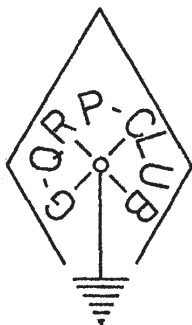


Rev.G.C.Dobbs,(G3RJV) 8 Redgates Court, Calverton. Nottingham. NG14 6LR.

Devoted to Low Power Radio Communication



SPRAT

NUMBER FIVE.

WINTER 1975/6.



G8EPE 2Metre A.M. Transmitter.
A C-MOS Electronic Keyer.(G3KPT/G3VHL)
Cheap Crystal Possibilities
For Q.R.P. Work (DJ4ZB)
The 'Transistor One' T.T.X. (reprint)
The G2NJ Trophy. Club News.
Q.R.P. Newsetc.

Q.T.H. of G4DQF (Keith Simpson).

CHAIRMAN.

Dr. Gordon Bennett (G3DNF)
52 Whinmoor Crescent.
LEEDS LS14 1EW.

CONTEST AND TEST MANAGER.

Mr. Angus D. Taylor (G8PG/GW8PG)
37 Pickerill Road, Greasby.
WIRRAL, Merseyside. L49 3ND.

Rev. G.C.Dobbs (G3RVJ) 8 Redgates Court, Calverton, Nottingham. NG14 6LR.
Tel. Woodbrough (060 744) 3928.

EDITORIAL NOTES:

Three months on in the new G3RVJ QTH and once more SPRAT is out again. The club has now run a full year and the membership stands at 177 - far more than I expected at this time next year, and I am still receiving letters enquiring about us most weeks. I believe this reflects the growing interest in Q.R.P. operation on the amateur bands, and it's off-shoots - home construction, CW operation, operating skill rather than brute force, and a weariness of the "black box" approach to amateur radio.

The new QTH has proved to be disappointing in one respect - I moved from the heart of a town into the country, to find that I "get out" worse on Q.R.P. thanks to the high land to the S/E and north of here. I must make more efforts with my aerials, but winter is usually my home-brewing time.

I was very happy to meet several of the club members at Leicester - see later in this issue, and very pleased to be stopped by several strangers who seeing my call sign lapel badge said "Hello, your the QRP fellow" or words to that effect. Most of them were not activity interested in QRP, but from their remarks, they appear to respect the club for "helping to restore the balance" (as one chap put it) in amateur radio.

For many of us, subs are soon due - see later in this issue - the club has managed to pull through the year quite well, but as you will see, I, with the general approval of members I have discussed the matter with, have now raised the subs to £1.50 - I think that a 25p per year increase is not too much to ask, with the obvious increases in our major items - production of SPRAT and postage.

As those of you who are in TOPS will know the "QRP Cult" as it was called came under attack by a TOPS member in the TOPS magazine QMF. I have written a brief reply to this attack (and joined TOPS in the process) I thought of printing both short articles in this issue, but I don't wish to make a mountain out of a good natured mole-hill. If you don't know about this matter ask your nearest TOPS members if you can have a look at the two issues of QMF.

Two of the most pleasant events which happened to me in the last 3 months was to meet Nick Carter (G2NJ) - who I first worked over 12 years ago, and has done so much to help QRP, and Paul Essery (G3KFE) of the Short Wave Mag. CDKN fame. Paul and the S.W.M. have been a great asset to the club and it's growth

I am still very happy to receive news, ideas, circuits, articles or "what have you" from any club members. I try to reply to as many letters as I can as quickly as I can bearing in mind time and postage costs. No letter to me - even if not instantly replied is wasted - in the sense that I like to add extra information which maybe useful to the cards in my members file. Then if another person mentions a similar interest, I can "connect" the members. Please also note that after a bit of a wait the GPO have put in a "land line" to the QTH - the number is above.

May I wish, you, and those whom you love, the very best of years in 1976, and I hope to CU QRP

Best 73's

George

G3RVJ.

P.S. Please don't forget the Winter DL AGCW QRP CONTEST.

COVER PICTURE

The QTH of Keith Simpson G4DQF, the chap who does the first class circuit diagrams for SPRAT. HWY is the main rig, the RX in the picture is Keith's homebrew version of the EC10.

LATE AD.

FOR SALE: Newly constructed HW7 transceiver, with QST modification sheets. G4AYX, 20A North Fen Road, Glington. Peterborough.

THE G2NJ TROPHY.

A few weeks ago, I enjoyed a very interesting day with Nick Carter in Peterborough, chatting about radio, looking at the cathedral and sharing a very good meal. But all of this was over shadowed by Nick's handing over for my safe keeping THE G2NJ TROPHY.

"SPLENDID" is the least one could say about it, as those who saw it at the Leicester Show will confirm. It stands 14" x 8", it's silver splendour, at the moment gracing the sideboard at G3RJV, until the first winner comes along. To go with the cup is a very fine silver plated "keep-sake" cup.

Now it is UP TO YOU to claim the award. It is being given in a three year cycle for certain QRP achievements (see the Awards Programme). This year it is being offered for the most outstanding QRP OPERATING PERFORMANCE of the year. This could be in terms of numbers of countries worked, or results with simple gear, or just good constant QRP operating for the year. Entries are to be submitted to G8PG, in written form, with as much confirmation proof as possible (certainly countersigned by at least one other amateur who has seen your log) cards if possible, although they may not have arrived for the last years work. I suggest a FINAL CLOSING DATE as MARCH 1ST. This will allow a Spring presentation, and time to include the result in the SPRING SPRAT. Entries before this date would be helpful (you can submit further evidence up to the closing date if you wish) The Judges will be G8PG, G2NJ, and myself (G3RJV).

DL AGCW QRP CONTEST.

The club made a good showing in the contest - Taking 2nd, 3rd and 4th places. Club places included :-
 2nd...Gw4DOO 20th...G3RJV/P 45th...DJ1ZB.
 3rd...G3IGU 21th...G4BJF' All out of 54 entries.
 9th...Gw8PG/P 24th...C3LDV
 10th...G3NEO 32nd...DK5RY

The Best 160m place went to DJ1ZB and best 15m place went to G3DNF. (both G-QRP-C)

THE WINTER CONTEST IS 17/18 JAN. 1976 most members have received a copy of the rules sticker, further copies can be obtained from G8PG. HOWEVER... Gus, Gordon and myself are concerned by the rather sudden change in the rules for the future contests which appeared after the stickers had been printed. The new change reads:

" A Station will not receive handicap points if

- a) XTAL and VFO control are used on the same bands.
- b) the input of a commercial rig is reduced below 3.5 watts. "

It is thought that (a) will spoil the common practice of multi-mode (xtal-VFO) used by many op's in this contest, and (b) suggests that some QRP operators cannot be trusted. Gus is so unhappy about the changing of these rules, without previous consultation, after the rules have been printed and issued that he will probably not remain as UK manager for the contest.

At present, I hope as many of the club as possible will still continue to enter for the contest. I think Gus will handle the logs for the Winter Contest (at the time of writing this) and we will see how matters develop. I have had a long letter from Hal DJ7ST, explaining why he has changed the rules - but the actual method of changing them leaves me a little cold. Let's hope that further thought and discussion will sort things out, and this excellent contest can go ahead with our support in the future. SO HPE CU JAN. 17/18. (I will have to do some homebrewing to catch these extra points!

I don't know about others, but G3RJV/P enjoyed the Summer contest. I worked /P from a friend's kitchen and back garden, using only a JOYSTICK V.F.A. about 3 watts and powered by several cans of lager supplied by my host ! Who knows where I might have come in the contest without the lager !!

