



MERCURY

THE JOURNAL  
OF  
THE ROYAL SIGNALS  
AMATEUR RADIO SOCIETY

NUMBER 5

AUTUMN 1963

## OFFICERS OF THE SOCIETY

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2 SQUADRON  
8 SIGNAL REGIMENT,  
VIMY LINES,  
CATTERICK CAMP,  
YORKSHIRE.

**HEADQUARTER STATION - CATTERICK CAMP - GB3RCS/G3CIO**

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## EDITORIAL

### G3EJF

Once again "MERCURY" is under new management. Alan Earl is now in sunnier climes recuperating after the joys of an English summer and the task of editing your quarterly journal has been temporarily "civilianised". This is the Autumn, or as our W friends would say, the "Fall", issue - a bad omen for a new editor.

In this issue you will find quite a lot of Society News. One of the main functions of a journal such as this must be to keep the members in touch, not only with the progress of the Society, but also with one another. Whilst we at Catterick originate some of this news a lot depends on you keeping us informed of your activities.

On the technical side we have articles from two of our staunchest supporters, Roy Walmsley G3IBB and Tom Wylie G3MEF. A newcomer to this journal, but no stranger to visitors to G3CIO in recent years where he runs the club shop, is Terry Richardson, Terry took the RAE years ago but still hasn't got around to taking the Morse Test.

A useful article on Amateur Radio in BAOR. comes from DL2HO, lately G3ONU and GW3ONU, this is worth filing away in case you are posted to those parts at any time.

Some heartening news from School of Signals, the solution to the July Brainteaser, and that's your lot!!!

Having seen this issue off, your scribe can start worrying about the next one. At present the file looks pretty thin so unless you fellows do your stuff you won't have much to read in the New Year. We urgently require news of your activities, practical or theoretical technical articles, reports on club activities, operating news - in short all the things you would like to read in MERCURY. Don't worry about style or grammar, as long as we can read your writing we'll knock it into shape.

Letters to the Editor would also be welcome, particularly those likely to start an argument in our columns - don't forget to sign your name though, we might want to start a libel action.

Finally the Society now has a permanent address:-

Royal Signals Amateur Radio Society,  
8th Signal Regiment,  
Catterick Camp, Yorkshire.

Correspondence to this address will go direct to the Field Secretary who will either deal with it himself or pass it on to the appropriate person. As the Field Secretary will be away from Catterick for most of October some delay is likely to occur, even Field Sec's get leave.

73 to you and yours,

ECHO JULIET FOXTROT

## PRINCESS ROYAL DAY 1963

The Society's HQ station operated as GB3RCS throughout Princess Royal Day and Old Comrades Reunion Weekend. As members may have read elsewhere it rained all the time and radio conditions were not much better. No real opening to the Far East occurred in the sixty hours non-stop operation.

Activity started with a bang, the A.M. transmitter went up in smoke and a home-brew rig had to be pressed into service until repairs had been completed. An early contact was with VE8TU of Royal Canadian Signals on Ellesmere island in the far north. At the time a cameraman from the local ITV company was in the shack at Catterick and was most impressed.

Our other Royal Canadian Signals contact was made on the Sunday morning. GB3RCS was busy on 3.5 Mc/s when G3IVG an ex-matelot, called to tell us that VE3FFW/SU was looking for us on 14 Mc/s. A quick change to the SSB transmitter, already tuned up on the band, and within minutes we were in contact.

Night time conditions were particularly poor and. very few contacts were made between midnight and 0700 hrs.

Most of Sunday was spent on 3.5 Mc/s working some 15 "G" Stations per hour. It is realised that many members failed to raise GB3RCS but the QRM was so severe that only the stronger signals could be copied. Near the end of this operating marathon a most interesting net materialised on 14 Mc/s SSB. This consisted of five South African stations and a member of the U.S. Army Signal Corps in Germany whose main experience of Royal Signals was of losing his money playing pontoon with members of the Corps.

Back to 3.5 Mc/s for a few more contacts and a rather weary bunch of operators pulled the big switch. The next few club nights were spent writing QSL's and answering Short Wave Listener reports, ten of which were received first post Monday. All cards were despatched via the RSGB Bureau by the middle of July.

During the weekend the station had several visitors including the Vice President and the Commander, Training Brigade. The usual G3CIO operators were reinforced by members from AAS Harrogate and 240 Signal Squadron, York.

