THE AUSTRALASIAN

Radio World

Registered at the G.P.O., Sydney, for transmission by post as a periodical.

1/-

VOL. 13 ..... NO. 2

JULY 18, 1948

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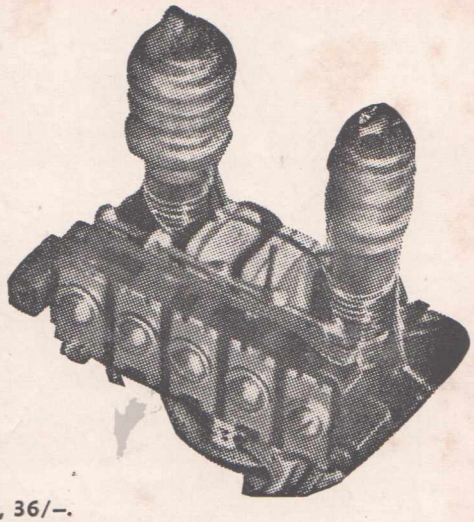
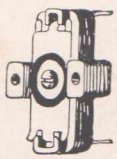
COMPONENTS





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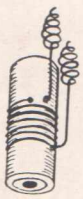

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Devoted entirely to Technical Radio

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ALL-WAVE ALL-WORLD DX NEWS

PUBLISHED BY THE PROPRIETOR—
A. G. HULL,
Balcombe St., Mornington, Vic.
Phone M'ton 344.

Technical Editor—
PAUL STEVENS
21 Fletcher's Av., Bondi, N.S.W.
Phone FW 6157.

Short-wave Editor—
L. J. KEAST
7 Fitzgerald Rd., Ermington, N.S.W.
Phone WL 1101.

Ham Notes by—
DON B. KNOCK (VK2NO)
43 Yanko Av., Waverley, N.S.W.

ADVERTISING REPRESENTATIVES—
In N.S.W.: Amalgamated Publications Pty. Ltd., 83 Pitt St., Sydney. Phone B 1077.

In Victoria: R. L. McKillop, Regency Advertising Contractors, 60 Market St., Melbourne. Phone M 1279.

In Queensland: John Bristoe, Box 82, Maryborough, Q.

In New Zealand: H. Barnes & Co., 4 Boulcott Terrace, Wellington.

In England: Anglo Overseas Press Ltd., 168 Regent St., London, W1.

Distributed throughout the World by Gordon & Gotch (A/asia) Ltd.

SUBSCRIPTION RATES—
12 issues 10/6
24 issues £1
To N.Z. and Overseas:
12 issues 12/-
POST FREE

Address for all correspondence—
AUSTRALASIAN RADIO WORLD
Box 13, Mornington, Vic.

VOL. 13 **JULY, 1948** **No. 2**

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EDITORIAL

I must have been feeling glum when I wrote last month's editorial. Since then I have been going over the accounts and things aren't quite so black as I expected. It now seems that there will be no need to increase our price, in spite of increased printing and block costs. Just a little more advertising support and it will be possible to turn out improved issues at our present price.

First step in the right direction has been the appointment of Paul Stevens as Technical Editor and my personal representative in Sydney. The fine articles which Mr. Stevens has contributed over the past six years have been widely appreciated and he can be counted on to do even better work in this direction in future. He is also a keen businessman and will soon get things organised so that the issues will be out on their due date.

It may take a while to get into top gear, but the first of the improved issues should be the September issue, which will take the form of a special "Data & Handbook Issue" which will contain lots of information you'll want to keep handy, such as colour codes for different brands of coils, specifications of components available on the market at present, and so on.

Another bright prospect has been provided by some experimenting which has been going on over the past few weeks. It looks as though I have in hand the logical successor to the old "1933 Standard," the most successful set I ever designed. Further testing is being made to probe every possibility, but so far it has shown nothing but the greatest possibilities.

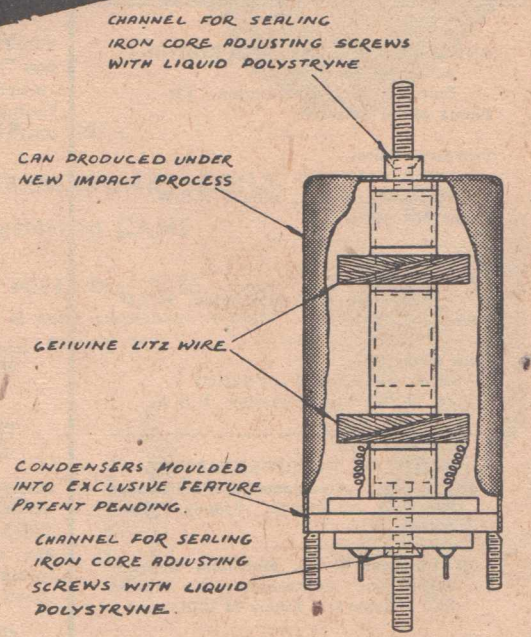
—A. G. HULL.

R.C.S. develops 6 new I.F.'s

Patents Pending on

DESIGN ADVANCEMENT

The new F.C.S. I.F.'s have the amazing new R.C.S. development (over which patents are pending) . . . condensers moulded into the polystrene base. To enable them to remain constant under all conditions, the condensers are first dried out under infra-red rays, thereby expelling moisture and raising their Q. They are then moulded into the polystrene former base, an exclusive R.C.S. patented feature, where they are beyond the reach of climatic variations. The aluminium cans, too, are now pressed out under a new "impact" process.



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DRIFT PREVENTED BY CONDENSERS ACTUALLY MOULDED INTO POLYSTRENE BASE

Sealing cavity in former at top and bottom (where iron core screw emerges). Condensers moulded into base.

Price 13/- Retail

R.C.S. I.F. SELECTION CHART

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IF170	IF171		Standard	Standard	Good
IF172	IF171		Good	Average	Good
IF172	IF173		Good	Sharp	Average
IF170	IF173		Standard	Very Sharp	Fair
IF174	IF174	IF171	High	Sharp	Good
IF168	IF169		High	Good	Fair
(Portable)					
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(A/C Mantle)					

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BUILDING BOX BAFFLES

Practical advice on the construction of vented loud-speaker enclosure.

By

MAURICE H. WILLIS

IN the past many articles have been published in many technical magazines including "The Radio World," but few have given actual constructional details. Many moons ago I read with great interest an article on the vented box by Charlie Mutton, and his article, together with many others have been tried and I give you my findings. Before I actually give constructional details here are a few notes about other types of baffles.

As most readers are probably aware, the loud speaker is rather a very poor instrument as far as efficiency goes and requires a baffle of the flat type far beyond the requirements of a modern home. The folded Horn type, is one of the most efficient and requires no mean bit of carpentry and joinery to construct. These are made up commercially and used for talkie work, and used to house one or more speaker usually reproducing the bass only. Next on the list is the "acoustic labyrinth." In effect the acoustic labyrinth consists of a long pipe enclosing the back of the speaker; its length being such that it provides very heavy acoustic leading at the resonant frequency of the cone and so damps out the resonance. The pipe is often constructed by placing a series of baffles in the speaker cabinet—hence the name labyrinth. If a speaker so treated is compared with one without a labyrinth, the clarity and improved performance which results from such resonant frequency damping is most pleasingly apparent.

The folded horn occupies less space and the shape of the cross section widely modified from circular without a serious reduction in efficiency, this in turn provided a much more compact unit occupying much less space than the Exponential Horn.

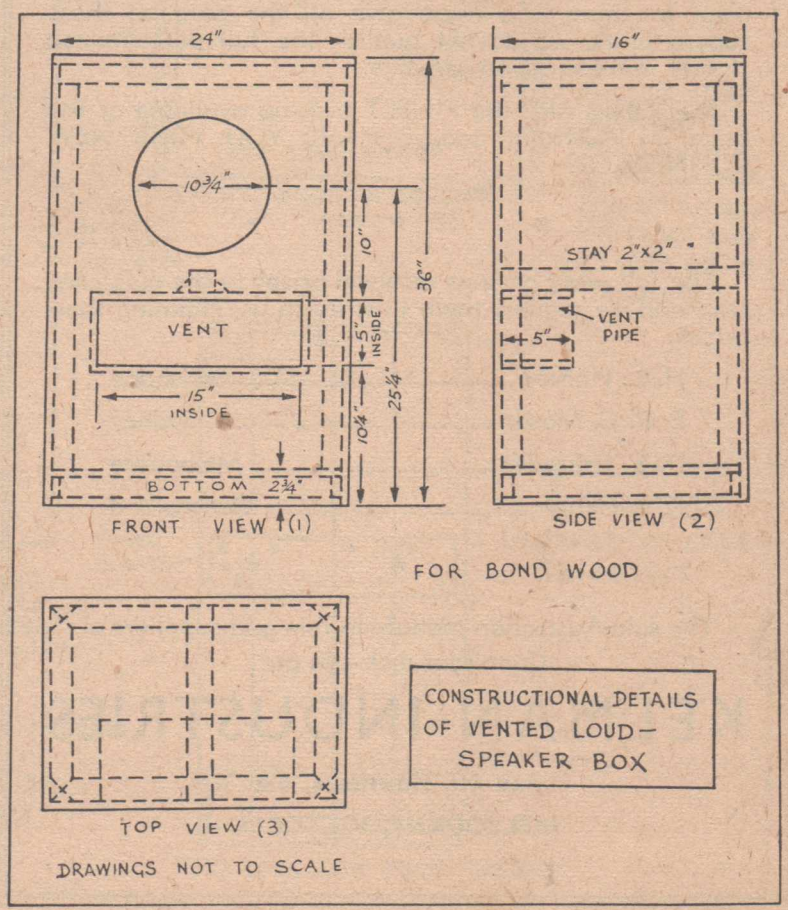
The design of a vented baffle is for an ordinary 12 inch loud speaker such as an Amplion 12P64, Rola G12 either electro or PM., Goodmans etc. Most of the speakers on the market today have cone resonances between 100 to 55 C.P.S. There has not been any provision to make accurate adjustment for the size of the baffle Cabinet to suit cone resonance of the speaker used, as fortunately not critical as regards the dimensions of the baffle. While the impedance characteristic may not be perfectly symmetrical, the general improvements in performance of the whole bass those obtainable with ideal adjustments.

One way of avoiding the droppler effect (bass notes modulating the highs) is to use a high degree of negative feedback, or better still use two speakers, one for the highs and one for the bass, together with a filter network.

A while back in an issue of "Radiotronics," a publication of the "A. W. Valve Coy.," they featured a short article on a box baffle. It is, together with their information and with findings from experiments of my own, that this article is written.

Readers may think that the baffle of this type is a lot of trouble

(Continued on next page)



BAFFLES

(Continued)

but, let me assure readers, the trouble and time expended will more than repay you for the time taken.

Actually the heavier the wood used in the baffle the better, though ¾ inch wood would suffice. The timber used in mine is 5¼ ins. by 1⅛ ins. in flooring, which gives an effective thickness in the front of 2¼ ins.

Don't forget, when making the baffle, allow eight cubic feet on inside measurements, allowing extra room should lining be used, which, I recommend. Lining such as hair felt, canite, etc. is needed, especially if one speaker is used, otherwise the cabinet will reflect the high frequency waves and spoil the whole effect. Remember that plenty of screws are required and on these, rest the final result, as any vibration is as bad as resonances.

On drawings 1, 2, and 3, are the actual measurements for this box and should be kept as near as possible. The materials, ah? Who said that 1 in. bond wood was easy to get? Perhaps some readers are lucky to have on hand some ⅞ or 1 in. bond wood. If so go ahead and use it, but, if not, you will probably have to use flooring or anything you have on hand. Whether you are using either of the above, give the lot a good coat of primer, as this will help to keep out the moisture, especially kiln dried timber. When cramping the flooring

A REAL POWER AMPLIFIER

In an advertisement in the English "Electronic Engineering" the Philips Electrical Limited offers a really powerful power amplifier. It has, according to the advertisement, a special low-distortion direct-coupled driver stage, push-pull output and an undistorted power output of one thousand watts, and it isn't a mis-print either! Another advertisement in the same publication offers the Enock pick-up for gramophone record reproduction at £36/15/- and that isn't a mis-print either. It has a polished diamond stylus.

don't cramp it too tight, otherwise the first moist day, the lot will bow in or out. Just tighten it then slacken it off a little, so that the joins are closed.

In drawing "A," you will notice that the front boards run vertically with two screws in each place, where the flooring behind crosses.

The easiest way to put in the screws for those who haven't done much in this line, is to drill the hole the same size as the screw, about ¾ of its length. A little fat or grease will help considerably in the screwing in of the screws. To make sure that you don't drill the holes for the screws too shallow or deep, put the drill through a piece of wood, leaving the length protruding from the wood.

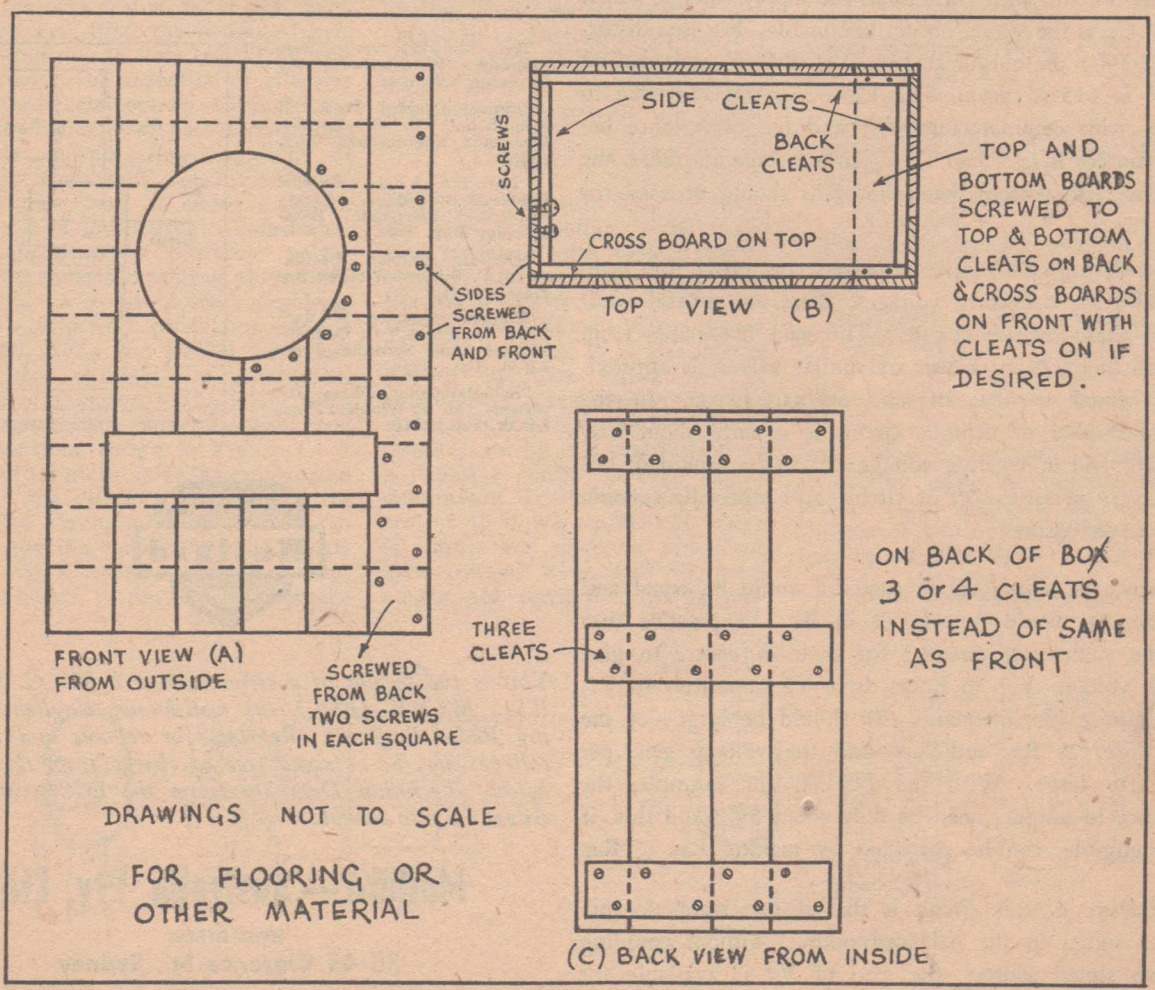
Drawing "B" shows the box looking down from the top. When making the back and front, leave some room on the cleats and cross boards to screw in the sides from the back and front. Drawing "C" shows the cleats on the inside of the sides and back. When you have the back, front and two sides assembled, screw the bottom and top on. Don't forget to put the speaker in before finally assembling. The voice coil or matching transformer leads can terminate on a socket on the outside of the box. It is a good idea to screw a grill over the front of the speaker opening to prevent accidental damage to the cone. To fix the canite, use screws with washers or tacks for the furfell, etc. If you have some sash cramps, use some glue to fix the joins and cramp leaving overnight, then prime both sides. The main thing is to keep the box as airtight as possible, as there is a great air-pressure generated during loud passages of music. Perhaps I had better mention not to paint the canite or other lining, otherwise this will completely ruin the sound properties.