N.B. Gw4DOO, who emerged as a real 'dark horse' in the Summer Contest is a 20 yr Student, studying for his Marine Radio Officer qualifications. He uses all home-brew and old commercial stuff !

One final point about the Winter Contest - I have run out of stickers with the (albeit old) rules, but I think that an S.A.E. to Gus (G8PG) would produce one.

Let's hope that the club can make an even better showing this winter - when the old 'master' DL7DO/P should be in the chase.

CLUB ACTIVITY:

During the past few weeks, the personal QRL has been very heavy for me, but I have had the odd listen around on 80m for Club members, but have not heard many. I wonder if a reminder of the "Club Activity Period" will increase the number of members I hear and work. Some of the more recent members may not know that, in the early days of the club, members attempted to meet on the air on SUNDAYS on 80m AROUND 3559 to 3540 (dodging QRM) from about 2pm (clocktime) onwards. So if you are active on 80m, make a note of the time and hpe cu qrp. (As yet no one has claimed the first "Worked Members Awards") Gordon (G3DNF) has suggested a QRP "Activity Day" - I think this would be a very good idea and I would welcome suggestions on this before the next issue of SPRAT.

THE LEICESTER EXHIBITION:

Unfortunately not many members managed to make the informal meeting on the Saturday of the Exhibition, but those of us present did enjoy a good chat and exchange of ideas. Three main points came out our discussions.

- 1) My presentation of outline accounts for the club:

G-QRP-C OUTLINE OF ACCOUNTS November 1st 1975.

Income:

Subscriptions£212.45
Advertising Space...£8.00
Total = £220.45

Expenses:

Postage£52.07
SPRAT + Sundries...£114.48
Total= £166.55

BALANCE IN BANK = £53.90.
Additional assets = 48 I.R.C's

SignedG.C.Dobbs
Audited....J. Youle

The above situation looks more healthy than it actually is - the cost of postage (very high this year) has risen steeply, the cost to produce SPRAT has also recently greatly increased. This issue of SPRAT is the most expensive to date - partly due to cost of paper, but also to the fact that the electronic stencil scanner I formerly borrowed for the illustration pages has broken down, and I am now paying in excess of a £1 per page to have these stencils prepared.

- 2) Because of the above, the members present at Leicester agreed that as from Jan. 1st 1975 - THE CLUB SUBSCRIPTION SHOULD BE £1.50.
- 3) That the subscription for 1976 should be "called for" from members on a rotation basis, based upon the date of joining - giving members with outstanding subs the three months between each issue of SPRAT to pay. THEREFORE:-

SUBSCRIPTIONS DUE :-

ALL MEMBERS WITH MEMBERSHIP NUMBERS BETWEEN 1 and 97 ARE ASKED TO PAY THEIR CLUB SUBSCRIPTION BEFORE THE NEXT ISSUE OF SPRAT (Week before Easter 1976) THE NEW FEE IS £1.50 - IT WOULD BE A GREAT HELP IF MEMBERS COULD PAY AS SOON AS POSSIBLE IN THIS PERIOD. Cheques to G.C.Dobbs: re QRP Club.

Although I would like to send out individual reminders, the postage cost would be high and wasteful on club resources.

CLUB TIES:

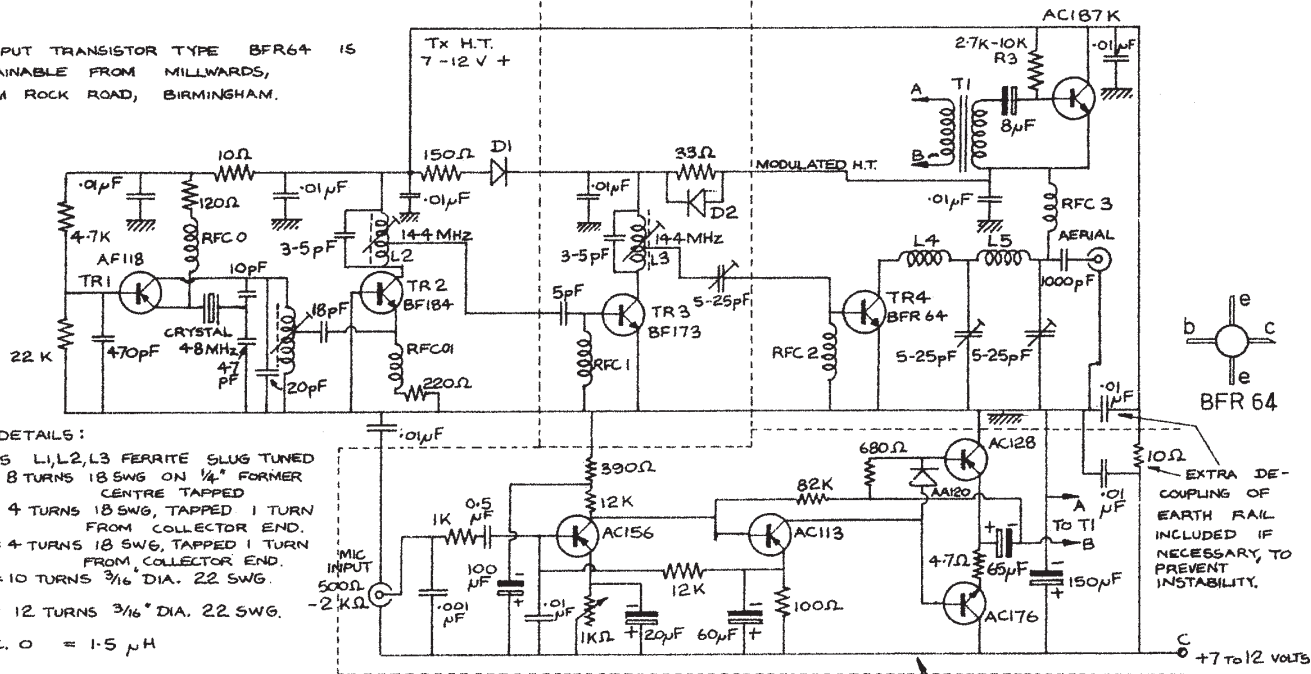
I still have quite a few CLUB TIES for sale. They are NAVY BARATHEA TIES, WITH THE CLUB BADGE PRINTED IN GOLD at £1.25 each (★ 10p Postage) Cheques to G.C.Dobbs re: QRP CLUB.

PLEASE MENTION THE G-QRP-C in QSO's - a simple small point, but three new members have recently joined through the club being mentioned to them when in QSO with club members - Also have you given that talk on Q.R.P. to you local club yet? I would like to see the club break the 200 mark before the next SPRAT.

ODD COMMENT: I am typing this monitoring the CW end of the 2 metre band, listening to a nice 589 signal from G3NEO (7.12.75 @1335) nice one Phil !

NOTE: CURRENT CONSUMPTION 80 TO 120mA

OUTPUT TRANSISTOR TYPE BFR64 IS OBTAINABLE FROM MILLWARDS, ALUM ROCK ROAD, BIRMINGHAM.



COIL DETAILS:

- COILS L1, L2, L3 FERRITE SLUG TUNED
- L1 = 8 TURNS 18 SWG ON 1/4" FORMER CENTRE TAPPED
- L2 = 4 TURNS 18 SWG, TAPPED 1 TURN FROM COLLECTOR END.
- L3 = 4 TURNS 18 SWG, TAPPED 1 TURN FROM COLLECTOR END.
- L4 = 10 TURNS 3/16" DIA. 22 SWG.
- L5 = 12 TURNS 3/16" DIA. 22 SWG.

