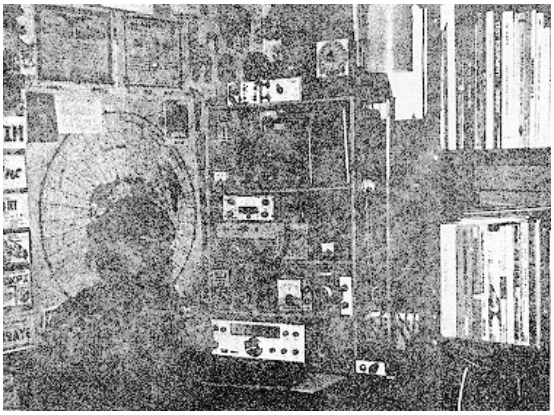
PRINTED RATE.

REV.G.C.DOBBS (G3RJV) "WILLOWDENE" CENTRAL AVE. STAPLEFORD. NOTTINGHAM. NG9 8PU.

Devoted to Low Power Radio Communication

SPRAT

AUTUMN 1978. Issue 16.



Callsign List SUPPLEMENT.
QRP "WINTER SPORTS"

SMALL CIRCUITS ISSUE.

CLUB AND QRP NEWS.
RIDE THE M.U.F.
HINTS AND TIPS.

G3RJV in the "new shack"

S.P.R.A.T. - JOURNAL OF THE G-QRP-CLUB. No.16. OCTOBER 1978.

Rev.G.C.Dobbs (G3RJV)"Willowdene"Central Ave, Stapleford. NOTTINGHAM. NG9 8PU.
Tel: Nottingham (0602) 394790.

Dear Members,

You will instantly notice that this issue contains the callsign listing of all members in an alphabetically arranged loose supplement. A full list of members with QTH and interests was at one time contemplated, but this would have been larger than an issue of SPRAT, so postal and printing costs would have been very high. When the club last issued a list, most members commented that the callsign list was the most useful part, so this time - that is all there is! A great aid to keep by the log book - to find fellow QRP Club members. It is double spaced so that new member information from SPRAT can be added for the coming year.

A brief word about subs - Alan and I will shortly be "weeding" out very overdue members. Please remember to renew to Alan (see below) and the cost is still £2.00 per annum or local currency equivalent for overseas members - I suggest $3.00 for USA etc. We lose quite a lot on I.R.C.s, so bank notes or giro cheques (from EU) are preferred

I look forward to seeing many of the members at Leicester this year and on 80m on Sunday afternoons during the winter. May I commend the QRP WINTER SPORTS to all members and hope that many intermember QSOs result.

Best 73 and hpe cu qrp George G3RJV.

SUBS DUE BEFORE DECEMBER ISSUE: Numbers 233-253, 326-350 and 155-177.
SUBS OVERDUE IF NOT PAID: 121-154, 223-232 and 293-325.

CLUB DATA SHEETS:
Available to club members for a large stamped addressed envelope to G3RJV.

Tucker Tin MK I valve SSB rig.	Tucker Tin MK II Transistor SSB rig
Minituner (40/80 RX)	G3IGU 80m transceiver.
HW7 modifications (various)	HW8 modifications (various from the US)
HW7 S Meter (a new sheet)	HW7/8 ATU
Minimite all band QRP TTX	Tramsistor 1 - simple one stage TX
SST1 transceiver for 40m	Ultramountaineer - transceiver for 40m
G8EPE 2m AM Transmitter	One Valve xtal controlled Transceiver
Club Awards Scheme	MFJ Audio Filter information/Circuit.

****

CLUB MORSE TRAINING COURSE:

Send TWO C90 cassette tape blanks and return postage, giving full name and QTH in block capitals to:
W.G.Jones,24 Underhill Cres. Abergavenny.Gwent.S.Wales.NP7 6DF.

****

SUBSCRIPTIONS: To Alan Lake (G4DVW) 7 Middleton Cl. Nuthall. Nottingham.
Cheques made out to: G.C.DOBBS RE: QRP CLUB. (Please quote NUMBER)

****

CLUB OFFICIALS:

CHAIRMAN: Dr. Gordon Bennett. G3DNF.
CONTEST & AWARDS MANAGER: Mr. A.D. Taylor. G8PG/GW8PG.
TREASURER: Mr. A. Lake. G4DVW.

****

SPRAT:

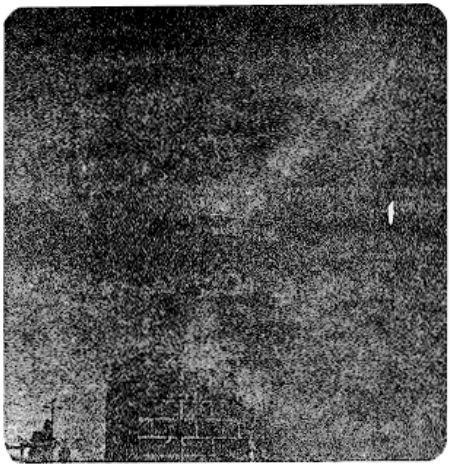
EDITOR: Rev.G.C.Dobbs. G3RJV.
TEXT TYPING: Mr. A.D. Taylor G8PG and G3RJV.
ART WORK: Mr. A.W.McNeill. G3FCK and G3RJV.
ADDRESS LABELS: Connie Wade. G4CUY.

