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THE BRADFORD GRAMMAR SCHOOL AMATEUR RADIO CLUB,

THE GRAMMAR SCHOOL,

BRADFORD, 9

EDITORIAL

BITERMINALLY

The last edition of this magazine sold thirty copies, whereas the first only sold twenty four. This edition we hope to sell thirty six copies. You may wonder just what this has to do with you. The answer is, that if we double circulation we can almost half the price. Thus, if each of you reading this now was to recruit one new reader, the next edition would still have the same quality of contents, but would only cost you about three pence or would have twice as many pages.

You probably feel that we are lining our pockets out of this, we can assure you that this is not so. Next year we will out of this year's profit either add another page at no extra charge or possibly supply a free copy to all those who have contributed printed.

This leads me onto the subject of contributions, a subject which most of you ignore. For us to continue producing this magazine, each and every one of you must make an effort and write an article about something. It is no use doing as some of you do and complaining about the quality of the subject matter if none of you are prepared to bother yourselves and write something for us. If each of you wrote just one half side of foolscap on anything we would be able to fill two Hams with all the contributions. This edition you will notice is filled almost entirely by the editorial staff contributions. That is because we did not receive one single contribution before the end of term. That is just not good enough when you think that you would only have to write one article to be able to read twenty nine articles written by others. If we do not receive more contributions next time we may well have to stop production, which would be a shame because through the medium of this magazine you are able to pass on your useful tips to many people and you yourself are able to pick up many useful tips which you would otherwise miss.

It should not really be necessary for me to point the above facts out to you, but it apparently is. I hope it will be the last time I have to do so. You will find the date by which your contribution must be handed in, on the back page.

We hope to have a series of sheets ready soon with instructions for the construction of various types of electronic equipment. They will start of with the crystal set and get progressively more complicated. They will essentially be reprints from the beginners' series of the Ham although eventually they will deal with far more complex apparatus, whereas that series will deal each year with the newcomers to radio. They will be available to Club members at about one penny and to non-members at two pence.

I hope you will enjoy our first edition of the New Year, which will not be so new by the time you read this, and that you consider it worth supporting in the two ways mentioned above.

JOHN P. STOTT, G3MAB

A SIMPLE INTERCOM SYSTEM

John P. Stott, G3MAB (Editor)

I am sure that many of you will have built some form of amplifier by now. In this article I am going to show you how such an amplifier can be used to enable you to talk to people in other parts of your house. By using a multi way switch you could extend it to cover all the house eventually, but that is where you get some fun out of it. This article is just to start you off.

Unless you are a Hi-Fi fiend there is no need to make the amplifier very complicated and so long as you obey the simple rules of construction, you should get good service and reasonable quality from the circuit shown below.

