

THE
AUSTRALASIAN

PRICE, 1/-

Radio World

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MAY 10, 1939

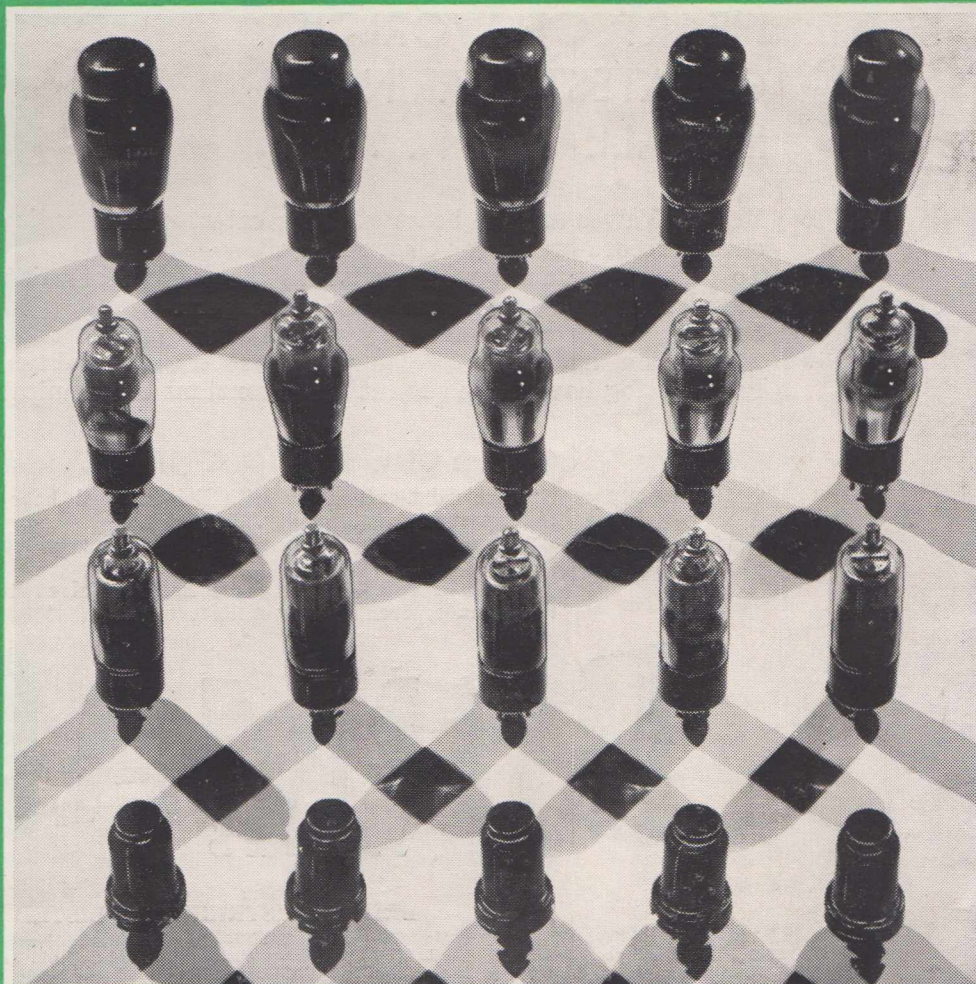
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● SPECIAL THIRD BIRTH-
DAY NUMBER

● FOUR RECEIVERS WITH
MANY NEW FEATURES

● HOW TO INSTAL THAT
EXTENSION SPEAKER

● WORLD S.W. NEWS:
HOURLY TUNING GUIDE



A selection of Brimar valves — See Page 8



ANOTHER WORLDS RECORD!

**"QUEEN MARY"
USING BRIMAR VALVES
BREAKS ALL RECORDS
FOR MARINE RADIO
TRAFFIC!**

**HEART OF WORLD'S
GREATEST MARINE
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Brimar Valves are the heart of the greatest marine radio equipment on the record-breaking "Queen Mary." To their dependability was entrusted the welfare of this six million pound liner and its thousands of passengers. Brimar Valves have faithfully played their part in this mammoth installation, and even through the most trying conditions of rain, hail and fog have helped to maintain constant communication.



GIVE YOUR RADIO A NEW LEASE OF LIFE

Replace worn-out valves with Brimar and hear the amazing difference in tonal quality. If you're planning a new circuit, for clearer reception install Brimar. There is a complete range of Brimar Valves to suit every radio made, even to the earliest model.



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VALVES**

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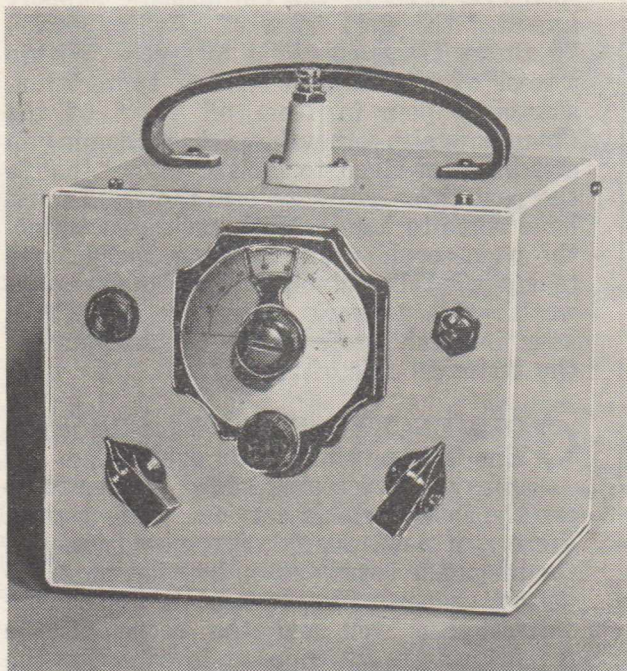
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EVERY BRIMAR VALVE IS 10 TIMES TESTED

Follow FOXRADIO

..... Always first
with the latest!

During the past two years FOXRADIO Coil Kits have been used and specified in a wide variety of outstandingly successful receivers featured in "Radio World," such as the "De Luxe Fidelity Eight," "Sky King D.W. Five," "One-Four Portable," etc. The many letters of appreciation we have received from satisfied builders prove that FOXRADIO coils and coil kits are your only logical choice.



We can supply a kit of parts for the "Tiny Tim" (illustrated above). More real distance-getting power has been packed into this little portable set than in any other two-valver we have ever seen.

Ultra DX Three

There are plenty of DX records waiting to be broken on "5," and the "Ultra DX Three" is the set that will enable you to break them, as from aerial terminal to 'phone jack it has been designed for highest possible gain.

Special complete kits of parts at special prices to "Radio World" builders have been prepared for all the above receivers. Quotations sent free by return mail. Take advantage of our speedy mail service . . . kits packed and despatched within twenty-four hours of receipt of your order.

● FASTEST SERVICE

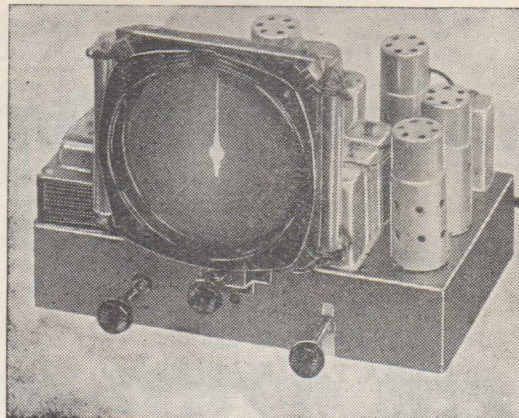
● LOWEST PRICES

● HIGHEST QUALITY

FOX & MacGILLYCUDDY LTD.

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(In Liq.)



ASTRA D.W. SIX

The "Astra Dual-Wave Six" described elsewhere this month fulfills the most stringent needs for sensitivity, selectivity, volume and tone. While we can supply any brand of coil kit for this receiver, we strongly recommend the FOXRADIO Coil Kit as specified for the "De Luxe Fidelity Eight," as it ensures highest gain coupled with perfect tracking.

Foxradio Coil Kit.

The Foxradio coil kit we recommend comprises aerial, r.f. and oscillator coils, with switch, and two iron-cored 465 kc. i.f. transformers.

1939 Companionette Three

The "Companionette Three" described this month makes the ideal personal receiver. Light and compact, it is easy to pack. Can be carried anywhere and used wherever power is available. A midget in size, but we guarantee you will be delighted with the excellent results you will get using a FOX-RADIO kit of parts. Everything supplied exactly as specified.

The Australasian
RADIO WORLD

Incorporating the
ALL-WAVE ALL-WORLD DX NEWS

Managing Editor:
A. EARL READ, B.Sc.

Vol. 4. MAY, 1939. No. 1.

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Our Third Birthday . .

WITH this month's issue the "Australasian Radio World" celebrates its third birthday, and commences its fourth year of service to readers. Prior to May, 1936, when the first issue of "Radio World" came off the press, there did not exist a locally-produced magazine serving the general technical radio field in Australia. That there was a real need for such a paper was soon evidenced by the enthusiastic support accorded the first issue of "Radio World" by those it was intended to serve. Within a week of publication letters of appreciation started to pour in from all parts of the Commonwealth—they have been coming in steadily ever since, to such an extent that in the past three years several thousand must have come to hand. With such a reception, the paper could not help going ahead, until to-day it is fully established, with a Commonwealth-wide network of readers, all with a keen interest, professional or amateur, in the technical side of radio.

COMMENCING with this issue the magazine is to be thoroughly overhauled, and many new features added to give readers the best possible service. This month there is a new cover design, new type, and the magazine is printed on heavier, more expensive paper. The content is under consideration as well, and the scope of the magazine is to be widened to cater for the varied interests of those whose acquaintance with radio extends beyond the tuning controls. While widely differing classes of readers are to be catered for, it is felt that all have one thing in common, and that is a deep and abiding enthusiasm for all things technical in radio.

LASTLY, a word of appreciation is due to the trade for its consistent support of the magazine during the past three years. Such support is a real tribute to the vital service the "Radio World" is giving, and proves its worth as one of the finest advertising mediums available in the technical radio field in Australia. For the future, both readers and advertisers can rest assured that the "Radio World" policy of "service first and always" will be just as rigidly maintained as it has been in the past.



During the past eight years we have specialised in supplying to the radio trade, test equipment cases, midget cabinets for mantel radios, and carrying cases for portable receivers and public address amplifiers.

We maintain extensive stocks, unequalled anywhere else in Australia, of specially-chosen timbers, covering cloths and plated fittings for all types of portable cases.

A comprehensive range of covering cloths offers our clients an exceptionally wide choice in up-to-date designs that are the last word in smartness and durability.

We can supply one case—or one thousand.

COMPANIONETTE CABINET.

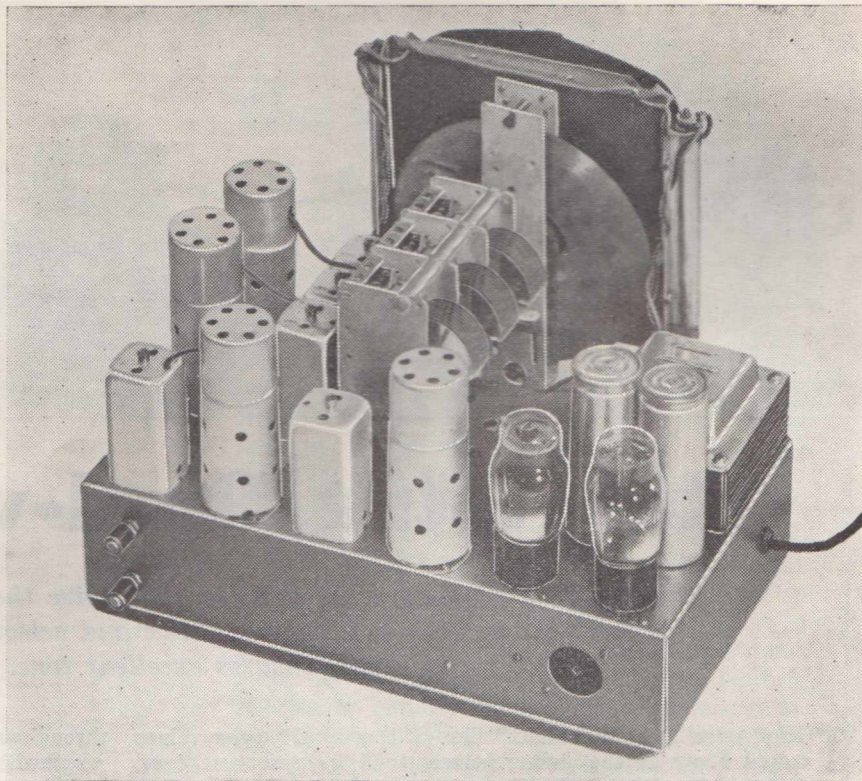
The midget cabinet used for the "1939 Companionette" described this month was designed and built by us specially for this receiver.

Write For Special Quote.

**Western
Manufacturing Co.**

18 Third Avenue,
Five Dock, Sydney.

'Phone - - - U 3444



This view shows the clean, compact layout of the "Astra D.W. Six," which is built on a steel chassis measuring 14" x 8" x 3."

pentode section is employed as i.f. detector and the other as a.v.c. rectifier.

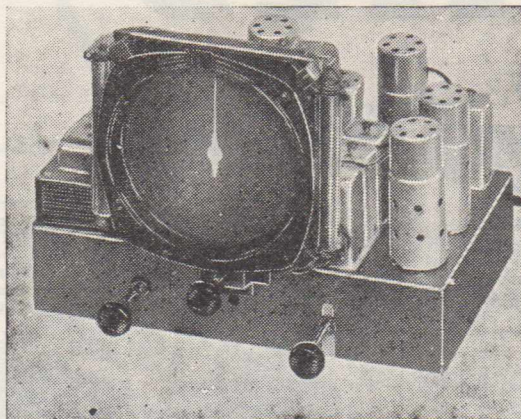
The audio system comprises a 6J7-G as a resistance-coupled pentode driving a 6V6-G beam tetrode with

"ASTRA DUAL-WAVE SIX"—List of Parts

- | | |
|--|---|
| 1—steel chassis to specifications | 1—20,000 ohm " " |
| 1—power transformer 385v. C.T., 385v. 100 m.a., 6.3v. 3a., 6.3v. 2a., 5v. 2a. (Radiokes) | 1—15,000 ohm " " |
| 1—dual-wave coil unit (Radiokes DAU-3) | 1—2,000 ohm " " |
| 2—iron-cored i.f. transformers (Radiokes type I.F.I.) | 1—300 ohm wirewound (I.R.C.) |
| 1—3-gang condenser (Stromberg-Carlson) | 2—250 ohm " " |
| 1—full-vision dial (Efco WD/180) | 1—210 ohm " " |
| 6—octal sockets, 1—4-pin wafer socket | FIXED CONDENSERS: |
| 1—length power flex and plug | 4—.0001 mfd. mica (T.C.C., Simplex) |
| 1—rubber grommet | 1—.02 mfd. tubular (T.C.C.) |
| 4—valve shields | 5—.05 mfd. " " |
| 1—25,000 ohm voltage divider (Radiokes) | 3—.1 mfd. " " |
| 1—.5 megohm potentiometer (I.R.C.) | 3—.5 mfd. " " |
| 3—knobs | 3—25 mfd. dry electrolytics (T.C.C.) |
| 2—terminals; 1 red, 1 black. | 2—8 mfd. wet electrolytics (T.C.C.) |
| FIXED RESISTORS: | 1—16 mfd. " " |
| 1—1.5 meg. carbon (I.R.C.) | VALVES: |
| 3—1 meg. " " | 1—6U7G, 1—6K8G, 1—6G8G, 1—6J7G, 1—6V6G, 1—5Y3G. |
| 1—.5 meg. " " | SPEAKER: |
| 1—.25 meg. " " | 1—dynamic speaker to match single 6V6G, 1,600-ohm field (Rola K-12 or F-12) |
| 4—.1 meg. " " | MISCELLANEOUS: |
| 1—50,000 ohm carbon (I.R.C.) | 6 yards push back, 2 doz. $\frac{3}{8}$ " nuts and bolts, 1 yard braid shielding, 1 resistor strip, 4 dial lights, 2 ft. 4 mm. spaghetti, solder tags, 4 midget grid clips. |

FIRE!

Messrs. F. J. W. FEAR & Co. wish to announce to their clients that, owing to the recent disastrous fire which resulted in the destruction of their premises in Willis Street, they are temporarily carrying on business in the basement of the Commercial Travellers' Building, 109 Customhouse Quay, Wellington.



BUILD THE . . . "Astra Dual-wave Six"

No finer 5/6 a.c. superhet than the "Astra Dual-Wave Six" described in this issue has ever been featured in any magazine. Its sensitivity and selectivity will amaze you, while both volume and quality are as good as from receivers costing several times the price. Write for our free quotation.

"1939 Companionette Three."

One of the cheapest a.c. kits we have ever supplied to builders, the "1939 Companionette" nevertheless gives a magnificent performance out of all proportion to its low cost. Write for details of our special kit of parts.

"The Astra DX Three."

Designed specially for u.h.f. DX reception, the "Astra DX Three" described in this issue is destined to become widely popular among amateurs and shortwave enthusiasts throughout New Zealand and Australia. Our kit of parts comprises only the highest quality components, designed specially for u.h.f. work.

"Tiny Tim" All-Waver.

The most compact and powerful headphone portable yet described, the "Tiny Tim" will bring in stations all over the world using only a three-foot aerial. Broadcast band coverage is optional. Write for details.

Now You Can Buy Real Vitreous Enamelled Resistors.

Ohmite manufacture the most reliable range of resistors in the field—10- and 25-watt adjustable types up to 10,000 ohms, 50, 100 and 200 watt up to 100,000 ohms, and fixed types in all wattage rat-

ings and resistance values. Prices are right.

Here's A Real Meter For Your Bench Test.

The new "9" Hoyt Cyclops is accurately calibrated and easily read at a distance of six feet or more. A.C. and D.C. Volts 0-10-250-1000. Resistance Lo-range, 0-500 ohms. Hi-Range, 50-500,000 ohms. D.C. Milliamps. 0-10-250 m.a. Meter mounts on panel and the separate control unit is carried where required and contains all shunts, resistors, etc. Very attractive appearance and sturdily constructed supplied complete with test leads. The best value we have offered.

Your Nett Cost £10

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Type 8810—Split Stator 100mmfd. per Section 3000-volt	39/-
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Type 7705—Split Stator 50mmfd. per Section 1500-volt	19/6
Type 7110—Single 100mmfd. 1500-volt	19/-
Type 7105—Single 50mmfd. 1500-volt . .	17/6

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Model T3—Wide range crystal, response 40 to 10,000 cycles	£6 17 6
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TAYLOR TRANSMITTING TUBES.

Type T20 and TZ20	23/-
Type T40 and TZ40	32/6
Type T55	62/6
Type 866	15/6

Book Your Order NOW!

A limited number of U.T.C. modulation transformers and Meissner tuning units are available ex shipment due approximately June 10. (U.T.C. and MEISSNER are prohibited lines under Government Import Regulations for second half of 1939!).

FEAR'S

FOR EVERYTHING IN RADIO

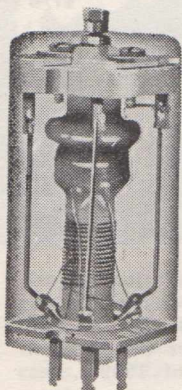
AN ADVERTISEMENT OF

F. J. W. FEAR & CO., "The Radio Pioneers."
Temporary Address: Commercial Travellers'
Building, 109 Customhouse Quay, Wellington.

RADIOKES

Star Performers

Constructors of the receivers featured in this issue can secure peak efficiency results ONLY with RADIOKES Components. RADIOKES Components were used exclusively by the Technical Editor for the construction of the "Astra" Dual-Wave Six, 1939 Companionette Three, Ultra DX Three and the "Tiny Tim." For the most efficient results, use RADIOKES Components—always!



★ RADIOKES DUAL-WAVE COILS

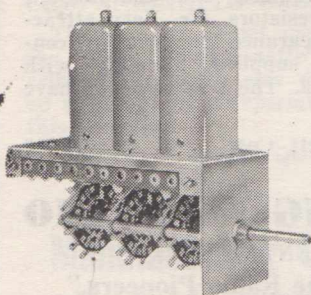
B'cast 1500 to 550 K.C., S.W.
16 to 50 Metres.
Air Core Aerial Coil.
Air Core R.F. Coil.
Air Core Osc. Coil.
Air Core Osc. Coil, 465 K.C.

★ RADIOKES INTERMEDIATE TRANSFORMERS

The new Radiokes Trolitul I.F.'s are extremely stable, due to new method of construction, made possible by use of Trolitul 'formers and base. No loose wires to shift and alter frequency. Positively the best I.F.'s produced.

Air Core, 1st, 465 K.C., sq. can, 3in.x1½in.	Type	Price
	I.F.A.	7/6
	I.F.I.	10/6
Air Core, 2nd, 465 K.C., sq. can, 3in.x1½in.		
Iron Core, 1st, 465 K.C., sq. can, 3in.x1½in.		
Iron Core, 2nd, 465 K.C., sq. can, 3in.x1½in.		

RADIOKES specialise in supplying matched and aligned coil kits: Dual Wave Air Unit with Trol. R.F. Stage and 2-Iron Core Trol. I.F.'s £4/7/6

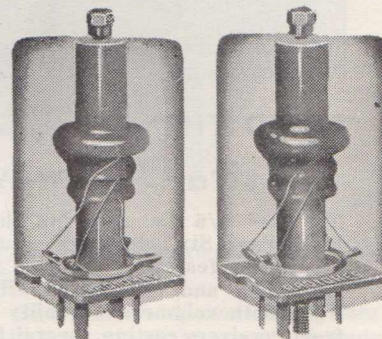


★ DUAL WAVE UNIT

B/C 1500 to 550 k.c. S/W 16 to 50 Metres.
Aerial, R.F., and Oscillator 460 k.c. A.C. Cat. No. DUA-3. Retail Price, £3/3/-.
Aerial, R.F., and Oscillator 460 k.c. battery Cat. No. DAU-3B. Retail Price, £3/3/-.

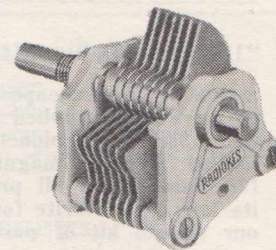
★ RADIOKES B'CAST COILS

Air Core Aerial Coils.
Air Core R.F. Coils.
Air Core Osc. Coils, 465 K.C.
Iron Core Aerial Coils.
Iron Core R.F. Coils.
Iron Core Osc. Coils, 465 K.C.
Permeability Tuned Aerial Coils.
Permeability R.F. Coils. . .
Permeability Tuned Osc. Coils, 465 K.C.
Type List Price
A.C.B. Air Core 6/6



★ RADIOKES TROLITUL TUNING COILS

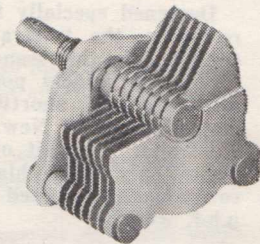
Radiokes new Trolitul Tuning Coils are highest Q yet produced. Being wound on and supported by a combined Trolitul 'former and base, they lend themselves to an accuracy and precision hitherto unobtainable. All coils are suitable for standard type valves.
Type List Price
S.W.P. Short Wave Permeability 4/6
B.C.P. Broadcast Permeability 7/6



★ TROLITUL MIDGET CONDENSERS

Radiokes Midget Condensers are made in two types, Trolitul insulation guaranteeing practically no loss. The 14 plate equals old-style 23 plate capacity. The M.C.T. Type may be ganged.
S.S.T. and M.C.T. Midgets.

Max. Cap. mmfds.	Min. Cap. mmfds.	Cap. Plates
10	3	2
15	3	3
25	3.5	4
35	4	5
50	4	7
70	5	9
100	6	14



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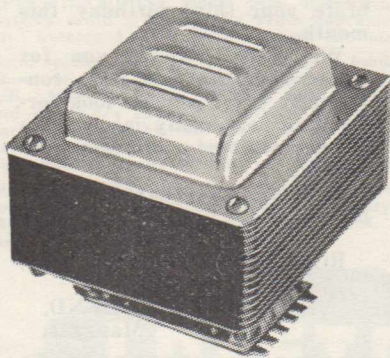
BLOCH & GERBER LTD.

46 YORK STREET, SYDNEY

RADIOKES

Set the Standard

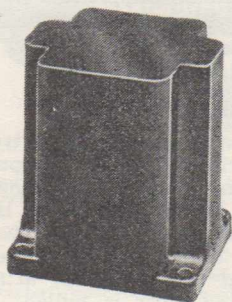
★ RADIOKES POWER TRANSFORMERS



Radiokes Power Transformers are wound with the finest grade materials, all wire is heavily insulated with enamel, and the insulation used between layers is the finest high test insulating paper. The most modern winding machines ensure perfect layer winding and no crossed turns.

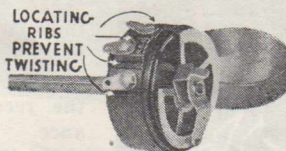
	List Prices	
	Flat	Up-right
60m.a. Midget	18/6	19/6
60m.a. Standard	20/-	21/-
80m.a. "	25/-	27/6
100m.a. "	30/-	32/6
125m.a. "	35/-	37/6
150m.a. "	42/-	45/-

★ AUDIO TRANSFORMERS



Long experience in the production of highly efficient transformers, combined with extensive research into raw materials and design, has resulted in the production of an audio transformer of excellent performance and complete reliability.