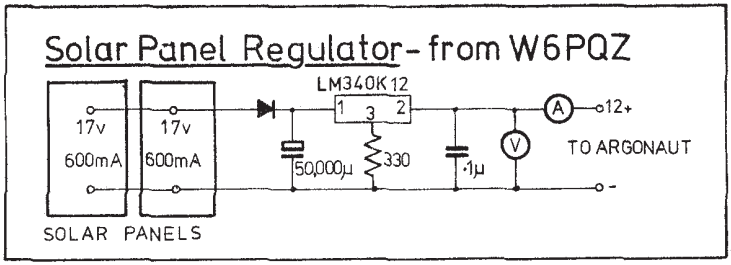
W6PQZ Solar Powered Station

John, W6PQZ, must rate as our top award winner. The photo of his station shows his QRPp DXCC Trophy and on July 18th, he received the first under 5 watt WAZ for all 40 zones worked. His DXCC country count is 215 worked and 200 confirmed.

To add to all this, John is now running a completely solar powered station. The solar panel arrangement in the photo gives 17v at 1.2A. After trying a fixed, south facing, set of panels from his southern Californian QTH, John now uses a rotator. He is able to obtain enough solar power for his station from 6.30am to 6.30pm on long summer days. The circuit below shows his voltage regulator for the panels.

The line-up in the station photograph is as follows:- Left Top: QRPp DXCC Trophy, Rotator Box - below that Homebrew Voltage Regulator for Solar Panel, Argonaut 509, B&W Dummy Load/Wattmeter and part of MFJ Keyer. Below Argonaut: Vomex Audiou Processor. Left Bottom: ATU, Clock, D104 Microphone, Brown Bros Keying Paddle and Straight Key.





NEW CLUB U.S. REP.

Many thanks for all the offers for the post that came from the US. The new US Club Representative is to be:
Robert E. Molle, WB9QPS, 624 Lawndale Drive, Greenwood. IN 46142. U.S.A.

Will US members please continue to RENEW subs via Alan Lake and keep at the $3.00 (bills) rate.

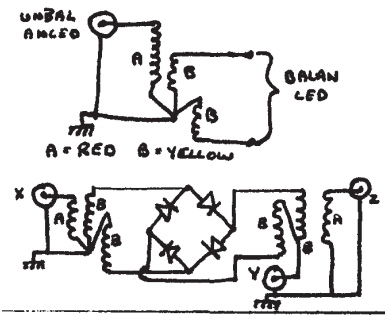
GERMANY AS THREE COUNTRIES !!

Prior to 16th September, 1973, Germany counted as one country (DL/DM) in the ARRL countries list. Following international political decisions, from 16th September , 1973, DL and DM each count as a separate country in the DXCC List. ARRL have now decided that contacts with either DL or DM prior to 16 September, 1973 can be counted as a country for DXCC, and contacts with DL and DM after that date as two additional countries, making 3 country credits in all. Your Committee has considered this decision, and has decided to accept it as far as the QRP Countries Award is concerned. It is therefore now possible to claim three country points for Germany, one for DL or DM between 1 January 1970/15 Sept. 1973, and one each for DL and DM on or after 16th September ,1973. New applicants should submit the cards or certified list normally. Award holders applying for an Endorsement should either send all three cards or include all three contacts, with dates, in their certified list. Failure to do this will involve unnecessary correspondence and delay the issue of the Endorsement.

IMPORTANT IMPORTANT.... QRP FREQUENCY CHANGES ...IMPORTANT IMPORTANT

The American QRP Amateur Radio Club International have altered the international QRP frequencies that we have so far used on a world-wide basis . The new recommendations are 1810 on Top Band, and 060 KHz up on all other hf bands (they also recommend ssb frequencies, but several of these are outside the normal European bands). Your Committee has examined the matter and makes the following recommendations. 14, 21 and 28 MHz.That we adopt the new frequencies of 14060,21060 and 28060 KHz as international CW QRP calling frequencies. 7 MHz. The American frequency of 7060 KHz is in the phone area of the IARU Region 1 Band Plan, so it cannot be adopted in Europe. The present frequencies of 7030 and 7040 KHz should be retained. 3.5 MHz. The present European frequency of 3540 KHz is agreed between our own Club, the Benelux QRP Group etc. It has been well publicised in radio magazine, and at least a few QRO operators have heard of it and try to avoid it. Also, some QRP operators have bought crystals for this frequency. We therefore feel that a change to 3560 should only be made if there is a demand for it from QRP operators in Europe. So the ball is in your court, fellow members. Let G8PG know whether YOU WANT TO KEEP 3540 OR TO CHANGE TO 3560. If we do not hear from you we will assume you do not want a change. 1.8 MHz. This is a shared band in Europe, and many countries restrict their amateurs to operation on a small portion of the band. In view of this your Committee do not believe that an acceptable QRP frequency can be recommended.

VOTE NOW RE 3540 OR 3560



Cambridge Kits (see advert elsewhere in SPRAT) are offering 10w, 1-30MHz, I:I baluns to members for £1.00 each, inc. postage.

The Basic circuit is shown top left. Another interesting application is to use two of these baluns as a ring mixer - circuit lower left.

The circuit invloves unsoldering the common B windings from one transformer and adding 4 suitable diodes.

X=1-200MHz, Y=0-30MHz, Z=1-200MHz. either can be signal,oscillator or IF.

TEN METERS FOR 90 Dollars

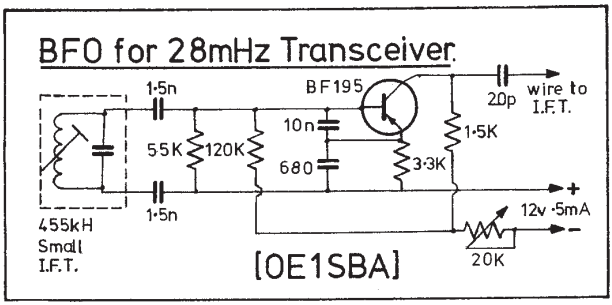
By Bruno Settinger OE1SBA.

