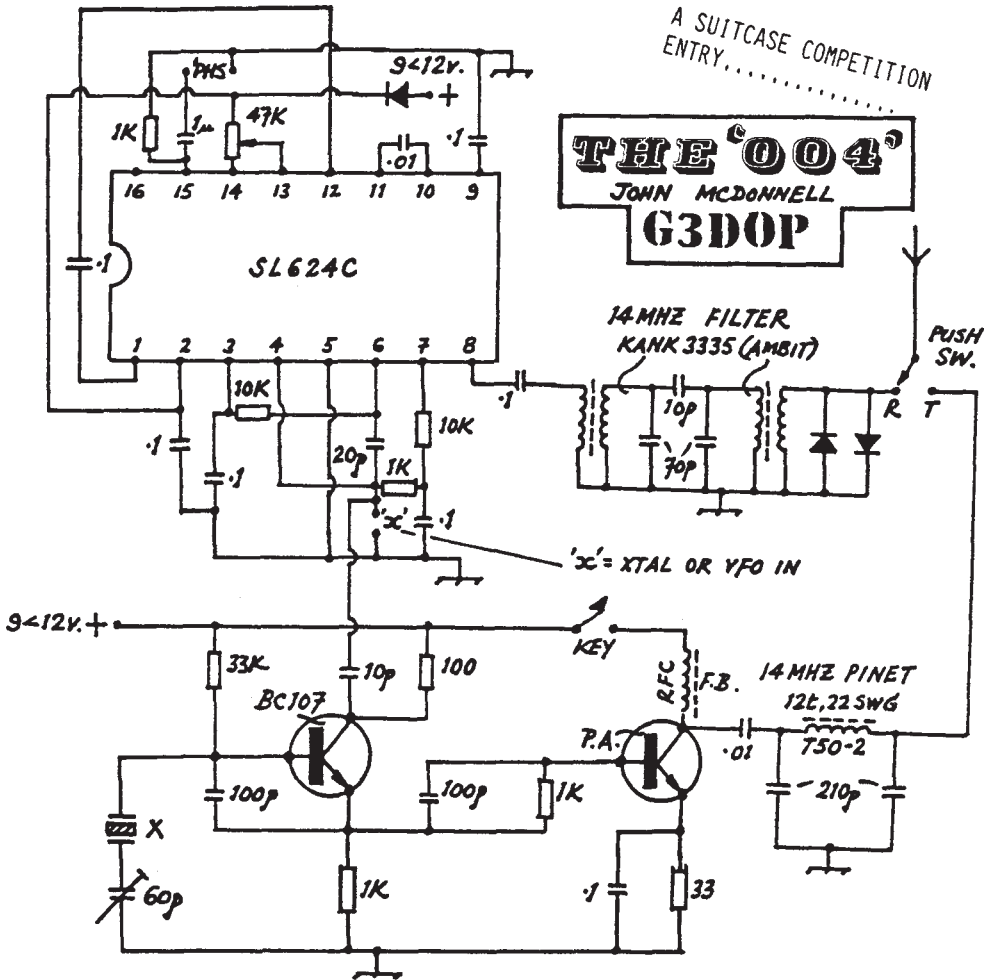






A SUITCASE COMPETITION  
ENTRY.....

**THE '004'**  
JOHN MCDONNELL  
**G3DOP**



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REMEMBER THE DC30P TRANSCEIVER FOR 30M IN THE LAST ISSUE?  
THE KITS TO BUILT THIS TRANSCEIVER ARE STILL AVAILABLE....

DC-30-P OFFER: Double sided PCB and construction notes £6. Kit of parts, less box £35, full kit £40. These prices include U.K. postage and packing. Overseas members please write for price quote. Also available, DC-40-P and DC-80-P, same price. Three band kit, covering 80, 40 and 30 metres £55, full kit only. Send orders to G8SEQ at 14 Hollow Crescent, Radford, Coventry, CV6 1NT.

TRY CALLING ON 3560, 7030, 14060, 21060 & 28060 KHz C.W.

THE "004"  
JOHN McDONNELL G3DOP

This is a simple direct conversion transceiver using the Plessey SL624C communications IC. An additional audio amplifier is possible if required by taking the output from the headphone connections.

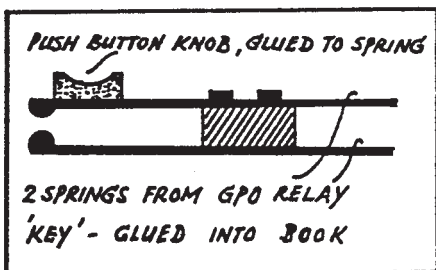
The power supply used by the author is a 9V rechargeable battery. The system will run on 9v - 12v if required and the battery was used for /P operation. Do not reverse the polarity to the IC!

The current consumption on RX is 50mA and TX is approximately 100mA with a 9V battery. The input of the TX is 900mW.

The TX is a slightly modified OXO (simplified) and the keying transistor may be included if required. Good clean keying was reported so it was not found necessary. On the air no ATU was used, and the antenna was a simple vee dipole, which lies flat against the barge boards of the bungalow being invisible from the road or the back of the bungalow.

The built in key has two relay springs from an old GPO relay. Keying was found to be a bit strange at first, but after a while no problem - in fact I quite like it now!

The transceiver is housed in an old diary with the centre cut out as in the photograph. The key is on the right hand side of the book.



OOPHS - corrections and alterations to the W3TS TS6 Mk I TCVR (SPRAT 42).

Fig 1: 25K tuning pot - must be of good quality and linear. The arrow from the 1N914 and 2.2K in the gate of 40673 should be marked "E" and go to +12v keyed. The 7p NPO in that circuit is a trimmer. The 5p in the gate of MPF102 is NPO.

Fig.2: 33v zener is optional for PA protection. TX power switch labelled the wrong way round, reverse Hi/Lo. Caps in the low pass filter: 420p can be 390p at PA end and 470p at the antenna end.

Fig.3: emitter of 2N3906 - add 3.3K between emitter and ground, and change 68K to 680K.

Fig.5: the resistor in the collector of 2N3904 is 100 ohms.

In the prototype the speaker at the phones jack is disconnected as the phones enter the jack.

WE REGRET TO ANNOUNCE the death of Tony Rhodes, G4WIU, member number 2594. Tony had been ill for some time but always managed to chat with friends on the air. He was only 36 and will be greatly missed by his many radio friends.