In the set-up of mine. I use a 8P83 for the highs, 12S64 for the bass, both of which are amplion per mag speakers; together with Swann & Swales filter network. The audio amplifier is the FFR 45 watt job. It is better if possible to use damping resistors across the voice coils, as this gives excellent damping on the cones. This, which I use on the filter network, still gives me an effective output of over 35 watts, which, as you can imagine is never used, except on rare occasions.

For any further information you may want, don't hesitate to get in touch with me as I will be only too happy to help you out.

Wishing you every success in screws and wood.

—Maurice H. Willis, "Glen View," Chaleyer St., Reservoir, N19. Phone: JU 3090.



VALVES AND THEIR APPLICATIONS

By M. G. SCROGGIE, B.Sc., M.I.E.E. (Eng.)

No. 2: Mullard TWIN TRIODE ECC32

THERE are quite a number of special circuits, such as multivibrators and push-pull drivers, that use a pair of similar triodes; for these purposes twin triodes usually save cost and space.

Each triode in the ECC32 is a normal type with an amplification factor of 32 and a plate resistance of 14,000 ohms. Used with a 0.1 M-ohm coupling, the voltage gain is nearly 30, and varies little with the supply voltage, which chiefly affects the signal output obtainable. For low distortion (2-3%) the output at 200 volts is 45 V peak, and at 400 V is 115 V peak. The ECC32 is not restricted to designs with common cathodes; and the capacitance between anodes is less than 1 pF. In a 2-stage amplifier, the grid pin farther from the heater pins should be used for input.

For driving push-pull amplifiers or providing symmetrical c.r.t. deflecting voltages, there are several well-known phase-inverter circuits. The gain obtainable from most of them, using a pair of similar valves, is approximately equal to that of one ordinary stage. In the cathode-coupled or Schmitt circuit it is only about half as much, and a negative voltage has to be provided; but it is a very versatile sort of circuit, and especially suitable for c.r.t. deflection.

Ideally, the signal anode currents would be equal and opposite, so would cancel out in R_c. In practice they must be sufficiently unequal for their *difference* to give enough voltage drop in R_c to drive V2 oppositely to V1. To minimise this inequality, R_c should be large—of the same order as R_{a1} and R_{a2}—and the voltage gain per stage also large. With the ECC32, for example, the difference in outputs need be only about 5%; and this, if not negligible, can be corrected by making $R_{a1} < R_{a2}$.

A feature of this circuit is that if one wants to mix another signal in the balanced output, without coupling the two signal sources, the grid of V2 is available for doing so.

It is obvious, too, that by coupling the anode of V2 to the grid of V1 it can be made to generate sustained oscillations, of a type depending on the couplings. If a 2-phase output is not needed, R_{a1} can be short-circuited. A very stable constant-frequency oscillator, using an untapped inductor, may be based on this arrangement, which is easily seen to be an earthed-grid triode driven by a cathode follower. Used as an amplifier, it is capable of covering a very wide frequency band.

The following are a few references to details of the foregoing schemes:

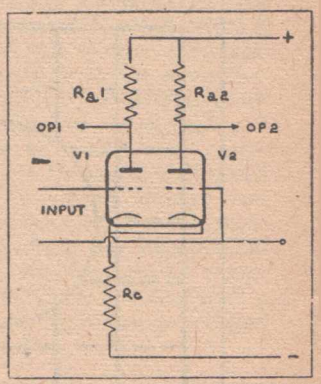
"Cathode-Coupled Push-Pull Amplifiers," O. S. Puckle; **Electronic Engineering, July, 1943.**

"The Cathode-Coupled Double-Triode Stage," Emrys Williams; **Electronic Engineering, May, 1944.**

"Cathode-Coupled Oscillators," F. Butler; **Wireless Engineer, 1944.**

"Cathode-Coupled Wide-Band Amplifiers," G. C. Szikai and A. C. Shroeder, **Proc. I.R.E., Oct., 1945.**

"Self-Balancing Phase Inverters," M. S. Wheeler, **Proc. I.R.E., Feb., 1946.**



BASIC CATHODE-COUPLED CIRCUIT

Mullard

This is the second of a series written by M. G. Scroggie, B.Sc., M.I.E.E. (Eng.), the well-known English Consulting Radio Engineer. Reprints for schools and technical colleges may be obtained free of charge from the address below. Technical Data Sheets on the ECC32 and other valves are also available.

USING H.F. PENTODES

Some notes on the application of latest Philips and Mullard high-gain valves

BECAUSE mainly of the release of large quantities of these valves through War Disposals sources, amateurs are making increasing use of the type EF50 valve and also the EF54 (until recently, known as the RL7). Very little application data has been available on these valves, other than the socket connections, voltages, etc., so that the information in this article should fill a long-felt want.

H.F. Pentodes

At high frequencies, ordinary valves function inefficiently for three inter-related reasons, which by now are sufficiently well known to the majority of radio engineers. They are, first, the increased grid loading due to time transit effects; secondly, the reduction of effective mutual conductance through the finite inductances possessed by the leads; thirdly, the magnitude of their equivalent noise resistance. To these may be added a fourth factor, of low mutual conductance, which prevents ordinary valves giving a useful degree of amplification. Answers to these problems were found in production of the EF50, EF54 and EFF51 (this latter not available in Australia). The best known is the EF50, with the structure, base diagram and dimensions shown in Figure 1. It is an all-glass valve, so constructed that the elements themselves are sealed through the glass base, to become the connecting pins. Leads to the electrodes are thus kept very short, so that their inductance is as small as possible. It is of single-ended construction, and uses a special base which is physically a little larger than the international octal base. It is a simple matter to mount a baffle shield across the socket in such a way that the grid-cathode circuit is on one side of the shield, and the plate circuit on the other. The valve is self-shielding, being provided with a complete external covering of aluminium which is connected internally to the two pins marked "S" on the base diagram. Additional shielding is provided by the aluminium locating spigot, which locks into place in the socket. The latter has a connecting lug which enables the spigot to be earthed independently to the baffle-shield, so that the spigot acts as a shield between grid and plate pins on the socket.

Complete Shielding

This type of construction enables the circuit shielding to be made very complete, with good effects on stability and gain. The EF50 is of the sharp cut-off type and for this reason conventional AVC cannot be used with it. It is possible to control its gain either by the variation of screen voltage (which method is very suitable for manual control) or by the application of a negative control voltage to the suppressor. The latter gives a control of 15 times, or 23.5 db, which is ample for effective automatic gain control when two or more stages are controlled. It is possible also to provide excellent A.G.C. by using a separate amplifier which controls the screen voltage of two or more stages. A feature of the EF50 is its low

(Continued on next page)

Electrical Characteristics EF50

Heater voltage: 6.3v.
Heater current: 0.3 amp.
Capacities:
- Grid-Plate: 0.003 mmfd.
- Input (valve heated): 10.0 mmfd.
- Output (valve heated): 5.3 mmfd.
- Grid-Heater: 0.01 mmfd.

Damping at 50 mC/s:
- Input resistance: 4000 ohms.
- Output resistance: 50,000 ohms.

Typical operating conditions:
- Gain controlled by suppressor grid.

Plate voltage: 250v.
Screen voltage: 250v.
Grid voltage: Neg. 2v.
Plate current: 10 mA.
Screen current: 3 mA.
Suppressor voltage: Zero (neg. 54v).
Mutual conductance: 6.5 mA/v 0.45 mA/v.
Plate resistance: 1 megohm.
Screen grid amplification factor: 75.
Equivalent noise resistance: 1400 ohms.

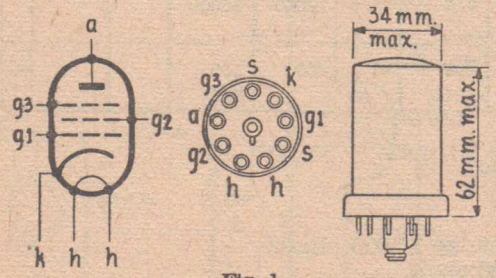


Fig. 1.

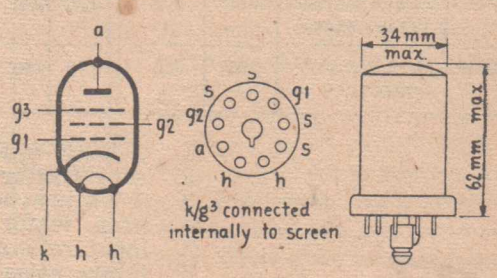


Fig. 2.

PENTODES

(Continued)

equivalent noise resistance of 1400 ohms, which is several times lower than that of normal RF pentodes used on lower frequencies. This, in conjunction with its high mutual conductance of 6.5 ma/volt, enables it to produce useful amplification at frequencies up to 150 mC/s.

The RL7

The next valve in the Philips range of HF pentodes is the EF54, formerly known to those in the Services as the RL7. It employs the same general construction as the EF50, but is more advanced in design, with the result that it may be used as an RF amplifier up to 250 mC/s. The EF54 has four separate base pins through which the cathode, suppressor grid, and screenings may be earthed. This results in greatly decreased cathode lead inductance, even when compared with the EF50, and this improvement is largely responsible for the superior VHF performance. In order to realise the benefit of the special construction, all four leads marked "S" on Figure 2 should be separately earthed. The best scheme when using the EF54 is to place the baffle shield across the socket between pins 1 and 2, and 5 and 6. This places two of the "S" pins in each of the plate and grid sides of the shield, enabling one pair to be used for the signal return in the plate circuit, and the other pair for the same purpose in the grid circuit. This reduces still further the undesirable effects of cathode-lead inductance. The grid input resistance of the EF54 is 10,000 ohms at 50 mC/s and its equivalent noise resistance is only half that of the EF50, namely 700 ohms. Similarly, its mutual conductance is higher, at the figure of 7.7 mA/v.

Operating data for other types of Philips special VHF valves is given in the following chart.

Electrical Characteristics EF54

Heater voltage: 6.3v.
Heater current: 0.3 amp.
Capacities:
- Grid-Plate: 0.02 mmfd.
- Grid-Screen: 2.2 mmfd.
- Input: 6.2 mmfd.
- Output: 4.9 mmfd.

Typical operating conditions:
- Plate voltage: 250v.
- Screen voltage: 250v.
- Grid voltage: Neg. 1.7v.
- Plate current: 10 mA.
- Screen current: 1.45 mA.
- Mutual conductance: 7.7 mA/v.
- Equivalent noise resistance: 700 ohms.
- Input resistance at 50 mC/s: 10,000 ohms.

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—coming soon

PHILIPS V.H.F. SPECIAL TUBES.

TYPE	DESCRIPTION	BASE	CATHODE DATA VOLTS	CATHODE DATA AMPS	PLATE VOLTS	PLATE CUR. M.A.	SCREEN VOLTS	SCREEN CUR. M.A.	GRID BIAS	MUTUAL COND. MICRO-OHMS.	PLATE RES. OHMS	LOAD RES. OHMS	POWER OUTPUT WATTS.	
EA50	Miniature Half wave Diode	Wire -in	6.3	.15	Max. R.M.S 200	D.C. Out-put 5.0								1.
EC52	U.H.F. Triode	B9G	6.3	.45	250	10			-2.6	6500	9200			2.
EC53	U.H.F. Triode	Wire -in	6.3	.25	250	14.5			Grid	current	5 mA.		(100 Mc/s) 1.3	3.
EC54	Grounded Grid Triode	B9G	6.3	.45	250	25				9000				4.
EF50	R.F. Pentode	B9G	6.3	.3	250	5	250	3	-2	6500	1.0 meg.	--	--	
EF54	U.H.F. Pentode	B9G	6.3	.3	250	10	250	1.45	-1.7	7700	.5 meg.			5.
EF55	Video Pentode (Television)	B9G	6.3	1.0	250	4.0	250	5.5	-4.5	12000	55000			
EFF51	Twin V.H.F. Pentode.	B9G	6.3	.75	250	6	200	1.2	-2	7500	.35 meg.			6.

1. Cathode to Plate capacity 2.1 mmf.
2. Amp. factor 60.
3. .3 Watts at 400 Mc/s.
4. Amp. factor 98.
5. Input resistance (at 50 Mc/s) 10,000 ohms.
6. Equiv. noise resistance 800 ohms.
   Screen grid resistance 42 K ohms.

Pre-Amplifier Tone Control

Official circuits from English manufacturer

WE were pleased to read the favourable comments on the Connoisseur pickup, in the March issue of the Australasian Radio World, a copy which was forwarded to us by our friends Messrs. J. H. Magrath and Co., of Melbourne. In view of the interest being shown by you, we thought that further details of the performance, and methods of equalisation would be of assistance to yourself and your readers.

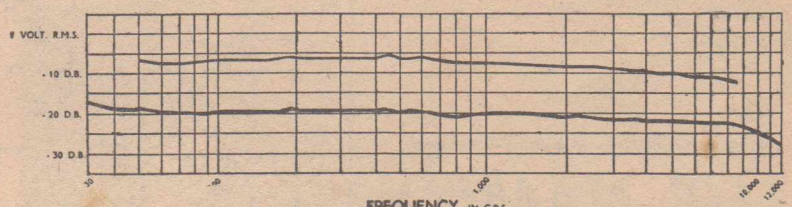
By

A. R. SUGDEN

A. R. Sugden & Co. (Engineers) Ltd.
Manufacturers of "Connoisseur" Pick-ups
England

As you will see from the response curve on the enclosed leaflet, the output from the pickup is approximately 5 db down at 10 kC/s, which confirms the findings of Mr. Swales.

RESPONSE CURVE *Connoisseur* PICK-UP



LOWER CURVE DIRECT FROM PICK-UP
RESISTIVE LOAD 100,000 Ω

TOP CURVE TRANSFORMER
COUPLED 1MΩ ON SEC OF TRANSFORMER

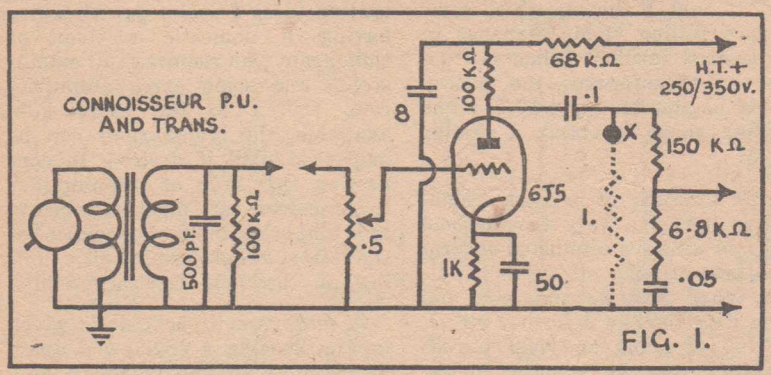


FIG. 1.

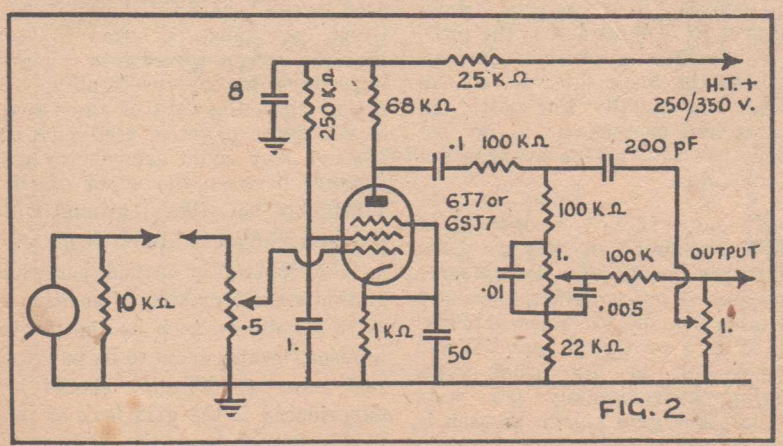


FIG. 2.

With regard to the distortion mentioned below 250 C/s, we believe that the fault may lie in the test record, as we have had several test records showing distortion in this region. This is also borne out by the fact that when the same pickup is used on an alternative record, no distortion is present. However on tests that we have carried out with records that we have cut ourselves, we have confirmed that there is no distortion in the pickup above 50 C/s. Each pickup we produce is hand-tested, in our laboratory, on an instrument of our own design, which incorporates a valve voltmeter and an oscilloscope. The voltage output must lie within the limits laid down (i.e. plus or minus 2db from our published response curve), and the waveform must be sinusoidal without distortion from 8,500 C/s to 50 C/s.