The log shows 157 contacts with 28 countries of which the following were of particular interest:-

Cyprus 5B4SS            9th Signal Regiment club station

Germany    DL2HO            200 Signal Squadron and DL2DJ 16th Signal Regiment

<u>U.K.</u>	G3OFV	209 Signal Squadron	G3PFB	42 Signal Regt (TA)
	G3OPW	46 Signal Regt (TA)	GI3PUE	66 Signal Regt (TA)
	G3SAE/A	410 Signal Squadron (AER)	G3RRZ	RAC Signal School
	GW3JPJ/A	Junior Tradesman's Regt.		

Royal Canadian Signals

VE8TU Alert, Ellesmere Island.  
 VE3FFW/SU U.N. Forces Gaza Strip

U.S. Army Signal Corps both in Germany and USA.  
 Royal Swedish Army Signals.

Fourteen members in addition to the operators of the above stations were contacted and some recruiting for the society was carried out when past members of the Corps admitted that they weren't members of RSARS.

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IT'S A GREAT HOBBY

Some join the Rotarians and some the Buffaloes but I've found ham radio just as useful in the world of business.

To take two recent examples:-

A little time back I had to attend a rather sticky conference with the Chief Procurement Inspector of one of the NATO powers. Things were very sticky indeed until I spotted the diamond badge. A whispered "What call?" across the table brought real results - it took us 20 minutes to get him off SSB and back to business - which was now very much on the "old. boy" basis.

Much the same at a Ministry recently. The "Chief" was notorious for his toughness. This time he spotted my badge. "Used to be G-- myself, ever work old so-and-so" Once again a pleasant and useful business session.

That reminds me, got to see my Inspector of Taxes next week!!!

PEE GEE

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AGONY

Are your subscriptions up to date. have we your correct address and detail?

## SPREADING THE GOSPEL

A recent issue of School of Signals Liaison Notes posed the problem:-

"Only by constant practice with live traffic on real circuits can operators be brought to the highest standard of morse efficiency. What suggestions have readers to offer on this morse problem?"

Our Treasurer G3RUS, no mean brass-pounder himself, offered a solution- Amateur Stations within each Royal Signals unit.

Quote -- "The standard of operating in the Ham fraternity is of the highest order and interference is an accepted hazard which is just not allowed to deter one from establishing contact."

Your Editor would add "Yes, and plenty of contest operating too". A session on 7Mc/s during a contest is good experience for any operator.

Now we hear from School of Signals that the new Royal Signals Officers Communication Course will require a morse speed of 18 wpm and that officers taking the course will be encouraged to sit the RAE and morse test and to obtain their tickets during the course.

This is most encouraging news, a steady flow of officers who are active amateurs could ensure that every Royal Signals unit had a club station and wherever a member of the Corps was posted he could find the facilities for his hobby.

The staff at G3CIO look forward to meeting some of these would-be hams and perhaps explaining some of the mysteries.

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## RADIO AMATEURS' EXAMINATION

The next RAE will be held on December 13th and registration has to be made before November 1st.

If you are in the Catterick area contact the Field Secretary as arrangements have been made for the exam to be taken at Kemme1 Education Centre.

Your Unit Education Officer can arrange for you to take the exam locally but contact him NOW, time is short. The examination fee is £1 - 10 - 0d

## P.A. Tank Efficiency

The function of an r.f. power amplifier is to convert d.c. power into r.f. power. A class "C" operated amplifier is capable of doing this with about 75% efficiency.

However, the r.f. has to be transferred from the tank circuit to the aerial where it is dissipated as useful energy in the radiation resistance. It is interesting and of practical value when redesigning the 'home-brew' rig to look at the factors which govern the transfer efficiency of the tank.

P.A. tank circuits take many and varied forms, but they can all be boiled down to the simple parallel tuned circuit such as that shown in Fig. 1. The coil (L) will have a small value of resistance (r), shown separately for simplicity, although of course it will be formed by the resistance of the coil windings. A resonant aerial, with a radiation resistance  $R_r$  is coupled and matched with a link winding - it could equally be by any other method, e.g. pi-coupler, etc.

