RADIOTRONICS

AMALGAMATED WIRELESS VALVE CO. PTY. LTD.

BOX No. 2516BB, G.P.O., SYDNEY

TECHNICAL BULLETIN No. 103 — 15th April, 1940

In this issue:—

AUSTRALIAN MANUFACTURE
1.4 VOLT BATTERY SERIES

A complete range of 1.4 volt valves is now being manufactured in the Australian Radiotron valve factory. Receiver manufacturers may therefore be confident of obtaining supplies of these valves for their current season's requirements. The range of types now being manufactured is:—

1A7-GT pentagrid converter.
1N5-GT sharp cut-off R.F. pentode.
1P5-GT super control R.F. pentode.
1H5-GT diode high-mu triode.
1Q5-GT beam power amplifier.*

** Expected to be available in May, 1940.*

It is not proposed to manufacture types 1G4-G or 1G6-G, since it is believed that the demand for a class B system in 1.4 volt receivers is very small. The maximum power output normally obtainable from such a class B stage with a typical class B transformer is only about 500 mW., which is hardly sufficient to warrant the use of two valves and a transformer in the audio stage.

It is believed that by the adoption of type 1Q5-GT the requirements of most receivers can be met. If a smaller power output is required than that normally given by type 1Q5-GT, this may be obtained by operating the 1Q5-GT with overbias, as explained in Radiotronics 102, pages 1 and 2. By this means the plate current may be reduced to less than 4 mA. for a power output in excess of 100 mW.

LOOSE LEAF DATA SHEETS

In conformity with the new R.M.A. maximum ratings, six revised Radiotron Loose Leaf Data Sheets are being made available concurrently with this issue. The types are:

6F6, 6F6-G	(Sheets 1, 2 and 3).
6U7-G	(Sheets 1 and 3, the existing Sheet 2 being retained).
6V6, 6V6-G	(Sheet 1, the existing sheet of curves being retained as Sheet 2).

When these sheets are filed, the existing sheets for types 6F6-G (1 Sheet), 6U7-G (1 Data Sheet) and 6V6-G (1 Data Sheet) should be destroyed.

These sheets give much more extensive information than the previous sheets, and also include further curves and maximum ratings. Equivalent revised sheets will also be issued with the next issue of Radiotronics.

NEW CONVERTER VALVE

NOW MANUFACTURED IN AUSTRALIA

Radiotron 6J8-G

Two types of converter valves (Radiotron 6A8-G and Radiotron 6K8-G) have been manufactured in Australia for some time past. In view of the demand for a converter valve having extremely low noise level on the short-wave band, we are pleased to announce that Radiotron type 6J8-G is now also being manufactured in Australia. The 6J8-G is particularly suitable for dual-wave receivers not having an R.F. stage, but having high I.F. gain. Since this type of receiver is extremely popular in Australia, the field of application of the 6J8-G is a wide one. It is expected that this type will be used in large numbers during the current season. It is not intended that this type should be used to the exclusion of types 6A8-G or 6K8-G since the former is still eminently satisfactory for most receivers covering the broadcast band only, while the latter may be used in certain dual-wave circuits in which its characteristics are found suitable.

RADIOTRON 6J8-G

HINTS ON OPERATION

Radiotron 6J8-G is a triode-heptode converter valve which was first announced in Radiotronics 84. The characteristics of the 6J8-G were given in Radiotronics 85 (19th April, 1938) and have since been incorporated in a loose leaf data sheet which is available on application. It differs from the ordinary pentagrid type of converter in that the oscillator section is completely removed from the cathode stream of the mixer. For this reason the oscillator frequency is very little influenced by any alteration in the voltages applied to the plate and screen of the heptode section. This frequency stability of the oscillator is a particularly valuable feature, especially on the short-wave band. The oscillator frequency is, however, affected by a change in the voltage applied to the control grid and in this respect the performance of the 6J8-G is inferior to that of the 6K8-G.

The grid of the oscillator section is internally connected to the No. 3 grid of the mixer and the pin connections are so arranged as to be equivalent to those of the 6A8-G. It is therefore practicable, although it is not advisable in most cases, to remove type 6A8-G from a receiver and to substitute type 6J8-G or vice versa. The fact that this substitution is possible indicates the basic similarity of operation of the two types, except that in the 6J8-G the oscillator is completely isolated from the mixer and the oscillator voltage is injected into an "outer" grid. The mixer section of the 6J8-G has five grids, grid No. 1 being the signal grid, grid Nos. 2 and 4 forming the screen grid, grid No. 3 being internally connected to the oscillator grid and the fifth grid being a suppressor grid. The mixer section is thus very similar to type 6L7 or 6L7-G, but the 6J8-G has the advantage that the oscillator also is incorporated in the same envelope.