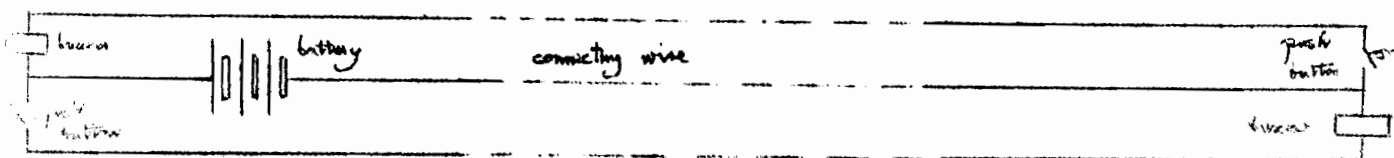
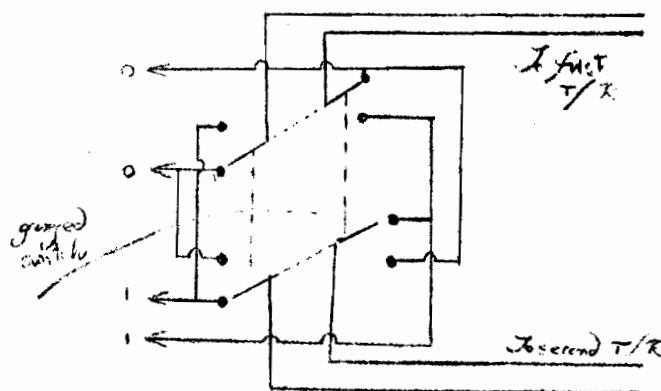
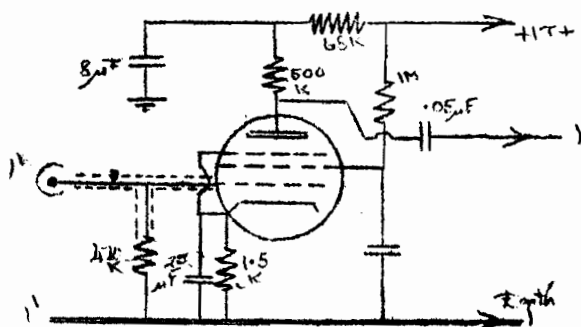
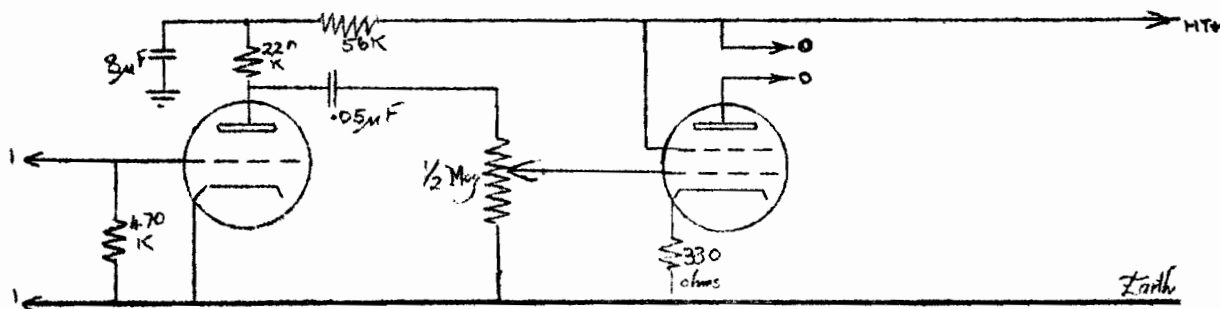
You will find that you get ample volume for normal use out of a triode amplifier feeding an output valve, e.g. 6J5 to 6V6, if this is not enough for you, you may substitute a pentode pre-amplifier, e.g. EP50.

The circuits show: the basic amplifier; a pentode stage which would be connected between input and the triode; and the switching for two way work.

I am not going into details of the amplifiers as you should all be aware of them. The transmitter/receiver used can be either a high impedance type headphone, a high impedance speaker or a low impedance speaker and matching transformer. You will find that these act just as well as microphones as do the carbon granule type, possibly better.

The switching is done from the main or control station, a buzzer system being provided so that the subsidiary station can indicate when connection is desired. The equipment should be run from a power supply such as that described by David Noble in the first edition of the Ham.

If you are careful with your construction and use good parts you should find this a useful and amusing piece of equipment, although your parents probably won't!



THE MODIFICATION OF BROADCAST RECEIVERS
DAVID NOBLE, G3MAW

The modification of broadcast sets to cover amateur transmissions is not a matter of sufficient difficulty to warrant over much attention. Some makers have included in their sets a 'Trawler Band' which gives reception not only on the 40 & 20 metre bands covered by the short-wave section; but also on the 80 and 150 metre bands. This last is a very useful band to listen to as every B.G.S. station uses it almost exclusively. But only a few people have facilities for listening on this band. The aim of this article is to give tips for the conversion of broadcast receivers to the reception of stations on this band.

The first method suggested is to build a onevalve set tuner unit, and apply the output to the 'gram' sockets of the receiver. The method of taking power for this unit is to take three leads from the receiver carrying HT, LT and Earth (An officer of the Club will give help in tracing these leads) to a small chassis bearing:

- i) a valve holder to hold the valve used in the IF stage;
- ii) a .0001 uF or .0002 uF variable condenser;
- iii) a trimmer, .0003 uF or thereabouts;
- iv) a coil former, wound as specified for top band in the table displayed in the Radio Room;
- v) a 100,000 ohm potentiometer;
- vi) 2 terminals;
- and vii) a Tag Strip.

A few assorted resistors and condensers, a length of screened lead, and plugs to fit the 'Gram' sockets are also required.