Scratch

On the subject of "scratch," we have found from our experiments that the scratch is distributed over the audio range from 1,500 C/s upwards, rather than over a narrow band as sugggested in your article. To date the most suitable scratch filter we have found is formed by merely connecting a 500 p.f. condenser across the secondary terminals of the pickup transformer. While some treble response is cut, the performance, especially on

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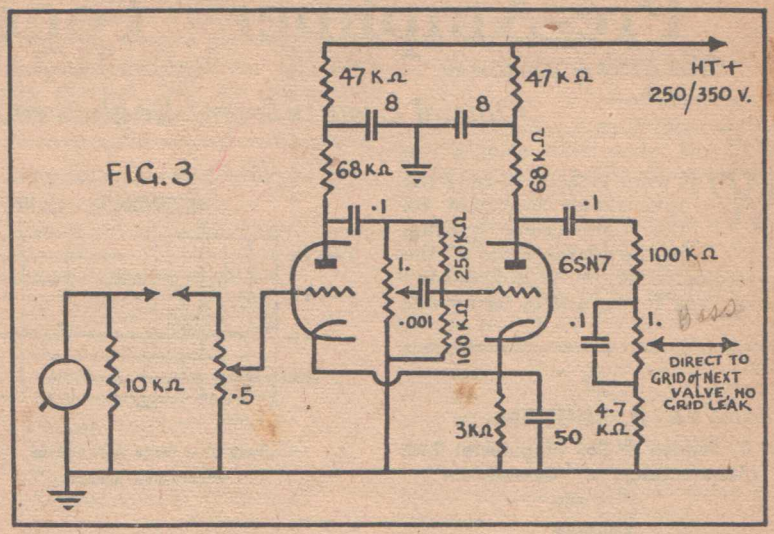


FIG. 3

PRE-AMPS

(Continued)

worn records is greatly improved. At the same time the load resistor should be reduced from 1 megohm to 100 K ohms, which produces a falling treble response in the desired fashion. When not using the transformer, the pickup should be shunted by a 10 K ohms resistor, so as to obtain a similar result.

This problem of scratch reduction is indeed a very troublesome one, and we have conducted several experiments with all types of filters, tuned and electronic etc., and up to date the one described above, i.e. 100 K ohms and 500 p.f. in parallel across the transformer has been found to be the most simple and effective (or without transformer, 10 K ohms across the pickup). Several electronic devices, such as the Scott filter have been made, but usually the outlay in valves and components is far beyond the scope of the average experimenter.

We note that you describe a 6SN7 pre-amplifier, and we have taken the liberty of enclosing some sketches of pre-amplifiers specially suitable for the Connoisseur Pickup. Fig. 1 providing bass lift and treble cut, is the usual type, having approximately 0.5 volts output. The gain as can be seen is approximately unity, but placed in front of an amplifier having a straight line response, full equalisation will be effected.

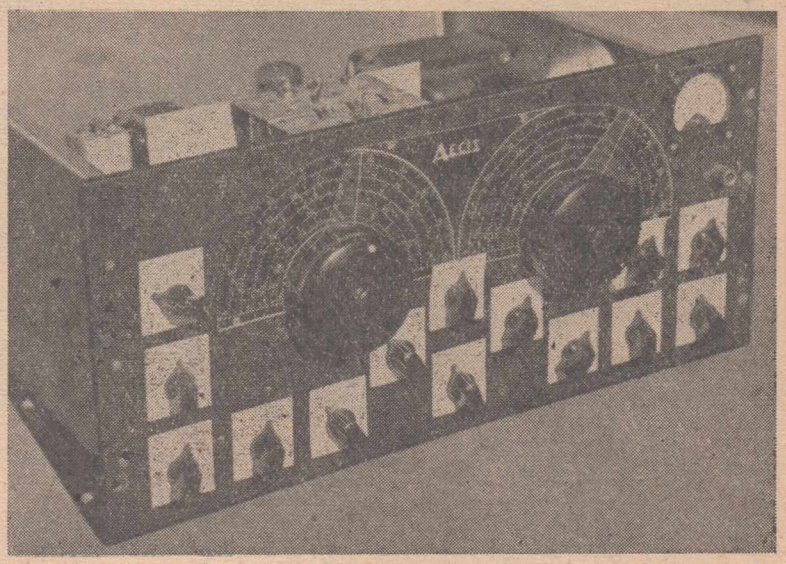
Another one valve pre-amplifier having variable bass and treble controls is shown in Fig. 2. This unit is ideal for the experimenter having a domestic receiver or radiogram who requires full equalisation and some extra amplification. Owing to the extra gain available, the transformer can be dispensed with if desired. In connecting this type of pre-amplifier to a receiver, care must be taken to see that the input impedance of the latter is high, to prevent shunting of the tone control circuits.

A more ambitious unit is given in Fig. 3 using a 6SN7, and again providing bass and treble control. This unit is similar to the type used in our high fidelity amplifiers. Great care must be taken to see that the output is fed into a high impedance source—preferably, as in our case, the grid of the valve to which the negative feed-back is applied. Any shunt capacity or resistance between the wiper of the 1 megohm pot. (bass) ground will produce a drop in treble response, as the control is turned between minimum and maximum positions. With amplifiers such as the "Williamson," which seem to be popular just now, no difficulty should be experienced if the grid leak of the first valve is removed.

12-Valve Communications Receiver

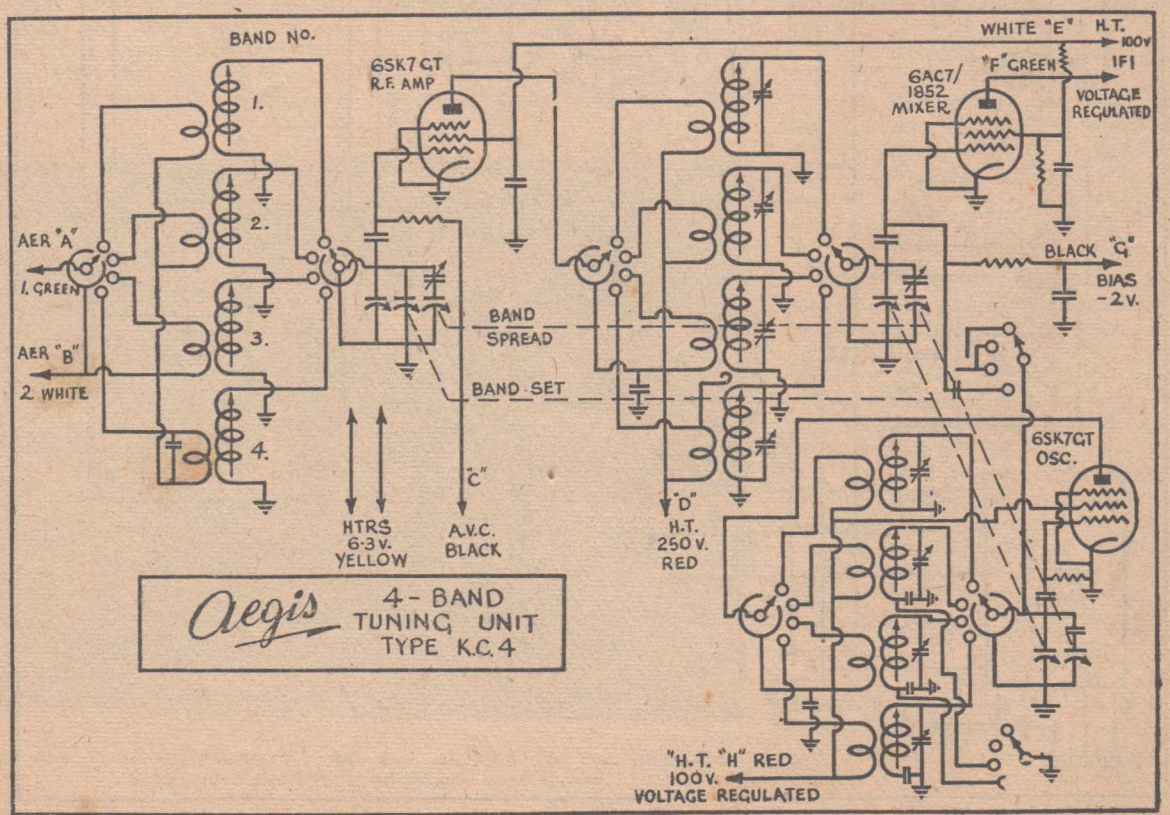
A challenge to home set-builders

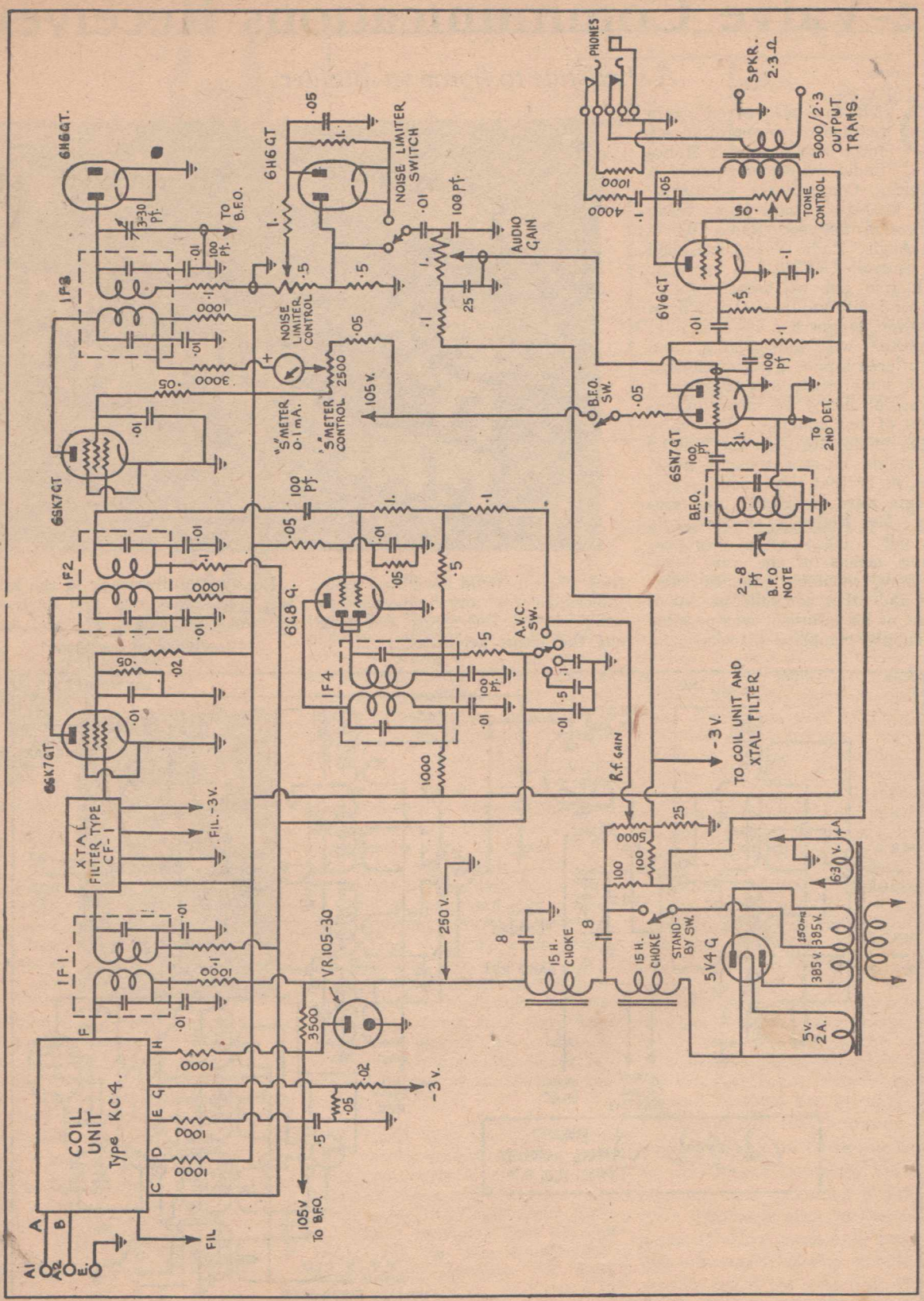
OVER the past seven years Radio World has made a feature of co-operation efforts with the Aegis Manufacturing Company to popularise their kit-sets. There is no trade connection between Radio World and Aegis. Radio World is owned and controlled exclusively by A. G. Hull, who has no association of any kind with any radio trade firm. However, Aegis has been a solid supporter with advertising, and has offered kits of a high standard which have made set building a successful hobby to many thousands of our readers. Especially in the immediate post-war months the Aegis kit-sets were a great boon, as at that time certain components were practically unobtainable. Mr. McGrath, of the Aegis Co., put a lot of effort into procuring stocks of the rare loudspeakers, moulded bakelite cabinets and other components. As a result of his efforts it was possible to supply complete kit-sets at a time when it would have been quite impossible for any individual to walk around the shops and pick out the items separately.



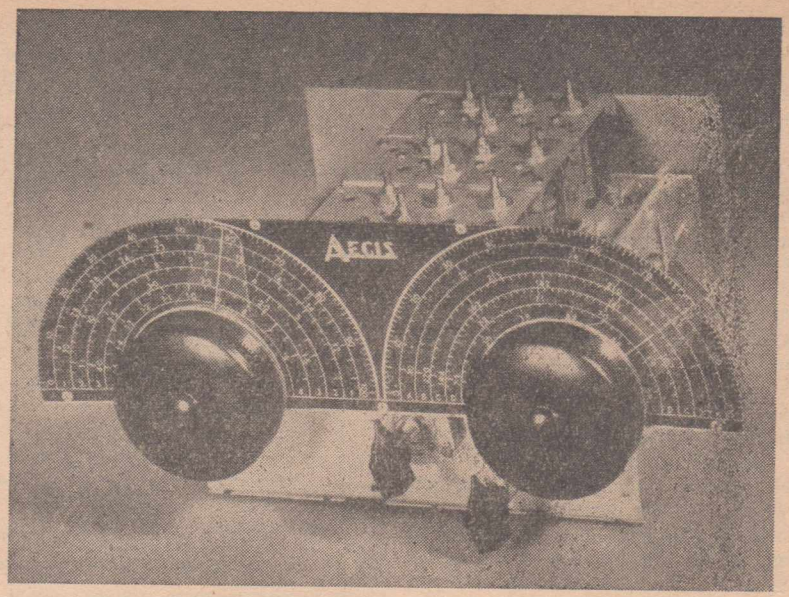
Really, the drawback to the kit-set, is the fact that you have to buy all components at once, and

(Continued on next page)



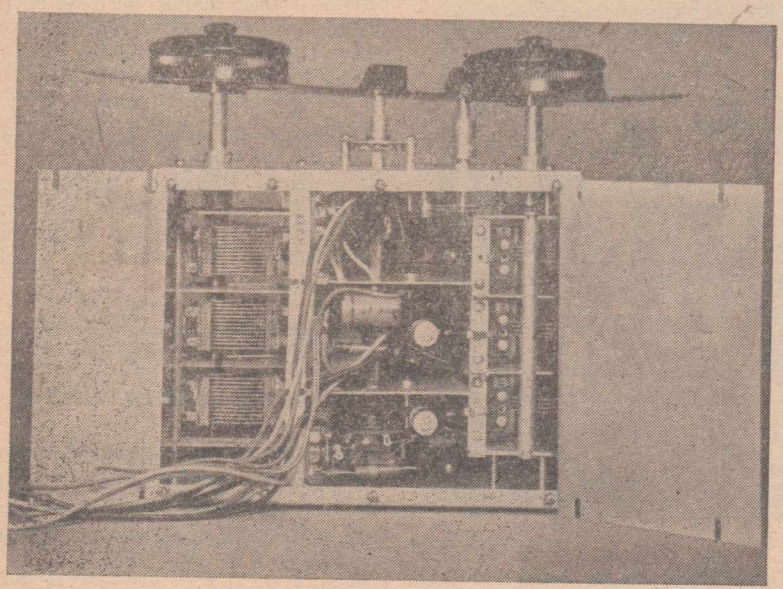

COIL UNIT Type KC4.
XTAL FILTER TYPE CF-1
6H6GT.
6H6 GT
6SK7GT
6G8 G.
6V6GT
6SN7GT
5V4 G
NOISE LIMITER SWITCH
NOISE LIMITER CONTROL
AUDIO GAIN
TONE CONTROL
PHONES
SPKR. 2-3 Ω.
5000/2·3 OUTPUT TRANS.
B.F.O. SW.
B.F.O.
2-8 pf B.F.O NOTE
A.V.C. SW.
R.F. GAIN
S METER 0-1 mA.
S METER CONTROL 2500
105 v.
TO B.F.O.
TO 2ND DET.
TO COIL UNIT AND XTAL FILTER
-3 v.
250 v.
105 V TO B.F.O.
15 H. CHOKE
STAND-BY SW.
385 v.
150 ma
5 v. 2 A.
6·3 v. 4 A
IF1
IF2
IF3
IF4

you cannot use up any odds and ends out of your junk box. This point seems to have annoyed a few readers, as you will have noticed if you have read the letters which have been published in the "Among Our Readers" pages. This criticism has largely been baseless, anyway, because we have in all cases published the full circuit, showing all component values. Such circuits are just as valuable as any other circuits. If you don't want to buy the kit-set you still can use the circuit and use any components you have available. In fact, you have an assurance that the circuits published for kit-sets have been most thoroughly developed to avoid any possibility of critical operation or uncertainty of performance, even with the widest tolerance in regard to the method of wiring and so on.