The conversion conductance of Radiotron 6J8-G is 290 micromhos, which is lower than that of the 6A8-G or 6K8-G; the plate resistance, however, is extremely high (4.0 megohms). Owing to these two characteristics it is advisable to use a high gain I.F. transformer immediately following the 6J8-G. **This transformer should have a high dynamic resistance, so that the full advantage of the high plate resistance of the 6J8-G may be obtained.** With such an I.F. transformer in this position it is possible to obtain, on the broadcast band, a sensitivity almost if not quite equal to that obtained with type 6A8-G. Under the same conditions on the short-wave band the sensitivity of the 6J8-G is very much greater than that of the 6A8-G, while at the same time **the noise level is much lower.** For these advantages to be gained, it is essential to use an I.F. transformer having a very high dynamic resistance. The second I.F. transformer need not necessarily be of the same design as the first I.F. transformer, although in practice a similar type is frequently used in the second stage.

The oscillator section of the 6J8-G has a mutual conductance of 1600 micromhos and this is sufficient, with good oscillator coil design, to maintain satisfactory oscillation over all normal broadcast and short-wave bands. The variation in oscillator mutual conductance, which exists from valve to valve, is less than that with other types of converter valves such as the 6K8-G or 6A8-G, and this is a further feature in favour of the 6J8-G.

The published data are for an oscillator grid current of 0.4 mA. (400 μA.). The best results are obtained from this valve type when the oscillator grid current is between 0.25 and 0.4 mA. (250 to 400 μA.). Some slight decrease in performance occurs when the grid current falls to 0.2 mA. (200 μA.), but even lower grid currents can be tolerated under certain circumstances where the maximum performance of the valve is not required. No harm will be done to the valve by operating it at a low value of oscillator grid current provided that the cathode current on an average valve does not exceed 13.5 mA. No harm will be done to the valve by operating it at a higher oscillator grid current than 0.4 mA. (400 μA.) and operation in this region may be found quite practicable under certain conditions, although not generally recommended. **It is desirable to design the coils so as to maintain the oscillator grid current as far as possible within the limits of 0.25 to 0.4 mA. (250 to 400 μA.).**

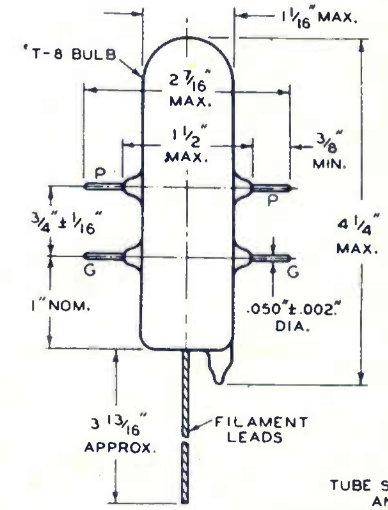
Converter valves may be divided into two principal groups, the first being those with "inner-grid oscillator injection" such as types 6A8-G, 6K8-G and 1C7-G, and the second with "outer-grid oscillator injection" such as types 6L7-G and 6J8-G. All valve types in each of these groups have certain similar characteristics such as positive or negative damping of the signal input circuit. A feature of all converter valves employing outer-grid oscillator injection (such as types 6J8-G and 6L7-G) is that a positive grid current tends to flow in the signal grid circuit at very high frequencies, due to what is known as the "transit time" effect.

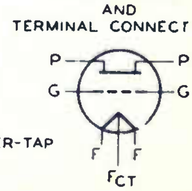
This current may be avoided by operating the valve at a sufficiently high negative bias, the value of the bias required increasing as the frequency increases. When a low resistance grid circuit is used this current is of little significance and causes negligible damping on the R.F. tuned circuit. When used on an A.V.C. circuit certain complications ensue, and these will be treated in further detail in a subsequent issue of Radiotronics. It is also possible for oscillator voltage to appear on the signal grid if there is any coupling between the signal and oscillator circuits. This coupling may occur through direct pick-up from coil to coil or by capacitance between wires or by an earthing system in which portion of the chassis or of a length of wire is common to both signal and oscillator circuits. If care is taken to avoid such coupling between the two circuits the voltage at oscillator frequency appearing on the signal grid is negligible.

Either "transit time" current or direct pick-up from the oscillator can cause positive grid current to flow in the signal grid circuit. This may be checked by inserting a sensitive milliammeter or microammeter in the earth return of the signal grid circuit, care being taken, however, that where the coil and condenser returns are to a common conductor, such as the chassis, the meter is not inserted **in** the tuned circuit. Both causes result in grid current which is "tunable" and may therefore be distinguished from ordinary positive grid current such as would be caused by operating the valve at a positive bias. As the frequency is increased the grid current due to both causes tends to increase, but while that due to the "transit time effect" increases linearly with frequency, the grid current due to external coupling of oscillator- and signal-grid circuits may be peaked at any frequency in the tuning range depending on the relative constants and tracking of the two circuits.

Either grid or plate tuning may be used in the oscillator circuit of the 6J8-G. There are some advantages in plate tuning which may warrant its use, although both methods are quite practicable. Further information on this matter will be given in a future issue of Radiotronics. In the same issue we also hope to give coil details and circuit diagrams using type 6J8-G.

