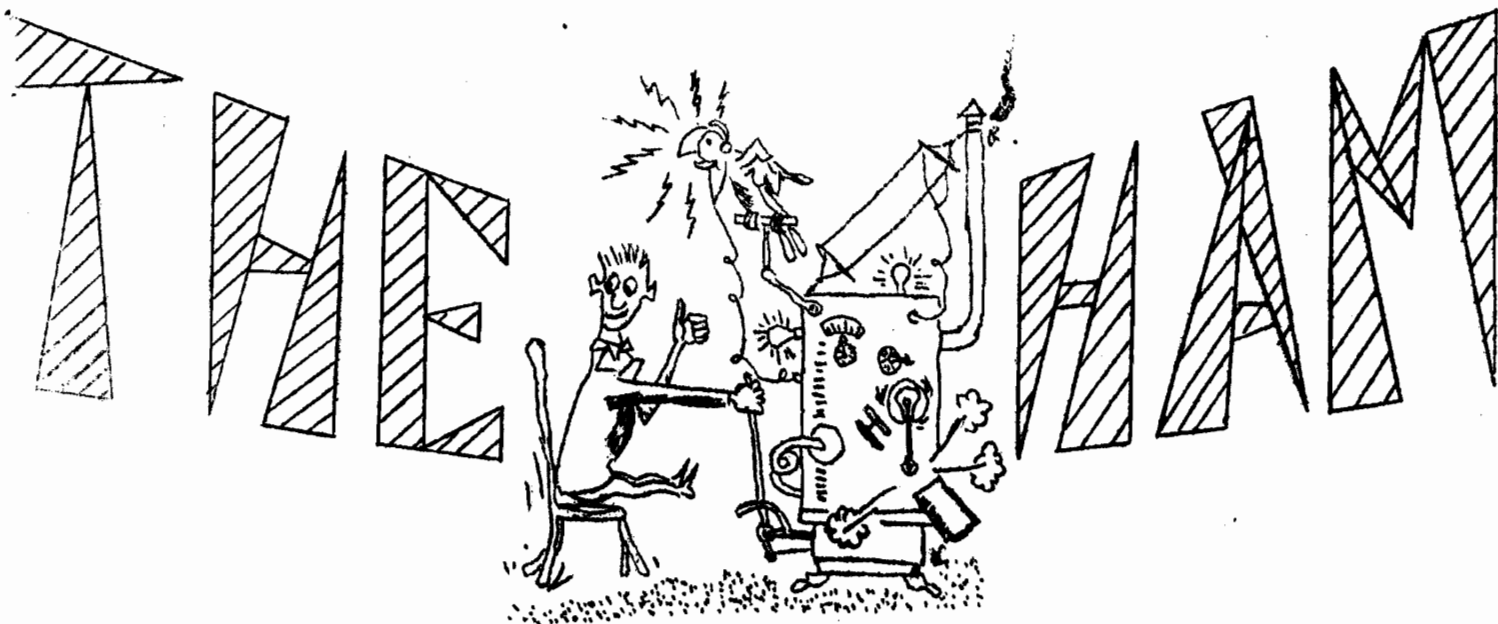


THE BI-TERMINAL MAGAZINE OF THE BRADFORD GRAMMAR SCHOOL AMATEUR RADIO CLUB



Published on the Wednesday after the first Sunday of each half-term. Articles for publication should be addressed to reach the Editor not later than 4 weeks before the date of publication.

Volume 1 Number 1

Wednesday, 25 SEP 1957

Editor: J. P. Stott.

Assistant Editors: R. L. Hodgson;
D. Noble;
A. M. Pomfret.

THE BRADFORD GRAMMAR SCHOOL AMATEUR RADIO CLUB,
THE GRAMMAR SCHOOL,
BRADFORD, 9

During the last few weeks I have been busy collecting information about the activities of local amateurs and listeners and other items of interest. In each forthcoming issue, I will be giving my bulletin as a regular feature of the magazine.

