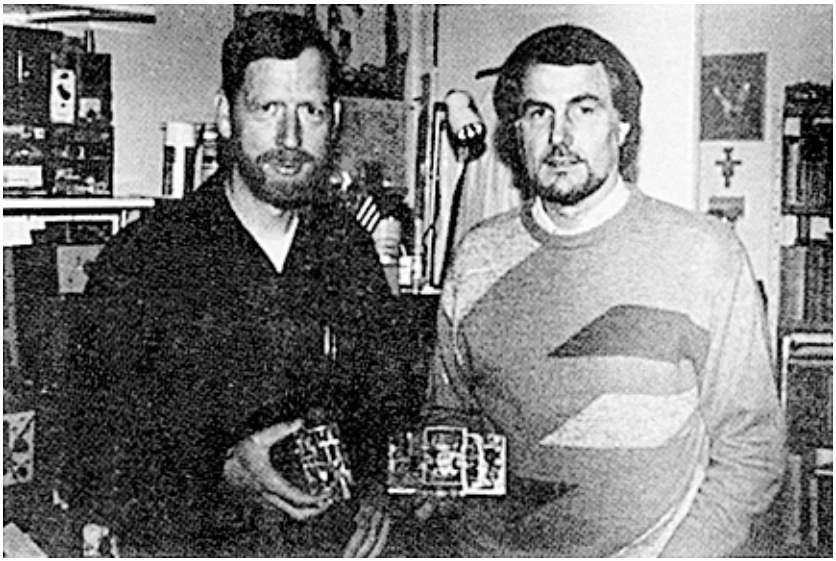
SPRAT

THE JOURNAL OF THE G-QRP CLUB

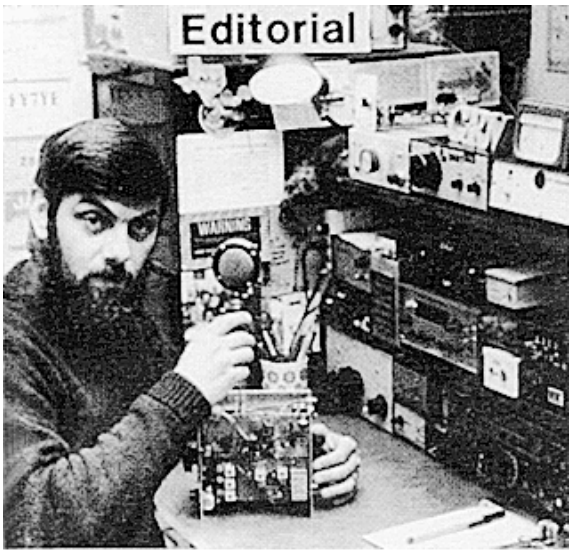
DEVOTED·TO·LOW·POWER·COMMUNICATION

ISSUE NR 57 | © G-QRP CLUB | WINTER 1988/89



Roy, W7EL and Jack, G4ZQK in the G3RJV Shack
pictured during Roy's recent visit to the UK
Roy is holding his famous Optimised Transceiver
Jack, his 20m transceiver with keyer and ATU

JOURNAL OF THE G QRP CLUB



Rev.George Dobbs G3RJV

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

May I, on behalf of all the officers of the club, wish you all a very happy 1989. 1988 has, once again, been a good year for the club with a lot of QRP activity on the bands and promise of increasingly favourable conditions on the HF bands.

Recently I was especially pleased to have Roy, W7EL. staying with me for a few days. Many of you will know Roy from his famous Optimised QRP Transceiver, which appeared in QST and in SPRAT. Roy brought the transceiver and I enjoyed firing it up on 40m. It is rare for an American on his first visit to the UK to head directly for the Pennines on his first day. Roy did just that and enjoyed some real countryside before heading south again!

The club has been invited to offer some lectures at the major QRP Forum which will be held at the ARRL 60th National Convention in Dallas next June. We have been asked to provide presentations on home construction..."your club's well known contribution to QRP"...as the invitation says.

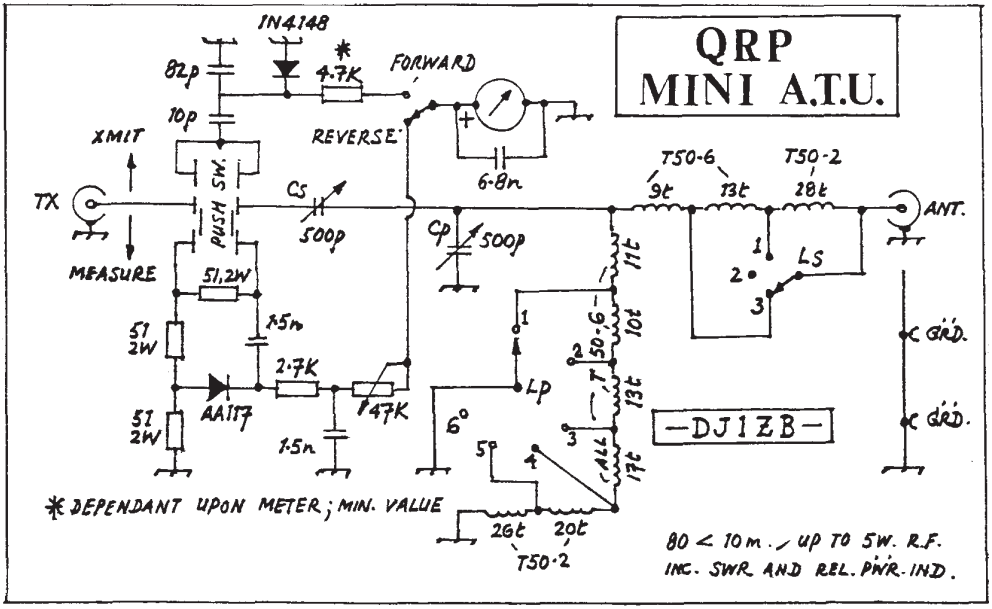
In response, Ian, G3ROO, and I will represent the club at the convention. I will be offering an illustrated presentation on a whole range of QRP home construction ideas, circuits and techniques. Ian will deal with the design of QRP equipment with special reference to the Plessey Communications I.C.s for CW and Simple SSB equipment.

We hope to take a range of books, kits and other items for sale on the QRP Stand to help pay for the visit much in the same way as we did at Dayton last year. Although this venture will be on a much smaller scale. Members comments and advice would be most welcome.

In response to many requests, in recent weeks I have working on a simple to build, but compact Club Direct Conversion receiver Project....but more of that next issue.

73 for now

George



This ATU is an improved version of my ATU published in SPRAT Summer 1976, also shown in the G QRP Circuits Handbook. By using solid dielectric variable capacitors and torodial coils it was possible to squeeze the whole circuit into a Teko 3/A aluminum box (106x72x28 mm).

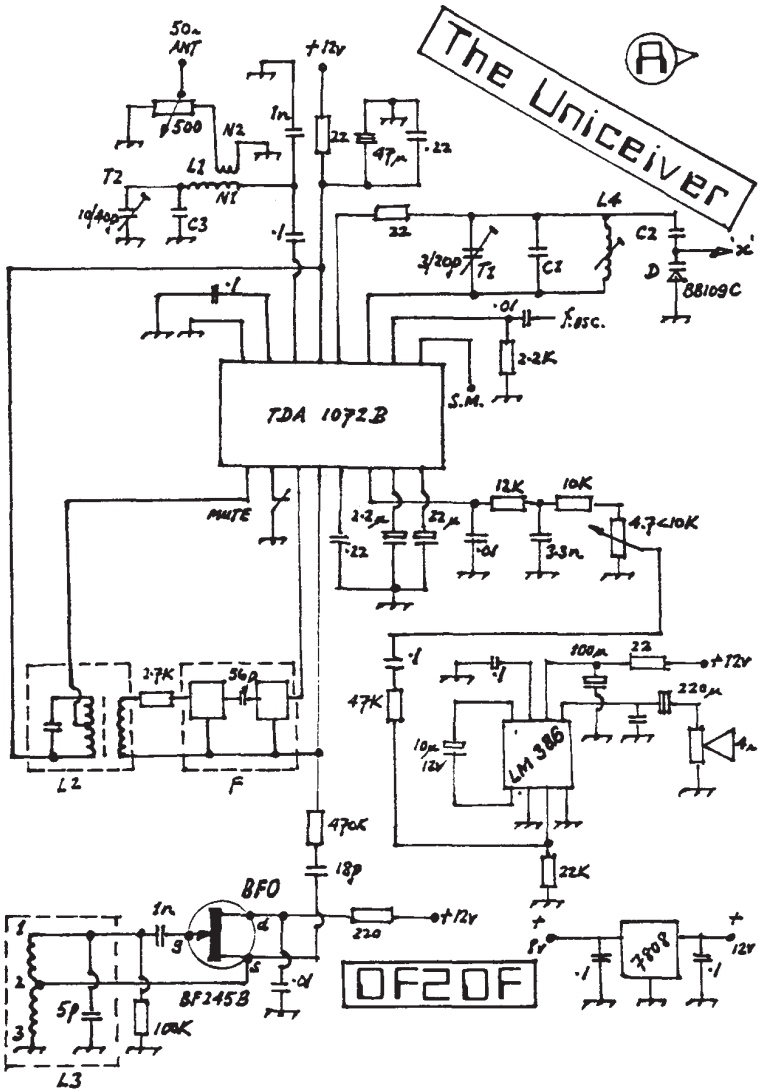
The simple 1977 circuit had one drawback. It was capable only to match impedances higher than 50 ohms, and the aerial wire length had to be changed if this conditon could not be met.

In this circuit three (minimum number) series coils in the output lead have been added. With high impedance loads they are shortcircuited, and the smaller coil has no noticeable effect in this case, even on 10 meters. But if low impedance loads are present, the series coil is causing a pretransformation. In the range 3.5 to 30 MHz, few inductance steps are necessary to achieve this: The low impedance appears to the rest of the circuit like a high impedance in parallel with an inductance, and thus can be matched like normal long wire aerials.

The pretranformation effect could also have been achieved by series capacitors, but coils were preferred to maintain an advantage of the old 1977 circuit: The aerial is always at dc ground potential, an important feature in areas of high static electricity.

To maintain a high Q on all inductivity steps, separate toroids are used. It has been observed that using a single toroid with taps would have been a questionable solution. If the taps are used and the coil end left open, the coil Q will be reduced roughly in proportion to the active circumference of the toroid, with the danger of a self resonance in the unused portion of the coil. On the other hand, if the taps are shortcircuited to the coil end, the self resonance will appear at a much higher frequency. But as soon as a certain portion of the toroid is shortcircuited, the coil Q will decrease to a value of 40 or so and remain there almost independangly of what tap is used. This would mean a very lossy matching circuit, and therefore separate toroids were preferred. When matching within a 50 ohms line, from 2 watts fed into the ATU 1.7 watts will appear at the output.

The relative power output indication has been added because after tuning the same meter is free for this purpose, and a separate instrument at the transmitter output can be eliminated.



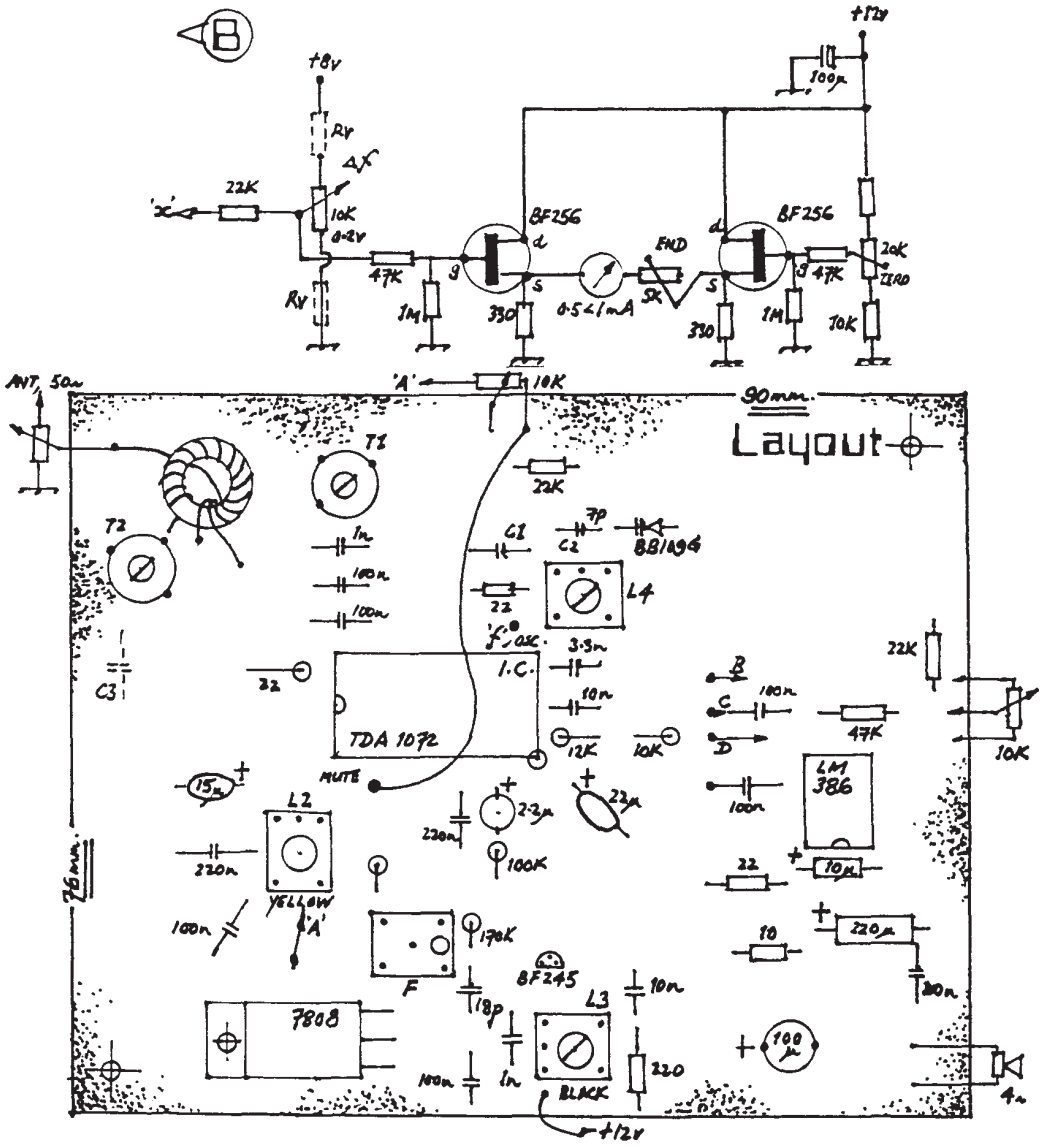
OSCILLATOR: L4

Band	L : uH	Neosid C1	C2
1.8	not tested	5890 "	18p
3.5	42uH	5019 39p	47p
7	8	5800 47	7
10	3.3	5044 39	7
14	3.3	" 18	7
18	3.3	" 10	12
21	2	5021 10	7
24	1	5041 10	7
28	1	5041 "	7