Fig.2 is the equivalent tank circuit to that in Fig.1, the only difference being that the radiation resistance of the aerial is shown reflected back into the tuned circuit by the transformer action of the link, and having a modified value due to the turns ratio, say  $R'_r$ . A circulating current of some arbitrary value "i" is indicated

Power can only be dissipated in a resistance, and therefore the total power in the circuit, from  $P = I^2 R$ , will be:-

$$\text{Total Power} = i^2(R'_r + r)$$

The power radiated by the aerial will be the power dissipated in the radiation resistance, i.e.:-

$$\begin{aligned} \text{Power Out} &= I^2 R'_r \\ \text{and as Efficiency} &= \frac{\text{Power Out}}{\text{Total Power}} \\ \text{then the Transfer Efficiency} &= \frac{i^2 R'_r}{I^2 (R'_r + r)} \\ \text{i.e. Transfer Efficiency} &= \frac{R'_r}{R'_r + r} \end{aligned}$$

The "Q" of a tuned circuit is the ratio of  $\frac{\text{Reactance}}{\text{Resistance}}$  and a tank circuit will have two values of Q, i.e. one with the aerial connected, the other with the aerial dis-connected, or Q loaded and Q unloaded ( $Q_l$  and  $Q_u$ ).

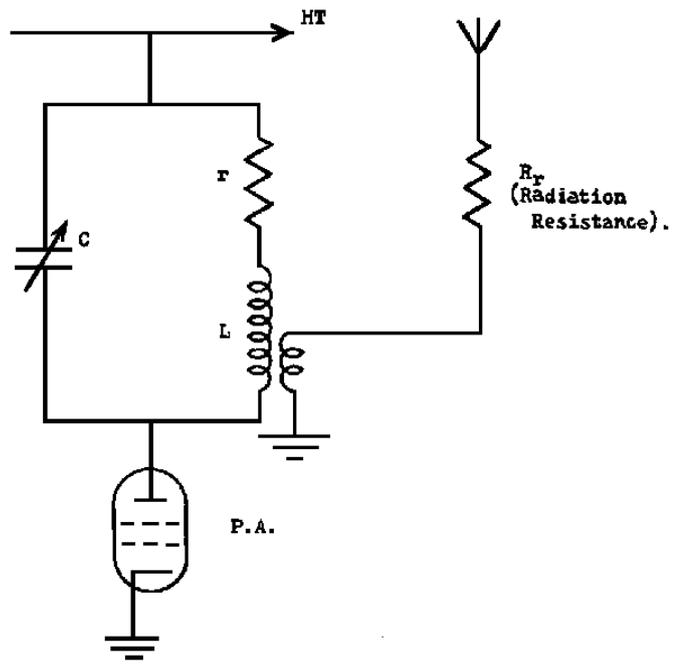


FIG 1.

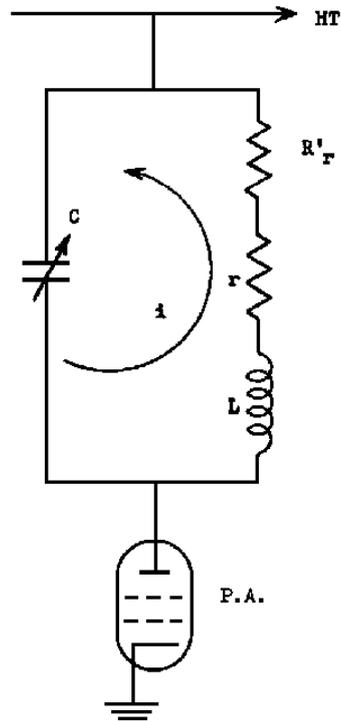


FIG 2

From Fig. 2:-

$$Q_1 = \frac{\Omega L}{R'_r + r}$$

therefore  $R'_r + r = \frac{\Omega L}{Q_1}$

Similarly :-  $Q_u = \frac{\Omega L}{r}$

(the  $R'_r$  term goes if the aerial is dis-connected).

-

therefore  $r = \frac{\Omega L}{Q_u}$

Substituting for  $R'_r$  and  $r$  in the expression for Transfer Efficiency, we get :-

$$\text{Transfer Efficiency} = \frac{\frac{\Omega L}{Q_1} - \frac{\Omega L}{Q_u}}{\frac{\Omega L}{Q_1}}$$

from which :-

$$\text{Transfer Efficiency} = \left(1 - \frac{Q_1}{Q_u}\right) \times 100\%$$

It will be seen from this expression that for a high efficiency the fraction  $\frac{Q_1}{Q_u}$  will have to be very small and this means that the  $Q$  of the tuned circuit unloaded must be very large, and the loaded  $Q$  very small. However, let's consider the practical implications.