Type	List Price
AF3 Audio	20/-
AF3C Audio	21/-
AFB Audio	18/6
AFI Audio	18/6
AFAB Audio	28/6



★ VOLUME CONTROL POTENTIOMETER

Manufactured under a new process, the new Radiokes Volume Control Potentiometer upholds the quality and precision workmanship of every Radiokes product.

Type	Description	List Price
W.V.C.	Wirewound Volume Controls	
	30 to 10,000 ohms ..	4/6
	15,000 ohms	5/9
	20,000 ohms	6/-

Other Radiokes Products.

Smoother Chokes		
P.C.50	50 m.a.	12/6
P.C.100	100 m.a.	13/6
P.C.150	150 m.a.	17/6
P.C.200	200 m.a.	22/6
L.F.U.	Line Filter Units, Bakelite Case	25/-
	Step-down Transformers .	25/-
Q.T.U.	Voltage Dividers	
V.D.15	Resistance 15,000 ohms	1/9
V.D.25	Resistance 25,000 ohms	2/6
R.F. Chokes		
3-20	Inductance 8.5 m.h., Max. Current 35 m.a.	1/3
3-21	Inductance 25 m.h., Max. Current 35 m.a.	1/6
3-22S	Inductance 25 m.h., Max. Current 50 m.a.	4/6
Padding Condensers.		
IP-2S	3 35 Trimming s.w. coils	2/6
IP-5	200 700 Padding 465 k.c. etc.	2/6
IP-7	400 1100 Padding 465 k.c. etc.	2/6
IP-11	900 1900 Padding 175 k.c. etc.	3/-
MEC	3 30 Trimming Coils	1/-



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Radio Suppliers Pty. Ltd.

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Please add my name to your mailing list for free technical literature and new free service.

Illustrated Catalogue and free technical literature.

Free advice on your construction problems.

Name

Address

State

DON'T BEAT ABOUT THE BUSH



INSIST ON

the following components as chosen by the designer for the receivers described in this issue of "Radio World."

● I.R.C. RESISTORS

I.R.C. metallised and power wirewound resistors give unequalled dependability under the most severe conditions. We manufacture an unequalled range of values and wattages in both types.

● I.R.C. VOLUME CONTROLS

I.R.C. volume controls are quiet—and are built to stay quiet. The patented Five-Finger "Knee Action" Contact and Silent Connector ensure no slide, no friction, no noise.

● BIRNBACH INSULATORS AND U.H.F. AERIALS

Birnbach stand-off and feed-through insulators are always specified where perfect insulation is of vital importance. The special Birnbach 5-metre aerial is recommended for the "Ultra DX Three" described in this issue.

● T.C.C. CONDENSERS

T.C.C. silver ceramic midgets are specified exclusively for the "Ultra DX Three"—sure proof of their superiority. Also insist on T.C.C. flat mica types, and wet electrolytics for the "1939 Companionette" and the "Astra Dual-Wave Six."

WRITE NOW FOR FREE CATALOGUE TO

W. J. McLellan & Co.

Bradbury House,
55 York St., Sydney.

negative feedback applied by the series method. Nearly seven watts of audio output is available, with excellent quality of reproduction.

The power supply comprises a standard Radiokes 385v. per side 100 m.a. transformer, with a 5Y3G rectifier. The filter system incorporates a 1600-ohm speaker field with 8 and 16 mfd. wet electrolytics on the input and output sides, respectively.

Wiring Diagram Free On Request.

A complete list of the parts required to build the "Astra Dual-Wave Six" appears elsewhere, while the photographs and circuit diagram provide enough data to enable experienced set-builders to complete the receiver without further assistance.

Next month a further article will be published outlining the assembly and wiring, and as well a complete under-chassis wiring diagram will be given. In the meantime, copies of

The Front Cover.

Featured on this month's front cover is a selection of Brimar valves, which are distributed throughout Australia by Messrs. Standard Telephones & Cables Pty. Ltd.

The types shown have been chosen to illustrate the different varieties of metal and glass envelopes that are used to-day in the manufacture of modern receiving type valves. The octal base is standard with all types shown, whether metal or glass.

Nearest the camera is a row of 6C5's, typical of octal-based metal valves. Next is a row of 1N5G's, from the new 1.4-volt range of valves that are largely responsible for the rapidly-growing popularity of portable receivers.

In the third row is a range of 6U7G r.f. pentodes, from the well-known octal-based "G" series, while the last row is comprised of five 6AG6-G's—the Brimar high slope output pentode that because of its unusually high sensitivity is in great demand by manufacturers of mantel model receivers. One of these valves is used in the output socket of the "1939 Companionette," described elsewhere in this issue.

Brimar valves for photo supplied by courtesy of Standard Telephones & Cables Pty. Ltd.—Photo by S. H. Cox.

"Many Happy Returns" From Rola.

To the Editor:
Dear Sir,—

Please accept our congratulations on the attainment of the anniversary of your third birthday.

Our company has followed the development of your magazine with considerable interest, knowing that you are making a sincere endeavour to cater for an exacting clientele.

The fact that you consistently produce a well-filled magazine backed by ample trade support, doubtless explains your being able to celebrate your third birthday this month.

We wish to thank you for the co-operation you have consistently given and we look forward to very many more years of harmoniously working together.

In short, many happy returns of the day.

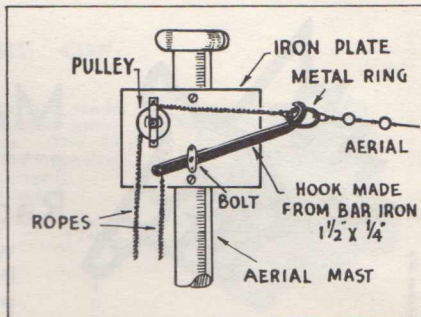
Yours faithfully,
ROLA COMPANY (AUST.),
PTY. LTD.
RAYMOND H. YEEND,
Manager.

the latter can be obtained free on request from Radio Suppliers Pty. Ltd., 3rd Floor, Wingello House, Angel Place, Sydney.

An Aerial Kink.

In the past I have had some trouble with my aerial ropes owing to pulleys jamming and ropes breaking—no doubt other readers have, too. Here's a kink that leaves the ropes free.

After the aerial has been pulled up in the usual way, the rope attached to the hooked lever is pulled. This



causes the hook to engage the metal ring on the end of the aerial, thus leaving both ropes free. The hook is released by pulling on the rope attached to the ring. The hook is made from a piece of bar iron $1\frac{1}{2}$ " x $\frac{1}{4}$ ". For further details see sketch.—J. Bayly, Cairns, N.Q.

A REALLY FIRST-CLASS OSCILLATOR for as low as £10-10-0

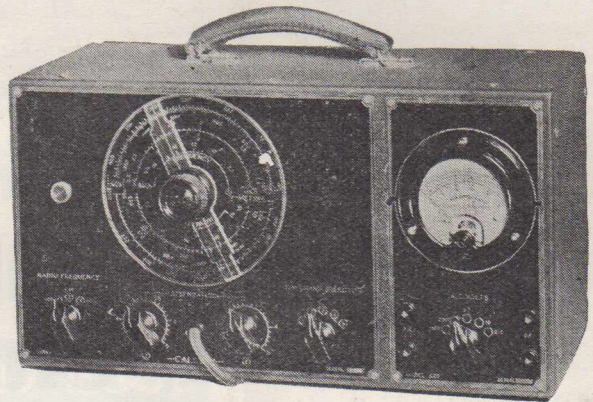
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IT'S a really high-grade job; all wording etched on non-ferrous metal; leather carrying handle, rubber feet. Pilot light and black instrument knobs on each model. Five inch dial reads direct in Kc/s, Mc/s (top half) and corresponding metres (bottom half); smooth planetary movement—adjustable for slip. Two attenuators on both models.

SPECIFICATIONS: Model 306, Battery-operated, with minimised battery drain ("B" battery drain approximately 5 ma., at 67.5 V.; "A" battery 4.5 V., drain approx. 120 ma., including Pilot).

Band spread 150 Kc/s to 16 Mc/s on fundamentals without breaks; above 16 Mc/s by using 2nd harmonics. R.F. signal modulated at will. High degree of stability and accuracy particularly over 175 and 465 Kc/s channels. Model 307 A.C. Mains operated. Feed back prevented by line filters, thus maintaining good attenuation. Bandsread 150 Kc/s to 25 Mc/s on fundamentals without breaks. Both models available with or without built-in output meter.

OUTPUT METER: 3 inch round type. Special Alnico magnet gives approx. 300 per cent. increase over old style. Ranges: 2, 5, 10, 50, 250. Provision for measuring A.C. Volts. All necessary cards and instructions supplied.



306 Battery Operated	£10 10 0
306a (illustrated) ditto with output meter	15 15 0
307 Mains Operated	10 17 6
307a ditto with output meter	16 2 6
Output Meter as used on both models	5 10 0

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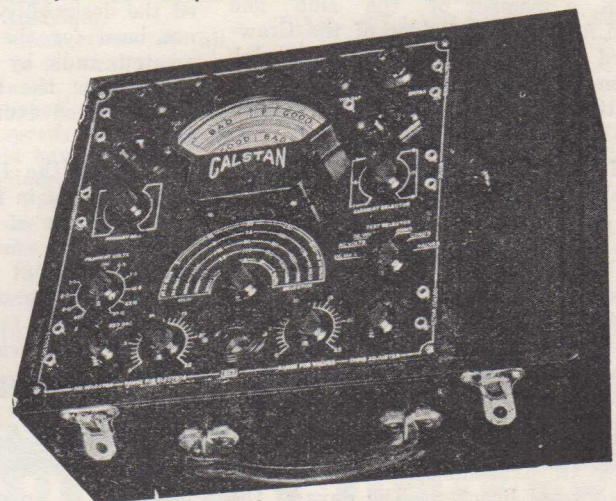
This is also an excellent instrument for lining up sets and as a "Multimeter" operating in conjunction with the Power Supply, an electrolytic condenser leakage test is available, and condensers may be checked at 10, 25, 100, 150, and 250 volts, and a "GOOD" —?—"BAD" meter scale provides the necessary indications.

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W.I.A. President Harold Peterson, who won first prize in the "Lucky Number" contest held during the evening.

THE ninth annual reunion of the Lakemba Radio Club was held at the Sunrise Hall, Canterbury, on Tuesday, May 2, there being in attendance representatives from the Radio Inspector's Dept., W.I.A. (Federal and State), suburban radio clubs, radio trade, radio press, besides other visitors and members.

The first toast of the evening was "The King," after which the President, Mr. E. P. Hodgkins, welcomed all present and briefly outlined the activities of the club and its members over the past year. The club had taken part in many functions, including the W.I.A. National Field Day, and had co-operated with the Search and Rescue Section of the Bushwalkers' Club in the matter of portable radio equipment. Mr. Henry, 2ZK, a member of the club and W.I.A., was the holder of the Crawford Trophy, while another club member was on the Vigilance Committee and two were on the council of the W.I.A.

In the course of his reply to the toast to the Radio Inspector, Mr. H. K. Burbury expressed his pleasure at once again being present at Lakemba Club's Reunion. He stated that as a result of the last International Convention, the rights of the amateur had been seriously challenged by rival interests. He recommended that amateurs render themselves technically efficient, and that they should always remember that they are experimenters and hold experimental licences. The days of the would-be amateur broadcaster who

Over 70 members and guests attended the highly - successful Annual Re-Union of the Lakemba Radio Club held in Sydney last month.

By W. J. P.

Lakemba Radio Club Reunion

attempted to provide the public with entertainment were numbered, he stated.

The experimental side of amateur radio was one well worth protecting, and in his opinion no other hobby really compared with it.

In conclusion, Mr. Burbury congratulated the Club on its progress during the year, and stated that the Department regarded such organisations as the Lakemba Club in a very favourable light, as they greatly assisted in training the young experimenter.

Days Of "Ham" Numbered.

Speaking as representative of the W.I.A. and B.E.R.U., Mr. Corbin, 2YC, stated that the days of the "ham" are numbered, and emphasised the desirability for unity. Had it not been for the fight put up for amateur radio by America at the last Convention, the bands would have been reduced even more than they were.

Although the Department in Australia was not in favour of the wholesale slaughter of the amateur bands, he continued, nevertheless it was perfectly evident that in the matter of telephony versus code, the department definitely favoured c.w. as they prefer good operators.

Appeal For Unity.

Mr. Peterson, 2HP, a representative of the State W.I.A., emphasised the necessity for unity. He was not appealing as an organising secretary of his Institute, but personally ap-

pealed for W.I.A. membership, so that a united front might be presented as far as Australia was concerned. He stated that there was little hope for amateurs at the 1942 Rome Convention, unless world-wide preparations were made.

Mr. Peterson recommended the intelligent use of the bands, and further stated that the official view of the Radio Inspector's Dept. was very much against what is generally known as "backyard chatter"; in other words, the practice of using high power for communicating over a few miles was to be condemned.

The Prize List.

At this stage Mr. Burbury was requested to present the cups, replicas and other prizes. The Chanex Dulytic Cup was won by VK2OI for the third time in succession. The Slade DX Cup was won by VK2AGH, and the receiving cups by Messrs. Biere and Wells.

The outstanding and most envied prize of the evening was a large time-finder globe presented by "Australasian Radio World." All present had equal chances of drawing this and other prizes, as they were presented with a free ticket when they entered the supper room. It was won by Mr. Peterson, 2HP, who, in expressing delight at his very good fortune, stated that he had won only two things in his life—his wife and this handsome globe!

The second prize of an open order for £1/1/-, donated by Mr. McIntyre, of Prices' Radio, was won by Mr.

Wilkins, of Manly Club. The third prize of a 280 rectifier was won by a club member, Mr. Sidwell. The "booby" prize—a perfectly good 60 watt "bottle"—was won by another club member, VK2AGR. In presenting this prize, Mr. Burbury mentioned that it was actually against the regulations to use it at its full rating. However, as the "bottle" in this case had no plate or grid (being an ordinary 60-watt household lamp), everything was in order!

Mr. McIntyre, in replying to the toast to the radio trade, said that he had been connected with radio since 1920, when he obtained his own licence. In his opinion he had no doubts whatsoever of "hams" being able to get together if pressure was brought upon them. Mr. McIntyre expressed his willingness to display radio club cards in his window, as he very often received enquiries from his customers as to where they could join a radio club.

Mr. Hume, of Philips Radio, stated that his firm would do all it could to assist "hams" in their problems. Mr. Haworth, of Amalgamated Wireless Valve Co., and Mr. Connelley, representing "Radiotronics," stated that their company also desired to assist the amateur by making available suitable equipment and data. Emphasis was also placed on the necessity for amateurs keeping to the experimental side of radio.

Other speakers included representatives from Ever-Ready and Besco Battery companies, "The Bulletin," "Radio & Hobbies," besides suburban club representatives.

Mr. D. B. Knock, VK2NO, representing "The Bulletin," was requested to give a brief outline of 5-metre work. Mr. Knock supported other speakers in their condemnation of using high power for local QSO's, and recommended the use of the 5-metre band for contacts over shorter distances, with stabilised apparatus. Co-operation was necessary on this band, and he offered his services to any amateur who might be interested. A network of 5-metre stations would be of immense value to the authorities should an invasion of our shores be ever attempted, he continued, as it would provide more or less secret communication which could not be obtained on the lower frequency bands.

In concluding the evening, the President thanked all those who had

(Continued on page 48)

MOST VALUABLE RADIO BOOK EVER PUBLISHED

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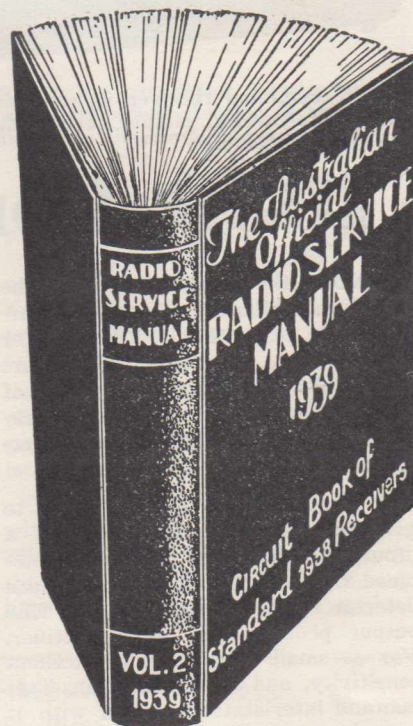
It's bigger and better than Vol. 1, 1938—the radio best seller of last year. This year's issue has over 400 pages of circuits and data of Australia's twenty-eight 1938 Standard sets in addition to twelve other chapters entitled:—

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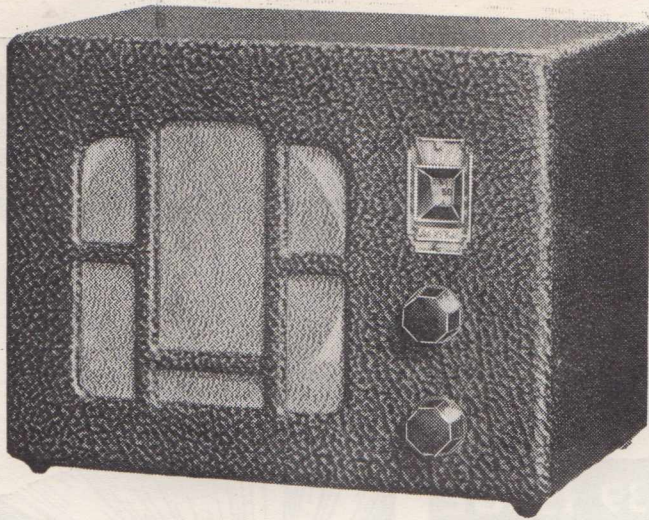


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An ingenious system of automatic regeneration is incorporated in this three-valve a.c. midget receiver.

The completed receiver is mounted in this attractive leatherette-covered midget cabinet designed specially for the "Companionette."

1939 Companionette Three

SINCE the description of the "Companionette Three" appeared in the "Radio World" for March, 1937, hundreds of readers have built it, and many letters of appreciation have been received regarding its exceptionally fine performance.

A three-valve receiver designed to give the gain and selectivity of a "four," the set uses a 6F7 as combined r.f. pentode amplifier and triode detector, with regeneration, an EL3 output pentode, and an 80 rectifier. For so small a set, it has excellent sensitivity, and reports of trans-Tasman and inter-state reception with it have been common.

The "1939 Companionette" described in this article has several new and very attractive features, that will ensure for it a popularity among readers even greater than that of its predecessor.

In the first place, the latest Radiokes Trolital coils are used. If the set is required purely for local station work, then the cheaper air-cored types will give more than ample gain. However, if inter-state reception is required as well, then the iron-cored types are recommended as giving the maximum possible sensitivity.

Another feature is that the reaction control has been omitted from the latest model, thus making the set simplicity itself to operate. Certainly

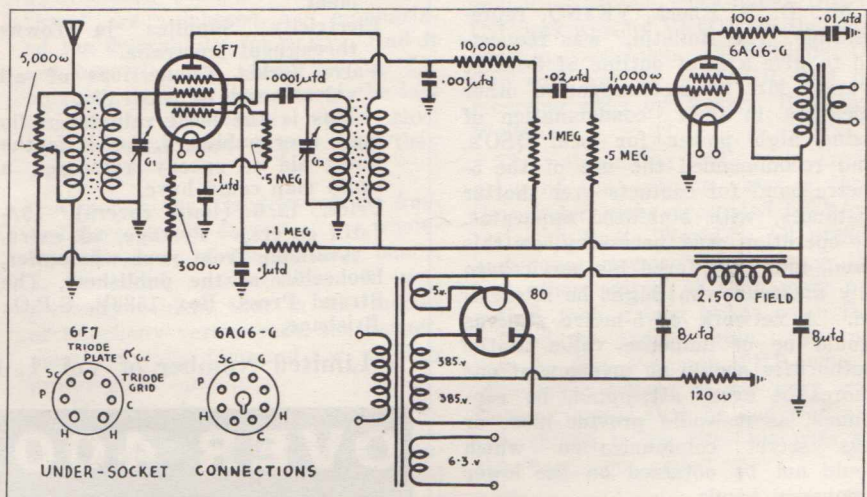
this means that there is a slight loss in regard to both selectivity and sensitivity, but if local stations only are required, this is of no account whatever, as there still remains more than ample of both to give complete satisfaction.

On the other hand, if DX reception is required, then some form of regeneration becomes essential. This problem has been very successfully solved without introducing a third control by employing a special type of automatic feedback.

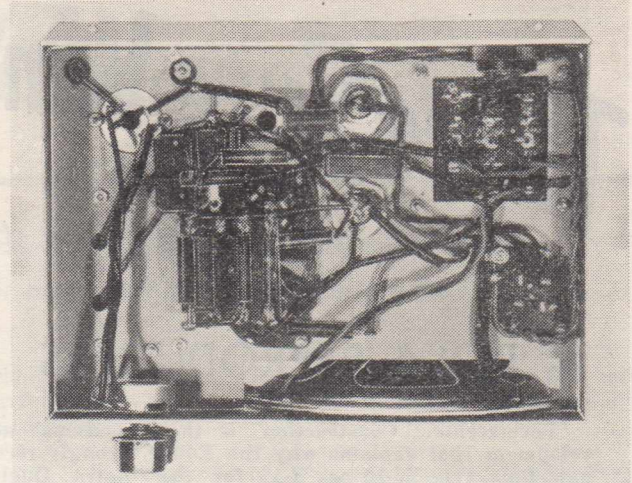
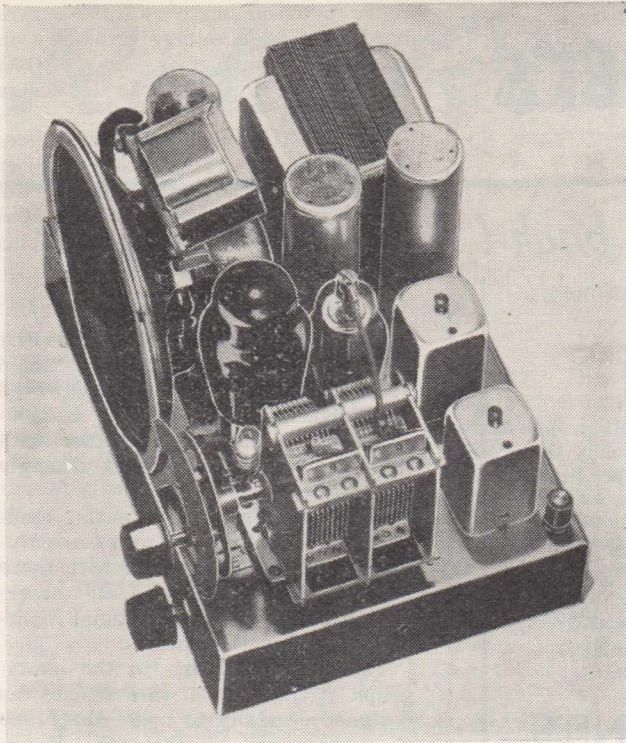
As is well known, the sensitivity

of the average t.r.f. receiver falls off badly towards the low frequency end. If some form of regeneration can be devised that, while coming into action over the entire wave-band, gives the greatest regenerative effect at the low frequency end, then the overall sensitivity will be substantially even throughout the whole band. This is actually what has been done in the "1939 Companionette," by using an unusual but very successful method of introducing feedback.

In practice, the set should be completely assembled and tested to en-



Circuit of the "1939 Companionette," which uses a 6F7 as combined pentode r.f. amplifier and triode detector, and a 6AG6G high-gain pentode in the output socket.



Of these two views of the completed chassis, that on the left shows the compact above-chassis layout, while that on the right illustrates the simplicity of the wiring.

sure that everything is working perfectly. Feed-back can then be introduced as follows. The bottom end of the detector grid winding is detached from earth, and to this lug is then soldered a length of cotton-covered or enamel wire—26 d.s.c. or enamel will do, though the gauge is not particularly important.

This lead is then taken over to the base of the aerial coil former, and at the point where the wire passes over the hole in the centre of the latter, some half-a-dozen turns are wound around a pencil. These are inserted up inside the aerial coil former, and then the remaining free end of the wire is connected to chassis.

It will then be found that regeneration is available. If there is "squealing" on stations, then there is too much, and the number of turns on the winding will need to be reduced. In the set described, three turns inserted well up inside the former were ample to produce the desired result. Incidentally, if no regenerative effect at all results, the direction of the feed-back winding should be reversed.

Same Circuit Details.

In the "Companionette," a 6F7 triode pentode, which comprises two separate valves in the one glass envelope, is used as combination pen-

tode r.f. amplifier and triode detector. The two component sections of this valve are entirely separate except for a common cathode. Thus the "Companionette" can be actually regarded as a four-valve set, with a screen-grid r.f. stage, triode detector, pentode output and 80 rectifier.

To get the utmost from a small set of this type, a sensitive output pentode is a necessity. For this pur-

pose the new Brimar 6AG6G high-slope output pentode is ideal. It is exceptionally sensitive—an input of only 2 volts r.m.s. will fully load it to deliver over 4 watts of output.