INPUT: L1 (N2: 2 to 3 turns on N1)

Core	N1	C3	mm	L: uH
T502	80	330p	0.2	31
"	80	"	0.2	31
"	45	50	0.4	10
T506	28	"	0.5	3.1
"	28	"	"	3.1
"	20	"	"	1.6
"	20	"	"	1.6
"	18	"	"	1.3
"	16	"	"	1

L2: Toko L4100 A yellow, L3: Toko 4202, F: SFD 455 (or try CFW455HT)
NOTE from G3RJV: If Neosid coils are not available try Toko coils the inductance values may be found in the Cirkit or Bonex catalogues.



THE UNICEIVER
Matthias Rauhut DF2OF

Inspired by an article in 'QST' (the simpleceiver), I looked around to find an IC containing a complete receiver. I discovered the TDA 1072, an AM broadcast receiver for car radios etc. First experiments have been very satisfying and I decided to test the circuit for several ham bands. But enough history, here's the circuit description.

The circuit is loosely based on the application form. I added a BFO, AF pa, rf input and oscillator circuit. The TDA 1072 contains all stages from RF amplifier to AF amplifier, including IF gain, internal voltage reference, mixer etc. There are only 4 coils needed, 3 IC's and 1 transistor. All parts should be easily available and not critical. To change from one band to another it is only necessary to replace the input toroid and oscillator coil, eventually one or two C's, hi. The toroid is from AMIDON, the other coils and filter from TOKO and NEOSID. The BFO works with one FET and a IF filter, delivering a signal below 455 kHz. As IF filter I have chosen a cheap ceramic (SFD 455) one. OM's with a larg4e budget could try the CFS 455J which is designed for SSB and costs about 16 times more. Good and loud audio is provided by a LM 386 AF amplifier. Vary the speaker to get best quality. Frequency tuning is done by using a varicap diode BB 109G and a lin pot. I have divided my favourite band (cw section) into 5 parts (each 25 kHz, overlapping), using a voltage dividing resistor network and so did not need a vernier drive. For frequency readout I use a simple FET VOM with an analog instrument and a self calibrated scale.
The RF attenuator pot is good to 40m, but a special preselector would be the optimum.
There are several useful output signals:
Oscillator signal (130mV) pin 10, S meter pin 9 and pin 2 for mute. The AF could be switched off easily for QSK. Unfortunately the S meter output is only useful when no BFO is used, for example as broadcast receiver.

alignment:

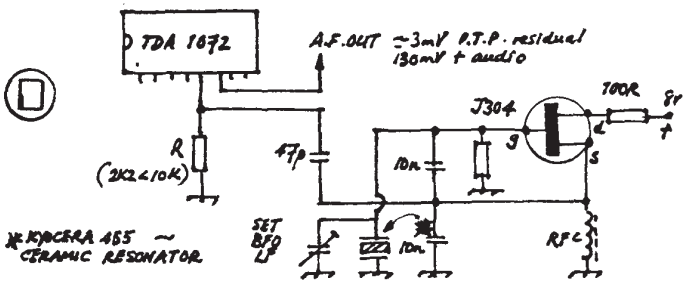
1 All parts must be in correct place on the pc board
2 Connect speaker and pots. The alignment procedure will be simplified, if the board and pots were mounted provisional on an aluminium strip:
3 Dip the input circuit, without connecting an antenna and without using the attenuator pot.
4 After connecting the power supply, a noise should be heard. If not, you may have forgotten to ground the mute pin, hi.
5 Bring the dipper near L1 and tune the freq. until you find two spots on the dipper's scale, where a sound is heard in the receiver. There must be about 900 kHz difference between them.
6 If you hear nothing, turn the core of L3 (BFO) a bit to get better reception
7 For USB reception, set the oscillator freq. below receiving freq.
For LSB set it above the receiving frequency!
That is because the BFO can't oscillate above 455 kHz.
Set the tune pot to the ground side and align T1/L4, to get a receiving frequency just below the beginning of the band.
8 Tune T2 to get max. AF.
9 Connect an antenna, which is designed for that band and find a CW signal with the tune pot. Eventually tunbe the core of L3 slightly until the CW becomes clear.
10 Turn the core of L2 carefully to get best CW reception and AM Suppression.
11 Calculate the voltage dividing resistors Rv for the tune pot, to get only your desired segment of the band.
Now its a bit easier to tune SSB stations.
12 Catch a loud SSB signal and try to tune it clearly
Eventually turn the core of L3 and L2 VERY carefully to get good reception
13 With some patience it should be possible to suppress the undesired sideband either of CW and ssb to a level of about 30%
14 If all alignment is done, secure the core of L4 with wax.

I am very pleased with this new RX, although it isn't as sensitive as my TS 520. Especially from 21 MHz upwards it would be better to use an additonal preamp for DX work. 160m isn't tested yet, but will be soon.
Please let me know about your experience with the RX. If there is a need I can supply the etched and drilled pc board for £6 (12 US$), postage included. a coil set should be no problem, if someone has difficulties to get them. If you are interested in already built and tuned receivers, drop me a line.

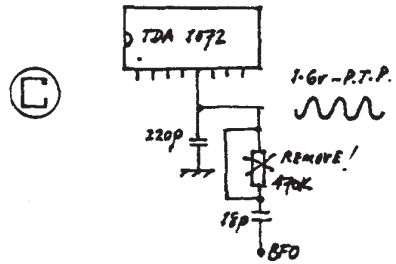
DF2OF MATTHIAS RAUHUT, Luetzowstr.13, D-3160 Lehrte, W. Germany.

NOTES ON THE RECEIVER BASED UPON LETTERS BETWEEN DF2OF AND G8SEQ.

G8SEQ:
Injecting a BFO into the TDA1072. The system used by Matthias brings the AGC into action rather early, losing the weak signals and S meter action.
It is possible to use the AM detector as a product detector by removing the .22 capacitor (pin 5) and replace it with a load resistor (10K, or the lowest value that does not stop the BFO oscillating). This works because the capacitor is to decouple IF from the AM detector : remove this decoupling and inject rf and you have a product detector. For the BFO I used a ceramic resonator in a Colpitts circuit to give several volts of injection, probably too much.



DF2OF:
The G8SEQ circuit does not work with my BFO but the circuit below does function with the original BFO circuit.
The BFO on the board shows leakage into the IF circuits and sensistivity can be improved by placing the BFO in a screened box (PCB or tinplate) Tests for this were made by connecting a meter between the S meter pin (SM) and ground. I deceide to try forcing the voltage on this line down by connecting a resistor to ground. Connecting a 470 ohm pot between the SM pin and ground (0.6 to 0,8v reading) improves the sensitivity, although I don't know why?
G8SEQ:
A better place to control the AGC line would be pins 8 or 7. Shorting pin 7 to ground should disable the AGC, so a pot here could be a useful control.



FOR SALE: TRIO 9R 59D Gen. Coverage Receiver with Spkr. 550kHz-30MHz. £35
G. Gregor, G4OWH, Police Station, Coleford, Bath. BA3 5PG.

WANTED: HW7 TRANSCEIVER, Fair to Good Cndx. Carriage to be arranged.
Photocopy of Article "Low Cost QRP Power Boosters by D.DeMaw
QST July 1987. pp30-34
GI4CBG. QTHR. TEL: (0232) 657343 (Evenings)

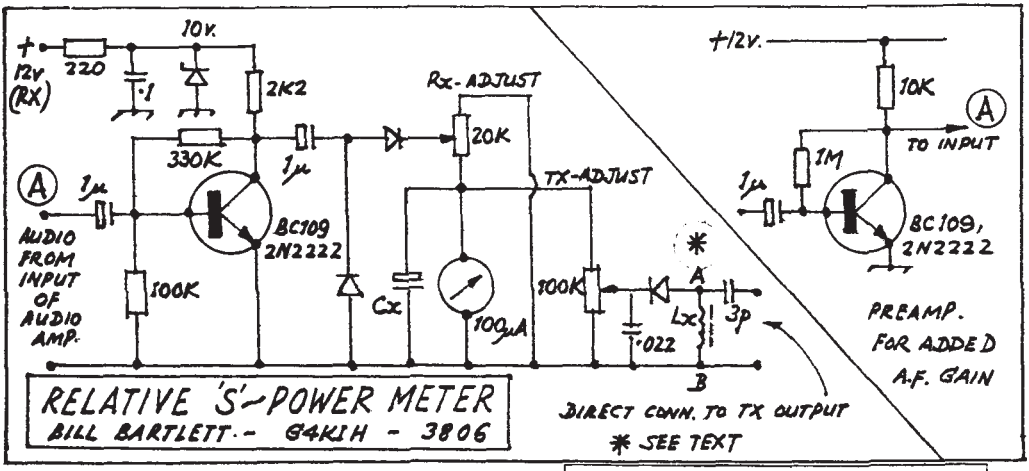
WANTED: Band Switched QRP Transceiver. Ken Hodge, GM3JIG. TEL (0294) 823364

WANTED: Old Rad Coms by W3TS. I have '82 Jan, Sept, Oct and need the rest of 82. Then I am good to 85, where I need Sept, Oct, Nov, Dec. I would pay the shipping for nay or all of these. Also wanted the German FUNK magazine for JULY and AUGUST '85 for DL3CS articles on German Spy Sets.
D.A.Michael, W3TS, POB 593-Church Lane, Halifax. PA 17032-0593. U.S.A.

ADD A RELATIVE S METER AND POWER METER TO YOUR TRANSCEIVER

Bill Bartlett G4KIH

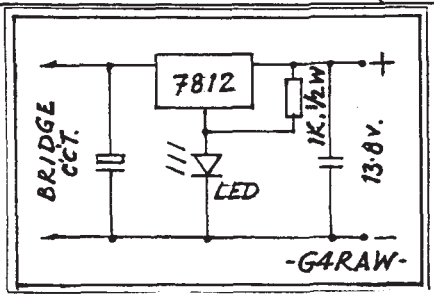
The meter was salvaged from an old CB. Cx is selected for required meter damping (say 50-100uF). All diodes are Germanium. Typical calculated values for Lx are: 80m:1mH, 40m:180uH, 20m:47uH, 15m:18uH. The pre amp can be added is required.



13.8v FROM A 12v REGULATOR

G4RAW

This circuit gives 13.8v and is useful for providing that extra bit of voltage from a 12v Reg. I.C. The heatsink tag on the I.C. is connected internally to the common tag, so any heatsink should be kept clear of ground. The LED holds the I.C. 1.8v up.



ANYONE FOR THE 1000 MILES - per WATT AWARD?