Firstly, we have news of two strange operating shacks; a caravan and a barge. During the summer holidays G3CMJ was heard from a caravan in Scotland under the call-sign GM3CMJ/P. He was worked by David G3KEP, of Cottingley, four times in one week; in Perth, Sutherland, Ross and Cromarty, and finally in Nairn. G3KEP is naturally delighted with this chance to work some of the rarer Scottish counties. G3JYH also got the roving spirit and moved a 30ft. Dutch sailing barge from Selby to Lymm, Cheshire, via the Aire and Calder Navigation and the Leeds-Liverpool canals, through Knottingley, Leeds, Skipton, Burnley and Wigan.

Now some news from the local amateurs. G3KEP has been on the air from several places in Shipley, Baildon and Heaton, and has been very busy entertaining some of the local listeners at his QTH, and constructing several additions to his station. His portable transmitter/receiver uses a Clapp VFO with a 12AU7, a 6BW7 BA and a 6BQ5 PA with pi-network output. The receiver section uses a 6BW7 RF amp., a 6BW7 detector and the receiver output and combined modulator are a 6AM6 and a 6BQ5. Hoising choke modulation is employed. He also operated from Filey last Whitsuntide. (N.B., no Mullard valve equivalents given here - see valve book !)

G3KLZ and G3LQJ of Heaton are still very active when time permits. Ron, G3LQJ, has been having trouble with his modulation, but has almost overcome his difficulties. Duncan, G3KLZ is trying to press ahead with the TV station project, but is short of coal. Cheques to:- D. Enoch Esq., 86, Heaton Park Drive, Heaton, Bradford, G.

John Stott of Baildon blew all nine valves in his transmitter/receiver recently with 100 volts through 6.3 volt heaters. He has managed to replace most of them, but would be glad of assistance. What price an 807 ?

My ancient receiver still gives me much to worry about, but even as I write, help is forthcoming. I hope to be able to use it in my early days on top band.

A Russian station, UA3MIR, has figured in local activity recently. G3INW of Eccleshill tells us that an acquaintance of his has access to the station, and he managed to contact UA3MIR every night for a week on 20 metres. It is rumored that the letters 'MIR' stand for friendship and goodwill.

The successes of recent candidates who sat the City & Guild's Radio Amateurs' Examination are announced elsewhere in this issue.

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B.G.S. AMATEUR RADIO CLUB HELP-OUT SERVICE (Advertising Manager -
David Noble)

Members wishing to use this service should obtain a form from D. Noble

2d. per line (6 words)

FOR sale, EF9, ECH3, offers please-
A. M. Pomfret.

SP61, 1/6; magic eye, what offers?
- D. Noble.

HOLES made to order, valve-holder
holes 3d., other round holes 2d.,
shaped 1/- - J. P. Stott.

6Y6 required - state price, age,
and condition - R. L. Hodgson.

SLOW Morse is radiated on 1860 kc/s.
every Friday evening from 2130 to
2200 hours local time by G3INW, G3KEP,
G3KLZ or G3KSS. Reports welcomed.

JOIN the Bradford Amateur Radio
Society - 5/- per year. The next
meeting is on 24th September.
Apply for Syllabus from G3KEP,
27, Woodlands Grove, Cottingley.

EDITORIAL

Hullo to all of you who have purchased this first issue of the HAM. We hope that you will consider it worth-while and come back for more.

The Ham hopes to fulfill the aims of the B.G.S. Amateur Radio Club by bringing even closer together all members of the school interested in radio. It will provide a means for you to pass on any useful tips you have, to learn those of others and to advertise your wants or surplus goods.

Suggestions and contributions for the next issue will be welcomed by any member of the staff up to four weeks before the date of publication. They can be on any subject as we want a broad outlook, but should not exceed one side of Foolscap in length. Please make an effort and contribute something as we want this to be YOUR magazine.

The contents of The Ham will include: a beginners' series; Club News; a competition and an Advertisement section. That leaves half the magazine for articles submitted by readers.

All technical enquiries concerning any article should be addressed to the author, but any member of the staff will be glad to help with any problem you may have.

For future issues of The Ham, readers are asked to place orders for their copy, as copies may not be available if unordered. The Ham is also available at subscription rates of 1/- per term (2 issues), or 3/- per year (6 issues). The subscription rate must, of course, be paid with order.

You may wonder at the length of this Editorial, but it is only because we have no Readers' Letters to fill the space this time. In future you will have to endure all this drivel from me.

Yours hamfully,

John P. Stett.

EDITOR.