R.F.C. 0 = 1.5 μH

R.F.C. 01 = 1.5 μH

R.F.C. 1 = 3 TURNS 32 SWG THROUGH 1/4" LONG FERRITE BEAD.

R.F.C. 2 = 3 TURNS 32 SWG THROUGH 1/4" LONG FERRITE BEAD.

R.F.C. 3 = 10 TURNS 32 SWG 3/16" DIA. CLOSE WOUND SELF SUPPORTING.

T1 = MINIATURE AUDIO OUTPUT OR DRIVER TRANSFORMER: CENTRE TAP NOT USED.

D1, D2 = ALMOST ANY SMALL SILICON DIODE WILL SUFFICE.

G8EPE 2Metre 3 Watt A.M. Transmitter.

TRANSISTORS IN MODULATOR NOT CRITICAL MOST GERMANIUM TYPES ARE SUITABLE OR USE ANY 300 mWATT AMP WITH A +VE EARTH RAIL.

NOTE: +VE RAIL OF MODULATOR FLOATING ABOVE EARTH POTENTIAL

EXTRA DE-
COUPLING OF
EARTH RAIL
INCLUDED IF
NECESSARY, TO
PREVENT
INSTABILITY.

THE G8EPE 2 METRE THREE WATT A.M. TRANSMITTER.

Notes by John Dodd (G8EPE)

This is modification of an earlier TTX for the band. The RFC values are not critical, just a few turns through ferrite beads would be OK for RFC ob to RFC 2. RFC 3 in the P.A. was found to work better 8 - 10 turns of 32 SWG 4mm. close wound self supporting.

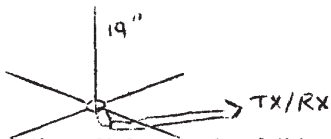
L2 and L3 resonate at 144 MHz, around 3 1/2 to 4 turns on 1/4" former, ferrite core tuned, a small fixed capacitor around 3-5pf across each winding. It is necessary to experiment tapping the L2 L3 collector ends to find the point of optimum transfer.

The P.A. transistor consisted of 3 X BF194 wired in parallel in the first QRP TX. - results were quite good with 200mW of RF around town.

The BFR64 is a 3 watt device (1000MHz) and works very well at low power levels. It was later tried in place of the BF194's and the RF output was far greater. Ranges of 30 to 70 miles have been achieved under average condx. with a simple dipole, the RX in use was a Super Regen.

A MATCHING ANTENNA...suggestion from G3EJV.

I have been listening recently to the CW end of the 2 metre band with a converter feeding my Argonaut and a simple homebrew groundplane antenna for 2 metres. The idea is not new, but it does work well (indoors), so for those who are without a 2 metre beam and want to try the band, it's worth a try.



REQUIRED:

- 5 Lengths of 1/8" Weldings Rod
- 19" long for CW end of band.

The radiator and the radials are made of thin welding rod mounted on a small block of wood. The radials are held in place by No. 6. screws and screwcups (lipped washers) and the radiator simply pushes into a small hole drilled in the wood block.

PS. I would like to see an increase on 2 metres of QRP CW activity - I think it could be fruitful band for QRP activity of this sort (?) Comments invited.

PFS. Anyone know of cheap crystal or two in the 48 to 48.05 MHz range for the G3RJV 2 metre CW TTX ?

PFSS ! Have you been reading the recent articles (September onwards) in Practical Wireless with 2 metre QRP practical circuits ?

TWO METRES is one of the sections of QRP interest (active in the club) which has been 'thin' in SPRAT - it's not a band I know much about - but now G8EPE has set the ball rolling, how about some more contributions ?

NEWS FROM G5BIU / WA2TLQ/4

Many of you will recall the QRP work done by David from the Scillies last year. The latest news from David, now in Florida, is that he hopes to return to the UK (probably to Bristol at first) and may in fact be here by the time you read this. David has been active QRP in the States - He gained FIRST PLACE in the autumn QRP ARC I Q.S.O. Party, mainly on 40m - all crystal controlled! He asked me to add the following note in SPRAT :

"G5BIU RETURNS ! SEEKS RADIO - RELATED POSITION IN THE U.K. - WILL TRAVEL AND PERFORM FOR PEANUTS". Any ideas?

THE G3YUQ D.S.B. RIG

G3YUQ and I would welcome comments from anyone who has built and used this rig. Des Vance (G1XZM) - who had had the pleasure of a recent QRP QSO with (what rotten grammar!) has sent me several interesting comments on BSB, I haven't room to include them in this edition, but who like to mention them in the next SPRAT, with any remarks about D.S.B. from those who have tried it, perhaps with the G3YUQ rig.

CORRECTION ! CORRECTION ! W9SCH points out that the emitter resistor in the diag at the top of page 12 in his article in the last SPRAT should be 1k ohm.

NEXT SPRAT - We have a VALVE Q.R.P. from W9SCH !

CHEAP CRYSTAL POSSIBILITIES FOR Q.R.P. WORK

By Hans-Joachim Brandt. DJ 1 ZB.

In SPRAT summer 1975, G3DNF has shown what can be done with crystals that can be opened. For hermetic crystals there are some other ways to go.

In spite of operating a vfo TX, the conditions of the DL QRP Contest managed by DJ 7 ST have influenced the author to wards simple crystal controlled transmitters. Compared to the multi-stage vfo TX, a crystal controlled TX may have as few as one or two stages and does not need much screening and metalwork. To get the amateur frequencies from cheap crystals three possibilities are considered.

Frequency Multiplying.

This is an old technique with the disadvantage of additional stages depending upon the crystal frequency. If just one stage can be used for doubling or tripling, the following frequencies are of interest in addition to the well known harmonically related frequencies :

<u>RANGE KHz</u>	<u>MULTIPLYING FACTOR</u>	<u>FOR BAND</u>
1167 - 1200	X3	80m
2333 - 2346	X3	40m
4667 - 4700	X3	20m
10500-10575	X2	15m
9333 - 9400	X3	10m

On their fundamental frequency crystals are good for VXO operation but care must be taken of low subharmonic output. In Fig.1. a typical combination of fundamental crystal oscillator and frequency multiplier preferred by the author. To extend frequency pulling, a coil L1 is added in series to the crystal. It's optimum value depends on the character of the crystal and must be determined experimentally. The capacitances C1 to C5 are best expressed in reactances ($C = 1/6,28 f Xc$) so they can be easily calculated for the desired frequency. Coils L2 and L3 must be chosen for resonance. C4 is a transforming coupling capacitor (the author does not like link or transformer coupling between transistors) and must be determined experimentally for the best match to the following stage. If better selectivity is required for the multiplied frequency C4 may be replaced by a quasi series resonant circuit L3/C5. Coupling to the next stage can then easily be adjusted by tuning L2 and L3.

For the best multiplier efficiency the emitter resistor RE must be optimized by experiment. In spite of looking like a Class A biasing scheme, the circuit actually operates like a "self-made" Class B to C stage: when RF is being applied from the oscillator, the DC emitter potential rises while the base DC potential does not, thus moving the operating point from Class A to B or even C. If sufficient RF drive is available, the resistor R2 may be omitted and the multiplier performance be optimized by varying R1 and RE. The collector series resistance (10-100 ohms) is to suppress parametric oscillations which are likely to occur in any tuned transistor collector circuit if a high voltage swing is present.