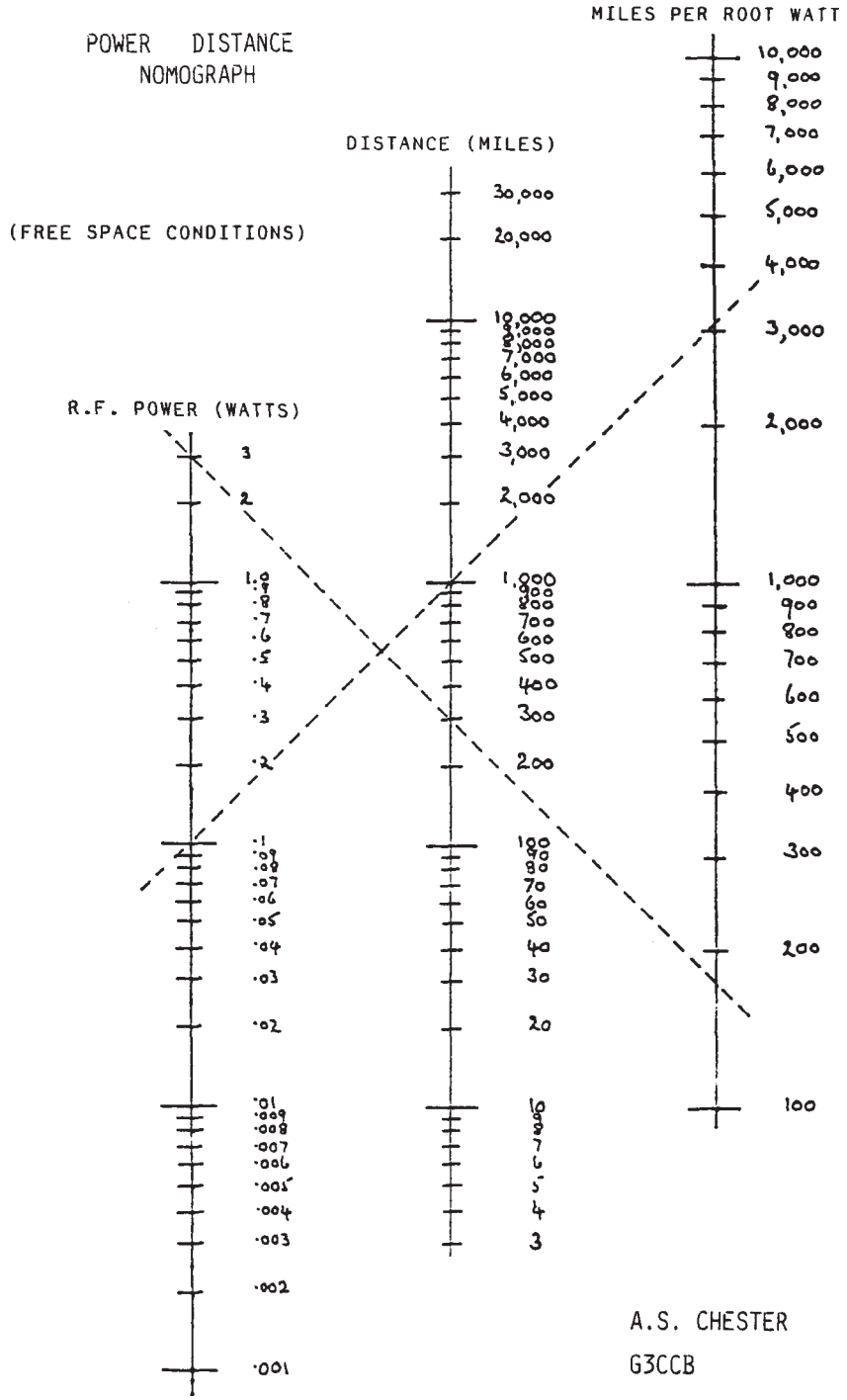
A.S.CHESTER G3CCB

Everyone knows this award with its well-intentioned aim to provide a simple measure of radio performance aginst minimal power. What is not immediately obvious is that the operator cannot stray very far from the 1 watt level without introducing a rapidly increasing error in one direction or the other. In fact, an increase in power over 1 watt will quickly reduce the change of award achievement, while a decrease in power will just as quickly enhance it!

The reason for this apparently odd state of affairs is simply that the power required for radio propagation is NOT proportional to distance as the award title implies but to the SQUARE of the distance (all other things being equal) The bit in brackets is a necessary conditon which admittedly is only perfectly met in free space but the square law cannot be thrown out altogether merely to account for a few complications at ground level.

If the 'Miles per Watt' idea was ever meant to be taken seriously, and I have no reason to believe otherwise, it can be saved from extinction by observing that the distance worked must be divided by the square root of the power used to obtain a measure of performance which can only be expressed in terms of miles per ROOT Watt. This 300 miles with 3 watts will produce a modest 173 MPRW while 1000 miles with 0.1 watt will result in an award-winning 3,200MPRW

The manupilation of the square root by pocket calculator should not present much difficulty but there are often advantages to be gained in using an abac or nomograph from which relationships can be seen at a glance and limits quickly established. A chart specifically designed for the QRP operator is given.


POWER DISTANCE
NOMOGRAPH
(FREE SPACE CONDITIONS)
R.F. POWER (WATTS)
DISTANCE (MILES)
MILES PER ROOT WATT
A.S. CHESTER
G3CCB

PUTTING THE HW8 ON THE WARC BANDS (PLUS 160 METRES
BOB FOWLER G3IQF

The recent acquisition of a Heath HW8 QRP Transceiver from another member (thanks Roy, G3GJQ/5NO), at a good price, afforded me the opportunity to perform an exercise which has been a dream project for a considerable time. Having a QRP transceiver which covers the 5 "traditional" bands from 3.5 MHz to 28 MHz, the idea of converting the HW8 to cover top band and the 3 "new" HF bands appealed greatly, especially as my shack has a floor area of just 4ft x 4ft 6in. So equipment has to be compact. Two small trasceivers to cover all 9 HF bands would be "just the job".

In the event, conversion proved to be reasonably straight forward. The reader may decide to convert any or all go the bands, each conversion taking two or three hours only. (It took me longer than that, but I was pioneering!)

When ordering the necessary crystals, please be sure to specify "30pF load capacity" and "HC6U Holder". I obtained my crystals from Quartslab Marketing Ltd. (who advertise in Radcom every month) and was supplied with fundamentals to cover the 160,30 and 17 metre conversion. All capacitors are silver mica types. Please note that, in several cases, capacitors removed during conversion of one bands, may be used towards the conversion of another.

In detailing the conversion of each band, I have set down the original value of each component, in the event that the reader might wish to re convert the transceiver at a later date.

Conversion of 40 Metres to 30 Metres

1 Y2 (15.895 MHz) Replace with 18.895 MHz
This puts the band edge at 100 on the tuning dial
2 C118 (130pf) Replace with 100pF
3 C66 (150pf) Replace with 68pf
4 C4 (68pf) Replace with 27pf
5 C18 (75pf) Remove
6 C81 (470pf) Replace with 150pf
7 C82 (100pf) Replace with 150pf
8 L23 (4.uH) Remove 2 turns (one from each end)
9 C98 (100pf) Remove
10 C101 (100pf) Replace with 80pf
(This can be difficult to obtain. I used a 47pf and added a 33pf in parallel soldered on the foil side).
11 C102 (400pf) Replace with 270pf
12 L28 and L29 (7uH) Remove 8 turns from each (4 turns from each end and respace remaining turns evenly around toroid).
13 Set tuning dial to 125 (10.125 MHz) and allow the set to stabilize for about 30 minutes. Re align all circuits (except VFO) following the 7MHz instructions in the Heath Manual. Transmitter out put obtained 2.2watts.

NOTE: When aligning the receive section you will find there are always plenty of signals on 30 metres (most of them non amateur).

Coversion of 20 Metres to 17 Metres

1 Y3 (22.895 MHz) Replace with 26.895 MHz
This puts the band edge at 68 on the tuning dial
2 C121 (47pf) Replace with 33pf
3 C68 (100pf) Replace with 68pf
4 C7 (Trimmer) Add 22pf, soldered on the foil side
5 C84 (130pf) Replace with 68pf
6 C85 (130pf) Replace with 68pf
7 L24 (1.8uH) Remove 2 turns (one from each end)
8 C105 (200pf) replace with 180pf
9 L31 and L32 (2.5uH) Remove 8 turns from each (4 turns fropm each end and respace remaining turns evenly around toroid)

10 For maximum performance at the CW end of Band, set tuning dial to 100 (18.100 MHz) and allow the set to stabilize for about 30 minutes. Re align all circuits following the 14MHz instructions in the Heath anual. Transmitter output obtained 1.3 Watts.

NOTE: At the time or writing, there is often a dearth of signals on the band with which to align the receive section. However, in the south of England, at least, the BBC World Service Transmitter on 18.080 MHz is a whopping signal during most of the daytime. I would assume, however, that this will be re-located by July 1st 1989 when the band is due to be fully released to the amateur service.

Conversion of 15 Metres to 12 Metres

1 Y4 (29.895 MHz) Replace with 33.695 MHz
This puts the banbd edge at 90 on the tuning dial.
2 C123 (24pf) Replace with 15pf
3 C71 (47pf) Replace with 33pf
4 C87 (47pf) Replace with 33pf
5 C88 (47pf) Replace with 33pf
6 L25 (1.3uH) Remove 3 turns (1 from one end, 2 from the other end and respce turns evenly around toroid)
7 C107 (100pf) Replace with 75pf
8 C108 (150pf) Replace with 100pf
9 L33 and L34 (1.3uH) as L25, above
10 For maximum performance at the CW end of the band, set tunin dial to 110 (24.910 MHz) and allow the set to stabilize for about 30 minutes. Re align all circuits following the 21 MHz instructions in the Heath Manual. Transmitter output obtained 700 Milli watts

NOTE: This band is outside the design frequency coverage of the HW8 and in addition to somewhat reduced transmitter output, it has to be admitted that the receiver performance does degenerate somewhat on 24 MHz. However, I restores this magnificently by replacing Q1 (MPF105 F.E.T.) with a 40673 dual gate mosfet as detailed by EI1DA in "SPRAT" 15, Page 4. This, of course, is of even greater benefit on the other 3 bands and can be highly recommended.
Like 17 metres, 12 metres can often sound dead, making receiver alignment difficult for those of us without a signal generator. However, there is an Italian amateur beacon sometimes audible on 24.915 MHz and a Brazilian one on 29.902 MHz. Also frequently telemetry signals are quite loud on 25.000 25.000MHz

Conversion of 80 Metres to 160 Metres

1 Y1 (12.395 MHz) Replace with 10.695 MHz
This puts the band edge at 10 on the tuning dial
2 C116 (100pf) Replace with 150pf
3 C64 (230pf) Add 400pf in parallet, on foil side
4 C1 (68pf) Replace with 560pf
5 C15 (47pf) Replace with 330pf
6 C78 (330pf) Add 330pf in parallel, on foil side
7 L22 (9uH) i) Remove the 24 turns of 265 swsg wire
ii) Rewind toroid with 34 turns of 325 swg wire
iii) Add 230pf in parallel with L22 (on the foil side)
8 C94 (270pf) Replace with 470pf
9 C966 (250pf) Add 470pf in parallel, on foil side
10 C97 (680pf) Add 680pf in parallel, on foil side
11 C303 (5.9 - 150pf loading C) Add 220pf in parallel, which is switched in when 160m. Bandswith is depressed.
1.E i) Connect one end of 220pf to C303/R304 junction
ii) Connect other end to pin 14 of bandswitch
iii) Connect a short lead between pins 11 and 15 of bandswitch
(Pins 14 and 15 are unused on unmodified HW8)
12 For maximum performance at the CW end of the band, set tuning dial to 40 1.840 MHz) and allow the set to stabilize for about 30 minutes.. Re align all circuits following the 3.5 MHz instructions in the Heath Manual. Transmitter output obtained 2.0 Watts.

NOTE: No trouble should be experienced in aligning the receive section as some "fish fone" signals are always audible (unfortunately) on top band,it is realised that this modification will not allow full transmitter output over the whole of the 1.8 MHz band, but from 1.810 to 1.860 MHz a good 2 watts was easily obtained. Received signals can be peaked up right across 1.810 to 2.000 MHz but the receiver preselector control must be rotated throughout its complete travel to achieve this.

Results

The above conversion was carried out at the rate of one band per month (to increase the fun!) from May to August 1988 when conditions were not at their autumn/spring best. 25 countries have been worked on 30 metres, the best being North Carolina. VK has been heard. 12 countries have been worked on 17 metres, the best being Ontario, VK and ZL have been heard. 7 countries only, to date (September 1988), on 12 metres, the best being Florida, but a QRZ? was received from a W6 and most stations called have resulted in a QSO. Best DX has been KH6. Top band was the last band to be converted and in spite of not yet being fully evaluated, has been a revelation. Best DX was a Y station in East Berlin and signal reports so far have been every bit as good as obtained with my Codar AT5 which puts out around 6 watts. UA9s have been heard. Aerials used have been various dipoles and an end fed 132ft wire (for 160m) all of which were less than 30ft. high.

I must admit that the conversion described is not the ultimate in scientific design. Most work was of the "cut and try" variety and is fully capable of improvement. (I must make a G.D.O. my next project!) However, all bands do perform well, a lot has been learned and it was enormous fun. The new bands have a great deal to offer and I only use my other transceiver for contests now!

ACKNOWLEDGEMENTS

Too numerous to mention, but I must single out the following:

1 SPRAT 15 Page 4 improved front end for the HW8 EI1DA
2 SPRAT 38 Page 10 converting the HW8 to 18 MHz GM3MXM
3 SPRAT 39 Page 16 30m for the HW8 KHIJS
4 "Solid State Design for the Radio Amateur" ARRL
5 "QRP Notebook" ARRL
Radcom, Practical Wireless, Short Wave Magazine, etc. etc.
Special thanks to the two Georges, G3ROV and GM3OXX, and to Doug Demaw, W1FB, for inspiring this amateur, who is essentially an operator, to (paraphrasing one of them) "plug in his soldering iron and actually do something"

CALLING TOP BAND OPERATORS : By Dick Pascoe, G0BPS :
I have been a keen operator on 160m ever since getting my A licence. I thought that a small piece about the band may be of interest.
I have been working UQ2, DL, OK, GM and Gs this season already using my 160m dipole wound all around the house and garden.
The QRP Frequency on 160 is 1815 (useless here-QRM) so look for me on 1850 CW or 1900 LSB. Let me know what you have been working on Top Band, what type of antenna, what rig etc. News to me c/o 3 Limes Road. Folkestone, Kent. CT19 4AU.