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RST HINTS FOR SHORT-WAVE LISTENERS

by Andrew M. Pomfret

Hullo listeners! (and I quote from the Overseas Service of the B.B.C.) I hope many of you have been spending your time listening on the amateur bands, and you will no doubt wish to add another QSL card to your string. Don't forget to send those amateurs a neat card yourself giving all the details about the station you heard to that station, so that he can check that you really have heard him. And don't forget to include an 'RST' report. For those who have forgotten what the particular members use, here is a reminder,

R or Readability:-

- R5 I didn't miss a single word; R4 I must listen more carefully;
- R3 (For GM's who speak English) I can never understand these Scottish accents;
- R2 Speak up! (More Mod.: technical note; R1 (For GM's, GW's, GI's, GD's, and EI's who converse in Gaelic, Welsh, Manx, or Erse) Speak English!

S or Signal Strength:-

- S9 I would like a QSL card, please. OR You have bent my S-meter needle;
- S8 S9 really, but need you run 500 watts? S7 Take it or leave it; it's not my fault;
- S6 I've got one of your QSL cards already; S5 I do not want a QSL card;
- S4 If you will let the XYL hang her washing on the aerial;
- S3 Blimey, mate, what's your antenna, if any?
- S2 Try HT on the PA, not just the VFO; S1 I can't hear you at all, but I know you're there because G---- said so.

A.M.P.

Before a person can obtain a licence to operate an Amateur Radio station he must be able to satisfy the appropriate authorities that he is able to send and receive the Morse code at a speed of twelve words per minute. This regulation is rigidly enforced by the British Post Office in accordance with International Treaty obligations. The object is to ensure that a person in charge of an amateur station is in a position to read instructions sent to him in Morse by a Government station.

International Morse code is common to all countries of the world, and communication by this system of short and long sounds is understood irrespective of race or native tongue.

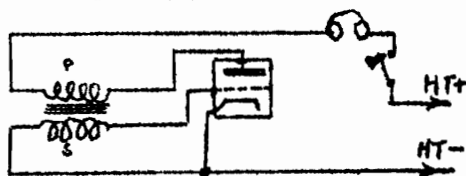
Learning the code is like learning a new language because, like a language, it is made up of sounds. For that reason, every effort should be made to think of the letters and numerals as sound combinations. Any visual impression the reader may have should be banished immediately. The Morse code is rhythmic sound. Take the letter R for instance. In Morse the sound combination is di-dah-dit with no space between di and dah or between dah and dit. For the sake of rhythm it is easier to make the last "di" into "dit".

There are several ways of memorising these sound equivalents. One is to learn all the letters consisting of short sounds, i.e., E, I, S and H and then the long sounds such as T, M, and O. Another method, which is probably as good as any is to learn five letters a day until Z is reached. When the various sound combinations have been mastered and before attempting to read the code, it is a good plan to spend a week or two spelling out words on hoardings, names on shops and car registration numbers. This can be done at any time by repeating quietly the equivalent sound for each letter or numeral. It is best to concentrate on letters which you find difficult to memorise. Such letters should be repeated over and over again. Do not worry about speed - that will come later.

Once you have thoroughly mastered the sound combinations and can relate them to the appropriate letters and numerals without hesitation, you require assistance from someone able to send Morse correctly. Fifteen minutes reading practice each day is sufficient to start with. You will be surprised how quickly you progress. However, do not become discouraged if you seem to stick at one speed for a long time; it is a common difficulty when learning. Do not try to read Morse sent by another beginner because he has yet to learn the rhythm of the letters. If you miss a letter while copying, forget it and go straight on, otherwise you will find you have missed several following characters which you could have copied.

Finally, take the characters down in longhand from the beginning. This will avoid the awkward period which may otherwise occur when changing over from block capitals to normal writing. It is not easy to print at any great speed.

The reader may wonder why nothing has yet been said about learning to send Morse. The answer is quite simple; it is far better to concentrate on becoming reasonably proficient at receiving before attempting to master the art of sending. A simple valve oscillator circuit, which produces a note in headphones similar to that heard from a radio receiver, is illustrated below.



The most important factor in producing well formed Morse characters is the key. It is best to purchase a good quality key because weight and balance make all the difference between good and bad sending. Stick to one you finally choose for learning the code because it will eventually be the one with which you key your transmitter when you obtain your licence.