Overtone Oscillators.

A rather wide variety of possibilities opens if overtone excitation of cheap crystals is tried. To find the fundamental frequency, the desired frequency must be divided by odd figures like 3, 5, or even 7 or 9. By this way, the following frequencies may be useful for QRP work.

80m	1167 - 1200				
40m	2333 - 2346	1400 - 1408			
20m	4667 - 4700	2800 - 2820	2000 - 2014		
15m	7000 - 7050	4200 - 4230	3000 - 3020	2333 - 2350	
10m	9333 - 9400	5600 - 5640	4000 - 4028	3111 - 3133	

As will be detailed later, the exact relation between the overtone and the fundamental frequency is not exactly 3,5,7,or9, but is somewhat lower, depending upon the fabrication of the crystal. Therefore the above ranges may shift to slightly higher frequencies.

To evaluate all available crystals for overtone operation, the Test Oscillator of Fig.2. has been built. In this circuit the crystal are excited in their parallel resonance mode, thus free oscillations not controlled by the crystal are impossible. The base and collector series resistors are to suppress VHF oscillations. The collector must be tuned slightly off resonance to the capacitive side, and the variable capacitor CB be adjusted for best feedback.

When tuning, the frequency generated may jump from one overtone to the next!

To check power output and exact frequency, and rf ~~oscillator~~ voltmeter and a frequency counter can be matched to the collector circuit. With bad crystals, the supply voltage may be increased to 24 volts and the collector current be adjusted by RB for the best oscillations. From the values found by experiment, a specific oscillator circuit can be derived for the QRP rig under construction.

After testing various crystals in this oscillator, the following observations can be summarized: FT243 crystals around 1.16MHz did not work in the overtone mode. All FT243 crystals around 3.5 and 4.68 worked in the third and several in the 5th overtone, the relation to the fundamental frequency being 2.992 to 2.998. From several FT243 crystals around 5.85, 7 and 8.2 MHz only a few worked in the 3rd overtone.

HC-6/U crystals in a plastic case from a German surplus source around 2.35 and 2.82 MHz worked well in their 3rd and 5th overtones, the relation to the fundamental being 2.98 to 2.99 and 4.97 to 4.98. ~~FT243~~ and were useful for the 40 and 20m bands. Metal cased HC-6/U crystals around 4.2MHz worked in their 3rd and 5th overtones and can be used for the 15m band. The relation factor of higher frequency HC-6/U crystals is closely approaching the theoretical order (2.998, 4.987, 6.982). There are some HC-6/U crystals which do not lend well to overtone excitation, but very crystal is worth a try! The author has found several crystals around 10.3MHz to work well on their 7th overtone between 72 and 73 MHz, useful for VHF. In this case however, the test oscillator has to be modified (lower L and C values and a high ft transistor like the 2N5179, 2N918, or similar).

In most cases a three stage design is recommended for QRP TX's, unless a high ft PA transistor is used, for the power output available from an overtone oscillator may be low. Frequency pullings is poor, decreasing with higher order modes. Compared to multiplied fundamental crystals however, there are no problems concerning sub-harmonics and their suppression.

Crystal Mixing.

Multiple choice of crystals also exists by using a crystal mixer. It consists of two oscillators with one or several crystals each and a mixer stage followed by an output filter for the desired band, or a low pass filter if all the crystals are higher than the desired output frequency. The crystals are selected so that their sum or difference frequency delivers the desired output frequency. If n crystals are used in one and m in the other oscillator, n times m output frequencies can be generated. (This technique was used in the fifties and early sixties for multichannel exciters and is still of interest for amateur purposes up to VHF).

Fig.3 shows a crystal mixer used by the author for 160m. The mixer stage being keyed, giving 70dB carrier suppression. The mixer stage emitter resistor must be optimized experimentally for best performance. For the wide 160m band in C-band, the output filter may be replaced by a low pass filter. If the oscillators are to be used for other crystal frequencies, the reactances of the capacitors between base and emitter and from emitter to ground should be retained as a starting point.

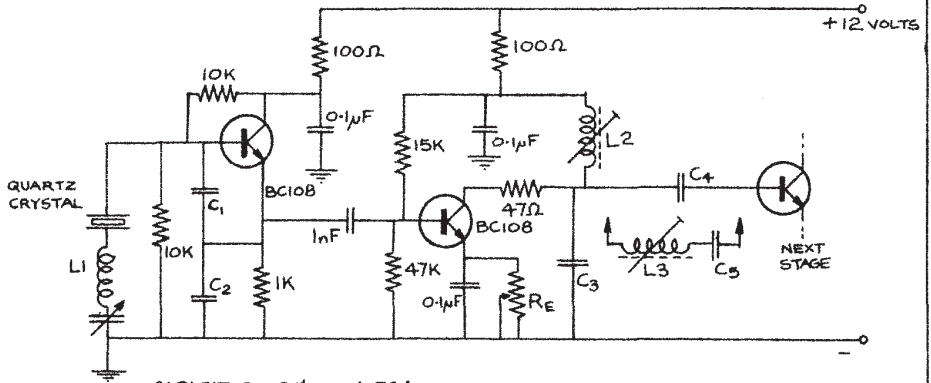
Another way to select two crystals a and b is to get the sum frequency f1 in one band and the difference frequency in the other.

a + b = f1	By using this simple calculation scheme, one will find that
a - b = f2	in some cases the crystal frequencies needed are within a
a = $\frac{f1 + f2}{2}$	ham band, because of the harmonic relationship of these bands
b = a - f2	But for the combinations 1.8/3.5 - 1.8/7 - 1.8/14 - 1.8/21
b = f1 - a	1.8/28 - 3.5/7 - 3.5/14 - 3.5/21 - 3.5/28 - 7/28 MHz amateur
	frequencies can be generated from out-band frequencies (3.5/14
	MHz being popular for simple SSB transceivers).

In some cases however, a harmonic of one of the two crystals may deliver a spurious signal in or near the desired output band and cannot be filtered out. Therefore a double balanced IC mixer such as MC 1496 or SL 640 is recommended.

A crystal mixer of this type must have two output filters which are switched to decide the output band. Depending on mixer performance and filter losses, a 2 or 3 stage amplifier may be needed before the PA. So for number of total stages, the crystal mixer is the worst approach.

Such an amplifier could be a IC coupled Broadband Class A design with few parts and no resonant circuits, except for the input and output matching of the PA. These techniques may be outlined in another SPRAT issue.