FOR SALE: LABGEAR TOPBAND CW/AM TRANSMITTER (Valves) Integral PSU £20
FERROGRAPH STEREO Tape Recorder, Valve type, 3 motors, 3 heads (monitor direct or from tape) complete with quantity of tape and set of spare heads. £35
3.5MHz VALVE VFO. Professionally built in 1955, with integral PSU and crystal calibrator. In pristine grey case. £25
AR88 COMMUNICATION RECEIVER (LF version) Working OK and in good condition but been in store for years, hence very dirty. as is £65
Quantity of valve items (junk?) including Muirhead V.Cap with SM drive in case FREE to QRP Club members.
WANTED: 1154 and 1155 plugs and sockets, male and female, large flat pin type 4 and 9 pins, to restore working R1155 T1145 combination.
Larry Robinson, G0HTR, 92 Grassholme, Stoneydelph, Wilnecote, Staffs. B77 4BZ.

THE G3LGX PILLBOX SPECIAL

A Loop Antenna for 10 metres which costs less than £5
Capable of local contacts and DX when Ten is open, with High Gain and Low Angle of Radiation - Built from Junk Box parts.

MATERIALS:

WIRE FOR LOOP : Prototype used reclaimed old TV Scan Coil Wire

CLEAR MOULDED TWIN (For Tuning Stub) : 6'offcut from DIY shop or lighting flex.

SPREADERS : Cut from old polythene icecream box or washing up liquid container.

PILLBOXES : Small snaptight lid (35mm film case?)

CLAMPS : Salvaged from old radios/TVs from scrap alloy bent to shape in vice.

5-35pF CERAMIC TRIMMER : Solder lead-out wires and drill pillbox to take leads, seal all holes with polystyrene cement.

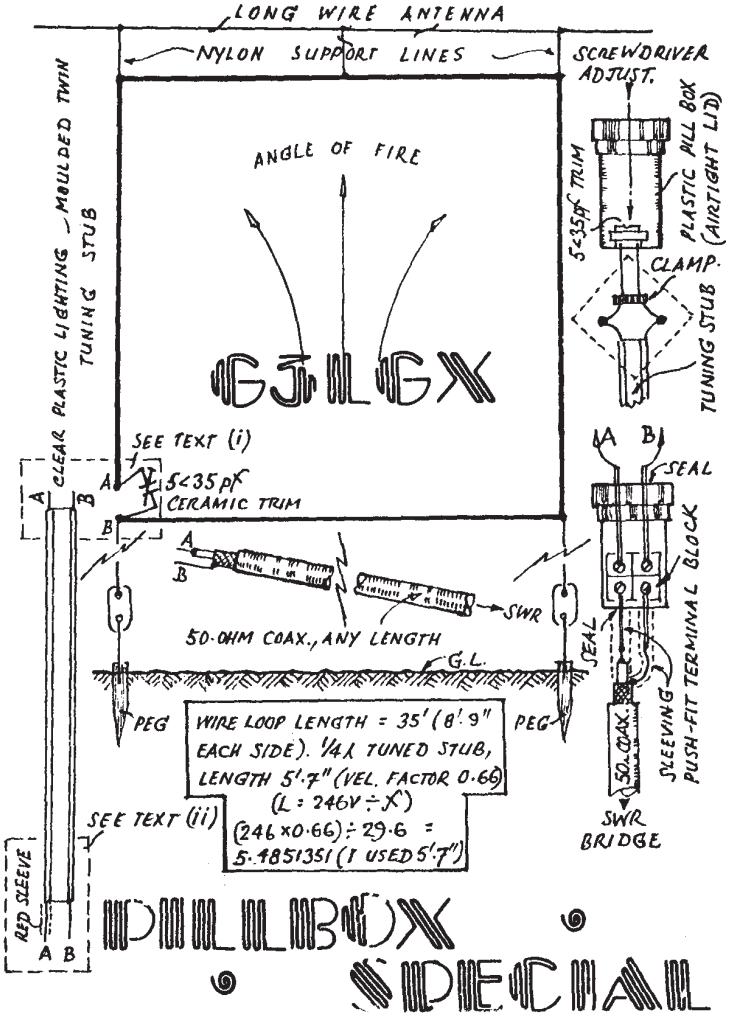
CO-AX TERMINATION : (See Diagram) Seal with cement.

ASSEMBLY : Pre-frabricate all small items, all sealings to dry and assmeble as per diagram.

STUB TUNING : NOTE-For vertical polarisation the feed point must be as shown

Tape your "RF Sniffer" in line with coax feed to observe tuning dip when the trimmer is adjusted (Rig loaded to 4 watts via SWR bridge). This method is better than using a GDO as reflections and movements make an accurate dip difficult. Replace airtight lid.

RESULTS : SWR is 1 to 1 across the whole 10FM Band. Angle of Fire of directly through the centre of the loop with nearly four times the gain of a dipole. Local stations off the side of the loop are only slightly down.



C.W. Audio Frequency Shifter by G4VSO

Comments in Autumn 1988 copy of sprat on using audio filter at 400 Hz lead into thinking about possible filters. Many transceivers have built in 800 - 1000 Hz audio filters with fixed Tx offset or audio tone (like the KW2000). Many operators are used to a C.W. tone of 800 to 1000 Hz thus without careful use of receiver independent tuning split frequency operation could easily occur. The development of a audio frequency shifter is what is required. It has the advantage that it works with a receiver transmitter offset of 800 - 1000 Hz but audio output is at 400 Hz.

A audio shifter was developed consisting of 1.2 khz square wave oscillator using CMOS CD4011, a balanced modulator using a CA5080 transconductance amplifier and a two stage band pass amplifier using two 741 operational amplifiers with overall Q of 5. A third 741 is used to generate low impedance 1/2 rail voltage.

The principle of operation is that the CA5080 amp is used as a double balanced mixer with 1.2 KHz square wave from CMOS acting as local oscillator. The square wave switching the transconductance amplifier from an inverting amplifier with pin 5 high and to none inverting amplifier with pin 5 low (it actually forms an attenuator as amplifier and is switched off with pin 5 low) . Carrier Balance is inherent in the design and is function of amplifier offsets. The two stage band pass filters out the audio 400 Hz and amplifies the output to a reasonable level.

The circuit was built up on vero board, special precautions were taken to keep the local oscillator away from any sensitive inputs. It is advisable to have some audio filtering ahead of the circuit to reduce the level of the image at 1.6 KHz. Setting up and testing is quite simple: check that CMOS oscillator is running by measuring output on pin 10 with AC voltmeter; Connect the unit up to receiver and switch in the 400 Hz filter to check its operation. Now switch to the shifter, and listen to a C.W. station at 800 to 1000 Hz; switch in the unit and adjust the pot VR1 on CMOS oscillator to give maximum output at 400 Hz. The unit is now ready for use. The pot can be adjusted to give any frequency offset required from approx 600 Hz to 2 khz. If pot VR1 is adjusted too low so that the oscillator is about 400 Hz the output will beat with the clock and this will become audible. The output is designed to drive a high impedance of 1k or more.

References

Radcom Technical topics oct 1975 (CA5080 as balanced modulator)
Solid State Design A.R.R.L. (operational amplifier bandpass filter)

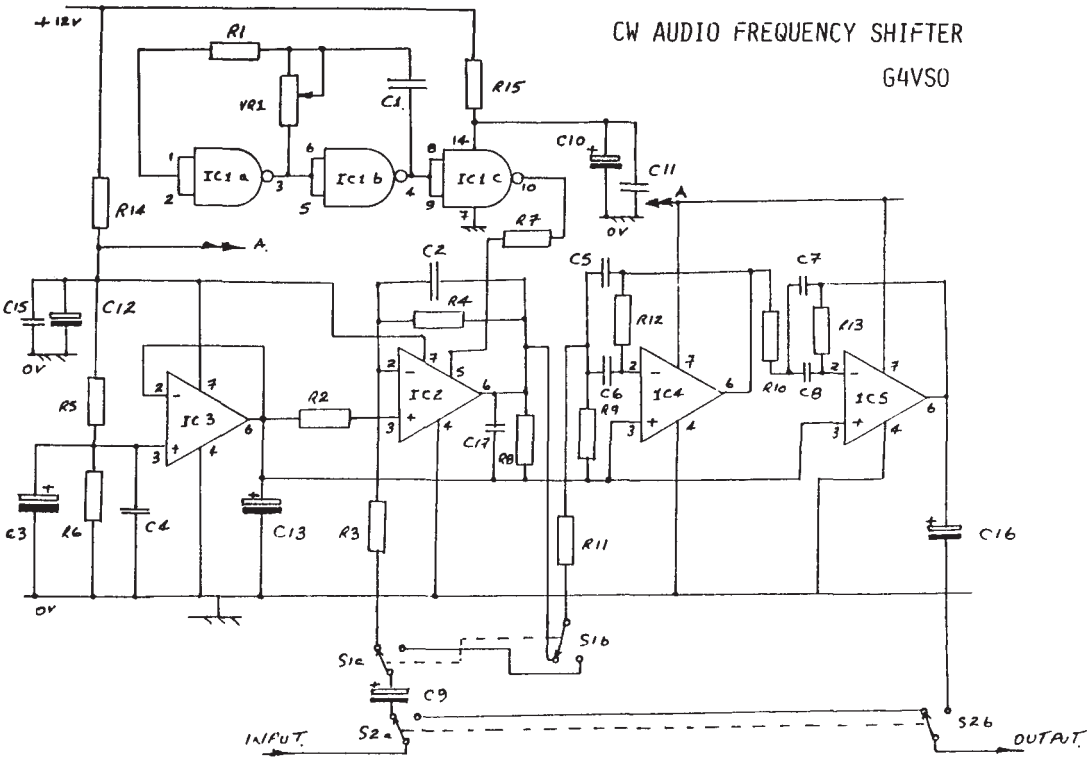
Component List:

Semiconductors

IC1 CD4011
IC2 CA5080
IC3 741
IC4 741
IC5 741

R1 1M 1/4 watt 5%
R2 1K ditto
R3 1K ditto
R4 1K ditto
R5 5.6K ditto
R6 5.6K ditto
R7 3.3K ditto
R8 22K ditto
R9 1K ditto
R10 1K ditto
R11 47K ditto
R12 82K ditto
R13 82K ditto
R14 100R ditto
R15 100R ditto
VR1 100k preset or pot

C1 10n Ceramic
C2 22pf Ceramic
C3 C13 100uf Tant 25v
C4 100n Ceramic
C5 47n Polyester or Mylar 10%
C6 47n ditto
C7 47n ditto
C8 47n ditto
C9 C16 2.2uf Tant 25v
C10 C12 47uF Electrolytic 63v
C11 C15 100n Ceramic
C17 390pf ceramic



Hardware

S1 SPDT shift/ 400Hz filter
S2 SPDT by-pass
0.1 Vero board approx 6in by 3in
1/4 input skt (or preferred type)
1/4 output skt (or preferred type)
Case to suit
Misc pillars nuts and screws

YET ANOTHER DOUBLE-D BEAM ANTENNA DESIGN

By Peter Dodd G3LDO

Now that the sunspot maximum is fast approaching the QRPer can benefit by using the lower propagation loss of the higher frequency bands.
This antenna is designed to give some gain and directivity on the 21MHz band (to my mind one of the best bands for consistant QRP DX during the high sunspot period) and to be as compact as possible without sacrificing performance compared with a full size two element beam.

The 21 MHz section of the antenna is a two-element beam, with a wingspan of 12 ft. It is based on the compact Double-D design which uses bent elements to obtain compactness, avoiding lossy loading coils or the additional constructional complexity of linear loading. Two variants of this design were described in SPRAT 30 and SPRAT 49. This design is nearer to the SPRAT 49 design but is not as compact.

The construction is shown in Fig 1. 'Plumbers delight' construction is used and the boom consists of an 8ft length of one and half inch (38mm) outside diameter aluminium tubing.
The elements are constructed from 1 inch (25mm)&7/8 inch (23mm) OD tubing with the small diameter tube telescoped into the larger one to facilitate length adjustment.
The elements are fixed to the boom using aluminium plate and car exhaust clamps.
The 'bent' wire sections of the elements are made from 1.5mm stranded wire with 0.5 covering of plastic insulation, although this wire size is not critical. If you use uncovered wire you may have to increase the length slightly.

The 21 MHz beam has a wingspan of 11ft and is appears as efficient as a full size two element beam. In addition it has a wide bandwidth for a compact array, see SWR plot in Fig 2. The antenna is sited on the chimney about 30 ft high. I can QSO JAs and VKs on the long path when the band is well open using 10 watts PEP SSB. Tests on 21mHz with G3FXB (about 20 miles away), using the full size model showed a front-to-back ratio of about 3 S-points.