Front view of the coil unit, showing the slow-motion knobs and the calibrated dials.

All of which is largely beside the point, but makes an introduction to the latest Aegis release, a coil box and a half if ever there was one. This particular release is not a kit-set, but is simply a coil box, although simply is hardly the right word to describe it. It is really the most super of all super coil boxes, with four main tuning bands and band-spread. An r.f. stage is used, also a separate oscillator for the mixer stage. Valve types used are a 6SK7GT for the r.f. stage, 6AC7/1852 for the mixer and another 6SK7GT for the separate oscillator. The sockets for all these valves, together with their associated wiring and components, are actually built into the coil box, with the valves lying on their sides under the main coil box. Output from the mixer stage goes to a crystal filter through the first intermediate transformer, the whole crystal filter unit being available from Aegis in one piece. If not required the filter can be omitted, and lots of selectivity is still available without it, for there are two stages of i.f. using 6SK7GT valves.



A view from underneath the coil unit, showing the two three-gang tuning condensers for band set and band spread.

Two three-gang condensers are actually built into the coil assembly, one of normal capacity for band setting and the other if lower capacity for band spreading. Each gang is fitted with a slow-motion vernier control knob and a large plastic dial, scaled with frequency calibrations.

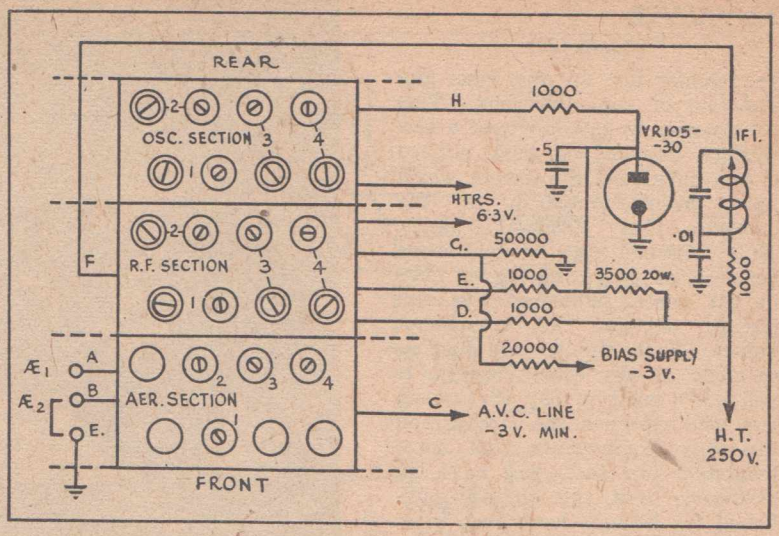
The arrangement which we detail, is a circuit which is recommended by Aegis for use with the coil unit, but it is by no means the only circuit for which the coil unit is suitable. It is, of course, quite essential to use the r.f. and mixer set-up as provided in the coil box, and the valves specified are imperative. But once beyond the mixer stage you can use your own discretion as far as you like if you don't want to accept the recommended circuit.

Referring back to the recommended circuit as published, you will note that a.v.c. is taken from a separate a.v.c. amplifying tube, type 6G8G, which is fed from the grid circuit of the second i.f. transformer, and provides several

steps of a.v.c. control as well as switching it right out of circuit. Output from the second i.f. amplifier goes to a 6H6GT diode detector, the audio going to one half of a 6SN7GT twin triode as an audio amplifier, feeding into a 6V6GT. The other half of the 6SN7GT is the beat frequency oscillator for code reception. A type VR105-30 voltage regulator is used to stabilise a supply voltage of about 105 volts for the oscillator plate supply and the high tension supply for the b.f.o.

As will be readily evident from the above circuit details the set, which can be made up with the new Aegis coil box, is indeed a set of the first water, a set which is a real communications receiver of world class, with every modern convenience. As will be seen from the photograps of the original chassis, it has looks, too.

In the past Aegis has made a specialty of providing kits which have made it possible for even the rawest novice to build up a successful receiver for broadcast or dual-wave reception. Now Aegis offers a coil box and crystal filter unit which are a decided assistance to the advanced set builder who wants to build up a communications-type receiver of a style not available from any Australian factory.

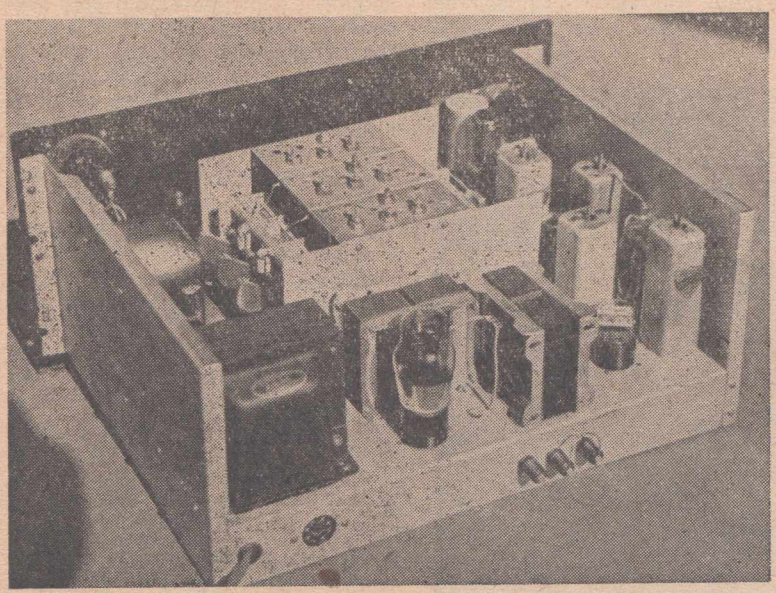


Connections to the unit and the location of the trimmers.

It is hardly the type of receiver which can be recommended to novices but to those with some general experience in set building it should be a fairly easy job to build a really fine receiver and get it into perfect operating efficiency without any great amount of trouble.

Each coil assembly is checked at the Aegis factory before despatch, being actually tested for performance and aligned up for greatest efficiency. Due to slight variations in valves, vibration in transit, and your particular way of wiring it up, the calibration may be found to vary slightly, but no great amount of re-alignment should be necessary, just the slightest adjustment of the trimmers. These should be handled in the usual way, adjusting the iron cores at the low frequency end of each band, then the trimmers at the high frequency ends.

The coil assembly is fully color coded and supplied with several blue-prints showing position of trimmers etc., so that the set-builder will not be short of proper guidance in his somewhat ambitious task.



Rear view of the finished chassis. Three valves mount under the coil unit in a horizontal position, in order to ensure shortest leads and greatest efficiency.

FIDELITY DEMONSTRATIONS

Music lovers are invited to demonstrations of fidelity reproduction at the showrooms of J. H. Magrath & Co., 208 Little Lonsdale Street, Melbourne.

SIGNAL - STRENGTH METERS

The whys and wherefores of "S"

TO start with, it is necessary to clear up one or two confusing ideas about signal strength meters. The first has to do with the "R" versus "S" controversy and until the R.S.T. system of reporting, with "S" representing signal strength, becomes universal for any type of signal, some confusion is bound to occur. As a step in the right direction, this article will refer to a signal strength meter as an "S" meter.

By

J. N. WALKER

(G5JU)

Eddystone Works

Stratton & Co. Ltd.

Birmingham, Eng.

Without any method of visible indication, an operator is bound to judge the strength of an incoming signal by comparing it, on the one hand, to the weakest signal he can hear and, on the other, the loudest signal he has ever received. The actual strength will depend on the audio output given by the receiver, and an S9 signal on an O-V-1 battery receiver will be quite different from an S9 signal on a mains operated set. Obviously, therefore, judging by audibility alone cannot be other than rough and unreliable.

At the same time, this method is normal when receiving C.W. since usually the A.G.C. (which actuates an "S" meter) will be switched off when the B.F.C. is brought into circuit. An "S" meter can be used on C.W. and details are provided later.

Another complication — and a major one—results from the fact that the strength of a telephony signal depends very largely on the depth of modulation. An "S" meter reads carrier strength and does not take into account modulation, unless the latter is excessive. Two different signals, one modulated 50 per cent. and the other 100 per cent., while perhaps showing identical "S" strengths on the meter, will produce very different amounts of audio power at the receiver output terminals.

Desirability of an "S" Meter

The reader must decide for himself, therefore, whether an "S" meter reading carrier strength only is going to be really useful. It is a fairly simple matter to fit one into circuit for operating on telephony but a definitely complicated business when it comes to C.W. operation.

Any given "S" meter reading really indicates that a certain signal intensity, measured in microvolts per metre, is being applied to the aerial terminals of the receiver. The reading will therefore depend on the efficiency of the aerial. This, in turn, involves matching systems, directional properties, variation of polarisation, etc. Alterations to the aerial, or change of location will therefore affect the readings.

It is possible to give other stations accurate relative reports on their signals but if a certain signal is received at say S6 at one location and at S9 at another, using equipment of identical types at both, it is not to be assumed that the former station equipment is below par.

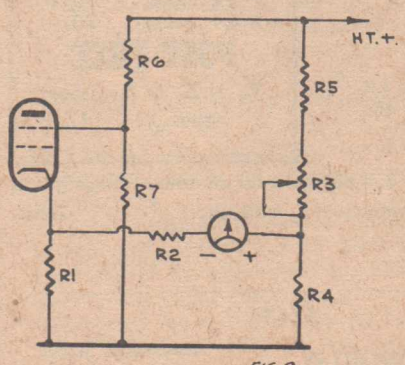


FIG. 2.

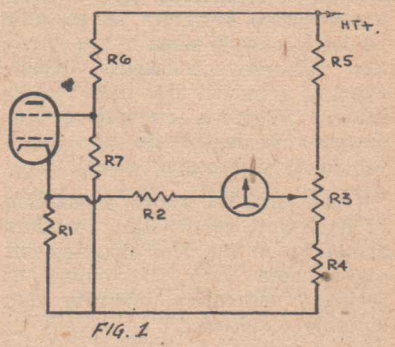


FIG. 1

For co-operative tests in radiation problems with another amateur, the "S" meter is obviously of great value. If an incoming signal of steady strength is available, the "S" meter will again assist in proving whether internal adjustments to the receiver or external alterations of any sort, are beneficial or otherwise.

Practical Considerations

The meter, that is the moving coil instrument itself, is the major item. It should be as sensitive as possible, since the deflection obtained, whilst also dependent on circuit constants, is directly in proportion to the meter sensitivity. It is better to have something in hand rather than have to resort to a lot of "frigging" to get adequate readings. Admittedly, with a very sensitive receiver having, say, two R.F. stages, a relatively insensitive meter, with a 5 mA full scale deflection, can be made to give good results. Generally, however, the full scale deflection should not exceed 1 milliampere and 500 microamperes is a good all-round figure. The movement should be free, well-balanced and adequately damped. A needle pointer is a distinct advantage.

The potentiometer required for zero adjustment should be a good

(Continued on next page)

"S" METERS

(Continued)

quality component. For the higher resistance values, a carbon type of the usual 3 watt rating is adequate. Miniature components are sometimes available, and by adding external resistors of suitable value, to absorb some of the wattage will prove suitable. Adjustment of zero will also then be less critical. Where a low value potentiometer is called for the wire-wound type becomes essential.

Other than the above, a selection of half watt composition resistors should be on hand for carrying out experiments with the object of securing maximum linearity and suitable sensitivity.

Valve Sequence and Meter Position

The "S" meter is actuated by a change of potential across two points, this potential causing a current to flow through the meter. The meter itself is usually of very low resistance and, except when absolute maximum sensitivity is required, it is wise to insert a resistance in series with the meter to restrict the flow of current.

The actual change of potential is invariably derived from the variation in current through a valve consequent upon the application of automatic gain control voltage to its control grid. Any valve included in the A.G.C. chain may therefore be used to obtain the indications, but maximum deflection, with minimum disturbance of other design factors, is obtained from the I.F. valve, if there is only one, or from the first I.F. valve, if there are two or more. In some receivers, the A.G.C. potential to the R.F., I.F. and possibly the frequency changer valve is graded but it will be found usually that the full potential is applied to the grid of the first I.F. valve.

It is possible to insert the meter in the anode, screen or cathode circuit, but the latter two lend themselves better to connection of an "S" meter to an existing receiver and the former will not be considered, as it offers no advantages.

Calibration of an "S" Meter

This article is written for the benefit of the ordinary amateur, who requires some definite indication, on which he can rely, of signal strength, as received on his own receiver at his own particular location.

At the same time, however, it will be useful knowledge for the user to know how the scale calibration is derived.

One must have an arbitrary reference level to start with but any such level must be chosen having regard to the receiver sensitivity. There will be general agreement that an S1 signal is one that is only just audible, is more or less lost in the inevitable noise and is not intelligible. (Notice that the mix-up between carrier strength and audio output breaks in again but it cannot be avoided.) With some receivers, this result will come about with an input of 1 microvolt, with others a considerably greater input may be necessary. It will be found, usually, that a sensitive "S" meter will give a very small response to whatever input is found necessary to produce a just audible output, provided—and this is important—there is no delay in the A.G.C. action. If there is a delay, obviously the meter will not commence to function until the signal is sufficiently strong to overcome the delay voltage. This does not matter much, as one is not interested, in practice, until a signal becomes intelligible. However, for setting up purposes, any A.G.C. delay should be temporarily cut out of circuit.

Having established a convenient reference level, the next point is to decide the increment of the divisions above S1 various figures have been used, generally between 4 and 6 decibels per division. By this is meant that if, say, 2uV is used as a reference level for S1, the input for S2 will be 6 db (for illustration purposes) above 2 uV —or 4 uV S3 will be 6 db up again, that is 8 uV. In this example, S9 becomes 572 uV—a figure which will most certainly give a very respectable S9 signal with any decent communication receiver! If the steps were 3 db ones, S9 would be 29 uV. Which illustrates the large difference which can occur in the results.

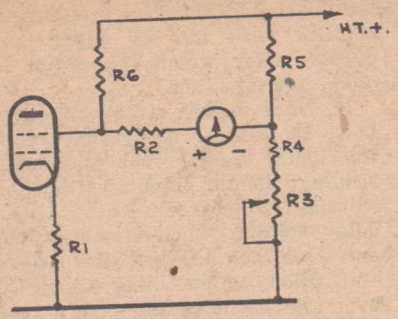


FIG. 3.

Most communication receivers will produce a loud signal with 29 uV although a preselector may be necessary with some.

However, the movement of the "S" meter needle will depend not only on the relative strength of incoming signals but also on the variation in the slope of the valve when A.G.C. voltage is applied. The greater the variation, the greater the meter indications.

In actual practice, therefore, it is advisable first to adjust the operating conditions of the appropriate valve so that one can vary the A.G.C. characteristic either way and then set up the "S" meter on a basis of 3 db variation in signal strength per division. If the result, on actual audibility tests, tends to give the impression that the meter is reading too low, one has only to increase the sensitivity of the circuit to changes of A.G.C. voltage to put matters right and vice versa.

Practical Circuits

Probably the most generally used circuit is that shown in Fig. 1. One terminal of the meter is connected to the cathode of the valve and the other to a point of equal positive potential, derived from a potentiometer placed across the H.T. line. Under no signal conditions, no current will flow through the meter but, on the application of A.V.C. voltage to the valve, the current through R1 will be reduced, the cathode will become less positive and current will flow through the meter. Without R2, this current may, with a strong signal, prove excessive, and it is therefore advisable always to include R2. If made variable, it can be used as a control over the sensitivity of the "S" meter. A maximum of 1,000 ohms is suggested, with a minimum of 200 ohms.