RADIOTRON 1628. *For data see pages 22 and 23.*





P = PLATE
G = GRID
F = FILAMENT
F_{CT} = FILAMENT CENTER-TAP

REVISED RATINGS

The ratings of most valve types have been amended in accordance with the new R.M.A. system as described in Radiotronics 102. The new ratings are, in general, very much more specific than the "maximum ratings" given in the past. These new ratings when applied to valves intended for use on A.C. or D.C. power lines are "Design Maxima"—that is to say, they are the values to be used by the radio designer in designing his equipment. In the determination of these "Design Maxima" the R.M.A. has made allowance for normal line voltage fluctuations, so that these fluctuations need not be the concern of the radio designer, who need work only on the basis of the nominal line voltage.

The valves may be operated in any manner which may be desired, provided that the "Design Maxima" are not exceeded. There is no need for the designer to be limited to the "Typical Operating Conditions" which apply only to specific conditions, and are not intended to be maxima. However, if the Typical Operating Conditions are not followed, it is the duty of the radio designer to make sure that none of the Design Maxima is exceeded. Advice on particular applications of valves will be given on request to the Unified Sales-Engineering Service. These new ratings will be incorporated in the published data in due course.

POPULAR A.C. TYPES (DESIGN MAXIMA)

6A8-G

Plate Voltage increased to	300 max. Volts
Screen Voltage unchanged at	100 max. Volts
Screen Supply Voltage (new rating)	300 max. Volts
Anode-Grid Voltage unchanged at	200 max. Volts
Anode-Grid Supply Voltage increased to	300 max. Volts
Control-Grid Voltage (new rating)	0 min. Volts
Plate Dissipation (new rating)	1.0 max. Watt
Screen Dissipation (new rating)	0.3 max. Watt
Anode-Grid Dissipation (new rating)	0.75 max. Watt
Total Cathode Current unchanged at	14 max. mA.

6B6-G

Plate Voltage unchanged at	250 max. Volts
Plate Supply Voltage	Not specified

6B8-G

Plate Voltage increased to	300 max. Volts
Screen Voltage unchanged at	125 max. Volts
Screen Supply Voltage (new rating)	300 max. Volts
Control-Grid Voltage (new rating)	0 min. Volts
Plate Dissipation (new rating)	2.25 max. Watts
Screen Dissipation (new rating)	0.3 max. Watt

6F6-G

PENTODE CONNECTION.

Plate Voltage unchanged at	375 max. Volts
Screen Voltage decreased to	285 max. Volts
Plate Dissipation (new rating)	11 max. Watts
Screen Dissipation (new rating)	3.75 max. Watts

TRIODE CONNECTION.

Plate Voltage unchanged at	350 max. Volts
Plate and Screen Total Dissipation (new rating)	10 max. Watts

6J7-G

PENTODE CONNECTION.

Plate Voltage increased to	300 max. Volts
Screen Voltage increased to	125 max. Volts
Screen Supply Voltage (new rating)	300 max. Volts
Control-Grid Voltage (new rating)	0 min. Volts
Plate Dissipation (new rating)	0.75 max. Watt
Screen Dissipation (new rating)	0.1 max. Watt

TRIODE CONNECTION.

Plate Voltage unchanged at	250 max. Volts
Grid Voltage (new rating)	0 min. Volts
Plate and Screen Total Dissipation (new rating)	1.75 max. Watts

6K8-G

Hexode Plate Voltage increased to	300 max. Volts
Hexode Screen Voltage increased to	150 max. Volts
Hexode Screen Supply Voltage (new rating)	300 max. Volts
Hexode Control-Grid Voltage changed to	0 min. Volts
Triode Plate Voltage unchanged at	125 max. Volts
Hexode Plate Dissipation (new rating)	0.75 max. Watt
Hexode Screen Dissipation (new rating)	0.7 max. Watt
Triode Plate Dissipation unchanged at	0.75 max. Watt
Total Cathode Current unchanged at	16 max. mA.

6U7-G

Plate Voltage increased to	300 max. Volts
Screen Voltage unchanged at	100 max. Volts
Screen Supply Voltage (new rating)	300 max. Volts
Control-Grid Voltage changed to	0 min. Volts
Plate Dissipation (new rating)	2.25 max. Watts
Screen Dissipation (new rating)	0.25 max. Watt

6V6-G

TETRODE CONNECTION.

Plate Voltage increased to	315 max. Volts
Screen Voltage decreased to	250 max. Volts
Plate Dissipation (new rating)	12 max. Watts
Screen Dissipation (new rating)	2 max. Watts

TRIODE CONNECTION.

Ratings not yet available.

6J8-G

Ratings not yet available.

6G8-G

Ratings not yet available.

POPULAR RECTIFIERS (DESIGN MAXIMA)

5V4-G

AS FULL WAVE RECTIFIER.

Peak Inverse Voltage	1400 max. Volts
Peak Plate Current per plate	525 max. mA.

5Y3-G

AS FULL WAVE RECTIFIER.

Peak Inverse Voltage	1400 max. Volts
Peak Plate Current per plate	375 max. mA.

Further Design Maxima will be given in the next issue of Radiotronics.