A polar diagram of this model is shown in Fig 3. This was measured using a professional field strength meter (Sadelta TC40), with the output connected to the analogue port of my BBC computer and plotted using special software. The VHF model was energized using an VHF signal generator. The VHF tests agreed with G3FXB tests; each circle on the polar diagram graph is equal to about 7db.
In the descriptions of the Double-D antennas in past issues of SPRAT the polar diagrams have been misleading because they gave an exagerated indication of F/B ratio; this was caused by the non-linearity of the diode voltmeter at low voltage levels

This antenna has been in use for some time. Originally the vertical section was a 2 metre folded J antenna which also worked well and seemed unaffected by the wire ends of the 21 MHz beam. The main structure of the antenna stood up to the hurricane of Oct 1987 but the folded J was damaged. I have replaced the centre support with a grounded element 8ft 3inches long to be used as a 28MHz vertical using the 21MHz antenna as a non-resonant counterpoise. A gamma match has been built and fitted but I have not yet got round to adjusting it. It does work quite well on receive. I will give details of the results in a later issue of SPRAT.

Although measurements are given the antenna will have to be adjusted to obtain the maximum performance - the same as with any beam antenna. I found I could adjust this antenna for maximum front-to-back ratio while only 6ft high off the ground; maybe it was because the ends of the elements are pointing upwards. Dont worry too much about adjustment of the gamma match at this stage. Adjust driven element and gamma match to obtain a reasonable SWR after you have adjusted the reflector. Do the final adjustment when the antenna is in position if possible.

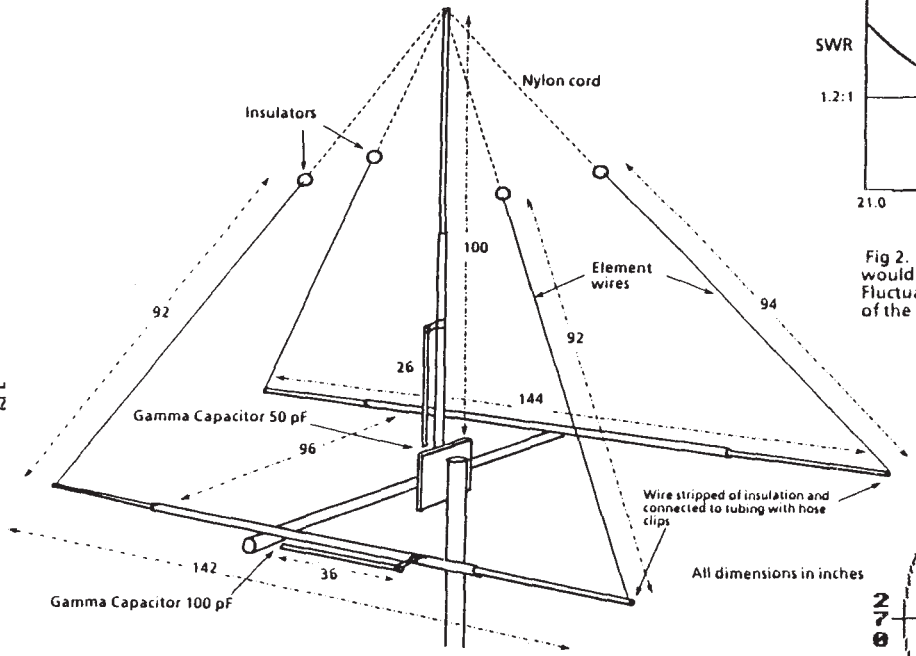


Fig 1 Perspective diagram of 21MHz Double-D

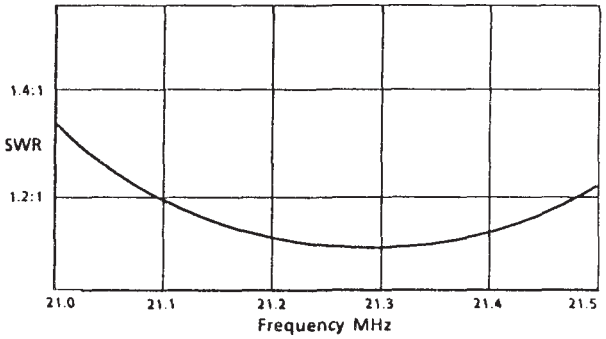


Fig 2. This SWR curve shows that my present Double-D installation would be improved if the driven element were lengthened slightly. Fluctuations of 0.2:1 SWR occur in windy weather due to movement of the wire sections of the elements.

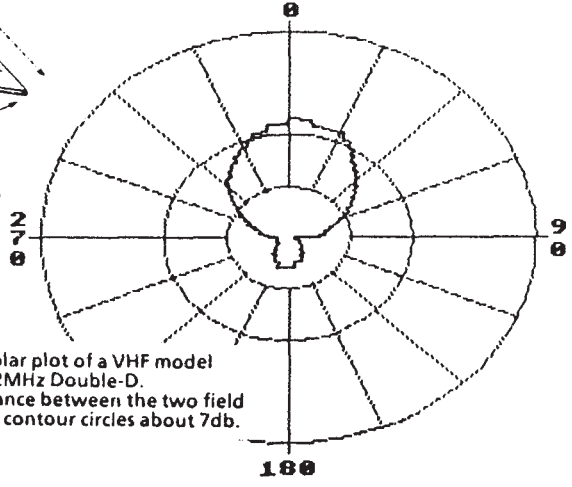


Fig 3. Polar plot of a VHF model of the 12MHz Double-D. The distance between the two field strength contour circles about 7db.

74HC4066, A Novel Low Cost Mixer For RF Applications

DJ1ZB

In recent SPRAT articles DK4SW and G3PDL have shown some applications of the CMOS 4066 quad FET switches. With the appearance of the HC and HCT line of faster CMOS circuits and the statement in an RCA advertising that the HC4066 would allow a control switching frequency of typically 35 MHz it was necessary to evaluate this IC for r.f. applications.

First, the four switches were connected similar to a ring modulator like a commutator switch, with both inputs floating (fed via a transformer) and one output end grounded (simplified scheme without bias).
The control inputs were connected to a quad NAND gate 74HC 132 driven by a signal generator. Operating in this setup like amixer, conversion loss was measured at about 8 dB up to 10 MHz, rising to about 13 dB at 30 MHz. Due to the relative high ON resistance compared to a diode ring modulator, operation at an impedance level somewhat higher than 50 ohms is advisable. Intermodulation distortion seemed quite low, indicating an intercept point in the +30 dBm range.

Next, the switching circuit was rearranged to introduce a bias of 2,5V to avoid limiting of the switches at high amplitudes. But in practice the improvement was low, reducing distortion at very high input levels only, without much improvement to the intercept point.

Then an rf input circuit (tunable from 7 to 14 MHz) and an AF amplifier were added to this circuit to operate it as a direct conversion receiver, with excellent results. But the 2,5V bias to the mixer caused some motorboating problems in co operation with the high gain AF amplifier. The easiest solution was to supply both parts of the circuit from separate stabilized voltage sources.

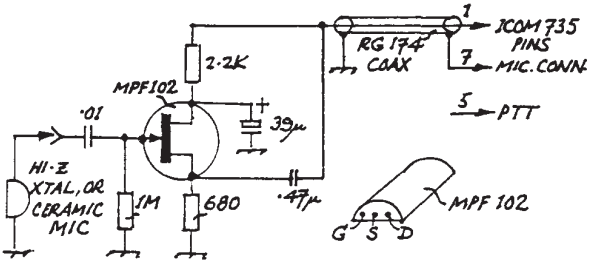
As receiving voltages are usually very low there will be no real degradation in performance when using the unbiased mixer circuit, this avoiding the motorboating problems.

For my visit to the 1988 RSGB Convention at Birmingham, where I met many G QRP C members, the signal generator was replaced by a 7 MHz VFO. The next step will be to combine this mixer with the TTL transmitter techniques already published in SPRAT to form something like a "TTL transceiver".

HI_Z MIC ADAPTOR
"Mike" Michaels W3TS

ICOM HI-Z MIC ADAPTOR

The circuit allows the use of crystal or ceramic mics (D104 in my case) with my Icom 735 Transceiver. The power for the circuit is supplied on the audio line as in electret mics. The results have been very good – Best audio reports ever with a properly matched D104. The unit was built in a large IF can with a mic jack (stereo phone type) on one end and a PCB cover on the other – using ugly construction techniques.

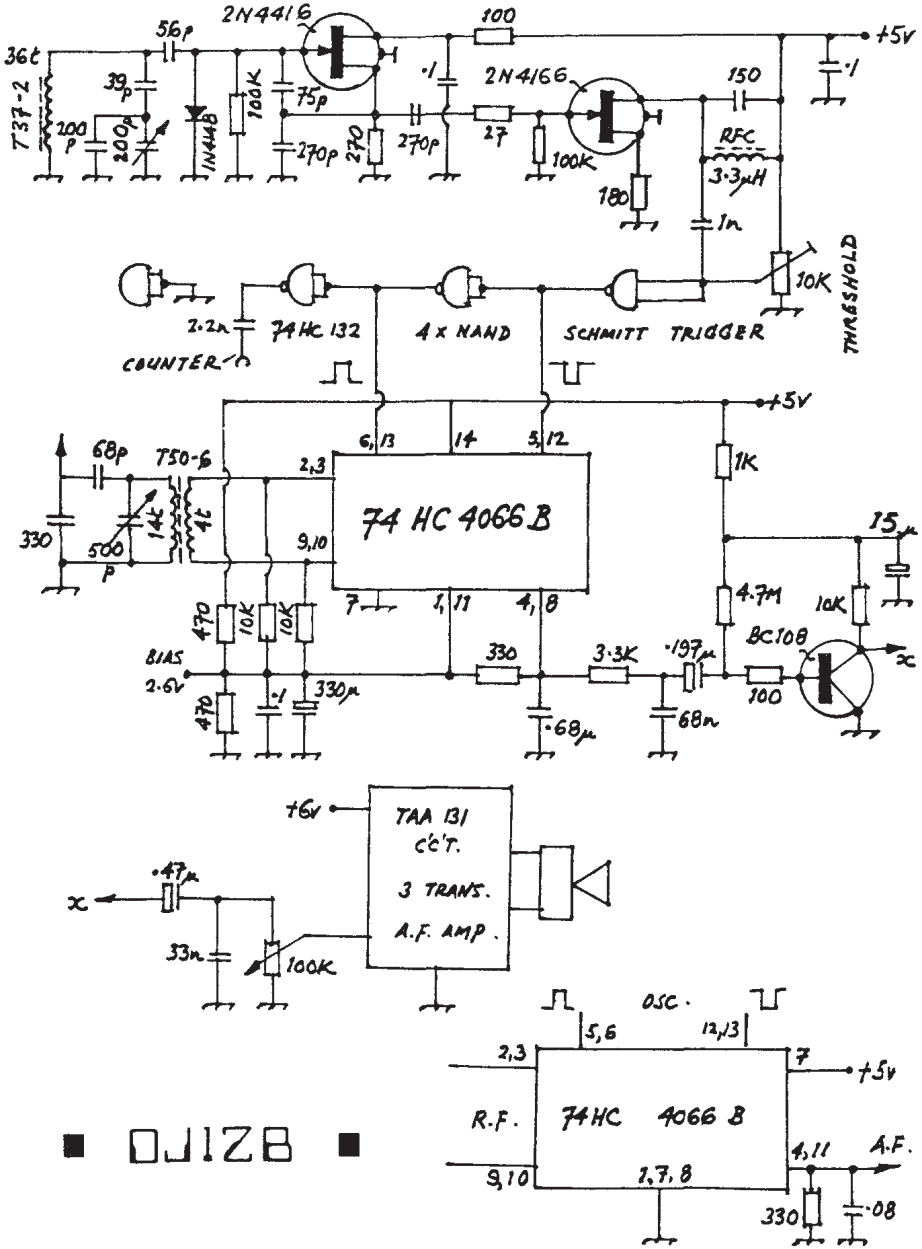


W3TS

WANTED: Circuit Diagram/Manual on MARCONI 52 SET (Canadian) Loan/Return
Bill Watson, G4EHT, 12 Chadswell Heights, Lichfield. Staffs.

WANTED: Circuit or Manual of CODAR AT5 TRANSMITTER for Loan and return
K.G.Attkins, G6CDD, 30 The Brow, Woodingdean, Brighton. Sussex.

■ 7 Mhz D.C. Rx. using 74HC4066



■ DJ1ZB ■

10 USEFUL HINTS AND TIPS
G3YCC o42

1. To make spacers for PCB's etc cut up defunct ball point pens.

2 Use selotape 'sticky fixers' - self adhesive pads to mount PCB's.

3 To re-use old cabinets and boxes, stick aluminium off-cuts behind unwanted holes; smooth over from front with filler (eg plastic padding) rub snooth set.

4 If multi screened wire is needed, pull the inner from length of coax and thread appropriate wires through.

5 Use sticky backed plastic to cover front panels (I use wood grained).

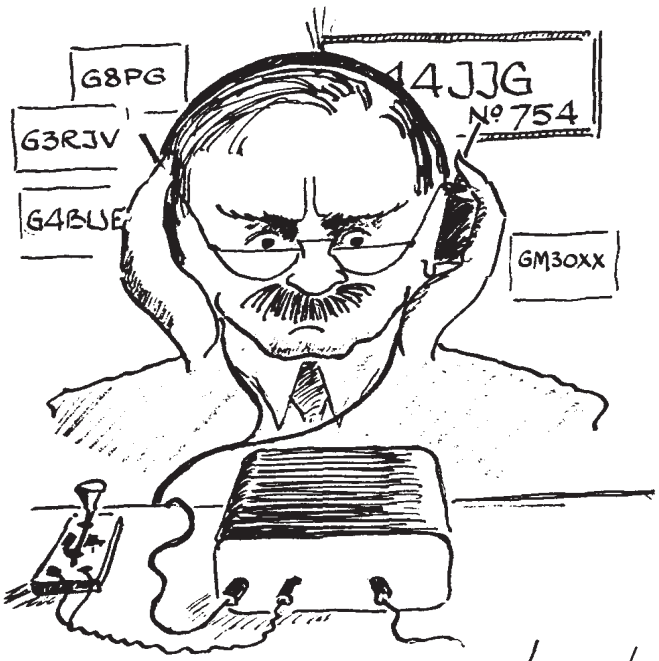
6 A useful 'third Hand' can be made by fastening a bull-dog clup onto one of the old upright capacitors with screw terminals.

