SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED·TO·LOW·POWER·COMMUNICATION

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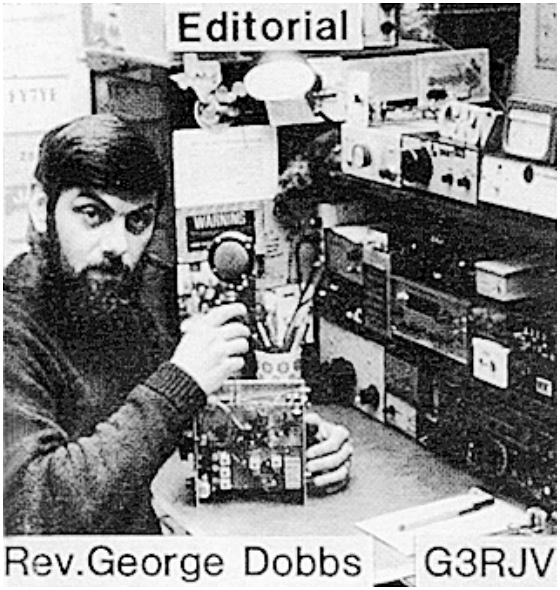
The JLD Transceiver, built by G3RJV
and featured in SHORT WAVE MAGAZINE
for May and June 1985.

G3YCC 14MHz SSB TRANSMITTER - A LINEAR AND STABLE V.F.O.
A SIMPLE SQUEEZE KEYER WITH CAPACITIVE TOUCH PADDLES
ROCK'S TEST BOX - G3AEP QRP TX - HF QRP POWER METER

AN IMPORTANT NOTICE.....MEMBERS NEWS.....AWARDS NEWS.....SMALL ADS
SSB NEWS.....28MHz SPORADIC E SEASON.....RSGB HF CONVENTION.....

Editorial



Rev.George Dobbs G3RJV

St. Aidan's Vicarage,
498 Manchester Rd
ROCHDALE,
Lancs,
OL11 3HE.
Rochdale [0706] 31812

Dear Member,

As the summer draws to a close (although there has not been much of it in the UK!) we begin to warm up the soldering iron for evenings of construction. May I remind you of the open Construction Contest announced in the last issue of SPRAT in time for the 50th issue. See page 20 of issue 47 for full details.

The size of the club is now such that once again we are looking at ways of streamlining our administration. Please read carefully the information which appears in this issue about the future payment of subscriptions. Please remember that the club is run by radio amateurs for fellow radio amateurs and we all fit it into our spare time along with attempts to get on the air, build equipment.....

Do not forget our annual WINTER SPORTS event. The details were in the winter issue. It is usually our best activity event of the year. The procedure is simple: from December 26th to January 1st we listen for or call "CQ QRP" on the calling frequencies (3560,7030,14060,21060,28060 KHz) and try to work as many other club members as possible. The current state of the bands means that we have no time/bandplan this year, so perhaps try the highest open band at the time of operation.

73 fer nw

George G3RJV

THE G3YCC SINGLE SIDEBAND TRANSMITTER FOR 14MHZ

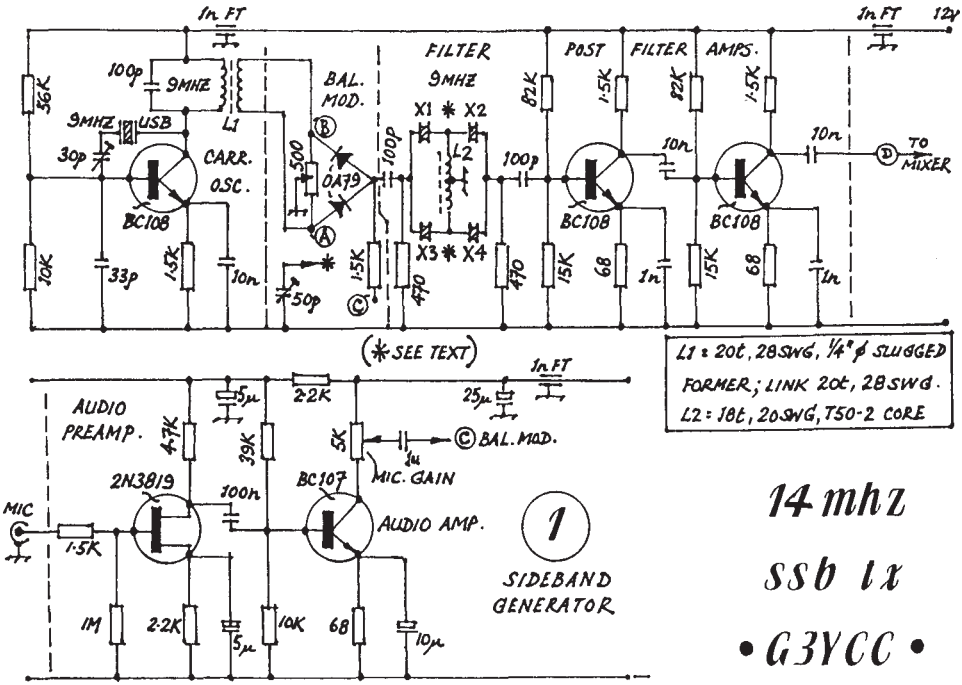
By Frank Lee G3YCC

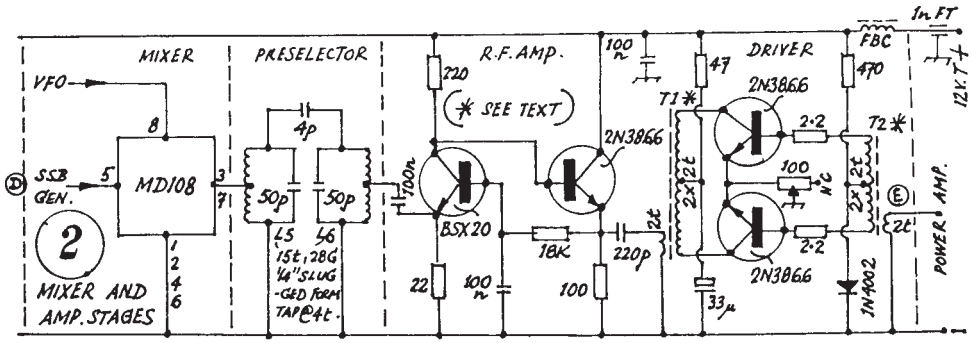
This rig was built with several points in mind. Firstly it was required to be a simple TX which could be made cheaply, mainly from junk box bits. A total of 13 transistors are used, ICs are not employed here.

The resultant rig puts out perfectly acceptable sideband on 20 metres and has worked the usual Europeans at the 4w output available. None of the circuitry is unique but rather adapted for the purpose. It should be reproduceable by the average constructor and could be adapted for any HF band.

Construction: The SSB generator (Fig.1) was built into an aluminium box with screens as indicated. Modules can be vero as in the prototype or similar PCBs. Inter unit wiring should employ screened cable. The PCB for the PA is described in Sprat 43. The component layout for the PCBs for the driver and VFO are outlined in Figs. 5 and 6. The RF amplifier was made on vero.

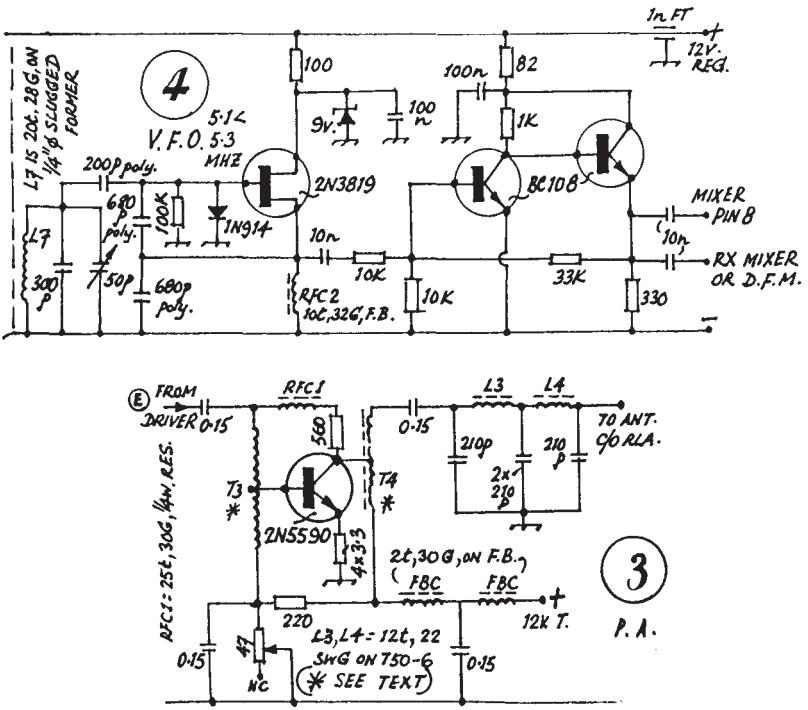
Circuit notes: The balanced modulator was the traditional diode bridge, which should idealy employ a matched pair. The 500 ohm pot is carbon track linear. The crystals employed in the filter are $X_1 = X_3$ and $X_2 = X_4$ for approximately 1.8KHz separation at 9Mz. A commercial 9Mhz filter, e.g. XF9B, could be employed with a large increase in cost and appropriate inout/output components. The mixer used an MD108 because it was to hand, other similar units would be suitable, but not the pin format varies. The driver stage has more than enough gain to drive the 4w PA, and could be used on its own as a low powered final . The emitter preset sets the output. T1 and T2 employ twin holed ferrite blocks with 2 x 2 turns of 28SWG bifilar wound for the centre tapped coil, and two turns 28SWG for the other windings. The ferrite bead chokes are two turns through a ferite bead.