RADIOTRON 1P5-GT

1.4 Volt Super Control R.F. Pentode

Radiotron 1P5-GT is a super-control R.F. pentode having a 1.4 volt filament which may be used as an alternative to type 1N5-GT, which has a sharp cut-off. The characteristics are tabulated below, and it will be seen that the cut-off is at approximately –12 volts. The gain in a typical receiver is of the same order as the gain from type 1N5-GT since, although the mutual conductance is slightly higher, the plate resistance is lower. The plate current is appreciably higher than that of the 1N5-GT and for this reason both types are being made available so that where battery drain is of primary importance type 1N5-GT may be used, while in other applications, where an efficient A.V.C. arrangement is essential, type 1P5-GT may be used.

Radiotron 1P5-GT is Australian made (see article elsewhere in this issue).

RATING AND CHARACTERISTICS.

Filament: Voltage	1.4 Volts
Current	.05 Ampere

TYPICAL OPERATING CONDITIONS.

Plate Voltage	90 Volts
Screen Voltage	90 Volts
Grid Voltage*	0 Volts
Plate Current	2.3 Milliamperes
Screen Current	0.7 Milliampere
Plate Resistance (Approx.)	0.8 Megohm
Mutual Conductance . ..	800 Micromhos
Amplification Factor (Approx.)	640
Mutual Conductance at E_{g1} = –12 Volts (Approx.)	10 Micromhos

* Negative filament return.

Direct Interelectrode Capacitances:

G_1 — P (With valve shield)	.007 μμf. Max.
G_1 — ($F + G_2 + G_3$)	2.2 μμf.
P — ($F + G_2 + G_3$)	9.0 μμf.

RADIOTRON 1.4 VOLT 5-VALVE RECEIVER

Circuit No. RB51

As a guide to receiver designers, we are pleased to give below the circuit of a 5-valve receiver using Radiotron 1.4 volt valves. This receiver incorporates an R.F. stage, converter, one I.F. stage, second detector and beam power amplifier. A.V.C. is obtained from the diode detector and the whole control voltage is applied to the R.F. stage, while half the control voltage is applied to the converter and I.F. stages. The fraction of the A.V.C. voltage which should be applied to any one of these stages depends upon the operating conditions, such as the district in which the set is to be used, the type of aerial to be used and the signal strength of the strongest local station. The three valve types used in the controlled stages of this receiver have sharp cut-off characteristics in order to obtain greater economy in B battery drain. On this account it is obvious that with a strong signal the control voltage may be sufficient to cause one or more of the valves to reach cut-off. **On account of the characteristics of these valves this circuit diagram is therefore restricted to use with a loop or small aerial in districts of high signal strength, or to a normal aerial in districts of low signal strength.** If used with a large aerial in close proximity to a broadcast station, cross modulation and other troubles are likely to occur. In a future issue of Radiotronics we hope to describe the circuit of a receiver using type 1P5-GT valves in the R.F. and I.F. stages.

DESCRIPTION.

The principal features of the receiver may be found by studying the circuit diagram, but in most respects the circuit is quite straightforward. The screens of the valves are supplied from B+ without decoupling. The oscillator grid resistor has a resistance of 200,000 ohms, as recommended for type 1A7-GT, but being considerably higher than is in common use in A.C. receivers. The diode load resistance consists of a resistor of 0.1 megohm in series with a volume control of 0.5 megohm. **The filter bypass condenser, which in previous Radiotron circuits has generally been taken from the junction of the 0.1 megohm filter resistance and the volume control, is, in this circuit, taken from the moving arm of the volume control to earth.** By this means the filtering efficiency on strong signals is improved and there is also a slight "tone control" effect. As the moving contact of the volume control is moved up, as would occur with reception from weak stations, there is a greater amount of audio frequency bypassing and therefore a slight restriction on the audio frequency range. The presence of the 0.1 megohm filter resistance prevents this second filter condenser from being placed in a position where it would seriously affect the tuning of the second I.F. transformer.

The control grid circuit of the 1H5-GT has a grid resistor of 10 megohms, which gives a type of **grid leak bias** similar to that used with type 6B6-G in A.C. receivers and thus eliminates any serious effects due to grid current in this stage. There is a bypass condenser from the plate of the 1H5-GT to earth so as to bypass any voltage at intermediate frequency appearing at this point.