How is it possible? You have to buy one of those CB 27MHz handheld transceivers for about 70 dollars and modify it a little.

These cheap AM transceivers have an output of about 0.5 watt, enough to contact stations upto 1000 miles! In a few days I worked UB5LAN, G5AQZ,DK5ZO and OH3YI - the last with only a whip antenna! I heard 6 continents in one day with the incorporated antenna. That is really fascinating QRPp work!

Now the modifications - You will have to change the crystals. I recommend 28.600 MHz as transmit frequency, in which case you will require a 28.145 receiving crystal.

To receive SSB mode, you have to install the little BFO shown in the circuit. To change the BFO frequency, you turn the slug of the 455 IF coil from outside. With the 20K pot, variation in the BFO amplitude and slight variation in the frequency is possible.



With your transmitter on 28.6 MHz (main station) connected to a dummy load, tune the receiver input circuits to 28.6 - dont touch the IF! Next step - you tune the transmitter - oscillator - PA and antenna loading coil for maximum with a field strength meter. If it is not possible to reduce the inductance of the coils change the powdered iron slug for a brass slug. To connect a better antenna, you install a cinch antenna connector to the point between the pi filter and loading coil.

The AGC pot in the set, I used to reduce the signal of strong stations - Thats All!

I would be glad to contact you on 28.6 MHz.

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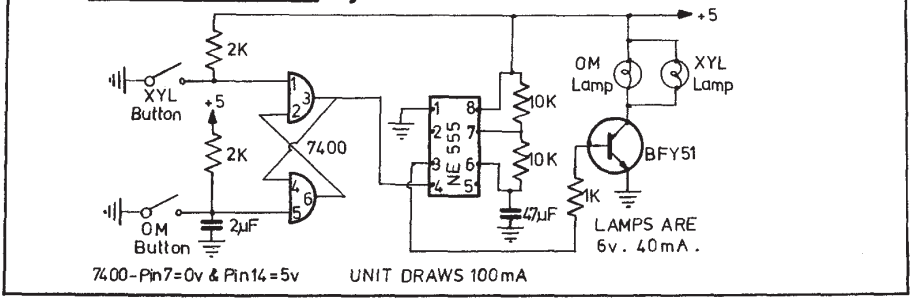
AGCW-DL HAPPY-NEW-YEAR CONTEST/EU

THIS ANNUAL SHORT LENGTH (3hour) CONTEST IS AGAIN ON JAN.1st 1979.
Time: 0900-1200 GMT, Mode: 2xCW, CLASS III for input max. 10 watts.
Freq: 3500-3600, 7000-7040, 14000-14100 - participants are asked to call preferably near 3560, 7030, 14060.
General Call TEST AGCW/EU de.....
Exchange: RST/001up/AGCW (members only use number)
Scoring: 1 pt for each valid QSO (EU) and multiplier point for every AGCW club member worked.
Total Score: QSO points multiplied by the sum of multiplier points achieved on all three bands.
A station may only be worked once on each band - Single operators only.
Usual contest type logs to be submitted to Renata Krause DJ9SB, Johannesmuhler Str.36, D-6800 Mannheim 31. Germany.
FURTHER DETAILS FROM: DJ9SB or club member DJ7ST.

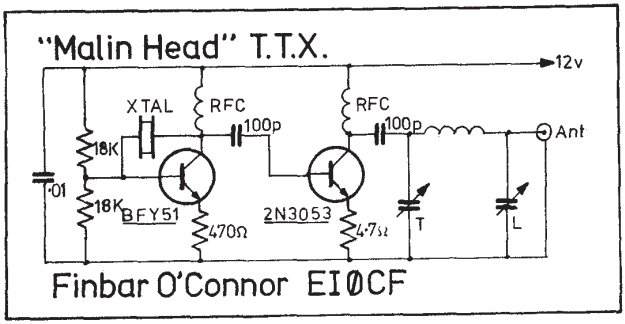
XYL Detector! By N.J.McIntosh



A "wee circuit" which Nor McIntosh has installed "between stairs". It isn't quite QRP, but it does stop the XYL banging on the ceiling when "its on the table".

When the XYL button is pushed both lamps flash. The O.M. then pushes his button and both lamps go out - letting the XYL know he QSLs!

(Good visual indication for headphone operating!)



Club members are always amazed by what they can work with very simple gear which costs next to nothing.

Finbar is a commercial operator at the Malin Head Coast Station. He has used this little TTX on 80m and sent us the circuit some time ago.

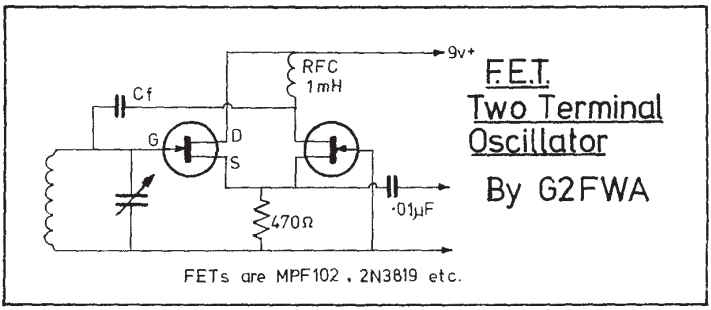
The circuit was un-named,so I Christened it! Malin Head.

Nor McIntosh (see above) 143 Waverley Dr. Glenrothes,Fife. has a small number of 1MHz crystals which can be obtained for a SAE only.