CAPACITOR REACTANCES :-

$$XC_1 = 50 \text{ TO } 100 \Omega \quad XC_4 = 200 \Omega \text{ STARTING VALUE}$$

$$XC_2 = 50 \text{ TO } 200 \Omega \quad XC_5 = 200 \text{ TO } 500 \Omega$$

$$XC_3 = 50 \text{ TO } 100 \Omega$$

RE : VARIABLE RESISTOR

Fig.1 : Fundamental mode crystal oscillator (VXO) and multiplier stage

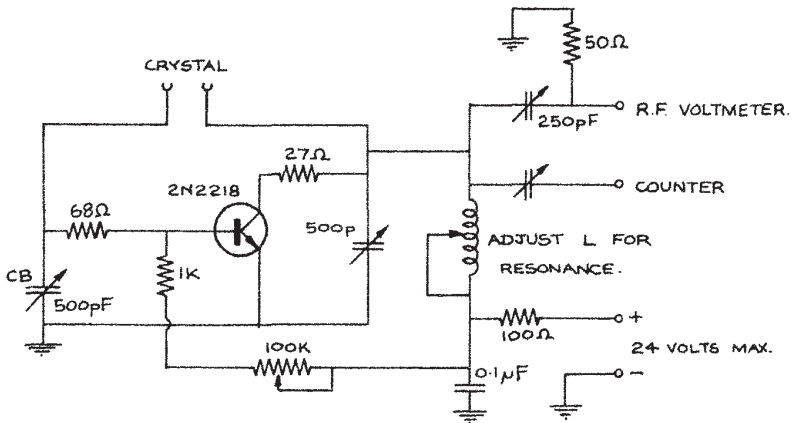
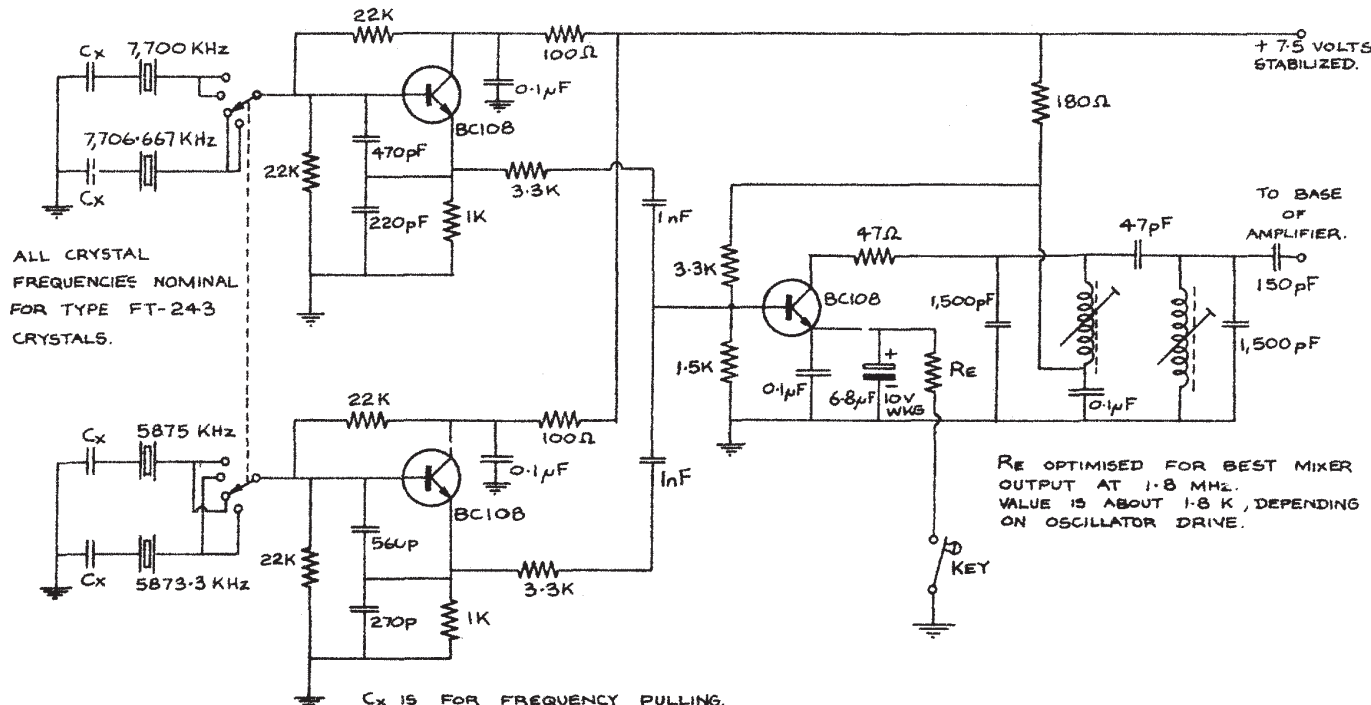


Fig.2: Overtone test oscillator

DWN	KAS
DATE	4.7.75



ALL CRYSTAL FREQUENCIES NOMINAL FOR TYPE FT-243 CRYSTALS.

+ 7.5 VOLTS STABILIZED.

TO BASE OF AMPLIFIER.

RE OPTIMISED FOR BEST MIXER OUTPUT AT 1.8 MHz. VALUE IS ABOUT 1.8 K, DEPENDING ON OSCILLATOR DRIVE.

Cx IS FOR FREQUENCY PULLING. IT MAY BE REPLACED BY A VARIABLE CAPACITOR IF A MIXER-VXD IS REQUIRED.

FIRST PUBLISHED IN "QRV" OCTOBER 1974.

Fig 3

Crystal mixer used by DJ1ZB for 160 metres

DWN	KAS
DATE	4.7.75

MEET THE MEMBER :

HA-JO BRANDT. DJ 1 ZB.

In 1953, when I was a pupil at high school, I got my amateur licence. After school, I became a coastal radio operator at DAO and DAN and later a German merchant marine radio officer. During this time Ham radio activity was nil. In 1959, I came to Munich to work in the communications industry, first on UHF TV transmitters, and now on HF TX's and RX's, as a design engineer.

At the advent of suitable transistors for hf circuits ham radio was re-activated and directed towards QRP solid state TX's and RX's. In contrast to the complex professional circuits I have to deal with, my tendency in Ham Radio is to use home brew equipment as simple as possible.

My QRP activity is mainly in CW on 80-10m, on NFD's and the DL QRP test, and occasionally portable on weekends and vacations, using my VFO TTX, 2 watts RF on all bands. Home antenna is a 2l metre horizontal wire, ended against a counterpoise system of wires on the roof. This year I discovered the possibilities of VHF CW with simple antennas, but somewhat higher power (lowatts)

Now aged 42, I have to devote myself to my family (3 sons - 10 - 9 & 4) so spare time is limited, another reason why simple circuits only have the chance to be completed at home.

SAMUEL POLSON. GM3RFR.

Now aged 55, educated in the Shetlands, R.AF. 1940 to 1946 - Radio Mechanic, served in Hebrides on Radar, Egypt and Iraq. Graduate (M.A.) Edinburgh University and London B.A. (Hons Geography) Fellow of the Royal Meteorological Society - run Britains most northerly Met Station.

Taught in Kinross Secondary School, before returning to the Shetlands as Headmaster of Britain's most northerly Secondary school.

Radio evening classes at school led to licence in 1962. Operated all homebrew equipment. Now QRO with Swan 350 and QRP with BD124 TTX. Antennae - Rhombic and phased verticals.

School club call - GM3STU - Other interests: Scottish Violin & drama writing.

I have a couple more such items for SPRAF - What about yours? G3RJV.

MEMBERS NEWS AND ADVERTS:

CYSTALS OFFERED BY DJ1ZE for postage and package paid (see Ha-Jo's article)

Material HC-6/U Cased: 2 of 1752.135KHz, 2 of 1760.937, 1 of 1761.718, 4 of 10522.5, 6 of 10523.93, 1 of 10525.360, 6 of 10539.64, 2 of 10542.5

Plastic HC-6/U - one of each followed by fifth overtone as tested :-
2813.25 - 14009, 2813.25 - 14010, 2813.25 - 14013, 2820.75 - 14051, 2820 - 14055.

G3RJV is looking for inexpensive 48MHz Xtals to switch channels for his proposed AM 2m Handheld 2m transceiver. Also circuit ideas and advice! (Xtals for A.M. sector)

CYSTALS WANTED BY DJ1ZE (see above, perhaps a swop(?) 72.005 to 72.030 MHz.