7 To get a nut onto that inaccessible bolt, stick it onto a blob of blue tak on a screw driver.

8 A trimming tool for beehive trimmers can be made by pressing an old ball point pen barrel onto an old component heated in a gas flame to obtain a perfect imprint.

9 Screw a child's ruler to the edge of the bench - useful for measuring odd lengths of coax, antenna elements (VHF) etc.

10 To cut strips or small pieces of glass fibre PCB, score well and snap off by supporting along the mark at edge of bench.



HOW THE CLUB WORKS: MEMBERSHIP RECORDS AND THE DELIVERY OF SPRAT

The club records are maintained on a Data base using a BBC computer. Recorded on this are:

1) Your name, callsign (where applicable), club number, and address.
2) The status of your subs (eg 89 indicates that you have paid to the end of the year).
3) A code to show the post area (this is to help with posting of SPRAT and does not appear on the label)

This information is confidential and is used only for the purposes of the Club.

These records are updated as you notify the Membership Secretary of changes and also when you pay your subs.
The records on the Data Base are used four times each year to print the labels for Sprat delivery. The labels are printed about 5 weeks before Sprat is posted. Any changes notified in that time will not appear on your address label until the next Sprat.
The records will not be used also for the Members Handbook to provide your number, name and callsign. This will be done probably about the middle of July in each year and the information will go to G3PDL (our treasurer) who will compile the lists. If yoiur subs are not paid by then you will not appear in the membership lists.

Sprat delivery
The printed labels go from G4HYY to G4JBL, Cedric, in charge of the team of unsung heroes who organise the posting of Sprat.
Cedric also receives Sprat from our printers and QSL cards for distribution from Dave, G4WZV, our QSL manager.
The labels, Sprat, QSL cards and, of course, stamps are distributed by Cedric to the posting team. The team put the appropriate materials in your envelope and then we rely on the Postal service for the rest!

CHANGES AND CORRECTIONS TO MEMBERSHIP LISTINGS (18th Nov. 1988)

245	ZL4HB	George	2181	G3GRT	Bill	3280	N1DWA	Clifford
880	KL7PF	Tim	2399	G8SBU	Des	3310	GOHWA	Peter
1089	PA3EUH	Piet	2426	GODQG	Mike	3337	G8GAR	Aitch
1111	G4TZB	Terry	2458	G4DHK	Roger	3378	G4ROC	Lawry
1163	G4JZV	Bob	2526	G4EVI	John	3463	G3XUO	Keith
1432	G4MDU	Jon	2784	GMOHBM	Brian	3466	GMOBCA	David
1483	G4DJZ	Cyril	2872	G3INZ	John	3756	GMOSRA	Jim
1504	GW3GJA/5NO	Roy	2934	G4VPF	Owen	3888	GOKHN	Sid
1577	PAOKJF	Joop	3158	G3GC	Eric	4179	WE2P	Pete
1842	G3JKS	Frank	3231	DL2QA	Elmar	4335	GMOIPW	Bob
2067	G8NWK	Geoff	3247	GODJA	Dave	4512	G1YNR	Betty
						4660	GOKKY	Frank

MEMBERSHIP HANDBOOK CALLSIGN/NAME LISTING
Due to an error in communication, some joint husband wife memberships have not been recorded. Omitted from the listing are :

2008	G8GGR	
2777	G1IJW	Jo-Anna
3550	GOAQX	
4575	G8WWO	Jennifer
3041	G1GZB	Val

THANK YOU to all members who have helped me to begin QRP, especially Larry, GOHTR. Bob Freeman, GOJCW.

PROFESSIONAL QSL BURO. Inter member and Inter service QSL cards cleared weekly or monthly. Just £2.50 p.a. Write for Full Details, enclosing sae to:
Elder Jones, GOCJM, LDS Chapel, Stepney Road, Scarborough, Yorks.

FOR SALE: YAESU FT757GX v.g.c. £450 ovno. DRAE PSU 24A (for FT757) #80
Tel. GOCJM on 0723 - 364654

WANTED: SX28 Communications Receiver by G3DOP.
John McDonnell, 25 Croft Parc, The Lizard, Helston, Cornwall.

Communications Forum

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

****

READ THIS : NEW CW POWER LEVELS FOR AWARDS! READ THIS : NEW CW POWER LEVELS FOR AWARDS! READ THIS : NEW CW POWER LEVELS FOR AWARDS!

****

In response to representations from members your committee has agreed that we line up our cw power level for Awards with that used by organisations such as QRP ARCI, namely FIVE WATTS OUTPUT. Award General Rule 1 (see your members Handbook) is thus revised by deleting "3.3W rf output or 5W dc input (cw" and substituting "5W rf output (cw)" And as it is Christmas, 5W output cards from 1st January, 1988, or later will now be accepted for Awards. (As far as ssb goes, our power levels for Awards have always been the maximum internationally agreed as representing QRP)

****

REMEMBER THE WINTER SPORTS ARE OUR BIG ONE! 26 December to 1st January inclusive on all QRP frequencies. This is your chance to push up your member and two way qrp country scores. Our Hong Kong members VS6VT and VS6WD both hope to be very active. To work them 28 MHz MAY be open around 1000 gmt, 21 should be open 1000-1100 gmt, and 14 MHz from band opening until at least 1400 gmt. These figures are from a computer forecast supplied by David, VS6VT, following a recent QRP/QRP QSO. This is our big get together, and the most interesting logs submitted to G8PG are considered for the G4DQP Trophy and merit certificates. See you there! (Our Russian friends see below have also been invited to take part).

DO NOT FORGET THE OK/G QRP WEEKEND on 21/22 January, 1989. See page 17 of the Autumn 1988 SPRAT.

THERE IS A RTSING TIDE OF QRP INTEREST IN EASTERN EUROPE. First in the field were the HAs with their 3.5 MHz Contest, but they have long been overtaken by our OK friends, spearheaded by OK1CY (ex DK1DKR) and OK2BMA. Although small in number our SP and YO members have also helped to spread the QRP message; few of us will forget the excellent signals from YO6HQ and SP5SDA during the last Winter Sports. For a long time LZ1SM was a lone 1W voice from Bulgaria. Now he has been joined by LZ1BB, Harry. The latter recently took over his Club station, LZ1V, turned the transceiver down to 3W output, and put on a live demonstration of QRP for his fellow members. He worked several of us here in the UK, and we were able to help him demonstrate the effectiveness of QRP and also to send over the air log extracts showing some of the DX that could be worked. As Harry said "some hears over here have almost stopped beating with amazement!" Now at last the USSR are getting the QRP message, with a group organised by Oleg, UA3GVR. He and other Russian members have been enrolled in our own club. USSR QRP stations worked recently included UB4YZZ, UA1AQQ, UA3ABT, UA3MES and RW3AZ. We extend a warm welcome to them and other Russian QRP radiosportniks!

IF YOU FEEL THAT YOU ARE NOT GETTING YOUR FAIR SHARE OF DX WITH YOUR QRP the reason may be that you are either not equipped for 28 MHz or not using the band regularly. The band is now open just about every day, and is producing some really rare DX stations which are workable with QRP. You may ask "why this emphasis on 28 MHz?". There are two important reasons. Firstly, effective antenna height increases as the wavelength is decreased. For example if your antenna is 33ft high it is a quarter wave high on 40m, a half wave on 20m but a full wave on 10m. This means that your radiation angle will be lower on that band, and your DX better. Secondly, each time you double your frequency you reduce the ionespheric attenuation on your signal by a factor of four. if, for example, the attenuation on your signal over a 3000 mile path on 14 MHz is 20 dB, the attenuation over the same path on 28 MHz will only be 5 dB, giving your signal a 15 dB gain (3 S points roughly!) This is why one can work such good DX on 28 with a simple antenna and 2 or 3 watts. Are you getting your share?

THE QRP ARCI CONTEST on 8th/9th October really showed how good trans Atlantic two way QRP communication could be. Even with the low, simple antenna at G8PG 18 trans Atlantic contacts were made with 15 different U.S.A. QRP stations. The best DX was NF0Z in Colorado. N48P was the outstanding signal and was worked on 14/21/28 MHz. Our member KZ1L was worked on both 21 and 14 MHz. A most significant event was the positive identification of KA7LKV (in GA and W1KKF (in CT) around 7040 KHz between 2345 and 2355 on 9th October, despite vicious SSB and RTTY QRM. Maybe next year we can make it across on that band. Peter, G3XJS, seems to have done even better with a terrific score of two way contacts on the hf bands.

400HZ FILTERS. Just before going to press a very interesting design produced with the aid of a computer has been received from Ho-Jo, DJ1ZB. Hopefully this will appear soon in SPRAT. G.P.O. MORSE KEY TYPE 33. I was recently lucky enough to acquire one from Norman, G4LGF. I believe it is about 80 years old. Has any Member any information on this type of key, please?

REMEMBER THAT THIS FEATURE IS HERE TO SERVE MEMBERS. If you have technical or operati n problems, or think some issue should be discussed as being important in the c ntext of QRP operation just drop me a line. Even if I cannot suggest a solution there may be others in the Club who can. We are here to help you. Over the years G8PG has had a lot of experience with small low antennas, so this is one obvious area where help can be offered. Anyone asking for such help should supply measured details of the space available, and also what bands it is desired to use. Space should include that available outside and also any indoor space available such as loft space.

DID I EVER TELL YOU ABOUT MY FIRST QRP CONTACT WITH A ZL. It was a good few years back in the early days of our Club when only the GM3OXX's of this world had managed to get that far on QRP. I heard this ZL working a big pile up on 28, and after an hour I was thrilled to get him back. The call book showed he was a club station, so off went my QSL and IRCs by air. Fourteen days later the eagerly awaited envelope arrived but when I opened it there was only a single sheet of paper inside. This was an apologetic note from the club Secretary to say that their club station had not been active for two years, and had never operated on 28 MHz. From the mass of cards received he thought the "ZL" was actually in eastern Europe. Four years later I worked a real ZL, as confirmed by his card. And that, Lads, is why QSL cards are required for all meaningful awards, The fact your contact claims he is in some exotic place means nothing unless you have written proof. This world is a hard place, and there are a lot of con men around, even in amateur radio!

10 ON 10 CONTEST. The winner was Edd, G4KLQ, with the excellent score of 940 points 47 QSOs with 20 DXCC countries including W (interestingly G8PG caught the same opening and also got across at that time). Congratulations to Edd, who has once again shown the 28 MHz band is not dead during the summer.

AWARD NEWS
NEW QRP MASTERS. Congratulations to G3IJV and G4ETJ on Admission.
QRP WAS. G3IJV, SM4KL
QRP COUNTRIES. 100 SM4KL; 75 G4ETJ; 25 GW0DYT
WORKED G QRP CLUB. 660 all cw GM3OXX!! 300 G8PG; 200 OK1CZ G4MQX; 180 GM4YLN ON4KAR; 140 GM40SS G4XVE; 80 G4VPV; 60 G3IJV SM4KL; 40 GOCQA; 20 G4VVI G40WH.
TWO WAY QRP. 30 G4MQC; 20 G4ETJ EA3EGV G3LGH; 10GOEWN SM4KL

UNSOLICITED TESTIMONIAL "CW is great but QRP CW is better. You make so many friends in the G QRP Club". Overheard from a G on 7030

MECHANICAL PROBLEMS? Member, Rod, GØBXQ, a new comer to construction is willing to give advice/help on mechanical aspects of homebrew, perhaps in exchange for "radio advice. Contact via G4HYY.

VHF

VHF Manager's Report
John Beech G8SEQ
124 Belgrave Road, Coventry, CV2 5BH

Unusually, I have spent more time operating this last quarter than I have on construction. The main reason for this is that I have at last created sufficient room in the shack to be able to leave the gear set up and just go up there and switch on when I feel like it! For those of you who are interested in collecting awards, my local club CARS have instigated the "Godiva Award". To gain a certificate you must score points by working Coventry stations. For full details send an SAE to Jon Ward G4HHT. 3 Shirley Road, COVENTRY.

I've been corresponding with Matthias DF 2OF concerning a superhet design which should appear in this issue. Unknown to each other we were both trying to use the same AM receiver chip (TDA 1072) as a product detecting IF & both experiencing the problem of the BFO swamping the Agc line. After a fortuitous visit to George's QTH (G3RJV) some correspondence was exchanged between me and DL land which resulted in Matthias coming up with a reasonable solution to the problem. The moral of this little epithet is that if you have a sticky problem someone somewhere may just have the answer.