The method of holding the knob of the key is important. Do not grasp it tightly but rather let the hand rest lightly upon it with the thumb against the left-hand side. The first and second fingers should be bent a little to hold the middle and right-hand side while the other fingers remain clear. Try to send evenly with a steady flexing of the wrist. Holding the knob too firmly will result in jerky sending, as will a tightly adjusted key spring. Use a moderate tension at first, then, as you progress, gradually reduce it to the tension you find most suitable.

The space between the key contacts is also critical. A gap of one-sixteenth of an inch is sufficient for slow and medium sending and one-thirty-second of an inch for

Do not try to send quickly but endeavour to develop a rhythm. Watch your spacing and speed will come with practice. Good sending and receiving is merely the outcome of patience and practise; there is no easy way!

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RADIO AMATEURS' EXAMINATION

Last year's total pass percentage for the Radio Amateurs' Examination was 88% against 67% this year. This shows that the paper, this year, was far more difficult than that of 1956. Nevertheless, the percentage pass of B.G.S. candidates was much higher this year. I would like, therefore, to congratulate the following upon their successful examination result:-

Peter J. Barowitz; Richard L. Hodgson; David Noble; Andrew M. Pomfret; John P. Stott; & Peter E. Gillett (of B.V.G.S.).

Year	Total pass percentage	B.G.S. pass percentage
1956	88 %	80 %
1957	67 %	100 %

For boys wishing to take the Examination next year, we have below a copy of the latest syllabus.

Part II

1. Electricity and Magnetism

The elementary theory of electricity; conductors and insulators; units including power; Ohm's Law; resistances in series and parallel.

Permanent magnets and electro-magnets and their uses in radio.

Self and mutual inductance; types of inductances used in receiving and transmitting circuits. Capacitance. Capacitors in series and parallel; construction of capacitors; electrolytic capacitors.

2. Radio Principles (Elementary Treatment Only)

Alternating currents; series and parallel A.C. circuits incorporating inductance, capacitance and resistance; impedance; resonance; acceptor and rejector circuits; coupled circuits.

3. Propagation

Radio waves; wavelength, frequency, velocity; nature and propagation of radio waves; fading and its connection with frequency, length of path.

4. Thermionic Valves and Circuits

Construction of valves; thermionic emission; principles and characteristics of diode and triode valves. Multi-electrode valves.

Use of valves; amplification, oscillation, frequency-changing; signal detection; the power stage; power rectification. Power packs for h.t. supply; smoothing.

5. Radio Receivers

The essentials of a receiver. Typical receivers; principles and operation of T.R.F., superheterodyne and super-regenerative receivers. C.W. reception. Interference caused by receivers.

6. Aerials.

Simple types of receiving and transmitting aerials. Transmission lines. Simple directional aerials. Aerial couplings to lines and transmitters.

7. Low Power Transmitters Part I

Oscillator circuits; frequency stability; use of quartz crystal to control oscillators; frequency multipliers; power amplifiers. Method of amplitude modulation and keying.

8. Transmitter Interference

Avoidance of harmonic radiation and interference by shock excitation; use of key-click filters and other means of preventing spurious emissions. Dangers of overmodulation. Use of wavetraps and other devices for reducing interference with nearby radio and television receivers.

9. Measurements

Measurements of frequency and simple frequency meters (including crystal-controlled types). Use of verniers and other interpolation methods. Artificial aeriels and their use for lining-up transmitters. Measurement of anode D.C. current and voltage.

10. Licence Conditions

Conditions laid down by H.M. Postmaster-General for the Amateur (Sound) licence, covering the purpose for which the transmitters may be used; types of signal permissible; types of emission; power, frequency control and measurement; avoidance of interference to other stations; qualifications of operators; log-keeping; use of call-signs.

David M. Pratt.

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A 3-valve Mains T.R.F. Receiver
by Richard L. Hodgson

Most of us, after we have learnt the basic principles of radio and have had some constructional experience want to build a more advanced receiver, not too difficult or costly, with which one can listen to foreign broadcast stations or more distant amateurs. The circuit and suggested layout for such a receiver are shown below.