*****WELL DONE**** to ex-SWL P. Kelly, members number 119 - NOW G4ENK, who hopes to be active with an HW7 very soon.

It is with deep regret that I announce the untimely death of one of our members WYNDHAM M. JOHNS (G8ITP), of Swansea. Wyndham had written to me a number of times, and hope to shortly take a G4 call. He was a man of deep Christian convictions. I have sent a suitable letter on behalf of the club expressing our sympathy to his widow. As with all deceased members, hopefully very few in the future, I intend to keep his membership number (109) vacant.

(Advert)

IS Q.R.O. NECESSARY ?

IT MOST CERTIANLY IS - if the antenna does not match the rig in efficiency!

AN EFFICIENT ANTENNA DOES NOT -

- (A) Radiate Harmonics. (X) Waste RF in ionosphere/earth Multi-skip bounce.
- (C) Limit you choice of bands or parts of band.

THE WORLD RECORD PARTRIDGE VFA ANTENNA SYSTEM has been proving it's superiority for 14 years, and few of your contacts realise it if you are using QRP, even during the "rush hours".

HOW IS THIS POSSIBLE WITH A 230 cm LONG ANTENNA ?

Because the Partridge Patented system involves

NO HARMONIC WASTAGE OF PRECIOUS RF PLUS

A VERY LOW ANGLE OF FIRE !!

SAVE IT ! SAVE CASH WITH A QRP RIG !! SAVE IT ON MAINTENANCE !!!

STAY FRIENDLY WITH THE NBEIGHBOURS !!!! AND ENJOY THE THRILL OF QRP !!!!!

STAMP FOR DETAILS (and QRO Copy Log.) TO:-

(Now supplied to H.M.)

BOX Q, PARTRIDGE ELECTRONICS LTD, BROADSTAIRS, KENT.

(Govt. Communications)

0843/62535 or 62839 (home QTH) BARCLAY/ACCESS.

(H.Q. Cheltenham.)

G3VFA "FLRA POWER ANALYSIS. 4th November to 21st November:

- 1) Power used: A steady and rapid reduction was made from 5 watts to the current 300 mW. A 12 volt Motor Bike battery comprises the power supply.
- 2) Total number of QSO's on 80,40,20 and 15m bands = 1,007.
- 3) Average signal strength of G3VFA = s. 5 to 6.
- 4) Total number of countries worked = 46
- 5) 83.22% of all QSO's reported G3VFA readability 5
- 6) most interesting contacts (G3VFA's report in brackets) :-

UKALAA (55/99)	YO4ARR/MM (589)	IC8CQF (579)	W4PEY (459)
W1TW (539) worked twice	IH9LAW (549)	W4DHZ (569)	W1BOA (459)
JH2RJY/MM (?)	WA3SWF (559)	G3ZGC/MM (569)	4L3MK (579) twice
9HLL (339)	W2DB (559)	U050BG (579)	W1AZK (449)
9H1CH (579)	TF3AW (539)	CT2GSA (569)	CG ww:-
HV3SJ (549)	JX2HK (599)	W4JTF (439)	UA9JH (599)
			ZE8JN (599)

While we are on the subject of George Partridge and his remarkable QRP work, may I add another small note - George has been experimenting with a QRP WATTMETER. I have built one up and find it fb. It is a combined DUMMY LOAD/RF WATTMETER suitable upto reading of about 10 watts, but easily readable down to 100 mW. George can offer details and a few kits of parts - any interested, please write direct to George G3CED/G3VFA as in members list or QTHR. (Also ready Built.)

OVERSEAS NEWS:

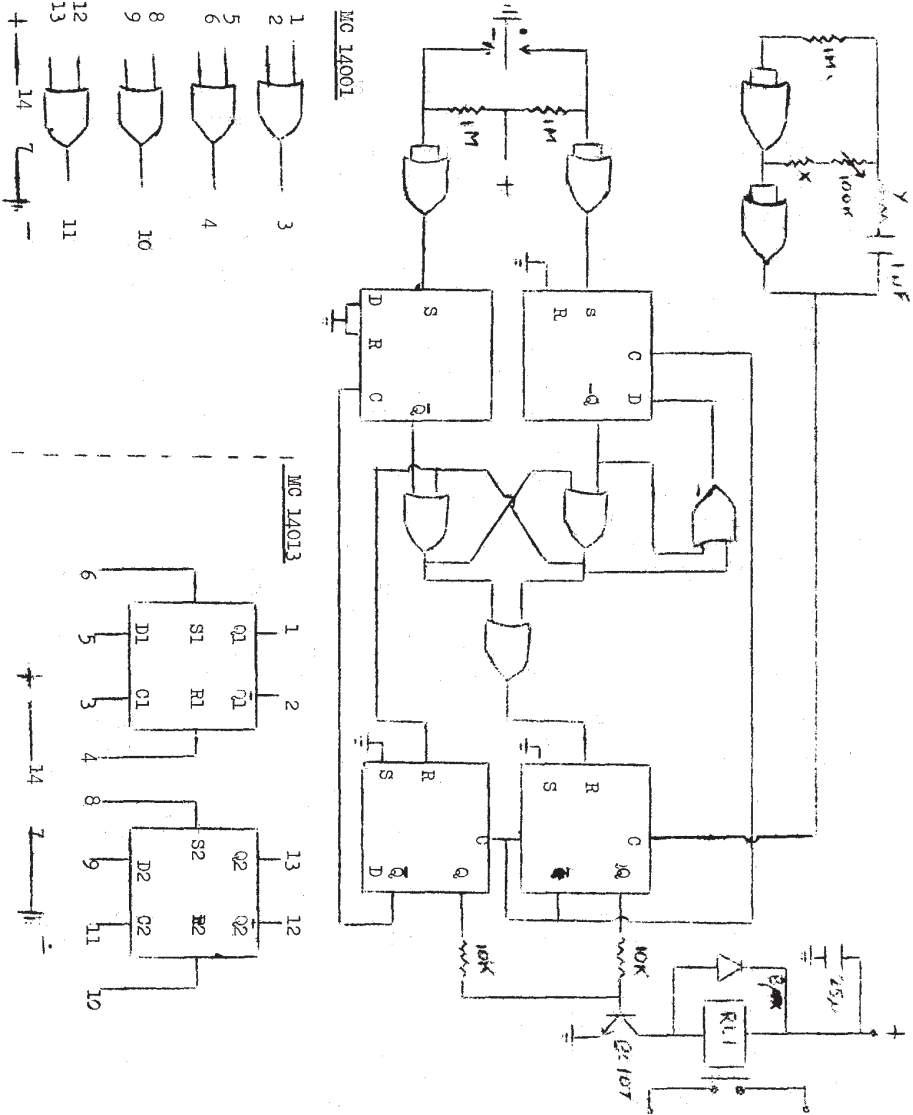
I have received a very interesting letter from VU2FET (what a call!) who reports his QRP work from India. "Fet" is a 21 year old Computer Science Student from Bangalore who runs only 150 milliwatts on 40m to an inverted V. He has worked around VU land and into 4S7 - The rig is crystal controlled with no tuned circuits. He intends to join the club, but at present the postal lag to VU land is holding up our correspondence on this matter. We probably will never hear him over here, but wish him good luck with his QRP work.

IN THE NEXT SPRAT.....