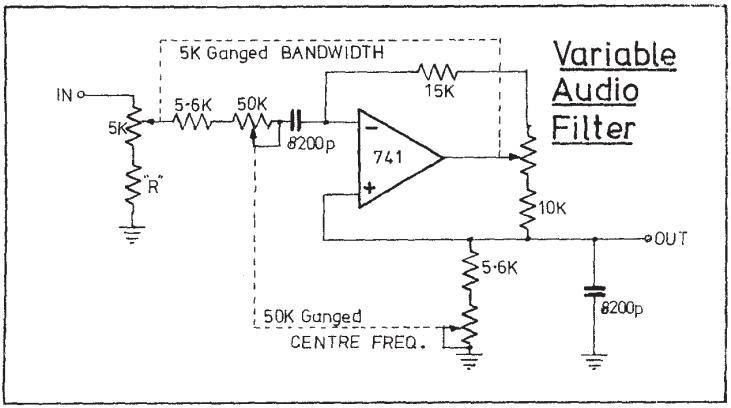
Mac. G3FCK, 40 Turnpike Rd.Newbury,Berks. who does many excellent drawings for SPRAT, is seeking information on the PANDA CUB TX - He would like circuit details, and alignment procedure for the VFO.

Members Ads is a free club service - all wants, sales,swops,borrows etc to G3RJV.....

STOP PRESS AD: G3FCK(Above) would like HEATH KIT "Q Multiplier" circuit,



This circuit is basically an equivalent of a twin triode cathode coupled oscillator. By merely changing the tank circuit constants, output over a very wide frequency wide can be obtained - from far less than 1MHz into the VHF region. 30pF is a good compromise for the feedback capacitor Cf.



This simple circuit, very suitable for use with a direct conversion receiver, uses a 741 operational amplifier I.C. although a 709 could be used with slightly inferior results.

It allows adjustment of the bandwidth and centre frequency. R is to produce the impedance for matching the "driver".

****

BOTH OF THE ABOVE CIRCUITS ARE REPRODUCED FROM THE NEWSLETTER OF THE CHELTENHAM GROUP RSGB.

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Have you any circuit ideas for SPRAT? A simple sketch and notes are enough. G3RJV is pleased to receive any such contributions. The copyright on published circuits remains with the author.

WANTED: Photographs - Black and White, with good contrast of Members Stations or subjects of QRP interest for SPRAT. Prints please, not negatives, with notes on the picture.

MORE HINTS AND TIPS

SPRAT Technical Staff

Emergency soldered connection

When working /P an emergency soldered connection can be made as follows; clean the two wires and twist them together. Wrap an inch or so of multi-core solder over the joint, then thoroughly cover the solder with a wrapping of metal foil from a cigarette packet or chocolate bar. Heat the foil thoroughly with the flame from a candle, a burning piece of wood or similar source, then remove the source of heat and let the joint cool. Two cautions; do not hold your hand directly under the joint while heating it in case any solder drips; do not try and make such a joint in a tent, car etc in case you start a fire!

Another useful connection

A useful connector can be made from part of one of the multi-way connectors (what used to be called "chocolate blocks) sold by Woolworths and other stores. These are now made in a soft plastic material which can be cut easily with a sharp knife. Each section cut off provides a barrel connector with two screw terminals, which is well insulated.

A cheap tester

If you do not want to build the Portatest described in SPRAT recently, an even simpler tester is available. It is surpising just how many 12V circuit tests can be made with nothing more than a suitable 12V lamp connected to two leads terminated on crocodile clips. Such a lamp can also be used as an inspection lamp on the car, and as an operating lamp at night.

"Glass Arm" ?

If you are over 40 years of age and finding that pounding out perfect morse on your straight key seems to be getting more difficult, try changing the key knob for a larger one. If this is not a complete cure try using a slightly heavier key, again with a larger knob. Muscular cramp increases with age and these ideas,often used by professional telegraphists, help to relieve it.

Slugging relays

To make a relay slow-to-operate, slow-to-release, connect a large capacitor (1000 mfd or more) across the relay coil in series with a 1000 ohm variable resistor. The delay can be adjusted by means of the resistor. If slow-to-realease operation only is required, wire one pair of contacts on the relay so that the resistor/capacitor combination is only connected across the relay coil when the contacts close.

Expensive books made cheap

You may live in an isolated village, but do not forget that in the United Kingdom even the smallest branch library has access to the large technical libraries in major cities. So, if you want to consult a book on radio (or indeed any other specialised subject) consult your local Librarian, who will be pleasedto assist you. Major libraries hold all the standard reference books on amateur radio.

Stations in a box

Recent reference in SPRAT to the above subject raises two interesting points. For short-term portable operation a whole station can be assembled in a large cardboard box such as those used for transporting canned food or bottles of wine. Such a box is large enough to allow two layers of equipment to be installed in it, separated by a thick sheet of cardboard. Send/receive and netting switches can be fitted in a suitable metal box , with cables to the transmitter and receiver. Small exit holes for battery leads, the aerial etc can be cut in the sides and back of the box. Once all the equipment has been inserted it can be firmly wedged in place with pieces of plastic packing material. For the home station, keep a lookout for someone disposing of an old piece of furniture containing large wooden drawers. It is easy to put shelves and partitions in such drawers, and they can be stood on the operating table to provide equipment containers, two or more being bolted together if necessary.

Retaining battery capacity

When re-chargeable batteries are used as QRP power supplies there is always a tendency to try and give them a topping charge very regularly. This is not a good thing. If a battery is constantly only partly discharged, then given a topping charge, it will very soon lose part of its capacity. If, on the other hand, the battery is regularly discharged down to the safe limits specified by the maker, then immediately recharged according to the maker's instructions, capacity will be retained and the battery will have a very long life. The battery can be discharged with the aid of a dummy load such as lamps or resistors in preparation for the re-charge. If such a full charge/discharge cycle is applied to the battery about once a month it should last for many years.