The signal is selected and amplified by the R.F. Amplifier, and then passed to the detector where it is changed into audio frequency signal to be amplified to work a speaker by the A.F. amplifier, and these are easily obtainable and quite cheap.

All receivers lose efficiency if they are wired up with long leads and haphazard construction, and this is no exception. You should try to build it as compact as possible, even though it is difficult to work in a small space with a hot soldering iron. The size of the chassis should be as small as you think your construction capabilities will allow.

A suggested layout is shown but it is only to give you a rough idea of the arrangement. There are, however, one or two important things to remember. Coils should be screened to prevent interaction; be as accurate as possible with component values. Take care over the polarity of electrolytic capacitors, and always check wiring thoroughly.

Coils for this receiver can be wound using coil data found in most reference books, or bought from a firm like Denco. The tuning condensers must be ganged, and if there are trimming condensers with them, these should be adjusted to give maximum signal strength, which will occur when the values are exactly the same. So that the stations can be tuned in accurately, a fine tuning condenser is also employed. A 500 pF is used to provide reaction so that C.W. (Morse) signals can be received.

With a good aerial, speaker results should be adequate, but if 'phones are used T1 should be replaced by a 10 H, 20 mA choke. The better the aerial the better results, and if you are going to erect an aerial for this receiver, and not rely on a piece of bell flex dangling out of the window, (which will get you no-where),

bear these points in mind:

Make it as high and long as possible, and of thick multi-strand wire. Insulate it from supports with two or three egg insulators, or similar methods, and use an insulated lead-in wire.

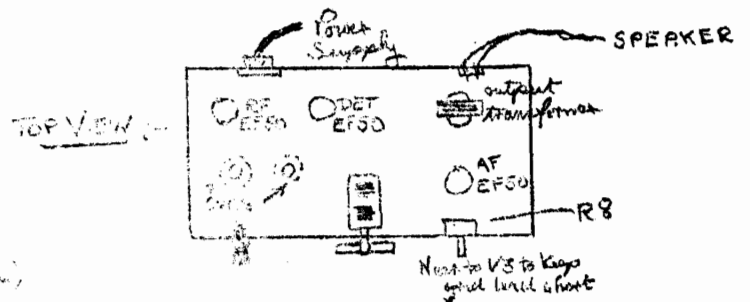
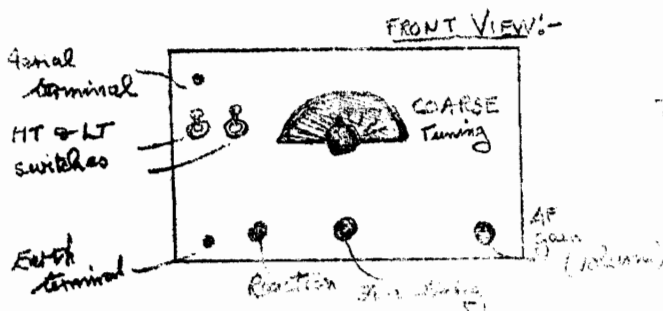
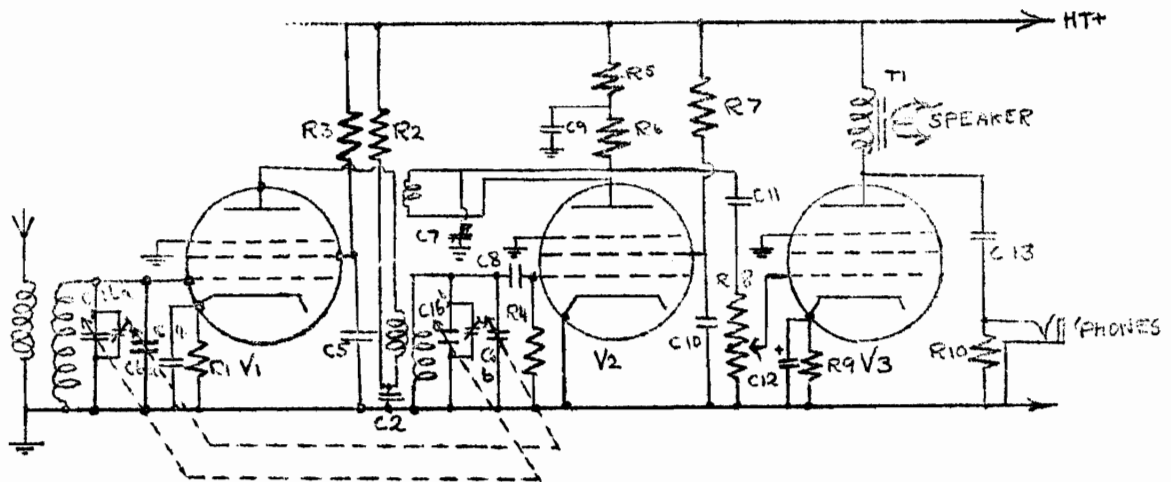
Operation: Tune with the coarse condenser (bandspread) to as near as possible to the desired station, and then tune, with the detector stage only just oscillating, "zero Beat" with the station. This is when the receiver is tuned in exactly by the stations frequency; then turn down the reaction and the station is audible at its maximum strength. This is the best way of using your receiver to its full advantage.