The **battery drain** of this receiver is

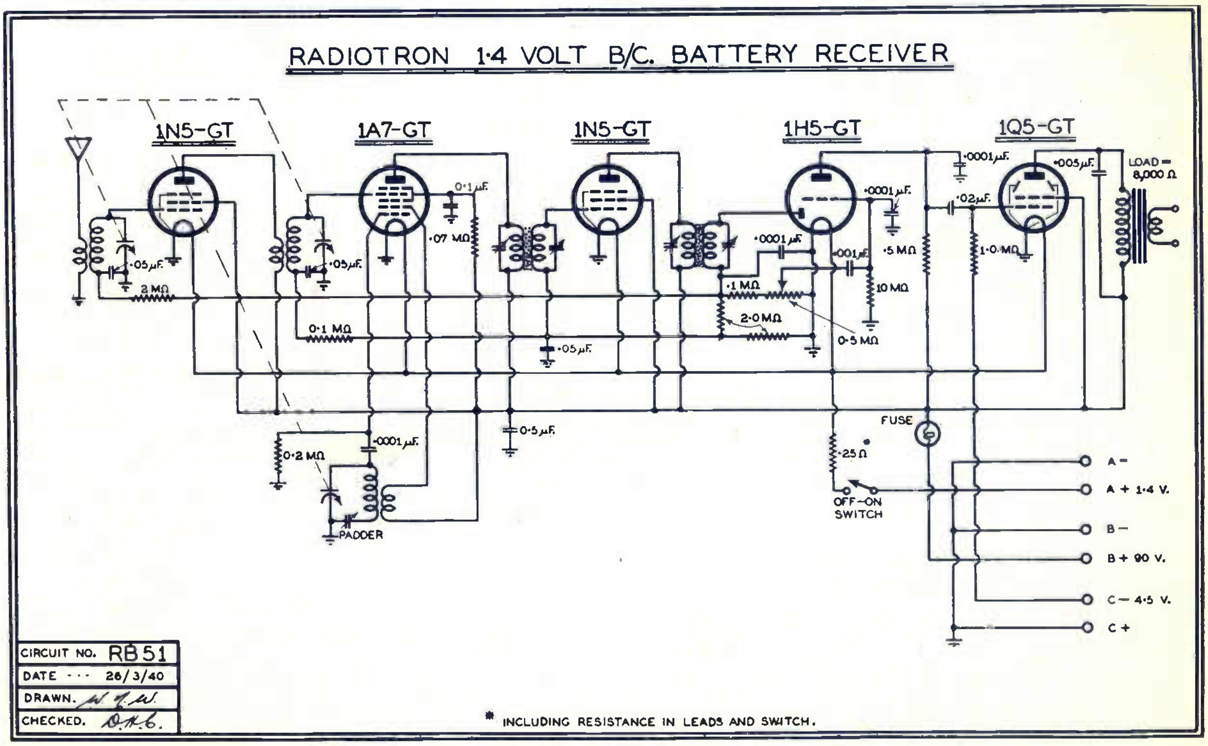
A battery drain, 300 mA.

B battery drain, 16.5 mA. (no carrier).

A reduction of B battery drain may be accomplished by overbiasing the 1Q5-GT power amplifier, as explained in Radiotronics 102. With a bias of –6 volts and a load resistance of 12,500 ohms, a power output of 170 mW. may be obtained with a total B battery drain of 11.7 mA.

The power output obtainable from the receiver as shown in the circuit diagram, is 270 mW. If back bias is employed in place of a C battery, the power output will be reduced slightly.

RADIOTRON 928.
Gas photo-tube with a caesium surfaced, cylindrical, mesh cathode, which has non-directional light pick-up characteristics. For data see page 20.



RADIOTRON 928

GAS PHOTOTUBE NON-DIRECTIONAL TYPE

(TENTATIVE DATA).

Cathode	Cylindrical Mesh, Caesium Coated
Cathode Window Area	0.67 sq. in.
Direct Interelectrode Capacitance	2.8 $\mu\mu$f.
Maximum Overall Length	$3\frac{9}{16}$"
Maximum Diameter	$1\frac{3}{16}$"
Bulb	T–9
Base	Small 4–Pin

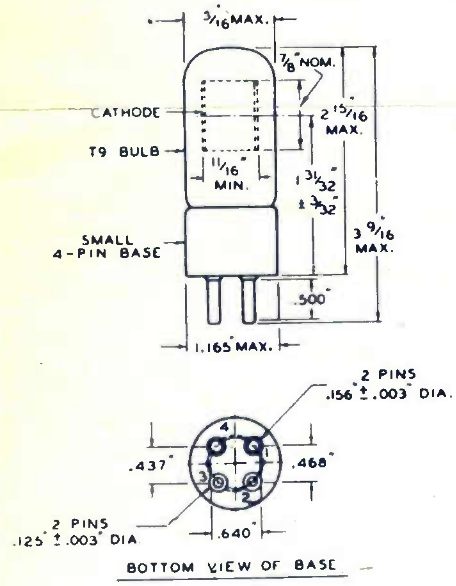
MAXIMUM RATINGS AND CHARACTERISTICS.

Anode-Supply Voltage (D.C. or Peak A.C.)	90 max. Volts
Anode Current*	15 max. Microamperes
Ambient Temperature	100 max. °C
Sensitivity†	65 Microamp./lumen
Gas Amplification Factor‡	Not over 10
D–C Resistance of Load:	
With anode-supply voltage of 90 volts.	
For currents greater than 2 microamp.	4 min. Megohms
For currents less than 2 microamp.	1 min. Megohm

* On basis of the use of a sensitive cathode area ½" in diameter.

† Sensitivity value is given for conditions where a Mazda Projection Lamp operated at a filament color temperature of 2,870 degrees Kelvin is used as a light source. The method for determining sensitivity made capacitance effects negligible and employed a 90-volt supply. The voltage drop in the load was kept small. A light flux of 0.1 lumen was used.

‡ Gas Amplification Factor is given as a ratio of sensitivity at maximum anode voltage to the sensitivity at a voltage sufficiently low (approximately 25 volts) to eliminate gas ionization effects.