## TWO BOOK REVIEWS BY G3RJV

THE JOY OF QRP      Strategy for Success      Adrian Weiss      WORSP

All QRP operators know, or should know, Ade Weiss WORSP (ex K8EEG). Ade is the founder of MILLIWATT, the original QRP journal, now sadly no longer published; the QRP editor of CQ Magazine and the originator and provider of the Milliwatt DXCC Programme of Awards. Now we have his long awaited book on QRP operation. Long awaited because at one time we thought it would be published before the G-QRP-CLUB Circuit Handbook.

I am pleased to say that the book has been worth the wait. THE JOY OF QRP is the most comprehensive publication on QRP that I have seen, in fact the first that undertakes a broad look at our fascinating area of the hobby. The book begins with a brief historical background to QRP operation and then describes the whole gamut of our subject: QRP organisations and awards, objectives and planning for operation, commercial equipment - both QRP and modified QRO, homebrewing the first QRP rig, general operating techniques, planning specific types of QRP operation, and concludes with a very useful chapter on RF power measurements. In short, a comprehensive guide to the whole subject of low power amateur radio operation on the HF bands.

I can recommend it to all QRP fans without the slightest hint of bias or fellow-traveller nepotism because he's rude about the G-QRP-CLUB! He says we should "catch up with the modern world"....tut, tut....I thought we were ahead of it! But all is forgiven Ade, it is a great book for QRPers and a lot of QRO operators would benefit from reading it. The book is an attractively bound paperback but here is the snag, because of currency exchange rates, like all American books it is not cheap. The club are to import a stock which will be available to UK members. Overseas members can obtain the book directly from Ade (833 Duke St. 83, Vermillion, S.D., 57069, USA), for \$12.95 post paid. For UK members the book is available from the source for our CW cassettes: Norman Field, G4LQF, 14 Regent Rd., Harborne, Birmingham 17, at £10 plus 55p postage.

### DIGEST OF HORIZONTAL WIRE AERIALS

By Dennis Hoult G400

Amongst the most battered books on my radio bookcase is a copy of the first edition of Digest of Horizontal Wire Aerials by Dennis Hoult. A book published by the Spalding Amateur Radio Society some years ago. What a good source book it is for people like me who enjoy playing about with "bits of wire" in their gardens. It is a simple book, just lots of drawings or wire aerial arrangements with measurements and brief notes with sources for additional study if required. The book is crammed with single and multiband horizontal aerials from the old to the new, including neglected ideas like the T2FD, lots of variations of the W8JK Flat Top, and my old favourite the W3EDP.

I was unwise enough to mention the book in an article in a radio magazine some little time ago and suppliers were vainly trying to answer requests for the then out of print book. Well - it has been reprinted and is available again. The cover price of the book is £3 post paid, but is available to club members at the reduced rate of £2,50 post paid from: Dennis Hoult, G400, Chespool House, Gosberton Rise, Spalding, Lincolnshire, PE11 4EU. Cheques should be made out to "Spalding and District Amateur Radio Society".

DONT FORGET THE RSGB H.F.CONVENTION. SUNDAY SEPTEMBER 29TH. THE G QRP CLUB WILL BE WELL REPRESENTED WITH A STAND AND A FULL PROGRAMME OF LECTURES. FOR FULL DETAILS - SEE FUTURE EDITIONS OF RAD COM.



The QRP Co. of Harrisburg PA. spotted and photographed by Mike (W3TS).

The QRP stands for:  
 Quality.....  
 Reliability.....  
 ..... and Performance.  
 (and so it should!)

They are "Tree Trimmers and Remodellers".

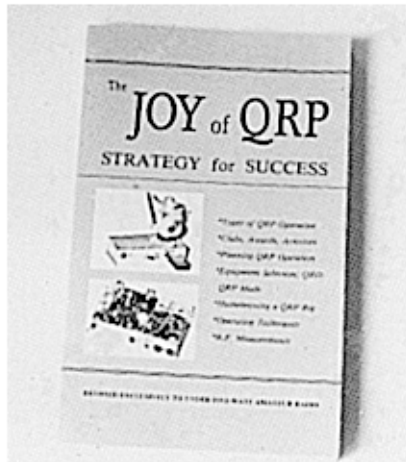
Never managed to quite grasp English, these Americans !  
 In the UK we would call them Tree Surgeons.

**THE JOY OF QRP**

The long awaited new book by Ade Weiss, WØRSP.

The book is a full and comprehensive guide to low power operation on the amateur bands.

Copies are now available to members of the G QRP Club - see opposite page.



**JANI (HA7ZX) member number 2421**

Jani uses a simple Clapp-PA system on 80m and worked 36 countries last winter. He is a museologist in the Museum of Science and Technology dealing with the history of communications. Jani wishes to contact other collectors of magazines, QSL cards and information on old radio. His QTH is: SZENTENTENDRE ROZSAKERT 4.1.2. 2000 Hungary.



THE R.S.G.B. NATIONAL CONVENTION 1985  
THE NATIONAL EXHIBITION CENTRE, BIRMINGHAM.

Once again the G QRP Club was well represented at the R.S.G.B. Convention with a club stand and a lecture on QRP on both afternoons. 234 members signed the "sign-in" sheet over the two days of the convention and, as usual, it was a real pleasure to put faces to the CW. The G3RJV QTH now being over 100 miles away from the site. this year several of us stayed with Norman, G4LQF apart from some notable Scottish QRPers who used a local hotel (and bar!). Like the previous National Conventions, it was an enjoyable and worthwhile weekend for us all.



The blurred hand shows the speed with which Fred (G4HOM) our Membership Secretary enrolled new members on the club stand!

On both days the stand was full of members and visitors from opening to closing time. The crowd around our stand put many of the commercial stands to shame.



Norman (G4LQF) who handles our CW tapes with Fred (G4HOM). Antone who has spent much time around 3560 will have worked either, or both of these gentlemen.

In the shack of G4LQF, Peter (G3PDL) operates some REAL radio - a two valve (tube) VFO - PA, One Watt Transmitter, an AR88 Receiver, a wall mounted Tuner to open feeders and a G5RV antenna. Peter was confused when a Polish Station, who gave him 589, asked him what power he was using. The only meter attached to the rig was an iron clad instrument calibrated in R.P.M. He turned it down a "few revs" and still got a 559! This was on 80M. The single valve transmitter next to the AR88 is for 40M.