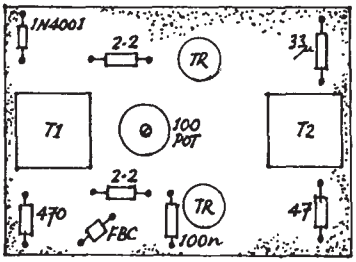
The VFO covers 5.1 - 5.35MHz to cover 14.1 to 14.350MHz and is sturdily constructed in an aluminium box. It is driven with a S/M drive, variation in the tuned circuit values may be required for band coverage. Polystyrene capacitors are required as indicated for stability.

The PA stage has an output of 4 watts in Class A, and has been found to be reliable on all HF bands. As a dissipation of 4 watts is required during transmission, an adequate heat sink is needed. T3 and T4 are wound on twin holed ferrites wound as shown. Alternatively 25 turns of 26SWG bifilar on T-68-2 toroids can be tried.

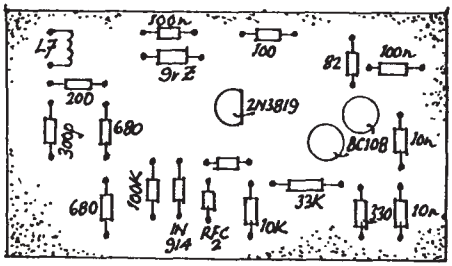


Change over relays are left to the constructor. 12v regulated is supplied directly to the VFO and the points labelled 12vT have the supply applied when the relay is energised by the PTT line as standard practice. A simple diode RF indicator using a 100uA meter, with the probe near the PA, was employed. Alternatively a separate RX, with suitable muting and netting switching, can be put into service. If the preselector and PA o/p circuitry is switched, a two band rig for 80 and 20 metres could ensue. A separate carrier crystal would need to be selected for LSB.

Setting up: Coverage of the VFO is done with a DFM or general coverage RX. The tuned circuits are best tuned with a valve or FET voltmeter, (make one!), or tuned for maximum output. The frequency of the carrier oscillator is best set by on air testing with a local for best sounding audio. The balance demodulator pot is set for maximum carrier suppression and the 50pF preset can be tried on either points A or B for maximum dip, or may not be found necessary at all. The preset in the PA is set for a standing current of 400mA with no drive applied, monitoring the current to the whole stage. More than adequate audio is available and is set by the 5K pot in the preamp. Again, more gain is available than required at the driver stage and is set to produce approximately 40mW to drive the PA or monitor the output on a wattmeter, (make one!), from the PA until 4w is obtained. Finally peak the tuned circuits for maximum output.



5 DRIVER P.C.B.



6 V.F.O. P.C.B.

Although a simple balanced modulator was used, tests with a local confirmed no residual carrier was radiated, and audio quality was excellent. The rig is cheap to build and fun to use. Despite the low cost, an acceptable SSB signal can be radiated. The rig can be added to and extended as required, but as described is a good basic SSB transmitter for the 20 metre band. All components are readily available, even if some have unfortunately to be brought.

CORRECTION TO POCKET RECEIVER: SPRAT 47:
1) There should be a joint at the junction of the 220K resistor and the 10n above the base of the BF115. 2) The emitter of the BC337 is shown the wrong way around, it should go to the top (junction of 47µ and 220Ω).
The tapping for L2 should be about midpoint in the winding.

FOR SALE MC1496 Balanced Mixer ICs. 14 DIL or TO5 types. State Which. 85p or 2 for £1.60 inc. Tony Webb, G3KCJ, 69 Lalleford Rd.Luton.LU2 9JQ.

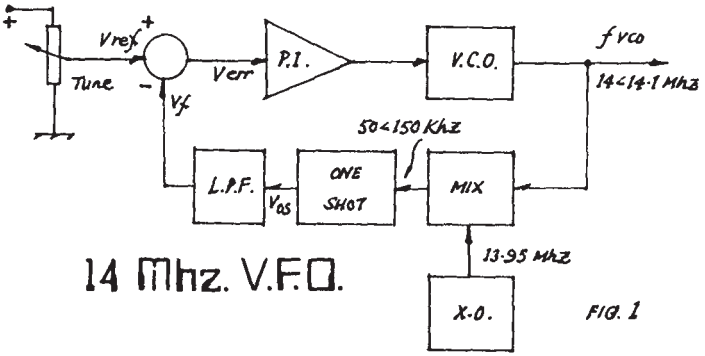
FOR SALE: FL110 Solid State Amp. 10w in 100w+ out. 160m to 10m. By Yaesu. £85 o.n.o. Philip Tel: 0793 771153.

A LINEAR AND STABLE VFO FOR 14MHZ

By Matthias Volkert DF4SQ

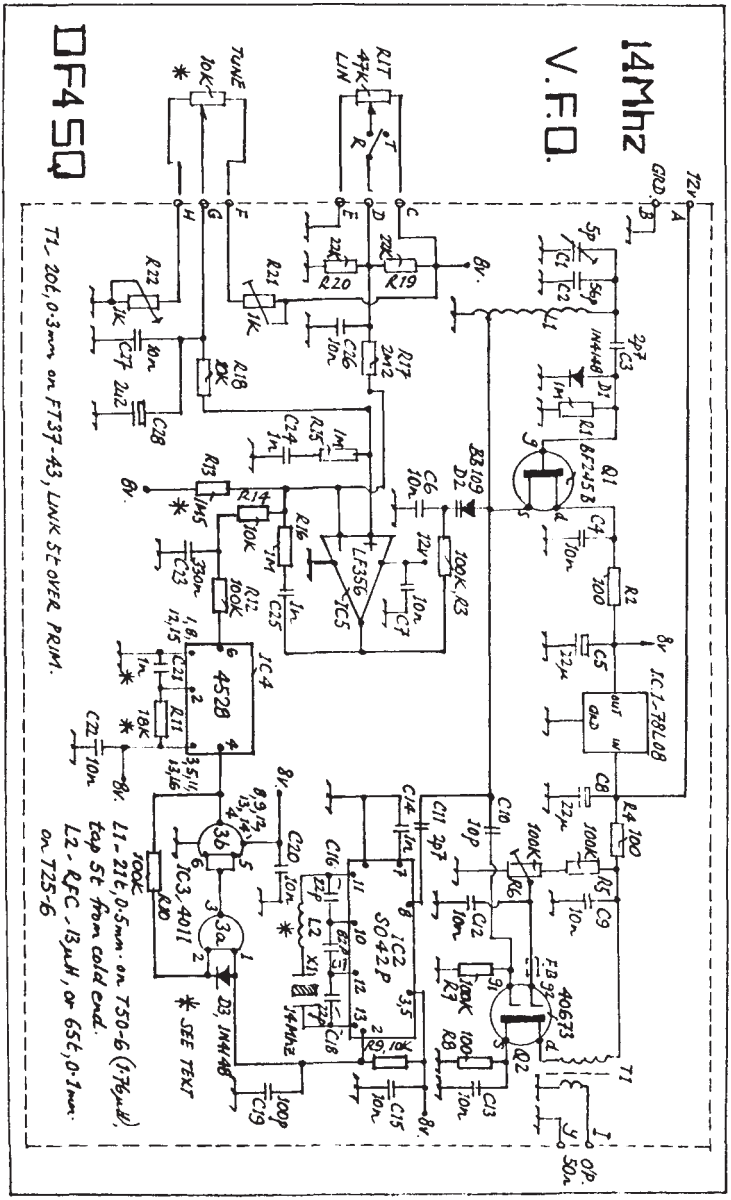
A VFO with a control loop does not necessarily mean a PLL circuit. This design uses a frequency to voltage converter in the feedback loop rather than a divider chain, and no phase difference is detected, but simply two voltages are compared with one another. The difference is fed into a PI control amplifier which acts on the VCO frequency in such a way that the two voltages are always made equal. The oscillator, therefore, can be tuned simply by variation of the reference voltage. A block diagram is shown in Fig. 1.

The main part of the control circuit is the frequency to voltage converter. Its accuracy determines the stability of the whole VFO. The 14.0 - 14.1MHz signal of the VCO is mixed down to a much lower frequency for easier processing. If a 13.950MHz crystal is chosen, the mixer will produce 50 - 150KHz. This low frequency signal is used to trigger a one-shot, which delivers a pulse of 5us length whenever a transient from low to high occurs at its input. Since the pulse length is constant, the duty cycle of the one-shot output signal depends linearly on the VCO frequency. A frequency of 14Mhz will yield a duty cycle of 25%, whereas 14.1MHz will yield one of 75%. This variable duty cycle is then converted into a corresponding DC voltage by means of a low pass filter.



The circuit diagram of the VFO is shown in Fig. 2. Q1 and associated components form a Hartley oscillator which is tuned by the varicap diode D2. The trimming capacitor C1 is used for the exact setting of the tuning range. Te VCO is followed by a buffer amplifier Q2 which provides an output of up to 1.5V across 50 ohms, depending on the setting of R6. Via C11 a small amount of VCO energy is fed into IC2. This device includes a doubly balanced mixer which is operated in self oscillating mode. A 14.9Mz crystal is used rather than a 13.95MHz one, as this is readily available. However, a slight increase of sideband energy must be accepted. The frequency of oscillation is shifted to about 13.985MHz by means of an RF choke in series to the crystal.

A Schmitt trigger consisting of two NAND gates is used to convert the low frequency mixing product into a square wave signal. This ensures proper and definite triggering of the succeeding one-shot IC4. A 4528B device was chosen here which proved superior to the 4538B. The plus length is determined by R11 and C21. Good quality components are essential here for a good stability of the whole VFO. R12 and C23 form a low pass filter which converts the duty cycle of the one-shot signal into a corresponding DC voltage. The operational amplifier IC5 compares this voltage with the reference voltage given by the setting of the external tune and RIT potentiometers. R21 and R22 set the lower band edge to exactly 14.0MHz and the upper band edge to 14.1MHz. This results in exactly 10KHz per revolution, if a ten turns tuning pot is used, and an accuracy of 1KHz is easily achieved, even with a simple mechanical turns counter. R13 was introduced to ensure proper operation of the amplifier, with input voltages close to zero.