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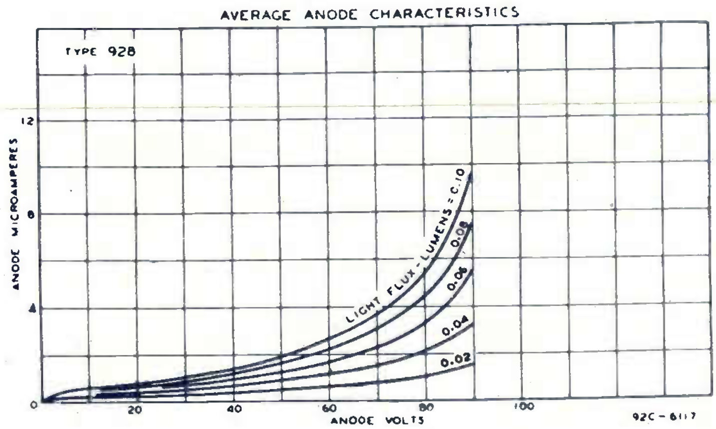
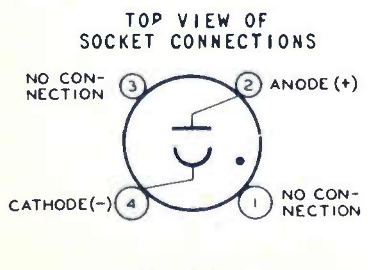
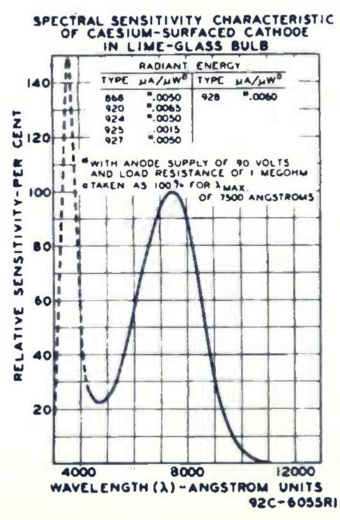






See photograph of Radiotron 928 on page 19.

AUSTRALIAN MADE RADIOTRON VALVES

Complete List of Receiving Types

There are now fifty-five types of Radiotron receiving valves manufactured in Australia at the works of Amalgamated Wireless Valve Co. Pty. Ltd. These are types:—

1A4-P, 1A7-GT, 1B5/25S, 1C4, 1C6, 1C7-G, 1D4, 1D5-GP, 1H4-G, 1H5-GT, 1H6-G, 1J6-G, 1K4, 1K5-G, 1K6, 1K7-G, 1L5-G, 1M5-G, 1N5-GT, 1P5-GT, 1Q5-GT*, 2A5, 5V4-G, 5Y3-G, 6A7, 6A8-G, 6B6-G, 6B7, 6B7S, 6B8-G, 6C6, 6D6, 6F6-G, 6G8-G, 6J7-G, 6J8-G, 6K8-G, 6U7-G, 6V6-G, 19, 24A, 30, 32, 34, 35, 42, 45, 57, 58, 75, 77, 78, 80, 83V, 85.

* Expected to be available in May, 1940.

CORRECTION

OVERBIASED OPERATION OF RADIOTRON 1Q5-GT

The table given under this title on page 2 of Radiotronics 102 did not directly specify the conditions under which the readings were taken. These conditions are:—

Plate Supply Voltage ... 90 Volts
Screen Supply Voltage .. 90 Volts
Self Bias.

The effective plate and screen voltages are 90 volts less the grid bias voltage.

Note that the left-hand figures in the first three columns all correspond, as do also the right-hand figures in these columns.

RADIOTRON 6V6-G

LOW SCREEN VOLTAGE OPERATION

In small mantel receivers it is sometimes desirable to limit the total wattage dissipation in the receiver so as to avoid overheating. One practicable arrangement is to reduce the plate current of the power amplifier valve either by over-biasing or by operation at a low screen voltage. Over-biasing has frequently been used in the past owing to its simplicity, but the arrangement described in this article offers some particularly attractive features.

In most receivers there are two supply voltages in use, one about 250 volts for the plates and the other about 100 volts for the screens. If the screen of the power valve is to be operated at a voltage of, say, 150 or 200 volts it will be necessary to make an additional tapping on the voltage divider, and to provide additional bypassing. This arrangement is not popular for obvious reasons.

Owing to the high power output of Radiotron 6V6-G it is possible to operate it with a screen voltage of 100 volts, using the screen supply as a source of voltage, and still to obtain a reasonable output power. As is shown by the characteristics of the 6V6-G for a screen voltage of 100 volts and a plate voltage of 250 volts, the grid bias is only –5 volts for a power output of 1.5 watts. This power output may be found sufficient for certain applications, while the small peak grid voltage required for full power output may also prove convenient.

6V6-G Characteristics
Screen Voltage 100 Volts

(Values given are for an average valve).