Remove the IF valve from the receiver, and place it in its cabinet. Place the valve in the chassis wired as shown. (Fig. 1) Switch the wavechange switch to 'Gram', take the blade of a screwdriver in the hand, touch on the 'Gram' sockets, and connect the inner of the screened lead to the one which gives the loudest hum. We thus have a 1 - valve TRF tuner unit, driving a 2 valve amplifier (The gram section of the original receiver). The i.f. amplifier is not used, and the valve may thus be used in the tuner.

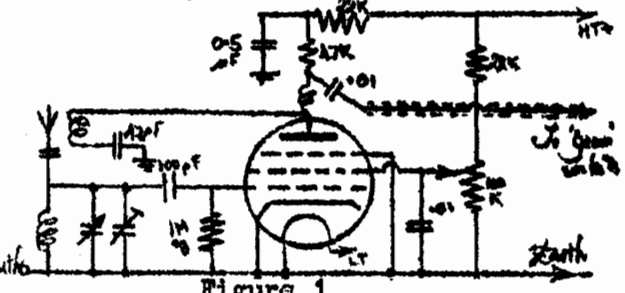
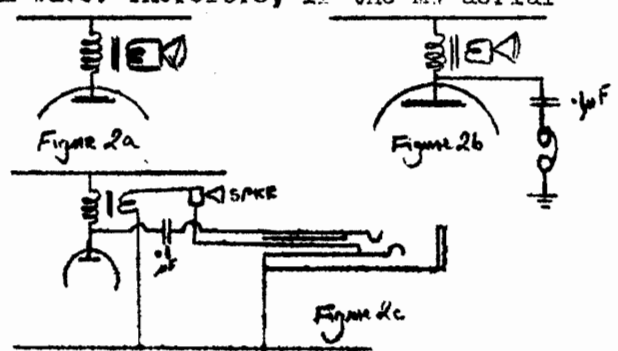


Figure 1

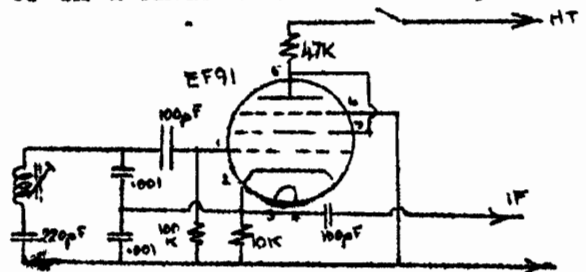
Another modification which may be useful under these circumstances is to connect headphones to the output. This may be done by modifying the output stage as in figs. 2a & 2b. To switch the speaker off when the 'phones are put in a closed circuit jack may be used, wired as in Fig. 2c

The expedient of a TRF tuner is however of very little real value, and another method of obtaining coverage is quite simply to reduce the

value of the trimmers and inductances in the set until the required frequency is obtained. This method, however, does not give ease of alignment, and another suggested method is to exchange the aerial coil for the oscillator coil. The 160 metre band is about 465 kc higher than the higher frequency end of the medium wave. Therefore, if the MW aerial coil is used as an oscillator, it will oscillate on 465 kc below 160 metres, and as the original oscillator coil covered 160 metres, it will now serve as a top band aerial coil. (Assuming the original circuit to oscillate at signal frequency plus I.F.)



The last two methods provide no means of listening to Morse signals, and to this end a beat frequency oscillator is a useful addition. The circuit shown in figure 3 is suitable; the coil can be a single winding from an old I.F. transformer. It may be mounted inside the set or on a small chassis outside, and an on-off switch should be placed in the H.T. lead.



A piece of wire is taken from the cathode of the B.F.O. valve, and taken through a .0001 uF condenser near to the grid of the I.F. amplifier valve.

Here is hoping that you have much fun trying the conversions suggested, and in listening to the various B.G.S. stations (on at 2100 local time nightly) and others.

WARNING: IT IS UNSAFE TO CONNECT OUTSIDE UNITS TO AC/DC SETS.
IT IS SUGGESTED THAT SUCH SETS BE LEFT SEVERELY ALONE.

BEGINNERS' SERIES

Part 3 - The R.F. Amplifier

The next stage after a one valve set, is the R.F. (radio frequency) amplifier. As those of you who have constructed them will have found, one valve sets are all right for strong broadcast stations but there is a great deal which is there but which you can't quite hear. This obviously calls for greater amplification which is achieved in the first case by putting an amplifier stage between the aerial and the detector.