Again at the G4LQF QTH, we have left to right: Jennifer (G8WWO) xyl of G4HYY, Peter (G3PDL), David (G4HYY) and Derek, son of G3PDL (awaiting RAE results). The object of attention is the partly completed new QRP SSB transceiver built by David. David is not eating a section of the transceiver, but a sample of bread pudding a delightful, but rather QRO, speciality of the district

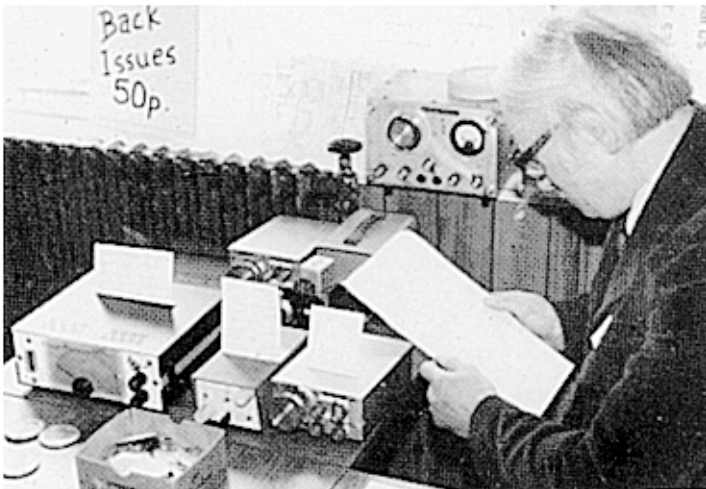


## THE HUMBERSIDE RADIO RENDEZVOUS



On the G QRP Club stand, at this event held in Scunthorpe, are (L to R) Keith (G3IGU), Frank (G3YCC) and Peter (G3PDL).  
No jokes about Scunthorpe please - G3RJV once lived there!

Below we have Keith with a selection of homebuilt equipment. Some of it built by Keith and some by Frank. You may know some of Keith's circuits which appear in the G QRP Club Circuit Handbook. The transceiver on the top ledge and the one on the bottom right have both appeared in SPRAT. The larger transceiver to the far left is the G3YCC Transceiver which appears in this issue of SPRAT. To add to his other skills, we are informed that Keith won the "Left Foot Keying Contest" at this event.....should I say well done?



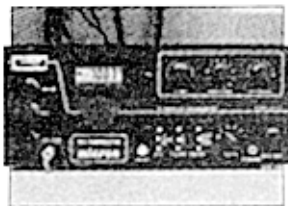


## EQUIPMENT REVIEW:

### THE MICRON SIX BAND QRP TRANSCEIVER KIT

GEORGE DOBBS

G3RJV



I was especially interested to follow the development and production of the MICRON kit because the project came out of a conversation some of us had with G3WPO at the RSGB National Convention two years ago. We were brave enough to suggest that there was a good market for a good multi-band QRP CW transceiver kit. Now that the MICRON has arrived, I hope our judgement was correct.

The first thing that occurred to me when the MICRON kit arrived is that you get a lot for your money. The transceiver has a lot of components: over 50 transistors, 7 ICs, 50 inductors, over 90 diodes...and so on. I like to layout my components for a project by sorting them into component values and pushing the leads into a polystyrene ceiling tile. This lot filled a whole tile! The components are also of good quality types.

The kit is built from a comprehensive stage by stage manual. It is a major constructional project and should only be undertaken by those who have the basic skills of soldering. Expect it to take a long time - it will, but if the manual is followed exactly there should be no problems for those with the manual skills, but lack the technical knowledge. The only item of specialist test equipment required is a frequency counter, but if the digital readout option is used, this can act as the frequency counter for alignment. I did have some frustrations during the building process caused by some errors in the manual, but I had issue one of the kit, and all the kits are now supplied with a corrected manual. Some of the component placing is tight, so it is essential to follow the manual order for construction...and keep everything neat.

Transceivers stand or fall on their receiver stages, and I was frankly surprised by the excellence of the MICRON receiver. It is a direct conversion, and when I first saw the circuit I thought - this is design overkill!! The basis is a PLL mixer VFO with double balanced active mixer and multi-pole passive LC audio filters. The receiver has a rather unique full AGC action which works - rare in direct conversion! When I completed the receiver stages I used the receiver for a while on the bench with loose leads strewn about, and on the first evening enjoyed listening to transcontinental signals on 7MHz.

Like the receiver, the transmitter requires no manual tuning up, and I obtained a little over 8 watts of RF on all bands, except 10 metres. The front panel DRIVE control smoothly controlled the power output from the 8 watts to a level too low to measure on my power meter. The transmitter worked very well at our regulation 3 watt RF output level. The semi-breakin arrangement, with PIN diodes, worked well and the 80mS recovery time seemed about right.

My operating time with the MICRON has been limited, but I have had a few evenings of successful operation on 80 and 40 metres, and a couple of QSOs on 30 metres. I really need more time to use the transceiver in anger on the HF bands, but so far I have been very pleased with the results. I must admit that it took me some time to get used to the netting procedure. There is a SPOT button on the front panel to align the receiver and transmitter frequency to zero beat the required station, and then the required sideband can be chosen with the RIT control. Much better than the usual hit and miss procedure with direct conversion transceivers, and

doubtless in time I will learn to love it. I would also have liked little more range on the RIT control.

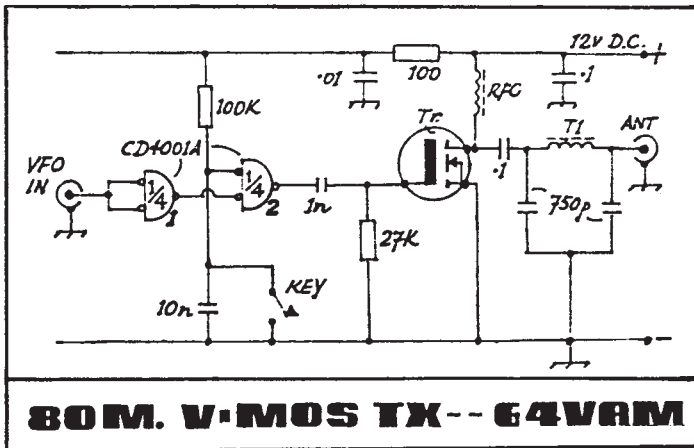
I'm very pleased with my MICRON, and I'm sure it will be a popular little rig in my shack. I consider it good value for money and a worthy transceiver for serious CW QRP operation. BUT...remember it is a kit, and it does require a lot of time to build and a little patience, but for many that will be part of the fun.