Another reason for including R2 is that, in its absence, the normal cathode resistor R1 will be shunted by R4, the total resistance being less than the proper value. The greater the value of R2, the less will the operating conditions of the valve be disturbed.

R6 will usually form part of the normal circuit, but not always R7. With R6 only, the screen potential is permitted to slide, the grid base being thereby increased. Under these conditions, stronger signals can be handled with less likelihood of distortion but the change of current through the valve is retarded and the "S" meter indications will be more gradual. The grid base of the valve is shortened if the screen is operated at more or less a fixed potential, by adding R7. Adjustment of the relative values of the R6 and R7, commencing by making them equal, will provide a means of varying the "S" meter reading for any given strength of signal. It should be remembered, of course, that the shorter the grid base of the valve, the less its capability of handling strong signals without distortion.

The current through R1 may be

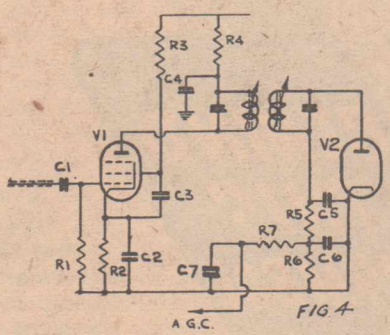


FIG 4

achieved, either R4 or R5 must be anything up to 10 mA., and the voltage at the cathode between 1.5 and 3 volts, in an average case. The current through the potential divider R3, R4 and R5 will be small and the value of R4 should therefore be two or three times that of R1. R3 may be 500 or 600 ohms and should be of the wire-wound type.

If, on initial test, balance cannot be achieved, either R4 or R5 must be changed. If the needle swings hard over to the right (beyond full scale deflection) R4 is too big or R5 too small and vice versa. R2 will have little effect on the point of balance, unless R4 be made much too small.

If a low resistance potentiometer is not obtainable, the circuit can be changed to that of Fig. 2. Exactly the same considerations apply but balance is not obtained by varying the current flowing through the resistance network. R3 becomes a 50,000 ohms potentiometer and more care will be required initially in choosing the value of R4.

The Screen Circuit

The cathode connection suffers from lack of linearity, the scale being unduly cramped at the lower "S" readings, giving open readings between S6 and S8 and then tending to close up again.

A circuit which gives better linearity is that shown in Fig. 3. Here the meter is connected from the screen to a point of equal potential, again obtained from a resistance network across the H.T. line.

The meter indication is derived from the variation of screen potential with the application of A.V.C. voltage and the sliding screen circuit is an essential feature. If the sensitivity is too great, a resistance can be placed in series with the meter, as shown at R2 in Fig. 3. The value will vary according to the full scale meter deflection.

With the majority of variable mu valves, such as the EF39, KTW61 and 6K7, R5 and R6 may be of 100,000 ohms, R4 47,000 ohms and R3—the balance adjuster—50,000 ohms.

R4 should be increased if the needle persists in holding over to the right (full scale deflection).

C.W. Indications

When the B.F.O. is switched on, a voltage near the intermediate frequency will be applied to the A.V.C. diode and the resulting A.V.C. voltage will be applied to the earlier valves and the sensitivity considerably reduced. For this reason, it is usual to switch the A.V.C. system out of circuit when receiving C.W.

If the circuit is arranged to prevent A.V.C. voltage developing except from the actual signal, then the A.V.C. system can be permitted to continue to function on C.W. as well as telephony reception, with some advantage during

(Continued on next page)

"S" METERS

(Continued)

periods when fading is prevalent. "S" meter readings can also be taken under key down conditions.

Fig. 4 shows a suitable arrangement. It consists of a buffer I.F. amplifier, fed from the output of the first I.F. valve through a small condenser. The second valve is a diode delivering the usual negative voltage for A.V.C. control. V1 may be any ordinary variable mu pentode and V2 a diode valve or a germanium crystal rectifier.

The I.F. transformer should possess equivalent characteristics to those used in the receiver In some cases, it will be possible to fit the additional parts on to the receiver chassis—in others, a small separate unit can be constructed, taking its power supplies (which are quite small) from the receiver. All leads should be kept short and as much screening employed as possible, to prevent interaction. Suitable values for the components are indicated in Fig. 4, although variations may be necessary in particular cases.

It will, of course, be necessary to disconnect the existing A.V.C. system and retune the I.F. transformers to resonance.

The "S" meter will occupy its normal position in the cathode or screen of the first I.F. valve.

The time constant of the A.V.C. system should be long, so that the applied voltage holds more or less constant during key-up intervals. Otherwise the background noise will rise and fall in a somewhat disconcerting fashion.

Zero Adjustment

Provided the associated resistors have been properly chosen, setting up the meter is a simple matter. The aerial terminals should be shorted out, R.F. gain set at maximum with the A.V.C. in operation and B.F.O. switched off. The meter needle should then be brought to coincide with zero by adjustment of R3, after which the aerial is connected up again.

If "man-made" static or other noise is brought in by the aerial, the meter will probably show a reading, if the input voltage is sufficient to overcome any A.V.C. delay voltage which may be present. One then has two alternatives —to allow an incoming signal to override the noise and give a true "S" reading—or back off the meter further and give what is in effect a report of signal strength over and above the prevailing external noise level. It is unwise to adopt the latter method, since the noise will vary from time to time and in different bands, whilst the meter calibrations also will not then be accurate.

Other Points

The manual R.F. gain control in

(Continued on page 28)

AMONG OUR READERS

News of our subscribers and their activities

"THERE is no need for my endorsing or elaborating on the remarks of others in Among Our Readers. I have been dabbling in radio for over twenty years, commercially from 1926 to 1933 and since then as a hobby. Although an amplifier enthusiast, I've built quite a number of sets from circuits in A.R.W., but, having not as yet developed interest in Personal Ports, shuddered when I found you had dished up still another in the April issue. However, I realise in catering for all cranks it would be impossible to please all, so I expect to see even a crystal set featured, for there are always beginners, potential set-builders of the future, and the crystal set is a good and safe start, for often a keen 'would-be' gives the game away after burning up a few tubes. I would suggest that you enlarge your 'Among Our Readers' pages or even change the heading to cater for suggestions and complaints as well as news, and so develop some controversy among the many enthusiasts that devour the A.R.W. There is, I think, a host of obstacles in the path of the would-be set builder. I am sorry for the kitchen-table type. I feel sure through your pages an airing could be given to readers' troubles, tryouts, guides, etc. An appeal could be made to manufacturers for their help to lessen the burdens of the radio hobbyist. For example, the Rola Company could be asked why the mounting bracket is now missing from the 5 and 6 inch speakers. Coil manufacturers could be asked for better identification markings. Don't tell me—I know the answer: buy Kingsley. However, can you imagine a kitchen-table mechanic trying to fit a speaker as above to any type of chassis? I recently built a 'four' only to encounter strife, until I discovered that I had installed two oscillator coils, one of which was so nicely marked AER. on the can!"—R. H. Johnston, 143 Cramer Street, Preston, Vic.

* * *

"I have been getting the Radio World ever since the first edition by Mr. Earl Read, who went over from New Zealand to Australia to start it off. I had the good luck to win a competition which the N.Z. Radio Times ran some little time before this, and have been in radio for over thirteen years. It looks as though I will be in it till the end of my days. Quite a large percentage of the sets I am selling I make up myself under my own trade name. The articles by Paul Stevens are excellent and one can easily see that they are from a practical man."—Selwyn Gane, 309 Gladstone Road, Gisborne, New Zealand.

* * *

"I have been interested in radio for many years now, but have only been actively engaged in the maintenance of radio gear since joining the R.A.A.F. in April, '42, prior to which I built a few sets, mainly crystal and one-valvers. Since '42 have built up several supers as well as odds and ends of test gear which I use mainly in connection with my first hobby of photography. Have built a timer, working on the delay principle across R.C. network, using a 5 meg. pot, giving a delay of 1 to 30 seconds across a 6V6GT. Am also in touch with Mullards in regard to their flash tube. At present I am with the Civil Aviation as a radio technician, mainly employed on transmitter maintenance."—A. R. Deverell, C/- Aerodrome, Geraldton, West Australia.

* * *

"I am twenty years of age, assistant engineer with RCA Photophone of Aust. Pty. Ltd. My work mainly brings me in touch with audio equipment, so any audio article in your magazine is eagerly read. I would like to see more articles on test gear building, even to the extent of some advanced gear, both radio and audio. Otherwise I cannot fault your magazine as I realise it has to be 'general purpose' in order to have universal appeal."—D. J. Abomady, 160 Bennett Street, East Perth, West Australia.

"There seems to be a tendency these days to look down on any amplifier capable of less than ten watts, but mine makes enough noise to annoy the neighbours. What more could one want? My only criticism of your magazine is —too many wire-by-wire descriptions of commercial kit-sets, otherwise a fine magazine even if articles are of variable quality. As for me, I am an industrial chemist, and have been interested in radio as a hobby for eleven years. A knowledge of electronics has proved useful in my job, as many instruments used in chemical laboratories are designed around radio valves."—A. F. Elliott, 31 Fenton Street, Ascot Vale, Vic.

* * *

"I have a high regard for your publication. I have been a constant subscriber since its inception. I am a first-war cripple, and have made a study of amplifiers in general, particularly for records, microphone, photo-cell, deaf-aid and combination work. My latest creation is your F.F.R. amplifier, with tone control stage, also double mixing inputs for talkie photo-cell, microphone, etc. This is an excellent job now, having overcome one or two shortcomings, such as rattling choke (dipped in paraffin) and also removed eleven metal hole stampings from between the laminations of one choke. Recently added the Red Line frequency dividing network with a 15-inch Goodmans speaker and a Rola 8-42 in reflex baffle and flare. I find this a fine job on talkies. I think your journal more than worth the money it costs."—R. C. Drewitt, 75 Goulburn Street, Hobart, Tasmania.

* * *

"As can be seen from the address, I am on a direction finding station in New Guinea, and am only interested in the practical side of radio, building a set now and then and doing a few repairs. I do a bit of listening and have sent a few reports to Mr. Keast, but they never seem to get posted. I managed to get an AR7 receiver

(Continued on next page)

OUR READERS
(Continued)

for a few quid from disposals, and when it goes I do a bit of DX-ing."—R. M. Jones, Port Moresby, Papua.

* * *

"I am keenly interested in radio receivers and their design as I construct about fifteen sets per year, varying from little reaction jobs to nine-valve radiograms. In the field of personal receivers I have found the Kingsley job to be by far the best of all the four-valve jobs. I am a great believer in Kingsley products, having tried all makes I now use Kingsley coils exclusively."—Cpl. K. J. Cameron, 82 Wing, R.A.A.F., Amberley, Queensland.

* * *

"I find your magazine most interesting and always look forward to it. Have been dabbling in radio since 1918. Got my commercial ticket in 1921. First went on the air with a ham station at Vila Radio in 1926 and was fairly active as YJ1RV up to 1939. While away on war work (in No. 1 test room, A.W.A., Sydney) my gear was confiscated and entirely disappeared. So far have no immediate plans for going back on the air. Since 1930 have owned a coconut plantation here."—F. H. Harvey, "Bonkovia," Epi, New Hebrides.

* * *

"I am extremely interested in your articles on audio equipment and receiver design. I have at times wondered if a radio publication could do anything towards encouraging manufacturers to supply fuller information about their components. For instance, a constructor would be greatly assisted in his choice of intermediate transformers if response curves were available. Thus the makers would come into line with the valve manufacturers, who freely release performance data and characteristics."—W. I. Quigley, 68 Iranui Road, Gisborne, New Zealand.

* * *

"Carry on with the good work; your magazine is still the best, particularly on the amplifier side."—G. T. Edgar, B.D.S., Dental Surgeon, 36 North Road, Dunedin, New Zealand.

A Four-Valve Battery Portable

IN summertime a young man's fancy lightly turns to thoughts of portables—and other things of course, but we are not interested in those except insofar as the lack of a good portable radio receiver might affect his chances of success in regard to those other things.

We are well aware of the fact that this is not summer. Well, why worry, you ask, let's wait until summer comes before we start thinking about portables, that will be plenty of time. We beg to differ. Your favourite blonde won't wait while you spend all your weekends tramping around from shop to shop endeavouring to buy parts to build the portable—and that is what will happen if you wait until summer is here before you start to think about building the set. The time to build is now, and then by all means, when summer does come, let your thoughts turn to the pleasures of music in the sun, but with this difference, your set is already built.

The set we are about to describe is a 4 valve portable for use on the broadcast band. The following valves are employed: 1A7GT converter, 1P5GT I.F. amplifier, 1H5GT second detector and first audio amplifier, 1Q5GT power output. There is nothing unusual about the circuit arrangement. It is quite straightforward and not at all difficult to get into satisfactory operating condition.

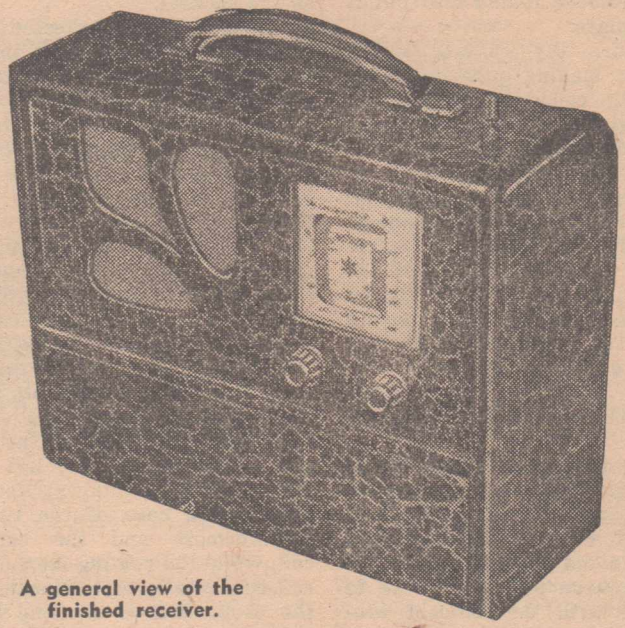
The performance of the completed receiver is good, in fact extremely good for its size. One of these sets operated on the roof of our city building received all the Sydney stations without any difficulty at all, and this without any aerial. It may be noted on examination of the circuit diagram that the receiver does not use a loop aerial but instead employs the orthodox aerial coil, a lead being taken from the primary of this coil to a terminal located on the top of the receiver's cabinet. With about six feet of wire connected to the aerial terminal, station 2KA could be logged easily in daylight.

Designed and described by

THE STAFF

Australian Radio College

Sydney



A general view of the finished receiver.

Constructional Hints

The receiver comes to you as a complete kit of parts, and when we say complete we mean that you get everything right down to the last nut and bolt, even a Rola 5-inch permag. speaker and Minimax batteries. In building any receiver, probably the most difficult job is laying out the components so that all leads will be as short as practicable and that grid and plate leads are well spaced from each other. With the set under discussion, this particular task is already performed for you. The kit comes with all the mechanical assembly work already carried out. All you are required to do is wire up the various components according to the circuit diagram shown in Figure 1.

Your first task is of course to take the chassis from its cabinet. To do this, first remove the two control knobs, then extract the two brass screws in the top left and top right hand corners of the front panel. The panel may then be lifted out. You will notice adjacent to the lower edges of the chassis two grooves cut in the sides of the cabinet. These grooves are to accommodate the flange on the ends of the chassis, consequently to remove the chassis from the cabinet it must be pulled straight towards you.

In the bottom of the cabinet you will find a parcel containing all the small parts such as resistors, condensers, battery plugs, grid clips, etc., also two 45 volt Minimax batteries and one 1.5 volt battery. Before making a start on the actual wiring up of the set, you are advised to carefully check the kit of parts with the undermentioned list.

When you are sure that you have accounted for everything, you may turn your attention to the preparation of the various components for the wiring-up process. First remove all the valves from their sockets and put them in a safe place. Although they will stand ordinary handling they have any valve's marked antipathy to being dropped on the floor. Next remove the speaker from the chassis. If you are one of those particularly careful and quite un-

natural people who never put their fingers through the cones of speakers, you may leave it on the chassis. However, if you are wise you will remove it and also put it in a safe place.

Now turn the chassis upside down, first making quite sure that the tuning condenser plates are turned right in, and then carefully tin all the solder lugs on valve sockets, resistor strips, coils, potentiometer and the eight solder lugs placed under the holding-down bolts of the I.F. transformers. Also tin portion of the wiper springs which make contact with the condenser's moving plates. The connections to the fixed plates of the condenser are accessible from the top of the chassis. These lugs should also be tinned.