This amplifier has a tuned circuit in the grid so that it only amplifies signals of the frequency that you want. This eliminated, or at least reduces another difficulty of the one valve set, that you can hear several stations at once. This circuit is usually tuned by one gang of a two gang condenser the other gang of which is used in the grid of the detector, thus saving the trouble of adjusting two knobs.

A typical circuit is shown below. The valve used is an R.F. pentode (e.g. EF50 EF39 6K7) which gives much more gain than a triode.

You should put one R.F. stage in at first and when that works you can put another in if you wish.

All the loads should be as short as possible and should also be firm.

Figure 2 shows a suggested layout for the stage, which would be connected to the detector with screened cable.

Figure 3 shows the base connections of a 6K7 or EF39 which is the best cheap valve to use.

I hope you will have success in constructing you R.F. amplifier and that it will greatly improve your enjoyment of your one valve set.

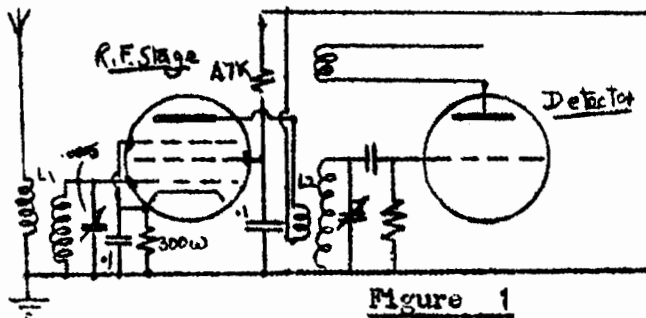


Figure 1

NOTE: I have used indirectly heated valves as they are best once you have passed the one valve set stage. The extra electrode is called the cathode and is just a metal tube which is heated by the filament inside it. Its symbol is k. the symbols for the grids are g with a number suffixed according to its position starting with the control grid as G₁.

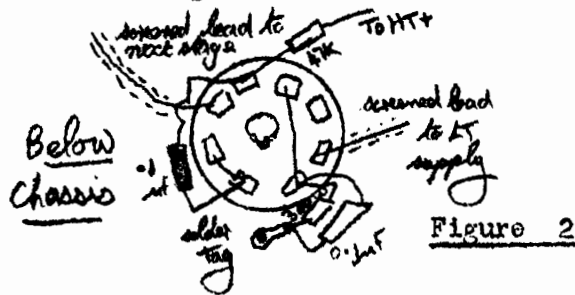
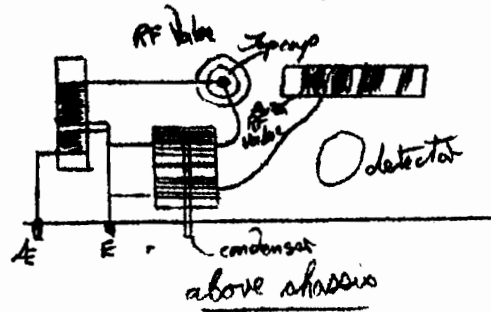


Figure 2



NOTE: By now you should have graduated up to using aluminium chassis construction with the chassis as Earth. One thing you should always do is to buy a size of chassis that will take all the additions you are likely to make to your set. This set will eventually have four valves.