The kit is offered in several options (I have the lot!). Full details may be found on the back page of this issue of SPRAT. I'm glad that WPO took our advice, and hope the transceiver will become a popular option for QR operation.

### 80 METRE VMOS TRANSMITTER PAUL HARRISON G4VAM

This little 80 metre QRP transmitter has worked SM, LA, OZ, YU, PA0, I, F etc., when used with a 66 feet long wire.

The VFO could be the Seiler type, used in the SCD Deluxe. RFC is 10 turns on a ferrite bead. T1 is 21 turns of 26SWG on a T50-2 core. The VMOS transistor is the VN10K, available from John Birkett at 50p each, (or a VN67AF could be used). The CD4001A is a two input quad nand gate - two other gates are unused - but one could be used to switch a driver transistor for a change over relay. Gate one could also be used as a simple crystal oscillator for a crystal controlled transmitter.



TIP FOR HW8 OWNERS  
RONNIE MARSHALL GM4JJG

The HW8 has an aerial change over relay, and on receive the contacts are closed by a very light spring. On transmit the contacts have the pull of the solenoid to close them firmer. A tiny piece of dust, or something of that nature, must have got between the receive contacts, as the receiver went 'phut' in the middle of a QSO, and the RST dropped from 589 to 339!

A skoosh of carbon tet fixed it. I had to spend ten minutes poking at the PCB, and wondering where the crackle was coming from. It seems a bit daft to place so much reliance on a minute contact closed in on light pressure.

## RF RELAY DRIVER

MEL EVANS      G6JAG

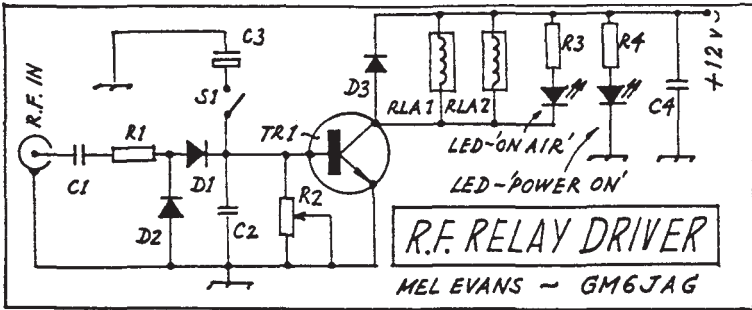
The only critical items are C1, which might need playing with and changing to 6.8pF or 3.3pF to improve the units overall response to RF, and C3, which if used for SSB can be any value nominally from 470uF to around 1000uF, as shown in the parts list. However, this is due mainly to the vagaries of electrolytics more than anything else!

The unit will happily switch up to three 400 ohm relays at 12 volts on anything from around 0.25 watts of RF in at HF, and 2 metre frequencies also. Obvious uses are change-over and linear switching.

R2, the 47K pre-set, simply adjusts the 'hang' time in conjunction with C2 for use on SSB. It can be replaced by a fixed 47K resistor and C2 omitted entirely if the unit is to be used on say 2 metres or 10 metres FM only.

### PARTS LIST

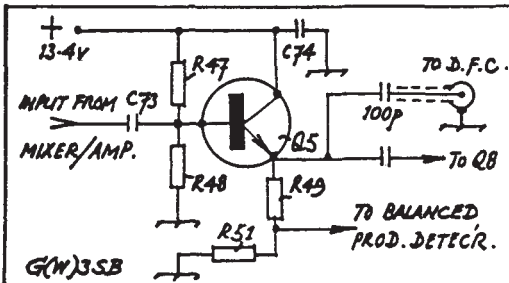
R1	100 ohms	C2	470pF	D3	1N4002
R2	47K pre-set	C3	1000uF	TR1	BFY 51
R3,R4	330 ohms	C4	2nF	S1	SPST switch
C1	4.7pF	D1,D2	1N4148	LEDs	to preference



### DIGITAL READOUT FOR DIRECT CONVERSION RIGS

By Chas Bryant GW3SB

Digital frequency counters are becoming quite common. I have equipped each of my direct conversion transceivers with a socket into which I can plug my counter and thus keep a watch on the frequency on both transmit and receive. The parts required are a piece of miniature co-ax, a suitable socket and a 100pF capacitor. The circuit shows the modifications for the HW8, where the drive for the counter is taken from the emitter of Q5 (an emitter follower), which is running in both the receive and transmit modes. A similar arrangement is used in my other gear.



THE SKELTON CONE REVISITED  
BOB SPIDELL                      W6SKQ

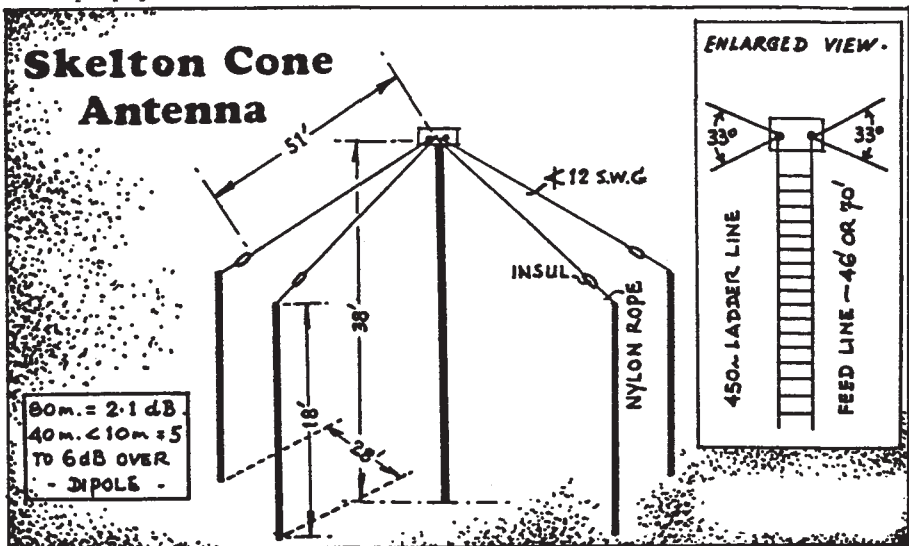
The basic idea of the Skeleton Cone comes from the R.S.G.B. Handbook (3rd edition), and has claims varying between 2.1dBs to 7dBs gain over a dipole on all bands. It has a 1:1 SWR over all bands, if used with an antenna tuner, and seems to have a pattern of 360 degrees.