Owing to its high efficiency, the makers recommend that grid and plate "stoppers" be used to overcome any tendency towards parasitic oscillations.

The bias required for this valve, with a plate and screen voltage, of 250 volts, is -6 volts. As shown by the circuit, back-bias has been employed, by connecting a 120-ohm re-

1939 COMPANIONETTE THREE — LIST OF PARTS.

- | | |
|---|--|
| 1—Special Cabinet (Western). | 1—10,000 ohm " " " |
| 1—Steel Chassis, stamped and drilled to specifications. | 1—1,000 " " " (I.R.C.) |
| 1—Power Transformer, 385 c.t., 385, 60 m.a., 6.3 v., 2 amp., 5 v., 2 amp. (Radiokes). | 1—300 " " " " |
| 1—Small 7-pin Wafer Socket. | 1—150 " " wirewound " |
| 1—Octal Wafer Socket. | 1—100 " " " " |
| 1—4-pin Wafer Socket. | FIXED MICA CONDENSERS: |
| 2—Iron-cored Coils, 1 aerial, 1 r.f. (Radiokes). | 1—.0001 mfd. |
| 1—2-gang Condenser (Stromberg-Carlson). | 1—.001 " " |
| 1—5,000 ohm Volume Control (Radiokes). | FIXED PAPER CONDENSERS: |
| 2—Terminals, 1 red, 1 black. | 1—.02 mfd. |
| 2—Control Knobs. | 2—.1 " " |
| 1—Rubber Grommet. | SPEAKER: |
| 1—Midget Dial and Escutcheon. | 1—Dynamic Speaker, to match single 6AG6-G, 2,500 ohm field (Rola F5B). |
| 1—Power Socket and Plug. | VALVES: |
| 2—8 mfd. wet Electrolytics (T.C.C.) | 1—6F7, 1—6AG6-G, 1—80. |
| FIXED RESISTORS: | MISCELLANEOUS: |
| 1—.5 meg. 1-watt Carbon (I.R.C.) | 2 doz. $\frac{3}{8}$ " Nuts and Bolts, 4 yards Push-back (solid and flexible), 1—6ft. length power Flex and Plug, 1 doz. Solder Tags, 1 yard 4 mm. Spaghetti, 1 Resistor Strip, Insulating Washers for Electrolytic, 1—6.3 v. Dial Light, 1 Grid Clip. |
| 1—.25 " " " " | |
| 2—.1 " " " " | |

Three Sure Winners

It will pay you to back!

★ ROLA REPRODUCERS

"Permacentric Construction" is the sensational new Rola development that explains why the Editor strongly recommends the new Rola type K-12 or F-12 for the "Astra Dual-Wave Six," described this month. Similarly, the new improved Rola F5B is the secret of the clean, crisp reproduction obtained from the "Companionette Three." The F5B is also the ideal speaker for use in the combination power pack and amplifier for the "Ultra DX Three."

Rola Reproducers are standard world's radio amplifying systems proof positive of Rola quality.

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The 1939 range of Ultimate "DX Champion" receivers incorporates many features not found in any other make. There are ten a.c. models, comprising two mantel receivers, five consoles and three radiograms for dual-wave and all-wave operation. As well, there are nine country models in the Ultimate range—mantels, consoles, radiograms and portables, for vibrator and battery operation.

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sistor between earth and the centre tap of the high voltage secondary on the power transformer. The 6AG6G grid resistor is returned to this centre tap.

A point that should be noted here is that the 8 mfd. electrolytic filter condenser on the input side of the smoothing filter must be insulated from the chassis; otherwise the bias resistor will be shorted out.

About The Parts.

The "Companionette" is the first receiver to be described in "Radio World" featuring the new improved Rola model F5B speaker. A 2500-ohm field is needed, together with input transformer to match a single 6AG6G.

When purchasing the parts, readers should make a point of specifying that these be identical with those used in the original model; otherwise difficulty might be found in fitting them on the chassis.

The cabinet shown in the photograph at the head of this article was designed specially to house the "1939 Companionette" by Western Manufacturing Co., of 18 Third Ave., Five Dock, Sydney. Measuring 11¼" x 8½" x 7½," it is compact and light, with an attractive fret design, and is covered in mottled leatherette obtainable in a variety of colours.

The Construction Outlined.

The parts to mount first of all comprise the three valve sockets, power socket and aerial and earth terminals. The power transformer can be bolted in place and the heater wiring put in. To do this run a pair of leads from the 6.3-volt winding on the power transformer to the heater lugs of the 6F7. A further pair of leads is run from these lugs to the corresponding lugs on the socket of the 6AG6G. The centre tap of the 6.3-volt winding is then earthed.

To complete the rectifier socket wiring, a pair of leads is run from the 5-volt winding on the power transformer to the filament lugs on the rectifier socket. A further pair is taken from the two 385-volt lugs to the plates of the rectifier.

The remainder of the components, with the exception of the dial and speaker, can next be mounted. These comprise the condenser gang, aerial and r.f. coils, electrolytics and volume control. Before the condenser gang is mounted, a 6" lead should be soldered to the fixed plate lug underneath each section of the gang.

(Continued on page 45)

Radio Ramblings

Improvised Insulated Screwdriver.

Around the shack the need frequently arises for some sort of an insulated screwdriver. Although only suitable for light work, the one illustrated amply repays the work spent on its construction. It consists of a toothbrush handle cut off near the bristles and the end filed to shape. If the other end is cut diagonally



ally across the hole which is invariably found in the end of the handle, it will form a tool which is extremely handy for holding several wires while they are being soldered to a lug.—F. A. Burke (Waverley).

★

"Hi-Fi" Baffle Gives Excellent Results.

I am another satisfied reader of your radio magazine. I have been taking it for the past eighteen months, and treasure every copy.

Have built up a "Hi-Fi" baffle box for a speaker, as described in the magazine several months ago, and believe me it is "A1." It was built to take a 12-inch

speaker. The inside is lined with double thickness hair-felt. Sides consisted of flooring boards with a 3-ply back.

A piece of $\frac{3}{4}$ " Donaconna was used for the front baffle of the speaker shown in the accompanying photo. The box was painted royal red, with green and red bars and lettering. During outside p.a. jobs the speaker box is hoisted up above the ground to give coverage.

On Easter Monday my pal and I had the amplifier job on the foreshore at the huge picnic held every year on the white banks of the Lake Bonney, with a crowd in the vicinity of 6,000 persons. Using the above speaker and baffle, music and speech could be heard three miles out in the settlement, clearly enough to follow ads. word for word!

The amplifier has two 6L6's in AB1, 6J7 triode driver, Radiokes class AB transformer coupling these tubes, 6J7 capacity-coupled pentode for the mike pre-amplifier. The mike is a crystal and pick-up, an ordinary B.T.H. On the plates are 400v., with 300v. on the screens of the 6L6.

For A.C., a Gilco converter is used with a 32v. input, giving 200v. 100w. output.

The amplifier was only run half out, for the speaker would not handle any more.

Have also enclosed a snap of the shack. The set is a Tasma five-valve superhet dual-wave. The aerial used is a "V" doublet, running north and south. The lead-in can be seen in the centre of the photo. Also have the usual "T" type running in the opposite direction, and is changed by switch over set.

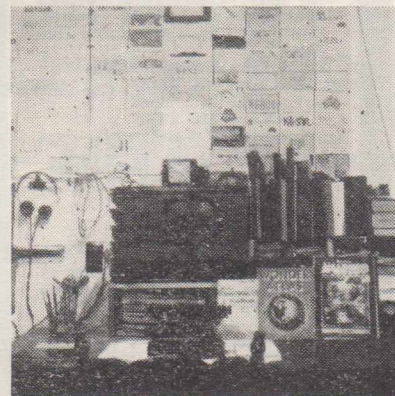
This shack is used by the Barmera DX Radio Club for meetings. The transmitter is under construction, and it is hoped will be on the air shortly. VK5LR is the Club's operator.

Several weeks ago I started to build up the battery-operated two-valve 5-metre transceiver designed by Don B. Knock. I bought all the parts, started it, but to date, the set has not been completed. However, when it is going, will let you know about its performance. Noticed in April issue of "Radio World" that the same job was heard 160 miles away!

Keep up your "Shortwave Review"—it is always a friend when one logs a station and cannot identify it. All the very best to "R.W."—M. Mead, Barmera, Sth. Australia.



Left: As mentioned by the correspondent above, this "Hi-Fi" speaker baffle (described in "Radio World" for December last) gives exceptionally fine results. On the right is a view of dxer M. Mead's radio shack.



"Find-The-Fault" Contest

Four Prizes For Best Solutions

In last month's issue details were published of a contest for readers arranged by "Radio World" in collaboration with Mr. F. H. Paton, principal of Paton Electrical Pty. Ltd., of Sydney. As June 20 is the closing date for the contest, readers still have plenty of time to forward entries, and possibly win one of the four prizes offered for the best solutions.

Below will be found a brief description of a fault that has caused a breakdown in a receiver, symptoms being outlined. Readers are invited to send in a brief description of not more than 50 words, outlining how they would proceed further to track down the trouble. A suggested cause (or causes) of the breakdown should also be given.

The reader sending in the best all-round solution will be awarded as first prize one of the new Palec 0-1 m.a. square type moving coil meters, donated by the Paton Electrical Pty. Ltd. The three entrants sending in the three next best solutions will each be awarded a twelve months'

subscription to "Radio World." Entries must be addressed to "Find-The-Fault Contest," and should reach the "Radio World" offices at 214 George St., Sydney, on or before June 20, so that results can be published in the July issue. Here is the problem:—

A serviceman, called out to service a recent model 4/5 a.c. dual-wave superhet that had stopped operating, noticed the following symptoms: All valve heaters and the rectifier filament were alight, while a faint humming sound was coming from the speaker. All valves checked O.K. on a tester. A voltmeter test showed that "B+" was present on the output side of the smoothing filter, being exactly 250 volts above the chassis. With the grid clip removed from the duo diode triode second detector and first audio amplifier, and a finger placed on the grid cap, no resulting sound was heard from the speaker.

WHAT FURTHER TESTS SHOULD BE MADE TO LOCATE

THE TROUBLE, AND WHAT WAS THE PROBABLE CAUSE OR CAUSES OF THE BREAKDOWN?

In Latest "Radiotronics."

Circuits and coil data for two five-valve receivers — one a vibrator model, and the other for battery operation—are published in the latest issue of "Radiotronics" (Technical Bulletin No. 97), issued by A.W. Valve Co.

A further article deals with oscillator grid current and why limits are imposed, while new valves on which complete data are given comprise Radiotron types 1620 triple-grid amplifier, with characteristics similar to those of the 6J7, type 1621 power pentode, and type 1622 beam power amplifier. The last two types have characteristics resembling those of the 6F6 and 6L6, respectively.

The supplementary sheet to this latest issue of "Radiotronics" shows recommended standard "G" type valves for radio receivers. This table shows valve types available for various purposes in a.c., a.c./d.c. and automobile receivers.

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- Sockets; Isolantite Insulation—
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 - 4—Type S-6B
- Chokes; Millihenry—
 - 2—Type 250
- Coil Kits and Coils—
 - 2—Type 4-pin 17-270 metres
 - 2—Type 6-pin 17-270 metres
 - 3—Type 4-pin B.C.
 - 3—Type 6-pin B.C.
- Intermediates—
 - 2—Type VT-465, variable
 - 1—Type VT-175, variable

Hitch Your Transmitter to a PREMIER X-TAL and Get Your Signals Through

A special shipment of "PREMIER" standard amateur power crystals, x-cut, has been landed. X-cut crystals have a negative temperature frequency co-efficient of approximately 20 cycles per megacycle per degree Centigrade.

Special prices to amateurs and immediate delivery from stock of the following types:

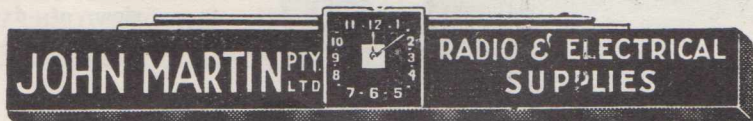
Type 180-A—1739.3 kc., 1847.2 kc., 1999.6 kc., 3503.0 kc., 3787.8 kc., 3746.6 kc., 3962.2 kc., 7016.2 kc., 7262.0 kc.	Type 182—1718.380 kc., 1848.3 kc., 1995.0 kc., 7021.4 kc., 7487.6 kc.	Type 400—1720.0 kc., 1848.3 kc., 1999.4 kc., 3737.7 kc., 3969.5 kc., 7234.4 kc.
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The actual frequency of the crystal, stamped on each holder, is guaranteed accurate to within the limits of primary standard which is maintained constant to slightly over one part in ten million, which, at the fundamental frequency of the 50 kilocycle bar, represents an accuracy of 0.005 cycles.

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The **FINEST RANGE** of **LOUD SPEAKERS** **EVER RELEASED**

featuring

Rola *dust-proof*

PERMACENTRIC CONSTRUCTION



Better in every way are these new Rolas featuring **PERMACENTRIC CONSTRUCTION**—the sound reproducers that give you greatest value for your money.

- **EXAMINE** a **PERMACENTRIC ROLA** and note the sturdy one-piece construction, the complete absence of nuts, bolts, clamps and other means of centring the voice coil. Note particularly the dustproofing system—the most efficient ever devised.

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Incorporate them in the set you build—ask for them in the set you buy.

ILLUSTRATED IS K12, UNDOUBTEDLY THE FINEST 12" STANDARD SPEAKER ON THE MARKET—WILL IMPROVE ANY SET.

ALL ROLA 12" AND 10" REPRODUCERS AND 8" PERMANENT MAGNET MODELS ARE NOW BUILT ALONG PERMACENTRIC LINES AND ARE AVAILABLE AT NO EXTRA COST.

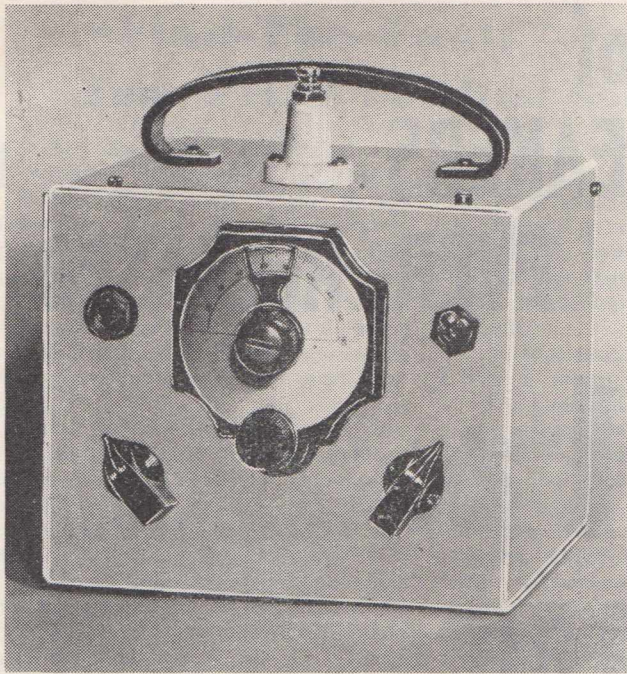
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Complete with midget "A" and "B" batteries, "Tiny Tim" is housed in an aluminium cabinet measuring only 5" x 6" x 6".

Using only a 3-foot vertical aerial, the designer of this amazing two-valve midget portable has logged 29 countries.

By J. FERRIER (AW129DX)

"Radio World" Official S.W. Observer For Victoria.

Hear The World On Tiny Tim

THE wonderful possibilities of midget receivers for DX work on the short waves are strikingly illustrated by the "Tiny Tim," designed and built by Mr. J. Ferrier (AW-129DX), "Radio World" Official Shortwave Observer for Victoria.

This receiver was first mentioned in "Radio World" in Mr. Ferrier's report published in the March issue, in which he states:—"Since my last report I have built a small portable, using two of the new 1.4-volt tubes. Complete with batteries, it is housed in an aluminium box 5" x 6" x 6". The antenna used at present is a 15" vertical. Really astonishing results have been obtained, and I am more than pleased. While carrying it around outside, W's, XU's, PK's and K6's have been heard on 20-metre 'phone; and OH1BA on C.W."

In the April issue Mr. Ferrier makes further reference to the set, stating that—"to date I have heard 29 countries on 20-metre 'phone."

In view of these phenomenal results, no doubt many other readers would be interested in design details given below. They were kindly supplied by Mr. Ferrier, while the photographs and diagrams illustrating this

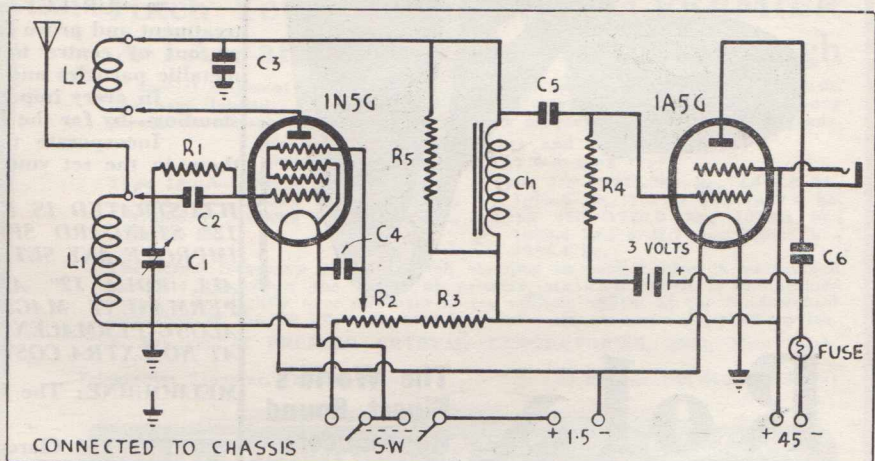
article are of the original receiver.

Data Supplied By The Designer.

With the new 1.4-volt series of valves it became possible to build a receiver that could be taken anywhere and operated under practically any conditions. As the receiver is completely self-contained and has no cumbersome plug-in coils, it would be

ideal for the hiker or for use on a field day.

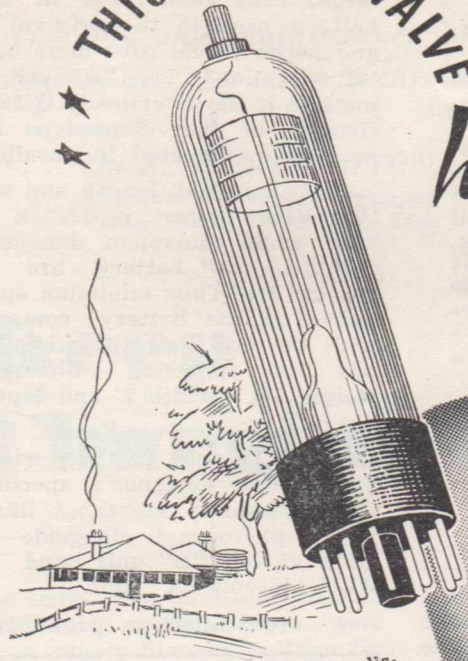
The set is built into an aluminium box which measures 5" x 6" x 6". The antenna is mounted on top of the set with a small stand-off insulator, and is connected to the grid end of the coil, thus giving maximum pick-up. A 1N5G is used as a detector, while a 1A5G is used as the



Circuit of the "Tiny Tim":—C1, .0001 mfd. variable; C2, C3, .0001 mfd. mica; C4, .5 mfd. tubular; C5, .01 mfd. tubular; C6, .00025 mfd. mica. R1, 3 meg. grid leak; R2, .5 meg. pot.; R3, .1 meg.; R4, R5, 1 meg.

★ ★ THIS LITTLE VALVE

has revolutionised
Country Radio!



The new 1.4 volt valve—newest discovery in the world of radio—has revolutionised country radio set design! Operating on a current consumption equal to that of an ordinary torch bulb, it has enabled Australian manufacturers to produce models for use in country districts that offer almost incredible economy, use fewer "B" batteries, and eliminate re-charging altogether!

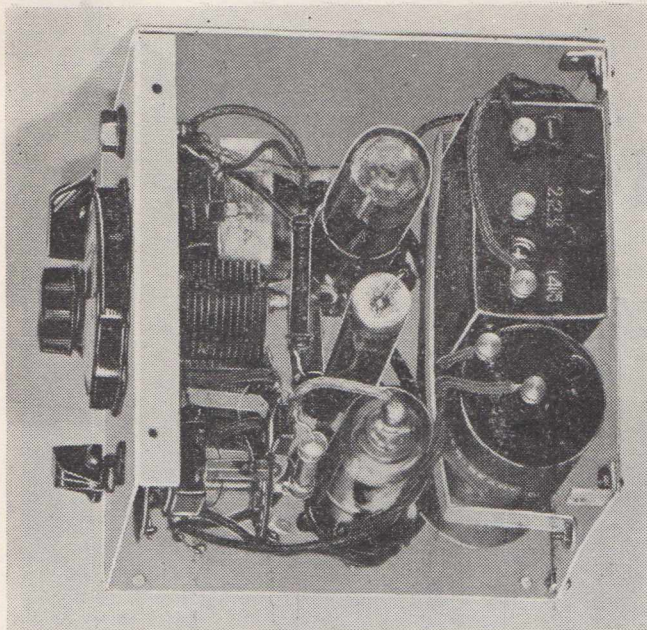
Before you buy any new set this year see one of these truly modern receivers in action. . . .

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TO DEMONSTRATE
**1.4 Volt
RADIO**

• 1.4 volt radio uses only two Superdyne Radio "B" Batteries and one of the new X250 1.5 volt "A" Batteries that give exceptionally long periods of service with the new valves.

EVER READY
RADIO BATTERIES

• If you have any difficulty in securing complete information on 1.4 volt radio, write to-day to Box 37, Mascot, New South Wales.



This view with lid removed shows how the batteries are strapped to the rear wall of the cabinet. The 3-volt bias battery is mounted vertically between the two valves.

detector is controlled by means of a $\frac{1}{2}$ meg. potentiometer which varies the screen voltage.

The band switch used is a Yaxley 4-pole 5-position, and room has been left to experiment with other coils. If the set is only required to cover three bands, a 3-pole 3-position may be used. The most used bands are 20, 40 and 80. The complete coverage of the receiver is from 15 to 95 metres in three bands. No. 1 covers from 15 to 28 metres; No. 2, 27 to

"Tiny Tim" Coil Data.

(All coils wound on $\frac{1}{2}$ -inch formers)

Band	L1	L2
20m.	12t. 26d.s.c.	13t. 28en.
40m.	24t. 28en.	18t. 30d.s.c.
80m.	46t. 34d.s.c.	30t. 38en.

48 metres; and No. 3, 47 to 95 metres.

The dial used is an Ormond mid-ge-t, while the tuning condenser is a Radiokes .0001 mfd. The choke can be made out of a small audio transformer by connecting the primary and secondary in series.

The 'phone jack must be insulated from the panel by means of a rubber grommet, and if it has a metal nut on the outside this must be connected to plate and not "B+," to prevent accidentally blowing the fuse when plugging in the 'phones. The fuse should be of the 2.5 volt 60 m.a.

type, as the "A" drain of the set is only 100 m.a. A double-pole single-throw switch should be used to switch out the "B" battery from leaking through the potentiometer, besides switching off the "A" battery.

The antenna is made out of three pieces of copper or brass tubing which slide inside each other, each piece being 12" long.

The results obtained with this set have left nothing wanting. On its own antenna on 20-metre 'phone, I have heard the following countries:—W, ZL, PA, CT, ON, EI, TG, F, G, PK, KA, VU, ZE, XU, CE, LU, VE, CO, J, K4, K6, HK, LA, NY, OA, TI, VS2, VS6, VS7 and XE. I can listen to GSB in the late afternoons at Q5, R7, while walking about with the antenna not extended.

There is slight hand capacity owing to the type of antenna used, but this is nothing very serious.

A small strap can be fixed on the top to carry the set by. The batteries used are Diamond, $1\frac{1}{2}$ -volt midget and a midget 45-volt (45SM).

Some Further Suggestions By The Technical Editor.

The accompanying photographs and diagrams will give set-builders all the data necessary for constructing the "Tiny Tim." Those wanting to use EverReady batteries can do so by increasing the height of the aluminium box an inch and the depth by an inch. The space available for batteries would then accom-

modate an EverReady type WP 45-volt battery, which has slightly larger cells than those in the "B" battery used in the original model, and hence would give more economical operation. The "A" cell recommended is the EverReady Q-18, which consists of four Superdyne $1\frac{1}{2}$ -volt unit cells connected in parallel.

Overall height, length and width of the WP45 battery is $5\frac{1}{8}$ " x $4\frac{1}{4}$ " x $2\frac{1}{8}$ ", while equivalent dimensions of the Q-18 "A" battery are $4\frac{3}{8}$ " x $2\frac{1}{8}$ " x $2\frac{1}{8}$ ". Thus minimum space required in the battery compartment with the two batteries side by side has the following dimensions:—Height $5\frac{3}{4}$ ", width 7" and depth $2\frac{3}{4}$ ".

Alternative Ever-Ready batteries that can be used by those wishing to follow the designer's specifications for the cabinet are those illustrated in the photograph alongside—a type Q122 45-volt "B" unit and a type Q197 $1\frac{1}{2}$ -volt "A" unit.