I have quite a few articles pending, including:
 THE G13WUO 4 Metre Transceiver - I bumped into him with it at Leicester.
 VARACTOR TUNING OF THE DJ1ZB FET RECEIVER,
 A FULLY STABILISED POWER SUPPLY FOR QRP WORK by GM30XX
 MORE A.T.U. IDEAS, including an excellent circuit from DJ1ZB.

WHAT ABOUT THAT ARTICLE FROM YOU ?

You don't have to be an author, a circuit and rough notes will be enough.....



G-MOS KEYER BY G3KPT / G3VHL.

This article is a reprint of an article in MARS Newsletter Oct/Nov 1975 for which we offer thanks to the authors and the Midland Amateur Radio Society. Gerry - G3KPT - is a member of G-QRP-C.

This article is a reprint from the MIDLAND AMATEUR RADIO SOCIETY NEWSLETTER.

The majority of electronic keys previously found published in the various radio periodicals, have been designed around either discrete components or TTL. The power consumption of such devices is invariably high, and in the cases of TTL circuits the supply levels are rather critical.

The circuit shows a keyer which contains all of the normal facilities that are usually found on the average type of electronic unit. This system will operate, as far as electronics are concerned, on a dc level of anything between 3 and 12 volts. The only factor determining the supply used by the individual constructor for this device is his choice of relay.

The two resistors X and Y are chosen so that the speed pot gives the range of operating speed the individual requires. The C-MOS devices, 2 x MCL4001 and MCL4013 are not too expensive and the price appears to be coming down all the time, they need not be of the MC series but may be the CD14001 and CD14013 types, they are, respectively, quad, 2 input NOR gates, and dual, D type flip flops. The recommended supply voltage is 3 - 16 volts dc.

THE NORMAL HANDLING PRECAUTIONS FOR MOS DEVICES SHOULD BE EMPLOYED.

An extra refinement may be added to this keyer, if the two 1M ohm input resistors are increased in value to 10M ohms and the negative side of the supply is connected to the main earthing system of the station rig, then it is possible to obtain a "touch key" arrangement. All that is required to operate the keyer under these conditions, is for the operator to touch either the dash or the dot operating terminal and the electronics are operated by his body capacity to the earthing system, it's a bit weird at first! The overall effect of touch keying when you manage to control the operation of your fingers is that you are no longer dependant on obtaining a top class highly priced keying lever, just a simple pair of contacts will suffice.

Although the oscillator in this circuit is left running continually in the key up condition, the drain on the power source is only 2 - 3 mA, in fact a PP3 left on continually and keyed for about an hour each evening was good for over two weeks! So, no problems if you go to bed and forget to switch off the keyer.

The relay used in the prototype was a 12 volt, 500 ohm, reed relay, but this seemed perfectly happy on a 12 volt supply. There is nothing to be lost in how the keyer is laid out, the prototype was in fact built on veroboard and bases were used for the IC's in case the idea didn't work.

This keyer was the first attempt at using C-MOS devices for amateur equipment on my part and having encountered no snags at all I feel that there is probably quite a future for this type of equipment in similar ideas and techniques yet to come.

*****DIAGRAM OVERPAGE*****

GETTING ONTO EIGHTY WITH AN HW7

An idea by Bob Fowler G3IQF.

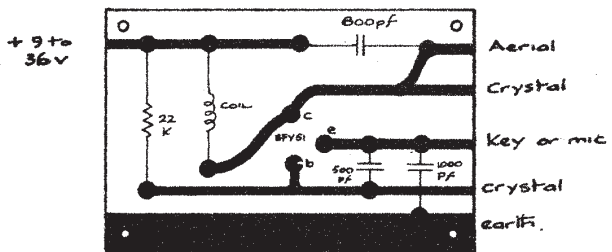
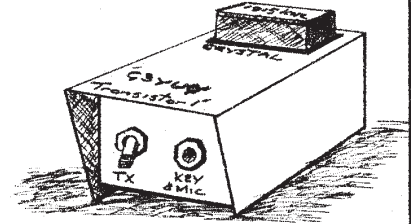
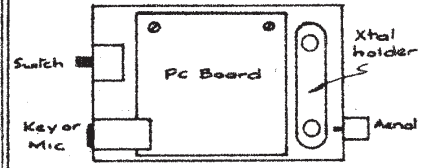
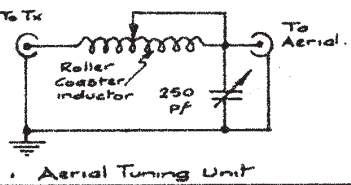
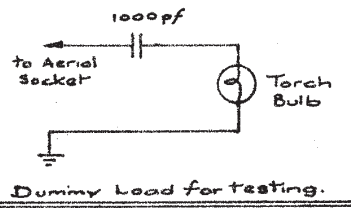
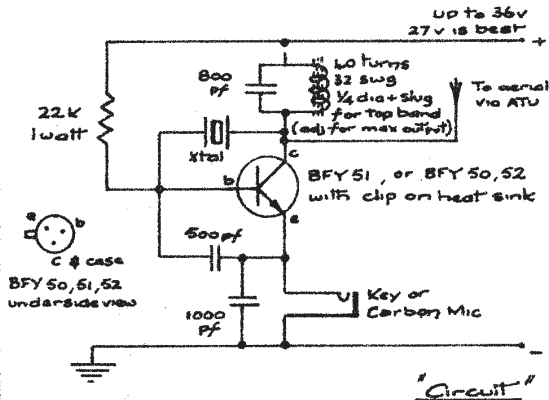
Many members who own the HW7, have also thought in terms of covering the 80m, band by building up the G3IGU 50 TX in the summer SPRAT. Bob has pointed out that a suitable 80m source can be derived from the HW7, using the VFO on the 40m position - it operates on 80m and is doubled-up.

The transistor Q4 in the HW7 circuit will provide a reasonable level of 80m drive - enough to drive TR7 in the G3IGU TX circuit. This means that only a BC108 and BFY51 will produce an 80m QRP signal, using another RX. Also using, the coupling pickup lead in the G3IGU circuit, the RX side of this transceiver could also be built - the result being an inexpensive "transverter for 80m"

The idea was only passed on verbally at the Leicester Exhibition, but it worked for Bob - any problems, and he will probably be able to give more gen. QTHR. Bob ~~the~~ the Xtal socket of the HW7 for his output point, to coax lead.

DID YOU KNOW...that J. Birkett has Dual-Gate MosFETS at only 30p - a free ad, but not to be missed, the last one I bought cost me £1.06 ~~anywhere~~...G3RVJ.