The output of the amplifier is finally connected to the tuning diode D2 via a further low pass filter consisting of R3 and C6. This low pass filter, as well as R12, C23, C24. C25. R15 and R16 determine the dynamic characteristic of the control loop. The value of these components are chosen in such a way that a fast semi break in operation will be possible.

When the assembly is completed the operation of the VCO is checked first. Disconnect R3 from pin 6 of IC5 and apply a tuning voltage of about 0.8V. Adjust C1 carefully until the VCO oscillates at about 14.0MHz. It should be possible now to tune the VCO from below 14MHz to above 14.1MHz by varying the tuning voltages from zero to,8V.

Next the frequency of the crystal oscillator is checked. It should be around 13.985MHz. If it is much higher than that add turns to L2, and if it is much lower, remove turns. To check the operation of the frequency to voltage converter connect a meter to the junction of R12 and C23. The measured voltage should vary continuously as you tune the VCO. Then connect R3 to pin 6 of IC5 and adjust R21 and R22 so that the tuning range is limited from exactly 14.0Mz to 14.1MHz, C21 may be a little too large. Alignment is completed by readjusting C1 to that point which just ensures proper oscillation when the VFO is tuned to 14.0MHz. Check the right setting by touching the resonant circuit with your finger. Oscillation should restart at 14.0Mz immeditely after you have drawn back your finger.

As you can imagine there are other possibilities with a frequency to voltage converter. I would like to exchange ideas with any other Club members.

NOTE:
When Matthias submitted this circuit for SPRAT, he included a suggested layout for the VFO. Unfortunately this would not reproduce clearly enough for inclusion with the article. Members who wish to have a copy of this layout can write to G3RJV with an SAE.

A SIMPLE SQUEEZE KEYER WITH CAPACITANCE TOUCH PADDLES

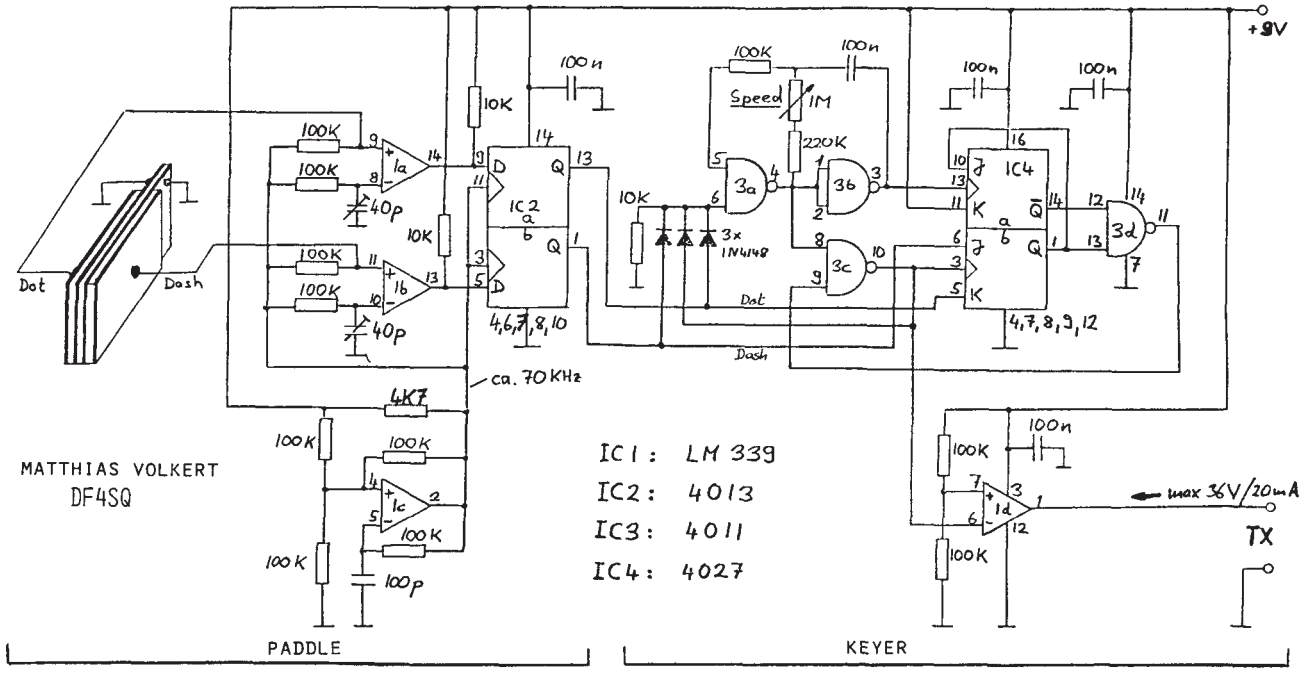
by Matthias Volkert DF4SQ

After having built a QRP rig into a tin of about 11 x 7 x 5 cms, I realised that my electronic keyer was now twice as large as the rig! This fact entirely shattered my view of the world (at least as far as amateur radio is concerned), and in order to recover the original proportions, I decided to build a small keyer as well.

The circuit consists of two parts, as shown in Fig. 1. Two ICs are used for a capacitance touch paddle, the remaining two ICs generate the dots and dashes.

Touch paddle: Two pieces of single clad PCB material (about 4 sq. cms.) are glued to the centre of double clad material. The centre piece is grounded. Each touch plate therefore forms a capacitance versus ground, which is increased by touching the plate. A square wave oscillator consisting of IC 1c and associated components injects a clock signal of about 70KHz into both inputs of the comparator 1a (dots) and 1b (dashes). The clock signal is shaped by the trimming capacitors and the capacitances of the plates in connection with the 100k resistors, (low pass filters). If the trimmers are set to a value, which is slightly larger than the capacitance of the plates, the trimmers and the capacitances are charged and discharged according to Fig. 2. As a result the comparator output signal will shift in phase, when a plate is touched. The D-FF IC2 is triggered on positive transitions of the clock signal. The Q outputs therefore will be low as long as the plates are untouched, but high when the plates are touched.

FIG.1. SIMPLE SQUEEZE KEYER WITH CAPACITIVE TOUCH PADDLE



MATTHIAS VOLKERT
DF4SQ

Keyer: Its operation is explained by the timing diagrams of Fig. 3. IC 3a/b form a clock oscillator which oscillates as long as pin 6 of IC 3a is kept high. The oscillator is started by touching one of the plates and does not stop until a dot or dash is completed. This is due to the three diodes which are connected as a three input OR gate. The open collector output of the comparator IC 1d is used to key the transmitter. The keying voltage, however, must not exceed 36V at 20mA. To ensure proper triggering of IC4 two additional 100pF capacitors from the clock inputs, (pin 3 and 13), to ground might be necessary, in case of possible noise pickup from the 70KHz signal.

Due to the simplicity of the circuit the keyer easily fits into a box only 11 x 3 x 3.5 cms. The only adjustment necessary is to set the desired sensitivity of the touch paddle by means of the trimming capacitor.