The power required to run the receiver is 6.3 volts @ 1 amp., and 100-250 volts @ 40 mA. The power supply is best built separate, and then it can be used for other applications. A valveholder and the base of a dud valve could be used as connectors. The circuit of construction of a power supply suitable for this receiver is described by David Noble on page 8.

COMPONENT LIST

- C1a,b - 350 uuF ganged variable;
- C2,4,5,9,10,11 - .01 uF;
- C3,8 - .0001 uF;
- C6a,b - 50 uuF ganged variable;
- C7 - 500 uuF variable;
- C12 - 50 uF electrolytic;
- C13 - .05 uF;
- R1 - 180 ohms;
- R2 - 470 ohms;
- R3 - 33,000 ohms;
- R4 - 1 Meg. ohm;
- R5,6 - 10,000 ohms;
- R7 - 50,000 ohms;
- R8 - 500,000 ohms variable (log);
- R9 - 250 ohms;
- R10 - 100,000 ohms;
- RFC - Radio Frequency Choke;
- T1 - Speaker Transformer;
- V1,2,3 - EF50 (VR91).

Also required: Chassis; and paxolin sheet for front panel; valveholders; coils and holders; knobs; wire; solder; nuts, bolts. EF50 Base connections: 1 - Heater; 2 - Screen Grid; 3 - Anode; 4 - suppressor grid; 5 - internal shield; 6 - Cathode; 7 - control grid; 8 - internal shield; 9 - Heater.



BEGINNERS' SERIES by John P. Stott
Part I - The Crystal Set

The Crystal Set is the simplest form of Radio set used. The condenser and crystal can be purchased or borrowed from the Radio Club. The coil you make yourself. It consists of sixty turns of copper wire wound round a cylindrical former - an old toilet roll will do very well. The wire can be purchased from the Radio Club.

You will also require: a board not less than 4" by 3" and a thin piece of hard-board or plywood of the same size; and two double sockets (from the Radio Club); and a pair of headphones.

One end of the coil is connected to one side of the condenser and the other end to the other side of the condenser. One side of the condenser goes to Earth, and the other to the Aerial. The red end of the crystal goes to the Aerial. The headphones are connected from the black end of the crystal to Earth. The diagrams show the actual layout.

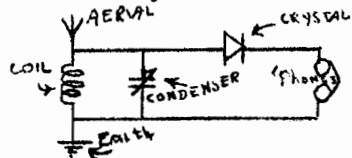


Fig. i. - Circuit Diagram

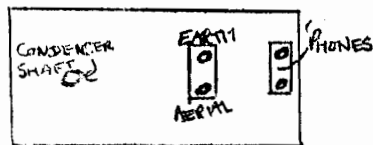


Fig. ii. - Top View

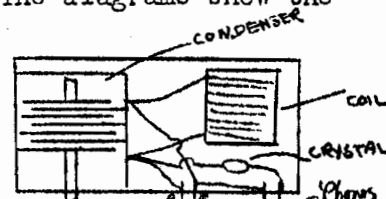


Fig. iii. - Side View

The Aerial should be an outside one and as long as possible. You should also, if there is no water pipe near to use as earth, bury a metal object deep down in the garden, avoiding your father's roses of course, and connect it to the Earth terminal. That's all, good luck & good listening.