I have been using a Skeleton Cone for sometime on the 40 and 80 metre bands. It is suspended from my tower at a height of 38 feet and is fed with 300 ohm twin lead to the homebrew Ultimate Transmatch. The ends of the antenna are 14 feet above earth, instead of the designed 18 feet, because of physical limitations at my QTH. I have worked JA, UA and KH6 with it and feel it should do well in the U.K.

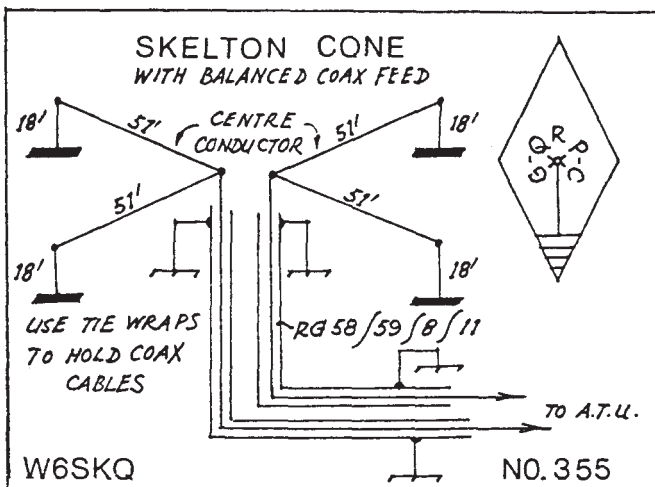
Although the claimed gain figures are rather high, my Skeleton Cone has out performed a 130 feet inverted vee at 38-45 feet above ground, so I am sticking with it. For 160 metres the feeders could be tied together and the antenna operated top loaded or umbrella fashion. George, G3RJV describes the Skeleton Cone as two G5RVs, and it was his standard antenna for two years at his Birmingham QTH.

The original version of the antenna was a modified G5RV. With double wires spread 33 degrees, greater bandwidth is achieved, and there is some filling in of the sharp nulls on the higher frequency bands. It is a good antenna with gain at the higher bands because it is electrically large. On 80 metres it is shorter than a half wavelength; 40 metres it is two half waves in phase; 20 metres it is three half wavelengths with six lobes and six nulls; 15 metres it is five half wavelengths long with ten lobes and nulls and on 10 metres it is two one and a half wavelengths long wires fed in phase.

The gain over a dipole in fact exists in certain directions where the lobes, are depending on the band in use. Another feature is that these lobes are at quite low angles, from 30 to 50 degrees, thereby enhancing a lot of propagation for DX.



The Skeleton Cone can also be used with a balanced coax feed, (see diagram). I plan to use RG58U or RG59U coax because it would be lighter in weight. K6MDJ physically was able to ground the top of his feed system but I cannot, but I don't see any problem. I think this is a novel way to use a balanced feed system for fellows who think they have to use open wire line.



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PETER GOLLEDGE  
G3EDW  
Ex- D2DW, VQ2W, 9J2W

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The above are normally available from stock. Further frequencies in the 10, 18, and 24 MHz bands will be added shortly. Any frequency of your choice, to the same specification, can be supplied in approximately 8 weeks at an inclusive price of £4.50. Overseas members please send the full, VAT incl., prices to allow for the extra cost of overseas despatches. PSE send SAE for lists of computer and marker freqs and filters. TEL: (0460) 73718

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## MEMBERS SMALL ADS

FOR SALE: Half sized G5RV antenna, new and boxed (TAR Antennas), never used, £9 post free, G8UA, 33 Red Lees Rd., Burnley, Lancs, BB10 4HZ.

WANTED: Old 10X or FT-243 crystals for amateur bands between 1.9 and 7.1MHz. Non amateur freqs accepted if cheap! These needed for my 128 Set. G4TMO, Tel: Camberley 683577.

WANTED: Chris, G4BUE would like help from members residing close to him in Sussex with the distribution of SPRAT. Now the membership has gone over 3000 he is putting out a CQ for assistance. Offers please to Chris on 0903.814594.

FOR SALE: Codar AT5 (TX) with AT5 PSU (mains) and all cables, first class condx, £25. Codar AT5 mobile PSU (inverter), good condx with circuit, £5. Sphinx SSB/AM/CW TX, 50w on 160/80/20 can be used on 40 CW by doubling in 6146 PA, really excellent condx, circuit and notes, real value at £40. Telford TC10 2m TX, AM/FM/SSB/CW, good condx, repeater tone burst, full VFO, xtal controlled on 2m SSB calling freq. Mains or 12v, circuit and notes, £40. Telford TC7 2m RX with homebrew front end, works OK on FM/CW/AM, but rather old for SSB, circuit and notes, £15. Part built homebrew linear, single TT21, all tubed circuits, switch relay and spare TT21, offers around £20. 160m mobile antenna, homebrew, large loading coil, less bumper fitting, £10. Command receivers for 160/80/40, each in mint condx and working with circuits, £20 each. Large stock of valves and junk, ring or write to enquire. Eddystone 759 RX, excellent condx, fine example at £60. Adrian Heath, G4GDR, 39 Barra Cl., Highworth, Swindon, Wilts.

FOR SALE: HW8, modified to cover bottom 170KHz of bands, built in audio amp and speaker, AF notch filter, freq tuning via 8:1 reduction drive, 14/21MHz and max sensitivity. Good condx, £125 (inc. post/packing), Ron, G12LLO, 32 Albany Rd., Bangor, Co. Down, BT19 2YW, Tel: 0247.459981.

AN INVITATION: A reminder that Chris, G4BUE and Pam are holding their QRP Open House on 17th August. Everyone is invited, but please telephone them on 0903.814594 to let them know you intend going so they can get the catering sorted. Only entrance fee is a bottle of something and your latest homebrew project, etc. This is your opportunity to meet some of the officials of the club as G3RJV, G4HOM, G4LQF and G3VTT will be there.