(continued on page 36)

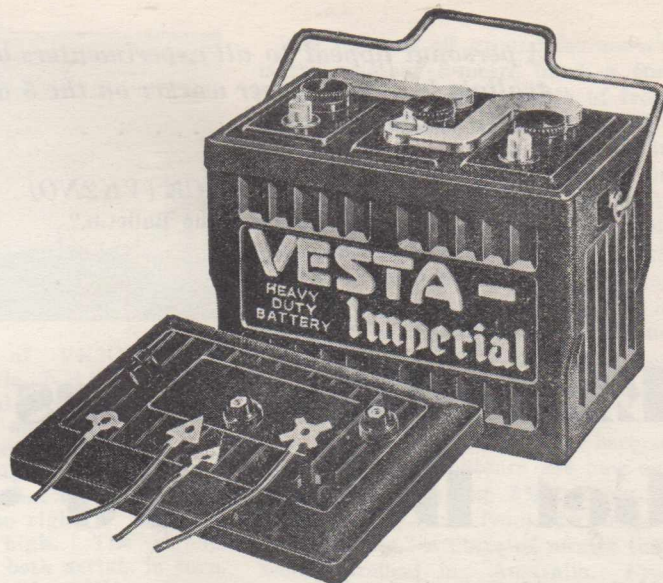
"TINY TIM" — LIST OF PARTS.

- 1 — Aluminium Case and Bracket, to specifications (see text).
- 1 — .0001 mfd. midget Variable Condenser (Radiokes).
- 1 — 'Phone Jack.
- 1 — D.P. S.T. Toggle Switch.
- 1 — Wave-change Switch.
- 2 — Octal Valve Sockets.
- 1 — Audio Choke.
- 4 — $\frac{3}{4}$ " brass Spacers.
- 4 — 1" Nuts and Bolts.
- 1 — 60 m.a. Fuse Bulb and Holder.
- 3 — Coils, wound to specifications (see text).
- 2 — Black Midget Pointers.
- 1 — Midget Dial (Ormond).
- 1 — .5 meg. Potentiometer (I.R.C.).
- 1 — pair Headphones (S.T.C.).
- FIXED RESISTORS:
- 1 — 3 meg. $\frac{1}{2}$ -watt Carbon (I.R.C.).
- 2 — 1 " " " (").
- 1 — .1 " " " (").
- FIXED CONDENSERS:
- 1 — .00025 mfd. Midget Mica (Simplex, T.C.C.).
- 2 — .0001 mfd. Midget Mica (Simplex, T.C.C.).
- 1 — .01 mfd. Tubular (T.C.C.).
- 1 — .5 " " (").
- VALVES:
- 1 — 1N5G, 1 — 1A5G.
- BATTERIES (see text):
- 1 — 45-volt Midget "B" Battery (Ever Ready, type Q122).
- 1 — 1.5 volt Midget "A" Battery (Ever Ready, type Q197).
- 1 — 3-volt Midget Torch Battery, for "C" voltage (Ever Ready).
- MISCELLANEOUS:
- 1 doz. $\frac{3}{8}$ " Nuts and Bolts, 1 doz. $\frac{1}{4}$ " Nuts and Bolts, Push Back (solid and flexible), Solder Tags.

The care and maintenance of wet batteries are discussed in this article

By S. J. BICKERTON
Assistant General Manager
Vesta Battery Co. Pty. Ltd.

Keep Charging!



Designed specially for vibrator-operated receivers, this Vesta 6-volt battery is fitted with patented "Right-Way" terminals that make wrong connections an impossibility.

IN the early days of radio, secondary cells of various types were used to supply filament voltage for battery receivers, and the lead-acid accumulator in particular has been used for this purpose right up to the present day.

The introduction several years ago of vibrator units made it possible to obtain both filament and plate voltages for a receiver from a single six-volt accumulator. This immediately popularised vibrator-operated car radios and domestic receivers for country use, and to-day there are thousands of this type of receiver operating throughout Australia.

Special Battery Developed.

This new development introduced a fresh set of problems for the battery manufacturer. It was not just a matter of his supplying an ordinary car battery to operate vibrator receivers, mainly because a car battery is designed to deliver many times the current drain taken by a vibrator receiver.

For example, a car battery is often called upon to supply a current of the order of 180 amps. to operate a self-starter, whereas the current drain taken by the average vibrator receiver is in the neighbourhood of 2 or 3 amps. Again, the car battery is constantly being re-charged by the generator, whereas a radio battery is expected to give up to two months of solid service before it is given a re-charge.

Correct Treatment Is Vital.

However, despite this fresh set of problems, a special vibrator battery capable of giving many years of efficient service was soon evolved. Actually, every problem has been overcome except one, and that is the problem of persuading battery users to take normal care of their batteries. Cases are constantly cropping up of purchasers who abuse first their batteries and then the manufacturer for not turning out a more satisfactory product, though it is not generally realised by users that by examining a battery, a manufacturer can definitely tell whether or not its

condition is due to abuse or to defective manufacture.

The main difficulty is that many listeners will not have a battery re-charged until the very last ounce of power has been drained from it. The set might stop operating during the evening due to a flat battery, and the listener switches off after making a resolution to have the battery charged the following day.

Next morning he switches on again, perhaps absent-mindedly, and to his surprise the set operates. This is of course due to the slight recuperation that has taken place in the battery during the night. An hour or so later, reception might peter out again. This process is repeated until the battery is completely flat, and then, but not until then, it is sent for a re-charge.

Unfortunately, the listener does not realise that this last half a dozen or so hours of reception are liable to prove the most expensive he has ever had, in that the chances are a new battery will be required. If the battery can be re-activated again, it will be a long and slow process, in that it might take a week of continuous re-charging to restore perhaps 70% of the original efficiency.

The regrettable part of all this is that by the exercise of a little care, none of these troubles will be experienced because, treated correctly, the average vibrator battery on the market to-day will give many years of trouble-free service.

(Continued on page 36)

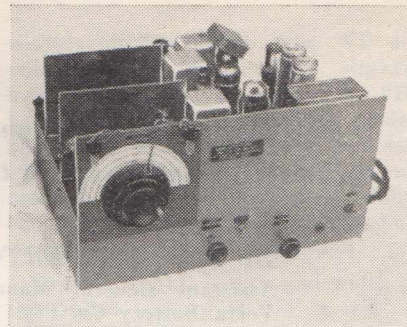


Left: The Vesta "ball-type" hydrometer, with special vent cap designed to accommodate it. The photo on the right shows the method of using both.



A personal appeal to all experimenters by Australia's leading pioneer worker on the 5 and 10-metre amateur bands

*By DON B. KNOCK (VK2NO)
Radio Editor "The Bulletin."*



Latest U.H.F. superhet used at VK2NO. This is a 7-valve receiver with noise limiter and plug-in coils for 5, 7 and 10 metres.

Experimenters - Get Down To "Ultra-Shorts"

IN the world of amateur radio communication and experimentation, the quest for DX, "new" countries, and imposing contest scores, is by no means the most interesting phase.

It is easy to understand the kick that a newcomer to amateur radio gets in being able to sit in his operating room and to exchange communication with fellows situated in far-distant parts of the world. The old hands at amateur radio know only too well what that fascination means, and when I say "old hands" I refer to those who took part in the pioneering days of short-wave communication when the business of working DX was an unknown quantity. Nobody lost more sleep over DX than I did.

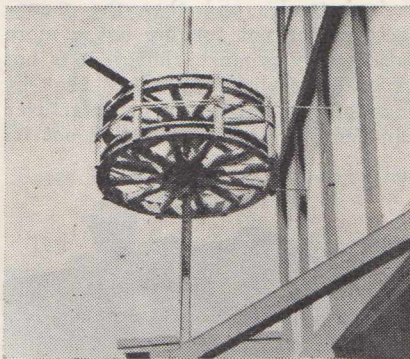
With the passage of years, DX communication on amateur and commercial channels suited for such work is no longer a novelty. Everybody knows that it is an occurrence of every minute of the 24 hours, and part and parcel of our everyday lives. In the amateur sphere DX goes on as a matter of course, and has been made more attractive by the fact that low-powered telephony can, with intelligent application of aerial fundamentals, girdle the globe.

But after a few years of frantic DX accumulation, even the fanatical "DX phone-hound" becomes rather blasé and turns to other radio activities for a change. These activities may involve a spell on 80 or 40 metres, with satisfying yarns about amateur radio matters in general with other fellows inside the boundaries of one's own country. Others may tackle sound recording, making

records of amateur transmissions, and others may acquire an "amplifier complex" and thereby get a great deal of interest out of high fidelity work.

Although the 56 m.c. band and still higher frequency channels are restricted in their communication ranges for ordinary usage, this doesn't mean that they are of little interest for regular communication. On the contrary, many amateurs spend hours on 40 and 20 metres yarning with local stations, to the accompaniment of static and inter-station interference. Even if such communication is 100% perfect, owing to very close range of the stations, the procedure is a selfish one on such bands. Such practice needlessly occupies channels intended for more distant communication, and the logical thing would be to use a u-s-w channel.

A much better signal can be put



How the W8JK 56 m.c. aerial array is rotated at VK2NO.

over ranges up to 60 miles or more on 56 m.c. by use of correctly designed transmitters, receivers and aerials, than is likely to be the case on 40 or 20 metres. With direct ray communication backed by high-gain aerial arrays, a maximum signal can be obtained, entirely free from static, and not unduly worried by car ignition interference if noise limitation is applied to receivers.

As is now well-known, 5 metres has the habit at times of behaving like the lower frequencies, and long-distance signals may appear suddenly, according to unusual ionosphere conditions. DX working then becomes possible, and provides something of a thrill. Inter-State working has been the order of things in U.S.A. at certain times of the year for a few years now, and on a few occasions East and West coast stations have hooked up.

In England distances of 130 miles are worked more or less regularly, and last year two Englishmen worked with an Italian. There have been several instances of DX recorded in Australia, but with so far no two-way communication. Signals from VK2NO have been heard over 380 miles in N.S.W. and overseas during the last three years.

The reason why two-way working has not taken place is lack of co-ordination. The band is not used constantly—stations are not active more or less continuously, and this is something that needs putting right.

Efforts are being made to populate

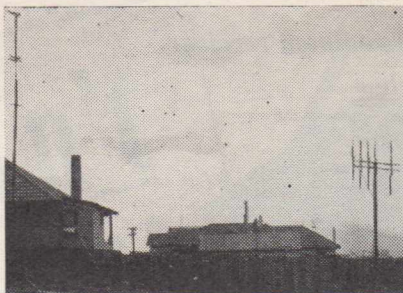
the band, and as this is written, plans are laid for a special test organised by the West Australian Division of W.I.A. Nothing may happen, but on the other hand it might. It certainly won't happen if stations don't try.

The listener can be equally valuable in helping to populate the band, and Sydney amateurs are fortunate in having the ready co-operation of a number of u-s-w listeners equipped with modern receivers, notable among these being Messrs. Rutherford and Bambury. The latter had patience rewarded recently by his reception of a N.S.W. amateur 160 miles north, in Taree.

In common with those experimenters concerned with the population of the band in the Sydney area, I will be only too pleased to render every assistance to those interested enough to pull their weight in using the right kind of gear. If, however, a man is only concerned with dabbling with the transceiver kind of gear, then he has no place in the modern scheme of things. It is likely in any case that before long, it will be imperative to use only stable transmitters and receivers on 56 m.c. from a regulation point of view.

There are sound reasons touching on the future of television as to why 56 m.c. will need to be treated with respect, as are the DX bands. As for the super-regenerative kind of gear, there is ample room for experimental work there in the yet higher ultra-high frequencies.

When amateurs begin to seek such



The location of VK2CI, Merewether, Newcastle, N.S.W., showing the 5-metre aerial arrays used on the occasion of the successful tests on Feb. 26 last, when VK2LZ and VK-2NO were received. The vertical W8JK array, 40 feet high, is by the house, and to the right is the Yagi array, 15 feet high. The signals were received on both aeri-als in turn, being superior on the 8JK type.

pursuits, other than DX, they become imbued with an experimental turn of mind, which is all to the good. It is realised after a while that the experimental side of radio can be even more fascinating than the business of fighting the QRM in quest of DX.

Even so, there is in the realms of radio communication, the vast and relatively unexplored field of ultra-short waves; those that lie, in a lay sense, below the amateur 10-metre band. It is here that the amateur with a desire to get into some really interesting experimental work has an excellent outlet, and by turning to such work he can contribute materially to development.

The jumping-off ground for u-s-w's is the amateur 5-metre band, a frequency channel with a width of from 56,000 to 60,000 kilocycles. This band has been closely investigated in the last 10 years, mainly, by reason of sheer weight of numbers, in U.S.A. Overseas, the 56 m.c. band is well populated, and because of this, much has been learned of the advantages and shortcomings of the band. It is used in such countries as U.S.A. and Britain as a regular communication channel, and in this respect it is an extremely useful one.

So populated has the band become in U.S.A. that amateurs are now engaged in developing 2½ metres in order to get away from the congestion on "five," a state of affairs that seems ironical in Australia. Five metres has been for a long time, and still is in this country, a most useful channel literally begging to be used. Those who are now sticking to the job of trying to populate it are a mere handful in the wilderness.

Even so, a stage has been reached where those who have plodded along on this band are reaping the benefits of modern practice. The uncertain methods of even three years ago with super-regenerators and self-excited modulated oscillator transmitters predominating are no more. Communication is conducted at 56 m.c. in just the same way as at lower frequencies. Transmitters are stabilised, and indeed they have to be if the user wishes to communicate with stations using fairly selective super-

(Continued on page 36)

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A further selection of common receiver faults is discussed below

By "SERVICEMAN"

Leaves From A Serviceman's Diary (2)

BEFORE continuing with a further list of the most common faults encountered in radio service work, it would be well at this stage to emphasise the necessity of the serviceman equipping himself with the best test equipment his pocket can afford.

The old days of a continuity meter, battery and a few tools have long passed, and unless some form of multi-tester is available, it is impossible to service the modern set in a really efficient manner. It is obvious, however, that there are numerous faults which require little or no "trouble shooting," especially with the simpler type of supers, and t.r.f. sets.

The present-day modern set with its automatic tuning, triple wave reception and numerous other up-to-date improvements is a much more complicated piece of apparatus, and renders fault-finding even more difficult. When it comes to these finer points of testing and adjusting so necessary for correct performance, good test equipment is a necessity.

In the case of the more complicated repairs, the serviceman should return the set to the factory or to a competent service engineer, if he finds he has not the necessary apparatus to make an efficient job.

"Trouble Shooting" — Common Causes Of Set Failure, With Suggested Cures.

(Continued from last month)

COMPLAINT: Distorted reception.
DEFECTS AND REPAIR PROCEDURE:—

(1) Weak Valve.

Check all valves, in particular the audio valves.

(2) Faulty Speaker.

Cone may be rubbing on speaker field magnet. Re-centre same if adjustable, making sure that there are

no iron or steel filings clinging to the magnet. Magnet may have rusted and may have to be removed and cleaned with fine sandpaper.

(3) Faulty Coupling Condenser.

This may test O.K. off load. It is sometimes advisable to remove this condenser altogether and try another in its place. A voltage check on the grid control of the audio valve will generally indicate if the positive voltage is getting through the condenser.

(4) Broken Down Resistor.

A faulty resistor in plate, grid, screen or cathode circuit will often cause bad distortion or loss of volume. Apply resistor test.

(5) Short Circuit In Speaker Field.

Portion of the field coil may be shorting out, causing loss of field excitation. Measure resistance and see that it corresponds to rated marking on speaker. Where speaker field is connected across the power pack, such a breakdown will be indicated by a considerable decrease in H.T. voltage and/or accompanied by the field winding getting very hot. Where the field is being used as a choke, an internal short will cause an increase in H.T. voltage.

(6) Shorted By-Pass Condenser.

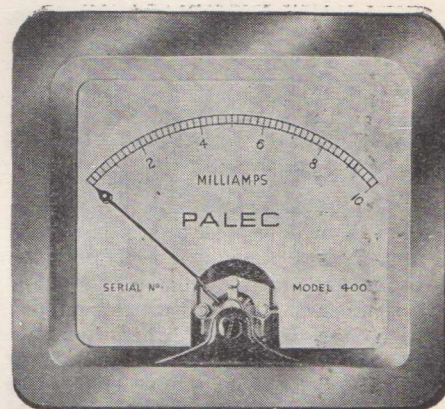
The high capacity low voltage condenser used to by-pass the bias resistor of the power tube should be tried first.

(7) Faulty A.V.C. By-Pass Condenser Or Resistor.

Defects of this nature are sometimes hard to trace, as when a test is applied with meter, they show O.K. If in doubt, remove the suspected component and connect another temporarily in its place.

(8) Station Overloading Set.

Where the receiver is located near a powerful local station, the signals from the latter will very often overload the autodyne or first detector. If a local-distance switch is not already fitted to set, a knife switch



The winner of the "Find-The-Fault" Contest, of which further details appear elsewhere in this issue, will be awarded this latest square type Palec Model 400 0-1 m.a. moving coil meter.

may be screwed in a convenient position and a long and short aerial connected.

(9) Incorrect Tuning.

Many people just will not tune the set right on the station, the result being distortion and noise. Make sure the client is tuning in correctly.

(10) Defective Electrolytic Condenser.

A faulty electrolytic very often introduces severe distortion, especially in the earlier sets, where no paper by-pass condenser was used in addition across the H.T. The distortion in this case is usually accompanied by hum.

SYMPTOMS: Set lights up, but no reception.

DEFECTS AND REPAIR PROCEDURE:

(1) Faulty Valve.

Ascertain whether all valves are lighting up. Although all may show a light, one may still be defective. Test each in a valve tester if it is not possible to obtain a visual indication. Tap each valve under test for element shorts. If tester unavailable, duplicate valves may be tried.

(2) Open Circuit Filter Choke Or Speaker Field.

Test choke and/or speaker field for continuity. A burn-out of one of these components is sometimes indicated by the first electrolytic condenser sizzling through the consequent rise in voltage.

(3) Speaker Transformer.

Test for continuity and if open-circuited replace with new winding. A burn-out is sometimes indicated by

(Continued on page 28)

**You can't
go wrong!**



VESTA RIGHT-WAY

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First and foremost—and if *you* don't think it's foremost your *pocket* will—you buy longer life, cheaper current, no bother at all when you buy a Vesta *Right-way* vibrator battery. *Otherwise 30 out of 36 leading radio manufacturers would never have chosen Vesta Right-ways as standard equipment!*

Here's the second point your way—you can't connect a Vesta *Right-way* the wrong way! And if you've ever delved in the semi-dark behind your set trying to guess the right terminals for the right leads you'll sigh with relief at this news.

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So what? So here's your third saving—on valves. You can't blow them with a Vesta *Right-way*! And if you've ever blown a set of brand new valves with a wrongly connected battery—but why bring that up?

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- The Vesta *Right-way* can't possibly be charged the wrong way—nor until the cover is removed.

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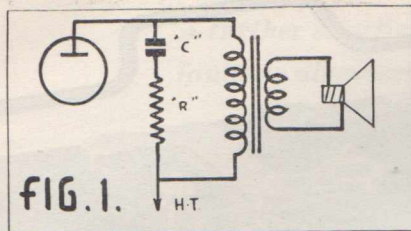


FIG. 1.—A filter to maintain load impedance relatively constant when extension speakers are used.

An authoritative article on an important subject, contributed by . . .

The ROLA Co. (Aust.) Pty. Ltd.

Installing An Extension Speaker

TO oneself and one's neighbours, few noises are more objectionable than an unduly loud or overloaded radio receiver. Yet, there are many times when one wishes to listen to news or music and cannot be beside the radio set. Of course, a very simple solution to the difficulty is to provide a second receiver, and in some countries radio sets are to be found in almost every home.

An equally effective and very much cheaper way out of the difficulty is to run an extension speaker or speakers from the existing set and place these speakers exactly where they are required. In fact, the job can be made so simple that the only cost involved is the extra speaker, baffle or cabinet and wire. It can be very easily done by anyone who is mechanically minded.

Volume can be independently controlled at the speakers and, by very simple wiring arrangements, the choice is always available between the extension speaker, the main speaker or both. Furthermore, wires could be run to several rooms and the extension speaker moved around as required.

It does not require the knowledge and experience of a radio engineer to fit up a system to take an extension speaker or speakers. Anyone with the slightest mechanical knowledge can do the job perfectly satisfactorily and at a very low cost. It is not even necessary to take the set out of the cabinet, and, provided reasonable care is taken in making the necessary alterations or connections to the main speaker, there will be no possibility of affecting its response and efficiency in any way.

Naturally, slightly more power is

required to run two speakers than one, but on almost every modern radio receiver there is always far more power than is required for normal volume levels. In fact, the average receiver can quite easily run two, three and sometimes four speakers quite satisfactorily.

Speakers used on older sets, and for that matter some of those used to-day, are easily outperformed by the latest high efficiency permanent

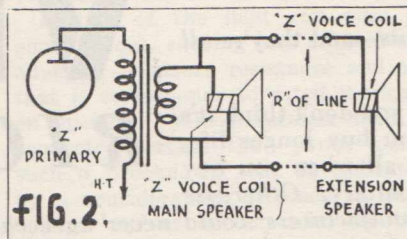


FIG. 2.—The simplest method of running extension speakers—an extension of the voice coil leads.

magnet speakers. It is not surprising, then, that the modern extension speaker of the Rola permanent magnet type, if wired correctly, will give quality equal to and often better than the original speaker.

There are two main types of radio receivers—one working from a battery or batteries and the other directly from the a.c. mains. In the case of the former, what are known as permanent magnet loud-speakers are used. The virtue of this type of speaker is that the magnetic flux required for its operation is derived from a permanent magnet, and hence there are only two or three wires from the set to the speaker.

The a.c. type of set uses a speaker fitted with an electro magnet, the power for which is supplied by the

receiver itself. The winding of this electro magnet is known as the field coil, and is used as a smoothing choke in the power supply of the receiver, so it must at all times be connected for the set to operate. In the case of the electro magnetic speakers there are either four or five connections. Sometimes designers use more, but they are only variations of the above. Because of the simplicity and general high efficiency of permanent magnet speakers, they are the more suitable for extension speakers. Furthermore, only two leads instead of four will have to be run.

The Output Stage.

Valves used in the output stage are designed to work into certain specified values of load impedance to give a maximum power output with a minimum of distortion. Variations in this load impedance will cause distortion and loss of power output, particularly in the case of pentodes and tetrodes which are now used in the output of practically every radio receiver.

The impedance of the voice coil of a loud-speaker rises with frequency, the lowest value of impedance being at and near 400 cycles per second.

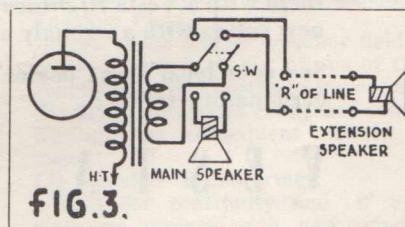


FIG. 3.—Connecting a double-throw double-pole switch so that either the main or extension speaker may be selected.

By the time the frequency has reached 3,000 cycles per second, the impedance has doubled in value. As the load impedance on the output stage is provided by the voice coil impedance (which is reflected into the primary of the output transformer), it follows that if the voice coil impedance varies, so will the load impedance. This load impedance is kept reasonably constant by means of an output filter as in Figure 1, consisting of a resistor "R" and condenser "C" in series, connected in parallel with the output transformer.

In this filter, with a rise in frequency the impedance of the capacitor "C" falls, this being opposite to the effect of a rise in frequency on the impedance of a voice coil. With correct proportions of "R" and "C" for a given load impedance, a condition can be met where a resultant load will be very nearly constant regardless of frequency. For the

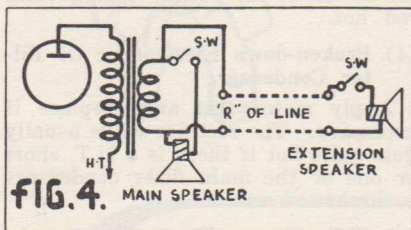


FIG. 4.—Employing two switches so that either or both speakers may be used at will.

modern types of pentodes with a load impedance of 7,000 ohms, the values of "R" and "C" will be 10,000 ohms and .02 mfd., respectively.

Methods of Connection.

Before running systems for extension speakers, it is necessary to decide upon the system most suitable for individual requirements. There are three main methods of running extensions, each one having several variations.

- (a) Low impedance voice coil lines.
- (b) High impedance lines.
- (c) The use of a 500 ohm line.

A.—Low Impedance Voice Coil Lines.

The easiest and by far the cheapest method of connecting an extension using a voice coil line is as shown in Figure 2.

In this method the extension speaker voice coil is connected in parallel with the main speaker voice coil. The only advantages of this method are its simplicity and low cost, although it is quite successful if used at average home levels. The

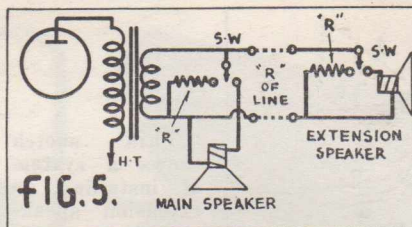


FIG. 5.—Extension of the method shown in Fig. 4 to provide for the maintenance of constant load on the line.

length of the extension is limited because the resistance "R" of the line must not exceed 25% of the impedance "Z" of the voice coil, otherwise big losses will occur in the line.