In a well designed tank circuit the unloaded  $Q$  will be in the region of about 200 - 300. When space and size are limiting factors, smaller values may be expected, particularly if the coil is placed near to the metal chassis, etc. Low loss formers, preferably air, large diameter coil wire and spaced windings are some contributory factors for obtaining a high unloaded  $Q$ .

The loaded  $Q$  will depend on how tightly the aerial is coupled and it is unwise to reduce this to below about 12 otherwise the tuned circuit will not be able to discriminate between the radiated frequency and unwanted harmonics.

G3IBB



## SOCIETY NEWS

### A Society QSL Card

As members will have read in the Minutes of the A.G.M. the choice of a Society QSL card has been deferred. In order to take full advantage of the reduced price per card that comes with bulk ordering the Society would have to order several thousand cards. The danger is that too much of our funds would be tied up in unwanted QSL cards as we do not know the rate at which members would take these up.

To enable us to forecast the demand will members please let the Field Secretary know their approximate requirements. We are not asking for firm orders, just an idea of how many per year you would be likely to want.

For your guidance, the cost would be about 35/- for 500 cards provided our bulk order was big enough. On top of this you would have to get your call and address printed on the cards; any small printer would do this, we were given an estimate of 15/- for the job.

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### SURPLUS EQUIPMENT

The Society has available several 36 sets and a small number of AR88's. Any club affiliated to Royal Signals Amateur Radio Society may be issued with these provided that, in the case of the 36 sets, it has a licensed amateur on its strength.

The AR88's are located at Aldershot and Catterick and the WS 36's at Catterick only. All bids for this equipment should be made to the Field Secretary in the first place.

As we go to press there are only two AR88's left at Aldershot. If these are not issued in the near future they will be moved to Catterick so any affiliated club in the southern half of the country is urged to act quickly.

Neither Aldershot nor Catterick can crate this equipment so units must collect, your Command Representative may know of units making regular trips who could help you.

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### AGONY

Your Editorial Staff urgently requires your news, views articles (not too technical).

## SOCIETY MEMBERS -- No 87

The most Northerly ham in the U.K., GM3KLA, has always been keen on Top Band DX. Located at Haroldswick on the island of Unst, Bill is over 150 miles North of John O'Groats and only about 170 miles from the Norwegian coast. His counties worked score is 93 with 90 confirmed, the first 60 of these to qualify for worked all British Counties were made with a wind charger powered rig in the days before a mains supply came to the island.

In an attempt to work further afield a Vee beam of 2 wavelengths per leg was erected last year, the 2,000 ft of wire crossing roads and power wires and quite altering the appearance of the place. Results were, however, disappointing with only one transatlantic QSO resulting from all this effort. Nothing daunted, Bill is now erecting a Top Band ground plane. A 128 ft mast, top loaded to resonate on the band, together with some 20 radial wires each 100 ft long and dug in with the aid of a plough, will shortly grace the shores of Haroldswick Bay. The mast will have a total of 32 guys at 15 foot intervals, a necessary precaution when it is remembered that the highest wind speed ever recorded in Britain was at a met. station on Unst. Counting guys and radials 1 mile of wire will be used.

The rig at GM3KLA uses a Clapp VFO and an 807 P.A. with an AR88 receiver. Amateur Radio seems popular in Unst, the schoolmaster at Baltasound is GM3RFR and 3 people sat for RAE this year.

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## ROYAL SIGNALS ACTIVITY IN ADEN

Iain Scott VS9AIS, soon to return to Catterick, reports:-

VS9ABK recently became the first VS9/MM on record when he went on a 3 weeks trip up the coast.

VS9ALD operated portable with W9JJF from Mukeiras. This counts as 4W1 to the ARRL whose maps are different to ours, ALD uses a 888A and a Viking TX and has a private aerial farm round his bunk.

VS9AGB is an addition to the group whilst VS9ADP has returned to the U.K.