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A GENERAL-PURPOSE POWER SUPPLY by David Noble

The usual circuit for a power supply is shown in fig. 1. The transformer has a mains primary, a 6.3 volt secondary, another L.T. secondary to suit the rectifier valve, and an H.T. winding between 200-0-200 v & 300-0-300 v. The current rating of the L.T. secondary should be at least 2 amps; the H.T. 60-100 mA.

The mains input should, for safety, be of good quality flex, and pass through fuses rated at 1 amp. Suitable cartridge fuses are readily obtainable. A double-pole on/off switch is shown; on switching off, the mains is completely disconnected.

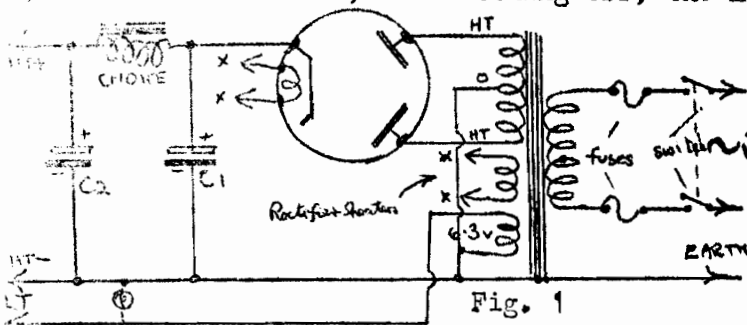


Fig. 1

Remember to earth the chassis to the 3rd pin. Any rectifier valve capable of carrying the required H.T. current and having a heater to match the transformer may be used.

If a 10-20 H choke is used, then C1 & C2 may be 8 mfd, 350 v.d.c. wkg., although better smoothing is obtained with 16, 32, or even 50 mfd. condensers. For cheapness, a 1 K, 4 W wirewound resistor may be used instead of a choke,

but much higher value condensers are required. The field winding of a mains energised may be used as a choke if one is available.

The size and shape of the chassis depend entirely on the actual components used in the unit. While the output may be taken from a nice, shiny row of brass terminals, it requires only a shock or two from the H.T. terminal to set the family against your hobby; the electrolytics can retain their charge for appreciable periods. It is therefore, suggested that the standard octal plugs and sockets, as used by many local amateurs & short-wave listeners, be used. The connections are shown in Fig. 2. It is important to ensure that in normal operation, it is impossible to receive a shock from the unit; a pilot lamp may be installed as shown.

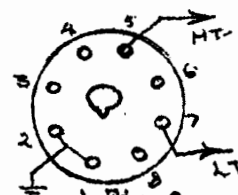


Fig. 2

GOOD OPERATING TIPS by David M. Pratt

1. Never net onto a specific frequency with the P.A. switched on. Arrange your transmitter so that the V.F.O. alone can be switched on.
2. On C.W., do not call CQ more than four times without giving your call-sign. The number of times the sequence should be repeated depends on the state of the band in use; but never should a CQ call exceed two minutes.
3. Do not send any faster than the speed at which you can receive solidly. After sending CQ, always send at the same speed as the replying station calls you at.
4. Do not send R when you have received only part of a transmission; use instead "OK PART", "OK MOST", etc. Once you have sent R do not repeat back what has just been sent to prove you have copied it.

5. OBEY THE EUROPEAN BAND PLAN

The primary purpose of the Plan is to protect those who use c.w. telegraphy. Prior to its introduction c.w. signals radiated by low-power stations were often subjected to very severe interference by high power telephony transmissions.

3500 - 3600 kc/s	=	Telegraphy only
3600 - 3800 kc/s	=	Telephony only
7000 - 7050 kc/s	=	Telegraphy only
7050 - 7150 kc/s	=	Telegraphy & Telephony
14000 - 14100 kc/s	=	Telegraphy only
14100 - 14350 kc/s	=	Telegraphy & Telephony
21000 - 21150 kc/s	=	Telegraphy only
21150 - 21450 kc/s	=	Telegraphy & Telephony
28000 - 28200 kc/s	=	Telegraphy only
28200 - 30000 kc/s	=	Telegraphy & Telephony

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AMATEUR RADIO by John P. Stott

Radio Amateurs (or 'Hams') are men and women who are licensed to experiment with radio. There are Hams in almost every country in the world.