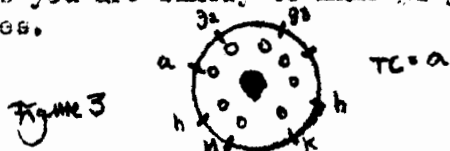


Figure 3

Journey into Space

by Andrew M. Pomfret, G3LZZ

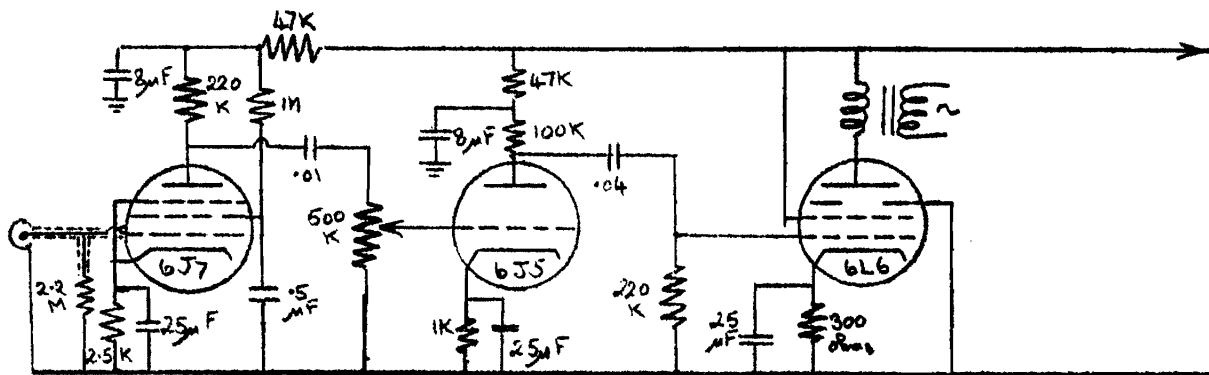
One of the major recent current events has been the launching of the two earth Satellites by Russia. It came as a great surprise to the ears of the Western world to hear that Russia had taken this step quite outside the field of I.G.Y. activities. But as soon as news of the first satellite had circled the globe, faster than the thing itself, experts at astronomical and radar stations were putting in extra work to track and plot this new celestial body. Jodrell Bank technicians completed this marvellous engineering achievement just in time for the radio telescope to be able to keep watch on the satellite's radio signals.

The first task was to find the accurate frequency of the satellite. It was found that there were two transmissions, one on 20.005 Mc/s., and the other on 40.002 Mc/s. The original standard B.B.C. recording was actually one of WWV, the American frequency station on 20.000 Mc/s. Many enthusiastic listeners noticed this mistake! Many there were, too, who began ranging the satellite by Doppler shift observation. The change in note of the whistle of a train is called Doppler shift; the same effect occurs in the field of radio waves from a moving source. The apparent frequency differs from the true frequency by a fraction given by its velocity of light. At the 20 Mc/s. frequency, this amounts to a change of 500 cycles/sec. On disappearing over the horizon, the frequency will appear to be 500 c.p.s. lower.

Hence, by simple observations, much information about the satellite can be gained

A Modulator for Low-Power Operation

by Richard L. Hodgson G3MAL



This modulator has been used by many local stations and has been proved to be most satisfactory for top-band operation. The valve line-up is 6J7 (comprising an efficient audio pre-amplifier for use with a crystal microphone), 6J5 and 6V6 final. A 6V6 should give 5 or 6 watts when run under correct conditions and this is the audio power necessary to fully modulate a ten watt carrier.

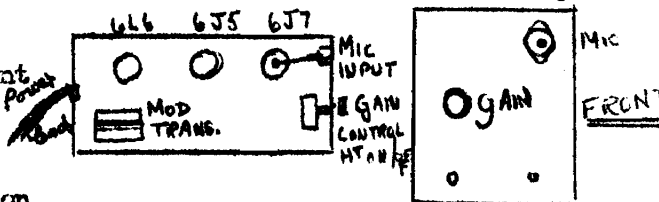
The circuit itself is very simple and easy to construct. The only important fact to remember is that the grid leads should be kept as short as possible, and screened if necessary.

The unit can be accommodated on the chassis of an "R.F. Unit", and this provides a neat layout.

A suitable modulation transformer can be obtained from the local ex-government store, preferably one with several ratios so that the modulator and P.A. can be accurately matched. (Ferranti OPM1)

The quality of a 160 metre transmission is expected to be good as there are no high powers involved, and although this unit is not designed as a Hi-Fi amplifier and utilises only simple equipment, it is very efficient and can be recommended for the beginner.

Note: This modulator is in use on 160 metres at the B.G.S. Club station.