A QRP FINAL By Brice Anderson W9PNE

[QRP from your QRO rig]

Most of my early QRP work was done with simple crystal controlled oscillators, with DC power inputs of one watt or less. Being rock bound is a great handicap to QRP work, and I considered ways to add VFO capability and also more reliable operation.

The regular station equipment consisted of a Drake T4XB transmitter and R4B receiver. I have an inherent distrust of pads so didn't want to use one to reduce the power of the T4XB. I tried to operate QRP by turning down the "Gain" control, but I found that it was very unstable in the milliwatt levels. I decided that a new final, tailored especially for power inputs of 500 milliwatts, would be the only answer.

I had a good supply of 6AU6A tubes in the junk box, so built the final around one. I used a pure resistance input circuit, with a 50 ohm carbon resistor directly from the input connector to ground. This matched the T4XB nicely. With approximately 5 watts RF output from the T4XB, the RF peak voltage on the 6AU6A is about 22 volts, which is plenty of drive for the power levels intended. The T4XB was reasonably easy to hold to an RF output of about 5 watts. The 50 ohm resistor was made up of a number of 1 watt carbon resistors in parallel.

The 6AU6A operates Class C. The 22K ohms grid resistor provides Class C bias during excitation. A 68 ohm cathode resistor provides Class A bias during key up conditions. I also used a 3 volt negative bias supply on the grid, to hold the plate current lower during periods of no excitation. The same two "C" cells have been used for years.

With pure resistive input, and with the excellent shielding of the little pentode, there is no instability at all, and neutralization is not needed. All you have to do is provide drive, dip the final, and adjust antenna loading. The exact amount of RF drive is not critical. Too much drive causes a reduction of power output. Also, too little drive reduces output. With 500 milliwatts DC input, about 4 to 5 watts RF drive is best.

I used four 22.5 volt "C" batteries as the plate supply. These batteries were very old, but worked at the small current drain involved. I also had a small 7.5 volt "C" battery with a tap at each cell, to provide vernier voltage steps. By proper selection of voltage and by varying the loading, I could settle on exactly any input power desired. To obtain 500 milliwatts DC input, I used 90 volts at 5.5 milliamperes plate current. For 120 mW DC input, 45 volts at 2.7 mA works nicely. A single 22.5 volt "C" battery produced a plate current of about 1.2 mA for a DC input of 27 mW.

With zero DC plate input, there is zero RF power output, even with 5 watts of RF drive. The RF output is proportional to the DC plate input. At DC inputs of 250 mW or less, it is necessary to reduce RF input drive to maintain efficiency.

I dug the 4 prong plug in coils from my junk box, and no attempt was made to adjust them for maximum efficiency. I made measurements on the several bands, using small pilot lamps as power output indicators and comparing brilliance with a variable DC supply, to arrive at the table below. I used a DC input of 500 milliwatts for these measurements.

80 meters - 55% 40 meters - 50% 20 meters - 40% 15 meters - 40% 10 meters -
Note: I used the 6AU6A as a doubler on 10 meters, because I could not control the T4XB RF output well on 10 meters.

Shortly after I put the final into use, I bought a Ten Tec Argonaut. Having now become used to milliwatt levels, the 2 watts output of the Argonaut seemed like high power. However, I soon had the urge to go back to milliwatt DX. The only modification required on the QRP final was that of replacing the 50 ohm input resistor with a 100 ohm carbon resistor. The Argonaut did not mind the 2:1 match, and easily drove the final. There was about 20 volts peak RF on the 6AU6A grid!

At last, I was satisfied. I had a truly QRP station. I returned to my pursuit of a WAS with 500 milliwatts or less DC input. This was actually not so difficult. Getting 50 QSL cards, each endorsed by the sender with my power input, was very tedious. I had to return about a fourth of the QSLs and ask the sender to please put the 500 mW input endorsement on the card. Some never returned the card at all, and I had to rework several states to get the QSLs. Eventually, about a year after I had worked all 50 states, I had the necessary 50 QSLs.

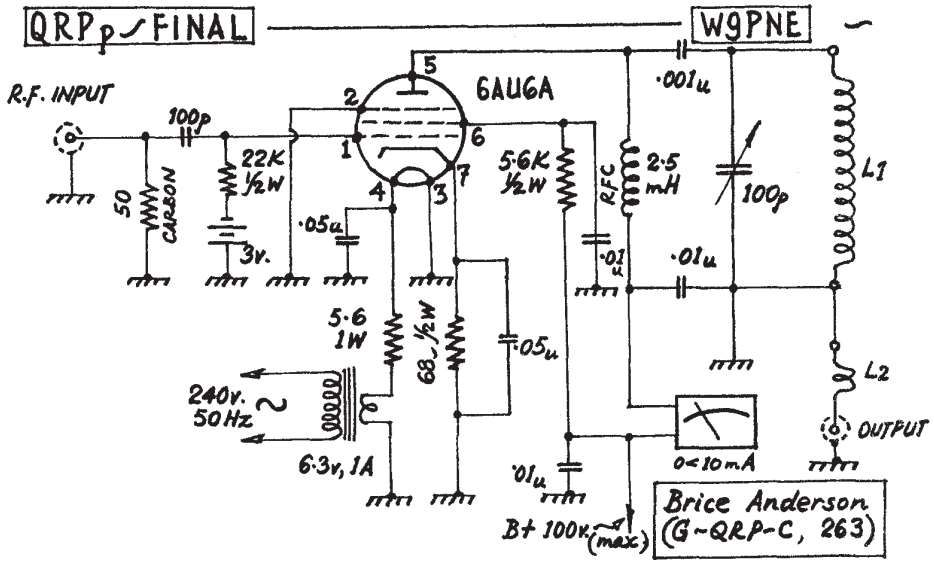
ARRL was quick to issue me a WAS endorsed "with 500 milliwatts or less input". The certificate was dated Jan. 14, 1975. At the time, this was the first WAS certificate issued for such low power.