Randy, AA2U wrote from the States to say he is an active QRPer on 50 MHz. He listens at 2.5KHz intervals from 50.1 to 50.2 MHz with his 5 el Yagi at 29 ft. So far he has worked 3 countries and 26 states using SSB and cw, so come on you 6m buffs, stop listening to the beacons and point your beams west!

While on the subject of 50 MHz, the White Rose Rx Converter PCBs are available from me at £1 + SAE, TX PCB £2.50 + SAE. The circuit of the latter appears in this SPRAT, so here goes with a brief description of how it works.

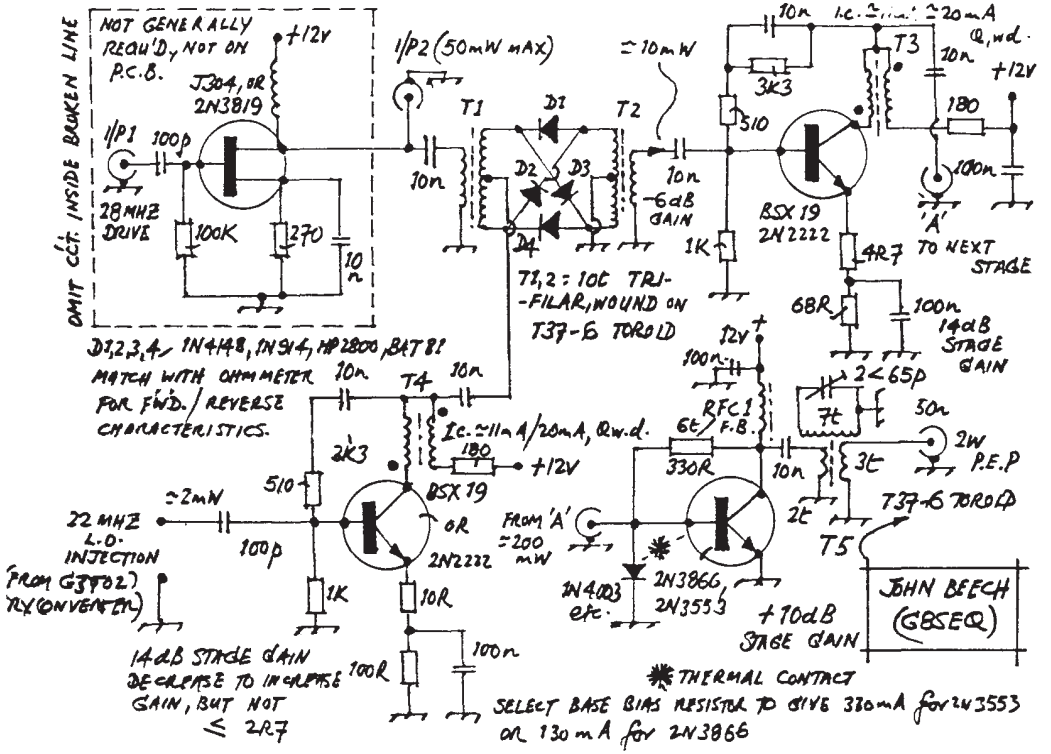
Some RF is bled from the 22 MHz osc. of the White Rose Rx board and amplified to about 50mW to drive a double balanced diode ring mixer. The second port of the mixer is driven by the 28 MHz Tx, via a suitable attenuator network if necessary. The level of this latter signal should also be about 50mW (rms CW). The output from the third mixer port is at 50MHz at a level of 5-10 mW. This is then amplified by a further buffer/driver stage.

The level of the signal should now be sufficient to drive the PA stage. This uses a 2N3553 device biassed in class A. With the output circuit shown it should be capable of delivering a watt or so of RF to a 50 ohm load. Included in the output cirucit is a band pass filter, which is about 500 KHz wide at the -3db points. It is quite effective at stopping the 22 and 28 MHz signals, which should be at a low level anyway if the mixer is balanced properly (4 matched diodes required.)

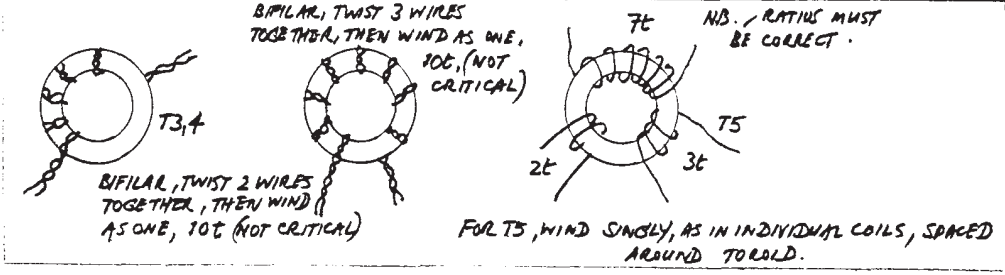
The PA transistor must have an adequate size heatsink, which poses a bit of a problem with a TO 5 device which has its collector connected to the can. One is that the heatsink is "live" and the other is, if it is made physically large there is a lot of stray capacitance between the collector and ground, shunting that valuable RF. At the power level of this circuit a small star shaped clip is adequate. The bias diode can be mounted within the folds of such a heatsink for a good thermal contact, taking care that the diode leads do not short onto the transistor can or heatsink.

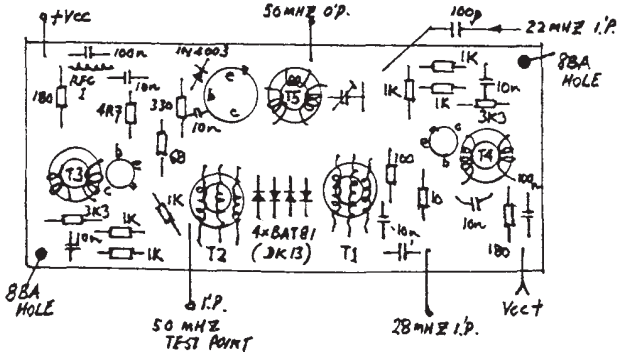
Finally, if you have buiult a 50 MHz converter and want to get on the band easily, the xtal controlled CW Tx on P30 of Solid State Design works very well and is easy to get going. Our friend J Birkett had some xtals conveniently on 50.1 MHz which worked very well, but I'm not sure what the stocks are like now.

73 John



50 MHZ TRANSVERTER, TX SECTION (COMPANION TO WHITE ROSE CONVTR)





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

The Dallas Convention dates are 2-4 June 1989 and Fred, W5QJM tells me that the final touches are being made to the arrangements for the QRP Forum. Further news will be published as it is received but in the meantime if any of you are planning to be in Texas around the begining of June 1989, get in touch with Fred at his new address at PO Box 420321, Houston, Texas, 77242-0321. Fred is on the air at his new QTH with an inverted vee at 25 feet fed with 450 ohm line through an ATU. Although it is not the best of antennas outside antennas are banned in the area! Fred heard GM3OXX on 10m at the end of October on the inverted vee, but George did not hear Fred calling him. W6SKQ is planning to attend the Dallas Convention but Bob will be missing Dayton this year because of it. It is a pity the Convention is so close to Dayton as I guess many of the QRP gang will only be able to visit one of the events. I won't be at Dallas as my final exam is on the 4th June, but should be at Dayton again for the fifth year running!

New member G0DNB says he has signed the pledge of building himself onto the HF bands, even if it takes him 10 years! Phil says he is a total novice at contruction. He has just got his full licence, but in the meantime offers 150mW QSOs on 70cms FM. G4KKI has built a new one valve 80m TX using an ECL82 biased to give 2.5w out. Bill says it was great to meet W7EL at the G3RJV QTH, and try out Roy's optimised TCVR. Look for a new QRP group in Florida, WA4NBE says several in his area are all fired up with QRP. George is at 73/55 DXCC. Another new member Andel, HA1ZF is QRV with a choice of 0.5 or 3w with his homebrew TX.

G0HTR thanks G1ZCY for responding to his request for a local VHF net. Larry was very interested to see G3DOP's WW2 gear in the last Sprat as he has the same equipment. He asks John and any other members interested in WW2 gear to get in touch with him to exchange notes, etc. G3DOP himself says he has been having lots of fun with the 1154/1155 combination, and now runs a sked with G3HKD who also uses a 1154 TX. G4CZL says he was struggling with CW when he came across QRP last year and it fired his enthusiasm. Al was soon QRV on 80m with a Howes kit and with a dipole at 24ft is having lots of fun. He has built the GM4JMU RF current transformer and says it's exceptionally good.

My article on milliwatting in the last Sprat has generated some interest. GD3HDL says he uses 300mW on most bands with a Micron and W3DZZ antenna at 20ft. Syd is looking at attenuators to get lower power. W5QJM says he and K5BOT ran some tests on the Welz RP-120 meter mentioned in my article. Fred and Ed found the 0-20w scale to be "within tolerance", the 0-2w scale to be "on the money", but the 0-200mW scale showed a 50% error. It appears this is due to not being able to find diodes that work accurately at both 200mW and 20w. My thanks to Fred and can anyone else confirm the 50% error reading on the 200mW scale or does Fred have a suspect meter? For my present milliwatting I am using the 0-20w scale to set my Argonaut at 1w output and then using the Dayton 'flea market' attenuator. G3DOP used to use 20-200mW several

years ago and made many QSOs on 80m at these levels. John has recently been experimenting again with his KW2000A, but can only get down to 200mW by reducing the drive. He also believes an attenuator is the best way to get lower. AA2U uses a stepped attenuator which he built. Randy keeps his milliwatting records on computer and his print-out is very impressive. He has worked 3 countries with 1mW, 23 with 25mW, 50 with 100mW and 93 with 500mW. Randy says with proper conditions many microwatt QSOs will be possible. He, (like me), has found that paths through dark areas, or partially dark areas produce the best results, possibly because of the lower absorption. DF4SB is using power down to 3mW. At that level Gerd has worked F and DL but 10mW was needed to work G.

G0GWA is a third year electronics student at Warwick University and is often QRV from the club station G4EWU. Simon used 3w in the RSGB 21MHz CW Contest and says he was surprised how many countries he worked - JA, UA0, VS6, 5N and W1-W0 as examples. GM4HQF used his Corsair at 3w and his "Dipole of Delight" antenna for the contest. Dave worked JA, plus other good DX amongst 22 countries. KD8BJ is another member operating from his work QTH. Martin takes his Argonaut to work in his brief case and uses it in his lunch hour at the club station in Ohio. Paul, G1ZCY had his first CW QSO on Bonfire night (5th nov) on 144m with fellow club member G4OUT. G0BQI using a Howes TX/RXand has been finding club members with his 132ft long wire. G4KKI worked ZL3GQ with his modded HW7 at 2w and half G5RV.

G0FIU has been doing a lot of QRP on 10m with his converted CB rig and eighth wave vertical antenna. He has worked 30 countries this year but has a bad TVI problem, even with 1w!! Roy

is also active on 70cms, (without TVI) and his best 1w QSO is with GM from his London QTH. WB9TBU discovered there is no propogation in the daytime in July in KP2 land. Paula used 2-5w to work 33 countries on her QRP DXpedition. NU4B joined her after a few days with his HW9. Another trip is planned so if you missed Paula this time QRX. W6SKQ mentions his first QSO with GM3OXX on 10m at the end of October. G4JFN and G3XJS both recently worked W6BUY on 10m who was running 2w from a hand-held to his yagi. Bob is now at 179/171 and Peter at 190, (with 156 worked this year).

In September G3XJS worked VK7VV on two-way QRP on 20m long path. Other two-ways for Peter include 5N0/G3GJQ, VS6VT, TF, KL7, JA and V2A. Peter made 48 QSOs with W and VE in the ARCI Fall Contest and worked the 3W8 gang on 10, 15 and 20m. G8QM tried a 20ft high dipole for 15m at the end of garden to better his indoor W8JK. After Vic quickly worked VK, several JAs and W6s plus EA8 he thought he was on to a quick WAC, but couldn't work South America (PZ) until two days later!! Vic has been running a daily sked using 4w with EA7DGA on FM on 29.7MHz.

G3OEP sends a report on the 1988 QRP Beside the Seaside Meeting. Guest of honour was G2UK who gave an excellent talk on satellite communications, using QRP of course. Dave says numbers were down on last year, but they were pleased to welcome PA3BHK and his home brew gear, (sorry I was out when you called here Robert). G0ATS sent a Howes kit for the raffle and G3RJV sent a tape, both arriving late because of the postal strike! Prizes for the best homebrew gear and person travelling the longest distance were a 40m Howes RX and McKnight (USA) 40m TX. Dave says the Norwich club may take over the organising of the 1989 event, but one way or the other he will be involved with it. Great work Dave and let me know about the 1989 event in good time so I can publicise it in Sprat for you. PA3BHK says how much he enjoyed this years event.

Now for some controversy! Ian G3ROO mentioned in his SSB column (SPRAT 55) that he will only QSL members who QSL direct with SAE. Although I disagree with his opinion on QSLing that is Ian's decision, but at least you know what you have to do if you want a G3ROO QSL. In the last SPRAT Ian says he received other letters all agreeing with him. Fine, but how do the rest of us know who those members are? In other words if we want their QSL how do we know they will only QSL direct? I'm not suggesting we carry a list of "QSL direct only" members in SPRAT as I would not want to encourage this attitude to QSLing. Surely all members can find the time to answer QSLs, and as regards the cost Gus, G8PG doesn't need expensive glossy cards when you apply for awards, just written confirmation. This can be done on a plain postcard or even a piece of paper. We already have an unofficial list of those members who refuse to QSL, surely they are not going to be joined by another group who will only QSL if they receive a SAE. The G-QRP-Club has not been built up on that type of QRP spirit, or is that just to be found amongst our SSB members?!!!