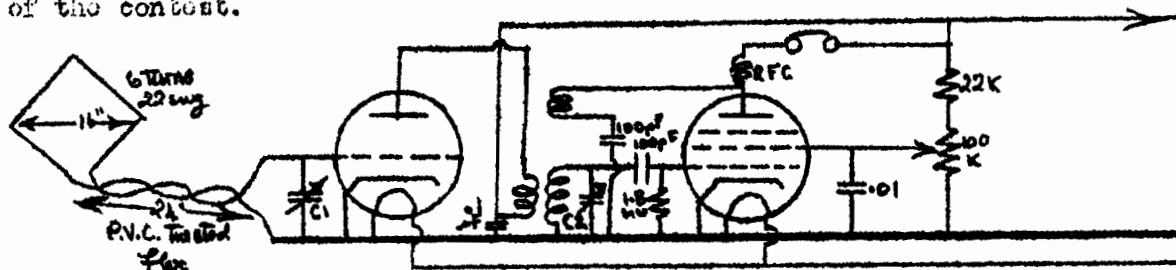


The Ham Direction Finding Competition 1958

Because of a suggestion by the Vice-president some time ago, the HAM has decided to arrange a direction finding contest towards the end of this term. A rough outline of the contest is as follows: A small crystal controlled transmitter will be hidden somewhere on Baildon Moor (not on private property). At a given time the contestants will meet at a pre-determined assembly point with direction finding receivers, and at a given time will proceed to trace by electronic means the exact position of the hidden transmitter. The winner will disconnect the aerial from the transmitter to indicate that the contest has been won. All receiving stations will then await further instructions from the control station.

Here are the Rules for the Contest:-

- i) The contest is open to all readers of the HAM subject to the following conditions.
- ii) The contest will run from 1430 G.M.T. on Saturday, 22nd March, 1958.
- iii) Contestants will be required to be at the assembly point by 1400 G.M.T.
- iv) The entry form should be completed and handed to the editor by 1st March, 1958.
- v) Direction Finding Receiving equipment must be constructed by the contestant.
- vi) The transmitter will radiate a continuous modulated tone on 1.9 Mc/s throughout the competition.
- vii) Contestants should arrange to have their dinner at school on the day of the contest; they will then proceed to Baildon Green with G3MAB.
- viii) At the end of the contest, light refreshments will be provided to all entrants.
- ix) There is NO entry-fee.
- x) When the winner finds the transmitter, he must remove the "Winner's Pass" from the transmitter compartment, and keep it as proof that he has won the contest.
- xi) The prize will consist of a quantity of useful radio equipment.
- xii) The decision of the organising committee shall be final.
- xiii) Apparatus shall be so constructed and operated such that it does not cause any undue interference to any other receiving station.
- xiv) No non-competitor shall interfere with any competitor or with the operation of the contest.



The above is a circuit of a typical direction finding receiver suitable for the above contest. It consists of a 955 R.F. stage and a 954 regenerative detector. The grid circuit of R.F. stage consists of a loop aerial of 6 turns of 22 s.w.g. enam. copper wire close wound on two 16 inch diagonals made of $\frac{1}{2}$ x $\frac{1}{4}$ wood suitably joined in centre. This is fed to the receiver with a piece of twin P.V.C. twisted flex 24 inches long. The tuning capacitances for the loop aerial can either be mounted on the aerial itself (as on the proto-type), or in the receiver. Acorn valves were employed in the proto-type, constructed by David Noble (G3MAW), because of their low heater consumption of 0.15 amperes each; but a L.T. voltage of 6 volts is required. Some entrants may wish to use battery valves, and this of course can be done quite easily with no modifications to the circuitry. Further details of the acorn valves are given overleaf for those who wish to use them.

Suitable valves for D/F Receiver

954, Pentode Detector, Amplifier
Heater: 6.3v @ 0.15 amp.
Max. Anode: 250v @ 2 mA.
Max. Screen: 100 @ 0.7 mA.

PRICE 1/6

955, Triode Detector, Amplifier, Oscillator

Heater: 6.3v @ 0.15 amp.
Max. Anode: 250v @ 6.3 mA.

PRICE 3/11

956, Variable- μ Pentode, R.F. Amplifier

Heater: 6.3v @ 0.15 amp.
Max Anode: 250v @ 6.7 mA.
Max. Screen: 100v @ 2.7 mA.

PRICE 2/6

958, Triode A.F. Amplifier, Oscillator

Heater: 1.25v @ .1 amp
Max. Anode: 135v @ 3 mA.

PRICE 3/11

A Pentode could be used instead of the 955 triode in the circuit on page 7. The screen-grid could be connected directly to the anode, and the suppressor grid to the cathode. The valves listed above can be obtained at the prices given plus 6d. per valve postage from: Eddy's (Nottm.) Ltd., Dept. W.W., 172 Alfreton Road, Nottingham.