If long extensions are run, heavy conductors must be used. These are expensive. Furthermore, the bigger the conductor, the harder it will be to conceal—a very important factor to consider when installing an extension in the home.

Wire suitable for short extensions would be type 1/20 bell wire, having a resistance of 2.36 ohms per 300 foot coil. For a voice coil whose impedance is 2.3

lowable resistance "R" will be $\frac{2.3}{4} = .575$ ohms. This resistance would be given by approximately 75 feet of wire, this giving us an extension of 75 — or approximately 37 feet.

The second fault of this system is that it causes serious mismatching to the output valve when both speakers are operating simultaneously. If the impedance "Z" of the extension speaker is the same as that of the main speaker, then, because the two are in parallel, the impedance reflected in the primary of the transformer will be one half that reflected by a single voice coil.

Figure 3 shows a method whereby the problem of mismatching is overcome provided the extension speaker voice coil is the same as that of the main speaker.

In this method, the secondary leads of the output transformer are disconnected from the voice coil of the main speaker and connected to a double pole double throw switch (S.W. in Figure 3) by which the secondary may be connected to either the main or extension speaker. The disadvantages of this method are, firstly, the limitation of the length of the extension due to resistance of the

line and, secondly, only one of the speakers may be used at once.

In Figure 4 is shown a method whereby either one of the speakers may be used separately or both together.

If both speakers are used simultaneously, serious mismatching occurs as in Figure 2.

Figure 5 shows the correct and best method of installation of an extension speaker utilising the low impedance voice line. With this method either speaker may be operated separately or both simultaneously without any mismatching. The transformer on the main speaker has been replaced by one designed to match two voice coils in parallel, i.e., half normal primary impedance.

Switches (S.W.) are of the single pole double throw type, and operate so that when one speaker is disconnected, a dummy load is connected in its place. The value of this dummy load is approximately 25% greater than the voice coil impedance.

Although in this system there is a loss of power in the dummy load resistor when one speaker only is being used, the correct load impedance is provided on the output valve, thereby maintaining its correct operating conditions for maximum power output and minimum distortion. It is important to note that each dummy load resistor must be capable of dissipating a power of at least half the maximum power output of the receiver or amplifier.

B.—High Impedance Lines.

The method is very simple, and was one of the first methods ever used. Figure 6 shows how an extension is made utilising the high impedance line.

This method consists of connecting the extension speaker input transformer in parallel with the main speaker input transformer through

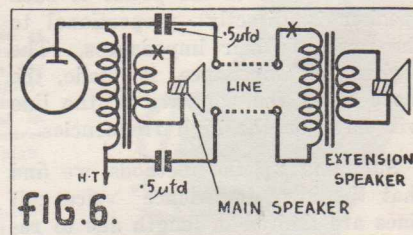
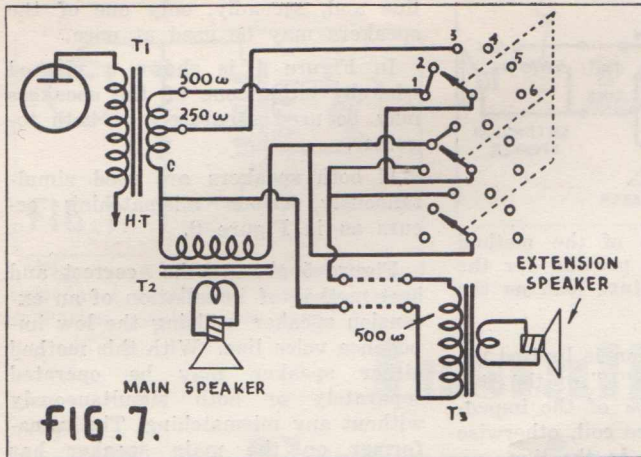


FIG. 6.—Taking an extension from the high impedance side of the output transformer.



This sketch shows a system of installing an extension speaker using a 500-ohm line. With this scheme correct impedance matching is obtained under all conditions.

two condensers having a value of about .5 mfd. each. These condensers are in the circuit to eliminate the high d.c. voltage from the extension.

Again in this system, because of the two speakers being in parallel, we have mismatching of the output valve. More care has to be taken with the insulation of a high impedance line of this type because of the high a.c. voltages that are encountered.

With this method, as in Figure 2, there is no choice of speaker, but by inserting two switches in the two points marked "X" on Figure 6, this disadvantage is overcome, without mismatching. Both speakers can be used simultaneously with the mismatch already mentioned.

The length of a high impedance extension is limited by the capacity between the two wires. This capacity has the effect of short circuiting the high frequencies. If the impedance of the extension speaker is increased, so, the resultant impedance will approach the correct value for the output valve.

This, however, will cause a smaller power to be fed to the extension because the ratio of the power to each speaker is directly proportional to the ratio of their impedances. The higher the impedance is made, the more effect the capacity of the line will have on the high frequencies.

Summing up the methods, we find that the low impedance voice coil lines are limited in length due to resistance. In the case of high impedance lines, the limitation is due to capacity and insulation.

C.—The Use Of A 500-Ohm Line.

A third and very successful method making use of a line having an impedance of 500 ohms is at our disposal. Resistive and capacitive effects are not serious, and use of this type of line has been adopted as standard practice.

This method consists of converting the output from the set or amplifier to a line with a secondary impedance of 500 ohms. The extension speaker and the main speaker each have primaries to match this line. If either speaker is used singly, the impedance of the line would be 500 ohms. If the two are used together (in parallel), the impedance of the line would need to be dropped down to half this value, i.e., 250 ohms, in order to provide matching.

It is, therefore, necessary to provide some means of altering the output impedance to match the number of speakers on the line.

Figure 7 shows a system of installing an extension speaker making use of a 500-ohm line. In this system correct impedance matching is provided with either main or extension speaker used separately or both together.

The change-over is made by means of a multiple all-wave switch. This switch consists of three gangs each having six contacts. Although only three positions are used, this switch was chosen because it is a standard type. The cost of installation of an extension using this method is higher than for above mentioned methods, but it is the most successful.

From the wiring diagram, it can be seen that when the switch is in

position 1, the extension speaker which is provided with an input transformer, T3, having an input impedance of 500 ohms, is connected to the 500 ohm output transformer. Position 2 of the switch connects the main speaker, whose input transformer has been changed for one having an impedance of 500 ohms, to the 500-ohm winding.

In position 3 of the switch the main and the extension speaker are connected in parallel, giving a resultant impedance of 250 ohms. They are then connected to a 250-ohm tapping on the 500-ohm output transformer, T1.

(To be concluded next month)

Leaves From A Serviceman's Diary.

(Continued from 24)

the screen of the power valve getting red hot.

(4) Broken-down Electrolytic Or Filter Condenser.

Apply meter test and replace if necessary. The rectifier valve usually gets quite hot if there is a H.T. short or one of the main filter condensers is broken down.

(5) H.T. Short—"B+" To Chassis.

Examine for such defect, especially on voltage divider clips.

(6) Broken-down By-pass Condenser.

Test all condensers for break-down, starting with those which have the greatest applied voltage.

(7) Open-circuited Volume Control.

Test for continuity over entire scale.

(8) Voltage Divider.

Test voltages at clips of divider.

(9) Intermediate Or Tuning Coil.

Test for continuity.

(10) Resistor.

Test all resistors, especially those which carry the highest current, such as plate resistors, bias resistors, etc.

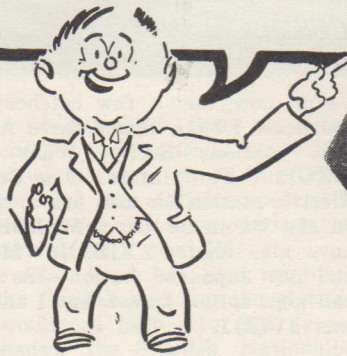
(11) Audio Transformer Open-circuited.

Test for continuity or plate voltage on audio valve.

Other Defects.

Plates of gang condenser shorting, padder or trimmer condenser shorting, piece of stray solder causing short circuit, wave-change switch faulty, aerial broken or aerial terminal shorting to chassis.

The D1503
DELTA
MULTITESTER

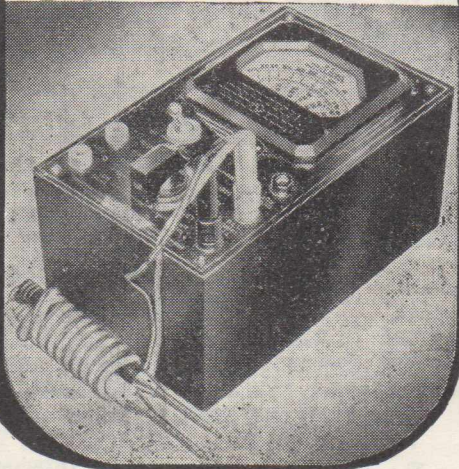


DELTA
MODEL D666

Small, compact, and highly efficient, this new Delta Portable Multimeter incorporates a precision-built Triplett Model 327 D.C. Microammeter, 0/300. Same scale used for A.C. and D.C. Volts. It is fitted in a highly finished wooden case, 6½ in. x 4 in. x 3½ in., with an attractive engraved panel in black, silver and red.

RANGES:

A.C. and D.C. Volts: 10-50-250-1,250; D.C. Milliamperes, 1-10-50-250; Ohms, 0.2-500 and 100-100,000. Selector switch for instrument readings. Ohms adjuster and A.C./D.C. switch, A.C. and D.C. jacks. Self-contained battery. Test leads and prods included. PRICE £6/10/-



SPECIFICATIONS:

1. COMPLETE VALVE TESTING (American and continental valves). (Emission Method.)
 2. SET ANALYSIS (A.C.-D.C. Voltage, D.C. Milliamperes and Ohms.)
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- Final Analysis multimeter:
- Combines in one instrument the equivalent of eight separate units.
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 - Paper Condenser Test (for shorts and opens).
 - D.C. Voltmeter, 10-50-250-1000 Volts at 1000 ohms per volt.
 - A.C. Voltmeter, 10-50-250-1000 Volts
 - D.C. Milliammeter, 1-10-50-250.
 - Ohmmeter, 0.2-10 megohms in three ranges—0-1 megohm, 0-10 megohms.
 - Line Voltage adjustment.
 - Attractive, durable, black, silver and red etched panel.
 - Triplett Model 426 D.C. Instrument square De Luxe case, 4¼ in. x 4¼ in.
 - Portable leatherette covered case, 15in. x 9in. x 6½in., sturdily constructed.
 - Test leads, prods, alligator clips, 3 core A.C. supply leads and full instructions.

PRICE £16/10/-

MODEL D735

The DELTA Model D735 illustrated at right is a remarkably compact instrument of the most advanced design for service, speed and precision. Employing a Triplett 326 D.C. Milliammeter 0/1,000 ohms per volt, and fitted in a handsome bakelite case, it measures only 3¼ in. x 5½ in. x 2½ in. high. Bakelite engraved panel and ohms zero adjuster.

RANGES: 1-10-50-250-M.A., 10-50-250-500 Volts, Ohms 0-10,000 and 0-100,000.
PRICE £4/10/-



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The end of a perfect holiday—the author and his companion after their 100-mile journey down the Shoalhaven.

One-Four Portable On 100-Mile Canoe Trip

Despite several capsizes in rapids, the "One-Four Portable" performed perfectly throughout the entire journey.

By A. C. BUSSELL

NO doubt you have had many reports on the performance of various "One-Four Portables" built by your readers, but I feel I am in a position to report on such a set in a way which no other person can.

100 Miles Down The Shoalhaven.

Recently I had the pleasure of making a canoe trip on the Shoalhaven River from a point opposite Goulburn down to Nowra. A "One-Four Portable" constructed by the writer was taken along. While in the boat the set was carried in a specially constructed watertight tin, strapped down to the floor of the boat. This precaution proved necessary, as we were overturned in rapids several times.

When operating, the set was placed on the ground and 20 feet of insulated wire slung into a tree. Most of our listening was done during the night or early in the morning. At night, for the most part no difficulty was experienced in logging any station of size in Australia, the dial being literally full of stations. New Zealand was heard on occasions.

During the day the stations at Goulburn and Canberra and National Central Regional were strongest, but both Sydney and Newcastle stations were playable at good volume.

Varied Results In Different Locations.

Several peculiarities in reception were experienced. At one camp site Sydney stations were very weak, Melbourne and northern stations being stronger. Six miles down the river this trouble disappeared. At another spot, Newcastle and 2TM, Tamworth, were stronger than the Sydney stations, as also were many

inland stations much further distant. Other peculiarities were noticeable, but in each case, a few miles' travel down river altered the position entirely.

On the whole the performance of the set was remarkable. Its value on a trip like this will be appreciated when I mention that during the fortnight we did not see a single person except ourselves. The trip was approximately 100 miles long, and there is no settlement on the river in this distance. The news sessions were particularly appreciated, keeping us in touch with the outside world.

"A Remarkable Little Set."

I think I can safely claim that this is the first time a radio has been carried through this river—I would not be surprised if it is the first time a radio has been carried on a canoe trip of such length, and I think it fitting that the honour should go to such a remarkable little set as the "One-Four Portable Five."

Allow me now to congratulate your journal on producing the "One-Four Portable Five," and to wish you many more successes.—A. C. Bussell, W. Kogarah, Sydney.

Stations Roll In On "Air Ace Four."

Since writing to you last I have built the "Air Ace Communications Four," and, boy, does she perk!

This set gives remarkable performance for such a small job, and stations seem to roll in. Although the noise level is extremely high around this district, the signal-to-noise ratio is extremely good.

And now for a few catches:—On broadcast I have logged three American stations—KAN, WLW and WXGE. The latter is a General Electric station (it also has a station on the 31-metre band, W6XBE). I have also logged XIB3 in Mexico, and one Japanese station—the exact call sign is not known but I think it was JV(Z)J.

175m. has been as usual, with its one or two sigs. but no DX. 80 has had its fair share of DX this month and K6's and K4's seem to be breaking through at times. Also, the W6 stations can be heard at R4-5 in the early mornings, 4-5 a.m.

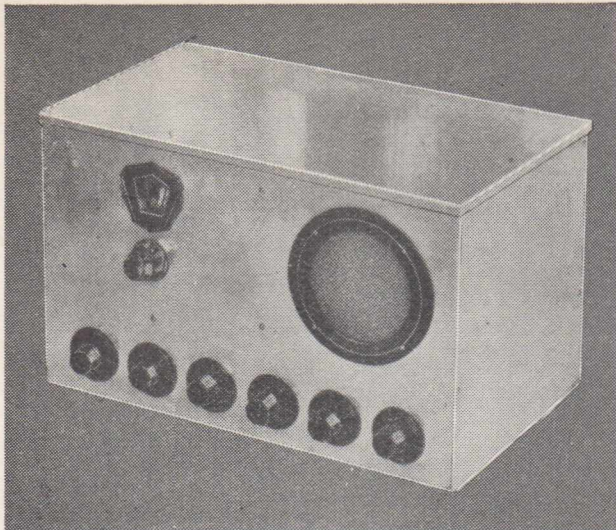
40 metres has been very noisy, and besides a host of VK3's breaking through during the day and VK5's at night, nothing seems to be on that band.

To operate on the 20-metre band and get DX it appears as though one must have E.C.O., because the band has been very lively, and all American States have been heard in two days. I advise anyone who wants G and F8 stations to get up early and collect them on Monday morning about 6 a.m. GI5NJ was heard working a VK2 and 5NJ was Q5R8-9 here.

10 metres appears to be like the 175m. band—it is there to be used and that is all, for no one seems to use it. Apart from a few W's, VE's, ZL's and K6's, the band seems to be dead.

The S.W. Broadcast Bands.

And now a few words about the S.W. B.C. bands. The 13m. band seems to be livening up and GSF and DJJ have been heard continuously for the past two weeks at Q5,



The "Air-Ace Communications Four," described by the writer of the accompanying letter as "a remarkable performer." It was described in the August and September issues of "Radio World" last year.

the most noteworthy being the General Electric station in San Francisco, W6XBE, broadcasting from the Golden Gates with a 20k.w. rig. The transmission starts at 11.30 p.m. on practically the same frequency as VLR. Also on the 31m. band is "Radio Saigon," which announces in English and Malay.

The 49m. band is beginning to liven up, and the Americans are coming through (when the noise level drops).

Well, that is all the DX I have collected this month, and I hope it is helpful.

By the way, how is this for a record. One of the local amateurs, VK4DU, running off batteries (80 volts) with .8 watt input, has worked two W6's, a VK5, XK6 and three VK-75's in one night on key, and with 5 watts on phone has worked two VK3's, six VK2's and one VK5. His rig is a 76 E.C.O. and 6A6 P.A. He uses the output of the "Air Ace Communications Four" as his modulator, and a Reiss microphone.

Lastly, I would like the circuit of a good battery 5-metre receiver, as a few of the boys around here are going down on "five."—S. E. Molen (AW213DX), Box 8, Kingaroy.

R7-8. Besides there, there are a few rare catches such as Chile, on 13.32m. No call-sign was given on this transmission, and this station appeared to be testing for 5-minute periods, at times rising to a good R6.

The 19m. band has also improved and the English and German stations are prominent here also, but do not overshadow the Spanish Nationalist station on 19.56m., announcing in Spanish and English, and giving the call-sign as "Radio National Spain,"

with a lady announcer and as well a lot of background noise. No address was given, but the transmitter appears to be just outside Madrid.

The 25m. band seems to be going into its winter sleep, as the only stations that have been heard on this band with any consistency are the English stations and at times even those fade right out, leaving a blank band.

A few new stations have put in their appearance on the 31m. band,

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JUST ARRIVED!

Stocks have been landed of NEW RAYMART Transmitting Condensers.

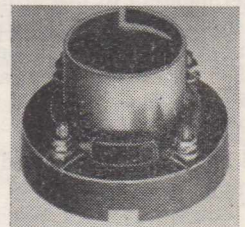
Manufacture by RAYMART is a guarantee of perfect performance. These condensers will enable you to BETTER your previous results. Write NOW for full particulars!

RAYMART Short Wave and Ultra Short Wave Equipment is scientifically designed and precision-built to meet the most exacting demands. Every "ham", every short wave experimenter can rely on RAYMART—because RAYMART Equipment WILL DO THE JOB. And, remember, John Martin Pty. Ltd. handles many other lines needed by every amateur—REGAL Microphones, TEFAG Headphones and ROLA Speakers. Send for full details of any line you may need—at the Lowest Prices in the State!

AMERICAN VALVE SOCKETS.

Owing to the increasing demand for first quality H.F. ceramic sockets, John Martin offers these:

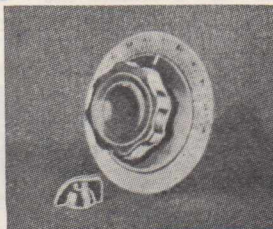
- Type VA4 4-pin Ceramic (for 210, etc.) 3/-
- Type VA5 5-pin Ceramic (for 46, 47, etc.) 3/-
- Type VA6 6-pin Ceramic (for 58, 6D6, etc.) 3/-
- Type VA7 7-pin large Ceramic (for 53, 59, etc.) 3/-
- Type VA7S 7-pin sml. Ceramic (for 6A7, etc.) 3/-
- Type VA8 8-pin Octal 4/-
- Type VA50 50-watt (Air Ministry, XMB262 H.F. Dielectric) 12/6
- Type VA50 50-watt, porcelain base 15/-



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Individually spun, heavy, solid nickel dials, with engraved, not etched, divisions and handsome knob. Diameter, 4ins.

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Rola

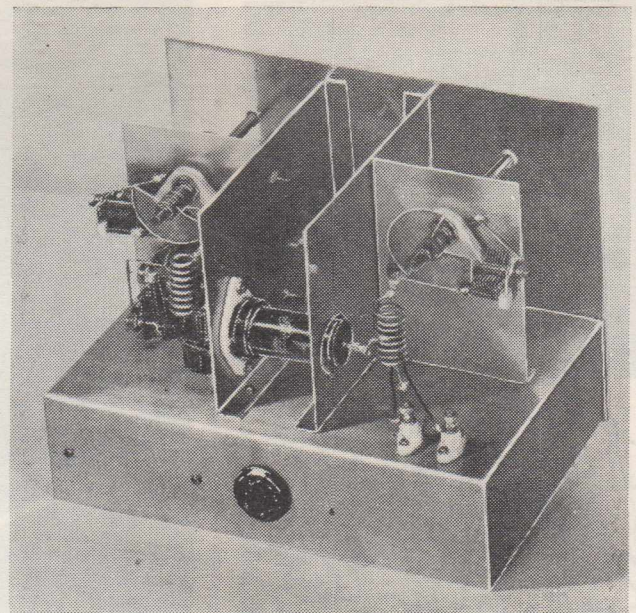
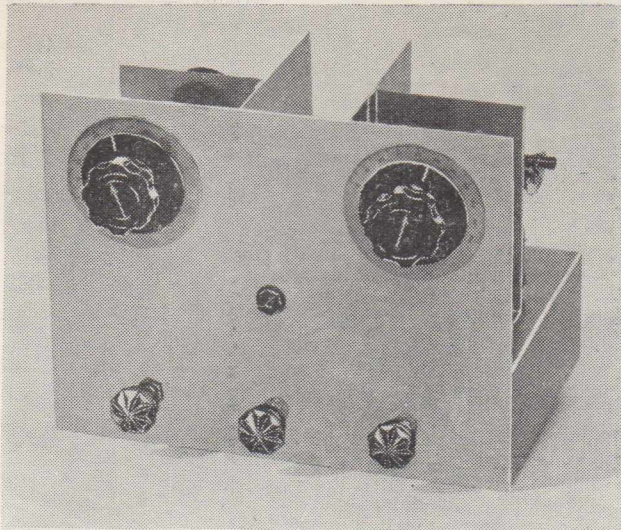
ROLA makes another contribution to Loud Speaker Technique with the patented "Permacentric Construction", a new method of permanently aligning the voice coil so that it never moves out of centre, and at the same time providing positive dustproofing. This, and other exclusive features, assures ROLA superiority.

Telegrams: "Jonmar," Sydney.

Phone: BW 3109 (2 lines).



116-118 CLARENCE ST., SYDNEY.



Front and rear views of the "Ultra DX Three." Elaborate shielding and a carefully-planned layout to give shortest possible leads are important features of the design.

this is only two inches long! The coil could have been a little closer, but too much damping would have resulted.

Above the coil is the tuning condenser. To its left is the band-setter, while directly underneath it is the socket of the 1852 with pins 2 and 7 in the vertical plane.

A point to watch with this valve is the unusual pin arrangement. The normal cathode pin is the plate, the cathode goes where the suppressor usually is, and the grid and cathode are next to each other, which makes an extremely good arrangement for cathode regeneration.

To the left of the socket is the 5-metre u.h.f. choke, and to its left are the detector plate by-pass condensers. These are .0001 mfd. mica ceramics (T.C.C.), and are extremely compact and efficient.

Tucked snugly under the Raymart ceramic socket (1852) is the .01 mfd. mica (T.C.C.) by-pass condenser for the screen of the 1852. All earth connections for the 1852 are joined to the left-hand side of the socket.

Just above the socket, and resting on pins 2 and 3, is the grid leak of 1 meg. which connects from the grid (pin 4) to earth. Behind the coil is the .0001 mfd. ceramic grid condenser, which connects from the grid pin straight out and onto the centre of the coil. The cathode pin (5) is then brought out to the bottom of the coil, which is then taken to the earth connection. Sufficient feedback is

obtained from this arrangement, as the 1852 valve is a particularly strenuous oscillator, and even a part of a turn up the coil is too much.

To the right of the coil is the ceramic socket of the 1851, which is mounted horizontally to permit of good physical separation between the r.f. and detector stages, thereby preventing any instability in the set.

To the left of the valve socket are the by-pass condensers for the screen and cathode; they connect directly on to the socket pins, which, by the way, for this valve are according to the conventional arrangement.

The socket is mounted with the filament pins 2 and 7 in the horizontal plane, with the suppressor in the central point for all earth wiring points. The screen resistor, which the valve manufacturer states must be at least 60,000 ohms from a 300-volt supply, consists of two 150,000 resistors in parallel. To their right is the cathode resistor of 1,500 ohms. Lying horizontally near the chassis base is the 2,000 ohm de-coupling resistor for the plate of 1851, and just behind it is the .1 mfd. mica by-pass.

High-Grade Condensers Essential.

Too much stress cannot be placed on efficient by-pass condensers in this stage. Junk-box paper condensers just will not do; they must be of the highest grade and definitely of mica.

Then on the extreme right-hand side of the chassis is the r.f. stage, with the grid pin just protruding

through the second partition. The r.f. tuning condenser is mounted similarly to that for the detector stage, and has its associated band-setter to its right.

The grid connection again comes from the centre of the coil with a very short lead. Incidentally, the grid pin is a departure from the usual type to eliminate some of the input capacity of the valve. Also, any leads soldered to the grid clip must not come too near the valve shield, as this would have the same effect as a large grid cap.

The grid clip is made from one of the socket pins of a Tasma socket, which makes a firm and rigid clip.

In the centre of the two partitions which separate the detector and r.f. sections is the 6C5 audio valve, while directly in front of this, mounted on the front panel, is the 'phone jack.

To realise the utmost gain from the detector, a high impedance choke is inserted in the "B+" lead, the supply being de-coupled with a 25,000-ohm resistor and an 8 mfd. dry electrolytic condenser.