WANTED: Argonaut 515 as cheaply as possible. Could be paid for in German DM via a DL amateur. Details please to Dan Hartau, YO2SB, PO Box 82, 2900 Arad-1, Romania.

WANTED: Help at a QRP event - on August 11th a Hamfest is being held at Flight Refuelling Club, Merley, Nr. Wimborne, Dorset. Phil, G4YX hopes to run a QRP stand and requires helpers and offers of homebuilt equipment to display. Please contact Phil Dykes, 68 Egmont Rd., Poole, Dorset, BH16 5AP.

FOR SALE: Mizuho TCVR QRP rig, 2 watts, £35. John, G4FKL, Tel: Sunderland 673350.

## HOW TO MAKE SOLDERING IRON ELEMENTS AND BITS LAST LONGER

DAVE CHAMBERS

G4GIK

Small 10/15/25 watt soldering irons generally run far too hot for most PCB work, and as a result the elements and bits often need replacing, (expensive!). I have fitted a commercial light dimmer in the mains lead and adjust the bit temperature to suit the soldering job. With a little experimenting the knob positions can be marked for reference.

## AWARDS

By Gus Taylor G8PG, 37 Pickerill Rd., Greasby, Merseyside, L49 3ND.

A LITTLE AND LARGE CLANGER! In our item last quarter the call of G4ELZ was printed when it should have read G4EZF. Apologies to both!

FIVE BANDER FOR JACK! Sincere congratulations to Jack, F9YZ on achieving a five band QRP WAC. It was a pleasure to check his cards and issue the Award. Well done ami!

HE LAIRD OF CLERMISTON STRIKES AGAIN: Yes, hardly was the ink on his 300 Member endorsement dry before George, GM3OXX came up with another 20 cards to make it 320. Jolly good show.

NOVICE CENTURY: Over 100 CW Novice Awards have now been issued, more than a third of the applicants having done it with QRP. Many letters have been received showing that working for this Award has opened up a new world to many ex Class B operators. To quote a typical letter "I found a lot of pleasure in working for the Award....It is a unique mode and something that started as an exerices in self-discipline has now become a compulsion....I have met a completely new breed of amateur." Coming from a G0 that says it all; I was proud that my own call appeared on his list. Incidentally, John G8SEQ, might like to know that 8% of Awards so far issued are endorsed "all on 144MHz".

CONGRATULATIONS TO: The following for the Awards indicated.

5 Band QRP WAC; F9YZ

QRP Countries; 50 GI4SNC, OK1DKR; 25 G4UYA, G4SXE, G4JXX.

Worked G-QRP-CLUB; 320 GM3OXX; 60 G3BFR; 40 G4SBU; 20 G4PUU.

YES, WE ARE LICENSED FOR FREQUENCIES ABOVE 3560KHZ! I am often amazed and saddened to hear as many as six QRP stations battling it out with the QRO QRM, (and each other) around 3560 when there are great areas of empty kilohertz up around 3575KHZ. 3560 is the recommended calling frequency. Let us sharpen up our operating practices and be prepared to use this upper part of the 3.5MHZ CW segment properly. Maybe a few pioneers would like to suggest a suitable alternative calling frequency in that area for use when 3560 is badly blocked. 3.5MHZ is going to be our main UK traffic frequency for several years to come, so let us make the best possible use of it.

### MAKE YOUR OWN WATER SLIDE TRANSFERS

IAN WHITE G4VJR

The equipment required is as follows:-

1. Gummed labels or gummed tape
2. Ignition sealer (the stuff that puts a thin plastic coat on plug leads, etc).
3. Waterproof pens and rub down letters.

Take the ignition sealer and spray the "gummy" side of the labels. Once this has dried (I usually leave it for a couple of hours, although it is touch dry in a few minutes). Simply write or draw, or indeed use rub down letters directly onto the ignition sealer surface. Once the ink has dried cut out the transfer and pop it into some tepid water. When it enters the water it will curl up, and when it is ready to leave the backing paper will straighten itself out again. Now you can use it as an normal transfer.

WANTED: REASONABLY-PRICED, OLDER TYPE, VALVE RECEIVER, GEN. COV. OR AMATEUR BANDS  
DETAILS AND PRICE TO G3FCK QTH OR NEWBURY 40750.

The Grupo QRP Brasil is sponsoring a certificate to the member of any QRP group who submits THE LONGEST LOG OF TWO WAY QRP CONTACTS for the IARU QRP DAY. Please submit any logs via G3RJV who will send the longest to PY2FNE.

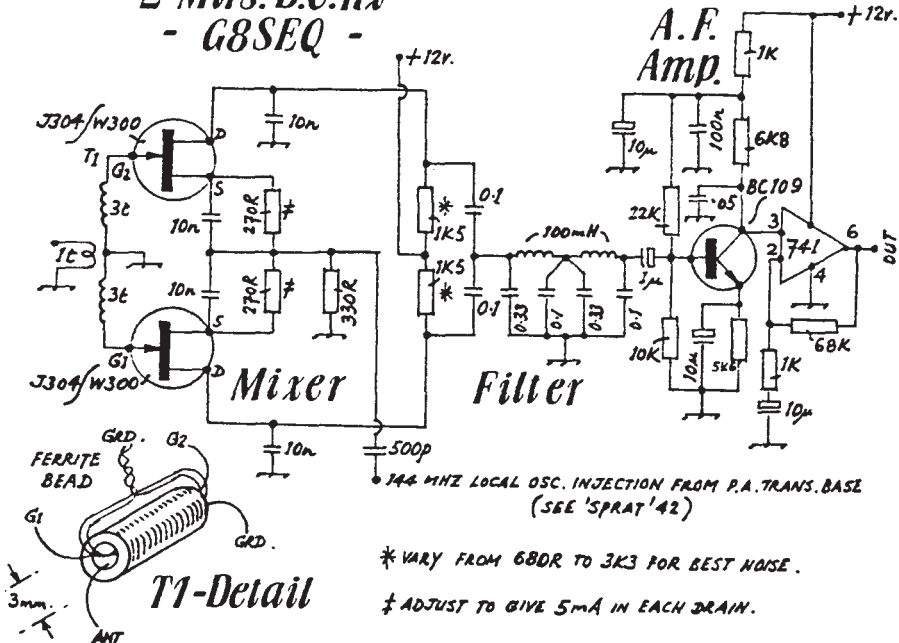
A SKED WITH THE HIGHEST QRP STATION IN EUROPE?