Incidentally, I had worked WAC with the 500 mW long before completing the WAS.

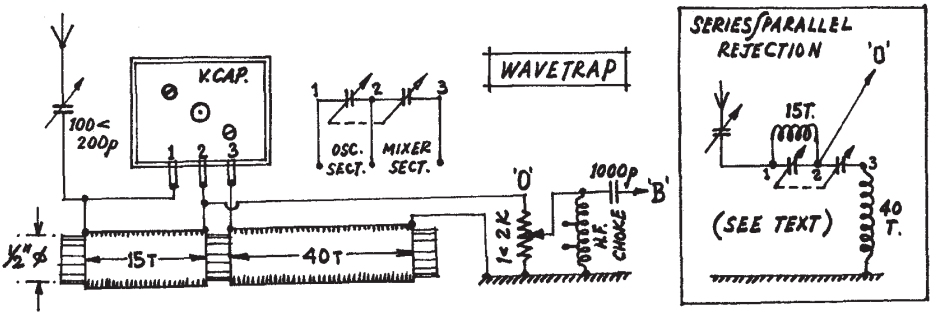
As soon as I completed the ½ watt input WAS, I began working on WAS and WAC with lower power levels. The listing below shows my progress to date. Unfortunately, during the past year, I have had very little time to operate.

500 mW input or less:	WAC,	WAS,	36 countries.
250 mW " " "	W5C,	W46S,	16 countries.
150 mW " " "	W2C,	W34S,	5 countries.
100 mW " " "	W2C,	W33S,	4 countries.
50 mW " " "	W1C,	W16S,	2 countries.
25 mW " " "	W1C,	W2S (Indiana & New York)	

I have two main antennas, a long wire and a vertical. Most of my QRP work has been done with the long wire, although the vertical is best for DX to JA and eastern Eu. The long wire is a 456 ft flat top, center fed with 40 ft of open tuned feeders. The antenna is 50 ft high at the center, but the average height is about 40 ft. The vertical is a Hustler Model 4BTV trap vertical, 20 ft above ground.



SILVER TERN RX ~ WAVETRAP & R.F. PREAMP'R. ~ SMØ 6259



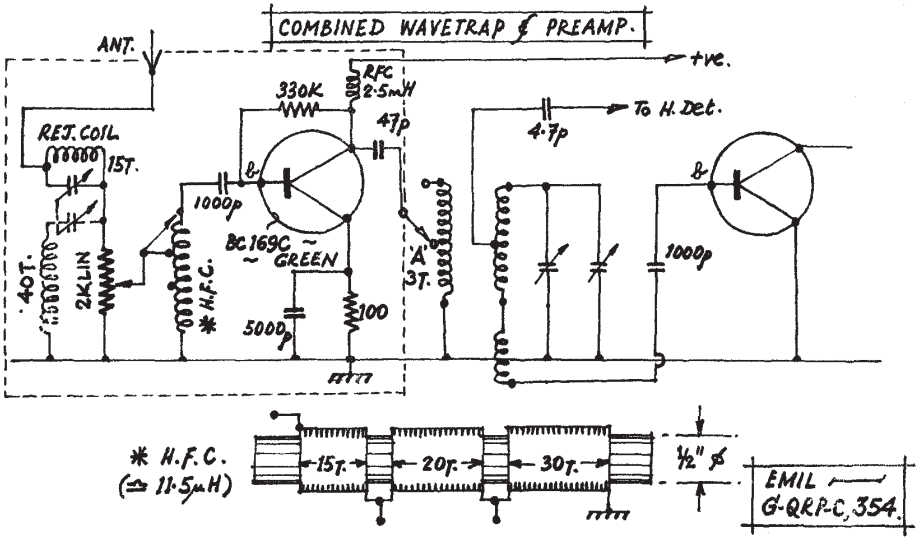
Additions to the "Silver Tern" Receiver By E.M.Tenlund (SMØ6259)

Orginal Circuit in SPRAT 15 - Circuit copies for SAE from G3RJV.

Emil suggests two further modifications for the receiver. Above is a Wavetrap circuit to overcome 16 and 19 metre broadcast QRM. This uses series/parallel rejection. The coil data is shown in the drawing with the H.F.choke shown in the lower diagram. The original used a two gang japenese B.C. receiver tuning capacitor as V.CAP. B goes to the aerial coupling coil on the receiver.

The circuit below shows a suggested Preamplifier combined with the wavetrap. The circuit addition to the receiver is within the dotted lines, the front end of the orginal to the right.

Emil once again used the BC169C with the green spot. Emil has suggested that if difficulty is found in obtaining usable BC169C's, he will gladly send 3 such transistors (free of change) to interested club members and he his keen to hear of members building the receiver (E.M.Tenlund,Grimstagat-70- S-16227, Vallingby. Sweden.)
Recent DX loggings with this RX include: YB7AAU,JJ1XQX/MM,TF6,PY7 tec.



CLUB NEWS

Chris Page (G4BUE) apart from featuring in pictures in every American Radio Magazine I seem to open(!) had a visit from OK1DKW, a Czech QRP fan. Petr has now joined the club as our first OK member.