Let me know what you think about QSLing, milliwatting and anything else in general that will tell me how your winter goes, by February 20th please.

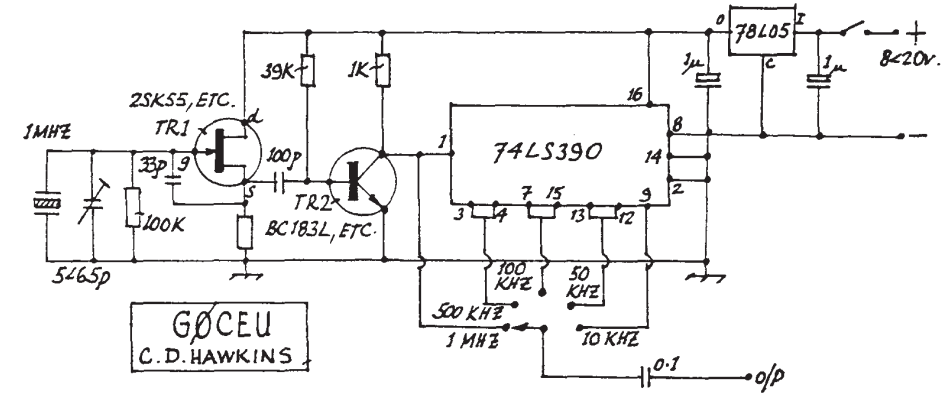
73, Chris

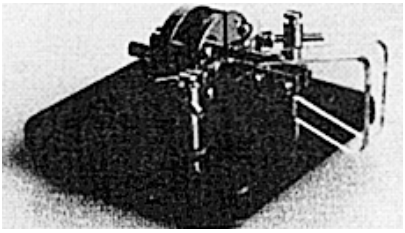
QRP FROM QRO? Following a letter from GØBOP and some discussions with the RSGB, I am seeking example of members using QRO rigs at genuine QRP levels. G3RJV would like to receive information from any members who use simple mods (ALC Line control....Reduced PA voltages....Outboard PAs...etc) to use a QRO rig for QRP working.

CRYSTAL CALIBRATOR

by C.D.Hawkins G0CEU

A Crystal Calibrator is a useful accessory in the shack/workshop, either as a stand alone unit or built into other equipment. The use of a 74LS390 dual decade counter provides outputs down to 10KHz (from a 1MHz) in one TTL package. This provides greater harmonic output than would a CMOS device. The prototype was built on a piece of veroboard 2.5"x1.5" and gave strong 10KHz. Markers to at least 30MHz. In case of difficulty, the 74LS390 is obtainable from Maplin Electronics (cat no. YH21X) or electrovalue. The 0.1uf capacitor in the output lead is for D.C. isolation. For most applicatios sufficient signal will be obtained by loosely coupling the output of the calibrator to the RX aerial input.





SARCON 1988
SCOTLAND DOES US PROUD ONCE AGAIN

This year SARCON was held at the Exhibition and Conference Centre in Aberdeen. Our Scottish Organiser was Nor, GM3RKO, and our site liaison man was Ty, KA9WRI. With 18 feet of stand space we had an excellent venue, and great interest was shown by the many people visiting the stand. Our own membership was well represented, with 44 signing the visitors book. Bob, G4JFN and his XYL who were touring Scotland joined us before opening time, and helped us greatly on both sales and enrolment side. Sales were well up on last year, and a number of new members were enrolled. There was a very high level of interest in both QRP and home construction shown by those who visited the stand, particularly in the GM3RKO ONER and associated output meter. Visitors could press the key and watch the needle bang up to 2 watts every time. Much of the display material used at NEC was taken up for the event, and the 800 mile round trip proved very worth while. Finally one bouquet and one brickbat. The bouquet goes to Aberdeen ARS for a first class job in organising the show. The brickbat goes to the Aberdeen City Fathers for having a magnificent conference centre and being too mean to put up signs showing how to get to it!

We understand that next year the venue will be the City of One thousand Roundabouts, namely Glenrothes. That should be quite an event!

The MacSprats also held a very successful meeting at the Strathclyde Water Sports Centre on 15 October, with GM3MNX/A putting out a massive signal.

THE MAC SPRAT MEETING
At Strathclyde Water Sports Centre

George Burt, GM3OXX, with his grab bag of components at the meeting.
The meeting was well attended from all parts, including G3HZX from Berwich on Tweed. GM4DJS gave a talk on satellite working and the Trans Artic Trek.
A modded HW7 was put on the air to a G5RV and six members were worked.
Ken, GM4JMU brought some interesting homebuilt equipment including his small "Blooper Receiver". Everyone enjoyed the day and look forward to next year.

OLEG UA3GVR Chairman
ANDY UA3EAC Secretary
VAL UW3DM #18

FOUNDER MEMBERS OF U QRP CLUB

Above is the sticker provided for the U QRP CLUB by the G QRP CLUB to help the new club along its way.

SPECIAL SPRAT OFFER

C R Y S T A L S

GOLLEDGE ELECTRONICS

BAND	QRP CALLING CHANNEL	OTHER FREQUENCIES			MODE	PRICE
160m	-	1850			Fundamental	£4.00
80m	3560	3540	3550		"	3.50
40m	7030	7025			"	3.50
30m	10106				"	3.50
20m	14060	14030	14040	14050	"	3.50
17m	-	18080	18090		"	3.50
15m	21060				3rd Overtone	3.50
	21060				Fundamental	4.00
12m	-	24910			"	4.00
10m	28060				3rd Overtone	3.50
	28060				Fundamental	4.00

All HC-25/U, 30pF.

Converter and transverter crystals: HC-18/U, 3rd Overtone, Series resonant. 22.0, 24.0, 31.333, 38.6667, 42.0 MHz, £3.50 each. 65.0(HC25) 94.0 MHz 5 O/T £4.00.

SAE please for lists of stock crystals and TTL oscillators for microprocessors, radio crystals, plus Crystal, Monolithic and Ceramic Filters on 455 kHz, 9.0, 10.7 and 21.4 MHz etc.
VAT and UK postage included. Overseas members please add £1.00 per order.

73 G3EDW

Merriott Somerset TA16 5NS England Telephone: (0460) 73718

DTR3 CW TRANSCEIVER for 80 METRES

This compact and lightweight TX/RX is an ideal QRP rig for the popular 80 Metre band. Great for portable and holiday operation!

Transmitter - Mode : CW
Range : 3.5 - 3.6 MHz
Power : 1.5W output
Receiver - Direct Conversion
Selectivity - 250 Hz @ 6dB
Sensitivity - Better than 1uV
AF Output - up to 250mW to 8 ohm headphones
Power requirements - 450mA (key down) at 12 - 14 Vdc.

ALL parts are included in the Kit. Not only the case, slow motion drive, good quality variable capacitor, knobs, hardware etc., but important features which, in some kits, are regarded as extras - stable VFO, Audio Filter, RIT, Sidetone - PLUS ready printed front and back Panels for that "Professional" finish.

In fact, the only other things you'll have to find are a morse key, headphones and the price - **£74.25** plus £2.00 postage and packing. If you prefer, we can supply the Instruction Manual and the five basic PCB's (i.e. boards only) for just £20.00 including postage.

For further details of the DTR3 and other kits in our range, send SAE to

Access

LAKE ELECTRONICS
7 MIDDLETON CLOSE, NUTHALL,
NOTTINGHAM, NG16 1BX
or, ring Alan, G4DVW, (0602) 382509

HAM RADIO NORTH WEST

Props: Kevin Fox GØ DRK, Mrs. A. Fox
23 NEW COURT DRIVE, EGERTON, BOLTON, LANCS, BL7 9XA
TEL: BOLTON (0204) 54808
CALLERS BY APPOINTMENT PLEASE

AMATEUR RADIO EQUIPMENT

RALLY PRICE LIST

Catalogue available 50p – Refundable with first order.

Top Quality British Cables, You Will Not Find Better Anywhere!!

		Post/Pkg
Permanoid URM57 75 OHM Low Loss Coax	60p/M	6p/m
Permanoid URM67 50 OHM Low Loss Coax	65p/M	6p/m
Permanoid URM 50 OHM Coax	23p/M	3p/m
Permanoid URM 75 OHM Coax	30p/M	3p/m
Permanoid RG58/CU 50 OHM Coax	25p/M	3p/m
Permanoid 75 OHM Flat Twin Feeder	18p/M	3p/m
Other Cables		
BOFA (Swedish) 300 OHM Slotted Ribbon GMP6	25p/M	3p/m
POPE H100 (Dutch) 50 OHM Very Low Loss Coax	80p/M	6p/m
TV Coax 75 OHM	20p/M	3p/m
Altronic RG58 per 100 metre Drum	£17.00	£1.50
Equipment and Accessories		
G5RV Multiband Dipole 102ft	£16.25	£2.50
½ G5RV Multiband Dipole 51ft	£14.25	£2.50
HB9 CV 2 El Beam Kit 2m or 70cms	£ 3.95	£2.00
HB9 CV 2 El Beam Kit 6m	£12.95	£2.00
Gamma Twin 2 mtr (Slim Jim Type Ant.)	£ 8.95	£2.00
Pair 7.1 Mhz Traps	£ 9.50	£1.00
Dipole Centre (Fully Enclosed)	£ 2.25	50p
Plastic Dogbone Insulators	70p ea	25p
Ceramic Egg Insulators	65p ea	25p
Plastic Egg Insulators	50p ea	25p
50M/165ft PVC Covered Aerial Wire (24 strand copper)	£ 3.00	£1.40
38mm Ferrite Rings	50p ea	25p
High Grade Ferrite Rings (Orange)	60p ea	25p
Sun 5/8 2m Antenna (Tilt Base)	£12.95	£2.00
Cast Gutter Mount Black C/W Cable (suitable for above)	£ 9.50	£1.50
Hi-Gain Silver Road CB/10fm Base Antenna	£14.95	£2.00
Revco 5/8 over ¼ UHF Colinear Mobile Antenna	£ 7.95	£1.50
'AA' Size Ni-Cads – £8.00 per ten	85p ea	25p
Station Log Book (1000QSO)	£ 1.00	25p
Value Component Packs 100's Resistors Mixed	£ 1.00	£1.00
Value Component Packs 100's Capacitors Mixed	£ 1.00	£1.00
G-Comm PSU (British) 8 – 12 amp	£44.25	£2.50
G-Comm PSU (British) 3 – 5 amp	£15.25	£2.00
Universal Ni-Cad Charger	£ 4.95	£1.00

We are now expanding our stock and services!!
e.g. Local Delivery, Bulk Discounts and Special Deals for Clubs etc.
If we haven't got it, we can probably get it. **try us first.**
• WANTED • Your S/H Equipment, HF, VHF Rigs: Cash Paid.

KANGA PRODUCTS

KANGA PRODUCTS offer a range of semi-complete kits for the Radio Amateur and the Listener. The kits are supplied complete with all those harder to get bits but leaves out those you or your friends are likely to have in the junk box.

*** NEW KITS NOW AVAILABLE ***

THE 'CHERITON' DUAL BAND TRANSMITTER At last a transmitter to go 'piggy back' on the Cheriton Dual Band receiver. It uses the crystal filter from the Cheriton but can be used on its own with a seperate filter. Send for full details. Cost £28:95

THE 'SIMPLE' T/R CONTROL BOARD Based on our more complex T/R board. This unit provides basic T/R switching with a variable hang time. Outputs are TX+12v, RX+12, TX+6v, RX+6v. Ideal for the QRP (or QRO) homebrew rig. Cost:£6:95

CW PRACTICE OSCILLATOR Ideal for the 'B' licencees to practice CW. Also incorporating an RF ACTUATED SIDETONE unit (replacing our Sidetone kit) and an A.F. AMPLIFIER. 3 kits in 1 All for £8:95

We have also decided to make available to constructors PCB's and instructions only for those of you who do have the bottomless junkbox. Full details in the catalogue.

*** OLD FAVOURITES ***
THE 'ONER' QRP TRANSCEIVER!!!
Four little kits each one supplied with its own 1" square board. The TX, RX, QSK and VFO to make what surely must be the SMALLEST TRANSCEIVER in the world.

All four kits for £27:50 (G-QRP members £23:00) plus p&p

IAMBIC KEYER
Features include... Very compact, 55mm x 75mm, full iambic operation, dot - dash memories, low power consumption, negative and positive output keying, on board speed control. £12:95

SPRATlets
We will also in the very near future be able to offer PCB's of the popular cct's that appear in SPRAT. Send for info & prices.

We are very sorry to announce that we have been forced to make price increases with effect from 1st January 1989.

SPECIAL OFFER TO G-QRP MEMBERS: DEDUCT 10%.
BUT TO QUALIFY YOU MUST QUOTE YOUR MEMBERSHIP NUMBER
(PLEASE add £1:00 P&P to total order)

FOR YOUR FREE COPY OF OUR LATEST CATALOGUE SEND A LARGE SASE TO:
KANGA PRODUCTS, 3, LIMES ROAD FOLKESTONE KENT CT19 4AU

VISA **One Jump Ahead** Access