Roger Vaughan (2179) G4VYK is taking a 20 metre TCVR, (the JLD from Short Wave Magazine), to the top of Mount Blanc (15700 feet), and attempting the highest QRP in Europe. Roger will be operating between August 10th and 13th and invites skeds. Ring Roger on 027.581.3351 or write to 73b Westward Drive, Pill, Bristol, BS20 0JR.

IT'S BIG, BUT MY WORD IT'S STABLE

The SD1 is a synthesised drive unit made by Redifon. You may have seen one on our stand at the NEC, six rotary switches dial up any frequency in 100Hz steps from 1.5 to 30MHz with a controlled output up to 100mW into 50 ohms. Just dial up the frequency and it comes out at the back. Stability: five parts in 10<sup>9</sup> between -15 and +55 degrees! The unit is large, in a 19 inch rack but neat and has lots of room inside for extras and modifications. G3RJV has played with one and used it barefoot, with a LPF, on 80 metres for several European QSOs....bit of an overkill QRP transmitter, but it would be excellent with a PA and a series of switched low pass filters. It should also be possible to offset the dividers inside to give transceive functions. And what a great piece of test gear! Two of our members have a small number of SD1 units for sale at £100 each. Interested? Want to know more? Ring Chris Shuttleworth G4LKZ on Clitheroe 25403.

2 Mrs. D.C. Rx  
- G8SEQ -



\* VARY FROM 680R TO 3K3 FOR BEST NOISE.  
‡ ADJUST TO GIVE 5mA IN EACH DRAIN.

WANTED: ORIGINAL MAINS POWER SUPPLY FOR CODAR AT5 (TYPE 250/S) IN V.G.C.  
TERRY CLARK, G3SPR, QTHR, 0249-653740 (NOT SUNDAYS PLEASE)



## V.H.F..NEWS

By John Beech G8SEQ, 14 Hollow Crescent, Radford, Coventry, CU6 1NT.  
(Tel: 0203.598186)

What did I say in SPRAT 42? I was snowed under with mail ranging from comments on the subject of Class B CW to queries on 2 metre transmitters and orders for HF TRX. I think I managed to answer everyones letters, my apologies to anyone who got missed.

I have been very busy just lately with family matters, Beech Mk.IIB, John William Henry, arrived 21.5.85, so lots of local QRM at the moment!

One of the most interesting letters was from Heinz, OE6HS who has been experimenting with DC receivers on 144MHz, and one of his designs is shown.

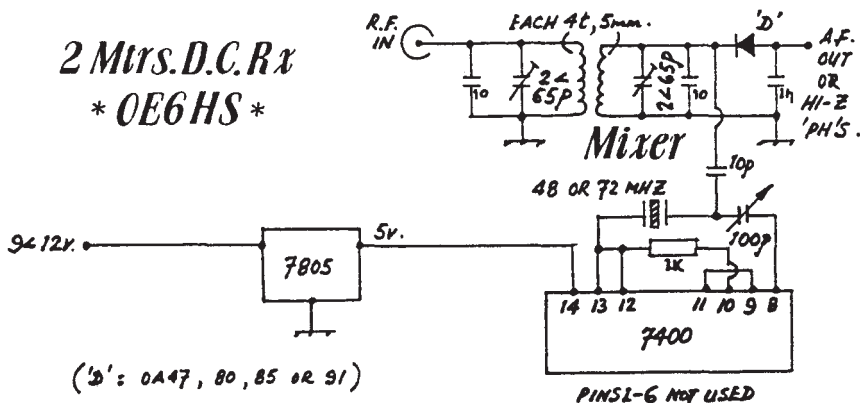
Wyn, G8AWT also wrote expounding the virtues of his FT290R, which reminded me he wrote sometime ago on his experiments with omni-directional horizontal antennas. I intend including these in a future SPRAT edition.

Several people wrote suggesting we have a calling frequency for Class B 144MHz CW, although only one took the positive step of naming a frequency, i.e. 144.550MHz. I wrote to the RSGB with the suggestion and was not overenamoured by their reply. Personally, I think that the letter of variation was badly thought out - it seems stupid to me to relegate "novice" operators to an even less used part of the band from the present CW allocation, so that they have little chance of communicating with competent CW operators because they are all down the band chasing DX! Hopefully our Class A brothers in the G-QRP-CLUB will come up into the all mode section and help us a long.

Lastly, the DC RX to go with the TX shown in the last issue of SPRAT. No doubt you will notice some similarities with GW4GIU's bi-directional mixer, the AF filter is the one I used in the DC-30-P circuit, and the AF amplifier goes back to SPRAT 29 - an 80 metre band design of mine. A point about the ferrite bead - look for the ones with that glassy look - they work better at VHF.

### THE OE6HS DIRECT CONVERSION RECEIVER CIRCUIT

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TEL: 0282 697777.



"Alamosa", The Paddocks, Upper Beeding,  
Steyning, West Sussex, BN4 3JW.

W1FMR, W9PNE, KA8NRC, VE3JFH, WB2RZU, W0RSP, KN1H, WB9WIC and WB2UXI. We also met Paul, OASV who will be well known to many of you.

The following week we went to visit Rich, K7YHA in Virginia, who many of you will remember as G5CSU. He sends his regards to all his friends in the U.K. In addition to visiting many of our friends in F.O.C., we also visited Ten-Tec in Tennessee and spoke to the designer of their famous Argonauts.

One idea that came out of the trip was to pair members of both ARCI and G-QRP-C for the purposes of paying subscriptions. Many amateurs are members of both clubs and if they were paired could pay each others subscriptions, thus avoiding the problems of foreign currency. Anyone who is interested please let me know.

Possibly due to the poor HF conditions, there seems to be an increasing interest in home construction. By far the most popular QRP transmitter is the OXO. G4NBI and G4GJY have recently built them; Les uses his on 80 metres while Sid worked a W4 on 20 metres using his with the G3MPN 3 band mini vertical antenna, lashed to his clothes line about 8 feet high! Since then he has worked W1 and W2 on 80 metres with a dipole.