Heater Voltage	6.3	Volts
Heater Current	0.45	Ampere
Plate Voltage	250	Volts
Screen Voltage	100	Volts
Grid Voltage	–5.0	Volts
Cathode Bias Resistor	250	Ohms
Plate Current, no signal	17.5	mA.
Plate Current, max. signal	18.35	mA.
Screen Current, no signal	0.7	mA.
Screen Current, max. signal	1.3	mA.
Amplification Factor	325	
Mutual Conductance	3,440	μmhos
Plate Resistance	94,400	Ohms
Load Resistance	14,000	Ohms
Power Output	1.5	Watts
Harmonic Distortion:—		
Second Harmonic	2.75	%
Third Harmonic	3.75	%
Total	5.0	%

RADIOTRON 1628

ULTRA-HIGH-FREQUENCY TRANSMITTING TRIODE

Tantalum Plate

Radiotron 1628 is a three-electrode transmitting valve of the high-perveance type designed especially for use as an oscillator, r-f power amplifier and frequency multiplier at the ultra-high frequencies. **The 1628 may be operated at maximum ratings at frequencies as high as 500 Mc and at reduced ratings as high as 675 Mc.** Maximum plate dissipation of the valve is 40 watts for class C telegraph service.

The thoriated-tungsten filament of the 1628 is of the double-helical type, and is center-tapped within the valve to minimize the effects of filament lead inductance. Another unusual feature of the valve is its double grid and plate leads which are brought out of the bulb through individual seals. The double leads facilitate neutralization by eliminating common impedances between the tank and neutralizing circuits within the valve. The grid and plate leads are short and heavy in order to further minimize lead inductance and resistance.

The tantalum plate and grid are closely spaced to increase plate efficiency at the higher frequencies by decreasing electron transit time between filament and plate.

TENTATIVE CHARACTERISTICS AND RATINGS.

Filament Voltage (A.C. or D.C.)	3.5 Volts
Filament Current	3.25 Amperes
Amplification Factor	23
Direct Interelectrode Capacitances:	
Grid-Plate	2 $\mu\mu$f.
Grid-Filament	2 $\mu\mu$f.
Plate-Filament	0.4 $\mu\mu$f.
Bulb	T–8
Terminal Connections	Special

MAXIMUM CCS RATINGS AND TYPICAL OPERATING CONDITIONS.

CCS = Continuous Commercial Service.

As Grid-Modulated R-F Power Amplifier—Class C Telephony.

Carrier conditions per valve for use with a max. modulation factor of 1.0.

	(CCS)
D–C Plate Voltage	1000 max. Volts
D–C Grid Voltage	–200 max. Volts
D–C Plate Current	50 max. Milliamperes
Plate Input	50 max. Watts
Plate Dissipation	40 max. Watts
Typical Operation:	
D–C Plate Voltage	1000 Volts
Driving Power (Approx.)*†	5 Watts
Power Output (Approx.)	20 Watts

As Plate-Modulated R-F Power Amplifier—Class C Telephony.

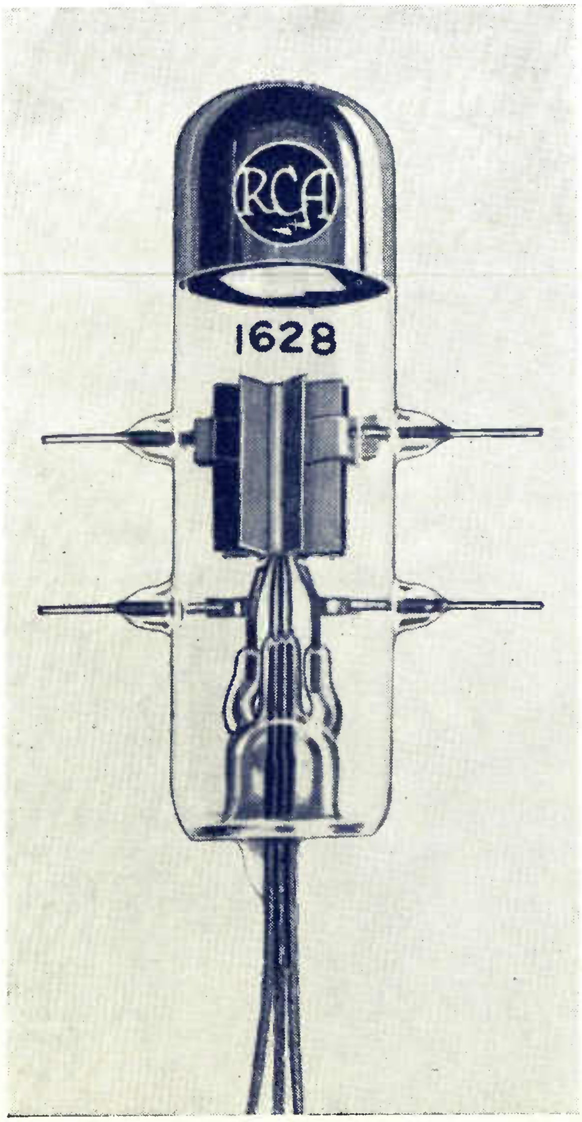
Carrier conditions per valve for use with a max. modulation factor of 1.0.