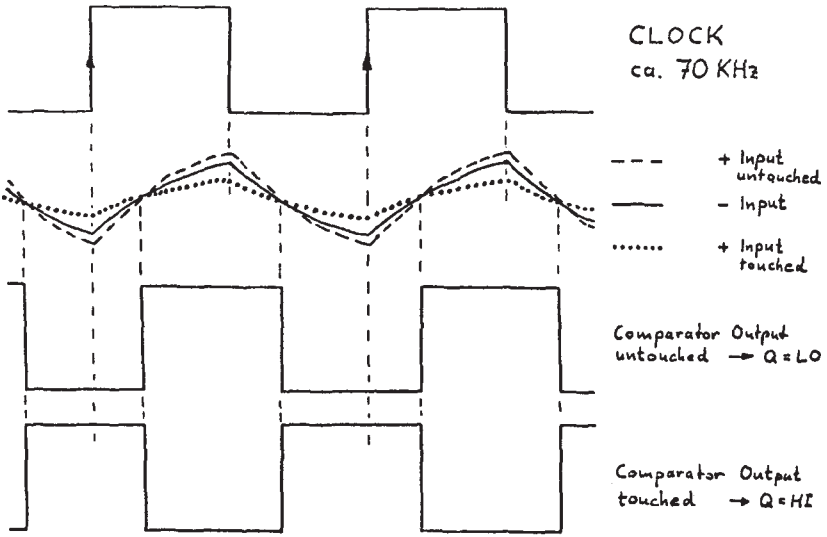


FIG.2. OPERATION OF THE TOUCH PADDLE

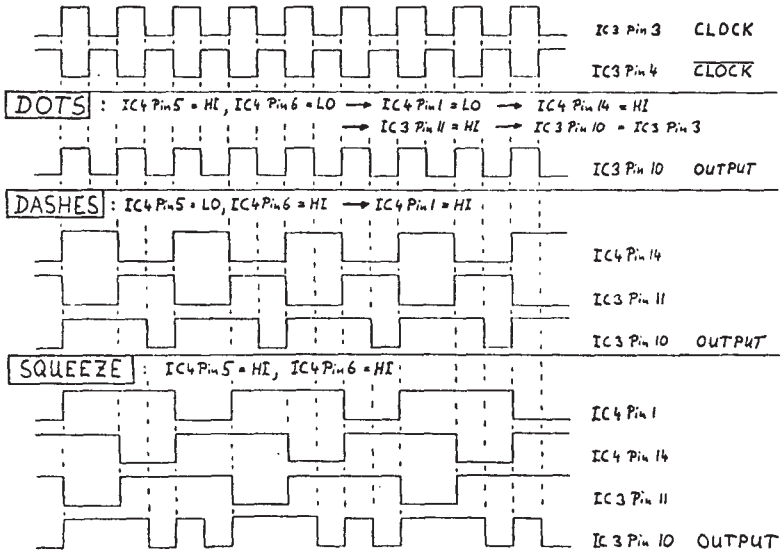
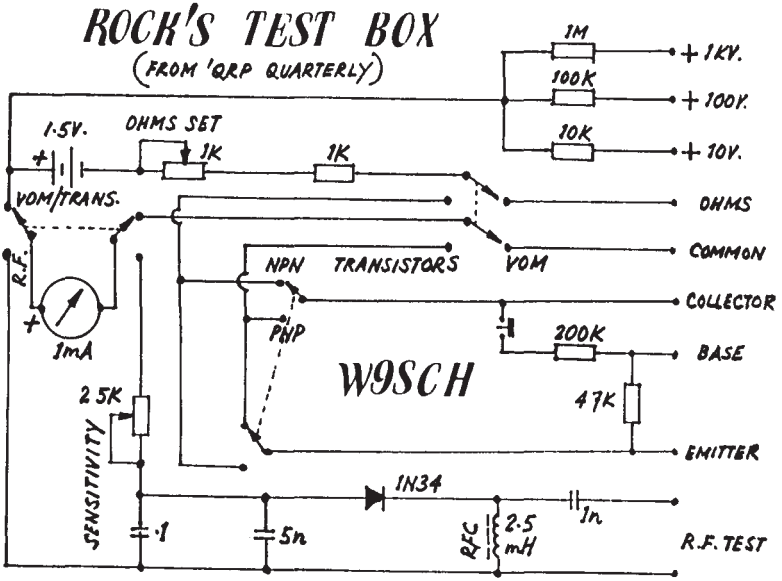


FIG.3. TIMING DIAGRAM OF THE KEYER

"ROCK'S TEST BOX DOES IT ALL! C.F. ROCKEY W9SCH



(Reprinted from QRP ARCI Quarterly)

"To measure is to know," the wise Hollanders say, but commercially made test gear is beyond the budget of many of us. On the other hand, it is practically impossible to get a freshly fledged "home brew" QRP rig working correctly without some checks being made. We describe here a simple and relatively inexpensive test set-up which almost any QRPer can build and use. And you will use it, too.

This gadget provides three basic functions:-

1. A DC voltmeter
2. A practical transistor tester
3. A "Soup Sniffer" or RF "Volt scope".

We cannot call the latter an RF voltmeter because it is not calibrated, but it's extremely useful just the same. The most expensive item used is a 0-1mA meter, probably as cheap as any meter you can buy, and often available for even less at ham "flea markets". It is also able to take more punishment than are more sensitive types, a valuable ham feature.

1. The DC Voltmeter - The volt meter provides the three voltage ranges I have found most useful during several decades of hamming. Other ranges may be set-up instead if you prefer. But remember, you must provide a thousand ohms of series resistance for every volt of full scale reading. (Due to the limited sensitivity I do not recommend a full scale range of less than ten volts, however.)

Use 5% tolerance resistors for the voltmeter circuit, (the 1M, 100K and 10K resistors), if you can get them, (or make them from various resistors in parallel and series from your junk box - Ed.). They must be of the one watt size or larger. It is upon these resistors that the accuracy of the voltmeter chiefly depends. The ohmeter function is also extremely useful; calibration data is given later. (Since 90% of the tests made in amateur trouble shooting are DC, we chose to forego the complexity of AC (low frequency) scales here.)

2. The Transistor Tester - this is simple yet has proven most valuable over the years. It will answer two questions most vital to the QRPer, first will it "transmit?" and secondly does it have any "betty?" (beta).

To use it, first put the switches into the "volts-ohm" position, then short the test leads together, setting the "Ohm set" potentiometer to full 1mA reading. Then throw the switches to "Xstr Test", (selecting NPN or PNP appropriately of course). The meter reading will then be the transistor leakage current; it should be no greater than about 0.05mA for germanium and negligible for a silicon unit. Push the button. The meter reading should swing sharply upward. (The higher the swing, the more "betty" she's got.) A good transistor should swing up to at least 0.2mA and a hot one might go up to 0.7mA. A bad one will not swing up at all when the button is pressed. (If you have popped as many transistors in the initial testing of "home brew" rigs as I have, you'll find this function extremely useful.)

3. The RF Voltscope - The "Soup Sniffer" or RF "Voltscope" is a true friend in need when that new QRP rig you've just built just won't "put out". With it you can trace the RF voltage right through, from oscillator to final amplifier. (This is practically the only simple way to check an untuned buffer or emitter follower stage.)

Hang a 47 ohm carbon resistor across the terminals and you could calibrate it as a QRP wattmeter; replace this with a piece of wire and you have what is called a "field strength meter" by some. Clever folks will find other uses for it. It's a handy item.

Use your own taste for construction in the physical arrangement; nothing is critical except the voltage meter resistors. Wire your gadget sensibly and provide proper insulation for the terminals and it should develope no problems. The DPDT switches should be either of the rotary or toggle type; personally, I have had poor luck with slide switches, but this is your choice.

I make no claims for high accuracy in this simple gadget, but no matter. Long experience shows that it is relative values that are important in most amateur measurements. An accuracy of, perhaps, plus or minus 10% can be expected; sufficient for amateur purposes in nearly every case. Build one of these things and you'll be glad that you did.

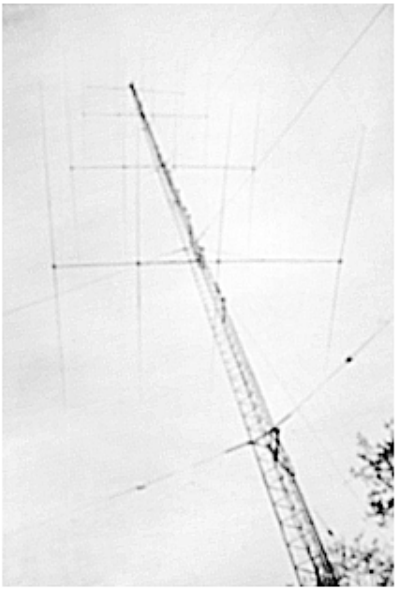
Calibration of the ohms scale assumes a good 1.5 volt battery is used and the "Ohms set" potentiometer is adjusted to bring the meter reading to 1mA when the test leads are touched together:-

Ohms	mA Indication	Ohms	mA Indication
0	1.0	3000	0.33
100	0.94	5000	0.23
300	0.83	10000	0.13
500	0.75	30000	0.05
1000	0.60	50000	0.03
1500	0.50		

USA 1987 - BY CHRIS PAGE G4BUE

Shots from my trip to the USA in April, described in Members News in Sprat 47

W7ZOI setting up his new 7MHz TCVR on the Washington side of the Columbia River Basin. Antenna was inverted vee 25 feet up in the pine trees. G4BUE/W7 using the rig to make a QSO over 500 miles to San Francisco, Cal.



No it's not for VHF. The 200 feet tower at N4AR in Kentucky has 16 elements for 14 MHz on Europe, 4 x 4 el yagis. It gave me a kick putting my OXO on it!

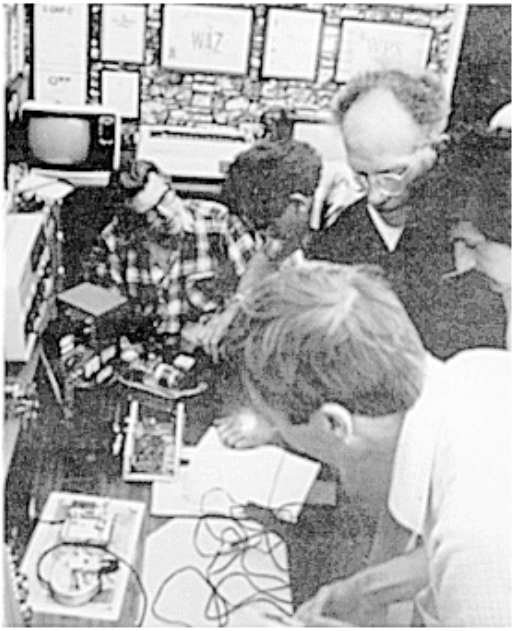
The KC5EV taxi service from Downtown Dayton to the Hamvention was a bit rough at times!! Danny K3TKS, Jack K2RS, John KN1H and Chris G4BUE enjopying the ride in the 90 degree sun

The Hospitality Suite was on the top floor of the hotel in Downtown Dayton where the QRP gang stayed. It was very busy with lots of homebrew rigs to see, and of course plenty of photos. Here Bob W6SKQ is showing Chris G4BUE something of interest with *Fred K6MDJ* looking on

PAM AND CHRIS´S THIRD SUMMER QRP PARTY AT ALAMOSA

42 amateurs attended this years QRP Party at the G4BUE QTH. Many members brought homebrew rigs and projects and it was nice just to sit around, drink, play with homebrew rigs and talk QRP, as the following pictures show. CU 87?

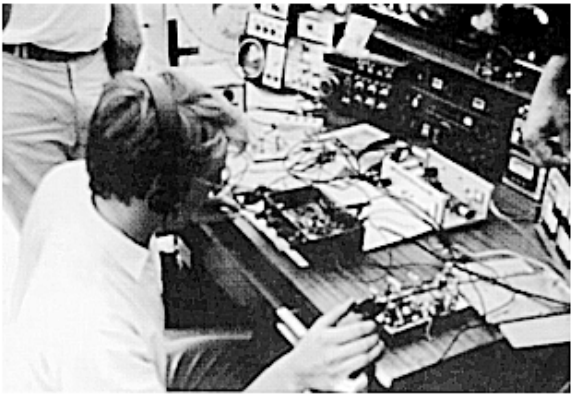
Ade W0RSP and Toshi JI6EKP, (who was enrolled over the week-end as member 3801) were the international guests



ABOVE "So what do you reckon´s wrong?" says Brian G4XMA to Colin G3VTT. In the fore-front Don G3EAO, Steve G4VRR and Derek G4ZHK check out a homebrew rig

LEFT "Now, if you put a 22K in here that should solve the problem", says Bill G2HNI to John G4ZFY

RIGHT A real live picture of what 3560 must look like, with several QRP QSOs going on close to each other! G3FTQ, G3WWS, G4FAI, JI6EKP, G4MQC, G3MCK, G3LGX, G5RV, G4VRR (sitting) G4JBL, G4JKS, G3JKS, and G4UYA (left to right) causing the QRM

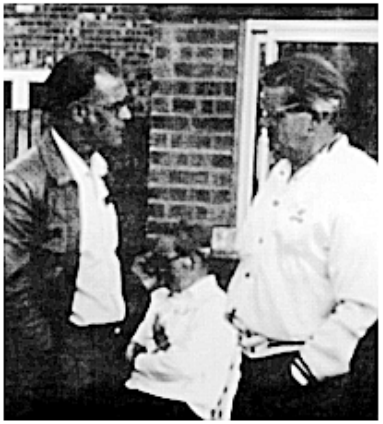


"CQ CQ QRP" sends Julian, G4UET with his homebrew TCVR and the Vibroplex bug key.