G3IOI has built a 14MHz version of the Ben TCVR, and says the VFO is the best design he has come across. The results have amazed Ray, who worked 32 countries including W7 in two weeks with a dipole. He is also trying milliwatting with a FT757. As a result of attending Dayton, K5VOL is intending to build the FOXX. W2JEK has worked a W3 at 325 miles with his FOXX on 7Mz. Don only gets 360mW output which he puts down to rather an unusual RF choke arrangement. G3NNK is QRV with all homebrew gear, a 5 watt TX for 3.5MHz and DC RX with a transvector for 21MHz. Alf says he is getting lots of fun from it. I hear that Fred, G4HOM has worked W1 and V01 with his new 80 metre VFO TX, and WB2EUF tells me he has built some of the rigs in SPRAT. Ken offers help to any Stateside members having problems in home construction. EI4DZ has built a modified version of the Snowshoe Mountaineer TCVR by W7ZOI (SPRAT 30) with an external VFO. One of the first QS0s with it was with G4EFE who was using his STX. Noel would like to hear from other members who have built this rig. Due to the increasing interest in home construction he also suggests an article for SPRAT on troubleshooting simple QRP TX and RX that won't work. Any offers from you technical types?

It seems there is a jinx on the Club's Activity Periods this year. The Spring CW week-end was hit with bad conditions, and the RSGB have just

When Colin, G3VTT and myself arrived at the big Dayton Hamvention in Ohio, U.S.A. during the afternoon of 26 April, we were both able to cross off another of our ambitions. George has promised me the centre pages of the next issue of SPRAT to tell you all about it, and show some of the photographs we took. I will just mention here that we both had a great time, and I have already got my hotel booked in Dayton for the 1986 event!

It was great to meet so many members of the QRP ARCI, most of whom I had worked over the years, and to find that the bond between ARCI and G-QRP-CLUB is very close indeed, despite being separated by an ocean. Among the members we met there were K5VOL, KK7C, K4AHK, WB2IPX, KZ9H,

announced that their new HF Convention at Oxford will be over the Sunday of the September Activity Week-end. GM4JJG describes the March week-end as "a washout", but Ronnies has made up for it since as he has achieved his first two-way QRP QSO with the USA. WA2AHP only worked one member, KV7X, and Andy summarised the week-end as "a few QRPers, a few almost QRPers, a rig is in the post QRPers, and a few QROers". KH6CP was called by 7X4BL who was also QRP, but then lost him before exchanging reports, poor Zack better luck next time. He says that I7CCF was the best QRP signal he heard from Europe.

GW3YDX is using a three element half sloper array for 80 metres which he finds is sometimes better. Ron worked KL7 on it with QRO, so it should work well for QRP. G4YVM is using 2 watts from his KW2000B on 160 metres, and says he hangs around 1884KHz. He is anxious to meet other members interested in top band. David has made a 9 feet vertical antenna for the band and will report the results to us. I7CCF reports only one member, DL2HAJ, worked during the SSB Activity Week-end. Felix is now on QRP RTTY using a C64 computer. GM4XQJ is QRV with a TS130 and W3DZZ and delta loop antennas for 30 and 40 metres. Nice to report that Brian says he has had a 100% QSL return from members. Wish some of us could say the same!!

Our first letter from the USSR, UA9CDC writes to say that interest in QRP is rapidly increasing there. SPRAT is very welcomed as all rigs have to be home built. Igor says that in 1982/3 he was QRV as EK9C/0 from the Arctic Circle and he can assist with any member requiring a QSL. He says he is QRV from the Urals Polytechnic Club station, UZ9CWW which has 4 el. quads for the HF bands and a 3 el. yagi for 7MHz! G3ZHI has sent details of the proposals for a novice licence submitted by the Amateur Radio Novice Licence Campaign, of which he is secretary. Any members with ideas or views should get in touch with Ian.

G4JFN has now reached 52 DXCC with 1 watt, and G4FMH has acquired a Century 22 to go with his Argonaut 515. W6SKQ is thinking of getting the FRG7700 RX and would like to hear from any member who has one. In June Bob is going over 7000 ft up in the mountains with a group of other QRPers for the USA Field Day. G4EBO reports very little activity, except a UC2 who was running 3 watts for Eric's 40th DXCC on two-way QRP. G4LQF's latest project is a 2 valve mid 1930s exciter using a Hartley oscillator. Norman worked an OZ with it on 80 metres. The rig gives 1 watt out with 200 volts on the HT. New member GM4VGV is running QRP with a FT1012D, but is hoping to build some gear.

An amusing story from Gordon who says when he was listening recently on 3560 he heard two big QRO stations telling member GM3MXN to QSY as he was causing them problems!! I hear the W1FB QRP book has been slightly delayed, but will still be well worth waiting for. ZS6PT says that QRP is going strong in S.Africa and sends information on two QRP contests organised by SARL. One is LF bands only, but the other on 30th September between 1400-1800 is on 20 metres, in addition to 40 and 80. I can supply details for a SAE.

Ade Weiss, WORSP is again visiting the UK this summer and should be staying with me over the week-end of 20/21 July. Any members who would like to meet him are invited to "Alamosa" then, just give me a ring first, see Members Ads.

Just room to say don't forget the 17th August, QRP open house at my QTH. Everyone is welcome, please see the note in Members Ads for more information. Pam says thanks to members for putting membership numbers on the cards for the QSL bureau, it makes her job a lot easier. Can I just mention that due to the large volume of letters I receive I cannot acknowledge them other than through this column, obviously I will answer any specific points or questions that are raised. Having said that please keep the letters coming, as without them this column cannot exist. Many thanks to all the above for writing. Let me how your summer goes, (by 20th August please), and perhaps see you on the 17th?

73, Chris

# WPO COMMUNICATIONS



## micron

### 6 BAND 8/10W CW TRANSCEIVER

**OUR LATEST TRANSCEIVER KIT**, setting new standards in QRP performance. **LOOK AT THESE FEATURES** - a 6 band CW only 8/10W output rig covering the 80, 40, 30, 20, 15 & 10m bands (bottom 200kHz of each). 0.25uV sensitivity receiver, featuring AGC, with S Meter. Stable 2 speed VFO with IRT (Spot facility), 1W AF output to speaker, and 3 position LC filter + switchable attenuator. Silent solid state R×/Tx switching with fast semi break-in and shaped keying. Sidetone facility. **Fully variable** RF power output for QRP work from OW to full power with metering. Needs +12v/14v supply.

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