The aluminium has been treated with a rather attractive finish, which helps to eliminate annoying scratchy noises in the receiver. Firstly, the aluminium is rubbed with steel wool, which can be procured from almost any hardware store. Then give the aluminium three light coats of clear duco, allowing each coat to dry thoroughly before applying the next.



do you like
listening too?

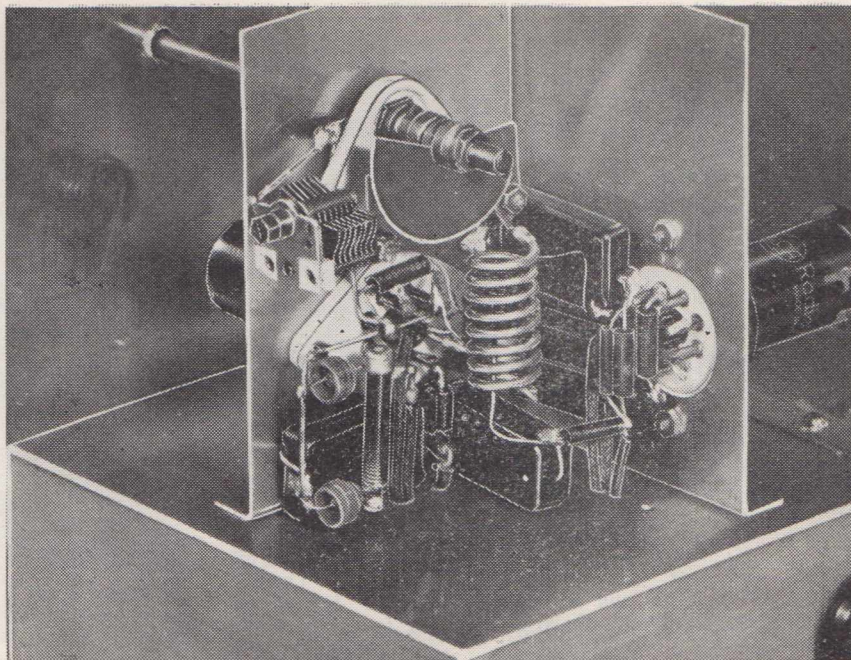
Everyone likes listening when there's something that pleases the ear. If your radio is dull and lacks sparkle, worn valves may be the cause. Make listening the pleasure it should be . . .

Revalve with



THE WORLD'S
STANDARD
RADIO VALVES

Specify . . . RADIOTRONS
for the "Ultra DX Three"
and "Tiny Tim" described
in this issue.



This close-up view of the detector section shows the short, direct wiring that is essential for highest efficiency on the "ultra-shorts." Note how the detector primary is wound concentrically inside the grid winding.

Now, in mounting the partitions, it must be remembered that there will be no contact between the chassis and partitions when laid in position, but this is desirable inasmuch as it will tend to eliminate any unwanted noise, due to poor contact at various

points. Contact is obtained only per medium of the mounting screws, as when these holes are drilled, a small section around and under each is thoroughly cleaned. A lug is then placed under the nut underneath the chassis, and all lugs around the

"ULTRA DX THREE" — List of Parts.

- | | |
|---|---|
| 1—aluminium chassis 10" x 6½" x 2½", with panel 10" x 8", and four partitions. | FIXED RESISTORS: |
| 1—combination power pack and audio amplifier as described in "Radio World," Jan. and Feb., 1938 (or any suitable power supply—battery or a.c.). | 1—1500 ohm ½-watt (I.R.C.). |
| 2—8-pin ceramic sockets (Raymart). | 1—2000 " " " |
| 1—octal, 1—5-pin socket. | 1—10000 " " " |
| 2—10mmfd. midjet variable condensers (Raymart, Radiokes). | 1—25000 " " " |
| 2—50mmfd. air padding condensers. | 1—50000 " " " |
| 3—knobs. | 1—75000 " " " |
| 2—dials. | 1—1 megohm " " " |
| 1—250 henry high impedance audio choke. | 1—20,000 ohm 2-watt " " |
| 1—5-metre r.f. choke (Raymart). | 1—2,500 " " wirewound (I.R.C.) |
| 1—closed circuit jack (ordinary single-circuit 'phone jack can be substituted if 'phones only are to be used). | FIXED CONDENSERS: |
| 2—flexible couplers (Raymart). | 3—.0001 midjet mica (T.C.C., Simplex). |
| 2—6" lengths aeronoid rod. | 1—.001 " " " " |
| 1—epicyclic reduction drive (Raymart). | 3—.01 " " " " |
| 2—midjet stand-off insulators (Birn-bach). | 2—.02 " " " " |
| 1—50,000 ohm potentiometer (I.R.C.). | 1—.1 mfd. paper type. |
| 1—.5 megohm " (I.R.C.). | 2—.5 mfd. paper type. |
| | 1—8 mfd. dry electrolytic, 450-volt working (T.C.C.). |
| | 1—10 mfd. dry electrolytic, 25-volt working (T.C.C.). |
| | VALVES: |
| | 1—1851, 1—1852, 1—6C5. |
| | MISCELLANEOUS: |
| | Small quantities of 12-gauge tinned and 22-gauge enamel copper wire for winding coils, solder tags, hook-up wire, nuts and bolts, 2 grid clips. |

Tune In To 2MA On "Ultra-Shorts."

A prolonged test is being conducted by Amalgamated Wireless to ascertain the value for various purposes of the almost unexplored radio channels in the ultra-high frequencies below the ten metres waveband.

From the top of the Grace Building in Sydney an experimental station with the call-sign 2MA has been broadcasting for two years by day and night on 42 megacycles (7.14 metres).

In the past, short programmes have been radiated on the ultra-short waves, but only intermittently. The present extended test is providing data on reception under all conditions. Many experimenters tune in regularly to the A.W.A. experimental station, which is on the air daily from 4 p.m. to 10 p.m.

In due course the results of 2MA's broadcasts will be collated and studied by A.W.A.'s research staff.

chassis bonded together. In this way, builders are assured of an excellent mechanical and electrical job.

The r.f. stage tuning control, while not broad, does not require a slow motion drive, but the detector does because of its extremely sharp tuning. The Raymart 6:1 epicyclic reduction drive does an excellent job here.

The tuning condensers on each stage are of 10 mmfd. capacity, and the band-setters, 50 mmfd. The secondary windings of the coils each comprise eight turns 12 gauge tinned copper wire, $\frac{1}{2}$ " diameter, spread to $1\frac{1}{2}$ ". This gives a coverage of from approximately 4.4 metres to 9.2 metres.

Both primaries consist of ten turns 22 ga. en. close-wound on $\frac{1}{4}$ " diameter former. These are mounted inside the secondaries.

With the band-setters "all in," it is possible to hear the 9-metre beacon at Mascot signing "SY," and then coming further down, the 7-metre

signals of 2MA, which is on the air from 4 p.m. to 10 p.m. each day. Then comes the 5-metre band, and finally, with the band-setters practically "all out," one can hear the harmonic from the beacon at Mascot on $4\frac{1}{2}$ metres. These three transmissions give quite good markers when the receiver is being tuned up—particularly 2MA, which allows an excellent opportunity to test the receiver out thoroughly.

The aerial recommended for maximum results is a twisted pair doublet, designed for five metres. Those without facilities for making one of these up are advised that an excellent version is available commercially in the Birnbach five-metre aerial, which comprises a pair of four-foot telescopic aluminium rods mounted on a six-inch Birnbach stand-off and fed from the centre.

Finally, a word of warning with regard to wiring. Extreme care in choice of parts and efficient assembly and wiring are essential to success on the "ultra highs." There is a wrong and right way, and invariably only one right with many points, so, in building, if everything does not seem to be just right, try a little rearranging of wiring points and you will be surprised at the results.

Next month further details regarding the assembly and operation of the "Ultra DX Three" will be given.

With 5 metres to-day calling to only a few experimenters, every encouragement is to be given to those who to-day are venturing down there for the first time. So for that very reason the building of this receiver was embarked upon, because it was felt that the more simple a receiver became for 5 metres, the better the results that would be obtained and the more easily could they be duplicated by others.

It is hoped that very shortly, test schedules on "five" will be arranged among a network of amateur stations throughout Australasia, so that there will be wonderful opportunities for "Radio World" readers to put up new DX records on the ultra-highs. In the meantime, a note to the writer (C/- "Radio World") will bring full details of this scheme by return mail, together with any advice that might be required in regard to building the "Ultra DX Three."

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Are they moisture proof? Simplex moulded condensers are designed specially to meet Australian conditions, and are triple-sealed against humidity.

CONTACTS ✓

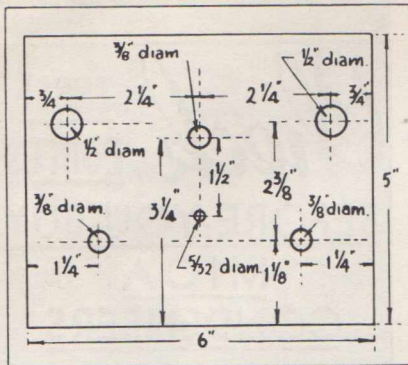
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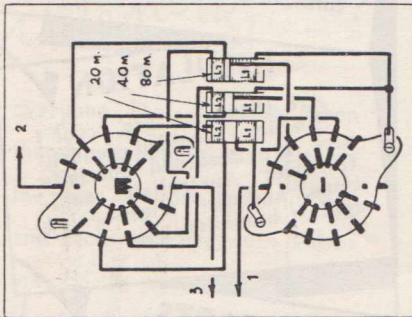
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"Tiny Tim" All-Waver.
(Continued from page 20)

The accompanying sketch shows the method of mounting the coils on the wavechange switch, and the connections. In all, there are three leads running to the coil assembly,



and these are numbered correspondingly in this sketch and the wiring diagram on the previous page.

The remaining sketch above shows dimensions for preparing the front panel.

(Continued on opposite page)

Keep Charging!

(Continued from page 21)

The first point to bear in mind is that if a battery is constantly discharged below the "quarter-charge" mark, the plates very quickly deteriorate, seriously shortening the battery's life. The only sure way to determine this minimum limit of safety is by an hydrometer, which tests the specific gravity of the acid. This varies from 1250 to 1285 degrees at full charge, to the minimum safe figure of 1100 degrees, below which the battery should never be allowed to run. Another important point to bear in mind is that when a re-charge becomes necessary, it should be given immediately; otherwise a coat of hard sulphate will form which hardens the plates and consequently ruins them.

Illustrated on page 21 is the Vesta "ball" type hydrometer, which uses three coloured balls instead of the usual specific gravity scale to indicate the state of charge of a lead-acid battery. To the non-technical user this greatly simplifies the use of the tester. Illustrated as well is the special Vesta vent-cap and the hydrometer shown in place in one section of a 6-volt battery.

These Vesta "ball" hydrometers are packed in individual cartons, and with each is supplied a special battery vent-cap drilled with the hole just the right size to hold the hydrometer permanently in position in any one cell. To test the battery, the bulb is first squeezed and then released, and the coloured balls will float or sink in the loaded hydrometer, so indicating the condition of the battery according to the instructions printed on the carton. The condition of charge indicated by testing one cell of an efficient battery generally speaks approximately for all cells.

One of the original vent-caps supplied with the Vesta radio battery should be unscrewed when the hydrometer is to be used, and the drilled hydrometer vent-cap screwed into its place. When the battery is to be moved or transported for re-charge, the original non-spill vent-cap should be replaced.

This "ball" type of hydrometer has a distinct advantage over the scale type in that the balls tell the condition of charge, and no knowledge of specific gravity is required in order to use it. As well, the hydrometer is kept permanently in the battery and no acid can be spilt.

Summing up, then, it becomes obvious that the user who neglects a lead-acid battery pays dearly for it in that a replacement soon becomes necessary. On the other hand, a little thought devoted to care and maintenance of a battery brings its reward in long and trouble-free service.

Get Down To "Ultra-Shorts."

(Continued from page 23)

hets or good t.r.f. receivers.

Crystal control is the order of things in transmitters, and if anybody imagines that the snags of putting a crystal-controlled 5-metre signal on the air are insurmountable, they can be quickly re-assured. The

exciter unit used from a 40-metre crystal in the writer's station is the answer to that.

This unit starts off with a 42 pentode crystal oscillator, with no tricks of any kind. The next stage is a quadrupler to 10 metres, using a 6L6G in the ingenious harmonic-reinforcement scheme of Reinartz's. Then an 807 as a series tuned doubler provides a solid 25 watts r.f. output at 5 metres.

This exciter in itself, only three valves from a 40-metre crystal, is an excellent transmitter, and can be plate modulated for telephony without any trouble. It is a simple matter to link on a higher-powered amplifier in push-pull (or single ended) if desired.

In Sydney, Melbourne, Adelaide, Brisbane and Perth, a goodly number of amateur stations are now on the air with crystal control on 5 metres, and scattered at points inland there are others.

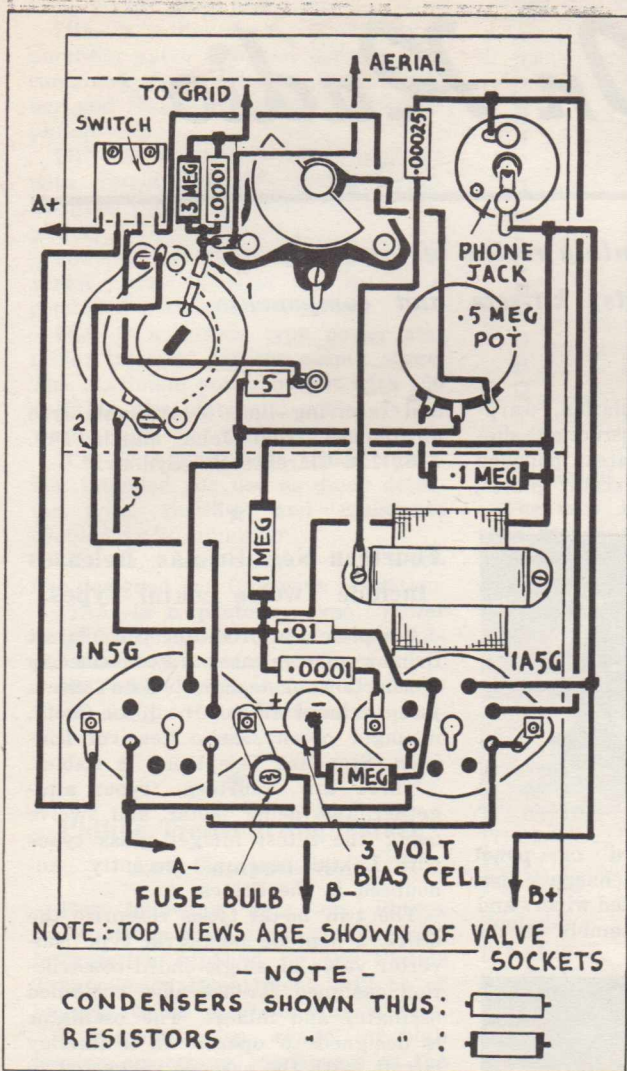
Receivers have likewise been the subject of much experimentation recently, and it is now easy to evolve a highly-efficient 5-metre super. by application of valves such as the 1851, 1852, 1853, 6J8G and 6K8 in the signal input circuits.

Enquiry shows that there is a tendency on the part of some amateurs to tackle the 112 m.c. (2.5-metre) range for close-range working around Sydney. While this is praiseworthy to some extent, there are points which militate against it at present.

In the first place, there is actually no 2.5-metre band in Australia. Permission has been given to one or two individuals to experiment on this channel, but such permission from the P.M.G.'s Department is usually governed by the amount of experience and consistency of the work already done on 5 metres. Latest reports indicate that it is in any case unlikely that 2 1/2 and 1 1/4 metres will ever be granted as regular experimental channels in Australia for reasons arising from the Cairo Conference.

If individuals are tempted thus to skip serious work on 5, and to play about on 2 1/2 metres, necessarily with self-excited oscillators and superregen. receivers, it may be looked upon by those desirous of bringing the 5-metre band to a populated status as dodging the issue.

(To be concluded next month)



This wiring sketch should be studied in conjunction with that of the coil unit on page 36.

"Tiny Tim."

(Continued from page 36)

A point that is worth mentioning here is that the carrying handle attached to the top of the cabinet should not be located exactly in the centre, but towards the rear at the point of balance so that the set remains upright while being carried.

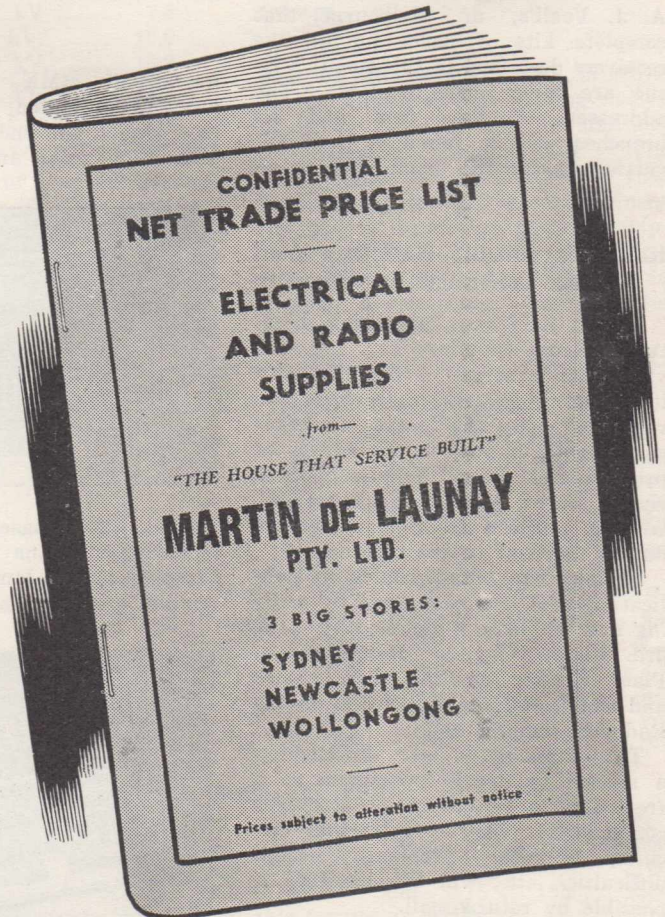
Use Aerial As Specified.

Unless some provision is made for looser coupling, an aerial longer than the one described by the author should not be used with their receiver. Otherwise its damping effect on the detector grid circuit would be high enough to prevent the set from oscillating. However, a simple way of overcoming this would be to attach a 6" length of flex to the aerial stand-off, and twist the aerial lead-in around this a few times until the optimum coupling is found.

Broadcast Band Coil.

There is room on the wave-change switch for an additional coil. This could either be designed to cover the 180-metre amateur band, or else the major portion of the broadcast band. It is hoped that winding details will be published in next month's issue of "Radio World."

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What's New In Radio

"R.W." Kits Available From Veall's.

Advice is to hand from Messrs. A. J. Veall's, of Melbourne, that complete kits of parts for all the receivers described in this month's issue are being made available. The addresses of this firm and its branches will be found in their advertisement on the inside back cover.



Radiokes Circuit Bulletins And Free Technical Service.

Mr. R. K. Stokes, managing director of Radio Suppliers Pty. Ltd., advises that a series of technical bulletins describing various circuits and receivers using the latest Radiokes components is now in the course of preparation. These bulletins, which should be of interest to all readers, will be released from time to time during the next twelve months.

Readers can obtain copies on publication free and post free by writing now to Radio Suppliers Pty. Ltd., 3rd. Floor, Wingello House, Angel Place, Sydney, so that their names and addresses can be included on the Radiokes mailing list.

This company is also establishing a special technical department as a free service to users of Radiokes components. Queries regarding circuits, technical problems, design difficulties, etc., will be answered if possible by return mail.

This service is entirely free of charge, but a stamped and addressed envelope must accompany each enquiry.



New Raymart Transmitting Condensers.

Illustrated alongside are three samples from the entirely new range of Raymart transmitting condensers, of which stocks have just been landed by Messrs. John Martin Pty. Ltd., of Sydney.

The entire range has been completely remodelled, and now incorporates the many features outlined in last month's issue of "Radio World." Most important of these is

A monthly review of latest releases in sets, kit-sets and components

the use of RMX insulation, warp-proof triangulated construction, die-cast aluminium end plates, polished aluminium rotor and stator plates,

and receiving lines is available free on request from John Martin Pty. Ltd., 116 Clarence St., Sydney.



Fourteen New Brimar Releases Include Twelve Loktal Types.

Complete information on latest Brimar valve releases are contained in a selection of technical data sheets just to hand from Mr. J. L. Coote, manager of the Radio Receiver Division, Standard Telephones & Cables.

There are fourteen types altogether, two being metal, and twelve being the latest midjet glass types with Loktal base, as recently announced in the States.

The two metal types comprise the 6SA7, a heptode pentagrid type converter valve of single-ended construction designed for use as a combined oscillator and mixer. The oscillator is designed to operate in a Hartley circuit, with the cathode connected to a tap on the oscillator coil. The 6SA7 can also be used as a separately excited mixer.

The 6SC7 is a twin-triode amplifier valve of single-ended construction, designed for use as a voltage amplifier or phase inverter. Shielding between the grid and heater leads in the base reduces the hum voltage picked up by the grid leads, ensuring low hum level.

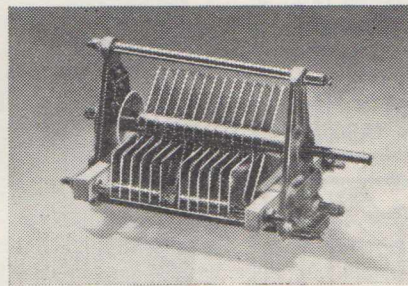
Following are brief details of the twelve Loktal base glass types mentioned above:—

7A6—is a twin diode designed for use as a diode detector and a.v.c. rectifier or as a low current rectifier.

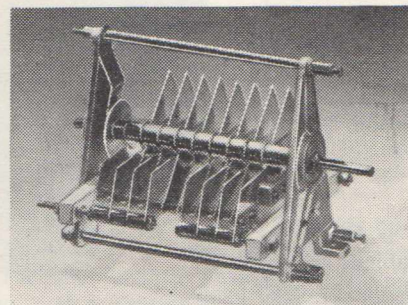
7A7—is a pentode type amplifier with remote cut-off characteristics, designed for use as an i.f. or r.f. amplifier.

7A8—is a heptode pentagrid converter designed for service as combined oscillator and mixer in vibrator or a.c. superhets.

7B5—is a pentode type power am-

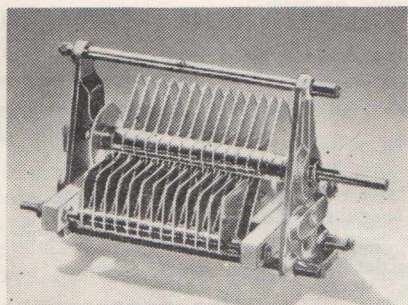


provision for baseboard or panel mounting, corona discharge disc, phosphor bronze laminated wipers and friction disc tension assembly on the



front bearing to maintain smooth operation.

Complete information on this and other latest Raymart transmitting



plifier delivering 3.4 watts with 250 volts on the plate and screen.

7B6—is a duo-diode triode type amplifier valve designed for use as a combined diode detector, a.v.c. rectifier and resistance-coupled audio amplifier.

7B7—is a pentode type amplifier with remote cut-off characteristics designed for use as an r.f. or i.f. amplifier.

7B8—is a heptode pentagrid converter valve intended for use as a combined oscillator and mixer.

7C5—is a tetrode type power amplifier intended for the output stage. The maximum power output with 250 volts on the plate and screen is 8.5 watts.

7C6—is a duo diode triode amplifier intended for use as diode detector, a.v.c. rectifier and resistance coupled audio amplifier.

7Y4—is a high vacuum type rectifier designed for full-wave operation.

35A5—is a pentode type power amplifier designed for use in the output stage of a.c./d.c. receivers.

35Z3—is a high vacuum type rectifier designed for half-wave operation in a.c./d.c. receivers.



Philips Transmitting Valves And Components.

The following data on Philips transmitting components, taken from information supplied by the Philips Transmission Department, will be of interest to all amateur transmitters.

A comprehensive range of high tension smoothing condensers is the first item of interest. Among other radically new features these condensers employ a special rag-paper dielectric and are impregnated under vacuum with an exclusive gelatinous compound, which is not only moisture resistant, but also has an extremely high dielectric strength. These factors ensure that losses are reduced to a minimum, and that each unit will retain its characteristics unimpaired over long periods. As a final precaution, each assembly is hermetically sealed into a metal container—tin cases being used for ratings up to 6 k.v., and steel tanks for larger units.

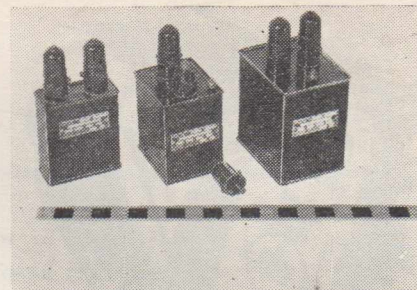
The following table shows the extremely wide range of capacities and ratings that is available in this series of smoothing condensers. The capacities are:—1, 2, 4, 8 and 16 mfd., while nominal D.C. working voltages range from 1,000 to 20,000 volts.