"So I said to them, the only way you´re ever likely to win Field Day is to use a G5RV antenna!", says Louis G5RV (left) to Frank G3JKS

"Hang on Brian, let me have a quick drink while Brenda´s not looking, then I´ll have a look at your new rig", says Colin, G3VTT to G4XMA

ABOVE New member JI6EKP, Toshi is working in England until next year



LEFT "Tell me Al, how is it you keep winning BERU year after year?", says Keith, G4SLE to G3FXB. Bob, G4JFN in the background trying to catch the answer and pick up a few tips about contesting and DXing

"These books will be worth a lot of money with my signature in", jokes Ade W0RSP, whilst signing copies of his book, The Joy of QRP. **LEFT** Chick G8TOZ, not sure whether to believe Ade, while Keith G4SLE (standing) gets out a piece of paper for Ade to sign to make sure! **RIGHT** Derek G4ZHK obviously believes him judging by the smile on his face. Ade is a regular visitor to Alamosa, having visited me three years running. The ATU in the black bakelite box on the corner of the desk in front of Derek was left behind, and I´m afraid I cannot remember who bought it. If it´s yours let me know and I will send it on to you. Sh!! see the SB220 amp in front of Ade, it was the subject of a lot of leg pulling

"Do I look better if I stand like this?", says Ade to Peter G3XJS. Sitting down are Norman G4LQF, Don G3EAO and Steve G4VRR looking at Steve´s excellent example of a homebrew ATU

We would like to thank W0RSP, G3ROO, G3LGX, JI6EKP, G6LKC, G4LQF, G4ZFY, G2HNI, G3EAO, G4MQC, G3BFR, G4VGA, G3XJS, G3GC, G3CQR, G4HZV, G0CIQ, G4UET, G3VXJ, G3LDO, G4XMA, G4UYA, G3WWS, G3FXB, G2HKU, G3VTT, G4JBL, G5RV, G4JFN, G4JKS, G3MCK, G3JKS, G4ZHK, G4VRR, G4SLE, G8TOZ, G3MXJ, G4FAI, G0BJJ, G3FTQ for coming and to G3RJV who dropped in during the late evening. Thanks to those who brought gear with them and thanks also to the wives and the help given in the way of drink, food, washing up etc. We have decided to make it party number 4 in 1987 so stand by for the date and more information. We had three continents represented this year, makes you wonder if we could ever make a WAC doesn´t it?

"I thought I saw it wobble?", says Mike G3WWS to Alan G3FTQ as they look at G4BUE´s tower. He has now improved it by raising it to 50 feet and fitting guys. A full wave loop for 80m, a set of four slopers for 40m and inverted vees for 30m and 160m, together with the four element tri-band yagi for the HF bands complete the set-up

THE G3AEP QRP TX

By G3AEP

The PA input is about two watts, but it can vary between 1.5 and 2.5 watts for different bands and activity of the crystal used. In addition to several test QSOs, a 15 minute QSO with a DL9 station on 10MHz resulted in a 559 at almost 1000 miles range.

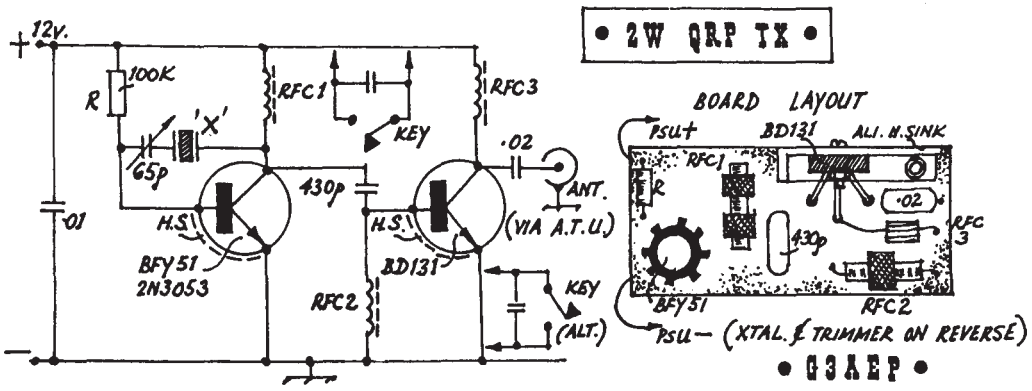
The circuit uses a crystal oscillator which can be varied a few KHz to avoid interference. It is untuned so transmission is possible on any band for which a fundamental crystal is available. The final tuning and reduction of unwanted harmonics is carried out by using the station ATU.

I suggest low value resistors (100 ohms in the oscillator and 10 ohms in the PA) included in the emitter to ground leads at first until working, and the currents checked as not excessive. The values can be adjusted as required. The key jack socket can be either in the PA+/emitter lead or the oscillator, if this does not cause chirp and the oscillator starts OK!

RFC1 is two pile windings of 100 turns (or more) on a ferrite core, (the two windings reduce stray capacity, but a single 200 turn is OK if a long core is not available. It can be mounted on the PCB by a cotton tie around the centre and a blob of candle wax). RFC2 is about 150 turns on a ferrite core and RFC3 is 15 turns on a ferrite bead. A 2N3053 or BFY51 gives more drive and power, but BFY50 or BFY52 can also be used.

RFC1 can be replaced by a resistor of 1 to 2K, (if it oscillates, sometimes only certain crystals do!). RFC2 can be replaced by a 100 ohm resistor, but experiment for the best drive. Also experiment with the value of 430pF for the coupling capacitor, and for best drive on all bands. This capacitor and RFC2, (or resistor if used), make a big difference to matching and the drive obtained.

The PA heat sink is 'live' if the transistor mounting washers are not used, so insulate from ground, (the BFY51 case is also, 'live'). Extend the trimmer spindle and crystal socket through the panel of the case for convenient adjustment and crystal changing. A carbon mike in the PA key socket gives low power AM.



QRP POWER METER FOR THE HF BANDS

By Ian Braithwaite G4COL

While measuring the DC input power to our transmitters is very straightforward, it can be quite difficult to get an accurate idea of the power the transmitter actually puts out. VSWR meters allow power to be estimated while feeding the antenna, but are usually very approximate. More accurate measurements can be obtained by feeding the power into a well matched load consisting of non-inductive load resistors, or a parallel combination of many resistors, (to reduce unwanted inductance), and measuring the RF voltage across it using a diode detector. The power is then calculated from Vr^2/Rl, where Vr is the RF voltage nmeasured and Rl is the load resistance, usually 50 ohms. Accurate measurerments can be made, but accuracy suffers if harmonics are present. They should not be of course if you measure after the low pass filter at the transmitter output, (you have got one haven't you!). However, if you are measuring prior to the output filter, such as a driver stage, or if you want to measure the loss of the output filter, then harmonics may well be a problem since their effect on the measured voltage depends on their phase relative to the fundamental.

An alternative common method is to use the brightness of a lamp to indicate power, by using the lamp as, (or part of), the RF load. Harmonics are then much less of a problem since the brightness of the lamp depends on the total applied power, and not on the peak voltage. Unfortunately, as the brightness of the lamp varies, so does its filament resistance, and the mismatch to the syhstem, (e.g. 50 ohms), changes. Unless the match is he d very good, uncertainities rapidly mount up.

I published the design of a power meter based on a lamp in Rad Com in December 1985 which overcomes the problem of varying lamp resistance. The method used is so-called DC substitution, used in a lot of instrumentation, where a varable DC, which is then measured, is substituted for the applied RF.

The design shown here is a greatly pruned down version of the Rad Com one, but preserves the essential principle. The main difference is that the applied RF power has to be calculated or looked up from a calibration chart, whereas the Rad Com design used quite a lot of circuitry to produce a direct reading of power.

The principle of measurement is to adjust the resistance of a small (6V 0.1A) lamp to 50 ohms with no RF applied by setting a DC current through it. The DC power supply is then supplying the meters maximum power to the lamp. The brightness of the lamp is monitored by an infra-red phototransistor, and kept constant by means of a negative feedback loop using an integrator to adjust the DC feed to the lamp. Because the brightness of the lamp is always the same, the good impedance match is kept constant, and should be very good over all the HF bands. The maximum power reading will be about 400mW, reasonable accuracy being obtained down to about 10mW. With a 10dB pad, the range can be extended upwards to 4 watts, providing an ideal range for most QRP work. The main drawbacks to this method are that it needs a DC power supply, and is relatively slow compared with a diode detector, so is only suitable for measuring continuous power. As can be seen from the measurements table, accuracy is very reasonable. Note that the accuracy can only be worse than the DC voltmeter used, so the better this is the better all round will be the results.