While I was in Wales, I called into the Centre For Alternative Technology. It is well worth a visit, I could have spent a whole day there if time had allowed. They issue a range of DIY Plans. I bought a pack which includes a 5 watt, 12volt, Wind Generator based upon a cycle wheel. This would make an ideal charger for my 12 volt Honda motorcycle battery, or even drive a rig directly. I'm not sure of the cost of this sheet alone, but details can be obtained from Centre For Alternative Technology, Llwyngwern Quarry, Machynlleth, Powys. Wales. (Machynlleth 2400)

Bob Molle, WB9QPS, has just completed his WAS with his HW8 and now has a countries score of 32 worked. Bob is our new US Rep.

++++++++++++++++++++++++++++++++++++++

Coming in SPRAT

A 80m to 160m TRANSVERTER - receive and transmit - by G3ROO, ideal for any QRP 80m rig. A project to put your HW8 on Top Band.

The 40/20m version of the popular G3IGU Transceiver.

A complete El Bug with paddle metalwork and circuitry.

A broadband tuned 80m transmitter - One Knob (VFO) and key operation.

(WHAT ABOUT YOUR CIRCUIT IN SPRAT ?)

As usual the Leicester Amateur Radio Exhibition provides us with a useful meeting place for UK club members. This year the dates are Thu.2nd, Fri.3rd & Sat.4th. of November. I suggest that groups of members could attempt to meet in the Refreshment Room, on any of these days at 4.30pm. It might also be useful to carry a copy of SPRAT and wear a callsign lapel badge.
G3RJV will be there on Saturday and looks forward to some QRP chat.

CAN WE "RIDE THE MUF"?

A suggested G-QRP-C investigation .

G8PG

All QRP DX workers are familiar with those short periods when the band suddenly peaks up and DX can be worked over long distances with very low power. Normally such results are obtained when an amateur band is first opening over a given path (say G to UA9) and when it is just closing. The peaks are usually short - - 10 to 30 minutes - and during them signals in both directions are often 20 to 30 dB higher than normal. The reason for the high signal strength is that, for a short period, the MUF at the path control point or points is optium for the path length and direction concerned, thus providing maximum signal. The eventual drop off in signal when the band is opening is caused by the MUF rising further. The drop off when the path is closing (often accompanied by a complete fadeout in a minute or two) is caused by the MUF dropping below the frequency of the amateur band in use. Note that "path" involves both direction and distance. Taking an example, for a given direction a station 2500 miles away may peak up an hour before one 1500 miles away when the MUF is rising, and an hour later when the MUF is falling. As these peaks provide such a great signal enhancement they are of vital importance to the QRP operator , particularly if he can use them on two or three bands in succession by riding with the MUF as it goes up or down. To see if this is at least theoretically possible, past MUF records for a number of different paths have been analysed. They indicate that during the summer MUF changes are only some 50% as great as those encountered in winter, and that they take place fairly slowly, so "riding with the MUF" is not too easy. During the equinox and winter periods, however, very large changes in MUF take place fairly quickly, so it should be possible to follow them from band to band by calculating the approximate time taken for the MUF to move up or down between bands. Such calculations were made for the 14, 21 and 28 MHz bands, and they produced some interesting results. Briefly summed up,the indications are that:-

(a) The MUF rises approximately twice as fast as it falls.
(b) The rise and fall time rates are approximately linear against frequency.
(c) If an MUF change of X MHz takes about 60 minutes at the equinox it will only take about 45 minutes at mid-winter,
(d) When the MUF is rising (band opening) one would expect to find the following correlation between band condition peaks for a given transmission path.

Equinox	Mid-winter
21 MHz about 1 hour after 14 MHz. 28 MHz about 2 hours after 14 MHz.	21 Mhz about 45 minutes after 14 Mhz. 28 MHz about 90 minutes after 14 MHz.

(e) The equivalent figures for (d) when the MUF is falling (band closing) are:-

Equinox	Mid-winter
21 MHz about 2 hours after 28 Mhz. 14 MHz about 4 hours after 28 MHz.	21 MHz about 90 minutes after 28 MHz. 14 MHz about 3 hours after 28 MHz.

(f) The time delays quoted in (d) and (e) are mid-period times - for example between December and March the periods will move from the mid-winter figure to the equinox figure. Times are only approximate - there will be day-to-day variations.

(g) Figures assume fairly high sunspot activity such as we have at present. Under conditions of low sunspot activity 28 MHz will rarely be open. The MUF rise time from 14 to 21 MHz will be much the same, but the fall from 21 to 14 Mhz will take about twice as long.

(h) A very good idea of approximately when a band will open or close for a given distance and direction can be obtained from the propagation forecasts published in"Radio Communications" each month. If the MUF rise and fall are drawn as a graph of frequency against time the rise and fall of the MUF will become immediately apparent.

Proving or disproving these theoretical calculations offers an interesting and useful challenge to our transmitting and listening members . If the theoretical analysis is correct it should provide the QRP operator with a most useful DX operating aid. Any member who studies the problem for a period is asked to send a report of his findings to G8PG so that a further paper, based on practical results, can be published

QRP WINTER SPORTS 1978

WHEN; December 26th, 1978, to December 31st, 1978.
WHERE; QRP calling frequencies, all h.f. bands, but special periods as follows:

Daily; 1000-1200 gmt, 21060 and 28060 for UK-Scandinavia.
Merit certificate for most QRP-QRP QSOs reported G-Scandinavia and Scandinavia-G.

1200-1600 gmt, 21060 and 28060 for Europe-USA.
Merit certificate for any pair of 5W or under stations who make a trans-Atlantic contact during these times (whether G-QRP-C members or not.)

1400-1500 gmt. QSO party, 3540 KHz. Benelux QRP Group and all others invited to attend.