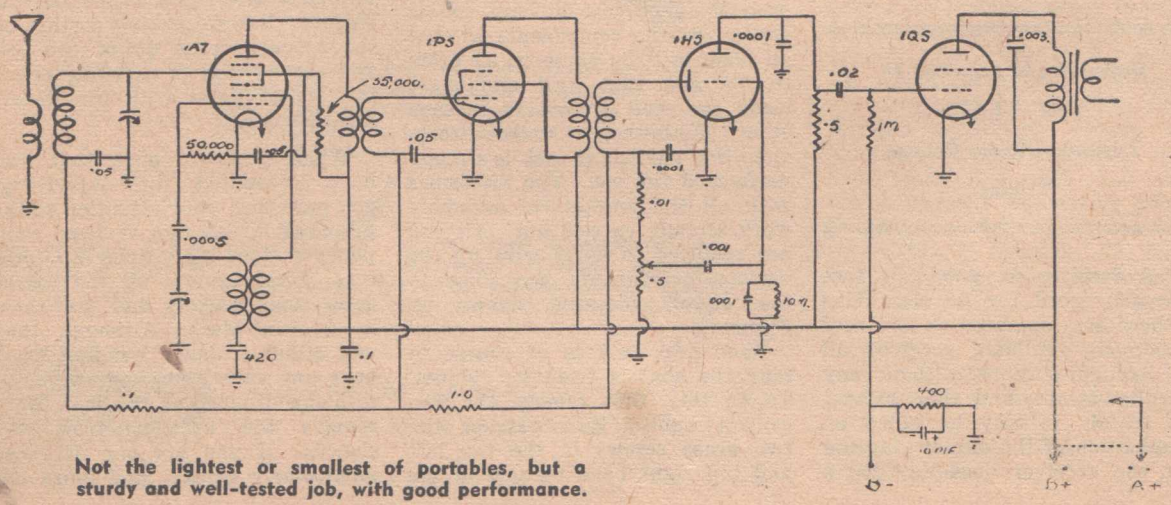
You are now ready to commence the wiring. With this receiver as with any other, some systematic method of wiring is advisable in order to avoid mistakes and forgotten connections. It is wise to commence with the filament connections as it is most important that no error be made here. The filament connections to all the valves are the same, viz. Nos. 2 and 7. A word concerning the method of numbering the sockets may be desirable here, although it is assumed that you are fairly familiar with them. Looking at the sockets from below the chassis, pin No. 1 is immediately to the left of the key-way, and the numbering is continued in a clockwise direction until one arrives at pin No. 8 which is of course immediately to the right of the key-way. You are advised to follow this method of identifying the pins rather than rely on the numbers on the sockets.

Unlike indirectly heated types of valves, we have, with the filament type, to adhere to a definite polarity in the wiring up of the sockets. In this case, pin No. 7 is filament minus while pin No. 2 is filament plus. The filament minus connections may be made where convenient to one of the solder lugs on the chassis. All the filament-plus connections should be connected together. The wiring of the filament circuit may be completed by making connection to two of the lugs on the resistor strip for later connection to the battery leads and switch.

The colour coding of the aerial and oscillator coils and I.F. transformers are as follows: Red is B plus in the case of the two I.F. transformers and the oscillator coil, while the red lug on the aerial coil connects to earth. Incidentally, the aerial coil is the one having the black dot in one corner, while the oscillator coil has a red dot in one corner. The black lug on the first I.F. transformer connects to grid return or the A.V.C. line. The black lead on the second I.F. transformer connects to earth via a .1 meg. and the .5 megohm potentiometer. The green lead emerging from the top of the first I.F. transformer connects to the grid cap of the 1P5GT valve while the green lug on the second I.F. transformer connects to pin No. 5 of the 1H5GT valve socket. The blue lead on the first I.F. transformer connects to pin No. 3 on the 1A7GT valve socket while the blue lead on the second I.F. transformer connects to pin No. 3 on the 1P5GT valve socket. The green lug on the oscillator coil connects to one of the fixed sections of the tuning condenser, preferably the one nearest the back of the chassis. The green lug on the aerial coil connects to the front section of the tuning condenser's fixed plates. The black lug on the oscillator coil connects to one end of the 420 mmfd. padder condenser. The other end of this condenser goes to earth. The black lug on the aerial coil also goes to earth. The blue lug on the oscillator coil connects to pin No. 6 on the 1A7GT valve socket.

The wiring of the battery switch located on the back of the volume control potentiometer needs some care if damage to the valve filaments is to be avoided. The switch is of the double pole single throw variety. One section is used to close the filament circuit while the other section is used to close the plate circuit when the knob is turned to the right. Looking at the back of the switch and moving in a clockwise direction the lugs may be identified as follows. Lug No. 1 fixed contact first section, lug No. 2 moving contact first section, lug No. 3 moving contact second section, lug No. 4 fixed contact second section. The A battery positive lead should be connected to pin No. 1 while the B battery

(Continued on page 30)



Not the lightest or smallest of portables, but a sturdy and well-tested job, with good performance.

positive lead should be connected to lug No. 4. Lug No. 2 should connect to the A positive connection on the valve sockets while lug No. 3 should connect to the B plus connections on the various coils.

The two small semi-adjustable trimmer condensers are for connection across each section of the main tuning gang—one trimmer between each set of fixed and moving plates.

As it is assumed that those building this receiver have had some prior experience, we are not giving any detailed description of how to wire in the remaining small components. The ability to read a circuit diagram will ensure that you will have no trouble in regard to the placement of these small components. When you have finally completed the wiring, check your work very thoroughly to make certain that you have not mixed any of the B plus connections with the filament wiring. This would be disastrous. Care is also necessary when connecting the battery leads to their appropriate plugs. The A battery leads should connect to the small two-pin plug, while the B battery leads should connect to two of the pins on the three-pin plug. If you make quite sure of this, no harm can come to the valves because the two plugs are non-interchangeable.

With the receiver completed and the batteries connected, you should be able to hear all the Sydney stations by rotating the dial because the coils have been pre-aligned by

(Continued on page 28)

PARTS LIST

*13—1/8 x ½ whitworth bolts.
*21—1/8 nuts.
*1—4-way resistor strip.
*8—½" brass wood screws.
3—feet spaghetti.
3—feet 18 gauge tin copper wire.
1—foot shielded Belden wire.
2—yards Belden.
4—pieces of Belden wire, each 1-foot long (four different colours) for battery leads.
*1—NP terminal.
3—small grid clips.
*4—octal sockets.
1—GT valve shield.
2—trimmers.
1—chassis.
1—cabinet and panel.
2—bakelite knobs.
2—felt washers.
1—1A7GT valve.
1—1P5GT valve.
1—1H5GT valve.
1—1Q5GT valve.
2—type 482 Minimax B batteries.
1—type 745 Minimax A battery.
*1—dial assembly.
*1—2 gang condenser.
*1—5-inch pm. speaker.
*1—aerial coil.
*1—oscillator coil.
*2—I.F. transformers.
*1—.5 meg. potentiometer, with switch.
2—.1 mfd. 400V condensers.
2—.05 mfd. 400V condensers.
1—10 mfd. 40 PV electrolytic condenser.
2—0.0001 mfd. mica condensers.
1—0.001 mfd. mica condenser.
1—0.003 mfd. mica condenser.
1—0.02 mfd. 600V condenser.
1—0.00025 or 0.0001 mfd. mica condenser.
1—0.0005 mfd. mica condenser.
1—420 mmfd. padding condenser.
2—1 meg. BT1 resistors.
1—10 meg. BT1 resistor.
2—0.1 meg. resistors, ½ watt.
1—35,000 ohm resistor, 1 watt.
1—0.5 meg. resistor, 1 watt.
1—400 ohm wire wound resistor.
1—0.05 BT1 resistor, ½ watt.

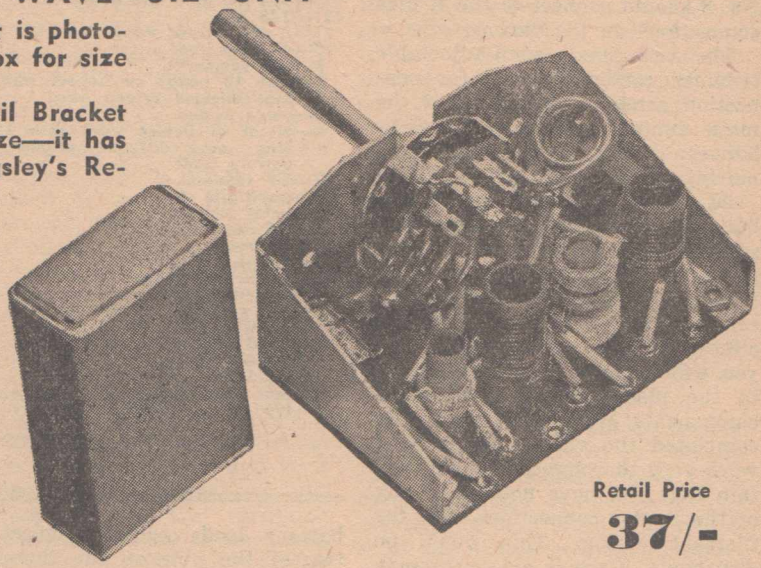
All those items marked with * are already assembled on the chassis.

MEET THESE NEW KINGSLEY UNITS

NEW MINIATURE DUAL WAVE OIL UNIT

The Kingsley Dual Wave Coil Unit is photographed here alongside a match-box for size comparison.

This new Kingsley Dual Wave Coil Bracket has not merely been reduced in size—it has been thoroughly designed by Kingsley's Research Engineers. It is no mere adaption of existing components, being engineered not only from the electrical but also the mechanical viewpoint.



NO OTHER D/W BRACKET GIVES ALL THESE FEATURES:

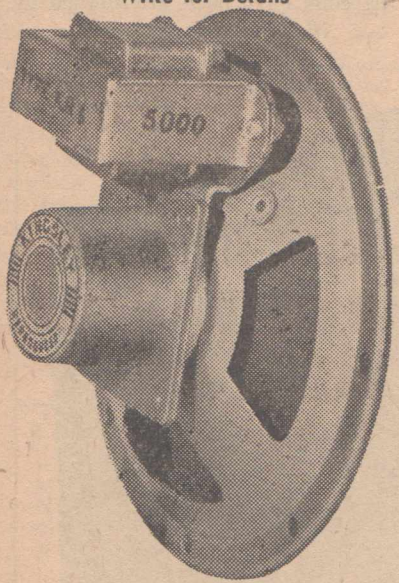
- Each unit is core tuned.
- Models for every converter valve.
- Frequency coverage 5.95 megacycles to 18.5 megacycles and 540 to 1650 kC/s.
- Trimmers and cores are ready accessible.
- Coils and wiring well protected.
- Dimensions of unit: 3 ins. wide, 2 ins. deep, 1¾ ins. high.
- Ease of wiring into chassis.
- Sturdy construction of unit.

Write for Details

Retail Price

37/-

☆ ☆ ☆



KR5

HERE'S A NEW ADDITION TO THE KINGSLEY RANGE OF SPEAKERS

5" Permag. TYPE KR5

The KR5 Speaker is the latest addition to the already famous range of Kingsley Radio Speakers.

Illustrated at left—This Kingsley Speaker has new and improved seamless cone. Imported British magnet, featuring "Alcomax 2"—the highest grade magnetic alloy made. Cadmium plated housing. Standard mounting. Full-size matching transformer. Available any desired impedance. Write for full details of the KR5.

IMPORTANT

If your usual supplier is unable to supply your requirements of Kingsley Products, drop us a line mentioning his name and address.

Ask for—Insist on—DEMAND Genuine Kingsley Parts from your supplier.

KINGSLEY QUALITY RADIO PRODUCTS

KINGSLEY RADIO

KINGSLEY RADIO PTY. LTD.

380 St. Kilda Road, Melbourne, Victoria . Phones: MX 1159, MX 3653

CALLING CQ!

By Don B. Knock, VK2NO

THE week ending 8/9 May was a bad one for DX workers, excepting perhaps on 28 mC/s. A pronounced Aurora produced queer effects on all bands, with flutter, distortion, and an unwanted commercial "ticker" signal on 14.2 mC/s. This also had repeat points through that band and led to suspicion that receivers were temperamental. It was old man Sol that was misbehaving.

* * *

Latest in Funny Fonetics is that presented to Dennis Chester, G3-BUU of Wolverhampton England, by Geoff Hanley, G8LP. Without much deviation from the authorised phonetic code, Dennis is known to DX men far and wide as "G Three Baker's Ugly Uncles!"

* * *

Effective from 7 May last, the old Westralian Subiaco Radio Society is now known as the "Radio Society of Western Australia." The change-over took place on the occasion of the 25th birthday celebration.

* * *

Amateur radio is a bit of a "busman's holiday" for Graham Connelly, VK2ARR. Graham oft-times puts in long hours at the turntables from mid-night to dawn at a Sydney commercial Broadcaster, and has been known to go home and keep a sked on 40 phone at 0700 hrs. That certainly takes enthusiasm!

* * *

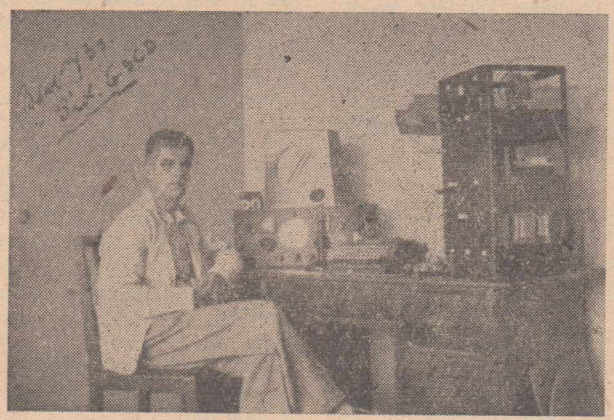
How true is a "QST" editorial, in speaking of the public relations aspect of amateur radio. "There are commercial interests which would sell their corporate souls for some of our frequencies. There are foreign governments which bitterly resent the international scope of amateur radio. And there are local cranks who would silence us permanently for messing up one stinking soap opera."

The VK can thank good fortune that as yet he doesn't have to contend with TVI in this country. In Britain and USA, amateur radio gets all the TV kicks, and is accused, oft-times unjustly, of interference with vision programmes. It isn't going to do amateur radio any good either. The publication "CQ" quotes an instance in USA, of a TV Show for children. The picture became blurred and one of the adults in the audience got up and denounced a certain ham . . . asked for civil suit and united action by the parents. The TV receiver happened to be 10 miles from the ham's station, but that didn't matter to the moron concerned. To the latter's discomfiture the ham happened to be in the audience himself . . . with his own children . . . and got to his feet and defended himself. But so often amateur radio doesn't get a chance to defend itself. TV is a real menace of the future to amateur radio.

* * *

Re German callsigns . . . those with prefixes D2, D4 and D5 are legitimate. Those using DA prefixes are undercover stations . . . pirates if you like. Severe penalties are imposed by the various Zone authorities and the usual punishment is 6 months "inside." It may seem hard on the keen German amateur who wants to partake of the hobby with the rest of us, but what would have been our fate under Nazi domination? Probably a bullet and no palaver. The Nazi regime wouldn't have tolerated amateur radio; it was rigidly controlled in pre-1939 Germany, very much on the lines of Russia today. Despite the fact that the unlicensed DA may have no evil purpose, it is necessary to discourage contact with him; for his own good. Unlicensed activity can only delay the issue of licenses to law-abiding German Nationals who want to join in at the hobby.

WELL-KNOWN "G"



G3CD is located at Bournemouth, one of Britain's most popular seaside holiday locations, the OM being Sid Taylor, and the address 68 Richmond Wood Road, Queen's Park. He runs 50 watts to a 6L6-807 TX with Zepp aerial. This "shot" shows G3CD at the operating position of his neat station, which often works with Australia on 14 mC/s telegraphy.

Practical Man's Corner

DURING the recent war, outstanding need in radio equipment was for effective tropicalisation of components. Gear had to stand up to intensely saturated atmospheres such as that of Milne Bay in the New Guinea area. During the week ending 1/2 may, 1948, Sydney amateurs could have done with a full complement of proofed gear when that cyclone hit Eastern VK. Rain streamed in torrents, swept in by Easterly gales, and receivers, after a few hours of about 100% humidity, went out of line or became otherwise temperamental. Antenna feedlines, other than the wide-spaced spreader varieties, just wouldn't take the load, or took too much. After that wet week-end, a drying-out process, followed by attention with the TP varnish brush, seemed to be in order.

* * *

A point about single-ended valves . . . don't rush to use them in microphone pre-amplifier stages unless you simply haven't a double-ender left. Especially with high-impedance microphone input, the SE valves can be productive of AC hum, where the grid lead runs anywhere near the heater wiring. There are advantages in the double-ended valves that seem to have been overlooked.