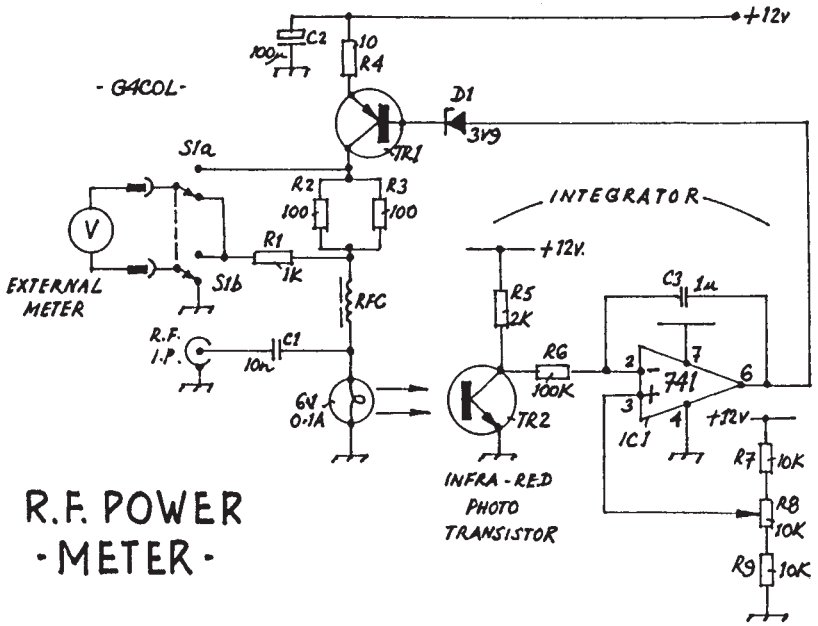
Circuit description - RF appearing at the input socket SK is passed to the lamp via C1 which blocks DC. The lamp is also fed with DC from current source TR1, with the RF blocked by the choke RFC. When the lamp lights a current flows in the collector of the infra-red phototransistor and a voltage is dropped across R5. IC1 is used in an integrator circuit and its output voltage will change until the voltage at its inverting input, (pin 2) is equal to the reference volltage at its non-inverting input (pin 3), which is set by potentiometer R8. The integrator output controls the

current fed to the lamp by TR1 so that the lamp is always operated at constant brightness, and therefore constant filament resistance. Power and lamp resistances are both monitored by the external meter. With S1 in the upper position, the voltage across R2 and R3 is measured by the external voltmeter. This voltage is proportional to the lamp current. With S1 in the lower position, the voltage across the lamp is measured. Since the parallel combination of R2 and R3 is 50 ohms, when the lamp resistance is 50 ohms, the two voltage readings will be equal. This condition is found by adjusting R8. With the switch in either position a reading of V volts is now obtained, and the DC lamp power is $V^2/50$. With no Rf applied, this will be the maximum power that can be read. When RF is being absorped by the lamp, the amount of DC required for the original brightness is less, and a new, lower power reading can be calculated. The difference is the applied RF power.

If Vo is the voltage reading without RF and Vr the reading with RF, the RF unput power is given by $(Vo^2 - Vr^2)/50$ (Watts) or (Vo+Vr)(Vo-Vr)/50.

If you prefer to work in a 75 ohm system, I recommend still running the lamp at 50 ohms, with a 25 ohm, (two 51 resistors in parallel), resistance in series with the input and C1. Power measurements then have to be multiplied by 1.5.

Note that R1 prevents TR1 from over dissipating if the external meter is set to read current rather than voltage, and presents a virtual short.



G3CED G3VFA

We regret to announce the death of George Partridge G3CED (G3VFA) on July 21 1986. George was an early member of the Club (015), and the inventor of the popular JOYSTICK antenna. The Club has an award "The Partridge Shield" offered each year for the best work in restricted spaced antennas

Construction - keep the connections from the input socket to the lamp and lamp to case as short as possible. It helps to make them with thick wire or tape, (e.g. a piece of used de-soldering braid), as this reduces the series inductance of the connection. Position the lamp above the phototransistor at the start of construction and build the rest of the circuit around this, since this is the only other critical item. The spacing between the surfaces of lamp and transistor should be about 8mm.. It can help to make the holes for the lamp holder slightly over size so that there is some adjustment. The circuitry is non-critical and can be built on Veroboard or whatever takes your fancy.

Just for reference, I built my meter in a diecast box with the input socket, meter switch, lamp resistance pot. and four terminal posts for power supply and meter on the outside of the box. The diecast box is very good for keeping the lamp transistor separation fixed, since otherwise frequent re-setting of the pot. could be needed if the meter is knocked.

Testing - check that the voltage on the external meter can be made the same for both switch settings by adjusting the pot. If this cannot be done then adjust the lamp transistor separation slightly. If this does not do the trick, and the separation has turned out a bit in error, then adjust R5. Do not lower its value very much though, but instead re-fit the lampholder to move it further from the phototransistor. To check that the optical feedback loop is working, put an opaque object between the lamp and transistor. If the loop is working, the brightness of the lamp should increase when the loop is broken.
Having made both voltages the same, put in some external RF within the normal working range, (about 10 to 400mW). Both voltage readings should decrease, and remain equal to each other. The instrument is now ready for use.

Components - the values of the resistors and capacitors are shown in the circuit diagram.
RFC not critical; about 20t on high permeabilitiy toroid (Fair-Rite 59-61001101).
D1 3V9 zener (any zener of several volts should suffice).
TR1 2N2905 or similar (only power rating is important).
TR2 Infra-red phototransistor (Maplin YY66W).
IC1 741 or similar general purpose op-amp (LF351 or TL071)
Lamp 6V 0.1A MES cycle lamp

Measurements - were made by first measuring the source on a Marconi Instruments 6960 Power Meter, (using a calibrated 10dB attenuator), and then transferring the source to the QRP power meter under test. The DC meter used was a Beckman RMS 3030 digital multimeter set to the 20V range.
Vo = voltage reading with no applied RF power.
Vr = voltage reading with applied RF power.

RF Power applied (dBm)	Voltmeter Readings Vo	Vr	Calculated RF (dBm)
10.2	4.42	4.36	10.2
13.3	4.42	4.29	13.55
16.5	4.42	4.15	16.7
19.9	4.41	3.81	19.9
23.0	4.41	3.11	22.9
25.5	4.42	0.73	25.6

The term dBm refers to decibels relative to 1mW. For example, 1W = 30dBm, 0.5W = 27dBm and so on. The instrument's maximum power reading is given by Vo2/50. In the case described, this would be 25.9dBm.

WANTED: Has anyone got a 9MHz SSB Filter and carrier xtals to sell so that I can complete my G3ZVC Transceiver Project? Would consider a complete board if price reasonable. G3INZ (QTHR)

*** IMPORTANT *** IMPORTANT *** IMPORTANT *** IMPORTANT ***

SUBSCRIPTION AND ADMINISTRATION CHANGES

For the last five years the membership records have been kept on a computer data base by Steve, G6GZD. The same data base has been used to print the address labels on your SPRAT envelopes. Unfortunately, due to a change of employment, Steve is not able to continue providing this service, so we are having to make some changes in the running of the Club.

On behalf of all Club members, we wish to thank Steve for first of all volunteering his services, and secondly for maintaining the data base and keeping it up to date. His printing of the address labels was always done punctually, which greatly assisted Chris, G4BUE in the posting of SPRAT. It should be noted that when Steve volunteered his services, the Club membership was around the 1500 mark, whilst to-day (24.8.86) the latest membership number issued is 3840! This gives you an idea of how Steve's work has increasd. The Club also owes Steve a vote of thanks for leading the Club into the computer age with its membership records. We all wish you the best of luck with your new job Steve.

Now to the changes. As you know Chris, G4BUE does the text for SPRAT on his BBC computer, and he has volunteered to take over the membership data base from Steve. At the moment he is enlisting the services of his local computer shop to enable Steve's data base, (which was used on an IBM computer), to be recognised by his BBC, to save re-typing all the records. Chris already deals with changes of address, call signs, etc. so continue to let him know of any future changes, but please bear with him if the change does not appear immediately. It is going to take a little while to get Steve's data base up and running on the BBC.

Now to subscriptions. We have been considering for some time going over to an annual system for the payment of subscriptions, i.e. one payment for 1986 regardless of when you joined the Club. This will have the benefit of everyone knowing when their subs are due, and save us issuing "subs due" reminders with your SPRAT. We have decided to make this change to coincide with Chris taking over the membership data base, as we have also decided that he will collect the subscriptions. Alan, G4DVW will remain as Club Treasurer, but subscription renewals will in future be paid to Chris. This will save time in the liaison between Alan and Chris as to which members have paid, and make it easier for Chris to keep the data base up to date.

Starting next year all members will pay a subscription for 1987 which will cover the four issues of SPRAT for that year. Subscriptions will become due for **ALL MEMBERS** on 1 January 1987, regardless of when you joined. The membership list will close on 31 January 1987 and those members who have not renewed will automatically be deleted. One problem of the Club growing to the size it has, is that it is just not possible to issue subs reminder notes to late payers. All the administration in the running of the Club is done by volunteers in their spare time, so ways have to be found of streamlining the system as the Club grows.

By announcing the changes now we hope to ensure that all members who wish to renew will be able to do so by the 31 January deadline, including those residing in the more remote areas of the world. Remember, there is nothing to stop you renewing prior to 1 January to make sure, but 31 January is the cut-off date. Those of you whose subs are due between now and the end of the year need not renew until 1 January 1987. We appreciate that in going over to the new system some members who have just renewed may feel harshly treated. Unfortunately whichever way we do it, some members will benefit and others feel they are losing out. We ask the membership to bear with us and hope they will understand that spread over a number of years any disadvantage will be minimal.

We have kept the present subscription rate of £4.50 for several years now, despite rises in postage and the printing of SPRAT. Postal rates are due to increase again in September. We are therefore, reluctantly, increasing the

annual subscription to £5. We still feel this to be one of the best bargains in amateur radio to-day, and hope the membership will agree it is a reasonable increase. Due to the increase in the value of Sterling against the US Dollar we are able to retain the $10 rate for overseas members. We hope the £5 or $10 subscription will make it easier for overseas members to renew as we can accept notes in either currency, or cheques in Sterling. We can accept Dollar cheques, but as we lose so much to the Bank in the conversion, have got to ask you to make cheques for $12.