On receipt of the competition application form, a number of components will be given to each entrant, one of which is the detector coil. The connections for this coil are as follows:

- | | | |
|---|---------|--------------------------------------|
| These coils will tune 1.9 Mc/s with a 150 pF condenser. | 1. • .6 | 1 - Reaction condenser (.0001 fixed) |
| | 2. • .5 | 2 - Chassis |
| | 3. • .4 | 3 - H.T. |
| | | 4 - Anode of R.F. stage. |
| | | 5 - Grid condenser |
| | | 6 - Anode of detector valve. |

High Tension The D/F receiver described operated quite satisfactorily from a 90 volt H.T. battery. But, of course, if this voltage can be increased, the receiver would be more sensitive. A 120 volt H.T. battery (Wt. 11lb., dim. $3\frac{1}{2}$ x $2\frac{1}{2}$ x $1\frac{1}{4}$) can be obtained at price 2/-. Orders for this type of H.T. battery are being taken, and these will be supplied nearer the time.

Loop Aerial The tuning of the loop aerial has been found to be very critical. With the proto-type, a capacity of about 120 pF was required to tune the loop to resonance at 1.9 Mc/s.; but with different types of wire used as feeder, the capacity will vary from aerial to aerial. The correct value of condenser should, therefore, be found by experiment. The loop can be tuned with a pre-set trimmer, as the transmitter will operate on one frequency only.

CURRENT NEWS BY A.M.P.
(Andrew M. Pomfret, G3LZZ)

Apart from the events concerning the satellite, quite a lot has been going on in our own circles, and although I intended to make the satellite my contribution for this month, it was felt by the editor that the community was missing something by not getting its usual gossip column. So I agreed to churn out my summary of events in the usual way.

One of the first things that may have struck you about this issue is the amount of information it contains on the direction-finding competition. I think most points have been covered by our contributors, but by no means rely on the circuit given if you have your own feasible ideas. I for one am considering using a PCL83 or a POF80 for the receiver, each of which is a two-stage miniature valve. It has also been suggested that a sensitive

meter be used in place of headphones to act as an S-meter, though it is advisable to have both, so that you can be sure the receiver is working correctly.

I have great pleasure in announcing two new local stations. The first is G3MFJ, that of G. F. Firth of RX, and the second is G3MGA, the call-sign held by Peter Gillett of Belle Vue Grammar School.

We were all pleased to see how successfully G3KEP's B.B.C. television broadcast went. The other amateur who appeared in the programme and answered the questions was G5OS who runs the Science Museum station GB2SM. The studio was given its own call-sign GB3LG (Lime Grove). After a CQ call on 10 metres, a contact with W3BIW was established. W3BIW is an American station in Pennsylvania operated by a woman called Eleanor. The contact was not pre-arranged. There is a photograph of G3KEP, G5OS, and Arthur Garratt on Page 594 of the January Short Wave Magazine.

A short time ago, during the holidays, G3LQJ, G3MAB, and myself were assisting at the Annual Convention of the Science Masters' Association. At the members' exhibition held at the University we met G3HMO, well known to S.W.M. readers as the man who wrote on the satellite ranging. He is a schoolmaster from Stowe, and was exhibiting his ranging methods. He had three visitors who were ham operators, two of which materialize together, and are known to some members of the club as G2QM and G6BX. The other ham visitor was G2FLH.

B.G.S. again entered for the Magazine Club Contest this year, organised by the S.W.M., and the station of G3KEP was used. The contest took place from 1600-1900 G.M.T. on November 16th, 17th, 23rd, and 24th. The top Club was Stourbridge (G3BMY) with a total score of 486 points. G2ASF, Coventry, 478, and G3IQE, Aldershot, 467 were close runners-up. Out of the 44 Clubs who entered, we were 20th with 301 points. Bottom was Ravensbourne, G3HEV/A with a score of 56 points. Congratulations David, and many thanks for doing so well for us. We must, of course, try to do better next year. Not many Northern stations were taking part, G4JW in Sheffield being one of the nearest.

Till next month, good listening.

TOP BAND CONTEST No. 1 RESULTS

31 points	G3LZW	1st.	
31 points	G3MAB	X	X late entry.
24 points	G3MAW	2nd.	
23 points	G3MAL	X	
20 points	G3LZZ	3rd.	