Noticed an ad for a useful kind of insulating tape, in "Short-Wave Magazine," England. It is called Parafilm and is ex-war stock. Difference from the usual sticky tape is that with Parafilm one binds the joint to be covered, then applies the heat from a warm hand or a match to mould the tape solidly. The price . . ,. four rolls for 2/- . . . but that is in GB . . . not here.

* * *

Following on the "Ribbon Beam" (ARW May, 1948) it was decided to try a version using spaced wires in the radiators. Two folded dipoles were constructed of 16 gauge copper with Sweetman Type 3 Polythene Spacers arranged every 14 inches. The Telcon feedlines were retained, but it is intended to try spaced lines using polythene spreaders similarly, thereby raising the overall efficiency of the system. Wet weather conditions will not affect to any noticeable degree radiators and lines of spaced construction. 12 inch separation is satisfactory between these Type 3 spacers for unstrained lines but with lines well strained either horizontally or vertically, separation of 24 inches will be quite satisfactory. Price of these spreaders is 5/6 per dozen, obtainable from C. S. Sweetman, 31 Chesser St., Adelaide.

* * *

Here is the germ of an idea for Home Recorder fans. Latest American outfit using wire is quoted in an advertisement as using "plated brass wire with unlimited magnetic life." In view of the scarcity of fine gauge steel wire for the purpose, the brass wire idea might be worth following up.

* * *

In applying a BC457A for service as a VFO unit on 14 mC/s, an unusual trouble was encountered. A power supply was constructed, including a 26 volt transformer for heater supply to the VFO valves, and with indirectly heated 4 volt valve rectifier for HT at 250 volts. Switching for HT was in the power transformer primary and it was noticed that at the VFO frequency the receiver indicated a T7 signal at about strength 7, despite the fact that the primary of the HT transformer was switched off. The unwanted signal was traced to coupling between the 26 volt heater transformer and the secondary of the HT transformer, resulting in about 8 volts getting to the oscillator of the VFO unit; a point which speaks well for the 1626 triode as an oscillator. Switching the HT transformer secondary centre-tap of course, provided a complete cure.

* * *

Dual I.F. receivers are in fashion just now, and the boys are hunting around for those ARC receivers (ex US Services) with 85 kC/s intermediates therein. Very few such receivers have appeared on the Disposals market here. A useful thought for dual IF receivers is to resurrect a few of those old-time 175 kC/s IFT's for incorporation in the second channel. Remember particularly those Wetless variable selectivity 175 kC/s IFT's with air trimmers? It is true that in radio, old components and ideas are likely to prove unexpectedly useful, even in this, the atomic era.

BAYSIDE CLUBS

There is considerable activity on both sides of the Bay, down Melbourne way.

At Geelong a radio club has been formed, with VK3ABE as President, VK3SY as Senior Vice-president, VK3AKE as Vice-president, VK3IC as Secretary, VK3AJF as Treasurer, and a committee consisting of VK3BU, VK-3BW, VK3VF, VK3APE and VK-3ALG as QSL manager and press correspondent. All interested, including short-wave listeners and would-be hams, are invited to get in touch with the Secretary at 158 Kilgour Street, South Geelong.

On the other side of the Bay at Mornington a club has been formed, with meetings to be held at the Balcombe Army School of Signals. At the inaugural meeting held on June 21, Lt. Roberts gave a talk on the Wireless Set No. 10.

Further details from VK3ABO, 3 Alfred Street, Mornington.

"S" METERS

(Continued from Page 20)

the majority of communications receivers varies the bias applied to the first I.F. valve (and also other valves). Backing off this control will therefore upset the balance of the meter circuit and the needle will come back against the left-hand stop. No harm will accrue if R2 in Fig. 1 and R4 in Fig. 2 are sufficiently large to prevent the meter passing a current sufficiently large to damage the moving coil winding. If any doubt exists, it will be well to fit a switch to cut the meter out of circuit when receiving C.W. This switch can often form part of the potentiometer used for controlling R.F. gain, as is done in many commercial receivers.

It should also be remembered that the meter itself is a delicate instrument. The movement will be highly damped and the needle will move much less if a piece of wire is arranged to short circuit the terminals, when the meter is transported at any time. This hint is a useful one to apply to any moving coil meter, when sent by post.

Amateur Transmitting Licenses

Following are the alterations, issues, and cancellations from the P.M.G. Department for June, 1948:

Issues:

VK2ZS. G. Challender, 112 Tozer St., West Kempsey, NSW.

VK2YM. R. Hancock, 603 Blaxland Rd., Eastwood, NSW.

VK2YN. J. R. Watt-Bright, P.O. Box 60, Bourke, NSW.

VK2YQ. R. J. Milne, 116 Kendall St., Cowra, NSW.

VK2XE. T. G. Melvan, 125 Cobra St., Dubbo, NSW.

VK2UY. S. J. Burke, 79 Hanbury St., Mayfield, NSW.

VK2TB. H. C. Rudder, 8 Fitzroy St., Grafton, NSW.

VK2OX. J. Stewart, 398 George's River Rd., Enfield, NSW.

VK2UU. E. J. Morrison, 44 Olola Avenue, Vaucluse, NSW.

VK2XX. E. C. Howard, 117 Oak Rd., Sutherland, NSW.

VK2ABL. R. W. Thurley, Lovedale Cottage, Stewart Avenue, Hornsby, NSW.

VK2ABX. R. C. Gibson, 127 Maitland St., Gunnedah, NSW.

VK2AMW. Wollongong Amateur Radio Club Technical College, Wollongong, NSW.

VK2ABW. K. W. Ford, 20 Augusta Rd., Manly, NSW.

VK3RM. R. W. Easterbrook, 37 Robert St., Bentleigh, Vic.

VK3ABX. V. D. Bond, Bogong, via Wodonga, Vic.

VK3AUG. N. K. Sallman, Box 98 Merbein, via Mildura, Vic.

VK3ABF. A Robinson, 143 Raymond St., Sale, Vic.

VK4AM. W. K. Kirk, 15 Brisbane St., Mackay, Qld.

VK5JZ. J. Young, 1 Naldera St., Glendore, S.A.

VK6CK. C. M. Hayes, 26 Kimberley St., West Leederville, W.A.

VK7BM. W. S. Morrison, 20 Main Rd., Moonah, Tas.

VK2JS, J. M. Roberts, 12 Nicholas Avenue, Campsie, N.S.W. (reissued).

VK2PT, A. Stephenson, 152 Fullerton St., Stockton, N.S.W.

VK2ZT, T. Troughear, 129 King's Rd., New Lambton, N.S.W.

VK3UG, H. N. Culliver, Napier St., Rye, Vic.

VK4XD, K. W. Nutt, 1 Fletcher St., Townsville, Q'ld. (C/- Box 486, Townsville).

VK6BF, E. J. Thornton, Lot 92, Toorak Rd., South Belmont, W.A.

VK6BA, W. S. Moore, 171 Thomas St., Subiaco, W.A.

Alterations:

VK2FK, T. W. Kinsella, now 115 Alice St., Sans Souci, N.S.W.

VK2VS, V. R. Shillcock, now C/- Canberra Broadcasters, Civic Centre, A.C.T.

VK2GD, K. H. Hatton, now 21 Bulkira Rd., Epping, N.S.W.

VK2AVT (formerly VK2AIT), V. E. Tierney, now Miller Rd., Guildford, N.S.W.

VK2AWV (formerly VK2OX), J. J. Mount, now 50 Potts St., Ryde, N.S.W.

VK2YT, G. R. Woodward, now Box 20, RMB, Kirkconnell, via Rydal, N.S.W.

VK2FN, T. G. Noble, now Hood St., Coff's Harbour Jetty, N.S.W.

VK3QK, E. H. Jenkins, now 415 St. Kilda St., Elwood, Vic.

VK3VN, P. E. Evans, now 1 Boola Crescent, Yallourn, Vic.

VK3IU, T. J. Coakley, now Sandilands Lodge, 71 Queen's Rd., Melbourne, Vic.

VK3FE, H. S. Constable, now 19 Parker's Rd., Parkdale, Vic.

VK7JB (formerly VK3AJB), J. C. Batchler, now 12 Beechworth Rd., Lower Sandy Bay, Tas.

VK2EH. E. P. Hodgkins, now Coast Rd., Avoca Beach via Gosford, NSW.

VK2MR. (formerly VK2ANN.) L. H. Vale, now 12 Quest Avenue, Miranda, NSW.

VK2CX. J. T. Evans, now Nelson's Bay, via Newcastle, NSW.

VK3ZK. J. T. Stevens, now Beverford, P.O. Box 263, Swan Hill, Vic.

VK3APW. (formerly VK2APW.) R. M. E. Rees, now 10 Craigmore St., Darling, Vic.

VK3JQ. T. L. Lang, now 270 Canterbury Rd., Surrey Hills, Vic.

VK2HM—SILENT KEY

On Monday, May 18, Mr. H. A. Marshall (VK2HM) died suddenly in Sydney. With the passing of Alec Marshall, Australian amateur radio and electrical trade circles lose a colourful identity. An electrical and radio engineer with a lifetime of experience, he operated his first amateur station at Port Pirie, South Australia, at the School of Mines. Later, he was electrical engineer at Armidale, N.S.W., where he supervised the changeover from D.C. to A.C. power for that township. It was at Armidale that A2HM was a prominent station in the "200 metre phone" days. Later in Sydney, he was active on the old "32 metre" band. Quite recently, VK2HM returned, after a long absence, to active participation in amateur radio, with CW operation on "20." He was about to keep a schedule with a J4 station at which his daughter was to be present, when fate decreed otherwise. Alec Marshall will be missed by all who knew him intimately, and our sincere sympathy goes to his family and relatives.

—D. B. KNOCK.

PORTABLE

(Continued from page 25)

the manufacturer and should not require any great degree of adjustment. This assumes of course that the slugs have not been touched prior to being wired into the set.

In order to check the alignment, tune to a station at about the middle of the broadcast band and turn one of the slugs on say the first I.F. transformer very slightly in one direction or the other; if an increase in volume is noted, keep turning in the same direction until a peak is reached. Make a similar adjustment to the second slug on the first I.F. transformer, then repeat the process with both slugs on the second I.F. transformer. Remember that you should not have to make a very drastic adjustment and so avoid turning the slug too far to begin with.

The adjustment of the aerial and oscillator coils may now be undertaken. First of all, tune to station 2SM and make a slight adjustment of the trimming condenser connected across the oscillator section of the gang. Retune to the station and note if any increase in volume has taken place. If there is an increase, continue to turn the trimmer slightly in the same direction, retuning the receiver after each adjustment. If on the first adjustment a decrease in strength is noted, then obviously it is necessary to turn the trimmer in the opposite direction. Having peaked the oscillator trimmer, perform the same function with the trimmer connected across the aerial section of the tuning condenser, but this time of course, the main tuning control is not touched during the process.

If after peaking the two trimming condensers, you find that the black line on the condenser drum does not coincide with the station call sign marking for 2SM, undo the set screw clamping the drum to the condenser shaft and position the pointer line on the station call sign without moving the condenser itself. Now tighten up the drum set screw once again so that it securely grips the shaft.

To check the alignment at the low frequency end of the dial, tune to station 2FC and then slightly move the slug on the aerial coil noting whether any increase or decrease in volume has taken place. The position of the oscillator slug should not need any adjustment, but if 2FC is very far from its correct position on the dial, it is permissible to make slight adjustment of the slug in order to bring the station into its correct tracking position. If it is necessary to do this, then you may find that you will also have to make a slight readjustment of the trimmers at the high frequency end of the dial.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

BBC Year Book

I have received from the BBC a copy of the 1948 Year Book and, being the Jubilee number, it is packed with entertainment and information. Among the seventeen leading articles written by famous authors, broadcasters, and members of the BBC staff I came across a few statistics that I thought would be of especial interest to readers of these pages.

Regular broadcasting began in Marconi House, London, and from November 14, 1922, daily programmes were transmitted in a 1kw transmitter having the call-sign 2LO. This transmitter had been assembled from scrap components by Marconi engineers and had been used in the months preceding November for occasional broadcasts.

The early low-power transmitters had only a very limited coverage. A great improvement in coverage was achieved when the first high-power long-wave broadcasting station in the world was opened in Daventry in 1925. The power of this station was 25kw., which now would be considered as only just out of the low-powered class. The technique of building high-power transmitters was gradually developed, and in 1927 experiments were started at Daventry with much higher power on the medium wavelengths. In 1929 more experiments and higher power transmitters. Further improvements between 1934 and 1939 and then "during the war more high-power transmitters were built, and one of these had a power of 800kw, by far the largest that has ever been constructed."

Another side of the work is the services on short waves to countries abroad. Experimental transmissions started in Chelmsford in 1927 and the first permanent transmitters for the Empire service were built at Daventry in 1932. The service was a great success and it was considerably expanded up to the beginning of the war by the construction of more transmitters. During the war there were further extensions and at the peak in 1944 there were thirty-six transmitters radiating programmes in some forty-five different languages. Since then there has been a slight reduction, but the Overseas and European Services of the BBC are still a major part of their work.

* * *

Letters received this month include two from listeners who have found these pages helpful in enabling them to identify many of the stations they were hearing but not quite sure about. Mr. Kevin J. Jacobson, of Gobarop, Victoria, writes inter-alia:

"I have been reading shortwave notes in Australasian Radio World for just on two years and find them very interesting. I am at present using an Army disposals receiver AR14, operated on dry batteries, for we have no electric light here and, as I live on a farm, it limits my spare time for listening.

New Stations

VLG-11, Lyndhurst, 15.21mc, 19.72m: This new transmitter for "Radio Australia" came into operation during June and is heard from 1-2 p.m. to Pacific, Asia and Japan daily except Saturdays when, from 1.15-5.30 p.m., it transmits special sports programme to the Forces.

VLG-11, on 15.20mc, 19.74m, is heard daily from 2.30 to 8.45 p.m. to Africa.

PCJ, Hilversum, 21.47mc, 13.97 m: After several tests, has now settled down to regular transmissions and is heard splendidly at night from 8 o'clock.

SAYS WHO?

"I am enclosing a list of stations I have logged which I generally check from your loggings:

"VLW-5, 9.61mc, and Radio Australia.

"VLQ-3, 9.66mc; VLH-3, 9.58 mc; VLR, 9.54mc; and VLR-2, 6.15mc, which have all been verified.

"KNBA, 9.75mc; KNBI, 9.65 mc; KWID, 11.9mc; KGEX, 11.73 mc; KCBR, 11.21mc; KGEX, 11.73mc; KCBR, 11.21mc; KGEI, 15.21mc; KNBX, 11.79mc; JKE, U.S. AFRS, Tokyo, 4.065mc; XGOY, 15.175mc; Radio Manila, 11.59mc; HER-5, Berne, 11.865 mc; All India Radio, Delhi, 9.59 mc; Radio Indonesia, 15.145, 11.206 and 10.6mc; HCJB, 9.90 and 12.445mc; and, last of all, Radio Saigon on 11.78mc. I would like some advice on a station I have been hearing about 8 o'clock on about 35.04 metres. It consists of a musical programme till about 9 and then ends broadcasting. I think it is an Asiatic station." (Probably you are hearing XPSA, Kweyang, 8.465mc, 35.44m.—L.J.K.)

* * *

Mr. C. R. Woolsey, Campbell St., Terrigal, N.S.W., writes: "Being a subscriber to ARW I thought you would like to hear from me re veries of S/W stations I have heard during the last three months. I have 130 QSLS from all parts of the world . . . I will send to you details of my receiver and where the QSL's are from in my next letter. I, like you, received a letter from Canada re my logging of CHOL, CKCS and CKNC." (Will certainly be very pleased to receive the information you promise.—L.J.K.)

Here's Good Listening

Signals from the U.S.A. will be found excellent as follows:

KCBR, 'Frisco, 15.13mc, 19.83 m: 7-8.30 p.m.

KNBX, 'Frisco, 11.79mc, 25.45 m: 7-8.30 p.m.

KGEX, 'Frisco, 11.73mc, 25.58 m: 7-8.30 p.m.

KNBI, 'Frisco, 9.75mc, 30.77m: 7-8.30 p.m.

KNBA, 'Frisco, 9.65mc, 31.09 m: 7-8.30 p.m.

Also—

KRHO, Honolulu, 15.25mc, 19.7m, and Radio Manila, 11.84 mc, 25.34m.

KWID, 'Frisco, 9.57mc, 31.35 m: 10.30-11 p.m.

News is given at 7 o'clock daily, Commentary at 7.15 except Sundays when "Radio Forum" is broadcast. News and Press Opinion daily at 8.15.

BBC General Overseas Service News and Programme Announcements

News at 2, 2.15, 4, 5, 6, 9 and 11 p.m. and 2 a.m.