Also A & B (I think they are called) of Leeds sell a stabilised 13 volt PSU for £1.50 - I bought one last year and it gave NO HUM with an HW7 (up to 2 amps)



Components on other side

"Printed circuit board." full size
copper side

Notes.
Testing. Connect 9 to 27v supply, morse key, & dummy load. Depress key & adjust coil slug for max output
Operation. Connect 9 to 27v supply, morse key & aerial via ATU. Depress key & adjust ATU for max output on a field strength meter.
 Note: if loading is too heavy the Tx stops oscillating. Best point is just below this.
For AM connect a carbon mike in the jack socket. Note: mike MUST be carbon. Power output drops to about 1/2 CW output & modulation is downward. However I still get very good results up to 15 miles on AM with a 90ft end fed wire & fair earth.
Power Supply. I use 3 - PP3 batteries in series to give 27 volts. But Tx will work OK with only 9 volts. i.e. 1-PP3. The smaller PP3 type are not suitable.
Power Output. This varies a little with different Transistors but average as follows.
 9volts 1/4 watt AM, 27volts 3/4 watt AM
 CW double above figures.
Use on other bands. AM would not be suitable due to extensive use of SSB. However CW should give good results. A change of Xtal & coil is all that would be required.
Crystals. 10x type are best or any large type.
PCB. Not essential but produces a neater job

"Transistor 1" Simple AM/CW 160 meters Transmitter. Designed by G3YUQ

J. BIRKETT

RADIO COMPONENTS.
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LINCOLN. LN2 1JF
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MINIATURE ELECTROLYTICS. 1000uF. 40 v.w. $1\frac{1}{2}'' \times \frac{1}{2}''$THREE FOR 35p.
R.F. AMPLIFIER TRANSISTORS type BF332 NPN (230 MHz).....EIGHT FOR 50p.
500 YARD REEL OF 14 strand .0048 P.V.C. CABLE.....£3.incl. postage.
SUPER BAG OF MULLARD CAPACITORS.....AT £1.
60 ASSORTED WIRE-WOUND RESISTORS (1 to 10 watts).....57p.
200 ASSORTED TUBULAR CERAMICS.....AT 57p.
FERRANTI ZTX 108 TRANSISTORS.....SIX FOR 57p.
BFY51 NPN TRANSISTORS (see G3YUQ TTX).....15p.
*****DUAL GATE MOS FET'S (Like 40673)....33p. *****
*****DUAL GATE MOS FETS as above....FOUR FOR £1.10. *****
BF 224 R.F. TRANSISTORS (600 MHz.).....SIX FOR 57p.
50 PLASTIC NPN TRANSISTORS (85% Good).....57p.
2N3375 V.H.F. POWER TRANSISTORS.....AT £2.16 each.
18 VOLT, 1 AMP. MAINS TRANSFORMER (240v AC input).....AT 85p.
BFW 30 VHF TRANSISTORS - - LIKE BFY 90.....25p each.
SIX F.E.T.'S....LIKE 2N3819 (type BE5565).....FOR= £1.
50 P.I.V. SILICON DIODES...50 AMPS....at 30p each.....FOUR FOR £1.
50 P.I.V. SILICON DIODES...70 AMPS....at 40p each.....FOUR FOR £1.40.
SUB MINIATURE MAINS TRANSFORMERS 12-0-12 volt at 50 mA.....88p.
REGULATOR I.C'S UA 723.....at 50p each
COMMUNICATION SERIES OF I.C's....Untested,consisting of 1xRF, 3xIF, 2xVOGAD,
2xAGC, 1xMike Amp, 2xDouble balanced Modulator,
1xmixer.....the 12 IC's with date £3 (27p each)
IC SOCKETS - DUAL IN LINE - 8 pin, 14 pin, 16 pin....at 15p each.
V.H.F. F.E.T. BF 256 (800MHz) sim. to 2N3819, MPF102, TIS88....25p each(5 for £1.10)
50 ASSORTED TRANSISTOR ELECTROLYTICS.....57p.
PRINTED CIRCUIT MARKER PENS.....50p.
365pF THREE GANG VARIABLE CAPACITORS ($2\frac{3}{4}'' \times 1\frac{3}{8}'' \times 1\frac{3}{8}''$).....at 66p.
TIMER IC. NE555.....at 50p.
OP-AMP 8 lead 741.....at 30p. (or FOUR FOR £1.)
200 ASSORTED POLYSTYRENE CAPACITORS.....57p.
200 ASSORTED CERAMIC (DISC).....57p.
35 ASSORTED PRE-SETS AND SLIDES.....57p.
50 ASSORTED POTENTIOMETERS.....£1.
UNMARKED GOOD 2N706 TRANSISTORS.....TWELVE FOR 57p.

100 ASSORTED SILVER MICA CAPACITORS.....57p*****

*****PLEASE ADD 15p, FOR ORDERS UNDER £1.50 FOR POST AND PACKING*****

CHANGES IN MEMBERSHIP DETAILS :

This month, I am listing CHANGES IN QTH of existing members and only the call signs and names of new members since the last SPRAT.

A complete new membership list is being prepared (mainly by the efforts of of Connie Wade G4CUY - herself a new member) and I expect to be able to post this complete new list to all members within the next few weeks

New members since 25.8.75.

155. Baden J.R. Powell.	G4DZN	167. Dennis Hault.	G400
156. Derek R. Sheen.	G4CCW	168. Peter Gollidge	G3EDW
157. Kenneth Baker Pearse.	G3MLC	169. Roy K. Clifft	G4DES
158. Colin Fitch.	G4CKI	170. Roy O. Rowntree.	G3ZQA
159. James L. Moar.	GM4EPR	171. Connie Wade.	
160. Peter Griffiths.	G8FGY	172. William R. Parkinson.	G3FNM
161. Peter Lewin.	G3PKS	173. Thomas Arden.	G3LJF.
162. Alan Lake.	G4DVW	174. Matthew Bamsley.	G3HZM
163. James Collins.	G3MBW	175. Arthur J. Gould.	G3JKY
164. H.E. Smith.	G3IVF	176. Dave Gallop.	G3LXQ
165. I.D. Brown.	G3TVU	177. Ronald V. Oakley.	G8GR.T.
166. Charles H. Brain.	A8583		

*****Sorry about the 'out of line lines' above - tabulator trouble - G3RJV.*****

Changes in Q.T.H. since 25.8.75.

<u>Number</u>	<u>Member.</u>	<u>New Q.T.H.</u>
135	Jim Prior (KL7HLC)	759D - New Married Student Housing, Fairbanks, Alaska.
005	Chas Anderson (G2BS)	39 High Riggs, Barnard Castle, Co. Durham.
083	C. Clayton.	34 Queensway, Parkwell, Gwersyllt, Clywd.
017	J. McDonnell (G3DOP)	7 Tregellas Road, Mullion, Cornwall.

Please note : I have wrongly called the CLAVTON (Father and son members) Clayton and also referred to G3IQF as G3IGF in previous lists.

The new membership list when completed will contain updated details of members names, QTH, and QRP interests.

STOP PRESS MEMBERS AD.....

G3FCK (Mac) is seeking the circuit diagram of the HEATHKIT "CHEYANNE" TX (MTL) and would like to purchase a Haeth "MOHAWK"...QTHR.

G3DOP (see change of QTH above) is seeking skeds on QRPp - John runs about 50 mW on 7020 Sat and Sun am. 0600 - 0800 and is pleased to seek contacts and reports.

+++++

G3RJV is looking for a 1.7 to 4.0 MHz H.R.O. G.C.Coil or an 80m Bandsread Coil.

ATTENTION TEACHERS AND PEOPLE WITH EDUCATIONAL ADDRESSES !

Did you know that by using headed note paper from an educational establishment you can obtain the 50p HENRYS RADIO CATALOGUE ! FREE !!!

G - QRP - DATA SHEETS.

The club still continues to run this service. At the moment I have limited copies of both QST articles on the HW7 - The Full MFJ Filter circuit and Gen - An Article on Active Filters and QRP by K8EEG - Simple HW7 Mods by Members The Full Awards Programme of the QRP ARC I - The SM3GFV 80/40m TTX - Improving The Efficiency of Short L.F. Band Aerial by G8PG (a SPRAT reprint)

Any other suitable material (overseas magazine articles etc.)for making into DATA SHEETS would be welcome.

NOTE: Did you know that the methods used in IMPROVING THE EFFICIENCY OF LF BAND AERIALS by G8PG (Sprat 2.) Also works well for counterpoises ?