	(CCS)
D–C Plate Voltage	800 max. Volts
D–C Grid Voltage	–200 max. Volts
D–C Plate Current	50 max. Milliamperes
D–C Grid Current	15 max. Milliamperes
Plate Input	33 max. Watts
Plate Dissipation	27 max. Watts
Typical Operation:	
D–C Plate Voltage	800 Volts
Driving Power (Approx.)†	1.6 Watts
Power Output (Approx.)	22 Watts

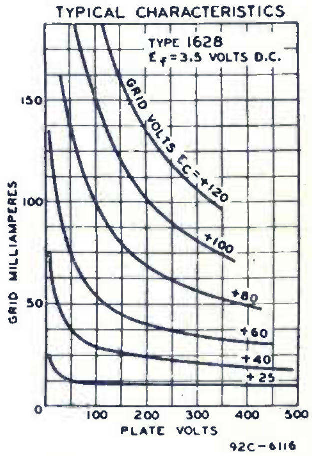
As R-F Power Amplifier and Oscillator—Class C Telegraphy.
Key-down conditions per valve without modulation ‡.

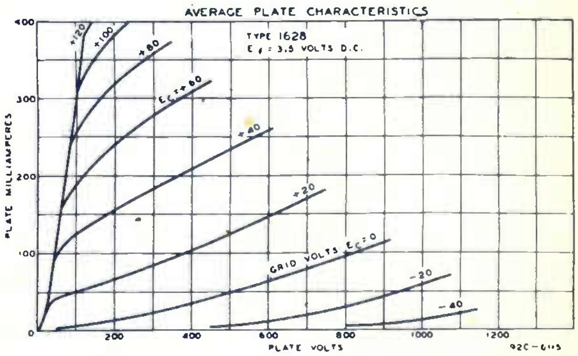
	(CCS)
D-C Plate Voltage	1000 max. Volts
D-C Grid Voltage	–200 max. Volts
D-C Plate Current	60 max. Milliamperes
D-C Grid Current	15 max. Milliamperes
Plate Input	50 max. Watts
Plate Dissipation	40 max. Watts
Typical Operation:	
D-C Plate Voltage	1000 Volts
Driving Power (Approx.)†	1.7 Watts
Power Output (Approx.)	35 Watts

* At crest of audio-frequency cycle with modulation factor of 1.0.
‡ Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
† Subject to wide variations depending on the impedance of the load circuit. High-impedance load circuits require more grid current and driving power to obtain the desired output. Low-impedance circuits need less grid current and driving power, but plate-circuit efficiency is sacrificed. The driving stage should be capable of delivering considerably more than the required driving power.



For Outline and Dimensions see page 15.





RADIOTRON 1628.
Transmitting triode for operation at ultra-high frequencies, having a plate dissipation of 40 watts. Note the double leads to both plate and grid. These double leads facilitate neutralisation by eliminating common impedances between the tank and neutralising circuits within the valve.

RADIOTRON 1840.

"Orthicon" tube used in television transmission to pick-up a scene to be telecast, converting it to an electrical signal. The tube contains a mosaic plate on which the scene to be transmitted is focussed by a lens, and an electron gun, which provides a cathode-ray beam for scanning the image on the mosaic. The overall length of the tube is 18⅛".

OBSOLETE VALVE TYPES

Notification has been received from R.C.A. that the following valve types are not planned for further production. These types will therefore cease to be available as soon as our present stock is exhausted:

00A*	12*	40*	886
01A	20	112A	V99
11*	22	876	X99

* Indicates that the stock is already exhausted.

Since several of these types are selling very slowly, our stock may last for a considerable time. On this account it is suggested that any orders for these types (with the exception of those marked with an asterisk) be placed in the usual way, and we will supply subject to stock being available.

RADIOTRON NEWS

New Types Announced

Radiotron 6AB5/6N5 is a Magic Eye Tuning Indicator having a cut-off at –10 volts and therefore intermediate between types 6AB5 and 6N5. It is therefore interchangeable with types 6AB5 and 6N5 and is intended ultimately to supersede both these types.

Radiotron 12K8 is a triode-hexode converter valve having characteristics the same as those of the 6K8 except that the heater is rated at 12.6 volts 0.15 ampere. This type is not available from stock.

Radiotron 12SR7 is a duo-diode triode of the single-ended type having characteristics the same as those of the 6R7 except that the heater is rated at 12.6 volts 0.15 ampere and the capacitances are different. This type is not available from stock.

Radiotron 928 is a gas photo-tube with a caesium surfaced, cylindrical, mesh cathode, which has non-directional light pick-up characteristics. See data and photograph elsewhere in this issue.

Radiotron 1628 is a transmitting triode for operation at ultra-high-frequencies, having a plate dissipation of 40 watts. See data and photograph elsewhere in this issue.

Radiotron 1840 is a special form of cathode ray tube known as an "Orthicon", which is intended for picking-up a scene to be telecast, and converting it to an electrical signal. Information on this type is available on request. See photograph in column 1.

Radiotron 1848 is an Iconoscope for television, having small size, high resolution capability and high sensitivity. It uses electromagnetic deflection and is especially suited for use in portable television cameras. Further information on this type is available on request.

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