Condenser Type	Peak Voltage	Wattless Power*
A	1.1 kV.	0.03
B	1.4 kV.	0.05
C	2.2 kV.	0.12
D	3.0 kV.	0.22
E	3.3 kV.	0.27
F	4.4 kV.	0.48
G	5.2 kV.	0.63
H	6.6 kV.	1.1
K	9.0 kV.	2.0
L	11.0 kV.	3.0
M	14.0 kV.	4.9
N	15.4 kV.	5.9
O	17.6 kV.	7.8
P	20.0 kV.	10.0
Q	23.0 kV.	13.2
T	26.0 kV.	17.0
U	28.0 kV.	19.6

* Expressed in kVA per microfarad.

The next line of interest to amateur transmitters is the range of high-voltage rating variable condensers recently announced by the Philips Transmission Dept.

This range comprises four basic types with ratings from 4 to 15 KV.,



A selection from the wide range of Philips high tension smoothing condensers.

each of which is available in three sizes of capacity, thus making twelve condenser types in all. In addition, an equivalent number of "split stator" types can be supplied, so that the amateur or transmission engineer engaged in the design of new equipment or the modification of existing gear should have no difficulty in choosing a condenser to suit his requirements.

TABLE A.—Transmitting Triodes And Pentodes.

Triodes	F.V.	F.C.	P.V.	W.P.	A.F.	Sm.	Ri.
TC 03/5-1	4.0	0.28	400	6	6	2.3	4000
TC 04/10-1	4.0	1.1	500	10	25	2.5	11400
TC 05/25	4.0	2.2	600	40	9	4.0	3600
TC 1/75	10.0	1.6	1500	75	25	8.0	5000
TC 2/250	11.0	2.5	2000	250	25	10.0	4200

Pentodes	F.V.	F.C.	P.V.	V.Sc.	W.Sc.	A.F.	Sm.
PC 03/3	4.0	0.13	300	125	3	3.3	3.0
PC 05/15	4.0	1.1	500	300	15	4.0	2.5
PE 05-15	12.0	0.37	500	300	15	3.0	2.5
PC 1/50-1	4.0	2.0	1000	300	35	3.0	3.5
PE 1/80	12.0	0.90	1000	500	35	3.0	5.0
PC 1,5/100	10.0	2.0	1500	500	85	2.7	4.0

TABLE B.—Modulating Valves.

	F.V.	F.C.	P.V.	W.P.	A.F.	Sm.	Ri.
MC 1/50-111*	10.0	1.1	1000	75	10	7.0	2500
MC 1/60-1	4.0	3.3	1000	75	12.5	11.0	2100
MC 2/200*	11.0	2.5	2000	250	15	10.0	2500

* These valves are also suitable for use as oscillators.

TABLE C.—Rectifying Valves (Half-wave types).

Type	F.V.	F.C.	Vip.	O.C.	Poc.	Vv.	Vdc.	Ow.
DCG 1/150	2.0	5.0	3000	150	600	16	950-2850	140-215*
DCG 4/1000	2.5	5.0	10000	250	1000	16	3150-9500	790-1190*
DCG 2/2000	5.0	10.0	5000	1000	4000	16	1600-4700	1600-2350*
DCG 5/2500	5.0	10.0	12000	500	2500	16	3800-11500	1900-2850*

*These values hold good for full load, but they depend on the circuit employed and on the number of valves used. The lowest values indicated hold good for ordinary full-wave rectification with two valves, whilst the maximum values indicated refer to three-phase rectification in "Graetz" circuit with six valves. For other circuits the d.c. voltage and the output energy will vary between these values.

(F.V.—filament volts, F.C.—filament current, P.V.—plate volts, W.P.—max. plate dissipation, Sm.—max. mutual conductance, Ri.—internal resistance in ohms, V.Sc.—max. screen volts, W.Sc.—max. screen dissipation, Vip.—inverse peak volts, O.C.—output current, Poc.—peak output current, Vv.—volts drop in valve, Vdc.—d.c. volts, Ow.—output in watts).



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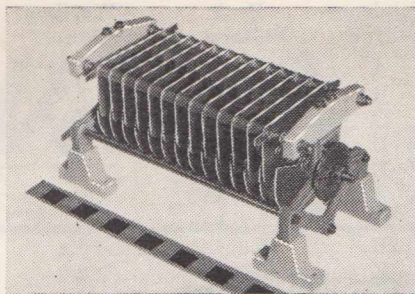
Even a trained radio engineer cannot tell the difference between an old valve and a new one by looking at it . . . Be sure that the valves you buy are new by insisting on Radiotrons in the factory-sealed carton. For better and brighter radio entertainment . . .

Revalue with



THE WORLD'S
STANDARD
RADIO VALVES

Specify . . . RADIOTRONS for the "Astra Dual-Wave Six" and "1939 Companionette" described in this issue.



A sample from the new Philips range of transmitting condensers.

Philips Transmitting, Rectifying And Modulating Valves.

A brief review of Philips transmitting, modulating and rectifying valves of interest to amateur transmitters is given below. Further details are available free on request to the Transmission Dept. of Philips Lamps (A'sia) Pty. Ltd.

The Philips transmitting triodes for amateur use—the denomination of which begins with a "T"—are

characterised by the ease with which they can be made to oscillate. As well, they give a high output and a comparatively low plate voltage.

The transmitting pentodes (whose denomination begins with a "P") are highly efficient, though non-critical in operation. Suppressor grid modulation can be used if desired.

Abridged characteristics of the triodes and pentodes obtainable in Australia are given in table "A" (see previous page), while table "B" shows the range of modulating valves, which are characterised by their steep slope. Table "C" shows electrical data of the small Philips mercury vapour rectifiers. In these, oxide-coated filaments ensure minimum filament wattage, while a further attractive feature is that the voltage drop in the valve is extremely small. A smoothing filter with choke input should be used with the types listed.

Complete information on any of the above components is available free on request from the Transmission Dept., Philips Lamps (A'sia) Pty. Ltd., Clarence St., Sydney.

1939 Australian Official Radio Service Manual

Hundreds Of Circuits With Full Data

THE enthusiastic reception given last year by servicemen and the radio trade generally to the first edition of the "Australian Official Radio Service Manual," gave clear proof of the widespread demand there existed for an authoritative book giving complete technical data of receivers built and sold in Australia.

The release of the second (1939) edition is now announced by the publishers—The Strand Press, in Brisbane. Edited by A. G. Brayne, M. Inst. R.E., president of the Australian Trained Radio Servicemen's Institute, this new edition gives circuits and essential data of twenty-eight leading Australian makes of receivers released during 1938. The book comprises 400 pages, and is available with either limp or stiff covers.

The following headings of the thirteen chapters that comprise this book give readers an excellent indication of its contents:—

Applying The Manual (this chapter contains full instructions for obtaining quick and complete service from the 1939 edition). The Service-

men's Test Kit (a review of service equipment that the modern serviceman should include in his kit, and comments as to the value of apparatus to the serviceman in the field). Circuits and Essential Data of Australian Standard 1938 Receivers. Radio Inductive Interference — Its Causes, Location and Cure. Radio Symbols. Air Cell Maintenance and Installation. Radio Installations Regulations for Radio Installation. Wire Tables and Service Formulae. Radio Manufacturers' Colour Codes and Tables. Wavelength Frequency Conversion Tables. (A complete table covering wavelengths from 10 to 3,000 metres). Valve Socket Connections of All Valves in Use in Australia (covering essential characteristic data—the only complete information on the subject available under a single heading in Australia). Electrical Supply Authorities and Type of Current and Voltages Available in Australia. General Service Information (covering alignment instructions and component testing. Notes are also included on car radio service and installation, the cathode ray oscillograph in service work, and pub-

(Continued on page 48)

All-Wave All-World DX News

"RADIO WORLD" OFFICIAL OBSERVERS.

Additional Appointments Contemplated.

It is almost two years since the "Radio World" instituted a special Shortwave Review section, in connection with which it was decided to appoint a number of Official Observers in each State of Australia and in New Zealand. As a result of the work done by these observers, readers have been provided with an up-to-date and comprehensive review of current DX conditions. So successful has the scheme proved that it has been decided to increase the number of observers to twenty-five, allocated as follows:—

New South Wales, Queensland and South Australia: Five each.

Victoria and West Australia: Three each.

Tasmania and New Zealand: Two each.

Because of the great interest lately aroused by excellent reception on the amateur bands (especially on 20 metres), it has been thought advisable to appoint at least one special amateur-bands observer in each State. This will ensure that the "Calls Heard" section of the Amateur Review will be as comprehensive as possible.

Many readers have written enquiring as to the exact nature of the duties to be carried out by observers. The only obligation assumed by observers is an undertaking to submit a monthly report containing information as to DX conditions in their locality, changes in station schedules and frequencies, etc.—in short, any information which they feel will be of interest to other readers. On appointment observers will be entitled to use their title of "Official Observer for the 'Australasian Radio World'" in correspondence with stations, etc.

In future observers will be appointed yearly; at the end of each twelve months the list of observers will be carefully checked, and those who have been active during the period, and who desire reappointment

will again be appointed for the ensuing year.

Any reader in Australia or New Zealand who is interested is invited to submit a brief application for appointment, setting out the type of receiving equipment he uses, and giving a few details of his outstanding DX achievements.

SWL Card Exchangers' Section.

The following overseas SWL's guarantee 100% QSL:—

A. M. Gluck, Apt. 105, 455 Rue Lafayette, Shanghai, China.

Derek Gray, Culvers Close, Winchester, Hampshire, England.

Lucien Guitard, Sturgeon Falls, Ontario, Canada.

Official organ of the All-Wave All-World DX Club

Reg irk, 344 Childers Rd., Gisborne, N.Z.

A. B. Robertson, "Thorncliffe," 5 York Rd., Southport, England.

Floyd Slosson, Box 808, Dryden, Wash., U.S.A.

Howard Schrieffer, 614 Soniat St., New Orleans, La., U.S.A.

O. Westman, 24 Lawrence Rd., Maitland, Cape Town, South Africa.

Tony Bingham, 191 Wykeham Rd., Reading, Berks., England.

Louis Berge, Everdijstraat 33, Antwerp, Belgium.

Johan Curiel, Mundo Nobo 143, Curacao, Dutch West Indies.

Bob Collins, Box 387, Ranglely Lakes, Maine, U.S.A.

R. T. Parsons, 14 Carlyle Ave., Brighton 7, Sussex, England.

F. L. Leach, 38 Wellington St., Gloucester, England.

ALL-WAVE ALL-WORLD DX CLUB

Application for Membership



The Secretary,
All-Wave All-World DX Club,
214 George Street,
Sydney, N.S.W.

Dear Sir,

I am very interested in dxing, and am keen to join your Club.
The details you require are given below:

Name.....

Address.....

[Please print both plainly.].....

My set is a.....

[Give make or type, number of valves, and state whether battery or mains operated.].....

I enclose herewith the Life Membership fee of 3/6 [Postal Notes or Money Order], for which I will receive, post free, a Club badge and a Membership Certificate showing my Official Club Number.

(Signed).....

[Note: Readers who do not want to mutilate their copies of the "Radio World" by cutting out this form can write out the details required.]

Shortwave Review

CONDUCTED BY
ALAN H. GRAHAM

Wordy Warfare Of The Ether.

During the past weeks, while the international position in Europe has been full of dangerous uncertainty, the propaganda machines of the more important countries have been speeded up, and shortwave listeners have been provided with the opportunity of tuning in to a veritable flood of charges and counter charges —of passionate denunciation and violent invective, which would probably arouse more than a little amusement if it were not for the fact that the circumstances surrounding such broadcasts were fraught with so much danger.

Well to the fore in this battle of words are the German, Russian and Italian stations, whose violent diatribes are much too vehement to carry much weight with overseas listeners, who are sufficiently removed from the centres of conflict as to be in a position to form an impartial judgment. Only the English and American stations have preserved any moderation in their news commentaries, for even France, previously as aloof as England in its radio comments, has succumbed to the prevalent hysteria and is replying in kind to the insults launched from Berlin and Rome.

An interesting feature of this wordy warfare is the ever-increasing number of languages used in these propaganda broadcasts. The shortwave spectrum begins to resemble the Tower of Babel of old.

Take for example the Italian stations. Recent information reveals that no fewer than **twenty-one** languages are spoken during the broadcasts from these stations. The languages principally used are English, French, Spanish and Portuguese; then come Hungarian, Bulgarian, Greek, Turkish, Japanese, Chinese, Bengali, Serbian, Danish, Swedish, German, Roumanian, Hindustani, Arabic, Russian and Italian. The Trieste station concentrates on the Balkan States, whilst Radio Bari, with Arabic and Turkish sessions, has done much towards fostering the present unrest in Syria and Palestine.

At times this propaganda fails to achieve its purpose by its very extent and vehemence. This has been shown by the ease with which the United States has been able to counteract, in a very brief space of time, the effects of the Nazi propaganda in the Latin American republics.

War In The Air ★ America Logged On Seven Metres ★ Latest Overseas Shortwave News ★ Reports From Observers ★ Hourly Tuning Guide.

With much greater subtlety than had been shown in the German broadcasts, America has provided first-class radio entertainment by such celebrities as Eddie Cantor, Charlie McCarthy and the Philadelphia Symphony Orchestra. The South Americans have shown a marked preference for such radio fare, and have been speedily won over from their former radio allegiance to the Reich.

Notable UHF Reception.

Readers will note with great interest the remarkable feat of DX recorded in this month's report from Observer Ferrier, of Victoria. He mentions the logging of an American police transmitter on 7.5 metres.

Receptions such as this provide the greatest thrill any S.W.L. can hope for.

A Feast Of DX.

From personal observations, and from the reports to hand from "Radio World" observers, it is obvious that dxers have recently been experiencing a veritable feast of DX. Every week sees new and interesting stations on the air—often in "new" countries. A glance at the Reports from Observers column will convince readers that the shortwave bands are full of interest. With improving conditions due to the approach of winter in the offing, the next few months should be really notable.



Latest News Of Overseas Stations.

Albania.

Just prior to the Italian invasion of Albania, information was received that ZAA, "Radio Experimental Tirana," was planning a series of transmissions on the following frequencies:—7487kc., 7880kc., 9987kc., and 15765kc., or 39.9, 38.0, 30.2 and 19.0 m., respectively. The higher frequency transmission was intended for America; the others for Europe. It is presumed that ZAA will continue its transmissions under Italian supervision.

Angola.

CR6RC is a low-powered transmitter located in Luando. Using a power of only 50 watts, it broadcasts an experimental programme for several hours daily, usually around 3 a.m., on 11790kc., 25.43m.

Colombian Republic.

Additional information regarding Colombian stations is as follows:—HJ1ABG, Barranquilla, is on 4905kc., 61.16m. HJ7GAB, Barranquilla, is on 4775kc., 62.85m. HJ1ABE, Cartagena, is now on 4835kc., 62.0m.

China.

Quite a budget of information regarding Chinese transmitters has come to hand during the past few

Official Shortwave Observers.

N.S.W.: V. D. Kemmis (AW301-DX), "Brampton Hall," 49 Kurraba Road, Neutral Bay, Sydney; A. R. Payten (AW352DX), High Street, Coff's Harbour.

SOUTH AUSTRALIA: J. C. Linehan (AW323DX), 181 South Terrace, Adelaide; A. E. Bruce (AW-171DX), C/- 54 Currie Street, Adelaide; R. S. Coggins, 8 Glen Rowan Road, Woodville.

QUEENSLAND: J. K. Sorensen (AW316DX), "Fairholme," Station Road, Gympie; E. Neill (AW64DX), 26 Canning Street, Nth. Ipswich.

WEST AUSTRALIA: G. O. La Roche (AW155DX), 62 Gladstone Avenue, South Perth; W. H. Pepin (AW402DX), Seventh Avenue, Maylands; C. J. Anderson (AW-417DX), Dumbleyung.

TASMANIA: H. A. Callander (AW304DX), 1 Franklin Street, West Hobart.

VICTORIA: J. Ferrier (AW129DX), "Winninburn," Coleraine.

NEW ZEALAND: H. I. Johns (AW-407DX), Mount Pleasant Avenue, Nelson, N.Z.

weeks. This "dope" is summarised below.

XPSA at Kwei-yang, 6976kc., 42.98 m., is on the air from midnight to 2 a.m. The English news session, relayed from the central broadcasting station at Chungking, XGOA, is to be heard nightly at midnight.

XGOY, Chungking, has been altering frequency during the past month. It was first noted on 9500kc., 31.58m., on which frequency QRM from VK-3ME was troublesome. Lately XGOY has shifted to the 25-metre band, where it may be heard on 11900kc., 25.21m., just below TPA-3. From another source, it is reported that this Chungking station, which will eventually have a power of 35kw., will soon be operating on 16, 19, 25 and 31 metres. Tests were to be carried out around 1 p.m. and 6 p.m.

XGRV, Chungking, has replaced Station XTJ. XGRV operates between 11380 and 11420kc., around 26.3m. Schedule is from 4-4.35 p.m. (news in Chinese and Japanese), and 11-11.35 p.m. (news in English and French).

The call-sign of the 19-metre station (19.75m., to be exact) is now reported as XGRV, too, although previously it was thought to be XGOX.

XGAP, in Peking, is on the air from 7 p.m.-midnight on 9560kc., 31.38m. XGAP will verify all reports to S. Yoshimura, Director Peking Central Station, Hsi-chan-an-Chieh, Peking, China.

Dominican Republic.

A new station is reported from Ciudad Trujillo, namely, HI2G, on 9295kc., 32.3m. Practically nothing is known of this station's schedule, but it is understood to be on the air in the early afternoons.

Ethiopia.

Addis Ababa station on 9650kc., 31.09m., now uses the official call IABA. It is on the air daily from 2-4 a.m.

Finland.

The Finnish shortwave station at Lahti now uses four transmitters on the following schedules:—OFD, 9500 kc., 31.58m., from 3.15 to 8 a.m. OFE, 11780kc., 25.47m., from 4.05 p.m. to 3.05 a.m. OIE, 15190kc., 19.75m., from 4.05 to 7 p.m., and midnight till 8 a.m. OIH, 17800kc., 16.85m., from 7 p.m. till midnight. OII, 21550 kc., 13.92m., is not in use at present.

French Indo-China.

Radio Saigon has been conducting experimental transmissions on quite a number of frequencies. It has been heard lately on 6115kc., 49.05m.; 9620kc., 31.2m.; and 6838kc., 43.99 m. Reports of reception on these channels are desired; QRA is Box 238, Saigon.

India.

Slight frequency shifts noted in the Indian stations on 60 metres have

since been found to be due to a re-allocation of frequencies. VUD-2, 4960kc., 60.5m.; VUB-2, 4880kc., 61.48m.; VUM-2, 4920kc., 61.0m.; VUC-2, 4840kc., 61.97m.

Both VUD-4 and VUD-3 are now operating on the 19-metre band. Unfortunately the schedule of these stations renders reception here unlikely, as they are on the air from 12.30-2.30 p.m.

Iraq.

Two stations in Baghdad have been reported on the 40-metre band, on 6900 and 7200kc., respectively. Both appear to use the call-sign YI5KG, so the call previously given, YIJG, seems to be a mistake.

Ireland.

Details are now to hand regarding the experimental transmissions of the new Irish station at Athlone.

On 16.82m., from 3.30 to 5.30 a.m., and from 11.30 p.m. to 1 a.m.

On 16.82m. or 31.27m. (alternate days), from 5.30 to 7.30 a.m., and from 8.30 to 9 a.m.

Reports are desired.

Japan.

Anyone forwarding a report on Japanese phone stations will now receive a prompt reply, and a new and attractive card.

New Japanese phones reported recently include:—JVW, 7260kc., 41.3 m.; JVW-2, 9673kc., 31.01m.; JVW-3, 11725kc., 25.59m.; JVW-4, 17823kc., 16.8m.

Macao.

CRY-9 is the old CQN transmitter on a new frequency, and is on the air from 11.30 p.m. to 1 a.m. on Mondays. Channel now used is 6100 kc., 49.18m. Reports to the Post Office Building, Macao, will be acknowledged.

Malaya.

Station ZHJ, 40 Perak Rd., Penang, Straits Settlements, on 6080kc., 49.34m. Power will be increased from 90 watts to 1 kilowatt in the near future.

Philippines.

KZIB is now on 9490kc., 31.61m., to avoid interference from VK3ME. Schedule from 9 p.m. to midnight. Address is Box 440, Manila, P.I.

Netherland Indies: Sumatra.

YDX, Medan, is reported on 5175 and 8090kc., 58.31 and 37.33m.

U.S.A.

The American stations have recently re-arranged their schedules, and are now on the air as follows:—

W1XAI: 13.98m., testing in early mornings. 19.67m., daily, exc. Sunday and Monday, 5-7 a.m. 19.83m., Mondays, 1-4 a.m. 25.45m., Mondays, 6-9.30 a.m.; Tuesday, Thursday, Saturday, 7.55-9.30 a.m.; Wednesday, Friday, 7.40-9.30 a.m.; Sunday, 4.45-9 a.m. 25.57m., exc. Sun. and Mon.,

12.15 to 2.30 p.m. 49.65m., exc. Sun., 10 a.m.-noon.

W1XK: 31.35m., daily 9 p.m.-4 p.m. next day.

W2XAD: 19.56m., daily, 3.15-9 a.m.; 31.41m., daily, 10.15 a.m.-1 p.m.

W2XAF: 31.48m., daily, 7 a.m.-3 p.m.

W2XE: 13.91m., Sun. and Mon., 11 p.m.-4 a.m.; other days, 10.30 p.m.-1 a.m. 19.65m., Sun. and Mon., 4.30-5.30 a.m.; other days, 4-6 a.m. 25.36 m., Sun. and Mon., 6-9 a.m.; other days, 6.30-9 a.m. 31.09m., daily, 9.30 a.m.-2 p.m. 48.62m., 2.30-3.30 p.m.

W3XAL: 31.02m., daily 8 a.m.-4 p.m.

W3XAU: 31.28m., Mon. Wed. and Sat., 3-4 p.m.; Tues., Fri. and Sun., 4 a.m.-4 p.m.; Thursdays, 1-4 p.m. 49.50m., Mon., Wed. and Sat., 4 a.m.-3 p.m.; Thursdays, 4 a.m.-1 p.m.

W3XL: 16.87m., daily, midnight-2 p.m.

W4XB: 49.65m., Mondays, 7-9 a.m., noon-3 p.m.; other days, 4-6 a.m., noon-3 p.m.

W6XBE: 19.57m., daily, 6 a.m.-noon. 31.48 m., daily, 3 p.m.-7 a.m.

W8XAL: 49.50m., Mondays, 11 p.m.-11 a.m.; other days, 9.45 p.m.-11 a.m., 2-5 p.m.

W8XK: 13.93m., daily, 9.45 p.m.-midnight. 19.72m., daily, midnight-4 a.m. 25.26m., daily, 4 a.m.-2 p.m. 48.83m., daily, 2-4 p.m.

U.S.S.R.

Moscow now uses several additional transmitters for its daily transmissions. These are RW-96, 15400kc., 19.47m.; RW-96, 9518kc., 31.5m.; and RW-96, 6026kc., 49.75m.



Reports From Observers.

(N.B. All times mentioned below are Eastern Standard)

Mr. G. O. La Roche (South Perth, Western Australia):

On the broadcast bands there is very little to report. Only the usual regular stations have been logged. It has been noted that reception below 19 metres has fallen off a good deal at night; but on the whole conditions are quite satisfactory for this time of the year. The 31-metre band is now so crowded that reception is badly marred in most cases by QRM. Above 31 metres some strong signals have been noted above the QRN.

Best loggings on the various bands include:—

13 metres: W8XK and W2XE (barely audible); GSH.

16 metres: DJH and DJE; GSG and GSV; PHI; W3XL.

19 metres: OLR5A; W8XK and W6XBE; RW-96; HVJ; VUD-3; JZK; 2RO-6.

22 metres: SPW.

25 metres: COCX; HVJ; XGOY; W2XE and W8XK.

26-30 metres: XGRV (XTJ); CSW-7; ZHP; EAQ.

31 metres: RAN and RW-96; W3-XAL, W3XAU, W6XBE and W2-XAF; VUD-2 and VUC-2; TPB-11.

32-49 metres: RKI; XPSA; PMH.

49 metres: RW-96; 9MI.

50-100 metres: PMY; VUD-2, VUM-2, VUB-2 and VUC-2; RV-15.

Most of the listening done this month has been on the ever reliable 20-metre amateur band, where conditions continue as good as in previous months. Generally speaking, Europeans and South Africans are heard in the early mornings, and Asiatic stations at night. A new country, making 82, was logged—French India, FNIC being heard at 5 a.m.

The 10-metre band continues to be disappointing in this locality, only ZL's being heard.

Mr. C. J. Anderson (Dumbleyung, Western Australia):

Nothing startling in the way of DX has been logged this month. On 49.1 m. (approx.) "Radio Saigon" has been heard testing around 10 p.m.; these transmissions have been irregular, but when logged signals have been strong. The new G.E. station, W6XBE, is being heard with a very entertaining programme around 10 p.m. each night. TPB, Paris, put in a good signal on 41.21m. in the early mornings. W3XAL, 31m., have been heard quite well till 4 p.m. T14NRH, 30.9m., were heard on one Sunday recently—the first reception of this well-known station for months.

On April 2 a N.B.C. transmitter was heard testing on about 22m. in preparation for Hitler's speech. No call was given.