Weekly News letter at 8 p.m. on Sundays.

Home News at 5.10, 9.10 and 11.10 p.m. and 2.10 a.m.

News Analysis at 6.10 p.m. (Tues. to Sats.) and 2.10 a.m.

British Press Review at 10 p.m.

Radio Newsreel at M/n (except Saturdays, when 11.15 p.m.)

"London Calling" (programme announcements and summaries) at 2.10, 8.10 p.m., 1.15 a.m.

The short wavebands the BBC expect to be using for July and August will be:

July

Australia, N.Z., S.W. Pacific: Morning—16, 19, 25. Afternoon —13, 16, 19. Evening—16, 19, 25, 31.

Far East, North and Cen. China and Japan: Morning—19, 25. Afternoon—13, 16. Evening—13, 16.

N.W. Pacific, Burma, Malaya, S. China, S.E. Asia: Morning—19, 25. Afternoon—13, 16. Evening —13, 16.

August

Australia, N.Z., S.W. Pacific: Morning—16, 19, 25, 31. Afternoon—13, 16, 19, 25. Evening—16, 19, 25, 31.

Far East, North and Cen. China and Japan: Morning—19, 25. Afternoon—13, 16, 19. Evening —13, 16, 19.

N.W. Pacific, Burma, Malaya, S. China, S.E. Asia: Morning—19, 25. Afternoon—13, 16, 19. Evening—13, 16, 19.

Portugal Changes Frequency

I suppose CSW-6, Lisbon, on 11.04mc, 27.17m, has been one of the most consistent of the overseas stations as regards signal strength for many many years. Whilst changes in frequency have been commonplace with a large number of foreign transmitters, CSW-6 has stuck pat on 11.04mc. It will therefore come as a surprise to regular listeners to find they have been replaced by CS2MK on 11.027mc.

Here Are Some Good Reliable Signals Listed By Country

Austria

KXCA, Salzburg, 7.22mc, 41.61 m: This is the call-sign for the Armed Forces Radio Service previously listed as KOFA. Closes at 6.30 a.m.

Belgian Congo

Radio Congo Belge, Leopoldville, 9.38mc, 31.95m: Latest schedule: 3-4 p.m., 4-6 a.m. (This transmitter is intended for Belgian Congo only, so reports from Australia would be of especial interest to their engineers and doubtless bring a verification card.)

Radio Congo Belge, Leopoldville, 11.72mc, 25.6m: 8.30-11 p.m.

Radio Congo Belge, Leopoldville, 6.28mc, 47.77m: Generally in relay at above times.

Celebes

YFA4, Kakassar, 9.55mc, 31.41 m: Schedule on this new frequency: Week-days—2-4.30 p.m.; 8 p.m.-12.30 a.m.; 8.30-10.15 a.m. Sundays—10 a.m.-4.30 p.m.; 7.15 p.m.-12.30 a.m.

Colombia

HJCT, Bogota, 6.2mc, 48.08m: Being heard in N.Z. by Arthur Cushen till 2.15 p.m. on Sundays.

Canada

CHLS, Montreal, 9.61mc, 31.22 m: 6.45-8.30 p.m. on Sundays . . . special programme to Australia.

CHOL, Montreal, 11.72mc, 25.60m: Same as above.

CKCS, Montreal, 15.32mc, 19.58m: Good in mornings around 7.30. At night news can be heard at 11 o'clock.

CBLX, Montreal, 15.09mc, 19.88m: Good around 9 p.m.

China

XGOY, Chungking, 11.83mc, 25.35m: News at 8.30 and 11 p.m.

15.17mc, 19.77m: News at 9 p.m.

6.14mc, 48.86m: News at 10 p.m.

XGOA, Nanking, 9.73mc, 30.81 m: News at 11 p.m.

Cuba

COCY, Havana, 11.737mc, 25.55m: Good both morning and night, especially at 10 p.m.

Finland

OIX-2, Lahti, 9.495mc, 31.57m: News in English at 10.25 a.m. and 3.45 p.m.

Germany

Berlin Rundfunk, 6.07mc, 49.42 m: Being heard again—2-6.30 p.m., 8-9.30 p.m.

Holland

PCJ, Hilversum, 21.47mc, 13.97 m: Very good at night.

11.73mc, 25.56m: English at 7 a.m.

9.59mc, 31.28m: Closes at 8.30 a.m.

India

VUD-8, Delhi, 21.51mc, 13.95 m: News at 1.30 p.m.; 3.30; 4.30 and 8 p.m.

VUD-10, Delhi, 17.83mc, 16.83 m: News at 1.30 and 7.30 p.m.

VUD-5, Delhi, 15.19mc, 19.75 m: News at 12.30 p.m.

VUD-7, Delhi, 15.16mc, 19.79 m: News at 8 and 9.30 p.m.

Indo-China

Radio France, Hanoi, 6.045mc, 49.60m: Heard from 5 p.m. with news at 6 o'clock.

Italy

Radio Milan, 11.81mc, 25.40m: Heard around breakfast time.

Java

YHN, Djogjakarta, 10.84mc, 27.67m: Is very good from 8.30 to 10.30 a.m. Opens again at 6.45 p.m. and heard until well after M/N.

Korea

HLKA, Seoul, 7.95mc, 37.81m: Can be heard fairly well from 10 p.m.

Norway

LLM, Oslo, 15.175mc, 19.78m: Signal at 4.30 p.m. is fair but spoilt by GSO, London, on 15.18 mc.

Portugal

CS2MK, Lisbon, 11.027mc, 27.20m: Heard till closing at 9 a.m.

Roumania

Radio Libre, Bucharest, 9.275 mc, 32.36m: Has been heard testing in English and asking for reports.

6.21mc, 48.29m: Same remarks apply.

Spain

Radio Nacional de Espania, Madrid, 9.368mc, 32.02m: Heard before breakfast. According to DX.NZ. are now verifying with attractive card.

Sweden

SBT, Stockholm, 15.155mc, 19.80m: Signal is fair at 5.45 p.m. Can also be heard on Sundays at 11 a.m.

Switzeralnd

HER-7, Schwarzenburg, 17.784 mc, 16.87m: Good night.

HER-6, Schwarzenburg, 15.315 mc, 19.59m: Also good in evenings.

West Indies (Haiti)

HH2S, Port-au-Prince, 5.94mc, 50.42m: English is given from 10-11.30 p.m.

* * *

HERE IS "RADIO AUSTRALIA'S" TRANSMISSIONS TO THE FORCES

Trans. F1: 7.43-9.15 a.m.: VLB-11, 15.16mc, 19.79m.

Trans. F2, 1-2 p.m.: VLB-5, 21.54mc, 13.93m. (Sundays from noon): VLC-9, 17.84mc, 16.82m; VLG-11, 15.21mc, 19.72m; VLA-6, 15.20mc, 19.74m (Sat. and Sun. only).

Trans. F3, 6.30-9.30 p.m.: VLB-3, 11.76mc, 25.51m: VLA-6, 15.20mc, 19.74m; VLG-3, 11.71 mc, 25.62m (from 8 p.m.).

Special Sports Transmission, Saturdays only, 1.15-5.30 p.m.: VLB-5, 21.54mc, 13.93m; VLC-11, 15.21mc, 19.72m.

Lieut. Commander Ted Ironmonger RN, the G who really started something with his "G8PO Beam Array," is for a year or two, on special duties in Australia. He is meanwhile on the air as VK3WU and can be heard reaching the Old Country in fine style on 14 mC/s phone. Needless to say, Ted is using a G8PO antenna.

Speedy Query Service

Conducted under the personal supervision of A. G. Hull

R.T.D. (Carramut) asks whether Radio World is operated by trade interests.

A.—No, Radio World is solely owned and operated by A. G. Hull, who is not in any way connected with the radio trade. The policy is completely independent, but one of co-operation with those firms which care to provide kits or components to help foster the interests of experimental radio. The Aegis Company has done a great job of providing complete kits at a time when it would be most difficult for the home builder to obtain parts individually.

* * *

G.C.T. (Mayfield) has built a set which operates well and appears to be correctly aligned, yet the dial markings will not match up with the positions of the stations when tuned in.

A.—There is no easy way of altering the dial settings if they are correct at one end of the band but run out down the other end. It would seem that your trouble is a matter of non-matching dial, gang and coils. For proper tracking these three items must all match. In your case the tracking error does not appear to be very serious and so the easiest way out will be to loosen the grub screw on the gang shaft, set the dial correctly to tune a station about the middle of the dial and tighten up at that. Sations at both extreme ends will then be out a bit, but not enough to be worth worrying abou. It is seldom possible to tune a set by the dial markings alone; much better to rock the dial over the station until correct tuning has been proved by ear.

* * *

D.M.H. (Hawthorn) says that he has heard that it is now an offence to use a regenerative receiver.

A.—No, we don't think that your information is correct. It is, and always has been, an offence to operate a regenerative receiver in an oscillating condition, thereby interfering with proper reception by other receivers in the neighbourhood. Operated intelligently a regenerative receiver will give its best results without actually causing interference.

* * *

I.D. (Bendigo) has in mind to take up technical radio by correspondence course, but is a little doubtful about whether the idea is practical.

A.—Yes, it might seem that technical radio is a difficult thing to study by correspondence, but we have plenty of proof that it can be done. Some practical work is essential, but this can be done at home by building up and experimenting with simple sets for a start, later building up bigger sets and the test equipment with which to adjust and check them. Among our subscribers we have simply hundreds of fellows who tell us that they started a correspondence course without any previous experience or knowledge and now operate successful radio and servicing businesses. Some of them live in far-away up-country towns and have never been to the cities, or seen the inside of a radio factory. In your particular case we feel sure that the Australian Radio College would suit you. They have had lots of experience in guiding students, and provide certain assistance which means a lot to those students who want to get started in their own business.

BACK NUMBERS

The following issues are available from our Back Dates Dept. at 6d. each or 5/- per dozen, post free:

1940—Only November.
1943—Only December.
1944—All except Jan., Oct., Nov. and Dec.
1945—All except Jan., Feb., Mar. and Apr.
1946—All except Jan., Mar., and May.
1947—All issues.

Please send your remittance in 1½d. stamps or postal notes.

Address:
Australasian Radio World, Box 13, Mornington, Vic.

BARGAIN CORNER

Advertisements for insertion in this column are accepted free of charge from readers who are direct subscribers or who have a regular order placed with a newsagent. Only one advertisement per issue is allowed to any subscriber. Maximum 16 words. When sending in your advertisement be sure to mention the name of the agent with whom you have your order placed, or your receipt number if you are a direct subscriber.

WANTED TO SELL: 11 copies of "Radio & Television," 1938, 1939. Also morse sounder and magnetic pick-up. A. M. McGregor, 6 Murray Street, Red Hill, Brisbane.

FOR SALE: Rola G12, permag, perfect condition, practically new. Price £10. Apply J. W. Nairn, 22 McLean Street, Morwell, Vic.

FOR SALE: M.C.R.1 receiver, AC/DC/Battery, all-band coverage, complete with power supply, 2 new batteries, earphones. Real bargain at £9. E. Gibbons, Box 189, Warracknabeal, Vic.

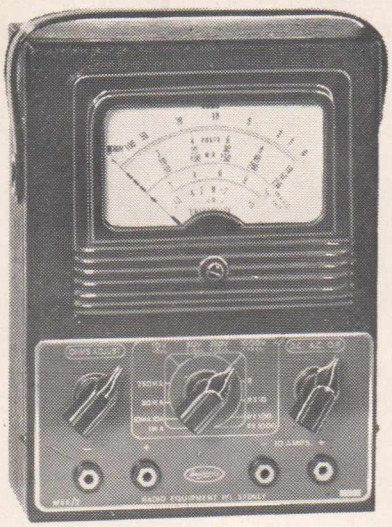
FOR SALE: Palec photo exposure meter, as new, in zipper case, price £7/10/-. Write No. 303, C/- Radio World, Mornington, Vic.

FOR SALE. A 900-watt, 30-volt projection lamp, with Goliath socket, new. Price £2 or offer. C. C. Mueller, Trungley Hall, via Temora, N.S.W.

C.T. (Auburn) is worried about the voltages in his FFR amplifier.

A.—By using the two separate transformers instead of the one specified you have left yourself open for quite a bit of trouble and you cannot expect to get full power. However, you should still get very fair results with the altered voltages. The most important voltage is on the screens of the output valves. This is much more critical than the plate voltage. Don't exceed 330 volts on the screens, measured to earth, and fix the bias at 27 volts. If these are O.K. the plate voltage can be anything from 550 to 650 without making much difference.

14 mC/s early morn DX phone men will remember Sgt Morgan RAF of VS2BU. He is now domiciled in Scotland and is ready to start up as GM3DPL.

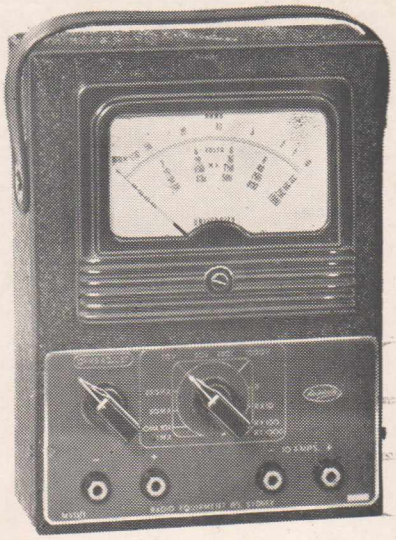


New . . . Two more

University

MULTIMETERS !

HOUSED IN ATTRACTIVE NEW CASES . . . AND MANY NEW FEATURES!



MODEL MVA/2—AC/DC

Famous throughout the radio electrical industry in Australia, New Zealand and the near East, Model MVA Multimeter has been supplied in thousands. It has been used extensively in Trade circles, Military organisations and Government Departments. Now it comes to you in a new improved version with a "new look" appearance, and additional features. This new model, MVA/2, really has something. It is a reliable first-class instrument—designed for either use on the bench, or as a portable instrument in the field. As with all "University" test equipment, the heart of the instrument is the latest "University" four-inch square meter with clear open scale. The following ranges are provided:

D.C. Volts, A.C. Volts, Output Volts: 0/10, 0/50, 0/250, 0/1000. The sensitivity of the voltage ranges is 1,000 ohms per volt.

D.C. Current: 0/1, 0/10, 0/50, 0/250 mA and 0/10 Amps. Ranges are automatically compensated to prevent error due to changes in atmospheric temperature.

Resistance: 0/1000, 0/10,000, 0/100,000 ohms and 0/1 Megohm. Resistance values as low as .25 ohm can be measured on the low scale. Special circuit retains accuracy, despite voltage changes as battery ages.

Output Ranges: Minus 10 to plus 5 db, plus 4 to plus 19 db, plus 18 to plus 33 db and plus 30 to plus 45 db.

Controls and readings are on heavy brass etched panel. Instrument is built into sturdy, brocade-finished metal case with plastic strap carrying handle. Resistance ranges operate from internal batteries. Price: £11, plus sales tax. Size: 8" x 6" x 3", excluding handle. Complete with test leads and instructions. Range can be extended up to 50 Amperes with "University" plug-in shunts. Leatherette-covered carrying case is available separately if so desired.

MODEL MVD—DC

Pictured above is a new D.C. Multimeter of high quality specially designed for radio service and electrical work. It is a reliable instrument which carries the guarantee of satisfaction in the famous "University" Trade Mark. The following ranges are provided:

D.C. Volts: 0/10, 0/50, 0/250, 0/1000. The sensitivity of the voltage ranges is 1000 ohms per volt.

D.C. Current: 0/1, 0/10, 0/50, 0/250 mA and 0/10 Amps. Compensated ranges to minimise error due to atmospheric changes.

Resistance: 0/1000, 0/10,000, 0/100,000 ohms and 0/1 Megohm. Values as low as .25 ohm can be measured. A special Ohms circuit retains the original accuracy, although the battery may vary due to age.

This special 10 Ampere range is of particular value in the servicing of battery and vibrator receivers. This range can be extended to 25 or 50 amperes with "University" plug-in shunts, which can be purchased at any time. Shunts are also available for lower ranges, such as 2.5 or 5 amperes. No further calibration is necessary when using these popular current shunts. The various ranges of volts, ohms, milliamperes are selected by means of a foolproof switching system, which prevents changes in accuracy due to switch wear and contact resistance of the switches. The meter is the well-known "University" Model R4 rectangular type, fitted with an easy-to-read scale. Controls and ranges are clearly indicated on an etched brass panel. MVD is built into a sturdy brocade-finished metal box with plastic strap carrying handle. It is complete with test leads and instruction booklet and has built-in batteries. Price: £8/17/6, plus sales tax 10%. Leatherette carrying case extra if required. Size: As MVA/2.

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