1130-1230 gmt. QSO party, 7030 KHz. Benelux QRP Group and all others invited to attend.

So, whatever your gear, aerials, or band interest, this Winter Sport period should give you a chance to see the Old Year out with some good QRP contacts. Reports will be very welcome, also certificate claims. Send them to G8PG. For the 21 and 28 MHz periods concentrate on calling and listening at 00-05, 15-20, 30-35 and 45-50 minutes after each hour.

G-QRP-Club. New Members since August 1978.

419	G3JKB	David Simmonds 5 The Firs, Wigginton. Tring Herts. HP23 6JE.	HF Bands CW HW8
420		Arthur Courtney 110 Lakeside Ave, Exeter, Devon. EX2 7BC	SWL
421		Richard Rudd The Rectory, The College Garden, The Butts. Warwick.	SWL Homebrew 160/80
422	K8MX	Jeffery Lee Cripps 214 South 20th Street, Battle Creek, Mich. 49015. USA.	HW8 (15-20-40)
423	G3VAI	Paul Carter 27 Waddow View, Waddington. Clitheroe. Lancs.	General QRP
424		Dave Waterman The Shambles, 27 Wain-a-long Road, Salisbury. Wilts.	CW on HF Bands
425		Alexander Vize 29 Bay View, Jonesboro, Newry. Co. Down. N.Ireland.	SWL
426	OK1DKW	Petr Doudera Na Petrinach 314, 16200 Praha 6, Czechoslovakia.	Homebrew 5w
427		Noel Brown 16 Corstorphine Hill Ave, Edinburgh 12.	SWL
428		Reginald Tyson 49 Strathaird Ave, Barrow-in-Furness. Cumbria.	SWL-Homebrew
429	ON6WJ	Warnier Jos Paddeschootdreef 58, 2700 Sint-Nicklaas, Belgium.	Homebrew gear
430	G4GWV	Robin Hookham 24 Debenham Rd. Stretford. Manchester. M32 9DG.	HW8 Antennas
431	GM4FDD	John Livingstone 44 Holburn Rd. Aberdeen. AB1 6ET.	HW8 (40m)
432	I7CCF	Felice Carbonara P.O.Box 165, 70059 Trani (Bari) Italy.	QRP Homebrew 20/40m QRP Xtal
433	I7QBH	Luigi Piracci Via De Robertis 56, Trani (Bari), Italy	QRP CW
434		Samuel Keith Parker 20 Swaddale Ave, Tapton. Chesterfield. Derbys.	RAE Pass HF CW
435		Dr.Arthur R. Bryant 1 The Cloisters, Belmore Lane, Lyminton. Hants. SU4 9NL.	RAE Pass HW8

G-QRP-Club. New Members since August 1978 Continued...

436	G8OOB	Clive Hancock "Countisbury, Plain-an-Gwarry, Marazion. Penzance. Cornwall.	QRP Home Const.
437	G4CRI	K. McArdle 3 Vyvyan Place, Helston, Cornwall. TR13 8AP.	HF QRP
438	G3FYD	R.K.Mildren "Ken Berry" 13 Queens Cres, Bodmin. PL31 1 QP	Design & Constr. Wire antennas
439	G4GHM	2 Old Vicarage Close, Chilton Pilden. Bridgwater, Soms. J. Mills	Home Const.
440	AA9N	Philip Lazar 6345 Nth Monticello, Chicago ILL.60659. USA.	General QRP
441		Richard H. Aubin 168 Knob Hill Rd, Sth Meriden, CONN. 06450. USA.	SWL QRP
442	WB8BHU	Robert F. Leamy JNR. 1588 Cobblegate Lane, Reynoldsburg, OH. 43068. USA.	QRP
443	SM7EHK	Bertil Svensson Tvartoftsvagen 12, S-291, 92 Kristianstad. Sweden.	General QRP
444	SM7BNG	Christer Osterstrom Blamesvagen 10, S-37100, Karlskrona. Sweden.	QRP

MEMBERSHIP CHANGES SINCE AUGUST 1978:

247 G4BJX, Gordon Sanders is sadly deceased.

193 Charles Remington is now G4HHG - WELL DONE CHARLES!
567 Rev. John Wylam is now G8PRU (CW TEST soon) WELL DONE JOHN (hopes G4)

NEW QTH CHANGES:

245 G4FSP - 63 Conway Ave, Great Wakering. Essex. (G.L.Rolton)

401 WD4FZU - Don Schramm,11303 Wilcrest Dr,APT2205, Houston.Texas 77099.
288 G4FAI - Tony Smith,1 Tash Pl, New Southgate, London. N11 1PA.

229 G3VTT - Colin Turner,'Hurley'Weavering St.Maidstone.Kent.ME14 5JJ.

334 G4GER - Mike Jackson,7,Church Walk,Swindon.Wilts.

344 WA2JOC - Bill Dickerson,65 John St,Red Bank,New Jersey 07701.USA.

258 J. Harvey, 38,Bodenham Rd.Northfield,Birmingham. B31 5DS.

068 GW3OIN - John Nicholas,36,Coast Rd.Rhyl.Clwyd.

282 G4DQP - V.A.Lewis,4,Standroyd Dr.Colne.Lans.BB8 7BG.

365 K7BWZ - Dave Christensen,190 Gary Way,NorthSalt Lake,UTAH 84054.USA.

WRONG QTH INFORMATION - CHANGE TO:

153 IV3BOZ - Claudio Borri, v.Milano,3-34142 Trieste. Italy.

RESIGNATION:
219 G4FLQ is no longer a member.

STP PRESS. Gareth Jones (350) is now GW8PLV (WELL DONE GARETH)