A prize was not given because only three entries were received by the required date.

Future Top Band Contests:- Saturday, 1st February, 1958
Sunday, 2nd March, 1958

- Points: 3 points for each B.G.S. member
- 2 points for each B.G.S. old boy.
- 1 point for each station within 10 miles radius of B.G.S.
- 4 points for contacts with other English stations
- 5 points for contacts with stations using any prefix other than 'G'

Log: 1st column time; 2nd column Station; 3rd column his RST; 4th column your RST; 5th column his name; 6th column his QTH; 7th column Points claimed.

All contacts must be on C.W. using standard (non-contest) procedure.
Logs to be submitted to G3KEP by the Saturday following each contest.

THE CONTEST IS OPEN TO ANY LICENSED AMATEUR OF THE B.G.S. AMATEUR RADIO CLUB.

Here is the solution of last issue's crossword:-

T	U	N	I	N	G	U	P
X	X	E	X	E	X	X	O
E	R	G	X	A	E	R	O
M	X	A	E	R	I	A	L
B	I	T	S	X	R	M	S
E	X	I	X	E	X	X	X
R	X	V	O	L	T	S	X
S	E	E	X	K	X	I	D

R.S.G.B. TOP BAND CONTEST will be held from 2200 GMT on Saturday, 1st March to 0300 GMT the following morning. This would give anyone an excellent opportunity to see just how they can get out. R.S.G.B. members can claim an equal number of points for non-RSGB operators as they can for RSGB members, and all entrants will be looking forward to working any amateurs on the band. At the same time it will be found that your CV ability will improve enormously. Further details (procedure, etc.) can be obtained from G3KEP at 2100 GMT any evening.

General Post Office News:

PIRATES, PLEASE NOTE: "Post Office investigations recently resulted in two men appearing at Liverpool City Magistrate's Court accused of operating radio transmitters without a licence.

"It was alleged that threats of physical violence had been made against anyone who took steps to trace the illegal transmissions, and that the call-signs of licensed amateurs had been used.

"The two Liverpool men were each fined £25." - R.S.G.B. Bulletin.

THE LOGGING OF TRANSMITTER FREQUENCIES Members of the Club should note that as from 1st January, 1958, the Frequency of a radio transmitter should be logged, although no specific degree of accuracy is called for. The G.P.O. point out that it is useful, when investigating complaints of interference, for inspectors to know the approximate frequency in use at the time of the complaint. In the past, many amateurs have recorded only the frequency band in use. - London Gazette.

"THE HAM" "HELP-YOU-OUT" SERVICE

Advertising Manager: David Noble, G3MAW Charge: 2d. per line (or part of line)

Sale: Many queer Valve types etc.

For Sale: battery valves suitable

Wanted: Switches toggle DPDT and others

DF RX: DA2 1/6; DL35 1/-; DG090

Also mains transformer with 12v. 4A winding.

4/-; DL92 5/-. Apply D. Noble.

DEADLINE

Material for the next issue should be submitted to the Editor by Wednesday, 2nd. February, 1958.

LATE NEWS

G3MHB ON THE AIR! Just before this issue went to press, the B.G.S. Amateur Radio Club was issued the Call-Sign G3MHB. The following are eligible to operate the station: G3LQJ; G3LXF; G3LZW; G3LZZ; G3MAB; G3MAL; G3MAW; G3MFJ; G3KEP. So that the licence can be renewed each year, all operators should pay an equal sum depending on the number of operators. This year 4/6 will be required to be paid by each operator, and should be paid in regular instalments to G3KEP before 13th January, 1959.

It is hoped that the flag of G3MHB will remain flying for many years to come.

THE "HAM" DIRECTION FINDING COMPETITION 1958

Open to all readers of the "Ham" who are members of the B.G.S. Amateur
Radio Club.

Name..... Call-sign (if any).....

I hereby declare that I will enter the above contest on 14th March
1958. I have read the rules for the contest, and agree that the judges'
decision shall be final in all case of dispute.

signed.....

N.B. There is NO entry fee for the competition, and a great deal of work
is being done towards its preparation. We would, therefore, ask readers
not to let us down, and be certain to enter for the contest if this form
is submitted.

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