Hams are often social outcasts, partly because society will not always accept the more fanatical ones, but also because they will not accept society. This is not worrying, however, because it is a full time job drinking cups of tea (or lemonade) with the other hams in the district.

There are no political, colour or nationality bars in Amateur Radio, and it brings together many thousands of people of all nationalities. One reason for this is that it enables them to converse without expensive 'phone bills; but for some reason, Hams are, amongst fellow hams, far friendlier and helpful than most people.

Hams are, however, exploited by wicked PMG's and the like who let them play with any disused wavelengths, then take them away from the Hams if they prove of any use.

One has only to listen on any of the Amateur bands to see what queer characters some of them are. They will talk for hours about their ailments, the weather, and other hams. At other times they go into learned discussions on sundry technical matters.

To listen to their Morse contacts one has two codes to master, firstly the Morse code, then the Ham's own code, which is just as bad. A common example is:

GE OM TNX FER CL UR SIGS RST 579

which a Ham of any nationality knows, means: 'Good evening, old man. Thank you for the call. Your signals are perfectly readable and moderately strong with a pure note'.

That example covers only a few symbols in one of the codes. There is also the 'Q' code, which is rather different. These codes have two uses. Firstly, they are far shorter for telegraphy, and secondly, people of all nationalities can understand them.

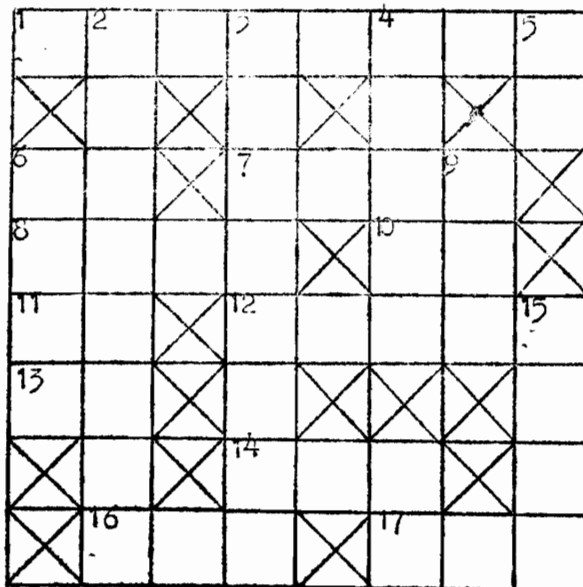
As with all technical professions and hobbies, Amateur radio has a slang of its own. Together with the more official codes, this can make conversations between Hams seem all nonsense. Many of them are of course, because one often forgets what the other chap has said and thus you play for time in which to remember.

If, after this, you are not convinced that you are associating with a race of mad-men, then you were probably meant to be a Ham, and the best of luck to you, you'll need it!

CROSSWORD

- Across:**
1. The most important piece of equipment in a 'Ham Shack'. (8);
 2. A Latin preposition, which also comes in a cq call. (2);
 7. The other kind of current (also a man's name). (4);
 8. The first name of a well-known B.B.C. conductor. (4);
 10. The ablative singular of "is, ea, id". (2);
 11. When giving an example, these letters save you ink. (2);
 12. They are very submissive when "tickled". (5);
 13. A type of putout circuit of a transmitter. (2);
 14. It's an — wind that blows no-one any good. (3);
 16. Another piece of latin; an abbreviation used when you're tired of stating facts. (5);
 17. You're supposed to do this after 3 score and 10 years. (3).

- Down:**
2. A transmitter does this with an Aerial. (8);
 3. Adj. from a word which describes an invisible power. (8);
 4. A television transmitter is modulated with this. (5);
 5. The amateur abbreviation for a receiver. (2);
 6. Your modulation should not be too —. (4);
 9. It describes the 2nd. person singular or Plural. (3);
 15. It hasn't stopped yet, and probably never will. (4).



(Solution next issue)

L A T E N E W S

Congratulations to A. F. Fell for obtaining his Amateur Transmitting Licence. He is now active on Top Band under the call-sign: G3LXF.

Also, congratulations to : Peter J. Barowitz; Richard L. Hodgson; David Noble; Andrew M. Pomfret; and John P. Stott for their successful Morse Test result. They all hope to be on the air within the next fortnight.

D.M.P.