The address label on the envelope for this issue of SPRAT is the last to be printed by Steve. Some late address changes will therefore be altered by hand. Hopefully, the first of the address labels printed by Chris will be for the Winter Sprat, and members are asked to check the details to make sure they are correct.

So, just to recap, all members subs will become due on 1 January 1987. To renew send either £5 or $10 to Chris, G4BUE, (his address is on the Members News page), to reach him by 31 January. If your subs fall due between now and the end of the year under the old system, don't renew until 1 January. Continue sending changes of address, call sign, etc to Chris.

HELPING HAND

By Walter Farrar G3ESP

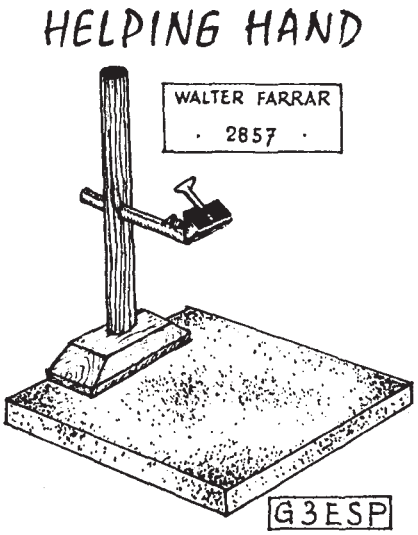
Rather than pay out £5 or so on one of those "Helping Hands", I made one myself from the household junkbox.

Two holes are drilled in the tile and screws put through to hold the wooden block. The dowel is fitted into a 3/4 inch hole and held with glue. The metal rod is a tight fit in a 1.4 inch hole through the dowl, but can be turned if need be. The clip is fastened to this rod by a self tapping screw , and the wire grip bent a little so that a PCB held in the clip is horizontal. Rubber feet, (I used redundant half inch tap washers), are glued to the underside of the tile. I made the dowel long enough so that I could mount a magnifier later if desired.

To date I have done only a little PCB assembling, but would have been lost without this aid.

Parts

Quarry tile 6" (15 cms) square
Hardwood dowel, 8 x 3/4" (20 x 19mm)
Metal rod 2.5 x 1/4" (6 x 6 mm)
Small bulldog (bullpup?) clip , jaws 3/4" (19mm) width
Piece of wood 3x1.5x1" (7x3.5x2.5cms)



SSB NEWS

BY Ian Keyser G3ROO

"Rosemount, Church Whitfield, Dover, Kent CT16 3HZ. Tel: (0304) 821588

My comments in the last SPRAT about kite aerials yielded more information. The first was from Gus G8PG with two references. The first being SPRAT 30, page 5, where Ron G3ZQA describes a kite which seems to have the advantages of no tail to get caught up. His second offering was his own very simple and easy to build kite, described in RAD COMM May 1979. When time permits I intend to try both of these kites and make a complete /P station.

The second came from Ron, G4XOU and this was a firm that produced reasonably cheap kites. A pamphlet with full information can be obtained from Kite and Balloon Co., 27 Essex St, Birmingham, B5 4TR.

I have been playing with kites and having great fun. I used G3ZQA's kite, as it folded away to nothing and launched very well indeed. It took 20 minutes to make while away in the caravan for the weekend, and would support over 500 feet of line in a steady 20 to 25 knot wind. On returning home it was tried on the Dover cliff top with disasterous results, as the windspeed was in excess of 40 knots. The kite survived the ordeal, but with some 400 feet of line out it was only 50 feet up! We then moved three miles inland and flew a 100 feet wire and went on 160 metres. Signal reports were fantastic from all over the country. We then tried a 400 feet wire, but even with two kites in tandam there was difficulty with lift.

My next experiment was with a box kite, as reports were that these are far more stable, even if a little more difficult to launch. This did prove to be the case, but the problem was overcome by using the sked kite to lift the box kite! The box kite is nearly five feet long with 17 inch end "boxes". The only test to date was this morning (!) with a light breeze of about 10mph. The sked kite lifted well to 100 feet, the cord was then cut and tied to the centre of the top bar of the box kite. With 300 feet of line out on the box kite the sked kite was at about 200 feet, and the box kite at a good 150 feet. I feel that it would be better if the sked kite could be released when the box was flying, but there was insufficient time to experiment with this, and in reality the wind was insuffficient for good tests. Another test I wish to conduct is to fly a dipole with its top section attached to the kite and the coax used as a feeder and "string", with the bottom end of the dipole hanging down. I hope to give a full report on these tests n the next edition of SPRAT.

There has been no members mews on activity, but with summer months that is not too surprising, especially with the conditions on the bands! But remember, I need news to keep this column running, and I need input from **YOU** to ensure that the SSBers interests are being catered for.

73's Ian

STOP PRESS.....

QRP NOTEBOOK

By Doug DeMaw W1FB

This new book on QRP arrived just before the final preparation of this issue. It is published by the ARRL at $5.00 and looks like OUR sort of book. A full review will follow later but to give you a taste of the book....it is full of practical circuits and advance for the QRP Home Constructor with sections entitled: The Essentials of Receiving, The World of QRP Transmitters, QRP Accessory Gear, QRP Transceiving, The QRP Workshop and QRP Operating. The book contains lots of circuits previously unpublished and lots of sound advice for building equipment. It should be available anytime from the booksales department of the SHORT WAVE MAGAZINE, UK price yet to be announced. I think it will be a good seller

G3RJV

COMMUNICATION MANAGER'S NEWS

By Gus Taylor G8PG

37 Pickerill Rd, Greasby, Merseyside, L49 3ND

FORTHCOMING QRP COMMUNICATION EVENTS - Make a note on your calendar.

Difficult Locations Week 4-12 October 1986 Listen around the calling frequencies for those weak signals from west coast EI and far north GM. This is your chance to work some of our more remote UK members. And of course remote members please be very active! Logs to G8PG.

Winter Sports 1986 26 December 1986 - 1 January 1987 Maximum activity around all QRP calling frequencies. If the area around 3560 is full of QRP signals also use 3570-80. The annual chance to meet new members, renew old friendships and have a ball!! Send your logs to G8PG.

OK-G QRP Weekend 31 January - 1 February 1987 Your big chance to meet our OK QRP friends. Times/frequencies on both days: 0800-0900GMT 7030KHz, 0900-1100 10106, 1100-1200 14060, 1200-1300 21060, 1300-1430 14060, 1430-1600 10106, 1600-1700 7030, 1700-1900 rest period, 1900-2100 3560 or 3570-80. 2100-2300 1.8MHz (exact QRG to be announced later). Awards for best logs; send them to G8PG. Provided you support it this will become an annual event.

CONGRATULATIONS PETR!
Our member Petr, OK1DKW has been elected to the HF Committee of the Czech Central Radio Club to represent QRP interests. CRC will in future recognise all G-QRP-Club Awards as awards of international significance.

28MHz VOLUNTEERS WANTED
Will any UK or European members who may be in a position to monitor 28MHz during May to June 1987, please contact G8PG. Availability to monitor the band during the day on several days each week is essential.

SUFFOLK TROPHY
QRP Day 1986 was a working day (Tuesday) and was also marred, in the UK at least, by much heavy static. This cut the entry down, but the eventual winner was Petr OK1DKW, with 21 points. The runner-up was Bob, G4JFN with 19 points. Hearty congratulations to both. The Laird of Clermiston ran into trouble - his big antenna picked up so much static that it wrecked his 14MHz PA and various other semi-conductors! (Next time put a 250K carbon resistor between your antenna and ground George.)

SUMMER RAMBLE
Very well supported indeed, especially by UK 80m stations, although there was other QRP activity on all bands from 28MHz downwards. The event lived up to its name with a nice relaxed atmosphere and plenty of ragchewing. It was particularly nice to hear so many recently licensed stations active on QRP. Certificates have been awarded as follows. Best overall log GM3OXX/A, Runner-up G4JFN, Best European Log OK1DW, Best Remote Location Log GI4MBO, Best 28MHz Log EA3FHC. Congratulations to all! This will become an annual Club event.

AWARD NEWS
Firstly a sincere apology to Vic, G8QM, whose 80 members score in Worked G-QRP-Club should have appeared in the Spring issue. My fault entirely - must be getting old! (You are! Ed.)

Congratulations also to the following members.

QRP Countries: 125 OK1DKW, 100 G8PG, 50 GM4UYE

Worked G-QRP-Club: 440 GM3OXX, 220 G3XJS, 120 G3BFR, G4MIJ, 100 G4SCB, 60 GM4XQJ, GM3KPD, G4SXE, 40 G4MSN, KH6CP, G3ZPN, G0BVZ, 20 GM4EWM

Two-Way QRP: 20 KH6CP, 10 G3XJS, GM4EWM, G8QM, G4XSE

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

You will read elsewhere in SPRAT about more administrative changes taking place in the Club. That, and getting my new shack sorted out, are the main reasons I have not been so active on the QRP frequencies as I would like. The summer QRP Party here went all too fast, and details and photographs appear in the centre pages. If you missed it, get your name down for next year.

G3GC and G3CQR were two members who came to the party. Eric and Peter told me about the Yeovil QRP Convention to be held on 10 May 1987. They would like to see a big turn out from members. I shall be going and would like to hear from other members who intend going so we can organise a Club stand. I also intend going to the RSGB HF Convention at Oxford at the end of September, and hope to meet other members who will be there. A surprise visitor here at the begining of July was PA0GG and his XYL. Although in the UK on a touring, holiday, Frans was not able to return for the Summer Party.