Other loggings include:—

19 metres: W6XBE; PCJ; 2RO-6.

25 metres: Saigon; COCX; XGOY and XMHA (latter now on 25.2m.).

30-31 metres: COBX and COCH; TAP; JDY; ZHP; IRF.

49 metres: COCW; 9MI (now on 49.54m.); VQ7LO; Colombo (call is VIO); and Rangoon.

50-100 metres: 60m., Indian stations, and DEI transmitters.

The amateur bands have been fair. Some ZL's and PK's on 10 metres, with FNIC the best logging on 20 metres.

Mr. W. H. Pepin (Maylands, Western Australia):

Generally speaking, morning reception has fallen off slightly, whilst 31 metres provided the best DX during the evenings.

15 metres: KAX, Manila, is heard fairly regularly, phoning Tokyo during the mornings; HS6PJ, Bangkok, are heard on Monday nights at 11 p.m. with a musical programme; they are also heard occasionally phoning PLE, Bandoeng.

25 metres: XGOY have been logged on this band, with a programme of Oriental music; station announcements are in English; W2XE, Rome, and GSD are the best morning stations; JZJ and Saigon are best in the evenings.

30 metres: COCM; IRF; JDY and ZHP are regulars. The last-mentioned are very strong and relay London.

31 metres: JFO; Rome and KZRM are best. Also RAN.

40-44 metres: Two strong Japanese stations on 39 and 41m., respectively, namely, JVP and JLG. PMH are very reliable with a native programme on 44m.

49 metres: QRM and QRN high, but some good signals noted. Saigon testing on 49.1m. at good strength. W1XAL have been noted on 49.67m.

50-100 metres: PMY; RV-15; and the four 60m. Indian stations.

Mr. J. Ferrier (Coleraine, Victoria):

This last month has proved very interesting as far as the U.H.F. bands have been concerned. A highlight was the logging of the Beverly Hills, California, police transmitter on 7.5m. On April 23 several announcements were heard from this station, signal strength varying from R3-7. As far as I know this is the highest frequency overseas station logged in Australia. (Yes, OM, I think your claim is justified. W9-XUY, on 8.4m., was listed as the previous best.—S.W. Editor).

Incidentally, when this 7-metre station was heard, conditions on 10 metres were distinctly poor. The weather at the time was unsettled and windy, with rain developing.

Some listening has been done below 7 metres, but as yet no station has been identified, although weak signals have been heard on approx. 6.5m.

The antenna used for the above loggings was a vertical half-wave on 10 metres, the receiver being a five-valve superhet.

Mr. R. S. Coggins (Woodville South, South Australia):

Shortwave reception has been remarkably good this last month, despite the fact that at times QRM has proved very troublesome. The usual commercial stations on 16 and 19 metres have been very reliable during the afternoon and evening hours, 19 metres being best till 10.30 p.m. and 16 metres after that hour.

A Chinese station at Chungking has been heard each evening lately on 25.2m. A news service is given in English for VK and ZL listeners at 8.50 p.m. (This is XGOY.—S.W. Editor).

On the amateur bands reception has been good. The best times for some really good DX on the 20-metre band are from midnight till 3

a.m.; from 6 till 7 a.m.; and from 4 till 5 p.m. Daylight reception, except from 4 till 5 p.m., is rather poor, only W's and K6's being logged. New countries logged this month are Poland (SPIQE), Azores (CT2AB) and British West Indies (VP2AD).

A feature of 20-metre reception has been the number of Europeans logged.

Mr. A. R. Payten (Coff's Harbour, New South Wales):

Easter provided some very fine DX—especially on the amateur bands. 10-metre signals were amazingly loud, and any number of ZL's, W's and K6's were logged. ZL4BK was as loud as any of the local VK2's, and a harmonic of his 10-metre signals was heard on 5 metres.

On 20 metres conditions have been splendid. Just glancing at the log I notice loggings from W (all districts), G, CO, YV, FA, ZB, HA, SU, SM, VE, LA, PY, LU, F, PK, VU, HB, OA, etc. Some of these stations were exceptionally loud, notably G6WT, HA8N and W6USA. Incidentally, the last-named is the station of the World Fair at Treasure Island, Calif. He has had 15,000 cards printed, so is all set to QSL. Hi. G6WT mentioned that he would QSL all S.W.L. reports.

One morning recently I had the satisfaction of logging all continents in about 20 minutes. Stations were G6WT and HA8N, Europe; FA3SB and SU1AM, Africa; VU2SA, India; PY2BE and LU5AN, South America, and a whole host of W's and VK's.

Under the circumstances I feel very pleased with the new vertical antenna.

Turning to the broadcast bands, there have been some interesting stations logged. XGOY, Chungking, has been heard on 25.2m., with a news session in English around 9 p.m. This is followed by a musical programme.

Radio Saigon have been testing on 49m. They are heard from 9.30 till 10 p.m. at good strength. Announcements are in French and English, and reports are requested.

TAP, 31.7m., are very good each Sunday morning with an English session at 6.20 a.m.

The U.H.F. bands have proved disappointing of late. W6XKG have been poor, whilst 9 metres seems to be passing out completely.

Mr. H. I. Johns (Nelson, New Zealand):

Shortwave reception has again been excellent this past month on all bands. Even during daylight hours excellent reception is possible, with a large number of Spanish-speaking stations putting in good signals, and these stations should improve in

strength during the next month or so. With the large number of commercials now on the air listeners are advised to concentrate on these stations as most of them are 100% QSL, whereas many amateurs will not verify even when return postage is included with a comprehensive report; over a period of six years I have received only 50% QSL from amateurs, return postage being included in every case.

XMHA, Shanghai, has been shifting around a good deal. It was last logged on approx. 25.2m. It has been heard as early as 6.40 p.m.

JVN, 28.14m., seems to have left the air, as this well-known station has not been heard of late. A new Jap. on 25.56m. seems to have taken its place—call is thought to be **JWX**.

PSE, 20.8m., Rio de Janeiro, is being heard around 6.15 a.m. with a transmission in French. **PSE** signs off at 6.30 a.m. This station verifies with an attractive card, which is the same as that for **PSH**, 29.35m.

LRX, 31.06m., is heard well on Sundays at 2.30 p.m. This station verifies promptly all reports to Calle Maipu 555, Buenos Aires.

CXA-8, 31.12m., is heard at the same time as **LRX**, Sundays at 2.30 p.m. On closing at 3 p.m. station announcements are given in several languages, including English. Verifies by letter.

COCQ now seems to have settled down temporarily at least on 33m. The best time to hear them is on Sundays, when they remain on the air till about 3.30 p.m.

COCB, 30.03m., and **COCM**, 30.6m., have been putting in some very strong signals around 2.45 p.m.

HBO, 26.31m., has been heard closing at 6 a.m. Also on Monday mornings **HBQ** on 44.94m., closing half an hour later.

TGWA, 30.96m., are now using this frequency again. They are on till as late as 6 p.m. on Sunday afternoons.

TIPG are now on a new frequency, 9705kc., 30.92m. They are on till 2.30 p.m. daily, announcing in English at frequent intervals. They sign off with an organ number, "Ave Maria." Full schedule is 10 p.m.-12.30 a.m.; 3-5 a.m.; and 7 a.m.-2.30 p.m. **QRA** is Apartado 225, San Jose, Costa Rica.

LYR, 32.27m., Kaunas, Lithuania, have been logged before closing at 4.35 p.m. This unusual station can be identified by chimes just before 4 p.m.

Best of the other stations logged are:—**Rome**, on 19, 25 and 31m.; **YDC**, on 19m.; **W8XK**, on 25m.; **DJX**, **W1XAL**, on 25m.; **COCH**; **JLG**, on 31.1m.; and **VK2ME**.

Amateur loggings are up to the standard of previous months. 10 metres has been particularly good.

From all sources comes confirmation of the splendid conditions now existing on all amateur bands. On 10 metres, although the Europeans have not been easy to log, there are any number of W's and K6's on the band during the late morning hours. 20 metres is as good as ever it was, and many unusual countries were logged around Easter and late in April—the S.W. Editor noted stations from **ZB**, **TF**, **LY**, **YR**, **I**, **NY**, **HP**, **SM**, **ES**, **YU** and **YN**, to mention just a few of the countries to be heard. On 40 metres a number of **DEI** and South American stations have been active, but reception of these is marred by **VK** and commercial code stations. 80 metres provides the usual **VK**'s and **ZL**'s, with a few **W**'s when conditions are good.

★

SWL Card Exchangers' Section.

Below are listed a few more overseas SWL's who are interested in exchanging QSL cards:—

J. Story, 182 Beech St., Halifax, N.S., Canada.

W. Buchanan, 189 Park St., Sydney, N.S., Canada.

D. F. H. Reed, 281 Queen St., Kingston, Ont., Canada.

Jack Ward, 73 Cavell Ave., Toronto, Ont., Canada.

Tom Hogg, RR No. 2, York Mills, Ont., Canada.

Stan Clarke, 468 Bourgeois St., Montreal, Quebec, Canada.

1939 Companionette Three.

(Continued from page 14)

These leads pass through the chassis and are connected to the appropriate lugs on the coils.

Next, commencing with the aerial terminal, wire the aerial coil, pentode section of the 6F7, detector coil, triode section of the 6F7, and so on until the wiring is completed. Before the set is switched on, however, the entire assembly and wiring should be carefully checked to ensure there are no mistakes.

Lastly, the dial and speaker can be bolted in position and the control knobs fitted. The set is now ready to be switched on.

Wiring Diagram Next Month.

Enough data has been supplied in this article and by the diagrams and photographs to enable those who have had some experience in set-building to go ahead and complete the receiver. However, for those who are not too sure of their ability to wire a set from a circuit, an under-chassis wiring diagram will be published next month, together with a further article outlining the construction of the receiver in detail.

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HOURLY TUNING GUIDE

When and Where To Search

Compiled by ALAN H. GRAHAM.

In order to assist beginners and less experienced dxers, it is intended to publish monthly a special tuning guide, setting out at what times to listen for the more easily logged stations. It should be noted that the guide is not intended to cover all stations audible; for full details as to when and where to look for the best catches are given elsewhere. Moreover, the fact that a station is shown as being on the air at a particular time is no guarantee that reception must follow as a matter of course.

All times are given in Australian Eastern Standard Time.

Key to abbreviations used: S, Sundays only; M, Mondays only; T, Tuesdays only; W, Wednesdays only; Th, Thursdays only; Sat, Saturdays only.

Midnight-1 a.m.	60.06 VUD	
	60.61 VUM	
13.91 W2XE	61.16 VUC	
13.93 GSJ	70.2 RV-15	
13.97 GSH	98.6 YDA	
16.81 DJH		1-2 a.m.
16.84 TPB-3	13.93 GSJ	
16.86 GSG	13.97 GSH	
16.88 PHI (S)	16.81 DJH	
16.89 DJE	16.84 TPB-3	
19.63 DJQ	16.86 GSG	
19.68 TPA-2	16.89 DJE	
19.71 PCJ (Th)	19.61 2RO-6	
19.72 W8XK	19.63 DJQ	
19.74 DJB	19.68 TPA-2	
19.76 GSO	19.71 PCJ (Th)	
19.8 YDC	19.72 W8XK	
19.82 GSF	19.74 DJB	
25.21 XGOY	19.76 GSO	
25.29 GSE	19.8 YDC	
25.4 2RO-4	19.82 GSF	
25.42 JZJ	19.83 W1XAL	
25.53 GSD	19.84 HVJ	
27.27 PLP	25.0 RNE	
28.48 JIB	25.21 XGOY	
29.24 PMN	25.24 TPA-3	
30.96 ZHP	25.29 GSE	
31.28 VK2ME (M)	25.4 2RO-4	
	25.53 GSD	
31.28 VUD	27.27 PLP	
31.35 KZRM	28.48 JIB	
31.45 DJN	29.24 PMN	
31.49 ZBW-3	31.01 DJX	
31.5 RW-96	31.28 VUD	
31.55 HS8PJ (F)	31.45 DJN	
	31.5 RW-96	
31.58 XEWW	48.7 Colombo	
31.8 COCH	49.75 RW-96	
32.59 COBX	49.9 COCO	
32.95 COCA	58.3 PMY	
33.32 COBZ	60.06 VUD	
39.95 JVP	60.61 VUM	
42.98 XPSA	61.16 VUC	
48.7 Colombo	70.2 RV-15	
49.75 RW-96		2-3 a.m.
49.9 COCO	13.93 GSH	
49.98 Rangoon	13.93 GSJ	
58.3 PMY		

16.86 GSG	31.41 TPB-II
16.89 DJE (M)	31.5 RW-96
19.61 2RO-6	31.55 GSB
19.74 DJB (M)	41.21 TPB
19.76 GSO	48.88 CR7AA
19.82 GSF	49.31 VQ7LO
19.85 DJL	49.75 RW-96
25.24 TPA-3	49.83 DJC
25.29 GSE	
25.4 2RO-4	5-6 a.m.
25.49 DJD	16.86 GSG
25.53 GSD	19.56 W2XAD
31.01 DJX	19.61 2RO-6
31.28 VUD	19.65 W2XE
31.41 TPB-11	19.67 W1XAL
31.5 RW-96	19.85 DJL
49.31 VQ7LO	22.0 SPW
49.75 RW-96	24.52 TFJ
49.83 DJC	25.24 TPA-3
60.06 VUD	25.26 W8XK
60.61 VUM	25.4 2RO-4
61.16 VUC	25.42 JZJ
	25.49 DJD
	25.53 GSD
3-4 a.m.	25.7 IQY
16.86 GSG	26.31 HBO (M)
16.89 DJE (M)	27.17 CSW
19.56 W2XAD	30.52 IRF
19.72 W8XK	31.01 DJX
19.74 DJB (M)	31.02 2RO-9
19.83 W1XAL	31.13 2RO-3
19.85 DJL	31.28 W3XAU
25.24 TPA-3	31.28 PCJ
25.29 GSE	31.32 GSC
25.4 2RO-4	31.32 GSC
25.49 DJD	31.41 TPB-II
25.53 GSD	31.41 TPB-II
25.7 IQY	31.48 W6XBE
30.52 IRF	31.5 RW-96
31.01 DJX	31.55 GSB
31.02 2RO-9	41.18 JLG
31.13 2RO-3	41.21 TPB
31.32 GSC	49.75 RW-96
31.41 TPB-II	49.83 DJC
31.5 RW-96	
41.21 TPB	6-7 a.m.
49.75 RW-96	16.86 GSG
49.83 DJC	19.56 W2XAD
	19.57 W6XBE
	19.61 2RO-5
	19.67 W1XAL
	19.85 DJL
	22.0 SPW
	25.0 RNE
	25.24 TPA-3
	25.26 W8XK
	25.36 W2XE
	25.42 JZJ
	25.45 W1XAL
	25.49 DJD
	25.53 GSD
	25.7 IQY
	27.17 CSW
	30.4 EAQ
	30.52 IRF
	31.01 DJX
	31.02 2RO-9
	31.28 PCJ (W)
	31.28 W3XAU
	31.32 GSC
	31.35 W1XK

31.41 TPB-II	31.02 2RO-9
31.48 W2XAF	31.06 LRX
31.55 GSB	31.09 CS2WA
31.7 TAP	31.13 2RO-3
41.18 JLG	31.28 W3XAU
41.21 TPB	31.32 GSC
41.8 CR6AA	31.35 W1XK
43.1 ZL2GB	31.41 TPB-II
47.2 ICC	31.45 DJN
49.75 RW-96	31.46 JZI
49.83 DJC	31.48 W2XAF
	31.49 LKC
	31.55 GSB
	31.58 XEWW
	31.8 COCH
	41.21 TPB
7-8 a.m.	
19.56 W2XAD	
19.57 W6XBE	
19.61 2RO-6	
19.62 GSP	9-10 a.m.
19.74 DJB	
19.76 GSO	16.87 W3XL
19.82 GSF	16.89 DJE
19.85 DJL	19.56 DJR
25.00 RNE	19.57 W6XBE
25.24 TPA-3	19.61 2RO-5
25.26 W8XK	19.63 DJQ
25.36 W2XE	19.74 DJB
25.42 JZJ	19.8 YDC
25.45 W1XAL	22.0 SPW
25.49 DJD	25.27 W8XK
25.53 GSD	25.29 GSE
27.17 CSW	25.4 2RO-4
30.4 EAQ	25.42 JZJ
31.01 DJX	25.42 DJZ
31.02 2RO-9	25.45 W1XAL
31.09 CS2WA	25.49 DJD
31.13 2RO-3	30.31 CSW
31.28 W3XAU	30.52 IRF
31.32 GSC	31.02 W3XAL
31.35 W1XK	31.02 2RO-9
31.41 TPB-11	31.06 LRX
31.46 JZI	31.09 W2XE
31.48 W2XAF	31.09 CS2WA
31.51 RW-96	31.13 2RO-3
31.55 GSB	31.28 W3XAU
31.7 TAP	31.35 W1XK
41.21 TPB	31.38 DJA
43.1 ZL2GB	31.45 DJN
49.83 DJC	31.48 W2XAF
	31.49 LKC
	31.55 GSB
8-9 a.m.	
16.87 W3XL	
16.89 DJE	10-11 a.m.
19.56 W2XAD	
19.56 DJR	9.49, 11.33 and
19.57 W6XBE	11.56 UHF to
19.61 2RO-5	stations
19.62 GSP	16.87 W3XL
19.63 DJQ	16.89 DJE
19.74 DJR	19.56 DJR
19.76 GSO	19.57 W6XBE
19.82 GSF	19.61 2RO-6
25.0 RNE	19.63 DJQ
25.24 TPA-3	19.75 DJB
25.26 W8XK	19.8 YDC
25.36 W2XE	25.26 W8XK
25.42 DJZ	25.29 GSE
25.42 JZJ	25.4 2RO-4
25.45 W1XAL	25.42 DJZ
25.49 DJD	25.49 DJD
25.53 GSD	25.53 GSD
30.04 COBC	25.61 TPA-4
30.31 CSW	29.15 DZC
30.51 COCM	30.52 IRF
30.4 EAQ	31.02 W3XAL
31.02 W3XAL	31.09 W2XE
	31.13 2RO-3

Radio Service Manual.

(Continued from page 40)

lic address equipment service and installation).

The above chapter headings show that the scope of the book has been greatly enlarged. In the circuit section the value of the circuits given and essential receiver data has been widened by the provision of a wider circuit range and more data concerning each. At the end of each set of circuits observation notes are made by the editor to provide general information, while space has been allowed for readers to make their own notes on each brand as they are encountered in the field.

Well worth bearing in mind in connection with a manual of this type is that it saves invaluable time—time that to the serviceman might

make the difference between profit and loss. During the course of a year each serviceman must encounter several hundred different makes and types of receivers, and except for minor faults a circuit diagram is essential for quick and efficient servicing. Another factor is that a manual of this type actually becomes more valuable as time goes on. Radio design technique is constantly changing and a set with which the serviceman to-day would be perfectly at home, would probably in six or seven years time appear foreign to him. However, with the circuit available, servicing has become merely a matter of routine.

The "1939 Australian Official Radio Service Manual" is obtainable from wholesalers or book-sellers or direct from the publishers, "The Electrical and Radio World," Box 1538 V., G.P.O., Brisbane. Price: 12/6 (limp covers), 15/- (stiff covers); postage 8d. extra.

ROLA "Permacentric Construction" Revolutionises Speaker Design. Perfect Centring And Dust-Proofing

LAST month brief details were published of "Permacentric Construction," an outstandingly important development in speaker design technique developed by Rola. By this invention the voice coil and diaphragm assembly are permanently centred in position at the factory—hence the name "Permacentric Construction." Simultaneously, this new method of construction makes possible what is claimed to be the most effective means of dust-proofing ever applied to loud-speakers.

In the past, the problem has been to exclude dust from the air gap between the two poles of the magnet. The inner gap between the centre pole and voice-coil can be protected by a suitable shield of porous dust-proof material stretched across the opening at the apex of the cone. Covering the outer gap satisfactorily presents a more serious problem. The general difficulty is to shield this outer gap without restricting the free movement of the cone, and yet not block the free passage of air.

A corrugated paper spider is now acknowledged to be the most satisfactory method of suspending the diaphragm, as it provides excellent support, a high degree of flexibility, and yet is rigid enough to prevent the voice-coil moving out of axis.

The principle difficulty, however, is

to suspend this spider so as not to imprison the air between the spider and the front pole plate of the magnet. The usual "dish pan" method of supporting the spider provides excellent support, but imprisons the air to form a cushion, detrimental to efficiency and frequency response.

The Logical Solution.

Rola recently designed and patented a method of supporting this spider so as to allow breathing spaces. This highly successful idea is now incorporated in permacentric construction, but whereas the support was previously held in position by clamps, it is now an integral part of the speaker and is thus absolutely immovable.

By using high precision, jigs, dies and tools, accurate assembly of this vital part is achieved, with the result that the voice-coil is free to move in a plane parallel to the magnet pole face, but it is quite impossible for any other movement to take place.

Thus, this new permacentric construction represents several outstanding achievements in loud-speaker design technique:—

1. Permanent and accurate alignment of the voice-coil.

2. The best system of dustproofing yet devised.

3. Finer manufacturing tolerances, representing higher efficiency.

4. Abolition of service troubles due to misalignment of the voice-coil or through dust or metallic particles entering the magnetic structure.

Lakemba Radio Club Notes.

(Continued from page 11)

attended, and in expressing a desire for general co-operation in the amateur movement, mentioned that the success attained by the Lakemba Club was through the good fellowship existing between members and the elimination of "curbside" meetings—in other words, discussing controversies and contentious matters outside the club rooms.

★

Zero Beat Radio Club Notes.

By "RUSS."

The annual general meeting of the above club was held in the club rooms, Bulletin Place, on April 28 last, and the following officers were elected for the coming year:—E. Treherne (2AFQ), president; A. Joscelyn (2AJ0), secretary-treasurer; P. Mulligan (2ABH), chief of transmitters; C. Thornthwaite, chief of receivers; W. Hicks, librarian; and "Russ" Miller, publicity officer.

During the meeting the president read his report on the year's workings, and it was gratifying to note that notwithstanding certain adversities met with during the twelve months, the club had increased its membership by almost 70%. The secretary's report was also read. It touched on the financial side of the club, and showed that the club had doubled its credit balance during the twelve months.

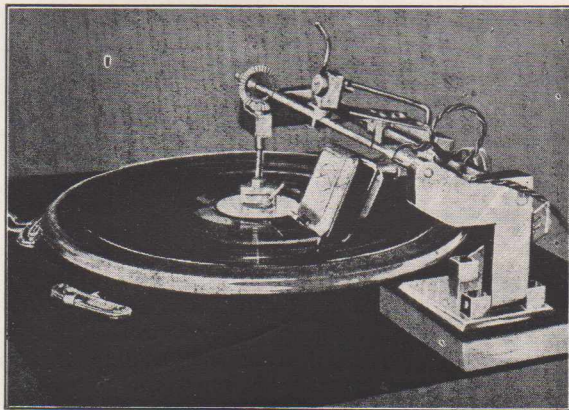
The four meetings during the month were taken up by three lectures, and the general meeting. On the 7th and 14th of April the lectures were on Antennas and Modulators, and on the 21st, a very interesting lecture was given by Mr. Chas. R. Jones, B.Sc., on the "Upper Layers—Their Ionisation And Effect On Radio Wave Reflection." Mr. Jones brought charts along for his lecture, and showed the effect of the radio waves of certain frequencies cutting through certain layers, until they were eventually reflected back.

The new A.O.P.C. Class is about to begin, and anybody desirous of commencing should call at the club rooms on the third floor of 16-18 Bulletin Place, Sydney, or write to the Secretary, C/- this address.

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The Velco Home Recorder has been designed by experts, and manufactured by skilled craftsmen to meet the rigid specifications of Vealls' sound technicians—the result is a recorder that will satisfy the most exacting demands and the quality of recording over a period of years will serve as a reminder that the price paid was small in comparison with the value received.



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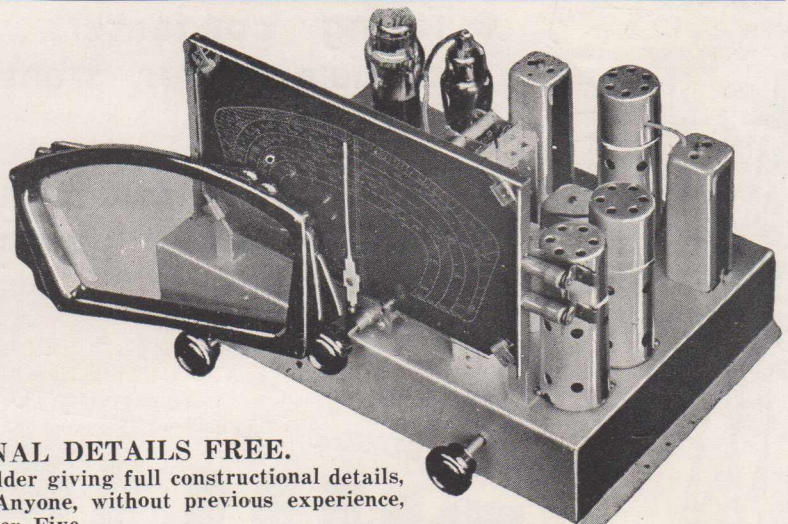
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