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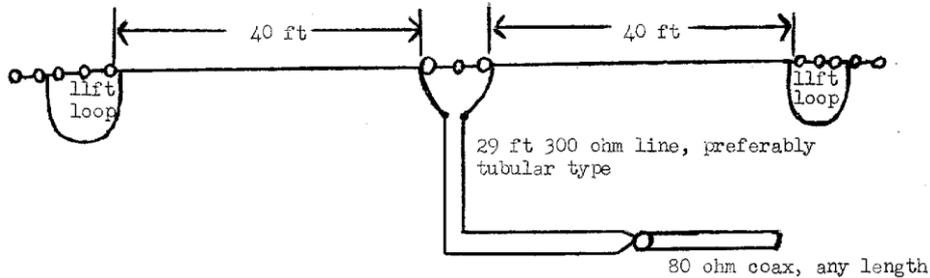
## WHO'S ON & WHEN

In order to promote contacts between Society members we intend to publish an activity list. Drop the Editor a note giving callsign, times, frequencies and modes of operation and we'll publish it next time. The following gives you the idea:

G3ADZ mainly CW on 1.8, 14 and 21 Mc/s most evenings after 2030 GMT.

## Shortening the G5RV Antenna

### More Simple Thoughts For Tiny Tots by Thomas C. Wylie M.I.R.E.



The above diagram shows the full size G5RV for use on 3.5, 7, 14, 21 & 28 Mc/s. For operation only on 7 Mc/s and above halve the length of the horizontal top portion (the radiator proper) and of the 300 ohm stub.

This method may be used for the physical shortening of the radiating portion of any antenna and; of course, the loops may be made larger, with a corresponding shortening of the remaining portion of the horizontal members.

However, it will be obvious that the loops become more unmanageable and prone to mechanical troubles as they increase in size and, further, that the old maxim of not less than  $\frac{1}{4}$  wavelength between radiator and transmitter should always be maintained wherever possible, with any antenna.

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## RADIO MATHEMATICS FOR BEGINNERS

$$12 \text{ WPM} + \text{RAE} = \text{G3}$$

$$\text{G3} + \text{YL} = \text{-LSD}$$

$$\frac{\text{OM} + .303}{\text{G3} + \text{YL}} = \text{XYL}$$

$$\text{G3} + \text{XYL} + \text{TVI} + \text{HP} = \text{QRT}$$

## HARMONIC GENERATION

Congratulations to Ted Philp, the society's first General Secretary, on the arrival of a third junior op, a girl, in Singapore on August 4th.

## A TRANSISTOR "DIP" METER

by WO II Terry Richardson

One of the most useful pieces of equipment in any shack is the Grid-Dip Oscillator. A transistorised GDO, small enough to be held in the hand and with no trailing mains lead, is an inexpensive and versatile instrument.

No originality is claimed by the writer as the unit to be described was first introduced by Bill Graham, G3KPQ, during one of the club sessions at G3CIO. Transistor technology has improved considerably in the past few years and transistors capable of operating at VHF can be obtained cheaply or indented for through local sources. The transistor used in this unit was purchased for 9/-.

The oscillator is basically a Colpitts breed and as there is no D.C. current in the transistor oscillator from which a "dip" can be obtained as from the grid current in a valve oscillator, the unit must depend on another method of indicating "dip" When the transistor oscillator is coupled to an external tuned circuit tuned to the same frequency as the oscillator, the R.F. voltage from the oscillator decreases because part of the power is absorbed by the external tuned circuit. This change can be indicated by a diode detector, and the resultant D.C. output applied to a sensitive meter, showing up as a dip in the reading as the oscillator is tuned through resonance with the circuit being checked.

In the circuit shown D1 rectifies the R.F. energy from the oscillator, and the resultant D.C. is applied to a D.C. amplifier allowing an inexpensive meter to be used.