GM4UYE has been active on 50MHz with the G3WPO transverter and a modifed Pye Westminster PA strip running 10w PEP. Hugh uses a two element beam pointing south to 'G' land. Despite working CT1WW with a 57 report he has not heard any 'G' stations. He monitors 50.1 or 50.2 and asks about a QRP calling frequency. Can members who use the band suggest a frequency, and then we will publicise it. GM4XQJ was due to be QRV /EA6 from the end of June on 20m for two weeks, and I7CCF went on an expedition to Pedagne Island in the Italian Navy restricted area at the begining of June using IY7WYF. Felix called several times on the QRP frequencies but had no takers. Talking of new QRP frequencies, GM3OXX asks about 18 and 24MHz. George has just got active on those bands with new transverters. Again, can members who use those bands suggest the frequencies. Try to keep them in line with the existing ones if you can.

G4EBO has been building rigs for 80m. So far Eric has got the Oner, SCD, and Howes CTX80 running. He found an opening to the USA on 15m one Sunday recently and asks if any other members are interested in 10m FM. Eric also comments favourable on the Century 22. K7YHA has QRM in the shack in the form of daughter Wendy who has just passed her Novice ticket. She is due to go for her General at the begining of September and wanting to build something, Rich has joined her in building the Tuna Tin Two from QST. G4JXX has been working /M on 10m SSB with 4w QRP from a converted Liner 2. Mike says he has worked most European countries but 80m CW is still his favourite band. Another member working /M on 10m is GM0BZF who gained a special award for working the two Commonwealth Games stations, GB8CG and GB4CGW on SSB QRP. Dave sends a long log of QSOs, including some /M on 15 and 10m. K5BOT reports on lots of short skip up to 1000 miles on 10/15m. Ed can hear the East coast stations working Europe but cannot hear the Europeans himself.

G4OKB was taking his Oner to Vancouver for Expo 86 at the end of June and DK4UH spent two weeks with G4HYY operating as G0/DK4UH. W1FMR says that his Oner refused to work with the FT243 surplus crystals, but removing the variable cap seemed to cure the problem. Jim has been showing KC5EV the New England countryside, as Leo is now working in the area. GW4KUS is pleased with his HW9. Bert says he gets more of a thrill with a QRP QSO a couple of hundred miles away than any of his QRO DX QSOs. He asks if ON4KAR would write about the ATU he built inside his HW9 - how about it Rene? G3ZPN has been carrying out mods to his HW8 including RIT, 'S'

meter, SM drive and a frequency counter. Sandy has built a 30ft mast out of 3x2 timbers and is now using it to support a 60ft random wire. He says the "Flexible ATU" by W4UWA lives up to its reputation of tuning any TX to any type of antenna, bedstead to washing line! The ATU is one of the many ideas in "Digest of Wire Antennas", price £3 from Club member G4OO. G3LGH is trying to complete his RSARS 500. Jim is on 455/380 and says he will then return to QRP. W6SKQ and K6MDJ were two of the operators of the Zuni Loop Mountain Expeditionary Force for the USA Field Day at the end of June. Bob and Fred were QRV from Table Mountain and made 723 QSOs.

OK1DKW says the OK QRP Group now has 36 members. Petr was recently awarded Milliwatt DXCC Trophy 10 from W0RSP, it took him 8 years but was done with all wire antennas. W7ZOI has been doing some additional work to the 40m TCVR that I used in Washington earlier this year, (see photos in centre pages). Wes has now built in an SWR bridge, ATU and battery pack and has improved the intermod distortion by dropping the signal level to the NE602 product detector. When the schematics are done he promises a write-up for SPRAT, and I can tell you it's a great rig to build. G4PUU has built a 70cms converter to use for ATV. Cyril says this is as a result of local interest, but he will not desert QRP. G3MBN is using an 80m version of the W7EL TCVR. Brian has built the Cmos keyer featured in the June edition of Wireless World on veroboard instead of a PCB and says it works very well. G4ZHI is now up and running with a DSB2 on 20m and says it is a big improvement on the DSB80. Bryan spent a week with his in-laws in Devon, and with a folded dipole made out of 300 ohm ribbon, worked YO and OH on DSB. He says that George is quite right in his advice not to volunteer you are QRP until the report comes back, and the satisfaction you get in saying you are running 3w from a homebrew TX and antenna in the face of 400 watts into tri-banders, etc.

How's this for a coincidence? G4ETJ received member G3VXJ's QSL card with his Summer SPRAT and the same day received some cards from the RSGB, amongst which was a card from member G4VXJ!! Nice one Reg. G0ATS has been trying out a little two valve rig given to her by a friend. She has made a contact to show it's working. Elaine invites any members visiting Cornwall to call in and see her. She can show you her Oner running to a 380 feet long wire through a 5Kw Tau ATU! Rene, ON4KAR has found the G5RV to be a good 80 metre antenna after unsuccessful attempts with trap dipoles and G3LGX has been playing with a vintage HR0-MX complete with band spread coils. G4EHT is very QRV on 160m, having built two TCVRs. First QSO with the CW rig, using a pair of BD131s, was with LA. The other TCVR is DSB, similar to the G3MJW one in Sprat 44, but with a mosfet mixer and a pair of BD124s which give 7 watts input. Bill asks where all the 160m SSBers are, (G3ROO?). G3YCC has just got a TS430s which he likes. Frank helped out at the Club stand at the Scunthorpe Rally and says there was a lot of interest in the Oner. GW3DVG has built the Phoenix TCVR. Ivor says he has had a few problems, but that is all part of the fun. G4DYC is on 80m with a homebrew TCVR based on the Howes kits. Mike says he hasn't used his TS530 since becoming a member of the Club.

G3DNF did the AGCW Summer QRP Test on 20m, and found OY and YK for new DXCC countries. G3IJV has built the PW Teme and has just acquired an Argosy. Like Gordon, Bob entered the Summer QRP Test and worked 9 DXCC on two-way QRP. Turning to the WPX Test at the end of May, G3BFR worked LU, PY and VE6. G4OFB has been QRT for the last nine months studying for his BA, congratulations Richard. GM3KPD is very impressed by the standard of QRP operating. Alf has just been given a McElroy bug and is now learning a new method of keying. G6ITG is waiting for his CW test. In the meantime Wally has been experimenting on VHF with 3w QRP. He works from Mid Kent to The Wash on 2m with no lift, and can access the PI repeater at Cambridge. His Kent QTH is 500 feet ASL.

G2BUV has been active since the end of April with a Oner on 80m. Ted has worked 41 members and 9 DXCC with it. He can recommend the G4BWE 20m VFO in the January 1986 Rad Comm as being very stable and the G4JXX keyer in the April 1984 edition of Amateur Radio. Ted asks members with commercial receivers not to use the 'S' meter as the basis of their signal reports as

they can be very misleading when reading low. G0EBQ has built the 6 transistor DC RX from the Rad Com Handbook and uses it with an OXO TX. G3XJS has got to 51 DXCC on 80 metres with OJ0 and 3A being the new ones. Peter is making progress with the G3OGQ TCVR. G4KKI is another member to work OJ0 on 80m. Bill is now all homebrew on 80-20m.

Well, I see I've gone over my two pages, (again!! - sorry George). Keep the letters coming and remember, now you have to send your subs to me you really have got no excuse to give me a bit of gossip or a snippet for this column. Let me know how your autumn goes, by 20th November please.

73's Chris

THE OPENING OF THE 28MHz SPORADIC E SEASON 1986

By Mike EA3FHC and Gus G8PG

From 27 April to 26 May we monitored 28MHz to check the results at our two locations, Barcelona and Merseyside. EA3FHC used either 1w of CW or 4w of SSB with a vertical, and G8PG used 3w of CW with an indoor ZL Special firing east. EA3FHC had 206 contacts with 27 countries, including CN, EA8, OD, TZ, VU and 4X4. G8PG noted occasional peaks to the Middle East, notably HZ1HZ from 1650-1700 on 26 May. His most significant opening was at 1121 on 7 June when ZC4CZ was worked at a time when, according to the propogation forecasts, an F layer contact was impossible. This may have been two hop Es, or F layer at the ZC end and Es at the G end, a possibility which requires further investigation. We leave cleverer men to work out the EA3FHC/VU path.

QRP/QRP contacts from EA3FHC included 7 G members plus DL, EA, OE and ON. G8PG worked QRP/QRP with G, EA, OK, OZ and SM. On occasions the band was open as early as 0800 and there were many evening openings. As expected things got even better from the begining of June onwards.

There is no doubt that QRP work via Es during the months of April to August is an effective and interesting means of communication. We hope that next year many more members will try it. Meanwhile if any member has thoughts about paths where the control point at one end is an F layer point and the control point at the other Es, G8PG would be delighted to hear from him/her.

MEMBERS ADS

WANTED Heathkit RA-1 or RG-1 RX
FOR SALE Leader Dip Meter 1.5-250MHz; 9MHz xtal filter from FT200; Sony ICF2001 RX; SEM Auto HF Pre amp. All VGC. Mr. N. Cameron, EI4DZ, 16 St. Mary's Crescent, Westport, Co. Mayo, Eire.

FOR SALE The "BUE" Membership List is still available for £1.50 or $3 including postage, (airmail). The list gives call sign, number and many christian names together with space for QSO/QSL record. In view of the new subscription system, the next edition will be published in February 1987. Chris Page G4BUE, "Alamosa", The Paddocks, Upper Beeding, Steyning, West Sussex, BN4 3JW.

THE RSGB HF CONVENTION:

The G QRP CLUB will have a stand at the RSGB HF Convention on Sunday September 28th. We require members to help man the stand. Will members who attend and would like to help, please report to the stand on arrival and sign up the rota for stand helpers.

THE ONER PROJECT

Thank you to all who have nominated recipients for a ONER Kit as the result of the project announced in the last issue. So far it has been possible to accept every nomination. Because of the numbers it is impossible to advise everyone that their nomination has been accepted. There are still a few kits available for further nominations. G3RJV