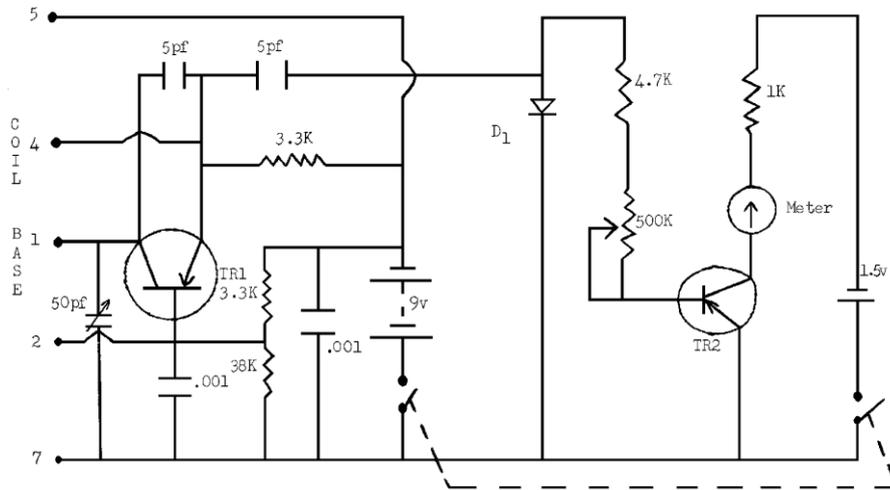
The construction of the instrument is simplicity itself. The case measures 6½" x 2 x 2 inches, all components being mounted on the lid and the batteries in the case. Care should be taken to ensure that all leads are kept as short as possible. A B7G P.T.F.E. valve base is utilised for the coil socket; this type ensures a minimum loss of R.F. energy at frequencies up to about 225 Mc/s. The base is located at one end of the box with the sensitivity control at the other end or on the face of the unit below the meter. The meter is a 1mA movement of Japanese manufacture and is mounted on the lid with the tuning capacitor.

The dial is a circular piece of white card suitably calibrated in Mc/s, and a hairline indicator is engraved on a circular piece of perspex of the same diameter and attached to the tuning control.

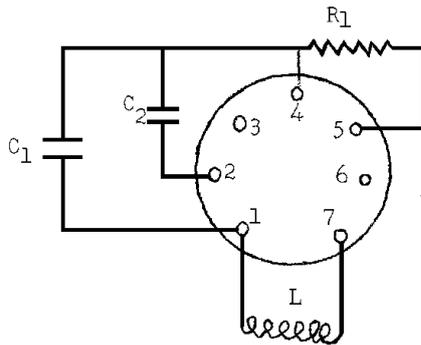
The additional components C1, C2 and R1 are mounted on the coil former as close to the base as possible. The values given work with the transistor stated but may have to be changed if a different type is used.

If a suitable transistor is used the frequency range can be extended to 230 Mc/s. A suitable coil would be a half turn of plated coil wire and R would be of 220 ohms C1 and C2 are not required on this range.

The coils are wound on perspex or similar formers fitted with pins to fit the B7G valve holder.



COIL BASE CONNECTIONS



TR1 Mullard OC 170  
 TR2 OC 71 or similar  
 D1 OA 79 or similar

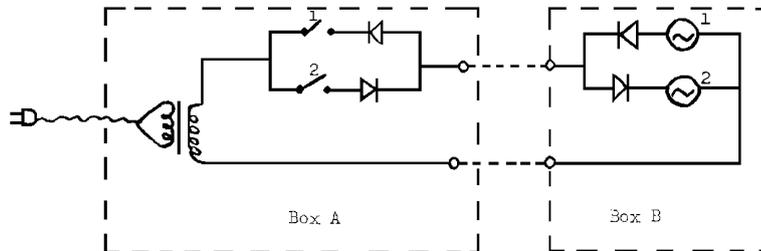
Frequency Range	Coil	C1	C2	R1
2 - 4 Mc/s	90 turns of 28, SWG 3/4" diameter	20 pf	100 pf	Not connected
4 - 8 Mc/s	72 turns of 22 SWG, 1/2" diameter	Not connected	47 pf	"
7.5 - 15 Mc/s	43 turns of 20 SWG, 1/2" diameter	" "	20 pf	"
12 - 25 Mc/s	17 turns as above	" "	20 pf	"
23 - 50 Mc/s	7 turns as above	" "	10 pf	"
40 - 90 Mc/s	3 turns as above	" "	10 pf	"
70 - 150 Mc/s	2 turns of 16 SWG 1/2" diameter 1/4" long	" "	10 pf	220 ohms

## Answers to July Brain Teaser

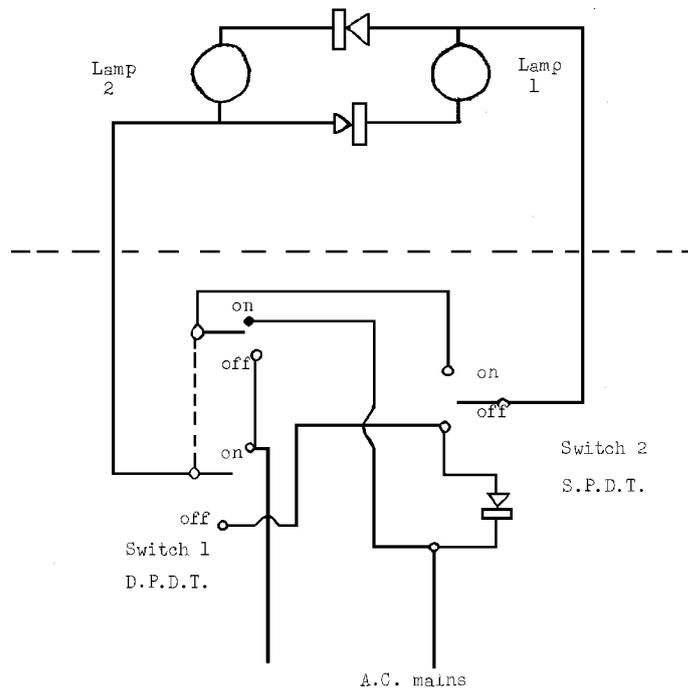
The clue was the A.C. supply :-

use +ve half cycles for one bulb and the - ve half cycles for the other.

From G3FGN



From GM3KLA who has built it !!!



## AMATEUR RADIO IN BAOR

These notes are submitted to assist members who may be coming to BAOR and are based only upon the personal knowledge of the writer.

### Licence condition

These are exactly the same as for the UK and there are no short cuts to obtaining a licence. One either produces a current licence or sit the RAE and the morse test in UK, or sit the German exam and morse test. The latter course has its language complications. The RAE may be taken in BAOR by the courtesy of the RAEC but the morse test still remains. The best answer is to come to BAOR with the necessary qualifications, it saves so much time.

All licensing is controlled by the Bundespost but application for a licence must be made to the BJCEB, HQ BAOR, B.F.P.O. 40. It is interesting to note that there is no 160m band available, and that there are two classes or licence.

Class A	20W anode dissipation
	80m      A1/A2/A3
	40m      A1/A2
	20m      A1/A2
	15m      A1/A2
	10m      A1/A2
	2m              A1/A2/A3

Class B              50W anode dissipation A1/A2/A3 on all the bands  
given above.

It will be seen that there is no mention of A3a!! Doubtless the regulations in English are a little out of date. The cost of 'A' licence is 24DM per year and the 'B' licence 36DM per year. Needless to say all DL 2 apply for the 'B' licence.

### Equipment

There is a lack of second hand war surplus as we know it, and what exists is expensive and outdated. Prices asked for second hand equipment are high by UK standards. However the UK and USA markets are available to all, and to military personnel available less tax and export duty. This means that the attractive USA Heathkits are outstanding value for money.

There are few shops which stock amateur gear but the only two in the British Zone known to the writer are in DUSSELDORF and ESSEN. There must of course be others.

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	80m A1/A2/A3
	40m A1/A2
	20m A1/A2
	15m A1/A2
	10m A1/A2
	2m A1/A2/A3

Class B 50W anode dissipation A1/A2/A3 on all the bands given above.

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## YOUR REPRESENTATIVES

The following are the Command representatives of Royal Signals Amateur Radio Society.

They may be able to help, particularly in Overseas Commands, with your Amateur Radio problems.

### Scottish Command

Lt. Col. W. Robertson  
The Schoolhouse  
Tannadice  
Forfar.

### Western Command

Major H. Chapman  
CSO's Branch  
Western Command  
Chester

### Eastern Command

Lt. A.P. Thackray  
605 Signal Troop (London District)  
Beavers Lane Camp  
Hounslow, Middx.

### Southern Command

Lt. Col. (Retd) Sir Evan Nepean, Bart.,  
CSO's Branch  
HQ Southern Command  
Wilton, Salisbury

### T.A. and A.E.R.

Capt. A.D. Taylor  
37 Pickerill Road  
Greasby, Wirral, Cheshire

BAOR

Capt. J.S. Howe  
16 Signal Regiment  
BFPO 34

Near East

Major F.C. Lockwood  
HQ Royal Signals  
BFPO 53

Mid East

Major G.S. Symons  
HQ Mid East Command  
BFPO 69

East Africa

Capt. B.W. Giller  
236 Signal Squadron (Comcan)  
BFPO 10

Far East

Squadron.

No representative appointed - try Capt. Philp, 263 Signal